



August 25, 2006

1887.01

**FILE COPY**

Mark Rychik  
Romar Homes Inc.  
18540 Bywood Drive  
Cottonwood, CA 96022

Dear Mark:

**Subject:** Required Water System Improvements to Provide Service to the Proposed Locust Road Development

PACE Civil Inc. has completed its review of the potential additional water demand by the proposed Locust Road development on the Cottonwood Water District. This report explains the requirements needed to provide water to the proposed 300-unit subdivision located within the District, east of Locust Road - See Figure 1. The analysis assumes that most, if not all, of the proposed homes will be located above the 550-foot elevation. The proposed improvements were added to the future Cottonwood Water District hydraulic model to determine the impact on water production and distribution.

The recommended improvements were presented in draft form to Kris Hollmer, District General Manager for review and comment. The District Board of Directors will need to review and revise the proposed improvements contained herein, and then if appropriate, enter into an agreement with the Developer.

## **PRESSURE ZONES**

The District has three pressure zones: 1) The Downtown Pressure Zone located in older part of town at the lower elevations; 2) the Main Pressure Zone, which encompasses the majority of the District and; 3) the Vantage Drive Pressure Zone, which serves residents located above the 550-foot elevation east of i-5. Most of the proposed Locust Road Development is located above the 550-foot elevation and would have to be included in an expanded Vantage Drive Pressure Zone.

## **EXISTING VANTAGE DRIVE PRESSURE ZONE FACILITY**

The existing Vantage Drive Pressure Zone consists of a 70 gallon per minute (GPM) well, a 100,000 gallon bolted steel tank, and a booster pump station capable of providing 400 GPM with a 5,000-gallon pressure vessel. The pressure zone currently provides water to an estimated 42 household equivalents (HEs), and the existing facilities are incapable of providing adequate service to the additional 300 homes in the proposed development. A new well, tank, booster pump station, and emergency generator will be required to supply the proposed development.

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Locust Road Development  
Water Service

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## DESIGN CRITERIA

The District has an estimated average day demand (ADD) of 780 GPD/HE and a maximum day demand (MDD) of 1,700 GPD/HE. The proposed 300-parcel subdivision plus the existing 42 HEs will require an estimated ADD of 267,000 GPD and MDD of 581,000 GPD.

## STORAGE

Storage is provided to meet flow equalizing, and the larger demand of emergency or fire. Flow equalizing and emergency storage requirements are each typically 25 percent of the MDD or 145,000 gallons. Fire storage for the proposed development is estimated at 120,000 gallons (1,000 GPM for 120 minutes) although the local fire District should provide its minimum requirement for consideration. Thus, the total minimum storage requirement for the expanded Vantage Drive Pressure Zone includes flow equalizing and emergency for an estimated 291,000 gallons.

The District's 1989 Master Plan called for storage tank improvements that were partially addressed with the recent installation of the 1 MG Rhonda Road Tank. The District's 2006 Municipal Services Review recommended that a minimum 500,000-gallon tank be installed to serve the Main and Vantage Drive Pressure Zones east of I-5. Neither the MSR or Master Plan envisioned the higher residential densities proposed in the Locust Road Development; therefore, it is recommended that the District install a 1 million gallon (MG) tank to meet current and projected demands. It should be noted that the proposed 1 MG tank will be connected to the Main Pressure Zone, thus increasing the available storage to serve the majority of the District.

## WELL

A new well will be required to supply the additional water needed for the subdivision. A new well located in the Panorama Estates subdivision is proposed, in conjunction with a supervisory valve located at the corner of Trefoil and Locust Roads to fill the new tank. The Locust Road Development will require a water supply of approximately 400 GPM during MDD.

A supervisory valve is needed to divert flows from the new well to the proposed tank through the existing 8-inch main leading from the Main Pressure Zone to the Vantage Drive Pressure Zone. The head losses to the new tank would be higher than the losses leading to the Rhonda Road Tank, and the hydraulic model indicates that the Rhonda Road Tank would overflow before the proposed tank filled. By installing a supervisory valve that would close when the Rhonda Road Tank was full, water from the new well would flow into the proposed tank and not overflow the Rhonda Road Tank. If the new

well were to fail, then the District would operate the new 1 MG tank at a lower water surface elevation until it was brought back into service. Eventually the District will improve the distribution system leading to the proposed tank to allow an even flow distribution and perhaps eliminate the need for the supervisory valve.

## **BOOSTER PUMP STATION**

A new booster pump station is required to increase pressures from the proposed 1 MG tank to services in the Vantage Drive Pressure Zone. While the existing Vantage Drive Booster Pump Station serves its intended purpose now, it would be replaced to service the proposed additional 300 homes and existing 42 HE. The booster pump station will need to supply an estimated maximum hour demand of 650 GPM for the existing and proposed homes, as well as an additional 1,000 GPM fire flow for a total maximum flow of 1,650 GPM. A 100 KW emergency generator will be required to power the booster pumps to ensure fire flow during power outages. A 10,000-gallon pressure vessel or variable speed drive will need to be considered as part of the design. Replacement telemetry will be required to link the tank, well, and booster pump station into the District's SCADA system.

## **COST ESTIMATE**

Table 1 details the preliminary project cost estimate, and Figure 1 shows the proposed location of the improvements. Table 1 has several notes that explain the basis for the cost estimate. Alteration to the assumptions, such as a change in well production capacity, has an impact on the costs and the respective distribution between the District and Developer. The estimate is in August 2006 dollars, and inflation should be added to the estimate to account for when the facilities are constructed. Furthermore, the cost of raw materials has risen sharply recently, thus an agreement between the District and Developer should be written in terms of the percentage costs of the actual project costs for the tank and well and not today's cost estimate.

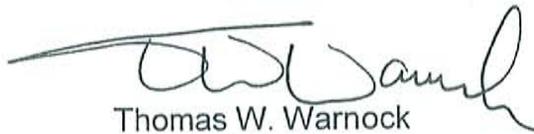
## **PROJECT FUNDING**

The Cottonwood Water District does not currently have the funding to finance this project. Preliminary discussions between the District and Developer regarding funding of the improvements suggest that Romar Homes will front the project costs and be reimbursed by the District for over sizing the tank and well facilities through future connection fees. The District needs to appreciate the fact that the Developer is funding a new tank and well, portions of which will supply future customers and would have been normally been funded through the Capital Improvement Fee. The Developer needs to appreciate the fact that they are connecting to an existing system that provides redundant wells, tank, distribution, operation, maintenance, and administration.

The District will request that a 15 to 20-year sunset clause be included in the reimbursement agreement. A sunset clause is a reasonable request that limits the District's debt service to a defined timeline given today's design criteria. Additional details of the reimbursement agreement will need to be negotiated by the District and Romar Homes.

Thank you for allowing PACE to provide you with this analysis. Please feel free to contact us if you have any questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read 'T. Warnock', with a long horizontal stroke extending to the left.

Thomas W. Warnock  
Principal Engineer

TWW

Enclosures

c/enc: Kris Hollmer, Cottonwood Water District

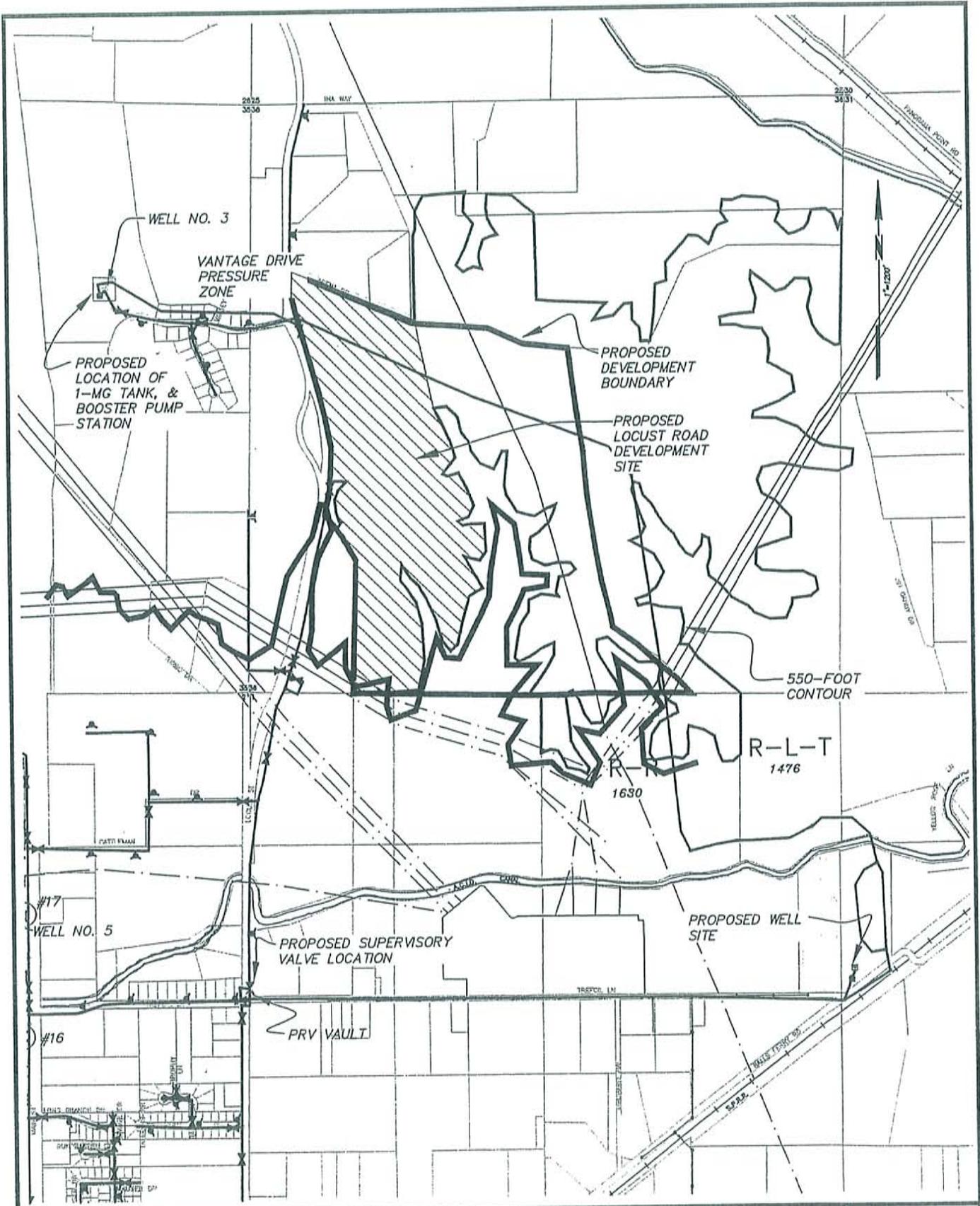
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**TABLE 1**  
**ROMAR HOMES - LOCUST ROAD DEVELOPMENT**  
**PRELIMINARY PROJECT COST ESTIMATE (1)(2)(7)**  
**FOR WATER SYSTEM IMPROVEMENTS TO COTTONWOOD WATER DISTRICT**

| ITEM NO.                            | DESCRIPTION                          | AMOUNT | UNITS    | COST PER UNIT | TOTAL COST(8)      | PERCENTAGE ASSIGNED TO DEVELOPMENT | COST ASSIGNED TO DEVELOPMENT | DISTRICT OVER SIZING PERCENTAGE | DISTRICT OVER SIZING COST |
|-------------------------------------|--------------------------------------|--------|----------|---------------|--------------------|------------------------------------|------------------------------|---------------------------------|---------------------------|
| 1                                   | 1-MILLION GALLON TANK <sup>(3)</sup> | 1      | LUMP SUM | \$700,000     | \$700,000          | 29%                                | \$203,000                    | 71%                             | \$497,000                 |
| 2                                   | WELL <sup>(4)</sup>                  | 1      | LUMP SUM | \$500,000     | \$500,000          | 40%                                | \$200,000                    | 60%                             | \$300,000                 |
| 3                                   | BOOSTER PUMP STATION <sup>(5)</sup>  | 1      | LUMP SUM | \$390,000     | \$390,000          | 100%                               | \$390,000                    | 0%                              | \$0                       |
| 4                                   | SUPERVISORY VALVE <sup>(6)</sup>     | 1      | LUMP SUM | \$75,000      | \$75,000           | 100%                               | \$75,000                     | 0%                              | \$0                       |
| 5                                   | 12-INCH MAIN TANK TO DEVELOPMENT     | 2000   | FEET     | \$150         | \$300,000          | 100%                               | \$300,000                    | 0%                              | \$0                       |
| 6                                   | 12-INCH MAIN LOCUST RD TO TANK       | 2000   | FEET     | \$150         | \$300,000          | 100%                               | \$300,000                    | 0%                              | \$0                       |
| 7                                   | 8-INCH MAIN DRIVE MODIFICATIONS      | 1      | LS       | \$20,000      | \$20,000           | 100%                               | \$20,000                     | 0%                              | \$0                       |
| 8                                   | MISCELLANEOUS PIPE IMPROVEMENTS      | 1      | LUMP SUM | \$50,000      | \$50,000           | 100%                               | \$50,000                     | 0%                              | \$0                       |
| 9                                   | TELEMETRY IMPROVEMENTS               | 1      | LUMP SUM | \$20,000      | \$20,000           | 100%                               | \$20,000                     | 0%                              | \$0                       |
| 10                                  | DEMOLITION OF 400,000 GALLON TANK    | 1      | LUMP SUM | \$40,000      | \$40,000           | 100%                               | \$40,000                     | 0%                              | \$0                       |
| <b>SUB TOTAL</b>                    |                                      |        |          |               | <b>\$2,395,000</b> |                                    | <b>\$1,598,000</b>           |                                 | <b>\$797,000</b>          |
| <b>ENGINEERING (25%)</b>            |                                      |        |          |               | <b>\$598,750</b>   |                                    | <b>\$399,500</b>             |                                 | <b>\$199,250</b>          |
| <b>CONTINGENCY (25%)</b>            |                                      |        |          |               | <b>\$748,438</b>   |                                    | <b>\$499,375</b>             |                                 | <b>\$249,063</b>          |
| <b>ESTIMATED TOTAL PROJECT COST</b> |                                      |        |          |               | <b>\$3,742,188</b> |                                    | <b>\$2,496,875</b>           |                                 | <b>\$1,245,313</b>        |

**NOTES:**

- (1) THIS ESTIMATE ASSUMES CONSTRUCTION WILL BE AT PREVAILING WAGE RATES FOR PUBLIC WORKS PROJECTS.
- (2) COSTS FOR EASEMENTS, SPECIAL USE PERMITS & ENVIRONMENTAL DOCUMENTATION ARE NOT INCLUDED.
- (3) COST PROPORTION ASSIGNED TO DEVELOPMENT IS BASED UPON 300 HE, 25% MDD EQUALIZATION DEMANDS (MDD = 1,700 GPD/HE), & 25% MDD FOR EMERGENCY STORAGE.
- (4) THE PROPORTIONAL COST FOR THE WELL IS BASED ON A 1,000 GPM WELL & 300 HES, A LARGER OR SMALLER CAPACITY WELL WILL ALTER THE TOTAL COST AND COST DISTRIBUTION. THE ESTIMATE ASSUMES THAT 3 PHASE POWER IS NEARBY.
- (5) THE DISTRICT MAY ELECT TO OVERSIZE THE PUMP STATION TO ALLOW FOR FUTURE GROWTH IN THE PRESSURE ZONE. THE ESTIMATE ASSUMES THREE PHASE POWER IS NEARBY.
- (6) THIS VALVE WILL BE LOCATED AT THE INTERSECTION OF TREFOIL AND LOCUST.
- (7) COST FOR WATER MAINS & APPURTENANCES INTEGRAL TO THE DEVELOPMENT ARE NOT INCLUDED.
- (8) COSTS BASED UPON CONSTRUCTION IN AUGUST 2006. ALLOWANCES FOR INFLATION SHOULD BE INCLUDED BASED UPON WHEN PROJECT IS CONSTRUCTED.



DATE  
7/06

**PACE**  
CIVIL, INC.  
REDDING, CALIFORNIA



ROMAR HOMES INC.  
PROPOSED LOCUST ROAD DEVELOPMENT  
WATER IMPROVEMENTS

FIGURE 1  
JOB #1887.01