Agenda

Sacramento Suburban Water District

Facilities and Operations Committee

3701 Marconi Avenue, Suite 100
Sacramento, CA 95821

Thursday, October 29, 2015
3:00 p.m.

Public documents relating to any open session item listed on this agenda that are distributed to the Committee members less than 72 hours before the meeting are available for public inspection in the customer service area of the District's Administrative Office at the address listed above.

The public may address the Committee concerning any item of interest. Persons who wish to comment on either agenda or non-agenda items should fill out a Comment Card and give it to the General Manager. The Committee Chair will call for comments at the appropriate time. Comments will be subject to reasonable time limits (3 minutes).

In compliance with the Americans with Disabilities Act, if you have a disability, and you need a disability-related modification or accommodation to participate in this meeting, then please contact Sacramento Suburban Water District Human Resources at (916)679-3972. Requests must be made as early as possible and at least one-full business day before the start of the meeting.

Call to Order

Roll Call

Public Comment
This is an opportunity for the public to comment on non-agenda items within the subject matter jurisdiction of the Committee. Comments are limited to 3 minutes.

Consent Items
The committee will be asked to approve all Consent Items at one time without discussion. Consent Items are expected to be routine and non-controversial. If any member of the Committee, staff or interested person requests that an item be removed from the Consent Items, it will be considered with the action items.

1. **Minutes of the September 3, 2015 Facilities and Operations Committee Meeting**
   Recommendation: Approve subject minutes.

Items for Discussion and Action

2. **Water System Master Plan and 2015 Urban Water Management Plan Update**
   Receive written staff report and update from consultant.

3. **Fulton/El Camino Recreation and Park District Easement Update**
   Receive written staff report and direct staff as appropriate.

4. **Water Transmission Main Asset Management Plan**
   Receive written staff report and direct staff as appropriate.

5. **Cost to Add Fluoridation to North Service Area Update**
   Receive written staff report.

6. **McClellan Business Park Improvement Agreement Update**
   Receive written staff report.

Adjournment

* *

Upcoming Meetings:

Monday, November 16, 2015, at 6:30 p.m., Regular Board Meeting

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I certify that the foregoing agenda for the October 29, 2015, meeting of the Sacramento Suburban Water District Facilities and Operations Committee was posted by October 27, 2015, in a publicly-accessible location at the Sacramento Suburban Water District office, 3701 Marconi Avenue, Suite 100, Sacramento, California, and was made available to the public during normal business hours.

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Robert S. Roscoe
General Manager/Secretary
Sacramento Suburban Water District

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Minutes

Sacramento Suburban Water District
Facilities and Operations Committee
Thursday, September 3, 2015

Call to Order
Chair Bob Wichert called the meeting to order at 5:00 p.m.

Roll Call

Directors Present:	Chair Bob Wichert and Kevin Thomas.
Directors Absent:	None.
Staff Present:	General Manager Robert Roscoe, Assistant General Manager Dan York, David Espinoza, Heather Hernandez-Fort, Dave Jones, John Valdes, James Arenz, Lynne Yost, Greg Bundesen.
Public Present:	Neil Schild, William Eubanks, Julie Beyers.

Public Comment
None.

Announcements
Chair Wichert announced the addition of Agenda Item 8; Antelope North Road Property for Sale. He inquired if there was any public opposition to adding this new agenda item. No opposition was indicated. Chair Wichert made a motion to add Agenda Item 8; Director Thomas seconded the motion. The motion carried by unanimous vote.

AYES:	Thomas and Wichert.	ABSTAINED:	
NOES:		RECUSED:	
ABSENT:			

Consent Items

1. **Minutes of the July 23, 2015 Facilities and Operations Committee Meeting**
   Director Thomas moved to approve the Minutes; Chair Wichert seconded. The motion carried by unanimous vote.

AYES:	Thomas and Wichert.	ABSTAINED:	
NOES:		RECUSED:	
ABSENT:			

Items for Discussion and Action

2. **Prop 84 O&M Agreement with City of Sacramento for Enterprise Intertie Improvements**
   Mr. John Valdes presented the staff report.

Chair Wichert commented that he is mostly in favor of this agreement, and requested to see the final draft once completed. He also requested for staff to be able to track time spent supporting this facility. Director Thomas also supported this agreement.

3. **Fluoridation in the South Service Area**
   Mr. Valdes presented the staff report.

   Mr. Eubanks commented

   Chair Wichert noted his desire to examine the feasibility of including fluoride to NSA water supply. He requested to bring this item back to the Committee, including previous Board discussions on this topic.

   Ms. Julie Beyers commented that PCWA is presently fluoridated. GM Robert Roscoe (GM Roscoe) clarified that the District purchases raw water from PCWA, which is then treated by the San Juan Water District, and the treatment process does not include fluoride.

   The Committee directed staff to present this to the full Board as an information item.

4. **Succession Plan Update**
   GM Roscoe presented the staff report.

   Mr. Eubanks commented.

   The Committee directed staff to present this to the full Board as an information item.

5. **Sacramento River Water Reliability Study Update**
   Mr. Valdes presented the staff report.

   Chair Wichert inquired if staff supports the draft Sacramento River Regional Water Reliability Project Planning Phase 1 Report. GM Roscoe stated that staff supports this project. He further explained the position of the District and the potential benefits to the District.

   Director Thomas questioned the likelihood of the project advancing. GM Roscoe clarified that this project would have a very good chance to advance with the full support of the two major drivers; PCWA and the City of Sacramento. Assistant General Manager York (AGM York) stated that the latest information is that both of those entities are in full support of the project.

   Chair Wichert stated that the project sounds very complimentary to the mission of the District, and that politically this project makes a lot of sense.

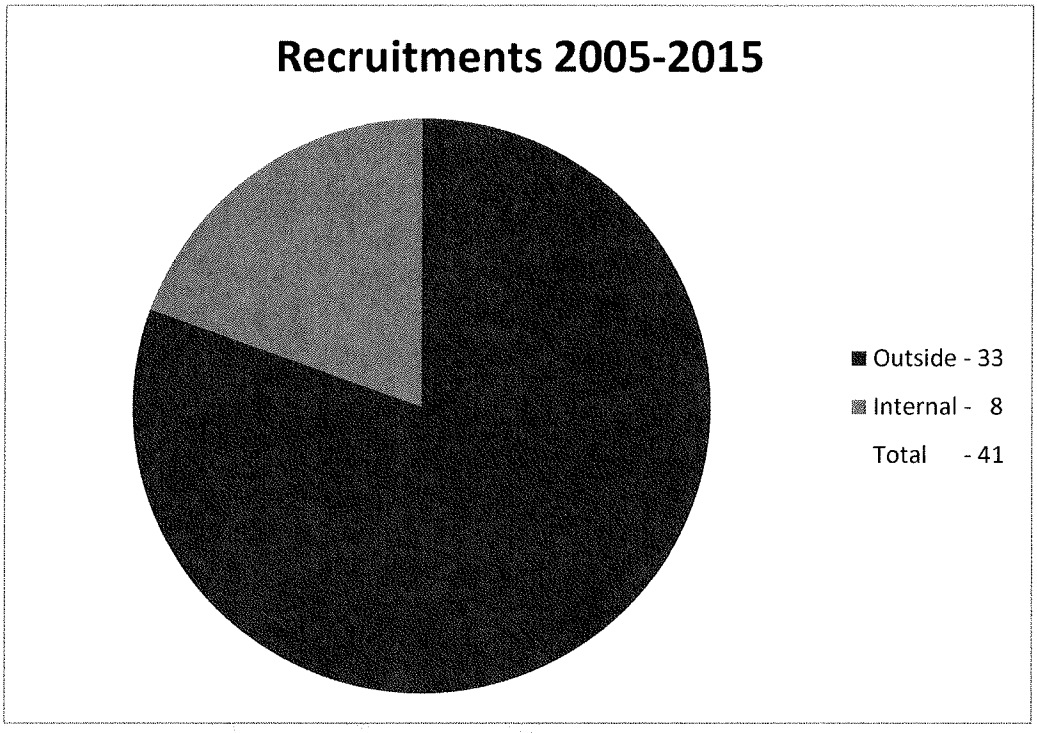
   The Committee recommended staff present this to the full Board with a recommendation of approval of continued involvement.

6. **District Hiring Practices**

GM Roscoe presented the staff report including a chart representing internal recruitments versus outside recruitments from 2005 to 2015.

Director Thomas complimented GM Roscoe on his management choices.

Chair Wichert requested placing the chart into the minutes.



7. **Water Conservation Update**
Mr. Greg Bundesen presented the staff report. GM Roscoe further explained that staff's recommendation is to further educate customers about appropriate watering with the weather, promoting one day per week watering.

Mr. Eubanks commented.

Director Thomas suggested staff brainstorm on new creative ways to promote water conservation.

Director Wichert suggested revising the staff report to include any updates along with adding staff's recommendation of promoting one day per week watering.

The Committee directed staff to present the updated report to the full Board for consideration and possible action.

8. **Antelope North Road Property for Sale**
GM Roscoe presented the staff report. He stated that staff would like to present this option to the full board at the September 21, 2015 regular Board meeting. He explained

that staff would then request for the Board to approve a contingent offer on the property, subject to appraisal and a phase 1 environmental assessment.

AGM York stated that the property is currently listed at $150,000. Discussion ensued regarding contingent offers, and the possibility of a contingent offer holding the property while the appraisal and phase 1 environmental assessment are being conducted.

The committee supported staff having an official property appraisal done and recommended presenting the official appraisal to the full Board for consideration and possible action.

Adjournment

Chair Wichert adjourned the meeting at 6:27 p.m.

Robert S. Roscoe
General Manager/Secretary
Sacramento Suburban Water District

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SACRAMENTO SUBURBAN WATER DISTRICT

Facilities and Operations Committee

Agenda Item: 2

Date: October 23, 2015

Subject: Water System Master Plan and 2015 Urban Water Management Plan Update

Staff Contact: John E. Valdes, Engineering Manager

Recommended Committee Action:
Receive report from staff and consultant on progress to date in updating the District's Water System Master Plan and preparing the 2015 Urban Water Management Plan and direct staff as appropriate.

Discussion:
In June/July 2015, following a qualification based selection process, the firm of Brown and Caldwell (B&C) was hired to update the District's 2009 Water System Master Plan and to prepare the 2015 Urban Water Management Plan (UWMP). B&C is well qualified for this project as they prepared the 2009 Water System Master Plan and the District's 2010 UWMP. Subsequently, their team prepared water system master plans for Sacramento County Water Agency and the City of Davis. B&C has prepared over 100 UWMP's including the only one that successfully withstood a legal challenge. They have also done master planning work for other large water agencies in the Sacramento region and are very familiar with the District's system and groundwater wells.

At the Facilities and Operations (F&O) Committee Meeting held on July 23, 2015, B&C "kicked off" the master planning and UWMP project by providing the F&O Committee an overview of the project, reviewing the planned scope of work and schedule, and discussing key issues that the Water System Master Plan and 2015 UWMP will need to address. They also discussed policy level decisions that the F&O Committee will be asked to make during the master planning process. At that meeting, it was indicated that they would be attending future committee meetings to provide updates on their progress.

The work to update the Water System Master Plan is well underway and B&C will now be providing the F&O Committee with a presentation on their progress. B&C has made significant progress on the demographic projections and the long term well rehabilitation plan. A draft Technical Memo (Chapter) has been prepared on the demographic projections that are currently undergoing review by District staff. B&C has also made progress on the conjunctive use

analysis. In addition, B&C staff has met with District operations staff to discuss the SCADA and preventative maintenance tasks and they have reviewed District water quality data.

As currently planned, B&C representatives will attend the next Facilities and Operations Committee Meeting to provide the committee with a detailed update on the project.

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SACRAMENTO SUBURBAN WATER DISTRICT

Facilities and Operations Committee

Agenda Item: 3

Date: October 23, 2015

Subject: Fulton/El Camino Recreation and Park District Easement Update

Staff Contact: Dave Jones, Associate Engineer
Patrick Wilson, Assistant Engineer

Recommended Committee Action:
Receive report from staff on the current status of easement acquisitions from the Fulton/El Camino Recreation and Park District (FECRPD), as needed for various main replacement projects, and direct staff as appropriate.

Discussion:
Over the past year, District staff has been working with management staff of FECRPD regarding the acquisition of three separate pipeline easements that will support proposed main replacement projects. Staff was directed to pursue the easements and report back to the Facilities and Operations (F&O) Committee.

There are three separate sites where the District has interest in obtaining easements from the FECRPD:

- Site 1 pertains to the Santa Anita Well site within the boundaries of the Santa Anita Park (See Exhibit 1).
- Site 2 is an easement for a public fire hydrant at the north side of the Howe Avenue Park (See Exhibit 2).
- Site 3 is an easement for a proposed pipeline linking the District's Morse/Cottage Park Well #37 to the existing distribution system in the public Right of Way (See Exhibit 3).

These sites and the required easements are described in more detail below:

Site 1 – Santa Anita Park

Site 1, as shown on Exhibit 1, is an easement for a new pipeline and an ingress/egress access easement to the District's Well #12, located in Santa Anita Park. Currently, there is a 15- foot wide ingress/egress easement acquired in the 1950's along the back property line between the Santa Anita Park and the homeowners on the south side of Hernando Road. This recorded easement has never been put into District use; is currently occupied with both underground and aerial utilities; and is landscaped with established trees. Due to its location and current use, the existing 15-foot easement does not meet the District's needs for the main replacement project. Consideration should be given to the possibility of quit claiming this easement back to the FECRPD as part of the negotiation process.

As shown on Exhibit 1, two proposed easements are within the project area of the recently completed Santa Anita Phase 2 Main Replacement Project. One proposed easement is a 10-foot wide ingress/egress easement over an existing 10-foot wide concrete walkway that extends from Hernando Road to the District's well site. In addition to the ingress/egress easement, there is also a separate proposed 10-foot water pipeline easement for pipeline installation combined with two proposed temporary 5-foot wide construction easements on each side of the pipeline easement. This allows for a 20-foot wide area to install the proposed water pipeline.

Currently there are several unresolved issues pertaining to the acquisition of these proposed easements at the Santa Anita Park site including the alignment of the required easements. FECRPD has proposed three different options to District staff for the acquisition of the easements.

- Option 1 – The FECRPD would provide the District with a new well site at another FECRPD park and also the required easement(s) at Santa Anita Park. In exchange for the new property, the District would deed the existing well at Santa Anita Park to FECRPD, which would use the well for irrigation purposes.

- Option 2 – The FECRPD would like to obtain unchlorinated water directly from the existing well prior to the District's chlorination system for irrigation purposes. Although there is no official request for this option, the FECRPD requested that this be analyzed. This would require the State Water Resources Control Board, Division of Drinking Water (DDW), to re-permit the well for both irrigation (park district) and domestic (water district) purposes. There are a number of potential issues that would be of concern such as gift of public funds, cross-connection concerns, and long term groundwater basin issues. To comply with this request the District would have to apply for an amended Water Supply Permit with DDW. This well is currently permitted as a potable groundwater well.

- Option 3 – The FECRPD would like to partner with the District to build a drought demonstration garden at Howe Avenue Park. The FECRPD has committed to maintain the garden after it is constructed.

FECRPD's General Manager has expressed a willingness to work with the District on the easement acquisition and to reach an agreement satisfactory to both agencies. Staff recommends further discussions on Options 1 and 3.

Site 2 – Howe Avenue Park

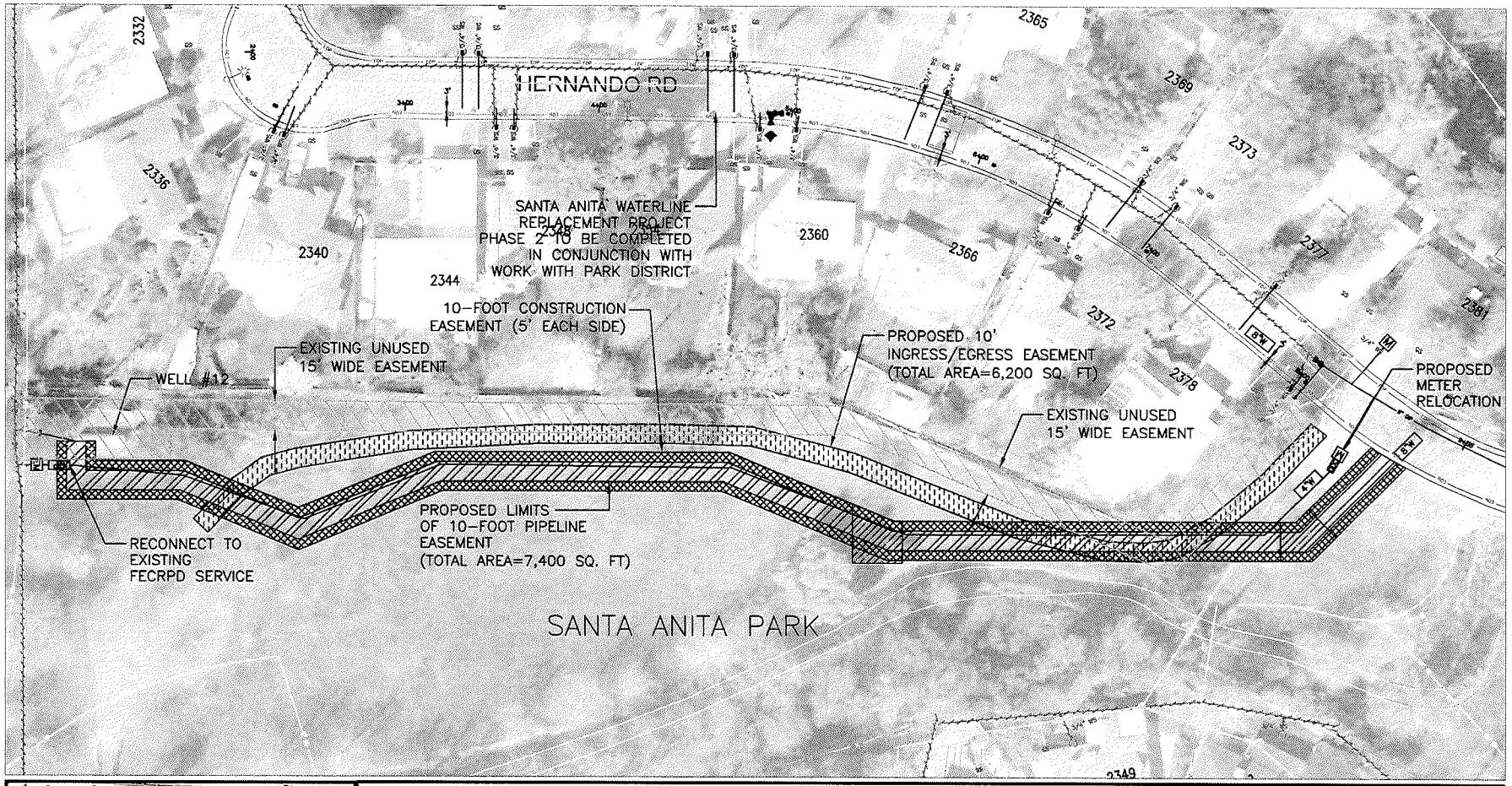
Site 2, as shown on Exhibit 2, is part of the Barcelona Water Main Replacement Project currently under construction. The required pipeline easement allows for the upgrading of an existing public fire hydrant to meet District standards and includes installation of a properly sized water main to meet current fire flow requirements. The proposed pipeline easement is 10-foot wide. There is a separate and adjoining 20-foot/24-foot ingress/egress easement. The proposed pipeline easement is overlapped 4-feet along the westerly portion of the 24-foot wide ingress/egress easement. These easements have been approved by the FECRPD and will be presented to the District's Board for approval at the November regular Board meeting. Staff recommends accepting the 10-foot pipeline easement.

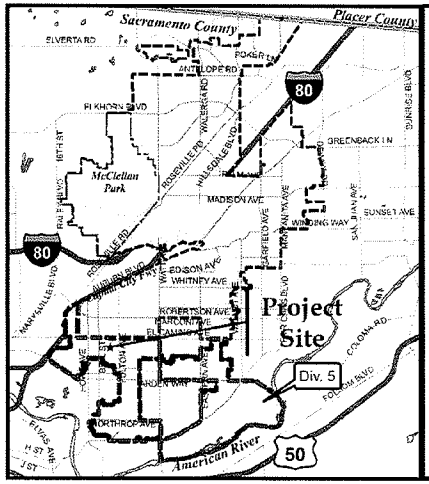
Site 3 – Cottage Park

Site 3, as shown on Exhibit 3, is part of the 2016 Drayton Heights Phase 2 Water Main Replacement Project proposed for construction beginning in late January or early February 2016. Currently, the District's Morse/Cottage Park Well #37 delivers water to the existing distribution system through backyard outside diameter steel water mains. The Drayton Heights Phase 2 project will install new ductile iron water mains in the street right-of-way. However, since Well #37 does not front any right of ways or have any easements available for infrastructure or access to the well, it is necessary to acquire two easements through the existing parking lot owned by FECRPD. The proposed easements, 10-foot pipeline and 10-foot construction, provide for a 20-foot working width for construction of the water system facilities. However, members of the FECRPD Board are currently only willing to provide the District with a 10-foot pipeline easement at the end of construction. Staff recommends accepting the 10' pipeline easement.

Fiscal Impact:

Due to a possible financial exchange for the easements, construction of a new groundwater well, or partnership in a drought demonstration garden at Howe Park, there are undetermined fiscal impacts to the District.





MAP NOT TO SCALE

Portion of Sacramento Suburban Water District

Exhibit 1

NOT FOR RECORDING

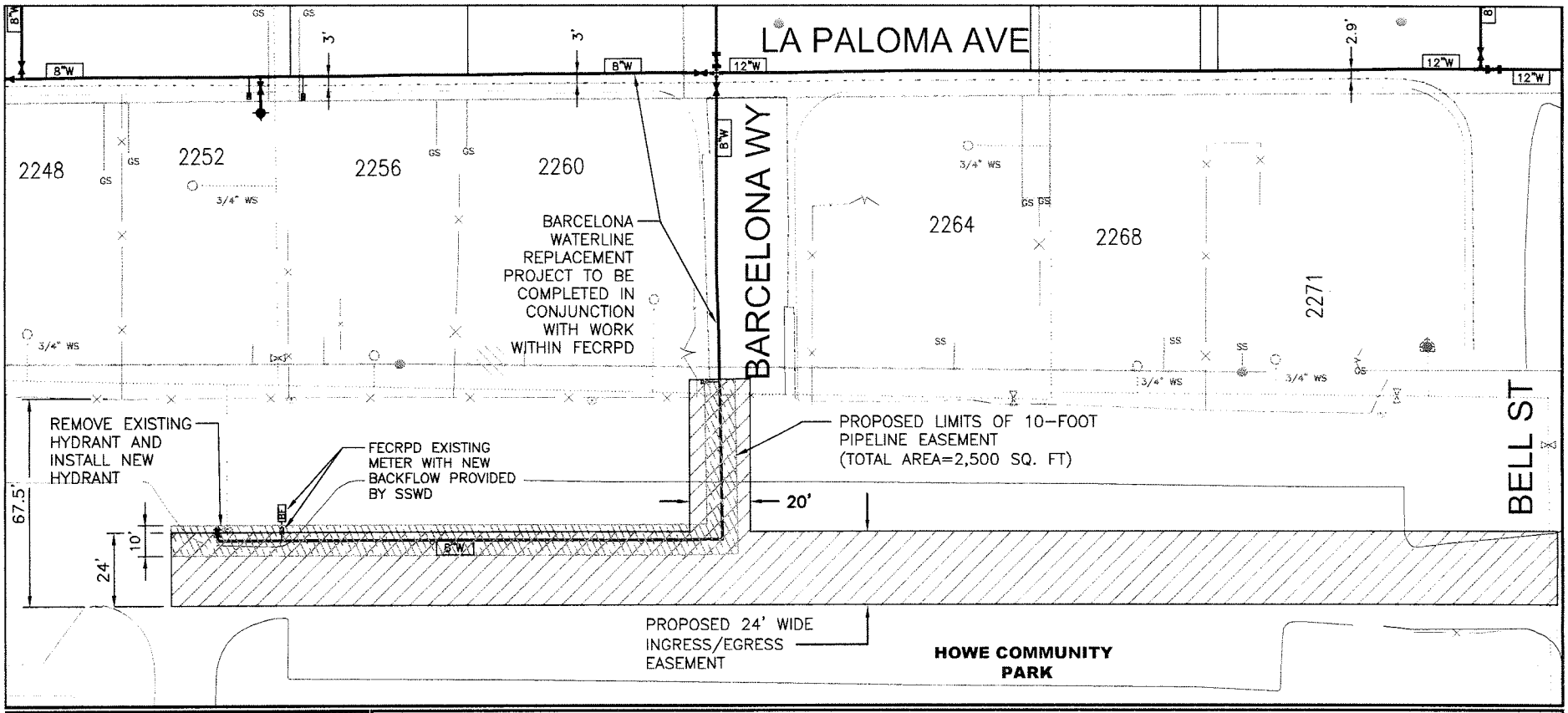
2015 Santa Anita Waterline Replacement Project Phase 2 Proposed Easement for Well #12

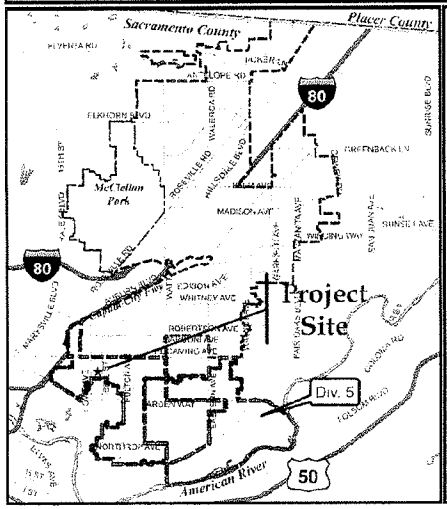
(Voting Division 5)

SACRAMENTO SUBURBAN WATER DISTRICT

Base Data: Sacramento County Gis Base Map
Projection: CA State Plane 2, NAD83
Scale: As Shown
Prepared by: DAV SSWD
Sacramento, Ca. May, 2015
Well-12-Esmt.mxd

THIS MAP SHOWS THE LOCATION OF THE PROJECT SITE AND IS NOT PART OF THE EASEMENT DOCUMENTS





MAP NOT TO SCALE

Portion of Sacramento Suburban Water District

Exhibit 2

NOT FOR RECORDING

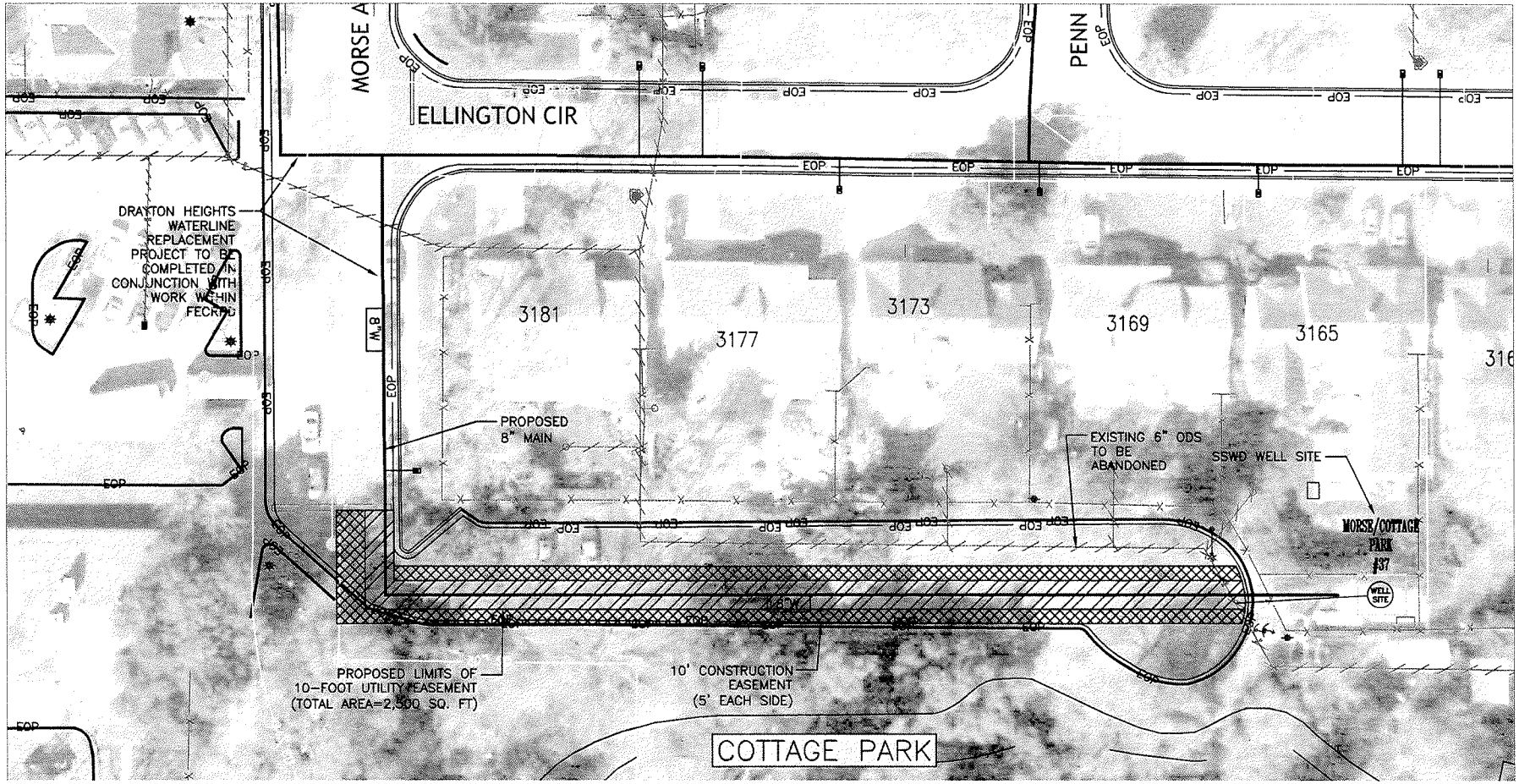
2015 Barcelona Waterline Replacement Project
Proposed Pipeline & Ingress/Egress Easement
At Howe Park

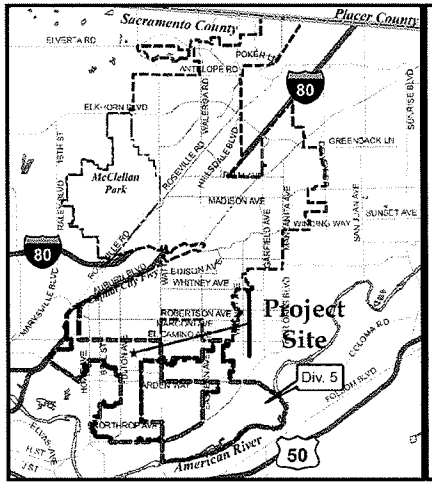
(Voting Division 5)

SACRAMENTO SUBURBAN WATER DISTRICT

Base Data: Sacramento County Gis Base Map
Projection: CA State Plane 2, NAD83
Scale: As Shown
Prepared by: DAV SSWD
Sacramento, Ca. May, 2015
Howe Park-Esmt.DWG

THIS MAP SHOWS THE LOCATION OF THE PROJECT SITE AND IS NOT PART OF THE EASEMENT DOCUMENTS





MAP NOT TO SCALE

Portion of Sacramento Suburban Water District

Exhibit 3

NOT FOR RECORDING

2016 Drayton Heights Water Main Replacement Project Phase 2 Proposed Easement for Well #37

(Voting Division 5)

SACRAMENTO SUBURBAN WATER DISTRICT

Base Data: Sacramento County Gis Base Map
Projection: CA State Plane 2, NAD83
Scale: As Shown
Prepared by: DAV SSWD
Sacramento, Ca. May, 2015
Well-37-Esmt.mxd

THIS MAP SHOWS THE LOCATION OF THE PROJECT SITE AND IS NOT PART OF THE EASEMENT DOCUMENTS

Back to Agenda

SACRAMENTO SUBURBAN WATER DISTRICT

Facilities and Operations Committee

Agenda Item: 4

Date: October 23, 2015

Subject: Water Transmission Main Asset Management Plan

Staff Contact: John Valdes, Engineering Manager

Recommended Committee Action:
Review Draft Water Transmission Main Asset Management Plan (WTMAMP) update. Provide input and direct staff to bring before the full Board at the December 2015 regular Board meeting.

Discussion:
The District's various asset management plans are systematically updated on a three to five year schedule. The WTMAMP, originally adopted by the Board in August 2011, has now been updated. It has been updated to include new information regarding proposed future transmission mains, condition assessment, corrosion testing and cathodic protection, and costs (for rehabilitation and/or replacement). A draft copy of the updated WTAMP is attached as Exhibit 1 to this staff report.

The primary objective of the WTMAMP is to inventory the District's existing transmission mains in terms of size, type of pipe and age and to discuss a plan for monitoring and testing and potential repair, rehabilitation and/or replacement. Fortunately, the District's transmission mains are generally newer pipes within the system and they typically have cathodic protection for corrosion control to further increase their life expectancy. However, they are also the largest and most expensive pipes to replace when the need arises. Additionally, this WTMAMP looks at various proposed future transmission mains that would benefit the District and the ability to move water within its service area.

The purpose and goals of the WTMAMP are to:

- Provide for a safe and reliable water transmission system.
- Inventory the District's existing transmission mains by size, type and age.
- Provide a preliminary plan for transmission main monitoring and condition assessment.

- Provide a preliminary plan for transmission main rehabilitation and/or replacement that can be adapted and modified to incorporate new technologies, management practices, and District needs.
- Provide for a maintenance schedule.
- Provide a direction and framework for future plan revisions.
- Coordinate with the District's Water Main Replacement Plan (WMRP).
- Coordinate with the District's long term *Water System Master Plan* and Capital Improvement Program (CIP).
- Provide supporting information to address the District's capital reserves going forward.

There are currently over 53 miles of 16-inch and larger transmission mains throughout the District. The majority (56.1%) of the transmission mains were constructed in the last 15 years and are in excellent condition with a long useful life remaining. Approximately 80% of the transmission mains are less than 25 years of age. The District's metallic transmission mains also include cathodic protection monitoring test stations to track corrosion rates of the pipelines. The average useful life of the water transmission mains is estimated at between 70 and 150 years depending on the pipe material, corrosion rates, and other factors. If planned future transmission mains are funded and constructed, they would add approximately 34 miles of new transmission mains to the District's system.

Various methods are available for monitoring and testing the condition of the piping and performing condition assessments. The newer water transmission mains within the District were constructed to allow for electrical continuity between pipe sections. Test stations are available at various intervals to allow for the monitoring of corrosion rates by collecting pipe-to-soil (P/S) potentials. The District has a program to regularly test these transmission mains but more emphasis must be placed on implementing impressed current cathodic protection systems in the future. Impressed current cathodic protection systems use sacrificial anodes buried deep in the earth and a rectifying element to provide adjustable current across a transmission pipeline in order to mitigate corrosion. Impressed current systems provide the District with control over the amount of current distributed to the transmission mains allowing for more accurate protection of the pipelines. In addition, the District is considering an acoustic based testing method to perform condition assessment on other piping.

Various alternatives are available for pipeline rehabilitation and/or replacement. One of the most common methods for large pipe rehabilitation is known as slip lining. This method is less invasive than traditional open cut or bore technology methods. In 2015 dollars, the cost for this rehabilitation can range from approximately 30-percent to 50-percent of the cost of complete replacement. Rehabilitation can extend the service life of the pipe by an estimated 50-years or more. Transmission main replacement costs are estimated to range from $1.1 million per mile for 16-inch diameter piping to $4.0 million per mile for 48-inch piping.

Similar to the WMRP, it is anticipated that this WTMAMP will be amended periodically in the future as conditions warrant. Review and reassessment of the WTMAMP is recommended for 3 to 5-year intervals. Future information that could change the plan include, but are not limited to, improved recordkeeping, information from leak detection surveys, information from condition assessment surveys and testing, infrastructure failures, catastrophic events, merger or consolidation with other water purveyors, and/or changes in District policies.

Fiscal Impact:

The draft WTMAMP update identifies future costs for the rehabilitation and/or replacement of water transmission mains. However, as reflected by language in the WTMAMP, it does not represent a financial commitment by the Board, other than those Capital Improvement Program (CIP) funds already approved and adopted. The Plan will be used as a planning tool during annual CIP budget discussions with the Board.

Over the next 100-years (2015 – 2115), costs have been estimated to rehabilitate and/or replace the District's transmission mains and those in which the District owns capacity (SJWD and the City of Sacramento). This cost estimate assumes that any transmission mains installed prior to 1985 will have a service life of 70-years and any transmission mains installed in 1985 or later will have a service life of 90-years. Once the existing pipelines reach their estimated service life it is further estimated that 50-percent of the pipelines will be rehabilitated using localized repair and rehabilitation methods, 25-percent of the pipelines will be rehabilitated using the slip lining process, and 25-percent of the pipelines will be replaced. Based on these assumptions, it is estimated that the total cost to rehabilitate and/or replace existing transmission mains over the next 100-years is approximately $87 million (in 2015 dollars). Based on an economic analysis, the present value of estimated future transmission main rehabilitation and/or replacement costs is approximately $257 million.

DRAFT

Water Transmission Main Asset Management Plan

October 2015

(Update From August 2011)

SACRAMENTO SUBURBAN WATER DISTRICT

LIST OF FIGURES

Figure 1. Transmission Mains by Size Map

Figure 2. Transmission Mains by Type Map

Figure 3. Transmission Mains by Age Chart

Figure 4. Transmission Mains by Age Map

Figure 5. Capacity in Transmission Mains Owned by Others

Figure 6. Proposed Future Transmission Mains

Figure 7. Acoustic Testing with Measurement of Acoustic Propagation Velocity

Figure 8. Transmission Main Life Expectance

Figure 9. Transmission Main Rehabilitation/Replacement Costs from 2015-2115

LIST OF TABLES

Table 1. Length of Transmission Mains by Size and Type of Pipe

Table 2. Age of Transmission Mains by Type of Pipe

Table 3. Pipe Diameter per Type by Length

Table 4. Pipe Diameter per Type by Percent

Table 5. Estimated Transmission Main Replacement Costs (Open Trench Construction)

pursuing conjunctive use opportunities, larger backbone transmission mains began to be constructed to move surface water throughout the District. The only exception is that the former Arcade Water District constructed a series of shallow infiltration wells along the American River in the 1960's and a fairly substantial transmission main system was constructed to move this surface water into the southeast portion of the District's South Service Area. These are the oldest pipes in the current transmission main system.

Although District staff has considerable experience and information on the replacement of aging water distribution mains, staff has very limited experience with repair, rehabilitation, maintenance, or replacement of the larger transmission mains. Therefore, for this report, staff has relied on research information and the experiences of other agencies. Cost estimates are considered as "ballpark" because they are based on an "educated guess" set of assumptions in regards to pipe life expectancy, the ability to rehabilitate as opposed to replace the majority of the pipe when it reaches the end of its useful life, and the methods to be used for pipeline rehabilitation. Staff anticipates refining the assumptions and cost estimates going forward based on institutional experience and industry experience.

This WTMAMP is intended to be used as a tool for ongoing communication between the Board and staff to prioritize water transmission main assessment, rehabilitation, maintenance, or replacement. Furthermore, it is to also be used as a planning tool during annual capital improvement program (CIP) budget discussions with the Board. This Plan does <u>not</u> represent a financial commitment by the Board, other than those CIP funds already in the District's approved budget.

The purpose and goals of the WTMAMP are to:

- Provide for a safe and reliable water transmission system.
- Inventory the District's existing transmission mains by size, type and age.
- Provide a preliminary plan for transmission main monitoring and condition assessment.

systems in the future. Impressed current cathodic protection systems use sacrificial anodes buried deep in the earth and a rectifying element to provide adjustable current across a transmission pipeline in order to mitigate corrosion. Impressed current systems provide the District with control over the amount of current distributed to the transmission mains allowing for more accurate protection of the pipelines. In addition, the District is considering an acoustic based testing method to perform condition assessment on other piping.

The majority of the District's transmission mains are already located within public streets and therefore replacement becomes more complicated due to available space within the right-of-way. However, the fact that the transmission mains are in the preferred location (i.e., the street) allows for other different approaches to extend the life of the transmission mains through repair and/or rehabilitation including relining or other rehabilitation alternatives.

Various alternatives are available for pipeline rehabilitation and/or replacement. One of the most common methods for large pipe rehabilitation is known as sliplining. This method is less invasive than traditional open cut or bore technology methods. In 2015 dollars, the cost for this rehabilitation can range from approximately 30-percent to 50-percent of the cost of complete replacement. Rehabilitation can extend the service life of the pipe by an estimated 50-years or more. Transmission main replacement costs are estimated to range from $1.1 million per mile for 16-inch diameter piping to $4.0 million per mile for 48-inch piping.

Over the next 100-years (2015 – 2115), costs have been estimated to rehabilitate and/or replace the District's transmission mains and those in which the District owns capacity (SJWD and the City of Sacramento). This cost estimate assumes that any transmission mains installed prior to 1985 will have a service life of 70-years and any transmission mains installed in 1985 or later will have a service life of 90-years. The life expectancy of these pipelines can vary greatly depending on many factors including construction methods, quality of pipe manufacturing, soil corrositivity, water quality, maintenance, etc. Once the existing pipelines reach their estimated service life it is further estimated that 50-percent of the pipelines will be rehabilitated using

INTRODUCTION / BACKGROUND

Water utilities throughout the United States are currently facing the challenge of extensive rehabilitation and replacement of aging and deteriorated water infrastructures. In 2010, the American Society of Civil Engineers (ASCE) published a report card on America's infrastructure and their rating for drinking water systems was a D-[1]. As part of their study, ASCE estimated the 5-year funding requirement for drinking water and wastewater infrastructure at $255-billion. The Sacramento Suburban Water District (SSWD) faces the same challenges in this regard. Of particular concern to SSWD are the older water distribution mains that date back prior to the 1950's. Some portions of these pipelines have been in service since the mid-1920's. An ongoing water main replacement program is underway to replace aging distribution mains that have outlived their useful life.

The next step is to evaluate and assess the District's larger water pipes, or transmission mains. Transmission mains are larger pipes (16-inches in diameter and larger) which are designed to move large quantities of water from the source of supply, such as a treatment plant or groundwater well, and provide water to the smaller distribution mains. Service lines to homes and businesses are not normally connected to a transmission main, and is not a major consideration in selecting the type of pipe to be used. Distribution mains are a network of smaller mains branching off from the transmission mains to which are connected the house service lines and meters, fire hydrants, and other appurtenances (blow-offs, etc.). Transmission isolation valves are typically installed at pipe junctions (at street intersections) but certainly within quarter mile intervals to allow for a leaking or damaged section of pipe to be shut off with minimum interruption of water service to adjacent areas.

The likelihood of a transmission main failure is lower than for other piping systems because they are typically more substantial in design. In addition, transmission mains typically have no service connections, which means there are significantly fewer locations where the pipe wall has been compromised. However, the consequences of failure for a transmission main are

[1] Source: *Report Card for American Infrastructure*, American Society of Civil Engineers, 2009.

TYPES OF PIPE USED FOR DISTRICT TRANSMISSION MAINS

The five pipe materials used for water transmission mains within the District are asbestos cement pipe (ACP), concrete cylinder pipe (CCP), cement mortar lined and coated steel (CMLCS) pipe, ductile iron pipe (DIP), and polyvinyl chloride (PVC). Standards for the manufacture of each type of pipe are established and maintained by the American Water Works Association (AWWA). The CCP, CMLCS and DIP pipe types contain ferrous materials and as a result, they need to be protected from both internal and external corrosion and each type uses a different method to prevent corrosion. A brief description of each type of pipe follows below.

Asbestos Cement Pipe (ACP)

ACP pipe is a concrete pipe made of a mixture of Portland cement and asbestos fibers. It is highly resistant to corrosion and it has historically been used for drainage systems, waterworks systems, and gas lines. ACP pipe was used extensively in the mid-1900's in potable water distribution systems, particularly in the Western United States.

The advantages of ACP pipe include low initial cost, smooth interior walls and light weight for ease of installation. Principal disadvantages are that it breaks easily if not handled and installed properly, the need for special care in tapping, and the need for special safety precautions during installation and repair to prevent inhalation of asbestos dust. ACP piping is no longer installed in the United States today, because of the fear of working with asbestos materials and because PVC pipe has taken its place as an inexpensive and lightweight piping material.

One of the most common issues that leads to ACP pipe breaks within the District is the presence of tree roots. If trees are planted over the top or near the ACP pipe, the tree roots can eventually spread out and cause the pipe to rupture. This is more common with the District's ACP distribution mains that are installed in backyard, side-yard, and back of walk easements where trees are more prevalent.

The advantages of CCP include good corrosion resistance, widespread availability, high strength, and excellent load supporting capacity. The disadvantages are that it requires careful handling and installation to avoid cracking, it is heavy and more difficult to install than other pipe types, and it is more expensive than other types of pipe. Tapping the pipe is also difficult as special provisions are required to make connections and preserve the integrity of the lining systems.

Cement Mortar Lined and Coated Steel (CMLCS) Pipe

CMLCS pipe has been used for water pipelines since the 1850's. It is frequently used where pressures are high and large diameter pipe is required. It is comparatively inexpensive, easy to install, and more easily transported than ductile iron pipe; however, CMLCS pipe cannot withstand the external loads that DIP can. Because it is metallic, steel pipe is subject to corrosion and the corrosion is oftentimes more severe in CMLCS pipe than DIP.

Cement-mortar lining and coating is often used to protect both the interior and exterior of steel pipe. Special care must be taken to prevent damage to these protective coatings. Steel pipe can be joined together using different methods including welding.

The applicable AWWA standards for steel pipe include C200 (Steel Water Pipe 6-inch and larger); C205 (Cement-Mortar Protective Lining and Coating for Steel Water Pipe—4-inch and larger—Shop Applied); C206 (Field Welding for Steel Water Pipe Fittings); C207 (Steel Pipe Flanges); C208 (Dimensions for Fabricated Steel Water Pipe Fittings); and C602 (Cement-Mortar Lining of Water Pipelines—4-inch and larger—In Place).

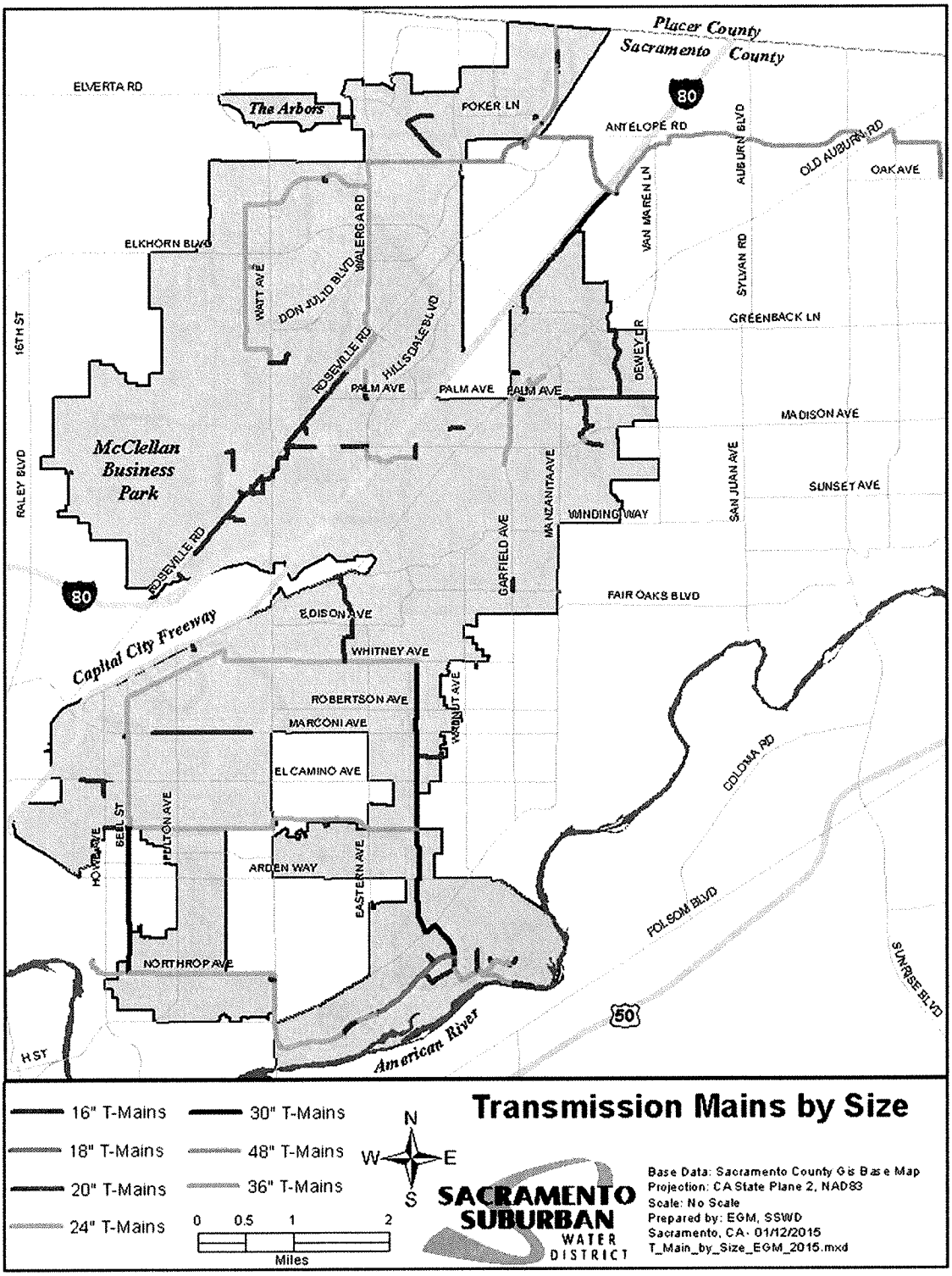
Ductile Iron Pipe (DIP)

Ductile iron pipe (DIP) is generally recognized as an industry standard for modern water piping systems. DIP has a high degree of dependability due to its high strength, durability, and impact and corrosion resistance. DIP can also be installed in a wide variety of soils and trench conditions and can be easily cut to length in the field. Disadvantages to DIP are that it is heavy

transmission and distribution pipe in sizes 16 through 24-inch, with integral bell and spigot joints for the conveyance of water and other liquids.

Unlike metallic pipes, PVC pipes do not rust or corrode over time. It is also lightweight and therefore easier to handle and install than other types of pipe. The primary method of wear is by exposure to sunlight and heat, which begin to warp the pipe and cause damage. This is why PVC pipe is normally used underground or in basements where there is little light to damage the pipes. Another disadvantage is that careful attention must be paid during construction to avoid rocks or sharp objects coming into contact with the pipe. Additionally, soils that have crude oil residue in them such as McClellan Business Park can cause the PVC to have brittle failures. This is primarily due to the oil consuming the PVC and depleting the wall thickness of the pipe.

Figure 1: Transmission Mains by Size



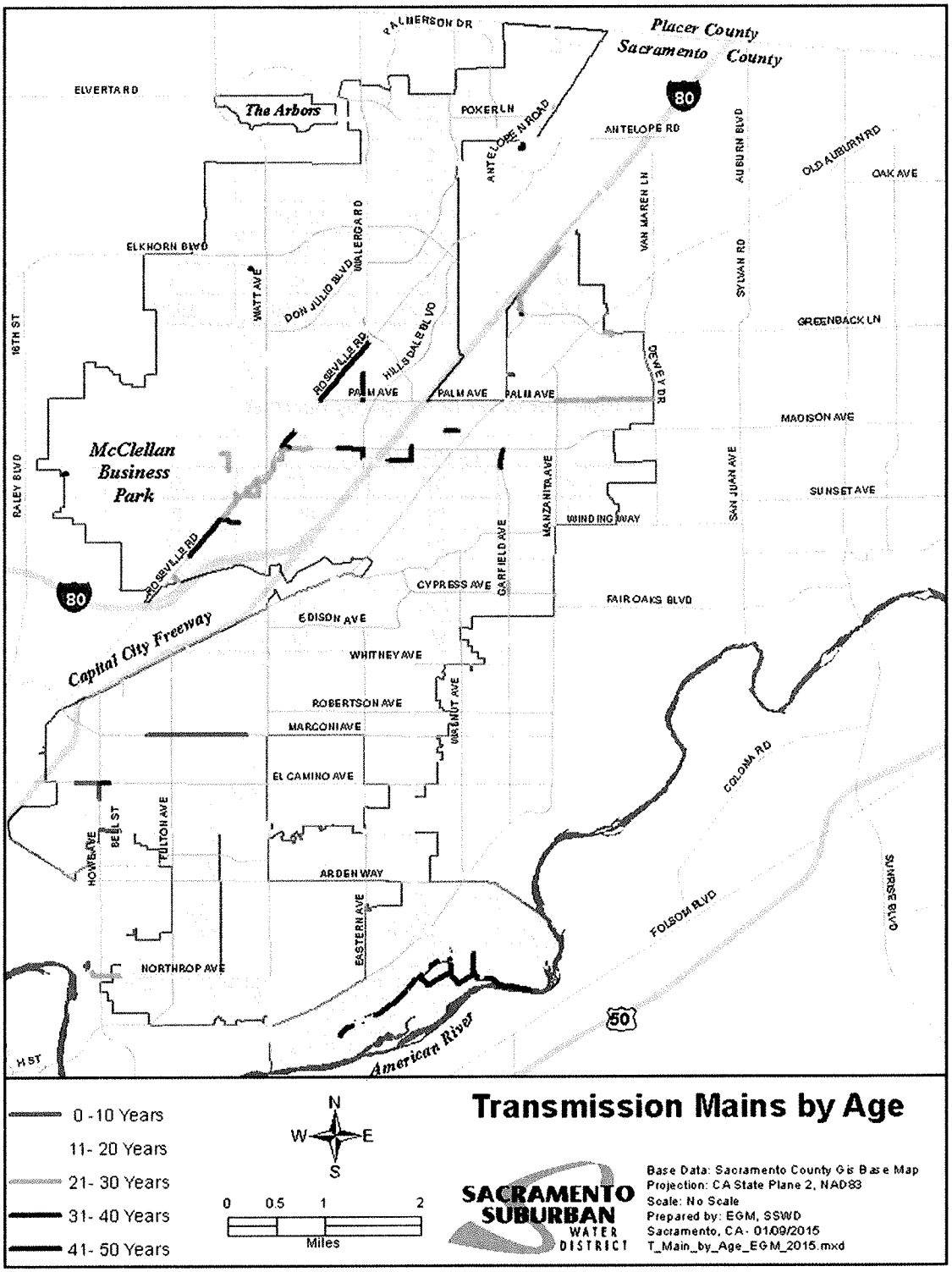
By size, the majority of the transmission mains are 24-inches in diameter with this size main making up 100,827-feet or approximately 36-percent of the District's transmission mains. The next most prevalent size is 16-inch diameter making up 76,776-feet or approximately 27-percent of the District's transmission mains.

The District's transmission mains were broken down by age and type as shown in Table 2 below. Note the ages of some of the older transmission mains had to be estimated because this information was not available. Figure 3 is a map of the District showing the location of all transmission mains color coded by their age. As indicated by Table 2 and Figure 3, the majority of the District's transmission mains are less than 25 years old and are in excellent condition with a long useful life still remaining.

Table 2: Age of Transmission Mains by Type of Pipe

Age (Years)	ACP (Feet)	CCP (Feet)	CMLCS (Feet)	DIP (Feet)	PVC (Feet)	Total (Feet)	Percent of total
0-10	0	0	1,561	9,507	0	11,068	3.9%
11-20	0	40,039	136,772	30,488	2,601	209,900	74.3%
21-30	1,476	0	2,040	21,174	475	25,165	8.9%
31-40	1,945	0	744	16,064	0	18,753	6.6%
41-50	141	0	17,407	0	0	17,548	6.2%
Totals	3,562	40,039	158,524	77,233	3,076	282,434	100%

Figure 4: Transmission Mains by Age



CAPACITY IN TRANSMISSION MAINS OWNED BY OTHERS

The District owns capacity in two transmission mains that are owned by other agencies. These co-owned transmission mains are discussed below. [**Note that the physical assets included in these transmission mains, since they are owned and operated by others, are not included in the inventory of existing transmission mains in the previous section of this report.**]

Antelope Transmission Pipeline (ATP)

In 1994, the former Northridge Water District (Northridge) constructed Phase 1 of the Antelope Transmission Pipeline. The first phase placed approximately 8,000-feet of 48-inch concrete wire wrap steel cylinder pipeline (C303 Pipe). The placement of the pipeline was on Antelope Road from Auburn Boulevard east to Old Auburn Boulevard. In 1995, Northridge constructed Schedule A of the Antelope Transmission Pipeline. The project continued the 48-inch pipeline another 6,000-feet. The pipeline was placed in Old Auburn Boulevard east to Fair Oaks Boulevard south to Villa Oak Drive east to C-Bar-C Park and south through the park to Oak Avenue connecting into the San Juan Water District's Cooperative Transmission Pipeline. The last phase was constructed in 1996 (Schedules B, C, D, E, and F) and the 48-inch pipeline was extended another 33,500-feet. The project continued the 48-inch pipeline from the end of Phase 1 at Auburn Boulevard west on Antelope Road crossing the I-80 Freeway under the Union Pacific railroad tracks into the District's Antelope Reservoir to Antelope Road North. At that point the 48-inch pipeline proceeded south on Antelope Road North to Antelope Road and along Antelope Road west terminating at Walerga Road. The total length of the project is approximately 9-miles.

Sacramento Suburban Water District (District) owns the Antelope Transmission Pipeline and 59.2-million gallons per day (MGD) of capacity in the San Juan Water District Cooperative Transmission Pipeline (CTP). This represents approximately 50-percent of the capacity in the CTP. See Figure 5 for a map showing the location of the Cooperative Transmission Pipeline in which the District owns capacity.

Per the "Agreement for Ownership, Utilization, Operation and Maintenance of the Cooperative Transmission Pipeline" dated July 1, 1997, the District is obligated to pay for its share of maintenance costs and capital replacement and capital improvement costs for the CTP. Section 4.C., Maintenance Costs, of the agreement states that "Maintenance Costs are defined as costs incurred for routine maintenance of the pipeline, valves, appurtenances, cathodic protection test stations, telemetry equipment, and the cost of administration and professional consultants related thereto. All Maintenance Costs of SJWD's routine Project maintenance shall be allocated to and paid by the Participants on a pro rata basis based upon the percentage each Participant is entitled to of the total capacity of the Project as set forth in Exhibit D." Furthermore, the agreement states that these maintenance costs will be assessed annually.

Likewise, Section 5.B. of the agreement discusses capital replacement costs. This section of the agreement states that "The cost of Capital Replacements shall be allocated and paid by the Participants on a pro rata basis based upon the percentage each Participant is entitled to of the capacity of a particular Project pipeline segment (as set forth in Exhibit C) for which such costs were incurred." Furthermore the agreement states that "The payment for Capital Replacements shall be made by Participants within the deadline set by SJWD, reasonably taking into consideration the potential need for a Participant to arrange for financing of its share of the cost."

Finally, Section 6 of the agreement discusses capital improvements. A "Capital Improvement" is defined as "an improvement or betterment to the SJWD-owned portions of the Project that SJWD recommends to enhance the operating design capability or capacity of the Project." The agreement also states that "SJWD shall determine the need for, administer and carry out any Project Capital Improvement that has been approved by the Participants." Similar to capital replacements, the agreement further states that "The cost of a Capital Improvement shall be allocated to and paid for by the Participants on a pro rata basis based upon the percentage each Participant is entitled to of the capacity in a particular Project pipeline segment (as set forth in Exhibit C) for which such costs were incurred, unless the Participants approve a

City of Sacramento's Transmission Main

Plans for the former Arcade Water District to purchase treated surface water from the City of Sacramento were in the works back in the early 1990's. The District agreed to purchase capacity in a planned 54-inch transmission main to be constructed by the City from their Fairbairn Water Treatment Plant (WTP) north to a turnout with the District located near the intersection of Northrop Avenue and Enterprise Drive (916 Enterprise Drive).

The first segment (approximately 4,200-feet) of the City's 54-inch transmission main was constructed in 1993 between University Avenue and Enterprise Drive. As part of this same project, the City constructed (for Arcade) approximately 1,200-feet of 36-inch transmission main from Enterprise Drive south to Northrop Avenue and then east on Northrop Avenue across Howe Avenue (to a point approximately 400-feet east of Howe Avenue). This 36-inch waterline was constructed solely for the future use of the District (and this pipe is included in the inventory of transmission mains in the previous section of this report). The second segment of the City's 54-inch transmission main was constructed in 2003/2004 and consists of 1.2-miles of a 54-inch diameter water transmission main from the Fairbairn WTP under the American River to University Avenue, and in the right-of-way of University Avenue north to Howe Avenue. See Figure 5 for a map showing the location of the City's Transmission Main in which the District owns capacity.

The District's agreed upon share of the design and construction cost for both segments of the City's 54-inch transmission main is 32.26-percent. This is based on a formula that factors in the capacity of the 54-inch transmission main (62 MGD), the City's anticipated maximum day water demand from this pipeline (42 MGD), and the amount of water that the District could divert (up to 20 MGD). Therefore, the District's share is 20 MGD ÷ 62 MGD or 32.26 percent.

The District's agreement with the City of Sacramento is different from the agreement with SJWD with respect to how the District's share of O&M and capital improvement costs will be paid. The applicable agreement is the "Wholesale Water Supply Agreement Between the City

PLANNED FUTURE TRANSMISSION MAINS

If budgets are approved by the Board of Directors and/or possible grant funding is secured, the District is planning on future transmission mains in the following locations and sizes. See Figure 6 for a map showing the proposed locations of the following future transmission mains.

- Indian River/Flaming Arrow Pipeline – This pipeline as proposed includes two phases of new transmission lines. The total length of this project will be 28,000 feet. The first phase will be 30-inch C303 reinforced concrete cylinder pipe to be constructed south from the intersection of Verner Avenue and Flaming Arrow Drive. Next, the pipeline runs southeast parallel to an existing 12-inch distribution main along Flaming Arrow Drive. It turns south and runs parallel to an existing 12-inch line along Indian River Drive to the south of the intersection with Faming Arrow Drive. At the northeast intersection of Greenback Lane and Indian River Drive the line turns west and runs parallel to Greenback Lane along the north side of Greenback Lane. In the intersection of Greenback Lane a tee will be installed with a blind flange for a future transmission main east of Indian River Drive. The 30-inch line continues west and ties into a proposed tee located at the northeast intersection of Greenback Lane and Garfield Avenue. One segment continues along Greenback Lane and ties into an existing 16-inch transmission main in Verner Avenue approximately 100-feet to the west. The 30-inch will run along the west side of Garfield Avenue until the northeastern portion of the intersection with Spruce Avenue. It then runs along the east of Garfield Avenue parallel to existing 12-inch main. At the southeast corner of Auburn Boulevard, Palm Avenue, and Garfield Avenue a cross will be installed on an existing 24-inch 90-degree elbow. The 30-inch line continues down Garfield Avenue and ties into the cross. One 16-inch ductile iron pipe segment runs to the west along the north side of Palm Avenue; utilizing the existing 16-inch creek crossing. Continuing 2,500-feet with the 16-inch west of the intersection of Palm Avenue and Coyle Avenue will be tied in to the existing 16-inch from Coyle Well. Returning to the 30-inch line will then run west along the north side of Palm Avenue and turn south down College Oak Drive. At the intersection of Chippendale Drive and

sides of the NSA.

- Crestview Transmission Main - Since the early 1990's, the District has made improvements to mitigate problems in the old Arvin system located east of Manzanita Avenue in the NSA. One such improvement was to construct and install new transmission mains to assist in circulating water from north to south and west to east. To provide the necessary facilities the District developed a six-phase project to construct transmission mains capable of providing sufficient flows throughout the area. Since the 1990's the District has constructed five of the six-phases. The remaining phase is the design and construction, as outlined below, of approximately 14,000-feet of new transmission and distribution pipelines. Included with the project would be miscellaneous tie-ins to the existing distribution system and fire hydrants spaced to meet local fire agency guideline standards.

  The Crestview Transmission Main will consist of 16-inch ductile iron pipe starting with a tie-in at Madison Avenue and Rutland Drive. From there the pipe will head west on Madison Avenue and continue to the intersection of Madison Avenue and Schuyler Drive. The pipe will continue down Schuler Drive and continue south on Crestview Drive to the intersection at Winding Way. Next the pipe turns west on Winding Way and then turns south on Manzanita Avenue. The pipe continues south on Manzanita Avenue until the intersection of Cypress Avenue where the pipe turns west onto Cypress Avenue. The pipe ties in to an existing 16-inch transmission main at the intersection of Garfield Avenue and Cypress Avenue. The total proposed length of new transmission main is 14,000-feet of 16-inch ductile iron pipe.

- Garfield Transmission Main Improvements - A new 24-inch C303 reinforced concrete cylinder pipe is proposed beginning at the intersection of Garfield Avenue from Marmith Avenue by removing an existing blind flange and heading south on Garfield Avenue. The pipeline ties into an existing 16-inch transmission main just north of Cypress Avenue.

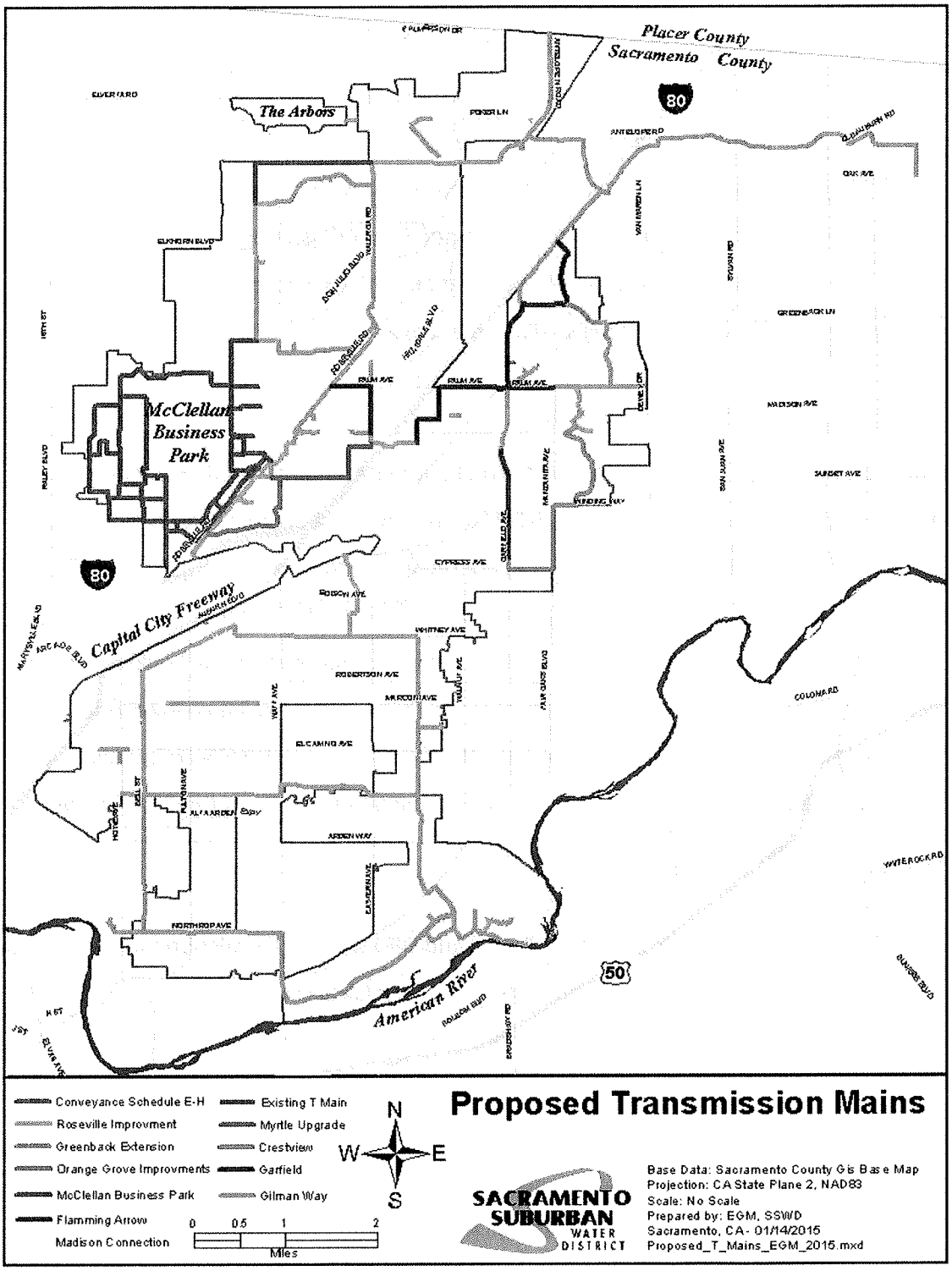
in an effort to move more water to the Arbors by extending the existing Conveyance Pipeline, can also provide a looped system in conjunction with the existing transmission mains.

The new Schedule G, a 48-inch C303 reinforced concrete cylinder pipe, will begin by removing the existing blind flange at the intersection of Walerga Road and Antelope Road. The pipe will run west to the intersection of Watt Avenue on the north side of Antelope Road. At the intersection a tee will be installed with a blind flange for a future pipe heading north to The Arbors. The pipe continues west onto U Street until the intersection of 34th Street where another tee will be installed with a blind flange to the west for future. As the pipe turns south it becomes Schedule H 36-inch C303 reinforced concrete cylinder pipe with the installation of a pressure reducing station at 34th Street. The pipe will head south down 34th Street on the east side. At the intersection of 34th Street and Q Street the proposed main will tie into an existing 24-inch transmission main. The total proposed length is 6,600-feet of 48-inch C303 for Schedule G and 2,500-feet of 36-inch C303 for Schedule H.

- McClellan Business Park Transmission Mains - As part of the 2009 *Water System Master Plan*, an analysis of the McClellan Business Park Service Area (MBPSA) needs were conducted by Brown and Caldwell (B&C) to evaluate the water system facilities needed to supply the McClellan Business Park at buildout. A MBPSA buildout water demand estimate of 4,183-acre-feet was used for buildout infrastructure sizing. A separate technical memorandum dated January 8, 2010, was later prepared by B&C to layout a backbone water transmission and distribution system for McClellan Business Park at buildout.

  A total of 92,903-feet of 16-inch ductile iron pipe and 20-inch C303 concrete reinforced cylinder pipe are proposed at buildout. The majority of the proposed lines will replace smaller distribution mains. New transmission mains will be installed along Dudley

Figure 6: Proposed Transmission Mains



at each test station. The National Society of Corrosion Engineers (NACE), recommends that field surveys to be conducted each year at the same time to accurately monitor corrosion.

At the time that the newer transmission mains were constructed, a national corrosion protection company, Corrpro, was hired as a subcontractor to perform an initial corrosion monitoring system survey. Pipe-to-soil potentials at each test station were measured and documented by Corrpro. This procedure is used to determine if the corrosion monitoring system is properly installed. This initial testing also forms a "baseline" for future testing that is recommended on a regular basis by Corrpro. Initial corrosion system monitoring system survey test reports from Corrpro are available in the District's files as described below.

- December 6, 2000. Electrical Continuity Testing and Corrosion Monitoring System Survey for 30-Inch Diameter Mortar Coated and Lined Steel Pipeline, Mission Avenue Phase I Project (Arcade Water District)
- April 6, 2001. Corrosion Monitoring System Survey for 48-Inch Concrete Cylinder Pipeline, Schedules A – F & Antelope Road Widening Project (Northridge Water District)
- May 16, 2002. Tracer Wire Electrical Continuity Testing, Transmission Pipelines Phase II (Arcade Water District)
- June 26, 2002. Electrical Continuity Testing and Corrosion Monitoring System Survey for 24-Inch Diameter Mortar Coated Steel Pipeline, Phase II, Schedule A, Cottage Way Alignment (Arcade Water District)
- June 26, 2002. Electrical Continuity Testing and Corrosion Monitoring System Survey for 24-Inch Diameter Mortar Coated Steel Pipeline, Phase II, Schedule B, Kenneth and Whitney/Edison Alignments (Arcade Water District)
- June 26, 2002. Electrical Continuity Testing and Corrosion Monitoring System Survey for 24-Inch Diameter Mortar Coated Steel Pipeline, Phase II, Schedule C, 34th Street/Bainbridge Alignment (Arcade Water District)

- Mission Avenue 30-Inch:

  The Mission Avenue Transmission Pipeline is the District's next largest transmission pipeline. The pipeline was surveyed on 9/12/14 and was found to have potentials ranging from 200-300 millivolts pipe to earth with a copper, copper sulfate reference electrode. The pipeline does not have an existing cathodic protection system; however electrical continuity testing was performed and it was found to be a candidate for an impressed current cathodic protection system. Design for the Mission Avenue Transmission Pipeline will begin after the designs for the Conveyance Pipeline and Antelope North Road have been completed.

- Bell Street 24-Inch and 30-Inch:

  The Bell Street Transmission Main was surveyed on 9/12/14, and electrical continuity testing proved that the pipeline is an excellent candidate for cathodic protection. Potentials were found between 200-300 millivolts pipe to earth with a copper, copper sulfate reference electrode. The cathodic protection design for this pipeline will not begin until the design and implementation of a new cathodic protection system is installed on the Walerga Road Transmission Main.

Condition Assessment

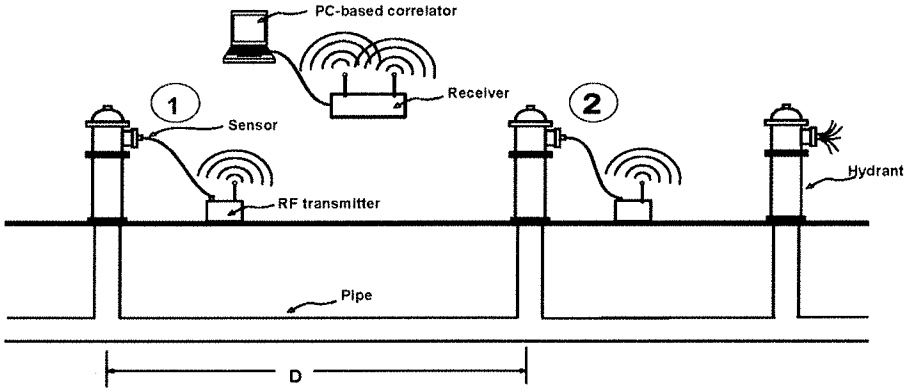
It is difficult but not impossible to monitor the condition of buried utilities such as transmission mains. Condition assessment is a process that helps to establish a record of the state of water pipelines. It's essential for cost-efficient repair and replacement programs. Condition assessment methods for pipes can generally be classified into direct or indirect methods. Both methods are discussed below.

<u>Direct Methods</u>

- Visual inspection, including closed circuit television (CCTV)
- Sampling programs (where sections of pipe or "coupons" are sent to a laboratory to have remaining wall thickness measured and a variety of material tests and analyses performed)

shown below in Figure 6. District staff has met with representatives of a company, Echologics, that provides this type of testing and a pilot program is currently being considered.

Figure 7: Acoustic Testing with Measurement of Acoustic Propagation Velocity



Wave propagation velocity (v) = D / ΔT, where ΔT is time delay between signals 1 and 2

To track monitoring, testing and/or condition assessment work on the District's transmission mains, each segment of existing pipe has been identified with an asset identification number and this information is now included in the District's Graphical Information System (GIS). Using this information, staff will be able to track whenever any piping is tested or if any condition assessment is performed and the results of the testing and/or condition assessment.

SJWD has estimated that through this rehabilitation process the service life of the existing Fair Oaks 40 pipeline has been extended by 50 years. A similar assumption is being made for the District's pipelines. The estimated cost of this type of rehabilitation is estimated to be 30 percent of the cost of complete pipeline replacement.

Sliplining is one of the oldest methods for trenchless rehabilitation of existing pipelines. For the purpose of this report, this is referred to as the "Method B" type of pipeline rehabilitation. Sliplining is used to repair leaks or restore the structural stability of an existing pipeline. Sliplining is completed by installing a smaller, "carrier pipe" into a larger "host pipe," grouting the annular space between the two pipes, and sealing the ends. Sliplining has been used since the 1940's. The most common material used to slipline an existing pipe is high density polyethylene (HDPE), but fiberglass reinforced pipe (FRP) and PVC are also common. The most common pipe sizes for sliplining are 8-60-inches, but sliplining can occur in any size given appropriate access and a new pipe small or large enough to install. The HDPE pipe has an outside diameter (OD) slightly larger than the inside diameter (ID) of the pipe to be lined. The tight-fitting HDPE liner results in a flow capacity close to the original pipeline design. The rapid installation of the liner and a small footprint means minimum impact on local businesses, traffic, and pedestrians.

The ballpark cost of the sliplining rehabilitation method is approximately $5 to $7 per inch diameter per foot of piping[4]. Therefore, for 16-inch through 48-inch diameter piping, the cost of sliplining would range from $80 to $112 per foot ($422,000/mile to $591,000 per mile) for 16-inch diameter piping to $240 to $336 per foot ($1.27 million/mile to $1.77 million per mile) for 48-inch diameter piping. For this report, the estimated cost of this type of rehabilitation is assumed to be 50-percent of the cost of complete pipeline replacement.

[4] Source: *Costs for Water Supply Distribution System Rehabilitation*, Selvakumar, Clark, and Sivaganesan, Environmental Protection Agency Publication EPA/600/JA-02/406, 2002.

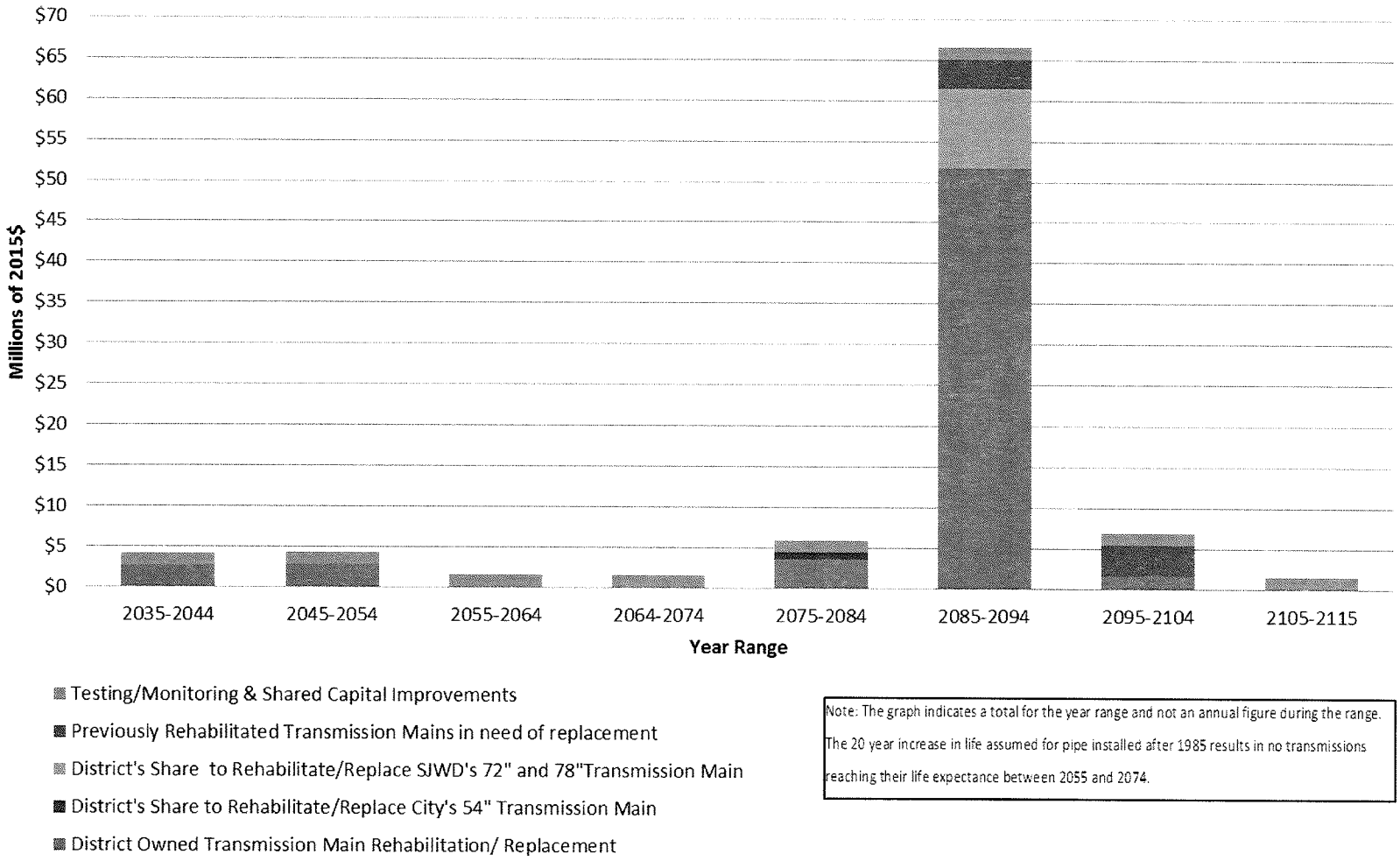
Table 5: Estimated Transmission Main Replacement Costs (Open Trench Construction)

Pipeline Diameter	Estimated Replacement Cost Per Foot	Estimated Replacement Cost Per Mile
16-inch	$234	$1.2 Million
18-inch	$262	$1.4 Million
20-inch	$290	$1.5 Million
24-inch	$351	$1.9 Million
30-inch	$524	$2.8 Million
36-inch	$625	$3.3 Million
48-inch	$837	$4.4 Million
54-inch (City of Sacramento)	$937	$4.9 Million
72-inch (CTP)	$1,255	$6.6 Million
78-inch (CTP)	$1,361	$7.2 Million

Cost Estimates

Over the next 100-years (2015-2115), costs have been estimated to rehabilitate and/or replace the District's transmission mains and those in which the District owns capacity (SJWD and the City of Sacramento). The cost estimates assume transmission mains installed prior to 1985 will have an estimated service life of 70-years and transmission mains installed in 1985 or later will have an estimated service life of 90-years. A longer life for newer pipe is an assumption based on better pipe manufacturing standards, improved methods of construction and the more common use of cathodic protection. The life expectancy of these pipelines can of course vary greatly depending on many factors including construction methods, quality of pipe manufacturing, soil corrositivity, water quality, etc. The projected year when existing transmission mains reach either 70 or 90 years of service life is shown in Figure 8 (note that this figure shows only District transmission mains).

Figure 9: Estimated Transmission Main Rehabiliation/Replacement Costs From 2015-2115



CONCLUSIONS AND RECOMMENDATIONS

- Unexercised valves can seize up increasing repair costs. It is recommended that main line and air release valves are exercised on an annual basis.

- Replacement of air release valves is recommended on a 10-15 year schedule to ensure proper operation, and to minimize a potential for any cross contamination due to leaks.

- It is recommended that acoustic sounding be conducted on a 5-10 year schedule. With internal inspection conducted on suspect sections identified by sounding.

- This *Water Transmission Main Asset Management Plan* provides an inventory of the District's existing transmission mains sized 16-inches in diameter and larger.

- There are currently over 53-miles of 16-inch and larger transmission mains throughout the District. The most common pipe type is CMLC steel at 158,525-feet or approximately 56-percent of all of the District's transmission mains.

- The majority (80%)) of the District's transmission mains were constructed in the last 20-years and are still in excellent condition with a long useful life still remaining.

- Out of 53-miles of existing transmission mains, approximately 3.3-miles consist of pipe that is 40-years of age or older. These older transmission mains are in the greatest need of repair and/or replacement.

- This *Water Transmission Main Asset Management Plan* provides a tool for communication between the Board and Staff to identify pipelines in need of repair, rehabilitation and/or replacement.

Appendix A - Detailed Cost Estimates for Transmission Main Rehabilitation and/or Replacement (2015 – 2115)

Date: October 15, 2011

		2021			2022			2023			2024			2025			2026		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0
	Replace (25% of Pipe)	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0
	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
TOTALS			0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000

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		2033			2034			3035			2036			2037			2038		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	0	$0	$72	0	$0	$72	3,115	$222,723	$72	0	$0	$72	0	$0
16"	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	0	$0	$116	0	$0	$116	1,558	$179,891	$116	0	$0	$116	0	$0
16"	Replace (25% of Pipe)	$231	0	$0	$231	0	$0	$231	0	$0	$231	1,558	$359,783	$231	0	$0	$231	0	$0
16"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	6,230	$762,396	SUBTOTAL	0	$0	SUBTOTAL	0	$0
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	2,699	$207,785	$77	0	$0	$77	0	$0
18"	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	1,349	$326,519	$242	0	$0	$242	0	$0
18"	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	1,349	$348,781	$259	0	$0	$259	0	$0
18"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	5,397	$883,084	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	339	$29,832	$88	0	$0	$88	0	$0
20"	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	170	$24,239	$143	0	$0	$143	0	$0
20"	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	170	$48,477	$286	0	$0	$286	0	$0
20"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	678	$102,548	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	2,058	$215,009	$105	0	$0	$105	0	$0
24"	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	1,029	$181,060	$176	0	$0	$176	0	$0
24"	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	1,029	$356,462	$347	0	$0	$347	0	$0
24"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	4,115	$752,531	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
30"	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
30"	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
30"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0
36"	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0
36"	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
36"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
48"	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
48"	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
48"	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
	TOTALS		0	$150,000		0	$150,000		0	$150,000		16,420	$2,650,559		0	$150,000		0	$150,000

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		2045			2046			2047			2048			2049			2050		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	588	$42,042	$72	2,627	$187,795
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	294	$33,957	$116	1,313	$151,680
	Replace (25% of Pipe)	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	294	$67,914	$231	1,313	$303,361
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	1,176	$143,913	SUBTOTAL	5,253	$642,836
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0
	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
	TOTALS		0	$150,000		0	$150,000		0	$150,000		0	$150,000		1,176	$293,913		5,253	$792,836

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		2057			2058			2059			2060			2061			2062		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0
	Replace (25% of Pipe)	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0
	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
	TOTALS		0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000

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		2069			2070			2071			2072			2073			2074		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0
	Replace (25% of Pipe)	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0
	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
	TOTALS		0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000

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		2081			2082			2083			2084			2085			2086		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	2,900	$255,200	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	1,450	$215,325	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	1,450	$430,650	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL	5,800	$1,051,175	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	619	$44,259	$72	0	$0	$72	208	$14,872	$72	4	$250	$72	18	$1,287
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	310	$35,747	$116	0	$0	$116	104	$12,012	$116	2	$202	$116	9	$1,040
	Replace (25% of Pipe)	$231	0	$0	$231	310	$71,495	$231	0	$0	$231	104	$24,024	$231	2	$404	$231	9	$2,079
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	4,673	$1,079,463
		SUBTOTAL	0	$0	SUBTOTAL	1,238	$151,500	SUBTOTAL	0	$0	SUBTOTAL	416	$50,908	SUBTOTAL	7	$857	SUBTOTAL	36	$4,406
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	6	$462	$77	22	$1,694
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	3	$726	$242	11	$2,662
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	3	$776	$259	11	$2,844
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	4,048	$1,046,408
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	12	$1,964	SUBTOTAL	44	$1,053,608
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	509	$145,574
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$145,574
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	9	$888	$105	132	$13,794
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	4	$748	$176	66	$11,616
	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	4	$1,473	$347	66	$22,869
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	3,087	$1,069,646
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	17	$3,109	SUBTOTAL	264	$1,117,925
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	6	$924	$154	2,083	$320,705
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	3	$776	$259	1,041	$269,163
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	3	$1,551	$517	1,041	$538,326
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	12	$3,251	SUBTOTAL	4,165	$1,128,194
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	1,015	$187,572	$185	0	$0	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	508	$156,310	$308	0	$0	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	508	$312,620	$616	0	$0	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	2,030	$656,502	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	11,700	$2,895,750	$248	8,317	$2,058,334
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	5,850	$2,413,125	$413	4,158	$1,715,278
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	5,850	$4,826,250	$825	4,158	$3,430,556
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	23,400	$10,135,125	SUBTOTAL	16,633	$7,204,168
	TOTALS		0	$150,000		1,238	$301,500		2,030	$1,707,677		416	$200,908		23,448	$10,294,305		21,142	$10,803,874

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		2093			2094			2095			2096			2097			2098		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	3,250	$286,000	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	1,625	$241,313	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	1,625	$482,625	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$1,159,938	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	2,522	$180,787	$72	696	$49,764	$72	0	$0	$72	165	$11,798	$72	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	1,261	$145,617	$116	348	$40,194	$116	0	$0	$116	83	$9,529	$116	0	$0
	Replace (25% of Pipe)	$231	0	$0	$231	1,261	$291,233	$231	348	$80,388	$231	0	$0	$231	83	$19,058	$231	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	5,043	$617,137	SUBTOTAL	1,392	$170,346	SUBTOTAL	0	$0	SUBTOTAL	330	$40,384	SUBTOTAL	0	$0
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	158	$16,511	$105	187	$19,542	$105	0	$0	$105	0	$0	$105	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	79	$13,904	$176	94	$16,456	$176	0	$0	$176	0	$0	$176	0	$0
	Replace (25% of Pipe)	$347	0	$0	$347	79	$27,374	$347	94	$32,398	$347	0	$0	$347	0	$0	$347	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	316	$57,789	SUBTOTAL	374	$68,395	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	7,565	$1,398,012	$185	22	$3,973	$185	222	$41,026	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	3,783	$1,165,010	$308	11	$3,311	$308	111	$34,188	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	3,783	$2,330,020	$616	11	$6,622	$616	111	$68,376	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	15,130	$4,893,042	SUBTOTAL	43	$13,906	SUBTOTAL	444	$143,590	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
	TOTALS		0	$150,000		20,489	$5,717,968		1,809	$402,647		444	$1,303,527		330	$190,384		0	$150,000

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		2105			2106			2107			2108			2109			2110		
		Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)	Unit Cost ($/ft)	Pipe Length (ft)	Estimated Cost ($)
Ongoing Testing/Monitoring/Condition Assessments ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to City of Sacramento Transmission Mains ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District Share of Capital Improvements to CTP ($50,000/Year)				$50,000			$50,000			$50,000			$50,000			$50,000			$50,000
District's Share of Cost to Rehabilitate/Replace City's 54" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B (25% of Pipe)	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0	$149	0	$0
	Replace (25% of Pipe)	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0	$297	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 72" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0	$193	0	$0
	Rehabilitation - Method B (25% of Pipe)	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0	$319	0	$0
	Replace (25% of Pipe)	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0	$638	0	$0
District's Share of Cost to Rehabilitate/Replace SJWD's 78" Transmission Main																			
	Rehabilitation - Method A (50% of Pipe)	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0	$209	0	$0
	Rehabilitation - Method B (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Replace (25% of Pipe)	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0	$688	0	$0
		SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000	SUBTOTAL		$150,000
16"	Rehabilitation - Method A [2] (50% of Pipe)	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0	$72	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0	$116	0	$0
	Replace (25% of Pipe)	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0	$231	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
18"	Rehabilitation - Method A [2] (50% of Pipe)	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0	$77	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0	$242	0	$0
	Replace (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
20"	Rehabilitation - Method A [2] (50% of Pipe)	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0	$88	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0	$143	0	$0
	Replace (25% of Pipe)	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0	$286	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
24"	Rehabilitation - Method A [2] (50% of Pipe)	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0	$105	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0	$176	0	$0
	Replace (25% of Pipe)	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0	$347	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
30"	Rehabilitation - Method A [2] (50% of Pipe)	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0	$154	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0	$259	0	$0
	Replace (25% of Pipe)	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0	$517	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
36"	Rehabilitation - Method A [2] (50% of Pipe)	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0	$185	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0	$308	0	$0
	Replace (25% of Pipe)	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0	$616	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
48"	Rehabilitation - Method A [2] (50% of Pipe)	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0	$248	0	$0
	Rehabilitation - Method B [3] (25% of Pipe)	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0	$413	0	$0
	Replace (25% of Pipe)	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
	Previously Rehabilitated T-Mains Reaching End of Extended Service Life	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0	$825	0	$0
		SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0	SUBTOTAL	0	$0
TOTALS			0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000		0	$150,000

Back to Agenda

SACRAMENTO SUBURBAN WATER DISTRICT

Facilities and Operations Committee

Agenda Item: 5

Date: October 21, 2015

Subject: Costs to Add Fluoridation to North Service Area Update

Staff Contact: John E. Valdes, Engineering Manager

Recommended Committee Action:
Receive report from staff on the estimated cost to add fluoridation to the District's water supply in the North Service Area (NSA).

Discussion:
At the Facilities and Operations (F&O) Committee Meeting on September 3, 2015, staff provided a report to the Committee on the potential impacts of terminating fluoridation in the District's South Service Area (SSA). Director Wichert noted his desire to examine the feasibility of adding fluoride to the NSA water supply. Staff informed Director Wichert that the District had previously conducted an analysis of adding fluoride to the NSA water supply. It was requested that staff bring this back to the F&O Committee at the next meeting.

In 2009, the San Juan Water District (SJWD) contracted with MWH to prepare an engineering study on the feasibility and costs to add fluoridation facilities for the San Juan Retail and Wholesale service areas. This engineering study was paid for by a grant from the First 5 Sacramento Commission. The District's NSA was included in this study because it receives surface water treated at SJWD's Peterson Water Treatment Plant (WTP). An engineering report dated June 2009 was prepared by MWH titled, *Fluoridation Feasibility & Project Cost Report*. The report included an estimate of the capital and Operation &Maintenance costs to add fluoridation facilities to the District's NSA wells so that the customers in that service area would receive optimally fluoridated water at all times, no matter the mix of groundwater and surface water.

However, the estimated capital cost in the 2009 report assumed that SJWD would be installing facilities to add fluoride to the treated surface water at the Peterson WTP. If this is not done, then the District would need to add fluoridation facilities to add fluoride at both the Verner Pressure Reducing Valve (PRV) and the Antelope PRV stations. The need for fluoridation at both locations is because the District's 48-inch Antelope Conveyance Pipeline (ACP) bifurcates near Navion Drive and purchased surface water enters the District after passing through PRV

stations at both Verner and Antelope. The District also already owns property and has flow metering at both locations, which makes them the logical choice for the additional fluoridation facilities. These additional facilities would result in additional capital costs. These costs were not estimated in the MWH report because it assumes that fluoridation facilities would be added at the Peterson WTP.

Subsequently, in 2010 the District received a grant from the First 5 Sacramento Commission to hire MWH to complete a supplemental engineering study to estimate the costs to add fluoridation facilities to the two turnouts at the Verner and Antelope PRV Stations.

Key findings in the supplemental MWH report dated November 2010 are as follows:

- The supplemental report compiled information from the original 2009 engineering study into a single overall document addressing the facilities and estimated costs to fluoridate the entire NSA (both groundwater and surface water supplies).

- The estimated capital cost to install fluoridation facilities on 39 NSA groundwater wells and the two surface water turnouts is $8.68 million. [The capital cost in the 2009 SJWD report was estimated at $6.8 million.] Note that at the time of the 2009 report, a total of 37 NSA wells were to be fluoridated.

- The estimated annual O&M cost is $564,000 per year. [The annual O&M cost in the 2009 SJWD report was estimated at $372,000/year.]

- The major differences between the two engineering reports are:

    1. The November 2010 report includes the cost to add fluoridation facilities to the two turnouts located at the Verner and Antelope PRV Stations, which is a significant addition.

    2. The November 2010 report includes the addition of three wells in the NSA either built or under design (Verner #N36, Roseview Park #N37 and Coyle #N38) and the removal of one well (Jamestown #N27) that is a candidate for abandonment.

    3. The November 2010 report recommends the addition of pH adjusting chemicals at the two PRV Stations due to the low buffering capacity of the Folsom Lake water and the resulting potential for distribution system corrosion and lead and copper leaching. Buffering capacity is defined as the "ability of a water body to resist large changes in pH when an acidic or alkaline solution is added to it." A variety of chemicals are available to raise the pH of the water but for the purposes of the draft report MWH has assumed that caustic soda would be added to the water.

    4. The cost for Supervisory Control and Data Acquisition (SCADA) at several wells was actually reduced in the 2010 report because the original report assumed that

there was no existing SCADA. The 2010 report included only the cost to upgrade the SCADA at these wells due to the addition of fluoride.

The MWH engineering report dated November 2010 is attached to this staff report as Exhibit 1. As indicated, the estimated capital cost to install fluoridation facilities on 39 NSA groundwater wells and the two surface water turnouts is $8.68 million. The estimated annual O&M cost is $564,000 per year. These costs have been updated to current using Engineering News Record's (ENR) Construction Cost Index (CCI). Between November 2010 (the date of the supplemental report) and July 2015 (the most current index available), the CCI increased from 8,951 to 10,037, or an increase of 12.1%. Applying this inflation factor would result in an updated estimated capital cost of $9.73 million. It is assumed that the estimated annual O&M cost would also be increased by a similar factor to an estimated $632,400 per year.

Fiscal Impact:

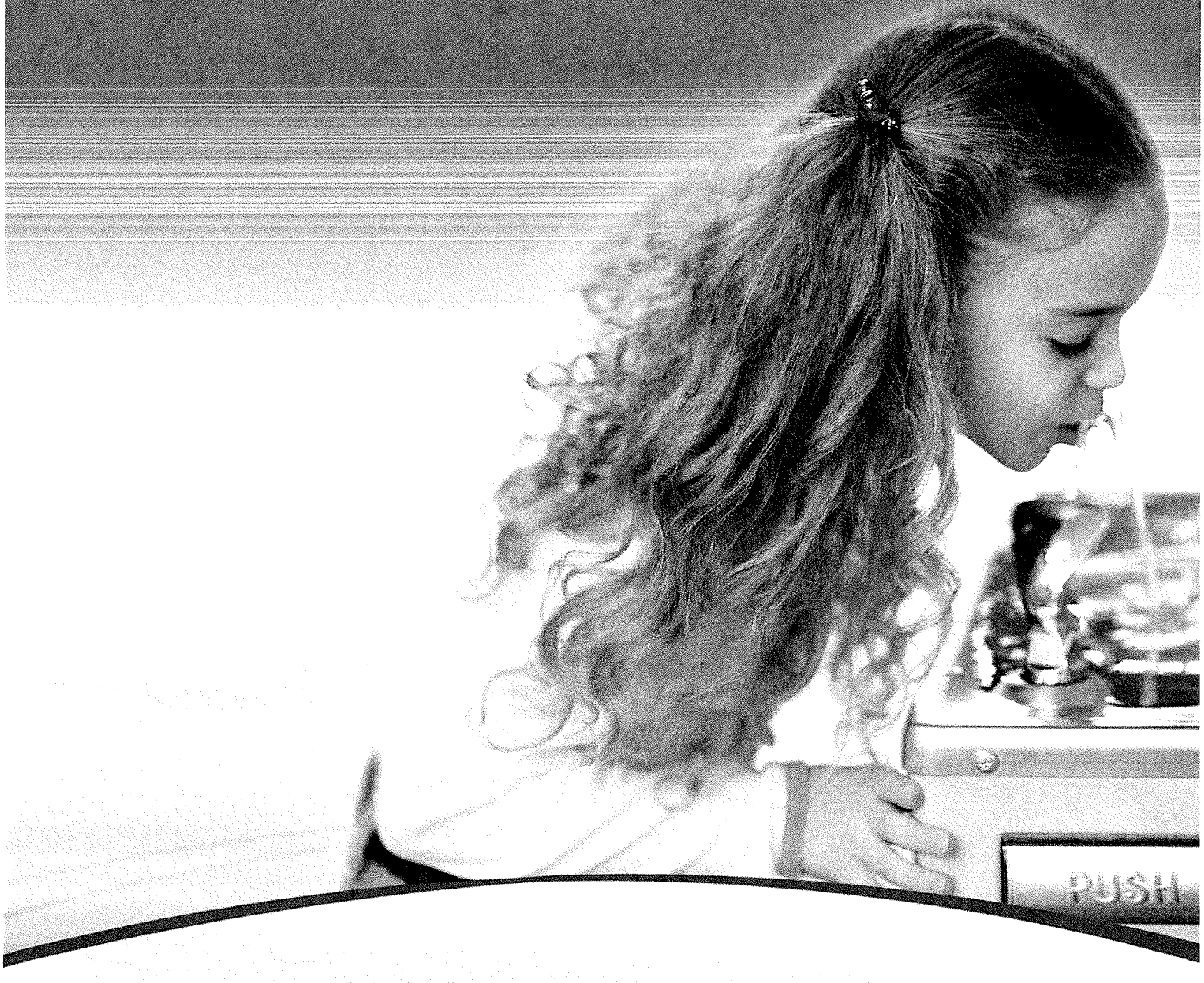
The estimated capital cost to install fluoridation facilities on 39 groundwater wells and two surface water turnouts in the District's NSA is estimated at $9.73 million. The estimated annual O&M cost is $632,400 per year. Upon fluoridating the SSA an additional staff person was required in order to comply with the multiple tasks associated with a fluoridated water system. It is anticipated that an additional staff person would be required if the NSA is fluoridated.

Note: There could be a potential opportunity for grant funding from First 5 Sacramento Commission.

Exhibit 1

SACRAMENTO SUBURBAN WATER DISTRICT

Fluoridation Report Supplement



November 2010

MWH

BUILDING A BETTER WORLD

Sacramento Suburban Water District

Fluoridation Report Supplement

November 2010

Prepared by

MWH

3321 Power Inn Road, Suite 300
Sacramento, California 95826

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LIST OF ABBREVIATIONS AND ACRONYMS

AACE	Association for the Advancement of Cost Engineering
ACP	Antelope Conveyance Pipeline
ADA	American Dental Association
AF	Acre-Feet
CCR	California Code of Regulations
CDC	Centers for Disease Control and Prevention
CDPH	California Department of Public Heath
CEQA	California Environmental Quality Act
CTP	Cooperative Transmission Pipeline
FMP	Fluoride Monitoring Plan
FSOCP	Fluoride System Operations Contingency Plan
gpm	gallons per minute
HDPE	high density polyethylene
hr	hour
kW-hr	kilowatt hour
MGD	million gallons per day
mg/L	milligram per liter
MWH	MWH Americas, Inc.
NaOH	sodium hydroxide
NSA	North Service Area
O&M	operations and maintenance
OPCC	opinion of probable construction cost
P&ID	piping and instrumentation drawings
PRV	pressure reducing valve
Psi	pounds per square inch
Report	Report Supplement
RTU	Remote Terminal Unit
SCADA	supervisory control and data acquisition
SJWD	San Juan Water District
SJWD Fluoridation Report	San Juan Water District Fluoridation Feasibility and Project Cost Report Project
SSWD	Sacramento Suburban Water District
WTP	Water Treatment Plant

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INTRODUCTION AND PROJECT BACKGROUND

The Sacramento Suburban Water District (SSWD) has undertaken this Fluoridation Report Supplement (Report) to refine its investigation of the feasibility and potential costs associated with fluoridating its North Service Area (NSA), McClellan Business Park Service Area, and Arbors at Antelope Service Area. SSWD currently fluoridates its South Service Area, which receives supplementary fluoridated surface water from the City of Sacramento. Fluoride, when maintained in drinking water supplies within an optimal concentration range, has been shown to reduce tooth decay[1]. The policy of adding fluoride to community drinking water supplies is recommended by the Centers for Disease Control and Prevention (CDC)[2] and the American Dental Association (ADA)[3]. Article 4.1 of the California Code of Regulations (CCR) requires water systems with 10,000 service connections or more to fluoridate their water if funding is available for capital costs and ongoing operations and maintenance (O&M) costs. This Report is funded by a grant from the First 5 Sacramento Commission[4].

This Report is a supplement to the San Juan Water District (SJWD) Fluoridation Feasibility and Project Cost Report Project (SJWD Fluoridation Report) prepared my MWH Americas, Inc. (MWH) in June 2009. The SJWD Fluoridation Report examined the feasibility and costs associated with SJWD fluoridating its treated water and the water systems of those agencies that it provided with wholesale treated water. SSWD was included in the examination since it routinely obtains treated surface water from SJWD when the water is available under SSWD's contracting arrangements[5]. This supplementary Report provides SSWD with feasibility-level designs and estimated costs to fluoridate the water it receives from SJWD, in the event that SJWD elects not to pursue fluoridation of its system. The Report includes the groundwater well designs and costs from the SJWD Fluoridation Report to provide SSWD with a single overall document that captures all fluoridation-related facilities and costs.

SSWD serves a population of approximately 160,000 in Sacramento County[6]. SSWD has separated its distribution system into four service areas: NSA, Arbors at Antelope, McClellan Business Park, and South Service Area (see **Figure 1**). SSWD typically uses the term North Service Area to describe a larger area that includes Arbors at Antelope, McClellan Business Park, and the previously mentioned NSA; this Report will use that same naming convention. The water distributed in the North Service Area is un-fluoridated while that in the South Service Area is currently fluoridated. Approximately 65-percent of the population served by SSWD is located in the North Service Area.

[1] American Water Works Association Manual M4 – Water Fluoridation Principles and Practices, 2004
[2] Centers for Disease Control and Prevention, 2001. Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States. Morbidity and Mortality Weekly Report, (MMWR), Vol. 50 No. 14; 1-42
[3] American Dental Association Web site: www.ADA.org; A-Z Topics: Fluoride & Fluoridation
[4] First 5 Sacramento Commission was formed in 1998 as a result of the passage of California State Proposition 10 to facilitate funding of children's programs and services in Sacramento County
[5] SSWD obtains the water from Placer County Water Agency but it is treated and transported by SJWD.
[6] Water Master Plan, prepared for Sacramento Suburban Water District, Brown and Caldwell, July 2009

The SJWD surface water provided to SSWD is used exclusively in its North Service Area, where it is introduced at two separate locations. The water is drawn from Folsom Lake and is treated at its Sidney N. Peterson Water Treatment Plant (Peterson WTP). From the Peterson WTP, as shown in **Figure 1**, the water is carried through the Cooperative Transmission Pipeline (CTP) to the 48-inch Antelope Conveyance Pipeline (ACP) at C-Bar-C Park. The water is then carried in the ACP to the Antelope pressure reducing valve (PRV) station (Antelope PRV), where the pressure is reduced from approximately 106 pounds per square inch (psi) to approximately 48 psi, and the water is introduced into SSWD's North Service Area distribution system. A separate 30-inch pipeline branches off the ACP east of Interstate 80 and carries water to the Verner PRV, where pressure is reduced from approximately 108 psi to 52 psi, and the water is separately introduced into the North Service Area

In a typical year, roughly half of the water distributed in the North Service Area is obtained from SSWD's groundwater wells. As shown in **Figure 1**, the North Service Area currently includes 42 active, unfluoridated wells. Two additional wells, Roseview Park Well (N37) and Coyle Well (N38), are in the planning stages and are scheduled to be operational by the fall of 2012.

This report is organized under the following key headings:

- Inventory of Facilities to be Fluoridated
- Fluoridation Facilities Design
- Fluoridation Facilities Opinion of Probable Cost
- Fluoridation Facilities Implementation Schedule

INVENTORY OF FACILITIES TO BE FLUORIDATED

The sources of water flowing into SSWD's North Service Area include two surface water interties with SJWD as well as 42 current and two planned groundwater wells. Fluoridation facilities would be required for both SJWD interties. Of the 42 active wells, five would not require fluoridation facilities due to low production, operational difficulties, or minimally acceptable water quality. Therefore a total of 37 active wells and two planned wells would require fluoridation facilities. Relative to the South Service Area, a higher percentage of North Service Area wells would require fluoridation. This is due to the greater distance between wells and the lack of large, high flow wells that could potentially compensate for nearby unfluoridated, lower flow wells. The geographical distribution of the project facilities are presented in **Figure 1**.

Recent annual water production for groundwater and surface water are presented in **Table 1**. The average annual groundwater production is 3,199 million gallons (MG) while the average annual surface water production is 3,850 MG. Until 2009, SSWD was contractually allowed to use the SJWD-provided surface water during only those years when Folsom Lake contained a minimum of 900,000 Acre-Feet (AF) of water on March 1[7]. If the volume in Folsom Lake was less than 900,000 AF on March 1 then SSWD could use no surface water for that contract year (March through February) This minimum cutoff volume was raised to 1.6 million AF in 2010, increasing the likelihood of non-surface water years for SSWD's North Service Area.

[7] SSWD obtains the water from Placer County Water Agency but it is treated and transported by SJWD.

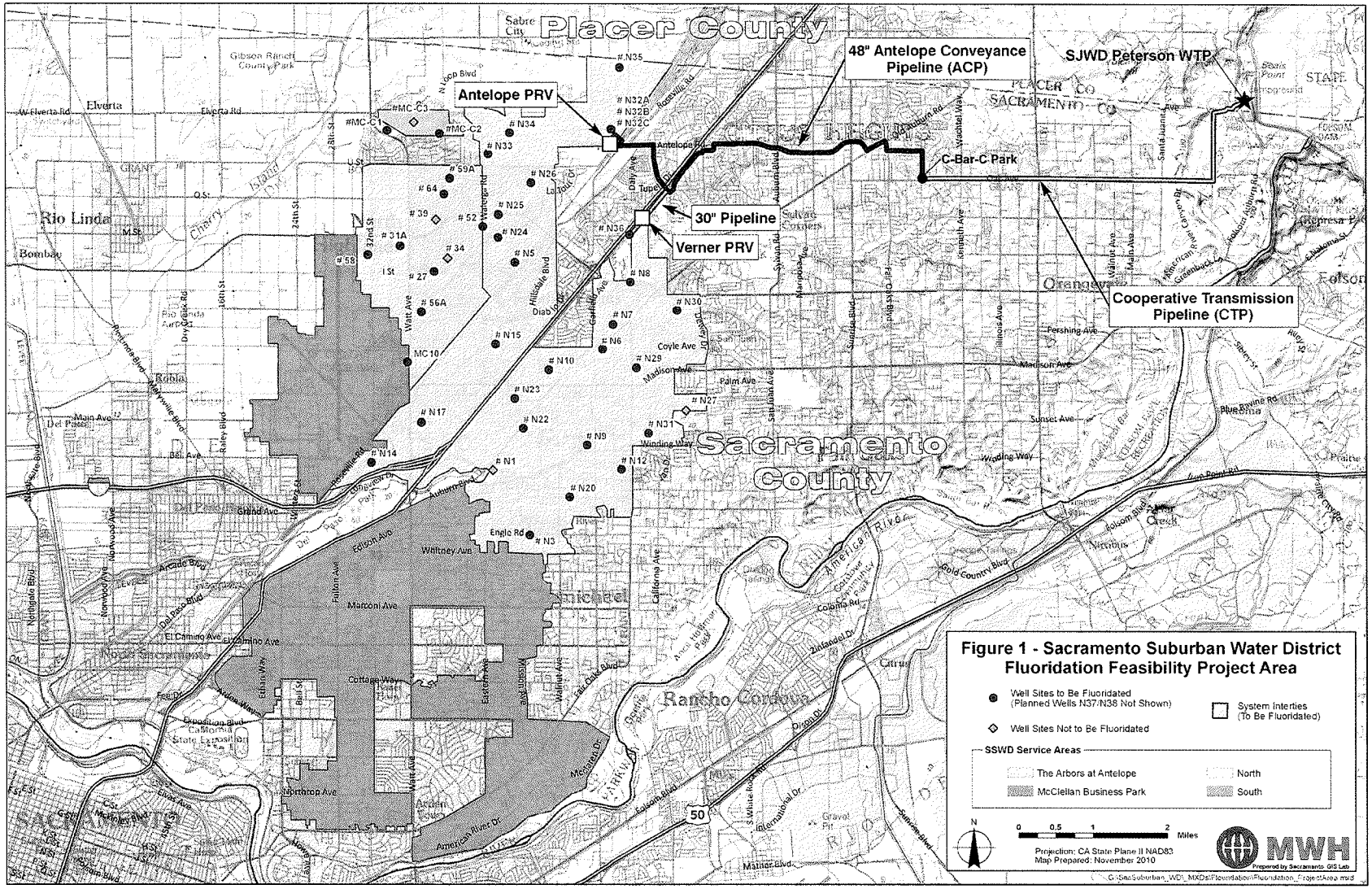
Placer County
Sacramento County
48" Antelope Conveyance Pipeline (ACP)
SJWD Peterson WTP
Antelope PRV
30" Pipeline
Verner PRV
C-Bar-C Park
Cooperative Transmission Pipeline (CTP)
Figure 1 - Sacramento Suburban Water District
Fluoridation Feasibility Project Area
Well Sites to Be Fluoridated
(Planned Wells N37/N38 Not Shown)
Well Sites Not to Be Fluoridated
System Interties
(To Be Fluoridated)
SSWD Service Areas
The Arbors at Antelope
North
McClellan Business Park
South
N
0 0.5 1 2 Miles
Projection: CA State Plane II NAD83
Map Prepared: November 2010
MWH
Prepared by Sacramento GIS Lab
G:\SacSuburban_WD_MXDs\Flouridation\Fluoridation_ProjectArea.mxd

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Table 1
SSWD Annual Groundwater and Surface Water Production

Year	Annual Groundwater Production (MG)	Annual Surface Water Production (MG)	Total Annual Water Production (MG)
2003	3042	4282	7324
2004	3202	5783	8986
2005	1851	4680	6531
2006	1861	4348	6210
2007	6840	1237	8077
2008	2276	3947	6223
2009	3321	2675	5996
Average Annual Production	**3199**	**3850**	**7049**

The flow rates at the two SJWD surface water system interties, Antelope PRV and Verner PRV, are shown in **Table 2**. Minimum, average, and maximum flows rates are shown along with the buildout flow rates. Average annual production at each of the two facilities is also shown.

Table 2
SSWD Surface Water Facility Inventory

	Minimum Flow Rate[1]		Average Flow Rate[1]		Maximum Flow Rate[1]		Buildout Flow Rate[2][3]		Average Annual Production Volume[4]	
SJWD Intertie Description	GPM	MGD	GPM	MGD	GPM	MGD	GPM	MGD	MG	AF
Antelope PRV	800	1.2	11,800	17.0	24,600	35.4	41,100	59.2	3,080	9,400
Verner PRV	200	0.3	2,600	3.7	4,700	6.8	15,400	22.2	770	2,400
								Total	3,850	11,800

[1]Minimum, average, and maximum flows based on typical current production data provided by SSWD.
[2]Buildout flow for Antelope PRV based on design of Antelope PRV to pass full ACP capacity flow (per SSWD).
[3]Buildout flow for Verner PRV based on design flow in 30" pipe at 7 ft/sec (per SSWD).
[4]Total Annual Production Volume based on average of SSWD's North Service Area reported production for Years 2003 through 2009. Annual production volume split on 80:20 basis to Antelope and Verner PRVs based on typical historical operation (per SSWD).

The names and system numbers of the North Service Area groundwater wells, along with their maximum pumping capacities and estimated average annual water production are presented in **Table 3**. The wells range in capacity from 0.58 million gallons per day (MGD) to 4.25 MGD (400 gallons per minute (gpm) to 2,950 gpm). The maximum pumping capacities reported in **Table 3** reflect the capacity currently reported by SSWD. The estimated annual production values listed are the fiscal year 2007 values reported in the SJWD Fluoridation Report modified to reflect the average annual groundwater production volume shown in **Table 1**. Fiscal year 2007 was a non-surface water contract year for SSWD and the values were modified as noted to

better estimate typical operation and maintenance costs presented later in this Report. Jamestown well (N27), which was reported in the fiscal year 2007 values, is no longer in use due to water quality problems and has been deleted from the list. No annual production values were available for Verner (N36), which was constructed earlier this year, so the previous production value reported for Jamestown was assigned to Verner to fully capture system production volume. Roseview Park (N37) and Coyle (N38) are planned wells and are expected to be operational by the fall of 2012. Annual production at these two wells is unknown but it is expected that well production at neighboring wells will decrease as these wells increase, maintaining overall system production volume.

MWH has collected other pertinent information about SSWD existing facilities and this information is provided in a **Table A-1** in **Appendix A** of this report. The information includes:

- Verification of sites that have sufficient space to accommodate required fluoride facilities and those that do not.
- Determination of any existing supervisory control and data acquisition (SCADA) facilities at the sites
- Concentration of natural fluoride in the raw water supply of each site, additional raw water chemistry information to evaluate pH and precipitation impacts of fluoridation chemicals at the sites.
- Information about other chemicals added at the sites to evaluate potential chemical interactions.

Table 3
SSWD Groundwater Facility Inventory

Facility	Maximum Pumping Capacity (MGD)[1]	Estimated Annual Production (MG)[2]
Engle # N3	1.33	100.5
Hillsdale # N5	1.22	75.2
Palm #N6	1.50	0.2
Rosebud # N7	1.87	98.8
Field #N8	1.73	1.3
Cameron #N9	1.87	2.9
Walnut # N10	1.87	184.4
St. Johns # N12	1.94	71.1
Orange Grove # N14	1.73	0.3
Cabana # N15	1.44	27.6
Oakdale # N17	1.58	0.3
Cypress # N20	1.87	90.8
River College # N22	1.44	77.6
Freeway # N23	1.48	82.4
Don Julio # N24	1.71	109.5
Sutter # N25	2.74	101.6

Table 3 (continued)
SSWD Groundwater Facility Inventory

Facility	Maximum Pumping Capacity (MGD)[1]	Estimated Annual Production (MG)[2]
Monument # N26	0.86	80.2
Merrihill # N29	1.85	147.7
Parkoaks # N30	1.62	63.4
Barrett Meadows # N31	1.08	131.5
Poker Lane # N32A	2.88	203.5
Poker Lane # N32B	2.59	360.2
Poker Lane # N32C	1.14	93.5
Walerga # N33	1.84	131.6
Cottage # N34	2.88	180.0
Antelope # N35	2.88	126.3
Verner # N36	2.45	3.6[3]
Roseview Park # N37	2.88[4]	0[4]
Coyle # N38	2.16[4]	0[4]
McClellan AFB # MC10	0.97	2.2
Capehart # MC-C1	0.65	5.4
Capehart # MC-C2	0.58	3.1
Melrose/Channing # 27	0.98	9.6
Watt/Elkhorn # 31A	2.30	3.4
Weddigen/Gothberg # 52	1.21	85.5
Fairbairn/Karl # 56A	3.46	179.1
32nd/Elkhorn # 58	0.94	0.1
Bainbridge/Holmes # 59A	4.25	306.3
Galbrath/Antelope Woods # 64	0.97	58.1
	Total	**3199**

[1]The maximum pumping capacity at the SSWD well sites is the current pumping capacity reported by SSWD.
[2]The annual production at the SSWD wells reflects average annual production for years 2003 through 2009.
[3]Well construction completed in 2010. Annual production at this well is unknown. Production value for deleted Jamestown (N27) well assigned to this well to fully capture system production volume.
[4]Well currently in planning stage. Estimated operational date is by fall 2012. It is assumed that well production volumes at neighboring wells will decrease as these wells increase, maintaining overall system production volume.

FLUORIDATION FACILITIES DESIGN

A review of fluoride corrosivity, project design criteria, and the facility layout and piping and instrumentation (P&ID) drawings for fluoridation systems at the well sites and at the Antelope and Verner PRV stations are presented in this section of the Report. The well sites' design, based on fluorosilicic acid as the fluoride chemical form, was developed in the SJWD Fluoridation Report and is repeated here for completeness. Based on the analysis presented in the SJWD Fluoridation Report, fluorosilicic acid was also selected as the fluoride chemical form at the two PRV stations.

Fluoride Corrosivity Review

As noted in the SJWD Fluoridation Report, fluorosilicic acid is highly acidic and can impact the pH of treated water. Individual water quality data were provided for "typical" wells in the SSWD South Service Area: Well 71, Well 4B, and Well 33A (see **Appendix A**). Using a simple water quality spreadsheet model, it was determined that adding 1.0 milligram per liter (mg/L) fluorosilicic acid to these wells resulted in pH changes for the three wells, respectively, as follows: 8.40 dropped to 7.90, 7.12 dropped to 7.08, and 7.43 dropped to 7.36. The pH reductions for Wells 4B and 33A were not significant; however, the pH drop of 0.5 unit for Well 71 was larger than might be expected for groundwater, even though the resulting pH was not alarmingly low. Additional testing is recommended to confirm that the well water is sufficiently buffered to prevent a significant drop in pH. Significant lead and copper concentration changes are not expected based on SSWD's experience with the existing fluorosilicic acid system in their South Service Area.

The surface water introduced into the SSWD distribution system via the Antelope and Verner PRV stations was also modeled to determine the pH impact of fluorosilicic acid addition. Average surface water chemistry values obtained from the 2009 SJWD Consumer Confidence Report were used to model the impact of a 1.0-mg/L dose of fluorosilicic acid. The results showed an approximate 0.9 pH unit drop (from 8.4 to 7.5) due to the low buffering capacity of Folsom Lake water. Due to the potential for distribution system piping corrosion and lead and copper leaching, it is recommended that the PRV stations include facilities for raising the pH.

A variety of chemicals including Lime ($Ca(OH)_2$ and Caustic soda (sodium hydroxide, NaOH), among others, may be used to raise treated water pH. However, a detailed evaluation of the most appropriate chemical to use at the PRV stations is beyond the scope of this Report. For the purposes of this Report, Caustic soda was used as a basis for cost estimating. A dose of 1.7 mg/L of caustic soda was required to return the pH to the initial 2009 SJWD production target of 8.4. A detailed evaluation of the pros and cons of the various pH raising chemicals is recommended for the design development phase of project.

Design Criteria

Design criteria for the fluoridation facilities were developed using water system goals and requirements, regulatory requirements, industry standards, and MWH's experience in the design of similar facilities. Separate design criteria were developed for the PRV stations and the well sites.

PRV Station Design Criteria

The design criteria established for fluoridation facilities at two PRV stations are summarized in **Table 4**.

Table 4
PRV Station Fluoridation Facility Design Criteria

Description	Criteria
Antelope PRV	
Average flow rate	17.0 million gallons per day (MGD)
Minimum flow rate	1.2 MGD
Maximum flow rate	35.4 MGD
Build-out flow rate	59.2 MGD
Average Annual Production Volume	3,080 million gallons (MG)
Verner PRV	
Average flow rate	3.7 MGD
Minimum flow rate	0.3 MGD
Maximum flow rate	6.8 MGD
Build-out flow rate	22.2 MGD
Average Annual Production Volume	770 MG
Fluoride chemical form	Fluorosilicic Acid, 23-percent
Caustic Soda concentration	Sodium hydroxide, 25-percent
Design fluoride dose	1.0 milligram per liter (mg/L)
Caustic Soda dose required for pH neutralization	1.7 mg/L
Chemical storage requirements	Minimum 10-day supply at maximum flow and design dose, target 14-day supply.
Chemical storage tank type	Double-contained, cross-linked high-density polyethylene (XLHDPE)
Metering pump type	Solenoid-actuated diaphragm for all pumps except the Antelope PRV caustic soda, where mechanically actuated diaphragm will be used.
Metering pump arrangement	Two duty pumps required to cover flow range. Additional standby pump also provided.
Metering pump maximum flow range	Solenoid actuated pumps: 0.85 gallons per hour (gph) to 5 gph. Mechanically actuated pumps 7.5 gph.
Chemical building type – *Antelope PRV*	Metering pumps to be located in fiberglass-reinforced plastic (FRP) enclosures. Storage tanks located adjacent to FRP enclosures. Both enclosures and storage tanks located within existing walled yard area.
Chemical building type – *Verner PRV*	Metering pumps and storage tanks located within a concrete masonry unit block building, mechanically ventilated. Building will require fire sprinklers due to caustic soda storage tank greater than 500 gallons.

Table 4 (continued)
PRV Station Fluoridation Facility Design Criteria

Description	Criteria
Chemical injection location	New injection vaults to be located at the downstream end of the low pressure manifold pipe. (Antelope – 48-inch manifold, Verner – 30-inch manifold)
Chemical mixing requirement	Route water from existing taps on high-pressure side of PRV to use as carrier water and aid chemical mixing.
Fluoride residual measurement	New sample taps to be installed at existing meter vaults downstream of PRV stations. Sample routed to fluoride analyzers located at new chemical buildings.
Fluoride analyzer waste stream discharge	Discharge routed to existing sewer or storm drain. Dechlorination facilities to be provided if discharged to storm drain.
Supervisory control and data acquisition (SCADA) Requirements	Existing SCADA system to be expanded to accommodate fluoride analyzer input

Well Site Design Criteria

The design criteria established for fluoridation facilities at the well sites are summarized in **Table 5**.

Table 5
Well Site Fluoridation Facility Design Criteria

Description	Criteria
Minimum well flow rate	0.58 million gallons per day (MGD)
Average well flow rate	1.76 MGD
Maximum well flow rate	4.25 MGD
Fluoride chemical form	Fluorosilicic Acid, 23-percent (approx.)
Design fluoride dose	1.0 milligram per liter
Fluoride storage requirements	Minimum 10-day supply at max flow and design dose, target 14-day supply.
Fluoride storage tank type	Double-contained, cross-linked high-density polyethylene (XLHDPE)
Fluoride storage tank sizes	90, 120, or 150 gallons
Fluoride building type	Concrete masonry unit block building, mechanically ventilated

Table 5 (continued)
Well Site Fluoridation Facility Design Criteria

Description	Criteria
Fluoride building sizes (ID)	5'4" by 7'4" building for sites with sufficient space for fluoride; at sites with insufficient space, fluoride and relocated sodium hypochlorite facilities will be combined in a single 7'4"- by 10'0" two-room building.
Metering pump type	Solenoid actuated diaphragm
Metering pump maximum flow range	0.25 gallons per hour (gph) to 0.85 gph
Fluoride injection location	Well discharge piping, exact location to be determined. Feed pipe to be double contained.
Fluoride mixing requirement	Fluoride fed neat. Wafer-type mixer may be required depending on individual site conditions.
Supervisory control and data acquisition (SCADA) requirements	Radio tower and programmable logic controller (PLC) provided where no SCADA exists. SCADA to be expanded if it exists.
Fluoride residual measurement	Fluoride analyzer to be provided at each well site.
Fluoride analyzer waste stream discharge	Discharge routed to existing sewer or storm drain. Dechlorination facilities to be provided if discharged to storm drain.

Facility Layouts and P&IDs

Facility layout and P&ID drawings were developed for the Antelope PRV, Verner PRV, and for the well sites. These drawings are provided as **Figures FRS-01 through FRS-06**, attached following page 20.

Antelope and Verner PRV Station Facility Layouts and P&IDs

The site plan for the Antelope PRV station is presented in **Figure FRS-01**. Two fluorosilicic acid storage tanks are provided in separated control areas for system flexibility and safety. Two caustic soda storage tanks are also provided for pH treatment of the treated water. The tanks would be located at two new separate tank farms along the north boundary of the existing storage yard. It was assumed that the tanks would not be covered, however the need for covers for shade or security should be evaluated in the next phase of design. An emergency shower/eyewash would be located near each tank farm area. Both chemicals would be routed by gravity via double-contained piping to the corresponding Fluoride Feed Building or Caustic Soda Feed Building. Additional emergency showers/eyewashes would also be located in front of each feed building.

Metering pumps in each feed building at Antelope would feed fluorosilicic acid or caustic soda, assisted by carrier water, to injection points at the new Chemical Injection Vault located on the existing distribution main, downstream from the existing PRVs. Since carrier water is used, a static mixer would not be required as there will be adequate mixing of each chemical before the residual analyzer sample tap at the existing flow meter vault downstream. A new residual

analyzer, mounted on the inside back wall of the new Fluoride Feed Building to monitor pH and fluoride ion concentration, would also be provided. A plant drain pipe would be constructed to convey the waste stream from the analyzer to the existing storm drain or sewer service in the road.

The site plan for the Verner PRV station is presented in **Figure FRS-02**. A combined Fluoride and Caustic Soda Feed Building is provided, which houses all equipment to deliver both fluorosilicic acid and caustic soda for water treatment. Two separate rooms would be equipped with a storage tank and chemical metering pumps, one room per treatment chemical. Both rooms would require overhead sprinklers for a fire suppression system. A third room would house the electrical equipment for the building. Two emergency showers/eyewashes would be located outside the building: one immediately outside of the Fluoride Room, and the other immediately outside of the Caustic Soda Room. Both chemicals would be routed by gravity via double-contained piping to the corresponding Fluoride Feed Building or Caustic Soda Feed Building.

Metering pumps in each chemical room at Verner would feed fluorosilicic acid or caustic soda, assisted by carrier water, to injection points at the new Chemical Injection Vault located on the existing distribution main downstream from the existing PRVs. Since carrier water is used, a static mixer would not be required as there will be adequate mixing of each chemical before the residual analyzer sample tap at the existing flow meter vault downstream. A new residual analyzer, mounted on the wall inside the Caustic Soda Room to monitor pH and fluoride ion concentration, would also be provided. A plant drain pipe would be constructed to convey the waste stream from the analyzer and the building floor drains to the existing storm drain or sewer service in the road. A fence would be provided around the site perimeter to provide security as the facility is in a high vandalism area. The option of relocating the existing SCADA remote terminal unit (RTU) panel into the proposed chemical building should be evaluated in the next phase of design.

The land at the project site is not currently owned by SSWD. The project is located on an approximately 5 acre parcel owned by a private entity. A piece of land approximately 0.23 acres in size would be need to be acquired for the Verner PRV facilities. Based on recent purchases, SSWD estimate that property in the area would be valued at approximately $125,000 per acre.

Figure FRS-03 shows the floor plans for the buildings at Verner and Antelope. Three metering pumps would be provided for each chemical at each site in a two-duty, one-standby configuration, with space at each for a future fourth pump. It is currently assumed that the buildings would be mechanically ventilated, although a design that incorporates natural ventilation should be investigated during the next phase of design. An emergency eyewash/shower would be provided immediately outside of each indoor chemical area.

Figure FRS-04 shows the detailed piping and instrumentation required for the fluoridation storage and feed system at the Antelope PRV station. Level- and pressure-measuring instruments would be provided at appropriate locations throughout the system. A combined fluoride/pH analyzer would be provided to accurately measure the fluoride and pH residuals of treated surface water leaving the site. Detailed piping and instrumentation diagrams for the caustic soda

storage and feed system, as well as for both treatment chemicals for the Verner PRV station would be similar.

Well Sites' Facility Layouts and P&IDs

Figure FRS-05 shows two typical plans for buildings to be located at the various system well sites. The plan to the left would be typical for well sites that have sufficient space to accommodate a new free-standing fluoride feed building. The plan to the right would be typical for space-constrained well sites, which would require that existing sodium hypochlorite feed facilities be combined with new fluorosilicic acid feed facilities in a single, compact, two-room building. Both of these building designs would accommodate storage tanks of up to a 150-gallon capacity. CMU block buildings, rather than fiberglass, would be used due to California Building Code separation distance requirements for structures housing corrosive liquids. The 2-hour fire rating of the CMU block walls would allow the new buildings to be located a feasible distance from both the property lines and existing structures. Certain well sites are exceptionally space-constrained and may require modified fluoride building arrangements or applications for Code variance. These modified facilities would be developed in the next phase of design.

A single metering pump would be provided at the fluoride feed building and it is assumed that SSWD will maintain an inventory of shelf-spare pumps. Each room in the buildings would be provided with mechanical ventilation. An emergency eyewash/shower would be provided outside each building.

Figure FRS-06 shows the detailed piping and instrumentation required for the fluoridation system at the well sites. A typical sodium hypochlorite system is also shown to reflect those locations where the existing sodium hypochlorite systems would be relocated.

Fluorosilicic acid would be fed neat and injected into existing well pump discharge piping. Level-measuring instruments would be provided at the chemical tanks to measure fluoride usage and in the double containment piping to detect leaks. A fluoride analyzer would be provided to accurately measure the fluoride residual of treated water leaving the well site. The possibility of using combination fluoride/chlorine residual analyzers, where applicable, should be investigated during the next phase of design. It is assumed that the analyzer's waste stream would be routed to either existing sewer or storm drain facilities.

FLUORIDATION FACILITIES OPINION OF PROBABLE COSTS

The following discussion presents the development of the capital cost estimates, O&M cost estimates, and a project cost summary for the proposed fluoridation facilities.

Capital Cost Estimates

The capital cost estimates developed for the Antelope and Verner PRV stations were separated into the following components:

- Property Purchase (Verner PRV)
- Grading/Paving
- Security Fencing (Verner PRV)

- Miscellaneous Small Piping
- Analyzer Drain Pipeline
- Fluoride Feed Building (Antelope PRV)
- Caustic Feed Building (Antelope PRV)
- Chemical Feed Building (Verner PRV)
- Chemical Injection Vault
- Fluoride Storage Tanks
- Caustic Storage Tanks
- Fluoride Metering Pumps
- Caustic Metering Pumps
- Emergency Eyewash
- Electrical Wiring, Conduit, and Appurtenances
- Fluoride Analyzers
- Upgrade Existing SCADA System
- Additional Instrumentation

Similarly, the capital cost estimates developed for the well sites were separated into the following components:

- Grading/Paving
- Miscellaneous Small Yard Piping
- Standard Fluoride Building or Combined Fluoride/Sodium Hypochlorite Building
- Fluoride Storage Tank
- Fluoride Metering Pump
- Emergency Eyewash
- Electrical Wiring, Conduit, and Appurtenances
- Fluoride Analyzer
- New SCADA System or Upgrade Existing SCADA System
- Additional Instrumentation
- Sodium Hypochlorite Relocation (if required)

The costs for these components were developed using the project design criteria, the facility layouts and P&IDs, costs obtained for similar projects, and the judgment of MWH's cost estimating staff. The well site costs were originally developed in April 2009. Based on mixed market indices and the opinion of MWH cost estimated staff, the values reflect current market conditions and to not require escalation or de-escalation. Project capital costs are presented in **Table 6,** while a more detailed cost breakdown is included in **Table B-1** in **Appendix B**. The capital costs were developed to an Association for the Advancement of Cost Engineering (AACE) International Class 4 Cost Estimate standard: "Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. Typically, engineering is 10% to 40% complete. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Virtually all Class 4 estimates use stochastic estimating methods such as cost curves, capacity factors, and other parametric and modeling techniques. Expected accuracy ranges are from -15% to -30% on the low side and +20% to +50% on the high side, depending on the technological complexity of

the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 20 hours or less to perhaps more than 300 hours may be spent preparing the estimate depending on the project and estimating methodology" (AACE International Recommended Practices and Standards).

Table 6
Opinion of Fluoridation Facilities Capital Costs[1]

Antelope PRV	$644,000
Verner PRV	$682,000
Engle # N3	$125,000
Hillsdale # N5	$125,000
Palm #N6	$144,000
Rosebud # N7	$142,000
Field #N8	$125,000
Cameron #N9	$142,000
Walnut # N10	$106,000
St. Johns # N12	$106,000
Orange Grove # N14	$144,000
Cabana # N15	$125,000
Oakdale # N17	$125,000
Cypress # N20	$125,000
River College # N22	$125,000
Freeway # N23	$106,000
Don Julio # N24	$125,000
Sutter # N25	$106,000
Monument # N26	$144,000
Merrihill # N29	$125,000
Parkoaks # N30	$106,000
Barrett Meadows # N31	$142,000
Poker Lane # N32A	$104,000
Poker Lane # N32B	$70,000
Poker Lane # N32C	$70,000
Walerga # N33	$106,000
Cottage # N34	$125,000
Antelope # N35	$106,000
Verner # N36[2]	$103,000
Roseview Park # N37[3]	$103,000
Coyle # N38[3]	$103,000
McClellan AFB # MC10	$142,000
Capehart # MC-C1	$144,000
Capehart # MC-C2	$144,000
Melrose/Channing # 27	$144,000

Table 6 (continued)
Opinion of Fluoridation Facilities Capital Costs[1]

Watt/Elkhorn # 31A	$125,000
Weddigen/Gothberg # 52	$106,000
Fairbairn/Karl # 56A	$106,000
32nd/Elkhorn # 58	$142,000
Bainbridge/Holmes # 59A	$106,000
Galbrath/Antelope Woods # 64	$142,000
Total Cost[4]	**$6,028,000**
Engineering and Construction Management (20%)	**$1,206,000**
Scope Contingency (20%)	**$1,447,000**
Opinion of Project Capital Cost	**$8,681,000**

[1]AACE Class 4 estimate. Cost basis October 2010.
[2]Well construction completed in 2010. Base cost of fluoridation facilities reflected in estimate.
[3]Well currently in planning stage. Estimated to be operational by Fall 2012. Base cost of fluoridation facilities reflected in estimate.
[4]Total cost includes Contractor Insurance and Bonds at 3%, Overhead and Profit at 15%, and Mobilization at 3%.

O&M Cost Development

The cost estimates for annual O&M include the following:

- Scheduled monitoring and inspection costs (visual checks, readings, sampling, testing, recordkeeping)
- Regular maintenance costs (equipment calibration and adjustments)
- Unscheduled maintenance costs (false alarm response)
- Sewer service connection costs
- Electrical power consumption costs (ventilation, lighting, and equipment loads)
- Hazardous material permit costs
- Safety equipment costs (disposable supplies)
- Chemical delivery and consumption costs

Costs already borne by existing maintenance operations are not included as part of the estimates. Increases in costs that are shared by the new and existing facilities, yet would otherwise not be required if the fluoride systems are not constructed, are included in the estimates. Labor rates for water treatment staff are based on the current rate of $52 per hour (hr) (inclusive of benefits). Electrical energy costs are based on the current rate of $0.10 kilowatt hour (kW-hr). The fluorosilicic acid chemical cost is based on costs quotes provided by Sierra Chemical at $7.62 per gallon plus $23.95 per stop for each site visit. The caustic soda chemical cost is based on costs quotes provided by Sierra Chemical at $2.25 per gallon plus $23.95 per stop for each site visit. Fluorosilicic acid consumption quantities are reduced where the residual amount of existing naturally occurring fluoride is known. Caustic soda consumption quantities are also reduced in proportion to fluorosilicic acid reduction as required based on the above reduction.

To determine the cost of occasional major maintenance or equipment replacement, a life cycle cost analysis was performed for a 30-year period. The analysis was based on the following assumptions of the lifetime of the components:

Critical Fluoride System Component Replacement

- 2-Year Intervals – Replace PVC valves and fittings, tubing, and injector quills

Equipment Refurbishment (rebuilds and overhauls)

- 5-Year Intervals – Motor Driven Metering Pumps

Equipment Replacement

- 10-Year Intervals – Solenoid Pumps
- 15-Year Intervals – Motor Driven Metering Pumps, Building Exhaust Fans
- 20-Year Intervals – High-Density Polyethylene (HDPE) Storage Tanks
- 30-Year Intervals – Miscellaneous Chemical Appurtenances (valves, pressure gauges, rotameters, pulsation dampeners, etc.)

The costs of labor and materials that would otherwise be borne in the future were brought back to a net present value, combined into a lump sum, and spread over a 30-year life cycle to determine the annual average capital repair/replacement cost for each site. A net 3-percent interest rate was used in these calculations.

Table 7 presents the O&M costs associated with labor, energy, chemicals, hazardous materials permits, and repair and maintenance for fluoridation treatment at each site. The total annual labor cost of $180,641 translates to approximately 1.7 full time employees (FTE).

The annual O&M cost estimates provided herein are conceptual only, and are based upon the data available at the time of the estimate. The estimates have been prepared to serve as a guide aid for project evaluation. Moreover, the actual costs will vary from these estimates. Funding and feasibility requirements must be carefully reviewed before making detailed financial decisions to ensure adequate project evaluation and appropriate funding.

Table 7
Opinion of Fluoridation Facilities O&M Costs[1]

Facility Name	Annual Water Production[2] (MG)	Labor Costs	Energy Costs	Chemical Costs[1]	Hazardous Materials Permit Costs	Repair/ Maintenance Costs (annualized lifecycle costs)	Total Annual Costs
SSWD Surface Water							
Antelope PRV Site	3,080	$8,199	$204	$140,946	$565	$2,256	**$152,000**
Verner PRV Site	770	$8,232	$213	$37,105	$565	$1,126	**$47,000**
Total:	*3,850*						
Total Annual SW Category Costs		**$16,431**	**$417**	**$178,051**	**$1,130**	**$3,381**	**$199,000**
SSWD Groundwater Wells							
Engle # N3	100.5	$4,220	$201	$4,384	$565	$633	$10,000
Hillsdale # N5	75.2	$4,216	$196	$3,334	$565	$633	$9,000
Palm #N6	0.2	$4,197	$177	$1,254	$565	$633	$7,000
Rosebud # N7	98.8	$4,213	$194	$3,989	$565	$635	$10,000
Field #N8	1.3	$4,197	$178	$1,292	$565	$633	$7,000
Cameron #N9	2.9	$4,198	$178	$1,345	$565	$635	$7,000
Walnut # N10	184.4	$4,228	$208	$7,644	$565	$635	$13,000
St. Johns # N12	71.1	$4,208	$189	$3,711	$565	$635	$9,000
Orange Grove # N14	0.3	$4,197	$177	$1,255	$565	$633	$7,000
Cabana # N15	27.6	$4,203	$183	$2,204	$565	$633	$8,000
Oakdale # N17	0.3	$4,197	$177	$1,253	$565	$633	$7,000
Cypress # N20	90.8	$4,212	$192	$4,398	$565	$635	$10,000
River College # N22	77.6	$4,214	$194	$3,937	$565	$633	$10,000
Freeway # N23	82.4	$4,214	$195	$4,104	$565	$633	$10,000
Don Julio # N24	109.5	$4,217	$197	$4,209	$565	$633	$10,000
Sutter # N25	101.6	$4,209	$189	$3,713	$565	$635	$9,000
Monument # N26	80.2	$4,226	$206	$3,750	$565	$631	$9,000
Merrihill # N29	147.7	$4,222	$202	$6,372	$565	$635	$12,000

Table 7 (continued)
Opinion of Fluoridation Facilities O&M Costs[1]

Facility Name	Annual Water Production[2] (MG)	Labor Costs	Energy Costs	Chemical Costs[1]	Hazardous Materials Permit Costs	Repair/ Maintenance Costs (annualized lifecycle costs)	Total Annual Costs
Parkoaks # N30	63.4	$4,209	$189	$3,224	$565	$633	$9,000
Barrett Meadows # N31	131.5	$4,235	$215	$5,808	$565	$631	$11,000
Poker Lane # N32A	203.5	$4,219	$199	$6,895	$565	$635	$13,000
Poker Lane # N32B	360.2	$4,240	$221	$11,245	$565	$635	$17,000
Poker Lane # N32C	93.5	$4,222	$203	$3,840	$565	$631	$9,000
Walerga # N33	131.6	$4,219	$200	$4,898	$565	$633	$11,000
Cottage # N34	180.0	$4,216	$197	$5,617	$565	$635	$11,000
Antelope # N35	126.3	$4,211	$191	$4,751	$565	$635	$10,000
Verner # N36	3.6	$4,198	$178	$1,372	$565	$635	$7,000
Roseview Park # N37	*0.0*	$4,197	$177	$1,245	$565	$635	$7,000
Coyle # N38	*0.0*	$4,197	$177	$1,245	$565	$635	$7,000
McClellan AFB # MC10	2.2	$4,198	$178	$1,320	$565	$631	$7,000
Capehart # MC-C1	5.4	$4,200	$180	$1,394	$565	$631	$7,000
Capehart # MC-C2	3.1	$4,199	$179	$1,321	$565	$631	$7,000
Melrose/Channing # 27	9.6	$4,200	$180	$1,545	$565	$631	$7,000
Watt/Elkhorn # 31A	3.4	$4,198	$178	$1,362	$565	$635	$7,000
Weddigen/Gothberg # 52	85.5	$4,219	$199	$4,211	$565	$633	$10,000
Fairbairn/Karl # 56A	179.1	$4,213	$193	$7,459	$565	$635	$13,000
32nd/Elkhorn # 58	0.1	$4,197	$177	$1,247	$565	$631	$7,000
Bainbridge/Holmes # 59A	306.3	$4,219	$200	$9,747	$565	$635	$15,000
Galbrath/Antelope Woods # 64	58.1	$4,216	$196	$3,261	$565	$631	$9,000
Total:	*3199*						
Total Annual GW Category Costs		**$164,211**	**$7,443**	**$145,157**	**$22,035**	**$24,701**	**$365,000**
Grand Total Annual Costs		**$180,641**	**$7,860**	**$323,208**	**$23,165**	**$28,082**	**$564,000**

[1] Chemical cost for the PRV sites include the cost of caustic soda.
[2] SSWD estimated annual water production is based on the average annual water production for the period from 2003 through 2009.
[3] Values in italics represent either assumed values or facilities that are currently planned and budgeted.

Project Cost Summary

The annual O&M costs for the project's 30-year design life cycle were converted to a present worth using a net interest rate of 3-percent. Capital costs were added to present worth O&M costs to calculate total project present value costs for each water purveyor. The costs are summarized in **Table 8**.

Table 8
Conceptual Project Cost Estimate Summary[1]

Description	Total Annual O&M Cost (30-yr Life Cycle)	Present Worth of Annual O&M (30 yrs, i=3%)	Capital Cost	Total Present Value of Project O&M and Capital Costs (30-yr Life Cycle)
North Service Area Surface Water and Groundwater Fluoridation	$564,000	$4,272,000	$8,681,000	$12,953,000

[1]AACE Class 4 Estimate. Cost basis October 2010. Labor cost $52/hr. Power cost $0.10/kW-hr. Includes 15-percent Contractor OH&P, 3-percent Insurance and Bonds, 3-percent Mobilization, 20-percent Engineering and Construction Management, and 20-percent Scope Contingency.

The client hereby acknowledges that MWH has no control over the costs of labor, materials, competitive bidding environments, unidentified field conditions, financial and/or commodity market conditions, or any other factors likely to affect the opinion of probable construction cost (OPCC) of this project, all of which are and will unavoidably remain in a state of change, especially in light of high market volatility attributable to Acts of God and other market forces or events beyond the control of the parties. As such, Client recognizes that this OPCC deliverable is based on normal market conditions, defined by stable resource supply/demand relationships, and does not account for extreme inflationary or deflationary market cycles. Client further acknowledges that this OPCC is a "snapshot in time" and that the reliability of this OPCC will degrade over time. Client agrees that MWH cannot and does not make any warranty, promise, guarantee or representation, either express or implied that proposals, bids, project construction costs, or cost of O&M functions will not vary significantly from MWH's good faith Class 4 OPCC.

FLUORIDATION FACILITIES IMPLEMENTATION SCHEDULE

As noted in the introduction of this report, Article 4.1 of the CCR requires water systems with 10,000 service connections or more to fluoridate their water if funding is available for capital costs and ongoing O&M costs. Assuming that SSWD is able to obtain funding, the schedule shown in **Table 9** indicates key project activities, along with their approximate durations, that would be required to implement system/wide fluoridation. The project is expected to take approximately 27 months to complete.

Table 9
Fluoridation Project Schedule

Project Activity	Quarterly Project Schedule								
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Project Management									
Public Outreach									
Design									
Environmental									
Permitting									
Bid and Award									
Construction									

The expected duration of the design process is approximately 12 months. The construction contract would be administered by SSWD and would include their 37 existing wells, two planned wells, and two PRV station sites. It is assumed that the construction work would take approximately 12 months to complete. Bid and award of the contracts is expected to take 2 to 3 months.

It is expected that the SSWD's project management duties would extend over the full project duration. Due to the sensitive nature of fluoridation, it is also expected that a significant public outreach effort will be required to address customer concerns.

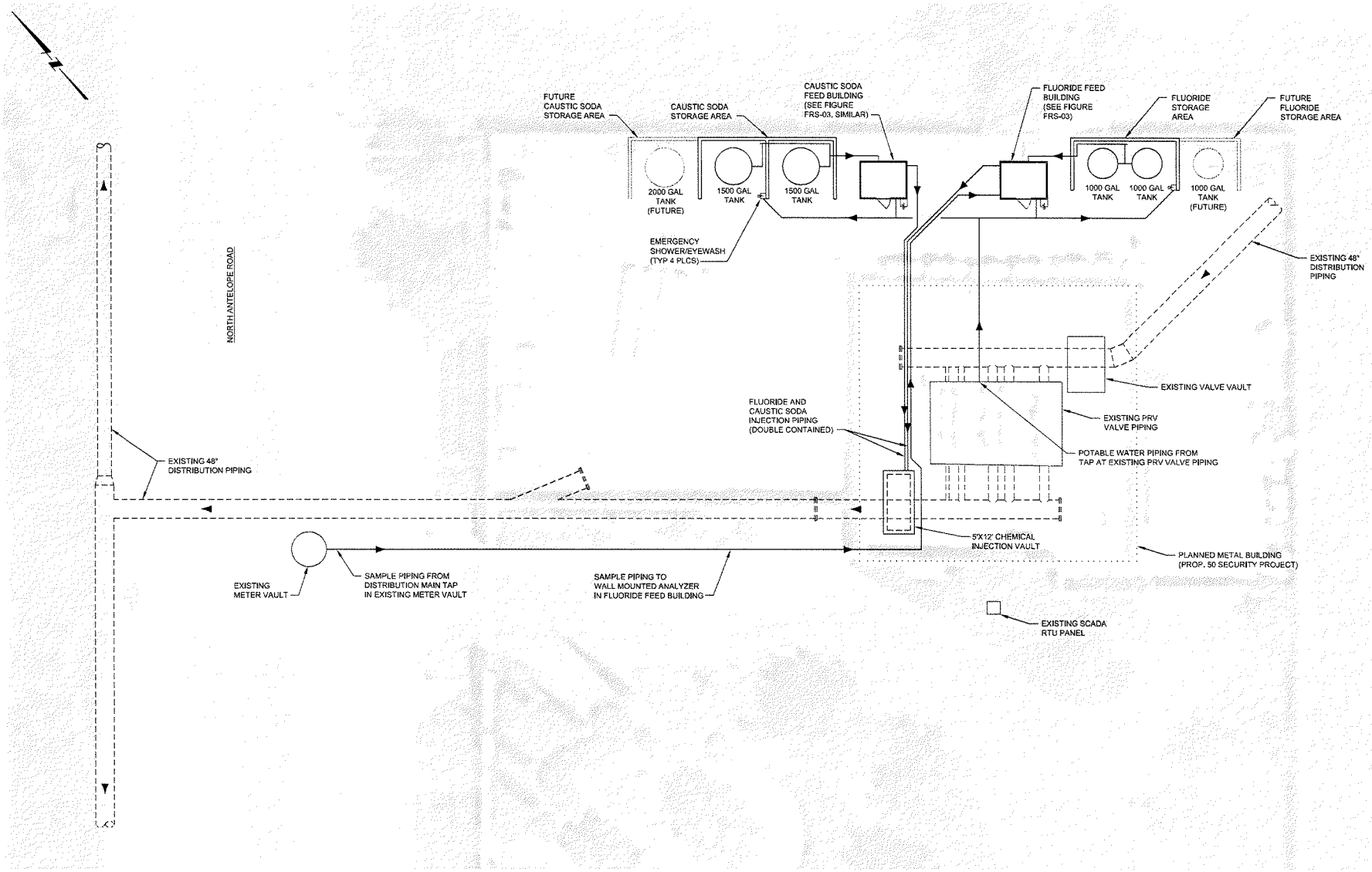
It is expected that activities to comply with environmental regulations will be minimal due to the limited impacts of the work. It is expected that the water agencies will only need to file a categorical exemption to meet California Environmental Quality Act (CEQA) requirements, similar to the approach taken by Sacramento County Water Agency's fluoridation project.

SSWD will also be required to coordinate with the California Department of Public Health (CDPH) and complete an Application for Domestic Water Supply Permit Amendment. Before submitting the application, SSWD would also need to develop a Fluoride Monitoring Plan (FMP) and Fluoridation System Operations Contingency Plan (FSOCP). These plans would typically include the following key elements:

- Daily Distribution System Grab Sample Testing (FMP)
- Monthly Distribution System Split Grab Sample Testing (FMP)
- Annual Raw Water Sample Testing (from each well) (FMP)
- Daily Calculated Fluoride Dose for Each Well (FMP)
- Monthly Calculated Fluoride Dose for the System (FMP)
- Reliability Measures (such as inclusion of on-line fluoride analyzers) (FSOCP)
- Action Plan for Non-Optimal Fluoride Levels (FSOCP)
- Action Plan for Spill/Leak (FSOCP)
- Procedures for Fluoridation System Shutdown (FSOCP)

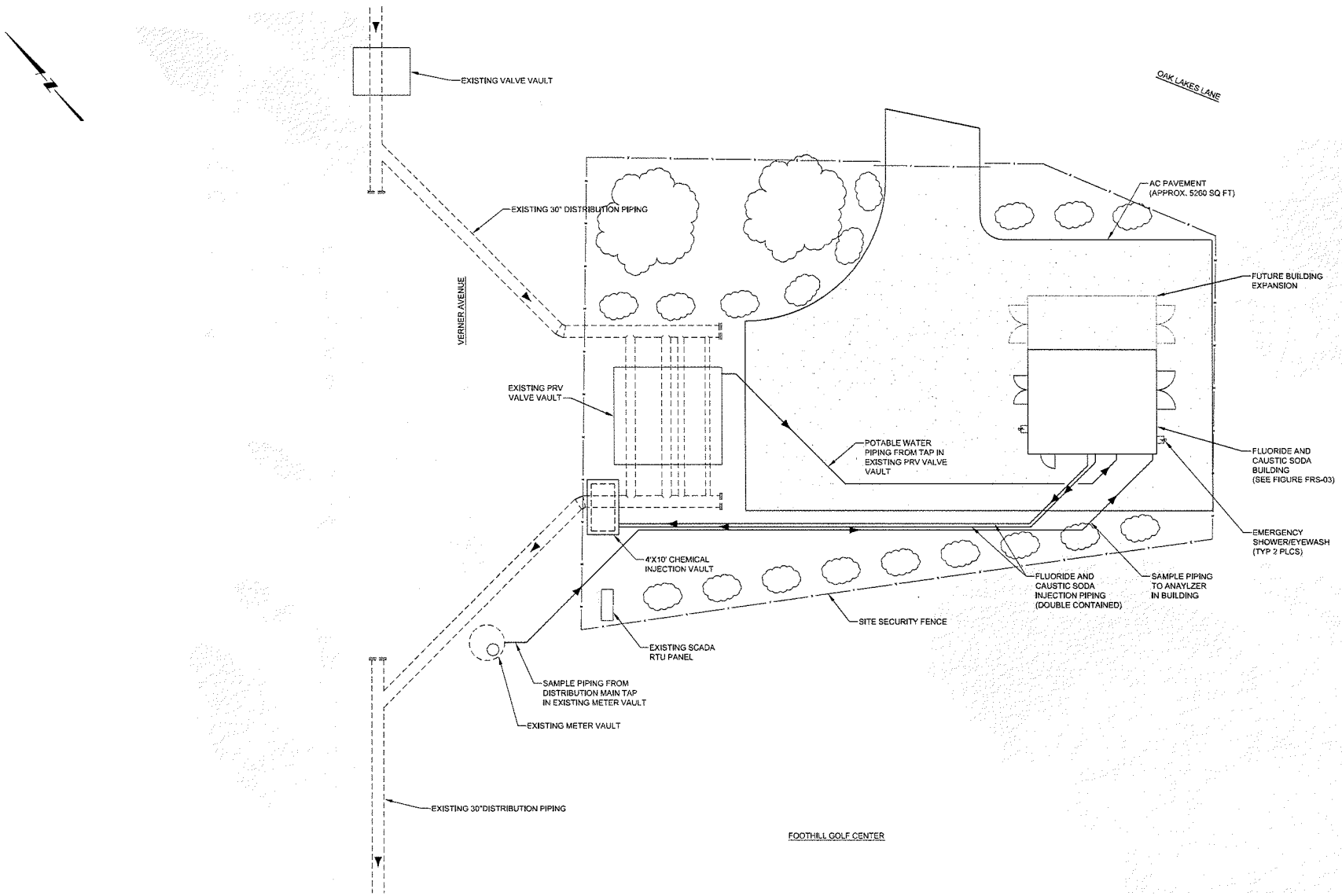
- Notification and Reporting Procedures (FSOCP)

CDPH would be responsible for monitoring and inspection of the project fluoridation facilities to confirm continued compliance with the requirements of CCR Article 4.1.



SCALE 1" = 10'	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED P. SALZMAN DRAWN E. GOSSE CHECKED P. SALZMAN	MWH Sacramento, California	SACRAMENTO SUBURBAN WATER DISTRICT	SACRAMENTO SUBURBAN WATER DISTRICT FLUORIDATION REPORT SUPPLEMENT	ANTELOPE PRV STATION FLUORIDATION FACILITIES ADDITION SITE PLAN	FIGURE FRS-01

Job No. 2222222 File



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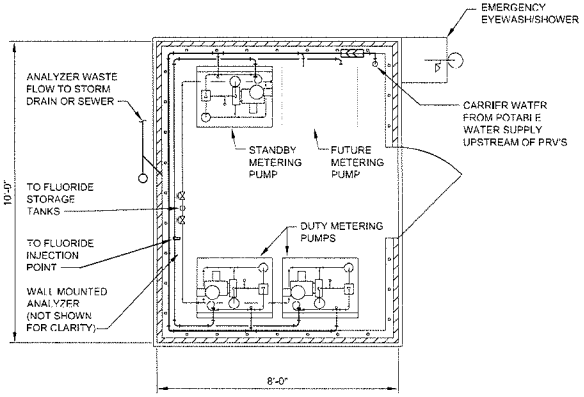
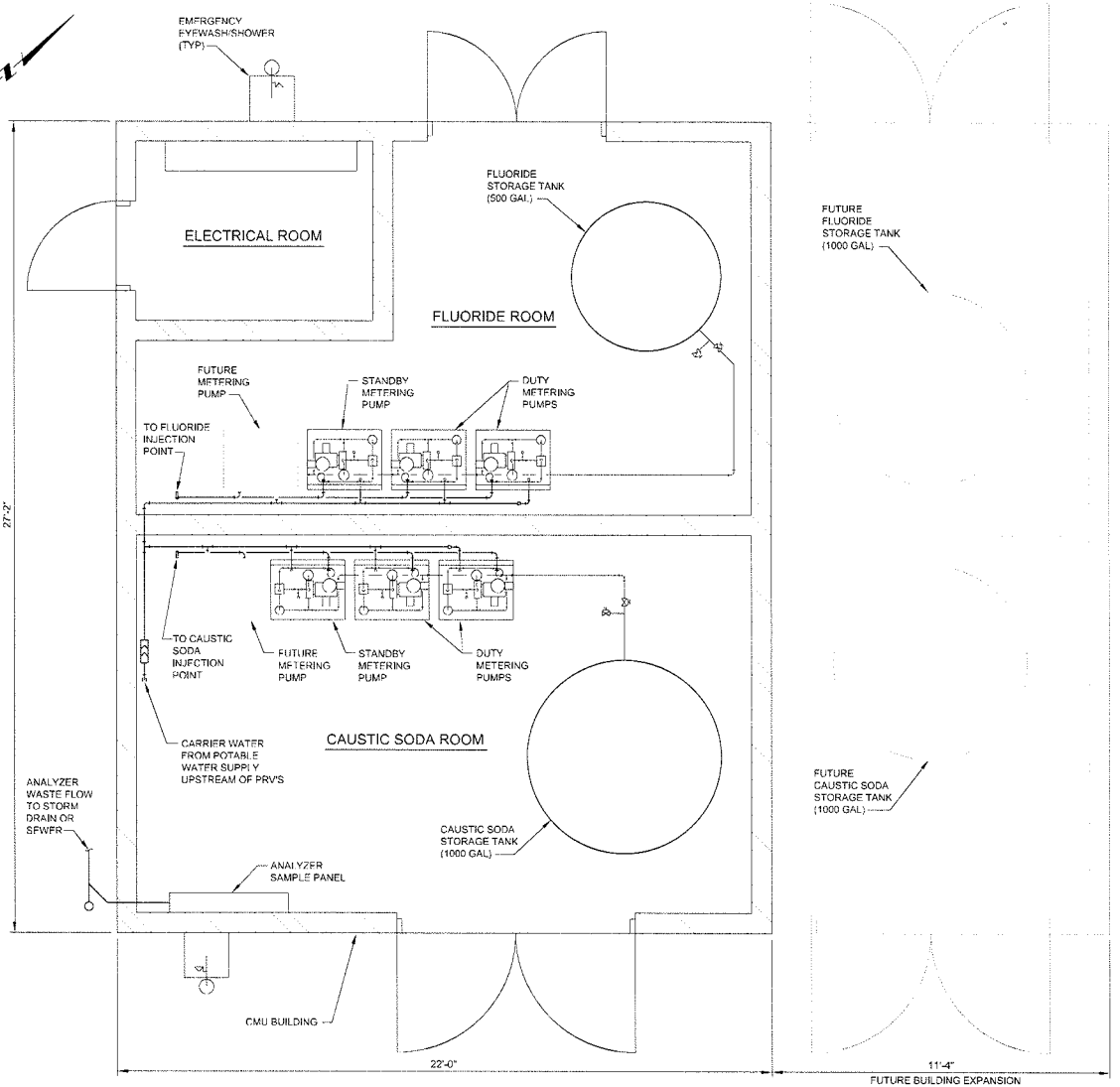


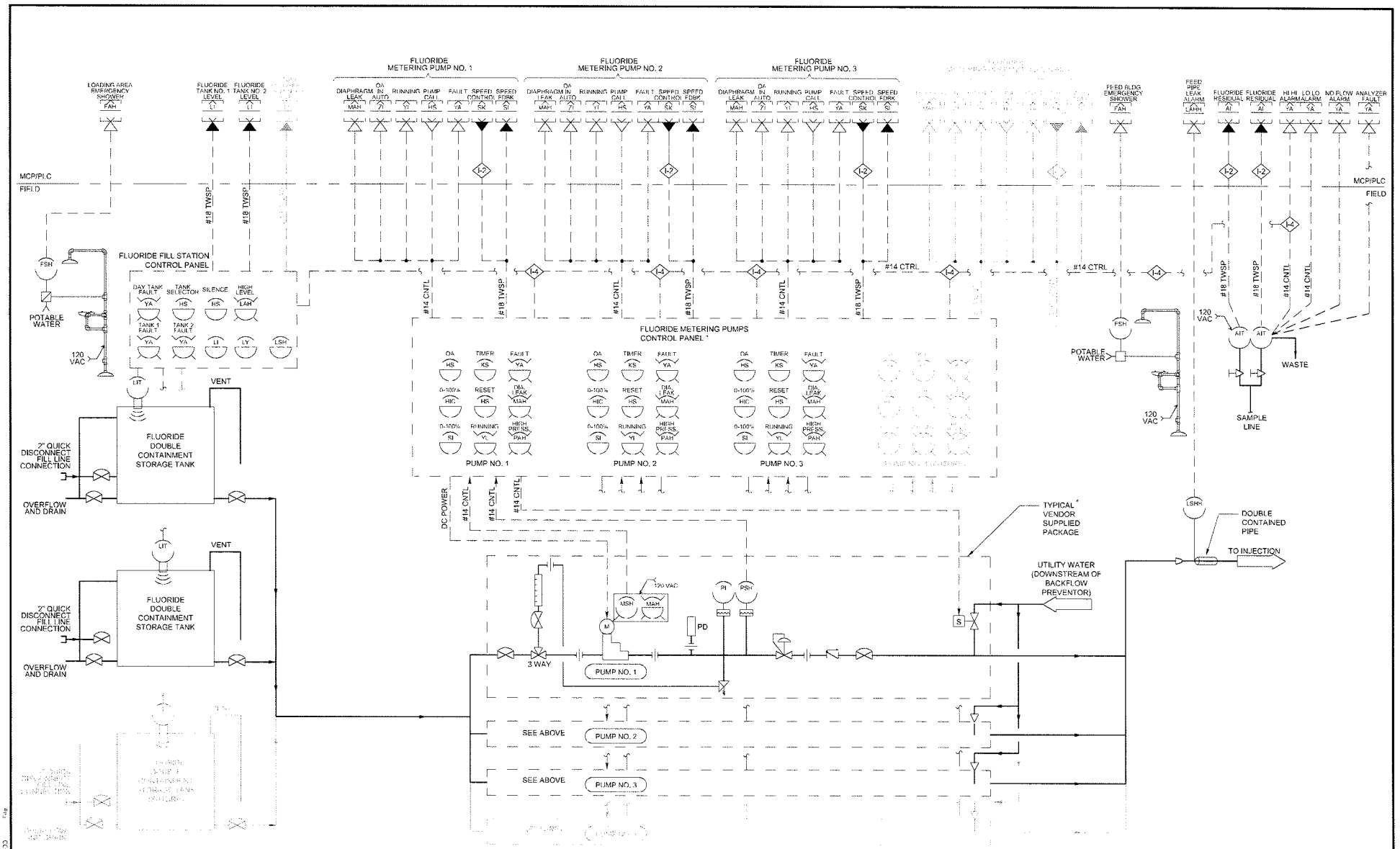
ANTELOPE PRV STATION
FLUORIDE BUILDING PLAN
(CAUSTIC SODA BUILDING PLAN SIMILAR)
SCALE: 1/2" = 1'-0"



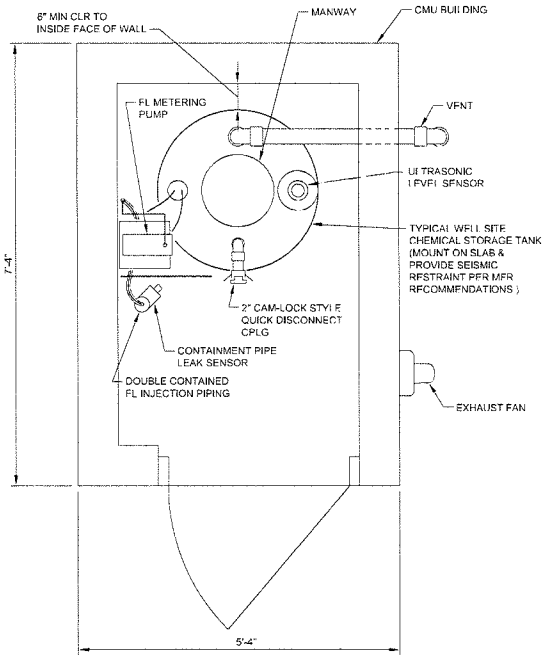
VERNER PRV STATION
BUILDING PLAN
SCALE: 1/2" = 1'-0"

SCALE: AS SHOWN	WARNING: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED E. GOSSE DRAWN E. GOSSE CHECKED P. SALZMAN	MWH Sacramento, California	SACRAMENTO SUBURBAN WATER DISTRICT	SACRAMENTO SUBURBAN WATER DISTRICT FLUORIDATION REPORT SUPPLEMENT	ANTELOPE PRV STATION AND VERNER PRV STATION BUILDING PLANS	FIGURE FRS-03

Job No. 23333333 File

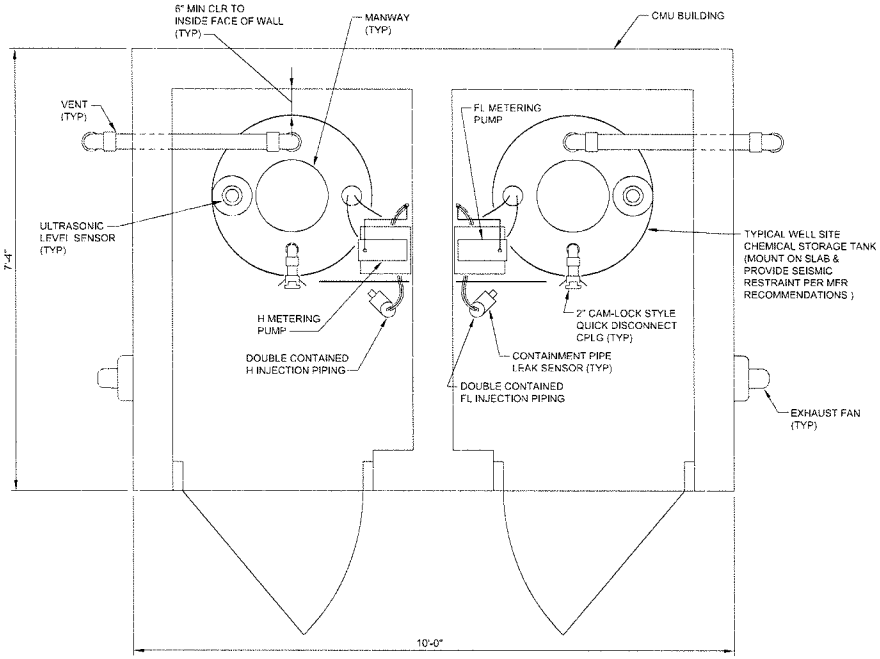


SCALE NONE	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED E. GOSSE DRAWN E. GOSSE CHECKED P. SALZMAN	MWH Sacramento, California	SACRAMENTO SUBURBAN WATER DISTRICT	SACRAMENTO SUBURBAN WATER DISTRICT FLUORIDATION REPORT SUPPLEMENT	ANTELOPE PRV STATION P&ID (VERNER PRV STATION P&ID SIMILAR) (CAUSTIC SODA SYSTEM P&ID SIMILAR)	FIGURE FRS-04



TYPICAL CHEMICAL ROOM
PLAN FOR FLUORIDE
BUILDINGS

SCALE: 1" = 1'-0"

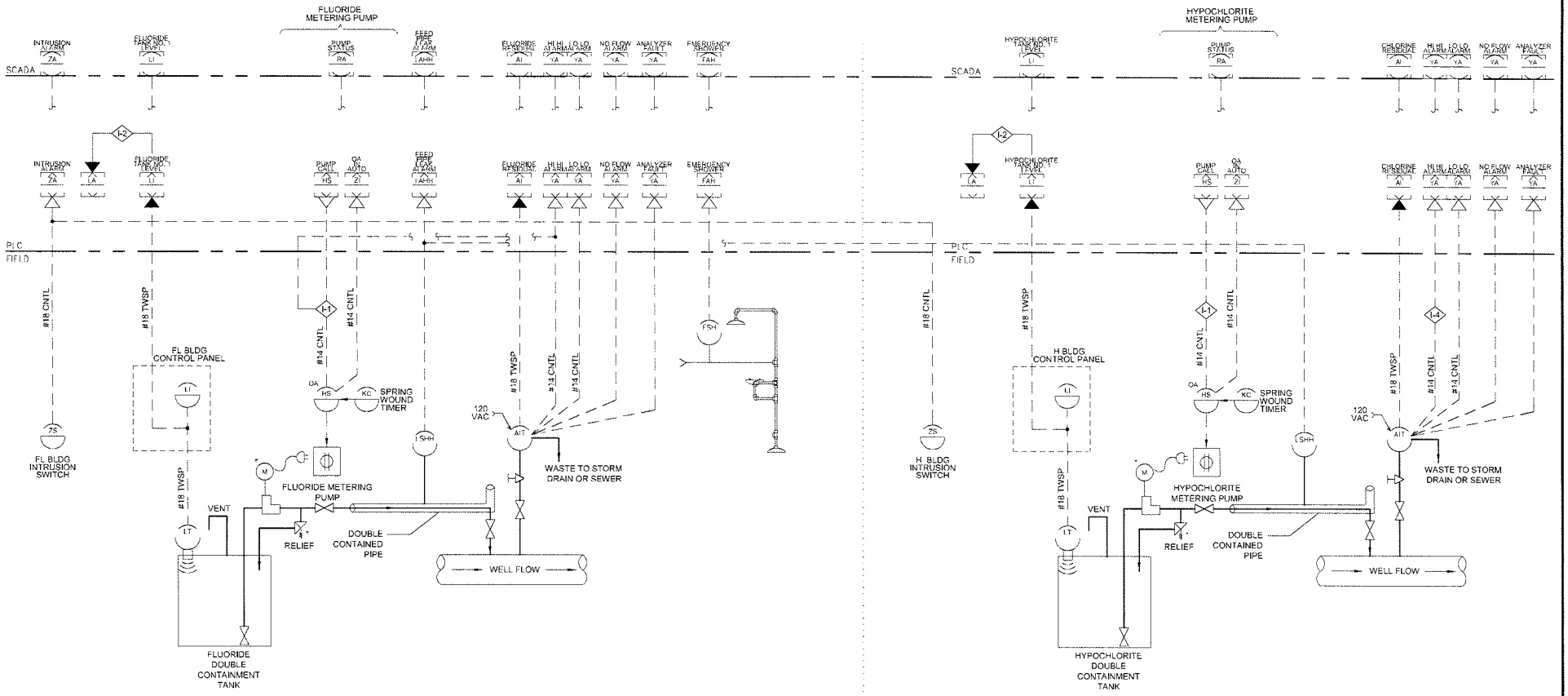


TYPICAL CHEMICAL ROOM
PLAN FOR CHLORINE AND
FLUORIDE BUILDINGS

SCALE: 1" = 1'-0"

SCALE: AS SHOWN	WARNING 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED E. GOSSE DRAWN E. GOSSE CHECKED P. SALZMAN	MWH Sacramento, California	SACRAMENTO SUBURBAN WATER DISTRICT	SACRAMENTO SUBURBAN WATER DISTRICT FLUORIDATION REPORT SUPPLEMENT	WELL SITES TYPICAL BUILDING PLANS	FIGURE FRS-05

Job No. 0000000 File



FLUORIDE FEED P & ID

HYPOCHLORITE FEED P & ID *

* FOR SITES WHICH REQUIRE REPLACEMENT HYPOCHLORITE SYSTEMS

SCALE: NONE	WARNING: 0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE	DESIGNED E. GOSSE DRAWN E. GOSSE CHECKED P. SALZMAN	MWH Sacramento, California	SACRAMENTO SUBURBAN WATER DISTRICT	SACRAMENTO SUBURBAN WATER DISTRICT FLUORIDATION REPORT SUPPLEMENT	WELL SITES TYPICAL FLUORIDE & HYPOCHLORITE SYSTEMS P&ID	FIGURE FRS-06

APPENDIX A

Table A-1
Existing System and Site Data for PRV Stations and Project Wells

Facility Name	Maximum Pumping Capacity		Estimated Annual Water Production (See Note 3)	Is the Existing Site Large Enough to Fit Fluoride Facilities ? (See Note 1)	Does the Existing Site have SCADA Facilities ? (See Note 2)	Natural Fluoride Concentration	Raw Water Chemistry								Additional Chemicals and Dosages, and Notes
							Total Dissolved Solids	Temperature	pH	Alkalinity	Calcium	Chloride	Sulfate	Hardness	
	(GPM)	(MGD)	(MG)	(Yes / No)	(Yes / No)	(mg/L)	(mg/L)	(Degrees C)	(units)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	
Antelope PRV	24600	35.42	3650	Yes	Yes	0.0	47	16.5	8.4		8.8	2.7	6.2	29	(See Note 7)
Verner PRV	4700	6.77	910	Yes	Yes	0.0	47	16.5	8.4		8.8	2.7	6.2	29	(See Note 7)
Engle # N3	925	1.33	214.864	No	Yes	0.1									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Hillsdale # N5	850	1.22	160.849	No	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Palm #N6	1040	1.50	0.507	No	No	*0.0*									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Rosebud # N7	1300	1.87	211.343	No	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Field #N8	1200	1.73	2.867	Yes	No	*0.0*									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Cameron #N9	1300	1.87	6.152	No	*Yes*	*0.0*									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Walnut # N10	1300	1.87	394.217	Yes	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
St. Johns # N12	1350	1.94	151.939	Yes	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Orange Grove # N14	1200	1.73	0.596	No	No	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Cabana # N15	1000	1.44	59.038	No	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Oakdale # N17	1100	1.58	0.572	No	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Cypress # N20	1300	1.87	194.218	No	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
River College # N22	1000	1.44	165.832	No	*Yes*	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Freeway # N23	1025	1.48	176.148	Yes	*Yes*	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Don Julio # N24	1190	1.71	234.093	Yes	No	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Sutter # N25	1900	2.74	217.242	Yes	Yes	0.3									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Monument # N26	600	0.86	171.499	No	No	0.1									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Merrihill # N29	1285	1.85	315.876	No	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Parkoaks # N30	1125	1.62	135.455	Yes	Yes	0.1									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Barrett Meadows # N31	750	1.08	281.101	No	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Poker Lane # N32A	2000	2.88	435.118	No	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Poker Lane # N32B	1800	2.59	770.134	No	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Poker Lane # N32C	790	1.14	199.844	No	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Walerga # N33	1275	1.84	281.307	Yes	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Cottage # N34	2000	2.88	384.803	No	Yes	0.3									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Antelope # N35	2000	2.88	269.999	Yes	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Verner # N36	1700	2.45	*7.800*	Yes	Yes	*0.0*									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Roseview Park # N37 ***(See Note 6)***	*2000*	*2.88*	*0.000*	*Yes*	*Yes*	*0.0*									*Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose*
Coyle # N38 ***(See Note 6)***	*1500*	*2.16*	*0.000*	*Yes*	*Yes*	*0.0*									*Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose*
McClellan AFB # MC10	675	0.97	4.612	No	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Capehart # MC-C1	450	0.65	11.466	No	No	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Capehart # MC-C2	400	0.58	6.694	No	No	0.3									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Melrose/Channing # 27	680	0.98	20.528	No	No	0.1									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Watt/Elkhorn # 31A	1600	2.30	7.172	Yes	No	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Weddigen/Gothberg # 52	840	1.21	182.729	Yes	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Fairbairn/Karl # 56A	2400	3.46	382.827	Yes	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
32nd/Elkhorn # 58	650	0.94	0.192	No	Yes	0.4									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Bainbridge/Holmes # 59A	2950	4.25	654.791	Yes	Yes	0.2									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
Galbrath/Antelope Woods # 64	675	0.97	124.188	No	Yes	0.0									Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
		Total:	**6838.612**												
South Service Area - Well 71 **(See Note 5)**							140	N/A	8.2	69	13	3	5	55	Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
South Service Area - Well 4B **(See Note 5)**							250	N/A	7.1	110	27	54	0	130	Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose
South Service Area - Well 33A **(See Note 5)**							250	N/A	7.4	120	19	20	5	100	Sodium Hypochlorite @ 0.75 - 1.2 mg/L dose

Notes:

1. It is assumed that a 14' x 14' area is required for fluoride facilities at the wells. If insufficient space available, chlorine and fluoride will be combined in a single new building.
2. New fluoride facilities will require remote SCADA facilities. If the existing site has no SCADA or a non-expandable SCADA system a value of "No" is entered.
3. Estimated annual water production is represented by actual production values from 2007. Existing well #N27 no longer in use and deleted from list. Production value for #N27 assigned to newly constructed well #N36 (Verner) to maintain overall system production volume.
4. Values in italics represent either assumed values or facilities that are currently planned and budgeted.
5. Typical raw water quality data provided for reference only. This well is not included in the current study.
6. Planned well. Expected to be in service Fall 2012. It is assumed that well production volumes at neighboring wells will decrease as these wells increase, maintaining overall system production volume.
7. Raw water chemistry data obtained from 2009 SJWD Consumer Confidence Report. Temperature and pH values reported by SJWD staff.

APPENDIX B

Table B-1
Fluoridation Facilities Capital Cost Detail

Notes:	1. Total Costs include Contractor Insurance and Bonds at 3%, Overhead and Profit at 15%, and Mobilization at 3%. Original well site facilities Cost Basis was April 2009. No significant escalation/de-escalation to current costs, October 2010 Cost Basis.
	2. AACE International CLASS 4 Cost Estimate – Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. Typically, engineering is 10% to 40% complete. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Virtually all Class 4 estimates use stochastic estimating methods such as cost curves, capacity factors, and other parametric and modeling techniques. Expected accuracy ranges are from –15% to –30% on the low side and +20% to 50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 20 hours or less to perhaps more than 300 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).
	3. The client hereby acknowledges that MWH has no control over the costs of labor, materials, competitive bidding environments, unidentified field conditions, financial and/or commodity market conditions, or any other factors likely to affect the opinion of probable construction cost (OPCC) of this project, all of which are and will unavoidably remain in a state of change, especially in light of high market volatility attributable to Acts of God and other market forces or events beyond the control of the parties. As such, Client recognizes that this OPCC deliverable is based on normal market conditions, defined by stable resource supply/demand relationships, and does not account for extreme inflationary or deflationary market cycles. Client further acknowledges that this OPCC is a "snapshot in time" and that the reliability of this OPCC will degrade over time. Client agrees that MWH cannot and does not make any warranty, promise, guarantee or representation, either express or implied that proposals, bids, project construction costs, or cost of O&M functions will not vary significantly from MWH's good faith Class 4 OPCC.

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
Surface Water									
	Antelope PRV	1	Grading / Paving	LS	1	$12,000	$12,000		
		2	Misc Small Piping	LS	1	$47,000	$47,000		
		3	Analyzer Drain Pipeline	Approx 240' at 6" dia, LS	1	$20,000	$20,000		
		4	Fluoride Feed Building	LS	1	$62,000	$62,000		
		5	Caustic Feed Building	LS	1	$62,000	$62,000		
		6	Chemical Injection Vault	LS	1	$14,000	$14,000		
		7	Fluoride Tank Slab	LS	1	$4,200	$4,200		
		8	Fluoride CMU Fire Walls	SF	450	$14	$6,300		
		9	Caustic Tank Slab	LS	1	$6,400	$6,400		
		10	Caustic CMU Fire Walls	SF	700	$14	$9,800		
		11	Fluoride Storage Tank	1,000 gal, EA	2	$10,900	$21,800		
		12	Caustic Storage Tank	1,500 gal, EA	2	$19,000	$38,000		
		13	Fluoride Metering Pump	5 gph, EA	3	$14,800	$44,400		
		14	Caustic Metering Pump	7.5 gph, EA	3	$22,300	$66,900		
		15	Emergency Eyewash	EA	4	$4,100	$16,400		
		16	Electrical Wiring, Conduit, and Appurtenances	LS	1	$130,000	$130,000		
		17	Fluoride Analyzer	EA	1	$17,700	$17,700		
		18	Upgrade Existing SCADA System	LS	1	$15,000	$15,000		
		19	Additional Instrumentation	LS	1	$50,000	$50,000		
								$643,900	**Antelope PRV Subtotal**
	Verner PRV	1	Property Acquisition	Acre	0.23	$125,000	$28,750		
		2	Grading / Paving	LS	1	$52,600	$52,600		
		3	Landscape	LS	1	$15,000	$15,000		
		4	Security Fencing	LF	440	$125	$55,000		
		5	Misc Small Piping	LS	1	$28,000	$28,000		
		6	Analyzer Drain Pipeline	Approx 160' at 6" dia, LS	1	$13,400	$13,400		
		7	Chemical Feed Building	LS	1	$150,000	$150,000		
		8	Chemical Injection Vault	LS	1	$14,000	$14,000		
		9	Fluoride Storage Tank	500 gal, EA	1	$7,000	$7,000		
		10	Caustic Storage Tank	1,000 gal, EA	1	$10,900	$10,900		
		11	Fluoride Metering Pump	0.85 gph, EA	3	$14,800	$44,400		
		12	Caustic Metering Pump	1.7 gph, EA	3	$14,800	$44,400		
		13	Emergency Eyewash	EA	2	$4,100	$8,200		
		14	Electrical Wiring, Conduit, and Appurtenances	LS	1	$85,000	$85,000		
		15	Fluoride Analyzer	EA	4	$17,700	$70,800		
		16	Upgrade Existing SCADA System	LS	1	$15,000	$15,000		
		17	Additional Instrumentation	LS	1	$40,000	$40,000		
								$682,450	**Verner PRV Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
Groundwater Wells									
	Engle # N3	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	New Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,820	**Well Subtotal**
	Hillsdale # N5	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,820	**Well Subtotal**
	Palm #N6	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$143,820	**Well Subtotal**
	Rosebud # N7	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$29,300	$29,300		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$22,600	$22,600		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$141,790	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Field #N8	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$125,020	**Well Subtotal**
	Cameron #N9	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$29,300	$29,300		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$22,600	$22,600		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$141,790	**Well Subtotal**
	Walnut # N10	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,090	**Well Subtotal**
	St. Johns # N12	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,090	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Orange Grove # N14	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$143,820	**Well Subtotal**
	Cabana # N15	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,820	**Well Subtotal**
	Oakdale # N17	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,820	**Well Subtotal**
	Cypress # N20	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,890	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	River College # N22	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,820	**Well Subtotal**
	Freeway # N23	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,020	**Well Subtotal**
	Don Julio # N24	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$125,020	**Well Subtotal**
	Sutter # N25	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,090	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Monument # N26	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$143,750	**Well Subtotal**
	Merrihill # N29	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,890	**Well Subtotal**
	Parkoaks # N30	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,020	**Well Subtotal**
	Barrett Meadows # N31	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$29,300	$29,300		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$22,600	$22,600		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$141,650	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Poker Lane # N32A	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Existing Building Retrofits	LS	1	$12,000	$12,000		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$10,000	$10,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$104,490	**Well Subtotal**
	Poker Lane # N32B	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	N/A	N/A	$0	$0		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$12,000	$12,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$70,390	**Well Subtotal**
	Poker Lane # N32C	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	N/A	N/A	$0	$0		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$12,000	$12,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$70,250	**Well Subtotal**
	Walerga # N33	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,020	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Cottage # N34	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$124,890	**Well Subtotal**
	Antelope # N35	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,090	**Well Subtotal**
	Verner # N36	1	Grading / Paving	LS	N/A	$0	$0		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	N/A	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$103,090	**Well Subtotal**
	Roseview Park # N37	1	Grading / Paving	LS	N/A	$0	$0		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.85 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	N/A	$0	$0		
		9B	Upgrade Planned SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$103,090	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

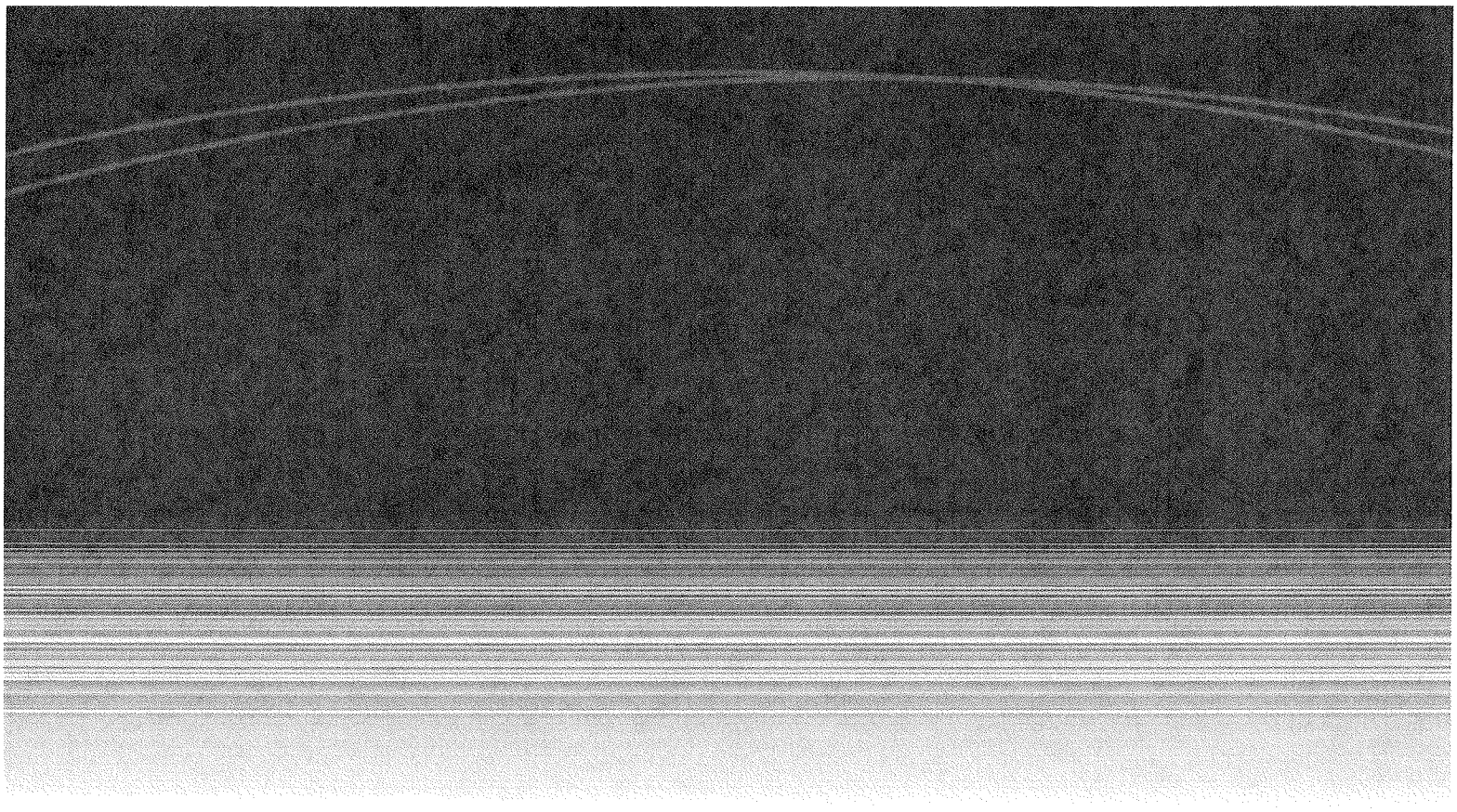
Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Coyle # N38	1	Grading / Paving	LS	N/A	$0	$0		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	N/A	$0	$0		
		9B	Upgrade Planned SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$103,090	**Well Subtotal**
	McClellan AFB # MC10	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$29,300	$29,300		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$22,600	$22,600		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$141,650	**Well Subtotal**
	Capehart # MC-C1	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$143,750	**Well Subtotal**
	Capehart # MC-C2	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$143,750	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	Melrose/Channing # 27	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$143,750	**Well Subtotal**
	Watt/Elkhorn # 31A	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	LS	1	$25,000	$25,000		
		9B	Upgrade Existing SCADA System	N/A	N/A	$0	$0		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$125,090	**Well Subtotal**
	Weddigen/Gothberg # 52	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	120 gal, EA	1	$2,570	$2,570		
		5	Fluoride Metering Pump	0.5 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,020	**Well Subtotal**
	Fairbairn/Karl # 56A	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.85 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,090	**Well Subtotal**

Table B-1
Fluoridation Facilities Capital Cost Detail

Location Type	Facility Name	Item No.	Description	Size or Type	Quantity	Unit Cost	Total		
	32nd/Elkhorn # 58	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$29,300	$29,300		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$22,600	$22,600		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$141,650	**Well Subtotal**
	Bainbridge/Holmes # 59A	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	LS	1	$17,600	$17,600		
		3B	Combined Fluoride/Sodium Hypochlorite Building	N/A	N/A	$0	$0		
		4	Fluoride Storage Tank	150 gal, EA	1	$2,640	$2,640		
		5	Fluoride Metering Pump	0.85 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$20,000	$20,000		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$15,000	$15,000		
		11	Sodium Hypochlorite Relocation	N/A	N/A	$0	$0		
								$106,090	**Well Subtotal**
	Galbrath/Antelope Woods # 64	1	Grading / Paving	LS	1	$3,000	$3,000		
		2	Misc Small Yard Piping	LS	1	$16,000	$16,000		
		3A	Standard Fluoride Building	N/A	N/A	$0	$0		
		3B	Combined Fluoride/Sodium Hypochlorite Building	LS	1	$33,400	$33,400		
		4	Fluoride Storage Tank	90 gal, EA	1	$2,500	$2,500		
		5	Fluoride Metering Pump	0.25 GPH, EA	1	$1,350	$1,350		
		6	Emergency Eyewash	EA	1	$4,100	$4,100		
		7	Electrical Wiring, Conduit, and Appurtenances	LS	1	$29,300	$29,300		
		8	Fluoride Analyzer	EA	1	$20,400	$20,400		
		9A	Complete SCADA System (Including PLC and Radio Communicaitons)	N/A	N/A	$0	$0		
		9B	Upgrade Existing SCADA System	LS	1	$6,000	$6,000		
		10	Additional Instrumentation	LS	1	$22,600	$22,600		
		11	Sodium Hypochlorite Relocation	LS	1	$3,000	$3,000		
								$141,650	**Well Subtotal**
			Surface Water Subtotal				**$1,326,350**		
			Groundwater Well Subtotal				**$4,701,740**		
			Project Total				**$6,028,090**		
			Engineering and Construction Management (20%)				**$1,206,000**		
			Scope Contingency (20%)				**$1,447,000**		
			Opinion of Project Capital Cost				**$8,681,000**		



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SACRAMENTO SUBURBAN WATER DISTRICT

Facilities and Operations Committee

Agenda Item: 6

Date: October 23, 2015

Subject: McClellan Business Park and Operations Agreement Update

Staff Contact: Dan York, Assistant General Manager

Recommended Committee Action:
Receive report from staff on the current status of the McClellan Business Park operations agreement.

Staff has prepared a summary of the historical activities that have occurred between Northridge Water District, later to become Sacramento Suburban Water District, and the McClellan Air Force Base, later to become McClellan Business Park, from 1988 to 2015. In addition, staff has prepared an update of the status of the Operations Agreement between Sacramento Suburban Water District and Sacramento County, entered into in 2000, which was subsequently turned over to McClellan Business Park.

The following summary was last provided to the Facilities and Operations (F&O) Committee and full Board in June 2010 for review and comment. Staff was directed to proceed per the recommendations on the report with the completion of the items per the McClellan Capital Improvement Plan (CIP).

Background
1988 – The former Northridge Water District (NWD) was contacted by the McClellan Air Force Base (Air Force) Civil Engineering Commander to provide a secondary water source to the Air Force Base. NWD negotiated and constructed standby emergency water service through extensions from its distribution system into booster pumps systems at two different locations along Roseville Road into the Air Force. Total capacity into the Air Force was tested at 6,400 gallons per minute (gpm).

1995 – NWD was contacted by the Air Force concerning the future closing and privatization of the Air Force Base (Base). The Air Force requested NWD submit a proposal for providing operation and maintenance on the Base potable water system.

1998 – NWD was considered the front-runner to assume control of the potable water facilities at the Base. The Air Force, which began downsizing their operations, brought in Boeing Services

to assist in the management and privatization of the Base. NWD began working with Boeing on inspecting the potable water system and what potential improvements would be required to bring to system up to standards. Boeing provided management for the Air Force until the Base was turned over to the County of Sacramento. The proposal was finalized with the assistance of the Air Force and Boeing.

1999 - In late 1999, the Air Force turned over the entire Base to the County of Sacramento Local Redevelopment Agency. McClellan Business Park (MBP) was formed from a group of local investors to transform the former Base into a mixed-use commercial/industrial park.

2000 – The County of Sacramento executed an agreement with NWD for operation and maintenance of the potable water facilities with ownership of the facilities, but no property (see Exhibit 1). Included in the agreement was a CIP consisting of ten items that were included in the proposal. As part of the agreement, NWD was required to provide improvements to the existing potable water system to bring the distribution system up to current American Water Works Association standards. The facilities turned over to NWD included the potable water systems at the former Base (currently McClellan Business Park) and the Capehart Housing (currently The Arbors at Antelope), attached as Exhibit 2.

Capital Improvement Plan

As discussed above, a CIP was prepared that included ten items related to the potable water supply system within the former Base and Capehart Housing. The CIP included a quantity and cost estimate for each item. The basis of the cost estimates for each of the above items was determined by the estimated cost to perform each item and extended by the number of estimated items in each activity. The quantities were provided by the Air Force and the cost was an estimate of the potential funding that might be required. However, the overall assessment was based on the list of activities to be completed rather than the funding investment threshold. The list of the capital improvement items included an estimated cost of each item based on provided information and quantities from the Air Force (see Exhibit 3). Also included in Exhibit 3 is a more accurate account of each item and the balance remaining to date. Total funds spent to date for each item completes the table, which includes actual capital improvement costs and operation and maintenance costs. A description of each capital improvement includes:

1. Installation of water meters and backflows on all buildings on existing services at the former Air Force Base.
2. Installation of backflow protection on all private fire sprinkler services at McClellan Air Force Base.
3. Installation of water meters at all units at the former Capehart Housing complex.
4. Fire hydrant upgrade and replacement including flow testing each fire hydrant. The Air Force had a requirement that every hydrant must be tested on a four-year rotation basis.
5. Storage tank inspection, cleaning and/or recoating.
6. Install backflow protection on all fire suppression facilities feeding the deluge systems.
7. Water well inspection and upgrade to current Department of Public Health Service's standards including installation of variable frequency drives (VFD), telemetry equipment and motor control center.

8. Installation of altitude valve on the storage tank facilities.
9. Preparation of a water quality sampling plan and installation of sampling stations.
10. Installation of two transmission pipelines, which support the Air Force Base. The two projects were the 16-inch on Roseville Road from Madison Avenue to Palm Avenue and a 24-inch pipeline on Roseville Road from Palm Avenue to north of Oakhollow Way.

The total funding spent to date is approximately $9.66 million. Cost associated with the ten items on the capital improvements is approximately $6.76 million. The original estimate for the capital improvements was approximately $5.16 million.

Existing System

McClellan Business Park (Formerly McClellan Air Force Base) – The current water system consists of one production well located at Palm Street and Watt Avenue. The well produces approximately 700 gallons per minute (gpm). The miscellaneous water pipeline facilities range from 6-inch to 16-inch in size, which makes up the distribution system. Two storage facilities, both elevated steel tanks, one located on the east side and the other on the west side of the Park, total approximately 650,000 gallons of capacity. The majority of the buildings contain single or multiple water services varying in sizes from 1-inch to 4-inch in size. Private fire sprinkler services are 8-inch or 10-inch in size and in multiple quantities providing fire protection to a majority of the larger existing warehouse type buildings. Until operation and maintenance was provided by the District no backflow protection existed on any of the existing services.

The Arbors at Antelope (Formerly Capehart Housing) – This area was the former offsite-housing complex for the enlisted military personnel stationed at the former Base. The area contains approximately 400 single-family housing units, a large recreational facility, an office and a clubhouse. The recreation building and surrounding facilities was later turned over to the North Highlands Recreation and Park District. Water facilities included 6-inch, 8-inch and 12-inch water mains; a 150,000 elevated steel storage tank; and two groundwater production facilities. One of the wells is also equipped with a booster pump, which fed water to the former golf course for irrigation. The wells produce approximately 700 gpm each. At the east end of the Arbors an existing intratie connects the distribution system to the District's distribution system. Water service to each unit is now provided through individual services. In addition, separate irrigation services provide water to the landscape areas (see Exhibit 4). Prior to the individual services, the water was delivered to this area by a master meter.

Billing & Metering

McClellan Business Park – Initially the MBP was billed through master meters. The meters were located at the booster pumps and the existing groundwater well. As meters were installed on individual services the billing has changed over from master metering to individual meters servicing the buildings.

The Arbors at Antelope – The Arbors were billed through master meters that were mutually accepted between NWD and MBP. The meters are located at each of the groundwater wells and on the intratie. MBP was consulted on the differences of master metering and the metering of

each individual water service. The differences also included the responsibilities of operation and maintenance of the existing facilities such as fire hydrants, water mains and services.

2004 - The MBP turned the Arbors over to Carmel Partners. Carmel Partners' plan was to subdivide the area into a condominium type complex with the housing footprint as lots and the rest of the area as common ground. Carmel Partners renovated the housing units by bringing each unit up to an agreed standard acceptable to the County of Sacramento. Staff attended several Community Planning Advisory Council (CPAC) meetings whereby Carmel Partners presented the project to subdivide the area into lots and sell the units as condominiums. The proposed change into condominiums was not well received by the CPAC nor surrounding property owners near Capehart. The District's operation and maintenance of Capehart was not changed when Carmel Partners assumed control of the housing complex. The complex remained on a master meter system and operation and maintenance of the facilities downstream of the meter was the owner's responsibility. However, no alteration to the operational agreement with MBP was made to reflect the change in operational and maintenance responsibilities. Of concern to the District was the Department of Public Health permit to operate the system. This permit recognized the District as the agency responsible for the operation and maintenance of the service area and as such would be responsible for all issues related to compliance of State regulations concerning the water system. There are several pending issues with the operation of the Arbors. Such issues included, but were not limited to:

- MBP has no interest in the upgrade or redevelopment of the Arbors.

2011 - District staff was informed that a commercial/residential plumbing company was making repairs to the distribution system. DPH informed the District that the risk transfer of operating and maintaining the Arbors system may have been assumed by the District. The District in 2012 reassumed the operation and maintenance of the Arbors system, which initiated improvements to the water system including installation of water meters for the units and landscape irrigation systems.

2012 - In 2012 the District retrofitted the water services with meters at each of the 400 living units in the Arbors per the District's Water Meter Retrofit Plan. The existing 1-inch copper services were retrofitted with 5/8 x 3/4-inch meters. Landscape irrigation for the common areas was supplied by 46 existing services. These 46 services were upgraded with water meters and approved backflow devices. It was also determined that to perform this work, 18 main line valves were installed to minimize large areas to be shut down during the retrofits. There have been no changes to the District's operation and maintenance of the Arbors. With the units being rentals, Carmel Partners remains the customer and is responsible for the individual metered accounts.

2013 - On September 17, 2013, the District issued a letter to MBP documenting the progress made on the CIP (see Exhibit 5). As identified on the letter, CIP items 1, 2 and 4 have yet to be completed for the reasons mentioned.

A comparison of master metering MBP has been recently analyzed by staff. Staff performed a cursory analysis of the amount of annual revenue being collected based solely on the meter service charge and capital facilities charge components of the District's water rate schedule. Volume of water was excluded considering an equal amount of water would be sold whether MBP be metered individually or master metered. Based on the 2015 water rates, the District currently collects approximately $1.06M through individual metering. MBP has two sources of water from the District. One 8-inch intratie and one 20-inch intratie. A third source of water through an 8-inch intratie exist along Freedom Park Drive, but is in the off position. The District does not have a 20-inch water rate for a domestic service. The water rates have a linear relationship amongst the various sizes. Staff extrapolated the existing water rates and projected water rates for a 20-inch domestic service. The annual revenue collected from the meter service charge and capital facilities charge for one 8-inch and one 20-inch domestic services would be approximately $192K. Considering that the Arbors is owned by Carmel Partners, not MBP, and the services are currently 100% metered, the Arbors was excluded from this analysis.

Recommendation

After review of the information and remaining activities at MBP, staff provides the following recommendations:

1. Continue to honor the existing agreement, including completion of the remaining items listed on the proposed CIP for MBP.

2. Continue requiring full cost recovery for all future development at MBP for activities not covered by the agreement.

3. Continue requiring facility improvements on development projects in compliance with the District's Regulations Governing Water Service.

4. Complete additional capital improvement projects not listed on the CIP:
    - Freedom Park Drive intratie connection (source number three) from North Service Area transmission facilities into MBP. The intratie connection is installed but turned-off. Completion of the intratie would include, but not limited, installation of a control valve, backflow protection and monitoring equipment. The connection is located on the water loop for the Air Museum.
    - Groundwater storage tank. The proposed tank is to replace the former 750,000-gallon concrete storage facility located at the northwest corner of Bell Street and Kilzer Avenue. The MBP removed the existing tank and furnished a new tank site for the District's use. The new location is near the northeast corner of Dean Street and Kilzer Avenue, ad would provide additional emergency storage for SSWD.
    - SCADA controlled automatic valves at booster pump stations. The booster pump facilities are located along Roseville Road. One site is on the MBP property and the other is located on the County of Sacramento's North Area Transfer Station. Both booster pump stations have SCADA, but require electrical wiring and new automatic control valves.

Exhibit 1

COUNTY OF SACRAMENTO
CALIFORNIA

APPROVED
BY RESOLUTION # 99-1167
BOARD OF SUPERVISORS
SEP 07 1999
By Cindy L. Turner
Clerk of the Board

For the Agenda of:
September 7, 1999
11:15 A.M.

To: Board of Supervisors

From: Department of Military Base Conversion

Subject: AGREEMENT BETWEEN NORTHRIDGE WATER DISTRICT (NWD) AND SACRAMENTO COUNTY FOR THE CONVEYANCE OF THE MCCLELLAN AIR FORCE BASE WATER DISTRIBUTION SYSTEM

RECOMMENDATION:

The Board of Supervisors approve the attached resolution authorizing the Chair to execute the attached Agreement for Transfer of the McClellan Air Force Base water distribution system to Northridge Water District (NWD) upon transfer of the water distribution system from the Air Force to the County consistent with the terms and conditions of the Economic Development Conveyance between the Air Force and the County. (Note: requires four-fifths vote)

BACKGROUND:

McClellan Air Force Base will close on July 13, 2001. The Air Force presently owns the water distribution system on base and plans to convey the system to the County prior to the base closure. On April 14, 1998, the County and NWD entered into a Memorandum of Understanding outlining the intent of the parties to cooperate to establish the most economically viable terms and conditions for system transfer, and for the County to convey the system to NWD. The negotiations that transpired subsequent to the MOU have resulted in the attached agreement that is recommended for approval by your Board.

NWD has positioned itself to be the water provider of choice at McClellan. They have had infrastructure in place to serve the base since 1988. In 1996 they petitioned LAFCO for a sphere of influence adjustment to include McClellan in their district. McClellan does not presently lie within the sphere of influence of any water district. LAFCO filed a negative declaration on July 3 1996, and has held the application in abeyance pending execution of this agreement. Additionally, since September 15, 1998, NWD has provided water to the Air Force, and maintained and operated the system on base.

DISCUSSION:

The attached agreement conveys the water distribution system at McClellan Air Force Base including associated water distribution facilities at Camp Kohler and Capehart housing (including the golf course) to the Northridge Water District (NWD) upon execution of the Utility Bill of Sale by the County of Sacramento and the Air Force.

The system includes wells, storage tanks, fluoridation stations, booster pump stations, and real property associated with the maintenance of the system such as land, materials, and equipment. In accordance with the terms of the executed EDC, fee title shall be conveyed to NWD in the same manner the fee title is conveyed to the County by the Air Force. The fee title property reverts to the County if NWD terminates use of the property for activities related to water distribution.

In exchange for conveyance of the system and associated property and the exclusive right to be the sole water provider for McClellan and associated off-site properties for ten (10) years, NWD shall provide the following consideration to the County valued at approximately 5 million, one hundred thousand dollars ($5,100,000):

1. NWD will perform metering of all McClellan facilities, including residential structures and common landscape areas, up to a total of 1162 meters.

2. NWD will perform all necessary upgrades to bring the McClellan water distribution system into compliance with the standards of the American Water Works Association, California Department of Health Services, California Department of Toxic Substances Control, and Central Valley Regional Water Quality Control Board, at no cost to the County.

3. NWD will perform all necessary upgrades to the fire system.

4. NWD will provide easement documents covering the system.

The Agreement includes a provision requiring NWD to defend and indemnify the County in connection with any legal challenges to the exclusivity set forth in lease agreements and property conveyance transactions.

FINANCIAL IMPLICATIONS

This agreement has no financial cost to the County and therefore does not require any adjustment to the 1999-2000 budget.

CONCLUSION:

Transfer of base infrastructure elements, especially utilities, is crucial to support the redevelopment efforts at McClellan Air Force Base. It is recommended that your Board execute the attached Agreement with NWD transferring the water distribution system at McClellan Air Force Base upon execution of the Utility Bill of Sale between the Air Force and the County.

Respectfully Submitted,

ROBERT B. LEONARD
Executive Director

Recommend Approval,

TERRY SCHUTTEN
County Executive

cc: County Counsel
Department of Military Base Conversion
Northridge Water District
Public Works

Document Approvals

For

Agreement Between Northridge Water District (NWD) And Sacramento County For The Conveyance Of The McClellan Air Force Base Water Distribution System

Status	User	Date
Approved	Terry Schutten	8/31/99

COUNTY OF SACRAMENTO

Resolution No. 99-1167

RESOLUTION OF THE BOARD OF SUPERVISORS AUTHORIZING THE EXECUTION OF AN AGREEMENT BETWEEN NORTHRIDGE WATER DISTRICT (NWD) AND SACRAMENTO COUNTY FOR THE CONVEYANCE OF THE MCCLELLAN AIR FORCE BASE WATER DISTRIBUTION SYSTEM

WHEREAS, McClellan Air Force Base (McClellan) was designated for closure by the 1995 Base Realignment and Closure Commission (Commission) and will cease operation as a United States Air Force facility on July 13, 2001; and,

WHEREAS, the County of Sacramento has been designated the Local Redevelopment Authority (LRA) for McClellan; and,

WHEREAS, the Air Force expects to convey a water distribution system (herein "System") to the County as part of a larger economic development conveyance between the Air Force and the County (herein "EDC Document"); and

WHEREAS, the McClellan facilities and equipment represent a unique high technology industrial park that must be developed and integrated into the community; and,

WHEREAS, Effective April 14, 1998, the County and NWD entered into a Memorandum of Agreement (herein "MOA") concerning the conveyance of the System to NWD; and

WHEREAS, the purpose of the MOA was to outline the general terms and conditions of the conveyance of the System by the County to NWD, and to allow time for the County and NWD to conclude their negotiations for the final agreement between them for the conveyance of the System, to be effective at such time as the EDC Document was, or is, finalized; and

WHEREAS, it is currently anticipated that the EDC Document will be finalized in the relatively near future; therefore, County and NWD desire to conclude their negotiations with respect to the conveyance of the System so that an agreement will be in place and ready to become effective at the time that the EDC Document is executed by the Air Force and the County, and, as a part thereof, the System is transferred to the County by the Air Force; and

WHEREAS, NWD, in exchange for certain rights and privileges, has agreed to upgrade the water distribution system to meet health and safety standards; and,

WHEREAS, NWD, by reason of its qualifications, experience and facilities, has proposed to provide the requested services under the terms and conditions set forth herein.

NOW THEREFORE, BE IT RESOLVED AND ORDERED that the Chair of the Board of Supervisors be hereby authorized and directed to execute the Agreement for transfer of the McClellan Air Force Base water distribution system, in the form hereto attached, on behalf of the COUNTY OF SACRAMENTO, a political subdivision of the State of California, with NORTHRIDGE WATER DISTRICT to do and perform everything necessary to carry out the purpose of this Resolution.

On a motion by Supervisor Dickinson seconded by Supervisor Johnson, the foregoing resolution was passed and adopted by the BOARD OF SUPERVISORS of the County of Sacramento, State of California, this 7th day of September, 1999 by the following vote, to wit:

AYES: Supervisors, Collin, Dickinson, Niello, Nottoli, Johnson

NOES: Supervisors, none

ABSENT: Supervisors, none

Muriel P. Johnson
Chairman, Board of Supervisors

COUNTY OF SACRAMENTO CALIFORNIA

ATTEST: Cindy H. Turner
Clerk of the
Board of Supervisors

In accordance with Section 25103 of the Government Code of the State of California a copy of this document has been delivered to the Chairman of the Board of Supervisors, County of Sacramento on

SEP 07 1999

By Gwynne Desloge
Deputy Clerk, Board of Supervisors

FILED

SEP 07 1999

BOARD OF SUPERVISORS

By Cindy H. Turner
CLERK OF THE BOARD

AGREEMENT BETWEEN THE COUNTY OF SACRAMENTO AND THE NORTHRIDGE WATER DISTRICT FOR THE CONVEYANCE OF THE McCLELLAN WATER DISTRIBUTION SYSTEM

This Agreement is made and entered into this 7th of September 1999, by and between the COUNTY OF SACRAMENTO, a political subdivision of the State of California (hereinafter "County"), and the Northridge Water District, a political subdivision of the State of California, formed pursuant to Division 12 (commencing at Section 30000) of the California Water Code (hereinafter "NWD"), to be effective on the date hereinafter set forth.

WHEREAS, McClellan Air Force Base (herein "McClellan"), is located in Sacramento County, California, and will close as an active military installation on July 13, 2001; and

WHEREAS, the Air Force expects to convey the water distribution system (described in part in Section 2 of this Agreement and generally referred to herein as the System) located on McClellan to the County as part of an economic development conveyance (herein EDC Agreement) between the Air Force and the County in regard to the disposition of real and personal property in connection with the closure of McClellan; and

WHEREAS, Effective April 14, 1998, the County and NWD entered into a Memorandum of Agreement (herein "MOA") concerning the conveyance of the System by County to NWD; and

WHEREAS, the purpose of the MOA was to outline the general terms and conditions of the conveyance of the System by the County to NWD, and to allow time for the County and NWD to conclude negotiations for the final agreement between them for the conveyance of the System, to be effective at such time as the Air Force transfers the System to the County pursuant to the provisions of EDC Agreement; and

WHEREAS, it is currently anticipated that the Air Force will be ready to convey the System to the County in the relatively near future; therefore, County and NWD desire to conclude their negotiations with respect to the conveyance of the System so that an agreement will be in place and ready to become effective at the time that the Air Force transfers the System to the County, and

WHEREAS, this Agreement shall supersede the MOA in its entirety; and

WHEREAS, pursuant to a real property lease with the Air Force, NWD owns and operates improvements at two (2) water booster pump stations located on McClellan and on the former off-site jet fuel farm (hereafter "Booster Pump Station No. 1 and No. 2", respectively), and

WHEREAS, NWD desires to acquire title to the Booster Pump Station sites and the County is willing to convey title to the said sites to NWD in order to preserve reliability benefits associated with having water pumping facilities located at McClellan; and

WHEREAS, On August 13, 1998, the County executed the EDC Agreement, but has not yet received title to the water distribution system; therefore, the effect of this Agreement remains conditional upon the transfer of the System by the Air Force to the County; and

WHEREAS, at such time that the Air Force transfers the System to the County, then this Agreement shall also become effective without any further action required of the County or of NWD, except as may be otherwise required by law.

NOW, THEREFORE, in consideration of the promises, terms, conditions, and covenants contained herein, County and NWD hereby agree as follows:

1. Affected Property. This Agreement shall govern the relationship of the County and NWD with respect to the subject matter expressed herein only in regard to the area of McClellan which is in the unincorporated territory of the County of Sacramento and depicted in Exhibit A1, as well as McClellan's facilities located at the former Camp Kohler area, and the

Capehart housing area (including the adjacent golf course), all of which are depicted on Exhibits A2, and A3, respectively (herein sometimes collectively referred to as Associated Facilities). This Agreement shall not be construed as having any precedential value with regard to any other area within the County of Sacramento.

2. Transfer of System. Upon transfer of the System by the Air Force to the County, and consistent with the terms of the EDC Agreement and this Agreement, the County shall transfer the System, as it is received from the Air Force to NWD. It is the understanding of the parties that the System to be transferred is substantially described in Exhibit B, and will generally include well pump stations, fluoridation sites, potable storage facilities, the on-site water distribution system, certain vehicles, related equipment and materials, and various parcels of real property. The County shall not be required to transfer any portion of the System, as referred to in the preceding sentence, that is not included in the transfer of the System to the County by the Air Force. As consideration for the County's transfer and conveyance of the System to NWD, NWD shall upgrade, maintain, and operate the System in accordance with all applicable laws, rules, regulations, and orders of State and Federal governments, agencies, and other governmental authorities, including, but not limited to, the American Water Works Association, the California Department of Health Services, the California Department of Toxic Substances Control, and the Central Valley Regional Water Quality Control Board. NWD estimates that System upgrades will cost approximately $5,100,000, as further described and set forth in Exhibit C. Implementation of system upgrades will be dictated by County's final re-use and capital improvement plan for McClellan.

The real property referenced in Exhibit B and in various sections of this Agreement shall be transferred and conveyed by the County to NWD at such time that the County receives title to such real property from the Air Force. Transfer of title shall occur in the same manner and by the same type of document by which title is transferred by the Air Force to

the County. NWD shall pay all costs of transfer, including any escrow fees and title insurance premiums. Prior to such transfer of title NWD shall be entitled to use such property without the payment of any rent.

Within 12 months of transfer of title to NWD, NWD shall initiate or participate in a process to secure legal descriptions, suitable for recordation, of all necessary easements to encumber the System, excepting that portion of the System which lies within proposed rights of way, and public utility easements adjacent thereto, as described in paragraph 11. Easements shall be a minimum width required by NWD to ensure maintenance, to provide for access, and shall be offered by NWD for dedication as public utility easements.

Should NWD terminate use of the particular real property to be transferred for activities related to the generation, distribution, or transmission of water, then title to such real property shall revert to the County or its successor in interest, pursuant to the provisions of California Civil Code, Sections 885.010 through 885.070, inclusive. The County's deed transferring such real property to NWD shall contain appropriate provisions regarding the contingency of the interest transferred and subject to such use limitation. In the event of a reversion in favor of the County, or its successor in interest, all costs of transfer, including any escrow fees and title insurance premiums associated with such reversion of title shall be paid by the County, or its successor in interest.

3. Water Distribution Facilities. Until July 13, 2001, NWD shall provide operations and maintenance of the water distribution facilities of the System at no cost to the County, but billed to the Air Force at one-twelfth (1/12th) of the proposed cost of overall water service based on the latest received invoice. Thereafter, operations and maintenance charges for water distribution facilities of the System shall be payable in accordance with NWD's Rules, Rates, and Regulations, as amended from time to time, attached to this agreement as Exhibit D.

The services provided shall be, but not limited to, operations and maintenance of

the water distribution system, potable water storage facilities, groundwater production systems, fluoridation systems, and all properties and facilities under possession of the Air Force until July 13, 2001.

4. Transfer of Booster Pump Stations Sites. The NWD Booster Pump Station Sites No. 1 and No. 2 described in Exhibit E shall be transferred and conveyed by the County to NWD at such time that the County receives title to such property from the Air Force. Transfer of title shall occur in the same manner and by the same type of document by which title is transferred to the County by the Air Force. NWD shall pay all costs of transfer, including any escrow fees and title insurance premiums. Prior to such transfer of title NWD shall be entitled to use such facilities without the payment of rent.

5. Conveyance Without Warranty. The conveyance of the System by County to NWD shall be without warranty of any kind or nature, and shall specifically exclude any implied warranty of condition, or fitness for a particular purpose, or of merchantability under common law, the California Uniform Commercial Code, or the American Water Works Association. It is specifically understood by the parties, and agreed to by NWD, that the conveyance and sale of the System, including all property (both real and personal) and equipment referred to herein and set forth in Exhibit B and Exhibit E, is to be conveyed and transferred and sold to NWD in an "as is" and "where is" condition.

6. Metering. As further consideration for the County's conveyance of the System to NWD, NWD shall perform metering of facilities located at McClellan, including the metering of residential, commercial and industrial buildings, and all common landscape areas, at the water service at no cost to the County, up to the number of meters specified in Exhibit C. Specific meter installations shall be by mutual agreement of NWD and the County or its successor in interest in accordance with Section 2.

7. Other Rates. All entities located at McClellan receiving surface water in lieu of groundwater shall be billed for wheeling and distribution charges attributable to surface water, in accordance with NWD's standard rate. Any entity locating to McClellan shall receive full requirements water service from NWD and may elect to receive service under any NWD rate, including economic development rates, for which the entity qualifies under NWD's Rates, Rules, and Regulations, as amended from time to time. NWD shall use its best efforts to identify the most advantageous NWD rate for each new commercial or industrial customer.

NWD shall not charge County for any "stand by" cost or other fee for unoccupied buildings, nor any charge for water service in regard to buildings until a particular building is connected to the System for service and a certificate of occupancy has been issued for such building.

8. Exclusive Right to Serve. Commencing upon conveyance of the System to NWD and continuing for a period of ten (10) years thereafter (herein the "Service Period"), NWD, as partial consideration hereunder, shall have the exclusive right to be the sole water provider for McClellan and the Associated Facilities, excepting the area of the River Dock. For the Service Period, County hereby agrees that it and any third party located within McClellan and the Associated Facilities shall remain a full requirements customer of NWD as may be authorized by law. Without limiting the generality of the preceding two sentences and for the purposes of this Agreement, the following definitions apply:

a. "Sole water provider", as used herein, shall mean that the County or any third party located within McClellan and the Associated Facilities is precluded from receiving water from another supplier of water, whether the supplier is a water utility, affiliate, or other legally authorized water purveyor.

b."Full requirements" shall mean the County's or any third party's total

requirement for water for its facilities located within McClellan and the Associated Facilities; provided, however, nothing in this Agreement shall be construed as limiting the County's or any third party's ability to implement demand-side management or energy efficiency measures which have the effect of reducing the County's or the third party's requirement for water.

9. Rental, Lease or Conveyance Agreements. If the County leases, rents, sells, conveys or otherwise disposes of all or any portion of McClellan or the Associated Facilities, County shall include in such rental, lease or conveyance agreement a reference to the rights set forth in Section 8 of this Agreement.

10. Indemnification of County. As part of the County's grant of exclusive service rights to NWD within McClellan and the Associated Facilities, NWD agrees to defend, on its own behalf and on behalf of the County, any and all proceedings of any kind and nature, legal and administrative, in regard to the exclusivity right set forth in Section 8 of this Agreement, and further agrees to indemnify the County in regard to any damage of any kind or n ature which may be levied or granted against the County in regard to said exclusivity rights, including all damages, attorneys fees, and costs of such proceedings, including but not limited to any anti-trust type of proceeding. It is the intent of the parties that the County shall not be subject to any type of administrative or legal proceeding, or the payment of any damages of any kind whatsoever, due to the exclusivity rights referred to in this Agreement.

11. First in Right Regarding Roadways. NWD acknowledges that the conveyance of the System is subject to all easements and rights-of-way for County roadways to be identified in the County adopted master roadway plan for McClellan and the Associated Facilities and easements up to 12 1\2 foot public utility easements (PUE's) on each side of such roadways. For purposes of this Agreement, the term "County roadways" shall mean those roadways within the property described in Section 1 hereof that are either: (i) included within the County roadway system; (ii) planned for ultimate inclusion in the County roadway system, or (iii)

generally available for use by the public or any entities located at McClellan and the Associated Facilities, including military organizations, in connection with the County's operation of McClellan and the Associated Facilities. Accordingly, County shall be deemed to be first in right concerning any public improvement by County with regard to any of the County roadways and easements up to 12 ½ foot public utility easements (PUE's) on each side of such roadways on any portion of McClellan and the Associated Facilities.

12. When NWD Deemed First in Right. As part of the conveyance of the System from the County to NWD and subject to the County's rights as set forth in Section 11, as between NWD and County only, NWD shall be deemed first in right as to the conveyance of rights-of-way and easements associated with the existing System at McClellan and the Associated Facilities which lie outside the County roadways, and any easements or rights-of-way existing or subsequently created for the benefit of the County as referred to in Section 11.

13. Allocation of Relocation Costs. The Parties further acknowledge that County initiated public projects may require the relocation of a portion of the System (NWD Facilities) which lie within the County roadways, easements or rights-of-way as referred to in Section 11. Costs of relocation of NWD Facilities related to such projects shall be allocated as follows: (a) For relocation of existing underground NWD Facilities necessitated by public projects which lie within the roadways, rights-of-way, and easements, as referred to in Section 11 the costs of relocation shall be paid by NWD; and (b) for subsequent relocations of such relocated underground facilities, the costs of relocation shall be equally divided between (1) NWD and (2) County or a third party. All NWD costs shall be in accordance with Section 2.

14. Water Service Water service provided by NWD at McClellan and the Associated Facilities shall be in accordance with NWD's Rates, Rules, and Regulations, as amended from time to time, attached as Exhibit D.

15. Entire Agreement. This Agreement and all exhibits attached hereto constitute the entire understanding between the County and NWD as to the subject matter hereof and may not be modified except by mutual written agreement of the Parties. The Parties acknowledge that the exhibits and attachments hereto were prepared with the best available information but may require modification as new information becomes available. The Parties agree to meet and confer regarding any proposed revision to an exhibit or any attachment hereto. No waiver of any default of either Party hereunder shall be implied from any omission by the other Party to take any action on account of such default or as a waiver of any future default.

16. Incorporation of Exhibits. All exhibits attached to or referred to in this Agreement are incorporated herein by such references as if fully and specifically set forth herein.

17. Effective Date. This Agreement shall be effective upon the date latest in time of the signatures of the parties.

IN WITNESS WHEREOF, each party hereto has caused this Agreement to be duly executed as of the day and year set forth below its respective signature.

COUNTY OF SACRAMENTO	NORTHRIDGE WATER DISTRICT
By: Muriel T. Johnson	By: _____
Title: Chairperson Board of Supervisors	Title: _____

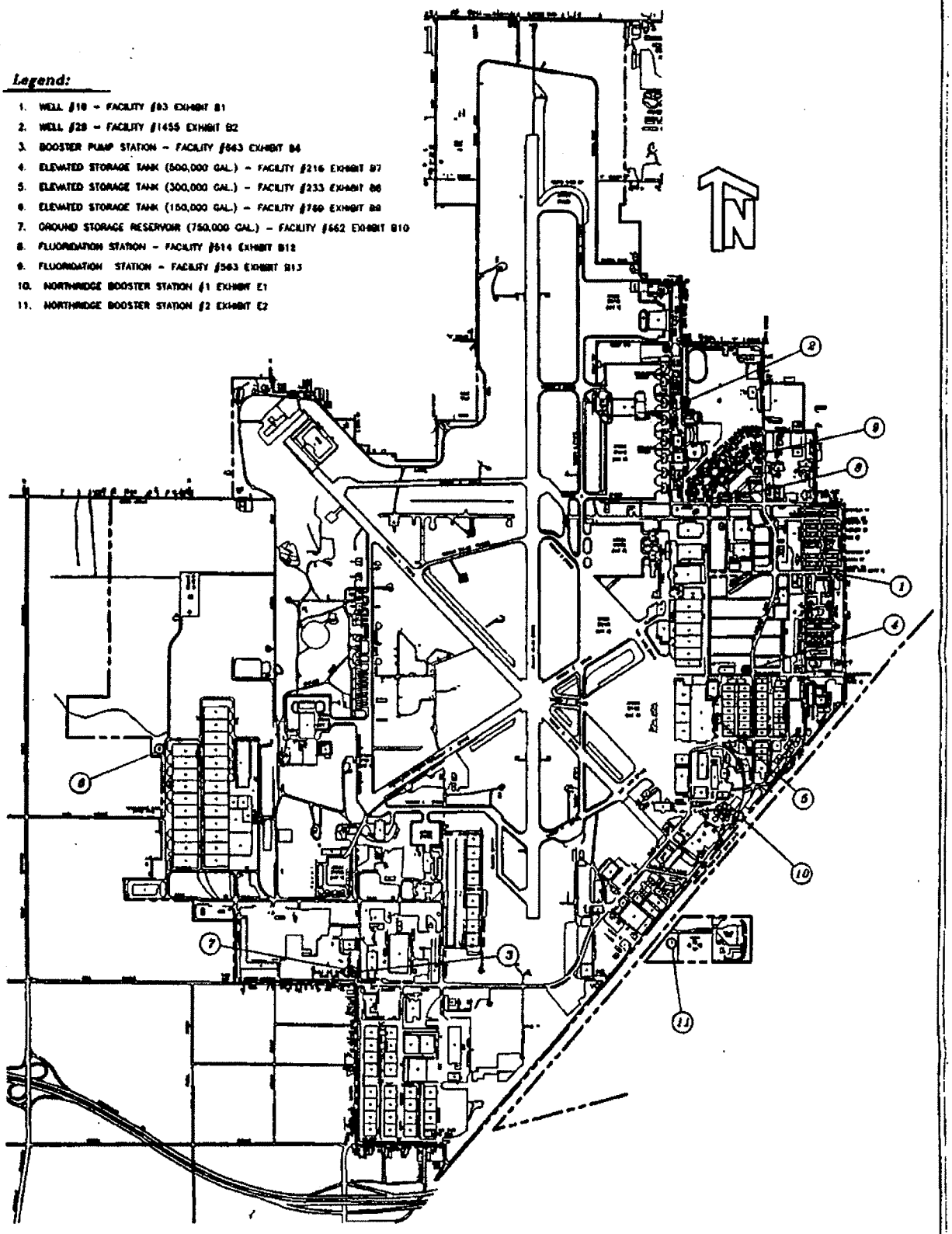
Approved as to Form for County:

_____
Counsel

Approved as to Form for NWD:

_____
Counsel

w:\deptmns\bascom\1999\mcclellan\agmt final re water.doc

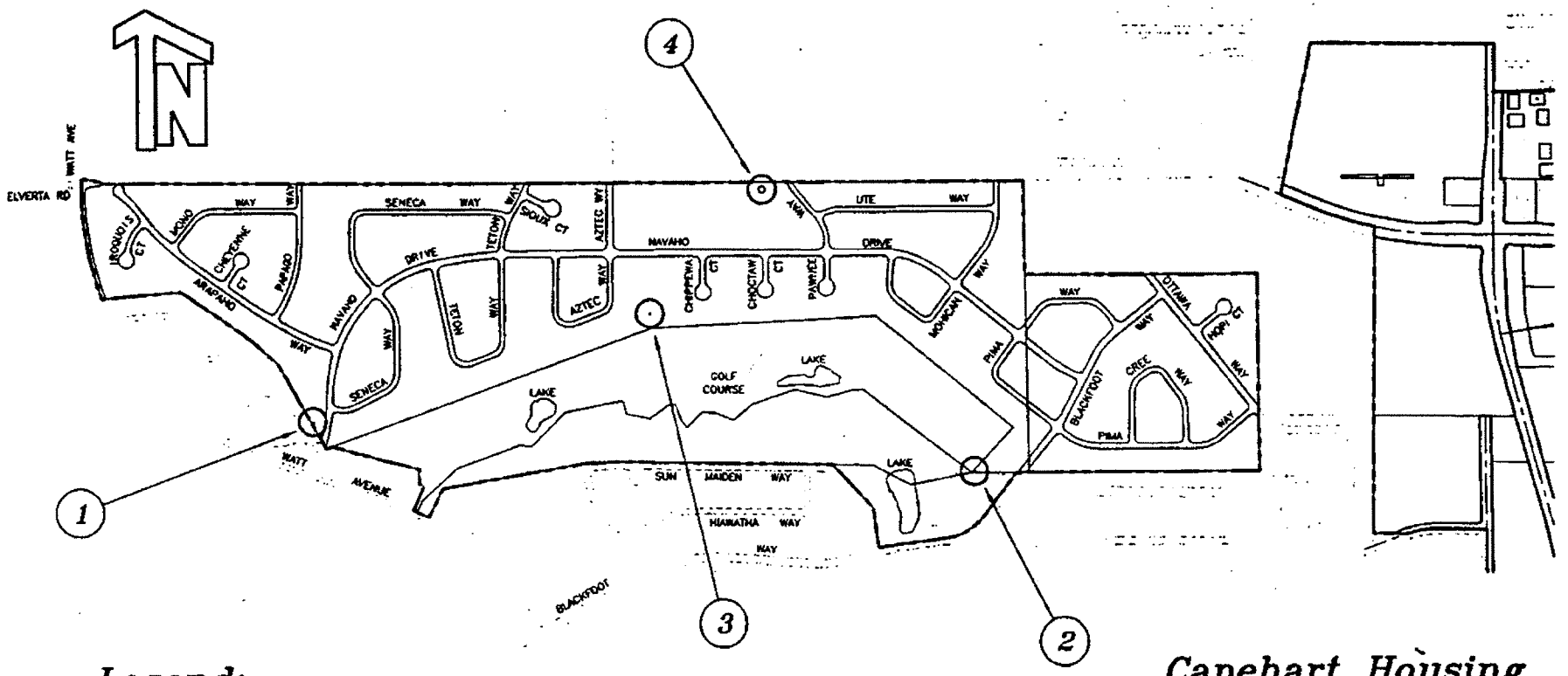


McClellan Air Force Base

NOT TO SCALE

Northridge Water District
5331 Walnut Ave, Sacramento, CA 95821
PH: (916) 332-4111 FAX: (916) 332-6215

DRAWING NAME: McClellan Air Force Base		EXHIBIT A1
SCALE: NOT TO SCALE		
DATE: 06/30/1999	CF NAME: MG451	



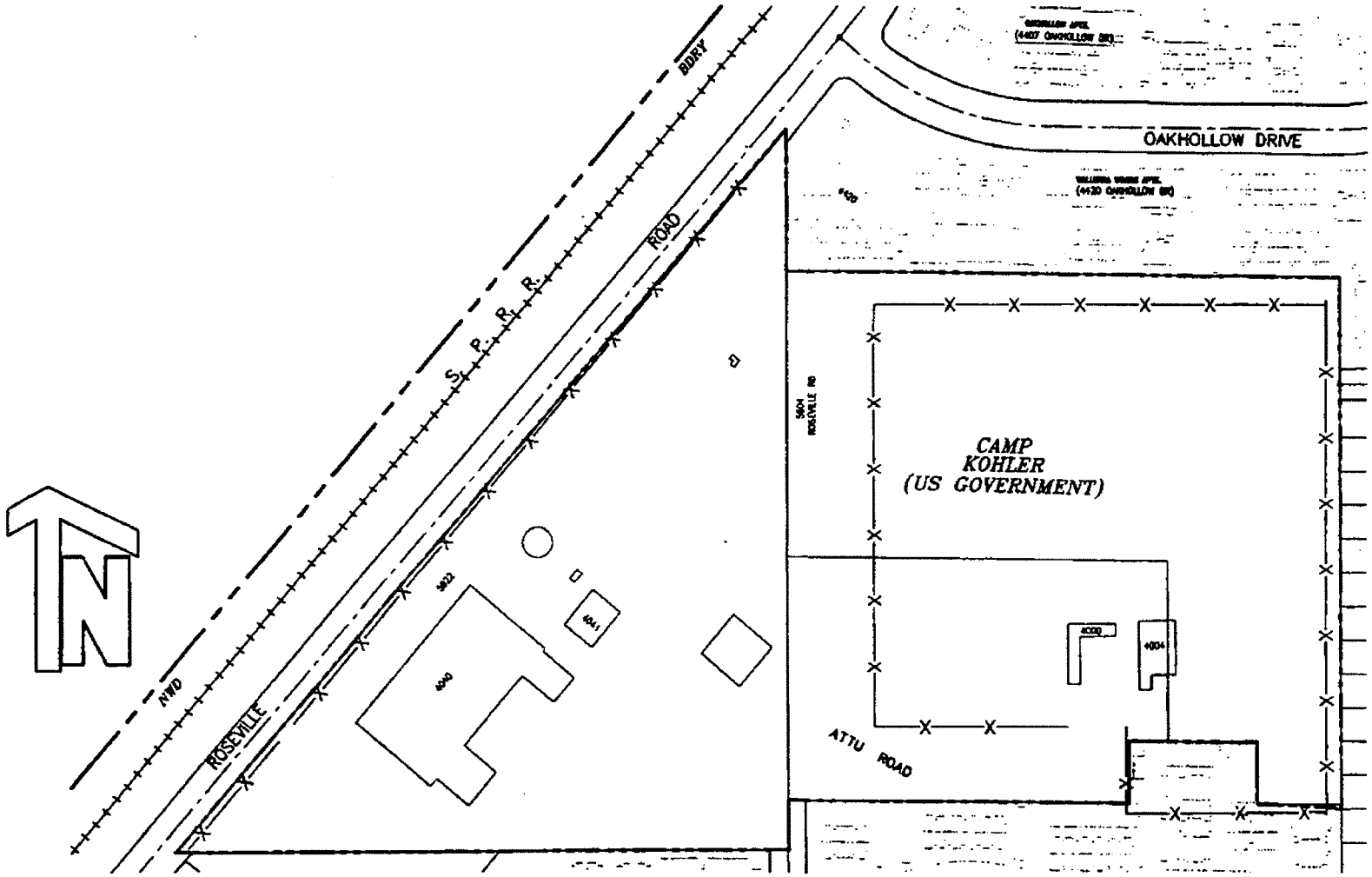
Legend:

1. WELL #1C – FACILITY #5008 EXHIBIT B3
2. WELL #2C– FACILITY #5208 EXHIBIT B4
3. WELL #3C – FACILITY #5200 EXHIBIT B5
4. 150,000 GAL. ELEVATED STORAGE TANK – FACILITY #5391 EXHIBIT B11

Capehart Housing

NOT TO SCALE

Northridge Water District 5331 Walnut Ave, Sacramento, CA 95821 PH: (916) 332-4111 FAX: (916) 332-6215	DRAWING NAME: Capehart Housing Area	Exhibit A3
	SCALE: NOT TO SCALE	
	DATE: 06/30/1999	CF NAME: MG450



Camp Kohler

NOT TO SCALE

Northridge Water District
5331 Walnut Ave, Sacramento, CA 95821
PH: (916) 332-4111 FAX: (916) 332-6215

DRAWING NAME: Camp Kohler		EXHIBIT A2
SCALE: NOT TO SCALE		
DATE: 06/30/1999	OF NAME: MG452	

EXHIBIT B

POTABLE WATER DISTRIBUTION SYSTEM

The water distribution system shall consist of the following:

1) **Well Stations**

The Well Stations consist of 5 sites described as follows:

a) Well #10 located at Building 93 near Palm Gate and Watt Avenue at McClellan AFB. Included on the site are building structures, piping, both above and below ground, gauges, wiring, vaults, concrete slabs, boxes, motor control panels, telemetry controls, sand separators, auxiliary power hookup, chlorination equipment as shown in Attachment B-1.

b) Well #29 located at Building 1455 on Perrin Avenue at McClellan AFB. Included on the site are building structures, piping, both above and below ground, gauges, wiring, vaults, concrete slabs, boxes, motor control panels, telemetry controls, sand separators, auxiliary power hookup, chlorination equipment as shown in Attachment B-2.

c) Well #1C located at Building 5008 on Navaho Drive at Watt Avenue entrance at Capehart Housing. Included on the site are building structures, piping, both above and below ground, gauges, wiring, vaults, concrete slabs, boxes, motor control panels, telemetry controls, sand separators, auxiliary power hookup and chlorination equipment. Fluoridation equipment includes gauges, sensors, mixing containers, tank, meter, mixing equipment, pump, building as shown in Attachment B-3.

d) Well #2C located at Building 5208 on Blackfoot Way near the Capehart Golf Course at Blackfoot Way entrance into Capehart Housing. Included on the site are building structures, piping, both above and below ground, gauges, wiring, vaults, concrete slabs, boxes, motor control panels, telemetry controls, sand separators, auxiliary power hookup and chlorination equipment. Fluoridation equipment includes gauges, sensors, mixing containers, tank, meter, mixing equipment, pump, building as shown in Attachment B-4.

e) Well #3C located at Building 5200 on Navaho Drive near the corporation yard at Capehart Housing. Included on the site are building structures, piping, both above and below ground, gauges, wiring, vaults, concrete slabs, boxes, motor control panels, telemetry controls, auxiliary power hookup and chlorination equipment. Fluoridation equipment includes gauges, sensors, mixing containers, tank, meter, mixing equipment, pump, building as shown in Attachment B-5.

The well sites shall also include all other miscellaneous appurtenances such as, but not

limited to, piping both above ground and below, gauges, wiring, vaults, concrete slabs and boxes. All well sites include associated real and personal property and improvements, including building structures and/or fencing as defined in Attachments B-1 through B-5.

2) **McClellan AFB Booster Pump Station**

The McClellan AFB Booster Pump Station consists of one site described as follows:

a) Building 663 booster pump station located at the corner of Bell Avenue and Kilzer Avenue. Included on the site are piping, both above and below ground, altitude valves, telemetry controls, gauges, sensors, valves, metal buildings as shown in Attachment B-6.

This booster station shall include all other miscellaneous appurtenances such as, but not limited to, piping both above and below ground, pumps, motors, gauges, wiring, vaults, concrete slabs, boxes, building and electrical control panels. All well sites include associated real and personal property and improvements, including building as defined and shown in the above Attachment B-6.

3) **McClellan AFB Storage Facilities**

The Air Force Storage Facilities consist of five sites described as follows:

a) 500,000 gallon elevated steel storage tank located at the northwest corner of Dudley Avenue and Peacekeeper Way, Facility #216. Included on the site are piping, both above and below ground, altitude valves, telemetry controls, gauges, sensors, valves, metal buildings.

b) 300,000 gallon elevated steel storage tank located on 45th Street, Facility #233. Included on the site are piping, both above and below ground, altitude valve, telemetry controls, gauges, sensors, valves, concrete vaults.

c) 150,000 gallon elevated steel storage tank located on Lang Avenue, Facility #769. Included on the site are piping, both above and below ground, altitude valve, telemetry controls, gauges, sensors, valves, concrete vaults.

d) 750,000 gallon ground level concrete storage tank located at the northwest corner of Bell Avenue and Kilzer Avenue, Facility #662. Included on the site are piping, both above and below ground, altitude valve, booster pumps, motors, control panels, telemetry controls, gauges, sensors, valves.

e) 150,000 gallon elevated steel storage tank located on the north side of Navaho Drive in the Capehart Housing area, Facility #5391. Included on the site are piping, both above and below ground, telemetry controls, gauges, sensors, valves, concrete vaults.

The storage facilities shall include all other miscellaneous appurtenances such as, but not

limited to, piping both above and below ground, pumps, motors, gauges, wiring, vaults, concrete slabs, boxes, buildings and electrical control panels. All storage sites include associated real and personal property and improvements, including buildings.

4) **Fluoridation Stations**

The Air Force Fluoridation Facilities consist of a total of five sites. Two sites are located at the Air Base with the other three located next to their respective well sites at Capehart Housing. These three fluoridation facilities are included in the well sites described in Paragraph 1 above. The following two at the Base are described as:

a) Fluoridation Station #563 located on the west side of Dudley Blvd. south of Luce Avenue. Included in the facility are gauges, sensors, mixing containers, tank, meter, mixing equipment, pump building as shown in Attachments B-7.

b) Fluoridation Station #514 located on the north side of James Way just east of Luce Avenue. Included in the facility are gauges, sensors, mixing container, tank, meter, mixing equipment, building, pump as shown in Attachments B-8.

The fluoridation facilities shall include all other miscellaneous appurtenances such as, but not limited to, piping both above and below ground, pumps, motors, gauges, wiring vaults, concrete slabs, boxes, buildings and electrical control panel. All fluoridation stations include associated real and personal property and improvements, including building as defined and shown in the Attachments B-7 and B-8.

5) **Omnibus**

It is the intention of the parties that the County of Sacramento will convey all the water distribution system, well pump station, potable storage facilities, fluoridation stations, booster stations and fire hydrants as is, where is and without representation or warranty, within the McClellan AFB, Camp Kohler and Capehart Housing, as identified herein. The attached attachments have been prepared in an effort to identify all the equipment and rights of way affected by the water distribution system and facilities in their approximate location. However, the attachments shall not be considered an accurate or complete representation of the water distribution system and facilities.

The District reserves the right that should any other additional water facilities be discovered within the boundaries of the former McClellan AFB, Camp Kohler and Capehart Housing, title to such facilities shall pass to the District as part of the potable water distribution system herein described. Additionally, rights of way for these discovered facilities will be covered by the easements and rights-of-way herein enumerated which are appropriate for the type of facility so discovered as though rights-of-way for these facilities had been shown on the attachments attached hereto.

ATTACHMENT B-1
WELL #10 LOCATED AT BLDG. 93

QTY	DESCRIPTION
1	Sand Separator & Associated Equipment
1	6" Black Rubber Hose
1	100 HP GE Motor
1	Aurora 10" Deep Turbine Pump
1	Sparling Flow Meter
	Various Pump Control Panels
1	Basco Oil Container
1	Chlorine Tox-Alarm
1	Chlorine Scale
	Various Safety Equipment
1	2 ½ HP Sta-Rite Chlorine Pump
1	Regal Chlorine Equipment

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-2
WELL #29 LOCATED AT BLDG. 1455

QTY	DESCRIPTION
1	100 HP GE Motor
1	R-50 Right Angle Drive
1	10" Peerless Pump
1	Water Level Gauge
	All Associated Electrical Pump Controls & Panels
1	Chlorine Bottle Adaptor Head
1	Chlorine Injector
1	10" Water Specialties Flow Meter
1	Basco Oil Containment
1	Metal Desk
1	2 ½ HP Sta-Rite Chlorine Pump

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-3
WELL #1C AT BUILDING 5008

QTY	DESCRIPTION
1	75 HP Electric Motor
1	6" Deep Well Turbine Pump
1	134 HP Diesel Motor
1	Right Angle Drive Unit
1	Fire Pump Controller Panel
	Various Existing Motor Control Panels
1	Fiberglass Chlorine Enclosure
1	2 ½ HP GE Electric Motor
1	Wallace-Tierman-Scale
1	Chlorine Detection Alarm
1	Chlorine Bottle Adaptor Head
1	Chlorine Injector
	Various Repair Parts
1	Metal Fluoride Enclosure
1	1/4 HP Fluoride Injector Pump
1	50 Gallon Fluoride Drum
1	5 Gallon Fluoride Mixing Container
	Various Existing Control Panels
1	Lakos Sand Separator

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-4
WELL #2C AT BUILDING 5208

QTY	DESCRIPTION
1	75 HP Electric Motor
1	6" Deep Well Turbine Pump
1	134 HP Diesel Motor
1	Right Angle Drive Unit
1	Fire Pump Controller Panel
	Various Existing Motor Control Panels
1	Fiberglass Chlorine Enclosure
1	2 ½ HP GE Electric Motor
1	Wallace-Tiernan-Scale
1	Chlorine Detection Alarm
1	Chlorine Bottle Adaptor Head
1	Chlorine Injector
	Various Repair Parts
1	Metal Fluoride Enclosure
1	1/4 HP Fluoride Injector Pump
1	50 Gallon Fluoride Drum
1	5 Gallon Fluoride Mixing Container
	Various Existing Control Panels
1	Lakos Sand Separator

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-5
WELL #3C AT BUILDING 5200

QTY	DESCRIPTION
2	75 HP Electric Motors
1	6" Deep Well Turbine Pump
	Various Related Motor Control Panels
1	Fiberglass Chlorine Enclosure
1	2 ½ HP GE Electric Motor
1	Wallace-Tiernan-Scale
1	Chlorine Detection Alarm
1	Chlorine Bottle Adaptor Head
1	Chlorine Injector
	Various Repair Parts
1	Metal Fluoride Enclosure
1	1/4 HP Fluoride Injector Pump
1	50 Gallon Fluoride Drum
1	5 Gallon Fluoride Mixing Container
	Various Existing Control Panels

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-6
BUILDING 663 BOOSTER PUMP STATION

QTY	DESCRIPTION
3	Office Chairs
1	Refrigerator
1	Wooden Book Shelf
1	Metal 5-Drawer File Cabinet
1	Metal Desk
1	Window Mount Air Conditioner
2	Metal 7-Shelf Storage
2	30 HP GE Motors
6	6" Booster Pumps
4	112 HP Cummins Diesel Motors
4	Fire Pump Controller Panels
59	Various Sizes Pipe Repair Clamps
23	Various Sizes Flex Couplings
3	4" Wheel Valves
4	Wooden Cabinets
3	8" Mechanical Joint Flanges
100 Ft.	3" Type L Copper Pipe
1	1/4 HP Metering Pump
2	6" Pressure Control Valves
1	Model 15-RA Fire Extinguisher
38	2 1/2" Plastic Fire Hydrant Caps
11	Spare Motor Fan Belts

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-7
FLUORIDATION STATION #563

QTY	DESCRIPTION
1	Contrec Batch Controller
1	1/4 HP Pulsatrom Chemical Pump
	All Associated Equipment & Electrical Panels
1	6" Hersey R-37 Flow Meter
	Various Safety Equipment
	Various Clean Up Equipment
	Various Spare Parts

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT B-8
FLUORIDATION STATION #514

QTY	DESCRIPTION
1	Contrec Batch Controller
1	1/4 HP Pulsatrom Chemical Pump
	All Associated Equipment & Electrical Panels
1	6" Hersey R-37 Flow Meter
	Various Safety Equipment
	Various Clean Up Equipment
	Various Spare Parts

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

EXHIBIT C

McCLELLAN AIR FORCE BASE
CAPITAL IMPROVEMENT PLAN

	Description	Unit Charge	Qty.	Estimated Charge
1	Water meters and backflows (All Buildings)	N/A	517	$ 1,374,000
2	Fire sprinkler protection system for all fire sprinkler services.	N/A	189	911,800
3	3/4 inch meters (Capehart Housing)	N/A	645	668,800
4	Fire Hydrants - testing - upgrade / replacement	300 ea. 2,500 ea.	360 180	108,000 450,000
5	Storage tank inspection, cleaning and/or recoating.	100,000 ea.	4	400,000
6	Backflow protection on fire and deluge system tanks.	10,000 ea.	4	40,000
7	Water well inspection and upgrade to current DOHS standards, including VFD drives, telemetry equipment and controls.	100,000 ea.	4	400,000
8	Altitude valves on storage facilities.	N/A	4	90,000
9	Water quality sampling plan and sampling station and installation.	20,000	LS	20,000
10	Pipeline Extensions - Roseville Road 24 inch - Roseville Road 16 inch	 N/A N/A	 LS LS	 380,000 220,000
	Estimated Total			***$ 5,062,600***

EXHIBIT E

NORTHRIDGE WATER BOOSTER PUMP STATIONS

The Booster Pump Stations consist of two sites described as follows:

a) Dudley Blvd. Booster Pump Station. Included on the site are two 40 horsepower booster pumps, backflows, meters, control valves, control panel equipment as shown in Attachments E-1.

b) Roseville Road Booster Pump Station near the Sacramento County Transfer Station. Included on the site is a single 30 horsepower booster pump, backflow, meter, control valve, control panel equipment as shown in Attachments E-2.

The booster pump stations shall also include all other miscellaneous appurtenances such as, but not limited to, piping both above ground and below, gauges, wiring, vaults, concrete slabs and boxes. All booster stations include associated real and personal property and improvements, including fencing as defined in the above Attachments E-2 and E-3.

ATTACHMENT E-1
DUDLEY BLVD. BOOSTER PUMP STATION - 20" INTERTIE #1

QTY	DESCRIPTION
2	30 HP Baldor Electric Motors
2	8" Booster Pumps
2	10" Sparling Mag Pac Water Meters
2	10" RP Backflow Devices
	Existing Chain Link Fence with Posts and Slats
	Existing Tesco Motor Control Panels & Telemetry Equipment

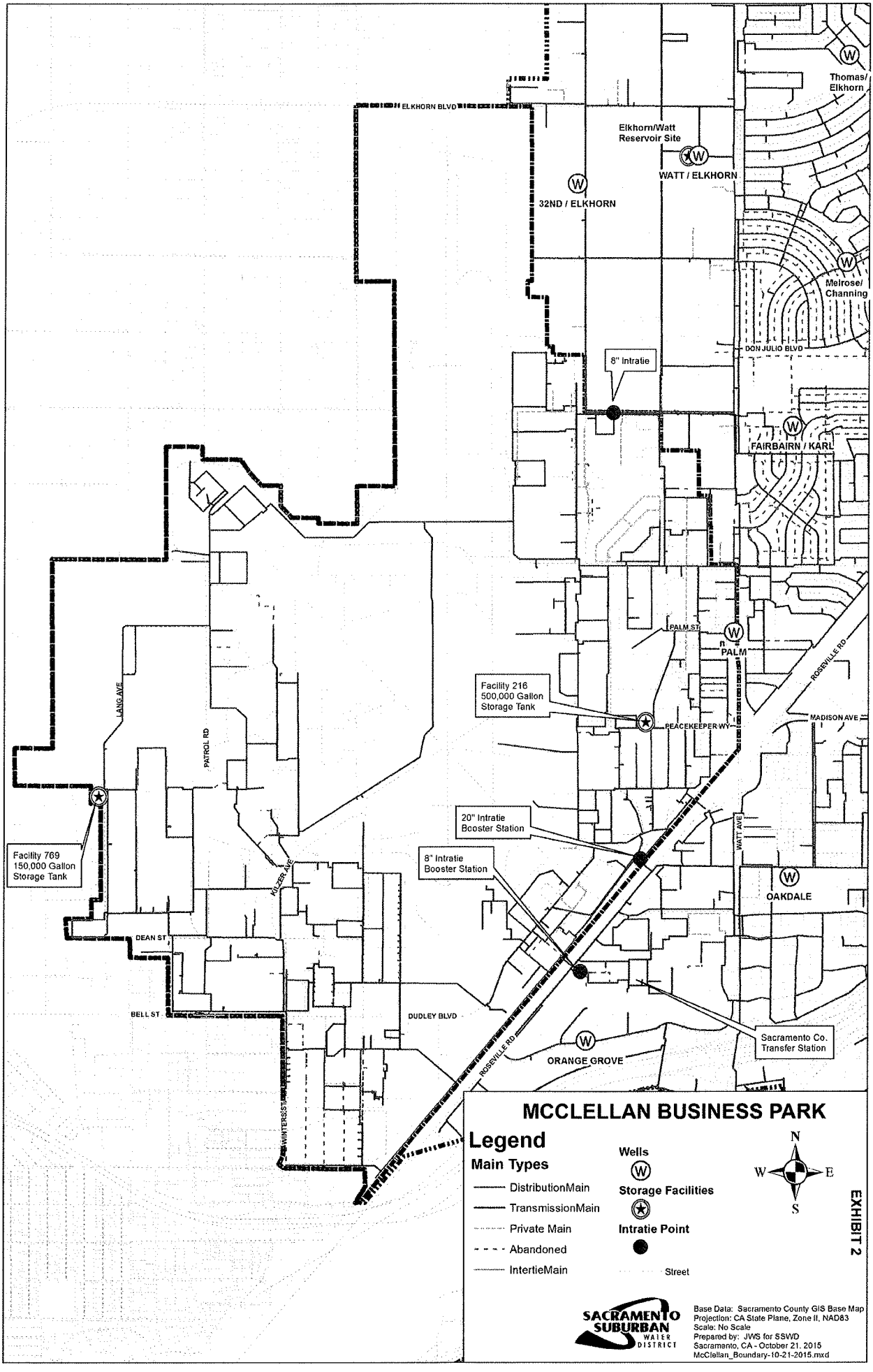
And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

ATTACHMENT E-2
ROSEVILLE ROAD BOOSTER PUMP STATION - 8" INTERTIE #2

QTY	DESCRIPTION
1	20 HP Baldor Ind. Motor
1	6" Cornell Booster Pump
1	8" Rotork Electric Valve
1	8" Double Check Valve
	Existing Chain Link Fencing with Posts and Slats
	Existing Associated Electric Panels & Tesco Motor Control Panels

And all other repair parts, vehicles, equipment, and/or associated parts that may or may not be known at this time.

Exhibit 2


ELKHORN BLVD
Elkhorn/Watt
Reservoir Site
WATT / ELKHORN
32ND / ELKHORN
Thomas/
Elkhorn
Melrose/
Channing
DON JULIO BLVD
8" Intratie
FAIRBAIRN / KARL
PALM ST
PALM
ROSEVILLE RD
Facility 216
500,000 Gallon
Storage Tank
PEACEKEEPER WY
MADISON AVE
LANG AVE
PATROL RD
20" Intratie
Booster Station
8" Intratie
Booster Station
Facility 769
150,000 Gallon
Storage Tank
KILZER AVE
WATT AVE
OAKDALE
DEAN ST
BELL ST
DUDLEY BLVD
ROSEVILLE RD
ORANGE GROVE
Sacramento Co.
Transfer Station
WINTERS ST
MCCLELLAN BUSINESS PARK
Legend
Main Types
DistributionMain
TransmissionMain
Private Main
Abandoned
IntertieMain
Wells
Storage Facilities
Intratie Point
Street
N
W
E
S
EXHIBIT 2
SACRAMENTO SUBURBAN WATER DISTRICT
Base Data: Sacramento County GIS Base Map
Projection: CA State Plane, Zone II, NAD83
Scale: No Scale
Prepared by: JWS for SSWD
Sacramento, CA - October 21, 2015
McClellan_Boundary-10-21-2015.mxd

McCLELLAN AIR FORCE BASE
CAPITAL IMPROVEMENT PLAN
10/21/15

	Description	Unit Charge	Estimated Quantity	Field Verified 2010	Quantity Completed to Date	Remaining to Date	Estimated Charge	Actual Cost to Date
1	Water meters and backflows (All Buildings)	N/A	517	488	451	37	$ 1,374,000.00	$ 3,105,516.04
2	Backflow protection for all fire sprinkler services	N/A	189	291	82	209	$ 911,800.00	$ 311,737.79
3	3/4-inch meters (Capehart Housing) (1)	N/A	520	446	446	0	$ 668,800.00	$ 766,962.59
4	Fire Hydrants -							
	Fire Hydrant Testing	$ 300.00	360		73		$ 108,000.00	$ 21,900.00
	Upgrade / Replacement	$ 2,500.00	180	256	166	90	$ 450,000.00	$ 772,048.72
5	Storage tank inspection, cleaning and / or recoating (2)	$ 100,000.00	4	3	3	0	$ 400,000.00	$ 798,373.00
6	Backflow protection on fire and deluge system tanks	$ 10,000.00	4	3	1	3	$ 40,000.00	$ -
7	Water well inspection and upgrade to current DPH standards, including VFD drives, telemetry equipment and controls	$ 100,000.00	5	1	1	0	$ 500,000.00	$ 254,997.00
8	Altitude valves on storage facilities	N/A	4	4	4	0	$ 90,000.00	$ 88,494.77
9	Water quality sampling plan and sampling station and installation	$ 20,000.00	LS		4		$ 20,000.00	$ 16,800.00
10	Transmission Pipeline Extensions							
	Roseville Road 24-inch	N/A	LS		Completed		$ 380,000.00	$ 406,341.89
	Roseville Road 16-inch	N/A	LS		Completed		$ 220,000.00	$ 216,245.00
	Estimated Total per CIP List						$ 5,162,600.00	$ 6,759,416.80
	Total Cost expended at McClellan to Date (3)							$ 9,658,612.40

(1) Includes 46 2-inch irrigation services found and also upgraded with new meters and backflow devices. Cost for the 3/4-inch services were $444,752.59. Cost for the 2-inch irrigation services was $322,210.00.
(2) Facility 233 was returned to the County of Sacramento and to the Air Force due to facilities being on the list of historic sites and no notification to SSWD that the site could not be removed.
(3) Total cost includes operation and maintenance of the water system and production sites, staff time and miscellaneous contract services not a part of the CIP for McClellan.

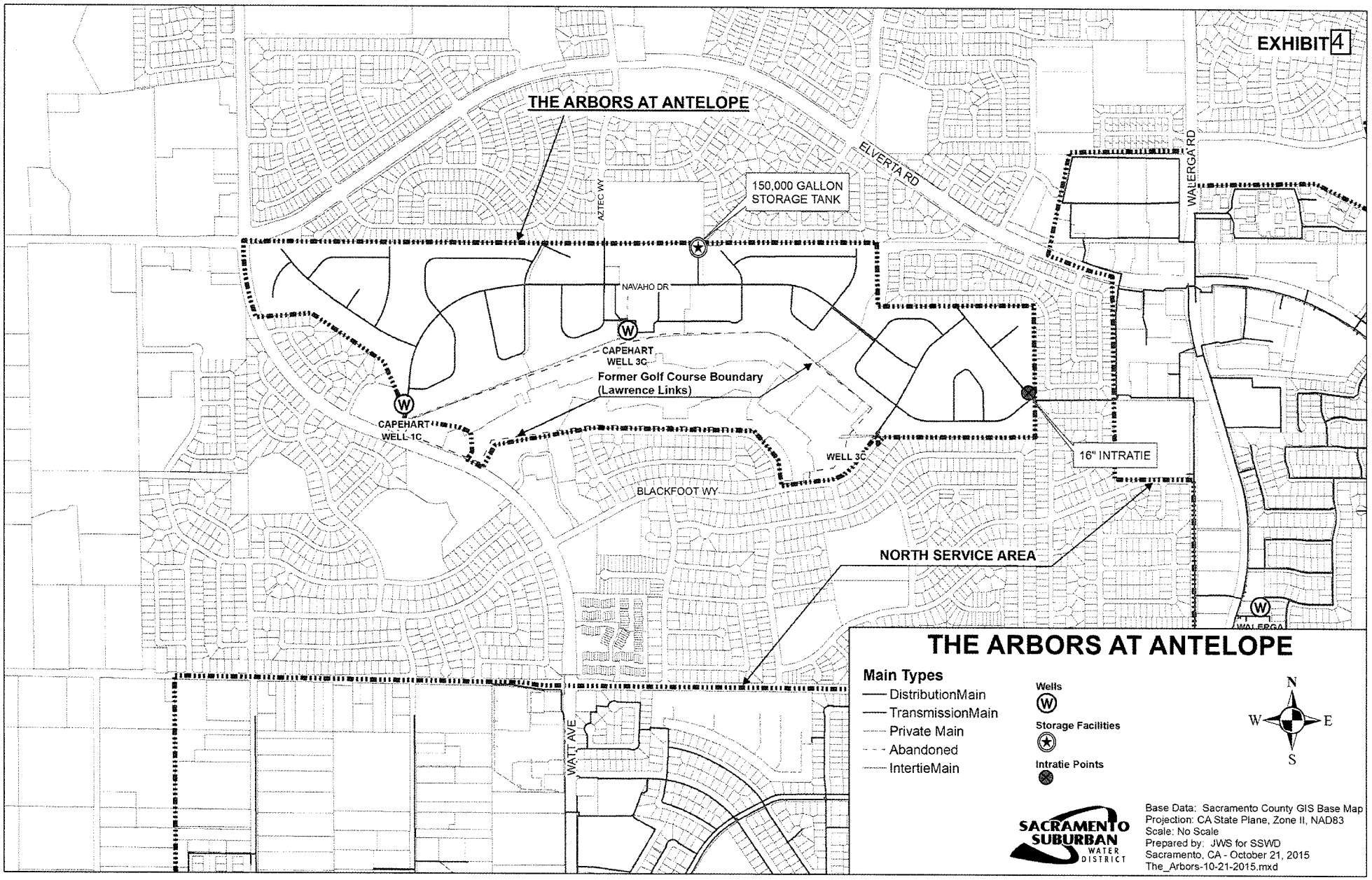


EXHIBIT 4
THE ARBORS AT ANTELOPE
150,000 GALLON STORAGE TANK
ELVERTA RD
AZTEC WY
WALERGA RD
NAVAHO DR
CAPEHART WELL 3C
Former Golf Course Boundary (Lawrence Links)
CAPEHART WELL 1C
WELL 3C
16" INTRATIE
BLACKFOOT WY
NORTH SERVICE AREA
WATT AVE
THE ARBORS AT ANTELOPE
Main Types
DistributionMain
TransmissionMain
Private Main
Abandoned
IntertieMain
Wells
Storage Facilities
Intratie Points
N
W
E
S
SACRAMENTO SUBURBAN WATER DISTRICT
Base Data: Sacramento County GIS Base Map
Projection: CA State Plane, Zone II, NAD83
Scale: No Scale
Prepared by: JWS for SSWD
Sacramento, CA - October 21, 2015
The_Arbors-10-21-2015.mxd

Exhibit 5

SACRAMENTO SUBURBAN WATER DISTRICT

CLEARLY REFRESHING SERVICE!

September 17, 2013

Mr. Alan Hersh
McClellan Business Park
3140 Peacekeeper Way
McClellan, CA 95652

Re: Capital Improvements at McClellan Business Park

Dear Mr. Hersh:

In 1998 the former Northridge Water District (currently Sacramento Suburban Water District) and the County of Sacramento executed a "memorandum of understanding" to perform ten (10) capital improvement projects for McClellan Park and the Arbors at Antelope (formerly Capehart Housing). This list of capital improvements was a condition of the agreement for Sacramento Suburban Water District to assume ownership and provide operation and maintenance of the water facilities at McClellan. Those 10 projects included the following:

1. Installing water meters and backflows on all existing water services at the former Air Force Base.
2. Installation of backflow protection on all existing private fire sprinkler services at the Air Force Base.
3. Installation of water meters at all existing living units at the former Capehart housing complex (currently the Arbors at Antelope).
4. Fire hydrant upgrade and replacement including flow testing each fire hydrant. The Air Force had a requirement that every hydrant must be tested on a four-year rotation basis.
5. Storage tank inspection, cleaning and/or recoating.
6. Install backflow protection on all fire suppression facilities feeding the existing deluge systems.
7. Water well inspection and upgrade to current Department of Public Health standards including, but not limited to, installation of variable frequency drives (VFD), telemetry equipment and motor control center.
8. Installation of altitude valve on the storage tank facilities.
9. Preparation of a water quality sampling plan and installation of sampling stations.
10. Installation of two transmission pipelines, which support the Air Force Base. The two projects were the 16-inch on Roseville Road from Madison Avenue to Palm Avenue and a 24-inch pipeline on Roseville Road from Palm Avenue to north of Oakhollow Way.

To date the Sacramento Suburban Water District (District) has completed 6 of 10 items on the list and by the end of 2013 will have completed a 7th. The remaining 3 items; installing water meters and backflows on all existing water services, fire hydrant upgrades and replacement

including flow testing each fire hydrant and installation of backflow protection on all private fire sprinkler services are well underway, but are not completed.

The District estimates that approximately 94% of the known water services have been metered, 65% of the fire hydrants have been replaced and approximately 28% of the fire services have been upgraded with backflow protection. The following is a summary of the remaining items:

- The remaining services left to be metered primarily serve hose faucets for wash down connection on small open hangers and lean-to sheds. The District has chosen not to meter these services until it is determine if the building is to be used and/or occupied.
- The status of the fire hydrants is that all are operational and being maintained. The balance of the hydrants will be replaced as they are found non-operable. The District has a preventative maintenance program that verifies the operation of each fire hydrant within the District's boundaries including operating the underground control valve. This program has been performed on all fire hydrants within McClellan Park. Based on the findings, the District believes the intent of this item is met.
- The existing fire services are technically single services of unknown size with a post indicator valve, which require upgrade, including but not limited to, a minimum of the installation of an isolation control valve and new backflow protection. These post indicator valves will be upgraded as required due to occupancy of the specific building. As these buildings are occupied, the District per the agreement will provide the backflow device and install a new isolation control valve for the service.

Moving forward, for new construction, the District will require the project to comply with current District Regulations Governing Water Service. The Regulations provide the policies, guidelines and requirements for water service for new development. New projects or existing buildings that require additional water related facilities will comply with the District's Regulations Governing Water Service and installed according to the District's Technical Specifications and Standard Details. The cost of these facilities is the responsibility of the developer/owner including all applicable fees as required.

Should you have any questions, please call me at 916.679.2896 or email at wjung@sswd.org. Thank you.

Very truly yours;
Sacramento Suburban Water District

Robert S. Roscoe, PE
General Manager

RSR
cc: Warren Jung - SSWD