



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY • LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

NOTICE OF REGULAR MEETING OF BOARD OF DIRECTORS

DATE: Wednesday, June 17, 2015

TIME: 7:00 p.m.

**LOCATION: Zone 7 Administration Building
100 North Canyons Parkway, Livermore, California**

Any member of the public desiring to address the Board on an item under discussion may do so upon receiving recognition from the President. After receiving recognition, please step to the podium and state your name and address.

In compliance with the Americans with Disabilities Act, the meeting room is wheelchair accessible and disabled parking is available at the Zone 7 Administrative Building lot. If you are a person with a disability and you need disability-related modifications or accommodations to participate in this meeting, please contact the Acting Zone 7 Board Secretary, Donna Fabian, at (925) 454-5007 or fax (925) 454-5724. Notification 48 hours prior to the meeting will enable Zone 7 to make reasonable arrangements to ensure accessibility to this meeting. {28 CFR 35.102-35, 104 ADA Title II}

A G E N D A

1. Call Meeting to Order
2. Pledge of Allegiance
3. Citizens Forum

This is an opportunity for members of the public to speak on an item not listed on the agenda. The Board cannot deliberate or take action on a non-agenda item unless it is an emergency as defined under Government Code Section 54954.2.

4. Minutes of the Special Meeting and the Regular Meeting of May 20, 2015
5. Consent Calendar
 - a. Memorandum of Agreement to Participate in the Bay Area Regional Reliability Plan
 - b. Award of Contract for Embankment Slope Mowing Services
 - c. Professional Services Contract with Bluestone Engineering for Structural Engineering Support Services
 - d. Joint Exercise of Powers Agreement for Aquatic Pesticides Permit Monitoring
 - e. Personnel Action: Water Resources Technician II Position
6. Staffing Update
 - a. April Employee of the Month Recognition
7. Nutrient Management Plan

Recommended Action: Adopt Resolution.

8. Solid Waste Disposal Contract with Altamont Landfill and Resource Recovery Facility

Recommended Action: Adopt Resolution.

9. Committees - Administrative Committee Meeting - June 4, 2015 - notes
Water Resources Committee Meeting - June 9, 2015 - notes

10. Reports - Directors

- a. Verbal comments by President
- b. Written report by Director Quigley
- c. Verbal reports

11. Items for Future Agenda - Directors

12. Staff Reports (Information items. No action will be taken.)

- a. General Manager's Report
- b. Monthly Budget Report
- c. Legislative Update
- d. Outreach Activities
- e. Drought Update
- f. Capital Projects Status Report
- g. Update Related to the Bay Delta Conservation Plan
- h. Update on Zone 7 Vehicle Fleet and GPS
- i. Ground Movement Study – Livermore Valley
- j. Verbal Reports

13. CLOSED SESSION

- (a) Government Code Section 549547; Public Employee Performance Evaluation
Title: General Manager
- (b) Conference with Legal Counsel - Significant exposure to litigation pursuant to Gov't Code Section 54956.9(d) (2):
3 cases
- (c) Conference with Legal Counsel - Potential litigation pursuant to Gov't Code section 54956.9(d) (3): 1 case
- (d) Conference with Legal Counsel - Existing litigation pursuant to Gov't Code Section 54956.9(d) (1):
Alameda County Flood Control and Water Conservation District, Zone 7 v. Pleasanton Gravel Co.,
Alameda County Case No. HG14724177
- (e) Conference with Labor Negotiators:
Agency Negotiator: G.F. Duerig
Employee Organizations: Alameda County Management Employees Association; Alameda
County Building and Construction Trades Council, Local 342, AFL-CIO; International
Federation of Professional and Technical Engineers, Local 21, AFL-CIO; Local 1021 of the
Service Employees International Union, CTW; Unrepresented Management.

14. Open Session and Report Out of Closed Session

15. Adjournment

16. Upcoming Board Schedule: (All meeting locations are in the Boardroom at 100 North Canyons
Parkway, Livermore, California, unless otherwise noted)

- a) Special Board Meeting (if needed): July 1, 2015
- b) Finance Committee Meeting: July 9, 2015, 4:00 p.m.
- c) Regular Board Meeting: July 15, 2015, 7:00 p.m.

MINUTES OF THE BOARD OF DIRECTORS
ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

SPECIAL MEETING

May 20, 2015

The following were present:

DIRECTORS: SANDY FIGUERS
JOHN GRECI
SARAH PALMER
ANGELA RAMIREZ HOLMES
BILL STEVENS

DIRECTORS ABSENT: JIM McGRAIL
DICK QUIGLEY

ZONE 7 STAFF: JILL DUERIG, GENERAL MANAGER
KURT ARENDS, ASSISTANT GENERAL MANAGER, ENGINEERING
DONNA FABIAN, ACTING BOARD SECRETARY

COUNSEL: DAVID ALADJEM, DOWNEY BRAND

Item 1 - Call Meeting to Order

President Greci called the meeting to order at 5:05 p.m.

Item 2 - Pledge of Allegiance

President Greci led a salute to the flag.

Item 3 - Citizens Forum

None.

Item 4 - Lake Del Valle Property Grazing Lease

Kurt Arends, Assistant General Manager, Engineering, provided a brief overview on the Lake Del Valle property and the process for the Lake Del Valle property lease. He stated that in November 2013 Zone 7 acquired approximately 5000 acres of land, formerly known as the Patterson Ranch, for watershed protection purposes. The Lake Del Valle property was purchased with an existing grazing lease. On September 17, 2014, the board extended the existing lease until October 31, 2015. Zone 7 developed a Grazing Management and Watershed Protection Plan that was reviewed by Zone 7 staff and staff from the San Francisco Public Utilities Commission, the Contra Costa Water District, and the University of California Extension. A draft Request for Proposal (RFP) was developed and reviewed by SFPUC staff who is experienced in the RFP process. The RFP was released on February 2, 2015, with proposals due

March 13, 2015. Zone 7 received 12 proposals in response to the RFP. Zone 7 staff enlisted the assistance of three experts in watershed protection from outside Zone 7, one from another public agency, and two individuals from the UC Extension. Each proposal was reviewed, evaluated and scored based on the criteria in the RFP. The results of the evaluation process were presented to the Patterson Ranch Ad-Hoc Committee on April 20, 2015, where the committee recommended that the full Board interview the top three. The top three proposers were asked to come to this special board meeting to present to the board why they feel they would be the best tenant for Zone 7 to achieve its watershed protection objectives. Approximately 20 minutes was allocated to hear each proposer's presentation, and for the board to ask questions. The three proposers are Paul Banke, TN Cattle Company, and Mission Livestock Management. The board will be asked to select a tenant and authorize the general manager to negotiate and execute a lease at the regular board meeting tonight at 7:00 p.m.

Director Figuers wanted to point out two things he noticed in the RFP. He said the whole concept of livestock grazing is subsumed by the environment. He said the term "this is not livestock, these are putting out animal units" was used. He also mentioned that he read in the RFP that Zone 7 wanted corrals and roads watered for dust, and he asked if there was an air pollution problem with a truck driving on a dirt road. Mr. Arends stated that they are not required to water the roads.

President Greci asked the first potential lessee to begin their presentation.

Paul Banke introduced himself and his children and provided an overview of the family cattle business, his history with the subject property, and the improvements they have made, and plan on making, on the property. President Greci thanked Mr. Banke and asked if there was any public comment or if anyone wanted to speak on behalf of the Banke family. John Shirley, retired veterinarian, former Livermore Mayor and resident of the Livermore Valley for almost 60 years, said that he knew Peter Banke and has known Paul Banke since he was in high school. He said he has visited that ranch a number of times and feels that the Banke family should be able to continue to live on the ranch. Tim Koopman, SFPUC Range Resource Manager, stated that he has spent a considerable amount of time on the ranch and has known Mr. Banke for quite a while. He believes there isn't a better-managed ranch in the state of California.

Director Ramirez Holmes asked Mr. Koopman if he also wrote a letter for the TN Cattle Company. Mr. Koopman confirmed that he did write a letter on their behalf and doesn't think Zone 7 could go wrong with either of the tenants. Shelley Miller, East Bay Regional Park District, said that she has been the supervisor at Lake Del Valle since 2003 and has worked at the park since 1982. She said she has known Paul Banke and his brother for a long time. She highly recommends the Banke family and their cattle company. President Greci complimented Ms. Miller on her letter of recommendation on behalf of the Bankes. Terry Huff, who was the District Conservationist for the U.S. Natural Resources Conservation Service in Alameda County for 17 years, also spoke on behalf of the Banke family. He said that he has worked with hundreds of ranchers throughout the state of California in his 33 years at the Resources Conservation Service and he highly recommends Paul Banke. Paula Orrell, Livermore, read a letter from Jackie Williams Cartwright who was unable to appear. Ms. Williams Cartwright, former Zone 7 Director, wrote on behalf of Paul Banke and supports him.

Director Ramirez Holmes asked Mr. Banke about horse boarding on the property. She wanted to know what his thoughts and plans are in terms of boarding horses if he were to continue leasing the property. Mr. Banke said that they have pastured between 10 and 15 horses over time and currently have about 9 horses. He said that whether they continue that program or not will be up to Zone 7 but it is mentioned in their proposal that they would like to continue to board horses.

Since there were no further questions or comments, President Greci asked that TN Cattle Company, Inc., present their proposal.

Ryan Nielsen of TN Cattle Company provided a brief history of the company and the Nielsen family, who has been ranching in Dublin for five generations. Mr. Nielsen said that the current tenant, Paul Banke, is and will be the most knowledgeable person about the property. He then played a video outlining various operations and improvements TN Cattle Company has completed over the years. President Greci thanked Mr. Nielsen and asked if there was anyone in the audience who wished to speak on their behalf. Since there was no one in the audience with any comments, President Greci opened it up to the Directors. Director Palmer asked Mr. Nielsen how many people they employ throughout the year. Mr. Nielsen stated at this time of year around 30 people. Director Ramirez Holmes asked Mr. Nielsen if they planned to have someone living on the property. Mr. Nielsen stated that one of his staff would live on the property.

There were no further questions so President Greci asked that Mission Livestock present their proposal. Adam Cline of Mission Livestock Management provided background and a statement of qualifications on his company. He has been co-owner of Mission Livestock Management with Doug Freitas since 2009. Mr. Freitas gave a brief background of his rangeland management experience. They shared a PowerPoint presentation showing their management approach, experience, and capabilities. Director Figuers asked who owned Mission Livestock Management Company. Mr. Freitas said that he and Mr. Cline both own the company. Director Figuers also asked what the Cline Livestock Company is. Mr. Cline stated that Cline Livestock Company is his own livestock company separate from Mission Livestock Management Company. Director Figuers then asked about Freitas Fencing Company and Mr. Freitas confirmed that that is his own separate company as well. Director Figuers asked if they felt any time constraints by managing multiple companies throughout Northern California. Mr. Freitas said that he has a foreman and a partner in the fencing business and that his primary job with the fencing business is acquisition of work. Mr. Freitas stated that he has managers that would manage the other ranches and that he would live on and manage the Del Valle property.

Director Figuers referred back to the previous presenter and asked what the difference is between TN Cattle Company and H&N Enterprises. Mr. Nielsen said that TN Cattle Company was started by his grandfather and that his father is part owner with his brothers and sisters. Mr. Nielsen said that he manages H&N Enterprises. Director Figuers asked if the lease would come under TN Cattle Company or H&N Enterprises. Mr. Nielsen stated that it would come under TN Cattle Company but H&N enterprises would be involved in the management, restoration, and improvements. Director Figuers asked Mr. Banke what WP Cattle Company is. Mr. Banke stated that WP Cattle is the DBA they have used since taking over the Patterson Ranch. WP was the brand that the Patterson family had and the Banke family bought the brand.

President Greci thanked everyone for attending and for their presentations. He stated that the Board's regular meeting will be held at 7:00 p.m. and at that time there will be discussion and a decision on Item No. 8 as to the Lake Del Valle lease.

Item 5 - Adjournment

The meeting was adjourned at 6:40 p.m.

MINUTES OF THE BOARD OF DIRECTORS
ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

REGULAR MEETING

May 20, 2015

The following were present:

DIRECTORS: SANDY FIGUERS
JOHN GRECI
SARAH PALMER
ANGELA RAMIREZ HOLMES
BILL STEVENS

DIRECTORS ABSENT: JIM McGRAIL
DICK QUIGLEY

ZONE 7 STAFF: JILL DUERIG, GENERAL MANAGER
KURT ARENDS, ASSISTANT GENERAL MANAGER, ENGINEERING
DONNA FABIAN, ACTING BOARD SECRETARY

COUNSEL: DAVID ALADJEM, DOWNEY BRAND

Item 1 - Call Meeting to Order

President Greci called the meeting to order at 7:00 p.m.

Item 2 - Pledge of Allegiance

President Greci led the Pledge of Allegiance.

Item 3 - Citizens Forum

Alfred Exner, Pleasanton resident, suggested that the septic tank rebate program be limited to owner-occupied dwellings with a household income of less than \$50,000. He also suggested that Zone 7 consider putting an item on the agenda on how Zone 7 is managing the water in the "Gate" area of Pleasanton, as he is concerned about the subsidence issue.

Item 4 - Minutes of the Regular Meeting of April 15, 2015

Director Palmer said there was a typo on page 5. There needs to be an "e" in Director Ramirez Holmes' last name.

Director Palmer moved to approve the minutes with the proposed change and Director Ramirez Holmes seconded the motion. The minutes were approved by a voice vote of 5-0 with Directors McGrail and Quigley absent.

Item 5 - Consent Calendar - none

Item 6 - Employee Updates

a. March Employee of the Month Recognition

General Manager Jill Duerig announced that the March Employee of the Month was Zeljka Bozic, Buyer I. Ms. Bozic was present and the board applauded her.

b. Recent Employee Activities

Ms. Duerig directed the board's attention to the poster boards in the boardroom detailing the events of Take Our Children to Work Day on April 22, and the Annual Service Recognition Awards on May 12. The service recognition awards were presented to employees celebrating milestones of 5, 15, 20, 25, 30 and 35 years with the County. Recipients of the Hall of Fame Awards, nominated by co-workers, were also acknowledged. A slideshow with pictures of the service recognition awardees and hall of fame recipients was shown.

Item 7 - Presentations by Science and Engineering Fair Awardees

Boni Brewer, Communications Specialist, introduced the Alameda County Science and Engineering Fair award recipients. Zone 7 staff Amparo Flores and Emily Moshier acted as Special Awards Judges of water-related projects during the Fair. They selected three students to receive awards for their water-related projects, and those three students were present at the meeting and they presented their projects to the board.

This year's recipients were:

- William Leslie Olsen, Sunol Glen School, who got a middle school water award for his study entitled, "Parabolic Solar Water Distillation."
- Meenakshi Singhal, Granada High School, who got a high school water award for her study entitled, "Optimization of Moringa Oleifera Functionalized Sand for Water Purification."
- Sidharth Bommakanti, Amador High School, who got a high school water award for his study entitled, "Project Wellness Water."

Ms. Duerig pointed out that congratulations should go not only to the students, but to the parents as well who supported their students. Director Palmer pointed out that teachers deserve credit, too.

Item 8 - Lake Del Valle Property Grazing Lease

Assistant General Manager Kurt Arends stated that this item is a follow-up to the Special Board Meeting that was held earlier in the evening where the board interviewed three potential tenants for the Lake Del Valle property. Mr. Arends asked the board to recommend a tenant, as well as authorize the General Manager to negotiate a long-term lease.

Director Palmer said how impressed she was with all three presentations, and the care and considerations for both animal husbandry and environmental issues. Director Ramirez Holmes stated that the environmental credentials were very impressive as were the letters of recommendation in all three proposals and it was easy to see why the presenters were in the top 3.

Director Stevens agreed with Directors Palmer and Ramirez Holmes and wanted to add that all three potential tenants have excellent reputations and he believes all three could do a very good job at managing the land. He said that the Banke family, because of their history, has the advantage over the other potential lessees. He said that all three are fully capable of managing the land to Zone 7's satisfaction.

Director Figuers stated that he is going to be voting for the Banke family, but also said that all three candidates are perfectly well qualified. He said that his concern with the other two organizations is that they are spread too thin with too many irons in the fire, and that Mr. Banke is not. He feels that Mr. Banke would be able to devote much more time to the Patterson Ranch than the other two.

President Greci said he, too, was impressed with the presentations. He is very familiar with the Banke family and with TN Cattle Company. He did research on Mission Livestock and all three potential lessees come highly recommended from many other cattlemen. President Greci continued to say that he also has a background in livestock and has a good understanding of rangeland management and the cattle business. He said it is very important to him that Zone 7 have a steward of the property that understands it, knows the history, and has proven they can handle this project. He said he spent a lot of time reading the proposals, and the one thing that was in the Banke proposal that was not in the others is the amount of time and money invested into a ranch that they rent. They have been excellent stewards and their letters of recommendation were very strong. President Greci said that he too would vote for the Banke family because of their history and their dedication.

Director Ramirez Holmes had a question in the sample lease. She said that under section 5.1 it says the lessee's use of the premises be limited to cattle grazing, and she wondered what staffs' thoughts were in terms of business ventures other than cattle. Mr. Arends said that staff are willing to listen to any proposals the tenant may want to make. He said it was not addressed in the proposed lease, and he welcomes input and/or direction from the board. Director Figuers stated that he has no problem with horse boarding. President Greci said that he also does not have a problem with it, and he has several friends that do the same thing. They are all insured under an umbrella policy and he said that in this case, Zone 7 would need to be listed as additionally insured on their policy. Director Ramirez Holmes said that she wants to make sure that the lease covers the required insurance and that it will also ensure, that as a public landlord, Zone 7 is outlining the policies of a public agency. Mr. Arends said that insurance would be included as part of the lease and there will be limitations on the number of horses that can be boarded on the property.

President Figuers moved that the board vote for Mr. Banke to continue managing the ranch, and Director Palmer seconded. The motion was approved by a voice vote of 5-0 with Directors McGrail and Quigley absent.

Since there were no further questions or comments, President Greci congratulated the Banke family and thanked them for their patience in the process.

Resolution No. 15-64

Authorizing the Lake Del Valle Property Lease (Item No. 8)

Item 9 - Consider Action to Increase the Compensation of Zone 7 Board Members

At the April 15, 2015 board meeting, the board reviewed the results of the 2015 Compensation Survey of comparable water agency's boards of directors. At the April 15 meeting the board directed staff to bring back Option 2 for discussion. Option 2 was to increase board compensation to \$176.21 per meeting. President Greci opened the public hearing and there was no comment from the public so the public hearing was closed.

Director Figuers moved that the board accept Option 2. Director Palmer seconded. The motion was approved by a roll call vote of 3-1-1 with President Greci abstaining, Director Ramirez Holmes voting no, stating that she feels uncomfortable voting for a raise for herself, and Directors McGrail and Quigley absent.

Ordinance No. 2015-01 Approving an Increase in the Compensation of Board Members (Item No. 9)

Item 10 - Proposed FY 2015/16 Budget

Hossein Golestan, Financial Consultant for Zone 7, gave an overview of the budget process, which began in December with the assistance of various individuals and departments in the agency. He said that staff met with the retailers then the Finance Committee three times. He stated that financial issues facing Zone 7 include the drought, the increasing fiscal impacts from water conservation efforts, the increased State Water Project charges, the slow recovery of the economy, and the continued increasing need to allocate funds to the Asset Management Program for aging infrastructure maintenance and improvements. Mr. Golestan showed a PowerPoint presentation highlighting the budget process and the major factors affecting the budget. Highlights included decreased water sales, increased expenses for water purchases, and the use of reserves to fill funding gaps.

Director Figuers referred to pages 7 and 8 of the slideshow. He asked that in the future there be a note explaining which funds are combined and which funds are separated so that he could fully understand. Director Ramirez Holmes said combining the funds is good because individually all of the accounts meet the minimums except the drought contingency, because that is what brings it down to below the minimum, and we want to make sure we are presenting the correct information that is the reserves for water enterprise are not in dire straits, and that Zone 7 is within the reserve levels. Ms. Duerig stated that this came up at the Finance Committee Meeting as staff presented the same graphs.

Director Figuers asked staff and the board if the term "at minimum" under the water enterprise operating reserve fund bothers staff, and do they want that amount higher? Ms. Duerig said that at a Finance Committee meeting when Zone 7 had a presentation by Fieldman, Rolapp & Associates, who assisted staff in preparing the policy that the board adopted, minimums were set, and yes Zone 7 could squeak through for a short time if funds get down to a minimum. She said that staff talked about having a board workshop in August or September to discuss the Reserve Policy, rates, and the agency's credit-worthiness.

Director Ramirez Holmes stated that the policy was set up based on a percentage to cover 32 days of operating expenses and Zone 7 has that. She said that Zone 7 has gotten into trouble with the retailers who are wondering why Zone 7 holds onto all that money while raising rates. She said Zone 7 is not focused on cutting costs, but on raising rates, and that is her concern about the proposed budget. She feels that Zone 7 needs to get a better handle on controlling costs. She said the budget has gone up every year since she has been at Zone 7. Director Palmer said that is a good topic for when they meet to

discuss reserves and rates. Director Stevens said he believes that staff explained very well the reasons why costs are going up, and he disagrees that Zone 7's costs are out of control.

Director Stevens feels the reserve balances are too low. He asked if the reason the flood control fund went down is because of the Stanley Reach. He said it has continually been going down over the last 4 years while we have been in a drought, and he doesn't understand why. Ms. Duerig responded that a big part of the drop from the 2012-13 to the 2013-14 flood control fund was due to the purchase of the Lake Del Valle property. Director Stevens asked about the drop from 2014-15 to 2015-16. Ms. Duerig responded that some money was put aside to try to get grants to do some projects, and those that are not complete will carry over to next year. Director Stevens is concerned that if we get rains next year since they are predicting an El Niño year, Zone 7 won't have enough reserves in their flood control fund to take care of potential flooding. He said he is looking forward to the retreat because he disagrees with the application of the Reserve Policy that was passed by the Finance Committee. Director Ramirez Holmes stated that it is a board-approved Reserve Policy and that it didn't come from the Finance Committee. Director Stevens agreed but said Zone 7 is at the minimum reserves so we need to rethink that policy. President Greci said that the Reserve Policy will be discussed further at the upcoming board retreat.

President Greci asked for public comment.

Alfred Exner, Pleasanton resident, said that he believes Zone 7 is eating up its reserves and will be broke in a couple of years. He believes the revenues for this coming fiscal year are overly optimistic. He said that at a Finance Committee meeting he pointed out line items that appear to be too high. He said that if Zone 7 continues this path, particularly if the drought continues into next year, Zone 7 will be below its minimums. He suggested that the revenue estimates be revised. He recommends Zone 7 put a cap on the carryover.

John Archer, Administrative Services Manager at Dublin San Ramon Services District, said that Zone 7 staff has done a great job, the reserves are at minimum, but no one knows what next year will bring. He recommended that Zone 7 come up with a five-year plan and a rate plan that mirrors the five-year plan.

Leonard Olive, Assistant Director Operations at the City of Pleasanton, thanked Director Ramirez Holmes for her input. He said that Zone 7 is free to transfer money between different funds with the exception of the capital expansion fund, and that Zone 7 can loan itself money between those funds.

Director Figuers stated that within the last 5 years, Zone 7 has gone from \$170 million to a projected \$123 million in reserves and he wanted to know where the interest of that money is identified in the budget. Mr. Golestan said that it is listed under investment earnings. Director Figuers asked if the interest could be moved between funds. Ms. Duerig stated that the two funds where you could move interest funds between are Fund 100 and Fund 120.

Director Palmer moved to approve the 2015/16 budget and Director Figuers seconded the motion, which was approved by a roll call vote of 3-2 with Directors Ramirez Holmes and Stevens voting no, and Directors McGrail and Quigley absent.

Resolution No. 15-65

Approved the proposed budgets for Fiscal Year 2015/16.

Item 11 - Committee Reports - Finance Committee Meeting - April 23, 2015 - notes
Liaison Committee Meeting - April 27, 2015 - notes
Finance Committee meeting - May 7, 2015 - notes
Water Policy Roundtable #4 - May 13, 2015 - notes pending

Item 12 - Reports - Directors

- a. Verbal comments by President
- b. Written report by Director Quigley
- c. Verbal Reports

Director Palmer attended a breakfast meeting in Sacramento on May 6 and said that the message was that water agencies need to stick together and that they are in for a rough road ahead. She also attended the Tri-Valley Liaison Roundtable meeting on May 13.

Item 13 - Items for Future Agendas - Directors

None.

Item 14 - Staff Reports

- a. General Manager's Report
- b. Monthly Budget Report
- c. Legislative Update
- d. Outreach Activities
- e. Drought Update
- f. Flood Protection Program 2014 Annual Report
- g. Verbal Reports

Ms. Duerig stated that at the ACWA Spring Conference, Zone 7 received a plaque for being a Claire A. Hill Award Finalist for the Arroyo Mocho Riparian Restoration and Channel Enhancement Pilot Project.

Director Stevens requested that on future Drought Updates, there be a graph showing the water levels at Lake Del Valle similar to the one used for Lake Oroville.

The Board went into closed session at 8:50 p.m.

Item 15 - Closed Session

- (a) Conference with Legal Counsel - Significant exposure to litigation pursuant to Gov't Code Section 54956.9(d) (2): 3 cases
- (b) Conference with Legal Counsel - Potential litigation pursuant to Gov't Code section 54956.9(d) (3): 1 case
- (c) Conference with Legal Counsel - Existing litigation pursuant to Gov't Code Section 54956.9(d) (1):
Alameda County Flood Control and Water Conservation District, Zone 7 v. Pleasanton Gravel Co.,
Alameda County Case No. HG14724177

(d) Conference with Labor Negotiators:

Agency Negotiator: G.F. Duerig

Employee Organizations: Alameda County Management Employees Association; Alameda County Building and Construction Trades Council, Local 342, AFL-CIO; International Federation of Professional and Technical Engineers, Local 21, AFL-CIO; Local 1021 of the Service Employees International Union, CTW; Unrepresented Management.

Item 16 - Open Session and Report Out of Closed Session

The Board came out of Closed Session at 9:05 p.m. and President Greci reported that there were no reportable actions taken in Closed Session.

Director Palmer moved and Director Figuers seconded a motion to approve the settlement agreement and adopt the resolution. The board approved the motion 5-0, with Directors McGrail and Quigley absent.

Resolution No. 15-63	Approve the salary adjustment and amendment to Appendix A, Footnotes to Salary Schedule Section 4.20.
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Item 17 - Adjournment

The meeting was adjourned at 9:10 p.m.



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: INTEGRATED PLANNING
CONTACT: AMPARO FLORES/CAROL MAHONEY

AGENDA DATE: June 17, 2015

ITEM NO. 5a

SUBJECT: Memorandum of Agreement to Participate in the Bay Area Regional Reliability Plan

SUMMARY:

- On May 21, 2014, the Zone 7 Board adopted a resolution (14-4367) directing staff to participate in the Bay Area Regional Water Supply Reliability Partnership (Regional Partnership) under a set of Guiding Principles.
- The Regional Partnership is undertaking the development of the Bay Area Regional Reliability Plan (BARR Plan), which will evaluate near- and long-term joint projects that contribute to a regional approach for achieving water supply reliability in the Bay Area.
- A Memorandum of Agreement (MOA) has been developed for agency participation in the BARR Plan, which is consistent with the Guiding Principles.
- If approved, each agency in the Regional Partnership would contribute \$50,000 towards the preparation of the BARR Plan.

FUNDING:

Funding is available in Fund 130 for the \$50,000 contribution. Staff time for the BARR Plan effort would be covered under Fund 100.

RECOMMENDED ACTION:

Adopt resolution authorizing the General Manager to negotiate and execute the MOA to participate in the Bay Area Regional Reliability Plan.

ATTACHMENTS:

Interoffice Memorandum
Resolution

INTEROFFICE MEMORANDUM

DATE: June 17, 2015
TO: Jill Duerig, General Manager
FROM: Amparo Flores, Associate Engineer
SUBJECT: Memorandum of Agreement to Participate in the Bay Area Regional Reliability Plan

Alameda County Water District (ACWD), Bay Area Water Supply and Conservation Agency (BAWSCA), Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), Marin Municipal Water District (MMWD), San Francisco Public Utilities Commission (SFPUC), Santa Clara Valley Water District (SCVWD), and Zone 7 Water Agency (Zone 7) (“agencies”) have agreed to work cooperatively to address water supply reliability concerns and drought preparedness on a mutually beneficial and regionally focused basis under the Bay Area Regional Water Supply Reliability Partnership (Regional Partnership). On May 21, 2014, the Zone 7 Board adopted a resolution (14-4367) directing staff to participate in the Regional Partnership under a set of Guiding Principles.

The Regional Partnership recognizes that integrated utilization of collective capacity in existing infrastructure and new interconnections or facilities may provide water supply reliability benefits to the Bay Area during current and future droughts. As such, the Regional Partnership is undertaking the development of the Bay Area Regional Reliability Plan (BARR Plan), which will evaluate near- and long-term joint projects that contribute to a regional approach for achieving water supply reliability in the Bay Area. Projects that may be evaluated as part of the BARR Plan include: reoperation of existing facilities, new interconnections, recycled water, water conservation, expanded treatment, regional desalination, water transfers and exchanges, and other projects or institutional arrangements. Certain projects, such as the Zone 7/EBMUD Reliability Intertie and the Bay Area Regional Desalination Project, will proceed in parallel to the BARR Plan efforts; the BARR Plan is not intended to delay projects already in progress but instead will help to integrate them into various regional efforts.

The Memorandum of Agreement to participate in the BARR Plan (MOA) is consistent with the Guiding Principles. It sets forth the roles and responsibilities of each agency as they work towards addressing water supply reliability concerns and drought preparedness in a mutually beneficial and regionally focused way, and it includes the principles of the cost share obligations. The draft MOA is included as Attachment A of this memo. MMWD has executed the MOA as shown, and the other agencies will go to their respective Boards in June and July.

EBMUD will serve as the lead agency to select the consultant for the development of the BARR Plan, with each member of the Regional Partnership having an opportunity to participate. The consultant will then develop the BARR Plan with input from the agencies. Zone 7 staff will also assist in the preparation of a grant application requesting funding for the BARR Plan development from the Bureau of Reclamation’s WaterSmart Drought Contingency Planning Grants for Fiscal Year 2015. EBMUD will submit the grant application and assume responsibility for administering the grant if the BARR Plan is selected for funding. The scope of

work of the BARR Plan will be consistent with the guiding principles and with grant funding requirements as applicable.

Each agency is asked to contribute \$50,000 towards the preparation of the BARR Plan. Funding is available in Fund 130 for Zone 7's contribution. Staff time for the BARR Plan effort would be covered under Fund 100.

RECOMMENDED ACTION:

Staff recommends that the Board adopt the attached resolution authorizing the General Manager to negotiate and execute a Memorandum of Agreement to participate in the Bay Area Regional Reliability Plan.

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY

SECONDED BY

Memorandum of Agreement to Participate in the Bay Area Regional Reliability Plan

WHEREAS, on May 21, 2014, the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District directed staff to participate in the Bay Area Regional Water Supply Reliability Partnership (“Regional Partnership”) under a set of Guiding Principles; and

WHEREAS, the Regional Partnership is undertaking the development of the Bay Area Regional Reliability Plan (BARR Plan), which will evaluate near- and long-term joint projects that contribute to a regional approach for achieving water supply reliability in the Bay Area; and

WHEREAS, a draft Memorandum of Agreement (MOA) has been developed for agency participation in the BARR Plan, which is consistent with the Guiding Principles.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District directs the General Manager to negotiate and execute the MOA to participate in the BARR Plan.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District on June 17, 2015.

By: _____
President, Board of Directors

ATTACHMENT A

Draft MOA to Participate in the Bay Area Regional Reliability Plan

**MEMORANDUM OF AGREEMENT
BETWEEN**

**THE ALAMEDA COUNTY WATER DISTRICT
THE ALAMEDA COUNTY FLOOD CONTROL AND WATER
CONSERVATION DISTRICT - ZONE 7
CITY & COUNTY OF SAN FRANCISCO PUBLIC UTILITIES COMMISSION
(With the BAY AREA WATER SUPPLY AND CONSERVATION AGENCY)
CONTRA COSTA WATER DISTRICT
EAST BAY MUNICIPAL UTILITY DISTRICT
MARIN MUNICIPAL WATER DISTRICT
AND
SANTA CLARA VALLEY WATER DISTRICT**

TO

PARTICIPATE IN THE BAY AREA REGIONAL RELIABILITY PLAN

THIS MEMORANDUM OF AGREEMENT (“Agreement”), made in the State of California on this _____ day of _____, 2015, is by and between the Alameda County Water District (“ACWD”), the Alameda County Flood Control and Water Conservation District - Zone 7 (“Zone 7 Water Agency” or “Zone 7”), City & County of San Francisco acting by and through the Public Utilities Commission (“SFPUC”), the Bay Area Water Supply and Conservation Agency (“BAWSCA”), Contra Costa Water District (“CCWD”), East Bay Municipal Utility District (“EBMUD”), Marin Municipal Water District (“MMWD”), and Santa Clara Valley Water District (“SCVWD”) referred collectively herein as the “Parties” and singularly as a “Party”.

This AGREEMENT sets forth the respective roles and responsibilities of ACWD, Zone 7, SFPUC, BAWSCA, CCWD, EBMUD, MMWD, and SCVWD in regard to the Bay Area Regional Reliability Plan (hereinafter referred to as “BARR Plan”).

RECITALS

1. WHEREAS, the Parties own and operate independent water systems that collectively serve the needs of over 6 million residents and businesses in the San Francisco Bay Region; and
2. WHEREAS, the Parties recognize that integrated utilization of capacity in existing infrastructure and new interconnections or facilities may provide water supply reliability and/or water quality benefits to multiple agencies or other regional partners and the public and businesses we all serve; and

3. WHEREAS, the Parties have approved a set of foundational principles related to Regional Reliability as provided in Attachment 1; and

NOW, THEREFORE, in consideration of the recitals and mutual obligations of the Parties herein expressed, the Parties agree as follows:

1. PREAMBLE

The Parties have agreed to work cooperatively to address water supply reliability concerns and drought preparedness on a mutually beneficial and regionally focused basis. Near- and long-term joint water supply reliability projects may be evaluated, including but not limited to, use of capacity of existing facilities, changes to infrastructure including new interconnections, recycled water, water conservation, expanded treatment, regional desalination, water transfers and exchanges, and other projects or institutional arrangements that encourage a regional approach to achieving water supply reliability in the Bay Area. The Parties have agreed to conduct Regional Partnership activities, including the preparation of a BARR Plan, in an inclusive manner that encourages voluntary participation by the Parties as well as other interested persons or organizations to improve water supply reliability in the Bay Area. The Parties also understand that some of the projects and concepts that could be evaluated as part of the BARR Plan may move forward in parallel with or completely outside of this effort, and that it is not the intention of this agreement to prohibit such projects from moving forward.

2. DEFINITIONS

- a) “BARR” - Bay Area Regional Reliability.
- b) “BARR Plan” – the Bay Area Regional Reliability Plan.
- c) “CEQA” - the California Environmental Quality Act
- d) “Consensus Agreement” - Agreements that require the approval of all Parties.
- e) “Consultant” - A consulting firm, engineering firm, construction contractor, public outreach firm or mediation firm retained to provide services for the BARR Plan.
- f) "Contract" - Contract between the Contracting Entity, as designated by the Parties, and a Consultant that will be utilized for preparing the BARR Plan.
- g) “Contracting Entity” - the specific Party who will serve as the entity that enters into a contract with a Consultant hired to prepare the BARR Plan.
- h) “ESA” - Endangered Species Act
- i) “NEPA” - National Environmental Policy Act

- j) “Project Implementation” – Future work, possibly including the implementation possible project elements of BARR, that may require environmental analysis, permitting, pre-design, design, and construction.
- k) “Project Staff Time” - Staff and management time from one or more Party that is necessary for conducting the general project management and other duties as assigned under this Agreement.
- l) “Regional Facility or System Interties” - One or more facilities or interties between two neighboring agencies used to meet the needs of one or more of the Parties for supplemental water during extended droughts, emergencies and/or periods when major facilities are taken out of service for maintenance or repairs, and contract delivery reductions.

3. TERM

- a) This Agreement shall become effective upon its execution by the Parties.
- b) This Agreement will terminate on December 31, 2018 or when all obligations under this Agreement have been performed, whichever occurs first, unless this Agreement is cancelled pursuant to Article 11, Cancellation.
 - i. Payment obligations under Article 8, Cost Sharing and Payment, and Article 11, Cancellation, shall survive discharge or termination of this Agreement until obligations are satisfied.

4. PURPOSE

The purpose of this Agreement is to:

- a) Define the roles and responsibilities of each Party for preparing the BARR Plan. All work associated with BARR Plan is to be conducted in accordance with the Agreement.
- b) Establish the guidelines and principles for cost sharing between the partners.
- c) Establish procedures for incurring costs such as contracting and payment of consultants.
- d) Establish procedure for seeking reimbursement from the other Parties of costs incurred by a Party for payment of consultants.

5. WORK TO BE PERFORMED

The BARR Plan will be developed with the cooperative input from the Parties and a hired consultant. The BARR Plan will be consistent with the BARR principles (Attachment 1) and with grant funding requirements as applicable. As provided in Section 7 of this Agreement, the Parties will designate a Party to be the Contracting Entity to enter into an agreement with a consultant for preparation of the BARR Plan. Work to be performed by

Party staff is described in Section 7 and Attachment 2 of this Agreement. The Parties acknowledge that work performed on individual projects or concepts that could be evaluated as part of the BARR Plan but yet move forward in parallel with or completely outside of this effort are not subject to the terms of this Agreement,

6. REGULATORY APPROVALS, ENVIRONMENTAL APPROVALS, ENVIRONMENTAL COMPLIANCE AND ENVIRONMENTAL REVIEWS

The Parties agree that the work contemplated in this Agreement, as it involves the preparation of the BARR Plan, is exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines and is similarly exempt from NEPA and ESA.

7. RESPONSIBILITIES OF THE PARTIES

The Parties shall have unique responsibilities identified in Attachment 2, and will provide a funding commitment that can be used for cost reimbursements in the amounts shown in Attachment 3.

General responsibilities of all Parties are as follows:

- a) Work cooperatively to develop the BARR Plan.
- b) Commit staff time to work with staff from other Parties and the selected consultant in conducting the BARR Plan.
- c) Share relevant engineering, permitting, regulatory and operational information regarding its own facilities and permits with other Parties for the benefit of the BARR Plan preparation.
- d) Provide access to facilities and operational data that may be needed for developing BARR Plan (such as intakes, aqueducts and pumping plants, treatment plants, interties, etc.). If needed, commit staff time to conduct necessary analysis of its own facilities, permits, operational data, procedures or requirements, or any other data needed for BARR Plan consideration and share the information with other Parties. Access to facilities will be consistent with, and will follow, the facility owner's standard safety and notification requirements.
- e) Provide engineering oversight and review of BARR Plan work products.
- f) Conduct general work that is needed to advance the BARR Plan development. These efforts may include State and Federal grant application and grant administration support, website update, and outreach.

- g) Accept that, if one or more of the Parties choose to move forward individual projects and concepts also being evaluated as part of the BARR Plan, those individual projects and concepts are not subject to the terms of this Agreement.

The Parties hereby designate EBMUD as the Contracting Entity under this Agreement. The Contracting Entity shall be responsible for entering into a contract with a Consultant to prepare the BARR Plan. The Contracting Entity shall conduct a consultant procurement process that satisfies its own internal consultant procurement policies/criteria and includes all Parties in the selection of a Consultant. All Parties will have equal representation in the selection process. Once a Consultant is selected by the Parties, and only after the Parties have funded the BARR Plan preparation effort as provided in Section 8 of this Agreement, shall the Contracting Entity enter into a contract with the Consultant on behalf of the Parties.

The Contracting Entity shall conduct all consultant administrative and management duties including receiving and verifying Consultant invoices. Invoices received from the Consultant will be sent to the other Parties for approval. Consultants will be paid in accordance with the Contracting Entity's internal process after the invoices are approved by other Parties. Approval of the invoice will be assumed if no comments or disputes are received from any individual Party within five (5) working days of when said Party received a copy of the invoice. If there are disputes, the Contracting Entity will take necessary actions that are developed through Consensus Agreement to resolve them with the Consultant. If the disputes cannot be resolved within a reasonable time, and the Contracting Entity is obligated to pay the Consultant charges, the costs will be shared equally by the Parties.

- a) Each Party shall provide one staff member to serve on the Panel assembled to select a BARR Plan preparation Consultant. The Parties agree that the selected consultant will be determined by a vote of the Panel, and further that the selected consultant will be based on the one that receives the most votes.
- b) Each Party shall allow the Party assigned as the Contracting Entity to negotiate the selected Consultant's budget and hold all managerial and administrative responsibilities regarding the management of the selected Consultant.
- c) Consultants hired on behalf of the Parties shall be required to indemnify all Parties and name all Parties as insured in the contract with the Contracting Entity.
- d) The Contracting Entity shall invoice other Parties in a timely manner for their share of the consultant services as billed. Invoices will include details of hours worked and tasks completed. As detailed in Article 8 c), invoices shall be provided as informational documentation, although payment of Contractor invoices shall be made solely by the Contracting Entity.
- e) Parties shall promptly review invoices for approval upon receipt of information from other Parties. Report disputes to the responsible Party within five (5)

working days of receipt of the invoices. Cooperate with other Parties in resolving disputes.

- f) All Parties will cooperate to resolve any payment/cost-sharing/accounting issues.

8. COST SHARING AND PAYMENT

The Parties agree that the total member agency financial contribution toward the preparation of the BARR Plan shall not exceed \$400,000. The Parties intend to apply for grant funding to assist with the cost of developing the BARR Plan. The balance of the monies remaining following the completion of the BARR Plan shall be returned to the Parties. Each Party shall pay the Contracting Entity an equal share of the \$400,000 financial commitment, or \$50,000 per Party, as specified in Attachment 3 of this Agreement. In the event that anticipated grant funding is not obtained or if the BARR Plan cannot be completed for a cost of the total funding compiled, the Parties shall meet to discuss, and develop agreement on an amendment including the scope of work, schedule and additional funding needed to complete the BARR Plan. Work will not proceed unless an amendment is completed. Cost reimbursement is based on the following principles:

- a) The Contracting Entity will collect the up-front financial contribution as noted herein. No Consultant contracting shall take place prior to collection of funds.
- b) Up-front shares are to be kept in a separate account by the Contracting Entity and are to be used to cover Consultant invoices.
- c) Agency staff time as incurred by one or more Party to this Agreement is not reimbursable.
- c) The Contracting Entity will provide each Consultant invoice received to each Party as a means to record work progress, share budgetary status, and identify any disputes as detailed in Article 7.d).
- d) If, as based on the proposed Consultant's budget as compared with the total funding collected, there are monies remaining, those monies shall be considered as contingency funds. Parties must develop a Consensus Agreement before being able to access any contingency funds. Contingency funds may be used to pay for cost-overruns.
- f) If there is a cost overrun by the Consultant, the Parties will be contacted and a proposed response or remedy identified. The Consultant's contract will clearly state that budget overruns will not be reimbursed without the express agreement of the Parties.
- f) Within ninety days following the completion of all work described in this Agreement, a cost true-up will be completed by Contracting Entity to determine the actual costs for the BARR Plan. If the actual costs add up to less than that

estimated in Attachment 3, the Contracting Entity will refund each Party its proportionate share of the unused funds or, if the Parties subsequently agree to proceed with follow-up BARR work or activities, the unused funds may be expended on such efforts.

No work on the BARR Plan shall commence until this Agreement has been executed by all Parties. If a single Party chooses to terminate their participation under the terms of this Agreement they will remain financially responsible for their contribution as detailed in Article 11, Cancellation.

9. HOLD HARMLESS, INDEMNIFICATION AND REMEDIES

To the extent permitted by State law, each Party will indemnify, defend and hold all other Parties and their directors, officers, agents, and employees safe and harmless from any and all claims, suits, judgments, damages, penalties, costs, expenses, liabilities and losses (including without limitation, sums paid in settlement of claims, actual attorneys' fees, paralegal fees, consultant fees, engineering fees, expert fees and any other professional fees) that arise from or are related in any way to each Party's, its associates', employees', subconsultants', or other agents' negligent acts, errors or omissions, or willful misconduct, in the operation and/or performance of this Agreement.

Notwithstanding the preceding paragraph, where more than one Party is named in a suit challenging the BARR Plan, or made subject to a claim or penalty regarding the same, the Parties shall coordinate and undertake a joint defense, utilizing a joint defense Agreement to the extent possible, subject to the approval of the Parties. Each Party to this Agreement agrees that, to the greatest extent practicable, it shall cooperate in such defense and execute any waivers and/or tolling Agreements that may be necessary in order to provide for a single joint defense of such a suit, claim, or imposition of penalty. Any communications between and/or among the Parties and any of their respective consultants and attorneys engaged in the joint defense shall be privileged as joint defense communications. Work performed during the joint defense by Consultants or attorneys, to the extent allowed by law, shall be considered attorney work product. Nothing in this paragraph is intended to require a joint defense under circumstances where it would be legally impermissible or under circumstances where it is wholly impractical.

10. DISPUTES

Any claim that a Party may have against another Party or Parties regarding the performance of this Agreement including, but not limited to, claims for compensation will be submitted to the other Party or Parties. Parties will attempt to negotiate a resolution of such claim and if necessary process an amendment to this Agreement or a settlement agreement to implement the terms of any such resolution.

11. CANCELLATION

If an individual Party elects to terminate its participation in this Agreement or in the BARR Plan, it may do so by delivering to each remaining Party a written notice of intention to terminate. Termination shall take effect five days following the receipt of notice by the other Parties. Termination of a Party from this Agreement shall not

terminate this Agreement. No portion of the terminating Party's \$50,000 provided under this Agreement for use in preparing the BARR Plan shall be refunded to the terminating Party. If the staff of the terminating Party was providing a service to the Parties as detailed in Attachment 2, it shall be the responsibilities of the remaining Parties to assume that role or roles.

12. MAINTENANCE AND INSPECTION OF BOOKS, RECORDS, AND REPORTS

All Parties will, upon reasonable advance written notice, make available for inspection to the other Parties all records, books and other documents directly relating to the BARR Plan as well as any other work related to water supply institutional arrangements and Agreements that are required for conducting the BARR Plan. Prior to release of information other than in response to a Public Records Act request, a subpoena, or court order, all draft information has to be approved by all Parties for finalization and release.

13. AGREEMENT NOT A PRECEDENT

The Parties intend that the provisions of this Agreement will not bind the Parties as to the provisions of any future agreement between them. This Agreement was developed specifically for the specified Agreement term.

14. NOTICES

Any notice, demand, or request made in connection with this Agreement must be in writing and will be deemed properly served if delivered in person or sent by United States mail, postage prepaid, to the addresses specified in Attachment 4, Notices.

15. MODIFICATION

This Agreement may be modified only upon the mutual written consent of the Parties.

16. NO THIRD-PARTY BENEFICIARIES

No third-party beneficiaries are intended or created by this Agreement.

17. SEVERABILITY

If any term or provision of this Agreement is deemed invalid or unenforceable by a court of competent jurisdiction or by operation of any applicable law, it will not affect the validity of any other provision, which will remain in full force and effect.

18. COMPLETE AGREEMENT

Other than as specified herein, no document or communication passing between the Parties to this Agreement will be deemed to be part of this Agreement.

19. ASSIGNMENT

This Agreement is not assignable either in whole or in part, except upon mutual written consent of the Parties.

20. AMENDMENT AND WAIVER

Except as provided herein, no alteration, amendment, variation, or waiver of the terms of this Agreement shall be valid unless made in writing and signed by all Parties. Waiver by any Party of the default, breach or condition precedent, shall not be constructed as a waiver of any other default, breach or condition precedent, or any right hereunder.

21. SUCCESSORS

This Agreement shall bind the successors of the Parties in the same manner as if they were expressly named.

22. INTERPRETATION

This Agreement shall be deemed to have been prepared equally by all Parties, and its individual provisions shall not be construed or interpreted more favorably for one Party on the basis that the other Parties prepared it.

23. INTEGRATION

This Agreement represents the entire understanding of the Parties as those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered hereunder.

24. TIME OF THE ESSENCE

Time is of the essence in this Agreement.

25. WAIVER

The waiver at any time by any Party of its right with respect to default or other matter arising in connection with this Agreement will not be deemed a waiver by that Party with respect to any subsequent default or matter.

26. GOVERNING LAW

This Agreement is governed by and will be interpreted in accordance with the laws of the State of California.

27. COUNTERPART

This Agreement may be executed in counterpart. Facsimile and electronic signatures shall be binding.

DRAFT

Signature Page (MOA to Participate in the Bay Area Regional Reliability Plan):

**ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION
DISTRICT, ZONE 7**

G.F. Duerig, General Manager

Zone 7 Water Agency
100 North Canyons Parkway
Livermore, CA 94551
(925) 454-5000

DRAFT

ATTACHMENT 1

Guiding Principles for Bay Area Regional Reliability Partnership Development

**Alameda County Water District
Contra Costa Water District
East Bay Municipal Utility District
Marin Municipal Water District
San Francisco Public Utilities Commission
(with the Bay Area Water Supply and Conservation Agency)
Santa Clara Valley Water District
Zone 7 Water Agency**

The purpose of these principles is to memorialize the mutual willingness of the Bay Area's largest public water agencies to develop regional solutions to improve the water supply reliability for over 6 million area residents and the thousands of businesses and industries located in the area. The Bay Area Regional Water Supply Reliability Partnership ("Regional Partnership") would enable Bay Area agencies to work cooperatively to address water supply reliability concerns on a mutually beneficial and regionally focused basis.

Whereas, the Alameda County Water District, Contra Costa Water District, East Bay Municipal Utility District, Marin Municipal Water District, San Francisco Public Utilities Commission (with the Bay Area Water Supply and Conservation Agency), Santa Clara Valley Water District, and Zone 7 Water Agency (referred collectively herein as the "Parties") own and operate independent water systems that collectively serve the needs of over 6 million residents and businesses in the San Francisco Bay Region, and

Whereas, the Parties recognize that integrated utilization of capacity in existing infrastructure and new interconnections or facilities may provide water supply reliability and/or water quality benefits to multiple agencies or other regional partners and the public we all serve, and

Whereas, recognizing the potential for mutual and regional benefits, the Parties agree to these principles for cooperative pursuit of short and long-term projects for water supply and/or water quality benefits which look first to maximize the use of existing infrastructure of each agency and may eventually include additional joint facilities to assist in providing region-wide water supply reliability and/or water quality benefits.

Therefore, in consideration of the recitals and mutual obligations, the Parties wish to establish a set of foundational principles that will guide any future partnership development as follows:

- Parties will participate in the evaluation of near- and long-term joint water supply reliability projects including, but not limited to, use of capacity of existing facilities, changes to infrastructure including new interconnections, recycled water, water

conservation, expanded treatment, regional desalination, water transfers and exchanges, and other projects or institutional arrangements that encourage a regional approach to achieving water supply reliability in the Bay Area.

- Parties will conduct Regional Partnership activities in an inclusive manner that encourages voluntary participation by the Parties as well as other interested persons or organizations.
- A specific project or activity does not have to involve all signatories of this Regional Partnership document but it is expected that each Party would endeavor to communicate planning efforts initiated by two or more Parties to improve water supply reliability including water transfers, wheeling agreements, interties and additional water supply infrastructure improvements.
- Partnerships are expected to result in betterment for the public served by the agencies involved and be conducted in a manner that does not adversely affect any of the Parties. Parties will not undertake Bay Area regional projects or activities that may impact the conditions within the service area of another Party without first obtaining that Party's approval.
- Parties will strive to achieve equitable cost- and risk-sharing for future projects or concepts commensurate with the benefits to be received.
- Parties agree to transparency with regard to costs and the expectation is that actual costs will be used in determining reimbursements unless another acceptable arrangement is determined by the participants.
- To the extent a partnership relies on regional, state or federal grant money to evaluate regional reliability, the grant recipients will work with the Parties to determine how priorities for regional reliability are balanced against other individual agency priorities.
- Parties agree to coordinate prior to characterization and evaluation of facilities, water rights, or water contracts owned by another Party.
- Parties undertaking specific projects identified through the Regional Partnership will cooperate in and, to the extent applicable, facilitate efforts to obtain regulatory approvals necessary to conduct demonstration and full scale projects.

ATTACHMENT 2

WORK TO BE PERFORMED BY AGENCY STAFF

Work by agency staff is necessary to prepare the BARR Plan. The table below briefly details the task(s) assigned to specific Parties:

AGENCY	WORK ASSIGNMENT
Alameda County Water District	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement
Alameda County Flood Control and Water Conservation District – Zone 7	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement
Bay Area Water Supply and Conservation Agency	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement
Contra Costa Water District	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement Lead in Grant / Funding Application Efforts
East Bay Municipal Utility District	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement Act as the Lead Agency of Behalf of the Parties for BARR Plan preparation, including serving as the administering agency on behalf of the Parties for grant / funding awards
Marin Municipal Water District	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement
San Francisco Public Utilities Commission	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement
Santa Clara Valley Water District	Adhere to the General Responsibilities as Defined in Article 7 of the Agreement

ATTACHMENT 3

FUNDING COMMITMENT

AGENCY TYPE	AGENCY	COMMITMENT (\$)
LOCAL BAY AREA WATER AGENCY	Alameda County Water District	\$50,000
	Alameda County Flood Control and Water Conservation District – Zone 7	\$50,000
	Bay Area Water Supply and Conservation Agency	\$50,000
	Contra Costa Water District	\$50,000
	East Bay Municipal Utility District	\$50,000
	Marin Municipal Water District	\$50,000
	San Francisco Public Utilities Commission	\$50,000
	Santa Clara Valley Water District	\$50,000
TOTAL	--	\$400,000

Note that additional funding for this effort is currently being sought. Any funds as may be secured shall be used in addition to, versus in substitution of, funding as provided by Partner Agencies.

ATTACHMENT 4

NOTICES

Any notice, demand, or request made in connection with this Agreement must be in writing and will be deemed properly served if delivered in person or sent by United States mail, postage prepaid, to the addresses specified below:

AGENCY	SIGNATORY AUTHORITY	DELEGATED PROJECT CONTACT	MAILING ADDRESS AND PHONE NUMBER OF DELEGATED CONTACT
Alameda County Water District	Robert Shaver	Thomas Niesar	Alameda County Water District 43885 S. Grimmer Blvd Fremont, CA 94538
Alameda County Flood Control and Water Conservation District – Zone 7	Jill Duerig	Amparo Flores	100 North Canyons Parkway Livermore, CA 94551
Bay Area Water Supply and Conservation Agency	Nicole Sandkulla	Michael Hurley	155 Bovet Road, Suite 650 San Mateo, California 94402
Contra Costa Water District	Jerry Brown	Maureen Martin	P.O. Box H ₂ O Concord, CA 94524
East Bay Municipal Utility District	Alexander R. Coate	Thomas Francis	East Bay Municipal Utility District P.O. Box 24055 Oakland, CA 94623-1055
Marin Municipal Water District	Krishna Kumar	Thomasin Grim	220 Nellen Ave Corte Madera, CA 94925
San Francisco Public Utilities Commission	Michael Carlin	Manisha Kothari	San Francisco Public Utilities Commission 525 Golden Gate Avenue San Francisco, CA 94102
Santa Clara Valley Water District	Beau Goldie	Tracy Hemmeter	Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: Flood Control

CONTACT: Joe Seto/Ted Tang

AGENDA DATE: June 17, 2015

ITEM NO. 5b

SUBJECT: Award of Contract for Embankment Slope Mowing Services

SUMMARY:

- Zone 7 currently does not have in-house equipment or adequate manpower for slope mowing along the flood control channel embankments and around the Chain of Lakes' perimeter to reduce fire danger. Therefore, Zone 7 relies on an outside contractor to perform this work.
- The existing contract with Bruce Balala Excavating for this service will expire on June 30, 2015.
- In April 2015, Zone 7 issued a request for proposals for this service and received two proposals: one from Bruce Balala Excavating and the second from H&N Enterprises.
- Proposals were reviewed by Zone 7 staff who determined that the lowest responsive and responsible bidder is Bruce Balala Excavating, with a unit price bid of \$230 per hour.
- Bruce Balala Excavating's performance under their existing contract has been satisfactory.
- The proposed contract is structured so payments will be based on actual time spent multiplied by the hourly unit price of \$230 per hour, in an amount not-to-exceed \$120,000 for FY 15/16, which may be extended for up to two additional years.

FUNDING:

The annual funding for this contract is \$115,000.00 from Fund 200 –Flood Protection Operations for the flood control facilities and \$5,000.00 from Fund 100 – Water Enterprise for a portion of the maintenance of the Chain of Lakes area.

RECOMMENDED ACTION:

Adopt the attached resolution: 1) authorizing the General Manager to negotiate and execute a contract with Bruce Balala Excavating in an amount not-to-exceed \$120,000 for FY 2015/16, 2) authorizing the General Manager to extend the contract up to two times to cover the period between July 1, 2016 to June 30, 2018 in an amount not-to-exceed \$120,000 per year plus any adjustments of the hourly rate and total in accordance with the Engineering News Record Construction Cost Index for San Francisco, and 3) authorizing the General Manager to issue change orders as and when needed in an amount not-to-exceed \$12,000 per year (10% of contract amount).

ATTACHMENTS:

- Memo providing additional background information on subject agenda item.
- Resolution

Interoffice Memo

Date: June 17, 2015
To: Jill Duerig, General Manager
From: Joe Seto, Principle Engineer
Subject: Award of Contract for Embankment Slope Mowing Service

The following provides additional background and discussion of the above referenced agenda item.

BACKGROUND:

Zone 7 owns and maintains about 37 miles of flood control channels in the Pleasanton-Dublin-Livermore area. In addition, Zone 7 has acquired undeveloped land around Lake I and Cope Lake in the Chain of Lakes area. Zone 7 performs routine maintenance activities including embankment slope mowing along the top five feet of the flood control channel embankments and around the Chain of Lakes' perimeter to reduce fire danger and to create a firebreak in compliance with Fire Codes in Pleasanton, Livermore, Dublin and the County. Since Zone 7 currently does not have the equipment or manpower to provide these services, it must rely on an outside contractor to perform the required work.

Zone 7 has an existing contract with Bruce Balala Excavating to provide this service, originally executed in June 2012. The contract allowed for two one-year extensions for a total contract term of three years. The contract is in its third and final year and will expire on June 30, 2015. The annual contract amount of \$95,000 had been fully expended in fiscal years 12/13, 13/14 and is expected to do so in 14/15.

DISCUSSION:

In April 2015, following established practices, Zone 7 issued a Request for Proposals (RFP) for embankment slope mowing services.

In response to the RFP, staff received two proposals, one from Bruce Balala Excavating and a second from H&N Enterprises. Bruce Balala Excavating's proposal is based on a unit price of \$230 per hour and H&N Enterprise's proposal is based on unit price of \$235.24 per hour.

Staff has reviewed the proposals and determined that Bruce Balala Excavating is the lowest responsive and responsible bidder with a unit price of \$230 per hour. Bruce Balala Excavating's performance under their existing contract has been satisfactory.

The proposed contract will be structured so payments will be based on actual time spent multiplied by the hourly unit price of \$230 per hour. The contract is on an as-needed basis in an amount not-to-exceed \$120,000 for FY 2015/16. The contract may be extended up to two times with the second and third years covering the period between July 1, 2016 and June 30, 2018 in an amount not-to-exceed \$120,000 per year plus any adjustments to the hourly rate and total in accordance with the Engineering News Record Construction Cost Index for San Francisco as published by McGraw-Hill Publishing Company. The increase in the contract amount from \$95,000 per year for the current fiscal year to \$120,000 per year for the next three years is due to the higher hourly unit price bid which increased from \$170 to \$230 per hour due to increased equipment and labor costs.

FUNDING:

Funding in the amount of \$115,000.00 is available from Fund 200 –Flood Protection Operations for the flood control facilities and \$5,000.00 is available from Fund 100 – Water Enterprise for a portion of the maintenance of the Chain of Lakes area.

RECOMMENDED ACTION:

Staff recommends the contract be awarded to Bruce Balala Excavating in an amount not-to-exceed \$120,000 per year beginning with FY 2015/16, which may be extended two times covering the period between July 1, 2016 and June 30, 2018 in an amount not-to-exceed \$120,000 per year plus any adjustments to the hourly rate and total in accordance with the Engineering News Record Construction Cost Index for San Francisco as published by McGraw-Hill Publishing Company.

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY
SECONDED BY

Award of Contract for Embankment Slope Mowing Services

WHEREAS, Zone 7 currently does not have in-house equipment or manpower for embankment slope mowing along the flood control channel embankments and around the Chain of Lakes' perimeter to reduce fire danger and therefore relies on outside contract services to perform this work; and

WHEREAS, following established practices, Zone 7 issued a Request for Proposals for embankment slope mowing service and received two proposals, one from Bruce Balala Excavating and the second from H&N Enterprises; and

WHEREAS, staff has reviewed the proposals and determined that the lowest responsive and responsible bidder is Bruce Balala Excavating, with a unit price of \$230 per hour.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District does hereby authorize the General Manager to negotiate and execute a contract for district-wide embankment slope mowing with Bruce Balala Excavating in an amount not-to-exceed \$120,000 based on the hourly unit price bid of \$230 per hour for the period from July 1, 2015 to June 30, 2016; and

BE IT FURTHER RESOLVED that the General Manager be authorized to extend the contract up to two times to cover the period from July 1, 2016 to June 30, 2018 in an amount not-to-exceed \$120,000 per year, adjusting the hourly rate and total annually in accordance with the Engineering News Record Construction Cost Index for San Francisco as published by McGraw-Hill Publishing Company; and

BE IT FURTHER RESOLVED that the General Manager be authorized to negotiate and issue change orders as and when needed in an amount not to exceed \$12,000 per year.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District on June 17, 2015.

By _____
President, Board of Directors



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: Facilities Engineering
CONTACT: Athena Watson/Rhett Alzona

AGENDA DATE: June 17, 2015

ITEM NO. 5c

SUBJECT: Professional Services Contract with Bluestone Engineering for Structural Engineering Support Services

SUMMARY:

- Zone 7 requires on-going structural engineering support services for the design, construction, and maintenance of Zone 7 facilities. Zone 7 staff currently does not have the in-house technical expertise to provide these services.
- The existing contract for these services expires on June 30, 2015.
- In order to more efficiently obtain these services, it is Zone 7's practice to go through the Request for Proposals process for such services at least once every three years.
- In May 2015, proposals for as-needed structural engineering support services were requested from ten firms. Two firms submitted proposals. Bluestone Engineering was found to be the best suitable firm to provide these services to Zone 7.
- The proposed initial contract is for one year. With satisfactory performance, annual contracts may be executed up to two additional times with the same firm to provide the services for a total of up to three years.
- Staff recommends that the General Manager be authorized to execute an annual professional services contract with Bluestone Engineering, for each of the next three fiscal years in an amount not to exceed \$130,000 per year.

FUNDING:

Funding is available from Fund 120 – Renewal & Replacement/System-Wide Improvements and Fund 130 –Expansion.

RECOMMENDED ACTION:

Adopt attached resolution authorizing the General Manager to negotiate and execute an annual professional services contract with Bluestone Engineering, for as-needed structural engineering support services for each of the next three fiscal years in an amount not to exceed \$130,000 each year.

ATTACHMENTS:

- Memo providing additional background and discussion of agenda item
- Exhibit A, Scope of Services
- Resolution

Interoffice Memo

Date: June 17, 2015
To: Jill Duerig, General Manager
From: Athena Watson, Associate Civil Engineer, Facilities Engineering
Subject: Professional Services Contract with Bluestone Engineering, for Structural Engineering Support Services

The following provides additional background and discussion of the above-referenced agenda item.

BACKGROUND:

Zone 7 requires on-going structural engineering support services for the planning, design, construction, and maintenance of Zone 7 facilities, such as buildings, treatment plants, groundwater wells, and pump stations. Zone 7 staff currently does not have the in-house structural engineering expertise to provide these services.

The existing Structural Engineering Support Services contract for these services expires on June 30, 2015. Services that have been provided under this contract over the past year include design and construction phase support for the PPWTP Ferric Chloride and Caustic Soda Improvements, PPWTP Clarifier Handrail Addition, design calculations for the DVWTP Centrifuge trailer pad, construction support services for the DVWTP Superpulsator Rehabilitation Project, design of improvements to Santa Rita Dougherty Pipeline vault at MGD, and review of structural design calculations for concrete pads for the PWRPA Mocho Electrical Installation Project.

In order to more efficiently obtain these services, it is Zone 7's practice to go through the Request for Proposals (RFP) process for such services at least once every three years. The initial contract is for one year. With satisfactory performance, a new annual contract may be executed up to two additional times with the same firm to provide the services for a total of up to three years.

DISCUSSION:

Zone 7 has compiled a list of projects that are identified in the current Capital Improvement Program, which will require structural engineering support services in Fiscal Years 2015/2016 to 2017/2018

In May 2015, a Request for Proposal to provide as-needed structural engineering support services was solicited from ten firms. Proposals were received from the following two firms:

- Bluestone Engineering, California
- Habitat Engineering & Forensics, California

Zone 7 staff reviewed the proposals and found Bluestone Engineering to be the most suitable to provide these services to Zone 7. The criteria used to rank the firms included qualifications and experience of personnel, services available, response time, and references. The Project Manager/Lead Structural Engineer for Bluestone Engineering previously performed on-call structural engineering services for Zone 7 while at another firm. Bluestone Engineering was rated high due to the proposed Project Manager/Lead Structural Engineer's previous experience performing similar work for Zone 7 for the last six years. The work has been satisfactory and utilizing the same Project Manager/Lead Structural Engineer provides for greater efficiency and productivity.

The Scope of Services to be performed by Bluestone Engineering on an as-needed basis is shown in Exhibit A. The Scope of Services identifies the broad range of structural engineering services and technical expertise the consultant will provide to Zone 7 to ensure the timely completion of quality projects. Payments will be based on actual time and materials charged.

FUNDING:

Funding is available from Fund 120 – Renewal & Replacement/System-Wide Improvements and Fund 130 –Expansion.

RECOMMENDATION:

Staff recommends that the General Manager be authorized to execute a professional services contract with Bluestone Engineering for each of the next three fiscal years in an amount not to exceed \$130,000 per year.

EXHIBIT A

SCOPE OF SERVICES

Annual Service Contract for Structural Engineering Support Services

The Consultant shall perform the following services on an as-needed basis:

1. Provide general structural engineering assistance to Zone 7 staff.
2. Prepare structural calculations and specifications for concrete containment structures and other miscellaneous structures.
3. Prepare drawings (usually 11 x 17 or 22 x 34 inches) using AutoCAD 2010 or AutoCAD 2013. Zone 7 will provide a sample border and logo, and the Consultant shall use the Zone 7 CAD Standards.
4. Perform site observation visits and construction inspection.
5. Provide clarifications and review of change orders.
6. Review submittals.
7. Prepare record drawings.

Zone 7 will contact the Consultant to determine the type and amount of services required for the individual projects. The Consultant will be called to the project on an as-needed basis depending on the project requirements. Execution of the Master Agreement (Contract) and Task Orders shall obligate Zone 7 to compensate the Consultant only for services provided to Zone 7 for that specific Task Order. Compensation for services will be based on Consultant's submitted fee schedule and as agreed by the Master Agreement.

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY
SECONDED BY

***Professional Services Contract with Bluestone Engineering
for Structural Engineering Support Services***

BE IT RESOLVED that the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District does hereby authorize the General Manager to negotiate and execute an annual professional services contract with Bluestone Engineering for as-needed structural engineering support services in an amount not to exceed \$130,000 for each of the next three fiscal years.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District on June 17, 2015.

By: _____
President, Board of Directors



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: FLOOD CONTROL
CONTACT: JOE SETO

AGENDA DATE: June 17, 2015

ITEM NO. 5d

SUBJECT: Joint Exercise of Powers Agreement for Aquatic Pesticides Permit Monitoring

SUMMARY:

- As part of the agency's channel maintenance program, Zone 7 requires coverage under the statewide National Pollutant Discharge Elimination System (NPDES) General Permit for the "discharge" of aquatic pesticides to waters of the United States.
- In 2003, Zone 7 entered into a Joint Exercise of Powers Agreement (JEPA) with Contra Costa County, Alameda County Public Works Agency, City of Antioch, and City of Concord to develop a monitoring and implementation plan for compliance with the permit.
- Participation in the JEPA is a cost saving measure, leveraging one consultant contract (Mike Blankinship and Associates) to provide monitoring and reporting services to multiple agencies.
- The JEPA requires each agency to pay its share of the costs and in 2004, the Board approved \$125,000 to cover Zone 7's share of the JEPA's cost of annual compliance with the NPDES permit for a period of 5 years (the original term of the permit).
- Periodic extensions and budget authorizations have been approved (2010 and 2012).
- Zone 7's continued participation in the JEPA is needed to continue coverage under the existing General Permit and authorization is needed to continue paying ongoing program costs.

FUNDING:

Funding for work under this agreement will be provided from Fund 200 - Flood Protection Operations

RECOMMENDED ACTION:

Adopt the attached resolution authorizing the General Manager to continue participation in the JEPA and pay annual program costs in an amount not-to-exceed \$35,000 per year to be paid upon presentation of invoices with proper documentation from Contra Costa County or other participating agency who serves as the administrator of the JEPA.

ATTACHMENTS:

- Memo providing additional background and discussion of agenda item
- Resolution

Interoffice Memo

Date: June 17, 2015
To: Jill Duerig, General Manager
From: Joe Seto, Principal Engineer
Subject: Joint Exercise of Powers Agreement for Aquatic Pesticides Permit Monitoring

The following provides additional background and discussion regarding the Aquatic Pesticides Permit Monitoring and Joint Exercise of Powers Agreement (JEPA).

BACKGROUND:

In March 2001, the State Water Resources Control Board adopted the statewide General National Pollutant Discharge Elimination System Permit #CAG990003, Order # 2001-12-DWQ, for the discharge of aquatic pesticides to waters of the United States. The purpose of the General Permit was to minimize the areal extent and duration of adverse impacts to beneficial uses of water bodies treated with aquatic pesticides, and to substantially reduce the potential discharger liability incurred for releasing water treated with aquatic pesticides into waters of the United States. This permit expired on January 31, 2004.

On May 20, 2004, the State Water Resource Control Board adopted the statewide General NPDES permit for Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States #CAG 990005, Order # 2004-0009-DWQ. Currently, dischargers must be covered under this 2004 General Permit to perform aquatic pesticide applications. It was expected that this permit would be a 5-year permit after which time a new permit would be developed and issued by the State Water Resources Control Board.

To assist in complying with the 2004 General Permit requirements, Zone 7 entered into a Joint Exercise of Powers Agreement (JEPA) in 2003 with Contra Costa County, Alameda County Public Works Agency, City of Antioch, and City of Concord to develop a monitoring and implementation plan. Participating in the JEPA is a cost saving measure, leveraging one consultant contract to provide monitoring and reporting services to multiple agencies.

In 2004, the Zone 7 Board approved \$125,000 to cover Zone 7's share of the JEPA's cost for annual compliance with the NPDES permit for a 5-year period. Since this time, Contra Costa County (current administrator of the JEPA) has retained Mike Blankinship and Associates (Blankinship) to provide compliance services. Contra Costa County has fronted the expenses on behalf of the JEPA group in consultation with Zone 7 and the other participating agencies to prepare and implement the requirements of the General Permit with the expectation that they will be reimbursed. Blankinship completes monitoring and testing and submits annual reports in compliance with the NPDES permit requirements. Zone 7 pays for only our fair share of the cost.

The 2004 general aquatic pesticide NPDES permit and its extensions expired on November 30, 2013. It was replaced with an updated Statewide General NPDES Permit for Residual Aquatic Pesticide Discharges from Algae and Aquatic Weed Control Applications on December 1, 2013. Zone 7 actively participated in the JEPA work group to convey the group's collective comments

to the State Water Resources Control Board during the public comment period. Zone 7 then developed the Aquatic Pesticide Application Plan to meet the new permit requirements and subsequently received approval from the State Board for our proposed aquatic pesticide application procedures and program.

DISCUSSION:

Since the new NPDES permit terms and reporting requirements are similar to the previous permit, the cost for compliance is expected to remain similar as in previous years.

To date, the Board has approved two extensions of the JEPA funding (in 2010 and 2012), for a total cost of \$275,000. See summary below.

Table 1. Summary of Board Authorizations:

Authorization	Years Covered	Amount
2004 Initial Contract Authorization	2005-06-07-08-09	\$125,000
2010 Extension	2010-11	\$60,000
2012 Extension	2012-13-14	\$90,000
Total previous authorization		\$275,000
Estimated annual program costs		\$30-35,000

The previous authorizations have since expired, and continued funding is required in order to continue Zone 7's participation in the JEPA. Staff recommends authorizing the General Manager to continue Zone 7's participation in the JEPA and approve annual funding in an amount not to exceed \$35,000.

FUNDING:

Funding for work under this agreement will be provided from Fund 200 - Flood Protection Operations

RECOMMENDATION:

Staff recommends that the Board approve the attached resolution authorizing the General Manager to continue participation in the FEPA and to pay annual program costs in the amount of up to \$35,000 per year.

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY

SECONDED BY

Extension of Joint Exercise of Powers Agreement for Aquatic Pesticides Permit Monitoring

BE IT RESOLVED that the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District does hereby authorize the General Manager to continue Zone 7's participation in the Joint Exercise of Powers Agreement (JEPA) among Contra Costa County, Alameda County Public Works Agency, Zone 7 of Alameda County Flood Control and Water Conservation District, City of Antioch, and City of Concord, and authorize funding in the amount of \$35,000 per year, to be paid upon presentation of invoices with proper documentation from Contra Costa County, or other agency, who serves as the administrator of the JEPA.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District on June 17, 2015.

By: _____
President, Board of Directors



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: ADMINISTRATIVE SERVICES

CONTACT PERSON: TOM PICO

AGENDA DATE: June 17, 2015

ITEM NO. 5e

SUBJECT: Personnel Action: Water Resources Technician II Position

SUMMARY:

- Zone 7 continues to assess the staffing needs of the Agency as we work towards a leaner, more cost-effective organizational model aligned with our goals.
- At the April 15, 2015 Board meeting the General Manager was authorized to negotiate and execute a Memorandum of Understanding with the Alameda County Public Works Agency accepting administrative function, powers and duties of the Well Ordinance.
- The agency would benefit by adding one Water Resources Technician position to existing staff; this position was approved and funded as part of the FY 15/16 budget.
- This position will be implementing County permit fees and will generate revenue which will be deposited into Fund 100-Water Enterprise to fund the Well Ordinance program.
- There is no change to the existing salary schedule.
- Funding is not required as funding was approved in the Budget for Fiscal Year 2015/16.

FUNDING:

We are requesting the authorization for one additional position. Funds exist in the FY 15/16 budget.

RECOMMENDED ACTION:

Staff recommends that the Board adopt the attached Resolution to (1) approve the addition of one classification at the existing salary schedule; (2) authorize the General Manager to approve and sign the salary schedule for this position; and (3) authorize the Auditor-Controller of Alameda County to draw the necessary payroll warrants from Zone 7 funds in accordance with the adopted schedule.

ATTACHMENT:

Zone 7 Board Resolution

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY
SECONDED BY

BE IT RESOLVED that the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District does hereby approve the following personnel action:

Approve one additional position of Water Resources Technician II, Zone 7

BE IT FURTHER RESOLVED that the General Manager of Zone 7 is hereby authorized and directed to approve and sign the salary schedule for this position; and

BE IT FURTHER RESOLVED that the Auditor-Controller of Alameda County is authorized and directed to draw the necessary payroll warrants from Zone 7 funds in accordance with the adopted schedule.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District on June 17, 2015.

By: _____
President, Board of Directors



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: ADMINISTRATIVE SERVICES
CONTACT: GINGER STATON/TOM PICO

AGENDA DATE: June 17, 2015

ITEM NO. 6a

SUBJECT: April Employee of the Month Recognition

SUMMARY:

The Employee Recognition Program Nomination Committee met in May and selected the Employee of the Month for April 2015 according to the established Program Guidelines. The individual chosen out of the submitted nominations is then recommended to Management for approval and there is a subsequent announcement of the selection to all Agency employees.

Boni Brewer, Communications Specialist, has been chosen from those nominated as the April 2015 Employee of the Month. Boni joined Zone 7 in July 2006 and works in the Employee Services Section at North Canyons.

Boni was nominated for her conscientiousness, diligence and skill working on multiple projects and with all levels of individuals. Boni provides a variety of public outreach and community relations for the agency. She works diligently to represent what is newsworthy both internal and external to the agency, working closely with employees and civic leaders. Boni promotes awareness of our agency goals, projects, environmental activities and programs through internal publications, external brochures and newsletters and our Zone 7 internet.

As noted in the nomination, even with a multitude of projects and activities, Boni gladly gives her time and expertise to employee events including the Summer Pool Party, the Pitmaster Barbecue, and the Holiday Potluck. Boni takes pride in her work and is a positive member of the Zone 7 team.

The committee seconded the recommendation and recognized Boni as a valuable employee and asset to Zone 7, with management approving the selection.

RECOMMENDED ACTION:

It is recommended that the Zone 7 Board of Directors recognize and congratulate Boni Brewer as April 2015 Employee of the Month.



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: GROUNDWATER SECTION

CONTACT: Tom Rooze/Matt Katen

AGENDA DATE: June 17, 2015

ITEM NO. 7

SUBJECT: Nutrient Management Plan

SUMMARY:

- Staff has completed a draft Nutrient Management Plan for the Livermore Valley Groundwater Basin documenting Zone 7's plan to address high nutrient concentrations in groundwater. The existing Salt Management Plan (SMP) for the Groundwater Basin was adopted by the Zone 7 Board and approved by the Regional Water Board in 2004.
- The NMP evaluates current and future nutrient loading (primarily nitrogen) from a comprehensive list of potential nutrient sources for the Main Groundwater Basin and its fringe sub-basins, and finds that in general, ongoing nutrient loading from planned recycled water use increases will not cause a significant impact to groundwater quality in the Groundwater Basin.
- The NMP also identifies ten (10) localized Areas-of Concern that historically have had high groundwater nitrate concentrations, and addresses them with plans for further investigation and continued use of Best Management Practices (BMPs) for nutrient source management and reduction.
- In addition, the NMP recommends special permitting criteria for new onsite wastewater treatment systems (OWTS) within the five (5) unsewered Areas-of-Concern.
- The draft Nutrient Management Plan (NMP) for the Livermore Valley Groundwater Basin presented at the February 2015 Zone 7 Board Meeting has been revised based on comments received at the board meeting and from the Regional Water Board, Alameda County (Environmental Health and Community Development) and Water Resources Committee since the board meeting.
- The primary revisions made to the February 2015 version include: 1) provide additional information and clarification for the analyses, conclusions and recommendations as requested by the Water Board and the two county agencies, and 2) Require existing failed OWTS systems to be upgraded to meet County Regulations.
- The changes made to the draft NMP were reviewed publicly at the Zone 7 Water Resources Committee (WRC) meeting on June 9, 2015, where the WRC, Water Board, and County staff provided support for the revised draft NMP.
- The revised draft NMP Executive Summary is attached, and the full revised draft report is available on the Zone 7 website: www.zone7water.com.

FUNDING:

The Nutrient Management Plan effort is funded from Fund 120 – Renewal Replacement and System-Wide Improvements (70%) and Fund 130 – Expansion (30%).

RECOMMENDED ACTION:

Adopt the attached resolution approving and adopting the Nutrient Management Plan as an addendum to the existing Groundwater Management Plan for the Livermore Valley Groundwater Basin.

ATTACHMENTS:

Resolution
Executive Summary of the Nutrient Management Plan

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY

SECONDED BY

Approving and Adopting the Nutrient Management Plan

WHEREAS, in 2009 the State Water Resources Control Board adopted a Recycled Water Policy that requires Salt/Nutrient Management Plans (SNMPs) be completed for all groundwater basins in California that did not already have Salt Management Plans; and

WHEREAS, Zone 7 completed a Salt Management Plan (SMP) for the Livermore Valley Groundwater Basin in 2004 that was approved by the Regional Water Quality Control Board – San Francisco Region on September 24, 2004; and

WHEREAS, the Livermore Valley Groundwater Basin is currently subject to a Groundwater Management Plan adopted by Zone 7 pursuant to its authority under the California Groundwater Management Planning Act (Water Code Sections 10750, et seq); and

WHEREAS, Water Code section 10753.7 requires the agency implementing a Groundwater Management Plan to include components relating to the monitoring and management of groundwater quality, and directs agencies to work cooperatively to achieve that objective; and

WHEREAS, Zone 7 recently developed a draft Nutrient Management Plan (NMP) to amend its existing SMP thus satisfying the State requirement for a SNMP with the combination of the two management plans; and

WHEREAS, the NMP was developed with input from the San Francisco Bay Regional Water Quality Control Board (RWQCB), Alameda County Environmental Health (ACEH), Alameda County Community Development Agency (Alameda CDA), Zone 7's Retailers (City of Livermore, DSRSD, City of Pleasanton, California Water Service), local septic tank owners, and other interested parties between 2013 and 2015; and

WHEREAS, the NMP estimates that average nitrate concentrations are below the Basin Objective and are not expected to increase significantly during or following the buildout of the Valley's population; and

WHEREAS, the NMP recommends the continued use of existing "best management practices" for fertilizer application, recycled water irrigation, livestock manure management, and winery wastewater disposal as protective measures; and

WHEREAS, the NMP identifies ten (10) localized 'Areas of Concern' where nitrate concentrations in groundwater exceed the Maximum Contamination Limit (MCL) for drinking

water in California and the RWQCB's Basin Plan Objective for the Livermore Valley Groundwater Basin; and

WHEREAS, the NMP recommends that in the development of the Local Area Management Plan (LAMP) ACEH incorporates special onsite wastewater treatment system (OWTS) permit requirements in five (5) of the 'Areas of Concern,' where wastewater disposal continues to be accomplished using OWTS, aimed at reducing the current nutrient loading in these areas over time; and

WHEREAS, a Notice of Exemption per the California Environmental Quality Act (CEQA) guidelines has been prepared and filed for the project.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District does hereby approve and adopt the February 2015 Nutrient Management Plan as the basis for Zone 7's nutrient management policy for future activities; and

BE IT FURTHER RESOLVED that the Board amends the existing Groundwater Management Plan for the Livermore Valley Groundwater Basin to incorporate the February 2015 Nutrient Management Plan; and

BE IT FURTHER RESOLVED that the General Manager is authorized to establish a rebate program to offset a portion of the incremental cost of installing an advanced system with nitrogen treatment in the Areas of Concern when no capacity is being added that is consistent with approved budgets.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

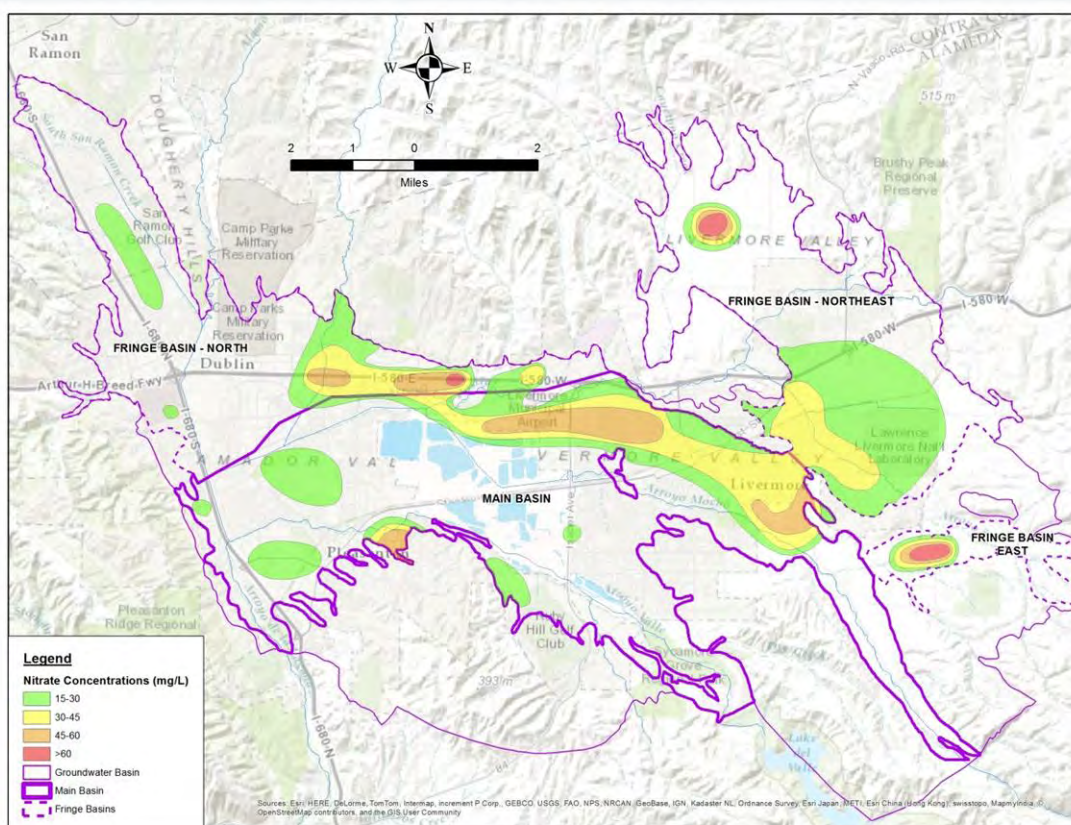
I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District on June 17, 2015.

By: _____
President, Board of Directors

NUTRIENT MANAGEMENT PLAN

LIVERMORE VALLEY GROUNDWATER BASIN

June 2015



PREPARED BY:

ZONE 7 WATER AGENCY
100 North Canyons Parkway
Livermore, CA 94551
(925) 454-5000

PREPARED BY:

ZONE 7 WATER AGENCY STAFF

Matt Katen, P.G. – *Principal Geologist*
Tom Rooze, P.G. – *Associate Geologist*

Contributors:

Jill Duerig, P.E. – *General Manager*
Kurt Arends, P.E. – *Assistant General Manager*
Jarnail Chahal, P.E. – *Engineering Manager*
Colleen Winey, P.G. – *Assistant Geologist*



ES Executive Summary

ES 1 Background

This Nutrient Management Plan (NMP) was developed for the Livermore Valley Groundwater Basin (California Department of Water Resources [DWR] Basin No. 2-10) by the Zone 7 Water Agency (Zone 7).

The NMP provides an assessment of the existing and future groundwater nutrient concentrations relative to the current and planned expansion of recycled water projects and future development in the Livermore Valley. The NMP also presents planned actions for addressing positive nutrient loads and high groundwater nitrate concentrations in localized Areas of Concern where the use of onsite wastewater treatment systems (OWTS) (i.e., septic tank systems) is the predominant method for sewage disposal.

The NMP was prepared as an addendum to Zone 7's Salt Management Plan (SMP) which was adopted by the Zone 7 Board of Directors in 2004 to address salt loading in the groundwater basin and to fulfill the requirements of the joint Master Water Recycling Permit (Order No. 93-159) and General Water Reuse Order (General Order No. 96-011). Because the SMP was incorporated into Zone 7's Groundwater Management Plan (GWMP) for the Basin in 2005, the NMP is now also incorporated into Zone 7's GWMP. This NMP is exempt from the California Environmental Quality Act, and a notice of exemption has been filed with the Alameda County Clerk-Recorder.

The State Water Resources Control Board (State Water Board) adopted a Recycled Water Policy in 2009 (State Water Board Resolution No. 2009-0011) and an amendment to the policy in 2013 (State Water Board, Resolution No. 2013-0003) to encourage and facilitate the increased use of recycled water statewide. The policy requires among other things, that Salt/Nutrient Management Plans (SNMP) be completed for all groundwater basins in California. With the addition of this NMP, Zone 7's SMP is akin to the SNMP required by the State's Recycled Water Policy.

The NMP was developed with support and input from the San Francisco Bay Regional Water Quality Control Board (Water Board), Alameda County Environmental Health Department (ACEH), Alameda County Community Development Agency (Alameda CDA), Zone 7's Retailers (City of Livermore, City of Pleasanton, Dublin San Ramon Services District [DSRSD], and California Water Service), and other stakeholders and interested public. For this purpose, several meetings were held with these stakeholders between June 2013 and June 2015.



ES 2 Groundwater Basin Characteristics and Nitrate Concentrations

The Livermore Valley Groundwater Basin is an inland alluvial basin underlying the east-west trending Livermore-Amador Valley (Valley) and Livermore Uplands in northeastern Alameda County. For this NMP, the groundwater basin has been divided into four basin areas:

- Main Basin
- Fringe Basin North
- Fringe Basin Northeast
- Fringe Basin East

The Main Basin has been further divided into an upper and lower aquifer. The Main Basin is a portion of the groundwater basin that contains the highest yielding aquifers and generally the best quality groundwater. It is an important source of drinking water for the communities that overlie it. The fringe basins contain slightly higher salinity water and generally yield low quantities of water to wells. Some groundwater flows from the Fringe Basin North into the Main Basin aquifer where it comeslingles with Main Basin groundwater, but it is believed that very little of the groundwater in the two eastern fringe basins comeslingles with Main Basin groundwater. The aquifers beneath the Livermore upland areas south of Livermore and Pleasanton typically only yield small amounts of groundwater to wells, and are not expected to be impacted by existing or planned recycled water projects, therefore, with the exception of the high OWTS use area of unincorporated Happy Valley, the upland portion of the groundwater basin is not addressed in this plan. The locations of the groundwater basin areas and Happy Valley are shown below in Figure ES-1.

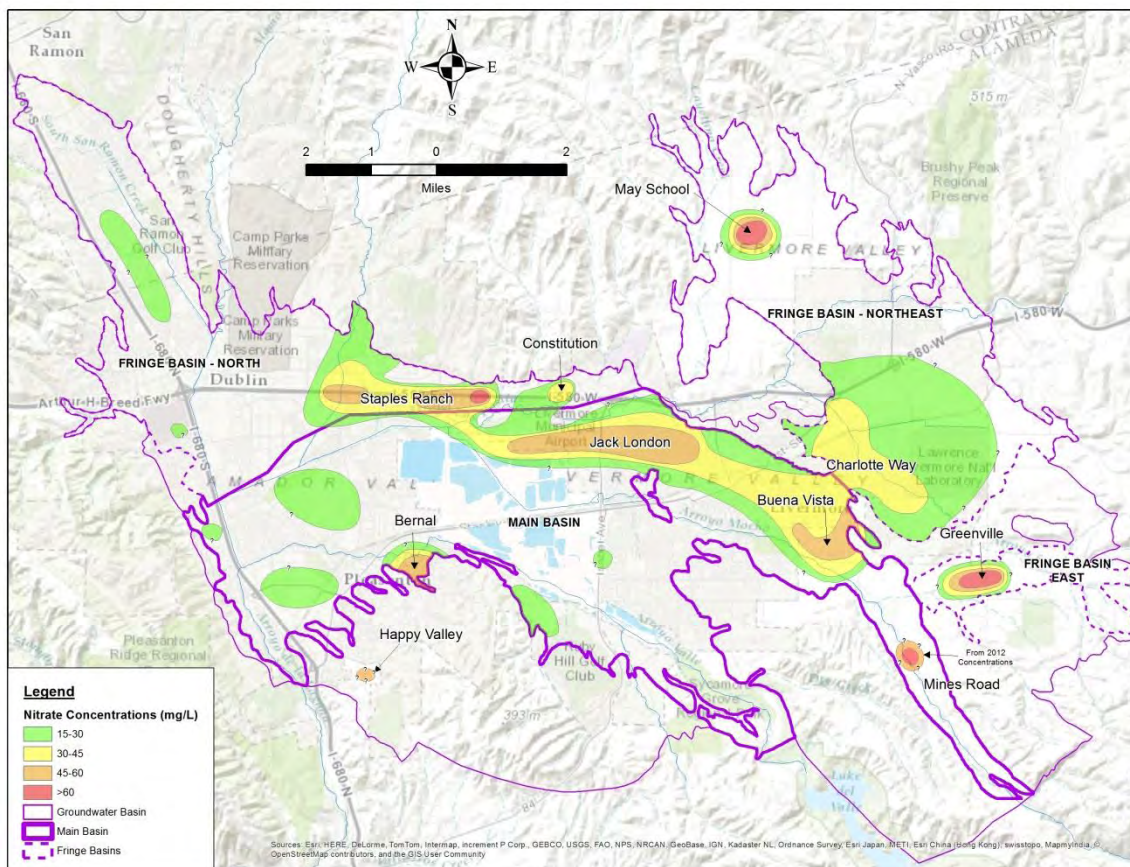
Zone 7's GWMP program monitors groundwater quality throughout the basin areas. Of the two main groundwater quality parameters being monitored as nutrient contamination indicators (nitrate and phosphate), only nitrate has been detected at significant concentrations in the basin areas. The Basin Objective (BO) for nitrate in groundwater is 45 mg/L (measured as NO_3) or less for all of the NMP basin areas (*California State Water Board, 2011*). This is the same value adopted by the California Department of Health as the maximum contamination limit (MCL) for drinking water.

Average nitrate concentrations (as NO_3) in the Main and Fringe Basins range from 11 mg/L to 15 mg/L. Assimilative capacity, which represents the capacity of a groundwater basin to absorb pollutants, is calculated by subtracting the average concentration from the BO. The assimilative capacities of the basins range from 30 to 34 mg/L. While average nitrate concentrations in the basin areas are below the BO, and ample assimilative capacity exists in each basin area for nitrate, there are ten localized Areas of Concern within the groundwater basin that have nitrate concentrations above the BO (see *Figure ES-1* below). These ten "hot spots" are believed to be vestiges of past agricultural land uses and processes, and former municipal wastewater and sludge disposal practices; however, five of the areas are outside of municipal Urban Growth Boundaries where sewage disposal continues to be by OWTS. They are:

- Happy Valley
- Buena Vista
- Mines Road
- May School
- Greenville



Figure ES-1: Nitrate Concentrations (Upper Aquifer) and Areas of Concern



ES 3 Nutrient Loading Evaluation

Nitrate contamination in groundwater supplies is typically the result of nitrogen-containing compounds being leached from the surface or soil column and mixing with the ambient groundwater. Nitrogen exists in the environment in many forms and can change forms as it moves through the soil. Sources of nitrogen loading include: fertilizers used on croplands, parks, golf courses, lawns, and gardens; sewage and other wastewaters disposed of onsite; decaying vegetation and other organic materials; animal manure and urine from pastures, animal enclosures, and other livestock boarding facilities; and nitrogen-fixing crops such as alfalfa, clover and vetch.

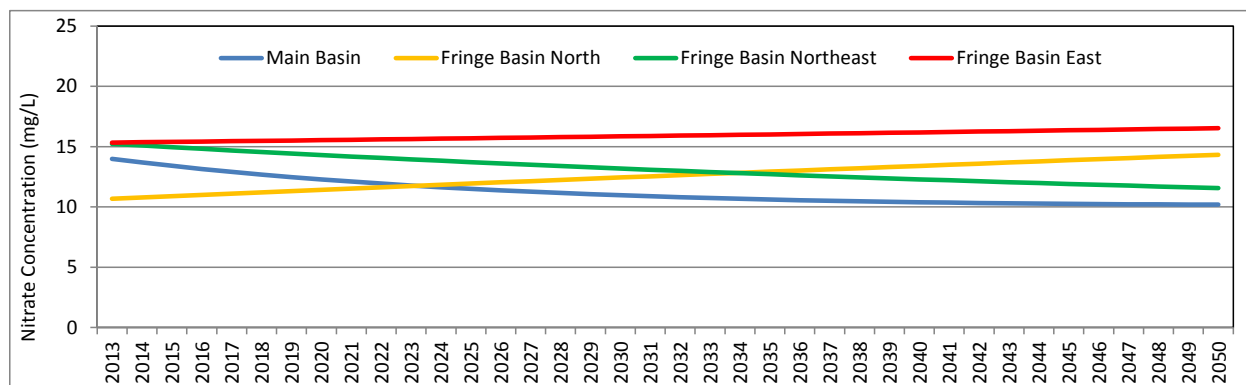


Within the soil zone, nitrogen compounds readily convert to ammonium and nitrate and/or are lost to volatilization, plant uptake and denitrification processes. Because nitrate is highly leachable and readily moves with water through the soil profile, excessive rainfall or over-irrigation will cause nitrate to leach below the plant's root zone and may eventually mix with groundwater.

Groundwater nitrate concentrations are good indicators of nutrient contamination, and graphing concentrations versus time can indicate whether nitrate conditions are changing or stable, however this NMP uses estimates of nitrogen loading from various identified sources to help evaluate whether nitrate concentrations will rise or decrease in the long-term. For this effort, annual nitrogen loading from each known source was estimated and summed spatially using geographic information systems (GIS) software. The results were then applied to a Zone 7-developed spreadsheet model to predict future nitrate concentrations for each basin area, taking into account planned land use changes and expansions of recycled water use.

The model results predict that average nitrate concentrations will decrease over time in the Main and Northeast Fringe basin areas, and will increase only slightly in the North and East fringe basin areas. The incremental increases in predicted nitrate concentrations due to the planned recycled water use expansions (shown on *Figure 3-14* and *Figure 4-1*) in the Main and Northeast Fringe basin areas are less than 1 mg/L over the 37 year model period, or about 3% of the assimilative capacity for these two areas. The future average total nitrate concentrations as predicted by the Zone 7 model are summarized by basin area in *Figure ES-2* below:

Figure ES-2: Projected Nitrate Concentrations by Basin





ES 4 Antidegradation Analysis

The State Water Board's Recycled Water Policy requires SNMPs to include an antidegradation analysis demonstrating that the recycled water projects included within the plan will, collectively, satisfy the requirements of State Water Board's "Antidegradation Policy" (Resolution No. 68-16). The antidegradation analysis for the Livermore Valley Groundwater Basin is summarized below in *Figure ES-3*:

Figure ES-3: Antidegradation Assessment

State Water Board Resolution No. 68-16 Component	Antidegradation Assessment
<i>Water quality changes associated with proposed recycled water project(s) are consistent with the maximum benefit of the people of the State.</i>	The irrigation projects will: • contribute only a minimal increase (< 1 mg/L) in groundwater nitrate concentrations at urban buildout. • will not use more than 20% of the available Assimilative Capacity • will not cause groundwater quality to exceed Basin Plan Objectives
<i>The water quality changes associated with proposed recycled water project(s) will not unreasonably affect present and anticipated beneficial uses.</i>	
<i>The water quality changes will not result in water quality less than prescribed in the Basin Plan.</i>	
<i>The projects are consistent with the use of best practicable treatment or control to avoid pollution or nuisance and maintain the highest water quality consistent with maximum benefit to the people of the State.</i>	Because all planned recycled water projects over the groundwater basin are landscape irrigation projects, most of the nitrogen from these projects will be removed by plant uptake and volatilization (and some by bacterial denitrification under certain conditions). Additional nitrogen loading will be avoided with the continued use of recycled water and fertilizer use best management practices (BMPs) (<i>Section 6.1</i>)
<i>The proposed project(s) is necessary to accommodate important economic or social development.</i>	The recycled water projects are crucial for continued sustainability of the Valley's water supply and are part of the urban growth plans for Cities of Dublin, Livermore, and Pleasanton.
<i>Implementation measures are being or will be implemented to help achieve Basin Plan Objectives in the future.</i>	Both, the SMP and the NMP contain measures that have been or will be implemented to address current and future salt and nutrient loading of the Groundwater Basin.



ES 5 Nutrient Management Goals and Strategies

Although overall basin groundwater quality is not expected to degrade significantly due to ongoing and anticipated future nutrient loading, there is still a need to further assess, reduce or manage, and monitor nutrient loading to make sure that new high nitrate areas are not created by poor waste management practices or over application of fertilizers and irrigation waters. In general, the NMP's short-term goals are to improve the understanding of current and historical nutrient impacts to the groundwater basin, and to minimize current and future nutrient loading while allowing for a reasonable amount of new loading from rural development and recycled water use increases. The long-term goal is to meet Basin Objectives in all parts of the groundwater basin.

The NMP strategies for achieving these goals include promoting the continued use of “best management practices” (BMPs) requirements aimed at minimizing nutrient loading from certain land uses (i.e., irrigated and fertilized turf and landscapes, confined livestock operations, vineyards and wineries). The NMP also promotes the enforcement of current County OWTs regulations and Zone 7 Wastewater Management policies and the future development and implementation of ACEH's Local Area Management Program (LAMP) to minimize nutrient loading from current and future development in unsewered areas of the basin. In order to address the localized high nitrate conditions in the Areas of Concern, the NMP advocates an adaptive management strategy that begins with:

- 1) Increasing the understanding of the extent and source(s) of the high nitrate concentrations in the Areas of Concern, and adjusting Area of Concern boundaries as appropriate;
- 2) Requiring new development projects within the unsewered Areas of Concern to minimize, or when practical, reduce the overall nutrient loading on the project parcel by installing only new advanced OWTs with nitrogen-reducing treatment; and
- 3) Continuing the monitoring of the nitrate concentrations and the success of these actions to reduce them.

Figure ES-4, below, provides a summary of the nutrient loading-specific goals for the active sources and the strategies developed to achieve the specific goals.



FIGURE ES-4
SUMMARY OF GOALS AND STRATEGIES
NUTRIENT MANAGEMENT PLAN

Goals	Strategies
Investigate Areas of Concern	
Goal 1: Obtain additional information in shallow aquifer zones of the Areas of Concern	Strategy 1a: Identify and sample additional existing domestic supply wells. Strategy 1b: Encourage additional hydrogeology studies in Areas of Concern as part of new commercial developments.
Fertilizer Application	
Goal 2: Minimize nitrogen loading from fertilizer application using BMPs	Strategy 2a: Promote the use of fertilizer BMPs (Section 6.1.2) to avoid over-application of fertilizers. Using results of soil and irrigation water chemical testing to determine the appropriate amount of additional fertilizer to apply is a good way to lessen excess leachable nitrogen in the soil. Strategy 2b: Limiting irrigation water application to the crop and landscape plants' agronomic rate will reduce the amount of nutrient-rich leachate that migrates below the vegetation root zone and into the underlying aquifer(s).
Recycled Water Irrigation	
Goal 3: Minimize nitrogen loading from recycled water irrigation projects	Strategy 3a: Follow Recycled Water Policy guidance for landscape irrigation projects. Minimize recharge of nitrogen by irrigating landscapes to the prescribed agronomic rates. Account for the nitrogen content of the recycled water when determining how much fertilizer to apply. Strategy 3b: Maintain low levels of nitrogen in the produced recycled water by keeping the nitrogen concentrations in the source water low and/or optimize low nitrogen levels in recycled water production.
Livestock Manure Management	
Goal 4: Minimize nitrogen loading from concentrated livestock facilities such as horse boarding, training, and breeding facilities	Strategy 4: Promote the use of BMPs (Section 6.1.4) such as manure management and controlling site drainage to prevent nutrient contamination of rainfall runoff and irrigation return flows that may percolate to groundwater and/or flow into surface water bodies.
Winery Process Wastewater	
Goal 5: Minimize nitrogen loading from onsite disposal of winery process wastewater	Strategy 5a: Require local wine producers and bottlers to apply for and comply with RWQCB WDRs for the proper treatment and disposal of winery process waste streams. Strategy 5b: Develop guidance document(s) to assist both project proponents and RWQCB staff with Report of Waste Discharge (ROWD) and WDR development and evaluations.
Septic Tanks - Outside Areas of Concern	
Goal 6: Minimize nitrogen loading from new onsite wastewater treatment systems (OWTS), e.g., septic tank systems.	Strategy 6a: Continue applying Zone 7 policies and County Ordinance and Regulation provisions, e.g., 1 Rural Residential Equivalence (RRE)/5 Ac max. Strategy 6b: Continue to work with ACEH to ensure that: 1) they are aware of groundwater nitrate issues in the Livermore Valley Groundwater Basin; 2) that variance requests are given the appropriate scrutiny; and 3) their OWTS approvals are consistent with adopted NMP goals and objectives.
Septic Tanks - Inside Areas of Concern	
Goal 7: Reduce nitrogen loading from OWTS in Areas of Concern	Strategy 7a: Increase understanding of existing conditions and causes, and set realistic management goals and apply adaptive management as necessary. Strategy 7b: Require new development projects utilizing OWTS in the Areas of Concern to reduce and/or minimize the overall nitrogen loading to the property. Strategy 7c: On at least an annual basis, assess performance of wastewater treatment systems, estimate area-wide nitrogen loading and monitor groundwater quality beneath the Areas of Concern.
Enhanced Attenuation	
Goal 8: Increase capture and infiltration of stormwater recharge to dilute and attenuate nitrate concentrations in groundwater	Strategy 8: Promote the use of Low Impact Development (LID) BMPs to capture and infiltrate rainfall runoff and irrigation return flow

ACEH = Alameda County Environmental Health
 BMPs = Best Management Practices

RWQCB = Regional Water Quality Control Board



ES 6 Plan Implementation

Zone 7 plans to simultaneously refine the extent of the Areas of Concern and minimize nitrogen loading from existing sources. To further characterize the range and size of nitrate contamination, Zone 7 will work with ACEH and CDA on encouraging or requiring hydrogeologic studies as part of new commercial developments, and with existing well owners to sample existing shallow wells for nitrate, and with permittees planning new wells or soil borings near Areas of Concern to include electronic logs (elogs) and/or groundwater sampling in their construction plans.

To minimize nitrogen loading from existing sources, the NMP encourages continued use of existing BMPs to minimize groundwater impacts from fertilizer and recycled water applications, livestock manure, and winery wastewater. Landscape and agriculture management industries promote careful metering of fertilizers and irrigation water as cost savings measures as well as environmental preservation measures. The State's Recycled Water Policy has built in prohibitions for over application and runoff of recycled water. Permitted livestock facilities, such as commercial equine boarding facilities, typically have requirements for active manure management conditioned in their County-issued Conditional Use Permits (CUP). Likewise, onsite treatment and disposal (or recycling) of industrial wastewater such as that generated by winemaking processes, requires a waste discharge permit from the Water Board which often contains provisions for minimizing and monitoring the nutrient loading from the onsite operations. The NMP also encourages continued use of existing Low Impact Development (LID) BMPs to increase the capture and infiltration of stormwater in order to help attenuate nitrate concentrations in groundwater. With continued implementation of these BMPs, future nitrate concentrations are projected to remain below 20% of the assimilative capacities calculated for each of the four Livermore Valley Groundwater Basin areas.

Continued application of these BMPs also helps to minimize nutrient loading in the high nitrate Areas of Concern. In the five Areas of Concern that are within sewerage areas, fertilizer and recycled water use BMPs are important for keeping nitrogen loading low, whereas fertilizer use and manure management BMPs and Waste Discharge Requirements for wineries help prevent nitrate concentrations from worsening in the five Areas of Concern that are in the unincorporated portions of the Valley. However, because there is potential for onsite disposal of residential and commercial sewage to be a significant nitrogen loading component in the five unincorporated Areas of Concern, the NMP recommends implementing additional OWTS performance measures that will, at a minimum, prevent nitrogen loading from OWTS from increasing, and in the long term, should help decrease the loading in these nitrate "hot spots."

The recommended OWTS design criteria for new development in the five Areas of Concern that are outside municipal urban growth boundaries are summarized below in *Figure ES-5*. These criteria are designed to minimize nitrogen loading from new OWTS use and reduce existing loading in the five Areas of Concern over time by replacing conventional OWTS with new treatment systems when the opportunities arise.



The NMP recommends that the special OWTS permit requirements described in *Figure ES-5* be incorporated into the LAMP, which ACEH anticipates completing a draft by 2016, and finalizing it by 2018.

Figure ES-5: Proposed OWTS Requirements Inside Areas of Concern

OWTS Scenario	Parcel Size	New Requirement	Max Nitrogen Loading Rate ²
New, upgraded or replacement OWTS required by County OWTS Ordinance ¹	≤ 7 acres	Must install/upgrade/replace with code-compliant nitrogen-reducing system(s).	23.8 lbs/year Per Parcel
	> 7 acres	Must install/upgrade/replace with code-compliant nitrogen-reducing system(s) OR Prepare hydrogeologic study that assesses current groundwater nitrate conditions beneath the site and demonstrates that nitrate concentration of total onsite recharge³ does not exceed 36 mg/L (80% of MCL) or the maximum concentration at the site, whichever is lower.	3.4 lbs/year Per Parcel Acre 6.8 lbs/year Per Parcel Acre

¹ Does not apply to existing, properly-working, and properly-sized OWTS

² Loading rates calculated based on 1 RRE = 34 lbs/yr

³ Assume that 18% of rainfall naturally recharges to groundwater unless study demonstrates otherwise.

Zone 7 has a comprehensive water resources monitoring program in place as part of its GWMP. Monitoring elements include groundwater level monitoring, groundwater quality sampling, and climatological, surface water, land use, and wastewater and recycled water monitoring. Zone 7 will continue to use the data collected as part of these monitoring program elements to refine the nitrate concentration maps, Area of Concern boundaries, and the extent of the special OWTS permitting areas.

Zone 7 will identify data gaps and suggested locations and depths for new monitoring wells and/or soil borings for expedited groundwater sampling in the Areas of Concern. Zone 7 will provide this information to property owners and developers to assist in developing efficient strategies for fully characterizing nitrate concentrations and nitrogen loading for projects inside Areas of Concern. Zone 7 will also work with ACEH to develop an OWTS monitoring plan that may require the installation of additional monitoring wells up-gradient and down-gradient of the areas with high nitrate concentrations by the owners and developers.

NMP-related monitoring results will be reported along with other groundwater sustainability and management information in Zone 7's annual Groundwater Management Program reports. Minor updates to the SMP/NMP will also be reported in the annual reports. As the assigned Groundwater Sustainability Agency for the groundwater basins located within its service areas, Zone 7 plans to incorporate the then current SMP/NMP into a Sustainable Groundwater Management Plan for the Livermore Valley Groundwater Basin before the due date of January 31, 2022.



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: Water Operations & Maintenance

CONTACT: Gerald DeWitt/Barry Ivy

AGENDA DATE: June 17, 2015

ITEM NO. 8

SUBJECT: Solid Waste Disposal Contract with Altamont Landfill and Resource Recovery Facility

SUMMARY:

- Zone 7 has an on-going need to contract with a landfill disposal site for disposing of the dried sludge produced as a byproduct of water treatment plant processes. The water treatment plants generate approximately 6,000 tons of treatment residuals (sludge) per year.
- Zone 7 also needs a disposal site for approximately 1,400 tons of Chain of Lakes debris and flood control channel debris and silt.
- Zone 7 has a current solid waste disposal contract with Republic Services, Inc., which expires on June 30, 2015.
- Proposals were solicited from Altamont Landfill and Resource Recovery Facility and Republic Services (Vasco Landfill).
- Altamont Landfill and Resource Recovery Facility quoted the lowest rates.
- Staff recommends approval of a services contract with Altamont Landfill and Resource Recovery Facility in an amount not-to-exceed \$225,000 for FY 2015/16 with the ability to approve up to two additional annual contracts for the period through FY 2017/18.

FUNDING:

Funding is available from Fund 100 – Water Enterprise and Fund 200 – Flood Control.

RECOMMENDED ACTION:

Staff recommends that the Board approve the attached resolution authorizing the General Manager to negotiate and execute a new contract with Altamont Landfill and Resource Recovery Facility for landfill disposal services for fiscal year 2015/2016 in an amount not-to-exceed \$225,000 and up to two additional annual contracts, each for up to \$225,000 plus up to a 3% increase per year in the contract amount to account for inflationary cost increases.

Interoffice Memo

Date: June 17, 2015
To: Jill Duerig, General Manager
From: Gerald DeWitt, Maintenance Manager
Subject: Solid Waste Disposal Contract with Altamont Landfill

The following provides additional background and discussion on the above-referenced agenda item.

BACKGROUND:

Zone 7 has continuous need for a solid waste disposal site for dried sludge and for flood control channel debris and silt and for refuse from maintenance activities at Zone 7 facilities. The majority of the waste material consists of sludge solids from the Del Valle and Patterson Pass Water Treatment Plants.

Water treatment solids derive from flocculants, polymers and powdered carbon, which are added to the water during the treatment process. As the treatment proceeds, particles of dirt from the water along with those additives are removed in the form of a dilute waste stream. This dilute stream of around 1% solids is concentrated through additional settling. The waste stream is concentrated in a thickener or equivalent facility to feed directly into a centrifuge. The centrifuge produces a product that is 20-25% solids. When a centrifuge is off line, the thickener may discharge a less concentrated waste stream to the solar drying beds as an interim measure.

Then sludge material is disposed at the landfill, where the disposal cost is determined by weight. The dryer the sludge, the less we pay for an equal volume. Through study, staff has determined that the extra work and expense to dry the sludge as thoroughly as practical (up to 75% solids), is offset by the reduced cost of hauling (less volume when dry) and disposal (less weight when dry).

When using solar drying beds, depending on wind, weather and plant production, solar drying beds can require a significant amount of time to dry without assistance. Simple solar and wind drying may take 3 months or longer. That being the case, a Bobcat tractor equipped with an auger is used to turn the wet sludge to reduce drying time. Once the sludge is dry enough to move with a backhoe, it is removed from a bed. It may be hauled directly to the landfill or moved to an open area at the plant and spread for additional drying. To address the limits of our drying beds we have supplemented our operation with centrifuges. Operation of the centrifuges successfully takes much of the load off the solar drying beds. We installed and began operation of a new centrifuge at the DVWTP this past year to reduce costs of contracting this service out. We still use a contractor-supplied and-operated centrifuge at PPWTP/PPUF. When in operation, a centrifuge produces a few tons of sludge at 20-25% solids per day. The material must be moved to allow space for additional material under the conveyor outfall, usually every one to two days. The material is stockpiled or spread for additional drying in the same area as sludge from the drying beds. Once the spread sludge has had time to dry thoroughly, the material may be piled to make room for additional sludge and hauled off later or loaded directly into a dump truck for hauling to the landfill.

DISCUSSION:

The Del Valle and Patterson Pass Water Treatment Plants generate about 6,000 tons of sludge per year combined. Zone 7 provides sludge management to dry the sludge from less than 2 percent solids (98% liquid) to as much as 75 percent solids (25% liquid) before disposal. Additionally, it is estimated that flood control activities will need to dispose of about 1,400 tons of flood control channel debris and silt in the coming year.

The approximate costs associated with sludge disposal are shown below.

Sludge drying (including centrifuge use, drying bed operations, and handling)	\$950,000
Sludge hauling to landfill	\$ 50,000
Landfill disposal fees	\$115,000

Two landfill operations serve Alameda County and the Livermore Valley: Republic Services, Inc. (Vasco Road Landfill) and Altamont Landfill and Resource Recovery Facility. The landfill operators compete on prices for disposal of waste material. To obtain the best value, Zone 7 solicits bids from both landfill operators. The prices quoted by each landfill are shown below along with the estimated total annual cost-assuming disposal of 6,000 tons of sludge (moisture content less than 25%) and 1,400 tons of debris.

Type of Material	Republic Services	Altamont Landfill
Sludge:		
Moisture content less than 25%	\$ 23.50	\$ 18.99
Other (Chain of Lakes & F.C. Debris)	\$ 75.00	\$ 65.00
ESTIMATED ANNUAL COST	\$ 246,000	\$ 204,900

Based on the cost comparison of the two proposals, staff recommends contracting with Altamont Landfill and Resource Recovery Facility, for landfill disposal services. A total contract amount of \$225,000 is recommended to accommodate up to a 10% variation in the estimated material quantities.

FUNDING:

Funding is available from Fund 100 – Water Enterprise and Fund 200 – Flood Control.

RECOMMENDED ACTION:

Staff recommends that the Board approve the attached resolution authorizing the General Manager to negotiate and execute a new contract with Altamont Landfill and Resource Recovery Facility for landfill disposal services for fiscal year 2015/2016 in an amount of \$225,000 for the first year and up to two additional annual contracts, each for up to \$225,000 plus up to a 3% increase per year in the contract amount to account for inflationary cost increases.

ZONE 7
ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

BOARD OF DIRECTORS

RESOLUTION NO.

INTRODUCED BY

SECONDED BY

Landfill Disposal Services

WHEREAS, Zone 7 of Alameda County Flood Control and Water Conservation District solicited proposals for landfill disposal services for a three-year period; and

WHEREAS, the proposal submitted by Altamont Landfill and Resource Recovery Facility, provides the lowest cost to Zone 7; and

WHEREAS, Zone 7 desires to obtain the best value for disposal services,

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Zone 7 of Alameda County Flood Control and Water Conservation District does hereby authorize the General Manager to negotiate and execute a landfill services contract with Altamont Landfill and Resource Recovery Facility in the amount of \$225,000 for each of the next three years, FY 2015/16 through FY 2017/18 with up to a 3% increase in the contract amount per year.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

ABSTAIN:

I certify that the foregoing is a correct copy of a Resolution adopted by the Board of Directors of Zone 7 of the Alameda County Flood Control and Water Conservation District on June 17, 2015.

By: _____
President, Board of Directors

Administrative Committee

Summary Notes

Meeting Date:	June 4, 2015	Start Time:	10:00 a.m.
Directors Present:	Dick Quigley Bill Stevens Jim McGrail	Staff Present:	Jill Duerig

Director Quigley called the meeting to order at 10 a.m.

1. Public Comment on Items Not on the Agenda

None.

2. Board Policy on Conducting Business

Director Ramirez Holmes began the discussion stating that she considered the “Guiding Principles” to be a PR document and that it seems backwards to put a PR document into the Board Policy on Conducting Business. Ms. Duerig clarified that the board had adopted the Guiding Principles as board policy.

Director Figuers stated that it was his opinion that the Guiding Principles violate the First Amendment based on recent US Supreme Court decisions. Therefore, the Guiding Principles cannot be enforced.

Director Quigley said that he agreed that the First Amendment allows board members to individually state their opinions but that there is a certain duty as elected representatives of the public to be respectful and to act with decorum. He said that the policies are deliberately vague to allow the board to apply reason and to deal with issues that arise. The Association of California Water Agencies has similar policies to avoid dysfunction.

Director Figuers said that dissidence is not necessarily a bad thing but that limitations on free speech are simply wrong. A certain level of incivility is needed for change to happen.

Director Ramirez Holmes said that the censure policy should be for serious ethical violations, only. It should not be applied for lack of teamwork, respect, or not doing one’s homework.

Director Quigley said that sometimes boards need to adopt policies like the “gentleperson’s agreement” to improve efficiency and enhance respectful behavior.

Director Ramirez Holmes said that the Guiding Principles had already been adopted so there is no need for further action. She suggested that, as a stand-alone policy, they are good enough. There is no reason to change the Board Policy on Conducting Business.

Director Quigley said that he agrees. An inordinate amount of time has been wasted on this issue, without much benefit.

Director Figuers said that he continues to protest the whole thing. Strict procedures are needed for censure and enforcement.

Director Ramirez Holmes said that without a process that has been adopted for censure, the Guiding Principles are not legally enforceable.

Director Quigley said that the documents, as is, are good enough. If nothing's broken and nobody's identified a redeeming value to change something, there is no need to move forward.

Director Quigley and Director Ramirez Holmes agreed that it is not a bad thing to revisit policies periodically but that changes need not always be made.

Led by Director Figuers, the committee voted 3-0 not to "make a bad situation worse" and directed staff not to bring this policy back to the board for changes at this time.

3. Verbal Reports

None.

4. Adjournment

The meeting was adjourned at approximately 10:25 a.m.

Water Resources Committee

Summary Notes

Meeting Date: June 9, 2015

Start Time: 4:00 p.m.

Directors Present: John Greci
Bill Stevens
Jim McGrail

Staff Present: J. Duerig, K. Arends,
T. Rooze, M. Katen,
J. Chahal

Director Greci called the meeting to order at 4:05 p.m.

1. Public Comment on Items Not on the Agenda

None.

2. Revised Draft Nutrient Management Plan

At the beginning of the meeting, staff distributed copies of a San Francisco Bay Regional Water Quality Control Board (RWB) letter written to the Zone 7 General Manager, dated June 8, 2015. The letter supported the work done to date on the draft Nutrient Management Plan (NMP), but conditioned RWB's endorsement of the plan on Zone 7's inclusion of a schedule for the development of specific technical recommendations for each Area of Concern. Other NMP improvements were suggested in the letter, as well, with the understanding that they might be addressed later. The public audience included Ms. Dyan Whyte (Assistant Executive Officer, RWB) and Ms. Dilan Roe (Land Use Program Manager, ACEH) who provided additional comments and answered questions asked by the Committee during the meeting.

Staff then gave a PowerPoint presentation summarizing the Draft Nutrient Management Plan, highlighting the revisions made to the Plan since February 2015, including a proposed schedule for developing the Area of Concern-specific technical recommendations that the RWB asked for. At the end of the presentation, staff asked for guidance from the Committee on three NMP items: 1) whether to omit the onsite wastewater treatment systems (OWTS) upgrade exemption for replacement of failed systems when no increase in loading is involved, as requested by ACEH and supported by RWB; 2) whether to include staff's proposed schedule for completion of technical recommendations related to additional monitoring wells, to be installed by developers, for each Area of Concern; and, 3) whether to advance the revised Draft NMP to the full Board for adoption consideration in June.

Summary of Presentation

Staff summarized the revised NMP's content stating that the general premise of the plan hadn't changed from the draft presented to the full Board in February 2015. And that many of the revisions involved the addition of clarifying supplemental information in response to comments received from RWB and ACEH staff. Tables were added in Section 3.3 to show the estimated relative contribution of each nitrogen source in each sub-basin under current and "build-out" conditions, and an appendix was created to include additional information about the Groundwater Basin and the derivation and sensitivity of some of the parameters used in the various NMP analyses. Staff also described a new NMP strategy that encourages continuation of

“Low Impact Development (LID)” best management practices (BMPs) to enhanced onsite percolation of uncontaminated rainwater, which will help to recharge the aquifers and dilute the intrinsic nitrate concentrations. For the Areas of Concern, staff reviewed the recommended special OWTS permit requirements and the proposed schedule for the development of technical recommendations.

Comments, Questions and Discussion

President Greci asked staff if current (or proposed) OWTS policies would require historic-lots-of-record of less than 5 acres located outside the Areas of Concern to install an advanced system. Staff responded that there is currently no advance system requirement for this and the NMP would not change this. Dilan Roe, ACEH Land Use Program Manager, interjected that a requirement for an advanced OWTS could come as a design prerequisite from ACEH if site conditions like soil type, shallow groundwater, or a steep slope exists on site.

Director McGrail said he thought that it was premature to adopt the special OWTS requirements because there is still a lot to be learned about the cause and extent of the high nitrate plumes. President Greci asked what else needed to be done. Director McGrail said he would like to have RWB and County endorsements, and for the need for special OWTS requirements to be clearer. He felt that the proposed requirements were moving forward too fast and that more study was warranted. He also wondered whether Zone 7 was overstepping its authority with regard to future rural development.

Director Stevens stated that there is a budget issue with regard to Zone 7 drilling wells to conduct further investigations. He said property owners should be responsible for financing the investigations, but that he was also sympathetic to those property owners’ who already have development plans for parcels within the Areas of Concern. He suggested that the Board could adopt the draft NMP, but delay the implementation of the special OWTS requirements until later to give people more time to figure out the project impacts and get grants or financing for the necessary investigations, but wanted to hear what ACEH and RWB thought about the idea.

Ms. Roe said that she supports the NMP but feels that it is not the only action needed. In the past, not all County OWTS regulations were enforced by ACEH, so everyone has gotten used to the leniency, which she feels has caused some of the public perception problems. She feels there needs to be more public outreach and community-accepted solutions.

President Greci complimented Ms. Roe for her public outreach efforts. He said he recognizes that the bulk of the nitrate contamination is no fault of the current property owners, but that limiting OWTS loading in Areas of Concern was a proactive measure that Zone 7 should take to make a difference where it can. He said, however, that the biggest difference would come from sewerage the Buena Vista area, and that the RWB should use their influence to get the cities to commit to it. Ms. Roe suggested that there are other potential solutions like community treatment systems. Director McGrail agreed that there should be additional talk about other potential solutions. Ms. Roe added that there is a need for an action to be taken to set goals and objectives because the current situation has OWTS permitting somewhat gridlocked.

Dyan Whyte, Assistant Executive Officer of the RWB, said the permit gridlock is real. California law requires denial of new permits if groundwater is impacted above the established Basin limit and there is no solution in place. By mandate, the RWB wants all groundwater to

meet drinking water standards. She said the RWB is willing to accept interim measures while additional investigation and solutions are being developed. She said that the NMP's special OWTS requirements are technology based and acceptable to keep land use development moving forward at a careful pace. Concannon Winery's Waste Discharge Requirement is an example of this. She stated that now is a good time to approve the NMP and start the additional investigations because Proposition 1 has set aside grant monies for these kinds of studies. She feels that developers should be willing to help because it is in their own best interest to find solutions early, and added that the RWB is willing to help with resources as well. She added that RWB and ACEH have been meeting with LAFCO to discuss the issues over cities extending sewer service to some of the Areas of Concern.

Director Stevens wants RWB and Zone 7 to continue to work together on this. He suggested that Zone 7 should budget for further investigation of nitrate occurrences. General Manager Ms. Duerig said that this year's budget already provides for the employment of two college interns this summer for the Groundwater Section to help with the data and information compilation and some groundwater sampling effort to determine what data gaps exist for some Areas of Concern.

Director Stevens agreed with scheduling the Greenville area first, but thought the overall schedule seemed too aggressive. Ms. Duerig clarified that work scheduled to be completed in 2016 would not be reported until the annual groundwater management report came out in Spring 2017, but that the results of the data review and whatever groundwater sampling that can be accomplished with existing wells could be reported earlier and used to identify potential location for new monitoring.

Director Stevens suggested that Zone 7 could adopt the NMP without implementation of the special OWTS permit piece. Ms. Duerig said that if there is no plan, then there may be no development in the unsewered Areas of Concern. Ms. Whyte clarified that the implementation of any special OWTS requirements would have to be done by ACEH as it is their responsibility as delegated by the RWB. And that any OWTS requirement implemented before a Local Area Management Plan (LAMP) is finalized between ACEH and RWB to handle special conditions such as high nitrate areas, would be considered only interim. Ideally, the NMP will be used to address the groundwater protection considerations in the LAMP. The draft LAMP is due in 2016 and must be finalized by 2018.

Staff suggested that a good way to think about the NMP's special OWTS provisions is that it establishes acceptable onsite wastewater loading limits for ACEH and RWB to apply when exercising their permitting responsibilities.

President Greci and Director Stevens reiterated that they would like Zone 7 to continue to work with RWB and ACEH on the OWTS issues, and move forward with the NMP adoption process. President Greci said it is a good plan based on good science. Director Stevens asked Ms. Whyte if it was okay that the special OWTS requirements didn't take effect until after January 2016. Ms. Whyte said realistically it might be longer due to the LAMP schedule but having it in a plan allows them some leeway to permit OWTS and other wastewater discharges in the Areas of Concern. Besides, she wants to keep working with the cities to sewer some unsewered areas. Director McGrail asked what the advantage was of adopting the NMP without implementation of the OWTS requirements. Ms. Whyte said it would solidify Zone 7's commitment to the management of groundwater quality, and that without the NMP, ACEH and RWB will be forced to develop the LAMP requirements for Livermore Valley without the groundwater basin

manager's perspective. Staff added that perhaps the most compelling reason to adopt a NMP now is that many of the State grant programs require the applicants to have adopted Salt/Nutrient Management Plans for eligibility. Since Zone 7 has only adopted a Salt Management Plan, its eligibility may be called into question, whereas there should be no question if Zone 7 adopts a NMP.

All three Directors agreed that the NMP has committee support for adoption and should now be presented to the full Board for their consideration.

3. Verbal Reports

Ms. Duerig said that BBID has been informed that their pre-1914 water rights are being curtailed this year. Unfortunately, a lot has already been invested in annual crops which have already been planted and they are desperate for water. BBID has approached Zone 7 with a deal to acquire 3,000 acre-feet of water this year and have agreed to pay Zone 7 back at 1.5 to 1 over the next three years.

All three Directors agreed that the General Manager should move forward with the deal under her operational authority, although Director Stevens said he felt a little guilty for Zone 7 to profit off of BBID because they have been so good to Zone 7 in the past. Ms. Duerig said that the deal was willingly offered by BBID but still needs approvals.

4. Adjournment

The meeting was adjourned at approximately 5:45 p.m.

6/17/15 Board written/narrative comments By Dick Quigley

May 28 & 29 participated at the ACWA Board meeting in Sacramento.

ACTION/DISCUSSION ITEMS

Department Initiatives –

1. ACWA 2014-2015 Strategic and Business Plan implementation update
2. Finance Committee Report
 - a. Reserve policy revision upward
3. ACWA Water Storage Policy Task Force Update

It is my understanding that agencies that want to compete for Prop 1 funding for storage projects must have plans submitted by July 2016. I suggest the appropriate committees and staff investigate the merits of proposal submission. Del Valle water storage expansion with existing dam, and accelerated Chain of Lakes usability; feasibility studies or more would be my suggestions. It may be time to think visionary!

4. Sustainable Groundwater Management Act (SGMA)
Implementation Policy Group Update

Water summits & webinars note: Special Webinar Series:

Urban Water Conservation in Drought

Webinar 1: Urban Water Conservation: Agency Assistance and Tools

Thursday, May 21, 2015 (10 AM - Noon)

Webinar 2: Emergency Regulations, Enforcement and Water Rate Structures

Tuesday, May 26, 2015 (10 AM - Noon)

Webinar 3: Regulations for Small Systems

Tuesday, May 26, 2015 (1 - 2:30 PM)

With emergency drought regulations on mandatory urban water conservation set to take effect May 15, local water managers, utility directors and staff are invited to register for a special webinar series presented by the Association of California Water Agencies (ACWA) and the Brown Administration.

5. Drought Efforts/ Drought Response & Save Our Water outreach and possible dollar savings for water Agencies like Zone 7 through partnering. See: Per your request, here is the member advisory we sent out regarding ACWA's new interactive local water agency drought response web portal

<http://droughtresponse.acwa.com/>. To participate, please complete this short survey<http://outreach.acwa.com/site/Survey?ACTION_REQUIRED=URI_ACTION_USER_REQUESTS&SURVEY_ID=2780>. Once your survey is received and reviewed, your agency card will be created and confirmation/review instructions will be sent to the identified agency contact.

There will be more water summits and webinars and I am suggesting Zone 7 think about hosting one at possibly the Bankhead Theater in the fall of 2015 or winter of 2016.

Administrative

At the Board meeting, we viewed a 13-minute video examining the Rim Fire of 2013 and how factors such as policies, fuel build-up, and climate change are putting forests at risk. In response to the Board's request, staff posted the video, "The Fire Next Time" to ACWA's website. You can access the video at the following links:

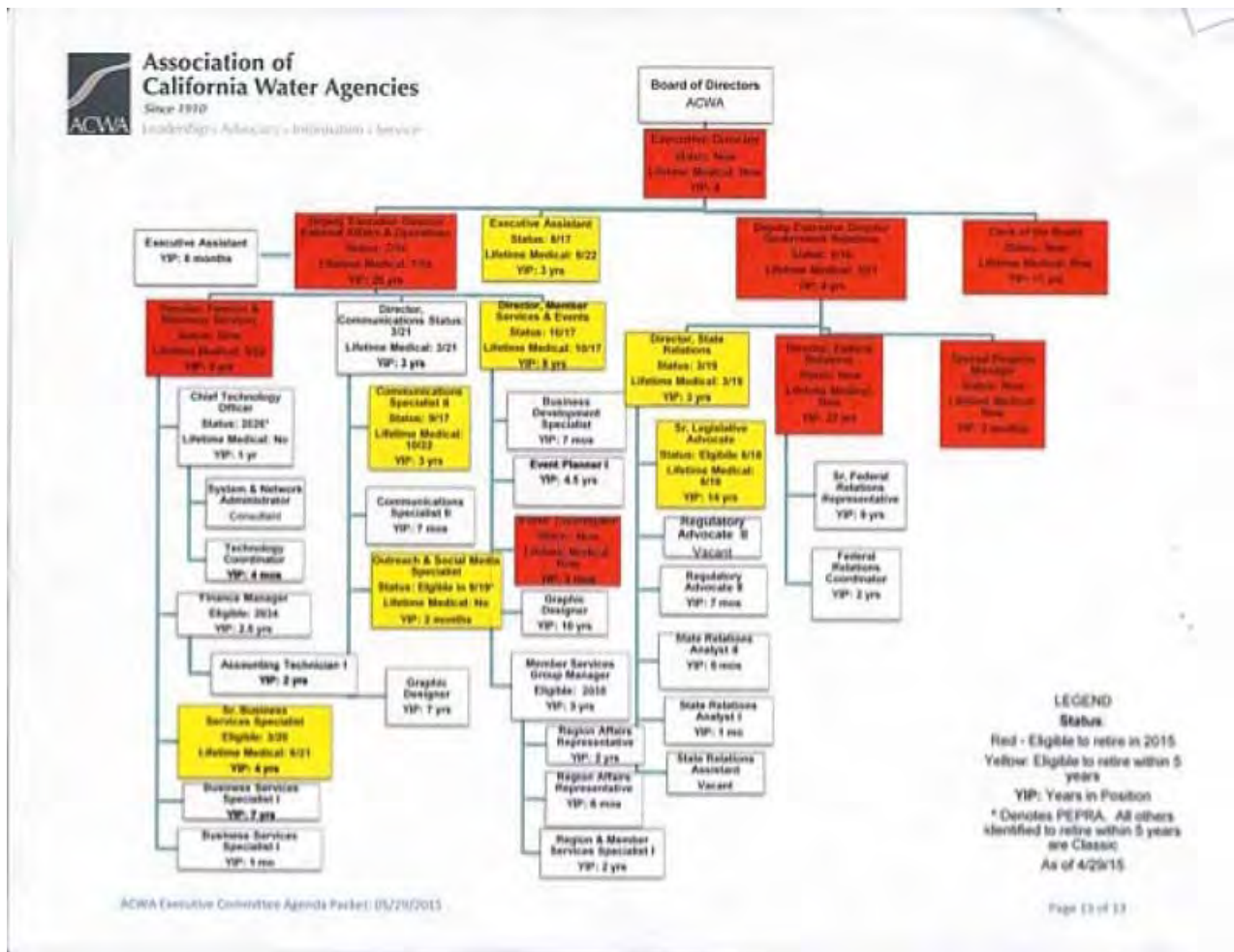
[Improving the Resiliency of California's Headwaters Page](#)

[Direct link to video](#)

[Succession Planning report](#)

There was a very well done Succession Planning report and org chart done for ACWA at the request of the executive committee that I urge my board colleagues and staff to review and possibly emulate. I was impressed.

See below pdf:



The GM has a complete report and salary schedule.

June 4 attended the administrative committee meeting regarding Board Policy on Conducting Business. The committee seemed to be supportive at least 2-1 on leaving it alone. "If it isn't broke, don't fix it."

Let me know if you have any questions or suggestions.

Thanks,

DQ



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: ADMINISTRATION
CONTACT: Jill Duerig

AGENDA DATE: June 17, 2015

ITEM NO. 12a

SUBJECT: GENERAL MANAGER'S REPORT

SUMMARY: The following highlights a few of the key activities which occurred last month. Also attached is a list of the General Manager (GM) contract(s) executed during May.

Environmental & External Affairs:

- DWR announced that construction of the temporary emergency drought barrier at West False River in the Sacramento-San Joaquin Delta was nearing completion at the end of May, about two weeks sooner than anticipated. The barrier now spans the approximately 750-foot-wide river between Jersey and Bradford islands and blocks salt water that tidal action attempts to push eastward from San Francisco Bay into Franks Tract.
- Imported water releases for groundwater recharge continued to the Arroyo Valle at 12 cubic feet per second (CFS) or about 7.8 million gallons per day (MGD) with 2.5 CFS (1.6 MGD) of it going into Shadow Cliffs.

Engineering and Flood Control:

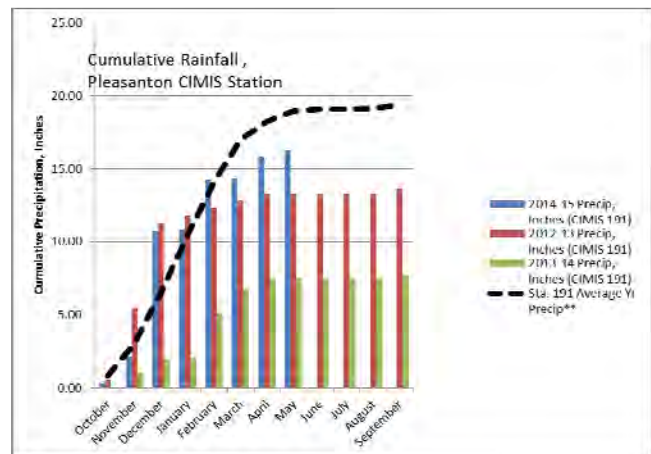
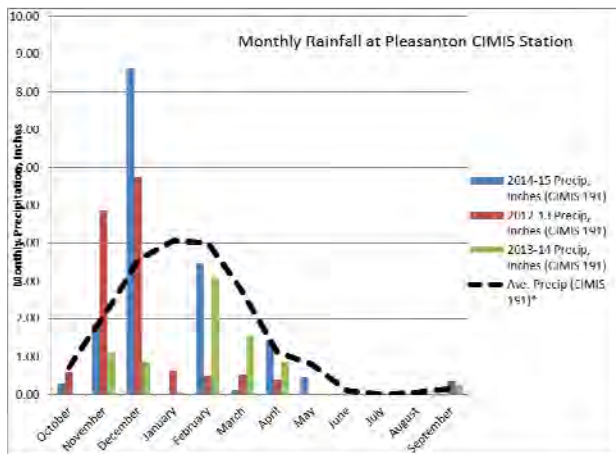
- Spring groundwater levels were collected in mid-May, generally showing a rise in levels since the Fall readings. During May, Vulcan's pumping to Cope Lake varied between 0 and 25 cubic feet per second (CFS), with flow between Cope and Lake I more constant at about 2-6 CFS; 370 acre feet were pumped into Cope and 230 acre feet flowed into Lake I.
- Throughout May, staff continued assessing active erosion issues along the reach of the Arroyo de la Laguna upstream of the Verona Bridge by calculating the rate of bank loss and identifying if utilities or other infrastructure may be negatively impacted should the erosion continue. Staff met with the Alameda County Resource Conservation District (RCD), the US Natural Resources Conservation Service (NRCS), Regional Board and the California Department of Fish and Wildlife to explore possible opportunities to collaborate and identify solutions that may be appropriate for this stretch of privately held land.
- The US Army Corps of Engineers inspectors completed the first and second phases of their "Continuing Eligibility Inspections" (CEI) for Zone 7 facilities. Inspections are required to remain in the USACE PL 84-99 program, which provides potential financial assistance to repair facilities damaged in federal/state-declared disasters.
- Zone 7's contractor completed all 11 scheduled horizontal pipe installations along the Alamo Canal channel embankment to reduce hydrostatic pressures in the embankment, which might otherwise cause bank failures.

Administration:

- Staff are working with the Urban Creeks Council (UCC) to close out their tasks for the Living Arroyos Program. As UCC prepares to shut its doors, a review of equipment inventory, shifting responsibilities for managing the program's social media and transferring data (including photos) is proceeding. The storage unit at the Arroyo Mocho-Stanley Reach has been removed and all program equipment has been transferred to the storage unit at the Parkside facility.

Operations and Maintenance:

- Meetings were held with both the retailers and the untreated water customers to discuss this year's operations. Preserving local groundwater was part of the discussion, along with plans for replenishing stored water reserves as soon as possible (both locally and in out-of-basin groundwater banks).
- May rainfall was slightly less than the recorded average, bringing cumulative local precipitation for the water year (October 2014 through September 2015) down to 86% of average, as measured at the California Irrigation Management Information System (CIMIS) Station 191 in Pleasanton.



Monthly List of GM Contracts

May 2015

Contracts:

PMA Consultants	\$50,000	Strategic Planning Consulting Services for SMMP support
KP, LLC	\$15,000	Mailing Services
Total May 2015	\$65,000	



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY • LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING DIVISION: ADMINISTRATIVE SERVICES
CONTACT PERSON: MIKE WALLACE / TAMARA BAPTISTA

AGENDA DATE: June 17, 2015

ITEM NO. 12b

SUBJECT: Monthly Budget Report

SUMMARY:

This report provides a summary of FY 14/15 budget performance and explanations of any major variances for the period July 1, 2014 through May 31, 2015.

The following provides explanations and additional details concerning this report:

The period of July 1, 2014 through May 31, 2015 is approximately eleven months or 92% of the fiscal year. However, Zone 7's revenue and expense cycles do not follow this pattern because of the nature of our business, which is seasonal and as needed. For example, the first installment of property tax revenue is not received until December and capital project expenses vary based on construction schedules. By May, we typically expect somewhere between 76 - 83% of the budget to have been used. This is because services rendered/goods purchased in May would typically be billed and paid for in June.

The FY 14/15 Budget shown is the amended budget, which includes any additional Board-approved appropriations, prior-year encumbrance carryovers and unspent capital project balances carried forward to this fiscal year.

The attached Fund Balance Changes Report details year-to-date changes in fund balance by fund type and category. Note the overall fund balance of the Proprietary Fund Category (Water Enterprise Funds), decreased by \$7.3M and the Governmental Fund Category (Flood Control Funds) decreased by \$1M. The decrease for the Water Enterprise Funds is partially due Fund 110 and 130 expenses, partially due to conservation-driven reductions in water sales, and partially due to Board-approved planned use of reserves.

Included is an attachment that depicts historical information covering the past seven years of total revenues, expenses and the ending fund balances for funds 100, 110, 120, 130, 200, and 210.

The information in the following tables summarizes, by fund, the attached Annual Budget by Account Classification Report:

Water Enterprise Fund – Fund 100:

Category	FY 14/15 Amended Budget	FY 14/15 YTD Actual	FY 14/15 % Used/Received
Revenue	\$34,461,062	\$22,095,558	64%
Expenses	\$50,157,219	\$33,733,722	67%

Fund 100 provides financing for the acquisition and conveyance of raw water, treatment and delivery to the Zone 7 service area. The main source of revenue for this fund is water sales. FY 14/15 YTD revenue is primarily from the sale of 21,619 acre-feet of treated water through April 2015. Significantly more conservation was achieved than projected in the budget. During the month of April 2015, treated water sales of \$2.0M were approximately 77% of the April 2014 amount of \$2.6M, and 62.5% of the April 2013 amount of \$3.2M, which reflects the revenue impacts of drought conservation efforts. **Note the April 2015 water sales revenue is significantly lower than the mandated 25% conservation level.**

May water sales revenue is not reported because the meter reading data that generates the monthly water billing was not available at the time of this report. Other revenue is from grant proceeds and DWR refunds; both are greater than the budget estimates.

YTD expenses include the first, second and third quarter transfers to Fund 120, water production costs, maintenance, miscellaneous services/supplies and memberships and dues. While imported water purchases were low due to the low allocation and minimal early access to transfers, they have since increased due to the recovery of Semitropic and Cawelo water. Utility and chemical costs remain within the normal range. Rental expenses remain significantly less than budgeted because portable generators for the wells have not been required to date. Organizational memberships are due and paid at the beginning of the fiscal year, resulting in the 79% as shown in the attached report.

State Water Facilities Fund – Fund 110:

Category	FY 14/15 Amended Budget	FY 14/15 YTD Actual	FY 14/15 % Used/Received
Revenue	\$14,060,937	\$14,417,301	103%
Expenses	\$14,227,251	\$16,094,485	113%

Fund 110 is a pass-through fund for fixed charges associated with the State Water Project, assessed as a property tax override. YTD revenue is from DWR refunds and the two installments of property tax payments. YTD expenses reflect payments to DWR for fixed costs through May 2015. DWR charges are both monthly and semi-annual. Transportation Capital charges are paid in January/July and the SBA Improvement and Enlargement debt service payments are paid in March/September. In June 2014, DWR announced that they were experiencing cash flow issues and presented the State Water Contractors (SWC) with a 2015 Statement of Charges (SOC) proposing to cover the majority of the shortfall. Zone 7's share of this is approximately \$3M. DWR stated that the primary reason for the cash flow issue was a large salary increase for DWR employees as well as an increase in the number of full time employees. The other factor affecting this fund is a reimbursement/credit of approximately

\$1.2M that we expected to receive in 2015 for the SBA Enlargement/Improvement project, but wasn't in the 2015 SOC. Zone 7 prepaid the initial costs of the project of around \$6M and DWR had stated that we would in turn be reimbursed via the 2015 SOC. This project is split 20% in Fund 110 and 80% in Fund 130. We have, as of yet, not received the credit. Staff followed up with DWR and learned that the reimbursement/credit is now planned to be included in the 2016 SOC. However, a partial credit will be given to us in July 2015. There currently exists enough cash in the fund to cover this fiscal year's unexpected increase; however at the end of this fiscal year, the fund's balance will drop below the Board approved minimum reserve level, as approved in the FY 15/16 budget.

Water Renewal/Replacement & System-Wide Improvements – Fund 120:

<i>Category</i>	<i>FY 14/15 Amended Budget</i>	<i>FY 14/15 YTD Actual</i>	<i>FY 14/15 % Used/Received</i>
Revenue	\$13,129,324	\$10,326,856	79%
Expenses	\$13,236,048	\$6,577,659	50%

Fund 120 pays for capital projects including the replacement and improvement of the current water treatment and delivery system. The primary source of funding is a quarterly transfer from Fund 100 – Water Enterprise; the first, second and third quarter transfers have been posted. Other revenue is from the sale of plans and specifications, grant proceeds and Dougherty Valley Facility Use Fees.

FY 14/15 YTD expenses reflect capital project expenses such as:

- Chain of Lakes Well 5 costs (portion),
- Cope Lake Slope Repair (portion),
- Groundwater Model Upgrade,
- Arroyo Valle Water Right Permit Extension,
- Busch Valley Well #1 Phase One project (portion),
- DVWTP Sludge Handling Improvements,
- DVWTP Superpulsator Rehabilitation,
- the DVWTP Caustic Soda System,
- Filter 1 Media Replacement projects at DVWTP,
- PPWTP Ferric Chloride & Caustic Improvement project,
- Nutrient Management Plan (portion),
- North Canyons Building Lease (portion).

Capital project expenses are tied to construction schedules.

Comparing the FY14/15 YTD actuals of \$6.6M to the Board Approved Budget of \$7.6M, the percent used/received is 87%. Whereas comparing the FY14/15 YTD actuals of \$6.6M to the Amended Budget of \$13.2M, (which includes \$1.9M encumbrance carryovers, \$2.2M project carryovers, and \$1.6M additional appropriations), the percent used/received is 50%.

Water Expansion – Fund 130:

<i>Category</i>	<i>FY 14/15 Amended Budget</i>	<i>FY 14/15 YTD Actual</i>	<i>FY 14/15 % Used/Received</i>
Revenue	\$22,042,020	\$23,102,776	105%
Expenses	\$22,352,045	\$20,813,423	93%

Fund 130 is intended to provide funding for new facilities and supplies to meet the demands of new development, many of them fixed (i.e., bond payment obligations for debt incurred by others). The primary source of revenue is connection fees. YTD revenue is primarily comprised of the connection fee revenue from 852 connections. Since July 1, 2014, a total of 155 connection fee credits have been used totaling \$3.7M, while 294 credits remain outstanding, valued at \$7.3M at the 2015 connection fee level (see Chart 1 attached).

FY 14/15 YTD expenses reflect this fund's portion of capital project expenses such as:

- Chain of Lakes Well 5 costs (portion),
- Nutrient Management Plan Update,
- Busch Valley Well #1 project (portion),
- Cope Lake Slope Repair (portion),
- SBA Improvement and, Enlargement debt service payment (portion).

The SBA payment is made twice a year (March and September), with September always being the higher payment per the DWR debt service schedule. DWR's cash flow issue mentioned above in Fund 110 also impacts this fund. Until we receive the reimbursement/credit of \$4.8M (80% of the \$6M prepay) for this fund, the SBA Enlargement/Improvement project will be over budget. Again, DWR is now projecting that this reimbursement/credit will be processed partially in July 2015 and the remaining balance in calendar year 2016.

Flood Protection Operations – Fund 200:

<i>Category</i>	<i>FY 14/15 Amended Budget</i>	<i>FY 14/15 YTD Actual</i>	<i>FY 14/15 % Used/Received</i>
Revenue	\$6,505,936	\$6,932,240	107%
Expenses	\$14,279,561	\$3,769,776	26%

Fund 200 provides for general administration and the maintenance and improvement of the existing flood protection system. The primary source of revenue is property taxes. YTD revenue represents both of the installment of property tax payments and other charges for services, including a reimbursement of \$324,945 (this Fund's share) for the Stanley Reach project per Board resolution 15-50.

Expenses include labor, a fraction of the North Canyons lease payment, flood protection maintenance activities and capital project expenses such as:

- Cope Lake Slope Repair Project (portion),
- Arroyo Mocho – Stanley Reach R. 3.5 (portion),
- Arroyo Las Positas Reach 1-7 Improvement Project,

- Living Arroyos Program (portion),
- Sediment Study – SFE 2010 (portion),
- Flood Control Hydrology Study, and the Stream Management Master Plan Update (portion).

Other budgeted projects (e.g., Arroyo Las Positas Treatment Wetland and Chabot Canal Regional Stormwater Detention projects) have yet to commence. Note these projects are funded by both Fund 200 and Fund 210.

Flood Protection and Stormwater Drainage (DIF) – Fund 210:

<i>Category</i>	<i>FY 14/15 Amended Budget</i>	<i>FY 14/15 YTD Actual</i>	<i>FY 14/15 % Used/Received</i>
Revenue	\$2,646,500	\$3,612,211	136%
Expenses	\$7,022,157	\$453,138	6%

Fund 210 pays for flood protection facilities required for new development. The primary source of revenue is from development impact fees. Zone 7 tends to receive most development impact fee revenue in the spring/early summer. This fiscal year we have received 135% year to date. Other charges for services include a reimbursement of \$66,555 (this Fund's share) for the Stanley Reach project per Board resolution 15-50.

FY 14/15 YTD capital project expenses are for:

- Cope Lake Slope Repair (portion),
- Arroyo Mocho – Stanley Reach R. 3.5 (portion),
- Living Arroyos Program (portion),
- Sediment Study – SFE 2010 (portion),
- Flood Control Hydrology Study,
- SMMP Update and the Arroyo Las Positas Reach 1-7 Improvement Project (portion).

Other budgeted projects that are split with Fund 200 (e.g., Arroyo Las Positas Treatment Wetland and Chabot Canal Regional Stormwater Detention projects) have yet to commence. The low expense level to date reflects over \$3.2M apportioned to not-yet-commenced projects as listed above.

Total All Funds – Fund 100, 110, 120, 130, 200, & 210:

<i>Category</i>	<i>FY 14/15 Amended Budget</i>	<i>FY 14/15 YTD Actual</i>	<i>FY 14/15 % Used/Received</i>
Revenue	\$92,845,779	\$80,486,941	87%
Expenses	\$121,274,281	\$81,442,204	67%

Reconciliation of 2014/15 Amended Budget to June Adopted Budget

	<i>June Approved Budget</i>	<i>Encumbrance Carryovers</i>	<i>Project Carryovers</i>	<i>Additional Appropriation</i>	<i>Total</i>
Fund 100	\$49,680,609	\$383,443	\$93,167	\$0	\$50,157,219
Fund 110	\$14,227,251	\$0	\$0	\$0	\$14,227,251
Fund 120	\$7,578,891	\$1,862,087	\$2,238,570	\$1,556,500	\$13,236,048
Fund 130	\$19,485,138	\$1,291,111	\$892,296	\$683,500	\$22,352,045
Fund 200	\$10,416,092	\$649,476	\$3,213,993	\$0	\$14,279,561
Fund 210	\$5,755,275	\$472,354	\$794,528	\$0	\$7,022,157
Total	\$107,143,256	\$4,658,471	\$7,232,554	\$2,240,000	\$121,274,281

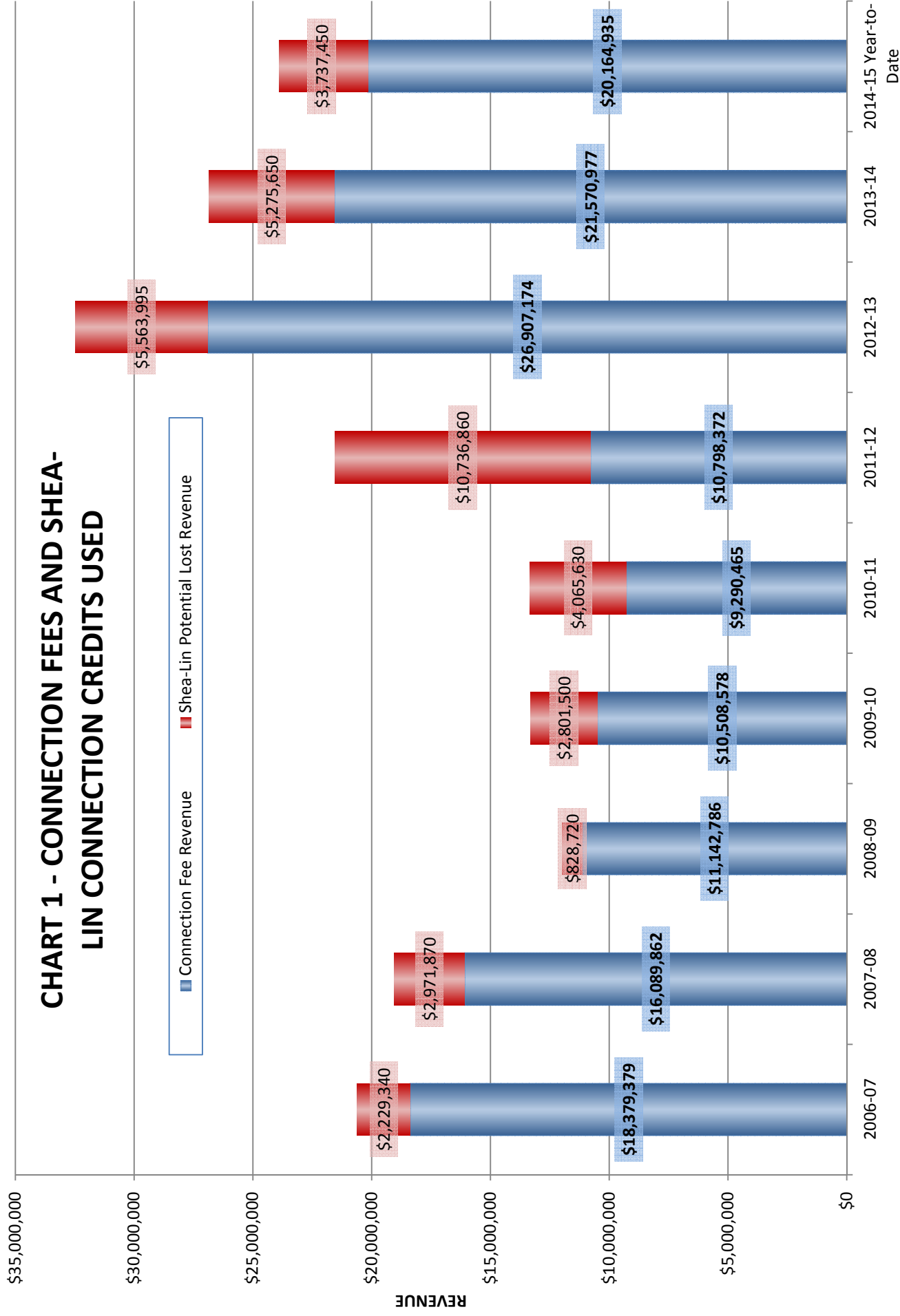
RECOMMENDED ACTION:

Information only.

ATTACHMENTS:

- CHART 1 – Connection fees and Shea-Lin Connection Credits used
- Zone 7 Water Agency Annual Budget by Account Classification Report
- Zone 7 Water Agency Fund Balance Changes Report
- Historical Revenue, Expense and Fund Balances

CHART 1 - CONNECTION FEES AND SHEA-LIN CONNECTION CREDITS USED



NOTES:
 Shea-Lin Credit Data as of 05-31-2015, 1741 Redeemed & 294 Remaining.
 Revenue as of 02-28-2015 for Livermore, 04-30-2015 for Pleasanton and DSRSD
 Initial Calendar Year 2000 Payment of \$10,000,000 for Credits is Not Reflected in This Graph

ZONE 7 WATER AGENCY
Budget vs Actual by Account Classification Report
For the period 7/1/2014 - 5/31/2015

	FY 14/15 Amended Budget	FY14/15 YTD Actual	% Used/Rec
FUND: 100 Water Enterprise Operations			
Revenue			
411 - Water Sales & Service	\$34,246,611.00	\$21,412,591.91	63%
441 - Charges for Services	\$0.00	\$4,888.87	-
452 - Aid from Governmental Agencies - State	\$0.00	\$220,575.49	-
461 - Investment Earnings	\$75,000.00	\$48,072.92	64%
462 - Rents and Royalties	\$65,263.00	\$59,837.54	92%
464 - Fines and Penalties	\$0.00	\$62.77	-
481 - Other Revenue	\$74,188.00	\$349,528.73	471%
Revenue Totals	\$34,461,062.00	\$22,095,558.23	64%
Expenditures			
511 - Personal Services - Salaries and Wages ¹	\$13,859,924.00	\$9,875,004.55	71%
512 - Personal Services - Overtime ¹	\$215,074.00	\$126,058.07	59%
513 - Personal Services - Benefits ¹	\$7,120,240.00	\$5,308,250.87	75%
600 - Labor & Overhead Distributed ²	(\$7,961,534.00)	(\$2,934,496.64)	37%
611 - Purchased Services	\$4,456,603.00	\$2,258,365.47	51%
621 - Water	\$9,014,831.00	\$3,569,141.48	40%
631 - Chemicals	\$2,250,973.00	\$1,654,813.80	74%
641 - Utilities	\$1,922,616.00	\$1,372,031.14	71%
643 - Communications	\$174,124.00	\$123,734.55	71%
651 - Cleaning Services	\$50,931.00	\$39,354.77	77%
652 - Repairs and Maintenance	\$2,833,012.00	\$1,293,086.22	46%
653 - Rental Services	\$792,900.00	\$103,222.90	13%
661 - General Office Services/ Supplies	\$610,897.00	\$303,060.62	50%
662 - Organizational Membership/ Participation	\$467,783.00	\$371,477.35	79%
665 - Other Services/ Supplies	\$399,078.00	\$136,069.78	34%
667 - Training and Travel	\$399,195.00	\$92,437.56	23%
669 - Special Departmental Expense	\$698,948.00	\$284,764.29	41%
671 - Equipment, Furniture and Vehicles	\$27,700.00	\$36,901.93	133%
691 - Transfers	\$12,823,924.00	\$9,720,443.01	76%
Expenditure Totals	\$50,157,219.00	\$33,733,721.72	67%
Revenue Less Expenses Fund 100 Total	(\$15,696,157.00)	(\$11,638,163.49)	
FUND: 110 State Water Facilities			
Revenue			
411 - Dougherty Valley Surcharge	\$1,311,950.00	\$1,648,304.77	126%
421 - Property Taxes	\$11,350,000.00	\$11,133,873.91	98%
452 - Aid from Governmental Agencies - State	\$45,000.00	\$37,489.96	83%
453 - Aid from Governmental Agencies - Local	\$610.00	\$0.00	0%
461 - Investment Earnings	\$15,000.00	\$17,939.55	120%
481 - Other Revenue	\$1,338,377.00	\$1,579,692.40	118%
Revenue Totals	\$14,060,937.00	\$14,417,300.59	103%
Expenditures			
621 - Water	\$14,227,251.00	\$16,094,484.79	113%
Expenditure Totals	\$14,227,251.00	\$16,094,484.79	113%
Revenue Less Expenses Fund 110 Total	(\$166,314.00)	(\$1,677,184.20)	

ZONE 7 WATER AGENCY
Budget vs Actual by Account Classification Report
For the period 7/1/2014 - 5/31/2015

	FY 14/15 Amended Budget	FY14/15 YTD Actual	% Used/Rec
FUND: 120 Water Enterprise Capital IR&R			
Revenue			
431 - Facility Use Fees	\$250,000.00	\$605,159.40	242%
441 - Charges for Services	\$2,500.00	\$150.00	6%
452 - Aid from Governmental Agencies - State	\$0.00	\$70,269.59	-
461 - Investment Earnings	\$52,900.00	\$33,334.03	63%
499 - Transfers	\$12,823,924.00	\$9,617,943.00	75%
Revenue Totals	\$13,129,324.00	\$10,326,856.02	79%
Expenditures			
600 - Labor & Overhead Distributed ¹	\$1,177,962.00	\$879,544.25	75%
611 - Purchased Services	\$2,875,329.00	\$694,734.27	24%
643 - Communications	\$0.00	\$27.75	-
653 - Rental Services	\$549,198.00	\$509,450.53	93%
661 - General Office Services/ Supplies	\$150,000.00	\$7,829.36	5%
665 - Other Services/ Supplies	\$8,595.00	\$13,909.33	162%
669 - Special Departmental Expense	\$978,698.00	\$0.00	0%
671 - Equipment, Furniture and Vehicles	\$120,000.00	\$0.00	0%
672 - Land and Facility Improvements	\$7,376,266.00	\$4,472,163.88	61%
Expenditure Totals	\$13,236,048.00	\$6,577,659.37	50%
Revenue Less Expenses Fund 120 Total	(\$106,724.00)	\$3,749,196.65	
FUND: 130 Water Enterprise Cap Expansion			
Revenue			
431 - Development Fees	\$19,020,120.00	\$20,164,935.23	106%
441 - Charges for Services	\$0.00	\$0.00	-
452 - Aid from Governmental Agencies - State	\$0.00	\$30,115.53	-
461 - Investment Earnings	\$81,100.00	\$61,739.30	76%
481 - Other Revenue	\$2,940,800.00	\$2,845,985.60	97%
Revenue Totals	\$22,042,020.00	\$23,102,775.66	105%
Expenditures			
600 - Labor & Overhead Distributed ¹	\$636,105.00	\$288,058.11	45%
611 - Purchased Services	\$1,808,744.00	\$494,306.02	27%
621 - Water	\$16,744,211.00	\$18,435,910.82	110%
643 - Communications	\$0.00	\$27.73	-
653 - Rental Services	\$426,376.00	\$396,119.99	93%
661 - General Office Services/ Supplies	\$0.00	\$2,114.92	-
662 - Organizational Membership/ Participation	\$694.00	\$2,211.00	319%
665 - Other Services/ Supplies	\$0.00	\$465.30	-
669 - Special Departmental Expense ³	\$472,643.00	\$43,020.75	9%
672 - Land and Facility Improvements	\$2,263,272.00	\$1,151,188.80	51%
Expenditure Totals	\$22,352,045.00	\$20,813,423.44	93%
Revenue Less Expenses Fund 130 Total	(\$310,025.00)	\$2,289,352.22	

ZONE 7 WATER AGENCY
Budget vs Actual by Account Classification Report
For the period 7/1/2014 - 5/31/2015

	FY 14/15 Amended Budget	FY14/15 YTD Actual	% Used/Rec
FUND: 200 Flood Protection Operations			
Revenue			
421 - Property Taxes	\$6,307,731.00	\$6,317,946.67	100%
441 - Charges for Services	\$13,000.00	\$442,207.16	3402%
452 - Aid from Governmental Agencies - State	\$54,000.00	\$72,917.81	135%
453 - Aid from Governmental Agencies - Local	\$10,700.00	\$5,784.70	54%
461 - Investment Earnings	\$25,000.00	\$26,407.22	106%
462 - Rents and Royalties	\$60,505.00	\$66,371.53	110%
481 - Other Revenue	\$35,000.00	\$604.51	2%
Revenue Totals	\$6,505,936.00	\$6,932,239.60	107%
Expenditures			
600 - Labor & Overhead Distributed ¹	\$2,098,094.00	\$1,582,466.59	75%
611 - Purchased Services	\$6,178,344.00	\$469,014.53	8%
643 - Communications	\$3,000.00	\$2,040.61	68%
651 - Cleaning Services	\$10,000.00	\$2,255.85	23%
652 - Repairs and Maintenance	\$2,355,491.00	\$1,319,610.52	56%
653 - Rental Services	\$159,322.00	\$130,951.66	82%
661 - General Office Services/ Supplies	\$19,550.00	\$7,647.26	39%
662 - Organizational Membership/ Participation	\$175,584.00	\$63,762.50	36%
665 - Other Services/ Supplies	\$516,902.00	\$132,361.83	26%
667 - Training and Travel	\$31,400.00	\$2,365.00	8%
669 - Special Departmental Expense	\$13,333.00	\$0.00	0%
672 - Land and Facility Improvements	\$2,718,541.00	\$47,300.00	2%
691 - Transfers	\$0.00	\$9,999.99	-
Expenditure Totals	\$14,279,561.00	\$3,769,776.34	26%
Revenue Less Expenses Fund 200 Total	(\$7,773,625.00)	\$3,162,463.26	
FUND: 210 Flood Protection/Drainage DIF			
Revenue			
431 - Development Fees	\$2,530,000.00	\$3,425,311.95	135%
441 - Charges for Services	\$0.00	\$83,555.00	-
452 - Aid from Governmental Agencies - State	\$0.00	\$32,357.11	-
461 - Investment Earnings	\$91,500.00	\$70,987.24	78%
481 - Other Revenue	\$25,000.00	\$0.00	0%
Revenue Totals	\$2,646,500.00	\$3,612,211.30	136%
Expenditures			
600 - Labor & Overhead Distributed ¹	\$665,730.00	\$184,427.69	28%
611 - Purchased Services	\$5,166,799.00	\$95,173.13	2%
643 - Communications	\$0.00	\$5.72	-
653 - Rental Services	\$121,822.00	\$113,275.34	93%
661 - General Office Services/ Supplies	\$0.00	\$56.17	-
669 - Special Departmental Expense	\$250,000.00	\$0.00	0%
672 - Land and Facility Improvements	\$817,806.00	\$60,200.00	7%
Expenditure Totals	\$7,022,157.00	\$453,138.05	6%
FUND Total: Flood Protection/Drainage DIF	(\$4,375,657.00)	\$3,159,073.25	-72%
Revenue Grand Totals:	\$92,845,779.00	\$80,486,941.40	87%
Expenditure Grand Totals:	\$121,274,281.00	\$81,442,203.71	67%
Net Grand Totals:	(\$28,428,502.00)	(\$955,262.31)	

Notes:

1. Agency-wide salaries, wages, overtime and benefits are budgeted in Fund 100, then distributed to other funds based on assignments and work demands.
2. This is a credit to Fund 100 for salaries, wages, overtime and benefits charged to other funds.

Fund Balance Changes Report

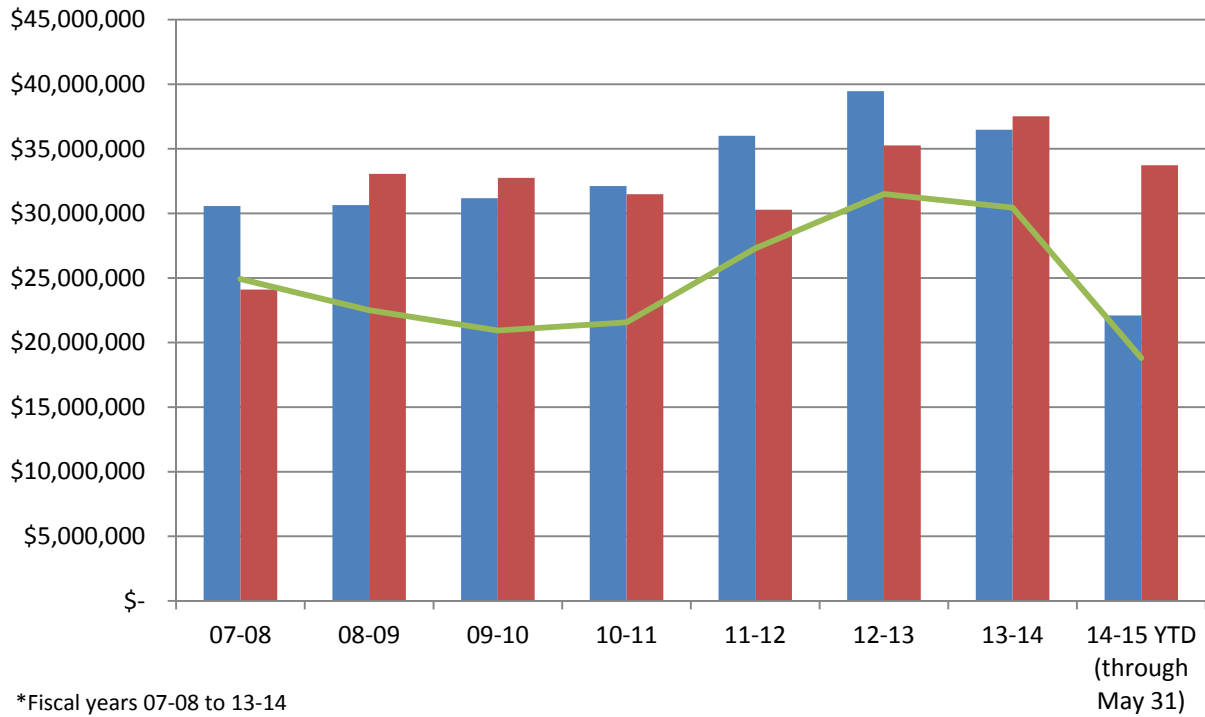
Through 05/31/15
Summary Listing

FUND		FUND Description	July 1, 2014 Audited Fund Balance	YTD Revenues	YTD Expenses	May 31, 2015 Estimated Fund Balance
Fund Category		Proprietary Funds				
Fund Type		Enterprise Funds				
100		Water Enterprise Operations	30,450,709	22,095,558	33,733,722	18,812,546
110		State Water Facilities	8,849,889	14,417,301	16,094,485	7,172,705
120		Water Enterprise Capital IR&R	18,690,974	10,326,856	6,577,659	22,440,171
130		Water Enterprise Cap Expansion	33,346,252	23,102,776	20,813,423	35,635,605
Fund Type		Enterprise Funds Totals	91,337,825	69,942,491	77,219,289	84,061,026
Fund Category		Proprietary Funds Totals	91,337,825	69,942,491	77,219,289	84,061,026
Fund Category		Governmental Funds				
Fund Type		Special Revenue Funds				
200		Flood Protection Operations	15,260,267	6,932,240	3,769,776	18,422,730
210		Flood Protection/Drainage DIF	41,506,429	3,612,211	453,138	44,665,503
Fund Type		Special Revenue Funds Totals	56,766,696	10,544,451	4,222,914	63,088,233
Fund Category		Governmental Funds Totals	56,766,696	10,544,451	4,222,914	63,088,233
		Grand Totals	148,104,521	80,486,941	81,442,204	147,149,258

Please note:

This report shows the total reserves or fund balance for each fund on a cash basis. Annually after making accruals for revenues and expenses and closing the books, individual reserves are calculated and reported in the audit. Individual reserves are not calculated on a monthly basis because the timing differences in the receipt of revenues and payment of expenses as well as lack of accruals are likely to produce misleading results.

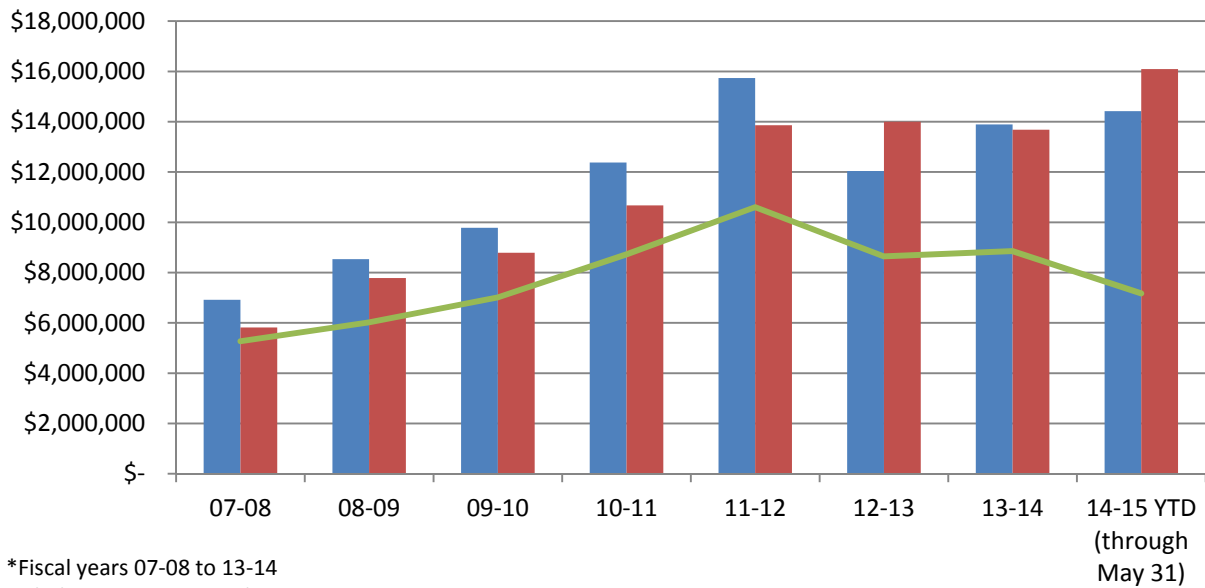
Fund 100 -- History of Revenues, Expenses and Ending Fund Balance



*Fiscal years 07-08 to 13-14 include Depreciation and Capitalized Expenses

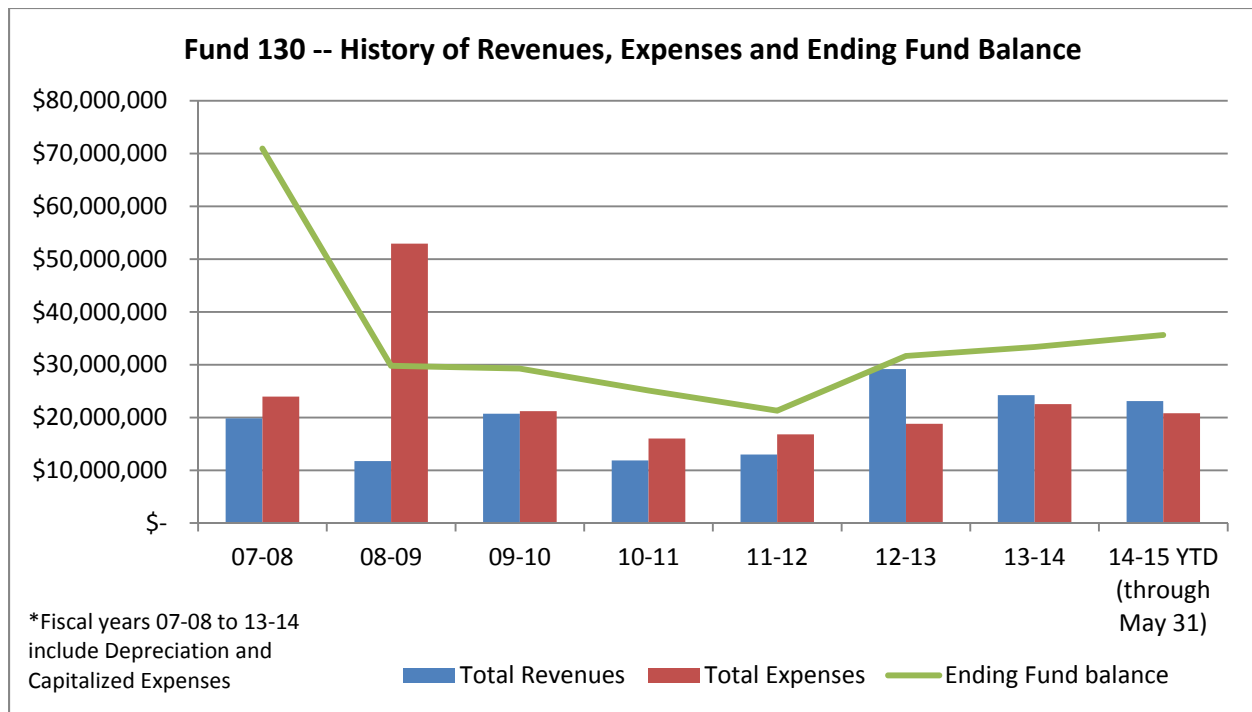
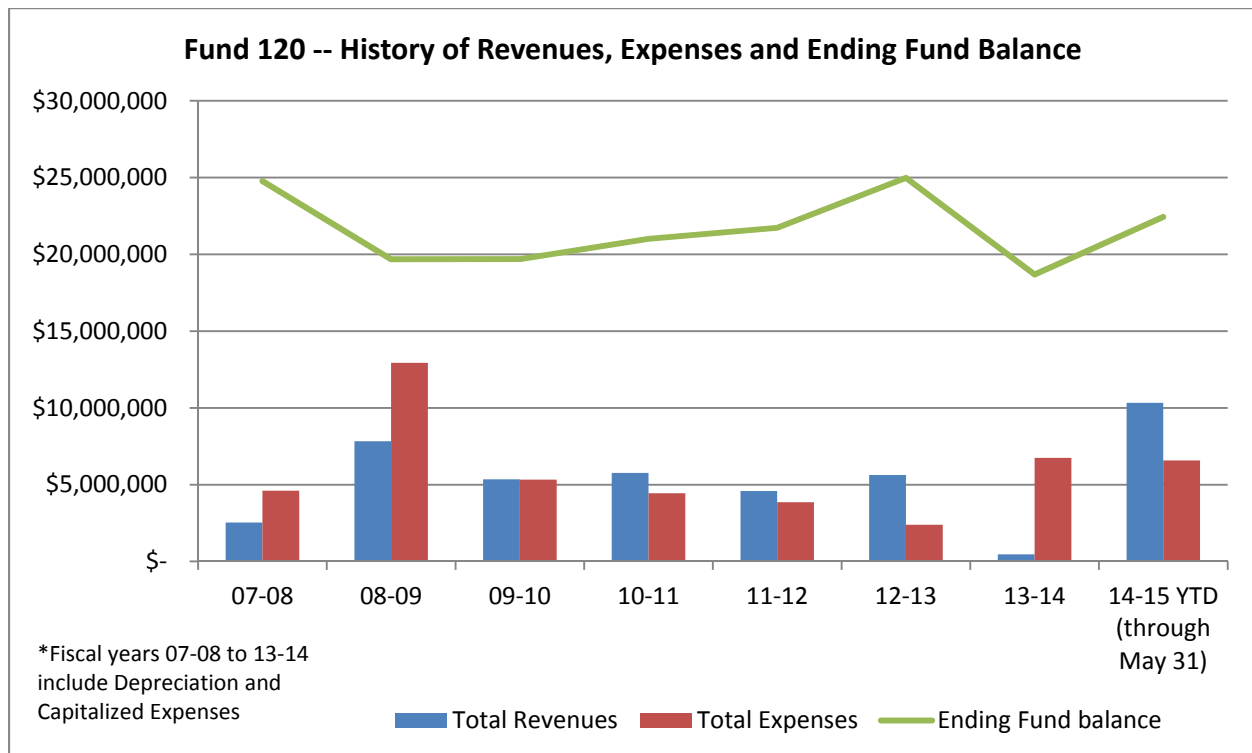
■ Total Revenues ■ Total Expenses — Ending Fund balance

Fund 110 -- History of Revenues, Expenses and Ending Fund Balance

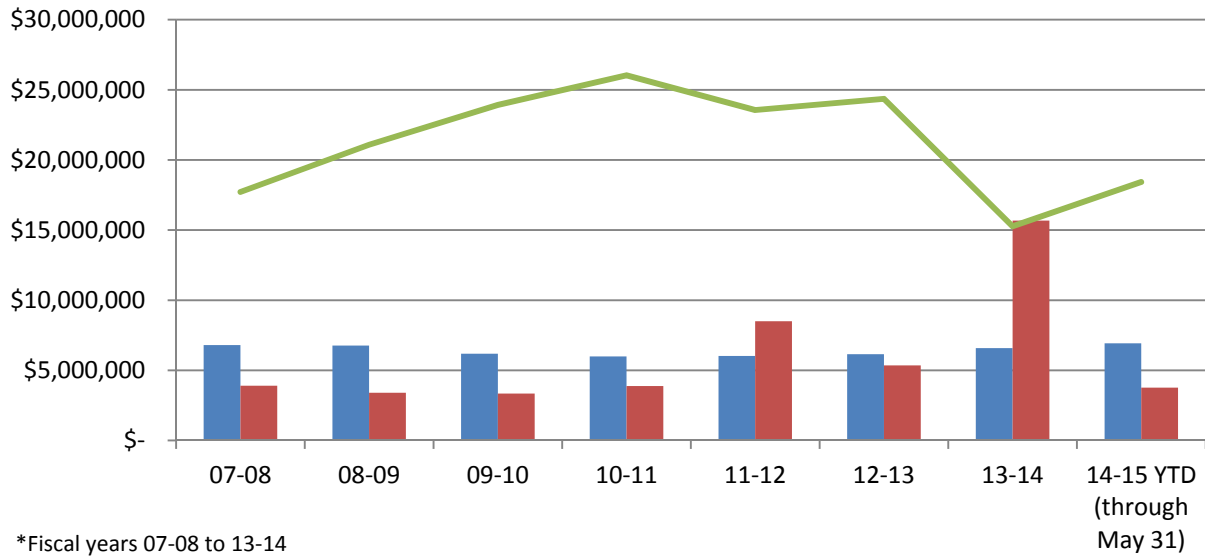


*Fiscal years 07-08 to 13-14 include Depreciation and Capitalized Expenses

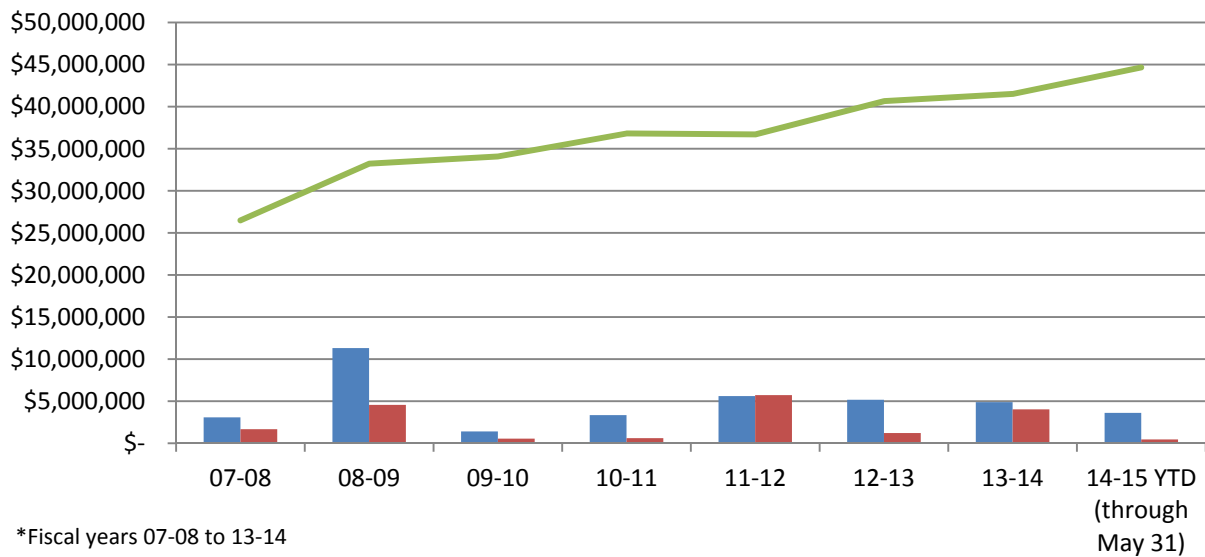
■ Total Revenues ■ Total Expenses — Ending Fund balance



Fund 200 -- History of Revenues, Expenses and Ending Fund Balance



Fund 210 -- History of Revenues, Expenses and Ending Fund Balance





ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: ADMINISTRATIVE SERVICES
CONTACT: BONI BREWER

AGENDA DATE: June 17, 2015

ITEM NO. 12c

SUBJECT: Legislative Update

SUMMARY:

- Zone 7 staff, with the support of Agency consultants, monitors legislation that is being considered in Sacramento, as well as other political activities of interest to the Agency.
- Governor Brown's May budget revise showed state revenues are \$6.7 billion more than estimated in January. The vast majority (\$5.5 billion) will go to K-12 schools and community colleges, while another \$1.27 billion will go to reduce debt and into the rainy day reserve fund. The budget proposed \$2.2 billion in additional spending for drought response. The new funding would come from a combination of accelerated spending from the water bond, new money from the general fund and Cap-and-Trade revenues. The spending is in addition to \$1.9 billion already allocated in the two drought emergency bills.
- Legislative budget subcommittees have been focused on the budget since the May revise. One area of concern for water contractors and farmers is the budget change proposal to increase water fees. The increased fees would be to implement the California Water Action Plan and to respond to the drought. The changes total \$7.2 million. Quick calculations showed it could nearly double fees. Committee staff was directed to provide a detailed analysis by early June and a meeting was set with concerned parties.
- Legislative leaders appointed a conference committee to resolve differences in the budgets passed by the Senate and the Assembly. It will be chaired by Senator Mark Leno. Other members include: Vice-Chair Assemblywoman Shirley Weber, Senator Ricardo Lara, Senator Jim Nielsen, Assemblyman Richard Bloom and Assemblywoman Melissa Melendez. To meet the constitutional deadline, both houses must pass the budget by June 15.
- The first statewide Field Poll taken since Governor Brown announced the 25 percent mandatory reductions showed 65 percent of respondents favored the action. Notably, there was no difference of opinion based upon where people lived—a response that poll director Mark DiCamillo called "striking." A substantial number of homeowners (44 percent) said it would be very difficult to curb their water use, while 57 percent of respondents thought agriculture could use water more efficiently.

RECOMMENDED ACTION: Information only.



EXECUTIVE SUMMARY State Legislation



Prepared for the Zone 7 Water Agency
by The Gualco Group, Inc.

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill / Comments as of 06/01/15
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Water Management

AB 149 (Chavez)	Urban water management plans	This bill would require each urban water supplier to update and submit its 2020 urban water management plan to the Department of Water Resources by July 1, 2021.	Watch	Senate Committee on Natural Resources and Water
AB 935 (Salas)	Integrated Regional Water Management Plans: conveyance projects: grants and expenditures	This bill would require the Department of Water Resources to provide grants and expenditures, consistent with an integrated regional water management plan, for the planning, design, and construction of local and regional conveyance projects that support regional and interregional connectivity and water management and provide certain benefits	Watch	On Assembly Floor
SB 664 (Hertzberg)	Water: urban water management planning	This bill would require an urban water supplier to include within its plan a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.	Watch	On Senate floor

Groundwater

AB 617 (Perea)	Groundwater	This bill would authorize a combination of one or more local agencies and one or more mutual water companies to enter into an agreement to form a groundwater sustainability agency and would authorize a groundwater sustainability agency formed by a joint powers agreement to exercise the powers granted in the Sustainable Groundwater Management Act.	Watch	On Assembly Floor
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Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
AB 936 (Salas)	Groundwater monitoring	This bill would authorize the Department of Water Resources to exempt an entity from this eligibility restriction if the entity submits to the department for approval documentation demonstrating that there are special circumstances justifying the entity's noncompliance, including, but not limited to, that a significant portion of the entity's service area qualifies as a disadvantaged community and that the water grant or loan project includes those actions needed to comply with groundwater monitoring functions.	Watch	DEAD
AB 937 (Salas)	Groundwater storage: beneficial use	This bill would require the Department of Water Resources to provide technical assistance to disadvantaged communities so that they may participate in groundwater planning, including, but not limited to, plans for regional groundwater banking, with any county or other local agency.	Watch	On Assembly Floor
AB 938 (Salas)	Groundwater: basin reprioritization: establishment of groundwater sustainability agency	This bill would impose a requirement to establish a groundwater sustainability agency or submit an alternative after reprioritization on a local agency or combination of local agencies overlying a groundwater basin.	Watch	In Senate Committee on Natural Resources and Water
AB 939 (Salas)	Groundwater sustainability agency: financial authority	The Sustainable Groundwater Management Act authorizes a groundwater sustainability agency to impose fees to fund the costs of a groundwater sustainability program and requires a groundwater sustainability agency to hold at least one public meeting prior to imposing or increasing a fee. This bill would require a groundwater sustainability agency to make the data upon which the proposed fee is based available 20 days prior to the public meeting to impose or increase a fee.	Watch	In Senate Committee on Natural Resources and Water
AB 1242 (Gray)	Water quality: impacts on groundwater: instream flows	This bill would require the State Water Resources Control Board to identify projects for fish recovery that may be undertaken in lieu of instream flows before adopting or approving water quality objectives or a program of implementation that requires instream flows for protection of instream beneficial uses	Watch	On Assembly Floor

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
AB 1243 (Gray)	Groundwater recharge: grants	This bill would establish the Groundwater Recharge Grant Fund and would provide that money in the fund is available, upon appropriation by the Legislature, to the State Water Resources Control Board to provide grants to local governments and water districts for groundwater recharge infrastructure projects.	Watch	DEAD
AB 1390 (Alejo)	Groundwater: adjudication	This bill would establish special procedures for an adjudication actions, which is defined as an action filed in superior court to determine the rights to extract groundwater within a basin or store water from a basin, as specified. The bill would authorize the court to determine all rights to groundwater in a basin whether based on appropriation, overlying right, or other basis of right. The bill would require these special procedures to govern all adjudication actions except in specified cases not involving allocation of a basin's groundwater supply.	Watch	In Senate Committee on Rules
SB 13 (Pavley)	Groundwater	This bill would specify that the State Water Resources Control Board is authorized to designate a high- or medium-priority basin as a probationary basin. This bill would provide a local agency or groundwater sustainability agency 90 or 180 days, as prescribed, to remedy certain deficiencies that caused the board to designate the basin as a probationary basin. This bill would authorize the board to develop an interim plan for certain probationary basins one year after the designation of the basin as a probationary basin.	Watch	In Assembly Committee on Water, Parks and Wildlife
SB 173 (Nielsen)	Groundwater: de minimis extractors	This bill would define a de minimis extractor as a person who extracts, for domestic purposes, 10 acre-feet or less per year.	Watch	DEAD
Well Reports				
SB 20 (Pavley)	Wells: reports: public availability	This bill would require the Department of Water Resources to, upon request, make the report of any person who digs, bores, or drills a water well, cathodic protection well, or a monitoring well, or abandons or destroys a well, or deepens or re-perforates a well, available to the public.	Watch	On Senate Floor

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
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CEQA

AB 311 (Gallagher)	Environmental quality: Water Quality, Supply, and Infrastructure Improvement Act of 2014	This bill would require the public agency, in certifying the environmental impact report and in granting approvals for specified water storage projects funded, in whole or in part, by Proposition 1. The bill would authorize the public agency to concurrently prepare the record of proceedings for the project.	Watch	DEAD
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AB 455 (Bigelow)	Groundwater sustainability plans: environmental impact reports	This bill would require the Judicial Council, on or before July 1, 2016, to adopt a rule of court to establish procedures applicable to actions or proceedings brought to attack, review, set aside, void, or annul the certification of an EIR for projects covered by a groundwater sustainability plan that require the actions or proceedings be resolved within 370 days of certification of the record of proceeding.	Watch	DEAD
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AB 1398 (Wilk)	Environmental quality: the Sustainable Environmental Protection Act	This bill would enact the Sustainable Environmental Protection Act and would specify the environmental review required pursuant to CEQA for projects related to specified environmental topical areas. The bill would provide that the act only applies if the lead agency or project applicant has agreed to provide to the public in a readily accessible electronic format an annual compliance report prepared pursuant to the mitigation monitoring and reporting program.	Watch	DEAD
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SB 127 (Vidak)	Environmental quality: Water Quality, Supply, and Infrastructure Improvement Act of 2014	This bill would require the public agency, in certifying the environmental impact report and in granting approvals for projects funded, in whole or in part, by Proposition 1, including the concurrent preparation of the record of proceedings and the certification of the record of proceeding within 5 days of the filing of a specified notice, to comply with specified procedures.	Watch	DEAD
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Public Works

AB 251 (Levine)	Public Works: public subsidies	This bill would provide that a public subsidy is de minimis if it is both less than \$75,000 and less than 1% of the total project cost. The bill would specify that those provisions do not apply to a project that was advertised for bid, or a contract that was awarded, before January 1, 2016.	Watch	In Senate Committee on Labor and Industrial Relations
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Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
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[AB 1315](#)
[\(Alejo\)](#)

Public contracts: water pollution prevention plans: delegation

This bill would prohibit a public entity, charter city, or charter county from delegating to a contractor the development of a plan, as defined, used to prevent or reduce water pollution or runoff on a public works contract, except as provided. The bill would also prohibit a public entity, charter city, or charter county from requiring a contractor on a public works contract that includes compliance with a plan to assume responsibility for the completeness and accuracy of a plan developed by that entity.

Watch

DEAD

Invasive Species

[AB 300](#)
[\(Alejo\)](#)

Safe Water and Wildlife Protection Act of 2015

This bill would enact the Safe Water and Wildlife Protection Act of 2015, which would require the State Water Resources Control Board to establish and coordinate the Algal Bloom Task Force.

Watch

On Assembly Floor

[SB 223](#)
[\(Galgiani\)](#)

Division of Boating and Waterways: oversight committee: invasive aquatic plants

This bill would require the Division of Boating and Waterways, no later than January 1, 2017, to establish an advisory and oversight committee to evaluate and monitor the activities of the division relating to the management and control or eradication of invasive aquatic plants in the Sacramento-San Joaquin Delta.

Watch

On Senate Floor

Governance

[AB 386](#)
[\(Dahle\)](#)

Tulelake Irrigation District

This bill would provide that, for the Tulelake Irrigation District, every owner of real property assessed by the district, but no others, is authorized to vote at district elections for director, as prescribed.

Watch

DEAD

[AB 402](#)
[\(Dodd\)](#)

Local agency: services: contracts

This bill would revise the circumstances under which a local agency formation commission may authorize a city or district to provide new or extended services. This bill would additionally establish a pilot program, until January 1, 2021, for the Napa, Sonoma, and San Bernardino commissions that would permit those commissions to authorize a city or district to provide new or extended services outside both its jurisdictional boundaries and its sphere of influence under specified circumstances.

Watch

In Senate Committee on Rules

[AB 656](#)
[\(Garcia\)](#)

Joint powers agreements: mutual water companies

This bill would specifically authorize a mutual water company and a public agency to participate in joint powers agreement for the provision of insurance and risk-pooling, technical support, and other similar services for the purpose of reducing risk liability.

Watch

In Senate Committee on Rules

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
SB 272 (Hertzberg)	The California Public Records Act: local agencies: inventory	This bill would require each local agency, in implementing the California Public Records Act, to create a catalog of enterprise systems, as defined, to make the catalog publicly available upon request in the Office of the clerk of the agency's legislative body, and to post the catalog on the local agency's Internet Web site.	Watch	In Assembly Committee on Judiciary
SB 554 (Wolk)	California Water Commission: disqualifying financial interest; removal from office	This bill would remove a member of the California Water Commission from office if after trial a court finds that the commission member has knowingly participated in any commission decision in which the member has a disqualifying financial interest in the decision.	Watch	DEAD
SB 704 (Gaines)	Public officers and employees: conflict of interest	This bill would include in the definition of "remote interest" the interest of a person who is an owner or partner of a firm serving on an advisory board or commission to the contracting agency, if the duties of the advisory board or commission do not include providing advice with respect to seeking or awarding contracts and if the owner or partner recuses himself or herself from all participation in reviewing a project that results from a contract between the firm and the contracting agency.	Watch	At Assembly Desk
Sacramento-San Joaquin Delta				
AB 501 (Levine)	Resources: Delta research	This bill would require a person conducting Delta research, whose research is funded, in whole or in part, by the state, to take specified actions with regard to the sharing of the primary data, samples, physical collections, and other supporting materials created or gathered in the course of that research.	Watch	DEAD
AB 1201 (Salas)	Fish and wildlife: Sacramento-San Joaquin Delta: predation by nonnative species	This bill would require the Department of Fish and Wildlife, by June 30, 2016, to develop and initiate a science-based approach that addresses predation by nonnative species upon species of fish listed pursuant to the act that reside all or a portion of their lives in the Sacramento-San Joaquin Delta.	Favor	On Assembly Floor
AB 1325 (Salas)	Delta smelt	This bill would enact the Delta Smelt Preservation and Restoration Act of 2016. The act would require the Department of Fish and Wildlife to develop a Delta smelt hatchery program to preserve and restore the Delta smelt.	Favor	DEAD

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
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Energy

AB 568 (Dodd)	Reclamation District No. 108: hydroelectric power	Existing law authorizes Reclamation District No. 1004, in conjunction with the County of Colusa, to construct, maintain, and operate a plant, transmission lines, and other necessary or appropriate facilities for the generation of hydroelectric power. This bill would grant the above-described hydroelectric power authority to Reclamation District No. 108 until January 1, 2021.	Watch	In Senate Committee on Rules
SB 471 (Pavley)	Water, energy, and reduction of greenhouse gas emissions: planning	This bill would require the State Air Resources Board, in cooperation with various other agencies, to develop an emissions inventory of greenhouse gas emissions from the water system in the state, using best available data. The bill would include reduction of greenhouse gas emissions associated with water treatment among the investments that are eligible for funding from the Greenhouse Gas Reduction Fund.	Watch	On Senate Floor
SB 758 (Block)	Atmospheric Rivers Research and Mitigation Fund	This bill would establish the Atmospheric Rivers Research and Mitigation Program in the Department of Water Resources to research the causes and effects of atmospheric rivers, and to take actions to capture water generated by atmospheric rivers to increase the water supply and reliability of water resources in the state and to operate reservoirs in a manner that improves flood protection in the state.	Watch	On Senate Floor

Water Efficiency

AB 585 (Melendez)	Outdoor Water Efficiency Act of 2015: income tax credits: outdoor water efficiency	This bill, for taxable years beginning on or after January 1, 2015, and before January 1, 2021, or an earlier specified date, would allow a credit equal to 25% of the amount paid or incurred by a qualified taxpayer for water-efficiency improvements made to outdoor landscapes on qualified real property in this state, not to exceed \$2,500 per taxable year, as specified.	Watch	In Assembly Committee on Revenue and Taxation
SB 553 (Wolk)	Water Conservation	This bill would require the Department of General Services to identify each public property in the department's state property inventory where it is feasible for water consumption to be reduced and water efficiencies to be achieved through implementation of the relevant recommendations made in the model water efficient landscape ordinance and would require the department to implement the relevant recommendations where feasible.	Watch	DEAD

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
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Disadvantaged Communities

AB 615 (Rendon)	Office of Sustainable Water Solutions: technical assistance	This bill would specify the types of technical assistance services that may be provided by the Office of Sustainable Water Solutions and would authorize the office to establish and administer at least one "Center for Excellence" for the purpose of providing technical assistance to disadvantaged communities.	Watch	On Assembly Floor
SB 552 (Wolk)	Public water systems: disadvantaged communities: drinking water standards	This bill would require, by January 1, 2017, the State Water Resources Control Board to develop a report identifying specific funding and enforcement mechanisms necessary, to ensure that disadvantaged communities have water systems that are in compliance with state and federal drinking water standards.	Watch	On Senate Floor

Water Use

AB 647 (Eggman)	Beneficial use: storing of water underground	This bill would declare that the storing of water underground constitutes a beneficial use of water if the diverted water is used while it is in underground storage for specified purposes. This bill would provide that the period for the reversion of a water right does not include any period when the water is being used in the aquifer or storage area or is being held in storage for later application to beneficial use.	Watch	On Assembly Floor
AB 1244 (Gray)	Water rights: small irrigation use	This bill would require the State Water Resources Control Board to adopt general conditions, in consultation with the Department of Food and Agriculture, the University of California Cooperative Extension, and others, including, but not limited to the Department of Fish and Wildlife, for small irrigation use, unless the board determines that sufficient funds are not available for that purpose.	Watch	DEAD
SB 555 (Wolk)	Department of Water Resources: urban retail water suppliers: water loss audits	This bill would require each urban retail water supplier, on or before July 1, 2017, and annually each year thereafter, to submit a completed and validated water loss audit report for the previous calendar year as prescribed by rules adopted by the Department of Water Resources on or before January 1, 2017, and updated as provided.	Watch	On Senate Floor

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
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Well Stimulation (Fracking)

AB 1490 (Rendon)	Oil and gas: well stimulation treatments: seismic activities	This bill would prohibit a well operator from conducting a well stimulation treatment following the occurrence of an earthquake of magnitude 2.5 or higher on a well that is within a radius of 10 miles from the epicenter of the earthquake until the division completes a certain evaluation and is satisfied that the well stimulation treatment does not create a heightened risk of seismic activity. The bill would also prohibit wastewater disposal wells and all well stimulation treatments within 10 miles of a recently active fault.	Watch	DEAD
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Drinking Water

AB 1173 (Williams)	Water equipment: backflow prevention devices testing: certification	This bill would require, if a local health officer does not maintain a program for certification of backflow prevention device testers, the testing and maintenance of a backflow prevention device be performed by a person who has received a California-specific certification for testing backflow prevention devices from one of specified entities or a similar certification provider deemed acceptable by the state board or the local health officer.	Watch	In Senate Committee on Rules
AB 1376 (Perea)	State Water Resources Control Board: appropriation: drought-related drinking water projects	This bill would appropriate \$15,000,000 from the General Fund to the state board, for expenditure until June 30, 2016, for grants of up to \$500,000 per project for public water systems to address drought-related drinking water emergencies or threatened emergencies in the state. The bill would require the state board to make every effort to use other funds available to address drinking water emergencies, including federal funds made available for the drought, prior to using the funds appropriated pursuant to these provisions.	Watch	In Assembly Committee on Water, Parks and Wildlife
SB 385 (Hueso)	Primary drinking water standards: hexavalent chromium: compliance plan	This bill would authorize, until January 1, 2020, the State Water Resources Control Board, at the request of a public water system that prepares and submits a compliance plan to the state board, to grant a period of time to achieve compliance with the primary drinking water standard for hexavalent chromium by approving a compliance plan.	Watch	At Assembly Desk

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
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Water Quality

AB 1454 (Wagner)	Water quality standards: trash: single-use carryout bags	This bill would suspend the operation of certain amendments to water quality control plans relating to the total maximum daily load for trash unless and until the provisions inoperative due to a pending referendum election become effective.	Watch	DEAD
SB 615 (Berryhill)	Waste discharge requirements: waivers: managed wetlands	This bill would require that managed wetlands be presumed to not pose a significant threat to water quality and would require, with respect to managed wetlands, the state board and regional boards to waive the reporting requirements, regional board prescribed waste discharge requirements, and monitoring requirements of the waiver program, except that the state board or a regional board shall require water quality monitoring of a managed wetland not more than once during the duration of each waiver period unless results of downstream monitoring demonstrate a violation of water quality discharge standards.	Watch	DEAD

Spot Bills

AB 478 (Harper)	Desalination	Current law provides that it is the intention of the Legislature that the Department of Water Resources shall undertake to find economic and efficient methods of desalting saline water so that desalted water may be made available to help meet the growing water requirements of the state. This bill would make a nonsubstantive change in these provisions.	Watch	DEAD
AB 1128 (Jones-Sawyer)	Water conservation	This bill would make nonsubstantive changes to existing law that declares the intent of the Legislature to promote urban water conservation standards.	Watch	DEAD
AB 1473 (Salas)	California Environmental Quality Act	This bill would make technical, nonsubstantive changes to provisions relating the California Environmental Quality Act.	Watch	DEAD
AB 1499 (Gray)	Property tax: revenue allocations	This bill would make a nonsubstantive change to the provision relating to allocation of property tax revenues to local jurisdictions.	Watch	DEAD

Bill	Topic	Synopsis	Staff Recommendation	Status of the Bill/Comments as of 06/01/15
SB 568 (Fuller)	Waste discharge requirements: waivers: managed wetlands	This bill would declare the intent of the Legislature to enact legislation relating to the Sustainable Groundwater Management Act.	Watch	DEAD
SB 756 (Stone)	California Environmental Quality Act	This bill would state the intent of the Legislature to enact legislation to amend CEQA.	Watch	DEAD
SB 768 (Wieckowski)	Water-conserving plumbing fixtures	This bill would make technical, nonsubstantive changes to these findings and declarations regarding the replacement of plumbing fixtures that are not water conserving	Watch	DEAD
SB 772 (Stone)	Bay Delta Conservation Plan: judicial review	This bill would state the intent of the Legislature to enact legislation establishing judicial review procedures for the Bay Delta Conservation Plan.	Watch	DEAD



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: ADMINISTRATIVE SERVICES

CONTACT: BONI BREWER

AGENDA DATE: June 17, 2015

ITEM NO. **12d**

SUBJECT: Outreach Activities

Gardening & Water Conservation Workshop, May 2nd

Zone 7 participated in this workshop and provided tips and informational materials on how to reduce water use both outdoors and indoors. The event was hosted by the City of Dublin as part of Dublin Pride Week.

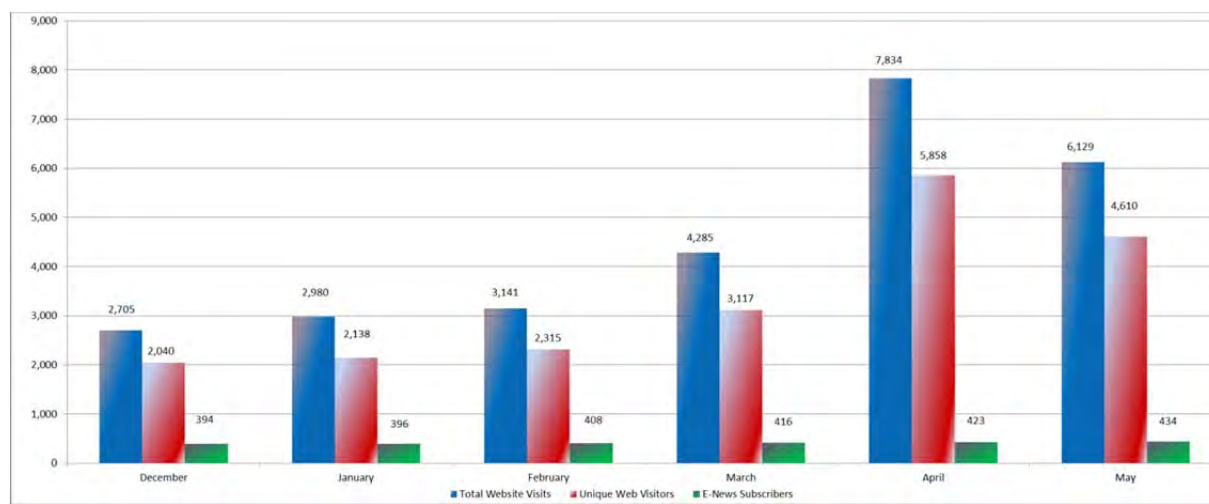
Water Awareness Month (May) Activities

In addition to honoring Zone 7's three Alameda County Science & Engineering Fair special awards winners at the May board meeting, the students' project boards were put in Zone 7's lobby for public display. Also as part of Water Awareness Month in May, schools program staff distributed "Water Saving Checklist for Kids" fliers in classrooms for students to take home. Staff also distributed posters to local libraries regarding the Alameda County Clean Water Program's "LuvtheBay" photo mosaic project, inviting residents to submit photos pledging to eliminate litter on streets, creeks and the Bay.

E-Newsletter, May 5th

The e-newsletter featured an article on the Arroyo Mocho Stanley Reach Riparian Restoration and Channel Enhancement Pilot Project recently being named a finalist in ACWA's 2015 Clair A. Hill Water Agency Award for Excellence.

Website & E-news Subscription Activity





ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: Engineering

CONTACT: Rhett Alzona

AGENDA DATE: June 17, 2015

ITEM NO. 12e

SUBJECT: Drought Update

SUMMARY:

- Lake Del Valle's water level is holding steady, with releases to the Arroyo Valle continuing at 12 cubic feet per second (cfs) including 2.5 cfs to Shadow Cliffs. Releases were made in May to accommodate the Vernalis Adaptive Management Plan (VAMP) outage. The current lake level in Del Valle is around 702 feet (39,200 AF).
- Raw water TOC concentrations were observed to be around 4.8 mg/L to 5.8 mg/L at the treatment plants in May, slightly lower than last month. However, coagulant demand continues to be higher than normal to combat the elevated TOC levels. Pilot testing of carbon dioxide at Del Valle is providing only minor relief.
- Following is the status of the ongoing emergency projects approved by the board:
 1. Busch Valley Well No. 1, Phase 1 – Zone 7 entered into a Progressive Design-Build (D/B) contract with Conco West, Inc. (with Stantec as sub-consultant). Along with the Basis of Design, Zone 7 is proceeding with Phase 1 work to provide a connection for the new well to the Zone 7 transmission system. In the near term, in case of limited to no surface water, this connection would give Zone 7 the option of using a temporary booster pump station to pump well water from the west side to the east side of the Zone 7 transmission system. This will be the final work to be undertaken before the remainder of the Busch Valley Well project is deferred. The Zone 7 Board has approved up to \$2.15 million which includes Zone 7 staff time, PG&E service, right-of-way engineering, and contingencies for the remaining work.

Phase 1 work began late due to design and construction coordination issues with PG&E. As of the week of June 1, the pipeline tie-in has been made under Valley Avenue. Site fencing, sidewalk and street repairs are scheduled to be conducted in the next two weeks. The restraining of an inadequately secured pipeline tee in another vault is scheduled for and expected to be complete by the third week in June. This pipeline tie is used to convey water to the BV1 tie-in. The remaining work will be the installation of electrical service. PG&E has started to perform their portion of the electrical design for service to the BV1 site. PG&E Service and associated electrical facilities are anticipated to be complete by December 2015.

2. Stoneridge Cross Valley Isolation Valve – Stoneridge Well is Zone 7's highest producing well. By itself, the well produces water that is just below the current hexavalent chromium (Cr6) drinking water standard maximum contaminant level (MCL). Moreover, by blending with surface water, water at the turnouts can be easily managed below the Cr6 MCL. This new isolation valve enables Zone 7 to direct Stoneridge Well water in the westerly direction in the event the well water exceeds the hexavalent chromium and there is limited surface water. During times of limited to no surface water, Stoneridge Well water can stay below the MCL by blending with other wells and water from the Mocho Groundwater Demineralization Plant on the west side of the Zone 7 transmission system. Zone 7 entered into a Progressive Design-Build contract with Conco West, Inc. (with Stantec as sub-consultant) for a not-to-exceed amount of \$452,000. Construction to install the new valve and valve vault is complete. Electrical systems installation for remote operation of the new valve and the sump pump line to the sewer system is almost complete. Remaining work is to replace an existing surge anticipator valve in need of maintenance but no longer supported by the manufacturer.

During the month of May, both Treatment Plants were online and groundwater use made up only 3% of supply. Cawelo and Semitropic Water Districts continue to recover water for Zone 7. Zone 7 is making releases on Arroyo Valle to maintain a live stream and recharge the groundwater basin. The Mocho Groundwater Demineralization Plant (MGDP) operation was limited to minimum reverse osmosis (RO) feed to maintain the membranes. Minimal MGDP use reduces discharge of the concentrate which minimizes water loss (waste stream is approximately 15% of the amount of groundwater pumped).

- The State Water Project Table A allocation has remained at 20%. This is expected to be the final allocation.
- DWR's pumping has filled Lake Del Valle to capacity. Zone 7 also has a claim to about 3,000 AF of local runoff minus a portion that is lost to evaporation.
- Zone 7 continues to store any excess surface water supply (i.e., surface water from the State Water Project that could not be used directly at this time) in San Luis Reservoir.

BACKGROUND:

Calendar Year 2013 was the driest year in recorded state history. 2013 also set a new record as the driest year measured in the Livermore-Amador Valley, with total precipitation of only 4.5 inches out of the average yearly rainfall of 14.47-inches (only 31% of average recorded at Livermore Station 15e). In early January 2014, the snowpack's statewide water content was estimated at about 20% of the recorded average for this time of year. On January 17, 2014, Governor Jerry Brown declared a State of Emergency in California due to the current drought conditions and asked all citizens to cut back water use by 20%. On January 29, 2014 at a Special Meeting of the Zone 7 Board, a Local Drought Emergency was declared and a Drought Emergency Response Plan was accepted. In addition, on January 31, 2014, the California Department of Water Resources (DWR) announced they were reducing State Water Project allocations from 5% to zero for the first time in history.

On January 29, 2014, the General Manager was authorized and directed to establish an appropriate level of conservation for the Livermore-Amador Valley, consistent with the governor's proclamation of a drought emergency (20% or greater). The initial conservation level was set at 20%.

On April 16, 2014, the Zone 7 Board received the annual Sustainability Report and authorized the General Manager to implement Stage Two Actions under the 2010 Urban Water Management Plan to achieve 25% demand reductions. On April 25, Governor Jerry Brown issued a second drought proclamation.

On July 29, a State Water Resources Control Board (SWRCB) emergency regulation to increase conservation practices for all Californians went into effect. The new conservation regulation targets outdoor urban water use and mandates conservation reporting by retail water agencies.

On August 14, the California Public Utilities Commission ordered the water companies under its jurisdiction to provide notice to their customers of the July 29 emergency regulation.

While conditions have improved from Calendar Year 2013, the drought still continues. The fall season of 2014 was relatively dry. A wet December 2014 was followed by a record dry January 2015, the driest January in recorded history for the State and Bay Area. Some rain in February and April helped locally.

On April 1, 2015, DWR's manual snow survey found the statewide snowpack with less water content today than any April 1st since 1950. The dismal snow survey results were followed by a new Executive Order from the Governor mandating 25% demand reduction across California underscoring the continued severity of the drought.

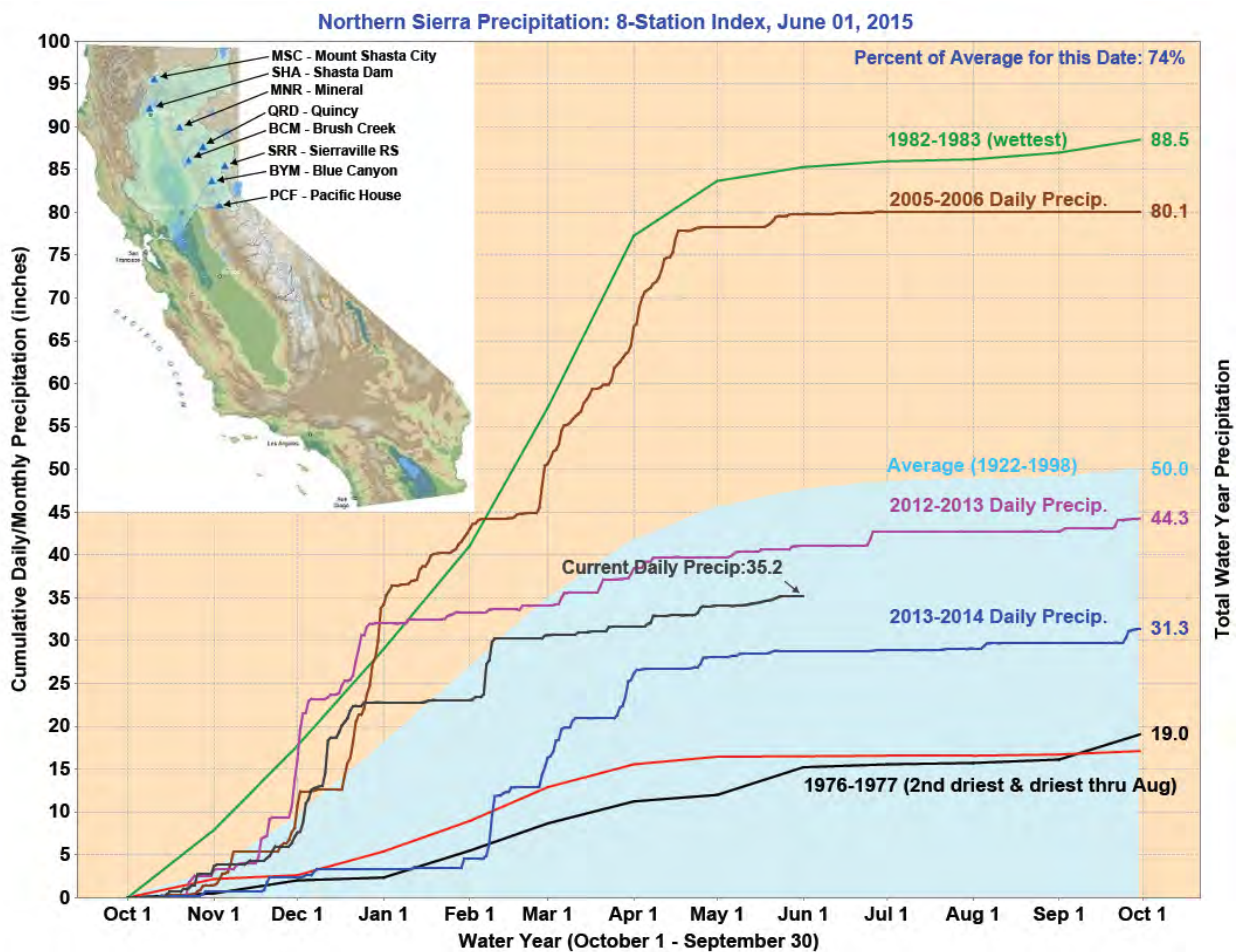
On April 15, 2015, the Zone 7 Board extended the local state of drought emergency, lifting the Stage 2 actions, and shifting support of the new statewide water conservation requirements.

On May 5, 2015, the SWRCB adopted an emergency conservation regulation in accordance with the Governor's latest directive. The provisions of the emergency regulation went into effect on May 15, 2015. This regulation set specific conservation targets for water retailers.

DISCUSSION:

There was a little rain in May. The Northern Sierra hydrology average is at 35.2 inches compared to an average of 47.5 inches for this time of year (see graph; or for updates see http://cdec.water.ca.gov/cgi-progs/products/PLOT_ESI.pdf).

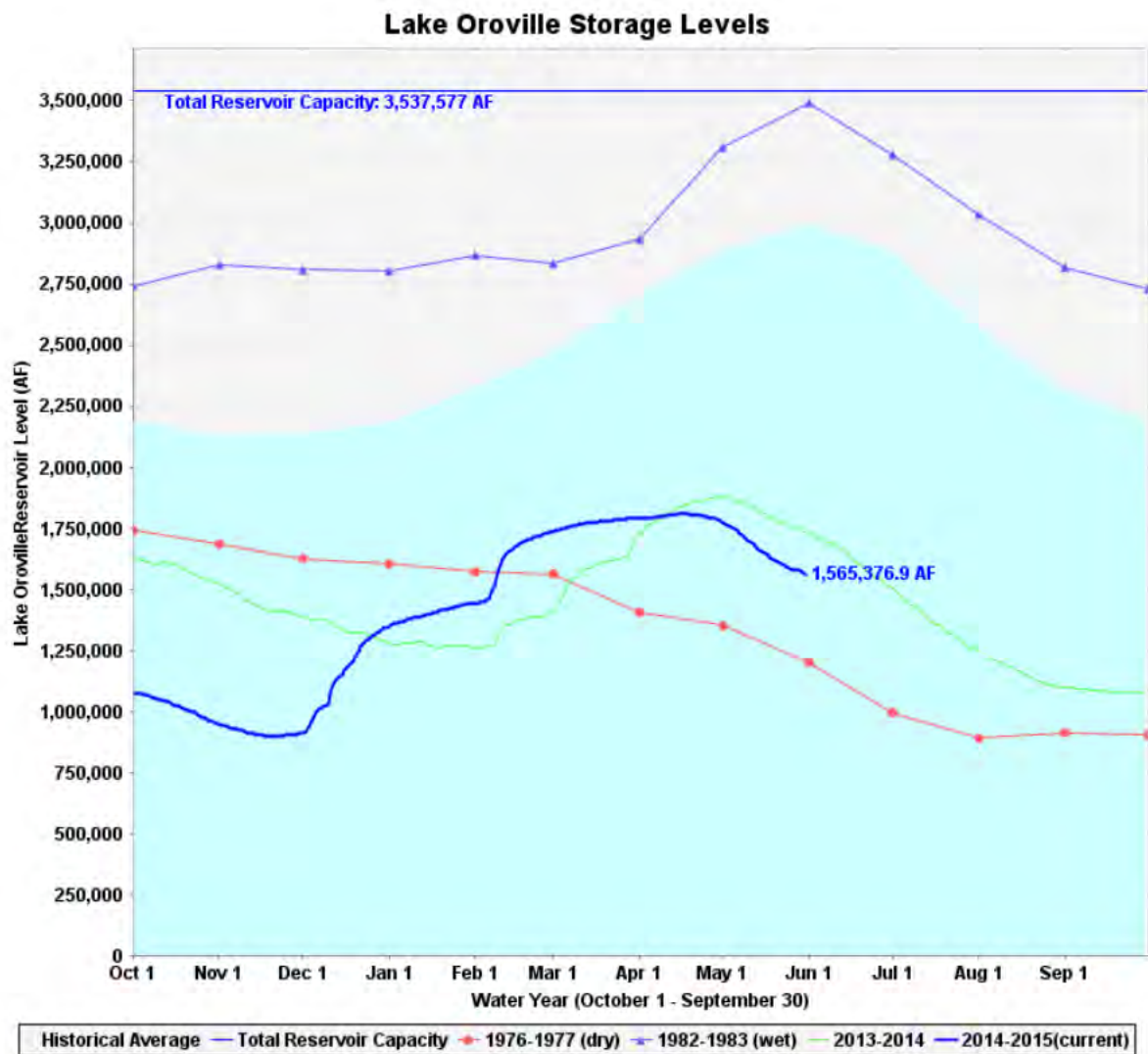
Northern Sierra precipitation is critical as it determines DWR's ability to refill Lake Oroville, which is the primary source of water for Zone 7 (water is released from Lake Oroville into the Feather and then the Sacramento River and from there it is conveyed through the Delta by a series of levees that direct the Oroville releases to the South Delta pumps which bring water to the Livermore Valley and to other State Water Contractors).



The local hydrology for the current Water Year (October 1, 2014-May 31, 2015) is currently at 91% of average recorded conditions to-date at 12.74 inches. This is 12% below the annual recorded average of 14.45 inches.

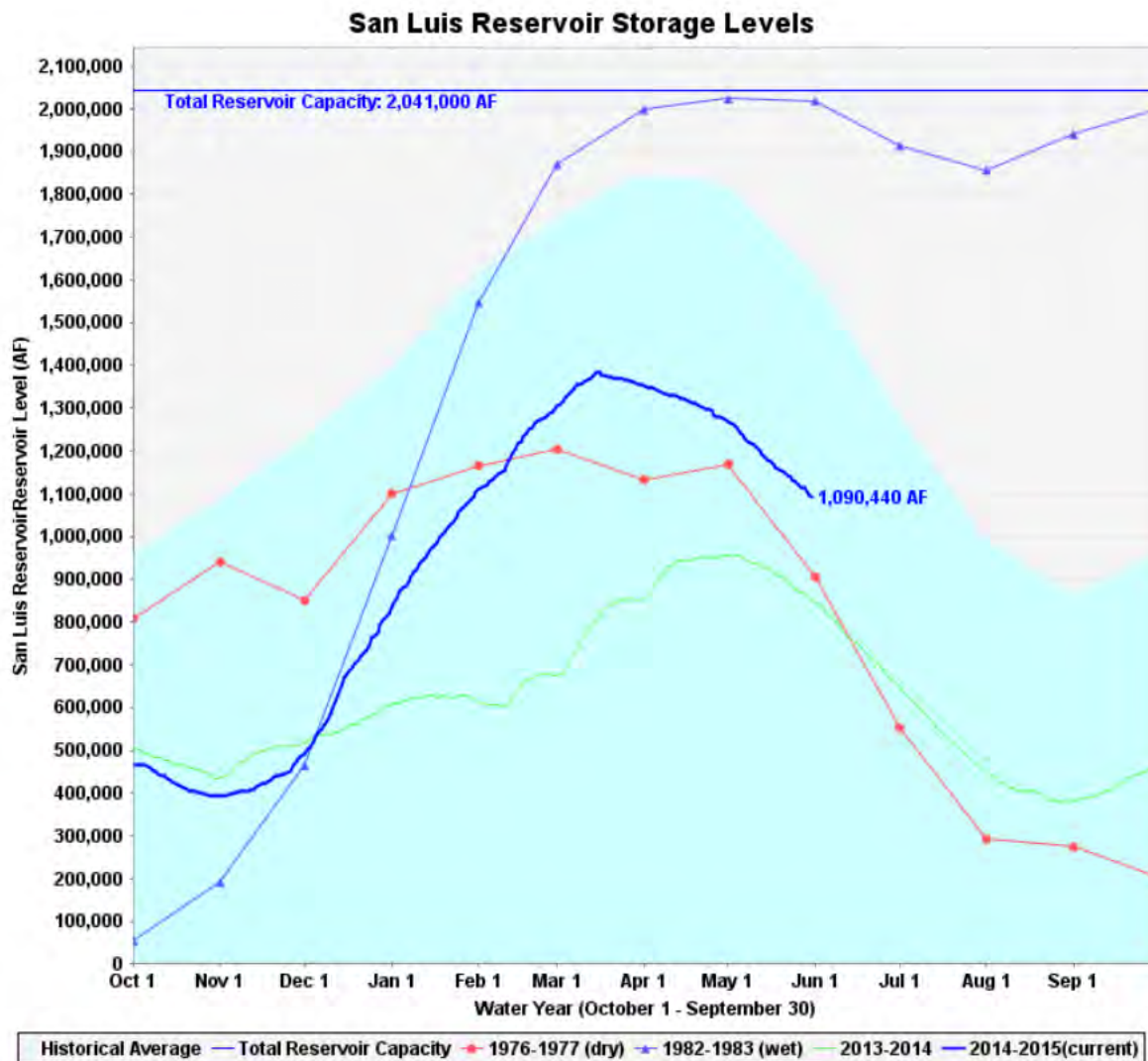
With limited snow pack this year and very little runoff, Lake Oroville levels have dipped and are slightly lower than at this time last year. However, Lake Oroville levels continue to be above the 1976-1977 critical dry year conditions (see Oroville graph, below). The current 1,565,377 AF of storage represents 44% of Lake Oroville's total capacity and approximately 52% of the historic average.

Lake Oroville storage levels can be tracked on the DWR data website at <http://cdec.water.ca.gov/cdecapp/resapp/resDetailOrig.action?resid=ORO>



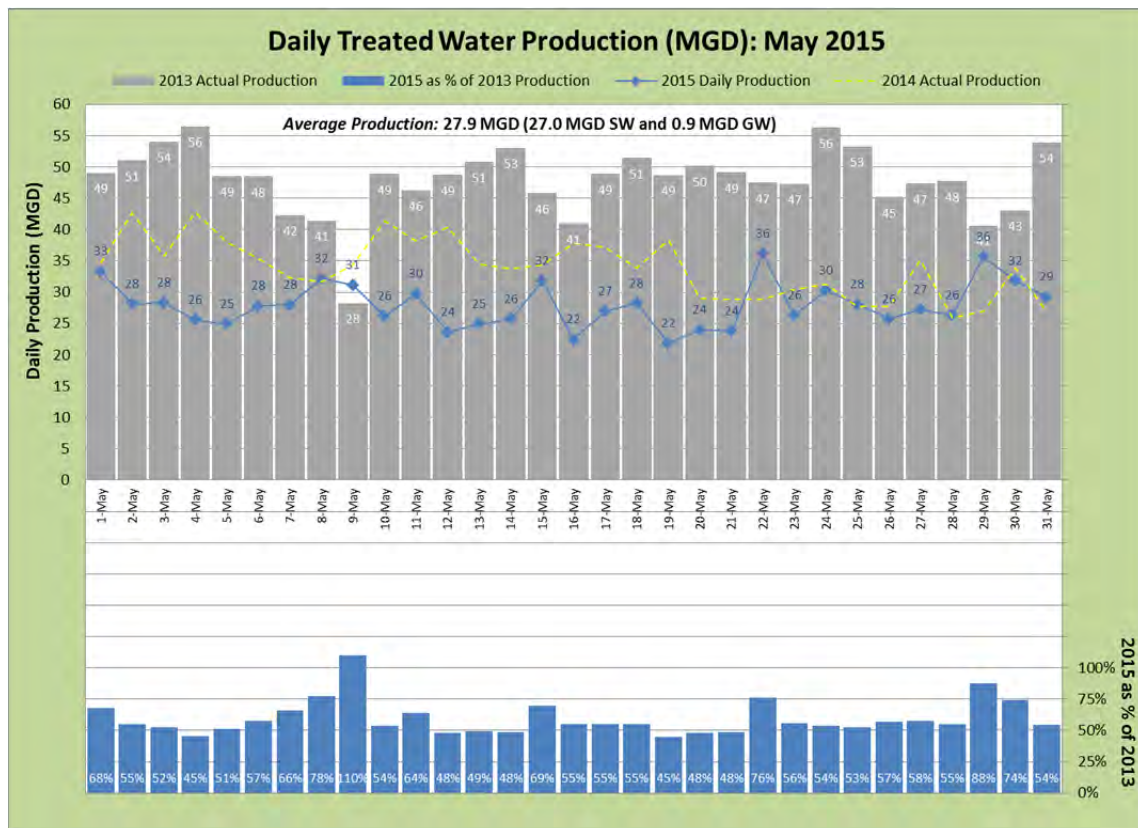
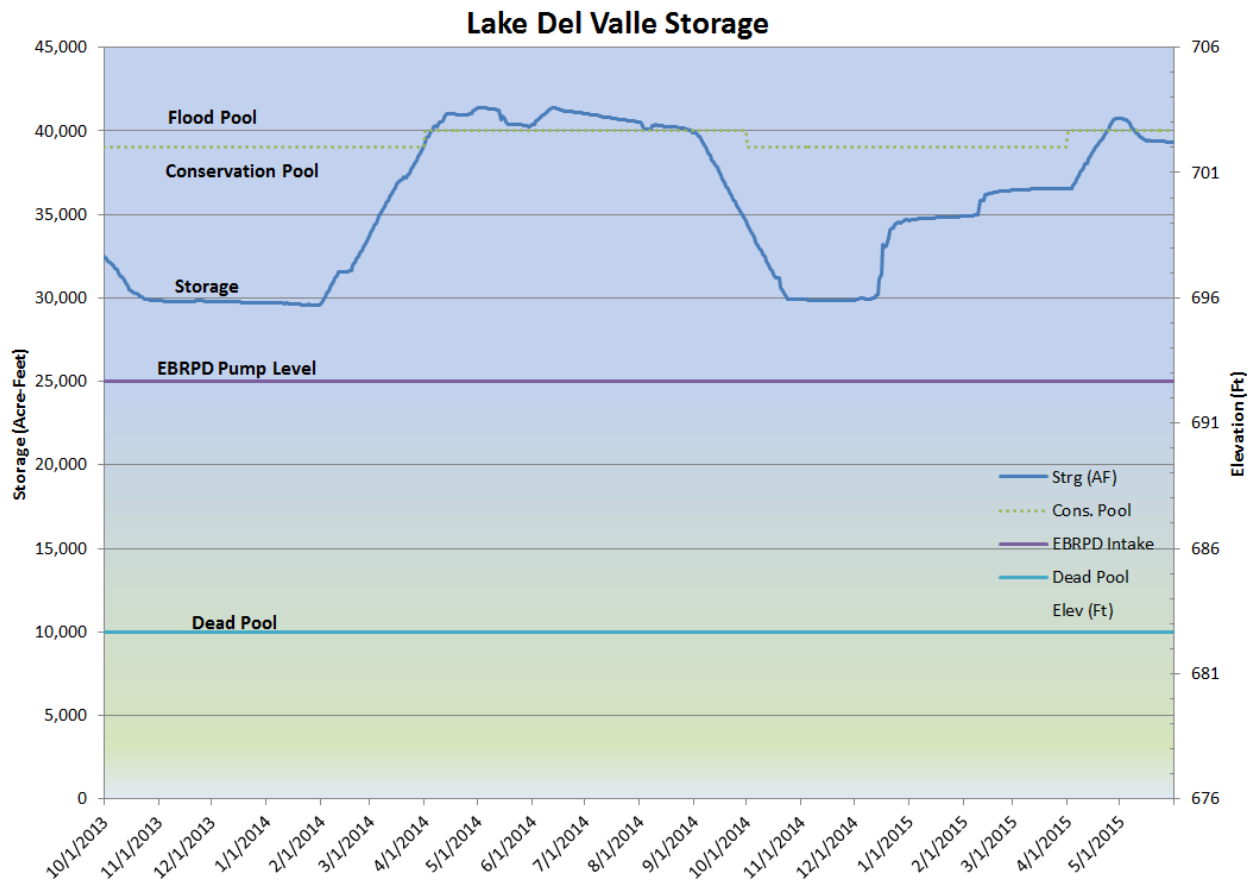
While Lake Oroville levels remain low, as shown in the graph above, San Luis Reservoir storage levels are much higher in Water Year 2014-2015 than Water Year 2013-2014 (see graph below). The current 1,090,440 AF of storage represents 53% of San Luis Reservoir's total capacity and approximately 67% of the historic average.

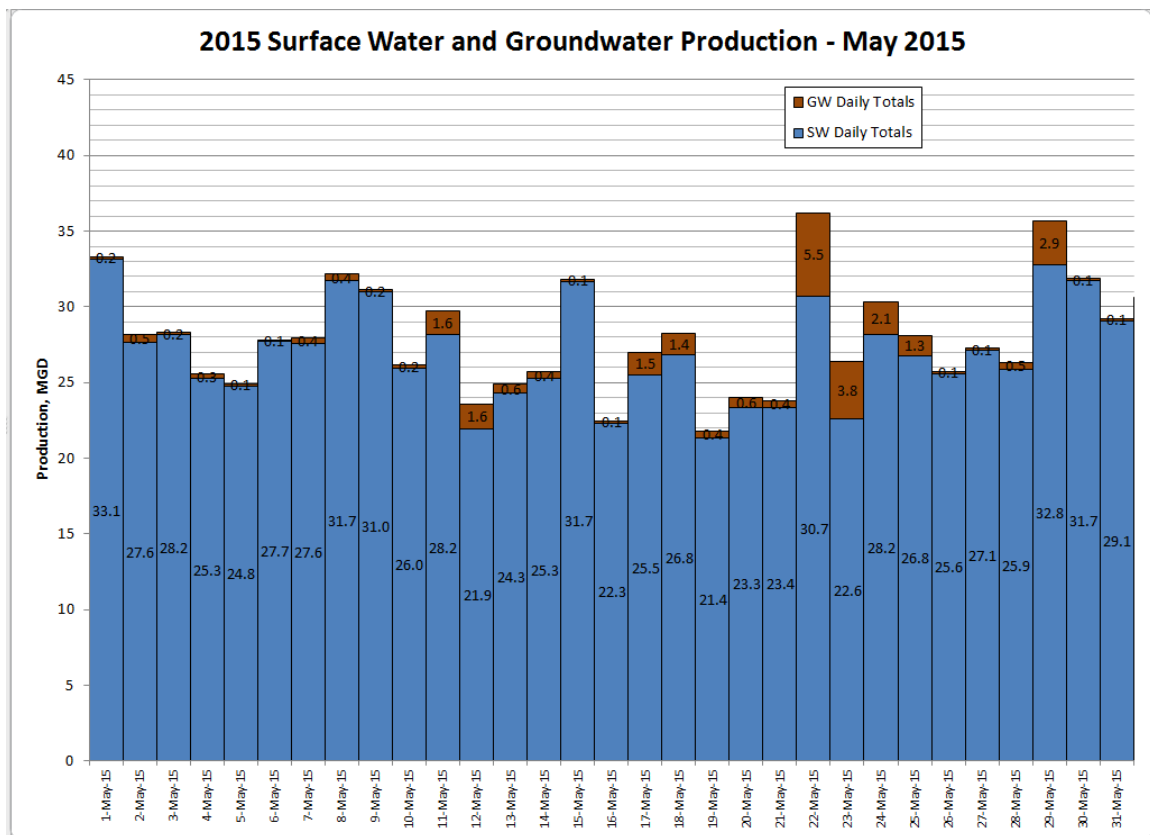
San Luis Reservoir storage levels can be tracked on the DWR data website at <http://cdec.water.ca.gov/cdecapp/resapp/resDetailOrig.action?resid=SNL>



Local demands for treated water in May 2015 increased from 24 MGD in April to 28 MGD, which is significantly lower than the May 2013 demand of 48 MGD. Surface water made up 97% of the water supply in May, consisting primarily of banked water from Semitropic Water Storage District (Semitropic) and Cawelo Water District (Cawelo). Del Valle Water Treatment Plant and the Patterson Pass Water Treatment Plant produced an average of 27.0 MGD with wells supplying 0.9 MGD for a total average production of 27.9 MGD.

Lake Del Valle storage levels are shown in the graph below. Water Year 2013-2014 shows the typical flow levels through the year. In the winter months, lake elevations are lowered for flood control purposes to capture storm water runoff. In the summer months, lake elevations are raised for recreational purposes. Lake Del Valle's current water level is holding steady, with releases to the Arroyo Valle continuing at 12 cubic feet per second (cfs) including 2.5 cfs to Shadow Cliffs. On May 31, the lake level in Del Valle was around 702 feet (39,200 AF).



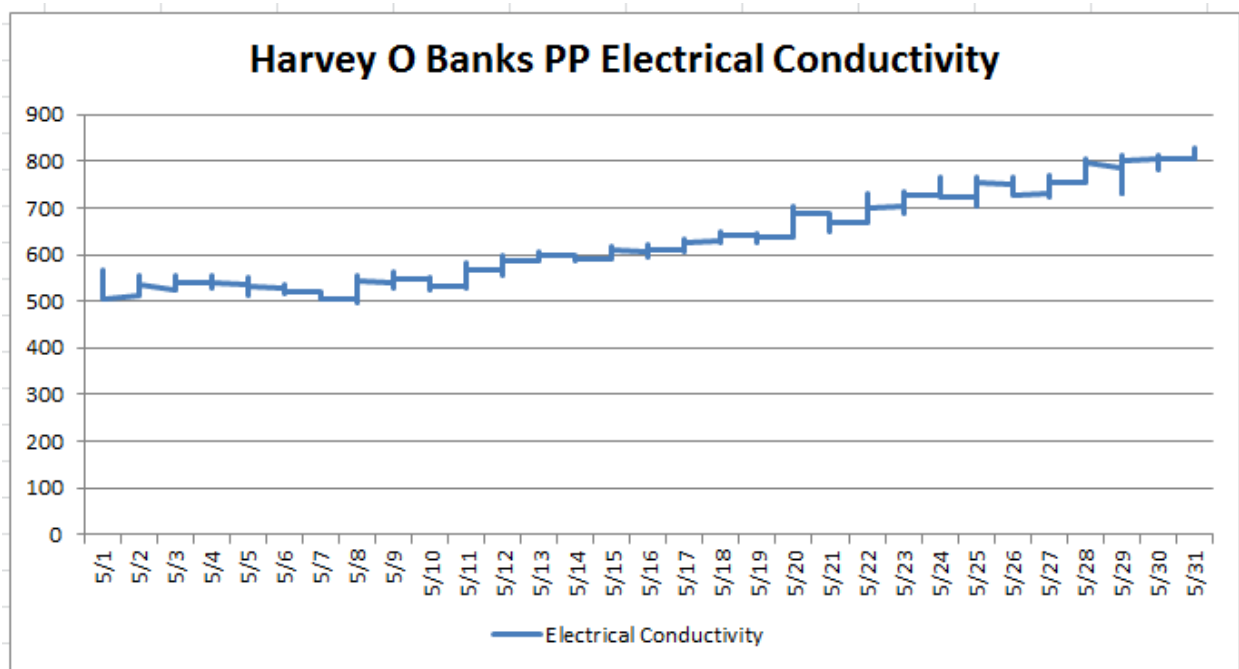


The State Water Project Table A allocation has remained at 20%. This is expected to be the *final* allocation. At this time, there is no indication that the allocation will be revised.

Semitropic continues recovering water for 2015 and is planning on returning almost 11 TAF by December and an additional 2 TAF in January 2016. Cawelo continues to recover banked water to fulfill Zone 7's 2014 delivery request and is expected to begin 2015 recovery in September.

To be conservative, Zone 7 has been preparing for another drought year in 2016. Zone 7 continues to store any excess surface water supply (i.e., surface water that could not be used directly at this time) in San Luis Reservoir. Zone 7 also continues to work with Contra Costa Water District on an exchange that would allow storage of 2,500 AF in Los Vaqueros Reservoir, located upstream of the Tri-Valley service area.

Electrical conductivity ($\mu\text{S}/\text{cm}$) is measured as a surrogate for TDS (TDS is approximately equal to 0.58 times EC):



Based on the above data, in the month of May, raw water at Harvey O Banks Pumping Plant has total dissolved solids (TDS) ranging around 290 to 480 mg/L. The escalating EC levels observed are likely due to runoff.

Higher TOC levels continue to impact treatment at the plants requiring higher ferric chloride dosages and more pH adjustments. Ferric chloride dosages have been around 65 to 75 mg/L in May. In the past, Zone 7 treatment plants have operated with ferric chloride dosages in the neighborhood of 25 mg/L.



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: Facilities Engineering

CONTACT: Rhett Alzona

AGENDA DATE: June 17, 2015

ITEM NO. 12f

SUBJECT: Capital Project Status Report

The Facilities Engineering Section plans, designs and manages the construction for the majority of the water supply conveyance, production, and delivery projects contained in the Zone 7 Capital Improvement Program. The Facilities Engineering Section also designs and manages the construction of flood control channel improvement projects identified in the CIP.

Attached is a table showing the current status of key capital projects. This is the final report for FY 14/15. Completed projects will be removed in the next report and new projects contained in the FY 15/16 CIP will be added.

Facilities Engineering Project Status Report – May 20, 2015

Project	Objective	Project Benefits	Budget	Current Phase	Current Activities	Funding Source
Arroyo Las Positas R.1-7 Improvements Project	Provide effective flood control system to Livermore-Amador Valley.	Increase channel capacity in this reach to be able to handle 100- year storm event	\$2.8 million Budget Spent to date - 14%	Project has been placed on hold . Preliminary hydrology and hydraulic model updates show minimal benefit of the project.	None.	Fund 200 – Flood Protection Operations – 83% Fund 210 – Flood Protection Stormwater Drainage - 17%
Arroyo Mocho Diversion Facility	This project is necessary to allow Zone 7 to divert water from Arroyo Mocho into the COLs as described in the Specific Plan for Livermore-Amador Valley Quarry Area Reclamation. As part of the Reclamation plan, Hansen Aggregates is responsible for designing, permitting and constructing the diversion facility for Zone 7.	This diversion facility will enable Zone 7 to divert water in an environmentally sensitive way from the Arroyo Mocho to the Chain of Lakes.	\$120,000 Budget Spent to date - 41%	Design Review for Permitting approval by regulatory agencies.	Zone 7 staff and its consultant Stetson Engineers have reviewed Hansen's latest design and provided comments. Next step for Hansen is to make changes in design and submit to regulatory agencies for permits	Fund 130 – 100%

Project	Objective	Project Benefits	Budget	Current Phase	Current Activities	Funding Source
Busch Valley Well 1	Construction of a new 2 to 3 mgd production well and associated treatment facility has been deferred. Only constructing Phase 1 work now (Pipeline tie-in to Zone 7 distribution system and associated electrical facilities)	Increases Capacity of existing wells, especially valuable during drought emergency. Near term Phase 1 connection provides the possibility to connect to a temporary booster pump station when needed in times of limited to no surface water	\$3,265,000 for Property purchase and Board authorized Budget Spent to date: \$2,07,000 (includes property ~\$1.1M, basis of design, and staff time)	Design/Build Contract, Basis of design (including well drilling plans and specifications), construction of Phase 1 PL tie-in and electrical work. Substantial Completion – June 19, 2015 Project Completion – December 2015 (permanent power).	Property has been purchased. Current contract is with Design-Builder for \$1,570,655 and includes a Basis of Design report and completed well drilling plans/specifications, design and construction of the Pipeline tie-in to the Vineyard Pipeline, electrical facilities and installation of the property fence. Pipeline tie-in construction is complete. Next step, Contractor will be working on fence installation and punch list items: street and sidewalk repair. PG&E has started electrical design in early June. Electrical work is still on track for completion by December, 2015.	Fund 120 – 50% Fund 130 – 50%
Chain of Lakes Well 5	Construct a new 1 to 2 mgd production well	Increases Well Production Capacity, especially valuable during drought emergency	Revised budget \$4,215,000 (as of 8/20/2014) includes \$235,000 change order, increasing the GMP to \$3.735million. Budget spent to date – 99%	Design/Build Contract, Production Well Construction Revised Project Completion – October 2014 (revised from August 2014) Project (Construction) is 100% complete	Substantial Completion of the entire facility was achieved October 2014, Final Completion December 24, 2014. Capacity ~ 2 mgd. Still accruing costs for final settlement of property acquisition.	Fund 120 – 50% Fund 130 – 50%

Project	Objective	Project Benefits	Budget	Current Phase	Current Activities	Funding Source
DVWTP Caustic Soda Tank Rehabilitation Project	Prolong the useful life of the tanks. Increases operational flexibility and reliability of the plant.	Structurally enhance existing 25 year old tanks followed by re-lining of the interior for corrosion protection for another 20 years of service.	\$2,100,000 For Caustic Soda and Ferric Chloride Tank Projects. 37% of total budget spent, remaining budget allocated to DV Ferric Chloride Project.	Complete Project completed October 2014	Tanks have been relined and put into service. Remaining work is secondary containment coating currently taking place. All work has been completed per the contract documents and contractor has vacated site. All systems are functioning as designed.	Fund 120 - Water Rates – 100%
DVWTP Ferric Chloride Tank Improvements Project	Increase production reliability and operational flexibility.	The existing Ferric Chloride tanks are showing wear and tear and per AMP are near the end of their useful life. The new tanks would also be upgraded in volume to better keep up with the expanded plant production in the recent years.	Shared budget with Caustic Soda Tank Projects will be returned to General fund and this work has been rescheduled in the CIP.	Project deferred due to change in funding priority to fund higher priority projects	While showing wear and tear, a condition assessment shows the tanks appear to still be in reasonable shape to last another few years. Ferric chloride tank improvements and parking lot/alleyway improvements have been reinserted in the CIP for FY 17/18.	Fund 120 - Water Rates – 100%
DVWTP Sludge Handling Project (Centrifuge Purchase and Z7 Operation)	Increase reliability of sludge handling (currently sludge beds).	By providing mechanical dewatering, sludge handling capacity and reliability are increased, significantly reducing the probability of having negative impacts upon WTP capacity.	\$1.43 million 100% of budget spent Project Complete: 100%	Construction Project Completion – September 2014 Project is Complete	Centrifuge is in operation since September 2014. While majority of the project complete, small site improvements were being made by in-house staff to enhance performance of the centrifuge and staff safety. Project is now complete and will be closed out.	Fund 120 - Water Rates – 100%

Project	Objective	Project Benefits	Budget	Current Phase	Current Activities	Funding Source
DVWTP Sludge Underdrain Overflow Improvements	Increase operational flexibility to better guard against potential overflows to the creek from breakdowns with the sludge underdrain pumps or overload to the underdrain wetwell and subsequent discharge violations from RWQCB.	This project is intended reduce potential discharge to the creek and RWQCB violations.	\$80,000 Project not started – 0% of budget spent	Planning	Project was delayed last fiscal year as resources were shifted to other projects. Project funds carried over to implement this fiscal year. Project budget was based on reviewing the problem and determining a fix. Project alternatives are currently under review.	Fund 120 - Water Rates – 100%
DVWTP Superpulsator Rehab Project Phase 1 and 2	Per AMP, existing superpulsators are beyond their useful life and to be replaced.	Phase 1 is to replace equipment, upgrade safety protections and operational efficiency, and coat concrete basin for two of the four superpulsator basins. Phase 2 is to replace and upgrade the equipment for the remaining two superpulsators.	\$ 5.0 million Budget Spent: 94% Project Complete: 94%	Closeout Phase 1 Construction May 2014 Phase 2 construction started Oct 2014 w/ Substantial Completion Date of March 21, 2015.	Superpulsators 1 and 2 which were rehabilitated under Phase 1 work are functioning properly and are in service. Phase 2 began Oct 2014 with construction approx. 94% complete. Startup and testing of Superpulsators 3 and 4 were conducted in February and substantial completion was reached in March, 2015. There is minor work remaining for final completion.	Fund 120 - Water Rates – 100%
MGDP RO concentrate sump pump replacement	Replace existing pumps with new submersible pumps connected to VFDs	Allows Operations to more closely match the output of the concentrate sump pumps with the flow coming into the sump and keep the pumps on their pump curves, avoiding premature pump failure	\$187,000 Budget spent to date = 94% Complete = 95%	Installation is complete and functional testing in progress.	VFD & pump installation was completed in April, 2015. Programming and some functional testing underway.	Fund 120 – 100%

Project	Objective	Project Benefits	Budget	Current Phase	Current Activities	Funding Source
Mocho Well 3, 4, and Stoneridge Well Repair Project*	Increase production reliability and well production rate.	Remove and replace poor performing pump(s). With pumps removed, perform downhole well maintenance.	\$557,000 83% of budget spent Project : 100% complete	Construction Completion – July 2014	Remaining work is 1) ordering a spare pump that could be used for Mocho 3 and 4. Pump has been ordered, waiting for delivery.	Fund 120 - Water Rates – 100%
PPWTP Ferric Chloride – Caustic Soda System Separation	Improved safety, compliance with ACDEH	Separate acid (Ferric) and base (Caustic) chemicals from sharing the same containment areas to prevent potentially unsafe chemical reaction in case both chemicals spill at the same time.	\$517,737 Budget spent to date = 114% Construction Contract completed within budget, additional labor and professional services were needed for unexpected issues with conduits and handrail, which came up during construction, and for added coordination with ACDEH. Money moved from contingency.	Project is complete	Project is complete.	Fund 120 - Water Rates – 100%
PPWTP UF Clarifier Corrosion Control Upgrades Project	Increase plant reliability and prolong facility service life	Upgrade existing sacrificial cathodic protection system for the ultrafiltration plant clarifier at PPWTP, and abrasive blast and recoat entire steel clarifier mechanism	\$414,000 99% of budget spent 100% complete	Project completed – July 2014	Project is complete.	Fund 120 - Water Rates – 100%

Project	Objective	Project Benefits	Budget	Current Phase	Current Activities	Funding Source
PWRPA Facilities at PPWTP	Build alternative power and renewable energy portfolio to save money, be an environmental steward, and keep up with environmental regulations.	PWRPA power is less expensive than PG&E power. Part of PWRPA energy is derived from renewable energy. PPWTP is expected to have reduced energy costs from the lower PWRPA rate relative to PG&E.	\$1,442,000 For PPWTP and Mocho Complex 12% of total budget has been spent	PPWTP Project completed – April 2014 PPWTP Project Complete: 100%	Patterson Plant is now operating on PWRPA Power. PG&E, PWRPA, Zone 7, and Contractor coordinated a power switch-over March 20 th . Punch list and progress payment being prepared. Final completion was March 27, 2014.	Fund 120 - Water Rates – 100%
PWRPA Facilities at Mocho Groundwater Demineralization Plant, Mocho 3 and 4 (Mocho Complex)	Build alternative power and renewable energy portfolio to save money, be an environmental steward, and keep up with environmental regulations.	PWRPA power is less expensive than PG&E power. Part of PWRPA energy is derived from renewable energy. The Mocho facilities are expected to have reduced energy costs from the lower PWRPA rate relative to PG&E.	Shared budget with PWRPA PPWTP. 39% for Mocho Complex, 51% of budget has been spent. Mocho Complex Project Complete: 75%.	Mocho Complex Project completion – October 2015	Construction site work for the new PWRPA electrical facilities started in late March. PWRPA equipment has been procured and delivered to the Mocho complex. Some of the equipment is being adjusted as they did not meet specific PG&E standards. This has pushed the switchover and completion of Mocho 4/MGDP work to late June 2015. The new electrical equipment on Mocho 3 is more difficult to adjust. This work may be deferred until Fall 2015 to wait for the equipment adjustments.	Fund 120 - Water Rates – 100%
Stoneridge Cross-Valley Isolation Valve Project	Design and construct a line valve and vault on the Cross-Valley Pipeline east of Stoneridge Well.	Provide a means of directing water with potentially higher chromium concentrations from Stoneridge Well west to blend with water from the Mocho Wellfield and for system isolation.	\$566,000 Budget Spent: 80% (including invoices in processing) % Complete: 85%	Construction	The new line valve and vault installation is complete. Finalizing electrical systems for the remote valve operation, sump pump, and other ancillary electrical equipment. Other remaining work is to replace a 20+ year old surge anticipator valve which protects Stoneridge Well from pressure buildup due to distribution system pressure spikes, closed valves, and power outages. Final Completion is scheduled around the second week in July.	Fund 120 - Water Rates – 100%



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY • LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: Engineering
CONTACT: Kurt Arends

AGENDA DATE: June 17, 2015

ITEM NO. 12g

SUBJECT: Update Related to the Bay Delta Conservation Plan

BACKGROUND:

The Bay Delta Conservation Plan (BDCP), which has the co-equal goals of achieving water supply reliability while improving the ecosystem, has been a voluntary effort to obtain long-term, incidental take permits for the operations and infrastructure improvements of the State Water Project (SWP) and the Central Valley Project (CVP) through development of a comprehensive Habitat Conservation Plan (HCP) under the federal Endangered Species Act, and a Natural Community Conservation Plan (NCCP) under the California Natural Community Conservation Planning Act. The BDCP could be a mechanism for improving the ecological conditions to provide multi-species regulatory protection for 57 different wildlife and plant species in the Delta. Zone 7's interest is to restore water supply reliability lost to recent regulation and court actions and to improve the ecosystem through a long-term multi-species habitat conservation agreement.

The Delta Habitat Conservation and Conveyance Program (DHCCP) is the associated effort to do enough preliminary engineering to analyze the proposed actions in the BDCP under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) and to prepare the related environmental impact documents (both a federal Environmental Impact Statement and a state Environmental Impact Report, known as an EIR/EIS, collectively). This effort also includes development of preliminary engineering designs, geotechnical field studies and analysis, and other necessary feasibility information for Delta water conveyance improvement projects and related habitat conservation measures.

Although the BDCP is a key element of the Delta planning framework established by the State Legislature in 2009, it is not the only effort needed to accomplish the "co-equal goals" of restoring the Delta ecosystem and water supply reliability for California. The Delta Stewardship Council, Delta Protection Commission, Delta Conservancy and State Water Resources Control Board all have important roles in the planning framework.

To put the BDCP into the context of all of the state's water resources, the California Water Action Plan was developed by the Administration (see http://resources.ca.gov/california_water_action_plan/docs/Final_California_Water_Action_Plan.pdf). This Plan lays the foundation for implementing broader, statewide measures including water use efficiency, groundwater management, integrated regional water management, expanded recycling and potential development of surface storage to improve water supply reliability.

DISCUSSION:

After several years of ongoing debate about the science and operation of the BDCP, resource agencies were still reluctant to guarantee a 50-year permit given the large uncertainty about the future. Unknowns about the effectiveness of habitat restoration and the impacts of climate change further muddled the waters until efforts to move a solution forward were at a near standstill.

On April 30, 2015, Governor Brown introduced “California WaterFix,” a revised approach to secure water reliability, and “California EcoRestore,” a parallel program to restore habitat in the Sacramento-San Joaquin Delta. Together, these two efforts represent an alternative approach to implement related component of the California Water Action Plan (see attached). No longer seeking a 50-year permit, these new programs aim to modernize Delta conveyance and restore habitat through separate permitting tracks.

California EcoRestore will pursue more than 30,000 acres of fish and wildlife habitat restoration in the next three to four years. California WaterFix is a new sub-alternative called Alternative 4a. It is comprised of two 30-mile long tunnels linking the Sacramento River to the existing pump facilities in the south delta. The details of the project will be available for public comment through a Recirculated Draft EIR/Supplemental EIS expected in the coming months.

Zone 7 will continue to track these parallel efforts and participate in future discussions as these efforts move forward to evaluate their benefits to the Delta ecosystem and the reliability of the Livermore Valley’s long-term water supply.

PROTECTING WATER SUPPLIES

Water flows from the Sierra Nevada mountains through the Sacramento-San Joaquin Delta (Delta), a critical link in California's water supply network. **The existing system is outdated, inefficient and in need of repair.**

Hundreds of miles of dirt and rock levees are all that protect our state's water supplies from saltwater intrusion and disruption. Without fixes to our water supply infrastructure, the Delta and the state's economy face threats:

①

CLIMATE CHANGE



- **Sea levels continue to rise**, putting pressure on aging levees, some protecting islands more than 20 feet below sea level.
- With warmer average temperatures expected, more intense storms and floods are likely, **increasing pressure on dirt levees.**

②

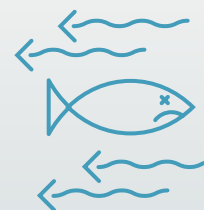
SEISMIC RISK



- Five active fault lines and many more inactive **fault lines pose a threat to our existing water delivery system.**
- A major earthquake or storm could cause flooding on as many as 20 islands at once and **jeopardize statewide water supplies.**

③

ENVIRONMENTAL DECLINE



- **Existing operations cause reverse river flows**, trap and kill migrating salmon, and have contributed to a severe decline in delta smelt.

THE PROPOSED FACILITY IS THE RIGHT SIZE

A SMALLER PROJECT COSTS MORE AND WASTES WATER IN WET YEARS

The charts on the right depict the effectiveness of a 9,000 cubic feet per second (cfs) facility, which captures maximum water supplies when all environmental flow improvements are met.

A 9,000 (cfs) facility is **40 percent smaller** than the existing system and provides the **greatest complement to local water supply projects** by allowing the safe capture of water in wet and above-normal years so that it can be stored and used in dry years.

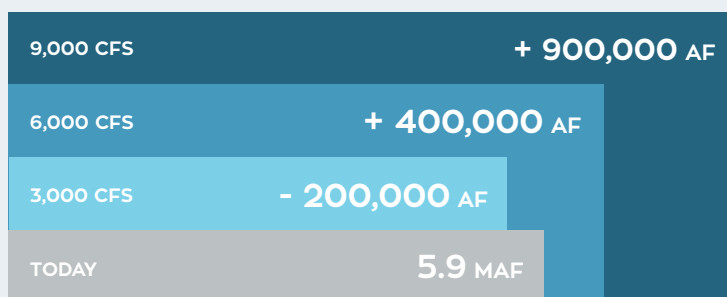
A smaller facility would provide much less water. The proposed 9,000 cfs facility is the best option for:

- Reducing reverse flows and minimizing the trapping of migrating fish
- Enhancing the ability to store surplus outflows and reduce diversions during critical fish migration periods
- Improving drinking water quality to meet public health standards
- Expanding groundwater recharge and recycling at the local level
- Protecting against water outages due to climate change, flooding, and earthquakes

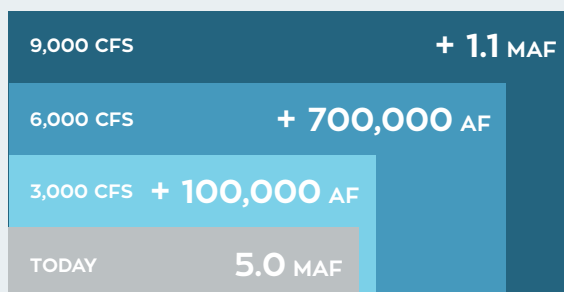
The cost of building the tunnels as a result of an emergency outage would range anywhere from \$3.6 - \$18.2 billion more than it would cost to build them now.

A 9,000 CFS FACILITY WOULD PROVIDE AN AVERAGE ANNUAL YIELD OF 4.9 MILLION ACRE-FEET

WET YEAR



ABOVE-NORMAL YEAR

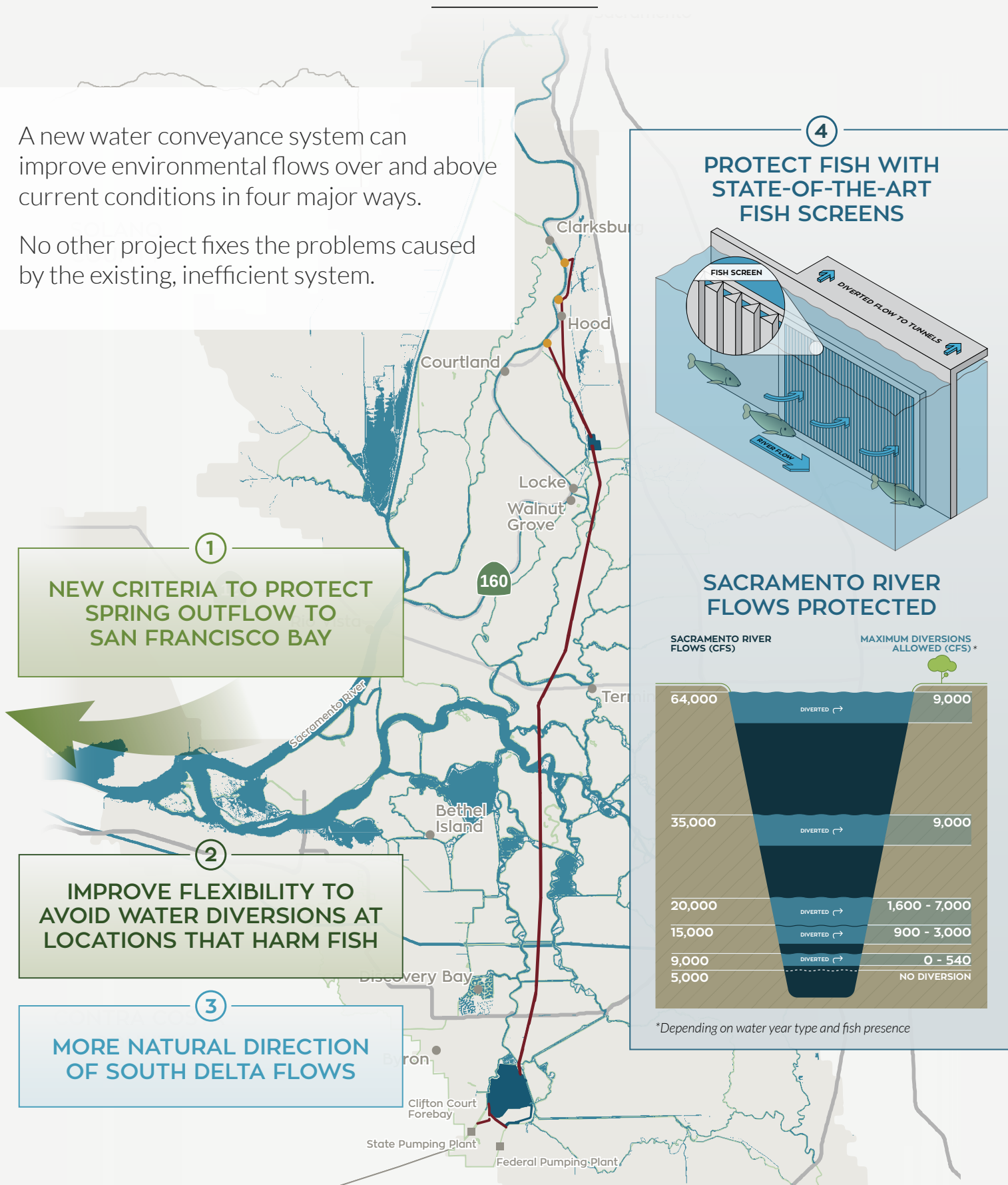


The yields depicted account for climate change, which is expected to cause more intense storms and flood events.

PROTECTING FISH

A new water conveyance system can improve environmental flows over and above current conditions in four major ways.

No other project fixes the problems caused by the existing, inefficient system.





ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 • PHONE (925) 454-5000 • FAX (925) 454-5727

ORIGINATING SECTION: MAINTENANCE
CONTACT: GERALD DEWITT/KURT ARENDS

AGENDA DATE: June 17, 2015

ITEM NO. 12h

SUBJECT: Update on Zone 7 Vehicle Fleet and GPS

BACKGROUND:

Previous Staff Reports have been prepared for the Board regarding the Zone 7 vehicle fleet (January 2014, March 2015). These discussed the agency's fleet management policies, energy guidelines, vehicle acquisition and replacement process, and provided an inventory of existing Class C vehicles. A question that has been asked about the value of equipping Zone 7 vehicles with Global Positioning Satellite (GPS) tracking technology. This item provides additional information related to this topic.

DISCUSSION:

The application of GPS tracking technology in vehicle fleet management is common in many industries. It can be especially valuable for businesses involved in hauling, transportation, delivery or service calls. The technology can allow a business to know where its closest vehicle is to a specific address reducing response time for service calls. It can lay out the most efficient route for a series of deliveries reducing time and saving fuel. Equipment can monitor the vehicles' idle time in an effort to reduce fuel consumption. While not inexpensive, GPS technologies can offer some businesses significant cost savings through fuel savings, reduced vehicle usage and reduced labor.

The hardware installed on the vehicles can be as small as a deck of cards and can relay information such as location, speed, and other data as often as every minute. Some products can use the vehicles computer port to send diagnostic reports without taking the vehicle out of service. Software applications can provide monthly and annual reports on vehicle usage, scheduled maintenance and customized summaries based on the agency's needs.

Several companies specialize in this type of GPS technology including RMJ Technologies and Fleetmatics. The cost of the equipment ranges from free to \$375 per unit plus an additional \$100 per unit for installation. The ongoing service cost ranges from about \$29 to \$40 per month per unit. For Zone 7's fleet of 45 class "C" vehicles, the total annual cost would be \$15,660 to \$21,600 plus up to an additional \$21,375 for the initial setup.

Zone 7 staff explored the benefits of installing GPS units on the agency's fleet and found the benefits to be limited. Agency vehicles are typically used to transport personnel and materials from one agency facility to another or for staff to attend meetings with outside entities. For an

agency that responds to various customer calls throughout the day (such as a retail water agency), this technology may provide an opportunity to improve efficiency and reduce response time. However, Zone 7 only works on our facilities in a relatively localized area. There is less opportunity to increase efficiency by planning trips and the staff time that would be required to manage and coordinate such an effort would likely offset any savings.

The one function that would apply to Zone 7 would be the tracking of driving history and the location of vehicles as a way to monitor staff. However, it is anticipated that this would be highly resisted by the employee unions and provide little value as Zone 7 has not had an identified issue in the past. Another benefit could be enhanced safety for individuals working alone in remote areas but this is uncommon at Zone7. If the unions wished to reopen this analysis, management would certainly be open to the discussion and would advise the Board of changing conditions at that time.

At this time staff does not plan to pursue the installation of GPS on agency vehicles. The added cost does not appear to be justified and it offers limited opportunities to improve the efficiency of agency operations. However, staff will continue to evaluate all fleet management needs and should additional benefits for this technology be identified, its installation will be reevaluated.

RECOMMENDATION:

No action - for board information only.



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, ZONE 7

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ORIGINATING SECTION: Engineering

CONTACT: Kurt Arends

AGENDA DATE: June 17, 2015

ITEM NO. **12i**

SUBJECT: Ground Movement Study – Livermore Valley

SUMMARY:

- During 2015, Zone 7 received several inquiries from Pleasanton residents regarding damage to residential structures. All of the inquiries received were from the neighborhoods near the Las Positas Boulevard and Stoneridge Drive intersection in Pleasanton. Zone 7 received similar inquiries from the same neighborhoods in 2002.
- Zone 7 experiences similar embankment settlement and slides problems in the northern and northeastern areas of Pleasanton and Dublin along Zone 7's Flood Control channels.
- In response to these inquiries, Zone 7 contracted with Cal Engineering and Geology to perform a Ground Movement Study for the Livermore Valley to help understand various potential ground movement mechanisms.
- Cal Engineering and Geology has completed the Study and the Report is attached.

FUNDING:

Funding for the Groundwater Movement Study was provided from Fund 100 - Water Enterprise.

RECOMMENDED ACTION:

Information only.

ATTACHMENTS:

Ground Movement Study, Livermore Valley, California dated June 10, 2015



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www.caleng.com

10 June 2015

Kurt Arends, P.E.
Assistant General Manager, Engineering
Zone 7 Water Agency
100 North Canyons Parkway
Livermore, California 94551-9486

Subject: **Ground Movement Study**
Livermore Valley
Alameda County, California

Dear Mr. Arends:

Cal Engineering & Geology, Inc. (CE&G) is pleased to submit our draft report entitled Ground Movement Study, Livermore Valley, California.

The investigation, geotechnical evaluation, and this report were completed by Mr. Reid Fisher (CEG 1858), and Mr. Phillip Gregory (GE 2193) of CE&G.

CE&G greatly appreciates the opportunity to submit this evaluation of ground movement mechanisms and effects in the Livermore Valley.

If there are any questions concerning the information provided herein, please do not hesitate to contact us.

Sincerely,

CAL ENGINEERING & GEOLOGY

G. Reid Fisher, Ph.D, P.G., C.E.G.
Associate Geologist

Phil Gregory, P.E., G.E.
Principal Engineer

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1. Introduction

1.1 Genesis of This Study

Ground surface movement within valleys and sedimentary basins is a complex geologic phenomenon that results from various earth processes. Movement can manifest at many scales of magnitude, at differing rates, and over variable periods of time.

Zone 7 and much of California have been faced with unprecedented drought in recent years, which has focused attention on ground surface movement that may or may not in some way be associated with the current climatic environment. Zone 7 wishes to synthesize existing information regarding various ground surface movements, including expansive soil movement and ground surface deformation accompanying groundwater elevation changes that may accompany climate swings.

1.2 Project Goals and Objectives

This study is intended to compile and synthesize available information regarding soils, geology, tectonics, groundwater elevation variability and monitoring, and ground surface elevation monitoring to understand the framework for ground surface changes that may be observed within the Livermore Valley particularly during drought (and recovery) periods. The objective of the study is to understand regional and local ground movement mechanisms in the Livermore Valley, the causes of the movements, how they are expressed at the ground surface, and their potential impacts on public infrastructure and private property.

1.3 Scope of Work

The scope of work completed for this study included:

1. Literature research and review regarding mechanisms of expansive soil response to changes in soil moisture.
2. Literature research and review regarding mechanisms of ground deformation as related to changes in groundwater levels.
3. Compilation of published and unpublished soils mapping and regional geologic mapping.
4. Consultation with area municipal public works staff regarding areas of historically identified problematic expansive soils.
5. Research and review of available published historic evapotranspiration data for the Livermore area.

6. Assembly of published and unpublished information regarding the hydrogeology of the Livermore Valley, including Zone 7's Groundwater Management Plan.
7. Compilation of Zone 7 data, operational information, and data/interpretive reports relating to monitoring of groundwater levels and ground surface elevation monitoring in the Livermore Groundwater Basin, including the Agency's *Annual Report for the Groundwater Management Program (2013 and 2014 Water Years)*.
8. Consultation with Zone 7 staff and consultants regarding existing well logs and subsurface information, and modeling of basin hydrogeology.
9. Consultation with Zone 7 staff.

2. Understanding the Ground Movement Mechanisms

2.1 Potential Sources of Ground Movement

Numerous mechanisms can affect movement of the earth's surface. However, this study is focused on three ground movement mechanisms that can be expected to occur within the project study area considering the current geologic regime. From shallow to deep, the mechanisms which are considered as potential sources of ground surface movement are volumetric changes in expansive, near-surface soils due to soil moisture content, changes in the volume of sedimentary deposits due to variation in groundwater elevation, and tectonic-related deformation. Other mechanisms, such as mass-wasting processes and seismically-induced soil volume changes, are not addressed herein.

2.2 Expansive Soils

The soil that mantles the ground surface is a product of many factors: climate; organisms living in the soil; relief/topography; parent material; and time (Jenny, 1946). The “climate” factor includes temperature and moisture. “Parent material” means the gravel, sand, silt and clay particles that compose the soil; these may be derived from the weathered rock immediately underlying a given site, or may be transported from elsewhere and deposited at the site.

Expansive soil is a term generally used to describe a soil material that has the potential for swelling or shrinking with changes in soil moisture content. The mechanisms of swelling and shrinkage are complex and are controlled by several factors. The primary factors influencing the potential for and occurrence of swelling and shrinking are the soil properties as summarized in Table 1, and environmental conditions as summarized in Table 2 (Nelson and Miller, 1992).

The soil aspects that are most important for this study are the percentage of expansive clay, how expansive the clay mineral grains are, and the soil moisture content. There are many different clay minerals, some of which shrink and swell according to changes in moisture content and pore water chemistry. When moisture is added to a soil containing significant fractions of expansive clay, the soil expands. The proportionate volume of expansion is related to the amount of moisture uptake due to clay mineralogy, percent clay, pore water chemistry, and consolidation (loading) history within the soil. When moisture is lost from such a soil, it undergoes volume loss or shrinkage. As is the case with swelling of these soils, the proportionate volume change is related to the same set of factors.

Table 1. Soil properties that influence shrink-swell potential

Factor	Description
1. Clay mineralogy	Clay minerals which typically cause soil volume changes are montmorillonites, vermiculites, and some mixed layer minerals. Illites and Kaolinites are infrequently expansive, but can cause volume changes when particle sizes are extremely fine (less than a few tenths of a micron).
2. Soil water chemistry	Swelling is repressed by increased cation concentration and increased cation valence. For example, Mg^{2+} cations in the soil water would result in less swelling than Na^{+} cations.
3. Soil suction	Soil suction is an independent effective stress variable, represented by the negative pore pressure in unsaturated soils. Soil suction is related to saturation, gravity, pore size and shape, surface tension, and electrical and chemical characteristics of the soil particles and water.
4. Plasticity	In general, soils that exhibit plastic behavior over wide ranges of moisture content and that have high liquid limits have greater potential for swelling and shrinking. Plasticity is an indicator of swell potential.
5. Soil structure and fabric	Flocculated clays tend to be more expansive than dispersed clays. Cemented particles reduce swell. Fabric and structure are altered by compaction at higher water content or remolding. Kneading compaction has been shown to create dispersed structures with lower swell potential than soils statically compacted at lower water contents.
6. Dry density	Higher densities usually indicate closer particle spacings, which may mean greater repulsive forces between particles and larger swelling potential.

After Table 2.1 in Nelson and Miller (1992).

Table 2. Environmental conditions that influence shrink-swell potential

Factor	Description
1. Initial moisture condition	A desiccated expansive soil will have a higher affinity for water, or higher suction, than the same soil at higher water content, lower suction. Conversely, a wet soil profile will lose water more readily on exposure to drying influences, and shrink more than a relatively dry initial profile. The initial soil suction must be considered in conjunction with the expected range of final suction conditions.
2. Moisture variations	Changes in moisture in the active zone near the upper part of the profile primarily define heave. It is in those layers that the widest variation in moisture and volume change will occur.
2.1 Climate	Amount and variation of precipitation and evapotranspiration greatly influence the moisture availability and depth of seasonal moisture fluctuation. Greatest seasonal heave occurs in semiarid climates that have pronounced, short wet periods.
2.2 Groundwater	Shallow water tables provide a source of moisture and fluctuating water tables contribute to moisture.
2.3 Drainage and manmade sources	Surface drainage features, such as ponding around a poorly graded house foundation, provide sources of water at the surface; leaky plumbing can give the soil access to water at greater depth.
2.4 Vegetation	Trees, shrubs, and grasses deplete moisture from the soil through transpiration, and cause the soil to be differentially wetted in areas of varying vegetation.
2.5 Permeability	Soils with higher permeabilities, particularly due to fissures and cracks in the field soil mass, allow faster migration of water and promote faster rates of swell.
2.6 Temperature	Increasing temperatures cause moisture to diffuse to cooler areas beneath pavements and buildings.
3. Stress conditions	
3.1 Stress history	An overconsolidated soil is more expansive than the same soil at the same void ratio, but normally consolidated. Swell pressures can increase on aging of compacted clays, but amount of swell under light loading has been shown to be unaffected by aging. Repeated wetting and drying tend to reduce swell in laboratory samples, but after a certain number of wetting-drying cycles, swell is unaffected.
3.2 In situ conditions	The initial stress state in a soil must be estimated in order to evaluate the probable consequences of loading the soil mass and/or altering the moisture environment therein. The initial effective stresses can be roughly determined through sampling and testing in a laboratory, or by making in situ measurements and observations.
3.3 Loading	Magnitude of surcharge load determines the amount of volume change that will occur for a given moisture content and density. An externally applied load acts to balance interparticle repulsive forces and reduces swell.
3.4 Soil profile	The thickness and location of potentially expansive layers in the profile considerably influence potential movement. Greatest movement will occur in profiles that have expansive clays extending from the surface to depths below the active zone. Less movement will occur if expansive soil is overlain by nonexpansive material.

After Table 2.2 in Nelson and Miller (1992).

Ground surface deformation resulting from soil moisture changes in expansive soils is a near-surface phenomenon that generally occurs within the upper 20 feet of the soil profile (see Fig. 1). The main interface across which soil loses moisture is the air/soil interface – the ground surface. The depth of significant soil moisture variation is generally referred to as either the *zone of seasonal fluctuation* or the *active zone*. For a given soil deposit, the deeper the active zone, the more total swelling and shrinking will occur.

The depth of the active zone at a given site can be a function of both natural and man-made climatic conditions. The natural climatic conditions which can affect the depth of the active zone are typically quantified by C_w , *climatic rating* or by the TMI, *Thornwaite Moisture Index* (Nelson and Miller, 1992). The lower the C_w or TMI, the greater the potential for large and sustained variations in climate (temperature changes, relative humidity, wind, seasonal changes in evapotranspiration rates, etc.) that lead to a deeper active zone and corresponding large, naturally occurring variations in near surface soil moisture content. Both the C_w and TMI for the Livermore Valley are near the lowest end of the scale (Greenfield and Shen, 1992) indicating the prevalence of conditions conducive for development of a naturally occurring deep active zone.

The manmade conditions that can affect the depth of the active zone include irrigation, ground surface cover, and vegetation. When ground is regularly and uniformly irrigated the potential for variations in soil moisture content is reduced and the active zone is kept to a relatively shallow depth. Relatively impermeable ground surface cover such as pavements, slabs, or membranes also tend to reduce the depth of the active zone as the soil moisture is trapped by the covering. The impact of vegetation is complex and variable. For example, the use of significant regular, uniformly distributed irrigation to support vegetation will tend to result in a shallower active zone. The uptake of soil moisture by plant roots in areas where there is no irrigation or where loss of moisture from plants to the atmosphere (evapotranspiration) outstrips the input from irrigation will tend to cause an increase in the depth of the active zone.

If soil moisture is lost uniformly from a homogeneous soil, as its volume lessens, the ground surface drops uniformly; the reverse occurs upon wetting. However, soils are typically non-homogeneous and the moisture loss or gain is never truly uniform. It is the non-uniformity and variability of soil deposits and soil moisture conditions which are problematic for shallow-founded structures and other ground level improvements. The result of the non-uniformity is differential volume change, differential shrinkage/swelling, and differential settlement/uplift that create problems (see Fig. 2). For natural soils, the extent of non-homogeneity is a primarily a function of the depositional environment. For manmade soil deposits, the variation depends on the source of the materials and means by which the materials are placed. The non-uniformity of soil moisture results from environmental factors other than climate, such as the influence of vegetation and surface exposure/aspect. Different types of vegetative cover are more effective at extracting

moisture from the soil. These differences have been quantified mainly for agricultural applications, but are applicable to urban landscape settings (for example, see Crop Coefficient Leaflets 21427 and 21428 published by University of California Cooperative Extension). The presence of slopes, and the direction in which they face (i.e. toward the sun), are additional factors in soil moisture distribution patterns (see Fig. 3).

2.3 Groundwater Level Changes

Ground deformation accompanies both the rise and fall of groundwater levels. The key to understanding this process is to understand how different sedimentary deposits – those which serve as aquifers and those which serve as aquitards – respond to changing groundwater levels.

The first key concept is that groundwater occupies the voids between the individual sedimentary grains in the ground. In nature, these grains are not a random collection of differently sized grains -- rather, they are sorted as they are deposited. For example, sediments deposited by a fast-moving stream tend to consist of coarser clasts (cobbles, gravels, and sands) with little or no fines (silt and clay). In contrast, sediments deposited in a lakebed or floodplain setting are much richer in fines, with little or no sand, and no cobbles or boulders.

“Aquifer” refers to an underground body of sediment (or fractured rock) that contains extractable groundwater. Since water flows most easily through coarse-grained sediments (they have higher “transmissivity”), the intake screens of wells are usually placed in these coarser intervals.

“Aquitard” refers to typically finer-grained intervals of sediment composed of mainly clay and silt. Water passes much more slowly through these intervals (of lower transmissivity).

Although it seems counterintuitive at first, it is useful to think of water moving *through* an aquifer, while the real water *storage* occurs in the aquitards. The reason for this has to do with compressibility of sediment.

Groundwater extraction is essentially the removal of water from between mineral grains. Groundwater recharge is the opposite: refilling of the voids between mineral grains. As groundwater is extracted, the water levels in the aquifer system drop; as recharge occurs, the water levels in the system rise again.

When groundwater is extracted, there is an accompanying drop in ground surface elevation as grains compress together; when recharge occurs, there is an accompanying rise in ground surface elevation. This ground surface deformation can be completely reversible (“elastic”), or largely permanent (“inelastic”). The magnitude of the elastic subsidence and rebound are small. An example scenario outlined in Borchers and others (2014) using typical observed values would

result in 0.25 feet of elastic subsidence from hydraulic head decline of 100 feet in a 500-foot-thick aquifer of average elastic compressibility. The elastic compressibility of fine-grained (aquitar) intervals is much greater than that for coarse-grained sediments (Borchers and others, 2014). The extent to which water levels drop, and the type of sediment, are the controls on whether the deformation is elastic or inelastic; the mechanism for this is described below. In a sediment-water system, it is only the sedimentary particles that compress; water is essentially incompressible.

In sediment (either aquifer or aquitar) that is below the groundwater level (the piezometric surface), the voids are full of water, and the pressure of each grain on the next is partially offset by the buoyant force of water. As water is pumped or drained from that sedimentary sequence, the water level (hydraulic head, or piezometric surface) drops as the voids between sedimentary grains begin to drain (water still clings to the margins of the grains), and the buoyant force of water is reduced. As a result, the grains exert ever more pressure on each other (the “effective stress” is higher).

In a coarse-grained sedimentary sequence like sand or gravel, the increase in effective stress that goes with water level drop has a negligible effect on the sediment, and a negligible effect on the amount of void space that could be refilled by water if the aquifer is recharged. Coarse-grained sediments largely behave elastically, and there is no permanent change in water storage ability.

However, in fine-grained sediments, the more the water level drops, the more the buoyant force is reduced (effective stress increases). The more the effective stress increases, the more it tends to cause the individual grains to rearrange themselves into a more compact mass. If this rearrangement occurs, there is a net loss of void space that is not recoverable – there is a permanent (inelastic) loss in water storage ability.

Permanent (inelastic) compaction only happens when the effective stress between sediment grains rises higher than it ever has before (in soil mechanics terminology, this is akin the pre-consolidation pressure being exceeded and virgin consolidation). Stated another way, inelastic compaction only occurs when water levels drop below their previous historic low.

The magnitude of inelastic compressibility is typically 20 to >100 times as great as the elastic compressibility of an aquitar (Borchers and others, 2014). This means that the volume of water released through inelastic consolidation (sometimes referred to as the “waters of compaction”) is on the order of 20 to 100 times the specific yield achieved through elastic consolidation (Riley, 1998; cited in Sneed, 2001). Using typical inelastic compressibility values for clay-rich sediments, a 100-foot drop in hydraulic head below the historic low (the preconsolidation stress) would result in 20 feet of subsidence (Borchers and others, 2014) in an aquifer system containing 500 feet of aquitar sediments (as compared to 0.25 feet of elastic subsidence).

Pumping from a well produces a pressure gradient; the flow of groundwater toward the well intake is acting to restore the system to pressure equilibrium in the aquifer system (Le Chatelier's Principle). As a result, the effects of groundwater level declines tend naturally to be distributed throughout a groundwater basin, across a broad geographic area. There is a lag in this pressure equilibration process imposed by the transmissivity (or permeability) of the sediment holding the water. As a result of this lag in pressure equilibration, in a layered or heterogeneous aquifer system, it is possible for localized inelastic compaction to occur in aquitard materials if groundwater withdrawal reduces the fluid pressure below that associated with historic lows, even if overall groundwater levels have not dropped below historic lows (S. Ingebritsen, pers. communication, 2015).

2.4 Tectonic Deformation

Tectonic deformation affects virtually the entire Earth's surface, albeit at different rates. The mechanism of plate tectonics involves the formation, relative movement, and destruction of crustal plates. Major zones of deformation and faulting are concentrated at the boundaries between plates, with less extensive deformation and faulting occurring within individual plates.

Tectonic plates move relative to one another in three basic ways: apart from one another (at spreading centers such as the Mid-Atlantic Ridge); toward one another, with one ultimately diving beneath the other (at subduction zones such as the Alaskan Trench); or horizontally past each other (at strike-slip faults such as the San Andreas fault).

Internally within tectonic plates, stresses may be accommodated or expressed by faulting, folding, uplift and subsidence. Depending on locality, the terrain affected by one or more of these processes may be uplifting, subsiding, tilting, or otherwise deforming at rates that typically vary from tenths of a millimeter per year, to tens of millimeters per year.

The tectonic setting of the Livermore Valley, and the associated deformation, is described in a later section.

3. Geologic Setting

3.1 Physical Setting

The Livermore Valley lies within the Coast Ranges geomorphic province of California. This province is characterized by northwest-southeast trending mountain ranges and intervening valleys. These ranges in a broad sense are a reflection of major faults in the area.

The Livermore Valley is bordered on the west by the East Bay Hills, with the Calaveras fault marking the western boundary of the basin (see Fig. 4). The basin is bordered on the east by the Altamont Hills, with the Greenville fault marking the eastern boundary of the basin.

To the north of the valley is the Mt. Diablo uplift, and to the south of the basin, the Diablo Range.

The Livermore Valley is drained by Arroyo de la Laguna, which flows southward out of the valley near its southwestern corner. Arroyo de la Laguna is renamed Alameda Creek at Sunol, as it continues its westward flow toward San Francisco Bay.

The overall flow pattern in the valley is from east to west, which is a reflection of the valley floor's tectonic subsidence and the basin's overall drainage exit route via Alameda Creek.

The general elevation of the valley floor ranges from approximately 580 feet above mean sea level (msl) in eastern Livermore/Altamont, to approximately 330 feet msl near the 680/580 interchange, to approximately 285 feet msl near the intersection of I-680 with Sunol Boulevard, where the Arroyo de la Laguna (headwaters of Alameda Creek) leave the main valley floor.

The elevations of the mountainous areas bounding the basin vary widely. Mt. Diablo's summit is 3849 feet msl. The divide along the East Bay Hills is on the order of 1100 to 1600 feet msl. The Altamont Hills rise to elevations on the order of 700 to 1500 feet msl. The Diablo Range south of the site rises to elevations on the order of 1400 feet msl.

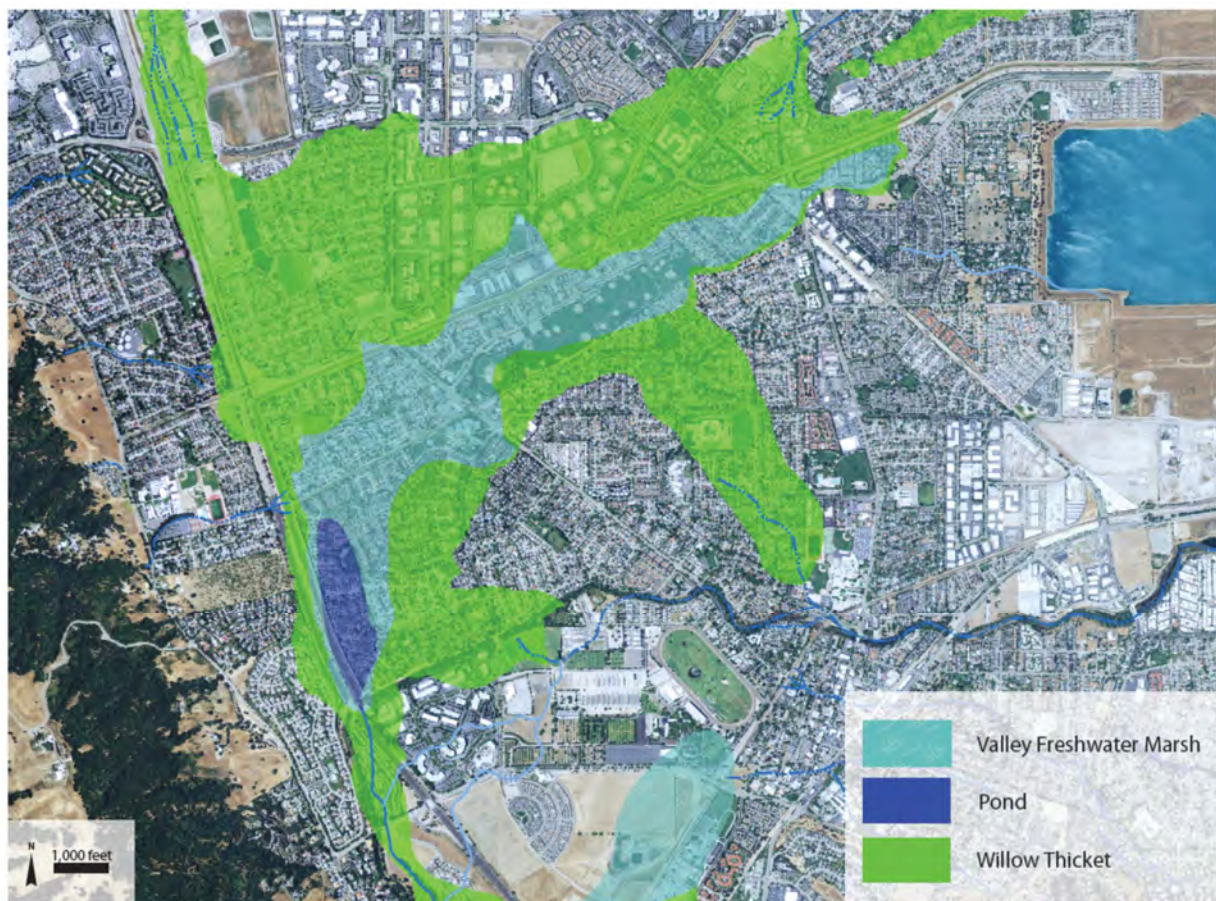
3.2 Livermore Valley Surficial Deposits and Soils

For the soils in the hilly areas surrounding the Livermore Valley, the weathered bedrock is the parent material for the soils.

For the soils on the valley floor, in contrast, the parent material is the sediment deposited by creeks that drain the surrounding hilly areas. These creeks erode the upland areas, and transport sediment through the basin, eventually leaving the southwest corner of the valley via Alameda Creek. The Livermore Valley is a tectonically active basin that has experienced subsidence, with the result

that some of the sediment is trapped within the basin (see Fig. 5), resulting in the thick accumulation over time that forms the groundwater basin. Fast-moving streams can transport relatively coarse sediment (cobbles, gravel and sand). The more slowly a creek moves, the finer the sediment that is deposited. The alluvium containing the most clay within the Livermore Groundwater Basin is material that is deposited by streams in poorly drained valley floor areas.

Even in historic times, areas of marshland were known. The City of Pleasanton, occupies the site of a former 2,600-acre marsh complex (SFEI, 2013). The marshland was cleared for agriculture beginning in the mid-1800's, and was complete by the early 1900's (SFEI, 2013). The Valley Trails area of Pleasanton is perhaps the most recent remnant of the wetland complex (SFEI, 2013). The natural soil profile in these areas reflects the fine-grained sediment (the basin deposits described above) deposited in such a setting. A second wetland complex (the "Springtown Sink") was present east of modern Livermore.



Map showing historic extent of the Pleasanton marsh complex (Figure 4.19 from SFEI, 2013).

In general, the northern side of the Livermore Valley was characterized by clay-rich, fine-grained soils that flooded each year. The southern side of the valley had coarser-grained, better-drained soils that reflected the stream transport northward out of the Diablo Range.

The surficial soils in the study area have been mapped by the USDA National Resource Conservation Service (USDA/NRCS). Many soil types have been identified in the vicinity of the site, with a great variety in properties. Individual soil types reflect the soil forming factors noted above, with many subclasses according to the slope of ground in a given area. Figure 6, although its main purpose is to illustrate certain soil properties described more extensively below, portrays the extent of individual soil series with thin gray lines. Soils mapping by the USDA/NRCS (both current, and archived) has been made available over the web at <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.

From the standpoint of surface ground movements associated with soil type, the most important characteristics are: the proportion of expansive clays contained in the upper few feet of the soil; and the type of clay minerals present.

Using data gathered as part of mapping and characterizing the individual soil series, the USDA/NRCS has classified soils according to shrink/swell potential and other attributes, and has classified various soils as to limitations they place on various uses, such as “Dwellings Without Basements” (essentially, single-family homes most likely to reflect expansive soil movement), and “local roads and streets.” While informative, maps developed by the USDA/NRCS (accessible at the website referenced above) include “slope” and “depth to hard bedrock” as factors in determining limitations, and do not single out the expansion potential of soils, which is of interest here.

One of the tests used by the USDA/NRCS to quantify the potential for shrink/swell movement measures “linear extensibility.” Linear extensibility is a measure of the volume change a soil goes through as it loses moisture. As used by the USDA/NRCS (see USDA/NRCS, 2015, National Soil Survey Handbook, Section 618.41), it is defined as “the linear expression of the volume difference of natural soil fabric at 1/3 bar or 1/10-bar water content and oven dryness.” We used laboratory test data from the USDA/NRCS to develop a map (Figure 6) that classifies the linear extensibility of soils mapped at any point on the ground into four classes: low, medium, high, and very high. That map is presented in this report as Figure 6 with the outline of the Livermore Valley groundwater basin shown. These four classes describe the percent volume change of soil as it dries, so the soils with the highest linear extensibility values have the highest shrink-swell potential (USDA/NRCS, 2015, National Soil Survey Handbook, Section 618.41).

Several features are apparent from Figure 6, all of which reflect the local geology and soil parent materials:

The most expansive soils (soils with the highest linear extensibility) are associated with the western part of Pleasanton, with parts of the San Ramon Valley, and with certain narrow valley floor areas in the uplands northeast of Pleasanton and San Ramon – the flanks of Mt. Diablo.

Expansive soil is very common in the hillside areas, as well as in valley floor areas. These expansive soils reflect the weathering product of the local bedrock, and indicate that the bedrock parent material is expansive as well as the soils derived from them.

In valley floor areas, those areas with less expansive soils (lower linear extensibility) are underlain by coarser alluvium that is relatively low in clay content (compare Figure 5 and Figure 6). Those valley floor areas with more expansive soils (higher linear extensibility) are concentrated near the western and northwestern perimeter of the valley, in areas of fine-grained sediments deposited in and around a marshy setting.

The distribution of expansive soils as measured by linear extensibility (see Fig. 6) correlates strongly with the historic limits of the Pleasanton marsh complex (see Fig. 5 and the excerpted marsh complex map presented above).

The City of Pleasanton Department of Public Works (verbal communication, 2015) reports that the westernmost portion of the city, especially areas near channels and floodplains, has historically experienced common expansive soil distress to improvements. The City of Dublin does not report such areas of common expansive soil distress (verbal communication, 2015).

3.3 Livermore Valley Geology

The Livermore Valley lies in a geologically complex area with ongoing tectonic activity.

The geology and tectonic setting of the Livermore Valley is reviewed in Norfleet (2004), and is summarized herein; the reader is referred to that report for additional detail. Additional information regarding geologically recent (Quaternary) deposits is drawn from Knudsen and others (2000), and SFEI (2013). The major elements of the geologic setting are shown on Figure 4. Geologically recent (Quaternary age) deposits are shown on Figure 5.

3.3.1 Bedrock

The Diablo Range, south of the Livermore Valley, consists primarily of Franciscan Complex rocks that formed in a subduction zone setting, and which were subsequently metamorphosed (Graymer and Brabb, 1996; Dibblee, 1980). As a result of tectonic activity, multiple thrust slices have been stacked vertically, with uplift beginning probably in Pliocene time.

Mt. Diablo and associated rocks are also largely subduction related and ocean floor (Great Valley Sequence) rocks that underwent metamorphism well before beginning to be uplifted probably in late Pliocene (roughly 6 million years ago) to early Pleistocene time.

The East Bay Hills consist of primarily low-grade metamorphic and sedimentary rocks that have juxtaposed against the western end of the Livermore Basin by strike-slip activity along the Calaveras fault.

The Altamont Hills consist primarily of low-grade metamorphic and sedimentary rocks that have been elevated since at least the Pliocene. Salts leached from these marine rocks have contributed to alkali and saline soils in the eastern part of the Livermore Valley (SFEI, 2013).

3.3.2 Valley Fill

The Livermore Valley formed as a result of fault activity, which led to the relative downdrop of the valley and relative uplift of adjacent uplift areas. The valley (and associated groundwater basin) began to form about 6 million years ago in the Pliocene, with parts of it having been overridden by the southward-vergent thrusts that accommodate uplift of Mt. Diablo (Fig. 4). As a result, sediments within this basin (see Fig. 5) may extend northward under the southern fringe areas of bedrock exposed at the modern ground surface. A total thickness of as much as 8 km of sediment has filled this basin since its inception (Isaacson, 1990).

During early stages of the basin's evolution, large volumes of coarse sediment were carried out of the Diablo range, depositing the "Livermore Gravels," which reach up to 4,000 feet in thickness (Barlock, 1988 and 1989; SFEI, 2013). The overall transport direction of waters transporting and depositing these gravels was at times northward into and through the San Ramon Valley, and at times southward (as today) through the Sunol Valley and through Niles Canyon (Helley, 1997). Depending on the presence or lack of blockage in either drainage path, the base level for the Livermore Valley changed, leading to deposition of thick, fine-grained sedimentary intervals interlayered with coarser deposits (see Fig. 7).

As interpreted by Norfleet (2004), the Livermore Gravels volumetrically make up the largest identifiable component of the Livermore Basin's aquifers. In the central portion of Livermore Valley, these gravels are relatively clean (low fines content), and have high transmissivity; Norfleet's analysis refers to these as "clean gravels" in their hydrostratigraphic analysis. Surrounding the central basin area where the clean gravels are found are sediments that contain more fines; Norfleet's analysis terms these "sandy gravels," and notes that the transmissivity is significantly lower. Pumping rates and associated water levels differ significantly between such areas. The sandy gravels were derived from various upland areas around the valley, not just the Diablo Range.

In addition to these coarser intervals, there are fine-grained intervals of sediment that probably reflect past lacustrine (lake) and floodplain sequences. These finer-grained intervals constitute the main aquitards.

The main sedimentary units making up the basin fill (see Fig. 7), and their hydrogeologic roles, as identified by Norfleet (2004) in their analysis of Zone 7 well log data are: lacustrine clays and silts (aquitard); overbank and floodplain clays and silts (aquitard); fluvial gravels and sands of braided streams (aquifer); and deltaic gravels and sands (aquifer).

The subsurface geometry of these complexly shaped bodies of sands, gravels, silts and clays means that pumping rates, groundwater levels and potential for recharge can vary over distances as short as hundreds of feet (Norfleet, 2004). While some of these differences were at first interpreted as evidence of faults in the subsurface, more recent analysis has found them to be a result of original deposition.

The modern valley floor ground surface of course represents the most recent episode of basin fill. Detailed geologic mapping by Knudsen and others (2000) differentiates the major sedimentary deposit types present at the ground surface (see Fig. 2). Much of the valley floor is mapped as Holocene alluvial fan deposits, with fine-grained alluvial fan deposits along the northern side of the valley floor. Holocene basin deposits (typically silt and clay, deposited in a marshy setting) are mapped at the western end of the valley floor, and are also fringed to the north and northeast by fine-grained alluvial fan deposits. Generalizing, areas of relatively coarse sediment and thin surficial soils tend to be more common in the eastern portion of the Livermore Valley, and along the southern margin. Areas with a greater amount of fine sediment, and thicker surficial soils, tend to be concentrated in the western part of the basin. Before settlers modified the local drainages, the valley floor streams were commonly braided or spreading streams that were not necessarily continuous.

3.3.3 Livermore Valley Groundwater

This section reviews the overall groundwater system for the Livermore Valley, and draws extensively from: Norfleet (2004); Zone 7 Water Agency's Well Master Plan (CH2MHill, 2003); Zone 7 Water Agency's Groundwater Management Plan (Jones & Stokes, 2005); and San Francisco Estuary Institute (2013).

Hydrostratigraphy and History of Usage

Local streams such as Arroyo Mocho and Arroyo las Positas in their natural state tended to be discontinuous, which facilitated recharge of the unconfined upper aquifer. Flood control projects, together with efforts to drain the Pleasanton marsh, channelized these streams and reduced their recharge impact. These streams recharged the uppermost (unconfined) aquifer, which farther to the west (down-valley) is confined by the relatively thick clay capping soils that were deposited in the Pleasanton marsh complex. As a result, artesian conditions existed in the western portion of the Livermore Valley in pre-settler days (SFEI, 2013).

Irrigation using spring water became widespread after about 1850 (SFEI, 2013). Artesian wells were dug in part to drain the marshland in the Pleasanton area. By about 1912, attention was already being paid to the potential for groundwater recharge through coarse gravels. By about 1916, the lowering of the water table was noticeable, and the dry year of 1913 led to localized drops in water levels west of Livermore of up to 50 feet, according to well records (SFEI, 2013).

Pumping began to be controlled and reduced beginning in the late 1940's, when large-scale pumping by SFPUC ended in the Pleasanton area (SFEI, 2013).

The groundwater hydrogeology of the Livermore Groundwater Basin is reviewed in more detail in Norfleet (2004) and Jones & Stokes (2005), and is more generally summarized herein.

Investigation of the Livermore Valley's groundwater began in earnest in the 1940s, when the California Department of Water Resources (DWR) began studying the valley. Based on work done by DWR from the 1940s into the 1960s, the valley was thought to consist vertically of three aquifer zones, separated by gently dipping clayey aquitards. Local differences in water levels and pumping rates were interpreted as reflecting local faults.

Norfleet (2004) performed a thorough reanalysis of the basin's hydrostratigraphy, analyzing the sedimentary sequences apparent in well logs. The role of tectonism and uplift was recognized, which have resulted in complex interrelationships between depositional sequences. These variously linked, cross-cutting, and stacked (coarse-grained) channels are locally separated by fine-grained materials. Four main sediment types and settings in which they accumulated ("lithofacies") were distinguished (see Fig. 7): lacustrine (lake) clays and silts; overbank and floodplain clays and silts; fluvial (stream-laid) gravels deposited by braided streams; and deltaic (stream mouth) gravels and sands deposited at the mouths of streams where they entered a lake. No evidence for significant fault offset within the aquifer system stratigraphic section was observed. None of these sediment types occurs as a laterally continuous blanket, although overall patterns permit them to be treated as such for some groundwater modeling purposes (see Fig. 7).

Hydrologic Basins

The net result of these aquitards is to divide the overall Livermore Valley Groundwater Basin into several groundwater subbasins, the limits of which are shown on Figure 2 (names are not shown for legibility). The “*Main Basin*” occupies the floor of the Livermore Valley, and is divided into the (from east to west) the *Mocho II*, *Amador*, *Bernal*, and *Castle* subbasins. The Main Basin is flanked on the northwest by the *Bishop*, *Dublin*, and *Camp* fringe subbasins; on the west by the *Dublin Uplands*, and *Sinbad Uplands*; on the south by the *Livermore Uplands*; and on the east and northeast by the *Cayetano*, *May*, *Vasco*, *Spring*, *Altamont*, and *Mocho 1* subbasins. We refer the reader to the Zone 7 Groundwater Management Plan (Jones & Stokes, 2005) and Zone 7 Annual Report to the Groundwater Management Plan (Zone 7, 2014) for additional background and detail regarding the subbasins.

The Main Basin is connected hydrologically to these adjacent fringe basins via relatively young, shallow alluvium. There is only minor subsurface groundwater flow from the fringe basins into the Main Basin (Zone 7, 2014 – Annual Report for GMP 2013YW). Virtually all municipal and industrial groundwater supply wells (including municipal and industrial retailers’ wells, and Zone 7 production wells) are located within the Main Basin (see Fig. 8).

Aquifer Zones

Multiple lenses, layers, and elongate bodies of coarse-grained (sandy, gravelly) materials are present in the Main Basin, which are most usefully divided into two main aquifer zones, separated by a central aquitard zone of variable thickness (tens of feet thick) composed of silty clay (see Fig. 9). A schematic east-west geohydrologic cross-section is shown on Figure 7, distinguishing aquifer and aquitard earth materials, and illustrating their complex interlayering.

The “*Upper Aquifer Zone*” consists of mainly sandy gravel and sandy, clayey gravels. This aquifer is considered confined only in its western portion, where it is capped by a surficial clay layer. In the eastern part of the Main Basin, the Upper Aquifer Zone is exposed at the ground surface, and is therefore unconfined. In the western part of the Main Basin, the upper surface of this aquifer ranges from 5 to 70 feet below ground surface (bgs), while its base is about 80 to 150 feet bgs.

The Upper Aquifer Zone overlies a clayey aquitard that is considered leaky – recharge from the Upper Aquifer Zone passes through this leaky central aquitard into the “*Lower Aquifer Zone*” below. The thickness of this central aquitard is quite variable, based on Zone 7’s analysis of well log data (Zone 7 staff, personal communication, 2015). As shown on Figure 9, this aquitard where present is typically on the order of 20 to 30 feet thick, ranging up to more than 80 feet in thickness.

The “*Lower Aquifer Zone*” is an inclusive term that aggregates an interbedded sequence of “semi-confined to confined, coarse-grained, water-bearing units interbedded with relatively low permeability, fine-grained units” (Zone 7, 2014 – Annual Report for the Groundwater Management Program). The Lower Aquifer Zone is considered to be semi-confined to confined. As noted, it appears to be recharged by downward flow from the Upper Aquifer Zone through the aquitard separating the Upper and Lower Aquifer Zones.

3.4 Livermore Valley Tectonics

The Zone 7 service area lies within the tectonically active Coast Ranges, which is cut by multiple active faults associated with the San Andreas Fault Zone (see Fig. 4). These faults accommodate the relative movement between the Pacific Plate (west of the plate boundary) and the North American Plate (east of the plate boundary).

The interaction between the numerous tectonic blocks between these multiple faults results in some areas undergoing uplift relative to others along dip-slip (up-and-down) faults. Other areas experience horizontal relative movement (strike-slip offset). Many faults exhibit a component of both dip-slip and strike-slip offset, with strike-slip motion dominating.

Overall the plate boundary is experiencing offset at a rate of about 38 mm/yr [Burgman and others, 2006]. A portion of that offset is accommodated by the rocks and faults in the general vicinity of the Livermore Valley. Major pertinent faults include the Calaveras fault (near the western end of the basin), and the Greenville fault (near the eastern end of the basin).

This tectonic activity is ongoing; for example, the larger faults east and west of the Livermore Valley – the Calaveras and Greenville faults – are both creeping, and Mt. Diablo continues to rise (and move south toward the Livermore Valley) at a slightly faster pace than erosion can lower it. The upland areas of the Diablo Range, south of the study area, are moving northward toward the basin.

Broad deformation from this activity is fast enough to be detectable, and significant earthquakes can be marked by relative offsets on the order of feet. The Livermore earthquake sequence of 1980 on the Greenville fault resulted in surface rupture. The southern flank of Mt. Diablo is being uplifted at ≥ 1 mm/yr, based on InSAR and GPS data (Burgman and others, 2006), and parts of the East Bay Hills (west of the Calaveras fault) are being uplifted at 0 – 1.5 mm/yr (Burgman and others, 2006). The creep rate on the Greenville fault is estimated to be 2 mm/yr (Sawyer and Unruh, 2012), and 3.0 to 3.5 mm/yr on the Concord fault (Galehouse, 1998). The Calaveras fault (central segment) north of Calaveras Reservoir is creeping at between 2 and 4 mm/yr (Galehouse and Lienkaemper, 2003).

The net effect of this tectonic activity is that the basin is tending to drop relative to the upland areas.

The Livermore Valley currently drains southward along Arroyo de la Laguna, which becomes Alameda Creek. This creek system exploits the weak rocks along the Calaveras fault, ultimately escaping westward through the East Bay Hills to San Francisco Bay.

Tectonic deformation and fault movement therefore are a major control on the elevation of Alameda Creek, and the elevation of the floor of the Livermore Valley floor. These in turn control whether sediment tends to accumulate there or be transported on through the system.

As one might expect, survey benchmarks located within a tectonically deforming region by nature are affected by deformation.

4. Comparative Expression of Ground Movement Processes at Ground Surface

The various processes of ground deformation described above will have broadly characteristic expression at the ground surface. Whether these are even detectable depends on frame, or scale of reference. For example, deformation detectable at the scale of thousands of feet may not be resolvable at a scale of tens of feet.

In the sections below, we try to consider the effects of the mechanisms above through the lens of scale.

It is useful to think of how these processes can be described at the earth's surface. Two measures of this are *angular distortion*, and *radius of curvature*.

Angular distortion – A measure of deflection of a linear or planar element from an originally straight or planar condition. An example is the angle by which an originally straight wire is bent, or an originally planar sheet of cardboard is creased or folded. If the straight/planar segments are very long/extensive, a very small angular distortion can result in a significant offset at the far end of the line or plane.

Radius of curvature – This refers to how tightly a line or plane curves as it passes from one straight/planar segment to another. If stress (i.e. a “bend”) is allowed to be distributed through a curve with a large radius of curvature, there may be no permanent effect. If stress is concentrated along a curve with a tight radius, there may be permanent effect. An example would be bending a piece of tubing to bend through a large-radius arc like a hula hoop, versus forcing it to bend tightly and causing a kink.

4.1 Expansive Soil Shrink/Swell

The effects of this process are detectable over distances of few feet to tens/hundred(s) of feet (CalGeo, 2013). The process and its effects are localized to areas with significantly expansive soils or bedrock, and are therefore not detectable in nonexpansive soil or bedrock.

Various aspects of the interaction of structures, slopes, pavement coverings and soil moisture variations are illustrated on Figures 2 and 3.

Impervious surfaces impede the loss of moisture to atmosphere, and impede local infiltration/recharge (Noe and others, 2007). Bare soil surfaces lose moisture more rapidly than mulched or otherwise covered surfaces (see Fig. 3).

Vegetation and evapotranspiration increase the transfer of moisture from soil to atmosphere, and root mats serve to extend the reach of vegetation (Perpich and others, 1965). With unusually warm drought conditions, there is an increased moisture gradient that exacerbates this process.

Irrigated areas such as golf courses, parks, and corporate landscaping tend to counteract local drying effects, although some landscaped areas are engineered to drain quickly and do not encourage infiltration.

Different types of vegetative cover are more effective at extracting moisture from the soil (Perpich and others, 1965; Hidalgo and others, 2005). These differences have been quantified mainly for agricultural applications, but are applicable to urban landscape settings (for example, see Crop Coefficient Leaflets 21427 and 21428 published by University of California Cooperative Extension).

There have been attempts to determine whether there are long-term trends in evapotranspiration rates over the scale of decades, but results are scattered, with no clear historical trends (M. Dettinger, personal communication, 2015).

Associations/Settings

The shrink/swell cycling of expansive soil places stress on even nonrigid structures, and on root systems of plants. There are a number of characteristic settings or associations where expansive soil movement and related distress are observed (Noe and others, 2007; CalGeo, 2013).

Impervious/exposed soil transitions - The interface between impervious (paved) and exposed (unpaved) area are more likely to experience distress, during both drying and rewetting, due to the differential change in soil volume. Examples:

- Perimeter of (even large) buildings, at the interface between soil that is covered by a (particularly slab-on-grade) foundation and bare soil in adjacent areas (see Fig. 2).
- Perimeter of paved parking lot, at interface with bare soil or minimally planted area (see Fig. 3).

- Perimeters of in-ground swimming pools, at interface between pool shell and adjacent slab-on-grade pool deck.
- Perimeters of swimming pool decks, at interface with grassy areas or bare ground. Linear cracks, and localized voids under the slab edge (if not turned down) are common where the soil has shrunk away from the rigid overlying material.
- Homes with shallow foundations and raised floors, where perimeter soils will experience greater drying than interior foundations. A common effect is for the structure to be arched over a relatively high area of slightly moister soil, with the perimeter depressed. Common results include cracks at the corners of door and window openings, binding and misaligned doors, and misaligned window frames (see Fig. 2).
- Linear bare or vegetated areas between impervious surfaces, such as parking strips between paved roadway and soil areas, median strips, fill prisms at the outboard road edge of pavement, canal or creek banks next to strip parks. Linear cracks parallel to the top-of-slope and/or slab edge, commonly with hexagonal pattern offshoots at 120-degree angles, are common in such a setting (see Fig. 3).
- Impervious surfaces of limited extent, such as driveways or walkways, especially where near irrigated areas and areas of episodic ponding during wet weather (e.g. parking strips ground surface depressed below adjacent slab/pavement grade). The outer edges, especially corners, of slabs are commonly more subject to settlement or differential heaving due to more rapid drying. The presence of large shrubs and trees next to slabs can result in significant localized soil shrinkage due to extraction of moisture from the soil by root systems (see Fig. 3).
- V-ditches, curbs and other concrete structures with limited footprint that are constructed on shallow foundations, and surrounded by exposed ground. Shrinkage of soils beneath structures such as these commonly results in soil/concrete gaps, cracked and irregularly tipped/settled concrete sections.

Foundation type transitions – As a generality, the shallower soil layers respond more quickly to soil moisture changes, and tend to experience more fluctuations in volume. As expected, structures with foundations that derive support from shallower soil intervals likewise respond more quickly, than structures that derive support from deeper intervals. Vulnerable structures can include:

- Bridge abutments. The approaches to bridges are commonly constructed of engineered fill, while the bridge structure itself is supported by abutments founded many feet below grade. Differential behavior between the two can result in pavement distress at the transition. This can have various contributing factors in addition to possible contribution by expansive materials (e.g. inadequate fill compaction; inadequate subgrade preparation; compaction due to fill surcharge).
- Houses with perimeter structures such as decks and walkways. The foundation of a typical residence, for example, commonly derives its support from deeper in the soil profile than adjacent non-structural improvements such as decks. These two structures commonly will experience differential movement as they respond independently to soil moisture changes.
- Raised decks with isolated footings. The soil underneath decks, although largely removed from direct sunlight, is commonly not vegetated. The footings may be affected by soil creep, while the adjacent structure (e.g. the house) is less so, or is differently affected.
- Houses with attached slab-on-grade garages. There may be at least two foundation types/depths involved in such a setting. Differential movement is common between the house and garage structure, between the garage and/or house and the floor slab, and between the garage and the exterior driveway slab.
- Concrete front steps and slab-on-grade perimeter walkways, particularly where these structures are on sloping ground and there may be a cut/fill transition.

Slope Behavior - Where expansive soil is located on a slope, repeated shrinking/swelling cycles have the tendency to promote accelerated downhill creep of the surficial soils (see Fig. 3). This is due to the fact that when a soil expands, it tends to expand directly toward the nearest “free face.” Since this is roughly perpendicular to the slope face, it involves a small component of movement in the downhill direction. The following shrinkage cycle, however, merely allows the soil to drop straight down under the influence of gravity, instead of “pulling” it back upslope. For this reason, highly expansive soils tend to perform less well in fill slopes. Areas or associations where this process is commonly exhibited include:

- Tops of fill slopes, such as the outer edge of a landscaped field or yard where it transitions to a fill slope below.

- Tops of fill slopes at the outboard edge of paved roadways, walkways, or sidewalks (see Fig. 3).
- Fences, fence posts, and non-engineered landscaping bulkheads. These tend to tilt in a downslope direction over time, in part due to the loss of support on the downslope side, and accumulation of soil and debris on the upslope side.

Structures that are supported on shallow foundations are thus vulnerable to the creep of shallow soils, which tend to transport the foundations along with them.

A common thread in these types of settings where distress from expansive soil movement is observed is that the angular distortion associated with the movement occurs over a short radius of curvature. If this radius of curvature is tighter than the structure can tolerate, features such as cracks or unacceptable bending/deflection are observed.

4.2 Elastic Ground Deformation Associated With Groundwater Rise/Fall

This process is typically detectable over distances measured in thousands of feet (Galloway and others, 1999).

The process of urbanization itself has significant effects on patterns of runoff and potential recharge areas (Hibbs, 2012). Examples include the channelization of streams into storm sewer systems, and extensive impervious soil covers (e.g. buildings, pavements).

Groundwater basin response to yearly cycles of water level rise and fall is a widely known phenomenon. High-accuracy surveys, and satellite-based measurement systems are commonly designed so as to avoid placing key benchmarks in sedimentary basins.

The effect at the ground surface is most pronounced wherever the decline in groundwater levels is greatest, and the greatest thickness of aquitard materials compress elastically. Assuming the decline in groundwater levels is gradual, the ground surface response is muted and distributed across a broad area. The effect decreases to zero at the sedimentary basin margin.

The elastic response of the (mainly aquitard) layers in the basin is due to the cyclic gain and loss of water from between compressible grains, as described above.

The angular distortion associated with elastic ground surface deformation is very low, since elevation differences of fractions of a foot occur over horizontal distances of typically hundreds to thousands of feet.

Another way to express this is to say that the radius of curvature of elastic ground surface deformation is very large (the curve is very gradual), with the radius on the same order of magnitude as the basin's width – on the order of thousands of feet, or miles.

4.3 Inelastic Ground Deformation During Groundwater Rise/Fall

Inelastic ground deformation associated with groundwater level declines is generally similar in lateral extent to inelastic deformation. The chief difference is that it is due to decline in groundwater level below historic lows, and the net deformation (subsidence) over time is not reversible.

As with elastic ground deformation, the effect at the ground surface is most pronounced where the decline in groundwater levels is greatest, and where the greatest thickness of aquitard materials are subjected to water table drawdowns that are lower than historic lows.

Inelastic ground surface deformation is most typically detectable over distance of hundreds to thousands of feet. The subsidence effects are observed within the area of unconsolidated (basin fill) sediments, lessening to zero at the basin margin. The effect is not detectable in bedrock areas.

Inelastic subsidence due to groundwater withdrawal was first noted in the Santa Clara Valley, California. Total subsidence ranged from 2 to 8 feet (Ingebritsen and Jones [1999], in Galloway and others [1999]). Once an ongoing system of groundwater basin management was instituted, inelastic subsidence was essentially halted by 1969.

More recently, inelastic subsidence has also been documented in the northern San Joaquin Valley, reaching 8.5 meters (28 feet) to date (Sneed and others, 2013). An effective groundwater management program has yet to be put into place, and inelastic subsidence is continuing, with measured rates as high as 3/16" to 1/2" per month reported (B. Martin, GRA webcast, May, 2015). As much as 42 percent of the groundwater pumped from some parts of the San Joaquin Valley is inferred to have originated through inelastic compaction (Prudic and Williamson, 1986; cited in Sneed (2001)). The effect of even such rapid and profound inelastic subsidence is commonly evident only on features that span great distances, and which are sensitive to elevation changes. Cracking of the Delta-Mendota Canal concrete lining is described as "rare," with the major effects related more to elevation and gradient (B. Martin, GRA webcast, May, 2015). For a canal, loss of gradient can result in slower flow velocities, and in sediment buildup. The Delta-Mendota Canal, for instance, has experienced reduction in flow capacity due to loss of gradient (Sneed and others, 2013). Changes in gradient can result in inadequate levee crest elevation, loss of freeboard above desired/modelled water level, and loss of flood protection. Erosion of levees can occur if water levels rise above the design elevation, such as above an interval of protective riprap. These effects involve low angular distortion, over a very large radius of curvature. As noted, cracking of the

concrete canal lining is described as rare, and no damage to structures such as pump stations has been reported.

Well casings that experience downdrag from subsidence of surrounding sediments can be damaged. As reviewed by Burbey (2002), buckled pipelines and twisted railroad tracks resulted from horizontal displacement spawned by differential compaction.

There are instances where groundwater levels have been drawn down rapidly enough that fissures have formed (Holzer and Pampeyan, 1981). Heavy groundwater pumping near Las Vegas, for example, appears to have resulted in subsidence rates reaching 2.5 cm/yr, and localized ground fissures formed (Bell and others, 2002). The occurrence of fissures generally appears to be associated with compressible deposits spanning a vertical fault or other feature resulting in rapid lateral changes in thickness of compressible deposits (Burbey, 2002). Such an occurrence appears to indicate angular distortion occurring over a relatively short distance (tight radius of curvature). Various scenarios under which fissures have been observed are reviewed in Borchers and others (2014).

4.4 Tectonic Warping/Uplift/Subsidence

Tectonic warping, uplift and subsidence are processes that are typically at work over distances of thousands of feet. They are typically only detectable over distances of thousands of feet.

Tectonic uplift and subsidence rates are measured in mm/yr. These processes affect large areas of the earth's surface, and unless this offset is somehow forced to be accommodated over a very short distance, such as within tens of feet across an earthquake fault, it is often difficult to detect without specialized instrumentation and monitoring.

4.5 Fault Creep and Fault Offset

Fault creep and offset may be ongoing, or may occur only during earthquake. The offset or distortion is localized to the span of the fault zone, and not present/detectable elsewhere.

Fault creep rates are typically on the order of mm/yr. Not all faults experience creep; some move only during earthquake events.

Fault creep is commonly seen in the field where the cumulative offset of a linear element over time has been enough to be recognizable. For example, the seismic literature has famous photographs of warped street curbs, deflected fences, and warped railroad tracks.

The angular distortion accompanying fault creep is usually low, although it builds over time and may require repair. The University of California Berkeley Memorial Stadium is built across the creeping Hayward fault. For many decades, the offset was more an object of curiosity. A recent reconstruction project specifically incorporated a means to accommodate this creep without damage to the structure.

5. Ongoing Monitoring Programs and Data Resources

Various tools can be used to monitor ground movement, depending on the application.

5.1 Expansive Soil Movement, Evapotranspiration Rates

Due to the generally localized effects of expansive soil movement, monitoring most often takes the form of repeat measurements across cracks; or installed measurement devices that permit repeated measurements across interfaces such as where concrete slabs meet each other, or a wall meets a slab-on-grade. Evaluation of structures that are experiencing distress that may be attributable to expansive soil movement will sometimes use floor level surveys (manometer surveys) to characterize differences in floor level. These surveys can be conducted during different seasons to observe the fluctuations in floor level occurring as a result of variation in the soil moisture such as from climatic seasonal changes, and changes in irrigation. Up to a few inches of elevation difference can be observed in floor slabs supported on highly expansive soils with large variations in the soil moisture content.

The California Irrigation Management Information System (CIMIS) measures evapotranspiration rates at various weather stations throughout California, and makes that data available online (accessible at <http://www.cimis.water.ca.gov/>). The closest station (Station #191) to the study area is located in Pleasanton.

5.2 Zone 7 Monitoring in Livermore Valley

Zone 7 is relatively fortunate among water agencies in having fairly early recognized the need for groundwater management and monitoring; as noted above, major pumping by an out-of-basin user (SFPUC) was halted in the 1940's due to drawdown in groundwater levels.

Zone 7 has a Well Master Plan (WMP) that was finalized in 2003 (CH2MHill, 2003). The WMP identified preferred areas for wells, and developed specifics regarding well spacing, sustainable pumping/production rates, well construction, and water quality impacts. It also looked at sustainable yield under drought conditions.

Zone 7's Groundwater Management Plan (GMP) was finalized in 2005, although elements of it had been in place before that date. In accordance with the California Groundwater Management Planning Act, the GMP brought together the cities of Livermore, Pleasanton and Dublin, and four large water retailers, to prepare an integrated plan for management of the Livermore Valley Groundwater Basin. The GMP itself does not put forth new policy. Topics addressed by the GMP include various monitoring programs; mitigation of overdraft conditions; protocols relating to

regulation/mitigation of contaminated groundwater, water recycling, wellhead and well integrity against contamination; and control of salt water intrusion. Monitoring programs include groundwater level monitoring; ground surface elevation monitoring; recharge monitoring; groundwater quality monitoring; surface water flow/quality monitoring; and meteorological/climatological monitoring. Two of these monitoring programs (groundwater elevation, and ground surface elevation) are described further below.

5.3 Groundwater Elevation Monitoring

Zone 7's groundwater elevation monitoring program tracks groundwater levels in the various subbasins, identifies trends, and permits proactive changes in policy regarding groundwater management (i.e. pumping, recharge). There are 236 wells in Zone 7's groundwater monitoring program, which undergo sampling/monitoring at various intervals depending on specific needs (see Fig. 8). The results of this monitoring and associated analysis are presented in an annual report to the Groundwater Management Program (see www.zone7water.com/publications-reports/reports-planning-documents).

5.4 Ground Survey Monitoring

Ground surface elevations have been monitored by Zone 7 since 2002 as a component of the Agency's Groundwater Management Plan. A network of approximately 60+ elevation benchmarks has been established that spans the Bernal and Amador subbasins within the Main Basin, with reference benchmark (datum) points located outside the sedimentary basin (see Fig. 10). All of Zone 7's production wellfields are encompassed by the survey monitoring network. Data from twice-yearly high precision leveling surveys are analyzed annually, and results presented in Zone 7's Annual Report to the Groundwater Management Plan (accessible online at the URL cited above). In the Livermore Groundwater Basin, ground surface monitoring points appear to rise and fall on the order of 0.025 to 0.050 feet, on an annual basis. These elevation changes are detectable within the area of unconsolidated (basin fill) sediments, with the effect lessening toward basin margin. They are not detectable or are insignificant in bedrock areas. As discussed below under Section 6.4.6 (Benchmark Points and Survey Points), some of the apparent movement may be associated with whether survey points are fixed to ground surface features as opposed to deriving support from deeper in the ground. Currently, groundwater levels are being managed so as to remain above historic lows, in order to assure that the aquifer's response is elastic.

5.5 Comparative and Historical Analysis of Groundwater and Ground Elevation Monitoring

These parallel monitoring programs (groundwater levels, ground surface elevation) are cross-compared and analyzed in order to avoid the possibility of inelastic deformation in the aquifer system by keeping the groundwater levels well above historic lows.

The monitoring programs are operated in tandem with hydrogeologic modelling of the basin hydrogeology by Zone 7, using a well log database of over 3,000 wells and boreholes, and a GIS that builds on data extracted from selected well logs and other data layers.

5.6 Tectonic Monitoring

Fault creep along the Calaveras fault has been monitored for over 30 years. Creep rates from a 20-year period were summarized by Galehouse and Lienkaemper (2003). The northern Calaveras fault, which passes through the Zone 7 service area, is creeping at 3 – 4 mm/yr.

Uplift on the southern flanks of Mt. Diablo is also monitored, with measured uplift rates of approximately 1 mm/yr (Burgmann and others, 2006).

Fault creep on the Greenville fault is monitored, with the creep rate measured at 1.1 mm/yr (McFarland and others, 2009).

6. Conclusions

In the sections below, we compare and contrast the water-related ground movement processes: processes of groundwater rising/falling (with either elastic or inelastic ground surface response), and expansive soil moisture changes. For completeness, we also review the effects of tectonic deformation, although it is not water-related.

We then review the nature of anticipated future ground movements likely to be observed in the Livermore Valley.

6.1 Separate Processes, Related by Water

Both expansive soil movement and land subsidence associated with groundwater level decline are related to water, however they are distinctly separate processes. Tectonic deformation is an entirely separate phenomenon.

6.1.1 Expansive Soil Movement

Expansive soil movement is most apparent near a wetting/drying front, with the atmosphere the biggest front. This means it is by nature a shallow process, with potential for relatively localized expression.

Expansive soil movement is strongly governed by soil clay content, and the soil's geologic inheritance (mineralogy) and variations in the soil moisture content. Variations in the soil moisture content can be due to climatic/seasonal variations (e.g. dry summer versus rainy winter) or man-induced (e.g. the introduction or removal of landscaping and irrigation systems).

6.1.2 Inelastic and Elastic Ground Surface Movement

Groundwater level decline affects the aquifer system at depth; elastic and inelastic response to those declines/rises is occurring at depth and reflected at the ground surface. As a deep process that is controlled by regional water level/pressure, these effects are distributed over a broad area. Localized distress or damage can result, but it is relatively infrequent and distress is more usually associated with warping of improvements that span very significant distances.

Both the deep behavior of the aquifer system, and the shallow behavior of the surficial soils, are strongly controlled by their geologic past. The sediments deposited in the Livermore-Amador Groundwater Basin over time, and the most recent deposits that make up the modern soil, are not randomly distributed, but rather were determined by the geologic processes acting in any one area – e.g. coarse gravels transported and deposited by streams in some areas, and clayey, organic

material deposited in a marsh setting in other areas (see Fig. 5). The behavior of these deposits can be broadly anticipated based on their geologic history and makeup.

6.1.3 Tectonic Deformation

Tectonic deformation is localized near active tectonic features; examples of these in the study area would include the Calaveras and Greenville faults, and the uplift of Mt. Diablo (see Fig. 4). Unless there is actual fault offset either through earthquake or ongoing creep, the effects are distributed over a broad area. Tectonic deformation is not water-related. The depth of groundwater extraction is not sufficient for there to be any link between pumping and earthquakes.

6.2 Nature of Recovery

Expansive soil as it goes through multiple shrink/swell cycles will change in character between a hard, overconsolidated clay-rich soil with shrinkage (desiccation) cracks when dry, and a soft, mucky, sticky clay when wet. The ground surface elevation differential of a thick profile of highly expansive soil can be on the order of a few inches between its fully dry state (shrinkage limit) and its completely saturated state. Highly expansive soil, when subjected to additional loads (such as construction of a building atop it), may not fully recover its initial volume in subsequent shrink/swell cycles, as it adjusts to the new loads.

Groundwater level cycles, so long as they remain within the elastic realm (above historic low levels), will not result in irreversible consolidation. Recharge is a slower process than extraction, so response to wet periods is likely to be slower than response to extraction. There is a time lag in response by the aquifer system (aquitards in particular), since it takes time for groundwater pressure to equilibrate.

Tectonic deformation is not cyclic, and is nonrecoverable.

6.3 Anticipated Phenomena in Livermore Groundwater Basin

This section outlines in a general fashion the types of ground movement features that we would anticipate observing in the Livermore-Amador Valley Groundwater Basin, with particular reference to drought conditions.

6.4 Climatic Trends and Cycles

Climatic cycles will affect the Livermore-Amador Groundwater Basin in the years to come, and these cycles will affect the geologic and hydrologic processes at work in the basin. There will be times of drought, and times of wetter than normal winters.

Weather records appear to indicate that climatic swings may be becoming more extreme, in which case droughts may be more severe than experienced in historic time, and wet periods likewise may be more extreme. The effect of these on groundwater levels, and on soil moisture cycles, is not yet clear.

Weather records also indicate that overall average temperatures are on a rising trend, which if continued, would tend to facilitate soil moisture loss.

6.4.1 Expansive Soil Response to Drought

If the current drought intensifies, and soils become drier to a greater depth than experienced in historic time, the shrinkage effect will be more pronounced than experienced to date.

There will be greater total shrinkage of the near-surface expansive soil profile resulting from this more extreme drying, and greater depth of drying. This will be manifested at the ground surface as hard, overconsolidated, desiccated clays with ground shrinkage cracks, and a decrease in the ground surface elevation relative to when the soil was wet.

Areas of mapped highly expansive soils are the most likely to experience future distress during future drying cycles. In our judgment, it is highly likely that future distress will be especially common in areas within or near mapped highly expansive soils (see Fig. 6, which corresponds to the extent of the historic Pleasanton marsh complex (SFEI, 2013; and Fig. 5).

The drying effect of drought conditions in developed areas is typically compounded by cutbacks in irrigation rates, in that there is reduced input of soil moisture at the same time there is increased rate of moisture loss.

Based on our review of the literature, our experience, and on our knowledge of the general geology and soils of the Livermore Valley, we think there is a high likelihood of distress concentrations:

- Along the canal alignments, which roughly follow the pre-development drainage axes.
- Along paved roadways, particularly near the edges of pavements where there is adjacent bare ground.
- Near the edges of large relatively impervious surfaces, where juxtaposed against bare or vegetated ground, such as near corporate developments, boulevards, parking lots, and playgrounds.

Commonly, engineered structures on expansive soils will have deeper foundations that are intended to derive their support from soils below the interval of soil that experiences significant

variation in soil moisture content. If drying of the soil profile extends to greater depths than previously experienced and designed for, structures may experience the effects of shrinkage.

More extreme drying of the soil profile may result in distress to buildings that previously experienced only minor expansive soil movement due to non-structural (non-foundation) elements that reduced shrink/swell cycling. These include irrigation patterns, soil-covering slabs or decking, and surface and subsurface drainage systems.

6.4.2 Expansive Soil Response to Wet Periods

Expansive soils will swell and soften during future wet periods.

Areas of mapped highly expansive soils are the most likely to experience future distress during future wetting cycles.

Wetting cycles (with accompanying swelling) will cause distress to many of the same features that suffer under drying cycles: shallow foundations, pavements, slabs-on-grade, and slopes in expansive materials.

6.4.3 Ground Surface Response to Groundwater Level Decline

We anticipate that ground surface elevation changes will be substantially the same in character as the apparently elastic responses observed in the data gathered since 2002, and reported annually by Zone 7 as part of the Groundwater Management Plan, so long as groundwater levels do not drop below historic lows.

If groundwater levels decline below historic lows, there may be renewed inelastic subsidence. As documented in the literature (Borchers and others, 2014; Sneed and others, 2013), renewed inelastic subsidence can progress more rapidly than inelastic subsidence does at its initial onset. If this were to occur, the inelastic compaction would affect primarily the aquitard intervals within the groundwater basin (see Fig. 7). The inelastic subsidence may not be uniform, depending on total thickness of aquitard sediments present in any one area and whether they become subjected to groundwater level declines below historic lows. As one example of this, the thickness of the central aquitard between the Upper Aquifer Zone and Lower Aquifer Zone alone varies over several tens of feet (see Fig. 9); inelastic subsidence of this interval could be expected to vary accordingly.

Residual compaction refers to the delayed response of aquitard sediments to the effective pressure experienced at the time of historic groundwater lows. Based on the data we reviewed, we cannot eliminate the possibility that although those historic lows are now many years past, the residual response of aquitard sediments could still be ongoing, though slowed considerably.

6.4.4 Ground Surface Response to Water Level Rise

We anticipate that ground surface elevation changes will be substantially the same in character as the elastic responses observed in wet year(s). The elastic response will have limits, however – continued recharge will not “inflate” the valley floor (Galloway and others, 1999).

6.4.5 Tectonic Deformation

Creep and limited deformation will be ongoing near the Calaveras and Greenville faults, as will the uplift of Mt. Diablo.

Zone 7 may wish to evaluate the location of reference survey benchmarks used for ground survey monitoring, in relation to benchmarks used for tracking tectonic creep. It may be advisable to employ multiple datum points. For example, the Zone 7 semi-annual ground surface monitoring program revealed that one benchmark thought to be located on bedrock was actually experiencing some elastic response.

6.4.6 Survey Benchmarks and Survey Points

A cursory review of the survey points used to track ground surface elevations (see Zone & Annual Report to the Groundwater Management Plan [Zone 7, 2014]) suggests that benchmark sites within the basin experience little or no movement compared to other survey points that utilize chisel marks on surface structures, or spikes or brass disks in roadways. It appears that the movement on survey points within the basin *other* than the more deeply-founded benchmark sites may be generally 3 to 10 times greater than for the benchmark points.

Benchmark points employing features that make for more repeatable measurements will be more reliable data points in future surveys, and will allow better discrimination between expansive soil movements, and groundwater-related effects. Examples of these features include use of bars or pipes embedded several feet into the ground to be less susceptible to ground surface movements caused by soil moisture content variation. The tops of well casing may also provide good survey points as the casing extends deep into the ground, below the soil active zone.

7. Limitations

The conclusions and recommendations of this report are based upon information provided to us, our geologic reconnaissance and research, subsurface conditions described on the boring logs, the results of monitoring summarized in reference reports, interpretation and analysis of the collected data, and professional judgment.

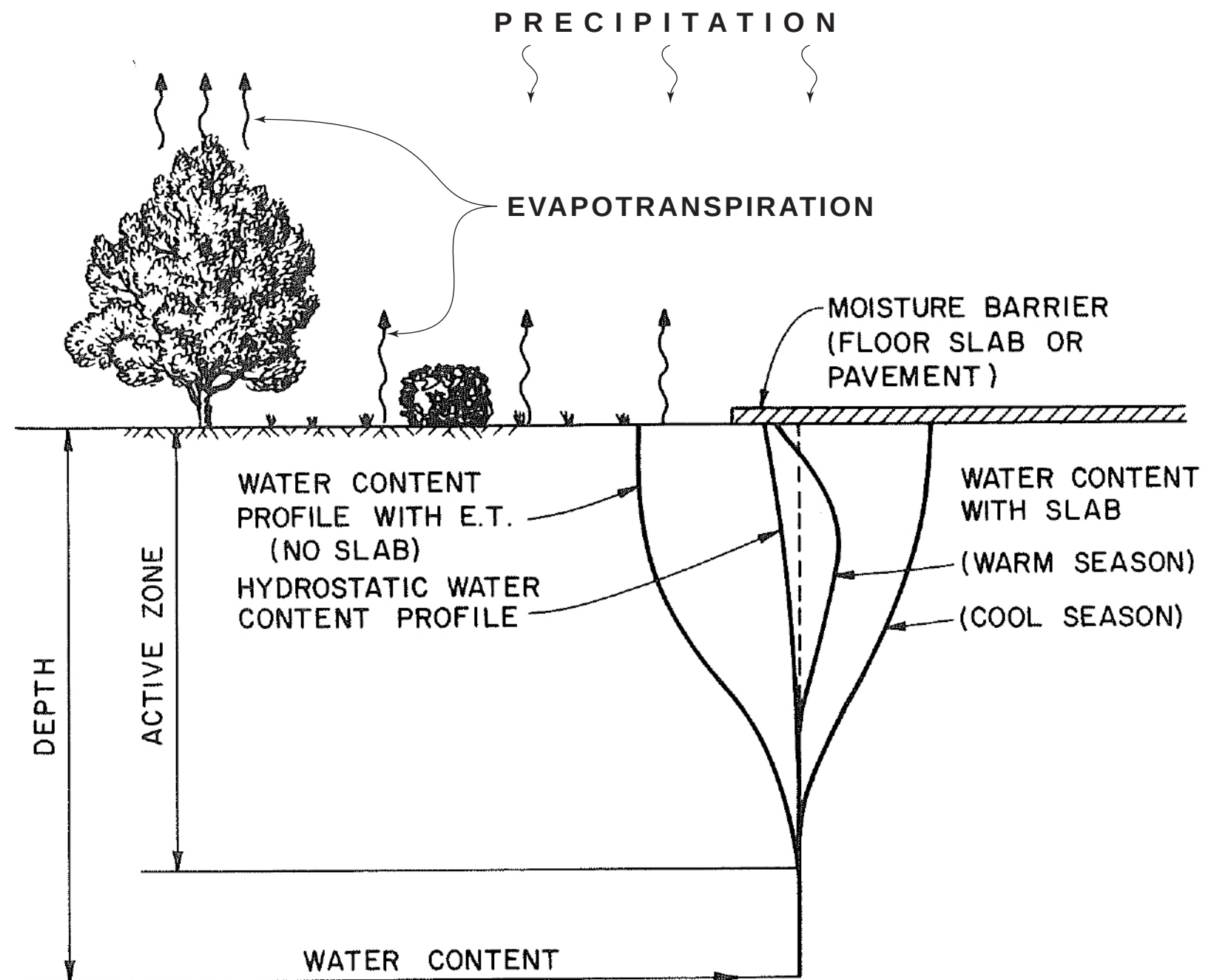
8. References

- Barlock, V.E., 1989, Sedimentology of the Livermore Gravels (Miocene-Pleistocene), southern Livermore Valley, California: U.S. Geological Survey Open-File Report 89-131.
- Barlock, V.E., 1988, Geologic map of the Livermore Gravels, Alameda County, California: U.S. Geological Survey Open-File Report 88-516.
- Bell, J.W., and 3 others, Land subsidence in Las Vegas, Nevada 1935-2000: new geodetic data show evolution, revised spatial patterns, and reduced rates: Geol. Soc. America, Enviro. & Engineering Geoscience, vol. VIII, no. 3, pp. 155-174.
- Borchers, J.W. and Carpenter, Michael, 2014, Land subsidence from groundwater use in California: unpublished consultants' report by Luhdorff & Scalmanini Consulting Engineers for California Water Foundation, dated April 2014.
- Burgmann, Roland, 2005, Active uplift and thrust-fault strain accumulation rates from PS-InSAR and GPS data: Annual Project Summary for FY2005, Grant 05-HQGR-0038.
- CalGeo, 2013, Coexisting with expansive soil: California Geotechnical Engineering Association.
- California Department of Water Resources, 1966, Livermore and Sunol Valleys, evaluation of ground water resources: Calif. Dept. of Water Resources, Bull. No. 118-2.
- California Geological Survey, 2008, Seismic hazard zone report for the Livermore 7.5-minute quadrangle, Alameda, California: CGS Seismic Hazard Zone Report 114.
- CH2MHill, 2003, Well Master Plan (draft): unpublished consultants' report for Zone 7 Water Agency, dated October 2003.
- Dibblee, T.W., Jr., 1980, Preliminary geologic map of the Livermore 7.5' quadrangle, Alameda County, California: U.S. Geological Survey Open-File Report 80-533-B-1.
- Ferriz, Horacio, 2001, Groundwater resources of northern California: an overview; in: Ferriz, H. and Anderson, R., eds., Engineering Geology Practice in Northern California: California Div. Mines and Geology, Bull. 210.
- Galehouse, J.S., and Lienkaemper, J.J., Inferences drawn from two decades of alignment array measurements of creep on faults in the San Francisco Bay Region: Bull. Of Seismological Soc. America, vol. 93, issue 6, pp. 2415-2433.

- Galloway, D., Jones, D.L., and Ingebritsen, S.E., 1999, Land subsidence in the United States: U.S. Geological Survey Circular 1182.
- Galloway, D.L., and 6 others, 1998, Detection of aquifer system compaction and land subsidence using interferometric synthetic aperture radar, Antelope Valley, Mojave Desert, California: *Water Resources Research*, vol. 34, issue 10, pp. 2573-2585.
- Groundwater Resources Association of California (GRA), 2015, Impacts of land subsidence on water delivery infrastructure and ongoing management efforts: GRACast Web Seminar, Part 3 of Series on Land Subsidence, accessed 5/20/15.
- Graymer, R.W., Jones, D.L., and Brabb, E.E., 1996, Preliminary geologic map emphasizing bedrock formations in Alameda County, California: a digital database: U.S. Geological Survey Open-File Report 96-252.
- Greenfield, Steven J., and Shen, C.K., 1992, *Foundations in Problem Soils*: Prentice-Hall Inc. in cooperation with ADSC: the International Association of Foundation Drilling.
- Helley, E.J. and Graymer, R.W., 1997, Quaternary geology of Alameda County, and parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: a digital database: U.S. Geological Survey Open-File Report 97-97.
- Helley, E.J. and Graymer, R.W., 1997, Quaternary geology of Contra Costa County, and surrounding parts of Alameda, Sonoma, Solano, Sacramento, and San Joaquin Counties, California: a digital database: U.S. Geological Survey Open-File Report 97-98.
- Hibbs, B.J., Sharp, J.M., Jr., 2012, Hydrogeological impacts of urbanization: *Geol. Soc. Amer., Enviro. & Engineering Geoscience*, vol. XVIII, no. 1, pp. 3-24.
- Hidalgo, H.G. and 2 others, 2005, Sources of variability of evapotranspiration in California: *Jour. Hydrometeorology*, vol. 6, Feb. 2005, pp. 3-19.
- Holzer, T.L., and Pampeyan, E.H., 1981, Earth fissures and localized differential subsidence: *Water Resources Research*, vol. 17, no. 1, pp. 223-227.
- Ingebritsen, S.E., and Jones, D.R., 1999, Santa Clara Valley, California, a case of arrested subsidence; in Galloway, Devin and others, eds., *Land subsidence in the United States*: U.S. Geological Survey Circular 1182.
- Isaacson, Kathleen A., 1990, Late Tertiary synorogenic sedimentation in the northern Livermore Basin, California (thesis): unpublished Master's Thesis, San Jose State University.

- Jenny, H., 1946, Arrangement of soil series and types according to functions of soil-forming factors: *Soil Science*, vol. 61, issue 5, pp. 375-392.
- Jones & Stokes, 2005, Groundwater Management Plan for Livermore-Amador Valley Groundwater Basin: unpublished consultants' report for Zone 7 Water Agency, dated Sept. 2005.
- Knudsen, K.L., and others, 2000, Preliminary maps of Quaternary deposits and liquefaction susceptibility, nine-county San Francisco Bay Region, California: U.S. Geological Survey Open-File Report 00-444.
- McLean, Hugh, 1987, Federal lands assessment program, Sonoma and Livermore Basins, California (province 79): U.S. Geological Survey Open-File Report 87-450-J.
- Nelson, J.D., and Miller, D.J., 1992, *Expansive Soils, Problems and Practice in Foundation and Pavement Engineering*: New York, John Wiley & Sons, 259 pp.
- Noe, D.C. and others, 2007, Guide to swelling soil for Colorado homebuyers and homeowners (2nd ed.): Colorado Geological Survey Spec. Pub. 43.
- Norfleet Consultants, 2004, Preliminary stratigraphic evaluation, west side of the Main Basin, Livermore-Amador Groundwater Basin: unpublished consultants' report for Zone 7 Water Agency, dated Jan. 29, 2004.
- Perpich, W.M., Lukas, R.G., and Baker, C.N., 1965, Desiccation of soil by trees related to foundation settlement: *Canadian Geotech. Journal*, vol. 2, no. 1, pp. 23-39.
- Poland, J.F. and Ireland, R.L., 1988, Land subsidence in the Santa Clara Valley, California, as of 1982: U.S. Geological Survey Prof. Paper 497-F.
- Rogers, J.D., 2015, GE 341 - Engineering geology and geotechnics Lecture 2 – Expansive Soils: course lecture syllabus/notes, University of Missouri Rolla, accessed May 2015 at <http://web.mst.edu/~rogersda/umrcourses/ge341/>
- Sawyer, T.L., and Unruh, J.R., 2002, Holocene slip rate constraints for the northern Greenville fault, eastern San Francisco Bay Area, California: implications for the Mt. Diablo restraining stepover model (abs.): Amer. Geophys. Union, Fall Meeting 2002.
- Sneed, Michelle, Brandt, Justin, and Solt, Mike, 2013, Land subsidence along the Delta-Mendota Canale in the northern part of the San Joaquin Valley, California, 2003-2010: U.S. Geological Survey Scientific Investigations Report 2013-5142.

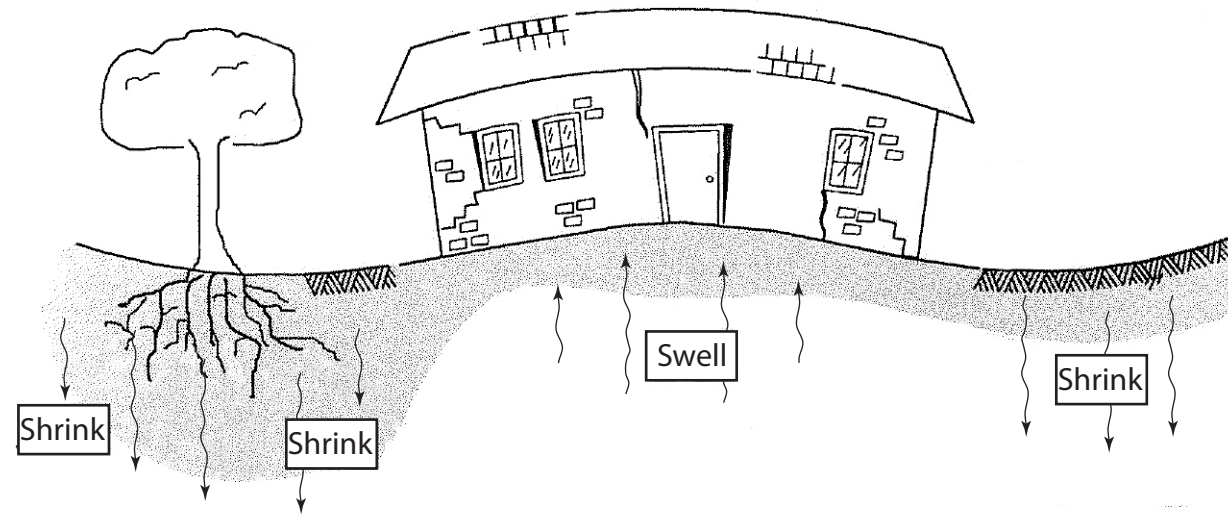
- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA/NRCS), 1910, Soil Map of the Livermore Area, California: have map, need citation.
- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA/NRCS). National soil survey handbook, title 430-VI. Available online, accessed May 29, 2015.
- Wentworth, et al., 1999, Preliminary Geologic Map of the San Jose 30 X 60-Minute Quadrangle, California: U.S. Geological Survey Open File Report 98-795.
- Witter, R.C., Knudsen, K.L, Sowers, J.M., Wentworth, C.M., Koehler, R.D., and Randolph, C. E., 2006, Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California: U.S. Geological Survey Open-File Report 2006-1037, scale 1:24,000 (<http://pubs.usgs.gov/of/2006/1037/>).
- Working Group on California Earthquake Probabilities (WGCEP), 2003, Earthquake Probabilities in the San Francisco Bay Region: 2002-2031: U.S. Geological Survey Open File Report 2003-214.
- Working Group on California Earthquake Probabilities (WGCEP), 2008, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): for 2007-2036: U.S. Geological Survey Open File Report 2007-1437; CGS Special Report 203; and SCEC Contribution #1138.
- Wray, Warren K., ed., 1995, So Your Home Is Built On Expansive Soils: a Discussion of How Expansive Soils Affect Buildings: ASCE.
- Zone 7 Water Agency, 2005, Well Master Plan DEIR: unpublished report prepared for Zone 7 Water Agency.
- Zone 7 Water Agency, 2014, Annual Report for the Groundwater Management Program, 2013 Water Year (October 2012 through September 2013), Livermore Valley Groundwater Basin: unpublished internal report.
- Zone 7 Water Agency, 2014, Annual report for the Groundwater Management Program, 2013 Water Year (October 2012 – September 2013), Livermore Valley Groundwater Basin: unpublished internal annual report dated August, 2014.



Schematic illustration of the active zone - the surface layer of soil in which moisture content is influenced by climate

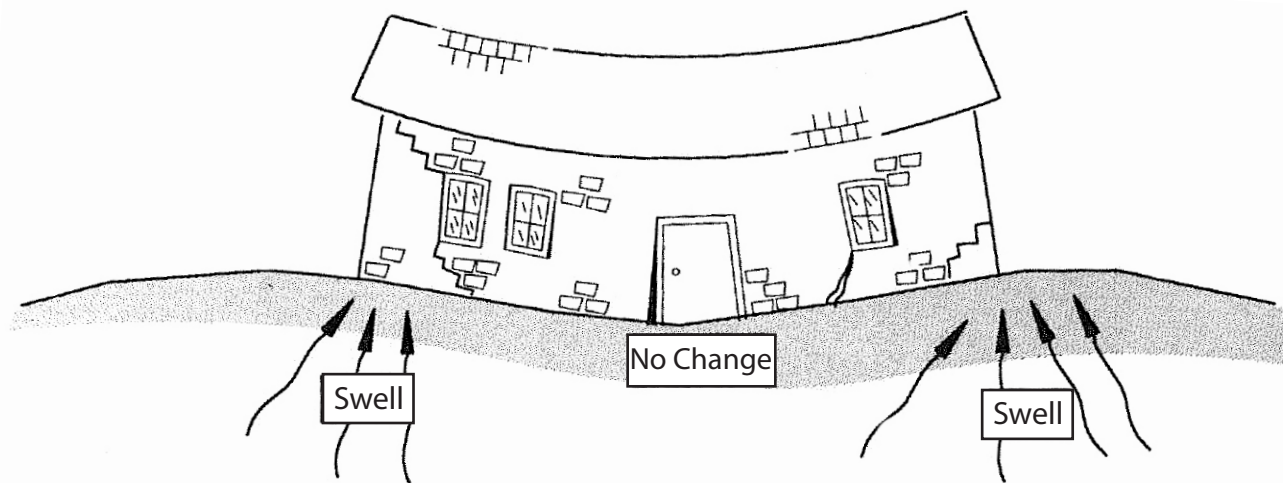
Figure adapted from Figure 2.2 in Nelson and Miller (1992)

Figure adapted from Wray (1995)



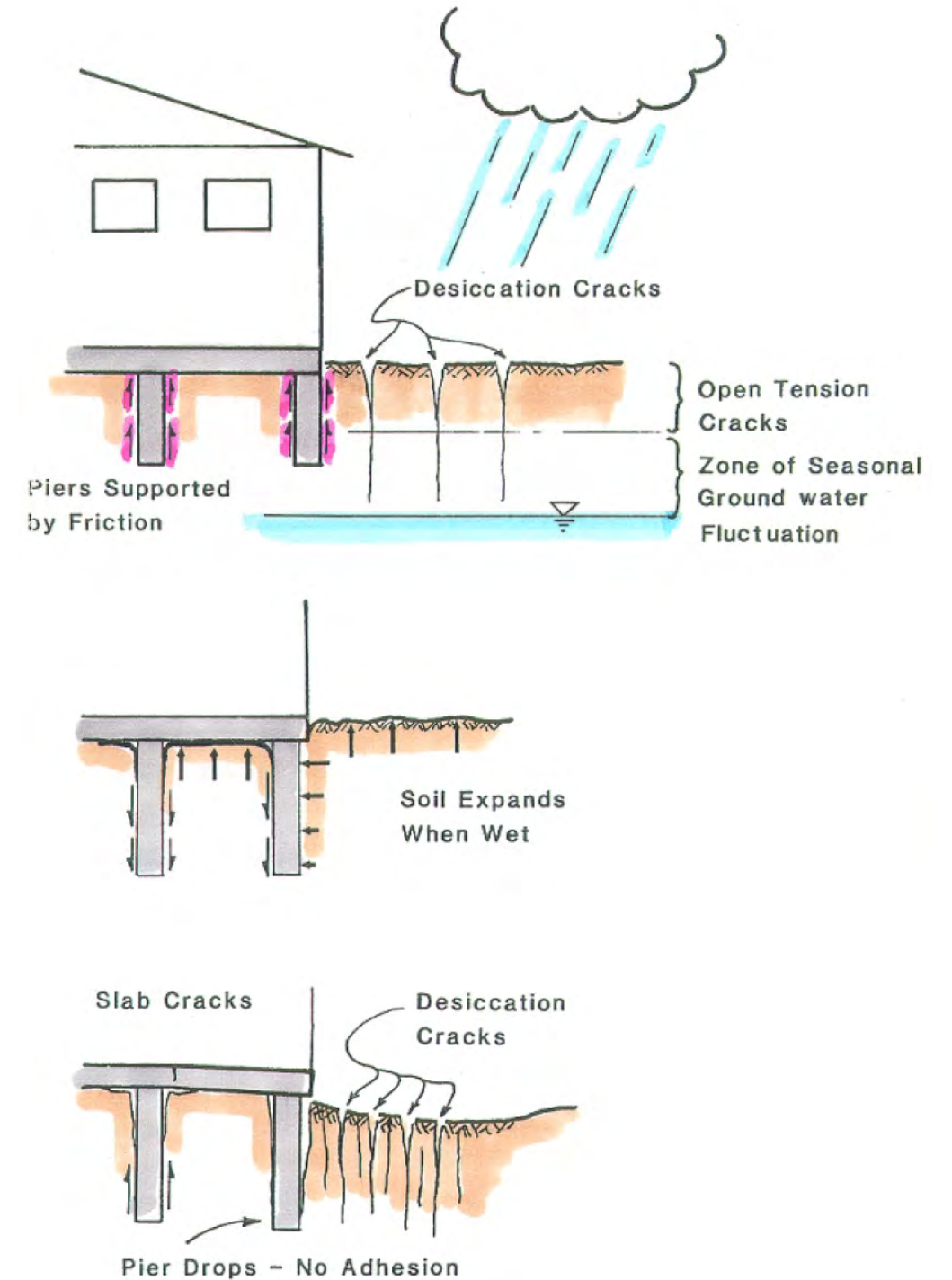
Schematic illustration of how a structure can be distorted by shrinkage of soils around its perimeter, swelling of soils beneath the interior, or both. Note that trees can extract moisture from soils.

Figure adapted from Wray (1995)



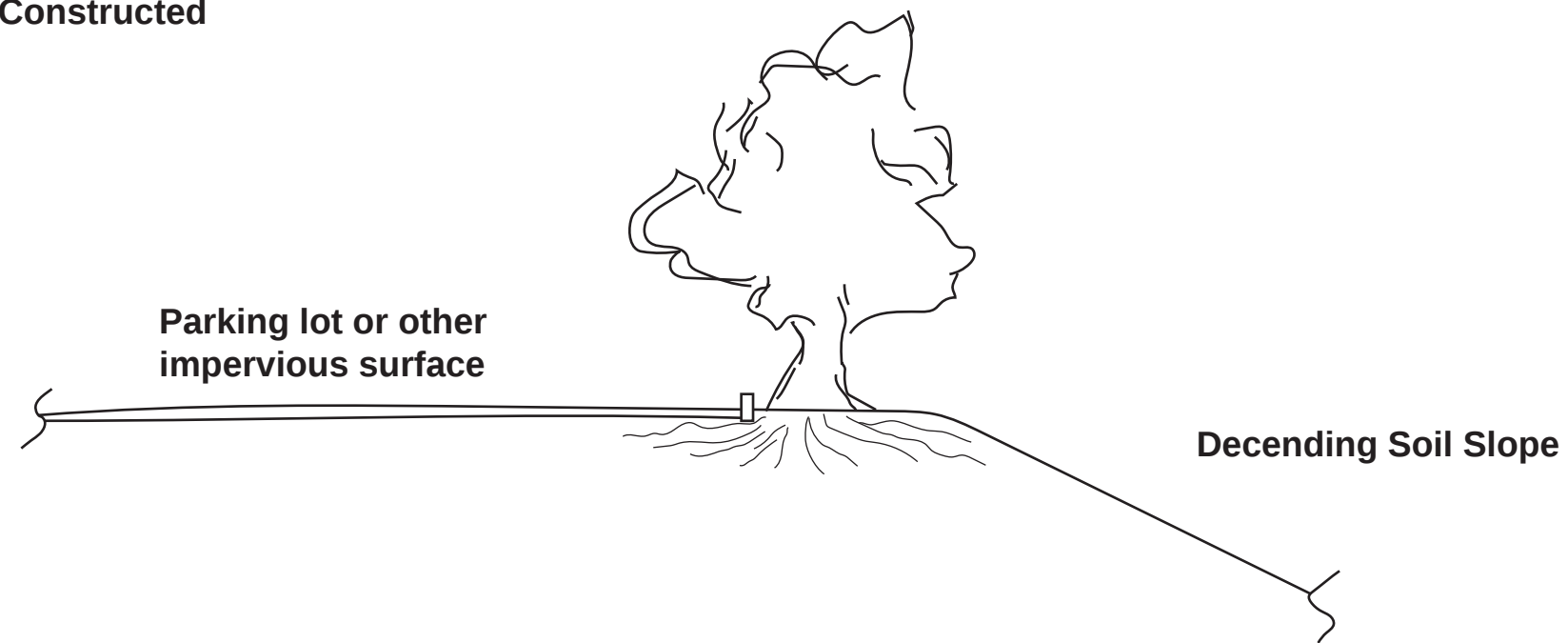
Schematic illustration of how a structure can be distorted by swelling of soils around its perimeter.

Figure adapted from Rogers (2015)

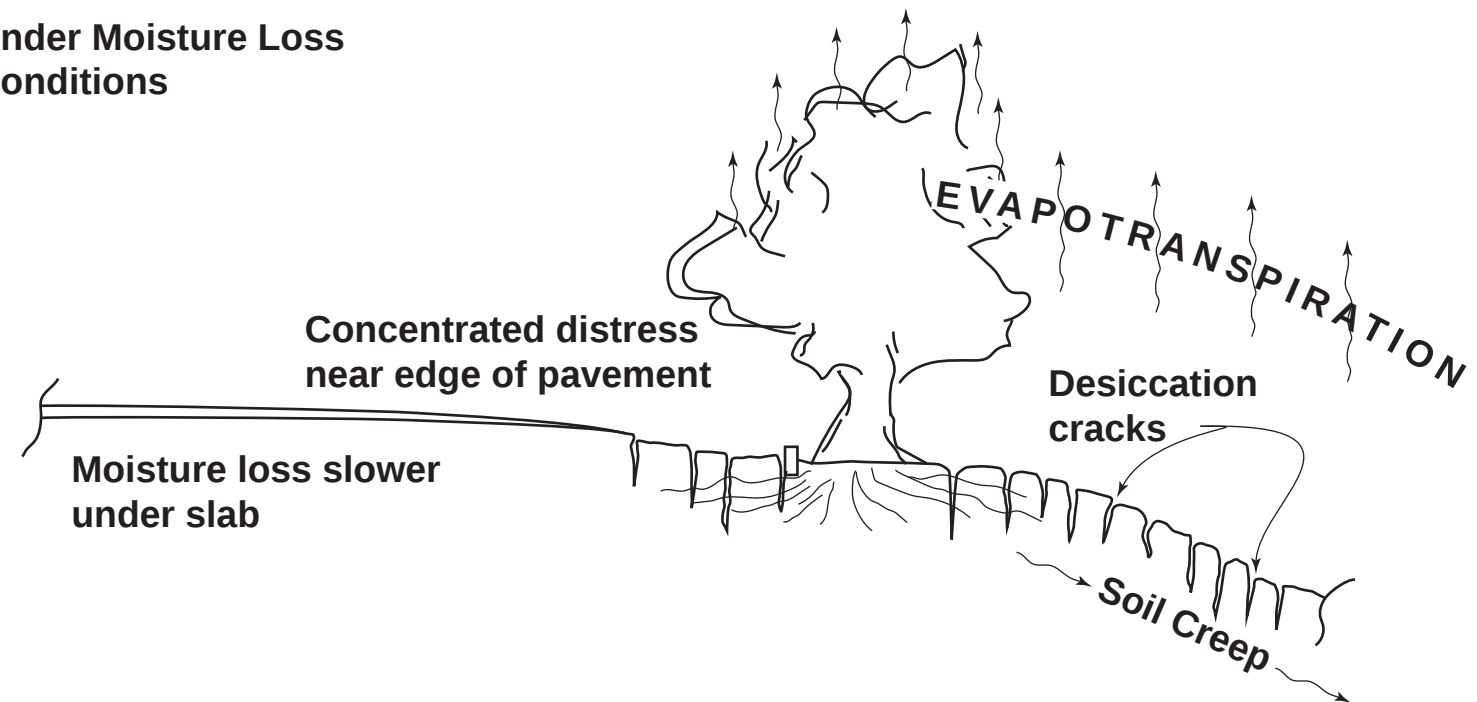


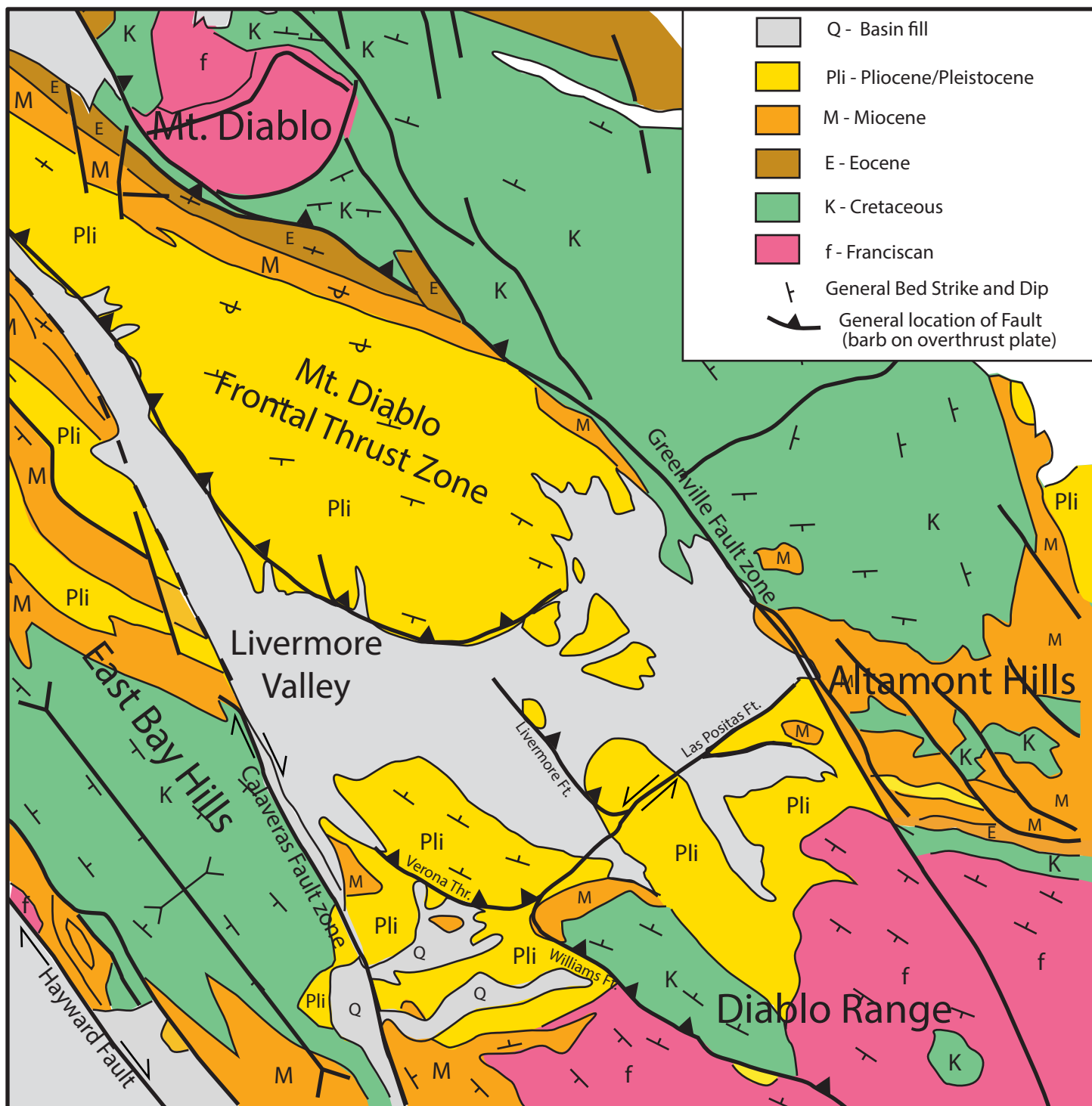
Example of how soil moisture changes can affect a structure on shallow piers.

I - As Constructed



II - Under Moisture Loss Conditions

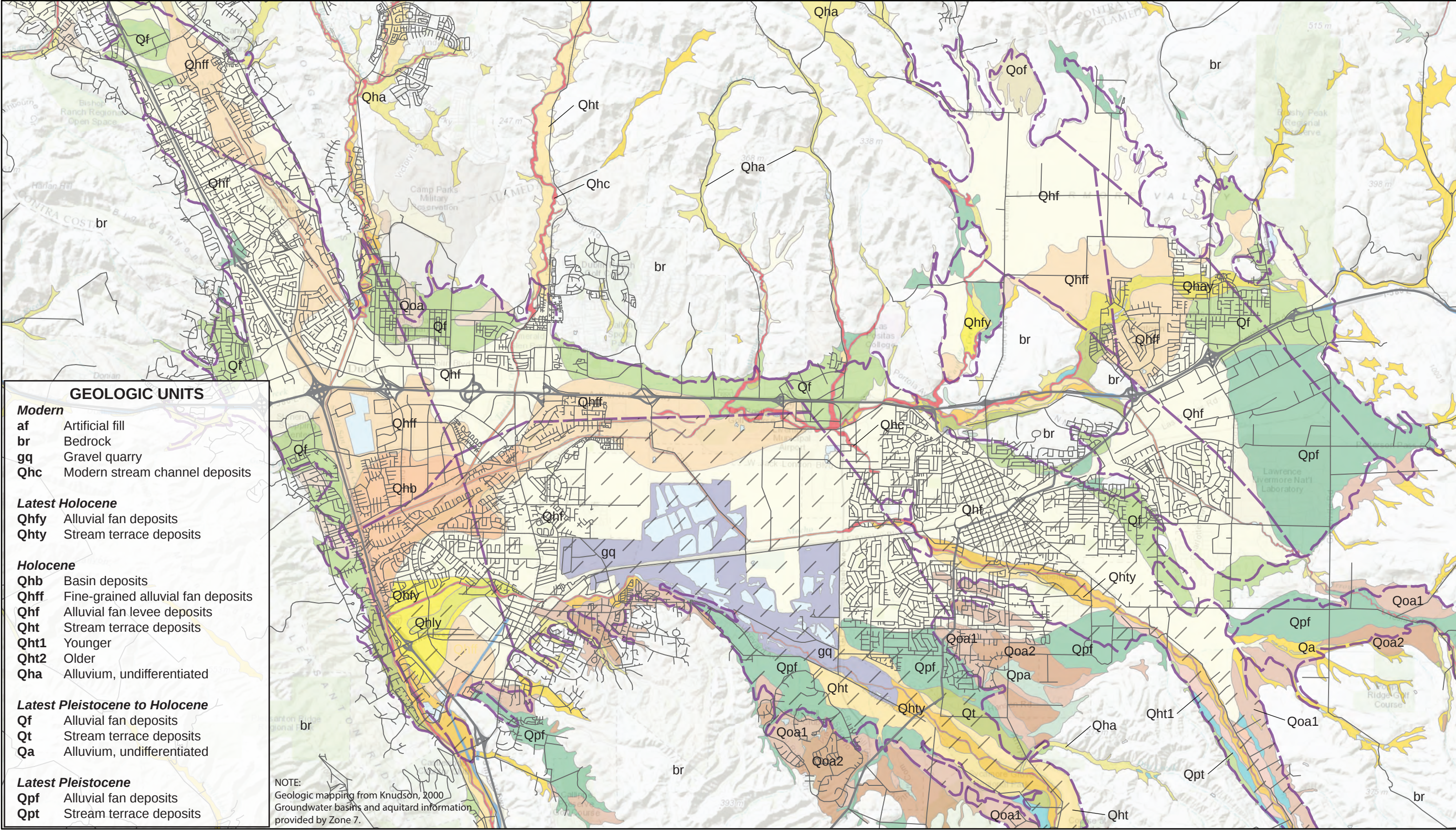




Not to Scale



Generalized geologic/tectonic map of the Livermore Valley vicinity. The major bedrock upland areas bounding the Livermore Valley are labelled, as are the major fault boundaries. The extent of "basin fill" (shown in gray) corresponds to the extent of the Livermore Valley groundwater basin. Figure adapted from Norfleet (2004).

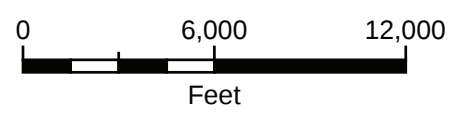


GEOLOGIC UNITS	
Modern	
af	Artificial fill
br	Bedrock
gq	Gravel quarry
Qhc	Modern stream channel deposits
Latest Holocene	
Qhfy	Alluvial fan deposits
Qhty	Stream terrace deposits
Holocene	
Qhb	Basin deposits
Qhff	Fine-grained alluvial fan deposits
Qhf	Alluvial fan levee deposits
Qht	Stream terrace deposits
Qht1	Younger
Qht2	Older
Qha	Alluvium, undifferentiated
Latest Pleistocene to Holocene	
Qf	Alluvial fan deposits
Qt	Stream terrace deposits
Qa	Alluvium, undifferentiated
Latest Pleistocene	
Qpf	Alluvial fan deposits
Qpt	Stream terrace deposits

NOTE:
Geologic mapping from Knudson, 2000
Groundwater basins and aquitard information
provided by Zone 7.

EXPLANATION

-  Main groundwater basin
-  Groundwater subbasin boundaries





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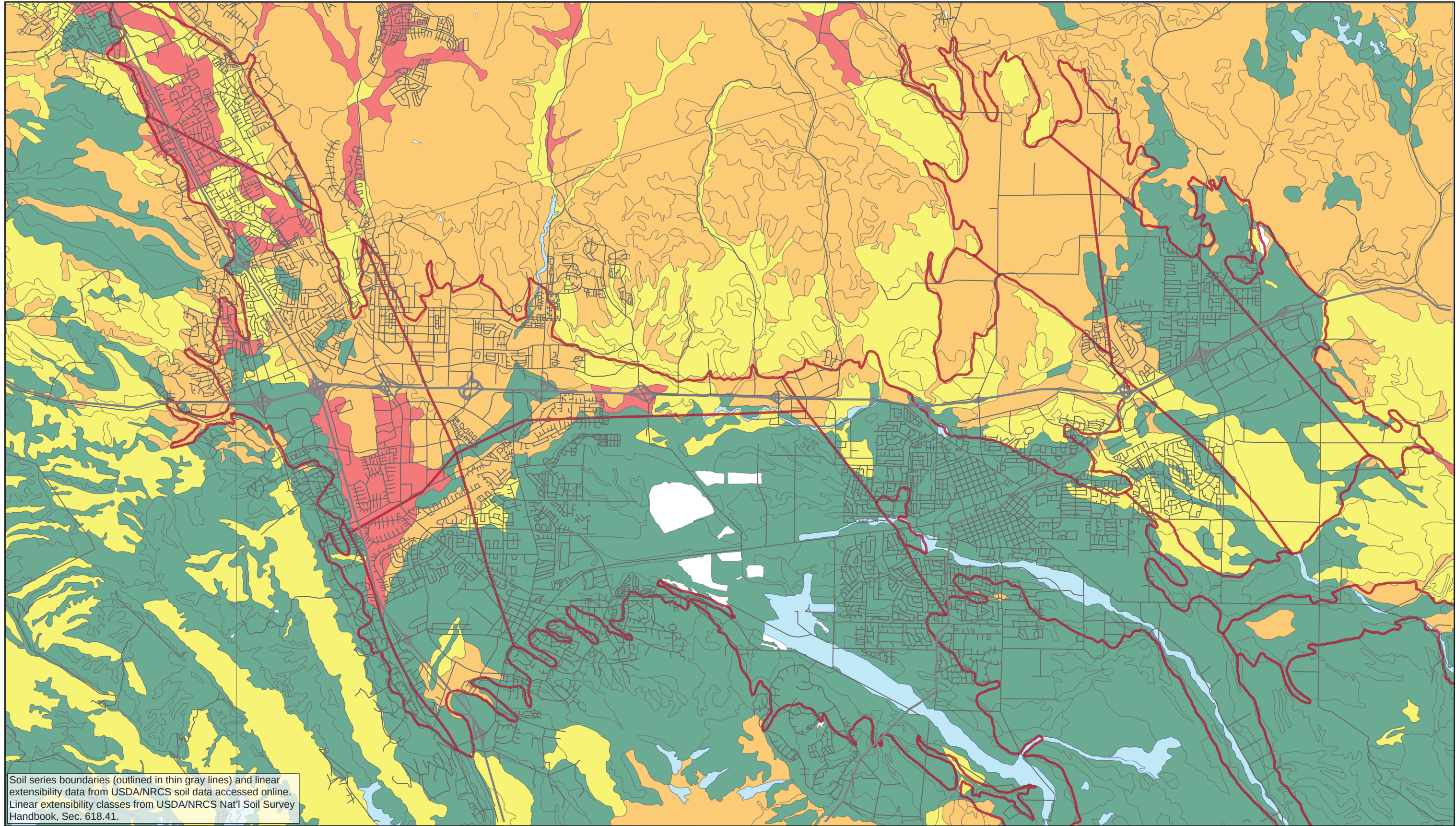
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REGIONAL QUATERNARY GEOLOGIC MAP
LIVERMORE VALLEY GROUND MOVEMENT STUDY
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FIGURE 5

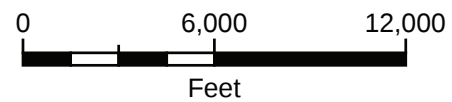


Soil series boundaries (outlined in thin gray lines) and linear extensibility data from USDA/NRCS soil data accessed online. Linear extensibility classes from USDA/NRCS Nat'l Soil Survey Handbook, Sec. 618.41.

Linear Extensibility (Percent)

Low	Med	High	V. High
<3%	3.0-5.9%	6.0-8.9%	≥9.0%

Subbasin Boundaries



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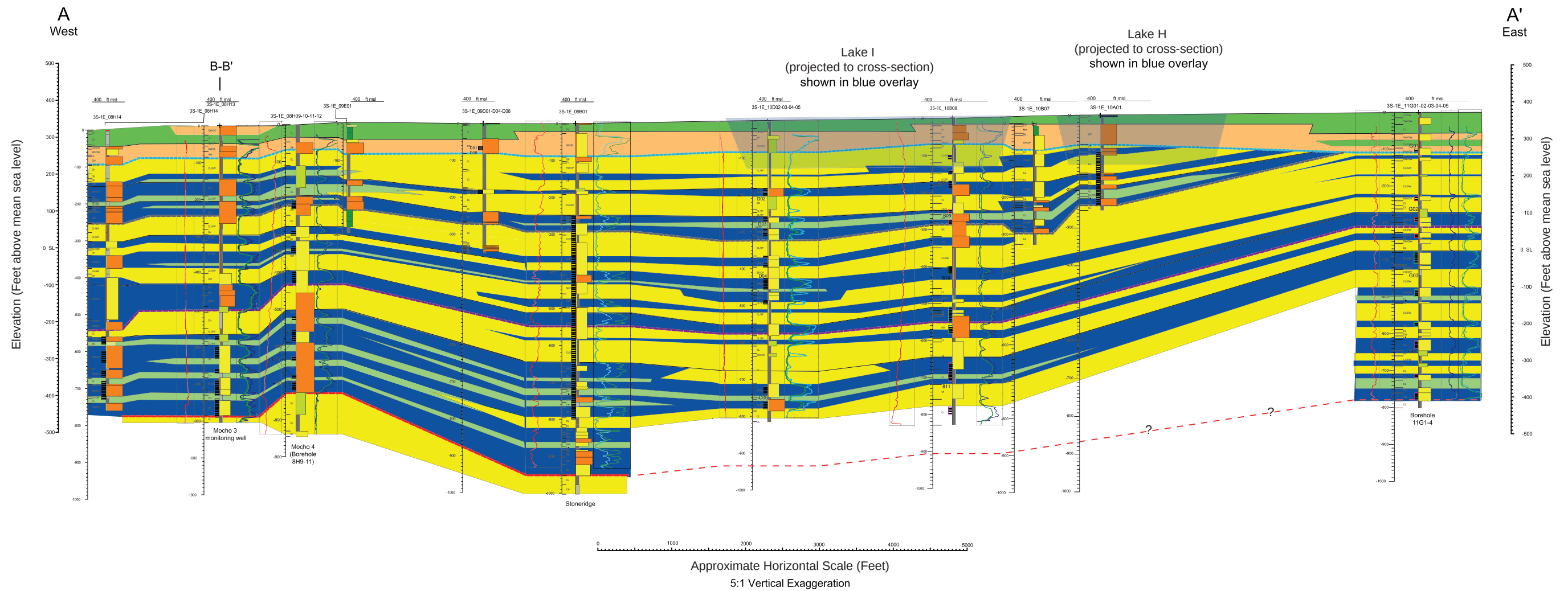
REGIONAL SOIL SHRINK-SWELL POTENTIAL MAP
LIVERMORE VALLEY GROUND MOVEMENT STUDY

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FIGURE 6



This cross-section extends approximately east-west across part of the Livermore Valley. It is intended to portray the complex interlayering of major alluvium types within the basin, some of which act as aquifers, some of which act as aquitards. See Figure 4 for location of section.

The cross-section was developed on the basis of data from well logs (see vertical lines or profiles representing various types of data). This section was simplified greatly from Plate 3 of Norfleet (2004); refer to that figure for detail regarding well log data types.



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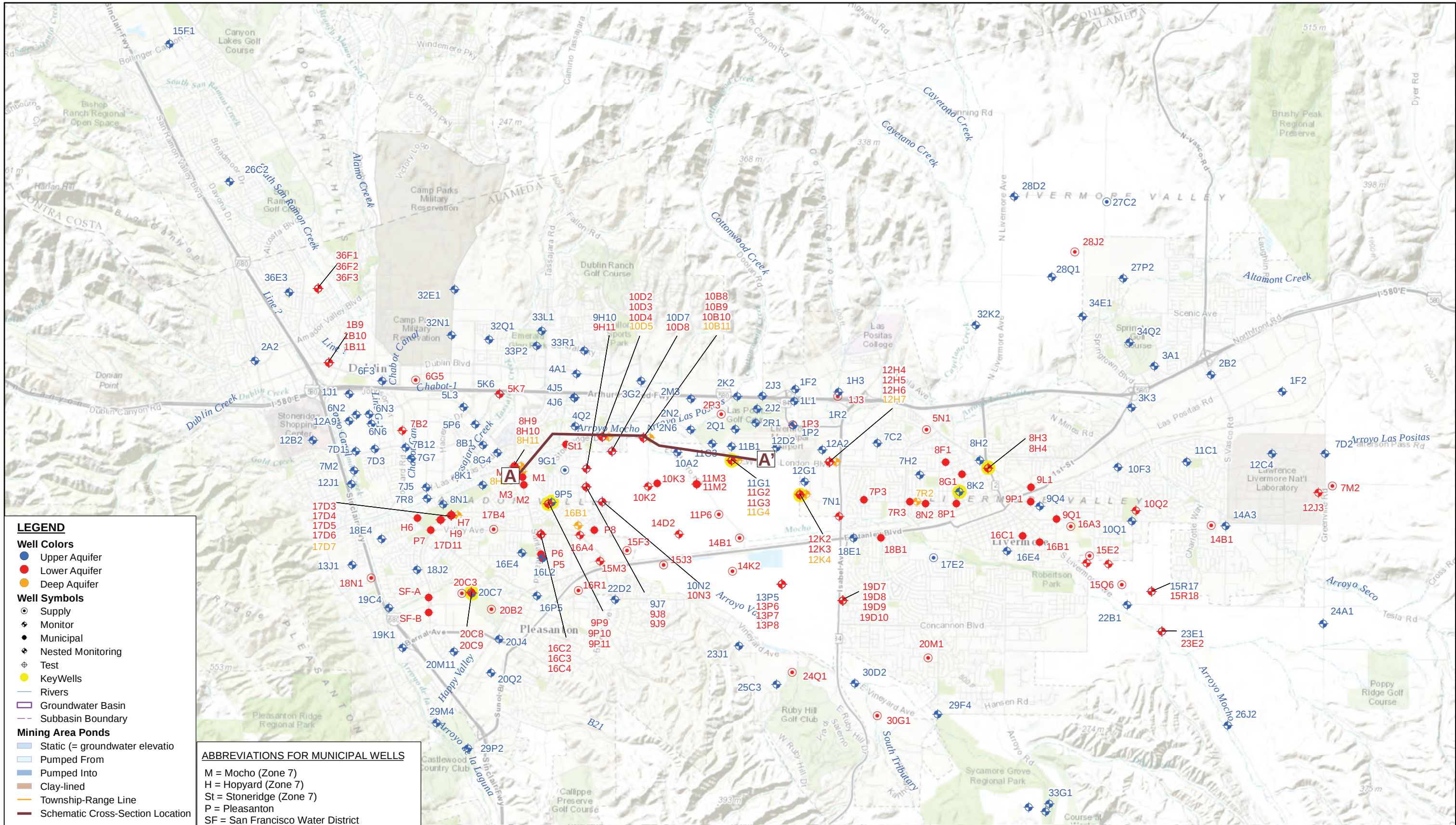
SCHEMATIC CROSS-SECTION, PORTION OF VALLEY
LIVERMORE VALLEY GROUND MOVEMENT STUDY

ALAMEDA & CONTRA COSTA COUNTY, CALIFORNIA

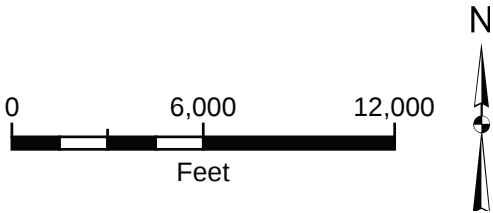
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FIGURE 7



Groundwater levels are measured >2 times/year (monthly or continuously in some) in the 236 wells shown. For details and findings of monitoring program, see Zone 7's Annual Report for the Groundwater Management Program for the 2013 Water Year (accessed at http://www-zone7water.com/images/pdf_docs/groundwater/2013-6_gwmp_2.4_gw-mntrng.pdf). This figure slightly modified from Fig. 2.4-1 of that report.



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		ALAMEDA & CONTRA COSTA COUNTY, CALIFORNIA		
		150370	JUNE 2015	FIGURE 8

