



## RANCHO MURIETA COMMUNITY SERVICES DISTRICT

15160 Jackson Road, Rancho Murieta, CA 95683

Office - 916-354-3700 \* Fax - 916-354-2082

### IMPROVEMENTS COMMITTEE




*(Directors Randy Jenco and Martin Pohl)*

Regular Meeting

June 1, 2021 at 8:00 a.m.

**This meeting will be held via ZOOM** video conference only pursuant to Gov. Newsom Executive Order N-29-20. You can join the conference by (1) logging on to <https://us02web.zoom.us/j/87359582935>, entering Meeting ID no. 873 5958 2935, and using the audio on your computer, or (2) dialing into 1-669-900-9128 and entering the meeting code 873 5958 2935. Those wishing to join with audio only can simply call the telephone number above and enter the code. Participants wishing to join the call anonymously have the option of dialing \*67 from their phone. Please refer to your telephone service provider for specific instructions. ***PLEASE NOTE – MOBILE DEVICE USERS MAY NEED TO INSTALL AN APP PRIOR TO USE AND MAC AND PC DESKTOP AND LAPTOP USES WILL REQUIRE YOU TO RUN A ZOOM INSTALLER APPLICATION – PLEASE FOLLOW DIRECTIONS AS PROVIDED BY ZOOM. IT IS RECOMMENDED YOU ATTEMPT TO LOGIN AT LEAST 5 MINUTES BEFORE THE START OF THE MEETING.***

### AGENDA

1. **Call to Order**
2. **Comments from the Public**
3. **Improvements Monthly Updates**
  -  District Projects
  -  Reserve Study update
  -  Development
4. **Discuss Residences East and West with Developers Bob Keil and John Sullivan**
5. **Director and Staff Comments/Suggestions *[no action]***
6. **Adjournment**

"In accordance with California Government Code Section 54957.5, any writing or document that is a public record, relates to an open session agenda item and is distributed less than 24 hours prior to a special meeting, will be made available for public inspection in the District offices during normal business hours. If, however, the document is not distributed until the regular meeting to which it relates, then the document or writing will be made available to the public at the location of the meeting."

In compliance with the Americans with Disabilities Act and Executive Order No. N-29-20, if you are an individual with a disability and you need a disability-related modification or accommodation to participate in this meeting or need assistance to participate in this teleconference meeting, please contact the District Office at 916-354-3700 or [awilder@rmcsd.com](mailto:awilder@rmcsd.com). Requests must be made as soon as possible.

Note: This agenda is posted pursuant to the provisions of the Government Code commencing at Section 54950. The date of this posting is May 28, 2021. Posting locations are: 1) District Office; 2) Post Office; 3) Rancho Murieta Association; 4) Murieta Village Association.

# MEMORANDUM

Date: May 26, 2021  
To: Improvements Committee  
From: Ron Greenfield, acting Director of Field Operations  
Subject: Monthly Development Project & other Updates

---

## General Update

### Sodium Hypochlorite Conversion Project

Staff installed two additional backpressure valves as close to the chemical injection points as possible at the tertiary influent and effluent sites. Outstanding work includes TESCO wiring the new control and monitoring telemetry into the Wastewater control PLC #2 and integrating these telemetry items into the existing Rockwell SCADA system.

### East & West Dissolved Air Floatation (DAF) Painting project

Redwood Painting Co. arrived on May 3 and began setting up equipment to start work for the sandblasting off the old coating and rust in preparation for the new epoxy coating of the DAF's interiors and painting of the exteriors. The project is proceeding, and we anticipate it to be complete in early June.

### Fire Hydrant Replacement Project (CRP 20-06-1)

Utility staff is nearly complete replacing the ten dry-barrel fire hydrants they outlined for replacement. There is one hydrant left on Guadalupe and Park 8.

## Development Projects

### The Retreats East & North

No update from last month. The project reports that K-Hovnanian remains in the due-diligence period. They have requested that Coastland sign off on plans that had expired and have now been resubmitted. District staff has requested past due and additional deposit funding before being able to continue work.

### Rancho Murieta North – Development Project

The project provided deposit funds to allow continued review of the project's water and sewer plans. Drainage plans had already been through a first review with comments and plan mark-ups provided back to the project.

### MG - Murieta Marketplace

No update.

### MG – Legacy Villas & Suites (lot 7)

No update.

### The Murieta Gardens I & II – Infrastructure

No update.

### MG - Murieta Marketplace

No update. The drainage basin that is a part of this project remains active as a stormwater best management practice for the development site.

MG – Lot 9 (Taco Bell)

No update.

MG -Lot 10 (PDF Office)

No update.

MG – Lot 11 (Circle K Convenience/Carwash/Subway)

No update.

Other Development Projects:

Riverview

Coastland is continuing it's review of Riverview's three-phased plan packages, including Water, Sewer and Storm Drain studies. Below is the status of all three packages that are being processed. Coastland understands that Phase 2 submittal is being prepared, but it has not been submitted for review.

- Phase 1A: Coastland/CSD returned comment letter and redlines to Developer on February 3.
- Phase 1B: Coastland/CSD returned comment letter and redlines to Developer on December 21, 2020.
- Grading: Coastland/CSD returned additional comments via letter and redlines to Developer on April 14, 2021.

Murieta Business Park

No update.

The Retreats East and North

No update. Continued review is pending the project submitting deposit funding. Last update: The project had submitted improvement plans on February 19, 2021 requesting that they be re-approved and signed off by Coastland Engineering, along with Sac Metro Fire Department and Sacramento County. Coastland responded that the previous review has expired, signature date of June 9, 2017, and needs to be reviewed.

Planned Projects:

The Residences East & West

Tom Hennig, and District Engineer, Joe Dominichelli, met with Bob Keil to discuss this project. Mr. Keil is interested in moving forward with the original plans for this project. Mr. Keil plans to submit a developer application packet and deposit. Mr. Keil and Mr. Sullivan have submitted a request for consideration for project scope determination for this Improvements meeting today.

Conditions for both East & West projects can be viewed:

<http://www2.agendonet.saccounty.net/BoardOfSupervisors/Meetings/ViewMeeting?id=3572&doctype=1>

# MRK DEVELOPMENT, INC

14768 Guadalupe Drive, Rancho Murieta, CA 95683

(916) 521-8856

[bobkeilmrk@gmail.com](mailto:bobkeilmrk@gmail.com)

Tom Hennig  
General Manager  
Rancho Murieta Community Services District

Tom,

I would like to formally request the chance to present to the Infrastructure Committee on June 1, 2021. The purpose of the meeting with the improvement committee is to confirm that the recommendations put in place in the Rancho Murieta North Infrastructure Master Plan (found on the RMCS D website) can be used to design the improvement plans for The Residences at Murieta Hills – East and West. Please note that the Master Plan assumed 235-245 dwelling units. We are only moving forward with 198 units so the conclusions of the report only get more favorable with all infrastructure. I will be representing East and John Sullivan will be representing west. Please accept the information below along with the attached exhibits for the agenda.

---

The RM North Infrastructure Master Plan was completed a couple years prior to the approval of the Vesting Tentative Map (2007) for The Residences at Murieta Hills East and West. The project was designed using the conclusions made in that plan. We would like to confirm that we can use those recommendations to create our improvement plans so we only have to do it one time and save everyone time. I will address Water, Sewer, Drainage, and Recycled Water.

Water – According to Section II-Infrastructure Elements, Sub-section A-Water (Exhibit A), The results of the Water Model demonstrated that the existing Hydro-pneumatic pump system has the capacity to accommodate the demand of the Murieta Hills Development with adequate system pressures (including fire suppression). We would like to have you confirm these findings and confirm the connection points for the new development as marked on Exhibit B.

Sewer – According to the RM North Infrastructure Master Plan, Page 13, Wastewater Collection Systems, sub-section “Murieta Hills”, recommends installing a 6” forced main carrier pipe within the casing of the abandoned 12” force main along Stonehouse Road (Exhibit C). I have included Exhibit D which are the relevant pages from the Recycled Water Program Preliminary Design Report, Section 2.7.3: Existing Stonehouse 12-inch Sewer Force main which concludes that the 12-inch sewer force main is rated in the High Risk Level with a useful life of 19 years if used for recycled water. Being used as a casing for the sewer would not put that line under pressure or subject it to highly aggressive recycled water. Please confirm that we can design the sewer line inside the 12-inch existing main.

Page 16 Infrastructure Elements sub section “Service Area “A” states that Main Lift Station North has the capacity to serve the entire Sewer Service Area A (of which RM East and West are part of). Please confirm that Main Lift Station North can be included as is in our improvement plans.

Recycled Water – Our conditions of approval from Sacramento County do not require the installation of recycled water. RMCS D has been discussing the matter with us without coming to a conclusion. The massive CSD expense necessary to bring recycled water to Stonehouse park and Murieta Hills is not economically feasible. I do not think RMA can commit to both building the infrastructure and having the recycled water capacity to deliver if it was built. As with the Riverview project, I think Murieta Hills should not have to construct recycled water facilities.

Drainage – Page 21 Infrastructure Elements sub-section “The Residences at Murieta Hills determines that the existing conveyance system can accommodate 100 year storm event. We would be building an on site detention basin designed to reduce post development peak flows to pre-development peak conditions. Please confirm that we are ok to use this design.

Thank you for consideration of these items and I look forward to a quick and painless process so we can get started as soon as possible with our grading and improvement plans.

Kindly,

Bob Keil  
President  
MRK Development, Inc.  
The Residences at Murieta Hills East

John Sullivan  
The Residences at Murieta Hills West

Exhibit A  
Water

**RANCHO MURIETA NORTH  
INFRASTRUCTURE MASTER PLAN**



**REVISED: AUGUST 2003**  
AS REPORTED TO THE RMCS  
BOARD OF DIRECTORS ON 8/20/03  
REVISED JANUARY 13, 2004

**MACKEY & SOMPS**  
**INFRASTRUCTURE GROUP**

ENGINEERS    PLANNERS    SURVEYORS



## II- INFRASTRUCTURE ELEMENTS

The three elements of this master plan include water, sewer and drainage improvements. An estimate of the probable magnitude of cost estimate was prepared for the proposed infrastructure improvements. Phasing of improvements are identified where appropriate.

Developable areas are approximated for each development. Undevelopable areas included areas that are environmentally sensitive, areas within 100-year flood plains, or on terrain difficult to build. Preliminary alignments for the infrastructure corridors (usually proposed roads) are identified.

### A- WATER

The following section describes the proposed water infrastructure improvements. It addresses the methodology, an evaluation of the existing system, the proposed transmission system and the magnitude of water infrastructure costs.

The District gets its drinking water from the Cosumnes River. Water is stored in three reservoirs within the community and treated at the water treatment plant located at the north end of Lake Clementia. The District supplies water to their customers using two separate water systems. One area is served by a gravity system using two storage reservoirs. This gravity system supplies water to services below the elevation of 220'. A hydro-pneumatic tank is used to provide increased pressure to the system that services customers above an elevation of 220'. Exhibit 1 identifies the extent of the two systems.

#### Methodology

For this master plan, a computer-based model was developed for the hydro-pneumatic system. The model analyzed the existing condition with and without the proposed developments. The models were used to evaluate:

- The affect of the current criteria on the existing system.
- The affect on the proposed developments.
- The sizing of the proposed water infrastructure.

The systems were modeled using Average Daily Flow (ADF), Max Day plus Fire Flow (MD+FF), and Peak Hourly Flows (PH) conditions. The systems performance was evaluated using the District's criteria for each of these conditions.

District records, previous reports and as-builts were used to obtain existing system information including pipe sizes, location, and material,



reservoir and pump characteristics, and elevations of existing system facilities.

Demands were estimated using the District standard consumption rates for different land uses and lot size. The developer’s planning documents were used to determine future demands. A listing of demands used can be found in the appendix.

**Criteria**

The District’s standards include the following guidelines:

- ADF pressures should be between 40 pounds per square inch (psi) and 125 psi.
- PH pressures should be greater than 30 psi.
- MD+FF pressures should be greater than 20 psi.
- PH and MD+FF velocities shall be less than 7.5 feet per second (fps)
- Blow-off valves are to be installed at the end of dead end runs such as cul-de-sacs.

The ADF demand is estimated using the District standard consumption rates for different land uses and lot size. Other demand rates are derived with the following peaking factors applied to the ADF value:

- Max Day flows apply a peaking factor of 2.2
- Peak Hour flows apply a peaking factor of 4.4 (2\*MD=4.4).

Fire flow criteria as defined by the American River Fire Protection District requires the following demands:

Dwelling Size (sf)	Fire Flow (gpm)
≤ 3,600	1,000
3,601 – 4,800	1,750
4,801 – 6,200	2000
> 6,200	2,500

The existing developments within Rancho Murieta are modeled with a 1750gpm fire flow. Two exceptions are first at the northern end of Lake Chesbro (node J-1-EX) where dwelling sizes require a 2000gpm fire flow





rate and at the east end of Unit 6 where the size of an existing structure exceeds 7000 SF (2,500gpm)

Generally existing 8" pipes will accommodate an MD+1750gpm fire flow and existing 10" pipes will accommodate a MD+2000gpm fire flow and greater based on velocity requirements.

Fire flows to the proposed developments are modeled as follows:

- The Estates at Murieta Hills is modeled with 1,750gpm fire flow.
- Numerous dwellings at the Estates at Lake Calero will exceed 6,200sf thereby requiring the model to reflect a fire flow of 2500gpm in this area.
- A fire flow of 2,000gpm is modeled at all other proposed development locations.

Only the main looped pipes were modeled. Demand nodes were placed at intersections and key location along a pipe such as a low or high point in the system. The demand for each lot was accounted for at the closest node. The model system layout and a listing of the system configuration can be found in the appendix.

All pipes in the existing systems are asbestos cement pipes (C-value = 135), while all proposed pipes are PVC (C-value = 135).

### **Analysis**

The existing hydro-pneumatic system (Units 3 & 4) was modeled with an elevated tank to simulate the performance of the hydro-pneumatic tank. The existing hydro-pneumatic tank adds approximately 138' min to 185' max of head to the base 300-foot elevation at the tank. This range corresponds to the existing start/stop pump operation settings at 60psi to 80psi. The maximum operating head for the hydro-pneumatic tank is 288' based on original system specifications. The 300-foot base elevation was obtained from a topographic map of the area.

The existing pump provides 60psi (138' head) at 3200gpm flow rate. See existing pump characteristic curve in appendix. The water system models conservatively set the simulated elevated tank at 138' above the base elevation for all existing flow scenarios regardless of higher head values at lower pump flows. This worst-case conservative assumption will assure that all flow scenarios will maintain the minimum adequacy for the system.

Once a working model of the existing system was complete, additions to the physical system were considered for The Residences of Murieta Hills, and eventually for the system at build-out as well.

At flow rates greater than 3200gpm the model is also set at the worst case scenario of 138' head. It is expected that the existing pump system will be



improved as needed to maintain existing pressure requirements as flow demands approach 3200gpm.

Each pipe is numbered (P-#), and the junction of two or more pipes is numbered (J-#). Additionally, a suffix is added to the pipe/junction ID to indicate whether it is a portion of the existing system (-EX), the Murieta Hills system (-MH), or the system at build out (-XX). An initial minimum size of 8 inches was set for all proposed pipes then incrementally changed to larger sizes as needed to accommodate the minimum District's standards.

The gravity system was originally designed to accommodate ultimate build-out flows and was not modeled within this master plan.

## Results of the Models

### Hydro-pneumatic System

The model demonstrates that the existing hydro-pneumatic pump system has the capacity to accommodate the demand of the Murieta Hills development with adequate system pressures. The peak discharge with Murieta Hills (fire flow + MD) is 2,886gpm. Although the existing hydro-pneumatic system is adequate, improvements to the existing pump system is recommended to reduce the existing start/stop cycling of the existing pumps.

A small portion of the Murieta Hills development will encompass elevations below 220'. This area will need pressure-reducing devices placed at individual residences to avoid excessive pressure problems.

At full build out the highest demand of 4,024gpm will be during max day with a 2,500gpm fire flow.

Since the existing pumping system can only accommodate 3,200gpm at 138 feet of head, the existing pump system is not adequate to accommodate the required 4,024gpm flow at full build-out. Existing pumps can be enhanced with the addition of booster/jockey pumps. These new smaller pumps would become the primary pumps to accommodate lower daily flow rates. The existing larger pumps would then assist with the higher fire and peak hour flow rates.

The proposed size of the water main loop at Calero Lake was determined to consist of a combination of 12" and 10" diameter pipes. This loop is the most critical in the system due to the higher elevations and higher 2,500gpm required fire demand. The application of smaller pipe sizes for this loop produces excessive friction losses and cannot accommodate the pressure requirements.

The models verify that the existing residential development on the hydro-pneumatic system meets the District's standards with build-out. The model



also shows the proposed infrastructure for the hydro-pneumatic system is sized to meet the District's standards.

The existing upper portion of Unit 6 currently has reports of low pressure at existing residences. It is proposed to connect this gravity system to the hydro-pneumatic system when the upper portion of the Terrace and the River Canyons are developed. An additional gravity transmission line will be required within the Review Canyons projects to accommodate the conversion.

The ultimate build-out model requires the installation of a secondary supply pipe to be routed between the existing pumping facility and the existing pipe network. This pipe will not need to be installed until the last phases of development occurs and velocities begin to exceed 7.5fps in the existing 14" supply pipe P-9-EX. Without this additional pipe, the existing supply pipe will exceed velocities of 8.5fps during a fire scenario.

The following table identifies the minimum pressure values in the full build-out hydro-pneumatic system at different flow scenarios:

**TABLE OF MINIMUM PRESSURES AT FULL BUILD-OUT**

Scenario	Node of Min Pressure	Pressure (psi)
Avg Day	J-258-CC	43.0
Peak Hour	J-258-CC	39.0
Max Day	J-258-CC	42.0
MD + FF @ J-1-Ex	J-258-CC	36.1
MD + FF @ J-122-MH	J-258-CC	37.5
MD + FF @ J-204-THRC	J-258-CC	37.4
MD + FF @ J-258-CC	J-258-CC	20.9
MD + FF @ J-303-CL	J-258-CC	37.2



### Gravity System w/build out

Improvements to the existing gravity system include:

- The installation of an 8" pipe to serve a small portion of the Terrace development that is located below the 220' elevation.
- The Retreats development will trigger the installation of a previously identified 12" line.
- The River Canyon Estates development will trigger the installation of 16" main in combination with the conversion of existing Unit-6 gravity system to hydro-pneumatic system.

The models show that the existing residential development on the gravity system meets the District's standards at build out of the north. The model also shows the proposed infrastructure for the gravity system is sized to meet the District's standards.

### **Cost Estimate**

A preliminary estimate of the magnitude of water infrastructure cost was prepared and is shown in Table 2. A 20% construction contingency was included to account for the general scope of items listed. A 20% project contingency was included for uncertainty in the scope of the project development. Approximately 30% was included for plan checking, engineering, inspection and construction surveying.

This cost estimate did not account for items associated with environmental clearance (if required).

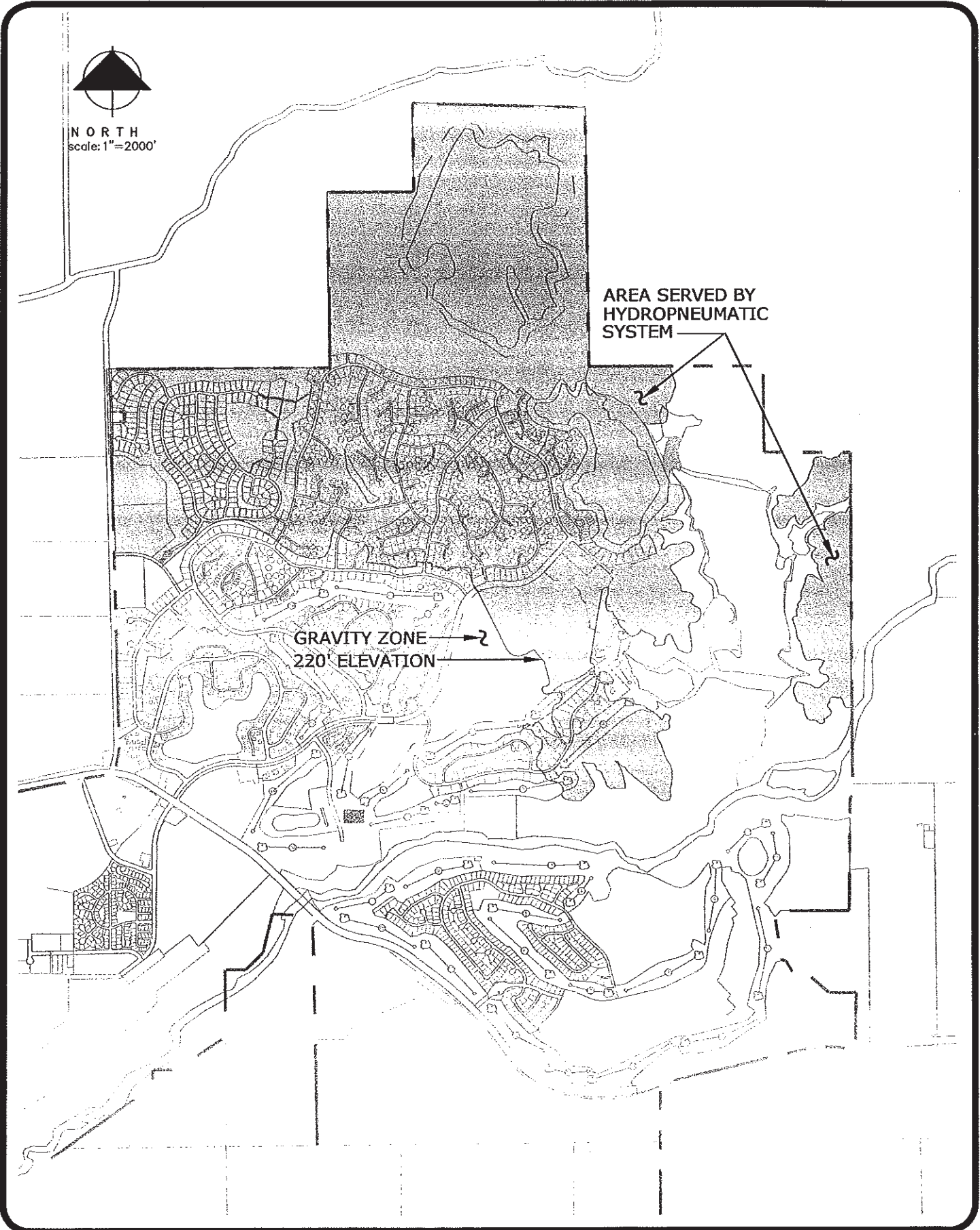


NORTH  
scale: 1"=2000'

AREA SERVED BY  
HYDROPNEUMATIC  
SYSTEM

GRAVITY ZONE  
220' ELEVATION

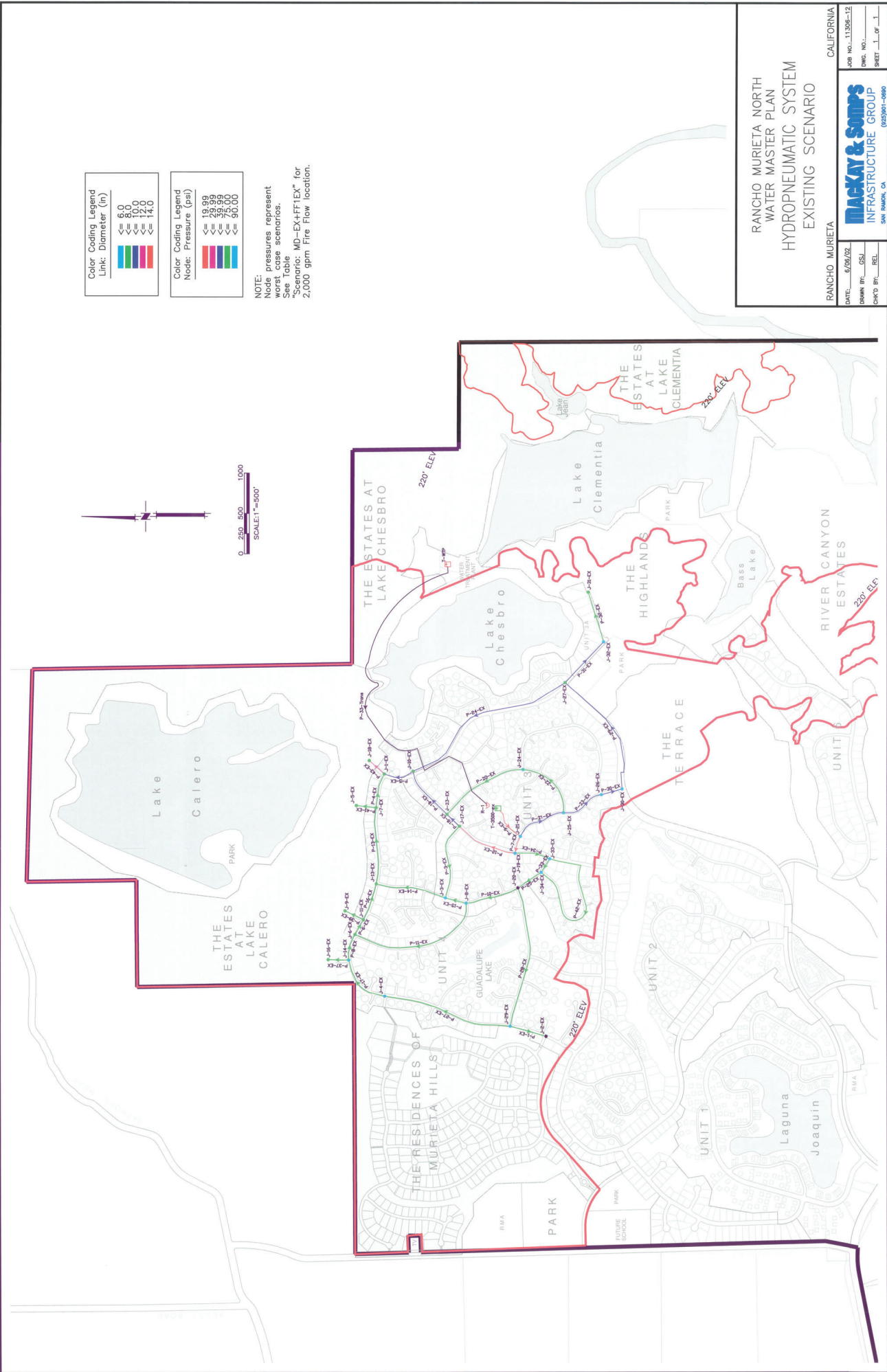
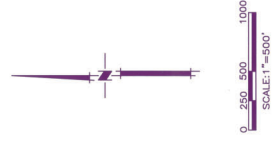
K:\DD2\projects\11306\dwg\12\WS\plans\Water-ex3.dwg 05/07/03 11:24:20 AM PDT



Color Coding Legend	
Link: Diameter (in)	
[Green]	≤ 8.0
[Blue]	≤ 10.0
[Red]	≤ 12.0
[Purple]	≤ 14.0

Color Coding Legend	
Node: Pressure (Psi)	
[Green]	≤ 19.99
[Blue]	≤ 29.99
[Red]	≤ 39.99
[Purple]	≤ 49.99
[Orange]	≤ 59.99
[Yellow]	≤ 69.99
[Light Green]	≤ 79.99
[Light Blue]	≤ 89.99

NOTE:  
 Node pressures represent worst case scenarios. See Table Scenario: MD-EX+FFLEX\* for 2,000 gpm Fire Flow location.



RANCHO MURIETA NORTH  
 WATER MASTER PLAN  
 HYDROPNEUMATIC SYSTEM  
 EXISTING SCENARIO

RANCHO MURIETA CALIFORNIA

DATE: 5/05/02  
 DRAWN BY: GSI  
 CHECKED BY: REL

JOB NO.: 1130E-12  
 DWG. NO.:  
 SHEET 1 OF 1

**Mackay & Samps**  
 INFRASTRUCTURE GROUP  
 SAN RAMON, CA (925)301-0800

Exhibit B  
Confirm Connection Points

**RANCHO MURIETA NORTH  
INFRASTRUCTURE MASTER PLAN**



**REVISED: AUGUST 2003**  
AS REPORTED TO THE RMCS D  
BOARD OF DIRECTORS ON 8/20/03  
REVISED JANUARY 13, 2004

**MAC KAY & SOMPS**  
**INFRASTRUCTURE GROUP**

ENGINEERS      PLANNERS      SURVEYORS



NORTH  
scale: 1" = 400'

0 200 400 800 1600  
SCALE: 1" = 400'

**CRITERIA:**

Average Daily Flow (ADF) Pressure should be between 40 pounds per square inch (psi) and 125 (psi).

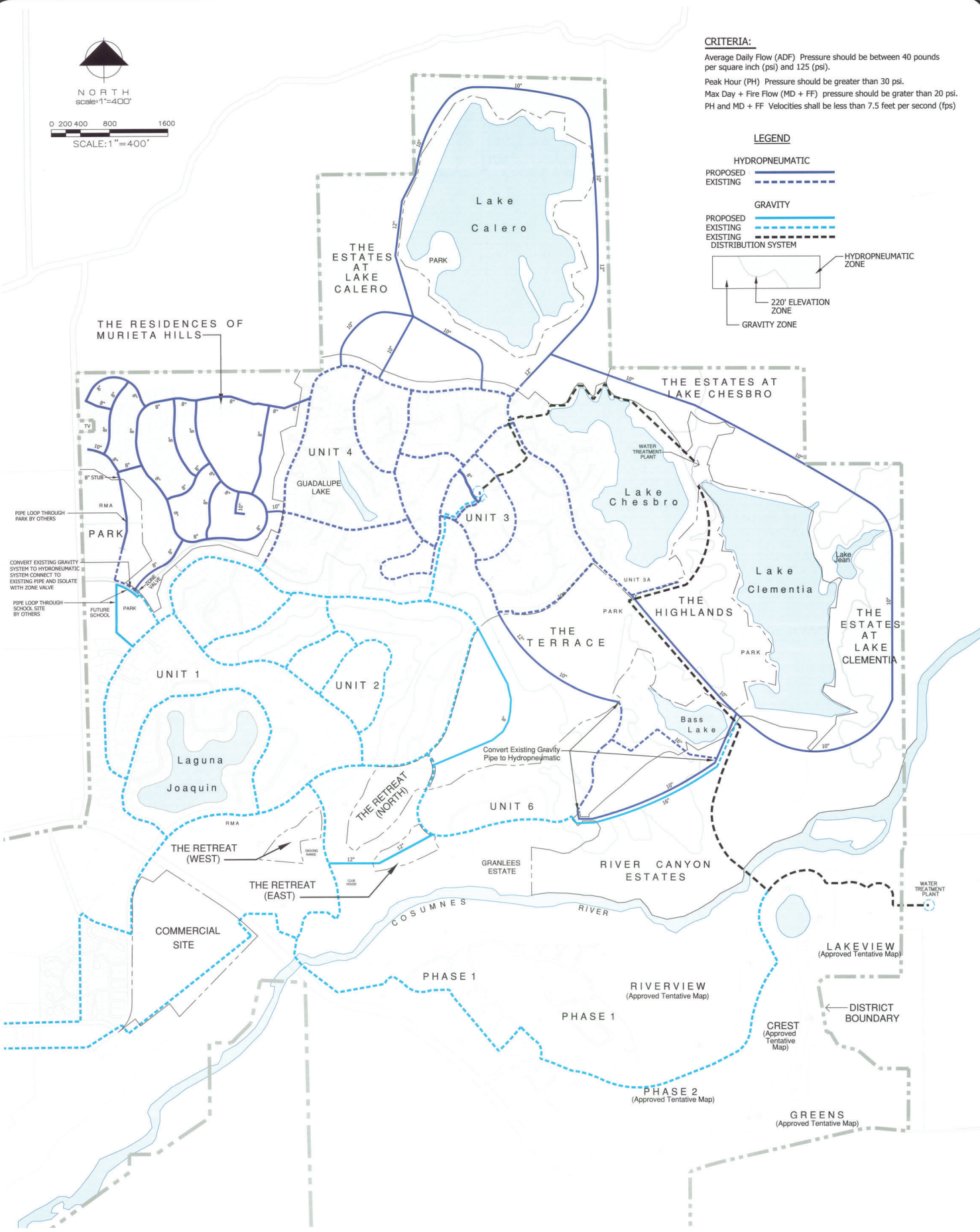
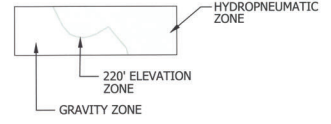
Peak Hour (PH) Pressure should be greater than 30 psi.

Max Day + Fire Flow (MD + FF) pressure should be greater than 20 psi.  
PH and MD + FF Velocities shall be less than 7.5 feet per second (fps)

**LEGEND**

**HYDROPNEUMATIC**  
PROPOSED (solid blue line)  
EXISTING (dashed blue line)

**GRAVITY**  
PROPOSED (solid light blue line)  
EXISTING (dashed light blue line)  
DISTRIBUTION SYSTEM (dotted light blue line)





**Exhibit C  
Sewer**

**RANCHO MURIETA NORTH  
INFRASTRUCTURE MASTER PLAN**



**REVISED: AUGUST 2003**

AS REPORTED TO THE RMCS  
BOARD OF DIRECTORS ON 8/20/03  
REVISED JANUARY 13, 2004

**MACKEY & SOMPS**  
**INFRASTRUCTURE GROUP**

ENGINEERS    PLANNERS    SURVEYORS



The following table lists the County approved PUD vs. the reduced densities used in the master plans.

Unit	Gross Density per Approved PUD	Proposed Gross Density
The Residence of Murieta Hills	2.3 DU/AC	1.7 DU/AC
The Estates at Lake Calero	2.0 DU/AC	0.5 DU/AC
The Estates at Lake Chesbro	1.8 DU/AC	0.9 DU/AC
The Estates at Lake Clementia	1.8 DU/AC	0.6 DU/AC
The Highlands	2.0 DU/AC	1.6 DU/AC
The Terrace	2.8 DU/AC	2.4 DU/AC
River Canyon Estates	0.9 DU/AC	0.7 DU/AC
The Retreat (West)	25 DU/AC	3.7 DU/AC
The Retreat (North)	25 DU/AC	3.6 DU/AC
The Retreat (East)	10 DU/AC	3.6 DU/AC

Infrastructure for the remaining undeveloped parcels in Rancho Murieta South has been identified. This report focuses on improvements required to develop the remaining parcels in Rancho Murieta North.

Accordingly, the purpose of this report is to

- Identify the water, sewer and drainage infrastructure necessary to build out the remaining developable lands within the Rancho Murieta North,
- Evaluate the ability existing facilities to accommodate the proposed development
- Develop an estimate of the probable magnitude of cost for the proposed improvements.

While impacts to existing infrastructure were evaluated, impacts to treatment facility, water supply and the reclamation system were not within the scope of the report.



NORTH  
SCALE: 1"=800'



**ALTERNATE 2**  
INSTALL NEW PUMP  
STATION AND INSTALL  
6" FM IN EXISTING  
12" CASING

**ALTERNATE 1**  
REPLACE SECTION  
OF SEWER LINE

K:\DD21\projects\11306\dwg\11\FP\plans\exhibit2sew.dwg 09/04/02 11:45:25 AM PDT





## Wastewater Collection Systems

The pipes in the collection system were sized to accommodate the peak wet weather flow (PWWF) at 70% full. Typically, no surcharging is allowed in wastewater collection systems. An n-value of 0.013 was used for the analyses. The system is required to meet a minimum velocity of 2 feet per second during PDWF and a maximum velocity of 10 feet per second for PWWF.

Pipe sizes in this master plan are based on minimum pipe slopes. Actual pipe sizes may be adjusted as allowed given actual pipe slopes. The minimum pipe size is six inches.

Tracer wires and test stations are required with all new sewer pipes.

### Murieta Hills

The capacity of the existing sewer collection system through Unit 1 was analyzed to determine if the system could accommodate the wastewater flows from the Murieta Hills development. The analysis showed that portions of the collection system would have to be enlarged to accommodate the additional flows. Specifically, the pipes along west side Laguna Joaquin and some pipes within Lago Dr. would have to be increased from 8 inches to 10 and 12 inches.

Another alternative is to utilize the abandoned 12" force main along Stonehouse Dr. The force main was initially used to convey wastewater from the old pumping station (near the shopping center) to the now abandoned Stonehouse wastewater treatment facility. The 12" force main is too large to accommodate the projected sewer flows from Murieta Hills and The Estates at Lake Calero. It is proposed to install a 6" force main carrier pipe within the existing 12" pipe (casing). However, utilizing this alternative requires constructing a pump station near Escuela Dr. Exhibit 3 shows the two alternatives.

Enlarging the pipes within the existing development, although less expensive, was determined not to be a favorable alternative. Therefore, utilizing the abandon force main and constructing a new pump station is the preferred alternative.

Prior to the use of the existing 12" casing, the casing condition must be assessed. The casing shall be video inspected and submitted for review by the District. If the existing casing is deemed unacceptable then the existing casing cannot be used. A new pipe force main installation or alternative will be required. A tracer wire with test stations must be installed over the existing casing (if used). If the casing if found to be electrically continuous then test stations can be connected directly to the casing and the tracer wire requirement will be eliminated.



### Commercial Site

Wastewater from the commercial site will be pumped to the existing pump station located near the firehouse. The commercial site pump station will be a local pump station to be constructed with the development of the site.

### The Estates at Lake Calero

The conveyance of wastewater flow for this development could be through either service area A or B. The entire sewer infrastructure within service area B would have to be constructed before this alternative can be developed. Therefore forcing The Estates at Lake Calero to be the final development along the easterly reach of service area B. Alternatively by routing the wastewater flows through service area A (Murieta Hills) this problem would be alleviated. A 6" force main was installed during the construction of Puerto Dr. with Unit 4 anticipating this option. The proposed pump station and gravity lines within Murieta Hills would have to be designed to accommodate the additional wastewater flows. It is recommended that the Estates at Lake Calero utilize the Murieta Hills alternative.

### Retreats & Terrace

Wastewater from the Retreat West can flow through the existing collection system in service area A. No major sewer infrastructure will be required.

Wastewater from the Retreats East & North as well as the Terrace can flow into the main pump station for service area B. No major sewer collection infrastructure will be required.

Currently, there exist parallel 4" & 10" force mains that run from the existing Unit 6 lift station 'B' to the old yellow bridge. Currently the 4" force main conveys the wastewater flow from Unit 6. This main ties directly into the 12" force main coming from service area A's main pump station located near the Fire Station. The 12" force main then continues to the wastewater treatment plant (WWTP). This is a temporary configuration. It operates sufficiently because of the low flows coming from the pump station south of Unit 6.

The amount of wastewater generated from the Terrace development will initiate 1) a new pump station/expansion (see below) 2) the parallel 10" force main to be put in use and 3) a new 12" force main running parallel to the exiting 12" force main from the old yellow bridge to the wastewater treatment plant.

There is an opportunity to possibly eliminate the Unit 6 lift station 'A' by routing wastewater flows to the sewer main that will cross the golf course from The Terrace.



less than 50 gallons per minute (gpm). They are typically required to convey a small number of resident's wastewater over a ridge, are constructed as part of the subdivision and are not considered an infrastructure improvement. Therefore, a quantitative analysis of the local pump stations was not performed. Regional pump stations identified in this report have a minimum capacity of 100gpm. The Sewer Master Plan shows the approximate locations for both local and regional pump stations.

Pump stations used on the entire Rancho Murieta development shall be from one manufacturer and will be sized consistently. There will be no more than three pump sizes used throughout the project in order to minimize the inventory of spare parts.

Protections against spills from pump stations must meet the requirements of the California Department of Health Services, Division of Drinking Water and Environmental Management standards manual section 5-4.01. Pumping facilities shall be designed to not result in the spillage of wastewater.

Pump Table:

Pump #	Min Size (gpm)	Location
1		Not used, is a local pump station.
2	84	The Estates at Lake Chesbro
3	363	River Canyon Estates
4	443	River Canyon Estates
5	647	Unit 6, Increase Existing Pump System
6	388	The Residence at Murieta Hills

#### Service Area "A"

The Residents at Murieta Hills, The Retreats West, the commercial site and The Estates at Lake Calero are within Sewer Service Area "A". This area drains into an existing pump station, "Main Lift Station North", located behind the fire station on Murieta Dr. Main Lift Station North has the capacity to serve the entire Sewer Service Area A.

#### Service Area "B"

The existing pump station located south of Unit 6 is currently designed to serve all 110 dwelling units of Unit 6. As of December 2000, Fifty-four of the 110 units were developed. At ultimate build-out of service area "B" a



**Rancho Murieta**  
*Community Services District*

# Recycled Water Program Preliminary Design Report



**Kennedy/Jenks Consultants**

*June 2017*

three existing pumps within the Recycled Water Pump Station is used to convey recycled water through the transmission pipeline to three sprayfields. There are no potable water or sewer pipelines along the transmission or distribution pipeline alignment.

The distribution system consists of approximately 29 strings of K-line irrigation systems, which are in turn composed of movable sprinklers and 40 millimeter (mm) piping. Each movable sprinkler is housed within a plastic pod. The connecting piping is flexible and the entire string of sprinklers can be moved within each sprayfield.

### **2.7.3: Existing Stonehouse 12-inch Sewer Forcemain**

As described in the District's Initial Study/Mitigated Negative Declaration (AECOM, June 2014), the existing Stonehouse 12-inch ACP sewer forcemain may be used in some fashion to convey recycled water to Stonehouse Park (Phase 1), Escuela Park (Phase 1) and Residences of Murieta Hills (Buildout) for recycled water irrigation. As shown in Figure 11, this pipeline extends from the District's Main Lift North Pumping Station to the Stonehouse Park. The District has completed a condition assessment of this pipeline to determine how best to leverage this asset in the future. Future condition assessment is expected to be conducted for the 8- and 12-inch ACPs that convey recycled water from the WWRP to Bass Lake. Information drawn from the next condition assessment will be helpful in refining costs for rehabilitating the North Golf Course Conveyance System.

A risk assessment was conducted to determine the appropriate level of condition assessment to conduct. Assessment results place the Stonehouse 12-inch sewer forcemain in the High Risk Level, which results in recommending a proactive and detailed assessment, including systematic pipe testing. The high risk level assignment was due to the recycled water being considered highly aggressive. Even though the Stonehouse 12-inch sewer forcemain has not been put into service, and has not conveyed recycled water, Phenolphthalein dye test, Shore D and other tests indicate significant wear and reduced useful life. The estimated remaining useful life of the Stonehouse 12-inch sewer forcemain is about 19 years based on specific and assumed service conditions as compared to about 50 to 70 years for a new asbestos cement (AC) forcemain.

Comparison of potential corrosion management alternatives indicated that chemical addition (pH and/or alkalinity addition) is the lowest cost alternative and is thus recommended. Other alternatives considered included non-structural liners and/or forcemain replacement. A copy of the report is included in the Appendix for reference.

## **2.8: Conveyance System Requirements**

The hydraulic model developed by AECOM was updated and modified to reflect the proposed configuration of the Buildout recycled water system and setup to provide separate irrigation cycles to accommodate golf course and urban and residential recycled water demands. The model and other data sources (i.e., drawings) served as the means of determining the conveyance system operating requirements, limitations, etc. described below in Sections 2.8.1 through 2.8.5.

### **2.8.1: Recycled Water Supplies and Demands**

Recycled water demands shown in the draft AECOM hydraulic model were adjusted to reflect those described in this PDR. Supplies were limited to the production from the WWRP. Tanks and golf course lakes were used to provide operational storage to help satisfy diurnal and instantaneous demands. Demands were limited to existing and proposed reuse areas.



**RANCHO MURIETA NORTH  
INFRASTRUCTURE MASTER PLAN**



**REVISED: AUGUST 2003**

AS REPORTED TO THE RMCS  
BOARD OF DIRECTORS ON 8/20/03  
REVISED JANUARY 13, 2004

**MACKEY & SOMPS**  
**INFRASTRUCTURE GROUP**

ENGINEERS    PLANNERS    SURVEYORS



Bass Lake is a reclaimed water reservoir; changes in the District's discharge permit prohibit any storm water runoff from entering into a reclamation facility. Accordingly, new development within the drainage shed of Bass Lake must construct interceptor drainage facilities to collect and prevent both urban and open space runoff from entering the Lake. The interceptor facilities must be sized to collect flows from the 100-year event.

To achieve this goal it is recommended that a combination of culverts, storm pipes and diversion ditches be employed to divert the runoff around Bass Lake. This storm water will outlet into a water quality basin.

Lake Jean is available as a water quality / detention basin. If the lake is used for this purpose then no water will be allowed to overflow into the adjacent Lake Clementia. The proposed drainage system will need to accommodate all outflows from Lake Jean to discharge to Cosumnes River.

#### Water Quality Basins

Water quality basins have been preliminarily sized within this master plan according to the Sacramento City/County Drainage Manual, Volume 2. The Drainage Master Plan depicts the drainage sheds used to size the water quality detention basins. It also shows schematic locations of proposed runoff interceptor facilities. A spreadsheet of water quality sizing calculations can be found in the appendix and tabulated on the Master Plan.

This sizing is based on the assumption that the entire developable area of each subdivision will contribute flows to the water quality basins. Since non-developed areas will be allowed to drain into the Lakes (except Bass Lake) the water quality basins will be smaller than indicated in the calculations based on actual developed areas.

### **Conveyance System**

The drainage conveyance system for the existing development, originally constructed as part of Units 1-4 and Unit 6, drains the storm water runoff into the Cosumnes River. It consists of: open channels, natural streams, culverts, ponds and storm drain pipes that drain approximately 1100 acres. The major drainage systems shall be designed to accommodate a 100-year storm event.

#### The Residences at Murieta Hills

This development is situated in the upper reaches of a 313-acre watershed. It is one of three watersheds that are tributary to Laguna Joaquin, a 24-acre man-made lake. Above Laguna Joaquin, storm water



drains through an existing conveyance system, which includes five culverts and approximately 6,100 LF of open channels and natural swales.

Runoff from Murieta Hills passes through culverts I through V to reach Laguna Joaquin where it combines with runoff from of sub-area 2 and 3. See Exhibit 4 for the drainage shed and culverts analyzed.

It was determined that the existing conveyance system, between the Murieta Hills area and Laguna Joaquin, can accommodate existing 100-year storm event. Table 6 shows the results of calculations for the culverts and channels. A detention basin will be constructed with the development of Murieta Hills to reduce post development peak flows to pre-development peak conditions. See exhibit 7 for plan view of the proposed detention basin.

Existing pre-development watersheds within the Murieta Hills area are split into two similarly sized drainage basins. Post-development construction will modify existing Murieta Hills subbasin sizes and thus modify runoff quantities. The westerly subbasin drains south through culvert II and the easterly subbasin drains south through culverts I and III. Post-development improvements to the subbasins are as follows:

- Under Post-development conditions the westerly basin is reduced in size. This area reduction compensates for the increased runoff per acre. Pre and post-development flow rates are similar. Therefore there are no adverse affects on downstream culverts from this sub-shed.

Additionally, a small water quality basin is to be constructed in this sub-shed that will further reduce outflow characteristics.

- Under Post-development conditions the easterly sub-shed will increase in size. A water quality/detention basin will be constructed to reduce runoff quantities to maintain pre-development outflow conditions.

Analysis of runoff quantities produced from the pre and post-development conditions were determined using the Sacramento County's methodology.

The Sacramento County charts 2-22 and 2-23 were used to obtain runoff quantities for these small (less than 160 acre) sub-sheds. See the appendix for copies of these charts.

The detention basin was sized using HEC-1 modeling system. The detention basin volumes were then determined by modeling the storage/outflow characteristics of the basin as required to reduce outflow to match pre-development flow rates at the culvert location. See table 6 for outflow rates.

There is a reduction of 49cfs from the easterly sub-shed of Murieta Hills. This reduction was directly applied to all downstream culvert crossings to determine the post-development flow rates at each culvert.



The required detention basin volume of 8.5 ac-ft is added to the required water quality basin size of 3.5 ac-ft for a total basin volume of 12 ac-ft. Total available detention volume within this basin is 16 ac-ft.

TABLE 6-CONVEYANCE SYSTEM BETWEEN MURIETA HILLS AND LAGUNA JOAQUIN

Culvert ID	Existing Culvert Configuration	Area		Flow			Capacity <sup>4</sup> (cfs)	Culvert Configuration Required
		Pre Dev (Ac)	Post Dev (Ac)	Pre-Dev. <sup>3</sup> (cfs)	Post-Dev. <sup>3</sup> (cfs)	Post-Dev. <sup>6</sup> (cfs)		
I	3 - 36" RCP	92	112	78	118	69 <sup>6</sup>	115	No Change
II	2 - 36" RCP	88	68	75	76	76	93	No Change
III	1 - 54" CMP <sup>1</sup>	110	130	98	130	81 <sup>6</sup>	93	No Change
IV	1 - 66" CMP <sup>2</sup>	88	68	75	76	76	93	No Change
V	1 - 72" CMP	260	260	180	235	186 <sup>6</sup>	236	No Change
VI	1 - 24" RCP	50	50	n/a	n/a	n/a	n/a	36" RCP

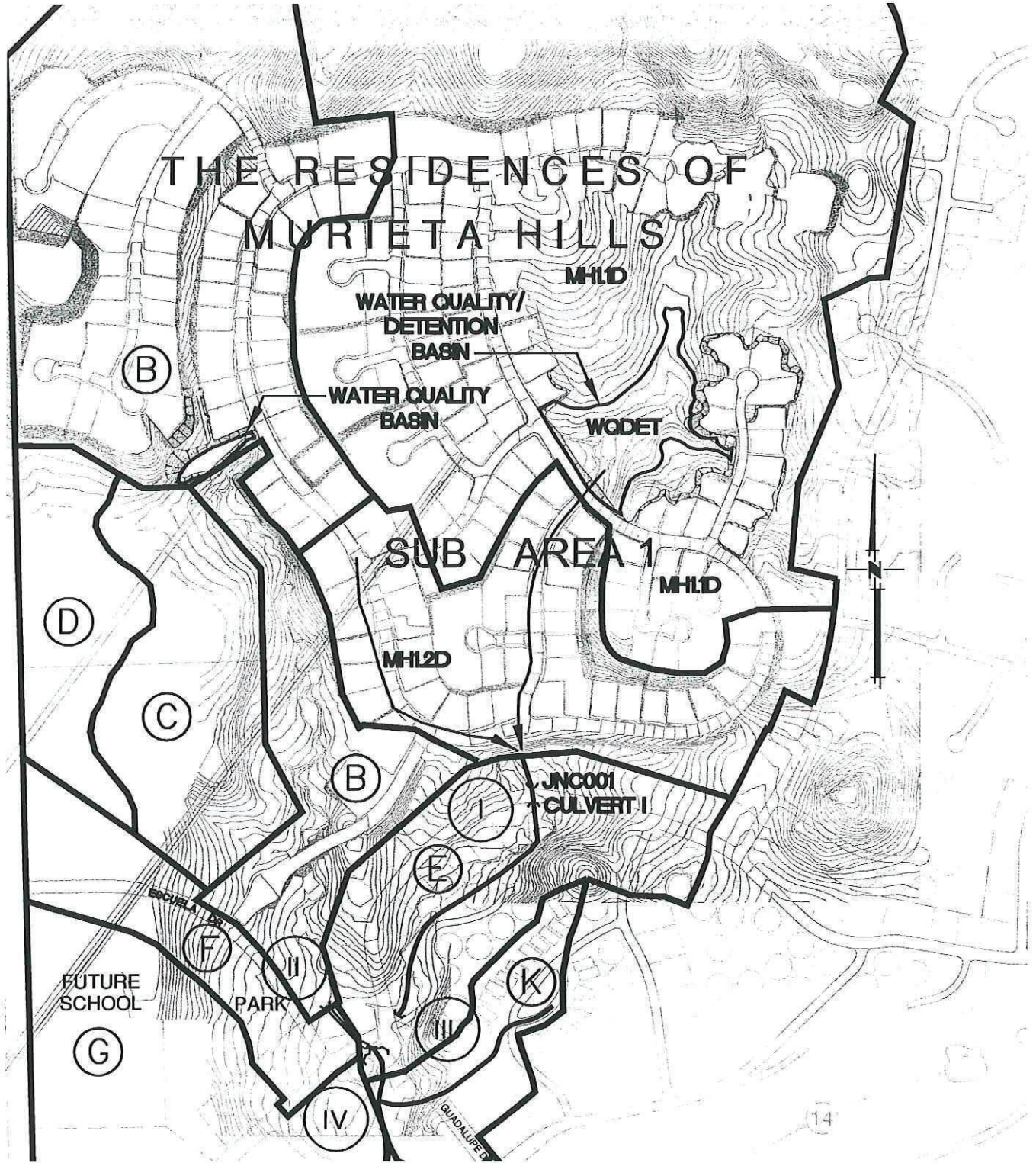
1. Equivalent size to two 65"x40" arc pipes
2. Equivalent size to a 76" x 52" arc pipe
3. Sacramento County method was used to calculate flows using figure 2-22 and 2-23.
4. Capacity calculations assume a one foot freeboard except culvert 3 with 6".
5. Culvert VI is currently under design with the development of The Retreat West.
6. Post development flows reduced with detention basin.

The conveyance system downstream of Laguna Joaquin includes a spillway channel, four culverts and 1,200 LF of open channel. The conveyance system goes under Lago Dr. and Highway 16, then south along the west side of the Murieta Plaza. It continues under Lone Pine drive, then travels west past Murieta village. The channel continues west under one access road and out the on to a flood plain before draining into the Cosumnes River. The drainage shed for this conveyance system, shown in Exhibit 5, encompasses sheds 1, 2 & 3 for a total of 900 acres.

District standards do not address criteria for determining flows from watersheds greater than 160 acres. Therefore, Sacramento County's methodology was utilized to determine the storm runoff. Using the Sacramento County's SACPRE preprocessor with HEC-HMS, the storm runoff into Laguna Joaquin for a 100-year event under pre-development conditions was estimated at 1095 cfs. The runoff increases to 1118 cfs under post development conditions without any upstream reductions from the detention basin in Murieta Hills. (See appendix for calculations and support data).

The estimated runoff under pre-development conditions is higher than a previously reported 100-year event flow, which was estimated between

k:\LDD2\projects\11306\dwg\13\ws\plans\drainage-exhibits 7-1.dwg 05/06/03 05:45:31 PM PDT



# MACKAY & SOMPS

INFRASTRUCTURE GROUP  
CIVIL ENGINEERING • PLANNING • LAND SURVEYING  
SAN RAMON, CA. 94583 (925) 901-1190  
MACKAY & SOMPS IS NOT RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF REPRODUCTIONS OF THIS DOCUMENT THAT ARE GENERATED BY OTHERS FROM ELECTRONIC MEDIA.

MAY 2002

## Exhibit 7.1

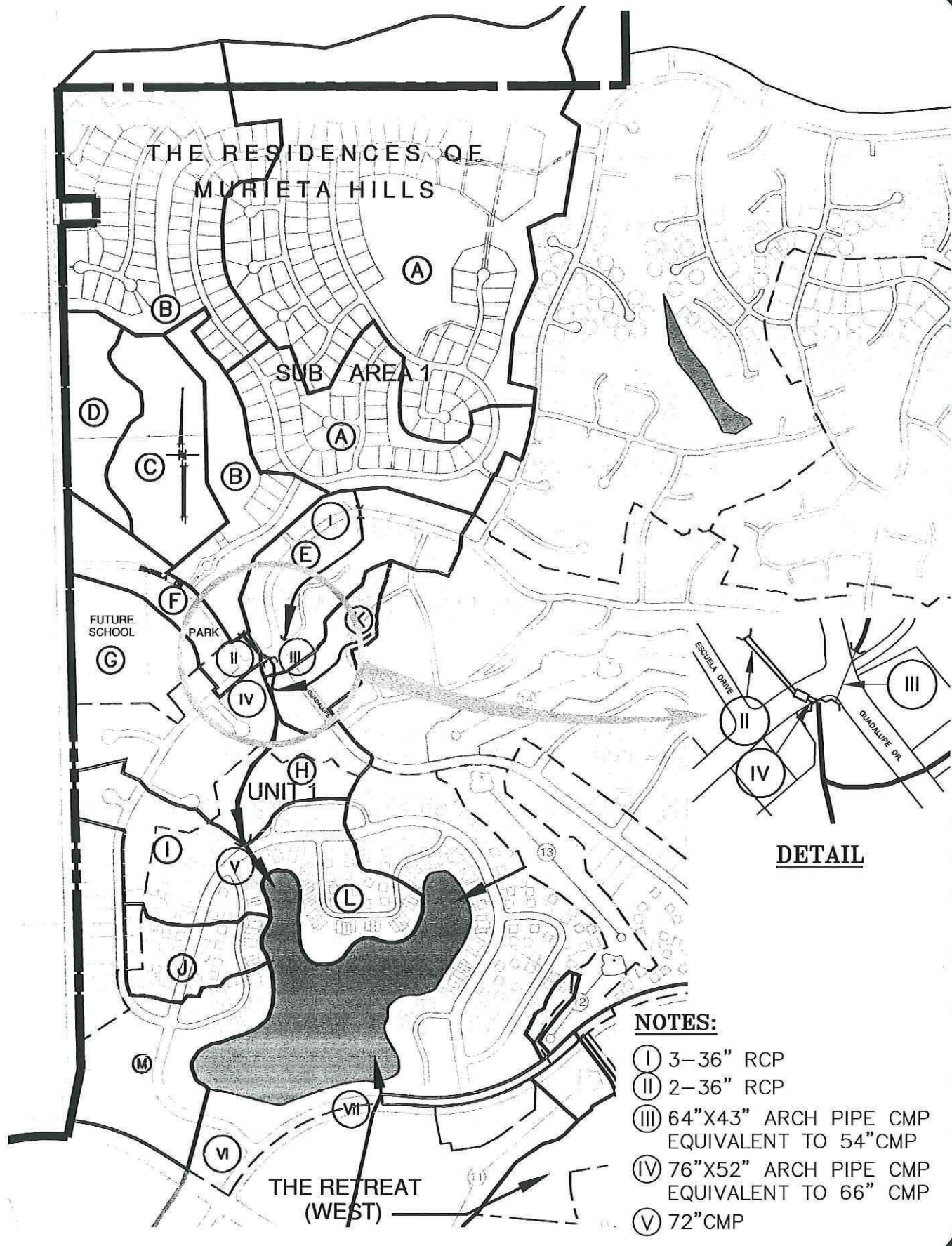
### Drainage Conveyance from Development to Laguna Joaquin

### Rancho Murieta North Infrastructure Master Plan



MAY 2002

K:\LD02\projects\11306\dwg\13\FP\plans\drainage--exhibits.dwg 05/02/03 11:46:26 AM PDT



**NOTES:**

- Ⓘ 3-36" RCP
- Ⓜ 2-36" RCP
- Ⓝ 64"X43" ARCH PIPE CMP  
EQUIVALENT TO 54" CMP
- Ⓓ 76"X52" ARCH PIPE CMP  
EQUIVALENT TO 66" CMP
- Ⓥ 72" CMP



- Increasing the size of the culvert or addition of another barrel was investigated. This alternative is preliminarily rejected due to the difficulty of construction given high traffic volumes on highway 16.
- Spillway weir modifications were investigated to utilize the unused detention capacity in Laguna Joaquin. This alternative was rejected for the following reasons: 1) By reducing the 40' weir to 35' the 100-year outflow would be reduced from 970 cfs to 951 cfs (1-foot reservoir freeboard). However, this would not be enough to allow the culvert under Highway 16 to perform properly. 2) By increasing the lake elevation there is a risk of flooding (backwater) problems in existing drainage systems.
- Floodwalls were investigated to increase backwater head and thereby increasing the culvert flow rate. Floodwalls would be no more than 4-feet in height (1-foot freeboard included).
- Modifications to the culvert entrance configuration were investigated to reduce friction losses. A rounded culvert entrance configuration in accordance with FHA chart 10 would reduce the required floodwall height by approximately 1.5 feet. This configuration could be constructed with the expansion of the culvert for highway 16 widening.

Although the existing channel downstream of highway 16 will meet the existing flow requirements this channel is in need of maintenance. The calculated channel capacity was based on design drawings. The following maintenance operations are required:

- Based on a recent survey, the channel bottom contains up to two feet of sedimentation along a significant portion of the alignment. This sedimentation must be removed to maintain the hydraulic properties of the channel.
- The channel friction characteristics (C-value) was based on consistent channel vegetation. There are several trees within the channel that may affect the channel capacity. These trees must be removed.
- There is approximately 300 feet of channel top of bank that is lower than the design elevation top of bank by approximately 1 foot. This stretch is located adjacent to the existing shopping center, any flooding in this area could adversely affect the shopping center therefore repairs must be done.

The culverts (IX) at lone pine drive do not have the capacity to accommodate the 100-year flow without overtopping. The culverts would have to be replaced with three 5'x8' box culverts to meet the capacity of the 100-year flow.