

September 30, 2011

2268.01

SENT BY E-MAIL ONLY

frmcsd@citlink.net

John Van den Bergh
Fall River Valley Community Services District
24850 Third Street
Fall River Mills, CA 96028

Dear John,

Subject: McArthur Water Storage Tank Project – Update to August 2, 2011 Letter

As a result of our August 2, 2011 evaluation for constructing a new water storage tank in McArthur and feedback obtained from District staff, we have modified our original letter to incorporate the following:

1. Propose a tank site further east of McArthur at a ground elevation that will allow a new tank to provide water system pressure equivalent to what exists now.
2. Eliminate the proposed supervisory valve at the tie-in to the McArthur distribution system.
3. Add the option of constructing an elevated tank in McArthur rather than a tank at grade and long pipeline along Highway 299.

FIRE FLOWS

We discussed the existing and desired fire flows for the Fall River Mills and McArthur water service areas with Mr. Quincy Hatch, FRVCSO Board Member and Battalion Fire Chief. According to Mr. Hatch, the desirable fire flow in the McArthur area is about 2,500 gallons per minute (GPM) to 3,000 GPM for the downtown commercial areas. It is reported the existing fire flow in McArthur ranges from about 800 GPM to about 1,250 GPM, depending on system demand. It is desirable for a new water storage tank in McArthur to supplement the existing fire flow in order to obtain 2,500 to 3,000 GPM in downtown McArthur.

PRELIMINARY WATER STORAGE TANK SIZING

In my July 21, 2011 e-mail, I discussed the two primary sizing parameters for municipal water storage tanks: 1) fire storage, and 2) equalizing storage. After a thorough review of the District's water consumption data, we have made some assumptions for sizing the water storage tank, described as follows:

Fire Storage

The fire storage volume needed for a 2,500 GPM fire flow for two hours is 300,000 gallons. It is our understanding there are about 600,000 gallons of storage in Fall River Mills; however, only about 30% to 50% of the needed fire flow can be

conveyed from Fall River Mills, due to the pressure losses in the pipeline along Highway 299. Therefore, it seems appropriate to provide enough fire storage in McArthur to make up the difference with what cannot be provided from Fall River Mills. If we assume 800 GPM can be provided from Fall River Mills during peak demands, and we limit the required fire flow in McArthur to 2,500 GPM, the new storage tank and pipeline would need to provide about 1,700 GPM (2,500 GPM – 800 GPM). For a two-hour duration, the fire storage volume would be about 204,000 gallons (1,700 GPM x 60 min/hr x 2 hrs).

Equalizing Storage

Equalizing storage is the volume difference between the average rate of water consumed on the maximum demand day (MDD) and the peak hourly demand on that day. Until recently, it was accepted practice to assume the equalizing volume represented about 25% of the total MDD. In March 2008, new Waterworks Standards went into affect requiring communities with less than 1,000 connections to provide enough equalizing storage to accommodate one entire MDD, or about four times what was considered historically.

Based on the production data, it appears the MDD occurred on July 27, 2010, at 0.557 MGD. However, on that day production data shows the well pump ran continuously. Additionally, low system pressures were reported during the peak demand periods indicating the McArthur well is not keeping up with demand. It appears the MDD production is not representative of the MDD consumption; therefore, a peaking factor of 1.5 was used to determine the design MDD of 0.675 MGD.

As indicated before, Fall River Mills currently has approximately 600,000 gallons of storage. Based on the current Waterworks Standards and the design MDD of 0.675 MGD, the District currently has an estimated 75,000-gallon deficiency in equalizing storage.

Preliminary Storage Tank Sizing

The existing Fall River Mills storage tanks currently provides approximately 600,000 gallons of the 675,000 gallons of equalizing storage required for both communities. In order to compensate for the uncertainty of the MDD and to allow for some modest future growth, it is desirable to oversize the tank. McArthur tank would need to be large enough to accommodate the 204,000-gallon fire storage component, 75,000 gallons of equalizing storage, and 68,000 gallons allowing for 10% growth. Therefore, for the purpose of developing a project cost estimate, we will assume a 350,000-gallon tank will be of adequate size for McArthur.

WATER STORAGE TANK SITING OPTIONS

Option 1 – At Grade Storage Tank Located east of McArthur: Option 1 consists of siting a new 350,000-gallon welded steel water storage tank on Assessor's Parcel No. 018-470-042 at a

base elevation of approximately 3,500 feet, see Figures 1 and 2. It would be necessary to construct approximately 21,800 feet (4.1miles) of new 14-inch water main between the existing water system in McArthur and the new tank.

Table 1 attached, was developed to determine the water transmission main size requirement based on desired fire flow and system pressure. As indicated, a tank delivering about 90 PSI system pressure would require a 14-inch pipeline to deliver 1,700 GPM to 2,000 GPM.

Option 2 – Elevated Storage Tank in McArthur: Option 2 consists of constructing an elevated water storage tank within McArthur proper. A proposed site has not yet been identified, but we have prepared a cost estimate assuming a new elevated tank could be constructed within 500 feet of an existing adequately-sized water main.

PRELIMINARY PROJECT COST ESTIMATE

Attached Table 2 contains a detailed project cost estimate for Option 1, a new 350,000-gallon welded steel storage tank at grade and a new 14-inch water main between McArthur and the new tank. Table 3 contains a detailed project cost estimate for Option 2, an elevated tank in McArthur. The construction cost component includes a 15% construction contingency, as well as a breakdown of indirect costs. Construction costs are based on recent bid prices from public works, prevailing-wages projects, completed in northern California. As indicated, the total estimated project cost for Option 1 is about \$3.435M and about \$1.922M for Option 2.

CONCLUSION

A number of assumptions have been made in preparing this preliminary evaluation for adding a new water storage tank to better serve McArthur. If the District decides to pursue this project, it is highly recommended they 1) perform a complete water system hydraulic analysis, and 2) perform a more accurate survey of ground elevations at the existing McArthur well and proposed tank site to fine-tune siting of a new tank under Option1.

PACE Engineering appreciates the opportunity to assist in the preliminary phase of the project. Please let us know if PACE can be of further assistance in completing this project.

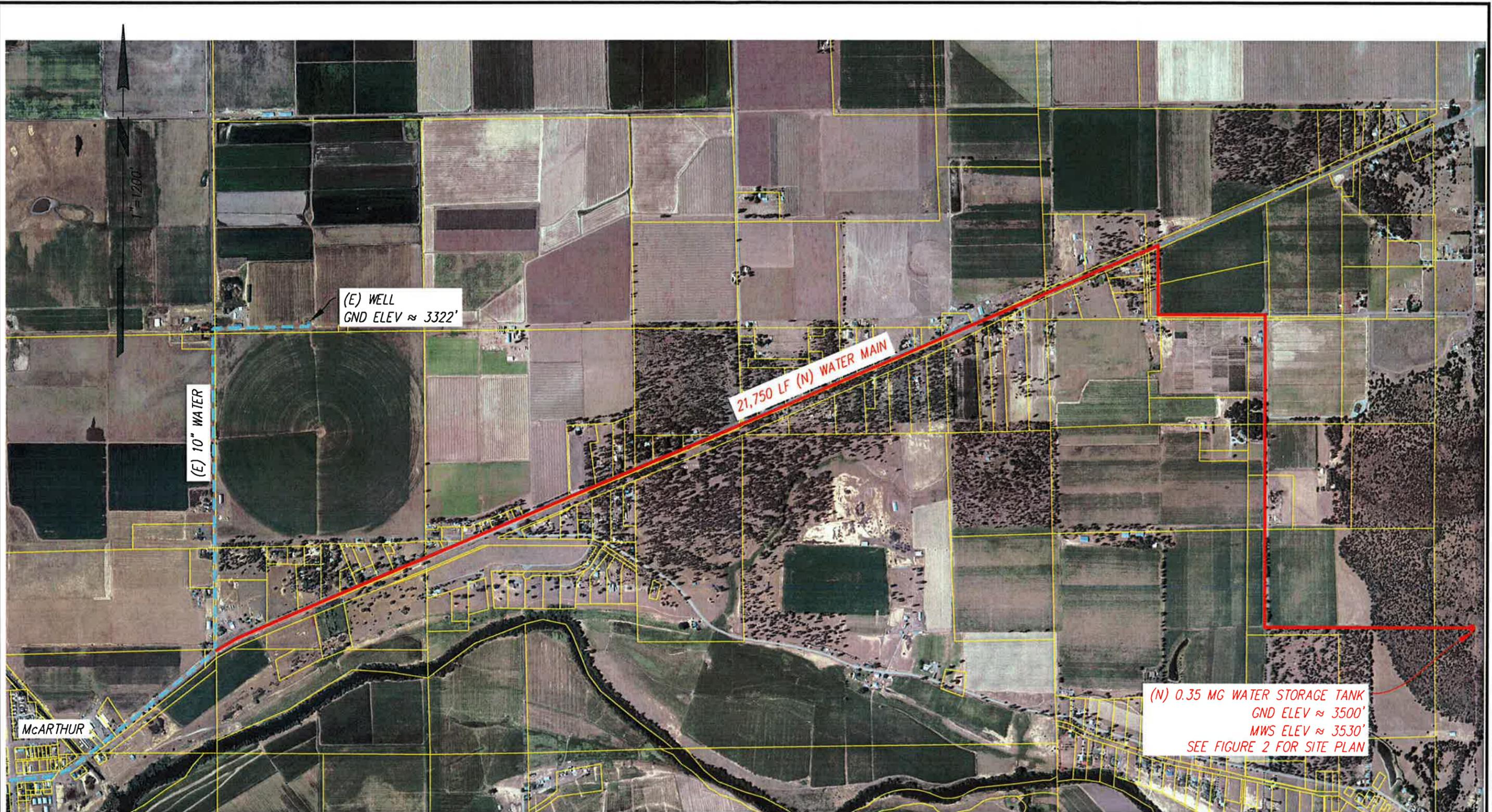
Sincerely,



Paul J. Reuter
Managing Engineer

PJR

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McARTHUR

(E) 10" WATER

(E) WELL
GND ELEV ≈ 3322'

21,750 LF (N) WATER MAIN

(N) 0.35 MG WATER STORAGE TANK
GND ELEV ≈ 3500'
MWS ELEV ≈ 3530'
SEE FIGURE 2 FOR SITE PLAN



FALL RIVER VALLEY COMMUNITY SERVICES DISTRICT
McARTHUR WATER STORAGE TANK
LOCATION MAP

FIGURE 1
DATE 08/11
JOB #2268.01

P:\11\2268.01\2268.01.dwg 08/11/11 10:00 AM User: jgarcia
 File Name: MWS LocMap.dwg Plot Date: 08/11/11 10:00 AM Plot Scale: 1"=1200'

TABLE 1
FALL RIVER VALLEY COMMUNITY SERVICES DISTRICT
McARTHUR WATER STORAGE TANK
PIPELINE SIZING CALCULATIONS

| | | POTENTIAL FIRE FLOWS (GPM) | | | | | |
|---|-------|----------------------------|-----------|-----------|------------|------------|-----------------|
| | | 1,000 | 1,700 | 2,000 | 2,500 | 3,000 | 3,500 |
| Existing Working Pressure (PSI): | 90 | | | | | | |
| Available Head for Fire Flow (FT): | 162 | | | | | | |
| Existing Water Main Characteristics: | | | | | | | |
| - Length (FT): | 2500 | | | | | | |
| - Size (IN): | 10 | | | | | | |
| -C Factor: | 120 | | | | | | |
| -Minor Loss Factor (K): | 3 | | | | | | |
| Friction Loss (FT): | | 18 | 48 | 65 | 98 | 138 | 183 |
| Velocity Head (FT): | | 0.3 | 1 | 1 | 2 | 2 | 3 |
| Total Headloss (FT): | | 19 | 48 | 65 | 98 | 138 | 183 |
| New Water Main Characteristics: | | | | | | | |
| - Length (FT): | 21800 | | | | | | |
| - Size (IN): | 24 | | | | | | |
| -C Factor: | 130 | | | | | | |
| -Minor Loss Factor (K): | 5 | | | | | | |
| Friction Loss (FT): | | 2 | 5 | 7 | 10 | 15 | 19 |
| Velocity Head (FT): | | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Total Headloss (FT): | | 2 | 5 | 7 | 10 | 15 | 19 |
| TOTAL HEADLOSS (FT): | | 21 | 53 | 72 | 109 | 152 | 203 |
| REQUIRED NEW WATER MAIN SIZE: | | 10 | 14 | 14 | 18 | 24 | Can't Do |



TABLE 2
FALL RIVER VALLEY COMMUNITY SERVICES DISTRICT
OPTION 1 - TANK LOCATED EAST OF McARTHUR
PRELIMINARY PROJECT COST ESTIMATE

Job No: 2268.01

Date: 08-27-11

By: PJR/GCH

| Item | Item | Qty | Unit | MATERIAL COST | | INSTALLED OR INTALLATION COST | | Total Cost (\$) |
|--|---|--------|------|---------------|------------|-------------------------------|------------|--------------------|
| | | | | Unit (\$) | Total (\$) | Unit (\$) | Total (\$) | |
| 1.0 | WATER MAIN | | | | | | | |
| 1.1 | Mobilization | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 1.2 | 12-Inch water main with class "A1" backfill (Hwy 299) | 2,000 | LF | | | \$100 | \$200,000 | \$200,000 |
| 1.3 | 12-Inch water main with class "A4" backfill (Hwy 299) | 10,950 | LF | | | \$85 | \$930,750 | \$930,750 |
| 1.4 | 12-Inch water main with class "A4" backfill | 8,800 | LF | | | \$75 | \$660,000 | \$660,000 |
| 1.5 | Fire hydrant, including gate valve and run (Every 1/4 mile) | 17 | EA | | | \$4,500 | \$76,500 | \$76,500 |
| 1.6 | 12-Inch gate valves (Every 1/4 mile) | 17 | EA | | | \$3,500 | \$59,500 | \$59,500 |
| 1.7 | Testing | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| Subtotal for Water Main: | | | | | | | | \$1,941,750 |
| 2.0 | 350,000-GALLON WATER STORAGE TANK | | | | | | | |
| 2.1 | Grading/earthwork for new access road | 1 | LS | | | \$15,000 | \$15,000 | \$15,000 |
| 2.2 | Site earthwork and rough grading | 1 | LS | | | \$20,000 | \$20,000 | \$20,000 |
| 2.3 | Gravel site access road | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 2.4 | Site finish grading and aggr base placement | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| 2.5 | Site fencing | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 2.6 | Tank foundation | 1 | LS | | | \$30,000 | \$30,000 | \$42,000 |
| 2.7 | Under-tank piping/mechanical | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 2.8 | Site piping | 1 | LS | | | \$15,000 | \$15,000 | \$15,000 |
| 2.9 | Tank fabrication | 1 | LS | | | \$150,000 | \$150,000 | \$210,000 |
| 2.10 | Tank painting | 1 | LS | | | \$65,000 | \$65,000 | \$91,000 |
| 2.11 | Telemetry/SCADA (Assumes solar power at Tank) | 1 | LS | | | \$50,000 | \$50,000 | \$50,000 |
| 2.12 | Testing | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| Subtotal for Water Storage Tank: | | | | | | | | \$483,000 |
| TOTAL WATER MAIN AND WATER STORAGE TANK COST: | | | | | | | | \$2,424,750 |
| CONSTRUCTION CONTINGENCY @ 15%: | | | | | | | | \$364,000 |
| TOTAL ESTIMATED CONSTRUCTION COST: | | | | | | | | \$2,788,750 |
| INDIRECT COSTS | | | | | | | | |
| Land Acquisition Costs (Surveys, mapping, appraisals): | | | | | | | | \$7,000 |
| Land and easement Purchase: | | | | | | | | \$35,000 |
| Environmental/Permitting: | | | | | | | | \$25,000 |
| Geotechnical Services: | | | | | | | | \$5,000 |
| Preliminary Engineering Report: | | | | | | | | \$15,000 |
| Legal Fees: | | | | | | | | \$5,000 |
| Design/Bid Document Preparation/ Bidding: | | | | | | | | \$251,000 |
| Construction Administration: | | | | | | | | \$110,400 |
| Construction Observation: | | | | | | | | \$112,700 |
| Indirect Costs Contingency: | | | | | | | | \$80,000 |
| TOTAL INDIRECT COSTS: | | | | | | | | \$646,100 |
| TOTAL ESTIMATED PROJECT COST: | | | | | | | | \$3,435,000 |



TABLE 3
FALL RIVER VALLEY COMMUNITY SERVICES DISTRICT
OPTON 2 - ELEVATED TANK IN McARTHUR
PRELIMINARY PROJECT COST ESTIMATE

Job No: 2268.01
 Date: 08-27-11
 By: PJR/GCH

| Item | Item | Qty | Unit | Material Cost | | INSTALLED OR INTALLATION COST | | Total Cost (\$) |
|--|---|-----|------|---------------|------------|-------------------------------|-------------|--------------------|
| | | | | Unit (\$) | Total (\$) | Unit (\$) | Total (\$) | |
| 1.0 | WATER MAIN | | | | | | | |
| 1.1 | Mobilization | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 1.2 | 8-Inch water main with class "A1" backfill | 500 | LF | | | \$65 | \$32,500 | \$32,500 |
| 1.3 | 8-Inch water main with class "A4" backfill | 0 | LF | | | \$0 | \$0 | \$0 |
| 1.4 | Fire hydrant, including gate valve and run | 1 | EA | | | \$6,500 | \$6,500 | \$6,500 |
| 1.5 | 8-Inch gate valves | 2 | EA | | | \$2,600 | \$5,200 | \$5,200 |
| 1.6 | New Combo PRV & Supervisory Valve | 1 | EA | | | \$0 | \$0 | \$0 |
| 1.7 | Testing | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| Subtotal for Water Main: | | | | | | | | \$59,200 |
| 2.0 | 350,000-GALLON WATER STORAGE TANK | | | | | | | |
| 2.1 | Grading/earthwork for new access road | 0 | LS | | | \$0 | \$0 | \$0 |
| 2.2 | Site earthwork and rough grading | 1 | LS | | | \$2,000 | \$2,000 | \$2,000 |
| 2.3 | Gravel site access road | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 2.4 | Site finish grading and aggr base placement | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| 2.5 | Site fencing | 1 | LS | | | \$10,000 | \$10,000 | \$10,000 |
| 2.6 | Tank foundation | 1 | LS | | | \$30,000 | \$30,000 | \$42,000 |
| 2.7 | Under-tank piping/mechanical | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| 2.8 | Site piping | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| 2.9 | Tank fabrication (including painting) | 1 | LS | | | \$1,130,000 | \$1,130,000 | \$1,130,000 |
| 2.10 | Telemetry/SCADA (Assumes solar power at Tank) | 1 | LS | | | \$50,000 | \$50,000 | \$50,000 |
| 2.11 | Testing | 1 | LS | | | \$5,000 | \$5,000 | \$5,000 |
| Subtotal for Water Storage Tank: | | | | | | | | \$1,264,000 |
| TOTAL WATER MAIN AND WATER STORAGE TANK COST: | | | | | | | | \$1,323,200 |
| CONSTRUCTION CONTINGENCY @ 15%: | | | | | | | | \$198,000 |
| TOTAL ESTIMATED CONSTRUCTION COST: | | | | | | | | \$1,521,200 |
| INDIRECT COSTS | | | | | | | | |
| Land Acquisition Costs (Surveys, mapping, appraisals): | | | | | | | | \$7,000 |
| Land and easement Purchase: | | | | | | | | \$35,000 |
| Environmental/Permitting: | | | | | | | | \$25,000 |
| Geotechnical Services: | | | | | | | | \$5,000 |
| Preliminary Engineering Report: | | | | | | | | \$15,000 |
| Legal Fees: | | | | | | | | \$5,000 |
| Design/Bid Document Preparation/ Bidding: | | | | | | | | \$136,900 |
| Construction Administration: | | | | | | | | \$60,200 |
| Construction Observation: | | | | | | | | \$61,500 |
| Indirect Costs Contingency: | | | | | | | | \$50,000 |
| TOTAL INDIRECT COSTS: | | | | | | | | \$400,600 |
| TOTAL ESTIMATED PROJECT COST: | | | | | | | | \$1,922,000 |