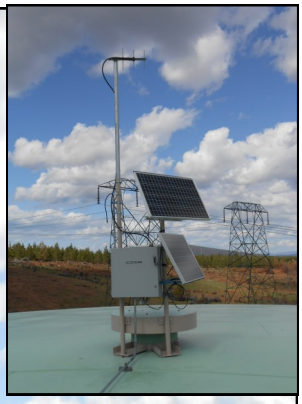
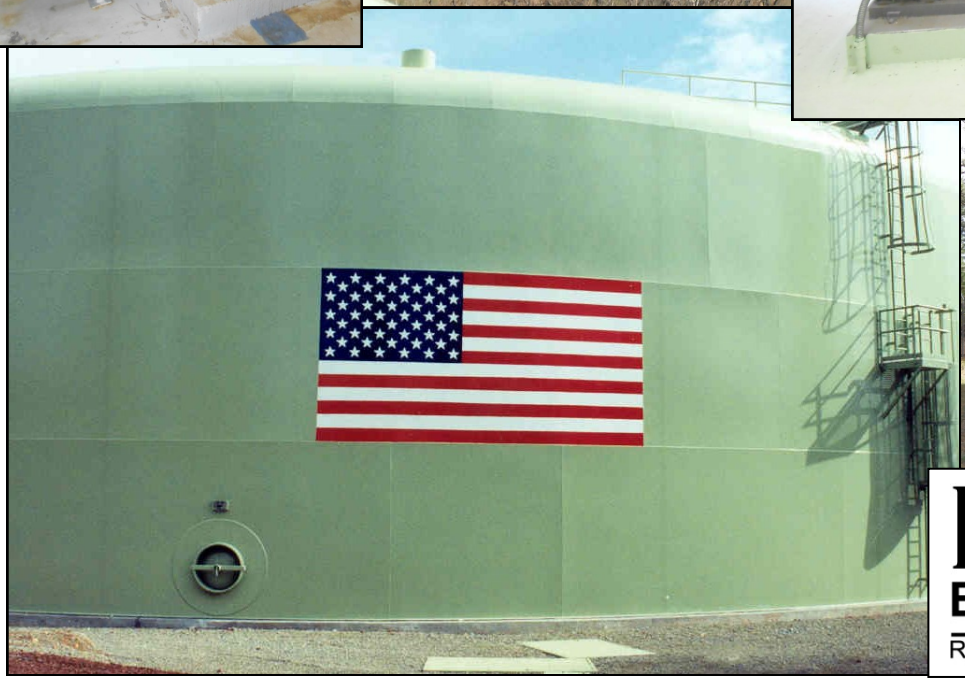
BURNEY WATER DISTRICT

WATER MASTER PLAN

MARCH 2014





PACE ENGINEERING
REDDING, CALIFORNIA

PACE ENGINEERING

March 18, 2014

306.24.200

Board of Directors
Burney Water District
20222 Hudson Street
Burney, CA 96013

We are pleased to present our engineering report entitled:

BURNEY WATER DISTRICT
WATER MASTER PLAN

This report contains the results of our investigation of the District's water system, including supply, storage, and distribution facilities. The report includes preliminary plans and cost estimates for major capital improvements recommended over the next 10 to 30 years. Emphasis has been placed on planning and staging of improvements necessary to correct existing deficiencies and be prepared for growth, should it occur. An executive summary of the report, including our recommendations, follows the Table of Contents.

PACE Engineering is very pleased to have participated in this project. We thank your staff for their able assistance in its preparation. We will be happy to meet with you at your convenience to discuss the Water Master Plan in detail.

Sincerely,

Laurie McCollum
Staff Engineer

REGISTERED PROFESSIONAL ENGINEER
LAURIE E. McCOLLUM
No. 77274
Exp. 6·30·15
CIVIL
STATE OF CALIFORNIA

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1730 SOUTH STREET • REDDING, CA 96001-1811 • (530) 244-0202 • FAX (530) 244-1978

BURNEY WATER DISTRICT

WATER MASTER PLAN

JOB NO. 306.24.200

BY:

PACE ENGINEERING
REDDING, CALIFORNIA

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ABBREVIATIONS

Certain terms and abbreviations have been used in this report for convenience. Definitions are as follows:

AC	Asbestos Cement
ADD	Average Day Demand. This is the average rate of water usage per day within a year. It can be expressed on an individual basis such as gallons per capita per day (GPCD) or on a community basis in million gallons per day (MGD), acre-feet per day, or per year.
AIR	Annual Inspection Report
AMR	Automatic Meter Readers
AWWA	American Water Works Association
BWD	Burney Water District
CDPH	California Department of Public Health
CIP	Capital Improvement Plan
DI	Ductile Iron
District	Burney Water District
ENR CCI	Engineering News Record Construction Cost Index
EPS	Extended Period Simulation
Fire District	Burney Fire Protection District
FPS	Feet per Second
GPD/HE	Gallons per Household Equivalent per Day
GPM	Gallons per Minute
HE	Household Equivalent
HP	Horsepower
HWY	Highway
ISO	Insurance Services Office (National Board of Fire Underwriters)
KWH	Kilowatt Hour
LAFCO	Local Agency Formation Commission Office
MDD	Maximum Daily Demand. Same units as ADD.

ABBREVIATIONS Cont.

MG	Million Gallons
MGD	Million Gallons Per Day. Note: 1 MGD = 694 GPM = 3.07 Ac-Ft/Day
MHD	Maximum Hourly Demand. Same units as ADD.
MMD	Maximum Monthly (Average) Demand. Same units as ADD.
MWP	Master Water Plan
O&M	Operations and Maintenance
PHD	Peak Hourly Demand. Same as MHD.
PRV	Pressure Reducing Valve
PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
RPP	Reduced Pressure Principle Backflow Prevention Device
SCADA	Supervisory Control and Data Acquisition
SOI	Sphere of Influence
TDH	Total Dynamic Head
USC	Utility Service Company
VFD	Variable Frequency Drive
WMP	Water Master Plan

EXECUTIVE SUMMARY

SUMMARY

Review of the Burney Water District water system consisted of a separate engineering analysis of each of the major components including: water supply, storage reservoirs, booster pump station, pressure reducing stations, fire hydrants, and distribution piping. Analysis of distribution piping was accomplished with the aid of a computer hydraulic model.

Water Supply: The District obtains its water supply primarily from two groundwater wells located at a well field near the southern edge of the District service area boundary. Well No. 6 supplies water to the Low Pressure Zone and pumps water to the Timber Drive Tank and Mountain View Tank. Well No. 7 serves the High Pressure Zone and pumps water to the Ivan Marx Tank.

The District also has an additional groundwater well that serves the Low Pressure Zone during power outages. Well No. 8 is controlled manually, operated on standby, and exercised weekly.

Water Treatment: Groundwater in the vicinity is of such high quality that treatment of the source water is not required. The District maintains disinfection facilities at Well Nos. 6 and 7, which can also be used at Well No. 8 if needed. At one time, the District chlorinated the system quarterly as a precaution against bacteriological contamination, but has not been required to do so for many years.

Distribution Booster Pump Station: The District has one booster pump station that can pump from the Low Pressure Zone to the High Pressure Zone. There is only one diesel driven pump at the station which is not adequate to meet peak demands in the High Pressure Zone. Additionally, this pump is currently inoperable due to an apparent cross connection between diesel engine coolant and the potable water supply. Thus, if Well

No. 7 should fail, it would not be possible to maintain adequate water level in the Ivan Marx Reservoir without restricting water consumption. This is considered a severe lack of backup, especially given the current age and condition of Well No. 7 equipment.

Water Storage: The District currently has three water storage reservoirs totaling 6.7 million gallons (MG) of storage. Based on the storage requirements shown in Table 13, this is more than adequate to meet existing and future anticipated 30-year demands.

Water Distribution System: The existing distribution system consists of approximately 160,000 feet (30 miles) of 6 to 24-inch distribution mains. About 64% of the system mains consist of 6 to 24-inch diameter polyvinyl chloride (PVC) in good condition, 34% are 6 to 12-inch tar coated steel mains in fair condition, 1% are 10 to 12-inch ductile iron (DI) in good condition, and 1% are 6-inch asbestos cement (AC) in reasonable condition. Approximately 11% of the smaller ¾ to 3-inch pipes are galvanized steel in poor condition and beyond their useful service life according to the 2011 California Department of Public Health (CDPH) Annual Inspection Report (AIR). Refer to Appendix A for the 2011 CDPH AIR. In 2012, the annual percentage of unaccounted for water was approximately 4%, which indicates a very tight system compared to that of neighboring water systems. The existing distribution system pipes 6 inches and larger are shown on Plate 1 at the end of this report.

Considerable attention was given during the hydraulic analysis to determine the entire water system's ability to meet estimated maximum hour demands (MHD) and fire flow requirements at MHD conditions. Water demands for potential fires were based on estimated fire flow requirements, as developed according to the Insurance Service Office of California (ISO). Based upon the hydraulic analyses, it appears the smaller diameter pipes and older steel piping in the distribution system limit fire flows.

ISO is the organization responsible for rating community water systems and fire protection facilities. This rating, in turn, affects the fire insurance rates paid in the

community. The Burney Fire Protection District was rated in 2004, and given an overall Class 5 rating. In the 2004 ISO evaluation, the water system component achieved 32.7 credit points out of a total of 40.0, which is exceptional.

The computer model was valuable in determining weaknesses in the system. Using the computer analyses and year 2042 growth projections, the location and extent of deficiencies were determined. Additional analyses were made incorporating improvements necessary to provide supplies and pressures, both now and with future 30-year development. Based on these analyses, a staged plan of improvements was prepared.

Future Water Demands: In order to determine required future improvements, it was necessary to project water usage. Given the relatively static trend in services over the last ten years, growth and population is likely to remain relatively static into the foreseeable future. As such, the District is more in a preventive repair and/or replace operations and maintenance (O&M) mode, rather than one of system expansion to accommodate new development. A Developer Fee Justification Study was completed by SchoolWorks for the Fall River Joint Unified School District in February 2012. This study projected five new residential units to be constructed per year, which would result in an approximate growth rate of only 0.2% per year. That having been said, there are a few proposed developments which have tentative maps and/or preliminary plans already completed. Therefore, this Master Plan utilized these developments to anticipate near-term growth in the next 30 years. Full build-out of these developments would result in an approximate growth rate of 1% per year for the next 30 years. It should be emphasized this is simply an estimate. Thus, if the actual rate of development is slower or faster, improvements shown herein should be proportionately shifted in time.

Since full build-out of the proposed developments is not likely to occur in the next 10 years, and the District intends to update this Master Plan within 10 years, making future flow predictions for ultimate development was beyond the scope of this Master

Plan. Additionally, the following elements were not included in this Master Plan for reasons discussed herein:

- A plan to meet all existing and/or future fire flow requirements
- Studies needed to verify how to serve proposed developments

Based on this study, the following design criteria was determined.

	2012	2042
AVERAGE DAY DEMAND, MGD	1.3	1.8
MAXIMUM DAY DEMAND, MGD	3.9	4.8
AVERAGE DAY DEMAND/HE, GPD	570	570
MAXIMUM DAY DEMAND/HE, GPD	1,500	1,500

RECOMMENDATIONS

General: The proposed major capital improvements necessary to correct existing deficiencies and to meet possible tentative development are shown on Plate 2 at the end of this report. Cost estimates and staging of the general improvements have been developed and are shown in detail in Table 14, under the heading of RECOMMENDED IMPROVEMENTS AND CAPACITY CHARGE BASIS at the end of this report. Table 14 is a listing of major improvements needed primarily to overcome existing system deficiencies and to provide for possible future growth. Many of the improvements in Table 14 may, because of their cost and timing, have to be financed by means of loans.

Water Supply: The District's current system MDD is about 3.9 million gallons per day (MGD), and its effective system pumping capacity with the largest pump out of service is 4.3 MGD. However, there is not currently enough effective capacity in the High Pressure Zone to meet the existing MDD. Several alternatives were considered for providing additional supply as follows:

High Pressure Zone Supply Alternatives			
Alternative	Initial Capital Cost (Feb 2014 Dollars)	Meets Current Demand	Provides Future Supply
1 - Drill New Well	$500,000	X	X
2 - Construct New 1.5 MG Tank	$750,000	X	
3 - Upgrade Booster Pump Station	$200,000	X	

It is recommended improvements be made immediately to the booster pump station in order to provide reliable water supply backup to Well No. 7 as quickly and cost effectively as possible. Additionally, immediate improvements are needed at existing wells including the following:

- Emergency generators at Well No. 7 and Booster Pump Station
- Bolt all wells to pedestals and balance
- Retrofit wells for sounder access
- Provide exterior lights and phone line
- Remove trees within falling radius
- Upgrade SCADA hardware and software

At an annual water demand growth rate of 1%, it is estimated the District's MDD will meet its 4.3 MGD effective system pumping capacity by about 2022. As such, upon completion of improvements to the booster pump station, it is recommended an additional well be developed near Washburn Park, as the piping infrastructure has already been put in place, and current and future demands would be met. Also, should any development occur in the Low Pressure Zone, Well No. 6 should be upsized to provide additional source capacity, or Well No. 7 valving and piping should be modified to provide water to the Low Pressure Zone.

Water Treatment: Source water quality is of such high quality that treatment is not required. No issues with lead, copper, or coliform have occurred within the last five years. As such, the District is on a reduced Lead and Copper monitoring schedule, and is not required to chlorinate.

Pressure Zones: The distribution system pressure zone boundaries are shown on Plate 1. In general, pressures in the District system are maintained within the 50 to 120 PSI range. Pressures are found to be outside this range only in a few special cases where very high system demands can result in localized low pressure problems. Areas where pressures drop below 50 PSI are a concern because available fire flows may not be adequate, and areas with pressures below 20 PSI are a concern because they may violate CDPH Standards.

The District has two major pressure reducing valves (PRVs), which are set to open to provide fire flows, or flows to improve downstream pressures during periods of extreme high demands.

Booster Pumping Facility: The existing Booster Pump Station has only one diesel engine driven pump capable of transferring water from the Low Pressure Zone to the High Pressure Zone which is currently inoperable. As such, it is recommended to replace the two undersized electric motor driven pumps with two new pumps with butterfly control valves, and all electrical be upgraded with an emergency generator with manual transfer switch to provide effective redundant source capacity to the High Pressure Zone. This would increase the pump station's capacity from 1.15 to 1.7 MGD.

Water Storage: The District currently has a water storage capacity of 6.7 MG in three water reservoirs. Although this is sufficient to meet the current and 2042 storage requirements, there is a need to add another reservoir to serve the High Pressure Zone if another well is not constructed for backup source capacity. All three existing water reservoirs are, or will soon be in need of recoating, and the decommissioned 0.4 MG concrete reservoir should be demolished because of safety concerns.

Water Distribution System: Recommended improvements are based on strengthening the main distribution system to provide adequate pressures and fire flows in the Low Pressure Zone. Replacement of approximately 700 feet of 6-inch pipe on Toronto Avenue (Pts. 1 to 2 on Plate 2), and 300 feet of 6-inch pipe on Highway 299 (Pt. 3) is

recommended in order to repair deteriorated pipes with a history of leaks and repairs. Additionally, 900 feet of 6-inch AC pipe along Highway 299 (Pt. 4) and 1,300 feet of 6-inch AC pipe on Black Ranch Road (Pt. 5) should be replaced.

It will be necessary to replace the old undersized steel mains downtown and in other areas shown in light blue lines on Plates 1 and 2 to significantly improve low fire flows. Approximately one-third of the distribution system consists of old steel piping that will probably need to be replaced over the next 10 to 50 years. It is recommended the District budget at least $74,500 per year for the next 50 years to replace the worst of the old steel mains and services. In addition, it is estimated that some of the other General Improvement Water Mains shown in red on Plate 2 and described in Table 14 will be needed by year 2022.

In 2012, the District's metered water consumption was approximately 4% less than the net production from the wells. This low amount of unaccounted for water reflects a tight system compared to neighboring communities. However, to further reduce the loss of revenue due to worn meters, the District should develop a meter testing and replacement program to continue replacing aging meters with automatic meter readers (AMRs).

Estimates of Costs: Due to the limited fire flow capabilities in the Low Pressure Zone, and the lack of backup source supply in the High Pressure Zone, the District should make a number of improvements by 2022. A detailed cost breakdown of the immediate, near-term, and long-term improvement costs is shown in Table 14 at the end of this report. Immediate improvements, recommended for 2012 to 2022, totaling $3,319,000, are geared toward increasing fire flows, replacing deteriorated and/or inefficient existing facilities, and developing a reliable source of well water. Near-term improvements, recommended for 2022 to 2032, totaling $3,455,000, include further increasing fire flows, strengthening the water supply, and recoating existing storage reservoirs. Long-term improvements, recommended for 2032 to 2042, totaling $2,414,000, focus on increasing water supplies and further strengthening the

distribution system to stabilize operating pressures and increase fire flows. As the District grows, additional improvements involving supply, storage, distribution, and control will be required to meet future development system demands.

In addition, the District should develop a meter testing and replacement policy, and continue to routinely replace approximately 5% of existing meters to AMRs to reduce the loss of revenue due to old inaccurate meters.

Financial Considerations**:** In 2009, the District raised the capacity charge to $3,488.10 per household equivalent (HE). See Appendix C. As a part of this plan, a determination was made of an appropriate capacity charge based on existing and future costs for general improvements. The computed fee is $4,260 as shown in Table 14. It is also recommended this fee be adjusted annually by the increase in the Engineering News Record Construction Cost Index (ENR CCI), which currently stands at 9,681 for February 2014.

The District calculates capacity charge for apartments, duplexes, motels, and hotels on a proportional HE basis. Currently, a ⅝-inch meter is typically the base unit for one HE. However, many municipalities are installing 1-inch meters in order to meet fire sprinkler demands, which the District should consider. Water consumption by commercial development is typically dependent on the type of enterprise. The HE determination is based upon the meter size requested with approval from the District Board.

The District evaluated the monthly service charge, including base and commodity components, as part of the 2009 fee increase. PACE has prepared rate studies for a number of agencies including Yreka, Shasta Lake, and Rio Alto Water District. Each agency is unique in how the budget is categorized. PACE recommends that budgets should include an operation and maintenance reserve component ranging from 10 to 25% depending on numerous other financial considerations including savings, debt service, and condition of facilities. Taking those elements into consideration, PACE recommends the District include a reserve component of at least 10% of the annual

operating budget. Funds collected should be set aside to accumulate in a separate account to be used on extraordinary operations and maintenance of the existing facilities.

It is recommended the District review this Water Master Plan report carefully and, if in agreement, it be formally adopted with any corrections or supplements as may be applicable.

INTRODUCTION

BACKGROUND

The unincorporated town of Burney is located approximately 50 miles east of Redding in Shasta County, California. See Figure 1. The Burney Water District (District or BWD) provides water and sewer services, and owns the community pool and parks in Burney. The District service area boundary encompasses approximately 2,420 acres (3.8 square miles). The District sphere of influence is approximately 4,770 acres (7.4 square miles) and includes areas outside the District boundary, such as Johnson Park. The 2010 Census indicated a population of 4,212 for the Burney zip code, which included nearby Johnson Park. In 2012, the District had 1,364 service connections with an average day demand (ADD) of 1.3 MGD and a maximum day demand (MDD) of 3.9 MGD.

Burney is located in a rural setting and is surrounded by forest and agricultural land. The Shasta County General Plan indicates a broad range of land use designations in the District boundary. As such, there is diverse development within the permitted land uses. Principal economic activities in the area consist of forest products, the cogeneration of electric power, agriculture, and tourism. Highway 299 east bisects the town and is lined with typical retail and commercial uses. Lumber mills and light industrial development occur on the outskirts of town. Residential development at urban and suburban densities is spread throughout the service area.

According to the 1978 Master Water Plan (1978 MWP) completed by Camp Dresser & McKee, Inc., the Burney water system began in 1930 as a small private system consisting of a shallow well, one supply pump, a 10,000-gallon storage tank, and 2-inch distribution mains. The District was originally formed as Burney County Water District in 1945 when it purchased the private system. During the next 10 years, fire hydrants were installed, 6-inch mains were constructed, Well Nos. 3 and 5 were drilled, and a new 230,000-gallon reinforced concrete storage tank was constructed.

Bacteriological contamination in the wells became a problem in the 1950's due to infiltration from septic tank leachate. Therefore, Well No. 6 was placed into service upgradient of town in 1969. Additionally, a new 400,000-gallon concrete below-grade storage tank was constructed at Well No. 6, and meters were installed for all town residents.

Since that time, residences have been connected to sewer lines, and the District has constructed two more supply wells (Nos. 7 and 8) in the same location as Well No. 6. Well Nos. 1 through 5 are no longer in service. The District relies solely on groundwater from these three wells, which provide high-quality water. A Groundwater Resource Evaluation of the Burney Basin completed in 1988 by CH2M Hill indicated groundwater to be of excellent quality with low hardness and alkalinity. As such, the source water does not require any treatment.

More recent improvements include construction of the Mountain View 4 MG and Ivan Marks 1.5 MG welded steel storage tanks. Additionally, modifications to the Timber Drive Tank were completed in 2002 to increase capacity from 0.8 MG to 1.2 MG. Due to these storage improvements, the older 0.4 MG concrete Tank No. 3 located at the well field is no longer active.

Photo 1: Timber Drive Tank Raising

PREVIOUS STUDIES

Some key previous studies used as reference in this Master Plan are as follows:

- Master Water Plan for the Burney County Water District, Camp Dresser & McKee, Inc., November 1978.
- Sphere of Influence Report for the Burney Water District, Shasta LAFCO, October 1984.
- Groundwater Resource Evaluation of the Burney Basin for Burney County Water District, CH2M Hill, October 1988.
- 2.0 MG Tank and Pipeline Project Engineering Report for Burney Water District, PACE Civil, Inc., December 1998.
- Burney Water District Water Supply Assessment and Drought Plan, LiquidState, January 2013.

NEED AND SCOPE OF CURRENT STUDY

In 2012, the District authorized PACE Engineering (PACE) to work jointly with District staff to prepare a Water Master Plan (WMP). The District has considerably enhanced the water supply, storage, and distribution system since completion of the 1978 MWP. The system was last analyzed in 1998, which is now over 14 years old. Additionally, CDPH noted in the 2011 AIR that the 1978 MWP should be updated. This study is necessary to review the current water system and recommend improvements needed in the next 30 years. Supply, storage, and distribution improvement needs to meet existing and anticipated water demands are included. Burney is experiencing its own economic downturn, with proposed subdivisions put on hold or eliminated completely, and a static if not declining number of water connections. Therefore, improvements needed to accommodate growth are expected to be minimal in the upcoming years. As such, many improvements recommended herein are needed to correct existing system deficiencies.

This study, referred to as the *Burney Water District Water Master Plan*, relies in large part on previous studies completed and information provided by District staff. Much of the records search, water main inventory and review, and data gathering was provided by District staff, so we are indebted to their service in making this a useful WMP.

Data gathered since the previous 1978 MWP was evaluated to update design criteria including:

- Determination of historic and future water usage.
- Development of existing and 30-year distribution system computer models.
- Evaluation of the existing source, storage, and distribution system.
- Development of a staged 10 to 30-year plan of improvements.
- Estimation of the current cost of proposed improvements.

EXISTING WATER SYSTEM

The existing Burney Water District water system will be described herein under the following 7 major categories:

1. Water Supply System
2. Pressure Zones and Pressure Reducing Valves
3. Storage Reservoirs
4. Distribution Booster Pump Station
5. Distribution System
6. Fire Protection
7. Control System

A plan of the District's existing water system 6-inch pipes and larger is shown on Plate 1. Tables, figures, and plates are located at the end of this report.

WATER SUPPLY SYSTEM

Currently, the District obtains its water supply from three wells, all of which are located near the southern edge of the District boundary, as shown on Plate 1 and described in Table 1.

Well No. 6 was constructed in 1969 to an approximate depth of 297 feet. The 200 HP water lubed turbine pump produces a typical flow of 1,600 gallons per minute (GPM) (2.31 MGD), at a pumping water level of 237 feet, and a total dynamic head (TDH) of 247 feet. An altitude valve closes off inflow to the Timber Drive Tank and allows the Mountain View Tank to continue filling. SCADA from the Mountain View Tank level then disables Well No. 6. The well has auto pump-to-waste at start up, and has shown very little drawdown during numerous pump tests over the years, indicating a very high-yield well.

Well No. 7 was constructed in 1982 to a depth of 332 feet. The 250 HP water lubed turbine pump has a maximum capacity of approximately 1,500 GPM (2.16 MGD), at a pumping water level of 237 feet, and a TDH of 437 feet. It is controlled by water level in the Ivan Marx Tank, and also has auto pump-to-waste at start up.

Well No. 8 was constructed in 1981 to a depth of 300 feet. The oil lubed turbine pump has a maximum capacity of approximately 1,500 GPM (2.16 MGD), at a pumping water level of 237 feet. It is controlled manually and is powered by a natural gas engine, with auto pump-to-waste at start up. It is operated in standby mode in case of power outages and is exercised weekly. At 1,500 GPM/Ft, the specific capacity of Wells 7 and 8 are excellent.

Photo 2: Well Building

All wells have meters, system alarms for low tank levels and power outages, and are housed in insulated and heated locked masonry block structures, inside a common locked fence. According to the 2011 CDPH AIR, well vents are properly screened and pump bases are sealed. However, a site visit conducted by PACE on April 19, 2013, revealed that none of the wells are bolted to their pedestals. Well No. 8 also has a defective seal where small copper lines enter the well bore which should be corrected to prevent contaminants from entering the well.

The District maintains disinfection facilities at Well Nos. 6 and 7, which can also be used at Well No. 8 if needed. Emergency chlorination injection points and bacteriological sample points are installed on all wells. Chemical feed pumps and 30-gallon-day tanks are available with 12.5% sodium hypochlorite. At one time the

District chlorinated the system quarterly as a precaution against bacteriological contamination, but has not been required to do so since July 2011 following a CDPH site visit.

It is estimated the maximum source capacity with all three pumps running is about 4,600 GPM (6.6 MGD), and the effective system capacity with the largest pump out of service is about 3,000 GPM (4.3 MGD). This meets the current system MDD of 3.9 MGD, which occurred July 2011.

PRESSURE ZONES AND PRESSURE REDUCING VALVES

The District service area is currently divided into two pressure zones; the Low Pressure Zone and the High Pressure Zone. The boundaries of these zones are shown on Plate 1 at the end of this report.

Two major 10-inch PRVs exist in the system as shown in Table 2. One is located on Park and Tamarack Avenues, while the other is on Hudson Street just south of Timber Hill Drive. Both are set at downstream pressure settings of approximately 50 to 60 PSI, and are reportedly in good operating condition. They are not exercised regularly, but the pilot tubing is replaced on a regular basis.

Normally, pressures of about 50 to 125 PSI should be maintained in a distribution system. However, as a matter of practicality, these limits are often stretched to about 40 to 150 PSI. Historically, pressures below 20 PSI do not meet CDPH standards unless the user is informed of the limited pressure and is in agreement with such limitation. The Low Pressure Zone is served by Well Nos. 6 and 8, and typically maintains pressures within a range of 45 to 55 PSI. The High Pressure Zone is served by Well No. 7 and the Booster Pump Station, and maintains pressures within a 50 to 90 PSI range at most times. Refer to Table 3 for a listing of current pressure zone limits and pressure extremes.

STORAGE RESERVOIRS

Adequate water storage facilities in a water system are important for a number of reasons. It may be necessary to replace a pumped supply with stored water in the case of a power outage or broken pipeline. Also, it is much more economical to rely on water from storage rather than construct raw water pumping capacity to meet peak hourly demands over and above the 24-hour average flow during MDD. The amount of storage needed to meet these peak demands is normally called equalizing storage. The amount of storage in a water system available for fire demands during MDD conditions also affects the ISO rating for fire protection facilities.

As shown in Table 4, there are currently three water storage reservoirs totaling 6.7 MG in the District.

Photo 3: Ivan Marx Tank

The Ivan Marx Tank is a 1.5 MG welded steel reservoir serving the High Pressure Zone. It has an 80.5-foot diameter, and was constructed in 1989. The 2011 CDPH AIR indicated the water in this tank to be clean and clear with very little sand. The ladder and hatches have locks, and the roof vent is screened. It is located in a remote location and is behind a locked gate; however, there is no fencing or security immediately around the tank which is located in a recreational hiking area. A recent site visit revealed there is some old graffiti present, and moss growth and black mold returned on the tank exterior soon after a 2009 pressure wash. Rust is present on interior exposed surfaces, specifically the overflow and roof beams.

The Timber Drive Tank is a 1.2 MG welded steel reservoir serving the Low Pressure Zone. It has an 80-foot diameter, and was originally constructed in 1994. The tank height was raised by 8 feet in 2003. The 2011 CDPH AIR indicated the tank to have very little sand. The ladder and hatches have locks, and vents and overflows are screened. It is behind a perimeter chain link fence and locked gate. It was noted there is black mildew on the tank exterior.

Photo 4: Mountain View Tank Paint Peeling

The Mountain View Tank is a 4.0 MG welded steel reservoir serving the Low Pressure Zone. It has a 155-foot diameter, and was constructed in 2001. The 2011 CDPH AIR indicated the water in this tank to have very little sand. The ladder and hatches have locks, and vents and overflows are screened. It is behind a perimeter chain link fence and locked gate. The exterior urethane topcoat is peeling in several locations exposing the epoxy intermediate coat.

An existing 0.4 MG prestressed gunite below-grade tank was constructed in 1963, and is located at the well site. The tank has been inactive for some time and is now an attractive nuisance. It is in disrepair and the roof is sagging. As such, destruction of this tank is recommended.

Overall, all active tanks are generally in good condition, with the exception of needing paint, and provide adequate storage to meet MDD and MHD for the system and each pressure zone.

DISTRIBUTION BOOSTER PUMP STATION

The District has one booster pump station which supplies water from the Low Pressure Zone to the High Pressure Zone. It is located on the west side of Hudson Street, just south of Timber Hill Drive. The station consists of a diesel powered 2-stage direct drive, oil and water cooled engine, with a capacity of approximately 800 GPM (1.15 MGD). It is typically exercised once a week. The pump typically serves as a backup to the High Pressure Zone should Well No. 7 be taken offline. Unfortunately, it has limited capacity and is not adequate to meet ADD in the High Pressure Zone. The diesel pump was originally meant to be a backup to boost fire flow pressures for the two existing electric single-stage variable frequency drive (VFD) pumps. However, these pumps were designed around 60 PSI flows and are undersized to overcome the High Pressure Zone system pressure.

Additionally, in late 2013, the booster pump station had to be taken out of service and is not currently operational. A recent thermostat failure caused freezing of the diesel driven pump heat exchanger, which in turn revealed an apparent cross connection between diesel engine coolant and the potable water supply. As such, should Well No. 7 have a failure at the present time, water consumption in the High Pressure Zone would have to be restricted.

DISTRIBUTION SYSTEM

Photo 5: Interior of 6-inch Steel Pipe

Condition: The existing distribution system is shown on Plate 1. The 160,000 feet of distribution mains consist of steel, asbestos cement (AC), ductile iron (DI), and polyvinyl chloride (PVC) piping. Approximately 64% of the

system mains consist of 6 to 24-inch diameter PVC in good condition; 34% are 6 to 12-inch tar coated steel mains in fair condition; 1% are 10 to 12-inch DI in good condition; and 1% are 6-inch AC in reasonable condition. Approximately 11% of the smaller ¾ to 3-inch pipes are galvanized steel in poor condition and beyond their useful service life according to the 2011 CDPH AIR. A small amount of AC pipe exists in the system on Black Ranch Road, a portion of Highway 299, and many service laterals. The District continues to remove it, along with the old galvanized steel piping, when leaks or breaks occur. Only four leaks were reported in 2010, indicating the distribution system is generally in good condition. A piece of 6-inch steel pipe likely dating back to pre-1980s was recently cut out of the system during a repair. A lot of corrosion was present on the outside while the inside was relatively smooth with little corrosion. However, it is possible the rust tuberculation had already fallen off prior to inspection.

The District is in the process of installing smart meters on all water service connections. As of April 2013, approximately 100 to 150 Neptune AMRs with radio-read handhelds had been installed. These will save the District time and money, as approximately 50 to 70 man-hours per month are currently spent on manual meter reads alone.

Existing System Capacity/Analysis: The capacity of a distribution system is generally considered to be adequate if both of the following criteria can be met:

1. Supply all water necessary to meet consumers' needs during periods of maximum usage at MHD, at a reasonable residual-pressure, usually not less than 40 PSI (preferably 50 PSI) and normally not greater than 125 PSI.

2. Supply needed fire flow coincident with MHD, and not drop pressure below 20 PSI.

To evaluate the distribution system, a computer model of the entire distribution system was prepared. Nearly all 6-inch and larger pipelines were included in the model. The

model contained approximately 280 pipelines. Flow demands were assigned to approximately 215 nodes. The system was analyzed using the Innovyze® H_2O Net Version 10.0 software program. The model was created from existing District water system maps and input by District staff. Once operational, the model was calibrated using the District's Supervisory Control and Data Acquisition (SCADA) data for August 2012, which pump records show to have been a MMD. The distribution system's reservoir levels, as well as pump flows and run times, were used to calibrate the model and to distribute system demands. Results of fire hydrant field tests were used to further calibrate the model's piping friction factors. The field testing and calibration results are summarized in Table 5.

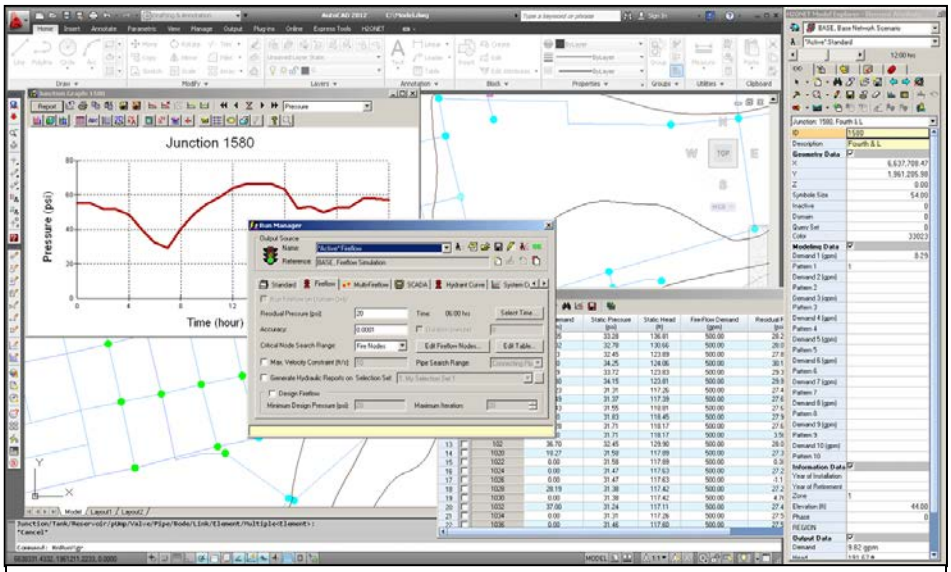


Photo 6: Innovyze® H_20Net Water Modeling Program

The existing system was evaluated under a flow condition based on 2012 MMD consumption data to determine if there were any apparent weaknesses (low pressures). Analysis of output pressures, flows, and head loss in pipelines provided information needed to identify system improvements. The distribution system model was analyzed under an extended period simulation (EPS). The EPS model simulates system demands, reservoir level fluctuations, pump run times, and other time related changes that occur over a defined period. For this Master Plan, a 24-hour period on a maximum demand day was simulated. Adjustments were made to estimated demands and pipeline roughness values (120 < C < 130) to obtain a model which duplicates the actual system as closely as possible.

The 2012 computer model indicated low pressures (below 20 PSI) at higher elevations adjacent to all reservoirs in the system, which is to be expected. Pressures near 20 PSI also occur during MHD conditions along Juniper and Holly Avenues. In addition, moderately low pressures (i.e., between 35 and 50 PSI) occur near the west end of Burney, along Woods and Tamarack Avenues and Timber Drive during MHD conditions. All other served areas appear to have adequate pressures during EPS modeling simulations while the wells are providing water for MHD.

FIRE PROTECTION

The hydraulic model was also used to estimate available fire flows in various areas of the District distribution system. Fire flow requirements for structures within District limits are developed by the ISO. As described in the 2004 ISO review, for single-family residential areas, a fire flow of 1,500 GPM is required for a duration of two hours while commercial areas require fire flows from 2,250 to 3,500 GPM. Fire flows of 2,500 GPM and less should be available for two hours, 3,000 to 3,500 GPM for three hours, and all others for four hours. Fire flow requirements must be obtained at any time; therefore, the system was evaluated under the worst conditions during MHD, which occurs in the District around 8:00 a.m. There are several hydrants where estimated fire flows at MHD conditions are less than the anticipated required fire flow. However, in most cases, due to adequate hydrant spacing and system piping, another hydrant is nearby to supply additional fire flow. Additionally, portions of the distribution system indicated as deficient can achieve fire flows at other periods of time when demands are lower.

Note that fire flow requirements can be much greater than 3,500 GPM depending on building size, construction, design use, and whether or not it is sprinklered. For example, fire flows required at Burney High School and Burney Elementary School are 4,500 GPM and 4,000 GPM, respectively. It is beyond the scope of this Master Plan to develop a plan that can meet all existing and/or future fire flow requirements. When improvements are designed, each area should be evaluated on a case-by-case basis to determine design fire flow needs. Replacing undersized steel piping and looping dead

ends in the distribution system should significantly improve fire flows in the west side of town, commercial areas, and in some higher elevation areas within the District.

The hydraulic model estimates theoretical available fire flows, and assumes a fire engine can connect to the 4-inch outlet of a standard fire hydrant to pump out of the distribution system to achieve the flow. Non-standard hydrants such as wharf hydrants do not have a 4-inch connection and cannot provide nearly as much water as a standard hydrant. Wharf hydrants have a 2½-inch outlet and are generally supplied through a 4-inch pipe. The Burney Fire Protection District (Fire District) does have the ability to pump from a wharf hydrant; however, there will be a great deal of headloss through the hydrant. Therefore, the estimated fire flow may not be available to put out a fire. ISO credit is reduced when hydrants lack a pumper outlet, and is further reduced when there is only a single 2½-inch outlet. A review of records indicated there is only one wharf hydrant in the system, located at the end of Gunsmith Way.

In 2004, ISO conducted a review of the District's fire protection facilities. This organization is responsible for rating fire protection facilities (including water systems) in all communities in the United States. The assigned rating is used by fire insurance underwriters to determine insurance rates. The lowest rating is a 10 with the highest corresponding premium rate, and the highest and best rating is a 1. In January 2004, the Fire District received an overall rating of 5. The water system accounted for 32.7 credit points out of a total of 40.0, which is exceptional. Outlying areas of Burney, including Johnson Park and far northeast on Black Ranch Road received a rating of 9. This area is served by Del Oro Water Company which has substandard sized piping. According to a newspaper article in the InterMountain News dated April 2004, a complete water system replacement is planned for this area over the next 20 years.

The location of existing fire hydrants is shown on Plate 1 at the end of this report. The District's water system currently has about 166 hydrants. An agreement exists between the District and the Fire District for repairs, maintenance, and upgrade of the hydrants. Resolution 98-02 indicates the District installs, maintains, and owns all fire hydrants

within the service area boundary. The 2004 ISO review indicates for maximum credit all hydrants should be inspected twice a year. The inspection should include operation and testing at domestic pressure. Records should be kept of the inspections. In order to achieve higher ISO ratings the District could add this to their regularly scheduled system O&M. However, a cost benefit analysis must be done to ensure increased inspection and testing would be worthwhile.

In evaluating the District water supply system, ISO rated the system through a series of eight hydrant tests. These tests measured the capability of the water system to deliver needed fire flows at different locations in the District. The needed fire flow capacities are established by ISO and are based on the type of construction of buildings in the fire hydrant test area. For example, in dense residential areas the needed fire flow is typically about 1,500 GPM; in commercial areas the required flow is typically 2,250 to 3,500 GPM. Even though some fire flow requirements may exceed 3,500 GPM, ISO does not penalize a community for not providing flows above 3,500 GPM. This places the burden of fire demands in excess of 3,500 GPM on the property owner. The trend is to encourage property owners of large buildings to sprinkler their buildings and thus, reduce their fire demand below 3,500 GPM. The best way to accomplish this is by District Ordinance, which the District should consider. A limit below 3,500 GPM should also be considered. Sprinkling of commercial buildings typically reduces fire flow requirements, but they cannot be reduced below a 1,500 GPM minimum.

Photo 7: Ivan Marx Tank Telemetry

CONTROL SYSTEMS

The current water facility SCADA system consists of a level signal from the Ivan Marx Tank which controls Well No. 7, and an altitude valve at the Timber Drive Tank. The valve closes off inflow to the Timber Drive

Tank and allows the Mountain View Tank to continue filling. SCADA from the Mountain View Tank level then disables Well No. 6.

Intermittent SCADA and communication failures have occurred during rain events due to the signal being directed from the Ivan Marx Tank to the District Office. Additionally, the District currently utilizes National Instruments Lookout for which software is outdated and no longer supported.

FUTURE WATER DEMANDS

SERVICE AREA

To determine future needs of a water system, it is first necessary to establish physical and political boundaries of the service area, and to estimate water demand for the area at various times in the future.

The future water service area for Burney Water District used in this Master Plan was limited to the current service area boundary, which is believed to be the same as the Local Agency Formation Commission Office (LAFCO) sphere of influence (SOI) boundary outlined in the 1984 LAFCO SOI Report. As shown on Plate 2 located at the end of this report, the current water service area includes the areas of Johnson Park; Highway 299 east corridor; expanded areas east, south, and north of Burney; and the west side/lumber mill. It is unknown if a portion of the existing water service area boundary, which includes the Ivan Marx Tank and service to Burney Forest Power, extends outside the current SOI. LAFCO has scheduled a review and update of the SOI for 2014, at which time these boundaries will be verified.

GROWTH PROJECTION

In 2002, the reported number of existing metered water services within the District service area was 1,365. In 2012, the number of services was 1,364, for a zero average annual growth rate for the past 10 years. According to the Shasta County General Plan, the California Department of Finance indicated the population of Shasta County as a whole increased by 4% the last five years (annual average growth rate of 0.8%). Current data shows the predicted growth rate of 17% between the years 2010 and 2020 (annual average growth rate of 1.7%) in a report previously completed by the Department of Finance is likely too high. Also noted in the General Plan, the Department of Finance now states that assumptions used to project future population

may no longer be applicable, and these projections could change with their next estimate cycle which is every five years.

Although population growth rate could be used to predict future water consumption, this alone tends to neglect other factors that contribute to growth in water consumption. For example, increases in industrial and commercial water use and the trend for higher-end residential development with higher landscape irrigation needs will tend to accelerate water consumption over time. However, given the relatively static trend in services over the last 10 years, District growth and population is likely to remain relatively static into the foreseeable future. As such, the District is more in a preventive repair and/or replace O&M mode, rather than one of system expansion to accommodate new development. A Developer Fee Justification Study was completed by SchoolWorks for the Fall River Joint Unified School District in February 2012. This study projected five new residential units to be constructed per year, which would result in an approximate growth rate of only 0.2% per year.

In fact, it is possible the District may see a contraction in the near future, with many retirees moving due to harsh weather in the winter months. Rather than having issues associated with too much growth in the near future, it is more likely the District will struggle to meet increased O&M costs with fixed source for revenue. That having been said, there are a few proposed developments which have tentative maps and/or preliminary plans already completed. Therefore, this Master Plan utilizes these developments to forecast near-term growth in the next 10 to 30 years. Full build-out of these developments with an assumed growth rate of 1% per year will take 30 years to complete. Known proposed developments are listed in Table 6 and shown on Plate 2. Tentative improvements to accommodate this growth are yet to be determined. Off-site improvements can be determined once on-site infrastructure improvements are presented to the District. Additional studies needed to verify how to serve each of these developments are beyond the scope of this Master Plan. Therefore, pipe size and location details must be further investigated and evaluated at such a time prior to development occurring.

This Master Plan has been developed assuming no additional annual increase in water consumption from current customers, rather the only increase will come from proposed tentative developments. If there is no development or increase in water consumption in the future, then improvements designed to accommodate growth for the next 30 years will be satisfactory for a longer period of time than indicated herein. If there is growth and an additional annual increase in water consumption greater than that anticipated herein from tentative developments, improvements will reach their design capacity sooner than projected.

PAST AND PRESENT WATER USAGE

The next step in predicting future water demands is to determine the demand rates per household equivalent (HE). An HE is the water usage of an average residential water user. This can best be accomplished by review of past water consumption and production records. Tables 7, 8, and 9 are a summary of these records.

Table 7, HISTORICAL WATER USAGE for 2011 and 2012, was compiled using District consumption records of metered sales and well production records. The average annual consumption for these two years was approximately 430 MG/year. It must be pointed out these values are approximate, because the various monthly water meters readings are taken over a two to three week period. Most recently, in 2012, it was found the resulting overall yearly production was about 4% higher than the actual metered consumption. This unaccounted water is used for fires, street cleaning, and flushing of distribution lines. It also reflects water lost to distribution system leakage, and water that is not accurately measured due to worn out or incorrect meters. A 4% unaccounted water loss is relatively low compared to what is seen in other communities, as the City of Anderson averages about 11%, City of Redding 10%, and Centerville Community Services District 5%.

Table 8, ANNUAL WATER PRODUCTION, was compiled using District well production records over the last six years. The recent peak month was August 2012, when

81.0 MG of water was produced. Table 9, 2012 MONTHLY WATER PRODUCTION, shows the supply from each of the three wells. As shown, Well Nos. 6 and 7 provided most of the water at 46.9% and 52.6%, respectively. Well No. 8 provided just 0.5%, most of which was due to weekly exercising of the pump.

The District started installing AMRs to replace their aging manual-read meters. As of April 2013, approximately 100 to 150 meters had been installed. However, there is not an existing O&M policy in place for regularly scheduled (20-year cycle) replacements. Due to the age of the distribution system, the District should develop a routine meter maintenance program for remaining meters that have not yet been upgraded to smart meters. This program should include periodic review of meter installations to determine if the meter is recording flows accurately, as well as review of the site to determine if upgrading or replacement is desirable because of meter age, ease of reading, better drainage, etc. Records including date of installation, date last tested, accuracy, and condition should be recorded for later use. It would be desirable to check large meters (2-inch and larger) about once every five years, and smaller meters at least every 10 to 15 years. Larger meters have the potential for greater loss of revenue should they not be measuring flow accurately. The program should start in older portions of the system, and progress to more recently developed areas.

The average consumption per HE was determined by subtracting water usage of the 39 largest users from the total system water use, then averaging the remaining water used over the remaining connections. Water use of the major users was then expressed in HEs. For example: Burney High School (Top User No. 2) is equivalent to about 108 HEs. In August 2012, the District had a total of 1,364 services, which were equivalent to about 2,335 HEs as shown in Table 10, HOUSEHOLD EQUIVALENTS DETERMINATION.

In order to demonstrate the relative change in water consumption rates throughout the day, month, and year, ratios of maximum month and maximum day to average annual production were developed from production records and are shown on Table 11.

PROJECTED WATER DEMANDS

Table 11, SUMMARY OF DESIGN VALUES USED IN WATER SYSTEM ANALYSIS, also shows future 2042 flows computed from the average annual demand rate of 570 gallons per HE per day (GPD/HE), and water production ratios as previously discussed. The future 2042 values were based upon build-out of the tentative developments discussed in the GROWTH PROJECTION section of this report.

DISTRIBUTION SYSTEM DEMANDS

In hydraulic analysis of a distribution system, it is necessary to use both the MHD and MDD to properly evaluate the system. In this study, distribution of existing flows was done based on location of the 39 large users and the remaining number of parcels being served. Year 2042 conditions were estimated based on development of the potential growth areas shown on Plate 2, which may or may not be all or partially developed during the next 10 to 30 years.

The estimated year 2042 HE and demand information shown on Table 12 was used to allocate demands to various points in the distribution system computer model. Piping head losses, pressures, and flows were then generated by the computer model. This procedure provides a means to determine where deficiencies occur, and where system improvements are needed.

ANALYSIS AND RECOMMENDED IMPROVEMENTS

GENERAL

The first step in analysis of the District water system was to compare capacity of existing facilities against recommended capacities based on current engineering design criteria. Next, facilities were analyzed under future conditions based on projected growth and corresponding system demands. Deficiencies were noted and various solutions examined. Finally, recommended improvements needed to provide required capacity for the next 30 years of growth were prioritized in a timetable which constitutes the Master Plan of Improvements. These improvements are shown in Table 14 and on Plate 2 at the end of the text. The analysis and specific recommendations for these improvements are discussed under the following 9 headings:

1. Supply
2. Pressure Zones & PRVs
3. Booster Pumping Facilities
4. Storage Reservoirs
5. Distribution System
6. Replacement of Deteriorating Steel Piping
7. Water Meters
8. Fire Hydrants
9. Control Systems

SUPPLY

As discussed previously in this report, the District's existing source of water supply is from three wells. The District's current effective system source capacity is about 4.3 MGD. This meets the current system MDD of 3.9 MGD, as recorded July 2011.

The maximum source capacity of the High Pressure Zone is approximately 2,300 GPM (3.3 MGD), which includes the Booster Pump Station pumping from the Low Pressure Zone to the High Pressure Zone. The effective capacity of the High Pressure Zone is 800 GPM (1.15 MGD) from the Booster Pump Station with Well No. 7 out of service. This is not enough source capacity to meet the existing 1.4 MGD MDD of the High

Pressure Zone. Additionally, the booster pump station had to be taken out of service and is not currently operational. A recent thermostat failure caused freezing of the diesel driven pump heat exchanger, which in turn revealed an apparent cross connection between diesel engine coolant and the potable water supply. As such, should Well No. 7 have a failure at the present time, water consumption in the High Pressure Zone would have to be restricted.

In light of these recent developments, and in order to provide reliable water supply backup to Well No. 7 as quickly and cost effectively as possible, it is recommended improvements be made immediately to the booster pump station.

It is recommended an additional well be developed at Washburn Park or the existing well field, after improvements are completed at the booster pump station in order to consistently provide adequate backup at peak hour demands to the High Pressure Zone. Should the well be drilled at the existing well field, approximately 14,000 feet of existing 10-inch pipe would need to be upsized along Sapphire Road and Bartel Street. Note that the existing well field has proven to be on a good aquifer with high-yield production. Conversely, the District has already installed distribution system improvements in anticipation of installing a new well at Washburn Park. This site is located relatively close to the existing well field, and therefore should produce a good well.

Photo 8: Well No. 7 Sounder

Well No. 7 is also in need of several improvements. Construction of a new well will allow for Well No. 7 to be taken offline and upgraded. It is not currently bolted to the pedestal; therefore, vibrations have occurred and the well has not been recently balanced. Additionally, the existing pump has a hard stop/start transfer switch which causes such a jolt to the well that District staff does not want to be

near it when it turns on. Accurate water levels cannot be obtained with a well sounder as there is no convenient insertion location. Currently a sounder remains in the well at all times, exposed to a moist environment, likely leading to inaccurate measurements, and resulting in the loss of multiple well sounders into the well. It is recommended a new VFD pump be installed, along with access for a well sounder to be easily taken in and out of the well. The VFD will allow for the pump to slowly ramp up to speed, eliminating the hard stop/start problem. The new pump should be bolted to the pedestal and balanced. The well pump motor is original 1982, is over 30 years old, and has met its useful service life. It reportedly runs very hot and oil in the upper bearing turns brown soon after replacement. As such, it is also recommended a new motor compatible with the new VFD pump be installed.

Well No. 7 has a solenoid-operated, pump to waste Cla-Val valve with minimal manual capability that has tripped multiple times in the past. Conversely, Well No. 6 has much more reliable and easy to use automated Rotork valves that can be easily switched to manual operation. It is recommended the existing Cla-Val valve and piping configuration at Well No. 7 be changed to match that of Well No. 6 for consistency, reliability, and ease of O&M. Existing 480 volt electrical components currently at Well No. 7 are not up to code, with power located in one cabinet close to the well, burnt wiring present, and no components marked. It is recommended all electrical be updated to meet current codes, and external lights and a telephone line be installed in at least one of the well buildings as none currently exist. Trees within falling radius of the wells should be removed. Additionally, an emergency generator for the well site should be installed, as one is not currently available.

Photo 9: Well No. 7 Valving

The maximum source capacity of the Low Pressure Zone is approximately 3,100 GPM (4.5 MGD). The effective capacity with Well No. 6 out of service is 1,500 GPM (2.2 MGD). This is just enough source capacity to meet the existing 2.2 MGD MDD of the Low Pressure Zone. Therefore, any growth in the Low Pressure Zone will require additional source capacity. Negligible draw down has been recorded at Well No. 6, indicating a very high yield well. As such, it is recommended when growth occurs in the Low Pressure Zone, Well No. 6 be upsized to meet the anticipated 2042 MDD demand of 2,400 GPM (3.4 MGD). Alternatively, Well No. 7 could be utilized to supplement the Low Pressure Zone, but this would result in less source capacity in the High Pressure Zone. It is recommended this alternative be considered when the valving and piping of Well No. 7 is modified in order to allow for flows to the Low Pressure Zone.

Well No. 6 is also currently in need of several improvements. It is not bolted to the pedestal; however, the well was recently balanced. Additionally, electrical at Well No. 6 is similar to that at Well No. 7, with 480 volt wiring in extremely poor condition. It is recommended the well be bolted to the pedestal and all electrical components be updated to current codes. Additionally, an emergency generator should be installed as one is not currently available.

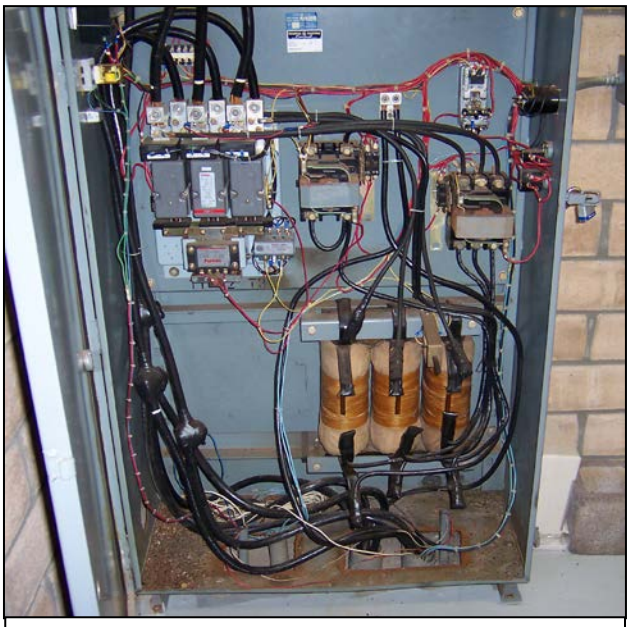


Photo 10: Well No. 6 Electrical

The pump at Well No. 8 was recently rebuilt due to leaking oil. The feed system allows oil to drip down into the water column. As such, it is recommended the pump be changed from oil lubed to water lubed, and bolted to the pedestal.

PRESSURE ZONES AND PRESSURE REDUCING VALVES

Pressure zone boundaries are shown on Plate 1. Normally, pressures of about 50 to 125 PSI should be maintained in a distribution system. However, as a matter of practicality, these limits are often stretched to about 40 to 150 PSI. Pressures below 20 PSI at the meter do not meet CDPH Standards unless the user is informed of the limits of pressure and is in agreement with such limitations.

In general, pressures in the District system are maintained within the 50 to 120 PSI range. Pressures are found to be outside this range only in a few special cases where high elevations result in localized low pressure problems. Areas where pressures drop below 50 PSI are a concern because available fire flows may not be adequate, and areas with pressures below 20 PSI are a concern because they may violate CDPH Standards.

Areas with Pressures Below 50 PSI

Oak Street, Cedar Street, Woods Avenue Areas in Low Pressure Zone

The hydraulic model indicates pressures between 30 and 40 PSI at hydrants located in the areas of Oak Street, Cedar Street, and Woods Avenue during MHD. However, this pressure is adequate for CDPH requirements, and still currently provides the 1,500 GPM fire flow requirement, both at current conditions and with anticipated 30-year growth.

Juniper and Holly Avenues in Low Pressure Zone

Juniper and Holly Avenues can experience pressures in the 20 to 30 PSI range during heavy demands. This pressure drops even further during simulated future 30-year MHD flows to as low as 15 PSI. Hydrants nearest these locations are capable of supplying required fire flow to these areas at current and expected 30-year conditions; however, pressures less than 20 PSI do not meet CDPH requirements. As such, unless future improvements remedy this problem, at future 30-year MHD flows property

owners in this area will have to be informed of the situation and advised to provide their own booster pumps and backflow preventers or tolerate the low pressure.

Las Colinas Trailer Park in Low Pressure Zone

The hydraulic model indicates pressures as low as 35 PSI in the Las Colinas Trailer Park during current MHD. This pressure is adequate for CDPH requirements, but too low to provide the 1,500 GPM fire flow requirement. Replacing 1,500 feet of 6-inch main on Tamarack Avenue to the Trailer Park with 8-inch main will improve fire flows from an estimated 500 GPM to only 900 GPM at MHD. Therefore, it is recommended a 10-inch main be installed which will provide adequate fire flows at current and 30-year MHD.

High Pressure Areas

South Burney in High Pressure Zone

The highest pressures in the system occur in the areas of Sapphire Road and Bartel Street, and can reach as high as 135 PSI. However, these pressures are well within practical limits of a distribution system. As such, high pressures are not currently an issue in the District system, and are not expected to be at anticipated 30-year flows.

Possible Future PRV Setting Changes: Both major PRV stations appear to be in good condition, although they are typically closed most of the time and are not metered. It is recommended these valves be monitored and exercised periodically to ensure correct and efficient operation. Ideally, PRVs should only open to provide fire flows or flows to improve downstream pressures during periods of extreme high demand. The District should investigate altering the pressure setting at the main PRVs to improve distribution system efficiency; however, some of these changes are dependent on system improvements. Meters placed at these locations would allow flows through the PRVs to be monitored. The District should also verify the downstream pressure settings of its PRVs on a regular basis. Installing a 2-inch PRV parallel to the 10-inch PRVs would

provide modest pressure increase as needed for domestic services, while the 10-inch PRV would be available to meet fire flow demand.

BOOSTER PUMPING FACILITIES

Photo 11: Booster Pump Station

The Booster Pump Station was designed to boost fire flows in the water system; therefore, it has limited capacity and is not adequate to meet peak demands in the High Pressure Zone. The diesel pump was originally meant to be a backup for two electric single-stage VFD pumps; however, these pumps are undersized. When operable, the diesel engine only has a capacity of approximately 800 GPM. It is typically exercised once a week and can hardly keep up during ADD. However, an apparent cross connection has currently made the booster pump station inoperable. Additionally, this is currently the only backup for the High Pressure Zone, so if Well No. 7 were to go down or if the Ivan Marx Tank had to be taken offline, water consumption in the High Pressure Zone would have to be restricted.

In light of these recent developments, and in order to provide reliable water supply backup to Well No. 7 as quickly and cost effectively as possible, it is recommended improvements be made immediately to the booster pump station. The existing booster pump station piping is 8-inch, and can therefore accommodate larger 1,200 GPM (1.7 MGD) pumps to supply the High Pressure Zone. Recommended replacement of the two undersized electric motor driven pumps, with two new pumps with butterfly control valves, would increase the pump station's capacity from 1.15 to 1.7 MGD. This is adequate to meet the existing 1.4 MGD MDD. However, this is still not large enough to supply the high industrial demand from Burney Forest Power at peak hour demands of 2.0 MGD. Therefore, another well will be required to provide backup to Well No. 7.

It is recommended the District purchase a trailer-mounted portable diesel generator capable of running the larger pumps in the event of a power outage. The portable generator could also be used in other areas of the District as needed, but would primarily allow for installation of a manual transfer switch at the booster pump station.

Existing electrical at the booster pump station is similar to that at Well Nos. 6 and 7, in that it is subpar and a complete upgrade is needed to meet current codes. As such, any improvements done will necessitate an electrical upgrade to provide effective redundant source capacity to the High Pressure Zone.

STORAGE RESERVOIRS

The California Waterworks Standard §64554(a)(1) states that for systems with 1,000 or more service connections, the system as a whole and in each pressure zone shall be able to meet four hours of peak hourly demand (PHD) with source capacity, storage capacity, and/or emergency source connections. Based on the District's current PHD, the required system storage to meet existing California Waterworks Standards is about 0.89 MG. Adding the required fire storage of 0.63 MG (3,500 GPM fire flow for three hours), the total system existing storage requirement is about 1.5 MG. Since the District's current storage volume is about 6.7 MG, the District has more than adequate system storage to meet Waterworks Standards.

PHD in the High Pressure Zone is estimated to be 2.0 MGD. As such, required storage in the High Pressure Zone, including fire storage, is approximately 0.96 MG. The District currently has 1.5 MG of storage in this zone, and therefore has more than adequate storage capacity to meet Waterworks Standards.

PHD in the Low Pressure Zone is estimated to be 3.3 MGD. Therefore, required storage in the Low Pressure Zone, including fire storage, is approximately 1.2 MG. The District currently has 5.2 MG of storage in this zone, which is more than adequate storage capacity to meet Waterworks Standards.

It is usually more economical and reliable to provide stored water for supply needed during: (1) fire demands, (2) peak demands in excess of maximum daily demand, and (3) in the event of an emergency, such as a power outage that interrupts the normal source of water. The required storage in a typical water system is a function of three quantities as follows:

1. Equalizing storage is the amount of water needed over and above the maximum daily demand rate (24-hour average) to satisfy peak demands of the day. This is often found to be between 15 and 20% of the MDD, and engineering practice is to use 20% for design purposes.

2. Fire storage is usually based on the theoretical amount that could be used to combat a major fire in the high value districts. Fire standards recommend minimum fire flows varying from 1,500 GPM for single-family residential lots to 3,500 GPM or more, for multi-family residential, commercial, or industrial, depending on the size of the structure, its composition, and if the structure has a fire sprinkler system. ISO recommendations can range from 500 GPM for single-family residential on large parcels (1,000 GPM if the dwellings have wood shake roofs) to a maximum of 3,500 GPM. It is impractical to design the entire water system to meet every possible fire demand, which can change with building construction, sprinkler installation, or building renovation or replacement. Fire storage requirements are based on being capable of providing the minimum residential fire flow for a period of two hours, and up to 3,500 GPM of commercial/industrial fire flow for a period of three hours. Therefore, it would require 0.18 MG and 0.63 MG of storage to meet the 1,500 GPM and 3,500 GPM fire flow requirements, respectively. All new residential buildings, and commercial buildings larger than 5,000 SF, are now required to be sprinklered which reduces fire flow demand.

3. Emergency Storage is the amount of water necessary to continue service in the event of power failure or some other failure of the supply system. This is usually assumed to be the MDD rate multiplied by some interval of time that might occur during a power outage. Six hours is typically used, or 25% of MDD. Recommended storage is typically equalizing storage plus the larger quantity of either fire storage or emergency storage.

Table 13 summarizes the District's existing and proposed 2042 storage demands for each pressure zone. The District currently has approximately 6.7 MG of water storage capacity contained in its three water reservoirs. During the winter months, the District produces about 1.0 MG of water per day. Thus, if the water supply system was shutdown due to an emergency, the existing storage facilities would provide sufficient water for about 6 to 7 days of normal consumption. However, if strict water conservation measures were adopted and enforced immediately, the stored water would last even longer. Because of the much higher and more variable water consumption in the summertime, it is estimated the existing storage facilities would provide about 1 to 2 days of water supply should the water supply system be shutdown.

Although the current 6.7 MG of storage capacity exceeds the existing desirable storage shown in Table 13, system redundancy must also be considered. The Low Pressure Zone has two reservoirs; therefore, if one must be taken offline or a pipe break occurs, backup system storage is available. However, the High Pressure Zone only has one remotely located reservoir to the far west of Burney, with one 14-inch main running nearly three miles to the nearest water services. Additionally, the tank primarily serves Burney Forest Power and quickly drains when operations there are in full swing. This customer supplies about 17% of District revenue, and is therefore integral to District finances. To compound matters, the Booster Pump Station is not adequately sized to provide backup to this area on maximum flow days, and can hardly keep up on average flow days. Should Well No. 7 go down or need to be taken offline at the same time the Ivan Marx Tank has problems or a pipe break occurs, there is no backup supply. Therefore, if a new well is not developed, it is recommended a new 1.5 MG reservoir be

constructed to serve the High Pressure Zone at the same maximum water surface elevation as the Ivan Marx Tank. Fruit Growers land to the northeast of town is a prime location for an additional tank due to suitable elevations and relatively close proximity to town.

Another need for additional storage capacity in the High Pressure Zone is for economic reasons. As shown in Figure 2, Well No. 7 is the most costly for the District in terms of yearly pumping, costing nearly $80,000 in 2012. Additional storage capacity would allow for pumping during more off-peak hours, rather than peak and partial-peak hours, resulting in savings for the District each year. In 2012, during peak summer months, approximately 26% of Well No. 7 pumping occurred during partial-peak hours, while only 1% occurred during peak hours.

Ivan Marx Tank: A Tank Maintenance Program Proposal (Maintenance Proposal) completed by the Utility Service Company (USC) in 2011 recommended the following improvements in 2013 for the Ivan Marx Tank: overcoat exterior; blast and two coat epoxy coating on interior; and install an interior ladder, an overflow screen, and a ladder gate. Refer to Appendix D for the Maintenance Proposal. A site visit conducted by PACE on April 19, 2013 confirmed the need for a new exterior coating, as the existing paint is original 1989, with old graffiti present, and moss growth and black mold in many areas. It is recommended the overflow be screened, and fencing be constructed around the tank as it is located in a remote recreational hiking area. PACE does not recommend an interior ladder, as these contribute to rust problems. If interior tank access is needed, a manway is already in place at a more convenient entrance location near the ground. Only interior paint touchups are believed to be needed at the present time, specifically on the overflow and roof beams. Complete recoating of the interior is recommended in the next 20 years. Either a new well or a new tank must be constructed in order to take the Ivan Marx Tank offline to recoat it. If a new tank is not constructed, system pressure would need to be maintained by the new VFDs at the wells and/or upgraded Booster Pump Station.

Timber Drive Tank: The Maintenance Proposal completed by USC recommended the following improvements for the Timber Drive Tank: overcoat exterior; blast and two coat epoxy coating on interior; replace the vent; and install an overflow screen and a flex cable safety climb. PACE concurs with these recommendations with the exception of a flex cable safety climb as this is not typical on tanks. Improvements are recommended to be completed in the next 10 to 20 years.

Mountain View Tank: The Maintenance Proposal completed by USC recommended the following improvements for the Mountain View Tank: whip blast and overcoat exterior; blast and two coat epoxy coating on interior; repair the top portion of overflow and bullet holes; and install an interior ladder. PACE concurs with these recommendations with the exception of an interior ladder installation. Improvements are recommended to be completed in the next 10 to 20 years.

An existing 0.4 MG prestressed gunite below-grade tank constructed in 1963 is located at the well site. The tank has been inactive for some time and is now an attractive nuisance. It is in great disrepair and the roof is sagging. As such, destruction of this tank is recommended to eliminate an existing safety hazard.

Photo 12: 0.4 MG Below-Grade Tank

DISTRIBUTION SYSTEM

Computer analysis of the existing distribution system indicates that, in general, the system maintains adequate pressures for all service areas during MHD, except for those problem areas discussed in the PRESSURE ZONES SECTION of this Master Plan. The computer model also indicates that a number of the analyzed water mains in the west area are undersized and tend to limit fire flows. Most of these undersized

pipes are 6-inch and smaller, and demonstrate the need for strengthening the system with larger water mains as the old steel mains are replaced.

In addition to hydraulically analyzing the existing 2012 system, a second computer model was developed to analyze anticipated flow conditions for the year 2042. ISO fire flow requirements were used to test adequacy of the system using the hydraulic model. To be conservative, the highest required commercial fire flow of 3,500 GPM was used to simulate fires in the business district, and 4,500 GPM was simulated at Burney High School. In residential areas, a fire flow of 1,500 GPM was simulated. The recommended pipeline improvements shown on Plate 2 are summarized in two categories:

1. Pipelines needed to correct existing deficiencies, including inadequate fire flows, and not related to development. These improvements are shown in Table 14 at the end of the text, and are prioritized and staged for construction over the next 10 to 30 years.

2. Pipelines needed to keep pace with projected development, and possibly at the same time provide for future growth, are shown as “As Developed.” Oftentimes, these pipelines are in excess of the size needed to serve that particular development. “As Developed” indicates there is no existing significant development along this water main and installation can likely wait until development proceeds.

The following are brief descriptions of distribution system improvements that are projected to be needed now or in the future:

Toronto Avenue: An existing 6-inch pipeline on Toronto Avenue in front of the Burney Elementary School consistently has leaks and is in very poor condition. It is recommended approximately 700 feet be replaced with 8-inch pipeline (Pts. 1 to 2 on Plate 2).

Hwy 299 from Elm Street to Cedar Street: Approximately 300 feet of existing 6-inch in this area has had a history of leaks and repairs. It is recommended this be replaced with an 8-inch pipeline (Pt. 3 on Plate 2).

Hwy 299 from Enterprise Drive to Cornaz Drive: About 900 feet of existing 6-inch along this section of Highway 299 is AC pipe. It is recommended this be replaced with an 8-inch PVC pipeline (Pt. 4 on Plate 2).

Black Ranch Road from Hwy 299: Approximately 1,300 feet of existing 6-inch on Black Ranch Road is AC pipe. It is recommended this be abandoned in place and replaced with an 8-inch PVC pipeline (Pt. 5 on Plate 2).

Las Colinas Trailer Park: At current MHD flows, the existing 6-inch pipeline on Tamarack Avenue to the trailer park is not adequate to provide a 1,500 GPM fire flow. It is recommended approximately 1,500 feet of pipe be paralleled with 8-inch, or upsized to 10-inch, to provide required fire flow (Pts. 6 to 7 on Plate 2).

Hwy 299 from Mountain View Road to Roff Way: Portions of existing 6-inch pipelines in this area have velocities between 5 and 6 feet per second (FPS) during simulated fire flows at MHD. Additionally, some hydrants in this business district area do not meet recommended fire flows of 2,250 GPM for 2 hours. Anticipated 30-year growth compounds these problems. While redundancy of hydrants in this area may be adequate for fire suppression, it is recommended approximately 1,300 feet of 6-inch pipes be upsized to 8-inch as shown on Plate 2 to reduce velocities and increase fire flows in commercial areas (Pts. 8 to 9 on Plate 2).

Hwy 299 from Ayris to Crews Way East: Portions of existing 6-inch pipelines in this area have velocities between 5 and 6 FPS during simulated fire flows at MHD. It is recommended approximately 1,000 feet of 6-inch pipes be upsized to 8-inch, and 400 feet of 8-inch be increased to 10-inch to reduce velocities and improve fire flows in this area (Pts. 10 to 11 on Plate 2). It is important to note, these improvements will

result in velocities of just under 5 FPS. Future growth will cause more of a strain on this key central area of the water system. Therefore, it is highly recommended the District consider installing 10-inch pipes in place of existing 6 and 8-inch pipelines in this area, or paralleling them with 8-inch pipes.

Commerce Way: Approximately 500 feet of pipeline along Commerce Way is 6-inch and does not meet the required 3,000 GPM fire flow. As such, it is recommended this portion be upsized to 8-inch to meet current and future 30-year fire flows (Pt. 12 on Plate 2).

Burney High School & Elementary School: As indicated in the 2004 ISO system review, fire flow requirements at Burney High School and Burney Elementary School are 4,500 and 4,000 GPM, respectively. As shown in Table 5, the existing system is unable to provide these flows. Therefore, it is recommended approximately 5,000 feet of primarily 6-inch pipe be paralleled with 12-inch to complete looping and provide required fire flows adequate at 30-year demands (Pts. 13 to 14 on Plate 2).

Timber Drive 12-inch Pipeline: At 2042 peak demands, the existing 12-inch pipeline from the Timber Drive Tank to Juniper Avenue has velocities larger than 6 FPS. As such, it is recommended approximately 950 feet of this portion of pipeline be paralleled with 10-inch (Pts. 15 to 16 on Plate 2).

Other Improvements: Not all pipelines that will be needed in the future are shown on the Master Plan. Some pipelines will be needed to serve new developments, and many will be needed to account for growth generally beyond the 30-year period.

It should be noted the size and location of water mains shown “As Developed” are very nebulous at this point. In these cases, the full extent of future development and how it will be served is not well known. The District should consider participating in the over-sizing costs of “As Developed” pipelines that are in excess of the size needed to serve a particular development, even though full capacity of the pipe may not be

needed for many years. Over-sizing normally refers to pipelines of 10-inch diameter and larger, which carry water to an area, whereas basic mains distribute water within a given area. Many agencies contribute the incremental cost of pipe materials plus an allowance of 15% of that amount, which is intended to cover extra labor required to install the larger size pipe.

Reduced pressure principle backflow prevention devices (RPPs) in the District are currently located below grade due to freezing concerns. While this minimizes the possibility of freezing, it does not allow for ease of testing, O&M, and visual inspection. Manufacturers recommend only placing RPPs where there is adequate drainage. If freezing conditions are likely, it is recommended RPPs be placed inside a building or enclosed in a separate insulated structure. Many municipalities serving cold climate areas, including South Tahoe Public Utility District and Truckee Meadows Water Authority, have integrated these recommendations into their construction standards. It is suggested the District adopt construction standards requiring above grade insulated RPP installations where possible for future installations.

REPLACEMENT OF DETERIORATING STEEL PIPELINES

As discussed previously, the distribution system consists of about 160,000 feet of 6-inch and larger pipelines, excluding individual service lines. Approximately 53,000 feet (34%) consist of old steel pipelines, which are shown on Plates 1 and 2 in light blue. Depending on whether the steel pipe is lined and coated, and the corrosiveness of the soil, steel pipelines typically have a useful life of 55 to 75 years. As steel deteriorates, the interior surface of the pipe becomes rougher and the pipe's capacity decreases. Furthermore, a majority

Photo 13: 6-inch Corroded Steel Pipe

of the system piping smaller than 6 inches in diameter is steel, which is too small a diameter to consistently provide fire flows above 1,500 GPM.

Undersized steel pipes could cause low pressures and inadequate fire flows in the Low Pressure Zone during periods of high demand. Increasing the diameter of water mains would increase pressures and improve fire flows. Therefore, it is recommended the District replace most of the steel pipelines over the next 10 to 50 years. Specific steel pipes to be replaced in the next 10 years with recommended diameters are shown on Plate 2 and include:

1. Approximately 700 feet of existing 2-inch steel main on Fir Street east of Tamarack Avenue should be replaced with an 8-inch PVC main to improve fire flows in this area (Pts. 17 to 18 on Plate 2).

2. Existing 1 and 1½-inch steel mains on Cedar Street from Woods Avenue to the end of Tamarack Avenue should be replaced with approximately 700 feet of 8-inch PVC mains to improve fire flows in this area (Pts. 19 to 20 on Plate 2).

3. Approximately 1,200 feet of existing 2 and 3-inch steel mains on the north side of Mountain View Road should be replaced with 12-inch PVC pipes to complete the loop and improve fire flows at the schools in this area (Pts. 21 to 22 on Plate 2).

Above recommended pipe diameters are the minimum size and may need to be increased depending on fire flow requirements and future development beyond the 30 years considered herein. As the remaining old and undersized steel mains are replaced in the future, it would be desirable to upgrade them with larger PVC mains where needed to improve fire flows. It is recommended the District have an oversizing policy that requires a minimum 8-inch for any main that could be logically extended in the future, and 6-inch for dead end pipes less than 2,000 feet in length, which is a CDPH minimum. The minimum sized piping in a new development should also be sized to adequately provide the required fire flows for that development. When piping is

required to be larger, then the developer has to pay for the correct size. If future development beyond the proposed development is envisioned, then the District has the option to over-size the proposed development mains and potentially recapture the difference from future customers.

Replacement construction costs will vary depending upon the type of existing roadway surface that will have to be excavated and replaced, the type of soils to be excavated, and other site-specific conditions.

The District should continue to maintain a log of the date, type, and condition of the pipe for all repairs made to existing steel mains, as well as the remainder of the distribution system so replacement can be prioritized. This data will also be valuable in applying for possible grant and loan funding.

WATER METERS

Water meters are the primary method by which water suppliers take in revenue. Meters degrade in accuracy over time, resulting in lost revenue to the utility. In 1997, the East Bay Municipal Utilities District concluded it was cost-effective to cycle replacement of all residential meters every 15 years. Many utilities have a policy of replacing or testing their meters at least every 15 to 20 years (i.e., City of Redding).

The District has already begun installing radio read meters to reduce meter reading costs, and facilitate meter reading in the wintertime. However, the District does not currently have, but should consider, a standard O&M policy for replacements such as replacing meters 20 years or older, etc. Cycling at least 5% of the meters per year (about 70 meters) would help maintain accurate meters, most likely increase revenues, and potentially reduce the amount of unaccounted for water. Particular attention should be paid to large meters as there is significantly higher flow through these meters; therefore, potential for greater losses in revenue. This justifies replacing larger meters more frequently than every 20 years.

In addition to a meter replacement policy, it is recommended the District develop a policy for all new service connections regarding parallel fire flow meters. New fire code requirements now indicate a separate parallel meter and/or service pipe be installed on all new service connections to allow for improved fire fighting capabilities. As such, many municipalities are installing 1-inch meters to meet fire sprinkler demands. It is recommended the District consider such a policy, and adjust capacity charges accordingly if/when the policy is adopted.

FIRE HYDRANTS

There are about 166 fire hydrants located throughout the distribution system, only one of which is a wharf hydrant located at the end of Gunsmith Way. Wharf hydrants are usually equipped with two 2½-inch nozzles to connect two fire hoses, and may not be capable of producing the fire flows predicted from hydrant tests due to high head losses required to pass water through them. Therefore, it is recommended this hydrant be replaced with a standard hydrant, which has a 4-inch connection and two 2½-inch connections, when additional development occurs beyond the end of Gunsmith Way.

Reportedly all system hydrants are in good working condition with operable shutoff valves. Based on ISO standards, all but a few hydrants deliver the required fire flow. Refer to the PRESSURE ZONES Section herein for details of these areas. ISO requirements call for a maximum hydrant spacing of 1,000 feet. All standard hydrants within 1,000 feet of a building, measured as hose can be laid by apparatus, are credited as follows: 1,000 GPM for hydrants within 300 feet; 670 GPM for 301 to 600 feet; and 250 GPM for 601 to 1,000 feet. A preliminary review of existing hydrant locations resulted in adequate spacing requirements throughout the District in all but a few locations. Refer to Plate 1 for approximate existing hydrant locations. Refer to Plate 2 for recommended new hydrant locations to improve firefighting capabilities.

CONTROL SYSTEMS

Since raising the elevation of the antennae on the Ivan Marx Tank, the SCADA control system and signals have been operating relatively well. However, there are still occasional communication fails from both the Ivan Marx and Mountain View Tanks during rain events. Well radio communications are reportedly approximately 12 years old.

The National Instruments Lookout software currently in use by the District is outdated and no longer supported. Therefore, it is recommended the SCADA system be upgraded to current software for which service, parts, and support is available. Communication improvements are recommended to be completed at that time to avoid failures due to rain. It is anticipated directing the signal from the Ivan Marx Tank to a repeater at the Timber Drive Tank, rather than straight to the District Office, should resolve this issue.

ESTIMATES OF COST AND FINANCIAL CONSIDERATIONS

BASIS OF COST ESTIMATES

Pipeline and other facility costs were determined on the basis of previous projects competitively bid in the northern California area. It should be noted these estimates are based, in many instances, on extremely preliminary information. For example, at the report stage it is often difficult to determine whether a new main will require pavement replacement, or how much utility interference will be encountered. These costs cannot be properly evaluated until final design. Consequently, estimates in this report should be considered as “order-of-magnitude” and may vary from actual construction costs for a particular project element. However, overall Master Plan costs should be reasonably close and satisfactory for the basis of planning a financial program.

For future or delayed work, an allowance for construction cost increases must be considered. During the last 10 years, general construction costs have increased at an average rate of about 3.6% per year. Similarly, the average rate of increase for the last 3 years has been about 2.8% per year. Therefore, it is recommended the District inflate cost estimates in this report annually based on the Engineering News Record Construction Cost Index (ENR CCI), which currently stands at 9,681 for February 2014, and is continuously updated to reflect current economic trends.

To obtain total project costs, construction contingencies and indirect costs were added to construction costs. Construction contingencies at this stage are usually estimated to be 25% of construction costs. Indirect costs include engineering, administration, and legal costs, and typically amount to about 20% of construction cost plus contingency. The total of the above two categories was taken at 45% for total project costs indicated herein. This figure may vary considerably depending upon complexity of the work and uncertainties of construction costs and raw materials. Where bonding or other loans are involved, costs for interest during construction and other finance costs, such as

bond discounts, legal and bond counsel fees, and reserve funds should be added in preparation of the financial plan.

IMPROVEMENTS COSTS

Note that costs presented in this report are capital improvements costs only, which do not include O&M costs of the water system. Project costs for each of the proposed improvements are shown in Table 14 at the end of this report. Improvements are listed in categories of potential immediate, near-term, and long-term improvements.

Time Periods

Immediate-Term (2012 to 2022): Improvements where existing capacity is clearly less than the calculated theoretical and are thus needed as soon as possible, or are needed to improve safety or performance of existing facilities (preferably completed within 5 to 10 years).

Near-Term (2022 to 2032): Other improvements that are marginal in capacity, or will be over the theoretical capacity in the next 10 to 20 years, or are needed to improve performance or efficiency.

Long-Term (2032 to 2042): Remaining improvements that are theoretically needed to have adequate capacity to meet proposed 30-year development. Scheduling of these water facilities will likely be more definite in future Master Plan updates.

A preliminary cost estimate for the staged water system improvements is shown in Table 14 and includes improvements needed to first correct existing system deficiencies, then to expand the water system to meet anticipated future 30-year demands. Table 14, together with the recommended improvements shown on Plate 2, in essence, are the Master Plan of Water Improvements. As shown in Table 14,

approximately $3,319,000 (February 2014 dollars) worth of water system improvements are anticipated to be needed in the next 10 years.

Recommended improvements include the eventual replacement of old steel distribution mains and services as they continue to deteriorate. It is not possible to evaluate the condition of each section of the water system at this time without performing extensive field testing. Therefore, sequencing of the replacement work will probably be determined by the frequency of repairs required in various areas. Longevity of steel piping is controlled by factors such as type and thickness of the steel piping installed, type of coating, corrosiveness of the soil, and normal operating pressures. Considering the magnitude of potential replacement costs, the District should develop a financial plan that provides for replacing the majority of the old steel pipes in the next 10 to 50 years in order to further improve system pressures and fire flows, and limit water leakage losses. Complete replacement of these pipes requires the District set aside approximately $74,500 per year for 50 years. This has been included in Table 14. In addition, the District should develop a policy for meter testing and replacement to reduce the loss of revenue due to old inaccurate meters, and ensure AMR installation is completed in a timely fashion.

Cost estimates in Table 14 do not include all improvements needed to provide adequate fire flows to all areas of the District; however, replacement of the existing steel piping over the years will significantly increase fire flows.

Additional improvements are scheduled for subsequent time periods. Project costs scheduled in these time periods are based upon the projected growth of 1%. Final timing of the individual projects will be dependent upon actual growth experienced. It is recommended this Master Plan of water improvements be re-evaluated every 10 years.

FINANCIAL CONSIDERATIONS

As a part of this Master Plan, a recommendation for a Capacity Charge for the District water system has been prepared. As of 2009, the District had a $3,488.10 Capacity Charge for a 5/8-inch water connection, which is equivalent to one HE. This charge is strictly a Capacity Charge, and the costs for the actual service line and meter are an additional Service Connection Fee if the District installs the connection. The Capacity Charge is updated annually based upon the ENR CCI, which stands at 9,681 as of February 2014.

Capacity Charges are often referred to as Connection Fees, but this is a misleading term applied to a charge that is intended to be a revenue producer for capital improvements. Such fees are also often called capital improvement fees. In the American Water Works Association (AWWA) Manual M26, “Water Rates and Related Charges” these fees are referred to as System Development Costs.

Herein, such fees will be referred to as Capacity Charges which are intended as a fair share payment towards capital improvements, specifically referred to herein as General Improvements. Although the purpose of this engineering analysis is to develop an updated Capacity Charge, other common charges will first be discussed, termed herein as the Service Connection Costs, and Local Improvement Costs.

Service Connection Costs

The District should consider charging a Service Connection Cost unique to each installation based upon cost incurred including:

1. Service line and meter box
2. Meter
3. Main line extensions

Refer to Appendix C for Water Service Charges as of 2009. It does not appear the District currently charges a Service Connection Cost. The Capacity Charge should be independent of Service Connection Costs, even though both are typically imposed at the time of building permit application or time of actual connection. For most water services currently being installed, the subdivision developer has already installed a service line and meter box (Item 1), and it is only necessary to charge a new customer for providing and installing a meter. However, if no service line exists, the new customer must pay for both. If the District does the work, it should charge on a time and expense basis because each service is unique.

In some cases, it is necessary to have a main line extension (Item 3) to serve a new property. In this case, the new customer should also pay for the main extension, including possible fire hydrants. Each main extension will be different, so the District should charge on a time and expense basis. The portion of any main extension that is in front of a given parcel being served is called a local improvement as discussed below. The portion of a main extension that is off-site (necessary to get to the property being served) is referred to as off-site improvements. The costs for such off-site improvements are usually borne by the developer, although the District does share in these costs if it benefits. The District should publish the Water Service Charges to new customers so that a potential customer is not surprised by additional costs they were not fully aware of.

Local Improvement Costs

When it is necessary to distribute costs of a water system to the ones it serves (or will serve), it is customary to require each property owner to pay for their fair share of the piping system that is needed to serve their property. In the simple case of a property that is on one side of the street, the cost of the pipeline in the street in front of that parcel should be shared 50/50 with the properties on the other side of the street.
The pipeline size needed to serve the property is usually a minimum size of 6 or 8 inch. In addition, each property owner pays for their share of the cost of a fire hydrant that

generally serves it and several other parcels.

These costs are commonly referred to as Local Improvements Costs. Local Improvement Costs for water facilities are typically paid for as follows:

1. At the developer's expense in the case of new subdivisions. These costs are ultimately paid for by the lot owner when they buy the lot.

2. By assessment district. Again, the costs are borne by the property owner.

3. By paying for the cost of a main extension.

The above three items are the most common for new local improvements in recent years.

There are two special cases as follows:

4. Funded by a grant. This is really a gift to those benefiting property owners. The cost was paid by all tax payers.

5. Funded by the revenues from water sales. Some districts have used water revenues to either pay for a loan for the original system or line extension or simply have installed line extensions with available funds. We do not see this being done as often today for local improvements except in special cases. Such funding is usually reserved for general improvements or main replacements.

The main principle to establish in trying to have an equitable system of finance is that Local Improvement Costs should be paid for by the property owners that benefit. Local Improvement Costs can also include pump stations and storage tanks (or similar facilities) if such facilities are needed for specific properties over and above the typical General Improvement Costs.

General Improvement Costs (Used To Determine Capacity Charge)

General Improvement Costs are defined as those improvements needed for a total water system that are not funded by Local Improvement Costs and Service Connection Costs. These costs include the following:

1. Water supply and treatment facilities.

2. Supply piping, i.e., the piping from the raw water source to the treatment plant and then to the first benefiting property.

3. Pump stations benefiting large areas of a district.

4. Tanks benefiting large areas of a district.

5. Pressure reducing stations needed for proper functioning of the distribution system and serving major areas.

6. Over-sizing of pipelines, usually greater than 8-inch diameter, to provide benefit to properties other than the property being served.

7. Interconnections of piping that are not necessary for service to existing properties (e.g., looping of pipelines, pipelines across government land, etc.).

8. Other improvements, which a district decides, are of benefit to the entire district. For example, an office building, monitoring facilities, etc.

It should be noted, water main replacements in kind are usually funded by revenues from water sales, but the upgrading cost of such mains are usually considered a general improvement and in some cases a local improvement.

Capacity Charge

The purpose of the Capacity Charge is to generate capital from new customers to pay for their fair share of General Improvements. Following are three possible ways this charge can be determined.

Method 1: Determine all capital costs of general improvements that have been paid in the past and divide by the number of present users being served. This is a buy-in cost, or a proportionate cost share of the current system. AWWA Manual M26 refers to this approach as the "equity" method.

Method 2: Determine all capital costs of general improvements that have been paid in the past and those that are planned for the future, and divide this total cost by the total of both the present and future users. This is a combination of Methods 1 and 3.

Method 3: Determine all capital costs of general improvements needed to serve future users and divide that amount by the number of future users that will benefit. This method often uses a defined planning period, such as a 10 to 20-year period, or a specific growth amount (number of new connections). AWWA Manual M26 refers to this approach as the "incremental cost" method. However, under the incremental cost method, the capacity charge is determined by dividing a project cost by the number of users benefiting. In this case, the project may or may not have already been built, but it is reflective of costs needed to serve future users.

Each method has its application. Each also has advantages and disadvantages. Capacity Charges have become the norm (especially since Proposition 13, Jarvis-Gann Initiative), and its purpose is to raise revenue for capital improvements and to bring about equity – so new customers pay a fair share of the capital cost of general improvements.

For the Burney Water District, Method 3 (future improvement costs divided by future connections benefitting) is believed to be the most applicable for several reasons: Methods 1 and 2 would require a considerable effort to determine past costs and depreciation of the present system, and would involve discretionary decisions regarding how to treat previous grants, debt financing, depreciation, and replacement costs. Method 3 is likely more representative of the true cost incurred for future users and, thus, is more easily supported. AWWA Manual M26 states “this method is considered most appropriate when a significant portion of the capacity required to serve new customers must be provided by the construction of new facilities.”

Refer to Table 14, RECOMMENDED IMPROVEMENTS & CAPACITY CHARGE BASIS. The General Improvement Costs were developed based on the in-depth study of the water system discussed herein. Following the cost for each item in Table 14 is a percentage assigned for new development. A portion of some improvements benefit existing users and are needed to resolve existing deficiencies. For those improvements that benefit both future and existing customers, a proportional share in the cost burden is recommended.

Cost proportioning is based upon the number of future HEs that will occur over the next 30 years based upon the 1% growth rate assumed herein. Given these estimates, the District will add 834 HEs over the next 30 years, which represents 26% [834 / (834 + 2,335)] of the total number of HEs. Based upon the estimates presented here, the Water Capacity Charge as calculated in Table 14 is $4,260 per HE. Customers that represent more than one HE, such as a commercial development, should pay a proportionately larger fee based upon the estimated number of HEs as determined by the District’s engineer.

The remaining portion of the Capital Improvement Plan (CIP) ($9,188,000 - $644,000 = $8,544,000) not paid by future customers is paid by existing customers through the monthly user fee. This cost spread over the existing 2,335 HEs for the next 30 years amounts to $10.16 per month per HE.

It is highly recommended the District adjust these fees annually, based on the ENR CCI to account for inflation. It is also appropriate to recalculate the fee every 5 to 10 years, especially at the time of preparation of an updated master plan. Before adopting a new Capacity Charge, an attorney should be consulted and shown this report to ensure the process is done correctly pursuant to government code.

In adopting a Capacity Charge, the District should be aware of similar charges by other water districts or water utilities. Systems such as Burney, where the supply is from local wells, tend to have lower computed Capacity Charges. The Cottonwood Water District just revised their capacity charge to $6,419 per 3/4-inch meter. Due to economy of scale, smaller systems such as Cottonwood or Burney, typically compute higher charges than cities such as Redding, currently at $6,888.90 per 5/8-inch meter. All this and Table 14 suggests that a fee of $4,260 is a bargain for new customers to the Burney Water District.

Capacity Charge Based Upon HEs

The District continues to base the Capacity Charge on an HE basis. For customers larger than a single HE, many utilities use the installed meter size and AWWA capacity ratios to determine the appropriate number of HEs to charge. Currently, a 5/8-inch meter is typically the base unit for one HE. However, many municipalities are installing 1-inch meters in order to meet fire sprinkler demands, which the District should consider. Water consumption by commercial development is typically dependent on the type of enterprise. The HE determination is based upon the meter size requested with approval from the District Board. See Appendix C.

TABLES

TABLE 1
Burney Water District
Water Master Plan
WELL DATA

Well	Depth (Ft)	Casing (In)	Date Const.	Depth to Perf. (Ft)	Well Head Elev (Ft)	Pump Flow (GPM)	Typ. TDH (Ft)	Typ. Static Water Level (Ft)	Typ. Summer PWL (Ft)	Typ. Draw Down (Ft)	Pump HP[3]	Pump Type	Pump Speed (RPM)	KWH Per Ac-Ft	$/AC-FT[2]
No. 6	297	16	1969	250	3245	1600	247	236	237	1	200	Line shaft turbine	1770	556	96
No. 7	332	16	1982	250	3245	1500	437	236	237	1	250	Line shaft turbine	1775	824	114
No. 8	300	12	1981	250	3245	1500	247	236	237	1	178	Line shaft turbine	1800	79[1]	116

(1) Therms per Ac-Ft
(2) Average of June 2012 to March 2013 pumping costs.
(3) According to pump nameplate.

TABLE 2
Burney Water District
Water Master Plan
PRESSURE REDUCING VALVE STATIONS

Type[1]	Location	Size (In)	Elev (Ft)[2]	Max Upstream Pressure (PSI)[3]	Downstream	
					HGL (Ft)	Pressure (PSI)
N.C.	Park Ave[4]	10	3166	125	3293	55
N.C.	Hudson St[4]	10	3204	110	3331	55
N.C.	Bartel St	2	3160	120	(5)	(5)

(1) N.C. - normally closed
(2) Elevations taken from H20Net water model and may be off by as much as ±20% from actual field elevations.
(3) Static pressures as indicated in the model.
(4) The PRV is normally closed, and should be set about 10 PSI below the downstream pressure to deliver water when a fire flow is required.
(5) The PRV is normally closed, and opens only under special circumstances.

TABLE 3
Burney Water District
Water Master Plan
PRESSURE ZONE LIMITS

Zone Name	Normal Static HGL[1] (Feet)	Highest Service Point		Lowest Service Point		Primary Pressure Source Control
		Elev (Feet)	Min. Static Pressure (PSI)	Elev (Feet)	Max. Static Pressure (PSI)	
Low	3262	3220	18	3102	69	Timber Dr Tank
High	3443	3220	97	3140	131	Ivan Marx Tank

[1] HGL is the hydraulic gradient elevation under static conditions. This is usually the elevation of the normal water surface in a reservoir controlling pressure in the zone. Otherwise, it is set by minimum pressure at a pressure reducing valve. The static pressures can be obtained by subtracting the elevation of any location from the HGL, and dividing by 2.31 to obtain pressure in PSI. These pressures exclude pipeline friction loss.

TABLE 4
Burney Water District
Water Master Plan
WATER STORAGE RESERVOIR DATA

Reservoir Name	Type	Diameter (Feet)	Date Completed	Volume (MG)	Pressure Zone Served	Base Elevation (Feet)	Height (Feet)	Maximum Water Surface Elev (Feet)	Normal Water Surface HGL (Feet)
Ivan Marx Tank	Welded Steel	80.5	1989	1.5	High	3408.4	41	3445.4	3443
Timber Drive Tank	Welded Steel	80	1994	1.2	Low	3235.3	32	3264.3	3262
Mountain View Tank	Welded Steel	155	2001	4.0	Low	3235.2	32	3264.2	3262

TABLE 5
Burney Water District
Water Master Plan
HYDRAULIC MODEL CALIBRATION AND HYDRANT TEST RESULTS [1]

Test No.	Location	Required Fire Flow (GPM)[2]	Pressures Static (PSI)	Pressures Residual (PSI)	Field Flow (GPM)	Field Flow @ 20 PSI (GPM)	Hydrualic Model Results Static Pressure (PSI)	Hydrualic Model Results Flow @ 20 PSI (GPM)	Hydrualic Model Results Accuracy (%)
1	Enterprise & Commerce	3000	55	50	1060	3032	58	4000	132%
2	Erie & Toronto	4000	51	46	1020	2732	58	3000	110%
3	37162 Washburn[3]	1500	50	46	1258	3734	50	3600	96%
4	Marquette & Timber Hill	1500	60	50	1160	2452	56	2500	102%
5	20120 Arrowood[3]	1500	64	45	1243	1956	57	1700	87%
6	20364 Arrowood[3]	1500	52	43	1215	2410	55	2250	93%
7	Pine & Tamarack	2250	40	32	1130	1853	44	2300	124%
8	Main & Roff	2250	55	43	1130	2014	58	2050	102%
9	Tamarack & HWY 299	3500	100	90	1310	4027	114	4800	119%
10	Burney High School on Campus	4500	52	45	1150	2613	50	2600	100%

(1) Field tests completed during ISO review September 3, 2003.
(2) Required fire flows based on 2004 ISO recommendations.
(3) Field tests completed by Burney Fire District performed May through October.

TABLE 6
Burney Water District
Water Master Plan
ANTICIPATED GROWTH AREAS

Plate 2 Number	Land Use Designation	Acres	ESTIMATED HEs[3]	Pressure Zone	ADWF (MGD)
1A	Residential[1]	261	256	Low	0.146
1B	Commercial[2]	66	530	Low	0.302
2	Residential[1]	6	8	Low	0.004
3	Residential[1]	10	17	High	0.009
4	Residential[1]	9	8	Low	0.005
5	Residential[1]	16	13	High	0.007
6	Residential[1]	2	2	Low	0.001
	TOTALS	369	834		0.475

[1] Residential property is assumed to be 1 HE per residence.
[2] Commercial property is assumed to be 8 HEs per acre.
[3] One HE equals 570 GPD.

TABLE 7

Burney Water District

Water Master Plan

HISTORICAL WATER USAGE

Year	Services [1]	Production[2] Annual (MG)	Consumption[3] Annual (MG)	Consumption[3] Unaccounted %
2001	1,360	-	-	
2002	1,365	545	-	
2003	1,370	444	-	
2004	1,377	539	-	
2004	1,377	539	-	
2005	1,436	520	-	
2006	1,436	503	-	
2007	1,407	496	-	
2008	1,382	534	-	
2009	1,331	523	-	
2010	1,330	471	-	
2011	1,325	396	394	1%
2012	1,364	485	467	4%

(1) Number of active meter connections.

(2) Production taken from well logs.

(3) Consumption taken from monthly meter reads.

TABLE 8

Burney Water District

Water Master Plan

ANNUAL WATER PRODUCTION BY MONTH (MG)

Month	2007	2008	2009	2010	2011	2012	6-Year Avg
January	25.7	27.6	31.8	24.7	24.4	25.4	26.6
February	28.5	26.7	25.8	26.3	23.5	25.2	26.0
March	22.4	22.3	20.1	21.5	23.0	26.3	22.6
April	26.3	35.7	29.5	28.1	20.5	19.4	26.6
May	58.4	54.2	56.6	38.0	31.3	46.7	47.5
June	67.7	64.7	51.3	52.9	36.0	57.2	55.0
July	73.3	77.4	84.8	74.7	45.4	65.3	70.1
August	71.7	71.6	67.5	65.6	54.2	81.0	68.6
September	43.5	57.2	57.9	49.8	49.3	54.0	51.9
October	31.5	43.6	37.1	35.9	31.5	39.5	36.5
November	27.0	20.8	26.5	27.4	28.1	24.5	25.7
December	19.7	32.4	34.0	26.0	29.3	20.3	27.0
Total	495.7	534.2	522.9	470.9	396.5	484.7	484.1
ADD (MGD)	1.36	1.46	1.43	1.29	1.09	1.33	1.33
MMD (MGD)	2.36	2.50	2.74	2.41	2.10	2.61	2.45
MDD (MGD)	2.37	3.60	3.32	3.57	3.93	3.36	3.36
MMD/ADD	1.7	1.7	1.9	1.9	1.9	2.0	1.9
MDD/ADD	1.7	2.5	2.3	2.8	3.6	2.5	2.6
MHD/ADD	2.6	3.7	3.5	4.2	5.4	3.8	3.9
MDD/MMD	1.0	1.4	1.2	1.5	1.9	1.3	1.4
Total Connections	1407	1382	1330	1330	1335	1364	1358

ADD = Average day demand
MMD = Maximum month demand
MDD = Maximum day demand
MHD = Maximum hourly demand

TABLE 9

Burney Water District

Water Master Plan

2012 MONTHLY WATER PRODUCTION (MG)

Month	Well 6	Well 7	Well 8	Total
January	9.1	16.2	0.12	25.4
February	9.1	16.0	0.10	25.2
March	8.8	17.3	0.14	26.3
April	10.8	8.5	0.12	19.4
May	22.0	24.7	0.08	46.7
June	29.1	28.0	0.13	57.2
July	34.2	30.0	1.07	65.3
August	43.4	37.5	0.11	81.0
September	26.8	27.1	0.09	54.0
October	16.4	22.9	0.15	39.5
November	9.0	15.4	0.10	24.5
December	8.5	11.7	0.04	20.3
Total	227.2	255.2	2.2	484.7

TABLE 10

Burney Water District
Water Master Plan
HOUSEHOLD EQUIVALENTS DETERMINATION

Top Users	AUG 2012 Consumption (GAL)	HEs
1	16,199,107	581
2	3,044,360	109
3	1,160,447	42
4	1,123,571	40
5	887,876	32
6	530,631	19
7	391,114	14
8	342,180	12
9	326,203	12
10	315,207	11
11	289,401	10
12	281,398	10
13	251,223	9
14	199,716	7
15	180,567	6
16	176,229	6
17	170,768	6
18	166,998	6
19	162,391	6
20	159,474	6
21	147,835	5
22	138,006	5
23	137,423	5
24	135,194	5
25	134,266	5
26	133,870	5
27	126,861	5
28	126,554	5
29	121,999	4
30	113,464	4
31	102,925	4
32	101,952	4
33	99,559	4
34	98,684	4
35	98,392	4
36	96,567	3
37	94,435	3
38	94,308	3
39	91,443	3
TOTALS	28,552,596	1,023

HE DETERMINATION

Total Water Consumed (Month)	66.0	MG
Water Consumed by Top Users (Month)	28.6	MG
Remaining Water	37.4	MG
Total Services[1]	1,364	
Top 39 Services	39	
Remaining Services	1,325	
MMD Consumption/HE	900	GPD/HE
MMD Production/HE[2]	1,100	GPD/HE
MDD Production/HE[3]	1,500	GPD/HE
Top 39 Consumer HEs	1,023	
Remaining HEs	1,325	
Total HEs	2,348	
Production ADD/HE[4]	**570**	GPD/HE

[1] Active services are the number of properties billed in Aug 2012. Where multiple meters serve one property the water use was combined.

[2] To convert consumption to production multiply by 1.19, as 19% more water was produced than consumed in Aug 2012.

[3] Use a ratio of MDD to MMD of 1.4, based on 6-year average.

[4] Production ADD HE has been rounded to the nearest 10.

TABLE 11
Burney Water District
Water Master Plan
SUMMARY OF DESIGN VALUES USED IN WATER SYSTEM ANALYSIS

DESIGN RATIOS [1]

Maximum Month/Average Day	MMD/ADD	1.8
Maximum Day/Average Day	MDD/ADD	2.5
Maximum Hour/Average Day	MHD/ADD	3.8

	Year	
	2012	**2042[2]**
Household Equivalents (HEs)	2,335	3,169
Annual Production, MG	485	659
Average Day Demand, MGD	1.3	1.8
Maximum Month Demand, MGD	2.6	3.3
Maximum Day Demand, MGD	3.4	4.8
Maximum Hour Demand, MGD	5.3	7.2
Average Day Demand/HE, GPD	570	570
Maximum Day Demand/HE, GPD	1,500	1,500

[1] Refer to Table 7 for six-year history of production values. Six-year average of values used for ADD, MMD & MDD.

[2] Estimates based on 30-year growth areas being fully developed.

TABLE 12
Burney Water District
Water Master Plan
ESTIMATED HEs AND DEMANDS BY PRESSURE ZONE

Pressure Zone	Existing 2012 System					2042		
	Regular HEs	Top Users HEs	Total HEs	MDD (MGD)	MHD[1] (MGD)	Total HEs	MDD (MGD)	MHD[1] (MGD)
High	300	593	893	1.4	2.0	923	1.4	2.1
Low	1,025	417	1,442	2.2	3.3	2,246	3.4	5.1
Totals	1,325	1,010	2,335	3.5	5.3	3,169	4.8	7.2

[1] Use a ratio of MHD to MDD of 1.5, based on 6-year average.

TABLE 13

Burney Water District

Water Master Plan

STORAGE REQUIREMENTS

Pressure Zone	MDD (MGD)	Equal. Storage (MG)	Emerg. Storage (MG)	Fire Designation	Fire Storage (MG)	Desirable Storage (MG)	Existing Zone Storage (MG)	Comments
		20%*MDD	25%*MDD					
Low								
2012	2.18	0.44	0.55	C/I	0.63	1.07	5.2	Adequate storage
2042	3.40	0.68	0.85	C/I	0.63	1.53	5.2	Adequate storage
High								
2012	1.35	0.27	0.34	C/I	0.63	0.90	1.5	Adequate storage
2042	1.40	0.28	0.35	C/I	0.63	0.91	1.5	Adequate storage
Total								
2012	3.53	0.71	0.88	C/I	0.63	1.97	6.7	Adequate storage
2042	4.79	0.96	1.20	C/I	0.63	2.44	6.7	Adequate storage

C/I = Commercial/Industrial fire flow of 3500 GPM for 3 hours, or 0.63 MG storage.

TABLE 14

Burney Water District

Water Master Plan

RECOMMENDED IMPROVEMENTS & CAPACITY CHARGE BASIS [1]

Item No.		ESTIMATED COST[2] Immediate Term (2012-2022)	Near Term (2022-2032)	Long Term (2032-2042)	% Attributed to Growth	Cost Attributed to Growth
GENERAL WATER SYSTEM IMPROVEMENTS						
1	Replace 700' of (E) 6" on Toronto Ave with 8" (Pts. 1 to 2)	$52,000			0%	$0
2	Replace 300' of (E) 6" on HWY 299 from Elm to Cedar with 8" (Pt. 3)	$22,000			0%	$0
3	Replace 900' of (E) 6" AC pipe on HWY 299 with 8" PVC (Pt. 4)	$67,000			0%	$0
4	Replace 1,300' of (E) 6" AC pipe on Black Ranch Road with 8" PVC (Pt. 5)	$96,000			0%	$0
5	Replace 1,500' of (E) 6" on Tamarack Ave to Las Colinas Trailer Park with 10" (Pts. 6 to 7)	$130,000			0%	$0
6	Replace 1,300' of (E) 6" on HWY 299 from Mountain View to Roff with 8" (Pts. 8 to 9)		$96,000		0%	$0
7	Parallel 1,400' on HWY 299 from Ayris to Crews Way East with 8" (Pts. 10 to 11)		$105,000		0%	$0
8	Replace 500' of (E) 6" on Commerce Way with 8" (Pt. 12)		$37,000		0%	$0
9	Parallel 5,000' at Burney High & Elementary Schools with 12" (Pts. 13 to 14)		$510,000		0%	$0
10	Parallel 950' from Timber Drive Tank to Juniper with 10" (Pts. 15 to 16)			$82,000	26%	$21,320
11	Replace 700' of (E) 2" steel main on Fir east of Tamarack with 8" (Pts. 17 to 18)	$52,000			0%	$0
12	Replace 700' of (E) 1" and 1 1/2" steel mains on Cedar from Woods to Tamarack with 8" (Pts. 19 to 20)	$52,000			0%	$0
13	Replace 1,200' of (E) 2" and 3" steel mains on Mountain View with 12" (Pts. 21 to 22)		$122,000		0%	$0
14	New fire hydrants - 7 complete			$40,000	0%	$0
15	Radio read meter replacement at 5% (~70 meters) per year	$28,000	$28,000	$28,000	26%	$14,560
16	Steel pipeline replacement at 2% (~1,060 LF) per year for 50 years	$745,000	$745,000	$745,000	26%	$387,400
	GENERAL WATER SYSTEM IMPROVEMENTS SUBTOTAL:	**$1,244,000**	**$1,643,000**	**$895,000**		**$423,000**
BOOSTER PUMP STATION IMPROVEMENTS						
17	New pumps, valves, and electrical	$200,000			0%	$0
18	75kW portable diesel generator & trailer	$60,000			0%	$0
19	Manual transfer switch	$10,000			0%	$0
	BOOSTER PUMP STATION IMPROVEMENTS SUBTOTAL:	**$270,000**	**$0**	**$0**		**$0**
WELL IMPROVEMENTS						
20	New well at Washburn Park with 300' of 12" main to Park Ave	$500,000			0%	$0
21	VFD pump, motor, & electrical at Well No. 7		$60,000		0%	$0
22	VFD pump, motor, & electrical at Well No. 6			$80,000	26%	$20,800
23	Rotork valve and piping at Well No. 7		$50,000		0%	$0
24	Emergency generator at Well No. 7	$50,000			0%	$0
25	Emergency generator at Well No. 6		$50,000		0%	$0
26	Upgrade Well No. 8 from oil lubed to water lubed		$10,000		0%	$0
27	Misc improvements - bolt all wells to pedestals and balance, well sounder access, exterior lights, phone line, remove trees	$25,000			0%	$0
28	SCADA hardware & software upgrade	$60,000			0%	$0
	WELL IMPROVEMENTS SUBTOTAL:	**$635,000**	**$170,000**	**$80,000**		**$21,000**
STORAGE IMPROVEMENTS						
29	Mountain View Tank exterior recoat and interior touch-ups immediately, compete recoat in 30 years	$100,000		$690,000	0%	$0
30	Ivan Marx Tank fencing		$20,000		0%	$0
31	Ivan Marx Tank recoating interior and exterior		$300,000		0%	$0
32	Timber Drive Tank recoating interior and exterior		$250,000		0%	$0
33	Demolish 0.4 MG concrete tank	$40,000			0%	$0
	STORAGE IMPROVEMENTS SUBTOTAL:	**$140,000**	**$570,000**	**$690,000**		**$0**
	TOTAL ESTIMATED CONSTRUCTION COSTS:	$2,289,000	$2,383,000	$1,665,000		$444,000
	Contingency & Indirect Costs (45%):	$1,030,000	$1,072,000	$749,300		$200,000
	TOTAL ESTIMATED PROJECT COSTS:	**$3,319,000**	**$3,455,000**	**$2,414,000**		**$644,000**
	Cumulative Project Costs:	$3,319,000	$6,774,000	$9,188,000		

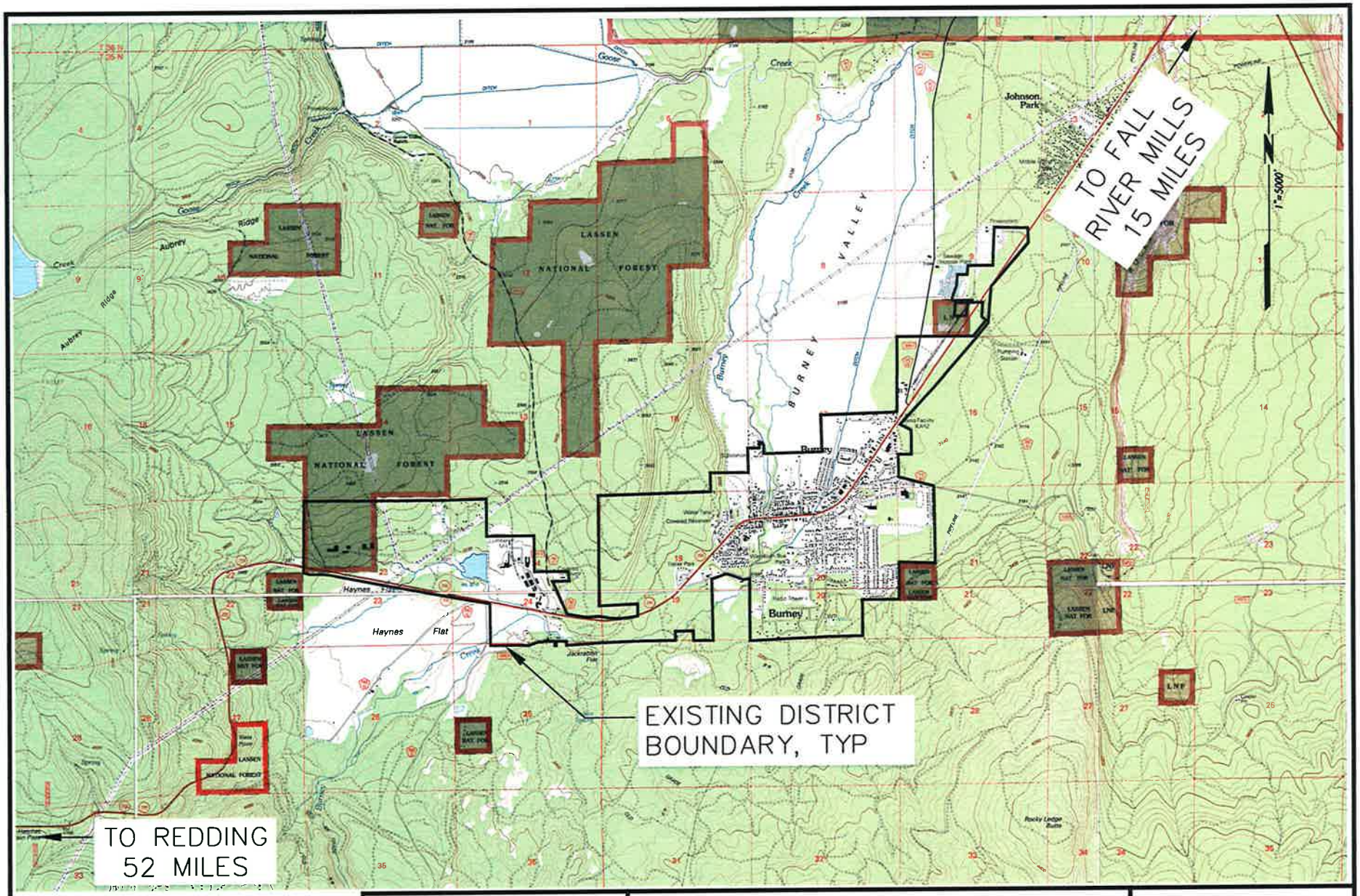
Total Cumulative Project Costs w/o Growth Components:	$8,544,000
Average Yearly Cost for 30 Years:	$284,800
Number of Existing HEs:	2335
Average Yearly Cost per HE:	$121.97
Average Monthly Cost per HE:	**$10.16**

Additional HEs Over Next 30 Years:	834
Additional Future Capacity Charge Per HE:	$772
Existing Capacity Charge:	$3,488
Total Future Capacity Charge:	**$4,260**

[1] Based on a 1% annual growth rate.

[2] All costs in February 2014 dollars at an ENR index of 9681.

FIGURES

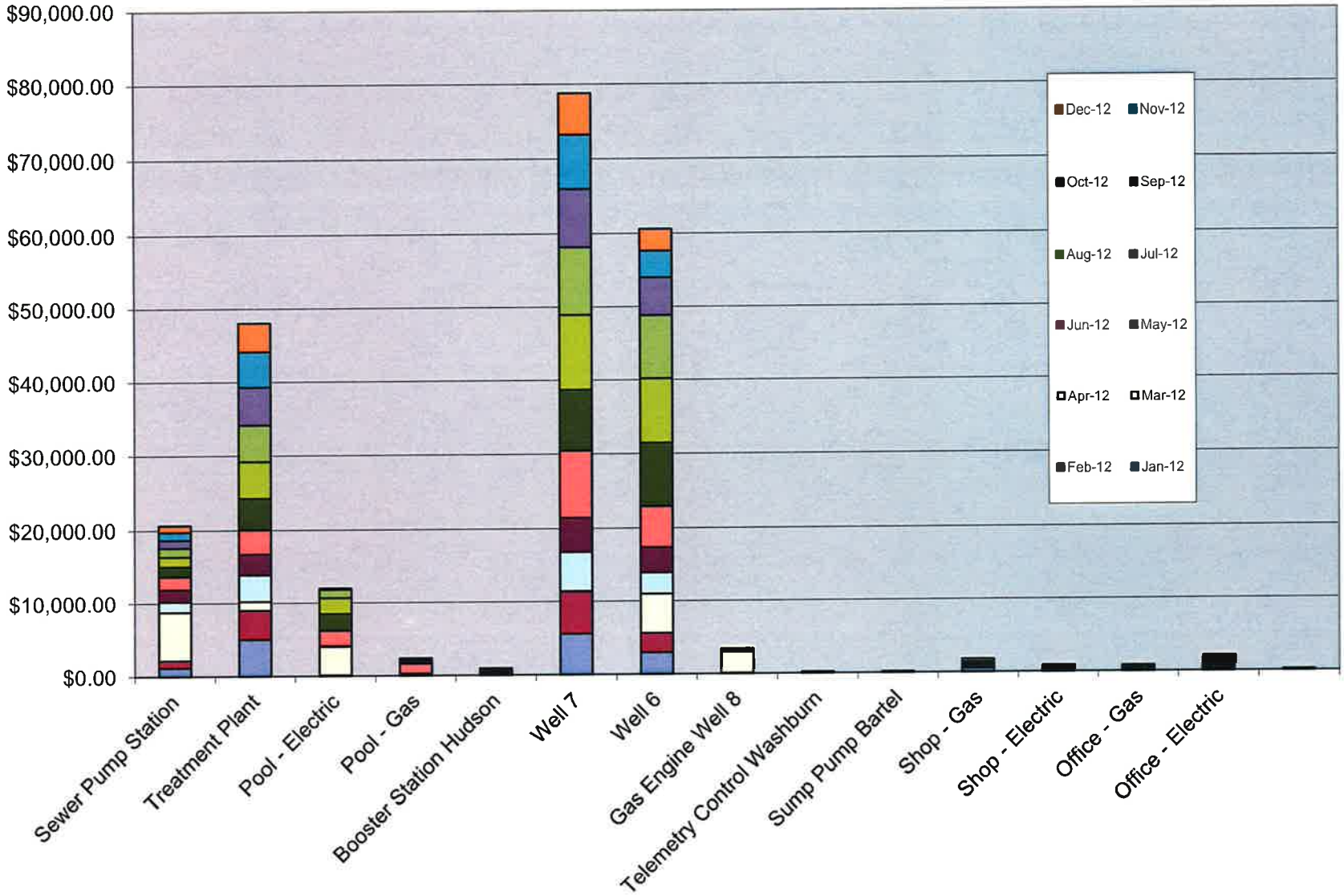


PACE ENGINEERING
REDDING, CALIFORNIA

BURNEY WATER DISTRICT BOUNDARY MAP

FIGURE 1
DATE: 3/14
JOB #306.24

FIGURE 2
Burney Water District
Water Master Plan
2012 Electrical and Gas Costs



APPENDIX A

State of California—Health and Human Services Agency
California Department of Public Health

RON CHAPMAN, MD, MPH
Director

EDMUND G. BROWN JR.
Governor

August 18, 2011

Burney Water District
20222 Hudson Street
Burney, CA 96013

Attention: Willie Rodriguez

Subject: Public Water System No. 4510003 – Annual Inspection Report

On July 13, 2011, staff engineer Gene Parham met with you and Mike Skelly to conduct an annual field inspection of the Burney Water District (District) domestic water supply system serving the Burney area. The Annual Inspection Report and System Record are enclosed for your review and action.

The field inspection, along with a review of the water system's records, found the District's domestic water supply system to be conscientiously operated and in reasonably good condition. Records show the three water wells have more than sufficient source capacity to meet current maximum day demands. In addition, the District has sufficient storage capacity to meet the current California Waterworks Standards requirements for a metered domestic water supply of your size. Based on past water quality monitoring, the water produced by each of the District's three wells meets State Drinking Water Standards, and records show the District did not have any bacteriological failures last year.

During the field inspection review, it was determined Well 07 will no longer be used as a routine bacteriological sample site. Therefore, the current bacteriological sample siting plan needs to be updated. District staff needs to update the sample siting plan and send a copy of the revised plan to this Office for our review and records as soon as possible.

The District is currently required to collect at least one set of ten tap water samples from the distribution system for lead and copper monitoring once every three years during the summer months. The last set of ten tap water samples was collected on September 9, 2009. As a reminder, the next set of ten tap water samples for lead and copper monitoring needs to be collected during June, July, August, or September of 2012.

The attached "System Record" sheet includes the above requirements as well as other needed water system corrections noted during the field inspection. The Record sheet should be reviewed by District staff and any remaining needed corrections made per the assigned order number.

Division of Drinking Water and Environmental Management
415 Knollcrest Drive, Suite 110, Redding, CA 96002
(530) 224-4800 (530) 224-4844 Fax
Internet Address: www.cdph.ca.gov

If you have any questions, please contact Gene Parham at (530) 224-4863 or myself at (530) 224-4800.

Michael J. McNamara, P.E.
Lassen District Engineer
DRINKING WATER FIELD OPERATIONS BRANCH

Enclosures

California Department of Public Health
Drinking water Field Operations Branch
Inspection Report

Purveyor Burney Water District **System Number** 4510003
Person(s) Contacted/Position Willie Rodriguez / District Manager, Mike Skelly / Field Supervisor,
Address 20222 Hudson Street, Burney, CA 96013 **Phone Number** (530) 335-3582
Date of Inspection July 13, 2011 **Reviewing Engineer** Eugene Parham, P.E.
Last Annual Inspection March 24, 2010 (SRT) **District Engineer** Mike McNamara, P.E.

A. INTRODUCTION

1. **Permit Status** (Date Issued/Amendment Purpose)
Full: Issued **April 24, 1970**, for source Wells 03, 05 and 06, and 0.15 MG, 0.23 MG and 0.4 MG Storage Tanks; Wells 03 and 05, and all permitted storage tanks abandoned.
Amendment(s): Issued **May 4, 1979**, for booster station, including fire flow pump, and piping; amended permit also issued **December 23, 1982**, for Wells 07 and 08.
Are the permit provisions complied with? Yes.
Is the permit up to date? No, the permit does not include the 1.5 MG Ivan Marx Tank, 1.2 MG Timber Drive Tank, or 4 MG Mt. View Tank.
List data sheets on file: Well Sources 06, 07, and 08 in permit; Ivan Marx, Timber Drive, and Mt. View Storage Tanks, Booster Station, and Distribution System in permit file.

2. **Changes in System**
Since last annual inspection: Last inspection of 2010 stated "increased frequency of exercising Well 08 and booster pump station to weekly (both are standby status)," and District staff continues to do so. Began installing smart meters. Have about 80 installed.
Planned future changes: Recoat tank exteriors.
Have an engineering firm update Camp, Dresser, and McKee's 1978 Master Water Plan.
Upgrade electrical at wells and pump station to meet current codes. These items were noted in the last inspection and remain on the "planning list." Also plan to continue installing smart meters on all the remaining service connections.

3. **Consumer and Production Data**

Year	Annual Demand (MG)	Max Month Demand (MG)	Max Day Demand (MG)	Max Day Demand (gpm)	No. Metered Service Connections	GPM PDPC	Population
2001	--	82.0	3.0	2,083	1,360	1.53	3,000
2002	545	79.8	3.9*	2,664*	1,365	1.95*	3,000
2003	444	68.7	3.3*	2,307*	1,370	1.68*	3,000
2004	539	76.9	3.7*	2,584*	1,377	1.88*	3,000
2005	520	83.6	4.0*	2,809*	1,436	1.96*	3,000
2006	503	82.0	4.0*	2,755*	1,436	1.92*	3,217
2007	496	73.3	3.5*	2,462*	1,407	1.75*	3,217
2008	532	82.0	3.1	2,153	1,382	1.56	3,217
2009	523	84.8	3.6	2,469	---	---	---
2010	471	74.7	3.6	2,475	1330	1.86	3220+/-
Average	**508**	**78.8**	**3.6**	**2,476**		**1.61**	

Note: Max day demands and GPM PDPC with asterisks are conservative estimates calculated by multiplying max month demand by factor of 1.5 and dividing by 31 days. All other values from AR.

Discussion and appraisal
The data in the table above was provided by the District in its Annual Reports (AR) to the Department. The water demands for this domestic water supply system are somewhat high for a metered water system; however, the District has several large commercial customers which use a considerable amount of water. The District's highest recent reported maximum day demand (MDD) was 3.6 million gallons per day (MGD) in 2010.

B. SOURCE DATA

Source	Status	Capacity gpm (MGD)	Comments
Groundwater			
Well 06	**Active**	**2,100 (3.02)**	**Constructed in 1969; 200 HP water lubed turbine pump; serves the Low Zone; controlled by water level in the Timber Drive Tank; auto pump to waste at start up.**
Well 07	**Active**	**1,400 (2.02)**	**Constructed in 1982; 250 HP water lubed turbine pump; serves the High Zone; controlled by water level in the Ivan Marx Tank; auto pump to waste at start up.**
Well 08	**Active (operated as if standby)**	**850 (1.22)**	**Constructed in 1982; 200 HP oil lubed (Chevron ISO32) turbine pump; serves Low Zone during power outages; controlled manually; auto pump to waste at start up; powered by right angle direct drive natural gas engine; exercised weekly every Friday.**
	Total	**4,350 (6.26)**	

Well Features: There is a water meter at each of the wells. All well pumps are housed in insulated and heated locked masonry block structures, inside a common locked fence. Wells 06 and 07 are controlled by a SCADA system which senses storage tank pressures. In the event of low water system pressure or a power outage, the 24-hour alarm system autodials the operator call-down list. Well vents were properly screened and the pump bases properly sealed. Well 08 has a defective seal on the base of the pump where small copper lines enter the well bore. This seal needs to be corrected to help prevent contaminants from entering the well. Emergency chlorination injection points and bacteriological sample points are installed, and the well houses were clean and neat.

Discussion and appraisal (i.e., does source capacity comply with Waterworks Standards [WWS]?) Section 64554(a) of the WWS requires public water systems have the source capacity "to meet the system's maximum day demand (MDD)." MDD is determined pursuant to subsection 64554(b)(1) as the day with the highest usage during the past ten years. The District's 6.26 MGD source capacity is sufficient to meet the reported 2010 MDD of 3.6 MGD.

C. TREATMENT

1. **Surface Water Sources:** None.

2. **Groundwater Sources**
   Is continuous disinfection provided? No.
   Describe facilities: N/A.
   If disinfection is not provided, are provisions and connections for emergency chlorination provided per ODW guidelines? The District maintains disinfection facilities at Wells 06 and 07 that, if needed, could be used at Well 08. LMI 0.58 gph chemical feed pumps and 30 gallon solution day tanks are used. Solution is NSF approved 65% sodium hypochlorite purchased from Sierra West Chemicals.
   Discussion and appraisal: Records show the raw well water is typically free of total coliform bacteria. In the past, the District chlorinated the distribution system quarterly as a precaution against bacteriological contamination. During this inspection, Willie stated they will no longer perform quarterly chlorination of the system. If coliform positive tests are obtained in the future, the District will address the issue at that time.

3. **Other Treatment or Blending Facilities**
   Describe facilities and parameters treated/blended (i.e. iron, and manganese, fluoridation, nitrate, corrosion control, organics, etc.): None.

4. **Describe Records Maintained of Treatment:** The District does not provide continuous treatment requiring monthly monitoring records.

D. STORAGE DATA

Name	Type	Capacity (MG)	Zone	Comments
Ivan Marx Tank (west of town)	Welded Steel	1.5	High	Constructed 1988; water clean and clear; ladder and hatches locked; vents and overflows screened; very little sand; remote location behind locked gate; some old graffiti; moss growth on tank exterior reportedly returned soon after 2009 pressure wash.

Name	Type	Capacity (MG)	Zone	Comments
Timber Dr. Tank (in town)	Welded Steel	1.2	Low	Constructed 1994, enlarged, by increasing height, in 2003; ladder and hatch locked; vents and overflows screened; water clean and clear; very little sand, behind perimeter chain link fence and locked gate; black mildew on tank exterior.
Mtn. View Tank (east of town)	Welded Steel	4.0	Low	Constructed 2001; water clean and clear; ladder and hatch locked; vents and overflows screened; very little sand; behind perimeter chain link fence and locked gate; exterior side coating beginning to peel; rust noted on tank overflow inlet.
	Total	**6.7**		

Are all data sheets completed and on file? Yes.
Are ODW coating procedures adhered to? As reported, yes.

Discussion and appraisal: The tanks are generally in good condition. With the exception of some rust, the interior coatings appear to be in good condition. The black powder mildew and moss on the exterior tank walls of Timber Drive and Ivan Marx Tanks is quite visible and may be a problem for the tank coatings if not controlled. The exterior coating of Mountain View is beginning to peel, and may need recoating in the near future.

Does storage capacity comply with Waterworks Standards? Section 64554(a)(1) of the WSS requires systems with 1,000 or more service connections, to be able to meet four hours of peak hourly demand (PHD) with source capacity, storage capacity, and/or emergency source connections. PHD is determined pursuant to subsection 64554(b)(1) by multiplying the average MDD hourly flow by a peaking factor (pf) of at least 1.5 to obtain the PHD. To determine compliance, the system as a whole as well as each zone is evaluated. As shown in the table below, the District is able to meet 4 hours of PHD with source capacity in each zone and the system as a whole.

Storage Capacity Compliance with the Waterworks Standards

Pressure Zone	Water Sources	Capacity (gpm)		Number services	MDD[2] (gpm)	PHD[3] (gpm)	Storage volume needed for 4 peak hrs (MG)	Storage (MG)
		Source	PS[1]					
Low	Wells 06 and 08	2,950		957	1,780	2,670	0	5.2
High	Well 07	1,400	1,000	373	694	1,056	0	1.5
Total		4,350		1330	2,474	3,726	0	6.7

Notes: [1]Pump Station (PS); [2]Maximum Day Demand (MDD) = 1.86 gpm per connection from 2010; [3]Peak Hour Demand (PHD) = 1.5 x average hourly flow during MDD (per WWS)

E. TRANSMISSION FACILITIES

Describe transmission: None.

Are there low head lines? No.

F. DISTRIBUTION SYSTEM

1. Pressure Zones

Pressure Zone Name	Pressure Range	Water Sources	Storage Capacity	No. of Conn.
Low	45 – 55 psi	Wells 06 and 08	5.2 MG	957
High	50 - 90 psi	Well 07 and BPS	1.5 MG	373

2. Booster or Reducing Stations

Station	Capacity (gpm)	Status	From Zone	To Zone	Comments
Booster Pump Station	1000	Standby	Main	High	Diesel engine, direct drive, oil and water cooled; exercised every Friday.
	VFD 2 x 20 HP ~50 ea.	Standby	Main	High	Electric motors, water cooled lubrication; operated as lead-lag or can both run at same time; piping stub-out and pump pedestal for an additional pump; exercised weekly every Friday.

3. **Mains**

Material	Amount	Size	Condition	Comments
PVC	48%	6 to 18 in.	Good	
Tar coated steel	40%	4 to 10 in.	Fair	
Galvanized steel	11%	3/4 to 3 in.	Poor	Continuing to remove from system
Asbestos cement	1%	6 in.	Unknown	Continuing to remove from system. Six inch section remaining on Black Ranch Road.
Total	**100%**			

4. **Discuss leak history during past 12 months (mains and connections):**
The 2010 AR reported one (1) service connection break or leak, three (3) main break breaks or leaks, one (1) low pressure event, no (0) boil water orders, and no (0) other system problems. All were corrected.

5. **Are Distribution facilities constructed in accordance with Waterworks Standards (WWS)?**
According to previous inspections and discussions with District personnel, it is our understanding the distribution system is constructed according to WSS.

6. **Describe water main and sewer line separation practices:**
The District is aware of and complies with our policy.

7. **Extent of lead pipes, joints, and/or lead solder used in distribution system and present policy:** As reported, there are no lead joints and/or solder in the distribution system.

8. **Discussion and appraisal:** With only four leaks reported for 2010, the distribution system appears to be in good condition. Most of the AC pipe in the system has been removed. Dead end mains are being looped and old steel mains are being replaced with PVC pipe in the north area. Weekly operation of the booster pumps turns over the water in the pumps and associated piping to help prevent taste and odor complaints.

G. WATER QUALITY and MONITORING

1. **Bacteriological Monitoring**
Description of program: District personnel collect 5 routine samples per month, on the same day, from the distribution system; the samples are delivered to Basic Laboratory, Redding, for analysis.
Bacteriological sampling siting plan (BSSP) approved and current (do we have a copy?): The Department has a copy of the District's current BSSP, signed by Mike Skelly on 03/14/2010, which includes routine and repeat sample collection addresses, map locations, and lab analyzing the samples.
Groundwater rule (GWR) Addendum to the (BSSP) approved and current (do we have a copy?): The Department has a copy of the District's approved GWR Addendum, signed by Willie Rodriguez on 05/06/2010, which includes the well sources that contribute to each

of the nine routine sample sites, and a schematic of the system, prepared by PACE Engineering, which shows the wells, tanks, and two pressure zones.

Number of samples required for population: 3,301 – 4,100 population requires four samples per month.

Number of samples required for service connections: 1,181 - 1,460 service connections requires 4 samples per month.

Controlling factor (population or service connections) and number of samples required: Population and service connections both require 4 samples per month.

MCL violations in past year? None in 2010 and through June of 2011. Records show that the District most recently failed the bacteriological standards in September of 2007. The District also show bacteriological failures in 03/2005, 08/2004, 04/2002, 10/2001, 09/2001, and 03/2001.

Special/additional monitoring done in past year: None.

Discussion and appraisal: The District is required to take four (4) routine bacteriological samples per month. Records show they were taking an average of five samples per month by rotating through nine (9) routine bacteriological sample sites including Well 07. Well 07 is the main source for the water system and the District wanted to take an occasional source water bacteriological sample. Since the Department does not consider a source an appropriate routine bacteriological sample site, the District should continue to collect at least four bacteriological samples from the distribution system each month. Under the newly implemented Groundwater Rule, if a routine bacteriological sample is total coliform positive, the District is required to take a source water sample within 24 hours and have it tested for total and fecal coliform bacteria. This gives the District the source water data they want and complies with the Groundwater Rule. Willie agreed and will revise their current Bacteriological Sample Site Plan, (BSSP) to show eight (8) routine sample sites from which to rotate through. As reported, the District also collects bacteriological samples after construction and/or major repairs, and may collect samples in response to customer complaints, if appropriate. District personnel need to ensure the order of rotation in the BSSP is followed sequentially and work to mitigate operational issues, such as freezing and broken valve handles, that prevent using a sample site in the routine bacteriological sample site rotation program.

2. **Chemical Monitoring**

Description of program: The District's certified operators collect chemical water quality samples as required, which are delivered to Basic Lab for analysis.

Discussion and appraisal: Under Title 22 Code of Regulations, effective 09/08/1994, nitrate monitoring is required annually, nitrite is required every three years, secondary/general physical and inorganic are required every three years until three rounds have been analyzed, and then are required every nine years, and volatile organic chemicals (VOC) are required every six years at all active sources. Under the Radionuclide Monitoring Rule, effective 06/11/2006, radionuclide monitoring is required every three, six, or nine years, depending upon historical monitoring results. It has been determined the three wells, which are located on the same parcel, draw water from the same aquifer; therefore, only Well 07 is sampled and the results are considered representative of the other two wells. The Department's latest chemical monitoring schedule for Well 07 shows the District is current for all required chemical monitoring. An updated chemical monitoring schedule is attached for the District's use.

For public water systems with groundwater sources and no known asbestos bearing formations in their watershed, the Regulations allow the sources to be designated as nonvulnerable to asbestos contamination. A review of the California Division of Mines and Geology, Department of Conservation, geologic map of your area shows no Mesozoic ultrabasic (ub) intrusive rock in your groundwater source watershed. Ub rock may or may not contain surpenite, an asbestos containing formation. The District's groundwater sources are, therefore, considered nonvulnerable to asbestos contamination and no sampling is required.

Records show, there is asbestos cement (AC) pipe in the distribution system. As shown in the following table, the source water is aggressive and considered corrosive; therefore, a sample must be collected every nine years at a point in the system being served water by AC pipe. As shown in the second table below, the District's 1997 and 2010 asbestos samples from the distribution system were non-detect. Based on asbestos sampling required every nine years beginning in 1997, an asbestos sample from the distribution system being served water by AC pipe will be due again in 2015.

Aggressive Index Worksheet

Source Name:	**Well 07 (representative of Well 06, 07, and 08)**		
Sample Dates:	**12/09/2003 and 02/09/2009**		
Chemical	**In formula**	**Result**	**Units**
Hydrogen Ion Concentration	pH	7.89	pH units
Total Alkalinity as CaCO3	A	56	mg/L
Calcium as Ca		8.18	mg/L
Calcium Hardness as CaCO3	H	20.45	mg/L
Aggressive Index (AI) = pH + log(A*H)	**If AI < 11.5, water is considered aggressive.**		**Aggressive?**
Aggressive Index	**AI**	**10.95**	**Aggressive**

Asbestos Results in the Distribution System

Date Due	Date Collected	Result	Location (Notes)
1997	05/01/1997	ND	Black Ranch Road (RJ Lee Group Lab)
2006	04/27/2010	ND	Black Ranch Fire Hydrant (EMSL Lab - Method 100.1)
2015			Black Ranch Road
Note: Results in million fibers per liter (MFL) exceeding 10 micrometers (um) in length			

3. **Other Organics:** Not vulnerable, therefore not required

4. **Trihalomethanes and Haloacetic Acids:** Not chlorinating, therefore not required.

5. **Lead and Copper**
   Description of program: California's Lead and Copper Rule (LCR) took effect on 12/11/1995. Our records show that the District has completed two rounds of standard lead and copper monitoring at 20 sites and six rounds of reduced monitoring at 10 sites with no

exceedence of the lead or copper 90th percentile action levels of 0.015 parts per million (ppm) and 1.3 ppm respectively. Under reduced monitoring, the District is required to collect 10 tap samples from the distribution system, in accordance with Department procedures, once every three years.

Lead and Copper Monitoring Record

All reporting units are in parts per million (ppm)			Lead	Copper	
Action Level			0.015	1.3	
Round	Date	No. of Samples	90th percentile results		Comments
1	11/24/1993	20	0	0.053	Standard monitoring
2	05/25/1994	20	0	0.058	Standard monitoring
3	08/17/1995	10	0	0.085	Reduced monitoring
4	07/23/1997	10	0	0.052	Reduced monitoring
5	06/15/2000	10	0	0.00	Reduced monitoring
6	10/03/2003	10	0	0.00	Reduced monitoring
7	12/26/2006	10	0	0.00	Reduced monitoring
8	09/09/2009	10	0	0.055	Reduced monitoring
9	**June - September 2012**	**10**	**Due**	**Due**	Reduced monitoring

Discussion and appraisal: The next round of reduced sampling is due between June and September 2012.

6. **Is an approved water quality monitoring plan on file:** Not required; Section 64416 requires systems with >10,000 contiguous SC to submit a monitoring plan for all monitoring except bacteriological.

7. **Status of Drinking Water Source Assessment Program (DWSAP)**

Source	Status	Completion Date	Date Sent to Utility	Comments
Well 06	Complete	January 1999	January 1999	Completed by Mike Lewis, CDPH
Well 07	Complete	January 1999	January 1999	Completed by Mike Lewis, CDPH
Well 08	Complete	January 1999	January 1999	Completed by Mike Lewis, CDPH

8. **Emergency Response Plan (ERP):** As a system serving less than 3,300 population, the District was not required to conduct a vulnerability assessment and ERP under the 2002 *Bioterrorism Preparedness and Response Act*. However, the District reports that it has an ERP dated 02/13/2009. The Department commends the District is for taking the initiative to complete an ERP and encourages the District to keep its ERP up-to-date.

9. **Was the Consumer Confidence Report (CCR) sent to the customers?** Yes, 2010.
CCR Certification form received? The 2010 certification form was received on October 1, 2010.

Is a copy of the report on file with DDW? Yes.

Are there needed additions or changes? No.

H. OPERATION and MAINTENANCE

1. Planning and Personnel

Are system improvements made in accordance with the WWS? Yes.
Does the utility have up-to-date distribution system maps? Yes.
Is up-to-date copy of system schematic on file? Yes.
What is the minimum grade requirement? As a community system and based on a population of 1,001 – 10,000, the District is classified as a Grade D2 distribution system, requiring a state-certified D2 chief distribution operator and D1 shift operators. The District does not have any water treatment plants; therefore, a certified water treatment operator is not required. A summary of the District's operator certification levels is shown in the table below.

Operator Certification

Name	Title	Certification	
		Distribution	Treatment
		D2	None
Willie Rodriguez	District Manager	D2	T1
Mike Skelly	Superintendent	D2	T2
Richard Tavares	Operator	D1	T2
Don Sibert	Operator	None	None

Discussion and appraisal: The District is in compliance with the operator certification requirements with regard to operator certification level and assigning a chief operator. The District has appropriately certified operators for day-to-day operations as well as emergency response situations. As reported, Don will take the exams in the near future.

2. Cross-Connection Control Program

a) **Operating Rules or Ordinances:** Ordinance No. 1983 – W-1, Water Rules and Regulations, beginning Page 11.
Is there a copy of the cross-connection control ordinance on file? Yes.

Recent Backflow Prevention Assembly Testing Records

Year	Total Number in System	Number Installed	Number Tested	Number Failed	Number Repaired/ Replaced	Comments
2002	27	0	27	3	3	100% tested
2003	28	1	28	2	2	100% tested
2004	29	1	28	2	2	100% tested
2005	29	0	29	3	3	100% tested
2006	31	0	31	1	2	100% tested
2007	31	0	Not reported			
2008	32	1	31	2	2	100% tested
2009	--	--	--	--	--	--
2010	33	0	0	0	0	None tested

b) **Surveys:** None known. Willie will do if not done.

c) **Trained Person to Carry out the Program:** Richard Tavares is certified in backflow device testing (No.12383) and performs all backflow device testing for the District.

d) **Records of Device Locations, Tests, and Repairs:** The devices are tracked on a spreadsheet, which includes the device number, name, address, type, make, model, reason needed, date installed, date tested, pass/fail, date retested, pass/fail, and tester's initials

e) **System for the Testing of Backflow Preventers:** As a rule Richard checks all the devices in the system. CalTrans, however, checked its own six devices in 2009. The District owns the devices at the wastewater treatment plant (WWTP), sewage lift station, and swimming pool. All other devices belong to the customers on the premises where the devices are installed. The District charges the customers $50 for the annual testing. In the event a device fails, Richard cleans or repairs and retests. If it fails again, he directs the customer to replace the device or have the District replace it for them at District cost.

Discussion and appraisal: Records show the backflow devices were not checked in 2010. The backflow devices need to be tested as soon as possible and a written statement sent to this office showing the devices were tested. In addition, the 2009 and 2010 inspections found the RPP at the cemetery with soil pushed up around the vent by gophers, which prevents the device from operating properly. Recommend a vault similar to the one at the WWTP be constructed around the RPP, or the RPP can be replaced with a DC, which would provide sufficient backflow protection and operate properly even with soil pushed up around it.

3. **Complaints**

Describe complaint program: Complaints are received by the District personnel and, as reported, are recorded and appropriate action taken.

Type	Number			Comments
	2008	2009	2010	
Taste and odor	12	--	3	Flushed line.
Color	0	--		
Turbidity	0	--		
Visible organisms	0	--		
Pressure (high or low)	2	--	8	(low) Problem on customer's side of meter.
Waterborne illness	0	--		
Other	0	--	62	General, not related to water quality or quantity.
Total	**14**	--	73	

Discussion and appraisal: As required by Section 64453 of the California Domestic Water Quality and Monitoring Regulations, as of the 2010 AR, the District is maintaining records on water quality and system water outage complaints, verbal and written, received, and corrective actions taken.

4. **Notification of ODW of significant system problems:** Yes.
   Discussion and appraisal: District personnel are aware that the Department should be notified.

5. **Main Disinfection Procedure**
   Describe main disinfection procedure for new and repaired mains: The District follows AWWA procedures for main disinfection.
   Does the main disinfection program comply with AWWA specifications? Yes.
   Discussion and appraisal: Procedures appear to meet good water works procedures.

6. **Valve Maintenance Program**
   Describe program: The District has no formal program, but District staff locate and exercise valves during slow times.
   Are number and location of valves satisfactory? As reported, the valves are adequate.
   Discussion and appraisal: Will develop a valve maintenance program in the future if necessary.

7. **Flushing**
   Describe flushing program: The District flushes the hydrants once per year.
   Approximate number of dead ends: 85 **Percent with flushing valves:** All or near by.
   Discussion and appraisal: Based on the complaint record, the flushing program appears to be adequate. Future main flushing will try to be directional.

I. OVERALL SYSTEM APPRAISAL

The 2011 field inspection found the well houses clean, neat, and secured against unauthorized entry. The well vent at Well 06 was screened and all pump bases sealed at the pump base/concrete slab interface to help prevent contaminants from entering the well; however, Well 08 has an opening through the base plate that needs to be sealed. Wells 07 and 08 do not have air vents and do not need vents as there is no drawdown of the aquifer. Each well had a bacteriological and/or chemical sampling point and flow meter. LMI solution metering pumps, with solution tanks, are installed at Wells 06 and 07. Well 08 has an emergency chlorination injection point. Wells 06 and 07 are controlled by SCADA which senses storage tank levels. Well 08 is by manual operation only. All wells pump to waste at start-up to prevent water hammer from occurring. The wells have a 24-hour alarm system for low water pressure and power outages. Source and storage capacity exceed that required by the Waterworks Standards.

Records show required monthly bacteriological monitoring results and reports have been submitted to the Department in a timely manner; however, the 2009 Annual Report to Drinking Water was not sent to the Department. The Annual Report is used to help determine what monitoring is required by the District to comply with domestic water regulations and to help ensure the water delivered to the District customers is safe to drink at all times. I believe Willie Rodriguez, the new Manager of the District, will see that future Annual Reports are completed and sent to the Department as required.

During the inspection it was determined no backflow devices were tested in 2010. Section 7605 c. of Title 17 Code of Regulations states "backflow devices shall be tested at least annually....." This was discussed with Willie and he stated all backflow devices are scheduled to be tested this month. In addition, Willie is not aware of a cross connection survey being performed. If none can be found, a cross connection survey needs to be performed.

The District was chlorinating the water system on a quarterly basis as a precaution against positive routine total coliform results. During the inspection, Willie stated the District will no longer chlorinate the water system, thus ending the need to sample Well 07. The Groundwater Rule requires that Well(s) in service that could have contributed to a routine coliform positive sample from the distribution system be sampled for total and fecal coliform within 24 hours of receiving the results. Thus Well 07 would be sampled. Willie will revise the BSSP to reflect removing Well 07 as a routine sample point.

Based on the number of leaks reported, and findings during the file review and field inspection, it appears the domestic water supply system is in good condition, and operated in a conscientious and professional manner. Water system staff are appropriately certified and familiar with good waterworks practices. The District continues to replace old steel mains and asbestos cement pipe and loop dead end mains as time and finances permit.

J. APPENDIX

System Record
Chemical Monitoring Schedule

Report prepared by:

Eugene Parham P.E. Date
Associate Sanitary Engineer
DRINKING WATER FIELD OPERATIONS BRANCH

SYSTEM RECORD

Name of System: **Burney Water District** System No. **4510003**

Date Noted	Description of Needed Correction	Order No.	Reported Corrected	Confirmed Corrected
05/24/2005	The vent pipe on Well 06 should be turned down and screened to prevent contaminates from entering the well	3	05/25/2005	04/04/2009
05/24/2005	The gear head water return line through the base of Well 08 should be sealed to prevent contaminates from entering the well	3	12/12/2006	04/04/2009
12/11/2006	The bacteriological sample siting plan needs to be updated and sent to this Office for review and approval	2	02/13/2009	03/24/2010
12/11/2006	Need asbestos results from the distribution system, most recent distribution asbestos sample is from1997; distribution asbestos is due every 9 years	2	04/27/2010	04/27/2010
04/04/2009	Remove moss from Ivan Marx Tank	3	2009	Had grown back by 03/24/2010
04/04/2009	Maintain RPP vaults	1	02/12/2009	03/24/2010
04/04/2009	Place backflow test results on spread sheet for inspection review	3		03/24/2010
04/04/2009	Test for past due chemicals at well source	2	02/09/2009	02/09/2009
04/04/2009	Complete the 2008 Annual Report to Drinking Water and send to this Office	2	02/26/2009	02/26/2009
04/04/2009	Record all water quality or quantity customer complaints	2	02/26/2009	02/26/2009
04/04/2009	Complete data sheets for Ivan Marx Tank, pump station, and distribution system	3	02/12/2009	02/12/2009
07/13/11	The bacteriological sample siting plan needs to be updated, discarding the well as a routine sample point, and sent to this Office for review and approval.	2		
07/13/11	Test all backflow devices this year and submit record that devices were tested.	2		
07/13/11	Perform cross-connection survey.	3		
07/13/11	Correct the cemetery RPP from soil intrusion.	3		
07/13/11	Seal hole in Well 08 pump base.	3		
07/13/11	Submit future Annual Reports to the Department	3		

Order No:

1. Serious health hazard; corrective action must be taken immediately.
2. Critical system or operational defect and/or potential health hazard; must be corrected as soon as possible.
3. System or operational defect and/or potential contamination hazards of lesser public health significance. Must be corrected as workload permits.
4. System or operational defect and/or potential health hazard - costly to correct - to be included in any long-range water improvement project.

APPENDIX B

111 NORTH CANAL STREET SUITE 950 CHICAGO, IL 60606-7270
TEL: (312) 930-0070 (800) 444-4554 FAX: (312) 930-0017

March 17, 2004

Ann Walker, President
Burney Fire Board
37072 Main St.
Burney, CA 96013

RE: Public Protection Classification Results
Burney FD, Shasta County, CA

Dear Ms. Walker:

We wish to thank you and the other community officials for your cooperation during our recent Public Protection Classification (PPC) survey. ISO is the leading supplier of statistical, underwriting, and actuarial information for the property/casualty insurance industry. Most insurers use the PPC classifications for underwriting and calculating premiums for residential, commercial and industrial properties.

ISO has completed its analysis of the structure fire suppression delivery system provided in your community. We would like to report that the resulting classification is a Class 5/9. Congratulations on your commitment to serve the needs of your community's property owners and residents.

ISO will advice its subscribing insurers of this classification change within the next 30-days and assign an effective date of April 1, 2004. This date allows insurers the necessary lead time to incorporate the Public Protection Classification change into their policy rating systems.

Enclosed is a summary of the ISO analysis of your fire suppression services. If you would like to know how your community's classification could improve, or if you would like to learn about the potential effect of proposed changes to your fire suppression delivery system, please call us at the phone number listed below.

The PPC program is not intended to analyze all aspects of a comprehensive structure fire suppression delivery system program. It is not for purposes of determining compliance with any state or local law, nor is it for making recommendations about loss prevention or life safety.

If you have any questions about your classification, please let us know.

Very truly yours,

Public Protection Classification Dept.

Public Protection Classification Dept.
(800) 930-1677 Ext. 6209 SHR
cc: Robert May, Fire Chief
Bill Supa, Water Supt.

Grading Sheet For: Burney FD, CA
Shasta County

Public Protection Class: 5 / 9 Surveyed: September, 2003

Feature	Credit Assigned	Maximum Credit
Receiving and Handling Fire Alarms	7.29%	10.00%
Fire Department	20.51%	50.00%
Water Supply	32.69%	40.00%
*Divergence	-8.14%	
Total Credit	52.35%	100.00%

The Public Protection Class is based on the total percentage credit as follows:

Class	%
1	90.00 or more
2	80.00 to 89.99
3	70.00 to 79.99
4	60.00 to 69.99
5	50.00 to 59.99
6	40.00 to 49.99
7	30.00 to 39.99
8	20.00 to 29.99
9	10.00 to 19.99
10	0 to 9.99

*Divergence is a reduction in credit to reflect a difference in the relative credits for Fire Department and Water Supply.

The above classification has been developed for use in property insurance premium calculations.

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INSURANCE SERVICES OFFICE, INC.

HYDRANT FLOW DATA SUMMARY

City Burney Water District and Del Oro Water Company

County Shasta State CA Witnessed by Insurance Services Office, Inc. Date September 3, 2003

TEST NO.	TYPE DIST.*	TEST LOCATION	SERVICE	FLOW - GPM $Q=(29.83(C(d^2)p^{0.5}))$ INDIVIDUAL HYDRANTS			TOTAL	PRESSURE PSI STATIC	RESID.	FLOW - AT 20 PSI $Q_R=Q_F(h_R^{0.54}/h_F^{0.54})$ NEEDED **	AVAIL.	REMARKS***
1	Comm	Cottonwood St. x Hwy 299	Del Oro	750			750	60	42	1000	1200	(B)-(253 gpm)
2	Res	St. Helena St. x Hwy 299	Del Oro	170			170	56	1	1500	150	(B)-(253 gpm)
3	Comm	Enterprise Dr. x Commerce Wy.	Burney Low	1130			1130	55	48	3000	2700	
4	Comm	Enterprise Dr. x Commerce Wy.	Burney Low	1060			1060	55	50	3000	3000	
5	Comm	Main St. x Roff Wy.	Burney Low	1130			1130	55	43	2250	2000	
6	Comm	Burney High School	Burney Low	1150			1150	52	45	4500	2600	
7	Comm	Erie St. x Toronto Ave.	Burney Low	1020			1020	51	46	4000	2700	
8	Res	Marquette St. x Timber Hill Dr.	Burney High	1160			1160	60	50	1500	2500	
9	Comm	Pine St. x Tamarack Ave.	Burney Low	1130			1130	40	32	2250	1900	
10	Comm	Tamarack Ave. x Hwy 299	Burney High	1310			1310	100	90	3500	4000	

THE ABOVE LISTED NEEDED FIRE FLOWS ARE FOR PROPERTY INSURANCE PREMIUM CALCULATIONS ONLY AND ARE *NOT* INTENDED TO PREDICT THE MAXIMUM AMOUNT OF WATER REQUIRED FOR A LARGE SCALE FIRE CONDITION. THE AVAILABLE FLOWS ONLY INDICATE THE CONDITIONS THAT EXISTED AT THE TIME AND AT THE LOCATION WHERE TESTS WERE WITNESSED.

*Comm = Commercial; Res = Residential.

**Needed is the rate of flow for a specific duration for a full credit condition. Needed Fire Flows greater than 3,500 gpm are not considered in determining the classification of the city when using the Fire Suppression Rating Schedule.

***Available facilities limit flow to gpm shown plus consumption for the needed duration of (B)-2 hours.

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INSURANCE SERVICES OFFICE, INC.

CLASSIFICATION DETAILS

Graded Area: Burney FD
County: Shasta State: CA
Date Surveyed: September, 2003 Total Credit: 52.35 Class: 5 / 9 Pop.: 5000

RECEIVING AND HANDLING FIRE ALARMS

This section of the Fire Suppression Rating Schedule reviews the facilities provided for the general public to report fires, and for the operator on duty at the communication center to dispatch fire department companies to the fires.

	Credit	
	Actual	Maximum
1. Credit for Telephone Service (Item 414) This item reviews the facilities provided for the public to report fires, including the listing of fire and business numbers in the telephone directory.	2.00	2.00
2. Credit for Operators (Item 422) This item reviews the number of operators on-duty at the communication center to handle fire calls.	2.04	3.00
3. Credit for Dispatch Circuits (Item 432) This item reviews the dispatch circuit facilities used to transmit alarms to fire department members.	3.25	5.00
4. Total Credit for Receiving and Handling Fire Alarms:	7.29	10.00
Relative Classification for Receiving and Handling Fire Alarms:	3	

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CLASSIFICATION DETAILS

Graded Area: Burney FD
County: Shasta State: CA
Date Surveyed: September, 2003 Total Credit: 52.35 Class: 5 / 9 Pop.: 5000

FIRE DEPARTMENT

This section of the Fire Suppression Rating Schedule reviews the engine and ladder-service companies, equipment carried, response to fires, training and available fire fighters.

	Credit	
	Actual	Maximum
1. Credit for Engine Companies (Item 513)		
This item reviews the number of engine companies and the hose equipment carried.	7.94	10.00
2. Credit for Reserve Pumpers (Item 523)		
This item reviews the number of reserve pumpers, their pump capacity and the hose equipment carried on each.	0.50	1.00
3. Credit for Pump Capacity (Item 532)		
This item reviews the total available pump capacity.	5.00	5.00
4. Credit for Ladder-Service Companies (Item 549)		
This item reviews the number of ladder and service companies and the equipment carried.	1.05	5.00
5. Credit for Reserve Ladder-Service Companies (Item 553)		
This item reviews the number of reserve ladder and service trucks, and the equipment carried.	0.18	1.00

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Graded Area: Burney FD
County: Shasta State: CA
Date Surveyed: September, 2003 Total Credit: 52.35 Class: 5 / 9 Pop.: 5000

FIRE DEPARTMENT
(continued

	Credit Actual	Credit Maximum
6. Credit for Distribution (Item 561)		
This item reviews the percent of the built-upon area of the city which has an adequately-equipped, responding first-due engine company within 1.5 miles and an adequately-equipped, responding ladder-service company within 2.5 miles.	2.21	4.00
7. Credit for Company Personnel (Item 571)		
This item reviews the average number of equivalent fire fighters and company officers on duty with existing companies.	1.92	15.00+
8. Credit for Training (Item 581)		
This item reviews the training facilities and their use.	1.71	9.00
9. Total Credit for Fire Department:	20.51	50.00+
Relative Classification for Fire Department:	6	

+ This indicates that credit for manning is open-ended, with no maximum credit for this item.

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CLASSIFICATION DETAILS

Graded Area: Burney FD
County: Shasta State: CA
Date Surveyed: September, 2003 Total Credit: 52.35 Class: 5 / 9 Pop.: 5000

WATER SUPPLY

This section of the Fire Suppression Rating Schedule reviews the water supply system that is available for fire suppression in the city.

	Credit	
	Actual	Maximum
1. Credit for the Water System (Item 616)		
This item reviews the supply works, the main capacity and hydrant distribution.	29.17	35.00
2. Credit for Hydrants (Item 621)		
This item reviews the type of hydrants, and method of installation.	1.94	2.00
3. Credit for Inspection and Condition of Hydrants (Item 631)		
This item reviews the frequency of inspections of hydrants and their condition	1.58	3.00
4. Total Credit for Water Supply:	32.69	40.00
Relative Classification for Water Supply:	2	

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PUBLIC PROTECTION CLASSIFICATION

IMPROVEMENT STATEMENTS
FOR
Burney FD
Shasta County, CA

Prepared by
INSURANCE SERVICES OFFICE, INC.
111 North Canal St., Ste 950, Chicago, IL 60606
312-930-0070 FAX 800-711-6431

The following statements are based upon the criteria contained in our Fire Suppression Rating Schedule and upon conditions in Burney FD, CA during September, 2003. They indicate the performance needed to receive full credit for the specific item in the Schedule, and the quantity you have provided. Partial improvement will result in receiving a partial increase in the credit. These statements relate only to the fire insurance classification of your fire district. They are not for property loss prevention or life safety purposes and no life safety or property loss prevention recommendations are made.

RECEIVING AND HANDLING FIRE ALARMS

Credit For Operators (Item 422).

Actual = 2.04%; Maximum = 3.00%

For maximum credit in the Schedule, 11 operators are needed on duty at all times. You have an average of 7.5 operators on duty.

Credit For Dispatch Circuits (Item 432).

Actual = 3.25%; Maximum = 5.00%

For maximum credit in the Schedule, the primary alarm dispatch circuit should be monitored for integrity in accordance with National Fire Protection Association Standard, 1221.

Total credit for Receiving and Handling Fire Alarms (Item 440)

Actual = 7.29%; Maximum = 10.00%

FIRE DEPARTMENT

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Credit For Engine Companies (Item 513).

Actual = 7.94%; Maximum = 10.00%

For maximum credit in the Schedule, 3 engine companies are needed in your fire district.
These are calculated as follows:

3 for the Basic Fire Flow of 3000 gpm.

You have 3 engine companies in service.
These are calculated as follows:

89 percent for Engine E17 because of insufficient equipment.
Additionally Engine E17 is lacking: an adequate hose testing program, an adequate pump testing program.

89 percent for Engine E217 because of insufficient equipment.
Additionally Engine E217 is lacking: an adequate hose testing program, an adequate pump testing program.

59 percent for Engine E317 because of insufficient equipment.
Additionally Engine E317 is lacking: an adequate hose testing program, an adequate pump testing program.

Credit For Reserve Pumpers (Item 523).

Actual = 0.50%; Maximum = 1.00%

For maximum credit in the Schedule, 1 fully-equipped reserve pumper is needed. You have 0 reserve pumpers.
These are calculated as follows:

Credit For Ladder And Service Companies (Item 549).

Actual = 1.05%; Maximum = 5.00%

For maximum credit in the Schedule, 1 ladder company is needed in your fire district.

This is calculated as follows:

1 ladder company due to method of operation.

You have 1 ladder company
This is calculated as follows:

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20 percent for Ladder CL1 because of insufficient equipment, insufficient ladder testing and insufficient ladder length.

Credit For Reserve Ladder And Service Companies (Item 553).

Actual = 0.18%; Maximum = 1.00%

For maximum credit in the Schedule, 1 fully-equipped reserve ladder truck is needed.
You have 1 reserve ladder truck.
This is calculated as follows:

18 percent for Ladder CRL1 because of insufficient equipment and insufficient ladder testing and insufficient ladder length.

Credit For Distribution (Item 561).

Actual = 2.21%; Maximum = 4.00%

For maximum credit in the Schedule, all sections of the fire district with hydrant protection should be within 1½ miles of a fully-equipped engine company and 2½ miles of a fully-equipped ladder, service, engine-ladder or engine-service company. The distance to be measured along all-weather roads.

Credit For Company Personnel (Item 571).

Actual = 1.92%; Maximum = 15.00%

An increase in the on-duty company personnel by one person will increase the fire department credit by 0.63 and an increase in the average response by other fire department members by one person will increase the fire department credit by 0.21.

Credit For Training (Item 581).

Actual = 1.71%; Maximum = 9.00%

For maximum credit in the Schedule, the training program should be improved. You received 19 percent credit for the current training program and the use of facilities.

For maximum credit in the Schedule, pre-fire planning inspections of each commercial, industrial, institutional and other similar-type building should be made twice a year by company members. Records of the inspections should include complete and up-to-date notes and sketches.

Total credit for Fire Department (Item 590)

Actual = 20.51%; Maximum = 50.00%

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WATER SUPPLY

Credit For Supply System (Item 616).

Actual = 29.17%; Maximum = 35.00%

For maximum credit in the Schedule, the needed fire flows should be available at each location in the fire district. Needed fire flows of 2500 gpm and less should be available for 2 hours, 3000 and 3500 gpm for 3 hours and all others for 4 hours. See the attached table for an evaluation of fire flow tests made at representative locations in your fire district.

All AWWA standard hydrants within 1000 feet of a building, measured as hose can be laid by apparatus, are credited; 1000 gpm for hydrants within 300 feet; 670 gpm for 301 to 600 feet; and 250 gpm for 601 to 1000 feet. Credit is reduced when hydrants lack a pumper outlet, and is further reduced when they have only a single 2½-inch outlet.

Credit For Hydrants (Item 621).

Actual = 1.94%; Maximum = 2.00%

For maximum credit in the Schedule, all hydrants should: have a 6-inch or larger branch connection.

Credit For Inspection and Condition of Hydrants (Item 631).

Actual = 1.58%; Maximum = 3.00%

For maximum credit in the Schedule, all hydrants should be inspected twice a year, the inspection should include operation and a test at domestic pressure. Records should be kept of the inspections. Hydrants should be conspicuous, well located for use by a pumper, and in good condition.

Total credit for Water Supply (Item 640)

Actual = 32.69%; Maximum = 40.00%

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FIRE FLOW TESTS

Burney FD, CA

Tests witnessed on September 3, 2003

Test No.	Needed Fire Flow† gpm	Limited By Supply Works, gpm	Limited by Distribution Mains (flow tests), gpm	Limited By Hydrant Spacing, gpm
1	1000	253		
2	1500	253	150	
3	3000		2700	
4	3000			
5	2250		2000	
6†	4500		2600	
7†	4000		2700	
8	1500			
9	2250		1900	
10	3500			

†Needed fire flows exceeding 3500 gpm are not considered in Item 616 (CSS) Credit for System Supply

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APPENDIX C

06-13-12
15:34

BURNEY WATER DISTRICT
RATE SCHEDULE Maintenance

Cycle# 0
Pre-Upda

	Rate Schedules	Svc	Mult	Cy	Minimum	Other Cost
	0) Exit Rate Search					
	1) WATER-5/8 & 3/4"	1	1.00	1	11.80	0.0000
	2) WATER-1"	1	1.00	1	13.10	0.0000
	3) WATER-1 1/2"	1	1.00	1	14.60	0.0000
	4) WATER-2"	1	1.00	1	19.20	0.0000
	5) WATER-3"	1	1.00	1	29.55	0.0000
	6) WATER-4"	1	1.00	1	44.90	0.0000
	7) WATER-6"	1	1.00	1	67.95	0.0000
	8) WATER-BURNEY MOTEL	1	1.00	1	60.75	0.0000
	9) WATER-BUSN @ HOME	1	1.00	1	17.38	0.0000
	10) WATER-FULL 3/4"	1	1.00	1	12.58	0.0000
	11) WATER-POOL MTCE	1	1.00	1	0.00	5.0000
	13) W/READINESS TO SERVE	1	1.00	1	0.00	0.0000
	14) WATER-FR SCHOOLS	1	1.00	1	67.95	0.0000
WATER	15) WATER/COMPOUND	0	1.00	1	0.00	0.0000
	16) WATER-4" PG&E MULTPL	1	1.00	1	133.01	0.0000
	19)	0	0.00	1	0.00	0.0000
	20) WATER-CHARM MOTEL	1	1.00	1	208.24	0.0000
	21) WATER-GREEN GABLES	1	1.00	1	134.12	0.0000
	22) WATER-SHASTA PINES	1	1.00	1	92.97	0.0000
	23) WATER-SLEEPY HOLLOW	1	1.00	1	60.68	0.0000
	24) WATER-BURNEY VILLA	1	1.00	1	485.84	0.0000
	25) WATER-MTN SR CENTER	1	1.00	1	495.01	0.0000
	26) WATER - W W HILL	1	1.00	1	759.04	0.0000
	27) WATER-BFP 10"	1	1.00	1	140.60	0.0000
	28) WATER-BFP 6"	1	1.00	1	67.95	0.0000
	29) WATER-BFP 2"	1	1.00	1	19.20	0.0000
	30) CONSUMPTION ONLY	1	0.00	1	0.00	0.0000
	31) WATER-S P 8"	1	1.00	1	112.65	0.0000
	32) WATER- S P 2"	1	1.00	1	19.20	0.0000
	33) S/READINESS TO SERVE	1	1.00	1	0.00	0.0000
	34) SEWER-B MT POWER/IND	2	0.10	1	354.45	0.0000
	35) S/BURNEY MOTEL	2	1.00	1	119.35	0.0000
	36) S/0-4	2	1.00	1	11.15	0.0000
	37) S/5-99	2	1.00	1	11.70	0.0000
	38) S/100-199	2	1.00	1	12.80	0.0000
Sewer	39) S/200-299	2	1.00	1	13.85	0.0000
	40) S/300-399	2	1.00	1	15.05	0.0000
	41) S/400-499	2	1.00	1	16.30	0.0000
	42) S/500-599	2	1.00	1	17.25	0.0000
	43) S/600-699	2	1.00	1	18.35	0.0000
	44) S/700-799	2	1.00	1	19.40	0.0000

Sewer

Rate Schedules	Svc	Mult	Cy	Minimum	Other Cost
45) S/800-899	2	1.00	1	20.40	0.0000
46) S/900-999	2	1.00	1	21.55	0.0000
47) S/1000-1099	2	1.00	1	22.70	0.0000
48) S/1100-1199	2	1.00	1	23.80	0.0000
49) S/1200-1299	2	1.00	1	24.85	0.0000
50) S/1300-1399	2	1.00	1	26.05	0.0000
51) S/1400-1499	2	1.00	1	27.10	0.0000
52) S/1500-1599	2	1.00	1	28.20	0.0000
53) S/1600-1699	2	1.00	1	29.30	0.0000
54) S/1700-1799	2	1.00	1	30.40	0.0000
55) S/1800-1899	2	1.00	1	31.50	0.0000
56) S/1900-1999	2	1.00	1	32.75	0.0000
57) S/2000-2099	2	1.00	1	33.75	0.0000
58) S/2100-2199	2	1.00	1	34.80	0.0000
59) S/2200-2299	2	1.00	1	35.90	0.0000
60) S/2300-2399	2	1.00	1	37.00	0.0000
61) S/2400-2499	2	1.00	1	38.15	0.0000
62) S/2500-2599	2	1.00	1	39.30	0.0000
63) S/2600-2699	2	1.00	1	40.30	0.0000
64) S/2700-2799	2	1.00	1	41.00	0.0000
65) S/2800-2899	2	1.00	1	42.50	0.0000
66) S/2900-2999	2	1.00	1	43.60	0.0000
67) S/3000-3099	2	1.00	1	44.85	0.0000
68) S/3100-3199	2	1.00	1	45.75	0.0000
69) S/3200-3299	2	1.00	1	46.95	0.0000
70) S/3300-3399	2	1.00	1	48.00	0.0000
71) S/3400-3499	2	1.00	1	49.10	0.0000
72) S/3500-3599	2	1.00	1	50.20	0.0000
73) S/3600-3699	2	1.00	1	51.35	0.0000
74) S/3700-3799	2	1.00	1	52.45	0.0000
75) S/3800-3899	2	1.00	1	53.50	0.0000
76) S/4300-4399	2	1.00	1	59.00	0.0000
77) S/4400-4499	2	1.00	1	60.15	0.0000
78) S/4600-4699	2	1.00	1	62.25	0.0000
79) S/4800-4899	2	1.00	1	64.50	0.0000
80) S/5100-5199	2	1.00	1	67.85	0.0000
81) S/5300-5399	2	1.00	1	69.95	0.0000
82) S/5600-5699	2	1.00	1	73.35	0.0000
83) S/6600-6699	2	1.00	1	84.35	0.0000
84) S/7600-7699	2	1.00	1	95.20	0.0000
85) S/7700-7799	2	1.00	1	96.45	0.0000
86) S/8300-8399	2	1.00	1	103.05	0.0000
87) S/8800-8899	2	1.00	1	109.75	0.0000
88) S/11,100-11,199	2	1.00	1	133.80	0.0000
89) S/12,600-12,699	2	1.00	1	150.30	0.0000
90) S/12,700-12,799	2	1.00	1	151.40	0.0000
91) S/15,700-15,799	2	1.00	1	184.45	0.0000
92) S/17600-17699 B FABR	2	1.00	1	204.05	0.0000
93) S/RESTAURANT	2	1.00	1	14.95	0.0000
94) S/20400-20499	2	1.00	1	236.25	0.0000
95) S/SLEEPY HOLLOW	2	1.00	1	139.06	0.0000
96) S/CHARM MOTEL	2	1.00	1	295.77	0.0000
97) S/GREEN GABLES MOTEL	2	1.00	1	237.00	0.0000
98) S/SHASTA PINES	2	1.00	1	276.18	0.0000
99) WATER/HYDRANT	1	1.00	1	80.00	0.0000

Burney Water District

20222 HUDSON STREET, BURNEY, CA 96013 (530) 335-3582

ORDINANCE 2009 W-1
EXHIBIT "A"

Water Metered Rate:

Residential	$0.65 per 100 cubic feet
Commercial	$0.65 per 100 cubic feet
Industrial	$0.65 per 100 cubic feet

Water Base Rate – Monthly Charge:

5/8" x 3/4" Meter	$11.80 per month
All other meters	Add $1.00 to current per month charge

Water Capacity Charges generate funds from new water hook-ups to finance future capital improvements. Water Capacity Charges are charges for facilities in existence at the time the new water hook-up is made, or charges for new facilities to be constructed in the future, which are of benefit to the person or property being charged. These charges will be adjusted immediately upon adoption of this ordinance, and each July 1 thereafter, by an amount not to exceed the greater of: (1) the annual percentage increase, if any (comparing January of current year to January of prior year), in the Construction Cost Index published in the Engineering News-Record, or its successor ("CCI Increase"); or (2) 15% (the "Max Capacity Charge Increase").

Water Capacity Charge: $3,488.10 per household equivalent (5.7% CPI Increase)

Meter Size	Flow Per AWWA (GPM)	Household Equivalent	Sewer Capacity Charge
5/8"	20	1	$3,488.10
3/4"	30	1.5	$5,232.15
1"	50	2.5	$8,720.25
1-1/2"	100	5	$17,440.50
2"	160	8	$27,904.80
3"	300	15	$52,321.50
4"	500	25	$87,202.50
6"	1000	50	$174,405.00
8"	1600	80	$279,048.00

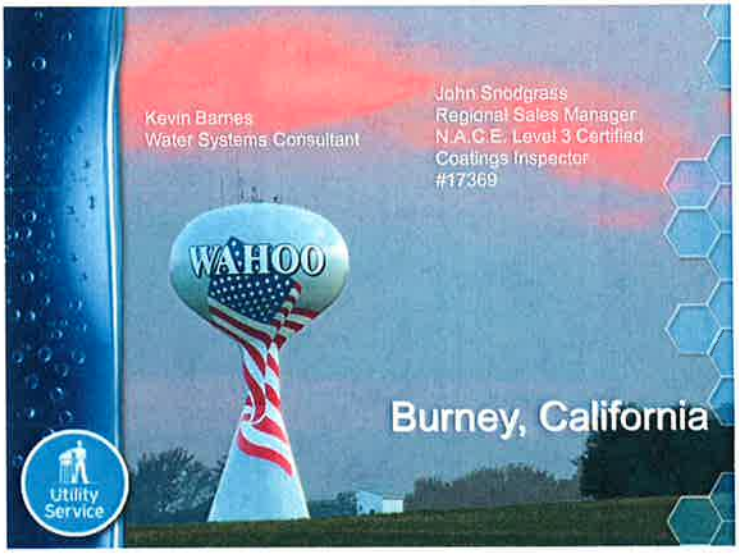
AWWA=American Water Works Association

Service Account Deposit:	$100.00 per account
Transfer Charge:	$25.00 per transfer of existing service to a new address
Computer Generated Late Fee:	$10.00
On/Off Fee:	$50.00 during business hours - $100 after hours & weekends
Backflow Testing Charge:	$50.00 per backflow device tested, per year
Meter Testing Deposit:	$30.00

Hydrant Meter Deposit:	$800.00 per usage, refundable
Hydrant Meter Base Rate – Monthly Charge:	$80.00 per month
Hydrant Meter Water Metered Rate:	$0.80 per 100 cubic feet

Annual Cost of Living Increase: Beginning on July 1, 2010, and each July 1 thereafter, BWD will impose an annual cost of living increase to the rates, fees and charges for its water service rate by an amount not to exceed the greater of: (1) the annual percentage increase, if any, in the Consumer Price Index, all Urban Consumers, for the US City Average, as determined by the United States Department of Labor Statistics, or its successor ("CPI Increase"); or (2) 15% (the "Max O&M Increase"). The CPI Increase and the Max O&M Increase are referred to in this notice as the "Cost of Living Increase." Provided, however, in no event shall such rates increase as a result of the Cost of Living Increase by more than the cost of providing water service.

APPENDIX D



Presentation Overview

- Introduce Utility Service Company.
- Review Condition of your tank assets to include summary and recommendations.
- Discuss Solution for how to maintain tank today and have a system in place so asset is maintained for future generations.

UTILITY SERVICE CO. INC

- Founded in 1963
- Largest provider of contract tank maintenance in Nation.
- Over 750 employees
- 53 Water System Consultants Nationwide
- Cover 85% of the continental United States
- 10 Production Offices Nationwide
- Over 1,400 Renovations completed in 2010
- Over 5,000 water tanks under the Full Service Maintenance Program nationwide
- Perform over 8,000 inspections annually

A Nationwide Company

Over 45 Local Representatives
10 Service Centers

Total Commitment to the Potable Water Industry Since 1963

- **Full Service Maintenance Programs:** Over 5,000 Tanks Utilize This Program, GASB 34 Compliant, Single Point Responsibility, Indefinite Warranty and ALL Aspects of Tank Maintenance are Covered.
- **Communications Site Management:** Marketing & Antenna Applications Completed by Water Tank Professionals, Revenue Maximization, Maintenance Expense Controlled.
- **Water Mix:** A Method Patent Pending Process for Potable Water Systems that Combines Unique Technologies with Professional Services that Result in Cleaner Water.

Full Service Preventive Maintenance Program

The "Concept":

Owner contracts directly with a qualified tank maintenance provider to evaluate, plan and provide ALL maintenance and repair needs for their water storage facilities on an ongoing basis (GASB 34 Compliant).

Site Management Program

- The " Concept"
- Tank Owner contracts with a qualified organization to market nationally, negotiate price , review and oversee installation, bill carrier. Handle process turn key.

Water Mix

- The "Concept"
- The owner contracts with USCI to access and provide recommendations to help with Water Quality Management.
  - Bio-film removal in tank.
  - Active tank mixing.
  - Chemical cleaning filter media.

You are not alone:

Over 2,000 cities currently use this business model

Over 5,000 water tanks cared for via this business model

Over 1,400 water tanks renovated every year

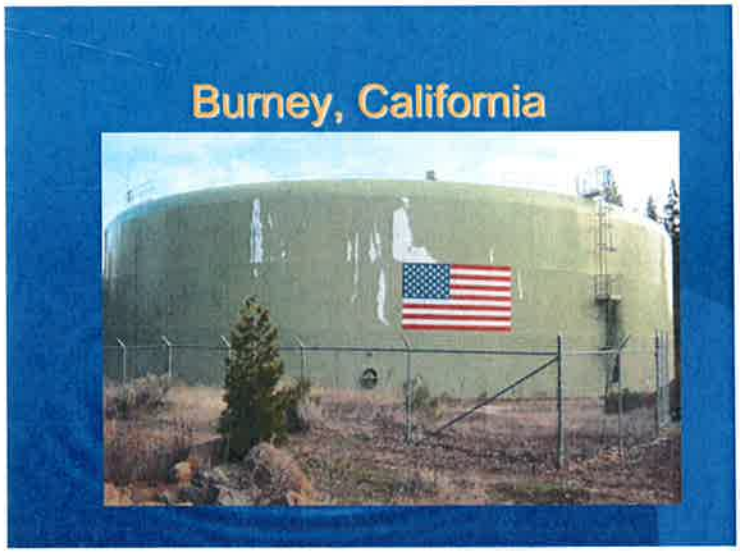
"NOBODY IS ON MORE TANKS THAN UTILITY SERVICE"

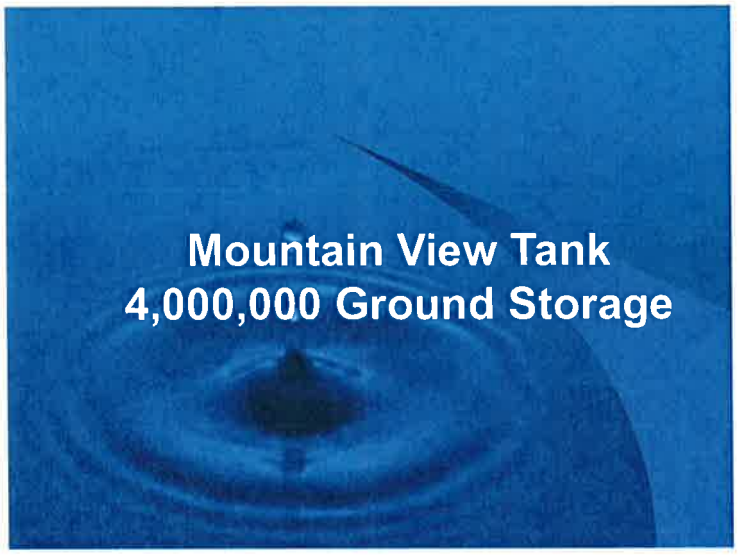
AREA CUSTOMERS

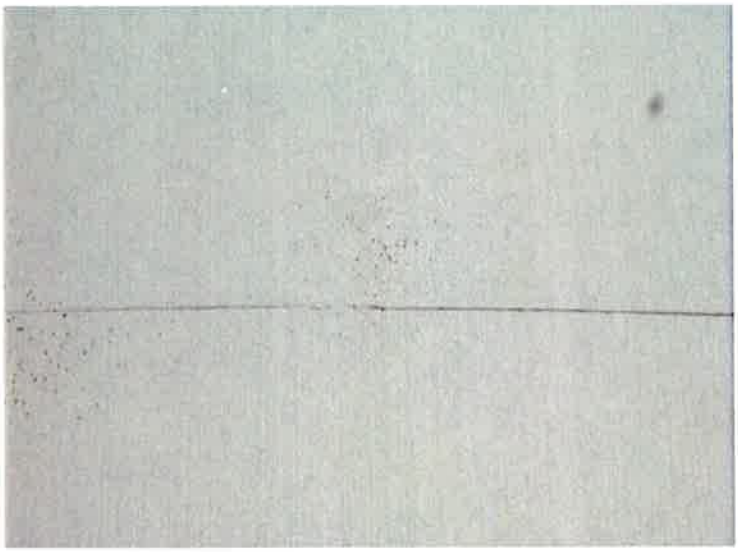
- Hamilton Branch Community Water District (2 Tanks)
- Quincy Community Services District (2 Tanks)
- Rincon Del Diablo Municipal Water District (10 Tanks)
- Joshua Basin Water District (17 Tanks)
- Kinneloa Water District (5 Tanks)
- City of Lathrop (4 Tanks)
- Bear Valley Community Service (43 Tanks)
- Mil Potrero Mutual Water Company (9 Tanks)
- Rainbow Municipal Water District (12 Tanks)
- Palmdale Water District (7 Tanks)
- Olivenhain Municipal Water District (9 Tanks)
- Del Dios Mutual Water Company (1 Tanks)
- Bella Vista Water District (2 Tanks)
- Tahoe Cedars Water Company (2 Tanks)

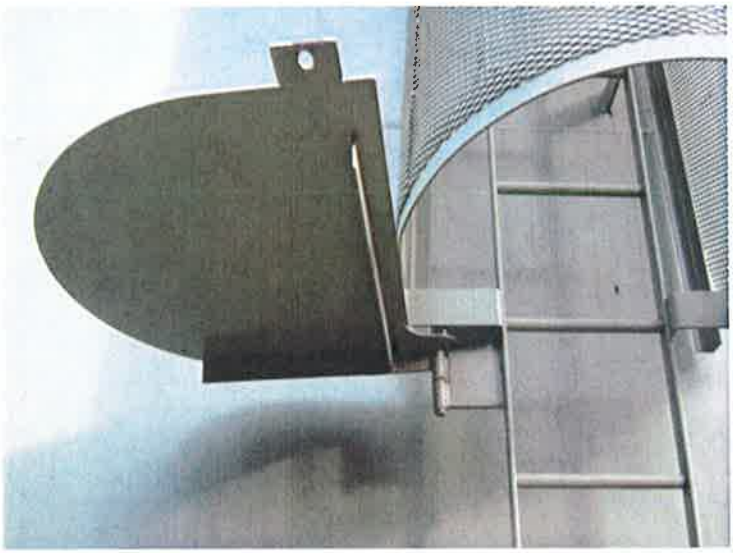
USCI Economies of Scale

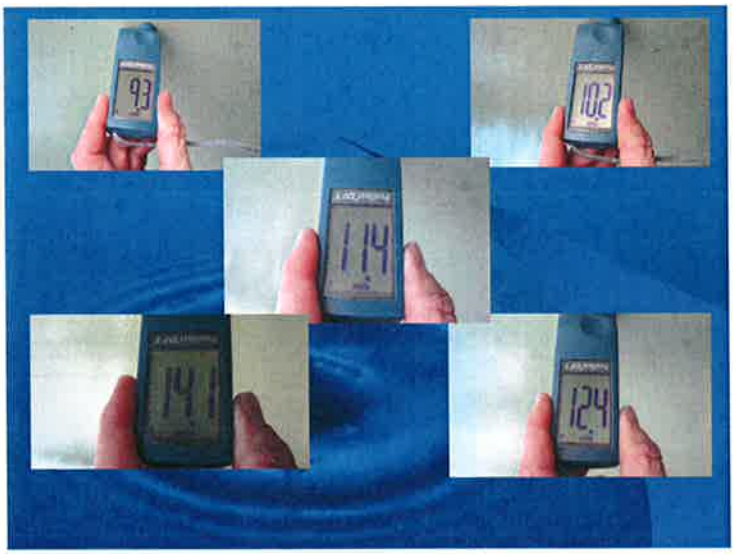
Over 100 Tank Maintenance Crews Available


Burney, California


Mountain View Tank
4,000,000 Ground Storage



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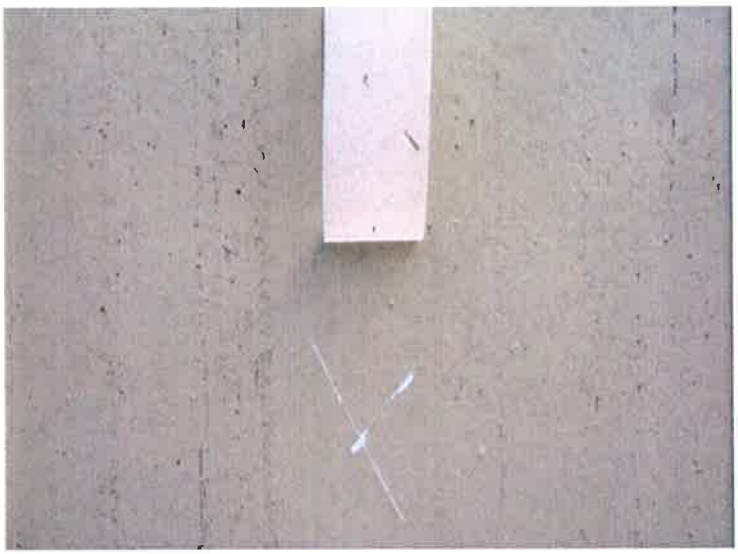
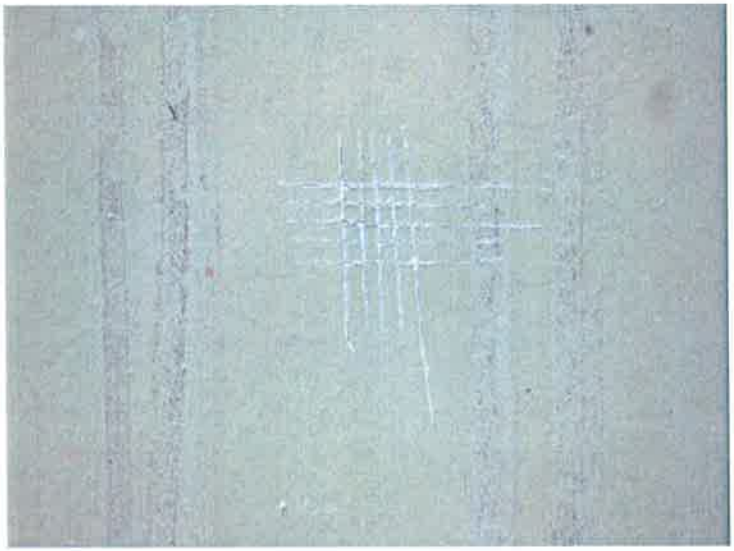
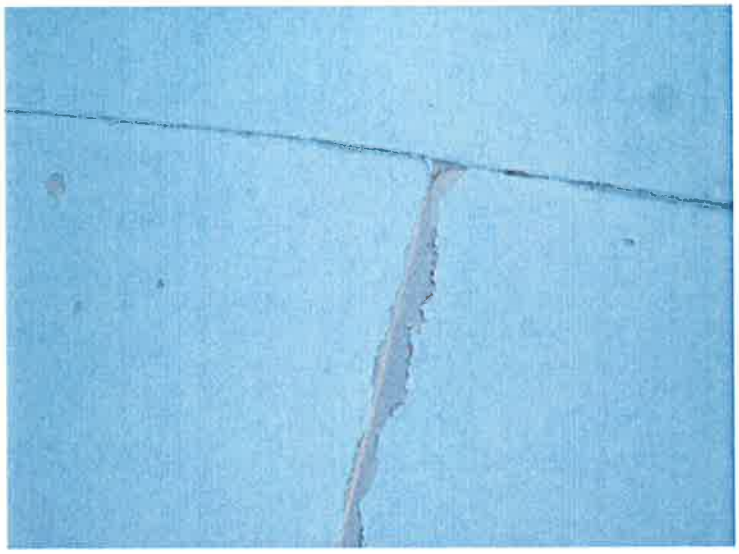
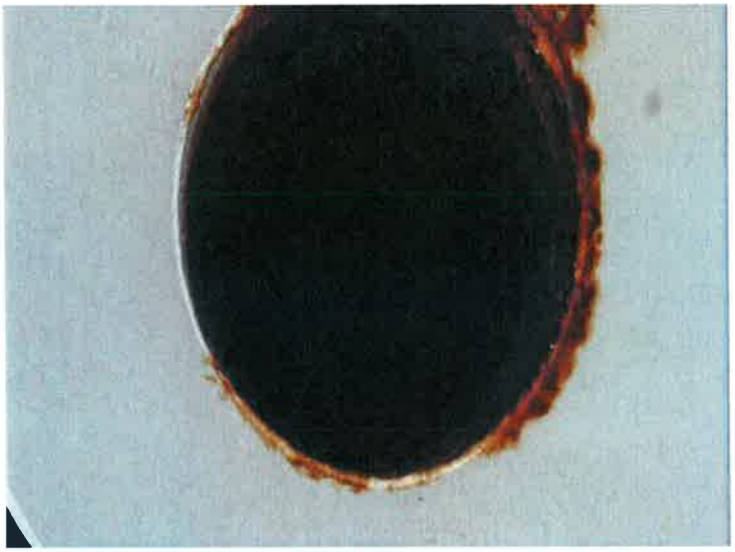
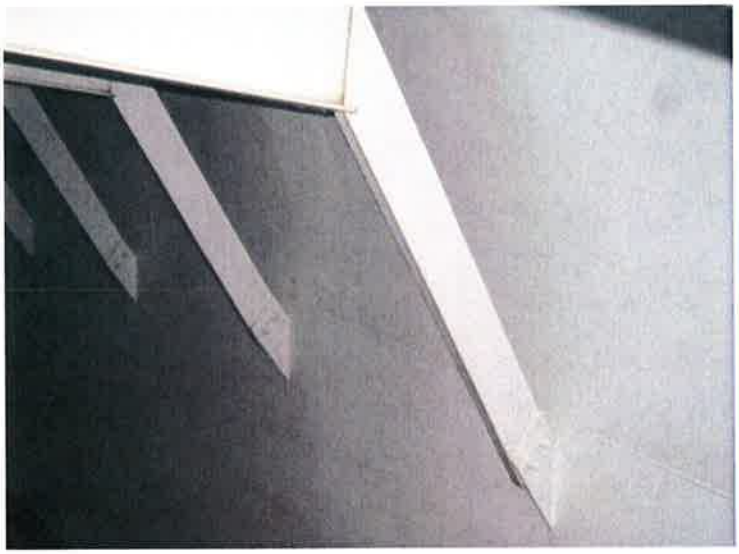
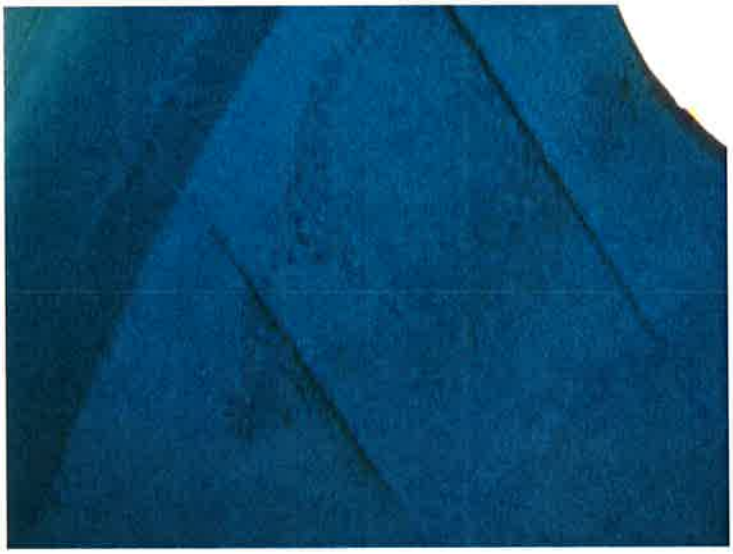


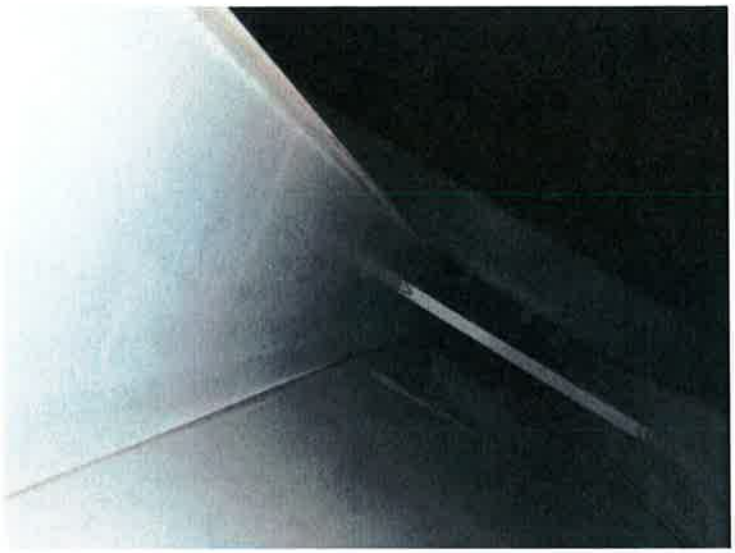








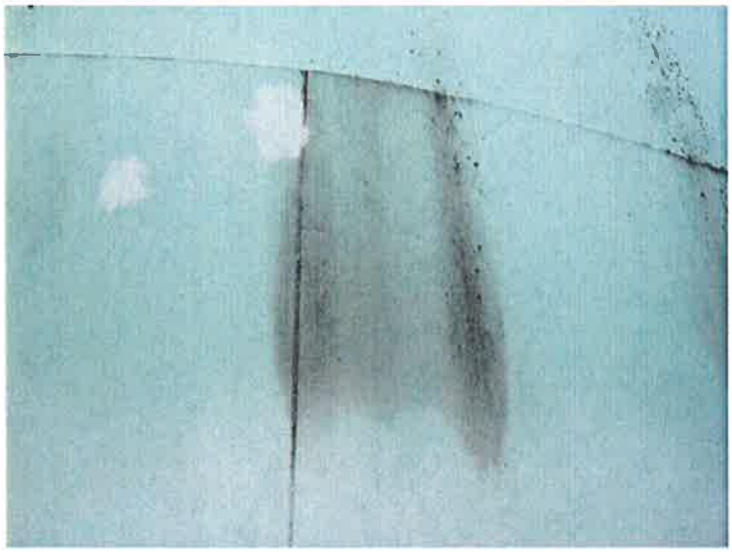


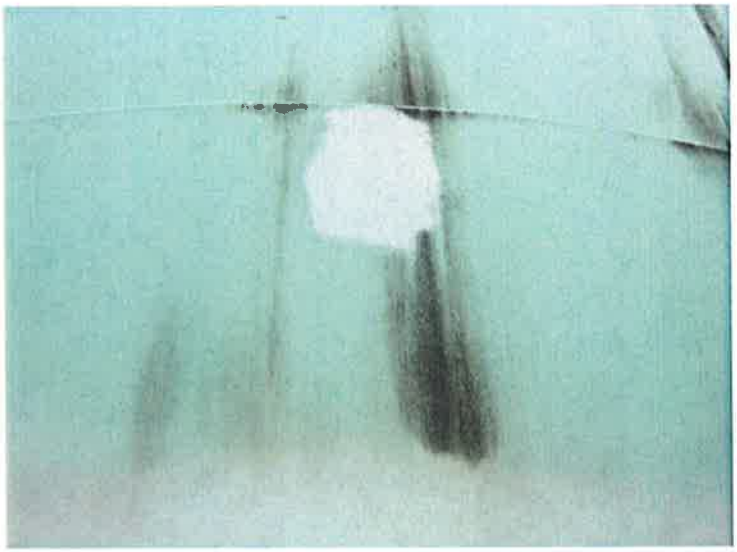


Recommended Repairs Mt View

- Overcoat exterior/brush-scarify (year 1)
- Blast and two coat epoxy coating on interior (year 4)
- Repair top portion of overflow
- Repair bullet holes
- Install interior ladder

Timber Ridge Tank
1,500,000 Ground Storage





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Positest®DFT
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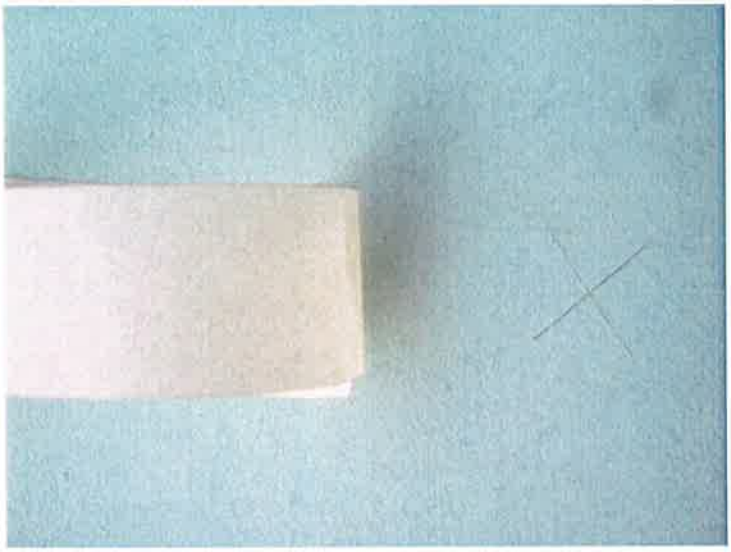
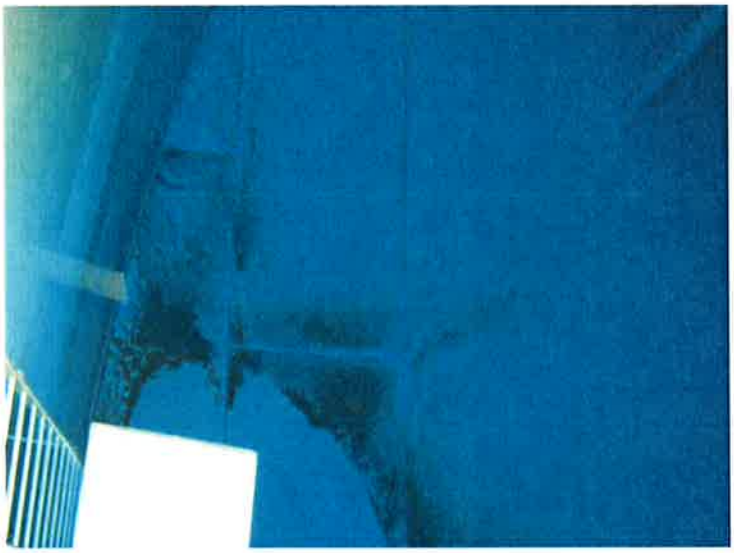
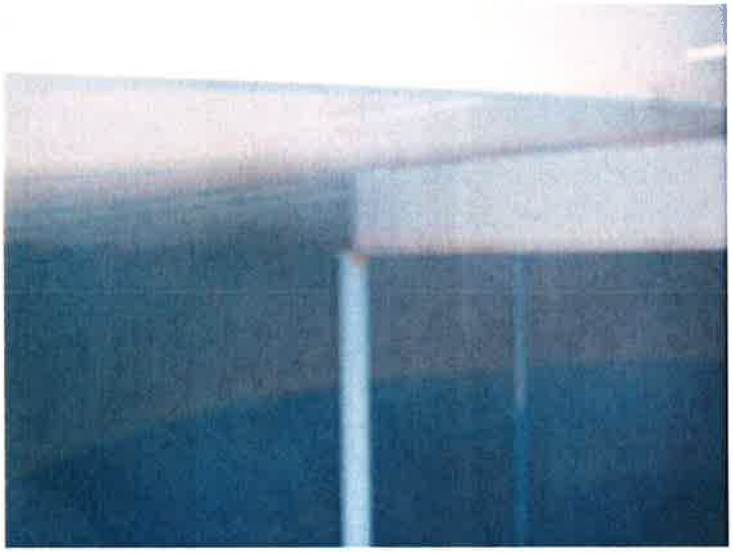
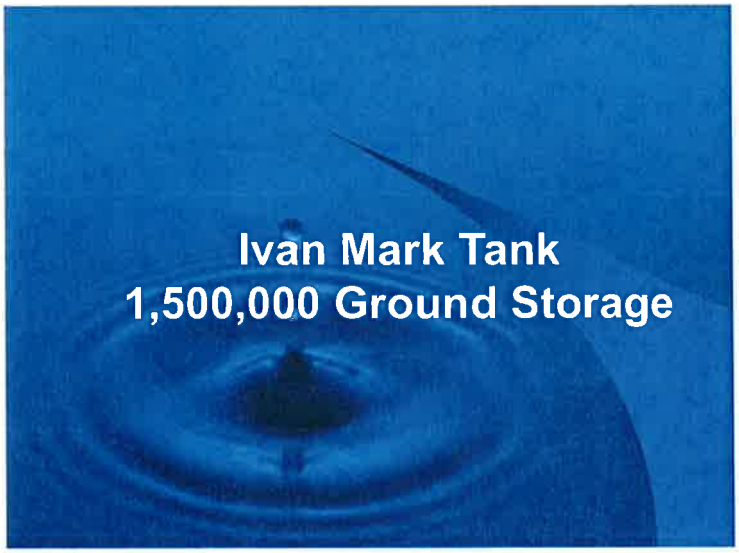


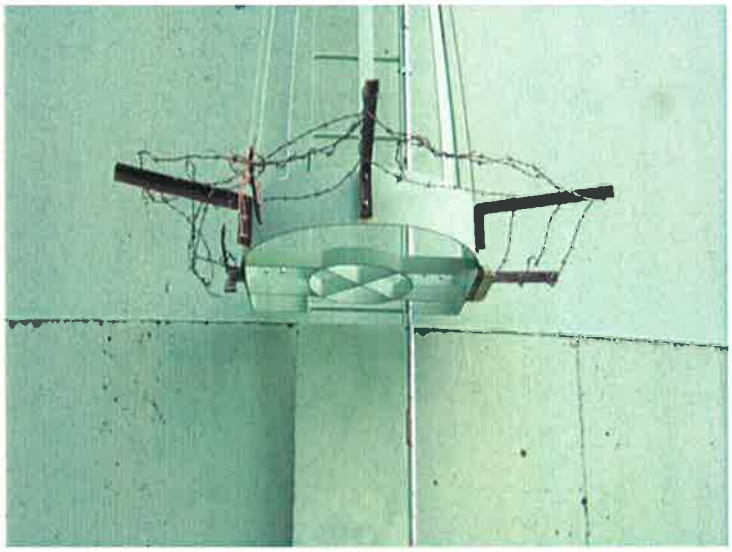




Recommended Repairs Timber Tank

- 2 coat overcoat (year 1)
- Blast and two coat epoxy coating on interior (year 3)
- Replace vent
- Install overflow screen
- Install flex cable safety climb


Ivan Mark Tank
1,500,000 Ground Storage



Positest DFT
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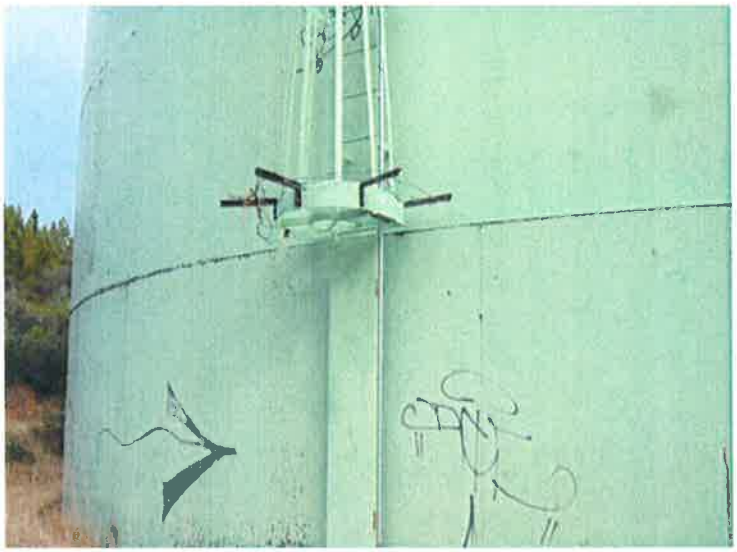
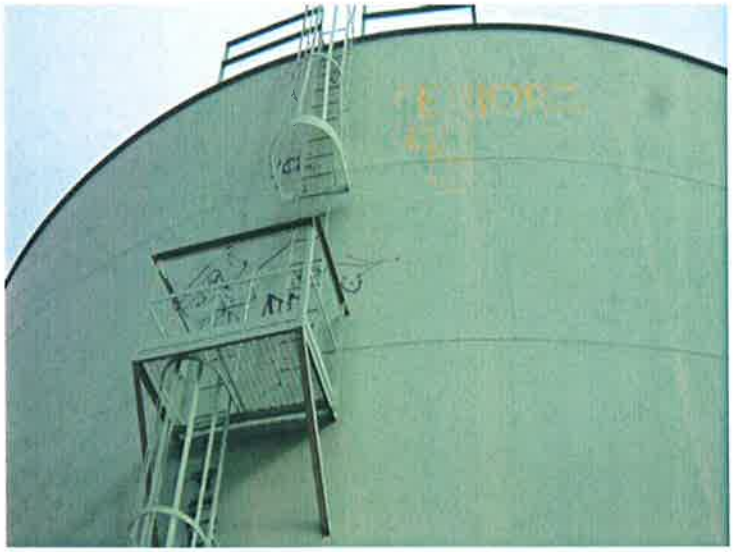
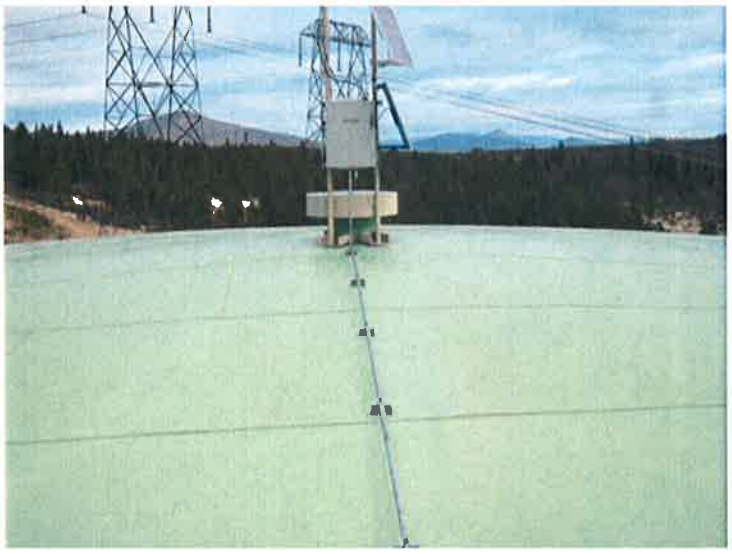
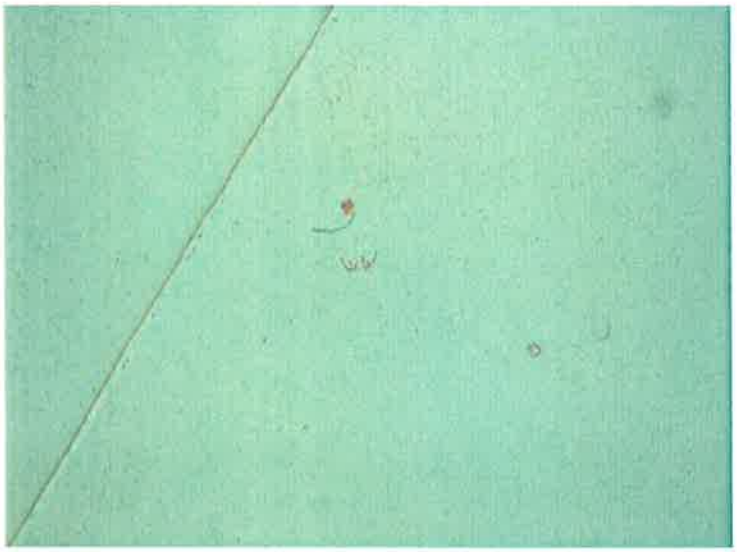
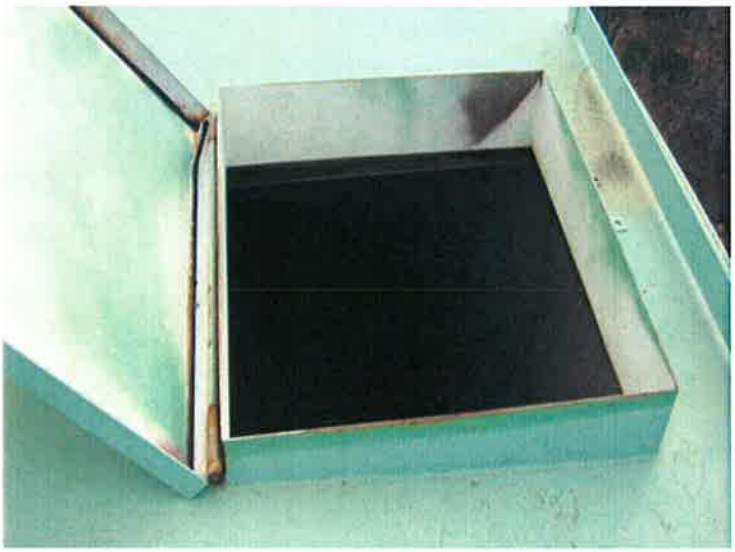
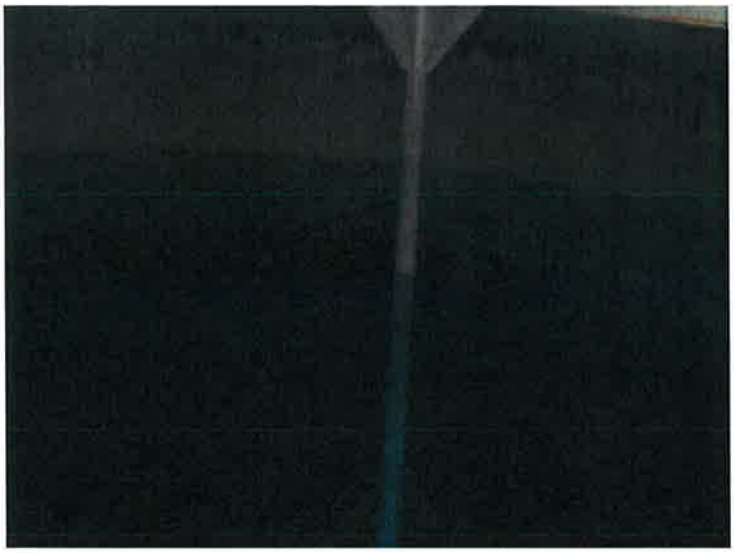












Recommended Repairs Ivan Marks

- Overcoat exterior (year 2)
- Blast and two coat epoxy coating on interior (year 2)
- Install interior ladder
- Install overflow screen
- Install ladder gate

Tank Condition Questions???

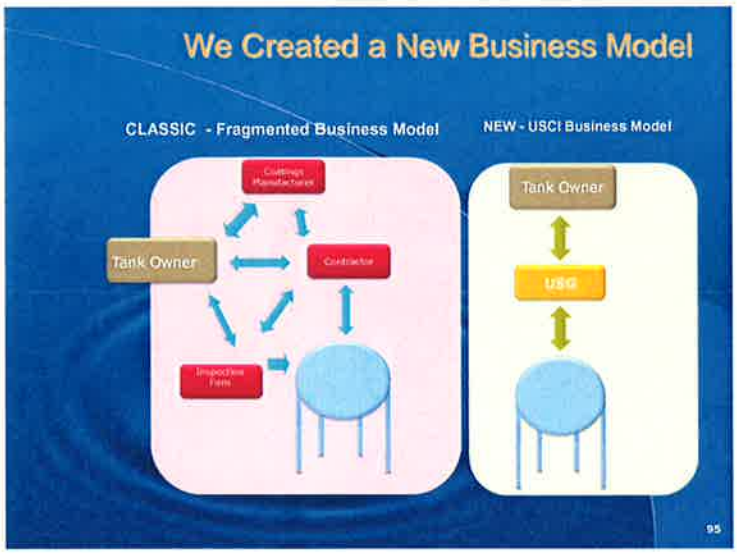
WHY ?

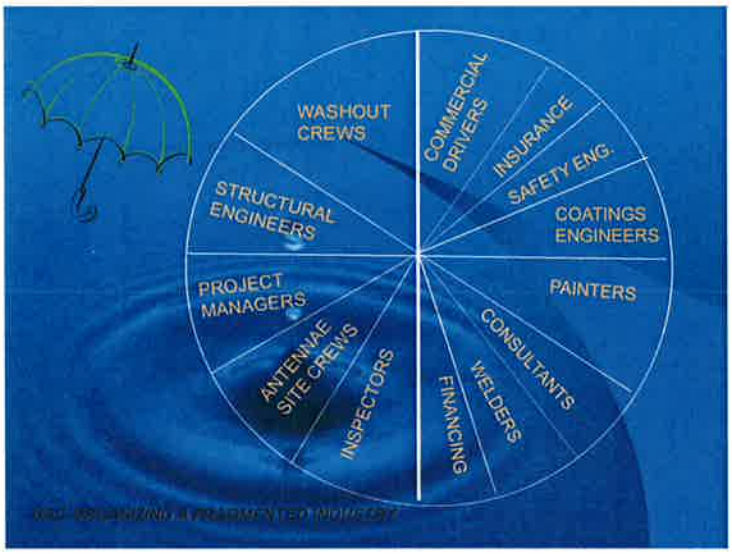
- **American Water Works Association (AWWA)M42 Quotes**

" A good, comprehensive preventative maintenance program can extend the life of an existing tank (as well as that of a new tank) INDEFINITELY" = GASB 34 Compliance

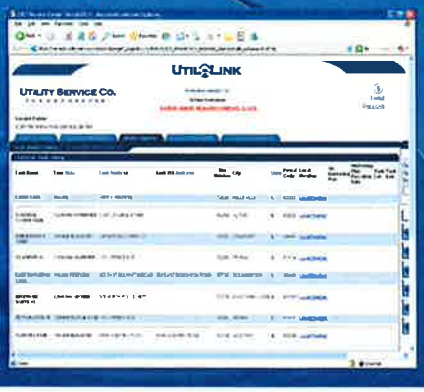
" Many thousands of dollars can be saved and complaints from citizens can be eliminated if a planned approach to tank maintenance is adopted."

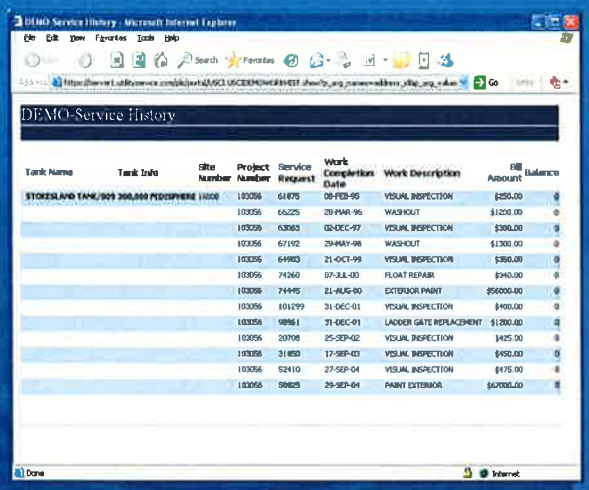
" Small outlays for maintenance can substantially delay or eliminate the need to replace a utilities large capital investment in tanks"





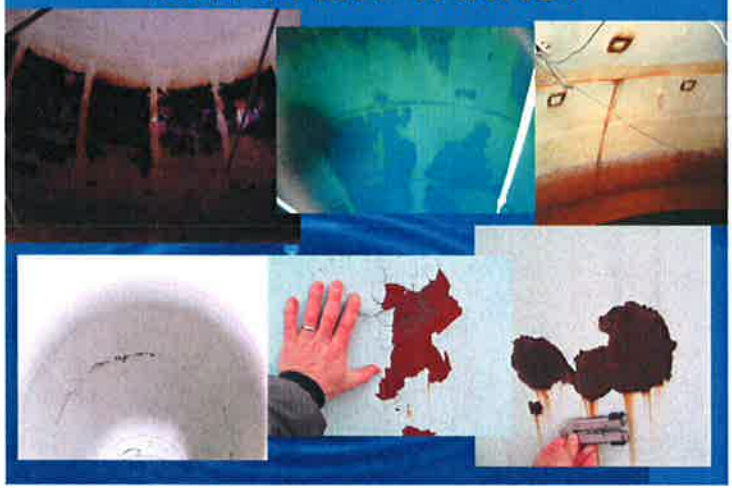
Customer Information Portal
Manage Tank Information



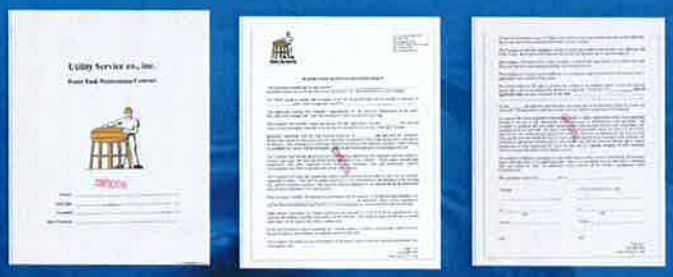


WHY INSPECT TANKS?

WHY PAINT TANKS?



SIMPLE CONTRACT



"Yearly Renewable"

Tank Maintenance Contract

- Each tank has a separate contract.
- It is a one year contract that can be extended indefinitely. "YOU" have complete control either to stay in or get out of program.
- Utility Service can never drop you as a customer with the exception of non payment.

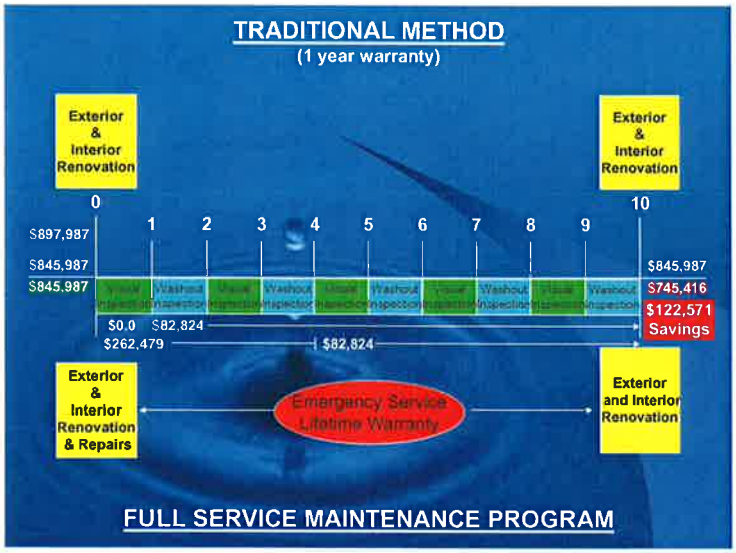
Tank Maintenance Agreement

- Payment can be set up into your budget. Either monthly, quarterly, semi-annual, or annually.
- Fees will be locked for (3) year increments.
- At end of the (3) year term the fee will be limited to a (5) percent annual adjustment and then lock for another (3) year term.
- This contract can extend indefinitely!!

Traditional Method

vs

Full Service Maintenance Program



Benefits of Full Service Maintenance Program

- Single Source Responsibility/Reassignment of Risk
- Balanced Funding/Spreading of Costs
- Equity Builds Towards Future Renovations
- Evaluation and Planning of All Maintenance
- Regulatory Compliance
- Annual Inspection, Biennial Washouts
- Emergency Repair Service
- Indefinite Warranty / No Surprises
- No Engineering Change Order
- N.A.C.E. Inspection on All Renovations
- GASB 34 Compliance: Modified Approach

	2012	2013	2014	2015	2016	2017
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Mountain View Tank 4,000,000 Ground Storage		Visual Inspection & Emergency Service	Visual Inspection & Emergency Service		Visual Inspection & Emergency Service	Washout Inspection & Emergency Service
	$ 262,479	$ 262,479	$ 262,479	$ 262,479	$ 82,824	$ 82,824
Timber Ridge Tank 1,500,000 Ground Storage		Visual Inspection & Emergency Service		Visual Inspection & Emergency Service	Washout Inspection & Emergency Service	Visual Inspection & Emergency Service
	$ 82,182	$ 82,182	$ 82,182	$ 82,182	$ 30,412	$ 30,412
Ivan Marks Tank 1,500,000 Ground Storage	Visual Inspection & Emergency Service		Visual Inspection & Emergency Service	Washout Inspection & Emergency Service	Visual Inspection & Emergency Service	Washout Inspection & Emergency Service
	$ 79,849	$ 79,849	$ 79,849	$ 79,849	$ 30,412	$ 30,412
YEARLY TOTAL	$ 424,510	$ 424,510	$ 424,510	$ 424,510	$ 143,648	$ 143,648

THANK YOU!