ENGINEERING/OPERATIONAL COMMITTEE MEETING AGENDA
TRABUCO CANYON WATER DISTRICT
32003 DOVE CANYON DRIVE, TRABUCO CANYON, CA
VIDEO/AUDIO BROADCAST MEETING
APRIL 7, 2021 AT 7:00 AM

COMMITTEE MEMBERS
Edward Mandich, Committee Chair
Stephen Dopudja, Committee Member
Michael Safranski, Committee Member Alternate

DISTRICT STAFF
Fernando Paludi, General Manager
Michael Perea, District Secretary
Lorrie Lausten, District Engineer
Gary Kessler, Water System Superintendent
Jason Stroud, Maintenance Superintendent

AGENDA NOTE:
*Due to the spread of COVID-19 and as authorized by the Governor's Executive Order, Trabuco Canyon Water District will be holding this Engineering/Operational Committee Meeting by video broadcast (**Go To Meeting**), and will be available by either video conference or telephone audio as follows:*

***Video Conferencing:** You can join the meeting from your computer, tablet, or smartphone by clicking on the following link: https://zoom.us/j/97375627682*

Telephone Audio: *1 (669) 900-6833*
Access Code: 973-7562-7682

*Persons desiring to monitor the Committee meeting agenda items may download the agenda and documents on the internet at **www.tcwd.ca.gov**.*

*You may submit public comments by email to the Board at **mperea@tcwd.ca.gov**. In order to be part of the record, emailed comments on meeting agenda items must be received by the District, at the referenced e-mail address, not later than 7:00 a.m. (PDT) on the day of the meeting.*

CALL MEETING TO ORDER

VISITOR PARTICIPATION
*Members of the public wishing to address the Board regarding a particular item on the agenda are requested to submit public comments by email to the Board at **mperea@tcwd.ca.gov**. The Committee Chair will call on the visitor following the Committee's discussion about the matter. Committees do not constitute a quorum of the Board of Directors and Committee Members cannot make decisions on matters. The Committee makes recommendations only to the Board of Directors. Members of the public will be given the opportunity to speak to the Committee prior to making a recommendation on the matter. For persons desiring to make verbal comments and utilizing a translator to present their comments into English reasonable time accommodations, consistent with State law, shall be provided. Please limit comments to three minutes.*

ORAL COMMUNICATION
*Members of the public who wish to make comment on matters not appearing on the agenda are requested to submit oral communication by email to the Board at **mperea@tcwd.ca.gov**. Under the requirements of State Law, Directors cannot take action on items not identified on the agenda and will not make decisions on such matters. The Board President may direct District Staff to follow up on issues as may be deemed appropriate. For persons*

desiring to make verbal comments and utilizing a translator to present their comments into English reasonable time accommodations, consistent with State law, shall be provided. Please limit comments to three minutes.

COMMITTEE MEMBER COMMENTS

REPORT FROM THE GENERAL MANAGER

ADMINISTRATIVE MATTERS

PRESENTER(S): FERNANDO PALUDI, GENERAL MANAGER
MICHAEL PEREA, DISTRICT SECRETARY

ITEM 1: ENGINEERING/OPERATIONAL COMMITTEE MEETING RECAP

RECOMMENDED ACTION:
Approve the following Engineering/Operational Committee Meeting Recap(s) and recommend that the Board receive and file same (Consent Calendar).

1. *March 3, 2021*
2. *March 15, 2021*

ENGINEERING MATTERS

PRESENTER(S): FERNANDO PALUDI, GENERAL MANAGER
MICHAEL PEREA, ASSISTANT GENERAL MANAGER
LORRIE LAUSTEN, DISTRICT ENGINEER

ITEM 2: DISCUSSION AND POSSIBLE ACTION(S) RELATING TO TCWD'S DOMESTIC WATER STORAGE AND RESERVOIR SITING STUDY UPDATE

RECOMMENDED ACTION:
Committee to receive information at the time of the Committee Meeting.

ITEM 3: DISCUSSION AND POSSIBLE ACTION(S) CONCERNING BELL CANYON SEWER LIFT STATION REHABILITATION PROJECT

RECOMMENDED ACTION:
Committee to receive information at the time of the Committee Meeting.

ITEM 4: DISCUSSION CONCERNING GOLF CLUB SEWER LIFT STATION REPAIRS & IMPROVEMENTS

RECOMMENDED ACTION:
Committee to receive information at the time of the Committee Meeting.

ITEM 5: SADDLEBACK MEADOWS DEVELOPMENT (181 DUs)

RECOMMENDED ACTION:
Committee to receive information at the time of the Committee Meeting.

ITEM 6: OTHER ENGINEERING AND OPERATIONS PROJECT UPDATES

1. Proposed Capital Improvement Program Budget for Fiscal Year 2021-2022
2. Joplin Property/SCADA Upgrade
3. 2020 Urban Water Management Plan and Water Shortage Contingency Plan Update
4. Master Plan and Condition Assessment RFP
5. Saddle Crest Development
6. Other Projects

RECOMMENDED ACTION:
Committee to receive project status updates at time of the Committee Meeting.

OPERATIONAL MATTERS

PRESENTER(S): GARY KESSLER, WATER SYSTEM SUPERINTENDENT
MICHAEL PEREA, ASSISTANT GENERAL MANAGER
JASON STROUD, MAINTENANCE DEPARTMENT SUPERINTENDENT

ITEM 7: WATER SYSTEM UPDATES

RECOMMENDED ACTION:
Committee to receive system status updates. No action required.

ITEM 8: WASTEWATER SYSTEM UPDATES

RECOMMENDED ACTION:
Committee to receive system status updates. No action required.

ITEM 9: MAINTENANCE DEPARTMENT UPDATES

RECOMMENDED ACTION:
Committee to receive system status updates. No action required.

REGULATORY AND OTHER MATTERS

ITEM 10: OTHER MATTERS/REPORTS

RECOMMENDED ACTION:
Hear Other Matters/Reports that may have arisen after the posting of the agenda.

ADJOURNMENT

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING AGENDA | APRIL 7, 2021

AVAILABILITY OF AGENDA MATERIALS

Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the Trabuco Canyon Water District Board of Directors in connection with a matter subject to discussion or consideration at an open meeting of the Board of Directors are available for public inspection at the Trabuco Canyon Water District Administrative Facility, 32003 Dove Canyon Drive, Trabuco Canyon, California (District Administrative Facility) or will be posted online on the District's website located at www.tcwd.ca.gov. If such writings are distributed to members of the Board less than 72 hours prior to the meeting, they will be available online at www.tcwd.ca.gov at the same time as they are distributed to the Board Members, except that, if such writings are distributed immediately prior to or during the meeting, they will be posted online on the District's website located at www.tcwd.ca.gov.

COMPLIANCE WITH THE REQUIREMENTS OF CALIFORNIA GOVERNMENT CODE SECTION 54954.2

In compliance with California law and the Americans with Disabilities Act, if you need special disability-related modifications or accommodations, including auxiliary aids or services in order to participate in the meeting, or if you need the agenda provided in an alternative format, please contact the District Secretary at (949) 858-0277, at least 48 hours in advance of the scheduled Board meeting. Notification at least 48 hours prior to the meeting will assist the District in making reasonable arrangements to accommodate your request. The Board Meeting Room is wheelchair accessible.

The District may conduct future meetings electronically (via teleconferencing) during the current ongoing emergency situation.

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ADMINISTRATIVE MATTERS
ITEM 1: ENGINEERING/OPERATIONAL COMMITTEE MEETING RECAP

RECOMMENDED ACTION:
Approve the following Engineering/Operational Committee Meeting Recap(s) and recommend that the Board receive and file same (Consent Calendar):

1. *March 3, 2021*
2. *March 15, 2021*

CONTACTS (staff responsible): PALUDI/PEREA

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING RECAP | MARCH 3, 2021

DIRECTORS VIA CONFERENCE CALL
Ed Mandich, Committee Chair
Stephen Dopudja, Committee Member

STAFF PRESENT
Fernando Paludi, General Manager
Michael Perea, Assistant General Manager/District Secretary
Gary Kessler, Water Department Superintendent
Jason Stroud, Maintenance Superintendent
Lisa Marie Sangi, Administrative Assistant

STAFF PRESENT VIA CONFERENCE CALL
Lorrie Lausten, District Engineer
Karen Warner, Principal Accountant

DISTRICT CONSULTANTS PRESENT VIA CONFERNECE CALL
Mike Swan, PSOMAS Engineering

PUBLIC PRESENT VIA CONFERNECE CALL
None

CALL MEETING TO ORDER
Director Mandich called the March 3, 2021 Engineering/Operational Committee Meeting to order at 7:00 AM. Public access to the meeting was made available by video broadcast.

VISITOR PARTICIPATION
No comments were received.

ORAL COMMUNICATION
No comments were received.

COMMITTEE MEMBER COMMENTS
No comments were received

REPORT FROM THE GENERAL MANAGER
No comments were received

ITEM 1: ENGINEERING/OPERATIONAL COMMITTEE MEETING RECAP

Mr. Paludi presented the Engineering/Operational Committee Meeting Recap for Committee review in accordance with the agenda.

RECOMMENDED ACTION

The Committee recommended that the Engineering/Operational Committee Meeting Recap be forwarded to the Board of Directors for approval (Consent Calendar).

ITEM 2: DISCUSSION AND POSSIBLE ACTION(S) RELATING TO TCWD'S DOMESTIC WATER STORAGE AND RESERVOIR SITING STUDY UPDATE

Ms. Lausten provided a project status update for Committee review, and she presented an updated DRAFT Domestic Water Storage & Reservoir Siting Study Update (Study) based on Committee feedback at the prior meeting. Mr. Mike Swan provided a brief review of the Study updates, and he provided an overview of the updated maps and datapoints with the Committee. Discussion occurred concerning the District's total domestic water storage and system challenges due to service area elevations. Director Mandich asked District staff and Mr. Swan to investigate potential alternative reservoir siting options and prepare a comparative analysis of all the proposed reservoir siting solutions.

RECOMMENDED ACTION:

The Committee received the status update. There was no action taken.

ITEM 3: DISCUSSION AND POSSIBLE ACTION(S) CONCERNING PORTER PROPERTY RESERVOIR PLANNING LEVEL CONSTRUCTION COST ESTIMATE

Ms. Lausten provided an update on this matter to the Committee, and she reported on the updates incorporated in the DRAFT Porter Property Planning Level Study & Cost Estimate (Study) based on Committee feedback at the prior meeting. Ms. Lausten reviewed the planning level cost estimates for reservoirs at both Harris Grade and the District's Porter Property. Discussion occurred concerning the potential costs directly related to alternative distribution system improvements and other domestic water capacity related time sensitive matters. Director Dopudja recommended scheduling a special meeting of the Engineering/Operational Committee to discuss this matter more fully and to make a recommendation to the Board of Directors.

RECOMMENDED ACTION:

The Committee received the status update. There was no action taken.

Director Mandich recommended moving forward Item 5.2 Other Engineering and Operations Project Updates, Saddleback Meadows. Director Mandich recused himself from meeting business and exited the Board Room at approximately 7:36 a.m.

ITEM 5: OTHER ENGINEERING AND OPERATIONS PROJECTS

2. Saddleback Meadows Development

Ms. Lausten provided a brief update on this project, and she reported that District staff has met with the developer concerning the domestic water demand and planned system improvements. Discussion occurred concerning the status of the development Sub-Area Master Plan (SAMP); Ms. Lausten commented that a DRAFT SAMP has been completed, but not approved. Discussion occurred concerning domestic water storage needs systemwide and the District's storage fees and charges. Director Dopudja requested District staff agendize the DRAFT SAMP for review at the following Committee meeting.

RECOMMENDED ACTION:

The Committee received the status update. There was no action taken.

Director Mandich returned to the Board Room at approximately 7:52 a.m. and resumed his participation on the remaining meeting business.

ITEM 4: DISCUSSION AND POSSIBLE ACTION(S) CONCERNING BELL CANYON SEWER LIFT STATION REHABILITATION PROJECT

Ms. Lausten provided a brief update on this project, and she reported that the contractor has mobilized and started demolition of the site. Ms. Lausten added that the project is estimated for completion by July 1, 2021. Discussion occurred concerning coordination with Dove Canyon Master Association (DCMA) for planned street improvements and the placement of the contractor's construction trailer.

RECOMMENDED ACTION:
The Committee received the status update. There was no action taken.

ITEM 5: OTHER ENGINEERING AND OPERATIONS PROJECTS

1. Saddle Crest Development
Mr. Paludi provided a brief update on this matter for Committee review, and he reported on his discussion with the developer concerning a potential extended warranty on eligible District facilities. Discussion occurred concerning facility acceptance and operational/maintenance challenges and concerns. Mr. Paludi mentioned that this matter will be agendized for Board review and consideration at the next Regular Board Meeting. Director Dopudja requested that Operations and Maintenance staff update the Board with their concerns.

3. Joplin Property/SCADA Upgrade
Mr. Paludi provided an update on this matter, and he reported that District staff has been working with staff from the Orange County's Chief Real Estate Office on a long-term license agreement for the District's onsite SCADA equipment at the Joplin Youth Camp property. Discussion occurred concerning the proposed terms of the agreement and concerns regarding certain limits that may adversely impact the District.

4. Golf Club Sewer Lift Station
Mr. Perea presented this matter for Committee review, and he reported that the District had contracted with Ferriera Construction to install an inline isolation valve on the discharge force main to isolate the station from the downstream wastewater flows. Mr. Perea provided a brief overview of the station operations and current challenges, as well as planned repairs and minor improvements, and he mentioned that an overview of the facility repairs will be presented at the following Committee Meeting.

5. Other Projects
None

RECOMMENDED ACTION
The Committee received the status update. There was no action taken.

ITEM 6: WATER SYSTEM UPDATES

Mr. Kessler reviewed the projects and repairs for February 2021, and he provided the additional highlights:

1. Water Operations staff repaired a struck abandoned two-inch water service on Robinson Ranch Rd. in the Robinson Ranch Community.
2. Water Operations staff pulled the Rose and Lang Well pumps at the Ground Water Treatment Facility.
3. Water Operations staff participated in crane and electrical training.

4. Water Operations staff replaced leaking hydrants on Bell Canyon Dr. and Promontory in the Dove Canyon Community.
5. Water Operations staff preformed Pressure Regulator Valve maintenance at the Canyon Creek Pump Station and Robinson Ranch Pump Station.
6. Water Operations staff is preparing to take the Dimension Water Treatment Plant offline for two weeks due to maintenance being performed on the Lower Feeder at Lake Matthews

Mr. Kessler reviewed the Monthly Water System Operations Summary with the Committee, and he reported that current domestic water demand is low due to the winter season.

RECOMMENDED ACTION
The Committee received the status update. There was no action taken.

ITEM 7: WASTEWATER SYSTEM UPDATES

Mr. Perea reviewed the projects and repairs for February 2021, and he provided the additional highlights:

1. Wastewater Operations staff repaired/replaced the inline polymer pump and polymer line at belt press building.
2. Wastewater Operations staff installed a surge arrestor on the Sequencing Batch Reactor (SBR) decant valve flush line to reduce/prevent water hammer.
3. Wastewater Operations staff installed a new disinfection feed line at the Dove Recycled Water Pump Station.
4. Wastewater Operations staff cleaned Golf Club and Bell Canyon Sewer Lift Station wet wells.
5. Wastewater Operations staff coordinated with third-party contractor to install and operate the permanent odor control system and equipment at Bell Canyon Sewer Lift Station.

Mr. Paludi provided a brief update that developer for The Oaks at Trabuco has installed a level indicator instead of a flow meter at the onsite wastewater treatment plant due to observed low flows.

Mr. Perea reviewed the Monthly Wastewater System Operations Summary with the Committee, and he reported that non-domestic water supplies are sufficient entering into the summer months. Mr. Perea reported that District staff will be conducting the second round of interviews for the vacant Wastewater Operator in Training position, and advertisement of the vacant Wastewater Operations Superintendent position will this week.

RECOMMENDED ACTION
The Committee received the status update. There was no action taken.

ITEM 8: MAINTENANCE DEPARTMENT UPDATES

Mr. Stroud reviewed the projects and repairs for February 2021, and he provided the additional highlights:

1. Maintenance Department staff participated in an electrical class (passed).
2. Maintenance Department staff participated in a crane certification class (passed practical exam, waiting results from written).
3. Maintenance Department staff assisted with an emergency repair at the Golf Club Lift Station stage I (submersible) pump.
4. Maintenance Department staff assisted with an electrical service upgrade at the Dove Tank Water Reservoir.
5. Maintenance Department staff replaced an electric motor at the Wastewater Treatment Plant on the East Sutorbilt aeration blower.

6. Maintenance Department staff conducted ongoing upgrades to the Jet Pump at the Wastewater Treatment Plant (80% complete).
7. Maintenance Department staff assisted Water Operations with the setup of the Rose and Lang Wells camera inspection and cleaning.
8. Maintenance Department staff procured new tires on District vehicles, #2, #4, #14.
9. Maintenance Department staff assisted with the ongoing work at Bell Canyon Lift Station.

RECOMMENDED ACTION
The Committee received the status update. There was no action taken.

ITEM 9: OTHER MATTERS/REPORTS
Director Mandich inquired on COVID-19 vaccine availability to District staff; Mr. Paludi commented that he would provide an update at the upcoming Board Meeting.

RECOMMENDED ACTION
There was no action taken.

ADJOURNMENT
Director Mandich adjourned the March 3, 2021 Engineering/Operational Committee Meeting at 8:30 AM.

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE SPECIAL MEETING RECAP
MARCH 15, 2021

DIRECTORS PRESENT
Stephen Dopudja, Committee Chair
Michael Safranski, Committee Member Alternate

STAFF PRESENT
Fernando Paludi, General Manager
Michael Perea, Assistant General Manager
Gary Kessler, Water Department Superintendent
Jason Stroud, Maintenance Superintendent
Karen Warner, Principal Accountant
Lisa Marie Sangi, Administrative Assistant
Lorrie Lausten, District Engineer

DISTRICT CONSULTANTS PRESENT VIA CONFERNECE CALL
None

PUBLIC PRESENT VIA CONFERNECE CALL
None

CALL MEETING TO ORDER
Director Dopudja called the March 15, 2021 Engineering/Operational Committee Special Meeting to order at 4:00 PM. Public access to the meeting was made available by video broadcast.

VISITOR PARTICIPATION
No comments were received.

ORAL COMMUNICATION
No comments were received.

COMMITTEE MEMBER COMMENTS
No comments were received.

REPORT FROM THE GENERAL MANAGER
Mr. Paludi welcomed Committee Member Alternate Director Safranski.

ITEM 1: DISCUSSION AND POSSIBLE ACTION(S) CONCERNING TRABUCO CANYON WATER DISTRICT'S DOMESTIC WATER EMERGENCY STORAGE GOAL AND RELATED MATTERS

Mr. Paludi presented this matter for Committee review, and he reported that District staff have worked with the Saddleback Meadows developer and engineer on the domestic water storage requirements for the proposed development. Ms. Lausten delivered a PowerPoint presentation which reviewed certain provisions of the DRAFT Sub-Area Master Plan (SAMP) update (March 2021) and highlighted the District's current water storage needs and planned system improvements to accommodate the proposed development. Discussion occurred concerning optional storage scenarios and options that have the potential to meet the needs of both the District and the

developer, and certain section language updates to the DRAFT SAMP. Ms. Lausten reviewed three proposed solution options for Committee review; Director Dopudja recommended including the options in the DRAFT SAMP.

Mr. Paludi recommended that District staff work with an independent, third-party to review the District's current storage fee charges to ensure consistency with the actual costs for storage requirements and in-lieu storage costs.

Director Dopudja recommended agendizing the review of the DRAFT SAMP for the next regular Engineering/Operational Committee Meeting.

RECOMMENDED ACTION

The Committee recommended agendizing the DRAFT Saddleback Meadow Sub-Area Master Plan for the next regular Engineering/Operational Committee Meeting for consideration.

ADJOURNMENT

Director Dopudja adjourned the March 15, 2021 Engineering/Operational Committee Special Meeting at 5:17 PM.

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ENGINEERING MATTERS

ITEM 2: DISCUSSION AND POSSIBLE ACTION(S) RELATING TO TCWD'S DOMESTIC WATER STORAGE AND RESERVOIR SITING STUDY UPDATE

In March 2016, District Staff, working with PSOMAS, completed a Domestic Water Storage and Reservoir Siting Study (Study). The purpose of the Study was to evaluate storage requirements and the feasibility of locating a site for a 2.0 MG reservoir. The purpose of this Domestic Water Storage and Reservoir Siting Study Update (Exhibit 1) is to update the Study of the same title conducted in 2016 to reflect current overall District demands, development projections and storage conditions as of the end of 2020.

The Study Update was discussed with the Engineering/Operational Committee at both the February 3, 2021 and March 3, 2021 meetings, where staff received input that has been incorporated into the current draft. Notably, a figure has been added that includes existing District reservoir locations and the distribution of storage capacity as well as domestic water demand and supply between the east and west portions of the District's service area. The Study Update's recommendation regarding the timing of additional domestic water storage is that the District annually monitor domestic water production volumes so that planning and design of a new reservoir commence within four years of the projected point at which production would not last the target seven (7) days even at a 35% reduction in an emergency condition. District staff will continue to plan a recommended new reservoir location to be ready for this trigger scenario.

At the Committee's request, staff has prepared a table matrix (Exhibit 2) of potential reservoir sites noting advantages and disadvantages of each site given the information available at this time.

More information may be presented at the time of the meeting. Mike Swan of PSOMAS will be in attendance to present the findings of the Study Update.

FUNDING SOURCE:
Not Applicable

FISCAL IMPACT:
Not Applicable

ENVIRONMENTAL COMPLIANCE:
Not applicable

RECOMMENDED ACTIONS:
Committee to receive information at the time of the Committee Meeting.

EXHIBIT(S):
1. Domestic Water Storage and Reservoir Siting Study Update-Draft
2. Tank Selection Summary

CONTACTS (staff responsible): PALUDI/LAUSTEN

DOMESTIC WATER STORAGE AND RESERVOIR SITING STUDY

April 2021 Update

Prepared for:
TRABUCO CANYON WATER DISTRICT
32003 Dove Canyon Drive
Trabuco, CA 92679

Prepared by:
PSOMAS
5 Hutton Centre Drive, Suite 300
Santa Ana, CA 92707

Project No. 2TRA132701

Water Storage System Overview

Trabuco Canyon Water District's (TCWD or District) water storage system is described in detail in TCWD's 1999 Master Plan (Master Plan). The Master Plan also discusses emergency storage and the reliability of water supply from TCWD's wholesale water importer, the Metropolitan Water District of Southern California (Metropolitan). The Master Plan notes Metropolitan requires that retailers provide for up to seven average days of demand without raw water through emergency storage or other sources of supply. The Master Plan also analyzed different emergency scenarios such as earthquakes with varying volumes of storage recommended. Since that time, the District has been utilizing a goal of providing five average days of emergency storage.

South Orange County relies heavily on water from Metropolitan, which supplies imported water through the State Water Project and the Colorado River Aqueduct. These imported water supplies are further managed by the Municipal Water District of Orange County (MWDOC) of which TCWD is a member agency. Unlike the northern areas of Orange County, where there are large groundwater aquifers from which water can be extracted during an emergency, South Orange County has very little to no available sources of groundwater and groundwater storage.

In 2010, through a Proposition 218 process, TCWD adopted the Water Reliability and Emergency Storage Fee (WRES) to finance the following three major capital projects: 1) 2 cubic feet per second (cfs) capacity in the Baker Water Treatment Plant, a regional water treatment facility in Orange County with access to stored water in Irvine Lake, 2) Trabuco Creek Wells Facility, a water treatment plant for treatment of local groundwater in Trabuco Creek, and 3) a 2.0 million gallon (MG) water storage reservoir and distribution improvements for increasing emergency storage supplies.

The purpose of this Domestic Water Storage and Reservoir Siting Study Update (Study) is to update the Study of the same title conducted in 2016 to reflect current overall District demands, development projections and storage conditions as of the end of 2020.

TCWD's Master Plan identifies the following three components of domestic water storage in a public water system:

- Operational Storage
- Fire Protection Storage
- Emergency Storage

Storage is required in a water system to balance variations in demand above and below normal supply settings (operational storage), to provide water for fighting fires (fire storage), and to provide water when normal supplies are reduced or unavailable due to unusual circumstances (emergency storage). TCWD has requirements for each of these in order to ensure system functionality and reliability. TCWD's Master Plan and subsequent individual Sub Area Master Plans (SAMPs) prepared for new developments discuss and determine these storage components.

Current Storage Condition

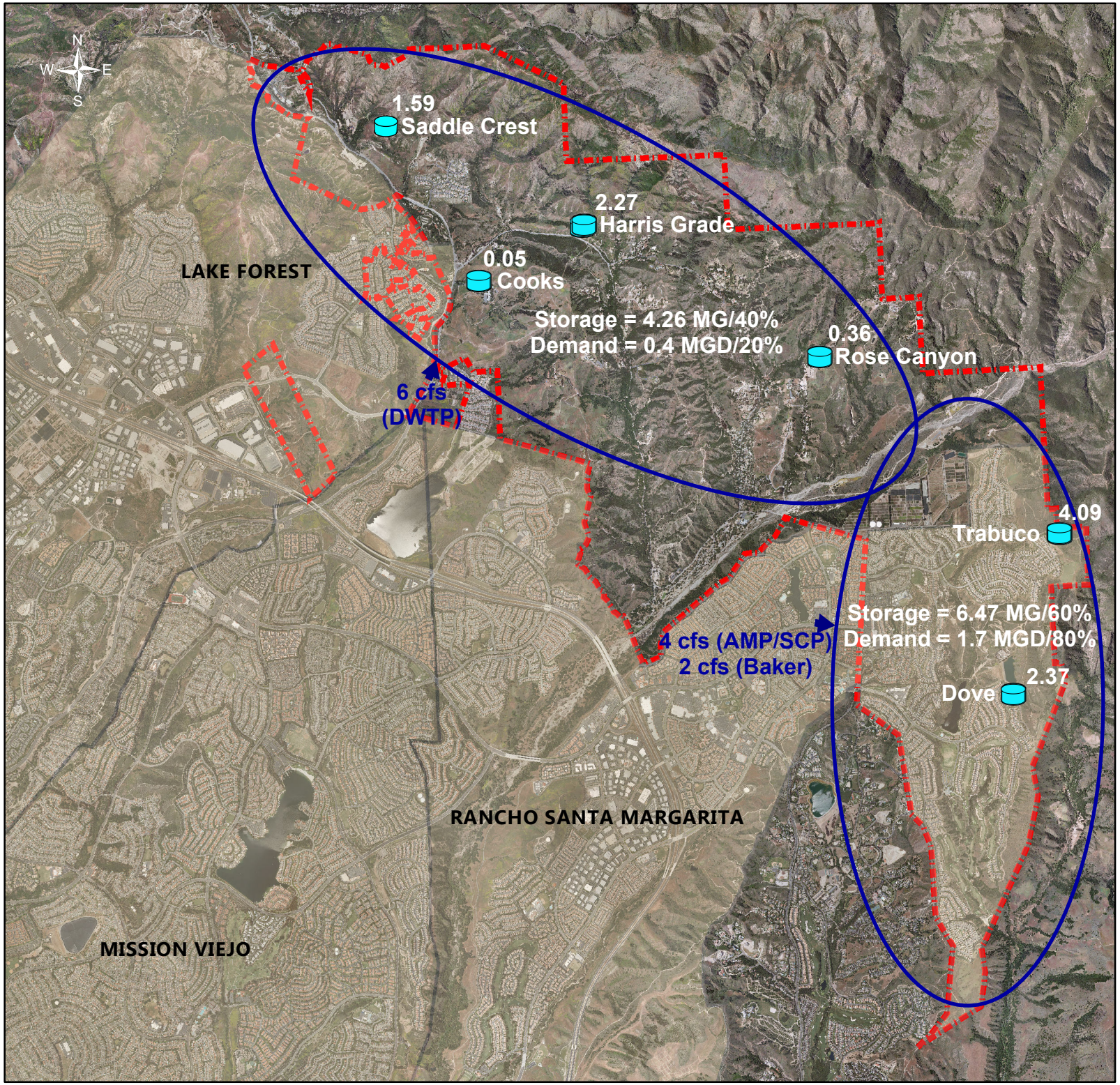
Table 1 shows TCWD's existing domestic water storage reservoirs and their characteristics and Figure 1 shows their respective locations. It should be noted that the Total Effective Storage available is reduced over Total Volume to account for normal operating conditions such as allowing for adequate "freeboard" to prevent overflowing the tank and wasting water and other operational factors. In early 2021 the Saddle Crest Reservoir will be brought on-line. This reservoir was constructed by the Saddle Crest developer but the reservoir was funded jointly by the developer and TCWD with the District paying for 0.62 million gallons (MG) of total storage volume.

Table 1
TCWD Water Storage Reservoirs

Reservoir[1]	As-Built Diameter (i.d.-feet)	Top of Shell Height (feet)	Height of Overflow[2] (feet)	Operating Height[3] (feet)	Effective Volume (MG)	Year Built	HGL Max.[4]
Cooks	21.5	24	22.5	20	0.05	1963	1,165
Harris Grade No. 1	104	32	31	30	1.91	1980	1,504
Harris Grade No. 2	55	24	23	20	0.36	1965	1,496
Rose Canyon	55	24	23	20	0.36	1979	1,357
Trabuco No. 1	99	24	26	23.5	1.35	1984	1,686
Trabuco No. 2	141	24	26	23.5	2.74	1986	1,686
Dove	116	32	33	30	2.37	1988	1,418
Saddle Crest	95	32	31.5	30	1.59	2020	1,508
Total Effective Storage (2021)					**10.73**		

1. Storage reservoirs are all steel, welded or bolted, and above grade
2. Height of Overflow; met design criteria for freeboard at time of design. Trabuco and Dove Tanks overflow is set above top of shell
3. Maximum height at which reservoir is operated
4. Hydraulic Grade Line Elevation in feet above mean sea level

Figure 1 also shows the effective volume of each reservoir as well as the storage volume east and west of Trabuco Creek compared to the average day demand for those areas. What is taken from this analysis is the fact that 40% of the District's storage volume lies in the west where there is only 20% of the demand. And conversely, 60% of the storage is in the east where 80% of the demand is found. While this is somewhat out of balance and could be an issue if the pipeline crossing Trabuco Creek is lost temporarily, the supply source locations and amounts are also shown on this figure illustrating geographic supply redundancy. And since normal operating conditions utilize the Dimension Water Treatment Plant (DWTP) supply as the primary feed it is operationally important to have a sufficient amount of storage near that source, in the western portion of the District.



TRABUCO CANYON WATER DISTRICT

Figure 1

Existing Reservoir Locations & Storage, Demand and Supply Distribution

Eff. Vol. (MG) Reservoirs

Service Area Boundary

East vs. West Breakdown
Storage = Vol./% of Total
Demand = ADD/% of Total

Supply Sources
Peak Capacity (Source)

Abbreviations/Notes

DWTP: Dimension Water Treatment Plant
AMP: Allen McCulloch Pipeline
SCP: South County Pipeline
Baker: Baker Water Treatment Plant

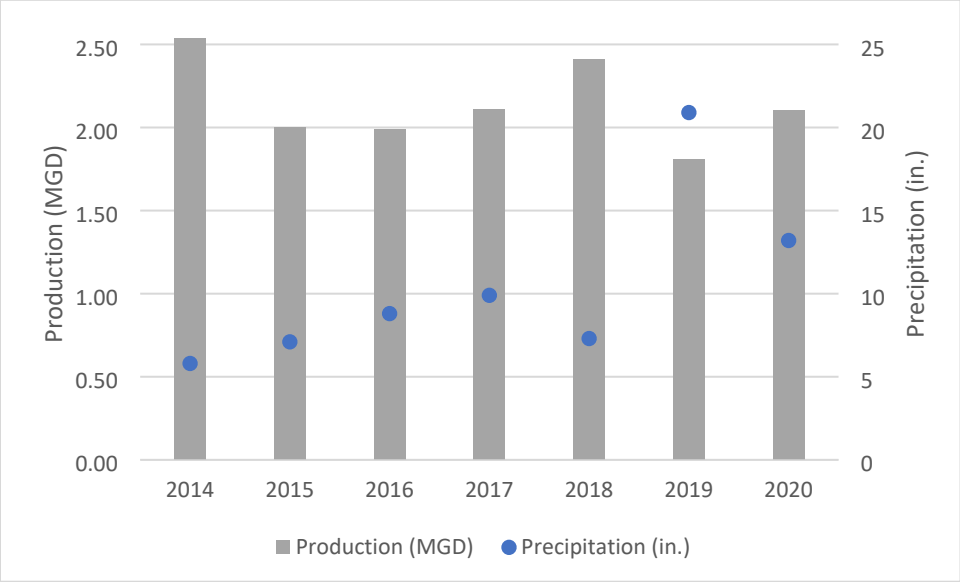
Note: Well supply not shown due to intermittent status

TCWD monitors its available storage on a daily basis taking into account that water levels fluctuate hourly based on system water demands and production rate. The number of available days of storage is calculated based on total storage and water demands or production. Over the past seven calendar years domestic water production has averaged 3.28 cfs, which is 6.55 acre-feet per day or 2.14 million gallons per day (MGD) as shown in Table 2 along with precipitation figures from the California Irrigation Management Information System (CIMIS) Station 75 in Irvine (Great Park). Figure 2 is a plot of this information, which shows the relationship between demand and precipitation. Although there has been some growth within the District over this period, demands are trending slightly downward, most likely due to continued conservation. It should be noted that the closest year to the average demand over this period occurred in 2017, which was also the closest year to the average rainfall over the seven-year period.

Table 2
Average Domestic Water Production and Rainfall

	2014	2015	2016	2017	2018	2019	2020	AVERAGE
cfs	3.92	3.09	3.05	3.26	3.66	2.77	3.22	3.28
Acre-Feet/Day	7.78	6.13	6.10	6.47	7.40	5.54	6.46	6.55
Production (MGD)	2.53	2.00	1.99	2.11	2.41	1.81	2.11	2.14
Precipitation (in.)	5.8	7.1	8.8	9.9	7.3	20.9	13.2	10.43

Figure 2
Average Domestic Water Production and Rainfall



Assuming average production of 2.14 MGD from Table 2 and existing effective storage of 10.73 MG from Table 1, the District has just over 5 days of storage (10.73/2.14). Using average production from 2019 of 1.81 MGD, would increase that to just under 6 days of

storage. If, during an emergency, existing customers were to reduce water use to water demands of about 2.0 cfs or 1.29 MGD, then 8.3 days of storage would be available. Reducing demands to 2.0 cfs or even below that amount for a period of one or two weeks should be completely achievable as the total monthly production has been at or below this amount for the five full months shown in Table 3 during the past two winters. In fact, average production of about 1.35 cfs was recorded over the two-month period of February and March of 2019. Therefore, indoor-only water demands should be below 1.5 cfs, which should be attainable with effective communication to all District customers requesting they eliminate all non-essential irrigation during such an emergency condition.

Table 3
Total Monthly Production (cfs)

March 2020	2.0
December 2019	1.8
March 2019	1.4
February 2019	1.3
January 2019	2.0

Metropolitan indicated in its *2018 Evaluation of Metropolitan's Emergency Storage Objective* report that "a retail water demand cutback of 25 to 35 percent appears reasonable based on levels of conservation achieved during the recent drought". Using that rationale, and TCWD's average demand over the past seven years of 3.28 cfs, a 25 to 35 percent cutback would result in demands of 2.46 to 2.13 cfs, respectively. The total effective storage volume of 10.73 MG puts the District in the "reasonable" range of demand cutbacks assumed by Metropolitan as achievable, which would equate to a 28.2 percent cutback to maintain seven days of storage. As Saddle Crest and other proposed developments come online, a higher percentage would be required but additional conservation is also likely to occur and moving towards a 35 percent reduction would provide more days of storage. The District's current goal of providing five average days of emergency storage equates to seven average days at a 28.6 percent reduction (7 minus 5 divided by 7), which is in the middle of Metropolitan's 25 to 35 percent reduction range.

Projections for new developments and their anticipated additional average day demands are detailed on Table 4 in five-year increments to Year 2035 (next pages). Taking the cumulative total demand projections from Table 4 and adding them to the average demand from the past seven years from Table 2, which is assumed as the existing demand, yields the demand projections shown in the first row of Table 5. These projections are believed to be conservative as they assume no additional conservation from the seven-year average assumed as the current demand.

Table 4 - Estimated Dwelling Units, Demand Factors and Demands for New Developments[a]

ID	Potential New Development	APN	Housing Density Assumed	Op+Em Storage (Gallons/ DU)[d]	Per Unit Demand Factor (gpd)	Acres	FTSP/Master Plan	2025		2030		2035	
								2025 Connect	2025 Demand (gpd)	2030 Connect	2030 Cum'l Demand (gpd)	2035 Connect	2035 Cum'l Demand (gpd)
1	Zadeh	866-081-12 +	Low	7978	*1850*	41.88	20 (4 Existing)	6	11,100	5	20,350	5	29,600
2	Saddle Crest[b]	858-011-09 +	Low	7978	*1850*	114.04	218 (SAMP lowered #)	25	46,250	40	120,250		120,250
3	Saddleback Meadows[c]	856-081-01 +	Medium	7978	*650*		299 (SAMP lowered #)	20	13,000	100	78,000	61	117,650
4	Nurseries	842-071-180+	Medium	3795	*880*	198.09	600 both nurseries			150	132,000	300	396,000
5	Varshney	105-202-58 +	Low	7978	*1850*	22.58	25 (cut back per Zadeh)			7	12,950	7	25,900
6	Geraci/Joley (Randazzo)	866-031-13	Low	7978	*1850*	6				1	1,850		1,850
7	Mills (Shimomura)	858-011-10 +	Low	7978	*1850*	75.2				15	27,750	14	53,650
8	Vawser	858-021-22	X			7.48	(1 existing DU)						
9	Matthews	858-021-13	Low	7978	*1850*	4.4	4	2	3,700		3,700		3,700
10	County of Orange (Adams)	866-032-12	X			5.3	3 (Now open space)						
11	Reilly	858-021-21	X			14.96	(1 existing DU)						
12	Oaks at Trabuco	856-171-01+	Low	7978	*1850*	32.03	9 (3 Existing meter)	3	5,550	5	14,800	1	16,650
13	Richardson (Haefele)	606-021-07	Low	7978	*1850*	1.1		1	1,850		1,850		1,850
14	Live Oak Ltd	856-011-22	X			23.4	21 (Now open space)						
15	Live Oak-A (Ramirez)	856-013-04	Low	7978	*1850*	1		1	1,850		1,850		1,850
16	Live Oak-B (various owners)	856-021-20+	Medium	3795	*880*	2.24		4	3,520		3,520		3,520
17	McCarthy (Serrano)	606-021-05+	Medium	3795	*880*	5		3	2,640		2,640		2,640
18	StanPac-Sky Ridge[e]	856-061-06+	X			16.6							
19	Shah (Tittle)	856-012-06	Low	7978	*1850*	17.7	Commercial	4	7,400		7,400		7,400
20	Rutter (Waston/Haskell)	858-021-11+	Low	7978	*1850*	98.3				24	44,400	24	88,800
21	Bach	856-042-15	Low	7978	*1850*	148.44				14	25,900	14	51,800
22	Beardslee	842-081-17	Low	7978	*1850*	40.3				8	14,800		14,800
23	Saddle Club LLC (Bishop of Orange)	125-035-34	Low	7978	*1850*	30.96				3	5,550		5,550
24	Lin (Federal S&L Insurance Corp)	856-052-14	Low	7978	*1850*	90.2				14	25,900	13	49,950
25	Felch	856-052-10	Low	7978	*1850*	5.3				1	1,850		1,850
26	Various owners (Ferber)	842-051-13	Low	7978	*1850*	155.9	OCTA portion should be 0			8	14,800		14,800
27	Their (Fossil Resources)	842-011-01+	Low	7978	*1850*	78.7						6	11,100
28	Politski (Grier)	856-041-05	Low	7978	*1850*	27.7				5	9,250		9,250
29	Trabuco Canyon Water District (Porter)	842-061-07+	Medium	3795	*880*	119.4							
30	Live Oak (various owners)	856-031-01+	Low	7978	*1850*	47.54	Combined C,D,E,F			10	18,500	10	37,000

Table 4 - Estimated Dwelling Units, Demand Factors and Demands for New Developments[a]

ID	Potential New Development	APN	Housing Density Assumed	Op+Em Storage (Gallons/ DU)[d]	Per Unit Demand Factor (gpd)	Acres	FTSP/Master Plan	2025		2030		2035	
								2025 Connect	2025 Demand (gpd)	2030 Connect	2030 Cum'l Demand (gpd)	2035 Connect	2035 Cum'l Demand (gpd)
31	OC Transportation Authority (Lucarelli)	125-035-33	X			116.07	(Now open space)						
32	Laval (Mithcell-East)	842-061-04	Low	7978	*1850*	39.8							
33	Laval (Mitchell-West)	842-081-12	Low	7978	*1850*	101.7				7	12,950	8	27,750
34	Moutain View Road	842-091-36+	Low	7978	*1850*		47 (26 existing)			8	14,800	8	29,600
35	Newell (various owners)	856-052-12+	Low	7978	*1850*	54.81				5	9,250	6	20,350
36	Wm. Lyon	833-011-25	Medium	3795	*880*	2.8				5	4,400	4	7,920
37	Keeler (Racki)	856-052-03	Low	7978	*1850*	39.3				8	14,800	7	27,750
38	Rose Canyon (various owners)	842-122-11+	Low	7978	*1850*	25.11	20 (8 existing)			5	9,250	4	16,650
39	McKittrick (Schwendeman-West)	842-081-20	Low	7978	*1850*	4.8				2	3,700		3,700
40	McKittrick (Schwendeman-East)	842-061-02	Low	7978	*1850*	40.9				3	5,550	3	11,100
41	Wm. Lyon Plano[f]	833-731-01	High	1164	*270*	1.83					-		
42	Trabuco PWT Corporation	842-061-01	Low	7978	*1850*	118.3				9	16,650	9	33,300
43	Uysugi	856-042-08	Low	7978	*1850*	13.4		3	5,550		5,550		5,550
44	Trabuco Ranches (various owners)	842-121-11+	Low	7978	*1850*	50.72	24 (13 existing)			4	7,400	4	14,800
45	Baywood Development (Saddleback Canyon)	858-044-24+	Low	7978	*1850*	8.93							
46	Various owners (Ferber)	842-041-05+	Low	7978	*1850*	285.91	50 (lower portion now OS)					11	20,350
47	Joplin Boys' Ranch (built out)	842-011-06+	X			311.2							
	Total DU Connections							72		461		519	
	Total Average Demand								102,410		694,160		1,286,230

(a) Average Water Demands for High, Medium, and Low Density Developments, with 75% development of plan (FTSP) levels in Canyon Areas (Unincorporated County).

(b) Saddle Crest constructed storage at development site in conjunction with District storage program. Total requirement is per SAMP (0.88 MG) and phased requirement is prorated by dwelling units.

(c) Saddleback Meadows is investigating storage options with regional storage program. Saddelback Meadows demand per draft SAMP for residential and HOA use and 181 dwelling units.

(d) Includes Emergency Storage per Master Plan.

(e) Sky Ridge Development receives supply and storage from TCWD purchased capacity in the SMWD system.

(f) Average domestic water demand based on high density development with recycled water for common areas.

FOR LOCATION OF DEVELOPMENTS, SEE FIGURE 2.1 FROM 2016 REPORT INCLUDED IN APPENDIX

Table 5
Demand Projections and Storage Situation

	2020	2025	2030	2035
Average Demand (MGD)	2.14	2.24	2.83	3.42
35% Reduction in Demand (MGD)	1.39	1.45	1.84	2.22
7 Days Reduced Demand (MG)	9.72	10.18	12.86	15.57
2021 Effective Storage (MG)	10.73	10.73	10.73	10.73
Surplus (Deficiency) (MG)[1]	1.01	0.55	(2.13)	(4.84)
Demand Reduction Required[2]	28.2%	31.5%		

1) Existing Effective Storage minus 7 days of 35% reduced demand
2) Demand reduction required to yield exactly 7 days of storage

The second and third rows in Table 5 show an assumed 35 percent reduction in demand in MGD and seven days of that reduced demand in MG. The next two rows show the existing effective storage volume from Table 1 and the surplus or deficiency in storage volume if you subtract the seven days of reduced demand from the existing Effective Storage.

As illustrated in Table 5, the current storage volume would be adequate with these assumptions until around 2026. The last row of Table 5 shows the demand reduction required to yield exactly seven days of storage, which also shows that the District should be within the "reasonably achievable cutback" range used by Metropolitan in their study of 25 to 35 percent until around 2026.

Recommendations

It is recommended that the District continue planning studies on development of a recommended storage site for constructing the next reservoir meeting various storage volume requirements. Recent studies have explored needs for storage being accommodated at District-leased or owned properties including Harris Grade Reservoir and the Porter Ranch sites. In the meantime, water production volumes (demand minus non-revenue water) should continue to be monitored and the tables above updated annually. When it appears production at a 35 percent reduction will not last seven days at some point within an upcoming four-year period, design should commence on the then recommended best alternative site. That will allow ample time for design, permitting, and construction.

Table A-1 TCWD Water Production Reports for 2014-2020

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2014						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	251	196	*	*	271	279	309	306	275	214	227	135	2,463
BACKWASH AC/FT	5	4	5	5	5	5	3	4	4	4	7	5	54
FLUSHWATER AC/FT	10	8	11	12	8	11	9	9	8	10	14	9	118
WTP EFFLUENT AC/FT	249	193	182	210	269	277	310	306	273	211	225	133	2,838
WELLS													
TRABUCO CREEK GWTF	0	0	0	0	0	0	0	0	0	0	0	0	0
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	0	0	0	0	11	17	45	12	9	46	0	0	139
IRWD AC/FT	0	0	0	0	0	0	0	0	3	28	0	0	31
TOTAL SUPPLY													
AC/FT	244	189	177	205	275	289	352	315	281	281	217	128	2,952
CFS DAILY AVERAGE	4.0	3.1	2.9	3.3	4.5	4.7	5.7	5.1	4.5	4.6	3.5	2.1	4
AC/FT PER DAY	7.9	6.1	5.7	6.7	8.9	9.3	11.3	10.2	9.0	9.1	7.0	4.0	8
OPERATIONS in GAL.													
WTP DOMESTIC	27,696	22,664	33,286	32,388	34,258	29,322	20,794	21,842	17,877	21,019	28,642	24,684	314,472
WWTP DOM	1,330	900	1,380	2,360	3,110	2,990	1,480	1,340	2,140	2,860	4,520	5,110	29,520
OPERATIONS (AF)													
SUPPLEMENT TO RW	14	31	0	0	0	5	34	15	0	18	5	0	120
LOSSES in GAL.													
FLUSHING (gal.)	0	0	0	0	0	0	0	0	0	0	0	0	0
SEWER CLEANING (gal.)	0	0	10,000	10,000	10,000	0	10,000	10,000	10,000	10,000	10,000	10,000	90,000
LINE BREAKS (gal.)	36,000	0	0	0	43,000	0	0	0	0	0	0	12,000	91,000
***SYSTEM DEMAND ** ***													
CFS DAILY AVERAGE	3.8	3.0	2.8	3.4	4.5	4.8	5.2	4.9	4.9	4.3	3.6	2.1	3.92
AC/FT PER DAY	7.5	5.9	5.6	6.8	8.9	9.5	10.3	9.6	9.6	8.5	7.1	4.1	7.78
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.0	8.2	8.0	8.2	7.9	7.9	8.2	8.0	8.2	8.4	8.2	8.2	8
DAYS OF STORAGE	3	4	4	4	3	3	2	3	3	3	4	6	3
ZONES (AF)													
RIDGELINE PS	219	195	182	195	262	253	281	291	271	231	222	115	2,717
EL TORO P.S.	26	4	2	18	16	30	25	27	16	40	4	18	226
TOPANGA	1	1	2	4	6	4	3	3	4	4	3	1	35
FALCON	0.9	0.4	0.6	0.8	1.0	1.1	1.1	0.9	0.8	1.0	0.7	0.1	9
ROSE PRV/ OAKS	8	7	8	10	15	11	12	15	13	11	10	7	127
CANYON CREEK	0.4	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.3	0.2	4
ROSE P.S.	1.3	0.4	0.7	0.7	1.1	1.2	1.5	2.5	1.6	1.6	1.2	0.9	15
ROBINSON RANCH	64	51	45	59	84	102	151	146	107	103	65	26	1,003
DOVE CANYON	83	69	85	83	95	93	81	66	75	82	74	50	935
PORTOLA HILLS	14	11	10	15	13	15	20	15	15	18	13	10	171

* Usage estimated new meter installed

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2015						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	172	173	210	107	201	211	185	235	195	187	182	155	2,213
BACKWASH AC/FT	5	6	6	3	4	5	4	6	6	5	6	6	62
FLUSHWATER AC/FT	11	10	12	6	9	9	10	13	11	11	11	11	125
WTP EFFLUENT AC/FT	165	171	210	106	200	211	182	234	194	186	181	154	2,194
WELLS													
TRABUCO CREEK GWTF	0	0	0	0	0	0	0	0	0	0	0	0	0
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	0	0	0	73	0	0	19	0	7	0	0	0	99
IRWD AC/FT	0	0	0	59	0	0	0	0	0	0	0	0	59
TOTAL SUPPLY													
AC/FT	160	166	203	235	195	205	197	228	195	181	175	148	2,289
CFS DAILY AVERAGE	2.6	2.7	3.3	3.8	3.2	3.3	3.2	3.7	3.2	3.0	2.8	2.4	3
AC/FT PER DAY	5.2	5.4	6.6	7.6	6.3	6.6	6.4	7.4	6.3	5.9	5.6	4.5	6
OPERATIONS in GAL.													
WTP DOMESTIC	0.08	0.07	0.10	0.08	0.06	0.08	0.06	0.09	0.07	0.06	0.07	0.07	0.9
WWTP DOM	1.16	0.97	1.02	1.14	1.28	0.43	0.50	0.29	0.24	0.17	0.18	0.23	7.61
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0	0	20	0	0	0	0	0	0	0	0	20
LOSSES in GAL.													
FLUSHING (gal.)	0	0	0	0	0	0	0	0	0	0	0	0	0
SEWER CLEANING (gal.)	10,000	10,000	10,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	75,000
LINE BREAKS (gal.)	0	0	6,000	414,000	0	0	50,000	0	0	0	0	30,000	500,000
SYSTEM DEMAND **													
CFS DAILY AVERAGE	2.6	2.7	3.3	3.5	3.1	3.5	3.3	3.7	3.3	3.0	2.9	2.4	3.09
AC/FT PER DAY	5.2	5.3	6.6	6.9	6.2	6.9	6.4	7.3	6.5	5.9	5.8	4.7	6.13
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.2	8.2	8.2	8.2	8.4	8.3	8.3	8.1	8.2	8.1	7.8	7.9	8
DAYS OF STORAGE	5	5	4	4	4	4	4	3	4	4	4	5	4
ZONES (AF)													
RIDGELINE PS	166	156	196	165	184	210	179	237	183	177	181	137	2,170
EL TORO P.S.	3	5	11	24	31	2	7	0	12	10	0	10	116
TOPANGA	1	2	2	3	2	3	2	2	2	1	1	1	21
FALCON	0.4	0.5	0.7	0.6	0.4	0.3	0.5	0.5	0.4	0.4	0.5	0.2	5
ROSE PRV/ OAKS	7	7	10	10	10	11	10	14	12	10	4	3	107
CANYON CREEK	0.2	0.2	0.4	0.4	0.3	0.4	0.4	0.5	0.3	0.3	0.3	0.3	4
ROSE P.S.	1.0	0.9	1.1	0.9	1.0	1.3	0.8	0.8	0.6	0.6	0.5	0.5	10
ROBINSON RANCH	38	42	61	62	68	55	56	63	49	45	47	35	620
DOVE CANYON	59	59	82	87	81	69	53	79	66	64	61	53	815
PORTOLA HILLS	12	10	10	15	12	11	15	10	14	10	6	12	137
* Usage estimated new meter installed													

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2016						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	130	92	133	152	170	160	257	307	250	168	71	145	2,035
BACKWASH AC/FT	6	3	4	5	6	4	5	5	5	5	2	6	56
FLUSHWATER AC/FT	3	6	8	8	9	8	10	10	10	3	5	11	91
WTP EFFLUENT AC/FT	127	91	130	146	174	158	253	308	262	167	69	146	2,031
WELLS													
TRABUCO CREEK GWTF	0	0	0	0	0	0	0	0	0	0	0	0	0
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	0	14	0	0	0	21	0	7	0	41	62	0	145
IRWD AC/FT	0	32	0	0	0	27	0	0	0	25	64	0	148
TOTAL SUPPLY													
AC/FT	122	133	126	141	170	206	257	314	250	233	195	146	2,293
CFS DAILY AVERAGE	2.0	2.3	2.1	2.6	2.8	3.4	4.2	5.0	4.0	3.7	3.1	2.3	3
AC/FT PER DAY	3.9	4.6	4.1	5.1	5.5	6.9	8.3	9.9	8.1	7.5	6.3	4.7	6
OPERATIONS in GAL.													
WTP DOMESTIC	0.07	0.04	0.26	0.21	0.05	0.05	0.07	0.08	0.08	0.09	0.07	0.12	1.2
WWTP DOM	0.25	0.23	0.27	0.22	0.18	0.15	0.25	0.29	0.23	0.23	0.33	0.35	2.98
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0	0	0	0	0	6	29	35	34	15	0	119
LOSSES in GAL.													
FLUSHING (gal.)	0	0	0	0	0	0	0	0	0	0	0	0	0
SEWER CLEANING (gal.)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000
LINE BREAKS (gal.)	0	215,000	0	0	10,000	120,000	10,000	0	2,000	0	90,000	0	447,000
SYSTEM DEMAND **													
CFS DAILY AVERAGE	2.0	2.3	2.1	2.6	2.7	3.2	4.1	4.9	4.3	2.8	3.2	2.4	3.05
AC/FT PER DAY	4.0	4.6	4.1	5.1	5.3	6.5	8.3	10.0	8.5	5.6	6.5	4.7	6.10
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.1	8.2	8.0	8.0	8.4	8.3	8.3	8.2	8.1	8.0	7.8	7.9	8
DAYS OF STORAGE	6	5	6	5	5	4	3	3	3	4	4	5	4
ZONES (AF)													
RIDGELINE PS	118	113	113	138	145	184	252	281	252	187	134	129	2,046
EL TORO P.S.	13	25	16	16	16	27	6	21	8	25	64	12	250
TOPANGA	1	1	1	1	1	2	2	2	2	1	2	1	17
FALCON	0.1	0.3	0.3	0.4	0.5	0.6	0.6	0.6	0.7	0.6	0.4	0.2	5
ROSE PRV/ OAKS	3	3	4	4	9	5	6	7	6	4	4	2	57
CANYON CREEK	0.2	0.2	0.2	0.3	0.3	0.5	0.5	0.4	0.5	0.4	0.4	0.2	4
ROSE P.S.	0.4	0.4	0.6	0.5	0.6	0.4	0.6	1.0	0.8	0.6	0.5	0.5	7
ROBINSON RANCH	29	35	34	45	54	56	87	161	129	86	63	31	810
DOVE CANYON	46	54	53	57	67	92	87	23	65	77	56	52	729
PORTOLA HILLS	8	9	10	9	10	15	12	12	16	12	14	10	137
* Usage estimated new meter installed													

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2017						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	84	93	25	66	114	170	247	168	245	253	161	222	1,848
BACKWASH AC/FT	5	5	1	3	4	5	5	3	5	5	4	5	50
FLUSHWATER AC/FT	8	11	3	7	7	9	10	7	10	10	7	7	96
WTP EFFLUENT AC/FT	84	89	28	64	114	168	248	172	247	257	162	225	1,858
WELLS													
TRABUCO CREEK GWTF	0	0	102	119	87	39	0	0	0	0	0	0	347
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	22	4	7	5	0	0	4	57	7	3	18	4	131
IRWD AC/FT	0	0	0	0	0	0	1.4	42.5	0	0	25.25	0	69
TOTAL SUPPLY													
AC/FT	106	93	137	188	201	207	253	271	254	260	205	229	2,404
CFS DAILY AVERAGE	1.7	2.8	2.2	3.2	3.3	3.5	4.2	4.4	4.3	4.2	3.4	3.7	3
AC/FT PER DAY	3.4	3.1	4.4	6.4	6.5	6.9	8.2	8.7	8.5	8.4	6.8	7.4	7
OPERATIONS in GAL.													
WTP DOMESTIC	22,739	28,125	10,696	27,975	28,125	37,400	43,758	27,900	36,420	39,644	19,822	30,070	352,674
WWTP DOM	1,050	1,060	1,100	970	1,070	1,020	2,341	2,847	2,775	2,992	3,378	3,257	23,860
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0	0	0	0	0	0	17	9	13	0	6	45
LOSSES in GAL.													
FLUSHING (gal.)	0	0	0	0	0	0	10,000	0	0	0	0	0	10,000
SEWER CLEANING (gal.)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000
LINE BREAKS (gal.)	4,000	4,000	0	0	1,000	1,000	0	45,000	0	1,000	0	0	56,000
SYSTEM DEMAND **													
CFS DAILY AVERAGE	1.6	1.5	2.1	3.1	3.2	3.5	4.3	4.4	4.4	4.2	3.3	3.6	3.26
AC/FT PER DAY	3.2	2.9	4.0	6.2	6.4	6.9	8.1	8.7	8.6	8.4	6.8	7.4	6.47
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.0	7.8	8.0	8.2	8.1	8.3	8.1	8.2	8.0	8.1	8.0	7.9	8
DAYS OF STORAGE	8	8	6	4	4	4	3	3	3	3	4	3	4
ZONES (AF)													
RIDGELINE PS	34	62	19	11	101	173	254	173	247	246	141	184	1,645
EL TORO P.S.	44	20	9	53	11	0	2	39	0	14	46	41	279
TOPANGA	1	1	1	1	1	3	3	3	2	3	2	3	23
FALCON	0.1	0.1	0.4	0.6	0.6	0.6	0.6	0.8	0.6	0.6	0.5	0.5	5.9
ROSE PRV/ OAKS	2	8	3	4	5	8	7	9	11	13	9	7	86
CANYON CREEK	0.1	0.1	0.2	0.5	0.3	0.4	0.5	0.5	0.3	0.4	0.3	0.4	4.1
ROSE P.S.	0.6	1.8	0.7	0.6	0.8	0.7	0.7	1.0	1.3	1.1	0.8	1.4	11.5
ROBINSON RANCH	16	18	29	53	56	65	83	74	76	75	57	67	669
DOVE CANYON	47	36	61	78	86	91	96	108	94	98	69	78	942
PORTOLA HILLS	8	10	8	10	8	14	13	17	14	13	15	13	143
* Usage estimated new meter installed													

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2018						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	166	114	143	218	219	236	250	289	255	220	194	136	2,440
BACKWASH AC/FT	4	3	5	5	5	5	5	6	5	5	5	4	57
FLUSHWATER AC/FT	6	6	9	9	9	10	11	14	9	9	7	7	106
WTP EFFLUENT AC/FT	167	113	143	220	220	239	250	289	262	217	194	135	2,449
WELLS													
TRABUCO CREEK GWTF	0	0	0	0	0	0	0	0	0	0	0	0	0
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	9	28	0	0	0	29	60	44	33	6	6	0	215
IRWD AC/FT	12.1	44	0	0	0	0	0	0	0	6	19	12	93
TOTAL SUPPLY													
AC/FT	188	185	143	220	220	268	310	333	295	223	213	147	2,745
CFS DAILY AVERAGE	3.1	3.3	2.4	3.7	3.6	4.5	5.0	5.4	4.0	3.6	3.5	2.2	44
AC/FT PER DAY	6.1	6.6	4.6	7.3	7.1	8.9	10.0	10.7	9.8	7.2	7.1	4.4	90
OPERATIONS in GAL.													
WTP DOMESTIC	32,987	15,035	23,412	27,826	28,723	30,219	30,818	31,865	31,715	40,616	28,274	25,357	346,847
WWTP DOM	19,060	18,700	12,400	14,180	13,176	14,180	15,280	18,246	16,284	17,274	18,246	16,284	193,310
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0	0	21	30	30	32	33	4	0	0	0	151
LOSSES in GAL.													
FLUSHING (gal.)	0	0	0	0	0	0	0	0	0	0	0	0	0
SEWER CLEANING (gal.)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000
LINE BREAKS (gal.)	977,574	0	30,000	3,000	1,000	1,000	2000	5,000	1,000	815,000	0	0	1,835,574
SYSTEM DEMAND **													
CFS DAILY AVERAGE	3.0	3.2	2.5	3.7	3.7	4.4	5.0	5.3	4.1	3.5	3.4	2.1	3.66
AC/FT PER DAY	6.1	6.6	4.5	7.3	7.2	8.9	9.9	10.5	9.9	7.0	6.8	4.1	7.40
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.1	8.0	7.9	8.2	8.1	8.0	8.2	8.1	7.9	7.8	8.0	8.4	8
DAYS OF STORAGE	4	4	5	3	3	3	3	2	3	3	4	6	4
ZONES (AF)													
RIDGELINE PS	156	146	134	224	221	243	254	263	264	214	213	136	2,468
EL TORO P.S.	11	43	9	0	0	0	0	26	0	3	19	13	124
TOPANGA	2	2	1	2	2	3	3	3	3	3	4	2	30
FALCON	0.4	0.4	0.2	0.5	0.4	0.4	0.1	0.3	Inop.	Inop.	Inop.	0.1	3
ROSE PRV/ OAKS	4	6	6	5	4	4	6	5	4	4	2	3	53
CANYON CREEK	0.2	0.2	0.2	0.3	0.3	1.1	1.0	0.6	0.4	0.3	0.4	0.2	5
ROSE P.S.	0.5	0.8	1.2	0.7	0.7	0.5	0.8	0.9	1.3	1.4	1.3	1.5	12
ROBINSON RANCH	49	49	37	60	58	75	96	115	87	62	61	33	782
DOVE CANYON	68	57	52	92	101	106	119	105	85	78	46	50	959
PORTOLA HILLS	9	13	9	8	14	11	14	17	16	11	13	15	150
* Usage estimated new meter installed													

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2019						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	116	23	7	79	42	0	0	207	237	226	119		1,056
BACKWASH AC/FT	4	1	0.3	3	2	0	0	5	5	5	5	4	34
FLUSHWATER AC/FT	7	2	0.6	4	3	0	0	9	8	9	8	7	58
WTP EFFLUENT AC/FT	120	21	7	79	40	0	0	210	243	227	197	117	1,261
WELLS													
TRABUCO CREEK GWTF	0	51	84	93	96	92	70	35	0	0	0	0	521
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	0	0	0	0	12	86	98	1	0	1	0	0	198
IRWD AC/FT	0	0	0	0	0	0	64	3	3	0	0	0	70
TOTAL SUPPLY													
AC/FT	120	72	91	172	148	178	232	249	246	228	197	117	2,050
CFS DAILY AVERAGE	2.0	1.3	1.4	2.9	2.4	3.1	3.8	4.0	3.9	3.7	3.3	1.8	34
AC/FT PER DAY	3.9	2.6	2.9	5.7	4.8	5.9	7.5	8.0	7.9	7.4	6.6	3.7	67
OPERATIONS in GAL.													
WTP DOMESTIC	21,916	5,460	2,917	13,464	8,901	0	0	67,395	37,325	67,021	31,266	25,133	280,798
WWTP DOM	16,479	12,285	14,998	16,490	16,410	17,421	15,400	15,900	11,800	14,300	18,260	16,060	185,803
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0	0	0	0	0	0	0	0	0	0	0	0
LOSSES in GAL.													
FLUSHING (gal.)	0	0	0	0	0	0	70,000	50,000	60,000	0	60,000	0	240,000
SEWER CLEANING (gal.)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000
LINE BREAKS (gal.)	0	10,000	10,000	0	70,000	2,000	2000	0	50,000	1,000	1000	0	146,000
SYSTEM DEMAND **													
CFS DAILY AVERAGE	2.0	1.3	1.4	2.8	2.4	3.0	3.8	3.9	3.8	3.7	3.3	1.8	2.77
AC/FT PER DAY	3.9	2.6	2.9	5.6	4.8	5.8	7.3	8.0	7.9	7.4	6.6	3.7	5.54
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.9	9.0	8.8	8.9	8.8	8.7	8.6	8.5	8.6	8.5	8.3	8.9	9
DAYS OF STORAGE	4	4	4	4	4	4	4	4	4	4	4	4	4
ZONES (AF)													
RIDGELINE PS	99	6	1	62	28	0	0	216	241	216	88	0	957
EL TORO P.S.	21	15	7	17	12	0	64	0	0	11	109	117	373
TOPANGA	1	1	1	2	2	3	4	4	4	4	2	2	30
FALCON	0.2	0.1	0.2	0.5	0.3	0.8	0.6	0.6	0.6	0.6	0.4	0.1	5
ROSE PRV/ OAKS	2	1	2	2	2	2	2	4	5	5	4	3	34
CANYON CREEK	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.4	0.3	0.2	3
ROSE P.S.	1.5	1.0	0.5	0.7	0.7	1.1	0.4	0.2	0.1	0.2	0.2	0.2	7
ROBINSON RANCH	21	12	15	45	30	39	51	64	68	60	48	15	468
DOVE CANYON	147	34	47	73	71	80	92	97	88	83	73	43	928
PORTOLA HILLS	10	8	7	8	12	11	12	14	16	12	13	11	134
* Usage estimated new meter installed													

TABLE A-1
TCWD Water Production Reports for 2014-2020

							2020						
DIMENSION WTP	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**TOTAL**
SAC METER AC/FT	152	166		68	147	13	Offline	199	264				1,009
BACKWASH AC/FT	5	4	4.0	3	5	1	0	3	5	5	5	5	45
FLUSHWATER AC/FT	9	9	9.0	5	9	2	0	9	10	8	8	6	84
WTP EFFLUENT AC/FT	153	168	128	68	151	10	0	199	268	252	195	212	1,804
WELLS													
TRABUCO CREEK GWTF	0	0	0	68	81	58	59	25	0	0	0	0	291
US WELL AC/FT	0	0	0	0	0	0	0	0	0	0	0	0	0
AMP WATER													
SMWD AC/FT	0	0	0	0	0	36	10	4	0	0	0	0	50
IRWD AC/FT	0	0	0	0	0	111	122	24	0	0	0	0	257
TOTAL SUPPLY													
AC/FT	153	168	128	136	232	197	191	252	268	252	195	212	2,384
CFS DAILY AVERAGE	2.4	2.9	2.1	2.3	3.8	3.3	3.1	4.0	4.5	4.1	3.3	3.4	39
AC/FT PER DAY	4.9	5.8	4.1	4.5	7.5	6.6	6.2	8.1	8.9	8.1	6.5	6.8	78
OPERATIONS in GAL.													
WTP DOMESTIC	28,424	26,778	32,688	18,700	37,176	3,740	75	59,242	45,254	43,758	42,412	82,878	421,125
WWTP DOM	6,000	20,570	14,630	11,110	27,170	22,800	23,430	17,710	16,170	15,070	10,546	14,855	200,061
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0	0	0	0	0	0	0	0	0	0	0	0
LOSSES in GAL.													
FLUSHING (gal.)	144,000	468,000	0	0	0	0	384,000	198,000	210,000	186,000	355,200	0	1,945,200
SEWER CLEANING (gal.)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000
LINE BREAKS (gal.)	1,000	350,000	350,000	30,000	5,000	1,000	0	1,000	350,000	0	0	0	1,088,000
SYSTEM DEMAND **													
CFS DAILY AVERAGE	2.4	2.9	2.0	2.2	3.7	3.3	3.1	4.0	4.5	4.1	3.2	3.4	3.2
AC/FT PER DAY	4.9	5.7	4.1	4.5	7.4	6.6	6.2	8.1	9.0	8.1	6.4	6.8	6.5
RESERVOIR STORAGE													
MONTHLY AVG (MG)	8.8	8.6	8.8	8.9	8.6	8.8	8.5	8.2	8.8	8.7	8.8	8.7	9
DAYS OF STORAGE	4	3	4	4	3	4	3	3	4	4	4	4	4
ZONES (AF)													
RIDGELINE PS	Offline	Offline	Offline	Offline	20	10	122	199	252	237	174	170	1,184
EL TORO P.S.	153	168	128	68	131	111	122	24	0	0	0	0	905
TOPANGA	3	2	2	1	3	3	4	4	4	3	3	3	35
FALCON	0.5	0.6	0.2	0.2	0.7	0.7	0.8	0.8	0.8	0.6	0.5	0.4	7
ROSE PRV/ OAKS	3	3	3	5	6	6	7	7	6	6	Inop.	Inop.	52
CANYON CREEK	0.2	0.3	0.2	0.2	0.3	0.4	0.4	0.6	0.6	0.4	0.2	0.2	4
ROSE P.S.	0.2	0.1	1.5	0.3	1.5	0.8	0.8	1.4	0.9	0.8	0.9	0.4	10
ROBINSON RANCH	26	30	19	24	49	47	56	73	81	72			477
DOVE CANYON	60	63	51	39	87	91	97	99	90	90			767
PORTOLA HILLS	8	11	9	8	11	13	16	15	16	15			122

* Usage estimated new meter installed

TABLE A-1
TCWD Water Production Reports for 2014-2020

DIMENSION WTP	**AVG 2014-20**
SAC METER AC/FT	2,009
BACKWASH AC/FT	52
FLUSHWATER AC/FT	99
WTP EFFLUENT AC/FT	2,105
WELLS	
TRABUCO CREEK GWTF	145
US WELL AC/FT	0
AMP WATER	
SMWD AC/FT	154
IRWD AC/FT	78
TOTAL SUPPLY	
AC/FT	2,456
CFS DAILY AVERAGE	15
AC/FT PER DAY	31
OPERATIONS in GAL.	
WTP DOMESTIC	215,799
WWTP DOM	72,084
OPERATIONS (AF)	
SUPPLEMENT TO RW	76
LOSSES in GAL.	
FLUSHING (gal.)	41,667
SEWER CLEANING (gal.)	67,500
LINE BREAKS (gal.)	512,596
SYSTEM DEMAND **	
CFS DAILY AVERAGE	3.3
AC/FT PER DAY	6.6
RESERVOIR STORAGE	
MONTHLY AVG (MG)	8
DAYS OF STORAGE	4
ZONES (AF)	
RIDGELINE PS	2,000
EL TORO P.S.	228
TOPANGA	26
FALCON	6
ROSE PRV/ OAKS	77
CANYON CREEK	4
ROSE P.S.	10
ROBINSON RANCH	725
DOVE CANYON	885
PORTOLA HILLS	145
* Usage estimated new meter installed	

Potential New Develpoments (Previous Owner)

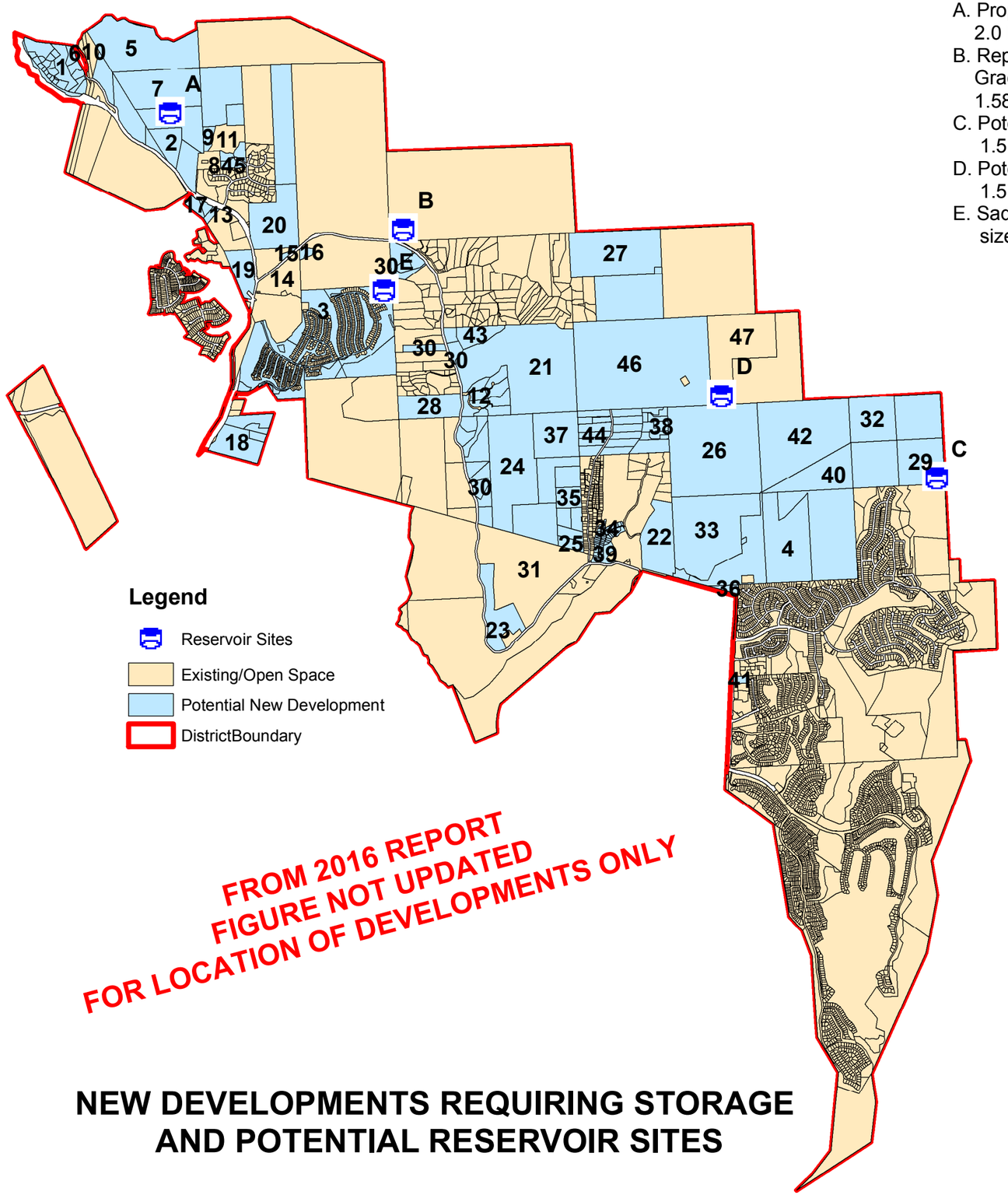
1. Zadeh
4. Nurseries
5. Varshney
6. Geraci/Joley (Randazzo)
7. Mills (Shimomura)
9. Matthews
12. Oaks at Trabuco
13. Ricahrdson (Haefele)
15. Live Oak-A (Ramirez)
16. Live Oak -B (Various Owners)
17. McCarthy (Serrano)
19. Shah (TIttle)
20. Rutter (Watson/Haskell)
21. Bach
22. Beardslee
23. Saddle Club LLC (Bishop of Orange)
24. Lin (Federal S & L Insurance Corp)
25. Felch
26. Various Owners (Ferber)
27. Their (Fossil Resources)
28. Politski (Greir)
29. Trabuco Canyon Water District (Porter)
30. Live Oak (Various Owners)
32. Laval (MItchell-East)
33. Laval (Mitchell-West)
34. Mountain View Road
35. Newell (Various Owners)
36. Wm. Lyon
37. Keeler (Racki)
38. Rose Canyon (Various Owners)
39. McKittrick (Schwendman-West)
40. McKittrick (Schwendman-East)
41. Wm. Lyon Plano
42. Trabuco PWT Corporation
43. Uysugi
44. Trabuco Ranches (Various Owners)
45. Baywood Development (Saddleback Canyon)
46. Various Owners (Ferber)

Developments Not Needing Storage

2. Saddle Crest : Storage on Site
3. Saddleback Meadow : Storage on Site
8. Vawser
10. County of Orange (Adams)
11. Reilly
14. Live Oak Ltd
18. StanPac-Sky Ridge
31. OC Transportation Authority (Lucarelli)
47. Joplin Boys' Ranch

Potential Reservoir Sites

A. Proposed Saddle Crest Reservoir :
2.0 MG, HWL ≈ 1508'
B. Replace Existing 0.42 MG Harris
Grade Reservoir with 2.0 MG Reservoir :
1.58 MG, HWL ≈ 1504'
C. Potential Porter Property Reservoirs :
1.5 to 4.0 MG, HWL ≈ 1508'
D. Potential Joplin Property Reservoirs :
1.5 to 4.0 MG, HWL ≈ 1508'
E. Saddleback Meadows Property Reservoir:
sized for development, HWL ≈ 1600'



NEW DEVELOPMENTS REQUIRING STORAGE AND POTENTIAL RESERVOIR SITES

PSOMAS

Figure 2-1

TANK SELECTION SUMMARY

	HARRIS GRADE-DISTRICT ONLY	HARRIS GRADE-DISTRICT AND DEVELOPER	HARRIS GRADE-DEVELOPER ONLY	PORTER RANCH	TRABUCO	DOVE
HGL (ft)	1504	1504	1504	1504	1686	1418
District Location	West	West	West	East	East	East
Current Capacity (MG)	2.27	2.27	2.27	None	4.09	2.37
Additional Capacity (MG)	1.7	2.7	1.25	2.25	3.6	2.25
Cost Estimate ($M)	4.5	7.9	Unknown	11.6	Unknown	Unknown
Additional Infrastructure	None	None	None	Access Road, Drainage &Inlet/Outlet Pipeline, Electrical	Grading, pump & pipeline upgrades	Grading, PRV, pump & pipeline upgrades
Environmental	NEPA	NEPA	NEPA	EIR or MND	EIR or MND	EIR or MND
Permitting/Easements	Requires Forest Service Lease Extension, Grading Esmt.	Requires Forest Service Lease Extension, Grading Esmt.	Requires Forest Service Lease Extension, Grading Esmt.	District owns property	Right-of Way: County	Right-of Way: Dove HOA
Pros	Replaces small 1965 tank with unmatched HGLs	Replaces small 1965 tank with unmatched HGLs; Less expensive option for emergency storage	Eliminates isolated zone for SBM	Increases East side storage	Increases East side storage	Increases East side storage
Cons	Increases West side storage imbalance	Increases West side storage imbalance	Eliminates less expensive option for emergency storage	More expensive option for emergency storage	Would have to eliminate smaller tank to make room. Most energy intensive	Dove HOA currently utilizes part of site

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ENGINEERING MATTERS
ITEM 3: DISCUSSION AND POSSIBLE ACTION(S) CONCERNING BELL CANYON SEWER LIFT STATION REHABILITATION PROJECT

Trabuco Canyon Water District (District) owns and operates the Bell Canyon Lift Station (Station) in the Dove Canyon community. The station was built in the late 1980's as part of the Dove Canyon Development and is located at the end of Bell Canyon Drive. The station lifts sewage from 130 homes via a 4" PVC force main, 4500 LF to a manhole at the intersection of Willowglade and Golf Ridge Dr., which then gravity flows to Golf Club Lift Station.

The station footprint is 30'x15' and includes a wet well with two sets of submersible pumps working in series, a dry pit/valve vault, electrical/MCC panel, a chlorine tank and a backup diesel generator. On September 2, 2019, a complete failure of the station occurred and required Wastewater Operations and Maintenance Staff to install an emergency bypass system to prevent a Sanitary Sewer Overflow (SSO). Two days later, operations were able to restore service to one set of pumps, removed the bypass system and installed a temporary pumping system to back up the operational pumps.

District staff, along with JIG Consultants, identified areas that required rehabilitation and replacement, and completed a bid package for this work in April 2020. At the May 20, 2020 Regular Board Meeting, the Board of Directors authorized the General Manager to execute a contract with Ferreira Construction for the Bell Canyon Lift Station Rehabilitation in the amount of $1,496,228, with a $75,000 contingency, for a not to exceed amount of $1,571,228. At the June 15, 2020 Regular Board Meeting, the Board of Directors authorized the General Manager to execute a contract with Butier Engineering, Inc. for Construction Management Services in the amount of $180,830.

The construction completion date is July 1, 2021. The following is the budget for the project:

ITEM	BELL CANYON LIFT STATION REHABILITATION PROJECT COSTS-UPDATED TASK DESCRIPTION	BUDGET
1	Construction – Ferreira Construction (Includes $75,000 Allowance for Field Orders and $75,000 Approved Contingency)	**$1,571,228**
	• *Fence Revision*	*$12,468.00*
	• *Wet Well Replacement*	*$52,952.93*
	• *By-Pass Valve on Surge Tank*	*$5,369.67*
	• *Odor Control During Construction*	*$11,341.97*
	Total:	*$82,132.57*
2	Geotechnical Site Investigation, Vibration Monitoring, Video Survey, Additional Boring - GMU Geotechnical	***$17,300.00**
3	Engineering Design/Services During Construction – JIG Consultants	**$117,625.00**
4	Construction Management/Inspection-Butier	**$180,830.00**
5	Design Site Survey/Construction Monitoring – DMc Engineering	***$8,280.00**
6	Easement Procurement - DMc Engineering/CPSI Right-of-Way Services	***$4,000.00**
7	Service/Meter Plan/Arc Flash Study - SCE	***$3,000.00**
	Total:	**$1,902,263.00**

FUNDING SOURCE:
Emergency Reserves

FISCAL IMPACT:
$1,903,000.00 (FY19-20 & FY20-21)

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ENVIRONMENTAL COMPLIANCE:
Notice of Exemption was filed with the County of Orange on June 16, 2020

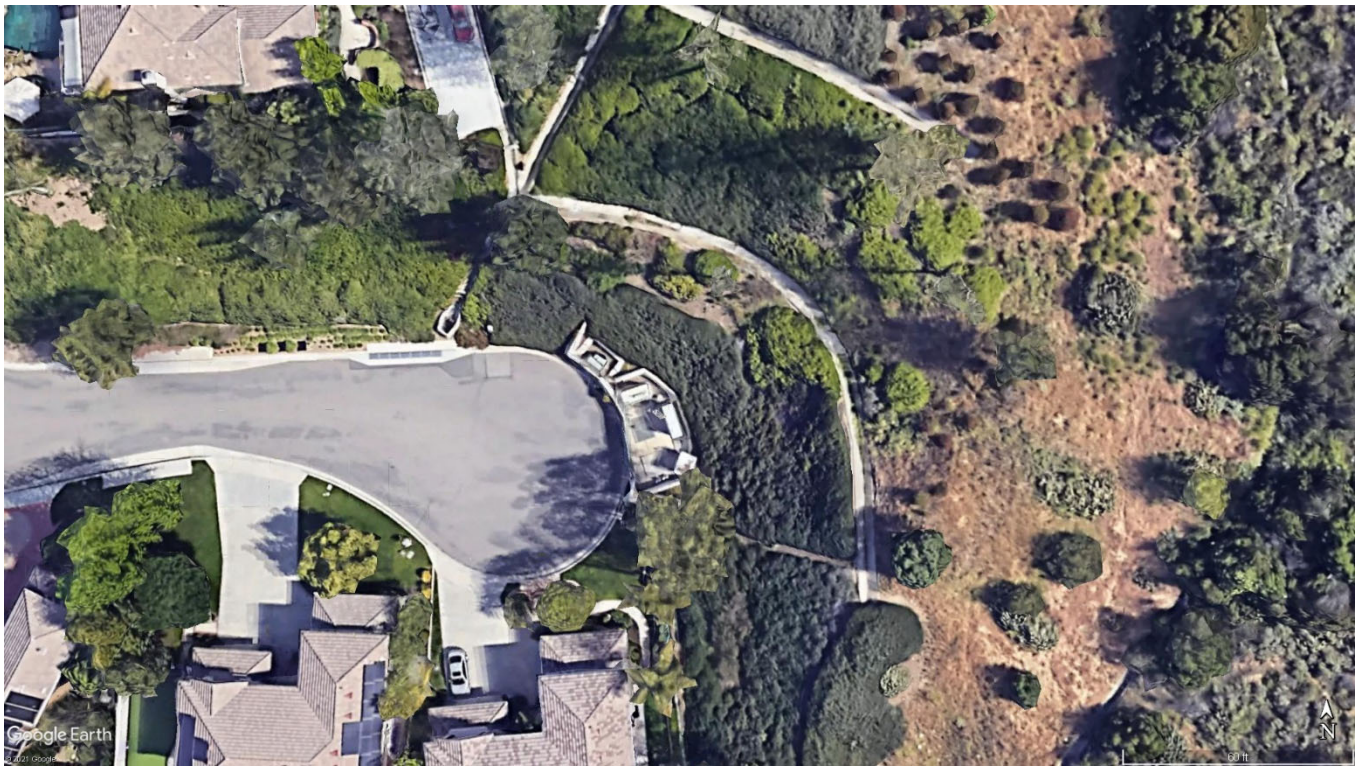
RECOMMENDED ACTION:
Committee to receive information at the time of the Committee Meeting.

EXHIBIT(S):
1. Construction Report-January-March 2021

CONTACTS (staff responsible): PALUDI/LAUSTEN

Bell Canyon Lift Station Rehabilitation Project
TCWD Project No. 1920-022

Construction Report
January – February – March 2021



I. GENERAL PROJECT INFORMATION

Contract	Bell Canyon Lift Station Rehabilitation Project
Contractor	FERREIRA Construction
Contract Time	
Original Calendar Days:	180 Calendar Days from Notice to Proceed
Notice of Award:	June 15, 2019
Notice to Proceed:	June 29, 2020
Original Contract Completion Date:	December 26, 2020
Allowed Calendar Days via Change Orders:	*187 Days (Pending)*
Revised Completion Date via Change Orders:	*July 1, 2021 (Pending)*
Weather-Related Delay Days:	5 Days
Contract Price	
Original Contract Amount:	$1,496,228.00
Approved Change Order Amount:	$0.00
Revised Contract Amount:	$1,496,228.00

II. CONSTRUCTION MANAGER SUMMARY

This report provides a summary of activities for the months of January, February, and March 2021 for the Ridgeline Booster Pump Station Project.

Within January 2021, FERREIRA Construction (FERREIRA) delivered and installed the Temporary Fencing enclosure to establish project limits, and to secure the project site. Soon as the Temporary Fencing enclosure was completed and through most of February 2021, the Project was on-hold until Southern California Edison (SCE) scheduled and performed their Switch-Over efforts from permanent power and to provide power for the Sewer By-Pass System. In the interim and prior to SCE's scheduled efforts, FERREIRA performed make-up work to support the Sewer By-Pass System by installing a "cut-in valve" consisting of fittings and spools into the existing 4-inch Sewer Force Main. This required TCWD-staff assistance for a temporary shut-down of the Lift Station, and operation of the Lift Station resumed upon completion of the "cut-in valve."

After SCE completed the Switch-Over efforts, FERREIRA's subcontractor, Rain-for-Rent, delivered and installed the Sewer By-Pass System consisted of pumps, smart levels, a temporary generator, and above-ground, HDPE pipelines. At this time, TCWD-staff turned over the operation and conveyance of existing sewer flows through the 4-inch Sewer Force Main, and FERREIRA was responsible for maintenance and operation of the Sewer By-Pass System.

Through the end of February 2021, FERREIRA continued to salvage items from the Bell Canyon Lift Station at the request and direction of TCWD-staff; and continued to demolish and remove the aboveground structures of the Lift Station. FERREIRA retained an Odor Control vendor to establish a dosing nitrate system at the manhole adjacent to the Bell Canyon Lift Station.

Starting in March, demolition of concrete pedestals and pavement of the Lift Station were performed. Soon after, FERREIRA started installation of the shoring system, consisting of steel I-beams and plates, to facilitate the excavation and placement of the concrete footings for the new Retaining and Block Walls. During demolition efforts, Vibration Monitoring Systems were placed at residences of 93 Bell Canyon and 95 Bell Canyon, and results generally reflect "no exceedances" where waveforms of the vibration to evaluate the type of vibrations occurring and determine the source, i.e. construction equipment use. DMC Engineering continues to perform periodic monitoring surveys for any movement to existing walls; and results will be provided after most construction activities are completed. GMU wase requested to perform and inspect the bottoms, or subgrade, of the new concrete footings. Upon acceptance of the bottoms, footings were formed with wood forms and steel reinforcement placed by the subcontractor, Granstrom Masonry (Granstrom). GMU inspected the forms and steel reinforcement bar placement, and upon acceptance, concrete was delivered and placed to complete the footings for the new Retaining and Block Walls. GMU observed concrete delivery and obtained concrete samples for future compression strength testing.

Through the end of March, Granstrom continued to install the new masonry block wall sections for the project. GMU observed and inspected the installation of the masonry stem wall, and upon acceptance, grout was delivered and placed to fill the masonry block wall cells. GMU observed grout delivery and obtained concrete samples for future compression strength testing.

III. CONSTRUCTION ACTIVITIES FOR THIS REPORTING PERIOD

The following work activities were performed during this reporting period:

- Install Temporary Fence Enclosure
- Install "cut-in valve" for Sewer By-Pass System
- Southern California Edison performed Switch Over Efforts
- Demolition, excavation, and shoring installation to accommodate improvements, i.e. Retaining and Block Walls
- Continue Vibration Monitoring and Monitoring Surveys
- Formed, place steel reinforcement bars, and pour concrete for Wall Footings
- Install Masonry Walls

IV. ANTICIPATED CONSTRUCTION ACTIVITIES – NEXT REPORTING PERIOD

The following work activities are anticipated to occur during the next reporting period:

- Waterproofing of Masonry Walls
- Backfill or Surcharge Masonry (Retaining) Wall
- Remove Shoring System
- Demolition and Removal of pre-existing, Wet Well
- Continue Vibration Monitoring and Monitoring Surveys
- Excavate and Install Vault and Replace Wet Well
- Install Underground Piping
- Trench for Electrical Conduits
- Install Level Transducer

V. CONTRACTOR SUBMITTALS

Through the end of the reporting period, the following submittals have been received:

	Lift Station
Prior Submittals	44
Submittals Received This Period	13
TOTAL SUBMITTALS	57

VI. CONTRACTOR REQUEST FOR INFORMATION (RFIs)

Through the end of the reporting period, the following RFIs have been received:

	Lift Station
Prior RFIs	11
RFIs Received This Period	12
TOTAL RFIs	23

VII. CHANGE ORDERS

No approved change orders were issued to FERREIRA during this reporting period. However, it is anticipated that a separate Change Order Request for the extension of the Contract Completion Date. This is due to the procurement and fabrication delays of materials, and the scheduled time for power Switch Over controlled by SCE. The new Contract Completion Date of July 1, 2021.

VIII. SCHEDULE

As currently scheduled the Completion Date for the Lift Station is July 1, 2021. See Appendix A.

IX. PHOTOS

Construction photos documenting the FERREIRA's activities and progress during this reporting period are provided in Appendix B.

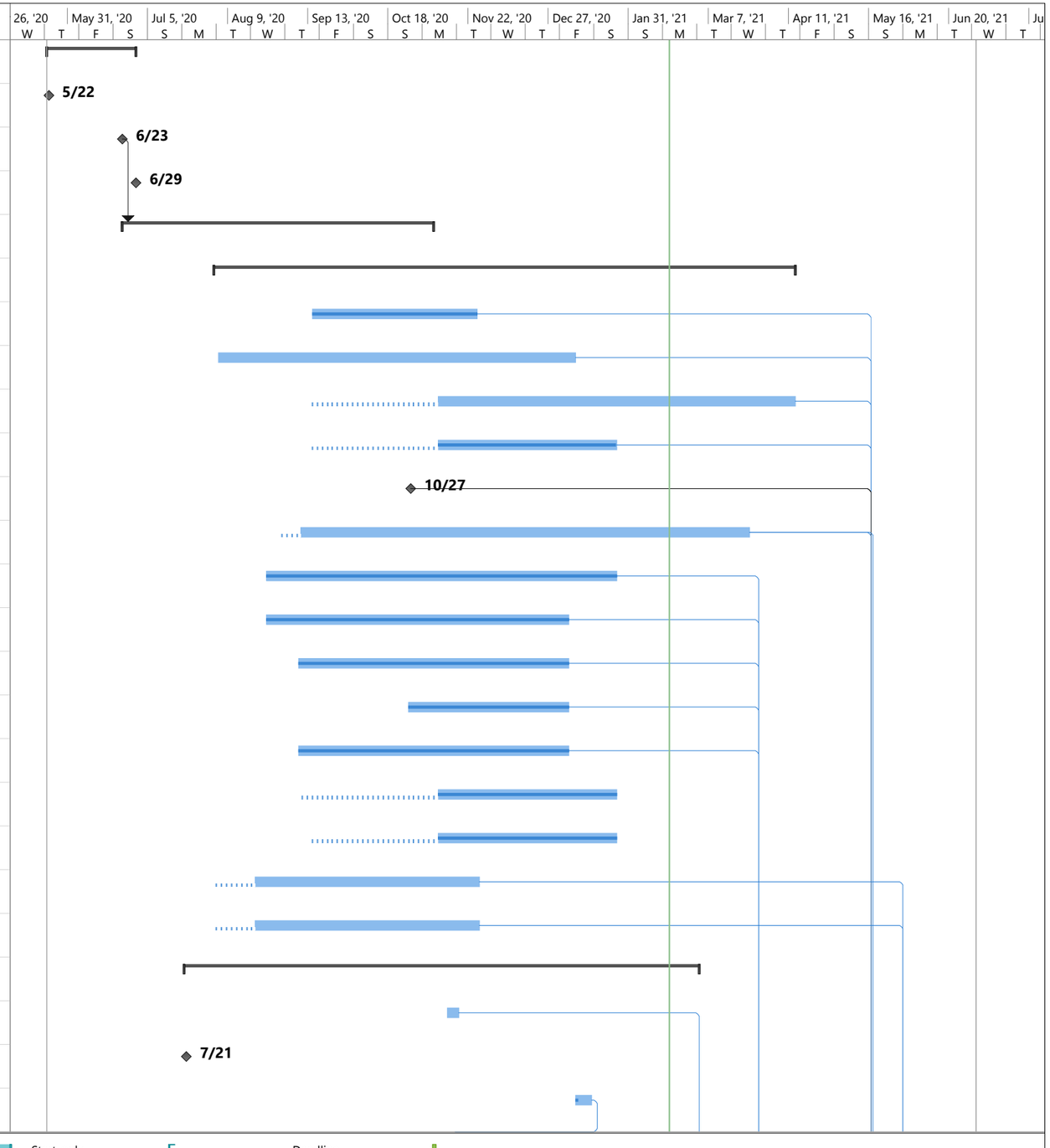
X. BELL CANYON MONITORING

Monitoring field surveys are being performed by DMC Engineering on a periodic basis through the duration of the Project. Initial Surveys was performed on February 26, 2021, and a follow-up Survey was performed on March 10, 2021. The results between these dated Surveys reflected a +0.01-foot and -0.01-foot on established points, and a Monitoring Survey Exhibit is provided in Appendix C.

APPENDIX A

Schedule

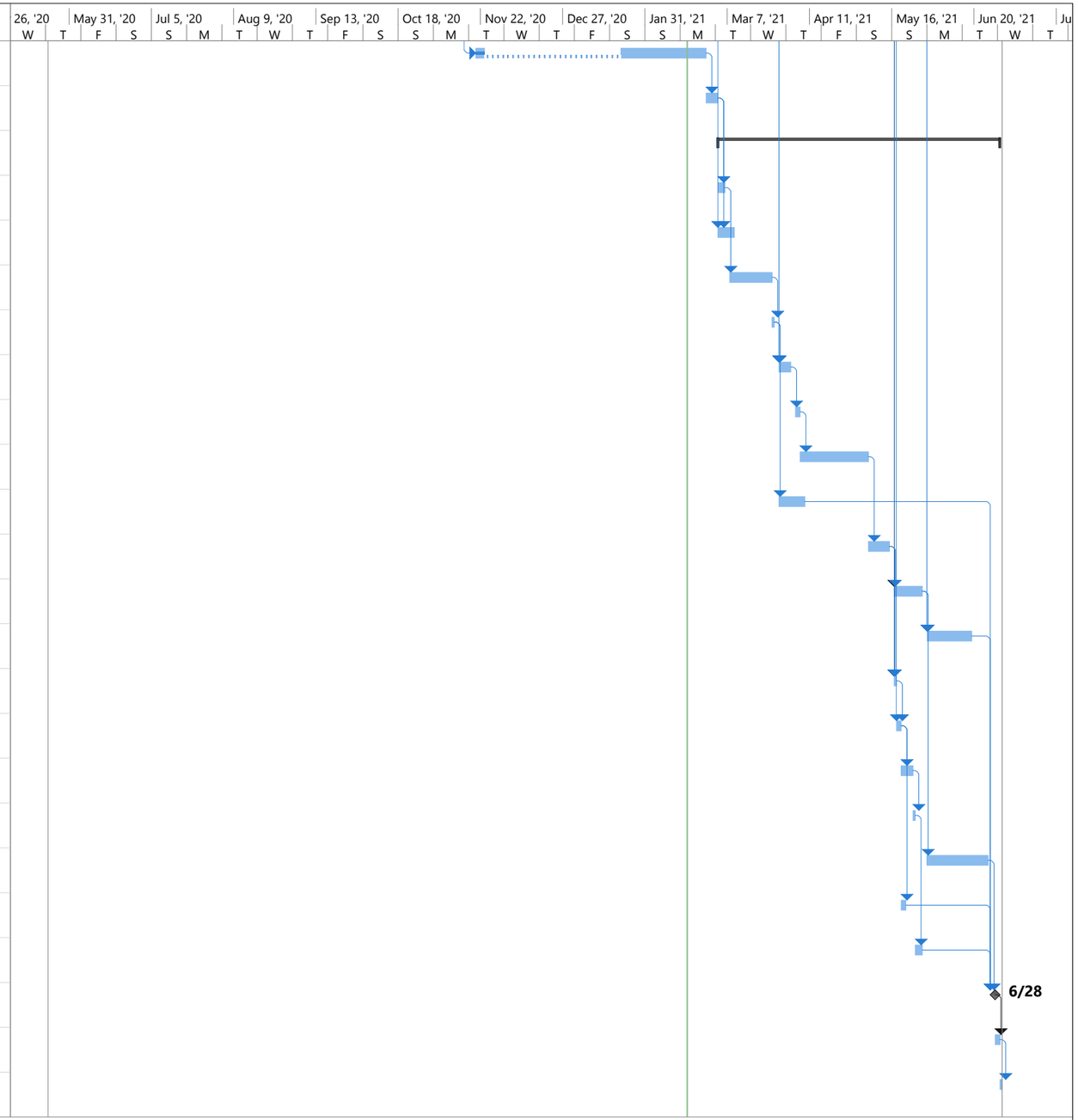
ID	Task Mode	Task Name	Duration	Start	Finish
1		**Project Setup**	**27 days**	**Fri 5/22/20**	**Mon 6/29/20**
2		Notice to Award	1 day	Fri 5/22/20	Fri 5/22/20
3		Pre-Construction Meeting	1 day	Tue 6/23/20	Tue 6/23/20
4		NTP	1 day	Mon 6/29/20	Mon 6/29/20
5		**Submittals**	**98 days**	**Wed 6/24/20**	**Fri 11/6/20**
69		**Material Procurement (Long Lead Items)**	**182 days**	**Mon 8/3/20**	**Tue 4/13/21**
70		Chemical Feed Unit	52 days	Tue 9/15/20	Wed 11/25/20
71		Bladder Surge Tank	112 days	Wed 8/5/20	Thu 1/7/21
72		Tesco Motor Control Center	112 days	Mon 9/14/20	Tue 4/13/21
73		Tesco Switch Board	56 days	Mon 9/14/20	Mon 1/25/21
74		ASCO ATS	0 days	Tue 9/1/20	Tue 10/27/20
75		CAT Generator	140 days	Tue 9/1/20	Wed 3/24/21
76		Sump Pump	109 days	Wed 8/26/20	Mon 1/25/21
77		Plug Valves	94 days	Wed 8/26/20	Mon 1/4/21
78		Check Valves	84 days	Wed 9/9/20	Mon 1/4/21
79		Sewer Air/Vac	50 days	Tue 10/27/20	Mon 1/4/21
80		Flow Meter	84 days	Wed 9/9/20	Mon 1/4/21
81		Sump Termination Panels	56 days	Wed 9/9/20	Mon 1/25/21
82		Instrumentation and Control	56 days	Mon 9/14/20	Mon 1/25/21
83		E-4 LED Wall Packs	70 days	Mon 8/3/20	Thu 11/26/20
84		Light Pole	70 days	Mon 8/3/20	Thu 11/26/20
85		**Project Start Up**	**161 days**	**Tue 7/21/20**	**Tue 3/2/21**
86		Call in USA	3 days	Fri 11/13/20	Tue 11/17/20
87		Assess Wet Well	1 day	Tue 7/21/20	Tue 7/21/20
88		TCWD Inspect and Release Panel/Temp Fence/TPP	5 days	Fri 1/8/21	Thu 1/14/21



Project: FCC5342 - TCWD Bell C
Date: Thu 2/18/21

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

ID	Task Mode	Task Name	Duration	Start	Finish
89		Power for Bypass Pumps	28 days	Fri 11/20/20	Thu 2/25/21
90		Setup Bypass	3 days	Fri 2/26/21	Tue 3/2/21
91		**Project Demo and Installation**	**86 days**	**Wed 3/3/21**	**Wed 6/30/21**
92		Surveying	3 days	Wed 3/3/21	Fri 3/5/21
93		Demo of Above Ground Structures, Gates, Wall	5 days	Wed 3/3/21	Tue 3/9/21
94		Shoring, Footings and Wall	14 days	Mon 3/8/21	Thu 3/25/21
95		Exc & Install Vault & Epoxy Well/Replace Wet Well	1 day	Fri 3/26/21	Fri 3/26/21
96		Install Piping	5 days	Mon 3/29/21	Fri 4/2/21
97		Trench for Electrical Conduits	2 days	Mon 4/5/21	Tue 4/6/21
98		Site Underground Conduit System	21 days	Wed 4/7/21	Wed 5/5/21
99		Level Transducer/Floats at Well, Cond. Inst at Vault	9 days	Mon 3/29/21	Thu 4/8/21
100		Form & Pour Concrete Slabs	7 days	Thu 5/6/21	Fri 5/14/21
101		Install MCC, Sump Term. Panel, Switchboard, ATS	10 days	Mon 5/17/21	Fri 5/28/21
102		Install Wiring and Lighting	15 days	Mon 5/31/21	Fri 6/18/21
103		Install Equipment and Tanks	1 day	Mon 5/17/21	Mon 5/17/21
104		Conduit Connection at Generator	2 days	Tue 5/18/21	Wed 5/19/21
105		Ornamental Fence	3 days	Thu 5/20/21	Mon 5/24/21
106		Asphalt Paving	1 day	Tue 5/25/21	Tue 5/25/21
107		SCE Metering/Cable Install for Power to Switchboard	20 days	Mon 5/31/21	Fri 6/25/21
108		Remove Bypass & Testing	2 days	Thu 5/20/21	Fri 5/21/21
109		Concrete Restoration	3 days	Wed 5/26/21	Fri 5/28/21
110		Substantial Completion	1 day	Mon 6/28/21	Mon 6/28/21
111		Punch List	2 days	Tue 6/29/21	Wed 6/30/21
112		Project Complete	1 day	Thu 7/1/21	Thu 7/1/21



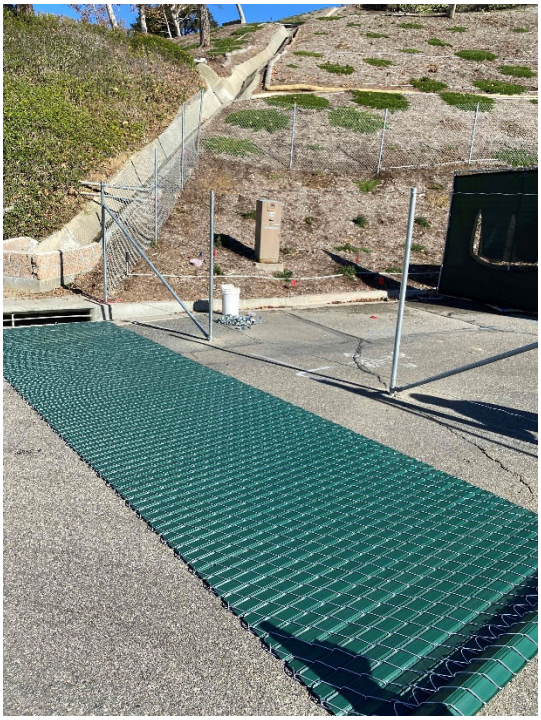
Project: FCC5342 - TCWD Bell C
Date: Thu 2/18/21

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

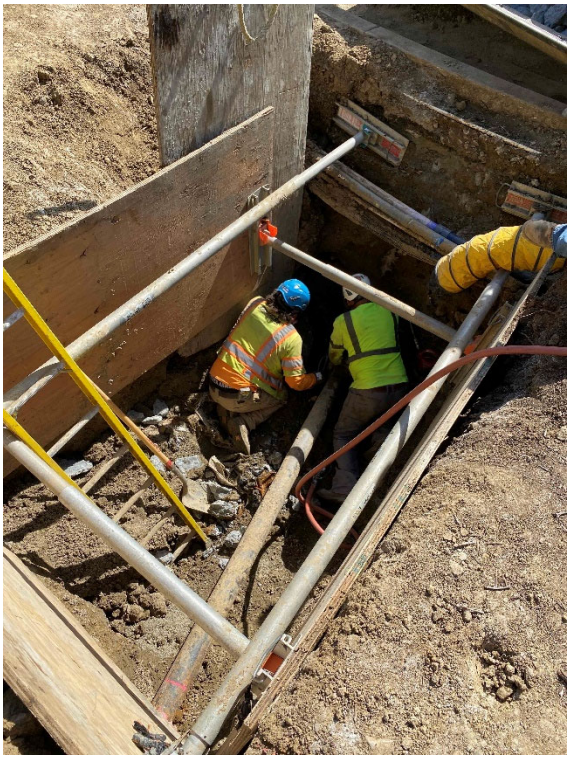
APPENDIX B

Construction Photos

Installing Temporary Fence Enclosure to protect Project



Temporary Fence Enclosure material



Exposed 4-inch Sewer Force Main for "Cut-In Valve"

"Cut-In Valve" system

Southern California Edison Switch Over Efforts

Temporary Panel (foreground) to support Switch Over

Rain-for-Rent delivered and installed Sewer By-Pass System

Rain-for-Rent delivered and installed Sewer By-Pass System

Nitrate Dosing Tote for Odor Control

Dosing Meter for Odor Control

Demolition Efforts of Lift Station

Typical Vibration Monitoring System placed between 95 Bell Canyon and 93 Bell Canyon Residences

Excavation for Shoring (Vertical) Beam-and-Plate

Shoring (Vertical) Beam-and-Plate

View of Shoring System

Making subgrade (or bottoms) of Wall Footings and Shoring Completed

Preparing subgrade and keyway of Footings

Placement of steel reinforcement bars and forms for Wall Footings

Concrete pour for Wall Footings

Concrete pour for Wall Footings

Delivery and installation of Masonry Block Wall

Continuing installation of Masonry Block Wall

Grout Placement in Masonry Block Walls

Completing Grout Placement of Masonry Block Walls

APPENDIX C

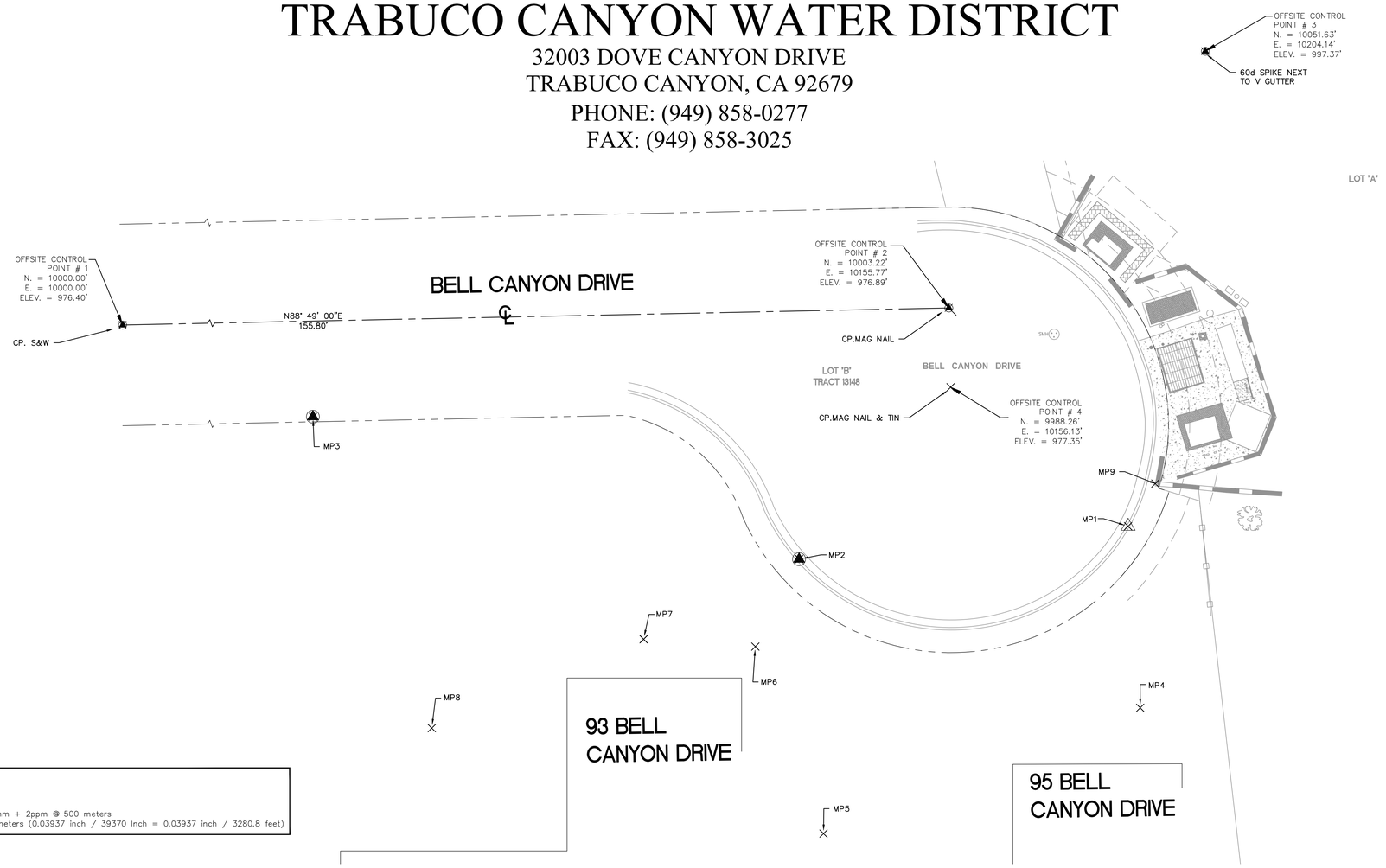
Monitoring Survey Exhibit

EXHIBIT "A"
BELL CANYON MONITORING POINTS

PREPARED FOR:

TRABUCO CANYON WATER DISTRICT

32003 DOVE CANYON DRIVE
TRABUCO CANYON, CA 92679
PHONE: (949) 858-0277
FAX: (949) 858-3025



SURVEY INSTRUMENT USED:

LEICA TCRP 1203T R400
SERIAL NO. 269046
ACCURACY – std. dev. ISO 17123–4: 2mm + 2ppm @ 500 meters
ppm = parts per million = mm/1000 meters (0.03937 inch / 39370 inch = 0.03937 inch / 3280.8 feet)

LEGEND

SYMBOLS

△	SCRIBED "X" IN TC
▲	FD "X" IN TC

LINE TYPES

— — — —	PROPERTY LINE
—— · ——	CENTERLINE

ABBREVIATIONS

N.	NORTHING
E.	EASTING
ELEV.	ELEVATION
DIFF.	DIFFERENCE
CN.	CONCRETE NAIL

5 0 5 10
SCALE IN FEET
1 inch = 10 ft.

MONITORING POINTS SUMMARY

POINT #	DESCRIPTION	INITIAL SURVEY DATE: 02.26.2021	SECOND SURVEY DATE: 03.10.2021	DIFF. +/-	THIRD SURVEY DATE: XX.XX.XXXX	DIFF. +/-	FORTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-	FIFTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-	SIXTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-	SEVENTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-	EIGHTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-	NINTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-	TENTH SURVEY DATE: XX.XX.XXXX	DIFF. +/-		
MP1	SCRIBED "X" IN TC	N. = 9962.05' E. = 10189.60' ELEV. = 977.27'	N. = 9962.05' E. = 10189.60' ELEV. = 977.28'	0.00 0.00 +0.01																		
MP2	FD "X" IN TC	N. = 9955.84' E. = 10127.56' ELEV. = 976.82'	N. = 9955.84' E. = 10127.57' ELEV. = 976.82'	0.00 +0.01 0.00																		
MP3	FD "X" IN TC	N. = 9982.69' E. = 10035.89' ELEV. = 975.74'	N. = 9982.70' E. = 10035.89' ELEV. = 975.74'	+0.01 0.00 0.00																		
MP4	CORNER OF PILASTER AT NE CORNER OF THE RESIDENCE OF 95 BELL CANYON DR.	N. = 9927.81' E. = 10191.89' ELEV. = 985.19'	N. = 9927.81' E. = 10191.88' ELEV. = 985.19'	0.00 −0.01 0.00																		
MP5	CORNER OF PILASTER AT NW CORNER OF THE RESIDENCE OF 95 BELL CANYON DR.	N. = 9904.09' E. = 10132.17' ELEV. = 985.92'	N. = 9904.09' E. = 10132.18' ELEV. = 985.92'	0.00 +0.01 0.00																		
MP6	STICK ON SURVEY TARGET (BY OTHERS) ON NLY BRICK WORK 93 BELL CANYON DR.	N. = 9939.36' E. = 10119.31' ELEV. = 985.08'	N. = 9939.35' E. = 10119.31' ELEV. = 985.08'	−0.01 0.00 0.00																		
MP7	TOP RIGHT CORNER OF EXTERIOR DOOR FRAME 1 IN SIDE OF RESIDENCE	N. = 9940.75' E. = 10098.25' ELEV. = 985.06'	N. = 9940.74' E. = 10098.25' ELEV. = 985.06'	−0.01 0.00 0.00																		
MP8	TOP RIGHT CORNER OF EXTERIOR WINDOW FRAME 1 IN SIDE OF RESIDENCE	N. = 9923.98' E. = 10058.30' ELEV. = 983.31'	N. = XXXX' E. = XXXX' ELEV. = XXXX'	XXX XXX XXX																		
MP9	SET MAG NAIL AT TOP WLY FACE OF PILASTER		**INITIAL SURVEY** N. = 9970.10' E. = 10194.72' ELEV. = 983.83'	XXX XXX XXX																		

PREPARED BY:

DMC ENGINEERING
CIVIL ■ SURVEYING ■ PLANNING ■ CONSTRUCTION
18 Technology Drive, Suite 100, Irvine, CA 92618
E-Mail: dmc@dmceng.com (949) 753-9393

03.16.21
03.15.21
03.01.21

JN: 728–45

Plotted: Mar 16, 2021 – 10:50am by: dmcpete Drawing Name: J:\JOBS\728-45 Bell Mt station\Drawings\BELL CANYON MONITORING POINTS EXHIBIT A.dwg

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ENGINEERING MATTERS

ITEM 4: DISCUSSION CONCERNING GOLF CLUB SEWER LIFT STATION REPAIRS & IMPROVEMENTS

Trabuco Canyon Water District (District) owns and operates the Golf Club Sewer Lift Station in the Dove Canyon community adjacent to the golf club driving range. This station receives wastewater flows from the majority of the community by way of Bell Canyon and Barneburg Sewer Lift Stations and gravity sewer flows, and then conveys the wastewater to the Robinson Ranch Wastewater Treatment Plant via a sewer force main on Hillrise. The station was constructed in the early 1990s and has undergone minor improvements since that time, but there are a series of critical repairs and improvements that Wastewater Operations and Maintenance Department (O/M) staff have identified for the station.

1. **Sewer Force Main Isolation Valve**
   On March 2, 2021, the District contracted with Ferreira Construction and Koppel for the installation of an in-line isolation valve on the force main to allow for O/M staff to work on the station without draining the entire sewer force main. On the evening of March 4, 2021, O/M staff coordinated for the replacement of certain plug valves and check valves in the Station Dry Pit with the assistance of a pumping truck contractor. The work by Ferreira Construction and Koppel totaled $18,898.25. Included with this report are photos of the work completed on both days.
2. **Station Bypass Valve Assembly**
   District staff currently plan to contract with Ferreira Construction for the installation of an onsite Bypass Valve Assembly that is typical for most sewer pump stations to allow for both emergency and long-term repairs and improvements.
3. **Dry Pit & Electrical System Improvements**
   O/M staff have identified the following equipment and appurtenances for repair and/or replacement in the station dry pit:
   - Surge Tank: The surge tank has been repaired and modified over the years, but currently, the surge tank is showing signs of wear and has reached end of its service life.
   - Isolation Valves & Piping: Much of the piping and pump isolation valves have not been replaced are showing signs of wear.
   - Electrical Improvements – Motor Control Center (MCC) Panel: Some of the components in the MCC Panel have been replaced due to failure, but there are many other system components that have reached the end of life. District staff has contracted with Hydrotech Electrical for much of this work to keep the station operating, but Hydrotech recommends an overhaul of the MCC Panel and many of the components due to low availability and technological advancement.
4. **Wet Well & Piping Improvements**
   O/M staff have maintained and serviced the wet well pumps, but there are certain items in the wet well which require repair and/or replacement, including, but not limited to, the pump guide rails, wet well coating, and wet well lid.

Due to the critical functions of this station as well as the impacts of the ongoing improvements at Bell Canyon Sewer Lift Station, District staff have adopted a slower approach to the repairs and improvements at this facility. This will allow O/M staff to complete the work without significant downtime and will take into consideration the current prolonged fulfillment timelines for replacement parts and equipment.

FUNDING SOURCE:
General Fund

FISCAL IMPACT:
TBD

ENVIRONMENTAL COMPLIANCE:
Notice of Exemption

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

RECOMMENDED ACTION:
Committee to receive information at time of the Committee Meeting.

EXHIBIT(S):
1. Project Photos

CONTACTS (staff responsible): PALUDI/PEREA/LAUSTEN

GOLF CLUB SEWER LIFT STATION REPAIRS & IMPROVEMENTS

Trabuco Canyon Water District
April 7, 2021 E&O Committee

Force Main Isolation Valve

Koppl Pipeline Services technician prepares for the installation of the in-line isolation valve

The in-line isolation valve is inserted into the sewer force main

Force Main Coupon

Note that there is no corrosion on the ductile iron pipe.

GCSLS PLUG/CHECK VALVE REPLACEMENT JOB
MARCH 4, 2021

O/M Staff performing Lock Out/Tag Out on station pumps

O/M Staff removing the failed plug valve.

Installation of new Plug Valve (Blue) in station dry pit.

Three pumper trucks collect wastewater flow upstream from the station.

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ENGINEERING MATTERS
ITEM 5: SADDLEBACK MEADOWS DEVELOPMENT (181 DUS)

The proposed Saddleback Meadows residential development (Development) is located on 222 acres of property within the unincorporated area of southeastern Orange County, California, in the Foothill-Trabuco area. The parcel is being planned and engineered for the California Quartet, LTD, ("CQ") by Hunsaker and Associates ("Hunsaker"). The proposed development has gone through several iterations and modification, and most recently, consisted of 181 detached single-family homes. A Sub-Area Master Plan ("SAMP") for this development was originally prepared by PSOMAS in May 2006. Hunsaker requested that the District prepare an updated SAMP for the Development. Staff has been working with PSOMAS on the updated SAMP and this report is included as Exhibit 1.

The total storage (operational, fire flow and emergency) required for the development is 820,000 gallons. Due to geological constraints, the proposed elevation of the storage is much lower than previous plan, which would create an isolated zone for the Development. The District has considered an alternative option of locating the required storage on an alternative District property, which is included in the updated Draft SAMP.

More information may be presented at the time of the meeting. Mike Swan of PSOMAS will be in attendance to present the findings of the SAMP.

FUNDING SOURCE:
By Developer

FISCAL IMPACT
By Developer

ENVIRONMENTAL COMPLIANCE:
All Environmental Compliance will be met by the Developer.

RECOMMENDED ACTION:
Committee to receive information at time of the Committee Meeting.

EXHIBIT(S):
1. Sub-Area Master Plan-DRAFT

CONTACTS (staff responsible): PALUDI/LAUSTEN

SADDLEBACK MEADOWS SUB AREA MASTER PLAN

April 2021

Prepared for:

TRABUCO CANYON WATER DISTRICT

32003 Dove Canyon Drive

Trabuco, CA 92679

Prepared by:

PSOMAS

5 Hutton Centre Drive, Suite 300

Santa Ana, CA 92707

Project No. 2TRA132500

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FIGURES

Appendices

1. Project Overview

1.1 General Description

The water and wastewater improvements detailed within this Sub-Area Master Plan (SAMP) are for the proposed residential development of Saddleback Meadows. A SAMP had previously been prepared for this project in 2006. The development area and number of homes have been reduced substantially since the previous SAMP. The current plan calls for 181 dwelling units and this SAMP is being prepared to determine what will be involved in providing water and sewer service to this proposed plan, assuming it goes through the planning approval process in fairly the same configuration.

Sewer service is relatively straight forward in that the landowner purchased capacity in the El Toro Road/Chiquita Wastewater collection and treatment system many years ago for a previous approved land use plan that contained substantially more dwelling units than is now proposed.

That previous plan had its own proposed potable water reservoir site in the northeast corner of the project at an elevation that was compatible with the District's Harris Grade hydraulic grade line and was sized to serve the much larger proposed demand based on the previous plan. Based on landslide analyses, that reservoir site, which was much higher in elevation than is now available on-site, is not feasible. Therefore, the District is considering available storage options for the project either on-site or off-site. And depending on where the storage is located the water delivery system will require a solution for reliability. The recommendations in this SAMP relative to water supply and storage should therefore be considered preliminary until these issues are resolved.

Improvements include the domestic water transmission and wastewater collection/conveyance facilities, which were developed and sized to be consistent with the current version of the appropriate District's Design Criteria, and the District's 1999 Water, Wastewater, and Reclaimed Water Master Plan (1999 Master Plan).

In addition, planning level capital cost estimates were prepared for the recommended off-site facilities. This SAMP will provide the groundwork for the subsequent detailed design of these facilities.

1.2 Proposed Development

The proposed Saddleback Meadows residential development (Project) is located on 222 acres of property within the unincorporated area of southeastern Orange County, California, in the Foothill-Trabuco area. The parcel is being planned and engineered for the California Quartet, LTD by Hunsaker and Associates. The parcel is situated on the east side of El Toro Road approximately 1,000 feet south of the Live Oak Canyon Road intersection. Aliso Creek runs north to south just outside the western property boundary.

As prepared by the developer, Tentative Tract Map No. 15230 dated November 27, 2019 was used for this analysis and is shown on Figure 1-1.

Primary access to the Project site will be along the proposed roadway of Spine Street that extends east from the existing El Toro Road and ends within a cul-de-sac at the easternmost edge of the development. Additionally, a 20' wide trail easement parallels the north side of Spine Street from El Toro Road to the beginning of a 400' wildlife corridor, for riding and hiking. The trail then runs northeast into the Viewport Spur Trail.

The Project is within the Foothill/Trabuco Specific Plan (FTSP) area, which was adopted by the County of Orange in 1991. The development contains 181 detached single-family on lots ranging in size from 4,000 to 13,810 square feet (sf), with an average lot size of 6,067 sf. A summary table prepared by Hunsaker and Associates provides the gross and net square footage of each of the 181 lots and is included in Appendix A.

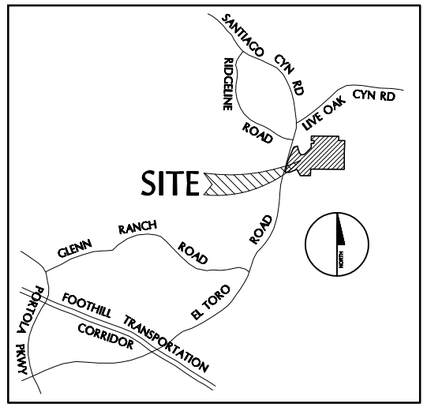
1.3 Urban Water Use Targets

The California Department of Water Resources requires urban water suppliers to prepare and adopt an Urban Water Management Plan (UWMP) every five years. UWMP's are designed to evaluate a retail water supplier's water demand and supplies in order to meet current and future growth within their respective service areas. Since 1999, there have been major legislative changes at the state level which impacts how water is allocated by water purveyors like TCWD. These water conservation-based legislative changes are included in TCWD's 2015 UWMP. It should be noted the District's 2020 UWMP is currently being updated.

The most significant piece of water conservation-based legislation to affect retail water suppliers is SBx 7-7, enacted in 2009. SBx 7-7 requires the development of urban water use targets to achieve a twenty percent reduction in per capita daily water use by December 31, 2020. TCWD's methodology for determining its water use target to comply with SBx 7-7 is detailed in the 2015 UWMP. The 2020 water use target for TCWD is 200 gallons per capita per day (gpcd). Actual 2015 water use equaled 204 gpcd, approaching the 2020 target and meeting the interim 2015 target of 233 gpcd.

Additionally, TCWD is a member of the Orange County 20 by 2020 Regional Alliance (Regional Alliance) which allows for flexibility in meeting the required per capita water use targets. If the Regional Alliance meets its water use target on a regional basis, then all member agencies are deemed compliant. If the Regional Alliance fails to meet its water use target, then each individual member will have an opportunity to meet their water use targets individually. The Orange County 20 by 2020 Regional Alliance 2015 target was 176 gpcd and the 2020 target is 158 gpcd. The actual 2015 water use in the region was 125 gpcd, already meeting the 2020 goal.

VICINITY MAP



LOT SUMMARY TABLE

LOT NUMBER	LAND USE	AREA
1 – 181	RESIDENTIAL LOTS	25.2 ACRES±
A – K	STREETS	10.5 ACRES±
L – V	OPEN SPACE	34.4 ACRES±
W – AA	OPEN SPACE/NATURAL	152.1 ACRES±

EL TORO ROAD
LIMITS OF GRADING
LOT V
SPINE STREET
LOT K
30' TRAIL EASEMENT
EXISTING POND H
EXISTING POND G
EXISTING POND D
FUEL MOD
PROPOSED TRAIL
LOT N
'J' COURT
LOT J
LOT C
'C' STREET
LOT P
LOT K
LOT E
'E' STREET
LOT Q
'F' STREET
LOT R
'H' STREET
LOT H
LOT S
'I' STREET
LOT I
LOT U
LOT X
LOT M
LOT L
'A' STREET
LOT A
LOT B
LOT O
'D' STREET
LOT D
LOT F
LOT G
'G' STREET
LOT T
LOT W
VALLEY VISTA WAY
MEADOW RIDGE DRIVE

2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230

SHEET 1 OF 1

F:\0007\Planning\GA_Project\TTM\TTM 181\TTM-15230.dwg

Figure 1-1

To meet water use targets, TCWD has implementation the following activities.

- Passive and active conservation activities
- Water conservation program permanent restrictions
- Use of additional recycled water

Water conservation activities include the demand management measures (DMMs) that TCWD implements as a signatory member of the California Water Efficiency Partnership (CWEP), formerly the California Urban Water Conservation Council (CUWCC). DMMs include the development of water conservation programs and the education of TCWD customers on the subject of wise water usage.

TCWD adopted its Water Conservation Ordinance, No. 2008-18 (Ordinance) in January 2009. The Ordinance identifies permanent mandatory water use efficiency measures which contribute to the realization of the 2015 UWMP target levels. The Ordinance and the Water Conservation Program Permanent Provisions can be accessed via the District website at www.tcwd.ca.gov.

TCWD has a long-standing practice of using recycled water, wherever possible, in order to offset the use of drinking water for irrigation purposes. TCWD will meet the reduction target levels through the continued use of recycled water in its service area, and any future developments where recycled water is available, and infrastructure can be installed. Unfortunately, the use of recycled water is not an option for the Saddleback Meadows development. Currently, there are no recycled water distribution facilities available in the area.

1.4 Model Water Efficient Landscape Ordinance

On July 15, 2015, the California Water Commission adopted a Model Water Efficient Landscape Ordinance (MWELO), which sets requirements for any new landscaping or landscaping renovation over 500 square feet. Since the Saddleback Meadows development is subject to this MWELO, the water use requirements for all landscaped areas within the project common areas have been calculated for consistency with the maximum allowable water use limits of this new ordinance. The ordinance also sets water use limits for residential landscapes, however, local agencies do not have the resources to monitor and enforce a homeowner's compliance with the ordinance and, as such, modifications and deferred maintenance by homeowners are common. Therefore, projected water use for residential landscapes has been estimated at what is believed to be more realistic values to account for properties which exceed the water use limits set by the MWELO. Specific requirements under the MWELO are as follows:

- The size threshold of landscapes subject to the ordinance is 500 square feet.

- The maximum applied water allowance (MAWA) is equal to 55% of the reference evapotranspiration (ETo) for residential landscape projects and 45% of ETo for non-residential projects.
- The minimum width of areas that can be overhead irrigations is 10 feet. Areas less than 10 feet in width must be irrigated with subsurface drip or other technology that produces no over spray or runoff.

2. Proposed Domestic Water System

Average-day, maximum-day, and peak-hour demands were estimated for domestic water and Homeowners Association (HOA) irrigation use inside Saddleback Meadows. The development pipelines were added to the District's existing hydraulic model using InfoWater software to analyze various operation and demand scenarios in order to size distribution system pipelines and facilities. The recommended water system facilities for Saddleback Meadows are shown on Figure 2-1A for on-site storage and Figure 2-1B for off-site storage and will be explained later in this section.

2.1 Water Use Factors

2.1.1 Average Day Demand

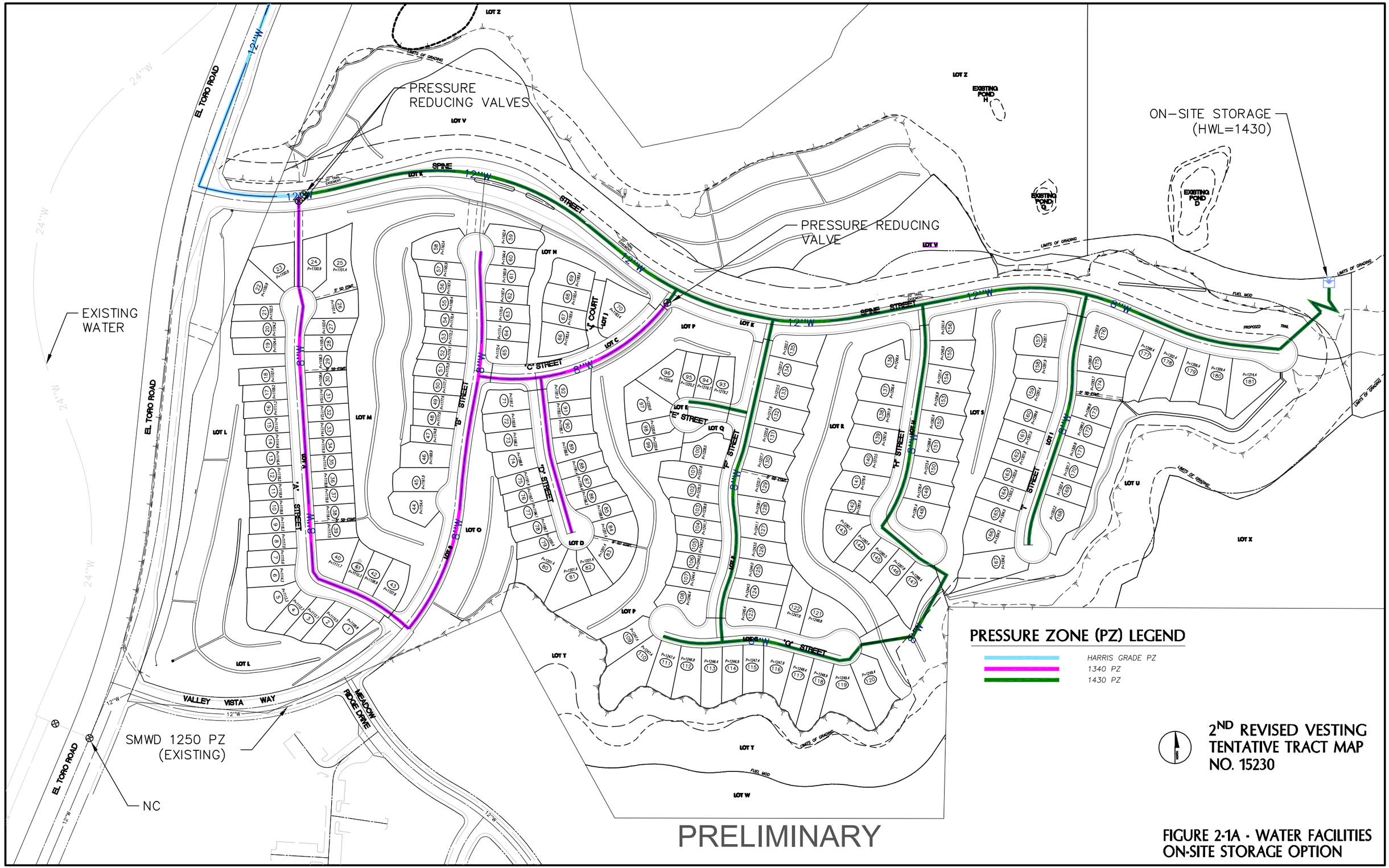
Land use information was provided by the developer's engineer, Hunsaker and Associates, in the form of a proposed land use plan for Tentative Tract Map (TTM) 15230 along with corresponding open space and residential lot square footages. The residential lot data is included in Appendix A and results in an average lot size of 6,067 square feet (sf), with a range of 4,000 to 13,810 sf. Open space areas that are to be irrigated were tabulated by Hunsaker and Associates and are also included in Appendix A. The total irrigated open space area for the project based on this data is equal to 1,414,300 square feet or 32.5 acres. Water demand calculations for the irrigated open space areas are straightforward to estimate as they are required to meet or be lower than the maximum applied water allowance (MAWA) per the State MWELO, which is 45% of the local reference evapotranspiration rate (ET_o). The MAWA will be used to be conservative and that calculation is shown in Table 2-1.

Table 2-1
Irrigation Demand Projections

MAWA Calculation	
Irrigated Area (sf)	1,414,296
ET_o for Irvine CIMIS Station (in)	49.6
MAWA % of Eto for Non-residential	45%
MAWA (gal/yr)(1)	19,571,600
MAWA (gpd)	53,621

(1) MAWA = (0.62) (ET_o) (0.45) (Area, sf)

To develop estimates of the residential project water use for the proposed development, two methodologies were utilized. These methods were applied to a slightly earlier version


PRESSURE REDUCING VALVES
PRESSURE REDUCING VALVE
ON-SITE STORAGE (HWL=1430)
EXISTING WATER
EL TORO ROAD
SPINE STREET
A STREET
B STREET
C STREET
D STREET
E STREET
F STREET
F COURT
G STREET
H STREET
I STREET
Q STREET
VALLEY VISTA WAY
MEADOW RIDGE DRIVE
LIMITS OF GRADING
FUEL MOD
PROPOSED TRAIL
EXISTING POND H
EXISTING POND G
EXISTING POND D
SMWD 1250 PZ (EXISTING)
NC
PRESSURE ZONE (PZ) LEGEND
HARRIS GRADE PZ
1340 PZ
1430 PZ
2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230
PRELIMINARY
FIGURE 2-1A - WATER FACILITIES ON-SITE STORAGE OPTION

PARALLEL PIPELINES IN EL TORO RD & SPINE STREET (FROM RIDGELINE BPS)

PRESSURE REDUCING VALVES

PARALLEL PIPELINES IN EL TORO RD & SPINE STREET (FROM RIDGELINE BPS)

PRESSURE REDUCING VALVE

EXISTING WATER

EL TORO ROAD

SPINE STREET

'A' STREET

'B' STREET

'C' STREET

'D' STREET

'E' STREET

'F' STREET

'G' STREET

'H' STREET

'I' COURT

LOT V

LOT Z

EXISTING POND H

EXISTING POND Q

EXISTING POND D

LOT L

LOT M

LOT N

LOT O

LOT P

LOT Q

LOT R

LOT S

LOT T

LOT U

LOT W

LOT X

LIMITS OF GRADING

FUEL MOD

PROPOSED TRAIL

VALLEY VISTA WAY

MEADOW RIDGE DRIVE

SMWD 1250 PZ (EXISTING)

NC

PRESSURE ZONE (PZ) LEGEND

- HARRIS GRADE PZ
- 1340 PZ
- 1430 PZ

2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230

PRELIMINARY

FIGURE 2-1B - WATER FACILITIES OFF-SITE STORAGE OPTION

of the TTM, however, the conclusions can still be applied to the latest version dated 11/27/19. First, an attempt to come up with similar sized lots in other areas of the District was undertaken. Assessor Parcel information on lot size was generated for various lots in Trabuco Highlands, Robinson Ranch and Dove Canyon. Addresses and square footages for lots in these areas were collected until a good sample size (195 residences) was generated with an average lot size similar to the average for the Saddleback Meadows lots. The addresses and square footages for these lots are shown in Appendix B with an average lot size of 6,467 sf, about 6% larger than the Project lots. Maps of these lots are also included in Appendix B. Water meter usage data for calendar years 2017 and 2018 was obtained from the District for the 195 similar lots with an average use of 347 and 358 gpd, respectively in 2017 and 2018, for a two-year average of 352 gpd.

As a check, a second water use methodology was utilized. This method involved generating a typical house footprint in terms of square footage based on home sizes along with typical assumptions for garages, driveways, and hardscapes. This generates a landscape area for each lot and then typical assumptions can be made for plant palettes that will, in turn, generate outside water demand. Adding a reasonable inside water demand per capita and a people per dwelling unit factor was used to generate a total water demand per residence, which was compared to the first method utilized. The previous TTM used for this analysis encompassed the same development area but included less homes, 166 total (versus 181 for the current TTM), on slightly larger lots averaging 6,487 sf. This analysis is detailed in Appendix B with the average outside irrigated area equal to 32% of the average lot area. This same assumption was used for the lots in the revised TTM, on a per lot basis. The resulting average landscape area for all 181 homes is calculated to equal 1,960 sf based on the average lot size of 6,067 sf.

To determine the average water use for irrigation it is assumed that half of each lot's landscape area is turf with a plant factor (PF) of 0.85 and an irrigation efficiency (IE) of 0.7 and the other half is various ground cover and/or shrubs with a PF of 0.4 and an IE of 0.8. The resulting estimated outside irrigation use is equal to 142 gpd/du. Subtracting this value from the average total water use from the meter reads on the similar lot sizes of 352 gpd results in 210 gpd for inside water use. Assuming an average occupancy of 3.3 people per dwelling unit generates an inside water use of 64 gallons per capita per day (gpcd). The State Department of Water Resources has set a goal of 55 gpcd for new home construction so the 352 gpd/du seems to be a reasonable and conservative value for estimating the total residential water demand for the development plan proposed for Saddleback Meadows (at 3.8 people per dwelling unit the use would be exactly 55 gpcd).

Based on the above, the estimated average day demand (ADD) for Saddleback Meadows is summarized in Table 2-2.

Table 2-2
Water Demand Projections

Land Use	ADD (gpd)	ADD (AFY)
Residential	63,712	71.4
Common Area Irrigation (HOA)	53,621	60.1
Total	**117,333**	**131.4**

Residential Use = 352 gpd/du x 181 du

2.1.2 Peak Water Demands

Maximum-day demand is defined as the largest demand day of the year. A Maximum-day demand (MDD) factor is the ratio of maximum-day demand to average-day demand. Based on an analysis of historical District daily water production and water storage, a MDD factor of 1.95 was calculated for domestic water demand and a factor of 2.2 was estimated for HOA irrigation demand in the 1999 Master Plan.

Peak hour demand is the largest hourly demand of the year. A peak-hour demand (PHD) factor is the ratio of peak-hour demand to maximum-day demand. Based on an evaluation of hourly water use in the Dove Canyon pressure zone, a peak-hour demand (PHD) factor of 2.47 was calculated for domestic water demand for the overall District water system in the 1999 Master Plan. Based on a review of irrigation practices in the District, it was estimated in the 1999 Master Plan that HOA irrigation demand typically occurs nightly between the hours of 7 p.m. and 7 a.m., which is a 12-hour irrigation period. Accordingly, a PHD factor of 2.0 was developed for HOA irrigation in the 1999 Master Plan. These MDD factors will be used in this Sub Area Master Plan. The average-day, maximum-day and peak-hour domestic water and HOA irrigation demands for Saddleback Meadows are shown in Table 2-3.

Table 2-3
Average Day, Maximum Day, and Peak Hour Demands

Land Use	Water Demand (GPD)		
	ADD	MDD[(1)]	PHD[(2)]
Residential	63,712	124,238	306,869
HOA Irrigation	53,621	117,966	235,932
Total	**117,333**	**242,204**	**542,800**

(1) Residential MDD = 1.95 x ADD and HOA MDD = 2.2 x ADD

(2) Residential PHD = 2.47 x MDD and HOA PHD = 2.0 x MDD

2.1.3 Fire Flow Demand

Based on information provided from David Oatis, the developer's consultant who obtained the information from the Orange County Fire Authority, the anticipated fire flow will be 1,125 gpm for a two-hour duration at a minimum residual pressure of 20 psi. This value is based on preliminary home sizes, construction types and sprinkler requirements. Final fire hydrant locations will be developed by the project civil engineer but are assumed to be at approximate 300-foot spacing. Following finalization of the storage and water delivery option, final fire flow analysis will be conducted using the existing and proposed facilities and final pipe sizing within the tract and off-site will be confirmed.

2.2 Source of Supply

The District's Dimension Water Treatment Plant (DWTP) provides water into the Cooks Reservoir pressure zone for further transmission to the rest of the distribution system. Three high service booster pumps at the DWTP have a combined capacity of 6 cfs and lift water from the clearwell directly into the Cooks Reservoir zone at a hydraulic grade line (HGL) of approximately 1,165 feet, equal to the maximum water level in Cooks Reservoir. Water is boosted from the Cooks Reservoir zone to the Harris Grade pressure zone (1,504' HGL) by the Ridgeline Booster Station. This zone is also connected to three other water systems and two water districts, IRWD (Lake Forest), IRWD (Santiago), and SMWD, through interties. The Ridgeline Booster Station, which was recently re-designed and improvements constructed, now has 3 pumps with a combined capacity of 6 cfs, matching the capacity of the DWTP booster pumps. The Saddleback Meadows project site will connect to the Harris Grade pressure zone served by the Ridgeline Booster Station. The project will therefore be responsible for its pro-rata share of the upgrades to the Ridgeline Booster Station that were recently constructed.

2.3 Water Storage Requirements

The total storage requirements for the project are determined based on the criteria from the 1999 Water Master Plan, which calls for 10 hours of maximum day demand for operational storage, five average days for emergency storage, and fire flow storage. The five average days for emergency storage would be equivalent to 7 days at a 29 percent reduction, which is what Metropolitan Water District considers reasonable (25 to 35 percent) based on water conservation during recent drought periods. Using these criteria and the demand analysis provided, the total storage requirement is as shown in Table 2-4.

Table 2-4
Storage Requirement

Storage Type	Volume (gal)
Operational[(1)]	100,918
Fire Flow[(2)]	135,000
Emergency[(3)]	586,664
Total	**822,582**

(1) 10 hours of Maximum Day Demand
(2) 1,125 gpm fire flow for 2 hours
(3) 5 days of Average Day Demand

The preliminary grading plan provided by the developer's engineer and dated July 11, 2019, showed a reservoir located on-site with a pad elevation of 1,420'. Based on discussions with the developer's representative and engineer, this is as high an elevation as can be reasonably provided based on geotechnical concerns due to potential landslides that would require extensive grading and remediation of the site and be extremely expensive. However, the findings in this SAMP are that the developer has two options. Option A would be to construct on-site storage at an elevation that could supply the upper zone by gravity and Option B would be to contribute to the construction of off-site storage along with a parallel pipeline from the Ridgeline Booster Pump Station to Spine Street and up Spine Street to "F" Street. Without on-site storage, the on- and off-site parallel pipelines are required to provide a second source of supply to the project for reliability/redundancy.

The most feasible alternatives available to the District for providing off-site storage, which the developer could contribute to would be the existing Harris Grade Reservoir site and the District's Porter Ranch property. The District has conducted feasibility studies on these alternative sites.

Hydraulic modeling was performed to determine off-site pipe sizes and verify sufficient water can be delivered to the site under each option.

The "existing" scenario that was preliminarily modeled assumed the following:

1. A 12-inch diameter line is constructed from the Ridgeline Booster Pump Station (RBPS) to the Saddleback Meadows entrance road to serve the development with the buildout demand placed on that location. The parallel system was not included in the model as it is needed for reliability in case one line is down for whatever reason.
2. An 18-inch pipeline is constructed from Cook's Corner along Live Oak Canyon Road to the location where the line branches off to the Harris Grade Reservoirs.

This line is needed to reduce head loss from the Ridgeline Booster Pump Station and from Saddle Crest Reservoir to Harris Grade Reservoir.

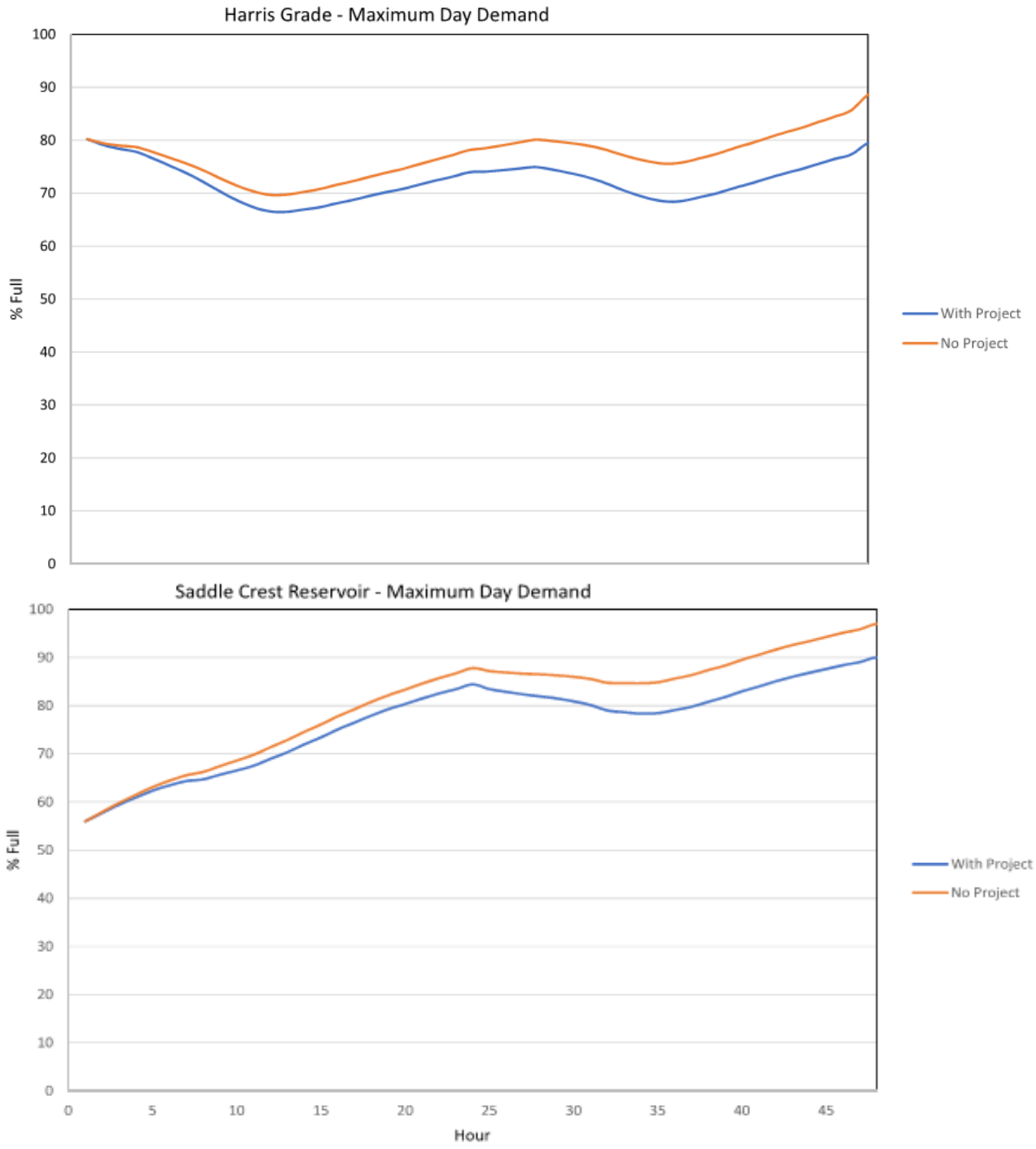
3. The Saddle Crest Reservoir is on-line along with the buildout demands for the Saddle Crest development.
4. The total District-wide average day demand (ADD) is 1,640 gpm or about 2.36 MGD (10 percent higher than average over past 7 years).
5. The District-wide maximum day demand (MDD) is 2,650 gpm or about 3.81 MGD.
6. All demands are served from the Dimension Water Treatment Plant or from the west (no Rose Canyon Well or SMWD supply), in order to be conservative (worst case).

The average day demand and maximum day demand loading in the hydraulic model were updated to reflect 2018 production data provided by the District and included in Appendix C. The ADD for 2018 equaled 2.36 MGD based on monthly production data. The MDD was estimated using daily production data for Dimension Water Treatment Plant (DWTP) and monthly data for supply from Santa Margarita Water District (SMWD). For the purpose of determining demand, it was assumed that SMWD supply was taken at a constant rate during each month. The maximum day in 2018 occurred in August with the estimated daily production equal to 3.81 MGD, close to the flow capacity from DWTP of 3.9 MGD. This MDD flow rate is assumed to be conservative as it is likely that more water was taken from SMWD during periods of no production from DWTP and less taken during high production from DWTP, rather than distributed equally each day as was assumed.

An extended period simulation was run using the District's hydraulic model and the above assumptions. Figure 2-2 shows percent full for both Harris Grade and Saddle Crest Reservoirs for a 48-hour period during assumed MDD conditions. It shows that the Harris Grade Reservoir levels remain virtually the same with the Saddleback Meadows development demands and gradually increase without the development. The Saddle Crest Reservoir levels increase both with and without the Saddleback Meadows demand added. The RBPS is set to come on and off based on the Harris Grade Reservoir levels and Saddle Crest Reservoir is allowed to fluctuate independently.

The modeled MDD can be sustained with supply from the DWTP both with and without the Saddleback Meadows demand. Additionally, the District could take water from SMWD if higher demand conditions were to occur, which would probably be called for even in the case without the proposed development and its demands.

Figure 2-3
Storage Analysis



2.4 Computer Modeling and System Layout

Water service to the Saddleback Meadows project can be extended from the existing water lines at the intersection of El Toro Road and Ridgeline Road that are boosted from

the Ridgeline Booster Station to the Harris Grade pressure zone. The Harris Grade Reservoirs have a high-water elevation of 1,504 feet. An approximate alignment for the proposed 12" pipeline from the hydraulic model is illustrated on Figure 2-3A, which assumes Option A, including on-site storage. If Option B, including off-site storage, is utilized parallel 12" pipelines would be constructed as shown on Figure 2-3B. As stated previously, improvements to the Ridgeline Booster Station were recently completed and were on-line prior to the Saddleback Meadows development coming online and are included in model simulations for the Project. Also, a new 18-inch transmission pipeline parallel to the existing 10- and 14-inch lines is proposed to be constructed from Cook's Corner along Live Oak Canyon Road to the location where the line branches off to the Harris Grade Reservoirs. This pipeline is assumed to be in place for Project simulations and would replace the existing 10-inch pipeline along that alignment.

The proposed onsite water facilities were added to the District's existing water system model, which uses InfoWater hydraulic modeling software. The proposed water system facilities are illustrated on Figure 2-1A (on-site storage) and Figure 2-1B (off-site storage). The proposed system meets the District's looping criteria which states that two water main connections are required for each street unless it is a dead-end street serving 25 or less normal-size residential lots. A pipeline easement will be required between the eastern end of "G" Street and the southern end of "H" Street to connect these two cul-de-sacs, in order to satisfy District looping criteria.

2.4.1 Pressure Zones

Pad elevations within the Saddleback Meadows development range from 1,100 to 1,314 feet above sea level. A proposed pipeline from the Ridgeline Booster Station to the project site along El Toro Road will serve the project from the Harris Grade Reservoir Pressure Zone with a HGL of 1504 feet (full reservoir). In order to provide adequate pressure to customers, a planning guideline of providing a minimum static pressure of 50 psi at the highest service elevation is typically used in the initial layout of the proposed system. This way, a minimum dynamic pressure of 40 psi can be maintained with the reservoir at a lower than full level and during peak hour demand conditions. Adequate flows and pressures must also be achieved under fire flow conditions. Additionally, the District wants to keep distribution pipeline pressures below 150 psi.

Pressure zone boundaries were set to achieve adequate pressures throughout the proposed development based on model simulations. Two pressure zones are recommended for the site based on the range of lot elevations. The higher pressure zone will serve the higher elevation lots on the easterly portion of the site starting at "F" Street to the cul-de-sac at the eastern end of Spine Street. The lower pressure zone will serve the remaining lots from El Toro Road and east to "C" Street. Both zones will be reduced off of the Harris

PSOMAS

Figure 2-3A
Project Transmission Pipeline
On-Site Reservoir Option

PSOMAS

Figure 2-3B
Project Transmission Pipeline
Off-Site Reservoir Option

Grade Pressure Zone using pressure reducing stations to limit excessive pressures, particularly when the Ridgeline Booster Station is operating. The upper zone is set to a HGL of 1430 feet and the lower zone is set to a HGL of 1340 feet. The recommended locations of the PRV stations and pressure zones are illustrated on Figure 2-1A and B.

2.4.2 Model Simulations and Results

Various operation and demand scenarios were analyzed with the model to size system pipelines and facilities such that performance meets all District criteria as outlined in the TCWD Design Criteria and Standard Drawings for Water and Sewer Facilities, June 2002. The proposed facilities were modeled using ADD, PHD, and MDD plus fire flow. Fire flows were preliminarily modeled at 1,500 gpm during maximum day demand conditions (higher and more conservative than the 1,125 gpm recently confirmed by OCFA). Sufficient service and fire pressures were modeled using each scenario. The model output and corresponding node diagram are included in Appendix D.

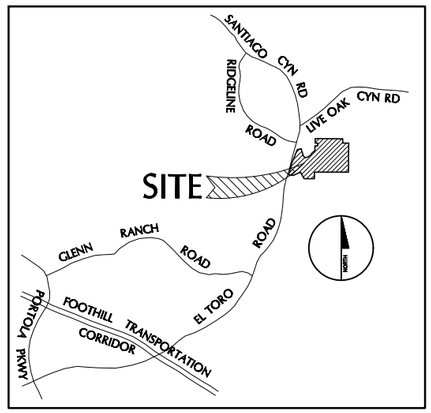
Fire flow demand occurring on the MDD typically controls distribution main sizing. Fire simulations were run at the highest locations in each pressure zone, at the eastern end of Spine Street in the 1430 zone and the southern end of "D" Street in the 1340 zone. Based on model results, a 12-inch distribution pipeline is recommended along Spine Street from El Toro Road to "I" Street with 8-inch distribution pipelines elsewhere within the tract.

Peak-hour demand for domestic water and HOA irrigation are simulated in the model using a diurnal curve with peak domestic demand occurring in the morning between the hours of 7:00 a.m. and 8:00 a.m. and HOA demand between the hours of 11:00 p.m. and 7:00 a.m., which is an 8-hour irrigation period. Therefore, the combined peak-hour demand for domestic water and HOA irrigation occurs at approximately 7:00 a.m. Model simulation results show sufficient pressure during peak hour demand, above 40 psi, and pipeline velocities less than 8 feet per second.

Per District and uniform plumbing code (UPC) criteria, pressure regulators are required on the customer's side of the meter where static pressures exceed 80 psi at the meter. Based on PRV settings, static pressures above 80 psi occur at the lots along "A" Street in the lower zone and along "E" and "F" Streets in the upper zone and a single lot on "H" Street. These lots (requiring individual pressure regulators) are highlighted on Figure 2-4.

Upstream of the pressure reducing stations, at the entrance to the project, there are pressures equal to approximately 190 psi, in excess of the maximum desired pressure of 150 psi. These would occur along the 12-inch transmission pipeline serving the project from Ridgeline Booster Station. It is recommended to use higher pressure class for this reach of transmission pipeline. It should be pointed out here again, that the water system layout is preliminary as with on-site storage, the pressure zone HGLs could be somewhat different.

VICINITY MAP



LOT SUMMARY TABLE

LOT NUMBER	LAND USE	AREA
1 – 181	RESIDENTIAL LOTS	25.2 ACRES±
A – K	STREETS	10.5 ACRES±
L – V	OPEN SPACE	34.4 ACRES±
W – AA	OPEN SPACE/NATURAL	152.1 ACRES±

Highlighted lots require individual pressure regulators per District criteria.

NORTH

2ND REVISED VESTING TENTATIVE TRACT MAP NO. 15230

SHEET 1 OF 1

F:\0007\Planning\GA_Project\TTM\TTM 181\TTM-15230.dwg

Figure 2-4

3. Wastewater System

3.1 Regional Collection, Treatment and Disposal Facilities

Wastewater generated from Saddleback Meadows will be conveyed into the District's existing El Toro Road Collection Zone. This collection zone receives wastewater from the District SMWD, and IRWD. Wastewater collected in this zone is conveyed through the El Toro Road Collection System, which consists of a 15-inch trunk sewer in El Toro Road, the El Toro Road Sewage Lift Station, and dual force mains in Santa Margarita Parkway, to the SMWD wastewater system.

The District owns 1.78 mgd capacity in the El Toro Road System and 0.428 mgd in the SMWD Chiquita sewage system, which includes collection, treatment at the Chiquita Water Reclamation Plant, and ultimate disposal of treated effluent via the Chiquita Land Outfall and the Serra Ocean Outfall. The total capacity of the El Toro Road system is 1.96 mgd. However, capacity in the SMWD system is currently limited to 1.15 mgd.

3.2 Wastewater Flow Factors

Since all the land uses within the proposed projects are similar residential uses, the only flow factor to be concerned with is the inside water use within the homes that is discharged to the sewer system. Average dry weather wastewater flow (ADWF) in the District was determined to be 270 gpd/du in the 1999 Master Plan, based on calibration of the sewer model. The housing density for Saddleback Meadows is approximately 5 dwelling units per acre after subtracting out the open space within the development boundaries. Based on indoor water use factors from IRWD for this housing density, a wastewater generation of 200 to 225 gpd/du is appropriate. The demand analysis presented in Section 2.1 estimated an indoor use for the Project equal to 210 gpd/du, within this expected range. Also discussed in Section 2.1, the State Department of Water Resources has set a goal of 55 gpcd for indoor water use for new home construction. With an estimated 3.3 persons per du, the indoor use would equal 64 gpcd, making 210 gpd/du conservative when compared to State standards. Applying the more conservative Master Plan factor 270 gpd/du to the 181 dwelling units, results in an average flow of 48,870 gpd or 0.05 mgd. The District owns sewer rights of up to 200,000 gpd of average flow for the benefit of the project.

Peak dry-weather wastewater flows (PDWF) were derived from the formula PDWF = 1.84 x $(ADWF)^{0.92}$, where flow is in cubic feet per second (cfs). The formula, which was originally developed by Los Angeles County Sanitation District, was assessed to be valid in the 1999 Master Plan by comparing the measured peak factors at three District lift stations with the calculated peak flows using this formula. The resulting peak flow for the Project equals 110,550 gpd or 0.11 mgd. The resulting average flow to peak flow factor equals 2.26.

3.3 System Layout

The minimum pipe size for gravity sewers per the District's standards is 8-inches in diameter and the Saddleback Meadows development is not large enough to warrant anything bigger than this. Using the District minimum slope criteria of 0.4 percent, the maximum depth to diameter ratio (d/D) equals 0.32 for the Project peak flow of 0.11 mgd. The District standard for maximum d/D ratio for 8-inch pipeline is equal to 0.50. Therefore, all gravity sewer pipelines constructed for the project site will be 8-inch, except for private lateral sewers.

The proposed sewer system layout is shown in Figure 3-1. The system will collect to Spine Street and cross El Toro Road to connect with the existing 15-inch TCWD trunk sewer just to the west of El Toro Road. The sewer should be designed to meet District criteria; 7 feet minimum depth of cover from finished grade to the top of sewer and manhole spacing not to exceed the maximum of 400 linear feet for 8-inch sewer. The sewers will be constructed of PVC pipe per District criteria, with special requirements for the El Toro Road sewer crossing and any deep sewers.

Figure 3-1 - Sewer Facilities

4. Project Costs

The engineer for the developer will be responsible for preparing a cost estimate for all onsite water and wastewater facilities that are to be constructed to serve the project. The developer will be responsible for a pro-rata share of the cost to upgrade the Ridgeline Booster Station and pipeline upgrades between Ridgeline and Harris Grade Reservoirs. The costs will be determined by the District prior to issuance of a will serve letter.

The developer will also be responsible for the construction of either on-site storage (Option A) or a contribution toward off-site storage (Option B) for their project's water demands and the ancillary water facilities that accompany either option, as shown on Figure 2-1A or 2-1B and Figure 2-3A or 2-3B. The developer's contribution toward off-site storage is under discussion and will likely be based on construction cost estimates from recent studies conducted by the District for different sized storage reservoirs at either the Harris Grade site or the Porter Ranch site.

The total project water use from Table 2-2 is equal to 117,333 gpd. Dividing by the 181 dwelling units results in an average total development water use of 648 gpd/du. The total water demand of 117,333 gpd divided by the District average equivalent dwelling unit (edu) demand of 459 gpd/edu yields approximately 256 edus for the entire development or 2.54 edu/du.

Water capital improvement charges for up to 715 edus were previously purchased for Tract 15239 (formerly Tract 10692) by a prior owner through an agreement with the District dated September 21, 1988 and have been reserved by the District for this development. This agreement was for Tract 10692, which included 705 dwelling units and 1.7 acres of commercial land. This tract was also included in the original 6 cubic feet per second of water supply capacity from 1988 Water Allocation Report. Therefore, no water capital improvement charges or supplemental water capacity fees are due for this project.

For sewer service, the landowner purchased capacity in the El Toro Road/Santa Margarita Water District Chiquita Wastewater collection and treatment system many years ago for a previous approved land use plan that contained substantially more dwelling units than is now proposed. Therefore, no sewer capacity charges are due for this project.

The planning-level estimated costs for the recommended off-site water and sewer facilities are shown in Table 4-1 and 4-2, respectively. The estimated construction cost includes a 20% contingency. The capital project cost was developed by applying 25% to the construction cost to account for technical, legal, and administrative costs and including permitting costs.

Table 4-1
Off-site Water Facilities Cost[(d)]

Description	Units	Unit Cost	Cost
Storage [(a)]	822,582 gal	TBD	TBD
Ridgeline Pump Station [(b)]	LS	-	$166,500
12” Transmission Pipeline in El Toro Road	3,200 LF	$150/LF	$480,000
12" Butterfly Valve	5	$3,300 EA	$16,500
18” Transmission Pipeline [(c)]	4,500 LF	6% of $300/LF	$81,000
18” Butterfly Valve [(c)]	5	$6,000	$30,000
Subtotal	-	-	TBD
20% Contingency	-		TBD
Construction Cost	-	-	TBD
25% Technical, Legal & Administration	-	-	TBD
Capital Project Cost	-	-	TBD

(a) Storage solution is pending.

(b) Pro-rata participation in District costs for 6 cfs Ridgeline Booster Station based on Project MDD = 0.37 cfs. District paying 100% of 2 cfs capacity ($0.27 million) and sharing the cost with another developer for the remaining 4 cfs capacity ($1.26 million District portion). Saddleback Meadows cost = 0.37/2 x $0.27 million + 0.37/4 x $1.26 million.

(c) Pro-rata participation in water transmission line from Cook's Corner to Harris Grade Reservoir. Project MDD = 0.37 cfs, Capacity = 6.0 cfs; Therefore, pro rata share = 6.0%

d) All pro-rata participation and cost estimates should be considered preliminary and subject to change.

Table 4-2
Off-site Sewer Facilities Cost

Description	Units	Unit Cost	Cost
Mobilization	LS		$60,000
8” Sewer [a]	130 LF	$325/LF	$42,250
8" Sewer [b]	150 LF	$150/LF	$22,500
Standard Manholes	2	$5,500/EA	$11,000
Connect to Existing Sewer	LS		$30,000
Subtotal	-		$165,750
20% Contingency	-		$33,150
Construction Cost	-		$198,900
25% Technical, Legal & Administration	-		$49,725
Capital Project Cost	-		$248,625

(a) Jack and bore 8" pipe in steel casing across El Toro Road.
(a) Down slope to connect to existing trunk sewer in trail.
(b) All cost estimates should be considered preliminary and subject to change. While these are titled off-site sewer facilities they are assumed to be constructed as part of subdivision improvements by developer.

APPENDIX A

Saddleback Meadows TTM Lot Statistics

LOT SUMMARY TABLE

Lot No.	Gross SQ.FT.	Net SQ.FT.	Lot No.	Gross SQ.FT.	Net SQ.FT.	Lot No.	Gross SQ.FT.	Net SQ.FT.	Lot No.	Gross SQ.FT.	Net SQ.FT.
1	5,708	5,308	47	4,120	4,120	93	5,119	4,884	139	6,597	5,713
2	4,978	4,721	48	4,113	3,913	94	4,268	4,268	140	6,851	5,925
3	4,941	4,941	49	4,378	4,378	95	4,394	4,394	141	6,007	5,769
4	4,990	4,990	50	4,654	4,654	96	8,241	8,241	142	5,524	5,523
5	9,731	9,731	51	4,816	4,570	97	8,110	8,110	143	8,673	8,410
6	5,523	5,286	52	4,457	4,219	98	4,366	4,366	144	5,676	5,461
7	4,745	4,504	53	4,156	3,939	99	5,262	4,699	145	5,269	5,052
8	4,660	4,430	54	4,125	3,916	100	7,175	6,095	146	5,362	5,362
9	4,462	4,462	55	4,167	3,958	101	6,436	5,640	147	9,545	9,545
10	4,314	4,355	56	4,346	4,346	102	6,196	5,610	148	7,661	6,692
11	4,278	4,278	57	4,606	4,379	103	5,074	4,779	149	5,442	5,211
12	4,274	4,274	58	7,624	7,387	104	4,942	4,500	150	6,054	5,511
13	4,308	4,077	59	6,624	6,411	105	4,311	4,311	151	5,822	5,275
14	4,319	4,100	60	4,623	4,405	106	4,266	4,266	152	6,024	5,261
15	4,313	4,094	61	4,899	4,688	107	4,851	4,308	153	5,950	5,291
16	4,284	4,066	62	4,621	4,421	108	7,502	7,502	154	5,977	5,317
17	4,287	4,069	63	4,720	4,720	109	6,966	6,966	155	6,870	6,207
18	4,531	4,302	64	4,658	4,658	110	13,810	13,810	156	7,167	5,563
19	5,064	5,064	65	5,577	4,810	111	6,950	6,950	157	8,669	6,768
20	5,247	5,118	66	7,332	7,332	112	7,622	7,622	158	5,962	4,860
21	4,692	4,437	67	4,883	4,883	113	7,142	7,142	159	6,799	6,372
22	8,103	7,521	68	5,528	5,528	114	6,465	6,465	160	5,332	5,117
23	8,772	8,772	69	5,984	5,984	115	5,804	5,804	161	5,253	5,253
24	6,977	6,977	70	10,043	7,734	116	7,122	7,122	162	5,275	5,275
25	10,874	10,355	71	5,682	4,837	117	7,412	7,412	163	5,301	5,301
26	5,985	5,760	72	5,453	4,668	118	8,415	8,415	164	5,530	5,530
27	4,601	4,372	73	5,328	4,551	119	11,213	11,213	165	5,720	5,720
28	4,357	4,357	74	5,820	5,024	120	10,069	10,069	166	8,230	8,230
29	4,846	4,346	75	4,140	3,930	121	10,750	10,750	167	11,049	11,049
30	4,000	3,600	76	4,110	3,899	122	8,136	8,136	168	8,771	8,771
31	4,000	3,800	77	4,189	3,974	123	7,597	7,232	169	5,088	4,882
32	4,000	3,800	78	4,186	3,983	124	6,514	6,082	170	5,000	4,800
33	4,000	3,800	79	4,195	4,195	125	6,437	5,954	171	5,000	4,800
34	4,000	3,800	80	9,386	9,386	126	5,796	5,762	172	5,000	4,800
35	4,000	3,800	81	9,052	9,052	127	5,429	5,209	173	6,175	5,972
36	4,000	4,000	82	5,263	5,263	128	5,577	5,352	174	6,765	5,249
37	4,200	4,200	83	7,810	7,279	129	6,549	5,991	175	7,299	5,281
38	4,300	3,600	84	6,199	6,199	130	6,307	5,403	176	10,672	6,445
39	4,021	4,021	85	4,556	4,556	131	6,451	5,753	177	8,864	7,532
40	8,015	7,319	86	5,212	4,835	132	6,749	6,017	178	9,070	7,871
41	4,436	4,209	87	4,764	4,417	133	6,710	5,945	179	7,909	7,055
42	4,573	4,370	88	4,492	4,176	134	6,598	5,802	180	7,749	6,966
43	6,410	6,201	89	5,856	5,095	135	7,404	5,844	181	10,981	10,981
44	7,727	6,146	90	4,641	4,026	136	8,752	7,378			
45	7,267	4,719	91	4,077	3,875	137	6,523	5,679			
46	7,013	5,699	92	6,261	5,587	138	6,504	5,679			

Total Gross	1,098,072	S.F.
Average Gross	6,067	S.F.
Total Net	1,029,210	S.F.
Averae Net	5,686	S.F.

OPEN SPACE AREAS

Lot No.	Use	Area SQ.FT.	Landscaped/Irragated Area SQ.FT.	Trail SQ.FT.
A	Road	46,029	0	0
B	Road	79,028	0	0
C	Road	21,711	0	0
D	Road	21,376	0	0
E	Road	9,005	0	0
F	Road	32,571	0	0
G	Road	31,497	0	0
H	Road	34,247	0	0
I	Road	31,312	0	0
J	Road	4,965	0	0
K	Road	145,055	0	0
L	Landscape/Trail	178,396	169,931	8,465
M	Landscape	173,316	173,316	0
N	Landscape	22,200	22,200	0
O	Landscape	61,359	57,917	0
P	Landscape	102,572	102,572	0
Q	Landscape	3,365	3,365	0
R	Landscape	85,367	85,367	0
S	Landscape	60,167	60,167	0
T	Landscape/Open Space	228,490	30,853	0
U	Landscape/Open Space	196,983	86,638	0
V	Landscape/Open Space/Water Quality/20' Equestrian Trail	385,967	276,482	50,709
W	Open Space	87,942	0	0
X	Open Space	1,754,047	0	0
Y	Open Space	3,522,717	146,801	0
Z	Open Space	1,185,159	198,687	0
AA	Open Space	76,919	0	0

APPENDIX B

Water Demand Support Data

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
30	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
31	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
32	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
33	4,500	3,555	1,955	400	440	2,795	1,705	682	1,023	23%
11	4,620	3,555	1,955	400	440	2,795	1,825	730	1,095	24%
55	4,621	3,555	1,955	400	440	2,795	1,826	730	1,095	24%
53	4,623	3,555	1,955	400	440	2,795	1,828	731	1,097	24%
47	4,630	3,555	1,955	400	440	2,795	1,835	734	1,101	24%
57	4,658	3,555	1,955	400	440	2,795	1,863	745	1,118	24%
10	4,668	3,555	1,955	400	440	2,795	1,873	749	1,124	24%
69	4,673	3,555	1,955	400	440	2,795	1,878	751	1,127	24%
84	4,674	3,555	1,955	400	440	2,795	1,879	752	1,127	24%
9	4,701	3,555	1,955	400	440	2,795	1,906	762	1,143	24%
56	4,720	3,555	1,955	400	440	2,795	1,925	770	1,155	24%
41	4,725	3,555	1,955	400	440	2,795	1,930	772	1,158	25%
48	4,728	3,555	1,955	400	440	2,795	1,933	773	1,160	25%
42	4,735	3,555	1,955	400	440	2,795	1,940	776	1,164	25%
95	4,792	3,555	1,955	400	440	2,795	1,997	799	1,198	25%
70	4,794	3,555	1,955	400	440	2,795	1,999	800	1,199	25%
94	4,798	3,555	1,955	400	440	2,795	2,003	801	1,202	25%
46	4,843	3,555	1,955	400	440	2,795	2,048	819	1,229	25%
8	4,849	3,555	1,955	400	440	2,795	2,054	822	1,232	25%
49	4,874	3,555	1,955	400	440	2,795	2,079	832	1,247	26%
60	4,883	3,555	1,955	400	440	2,795	2,088	835	1,253	26%
93	4,889	3,555	1,955	400	440	2,795	2,094	838	1,256	26%
54	4,899	3,555	1,955	400	440	2,795	2,104	842	1,262	26%
43	4,963	3,555	1,955	400	440	2,795	2,168	867	1,301	26%
117	4,970	3,555	1,955	400	440	2,795	2,175	870	1,305	26%
27	5,000	3,555	1,955	400	440	2,795	2,205	882	1,323	26%
92	5,000	3,555	1,955	400	440	2,795	2,205	882	1,323	26%
115	5,060	3,555	1,955	400	440	2,795	2,265	906	1,359	27%
118	5,065	3,555	1,955	400	440	2,795	2,270	908	1,362	27%
6	5,091	3,555	1,955	400	440	2,795	2,296	918	1,377	27%
28	5,100	3,555	1,955	400	440	2,795	2,305	922	1,383	27%
29	5,100	3,555	1,955	400	440	2,795	2,305	922	1,383	27%
88	5,128	3,555	1,955	400	440	2,795	2,333	933	1,400	27%
114	5,148	3,555	1,955	400	440	2,795	2,353	941	1,412	27%
50	5,168	3,555	1,955	400	440	2,795	2,373	949	1,424	28%
12	5,199	3,555	1,955	400	440	2,795	2,404	962	1,442	28%
119	5,199	3,555	1,955	400	440	2,795	2,404	962	1,442	28%
26	5,224	3,555	1,955	400	440	2,795	2,429	972	1,457	28%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
13	5,233	3,555	1,955	400	440	2,795	2,438	975	1,463	28%
14	5,233	3,555	1,955	400	440	2,795	2,438	975	1,463	28%
91	5,257	3,555	1,955	400	440	2,795	2,462	985	1,477	28%
78	5,263	3,555	1,955	400	440	2,795	2,468	987	1,481	28%
81	5,293	3,555	1,955	400	440	2,795	2,498	999	1,499	28%
15	5,300	3,555	1,955	400	440	2,795	2,505	1,002	1,503	28%
68	5,323	3,555	1,955	400	440	2,795	2,528	1,011	1,517	28%
76	5,344	3,555	1,955	400	440	2,795	2,549	1,020	1,529	29%
3	5,345	3,555	1,955	400	440	2,795	2,550	1,020	1,530	29%
45	5,362	3,555	1,955	400	440	2,795	2,567	1,027	1,540	29%
44	5,381	3,555	1,955	400	440	2,795	2,586	1,034	1,551	29%
34	5,383	3,555	1,955	400	440	2,795	2,588	1,035	1,553	29%
2	5,465	3,555	1,955	400	440	2,795	2,670	1,068	1,602	29%
155	5,500	3,555	1,955	400	440	2,795	2,705	1,082	1,623	30%
156	5,500	3,555	1,955	400	440	2,795	2,705	1,082	1,623	30%
157	5,500	3,555	1,955	400	440	2,795	2,705	1,082	1,623	30%
116	5,501	3,555	1,955	400	440	2,795	2,706	1,082	1,623	30%
148	5,503	3,555	1,955	400	440	2,795	2,708	1,083	1,625	30%
149	5,508	3,555	1,955	400	440	2,795	2,713	1,085	1,628	30%
150	5,513	3,555	1,955	400	440	2,795	2,718	1,087	1,631	30%
83	5,515	3,555	1,955	400	440	2,795	2,720	1,088	1,632	30%
80	5,516	3,555	1,955	400	440	2,795	2,721	1,088	1,632	30%
111	5,526	3,555	1,955	400	440	2,795	2,731	1,092	1,638	30%
61	5,528	3,555	1,955	400	440	2,795	2,733	1,093	1,640	30%
58	5,577	3,555	1,955	400	440	2,795	2,782	1,113	1,669	30%
7	5,598	3,555	1,955	400	440	2,795	2,803	1,121	1,682	30%
18	5,603	3,555	1,955	400	440	2,795	2,808	1,123	1,685	30%
87	5,643	3,555	1,955	400	440	2,795	2,848	1,139	1,709	30%
151	5,657	3,555	1,955	400	440	2,795	2,862	1,145	1,717	30%
24	5,704	3,555	1,955	400	440	2,795	2,909	1,164	1,745	31%
103	5,713	3,555	1,955	400	440	2,795	2,918	1,167	1,751	31%
105	5,746	3,555	1,955	400	440	2,795	2,951	1,180	1,770	31%
67	5,760	3,555	1,955	400	440	2,795	2,965	1,186	1,779	31%
21	5,767	3,555	1,955	400	440	2,795	2,972	1,189	1,783	31%
77	5,782	3,555	1,955	400	440	2,795	2,987	1,195	1,792	31%
1	5,785	3,555	1,955	400	440	2,795	2,990	1,196	1,794	31%
121	5,798	3,555	1,955	400	440	2,795	3,003	1,201	1,802	31%
36	5,807	3,555	1,955	400	440	2,795	3,012	1,205	1,807	31%
104	5,839	3,555	1,955	400	440	2,795	3,044	1,218	1,826	31%
17	5,877	3,555	1,955	400	440	2,795	3,082	1,233	1,849	31%
25	5,909	3,555	1,955	400	440	2,795	3,114	1,246	1,868	32%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
125	5,948	3,555	1,955	400	440	2,795	3,153	1,261	1,892	32%
99	5,951	3,555	1,955	400	440	2,795	3,156	1,262	1,893	32%
152	5,965	3,555	1,955	400	440	2,795	3,170	1,268	1,902	32%
62	5,984	3,555	1,955	400	440	2,795	3,189	1,276	1,913	32%
65	6,002	3,555	1,955	400	440	2,795	3,207	1,283	1,924	32%
79	6,032	3,555	1,955	400	440	2,795	3,237	1,295	1,942	32%
120	6,052	3,555	1,955	400	440	2,795	3,257	1,303	1,954	32%
158	6,080	3,555	1,955	400	440	2,795	3,285	1,314	1,971	32%
66	6,115	3,555	1,955	400	440	2,795	3,320	1,328	1,992	33%
97	6,153	3,555	1,955	400	440	2,795	3,358	1,343	2,015	33%
52	6,190	3,555	1,955	400	440	2,795	3,395	1,358	2,037	33%
82	6,261	3,555	1,955	400	440	2,795	3,466	1,386	2,079	33%
101	6,298	3,555	1,955	400	440	2,795	3,503	1,401	2,102	33%
124	6,310	3,555	1,955	400	440	2,795	3,515	1,406	2,109	33%
16	6,327	3,555	1,955	400	440	2,795	3,532	1,413	2,119	33%
135	6,331	3,555	1,955	400	440	2,795	3,536	1,414	2,121	34%
138	6,353	3,555	1,955	400	440	2,795	3,558	1,423	2,135	34%
122	6,395	3,555	1,955	400	440	2,795	3,600	1,440	2,160	34%
112	6,473	3,555	1,955	400	440	2,795	3,678	1,471	2,207	34%
140	6,509	3,555	1,955	400	440	2,795	3,714	1,486	2,228	34%
64	6,518	3,555	1,955	400	440	2,795	3,723	1,489	2,234	34%
139	6,593	3,555	1,955	400	440	2,795	3,798	1,519	2,279	35%
102	6,653	3,555	1,955	400	440	2,795	3,858	1,543	2,315	35%
100	6,697	3,555	1,955	400	440	2,795	3,902	1,561	2,341	35%
113	6,709	3,555	1,955	400	440	2,795	3,914	1,566	2,348	35%
40	6,724	3,555	1,955	400	440	2,795	3,929	1,572	2,357	35%
142	6,774	3,555	1,955	400	440	2,795	3,979	1,592	2,387	35%
129	6,778	3,555	1,955	400	440	2,795	3,983	1,593	2,390	35%
141	6,781	3,555	1,955	400	440	2,795	3,986	1,594	2,391	35%
128	6,823	3,555	1,955	400	440	2,795	4,028	1,611	2,417	35%
123	6,918	3,555	1,955	400	440	2,795	4,123	1,649	2,474	36%
107	6,931	3,555	1,955	400	440	2,795	4,136	1,654	2,481	36%
38	6,932	3,555	1,955	400	440	2,795	4,137	1,655	2,482	36%
143	7,170	3,555	1,955	400	440	2,795	4,375	1,750	2,625	37%
106	7,176	3,555	1,955	400	440	2,795	4,381	1,752	2,628	37%
146	7,177	3,555	1,955	400	440	2,795	4,382	1,753	2,629	37%
85	7,183	3,555	1,955	400	440	2,795	4,388	1,755	2,633	37%
51	7,236	3,555	1,955	400	440	2,795	4,441	1,776	2,664	37%
37	7,271	3,555	1,955	400	440	2,795	4,476	1,790	2,685	37%
90	7,272	3,555	1,955	400	440	2,795	4,477	1,791	2,686	37%
59	7,332	3,555	1,955	400	440	2,795	4,537	1,815	2,722	37%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
75	7,390	3,555	1,955	400	440	2,795	4,595	1,838	2,757	37%
86	7,414	3,555	1,955	400	440	2,795	4,619	1,848	2,771	37%
130	7,424	3,555	1,955	400	440	2,795	4,629	1,852	2,777	37%
96	7,502	4,331	2,382	600	640	3,622	3,880	1,552	2,328	31%
39	7,545	4,331	2,382	600	640	3,622	3,923	1,569	2,354	31%
147	7,551	4,331	2,382	600	640	3,622	3,929	1,572	2,357	31%
126	7,665	4,331	2,382	600	640	3,622	4,043	1,617	2,426	32%
23	7,758	4,331	2,382	600	640	3,622	4,136	1,654	2,482	32%
132	7,770	4,331	2,382	600	640	3,622	4,148	1,659	2,489	32%
5	7,824	4,331	2,382	600	640	3,622	4,202	1,681	2,521	32%
160	7,982	4,331	2,382	600	640	3,622	4,360	1,744	2,616	33%
20	8,016	4,331	2,382	600	640	3,622	4,394	1,758	2,636	33%
71	8,115	4,331	2,382	600	640	3,622	4,493	1,797	2,696	33%
4	8,125	4,331	2,382	600	640	3,622	4,503	1,801	2,702	33%
35	8,125	4,331	2,382	600	640	3,622	4,503	1,801	2,702	33%
127	8,281	4,331	2,382	600	640	3,622	4,659	1,864	2,795	34%
134	8,331	4,331	2,382	600	640	3,622	4,709	1,884	2,825	34%
137	8,333	4,331	2,382	600	640	3,622	4,711	1,884	2,827	34%
144	8,334	4,331	2,382	600	640	3,622	4,712	1,885	2,827	34%
74	8,372	4,331	2,382	600	640	3,622	4,750	1,900	2,850	34%
165	8,378	4,331	2,382	600	640	3,622	4,756	1,902	2,854	34%
131	8,385	4,331	2,382	600	640	3,622	4,763	1,905	2,858	34%
73	8,451	4,331	2,382	600	640	3,622	4,829	1,932	2,897	34%
136	8,465	4,331	2,382	600	640	3,622	4,843	1,937	2,906	34%
164	8,526	4,331	2,382	600	640	3,622	4,904	1,962	2,942	35%
19	8,684	4,331	2,382	600	640	3,622	5,062	2,025	3,037	35%
145	8,702	4,331	2,382	600	640	3,622	5,080	2,032	3,048	35%
159	8,995	4,331	2,382	600	640	3,622	5,373	2,149	3,224	36%
109	9,062	4,331	2,382	600	640	3,622	5,440	2,176	3,264	36%
133	9,191	4,331	2,382	600	640	3,622	5,569	2,228	3,341	36%
110	9,288	4,331	2,382	600	640	3,622	5,666	2,266	3,400	37%
163	9,342	4,331	2,382	600	640	3,622	5,720	2,288	3,432	37%
162	9,363	4,331	2,382	600	640	3,622	5,741	2,296	3,445	37%
154	9,632	4,331	2,382	600	640	3,622	6,010	2,404	3,606	37%
22	9,656	4,331	2,382	600	640	3,622	6,034	2,414	3,620	37%
153	9,949	4,331	2,382	600	640	3,622	6,327	2,531	3,796	38%
63	10,043	4,331	2,382	600	640	3,622	6,421	2,568	3,853	38%
108	10,323	4,331	2,382	600	640	3,622	6,701	2,680	4,021	39%
89	10,651	4,331	2,382	600	640	3,622	7,029	2,812	4,217	40%
161	10,655	4,331	2,382	600	640	3,622	7,033	2,813	4,220	40%
72	10,795	4,331	2,382	600	640	3,622	7,173	2,869	4,304	40%

Lot Sizes, Hardscape/Landscape Area and Water Use Calculation

(all areas in square feet (sf), lots sorted smallest to largest)

Lot No.	Lot sf	House	Building Footprint	Garage	Drive-way	Footprint + Garage + D'way	Remainder	Hardscape	Landscape	% Irrigated Area
166	12,544	4,331	2,382	600	640	3,622	8,922	3,569	5,353	43%
98	14,324	4,331	2,382	600	640	3,622	10,702	4,281	6,421	45%
Total	**1,076,807**								**347,834**	
Average	**6,487**								**2,095**	**32%**

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PSOMAS

Trabuco Highlands Lots

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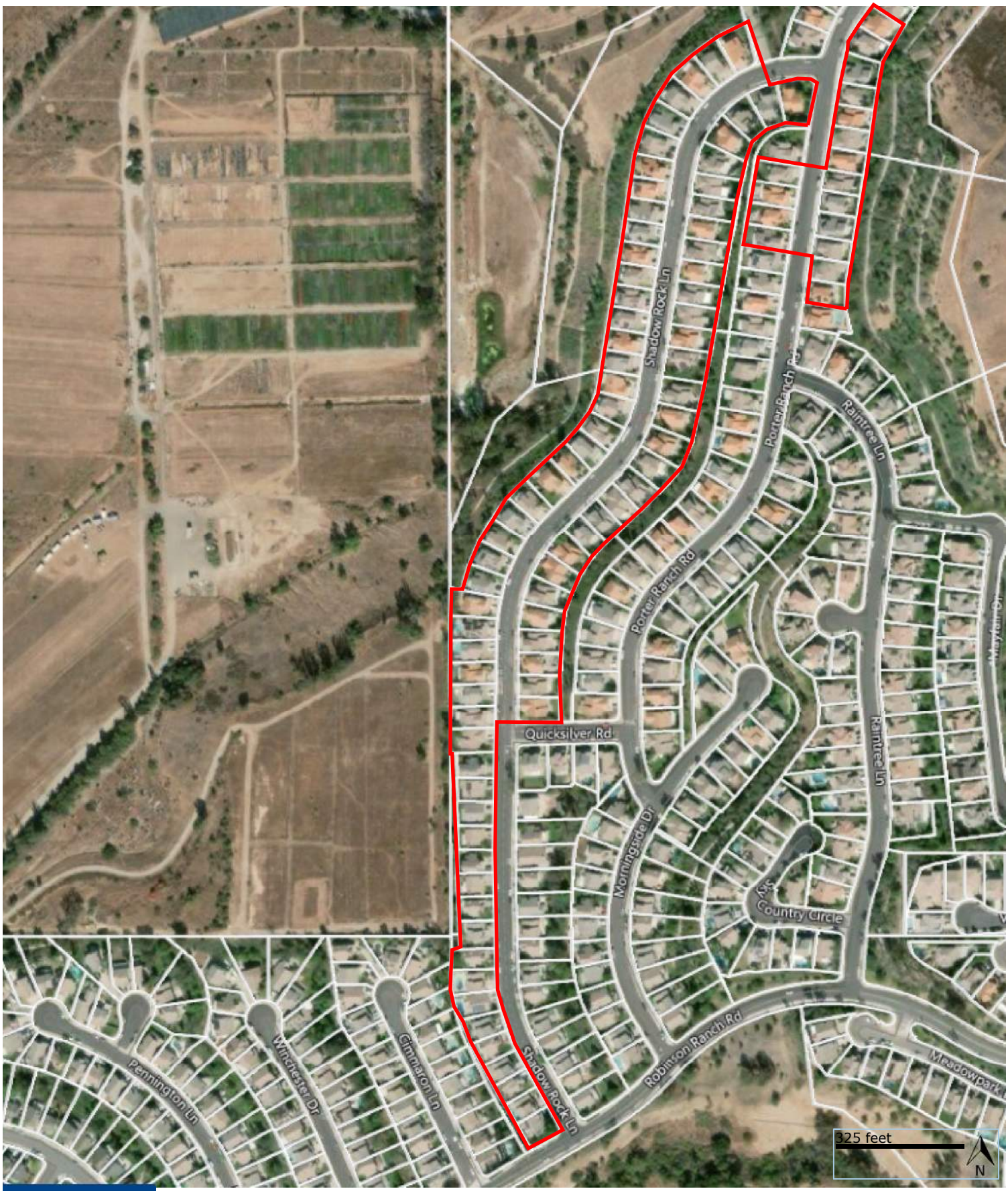

PSOMAS

Robinson Ranch Lots

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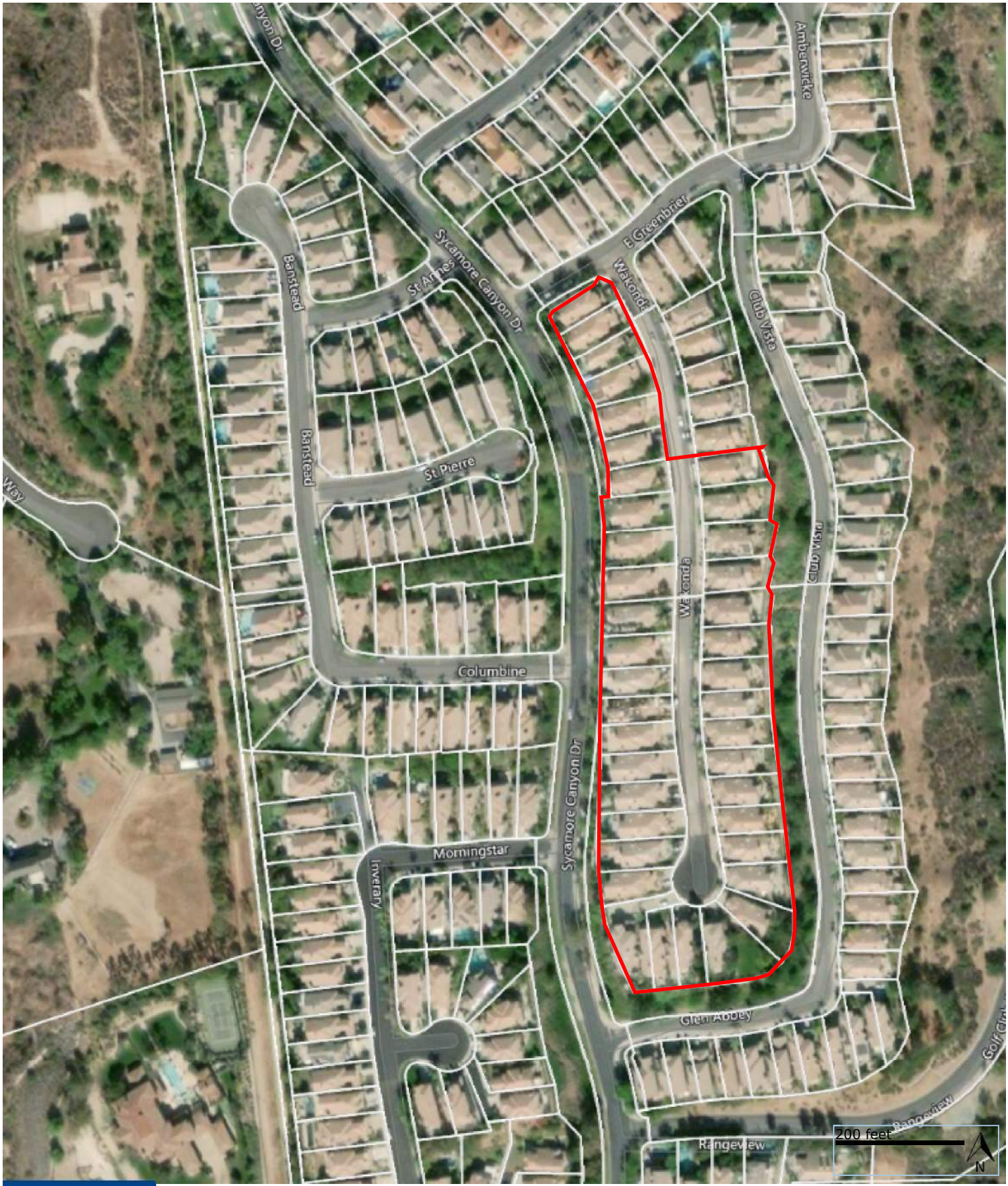


PSOMAS

Dove Canyon Lots

Similar Lots in Trabuco Highlands, Robinson Ranch and Dove Canyon

Address	Lot Size (sf)	Address	Lot Size (sf)	Address	Lot Size (sf)	Address	Lot Size (sf)	Address	Lot Size (sf)
21381 Birdhollow Dr	7,800	32592 Coppercrest Dr	12,000	20881 Shadow Rock Ln	6,435	20802 Shadow Rock Ln	5,610	1 Wakonda	4,400
21391 Birdhollow Dr	6,864	32602 Coppercrest Dr	7,875	20871 Shadow Rock Ln	6,490	20792 Shadow Rock Ln	5,900	3 Wakonda	4,905
21401 Birdhollow Dr	9,179	32622 Coppercrest Dr	7,519	20861 Shadow Rock Ln	7,200	20782 Shadow Rock Ln	5,650	5 Wakonda	4,815
21411 Birdhollow Dr	6,760	32632 Coppercrest Dr	7,446	20851 Shadow Rock Ln	6,000	20776 Shadow Rock Ln	6,695	9 Wakonda	5,100
21415 Birdhollow Dr	6,552	32642 Coppercrest Dr	7,800	20841 Shadow Rock Ln	6,000	20772 Shadow Rock Ln	6,600	11 Wakonda	5,300
21421 Birdhollow Dr	6,386	32662 Coppercrest Dr	8,000	20831 Shadow Rock Ln	6,000	20762 Shadow Rock Ln	7,280	13 Wakonda	4,704
21423 Birdhollow Dr	6,120	32682 Coppercrest Dr	7,500	20825 Shadow Rock Ln	6,000	20752 Shadow Rock Ln	7,700	15 Wakonda	4,900
21425 Birdhollow Dr	6,300	32692 Coppercrest Dr	6,283	20821 Shadow Rock Ln	6,060	20742 Shadow Rock Ln	7,490	17 Wakonda	5,824
21431 Birdhollow Dr	9,750	32702 Coppercrest Dr	6,313	20811 Shadow Rock Ln	6,060	20732 Shadow Rock Ln	8,800	19 Wakonda	6,384
21433 Birdhollow Dr	9,100	32712 Coppercrest Dr	6,490	20801 Shadow Rock Ln	8,000	20722 Shadow Rock Ln	6,215	21 Wakonda	6,325
21435 Birdhollow Dr	8,400	32722 Coppercrest Dr	6,380	20791 Shadow Rock Ln	5,656	20712 Shadow Rock Ln	6,325	25 Wakonda	5,928
21392 Silvertree Ln	9,800	32732 Coppercrest Dr	6,490	20781 Shadow Rock Ln	6,060	20702 Shadow Rock Ln	6,490	27 Wakonda	5,650
21402 Silvertree Ln	7,952	32742 Coppercrest Dr	5,940	20771 Shadow Rock Ln	6,060	20692 Shadow Rock Ln	6,435	29 Wakonda	4,972
21412 Silvertree Ln	8,008	32752 Coppercrest Dr	5,992	20761 Shadow Rock Ln	6,565	20672 Shadow Rock Ln	6,545	31 Wakonda	5,085
21422 Silvertree Ln	8,176	32756 Coppercrest Dr	6,160	20751 Shadow Rock Ln	6,060	20662 Shadow Rock Ln	6,720	33 Wakonda	5,175
21432 Silvertree Ln	8,880	32762 Coppercrest Dr	6,900	20741 Shadow Rock Ln	5,555	20652 Shadow Rock Ln	6,710	35 Wakonda	5,490
21452 Silvertree Ln	7,952	32766 Coppercrest Dr	7,150	20731 Shadow Rock Ln	5,606	20642 Shadow Rock Ln	6,820	37 Wakonda	5,850
21456 Silvertree Ln	7,840	32772 Coppercrest Dr	10,500	20721 Shadow Rock Ln	5,606	20632 Shadow Rock Ln	7,930	39 Wakonda	6,210
21462 Silvertree Ln	8,151	32780 Coppercrest Dr	8,050	20711 Shadow Rock Ln	5,555	20622 Shadow Rock Ln	7,700	41 Wakonda	5,850
21472 Silvertree Ln	8,140	21091 Shadow Rock Ln	5,225	20701 Shadow Rock Ln	5,555	20612 Shadow Rock Ln	7,280	43 Wakonda	6,100
21476 Silvertree Ln	9,750	21085 Shadow Rock Ln	5,225	20681 Shadow Rock Ln	5,555	20606 Shadow Rock Ln	7,140	45 Wakonda	6,250
21401 Silvertree Ln	11,000	21081 Shadow Rock Ln	5,225	20671 Shadow Rock Ln	5,555	20602 Shadow Rock Ln	8,000	47 Wakonda	4,880
21411 Silvertree Ln	6,890	21071 Shadow Rock Ln	5,225	20661 Shadow Rock Ln	5,555	20702 Porter Ranch Rd	6,300	49 Wakonda	5,490
21421 Silvertree Ln	5,871	21061 Shadow Rock Ln	5,225	20651 Shadow Rock Ln	5,555	20692 Porter Ranch Rd	5,610	46 Wakonda	10,400
21431 Silvertree Ln	6,300	21051 Shadow Rock Ln	5,225	20641 Shadow Rock Ln	5,555	20682 Porter Ranch Rd	5,582	44 Wakonda	7,800
21441 Silvertree Ln	5,936	21041 Shadow Rock Ln	5,775	20635 Shadow Rock Ln	6,565	20662 Porter Ranch Rd	6,181	42 Wakonda	6,300
21451 Silvertree Ln	6,180	21031 Shadow Rock Ln	6,270	20631 Shadow Rock Ln	6,630	20656 Porter Ranch Rd	5,582	40Wakonda	4,725
21455 Silvertree Ln	5,555	21021 Shadow Rock Ln	5,712	20625 Shadow Rock Ln	6,630	20652 Porter Ranch Rd	5,582	38 Wakonda	4,950
21461 Silvertree Ln	5,880	21001 Shadow Rock Ln	6,650	20621 Shadow Rock Ln	6,695	20642 Porter Ranch Rd	5,577	36 Wakonda	5,040
21471 Silvertree Ln	6,600	20991 Shadow Rock Ln	5,795	20615 Shadow Rock Ln	6,760	20632 Porter Ranch Rd	5,577	34 Wakonda	5,085
21475 Silvertree Ln	6,600	20981 Shadow Rock Ln	5,890	20611 Shadow Rock Ln	7,000	20622 Porter Ranch Rd	5,577	32 Wakonda	4,995
21481 Silvertree Ln	7,150	20971 Shadow Rock Ln	5,700	20892 Shadow Rock Ln	6,825	20612 Porter Ranch Rd	5,582	30 Wakonda	4,950
21483 Silvertree Ln	6,825	20961 Shadow Rock Ln	5,700	20882 Shadow Rock Ln	5,995	20592 Porter Ranch Rd	7,000	28 Wakonda	5,500
21485 Silvertree Ln	6,050	20951 Shadow Rock Ln	5,700	20872 Shadow Rock Ln	5,995	20572 Porter Ranch Rd	6,630	26 Wakonda	5,250
21491 Silvertree Ln	6,325	20941 Shadow Rock Ln	5,700	20862 Shadow Rock Ln	6,105	20562 Porter Ranch Rd	5,665	24 Wakonda	5,200
21493 Silvertree Ln	5,940	20931 Shadow Rock Ln	5,700	20842 Shadow Rock Ln	7,150	20651 Porter Ranch Rd	6,600	22 Wakonda	5,565
21495 Silvertree Ln	6,325	20911 Shadow Rock Ln	6,840	20832 Shadow Rock Ln	7,280	20661 Porter Ranch Rd	6,600	20 Wakonda	5,940
21501 Silvertree Ln	6,600	20901 Shadow Rock Ln	6,325	20822 Shadow Rock Ln	7,215	20671 Porter Ranch Rd	6,545	18 Wakonda	5,886
21505 Silvertree Ln	8,000	20891 Shadow Rock Ln	6,380	20812 Shadow Rock Ln	6,825	20681 Porter Ranch Rd	6,545	16 Wakonda	5,040
Averages	7,382		6,571		6,256		6,533		5,595

Average Size (195 Lots) 6,467 sf

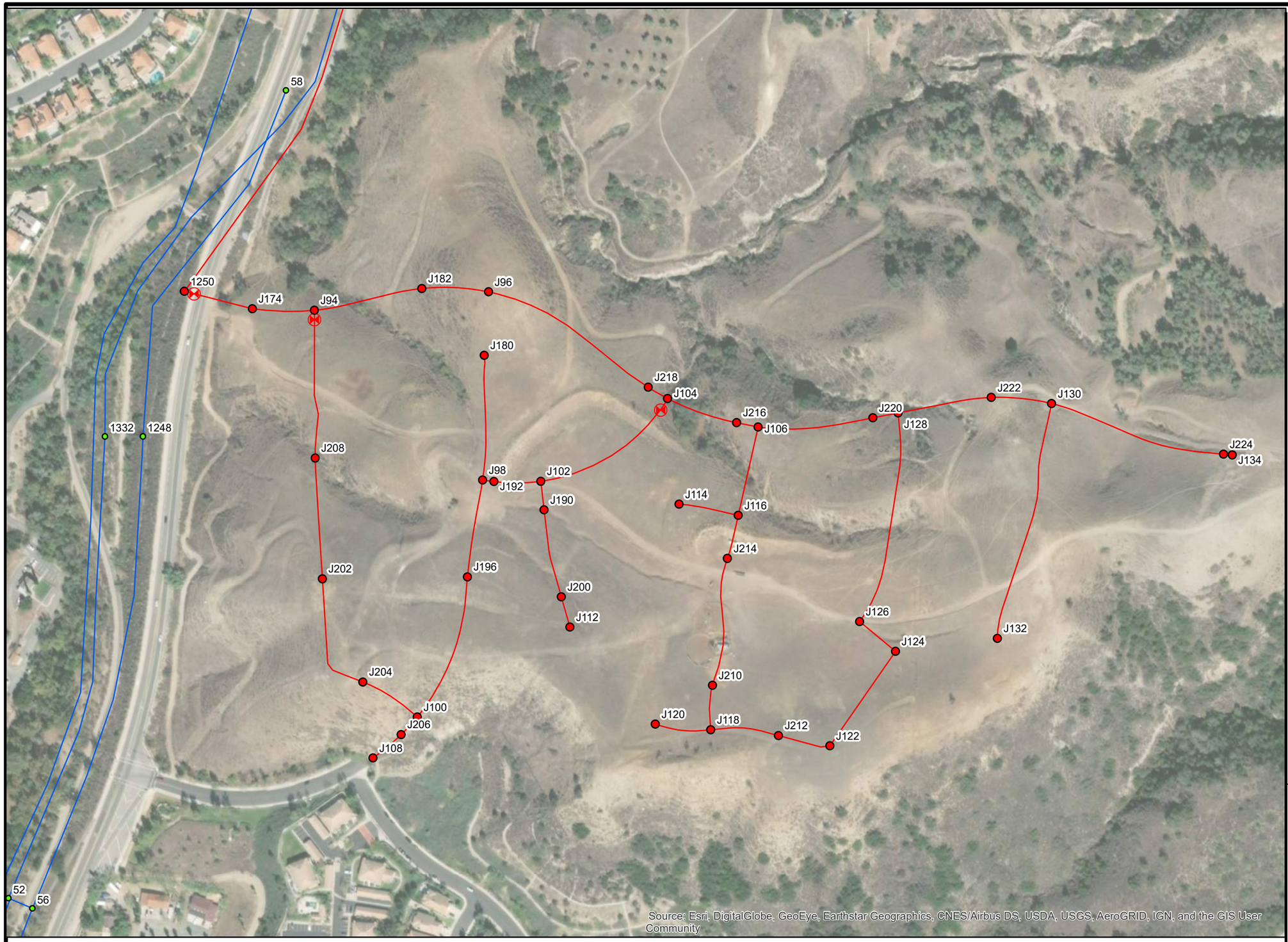
APPENDIX C

Storage Analysis Support Data

Production Aug 2018 (gallons)			
Day	**Dimension**	**SMWD (avg)**	**Total**
1	2,623,000	571,845	3,194,845
2	2,967,000	571,845	3,538,845
3	3,069,000	571,845	3,640,845
4	3,081,000	571,845	3,652,845
5	2,107,000	571,845	2,678,845
6	2,221,000	571,845	2,792,845
7	3,077,000	571,845	3,648,845
8	2,721,000	571,845	3,292,845
9	2,522,000	571,845	3,093,845
10	2,628,000	571,845	3,199,845
11	2,673,000	571,845	3,244,845
12	3,241,000	571,845	**3,812,845**
13	2,720,000	571,845	3,291,845
14	663,000	571,845	1,234,845
15	-	571,845	571,845
16	-	571,845	571,845
17	-	571,845	571,845
18	1,939,000	571,845	2,510,845
19	2,840,000	571,845	3,411,845
20	2,943,000	571,845	3,514,845
21	718,000	571,845	1,289,845
22	-	571,845	571,845
23	-	571,845	571,845
24	-	571,845	571,845
25	-	571,845	571,845
26	-	571,845	571,845
27	-	571,845	571,845
28	2,564,000	571,845	3,135,845
29	2,901,000	571,845	3,472,845
30	3,018,000	571,845	3,589,845
31	2,965,000	571,845	3,536,845
Average	1,812,935	571,845	2,384,781

APPENDIX D

Model Output and Node Diagram



0 0.025 0.05 0.1 Miles

SADDLEBACK MEADOW WATER MODEL

TRACT NO 15230

JANUARY 2020

FIGURE 1

JUCTION REPORT AT PEAK HOUR (HOUR=6)

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1250	0.0	1,065.0	1,503.6	190.1
J174	0.0	1,067.3	1,429.6	157.0
J94	34.1	1,078.6	1,429.5	152.0
J182	0.0	1,105.0	1,429.3	140.5
J96	49.3	1,121.2	1,429.3	133.5
J218	0.0	1,168.7	1,429.1	112.8
J104	3.1	1,174.4	1,429.1	110.4
J108	29.1	1,086.5	1,339.7	109.7
J206	0.0	1,097.8	1,339.7	104.8
J216	0.0	1,193.0	1,429.1	102.3
J208	0.0	1,105.2	1,339.8	101.6
J202	17.4	1,105.2	1,339.8	101.6
J204	0.0	1,105.2	1,339.7	101.6
J100	24.8	1,105.2	1,339.7	101.6
J106	18.3	1,198.5	1,429.1	99.9
J116	6.2	1,215.8	1,429.1	92.4
J114	4.9	1,218.7	1,429.1	91.2
J214	0.0	1,221.6	1,429.1	89.9
J180	0.0	1,141.5	1,339.8	85.9
J220	0.0	1,231.2	1,429.1	85.7
J196	0.0	1,146.7	1,339.8	83.7
J210	0.0	1,238.4	1,429.1	82.6
J128	39.7	1,238.5	1,429.1	82.6
J118	5.0	1,244.2	1,429.0	80.1
J120	26.0	1,245.4	1,429.0	79.6
J212	0.0	1,246.1	1,429.0	79.3
J122	5.6	1,247.6	1,429.0	78.6
J222	0.0	1,261.6	1,429.1	72.6
J98	4.3	1,173.5	1,339.8	72.1
J192	0.0	1,174.3	1,339.8	71.7
J102	0.0	1,177.4	1,339.8	70.4
J190	0.0	1,181.4	1,339.8	68.6
J130	6.8	1,276.4	1,429.1	66.1
J126	0.0	1,280.7	1,429.1	64.3
J200	0.0	1,193.7	1,339.8	63.3
J124	14.0	1,286.4	1,429.0	61.8
J112	13.6	1,201.0	1,339.8	60.1
J132	20.4	1,302.7	1,429.0	54.7
J224	0.0	1,312.7	1,429.0	50.4
J134	28.3	1,314.4	1,429.0	49.7

PIPE REPORT AT PEAK HOUR (HOUR=6)

ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
70	1460	1250	1,534.2	12	350.8	1.0
P121	J94	J174	160.4	12	-350.8	1.0
P123	J96	J182	173.0	12	-281.8	0.8
P125	J100	J204	167.7	8	-17.6	0.1
P127	J100	J196	389.7	8	-36.3	0.2
P129	J102	J192	121.5	8	40.6	0.3
P131	J98	J180	321.5	8	0.0	0.0
P133	J96	J218	484.7	12	232.5	0.7
P135	J104	V8018	34.5	8	54.2	0.4
P137	J106	J216	56.4	12	-175.2	0.5
P139	J108	J206	94.2	8	-29.1	0.2
P143	J112	J200	81.1	8	-13.6	0.1
P145	J106	J116	232.8	8	41.0	0.3
P147	J116	J114	155.4	8	4.9	0.0
P149	J116	J214	114.4	8	29.9	0.2
P151	J118	J120	145.2	8	26.0	0.2
P153	J118	J212	177.0	8	-1.0	0.0
P155	J128	J126	554.7	8	20.6	0.1
P157	J126	J124	120.0	8	20.6	0.1
P159	J132	J130	623.2	8	-20.4	0.1
P161	J106	J220	298.2	12	115.9	0.3
P163	J128	J222	244.2	12	55.5	0.2
P165	J130	J224	465.0	8	28.3	0.2
P167	1250	V8020	25.9	12	350.8	1.0
P169	J94	V8016	23.2	8	35.0	0.2
P171	V8018	J102	368.5	8	54.2	0.4
P179	J182	J94	282.9	12	-281.8	0.8
P181	J190	J102	74.0	8	-13.6	0.1
P183	J192	J98	29.4	8	40.6	0.3
P185	J196	J98	252.3	8	-36.3	0.2
P187	J200	J190	228.7	8	-13.6	0.1
P189	J202	J208	311.3	8	-35.0	0.2
P191	J204	J202	323.5	8	-17.6	0.1
P193	J206	J100	61.6	8	-29.1	0.2
P195	V8016	J208	358.3	8	35.0	0.2
P197	J210	J118	115.3	8	29.9	0.2
P199	J212	J122	136.5	8	-1.0	0.0
P201	J214	J210	332.7	8	29.9	0.2
P203	J216	J104	189.1	12	-175.2	0.5
P205	J218	J104	57.9	12	232.5	0.7
P207	J220	J128	66.2	12	115.9	0.3
P209	J222	J130	156.7	12	55.5	0.2
P211	J224	J134	22.4	8	28.3	0.2
P213	V8020	J174	155.2	12	350.8	1.0
P215	J122	J124	295.7	8	-6.6	0.0

VALVE REPORT AT PEAK HOUR (HOUR=6)

ID	Elevation (ft)	Upstream Pressure (psi)	Downstream Pressure (psi)	Flow (gpm)	Velocity (ft/s)	Headloss (ft)
V8016	1079.0	151.9	113.0	35.0	0.2	89.7
V8018	1174.0	110.5	71.9	54.2	0.4	89.3
V8020	1065.0	190.1	158.0	350.8	2.2	74.0

MDD PLUS FF JUNCTION REPORT - PZ 1430

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1250	0.0	1,065.0	1,479.3	179.5
J94	34.1	1,078.6	1,425.8	150.4
J96	49.3	1,121.2	1,420.5	129.7
J98	2.5	1,173.5	1,339.8	72.1
J100	18.4	1,105.2	1,339.8	101.6
J102	0.0	1,177.4	1,339.8	70.4
J104	1.8	1,174.4	1,414.5	104.1
J106	17.2	1,198.5	1,412.0	92.5
J108	29.1	1,086.5	1,339.8	109.7
J112	7.8	1,201.0	1,339.8	60.2
J114	3.1	1,218.7	1,411.6	83.6
J116	3.5	1,215.8	1,411.6	84.8
J118	2.8	1,244.2	1,410.6	72.1
J120	24.6	1,245.4	1,410.6	71.6
J122	3.2	1,247.6	1,410.2	70.5
J124	12.4	1,286.4	1,409.9	53.5
J126	0.0	1,280.7	1,409.7	55.9
J128	35.7	1,238.5	1,409.1	73.9
J130	3.9	1,276.4	1,405.4	55.9
J132	18.0	1,302.7	1,405.4	44.5
J134	1,527.0	1,314.4	1,373.7	25.7
J174	0.0	1,067.3	1,427.7	156.2
J180	0.0	1,141.5	1,339.8	85.9
J182	0.0	1,105.0	1,422.5	137.6
J190	0.0	1,181.4	1,339.8	68.7
J192	0.0	1,174.3	1,339.8	71.7
J196	0.0	1,146.7	1,339.8	83.7
J200	0.0	1,193.7	1,339.8	63.3
J202	9.9	1,105.2	1,339.8	101.6
J204	0.0	1,105.2	1,339.8	101.6
J206	0.0	1,097.8	1,339.8	104.8
J208	0.0	1,105.2	1,339.8	101.7
J210	0.0	1,238.4	1,410.8	74.7
J212	0.0	1,246.1	1,410.4	71.2
J214	0.0	1,221.6	1,411.4	82.2
J216	0.0	1,193.0	1,412.6	95.2
J218	0.0	1,168.7	1,415.2	106.8
J220	0.0	1,231.2	1,409.6	77.3
J222	0.0	1,261.6	1,406.9	62.9
J224	0.0	1,312.7	1,375.2	27.1

MDD PLUS FF PIPE REPORT - PZ 1430

ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
70	1460	1250	1,534.2	12	1,804.1	5.1
P167	1250	V8020	25.9	12	1,804.1	5.1
P213	V8020	J174	155.2	12	1,804.1	5.1
P133	J96	J218	484.7	12	1,697.1	4.8
P205	J218	J104	57.9	12	1,697.1	4.8
P163	J128	J222	244.2	12	1,548.9	4.4
P209	J222	J130	156.7	12	1,548.9	4.4
P165	J130	J224	465.0	8	1,527.0	9.8
P211	J224	J134	22.4	8	1,527.0	9.8
P161	J106	J220	298.2	12	1,416.3	4.0
P207	J220	J128	66.2	12	1,416.3	4.0
P145	J106	J116	232.8	8	217.8	1.4
P149	J116	J214	114.4	8	211.3	1.4
P197	J210	J118	115.3	8	211.3	1.4
P201	J214	J210	332.7	8	211.3	1.4
P153	J118	J212	177.0	8	183.8	1.2
P199	J212	J122	136.5	8	183.8	1.2
P215	J122	J124	295.7	8	180.7	1.2
P135	J104	V8018	34.5	8	43.9	0.3
P171	V8018	J102	368.5	8	43.9	0.3
P129	J102	J192	121.5	8	36.2	0.2
P183	J192	J98	29.4	8	36.2	0.2
P151	J118	J120	145.2	8	24.6	0.2
P169	J94	V8016	23.2	8	23.7	0.2
P195	V8016	J208	358.3	8	23.7	0.2
P147	J116	J114	155.4	8	3.1	0.0
P131	J98	J180	321.5	8	0.0	0.0
P143	J112	J200	81.1	8	-7.8	0.1
P181	J190	J102	74.0	8	-7.8	0.1
P187	J200	J190	228.7	8	-7.8	0.1
P125	J100	J204	167.7	8	-13.8	0.1
P191	J204	J202	323.5	8	-13.8	0.1
P159	J132	J130	623.2	8	-18.0	0.1
P189	J202	J208	311.3	8	-23.7	0.2
P139	J108	J206	94.2	8	-29.1	0.2
P193	J206	J100	61.6	8	-29.1	0.2
P127	J100	J196	389.7	8	-33.7	0.2
P185	J196	J98	252.3	8	-33.7	0.2
P155	J128	J126	554.7	8	-168.2	1.1
P157	J126	J124	120.0	8	-168.2	1.1
P137	J106	J216	56.4	12	-1,651.4	4.7
P203	J216	J104	189.1	12	-1,651.4	4.7
P123	J96	J182	173.0	12	-1,746.4	5.0
P179	J182	J94	282.9	12	-1,746.4	5.0
P121	J94	J174	160.4	12	-1,804.1	5.1

MDD PLUS FF JUNCTION REPORT - PZ 1340

ID	Demand (gpm)	Elevation (ft)	Head (ft)	Pressure (psi)
1250	0.0	1,065.0	1,479.3	179.5
J94	34.1	1,078.6	1,425.8	150.4
J96	49.3	1,121.2	1,422.7	130.7
J98	2.5	1,173.5	1,327.7	66.8
J100	18.4	1,105.2	1,331.4	98.0
J102	0.0	1,177.4	1,326.8	64.8
J104	1.8	1,174.4	1,419.3	106.1
J106	17.2	1,198.5	1,419.3	95.7
J108	29.1	1,086.5	1,331.4	106.1
J112	1,507.8	1,201.0	1,302.5	44.0
J114	3.1	1,218.7	1,419.3	86.9
J116	3.5	1,215.8	1,419.3	88.2
J118	2.8	1,244.2	1,419.3	75.9
J120	24.6	1,245.4	1,419.3	75.3
J122	3.2	1,247.6	1,419.3	74.4
J124	12.4	1,286.4	1,419.3	57.6
J126	0.0	1,280.7	1,419.3	60.0
J128	35.7	1,238.5	1,419.3	78.3
J130	3.9	1,276.4	1,419.3	61.9
J132	18.0	1,302.7	1,419.3	50.5
J134	27.0	1,314.4	1,419.3	45.4
J174	0.0	1,067.3	1,427.7	156.2
J180	0.0	1,141.5	1,327.7	80.7
J182	0.0	1,105.0	1,423.9	138.2
J190	0.0	1,181.4	1,322.1	61.0
J192	0.0	1,174.3	1,327.5	66.4
J196	0.0	1,146.7	1,329.2	79.1
J200	0.0	1,193.7	1,307.6	49.4
J202	9.9	1,105.2	1,334.9	99.5
J204	0.0	1,105.2	1,332.6	98.5
J206	0.0	1,097.8	1,331.4	101.2
J208	0.0	1,105.2	1,337.2	100.5
J210	0.0	1,238.4	1,419.3	78.4
J212	0.0	1,246.1	1,419.3	75.0
J214	0.0	1,221.6	1,419.3	85.7
J216	0.0	1,193.0	1,419.3	98.1
J218	0.0	1,168.7	1,419.7	108.7
J220	0.0	1,231.2	1,419.3	81.5
J222	0.0	1,261.6	1,419.3	68.3
J224	0.0	1,312.7	1,419.3	46.2

MDD PLUS FF PIPE REPORT - PZ 1340

ID	From Node	To Node	Length (ft)	Diameter (in)	Flow (gpm)	Velocity (ft/s)
70	1460	1250	1,534.2	12	1,804.1	5.1
P121	J94	J174	160.4	12	-1,804.1	5.1
P123	J96	J182	173.0	12	-1,299.9	3.7
P125	J100	J204	167.7	8	-460.3	2.9
P127	J100	J196	389.7	8	412.8	2.6
P129	J102	J192	121.5	8	-410.3	2.6
P131	J98	J180	321.5	8	0.0	0.0
P133	J96	J218	484.7	12	1,250.6	3.6
P135	J104	V8018	34.5	8	1,097.4	7.0
P137	J106	J216	56.4	12	-151.4	0.4
P139	J108	J206	94.2	8	-29.1	0.2
P143	J112	J200	81.1	8	-1,507.8	9.6
P145	J106	J116	232.8	8	32.9	0.2
P147	J116	J114	155.4	8	3.1	0.0
P149	J116	J214	114.4	8	26.3	0.2
P151	J118	J120	145.2	8	24.6	0.2
P153	J118	J212	177.0	8	-1.1	0.0
P155	J128	J126	554.7	8	16.7	0.1
P157	J126	J124	120.0	8	16.7	0.1
P159	J132	J130	623.2	8	-18.0	0.1
P161	J106	J220	298.2	12	101.3	0.3
P163	J128	J222	244.2	12	48.9	0.1
P165	J130	J224	465.0	8	27.0	0.2
P167	1250	V8020	25.9	12	1,804.1	5.1
P169	J94	V8016	23.2	8	470.2	3.0
P171	V8018	J102	368.5	8	1,097.4	7.0
P179	J182	J94	282.9	12	-1,299.9	3.7
P181	J190	J102	74.0	8	-1,507.8	9.6
P183	J192	J98	29.4	8	-410.3	2.6
P185	J196	J98	252.3	8	412.8	2.6
P187	J200	J190	228.7	8	-1,507.8	9.6
P189	J202	J208	311.3	8	-470.2	3.0
P191	J204	J202	323.5	8	-460.3	2.9
P193	J206	J100	61.6	8	-29.1	0.2
P195	V8016	J208	358.3	8	470.2	3.0
P197	J210	J118	115.3	8	26.3	0.2
P199	J212	J122	136.5	8	-1.1	0.0
P201	J214	J210	332.7	8	26.3	0.2
P203	J216	J104	189.1	12	-151.4	0.4
P205	J218	J104	57.9	12	1,250.6	3.6
P207	J220	J128	66.2	12	101.3	0.3
P209	J222	J130	156.7	12	48.9	0.1
P211	J224	J134	22.4	8	27.0	0.2
P213	V8020	J174	155.2	12	1,804.1	5.1
P215	J122	J124	295.7	8	-4.3	0.0

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

ENGINEERING MATTERS
ITEM 6: OTHER ENGINEERING AND OPERATIONS PROJECT UPDATES

1. Proposed Capital Improvement Program Budget for Fiscal Year 2021-2022
2. Joplin Property/SCADA Upgrade
3. 2020 Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan (WSCP) Update
4. Master Plan and Condition Assessment RFP
5. Saddle Crest Development
6. Other Projects

RECOMMENDED ACTION:
Committee to receive project status updates at time of the Committee Meeting.

EXHIBIT(S):
1. CIP Budget
2. UWMP & WSCP Schedule
3. Master Plan and Condition Assessment RFP Scope of Work

CONTACTS (staff responsible): PALUDI/PEREA/LAUSTEN

TRABUCO CANYON WATER DISTRICT
5-YEAR CAPITAL IMPROVEMENT PLAN BUDGET
F.Y. 2020/21 - 2024/25

ITEM	WATER	ACTUAL FYE 2021	*PROPOSED* FYE 2022	PROJECTED FYE 2023	PROJECTED FYE 2024	PROJECTED FYE 2025
1	Dimension WTP Vault Improvements				$ 40,000	
2	PRV Improvements	$ 75,000	$ 55,000	$ 75,000	$ 75,000	$ 75,000
3	Domestic Water Turbidimeter Replacement Program - District-wide	$ 10,000		$ 15,000	$ 15,000	$ 15,000
4	Valve Replacement Program	$ 50,000	$ 37,500	$ 37,500	$ 37,500	$ 37,500
5	DWTP Chlorine Building Improvements - Doors & Roof		$ 35,000			
6	DWTP Office & Storage		$ 200,000			
7	DWTP Filter 4 Recoating				$ 150,000	
8	DWTP Backwash Recovery Tank Replacement	$ 320,000				
9	DWTP VFD Pumps (2 Pumps & 3 VFDs)			$ 1,100,000		
10	Live Oak Transmission Main Upgrade		$ 900,000	$ 700,000		
11	Live Oak Transmission Main (Harris to Station 18) Scoping			$ 200,000		
12	Reservoir Rehabilitation Project				$ 500,000	$ 500,000
13	El Toro Road Bike Trail Pipeline Improvements			$ 100,000		
	WATER SUBTOTAL	**$ 455,000**	**$ 1,227,500**	**$ 2,227,500**	**$ 817,500**	**$ 627,500**
	DISTRICT-WIDE	**FYE 2021**	**FYE 2022**	**FYE 2023**	**FYE 2024**	**FYE 2025**
14	SCADA System Upgrades	$ 600,000	$ 1,000,000	$ 900,000		
15	Meter Replacement Program	$ 35,000	$ 35,000	$ 35,000	$ 5,000	$ 5,000
16	AMR/AMI System Implementation - Grant Funding		$ 600,000	$ 600,000		
17	District Facility Security Improvements	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
18	Trucks	$ 55,000	$ 50,000	$ 70,000	$ 70,000	$ 70,000
19	Forklift - WWTP		$ 40,000			
20	Polaris ORV (Mule Replacement)				$ 25,000	
21	Skiploader - AQMD Tier 1 Compliant		$ 100,000			
22	Dump Truck - AQMD Tier 1 Compliant	$ 125,000				
23	Pump Replacement Program	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
24	Field Office Remidiation (Excavation, French Drain, Retaining Wall)		$ 20,000			
	DISTRICT-WIDE SUBTOTAL	**$ 1,015,000**	**$ 2,045,000**	**$ 1,805,000**	**$ 300,000**	**$ 275,000**
	WASTEWATER / RECLAIMED / RECYCLED	**FYE 2021**	**FYE 2022**	**FYE 2023**	**FYE 2024**	**FYE 2025**
25	Wet Well Recoating Program - Sewer		$ 25,000	$ 25,000	$ 25,000	$ 25,000
26	Manhole Recoating Program - Sewer		$ 20,000	$ 20,000	$ 20,000	$ 20,000
27	PRV Vault Improvements Program - Reclaimed		$ 45,000	$ 45,000	$ 45,000	$ 45,000
28	SLS Surge Tank Improvements/Rehabilitation Program - Sewer		$ 25,000	$ 25,000	$ 25,000	$ 25,000
29	Heritage SLS Improvements - Security, Asphalt ,Piping, Bypass, Electrical	$ 100,000	$ 240,000			
30	RW Pump Station Improvements (Dove/RR) - Reclaimed/Recycled	$ 100,000				
31	Dove/RR RW Pump Station - Dove Lake Access Road Improvements			$ 250,000		
32	Golf Club SLS Bypass Construction - Sewer ByPass, MCC, Wet Wet Rehab (guide rails etc).		$ 150,000			
33	Emergency Bypass Pump - Sewer/Reclaimed/Recycled	$ 110,000				
34	WWTP Drying Bed/Sludge Bin Permanent Cover - Sewer				$ 100,000	
35	WWTP Headworks Climber Screen - Sewer - *Travis/Oscar Quote 09/2020*		$ 110,000			
36	WWTP Safety Railing Replacement - Sewer	$ 20,000				
37	WWTP Brine Tank Removal - Sewer				$ 25,000	
38	El Toro SLS Improvements - Phase 1 - Existing Pump Demolition, Backup Generator, Electrical			$ 500,000		
39	El Toro SLS Improvements - Phase 2 -				$ 1,500,000	
40	El Toro SLS Improvements - Phase 3					$ 1,500,000
41	RW PS Header, Filters		$ 120,000			
42	Bell Canyon Sewer Lift Station Improvements	$ 1,800,000				
	WASTEWATER / RECLAIMED / RECYCLED SUBTOTAL	**$ 2,130,000**	**$ 735,000**	**$ 865,000**	**$ 1,740,000**	**$ 1,615,000**
	TOTAL ANNUAL CIP	**$ 3,600,000**	**$ 4,007,500**	**$ 4,897,500**	**$ 2,857,500**	**$ 2,517,500**

2020 UWMP & WSCP Notification and Adoption Timeline

Project Task Description	Schedule
60 Day Notification letter to OC Public Works, County of Orange Clerk Recorder, City of Lake Forest, City of RSM, City of Mission Viejo	March 8, 2021
First Plan & WSCP Draft	March 15, 2021
Receive Final Plan Draft	April 15, 2021
Final Plan to E/O	May 5, 2021
Receive Final WSCP Draft	May 5, 2021
Final WSCP to E/O	June 2, 2021
First Notice of Hearing in newspaper	By June 2, 2021
Second Notice of Hearing in newspaper	By June 9, 2021
1. Hold Public Meeting 2. Adopt 2020 Urban Water Management Plan 3. Adopt 2020 Water Shortage Contingency Plan 4. Adopt Addendum to 2015 UWMP for inclusion of Appendix C 5. Consideration of an Ordinance for the Water Shortage Contingency Response	June 16, 2021
DWR Submittal Due	July 1, 2021
Submit UWMP to the California State Library and city or county	August 1, 2021

2021 Master Plan and Condition Assessment Scope of Work

ITEM	DESCRIPTION
1	Review information from District and past Master Plans
2	Access existing conditions of domestic water, non-domestic water and sewer system facilities
3	Calibrate existing water and non-domestic water models
4	Update Sources, Water Quality and Regulatory Issues
5	Develop a Sewer Hydraulic Model
6	Develop Domestic Water, Non-Domestic Water and Sewer Improvements
7	Recommend Future CIP
8	Update GIS Database
9	Detailed Condition Assessment at Barneburg LS, Golf Club LS, Via Allegre LS, Plano LS/PS, and Dimension Water Treatment Plant. The remaining District vertical assets will be reviewed on a desktop assessment
10	Evaluate and update the facility capacity charges

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

OPERATIONAL MATTERS
ITEM 7: WATER SYSTEM UPDATES

The following is a brief report of the water system for **March 2021**.

Projects and Repairs

1. Water Operations staff replaced water service on Wood Spring Circle in the Portola Hills community.
2. Water Operations staff worked with Ferreira Construction to repair a 14" valve on Ridgeline Rd in the Canyon community.
3. Water Operations staff repaired a struck a Blow Off on the El toro bike trail.
4. Water Operations staff replaced 5 air vacs throughout the District.
5. Water Operations staff replaced a commercial fire hydrant behind Smart & Final.
6. Water Operations staff replaced a curb stop on Mill Stream Road in the Trabuco Highlands community.

Monthly Water System Operations Summary

The Monthly Water System Operations Summary is attached for the Committee's review. Any anomalies will be presented at the time of the Engineering/Operational Committee Meeting.

RECOMMENDED ACTION:

Committee to receive system status updates. No action required.

EXHIBITS

1. Monthly Water System Operations Summary

CONTACTS (staff responsible): PALUDI/KESSLER

TRABUCO CANYON WATER DISTRICT
MONTHLY WATER SYSTEM OPERATIONS SUMMARY

2021													
DIMENSION WTP													
	JAN	**FEB**	**MARCH**	**APRIL**	**MAY**	**JUNE**	**JULY**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	***TOTAL***
SAC METER AC/FT													
BACKWASH AC/FT	4	4											
FLUSHWATER AC/FT	7	6											
WTP EFFLUENT AC/FT	175	124											
Wells													
TRABUCO CREEK GWTF	0	0											
US WELL AC/FT	0	0											
AMP WATER													
SMWD AC/FT	0.12	2											
IRWD AC/FT	0	12.4											
TOTAL SUPPLY													
AC/FT	175	138											
CFS DAILY AVERAGE	2.8	2.5											
AC/FT PER DAY	5.6	5.0											
OPERATIONS in GAL.													
WTP DOMESTIC	32,239	27,377											
WWTP DOM	17,354	18,176											
OPERATIONS (AF)													
SUPPLEMENT TO RW	0	0											
LOSSES in GAL.													
FLUSHING (gal.)	0	0											
SEWER CLEANING (gal.)	5,000	5,000											
LINE BREAKS (gal.)	100,000	24,000											
SYSTEM DEMAND **													
CFS DAILY AVERAGE	2.8	2.5											
AC/FT PER DAY	5.6	5.0											
RESERVOIR STORAGE													
MONTHLY AVG (MG)	9.0	8.8											
DAYS OF STORAGE	4	3											
ZONES (AF)													
RIDGELINE PS	127	107											
EL TORO P.S.	18	20											
TOPANGA	2	2											
FALCON	0.3	0.2											
ROSE PRV/ OAKS	1	1											
CANYON CREEK	0.1	0.2											
ROSE P.S.	0.3	0.3											
ROBINSON RANCH	31	31											
DOVE CANYON	61	54											
PORTOLA HILLS	11	10											
* Usage estimated new meter installed					** Excludes Operational use, losses, and supplement to Recycled Water Reservoir (RW)								

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

OPERATIONAL MATTERS
ITEM 8: WASTEWATER SYSTEM UPDATES

The following is a brief report of the wastewater system for **March 2021.**

Projects and Repairs

1. Wastewater Operations staff responded to flooding at Tick Creek Pump Station due to rain event impacts which resulted in an overflow. Staff remediated the standing water and adjusted the overflow structure.
2. Wastewater Operations staff worked with Ferreira Construction and Koppl Pipeline Services for installation of one in-line isolation valve on the discharge force main at Golf Club Sewer Lift Station.
3. Wastewater Operations staff cleaned the v-ditch below Dove Canyon Recycled Water Pump Station.
4. Wastewater Operations staff performed the annual exercise of the Recycled Water Reservoir discharge valve.
5. Wastewater Operations staff performed routine preventative maintenance on the Belt Press Filter Pump and replace the pump impeller.
6. Wastewater Operations staff worked with Maintenance staff to replace the sludge line to the Belt Press Filter and flow meter.
7. The Wastewater Operations Department welcomes new Operator in Training Mr. Garret Rias.

Sewer System Management Plan (SSMP) Report

1. *SSMP Communication Program*: The purpose of the program is to communicate on a regular basis with the public on the development, implementation, and performance of TCWD's SSMP. Status updates on the work and type of work performed on the sewer system will be provided, including sewer line and manhole cleaning, system repairs, lift station cleaning, and updates from satellite facilities:

- Sewer System – Cleaned **5,244** feet of gravity sewer line.
- Satellite and Contract Facilities:
  - The Oaks at Trabuco Wet Well was pumped out **9** times.
  - O'Neill Park Sewer System (Gravity Sewer, Lift Station, and Force Main)
    - Status: Ok | Repairs: None
- Sewer System Quarterly Report:
  - Next Scheduled Report – **June 2021**

2. *SSMP Program Audits*: Periodic internal audits shall be conducted, at a minimum every two years, with reports kept on file. The audit shall focus on evaluating the effectiveness of the SSMP and TCWD's compliance with the mandatory elements of TCWD's SSMP:

- Next scheduled Report Due: **January 2022**

Monthly Recycled Water System Operations Summary

The Monthly Recycled Water System Operations Summary is attached for the Committee's review. Any anomalies will be presented at the time of the Engineering/Operational Committee Meeting.

RECOMMENDED ACTION:

Committee to receive system status updates. No action required.

EXHIBITS

1. Monthly Recycled Water System Operations Summary
2. Quarterly SSMP Report – 1Q 2021

CONTACTS (staff responsible): PALUDI/PEREA

TRABUCO CANYON WATER DISTRICT | NON-DOMESTIC WATER SYSTEM SUMMARY - 2021

RECYCLED WATER SUPPLY	MAX	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	TOTAL	FIVE YEAR AVG
WWTP Reclaimed Water Production, AF	78.3	50.6	43.9	52.8										147.3	550.04
Reclaimed Reservoir Level, FT	1274.5	1,266.0	1,268.5	1,270.8										-	-
Reclaimed Reservoir Free Board, FT	25.5	8.5	6.0	3.7										-	-
Reclaimed Reservoir Storage, AF	145.5	96.4	112.5	125.2										-	-
Supplemental Domestic Water Added, AF	N/A	0.0	0.0	0.0										0.0	72.88

RECYCLED WATER SYSTEM DEMAND NON DOMESTIC WATER USER	ALLOC. AF	8% JAN	17% FEB	25% MAR	33% APR	42% MAY	50% JUN	58% JUL	67% AUG	75% SEP	83% OCT	92% NOV	100% DEC	TOTAL	ALLOC. %
Dahlia Court	8.2	0.2	0.2	0.2										0.7	8%
Dove Canyon Golf Course	106.7	6.6	7.1	10.6										24.3	23%
Dove Canyon Master Association	279.3	5.5	5.7	7.1										18.3	7%
Robinson Ranch	80.2	0.9	1.3	1.3										3.4	4%
Trabuco Highlands	159.7	3.7	3.0	2.1										8.8	5%
City of RSM	0.1	0.0	0.0	0.0										0.0	0%
Construction Water	N/A	0.0	0.0	0.0										0.0	N/A
Sakaida Nursery	1.1	0.0	0.0	0.0										0.0	0%
SMWD	N/A	0.0	0.0	0.0										0.0	N/A
TY Nursery	17.9	0.0	5.8	4.0										9.8	55%
TOTAL, AF	**653.2**	**16.8**	**23.1**	**25.3**										**65.2**	**10%**
PERCENTAGE OF NDW ALLOCATION/YEAR		**3%**	**6%**	**10%**											
TOTAL ANNUAL AVG. NDW AVAILABLE**	**774.36**														

URBAN RUNOFF CAPTURE AND REUSE DISTRICT FACILITY		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	FIVE YEAR AVG
Shadow Rock Detention Basin Production		0.0	0.0	0.1										0.1	21.2
Dove | Tick Creek Production*	*Dry Season*	0.0	0.0	0.0										0.0	102.7
	TCWD Portion	0.0	0.0	0.0										0.0	-
	SMWD Portion	0.0	0.0	0.0										0.0	-
Dove Lake Water Pumped		0.0	0.0	0.0										0.0	201.7
Dove Lake Free Board, Ft		5.6	5.3	3.2										-	-
Dove Lake Storage		128.0	131.5	166.4										-	-
Total Rainfall, In.		1.7	0.0	1.2										2.9	14.5

**** SMWD share of Dove/Tick Pump Station Dry Season Water is 50% of production.***

***** Based on 5-Year Average Reclaimed Water Reservoir Base Supply & Recycled Water Production***

TRABUCO CANYON WATER DISTRICT

Sewer System Management Plan (SSMP) Quarterly Report

Report Date: March 31, 2021
Report Period: First Quarter 2021 - Jan. to Mar. 2021
Prepared By: Oscar Ulloa, Wastewater Operations Chief Plant Operator

District Sub-Section	Santiago/Portola Hills			Dove Canyon			Rancho Cielo/Walden			Robinson Ranch/Trabuco Highlands		
	Total Amount	Amount Completed	% Completed	Total Amount	Amount Completed	% Completed	Total Amount	Amount Completed	% Completed	Total Amount	Amount Completed	% Completed
Sewer Line Cleaned, Feet	44,625	22,313	50%	64,135	64,135	100%	29,865	29,865	100%	59,170	2,000	3%
Manholes, Inspected/Cleaned	205	103	50%	212	212	100%	124	124	100%	236	5	2%
Manholes Needing Repair	0	0	0%	0	0	0%	0	0	0%	0	0	0%
Wet Wells, Inspected/Cleaned	2	2	100%	3	3	100%	1	1	100%	2	1	50%
Lift Stations, Inspected/Maintained	2	2	100%	3	3	100%	1	1	100%	2	2	100%
Grease Interceptors Inspected	1	0	0%	2	2	100%	5	5	100%	n/a	n/a	n/a

Note: All Sewage Lift stations are inspected 3-4 times a week

Contract Services	O'Neill Park/OCFA		
	Total Amount	Amount Completed	% Completed
Sewer Line Cleaned, Feet	12,700	0	0%
Manholes, Inspected/Cleaned	95	0	0%
Manholes Needing Repair	0	0	0%
Wet Wells, Inspected/Cleaned	1	1	100%
Lift Stations, Inspected/Maintained	1	1	100%
Grease Interceptors Inspected	0	0	0%

Sanitary Sewer System Cleaning Status Summary	
Total Sewer Line, Feet	210,495
Total Sewer Line Cleaned, Feet	118,313
Total Sewer Line Cleaned, %	56%

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

OPERATIONAL MATTERS
ITEM 9: MAINTENANCE DEPARTMENT UPDATES

The following is a brief report of the wastewater system for **March 2021.**

Projects and Repairs

1. Maintenance Department staff Installed a new chemical feed pump at the Dimension Water Treatment Plant.
2. Maintenance Department staff worked with Ferreira construction and Koppel Construction to wet tap a new isolation valve at the Golf Club Lift Station force main.
3. Maintenance Department staff worked with Sanitation Operations at the Golf Club Lift Station dry pit to install a new isolation valve and check valve flappers (night job).
4. Maintenance Department staff (2) along with staff from Water Operations (2) and Wastewater Operations (2) trained, tested, and passed the NCCCO crane certification program.
5. Maintenance Department staff assisted with an emergency repair at the Golf Club Lift Station emergency generator. Along with assisting Duthie Power on the install of a new water pump, belts, and coolant.
6. Maintenance Department staff assisted Flo-Services on the continuing work at El Toro Sewer Lift Station north side sewer pumps.

RECOMMENDED ACTION:

Committee to receive system status updates. No action required.

EXHIBITS

None

CONTACTS (staff responsible): PALUDI/STROUD

TRABUCO CANYON WATER DISTRICT
ENGINEERING/OPERATIONAL COMMITTEE MEETING | APRIL 7, 2021

REGULATORY AND OTHER MATTERS
ITEM 10: OTHER MATTERS/REPORTS

Other Matters/Reports from the General Manager and/or District staff may be provided at the time of the Engineering/Operational Committee Meeting.

RECOMMENDED ACTION:
Hear Other Matters/Reports that may have arisen after the posting of the agenda.

EXHIBITS
None

CONTACTS (staff responsible): PALUDI