

FUOG WATER RESOURCES INC.

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99210

Judith A. Taylor
Oakridge Mutual Water Co.
19390 Oakridge Dr.
Aromas, CA. 95004

Dear Miss Taylor;

In accordance with our contract I have prepared an alternative evaluation to increase the water supply for your system. I appreciated the input I received from Board members regarding the history and background of your system.

BACKGROUND

The Oakridge Mutual Water Company consists of an area off Dunbarton Road in Monterey County and serves potentially 35 lots. At the present time 33 lots are developed. However, only 19 homes are connected to the present system. The remainder of homes have their own wells.

The water system consists of 4 supply wells. They vary in depth from 195 feet to 300 feet. One approximately 10,000 gallon steel tank is provided for each of two pressure zones. With the exception of periodic disinfection of wells and tanks, no treatment of the water is performed. However, adjacent to the lower tank, housed in a wooden building, is a filtration system. It does not appear to be in operation and its ownership is unknown. The lower zone tank receives the water from all four wells. When the lower tank is nearly full, a transfer pump is activated, lifting water to the upper tank. The lower tank is located about at elevation 400 and the upper tank is located about at elevation 650. When insufficient water is available from the wells, the lower tank cannot be filled sufficiently to activate the transfer pump. Thus the upper tank cannot be refilled and homes served from this upper tank have no water. Homes within proximity of the upper tank and on the top of the ridge are not served from the existing system.

Based on our assessment, the distribution system piping does not meet current design requirements. The main line is believed to be a 4 inch pipeline and only small, 2-1/2" fire hydrants are on the main. Such a system provides marginal fire protection.

On September 21, 1976 the Monterey Department of Environmental Health issued a water supply permit to serve a potential 44 connections to the Oakridge Mutual Water Company. It is our understanding that a number of very large lots, that could be subdivided in the future, received more than one connection (shares). At the time of permitting, a sustained pumping test of the wells produced a total of 60.5 gpm. By September of 1979, the production had declined to 12.5 gpm. At that time, a total of 19 homes were in various stages of construction. As a result of this reduced water flow, the Monterey Department of Environmental Health prohibited the Water Company from making additional connections. Since then no changes have been made to the water supply system and the prohibition remains in effect.

Based on State and County Health requirements, a system with 44 connections requires a sustainable supply of 65 gpm, whereas 35 connections require a supply of 55 gpm. The existing 19 homes on the system require a minimum flow of 23 gpm.

The apparent deficiency in supply became reality when during recent years water had to be trucked in during late summer and fall to supplement the deficient water supply. Because of the system design, the Oakridge Mutual Water Co. has the challenging task to explain to home owners in the lower pressure zone, who do not run out of water, that there is a water supply problems in the upper zone and that people had run out of water. Implementation of operational control strategies on the transfer pump may minimize this system deficiency.

In 1990 the two steel tanks received a new interior coating. Based on our preliminary inspection, the tanks appear to be in reasonably good condition. No inspection of the well pumps and transfer pump was made.

The Oakridge Mutual Water Co. has made a pre-application to the State of California for a loan in the amount of \$700,000 from the Safe Drinking Water State Revolving Fund (Application #2701422-01). The proposed project was for a connection to the Aromas Water District. The Board of the Aromas Water District directed the Oakridge Mutual Water Co. to obtain a report on the possible cost for interconnecting the two systems. This report serves to satisfy this requirement.

ALTERNATIVES

Three basic alternatives exist:

- 1) Upgrade the existing wells if feasible
- 2) Install a new well
- 3) Connect to Aromas Water District

Besides the cost, each of these alternatives has advantages and disadvantages. They are briefly discussed in this report.

1. Upgrade existing wells

Well can plug for three reasons; physical plugging of well screen, plugging of surrounding ground of well or simply insufficient groundwater supply near the well.

Upgrading of the existing wells consists typically of cleaning of the intake screen of a well with compressed air. If these screens are plugged due to mineral deposits, they may limit the flow through the well and production of water. TV inspection of a well is feasible and may indicate a physical reason for the reduced capacity of the well. Such an inspection of a single well costs about \$800 per well.

Fractionation is a process sometimes used to fracture hard rock. In an existing well, it consists of freezing the well with the goal to break the rock surrounding the well. This type of upgrade, which is not very often used in this area would be successful only, if the existing fissures leading to the well are plugged. To our knowledge, this is difficult to determine and the process is a hit and miss operation.

If the groundwater level has dropped substantially, lowering of the well pump sometimes can improve the production of the well. Frequent tripping of a well pump is an indication that the water level is lower than originally encountered and the pump is "working too hard" to lift the water. An increase in the pump's motor horsepower will probably eliminate this tripping and may also result in a higher production of the well. Obtaining a well recovery test will indicate how fast the well is recovering and gives an indication of the water flow to the well.

It is beyond the scope of this study to determine the reason for the drop in water production. However, the suggested modifications should readily be recognizable by a qualified well driller and he could give you appropriate advice on possibly correcting the situation. I would contact both Salinas Pump Company and Lee Mellville for advice.

In any case, upgrading of a well is typically the least costly alternative. However, after all work is done, the well's capacity may still be the same or have only a slight increase in capacity. No assurances are available for the success of this approach. No information is

available with regards to the capacity of each existing well. However, a local well driller (Mark Thornton - Salinas Pump Co., Tel. # 422-4522) has indicated to me that an average deep well (~700 ft) in this area may deliver up to 10 to 12 gpm. It is our opinion, that it is unlikely that upgrading of all four wells will result in an average flow increase from 3 to 4 gpm to at least 14 gpm per well. 14 gpm of flow, sustained over a long period of time (at least 24 hours sometimes as long as three days) is required by regulations for each of the existing four wells. To determine the true capacity of a well in this area, a pump test should be performed in late summer or fall, when the groundwater table is low.

Advantages and disadvantages to such an upgrade are as follows:

Advantages:

1. Remain independent
2. Least capital cost alternative

Disadvantages:

- 1) Uncertainty of success to increase capacity to meet County requirements
- 2) Capital expenditure may be a waste, if not successful
- 3) Need to have a Board to operate system
- 4) Continued water readings and billings
- 5) Continuous maintenance of system
- 6) Respond to complaints
- 7) Uncertainty of future cost for maintenance of system (tanks, wells, pipelines)
- 8) Compliance with increasingly complex monitoring and reporting requirements
- 9) Prepare public notices in case of unsatisfactory water quality and perform additional testing
- 10) Selling of property may be difficult, as insufficient water supply must be disclosed. This may depress home values
- 11) May require in addition implementation of alternative 2

2. Install new well

Installation of a new well could be undertaken. A new well site has been provided to the Mutual by the Bowes family. This well is within the upper system zone. If sufficient water can be found and provides a sustainable flow, the well would discharge directly to the upper system, thus eliminating one deficiency of the current system, in which the supply is only provided to the lower zone. The large, unknown factor is related to the question if there is an adequate aquifer below this site that can provide a sustainable production from such a well.

We have performed a very limited analysis of the nearby Ballentree and Marilyn Estates' systems. They had simply run out of water, despite numerous tries to find sufficient water

with new wells. That system had, in our opinion, a greater chance to obtain water from its large water shed than the Oakridge Mutual Water Co with its limited water shed. Based on our analysis, it appears that the groundwater basin in this area has a limited depth and as such has a very small storage of groundwater. This aspect is reflected in the fact that towards the end of summer and late fall the water supply drops dramatically in this area. It is our opinion, that a new well in this general area is unlikely to be located over a new source of water and late summer supply problems may continue to exist.

As indicated above, the probable supply from a new deep well is about 10 to 15 gpm. While this definitely would help the system, it is unlikely that it will provide the desired long term solution. In addition, it probably would have to be supported by an increased well production of the existing wells, thus requiring implementation of alternatives 1 and 2. In any case, we recommend that the Oakridge Mutual Water Co. consult the experienced local well driller (Lee Mellville & Sons 831 443-1000) before this alternative is considered for implementation or is eliminated.

Advantages and disadvantages are similar to the upgrade alternative and are as follows:

Advantages:

1. Remain independent
2. Second lowest capital cost alternative, if successful

Disadvantages:

1. Uncertainty of success to increase capacity to meet County requirements
2. Capital expenditure may be a waste, if not successful
3. Need to have a Board to operate system
4. Continued water readings and billings
5. Continuous maintenance of system
6. Respond to complaints
7. Uncertainty of future cost for maintenance of system (tanks, wells, pipelines)
8. Compliance with increasingly complex monitoring and reporting requirements
9. Prepare public notices in case of unsatisfactory water quality and perform additional testing
10. Selling of property may be difficult, as insufficient water supply must be disclosed. This may depress home values
11. My require in addition implementation of alternative 1

3. Connection to Aromas Water District

A connection to the existing pipeline serving the Ballentree and Marilyn Estate areas is feasible. The closest proximity of Aromas' system is a 6" pipeline located at the

intersection of San Juan Road and Dunbarton Road. An extension of this pipeline would be constructed on the western side of Dunbarton Road to Oakridge Drive. The eastern side of the road, which allows a slightly more economical construction of a pipeline, is not available, as PG&E recently installed a high pressure gas pipe at that location. The connection to the Oakridge water system would be in Oakridge Drive near the "well road" to Oakridge's 4-inch main.

The Oakridge Mutual Water Co. would receive water from Aromas Rea water tank system. This tank is located at an elevation of 490 feet. This is about 90 feet higher than the Oakridge's lower tank. Consequently, a float valve would have to be installed at this tank. It would open when the tank level drops about 2 feet and immediately refill it. The tank would basically remain full at all times. The system pressure in the lower zone is expected to increase by about 40 psi. As the upper tank is located above the Rea tank it cannot be served directly from the Rea tank and the system will remain as today, being fed from the lower tank with a pump. System pressures will not increase in this upper zone. However, sufficient water should be available at all times.

A spare transfer pump should be installed at the lower tank for redundancy, in case one pump is inoperable.

If the Oakridge Mutual Water Co. is required to provide water also to the homes at the high point of the ridge with an elevation of about 700 feet, it must install a booster system, consisting of two pumps (one spare) and a pipeline that would transfer water from the upper tank to the existing system and tank in that area.

It should be noted that the aspects of a connection to the Aromas Water District must be approved by its Board. The following discussion is based on informal information obtained from the District Manager, George West. He indicated to me, that the Aromas Water Co. is not interested in providing only water through a master meter to provide water to the area. He prefers that the area be annexed to their system and that Aromas Water District provides full water service, including meter reading and maintenance of the system, including pipes, tanks and pumps. No financial credit should be anticipated from Aromas Water District to Oakridge Mutual Water's system for its water system.

Advantages and disadvantages to such an annexation are as follows:

Advantages:

- 1) Unlimited water supply
- 2) Long term water supply assured
- 3) No maintenance and operation headaches anymore
- 4) Water Board can be dissolved
- 5) No more water readings and billings
- 6) No response needed to water complaints

- 7) Removal of building moratorium
- 8) Water constraint removed from subdividing large lots
- 9) Lower water bills
- 10) Possibly increases value of homes due to elimination of water restriction disclosure requirement

Disadvantages:

- 1) Needs **two thirds majority of voters** to approve the formation of a Community Services District (levy of special tax)
- 2) Loss of control over system
- 3) Greatest long term cost
- 4) Completion and acceptance of State Funding
- 5) If no State funds are available, more expensive private funding needed
- 6) Water cost are determined by others
- 7) District may require upgrade of pipe system to upper tank

COST

If funding is obtained from the State, we would suggest that a new 6" pipeline be built to the upper tank. This would provide for upgraded fire protection and may possibly reduce the fire insurance of homes in the area.

There are four accumulative cost associated with the connection to the Aromas Water District:

- 1) The connection fee to Aromas,
- 1) The connection fee to Aromas Community Services District #98-1
- 2) The cost for construction of the Dunbarton pipeline and
- 3) Cost for other internal upgrade of Oakridge's Mutual Water Co. system.

The Aromas Water District charges presently \$4,393 for connection of each home. This cost reflects payment for new consumers fair share for the Aromas water system and has been determined and approved by the Aromas Water District's Board of Directors.

The Aromas Community Service's District 98-1 was formed by 29 land owners residing in the Ballentree and Marilyn Lane area. They paid for construction of the pipeline to Aromas. Their agreement with the Aromas District requires that each new connection must share in the entire cost of this pipeline. In other words, if one additional home is connected to this pipeline, independent of its actual point of connection, it must share in the total cost of the pipeline. This concept is similar to Aromas' connection fee referred to above. Based on the latest, but not final construction cost provided by the District, the pipeline cost is about

\$700,000. Thus, one new connection to this pipeline would have to pay $1/(29+1)$ of the total pipeline cost or \$23,333 to connect to Aromas CSD 98-1. However, the more connections are made at one time, the lower the individual connection charge. If all 35 properties are connected, the connection charge drops to about \$10,938. If the water 44 shares are used to distribute the cost, the charge drops to as low as \$9,589. This shows how important it is to get as many connections at one time to lower the unit cost.

The estimated cost for construction of the Dunbarton Road pipeline is \$280,000. A breakdown of the capital and operation cost is attached to this report. The unit cost per home is subject to the number of shares or homes that will be connecting to the system.

Should a party decide to connect at a later time to the completed water system, they would have to pay their fair share of the connection cost to CSD 98-1, as well as the Oakridge system cost. This connection fee would probably be higher in the future than if they connect now, as the initial number of participants would be lower resulting in higher initial project cost. In addition, the future party may be alone at that time thus would have an incremental higher cost, as reflected above with the connection cost to 98-1.

Minimum internal cost of system upgrade would consist of a float control system in the lower tank. This tank would be full at all times. In addition Aromas Water District would require installation of an additional transfer pump to the upper tank.

If the homes above the upper water tank want to be connected to the existing system, two booster pumps (including a spare) and a 6-inch pipeline would have to be installed to transfer water to their existing tank. At least three hydrants would be installed along the pipeline.

Economic comparison of alternatives

Typically, a long term cost comparison of alternatives is made which includes operating cost of the system. Such an analysis requires a number of assumptions to be made. The following assumptions are included in these calculations:

Assumptions

- | | | |
|----|----------------------------|---|
| 1) | Evaluation period | 20 years |
| 2) | Bond interest | 3% (This could change when the actual application is made, currently 2.32%) |
| 3) | Water fee rates | Current charges (no increases) |
| 4) | Water use per home | 400 gallons per day |
| 5) | Number of connections | 35 homes |
| 6) | Water cost Mutual per home | \$31.50/month (9,000 gal per month) |
| 7) | Water cost Aromas per home | \$14.64/month (1,200 cuft per month) |
| 8) | Mutual system cost | \$20 per month |

- 9) Aromas system cost \$15.69 per month (outside areas)
- 10) Power cost .15 cts/kwh
- 11) No inflation cost are included in this analysis (It would favor the Aromas connection due to lower water use fees)
- 12) Only minimum internal system upgrades are included
- 13) Besides source improvements, other Oakridge system maintenance or replacement cost are not included (tanks, well pumps and pipelines. These would happen within the next 20 years)
- 14) Residual value of existing system is zero (Aromas will pay nothing)
- 15) No financing is assumed for alternatives 1 and 2

Alternative 1 and 2 are added, as we believe that neither alternative 1 nor 2 alone would satisfy the required source demand. The expected average annual cost for water supplied to a single home for the various alternatives are expected to be as follows:

Annual Water Use Cost

Alternative 1 - Upgrade of existing wells	\$ 623
Alternative 2 - New well	\$ 623
Alternative 1 and 2	\$ 623
Alternative 3 - Connection to Aromas	\$ 394

In addition there will be an annual assessment for the duration indicated that would be collected directly or through property taxes. It should be noted that additional unknown cost for maintenance and upkeep of the Oakridge system would be additive to alternative 1 and 2.

Annual Assessments

Alternative 1 - Upgrade of existing wells	\$ 483	one year only
Alternative 2 - New well	\$ 1,671	one year only
Alternative 1 and 2	\$ 2,154	one year only
Alternative 3 - Connection to Aromas	\$ 1,237	for 20 years

Long Term Analysis

Over 20 years, the total cost for water (annual water use cost and annual assessments) per home would be as follows:

Alternative 1 - Upgrade of existing wells	\$12,948
Alternative 2 - New well	\$14,136
Alternative 1 and 2	\$14,619
Alternative 3 - Connection to Aromas	\$32,623

Based on this analysis, it is apparent that alternatives 1 and 2 are most cost effective, even

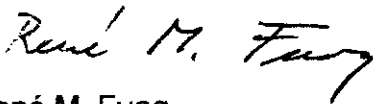
when they are combined. However, the question is: Will they satisfy the long term source demand? If alternative 1 or 2 or both are implemented and they still do not prove to be successful, the Oakridge Mutual Water Company has wasted its money. It is our professional opinion that alternative 1 or 2 or both together will not be able to satisfy the demand over a sustainable period of time if you drill within the Mutual's service area. Evaluation of other areas outside your service area for drilling of a new well are beyond our scope of work. However, as indicated above, I suggest you consult Lee Melville & Son for his input.

If the internal system is upgraded to the upper tank, the annual cost would increase by \$190 and if the internal system includes a connection to the ridge area the cost would increase by \$130.

While this analysis shows you the magnitude of cost involved in your decision it probably does not make your decision any easier. The key question you must ask yourself is: "Is the additional money spent over time worth an assured water supply?" The financial aspects have to be carefully weighted against the assurance and convenience to have water readily available. Hopefully the listed advantages a disadvantages are beneficial in your decisions making process.

It has been a pleasure to prepare this report for you. Because of budget constraints, no presentation to your Board had been included in the proposal. However, I will be glad to respond to questions from your Board by phone or letter.

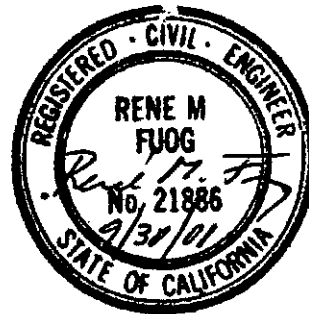
Very truly yours

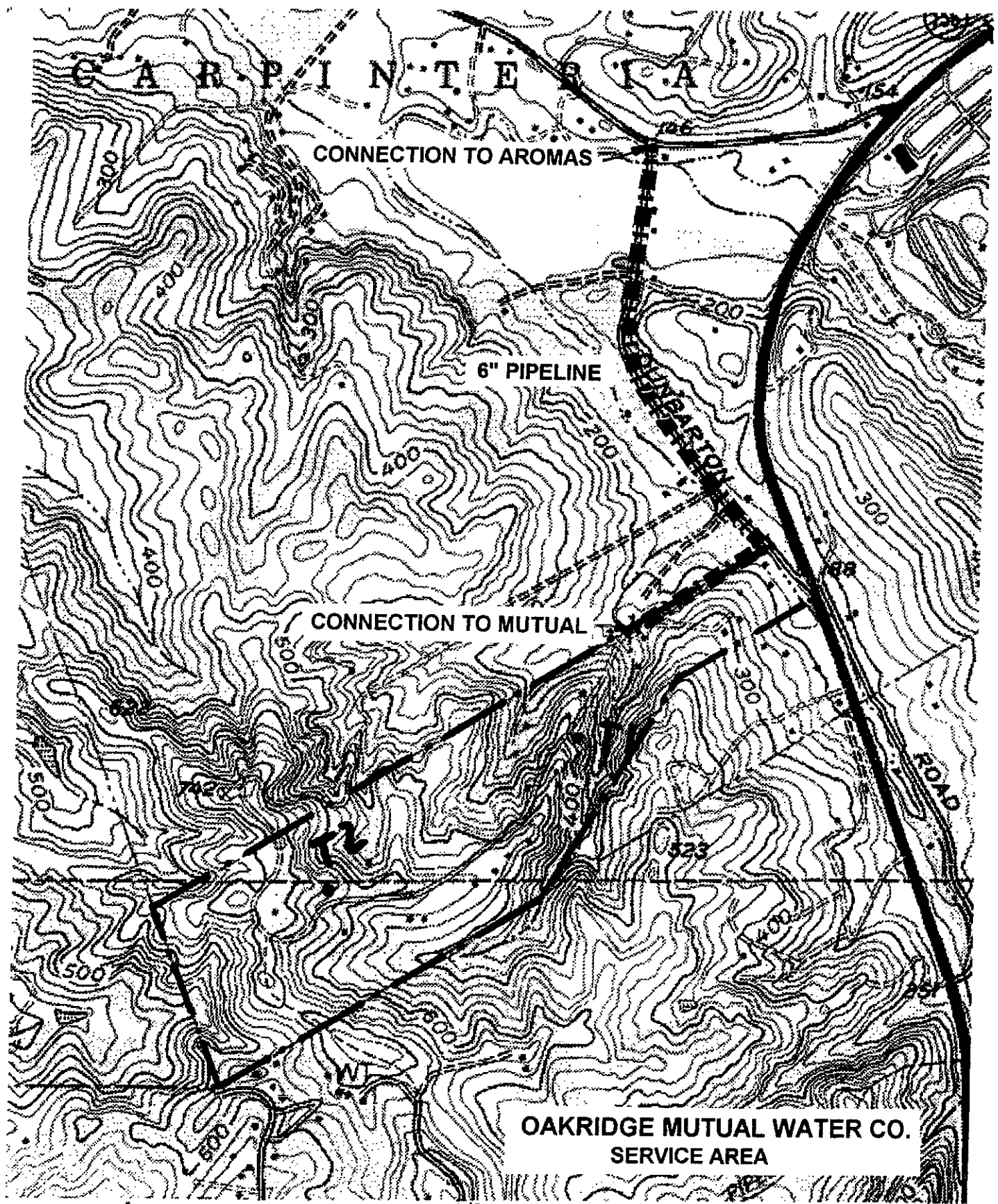


René M. Fuog

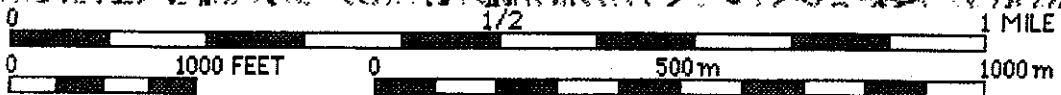
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cc: Aromas Water District, George West





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OAKRIDGE MUTUAL WATER CO.**FWR**
10/13/99**ALTERNATIVE EVALUATION****OPERATING COST****EXISTING SYSTEM**

POWER		2,000
CHEMICALS		500
MAINTENANCE		2,000
MONITORING OF WELLS (AVG. FOR 3 YEARS)		2,300
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SUBTOTAL		6,800
CONTINGENCY (15%)		1,020
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TOTAL		7,820
COST PER HOME	35	223
WATER COST PER HOME (300 GPD)		383
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TOTAL PER HOME		607
USE PRESENT ANNUAL CHARGE PER HOME, INC. MAINTENANCE FEE		623

AROMAS CONNECTION**WATER USE FEE**

WATER USE - AVG. HOME		206
MAINTENANCE FEE		188
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ANNUAL COST OF WATER SUPPLY PER HOME		394

ANNUAL CONNECTION FEE PER HOME

DISTRICT 98-1 FEE (AMORTIZED)		717
DUNBARTON PIPELINE (AMORTIZED)		520
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TOTAL CONNECTION FEE (FOR 20 YEARS)		1,237

UPGRADE WELLS

ONE TIME CHARGE (35 HOMES)		483
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NEW WELL

ONE TIME CHARGE (35 HOMES)		1,671
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UPGRADE WELLS AND NEW WELL

ONE TIME CHARGE (35 HOMES)		2,154
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20 YEAR COST (CAPITAL OR LOAN + ANNUAL WATER CHARGES)

UPGRADE WELLS		12,948
NEW WELLS		14,136
UPGRADE + NEW WELL		14,619
AROMAS CONNECTION		0

ADDITIONAL ANNUAL COST FOR UPGRADES

TO UPPER TANK		190
TO HIGH POINT OF SYSTEM		130

OAKRIDGE MUTUAL WATER CO.

FWR
10/13/99

ALTERNATIVE EVALUATION

CAPITAL COST

ALT.	ITEM	NUMBER	UNIT COST	TOTAL COST
MINIMUM UPGRADE EXISTING WELLS				
	6" WELL	1	4,000	4,000
	4" WELL	3	3,000	9,000
	SUBTOTAL			13,000
	CONTINGENCY (30%)			3,900
	TOTAL MINIMUM UPGRADE EX. WELLS			16,900
NEW WELL				
	WELL	1		40,000
	PUMPING EQUIPMENT	1		5,000
	SUBTOTAL			45,000
	CONTINGENCY (30%)			13,500
	TOTAL NEW WELL			58,500
AROMAS CONNECTION				
	CONNECTION PER HOME (AROMAS)	35	4,393	153,755
	SHARING OF EXIST. PIPELINE (98-1)	35	10,938	382,830
	DUNBARTON (MINIMUM CONSTRUCTION)			
	PIPELINE	3800	25	95,000
	PIPELINE	1400	22	30,800
	HYDRANTS	2	4,000	8,000
	UPGRADE INTERNAL SYSTEM			
	PUMP TO UPPER SYSTEM	1	2,000	2,000
	TANK VALVE	1	1,000	1,000
	SUBTOTAL			136,800
	ENG. & CONST. CONTINGENCY (30%)			41,040
	LEGAL AND BOND SERVICES (12% OF TOTAL)			100,000
	DUNBARTON CONNECTION			277,840
	TOTAL CONNECTION COST			814,425
	TOTAL CONNECTION TO AROMAS (MIN. CONSTR.) SAY			815,000
POSSIBLE ADDITIONAL COST				
	PIPELINE FROM DUNBARTON TO UPPER TANK			
	PIPELINE	3200	22	70,400
	HYDRANTS	3	2,500	7,500
	SUBTOTAL			77,900
	CONTINGENCY (30%)			23,370
	ADDITION SYSTEM IMPROVEMENTS TO UPPER TANK			101,270
	PIPELINE TO HIGH POINT			
	PIPELINE	2000	22	44,000
	HYDRANTS	3	2,500	7,500
	PUMP TO UPPER SYSTEM	2	1,000	2,000
	SUBTOTAL			53,500
	CONTINGENCY (30%)			16,050
	ADDITIONAL COST TO HIGH POINT			69,550