Date Posted: 2/26/2016

NORTH MARIN WATER DISTRICT
AGENDA - REGULAR MEETING
March 1, 2016 – 7:00 p.m.
District Headquarters
999 Rush Creek Place
Novato, California

Information about and copies of supporting materials on agenda items are available for public review at 999 Rush Creek Place, Novato, at the Reception Desk, or by calling the District Secretary at (415) 897-4133. A fee may be charged for copies. District facilities and meetings comply with the Americans with Disabilities Act. If special accommodations are needed, please contact the District Secretary as soon as possible, but at least two days prior to the meeting.

Est. Time	Item	Subject
7:00 p.m.		***CALL TO ORDER***
	1.	***APPROVE MINUTES FROM REGULAR MEETING***, February 16, 2016
	2.	***GENERAL MANAGER'S REPORT***
	3.	***OPEN TIME: (Please observe a three-minute time limit)***

This section of the agenda is provided so that the public may express comments on any issues not listed on the agenda that are of interest to the public and within the jurisdiction of the North Marin Water District. When comments are made about matters not on the agenda, Board members can ask questions for clarification, respond to statements or questions from members of the public, refer a matter to staff, or direct staff to place a matter of business on a future agenda. The public may also express comments on agenda items at the time of Board consideration.

4. ***STAFF/DIRECTORS REPORTS***

CONSENT CALENDAR

The General Manager has reviewed the following items. To his knowledge, there is no opposition to the action. The items can be acted on in one consolidated motion as recommended or may be removed from the Consent Calendar and separately considered at the request of any person.

	Consent - Approve Water Agreement	***Type***	***DU***	***EU***
5.	***Consent – Approve*** Valley Memorial Park Office Expansion	Comm.	0	3
6.	***Consent - Approve*** Board Planning Workshop Summary			
7.	***Consent – Approve*** Accept Asset Appraisal Report			

INFORMATION ITEMS

8. AEEP (Reach A-D) – Progress Report No. 5 – Final (Vali Cooper & Associates)
9. Water Quality Mid-Year Progress Report
10. Taste and Odor Control Strategy for Stafford Lake Treatment Plant
11. NBWRA Meeting Update – January 25, 2016
12. NBWA Meeting – March 4, 2016
13. ***MISCELLANEOUS***
    Disbursements
    March 3, 2016 PPFC Meeting
    Rate Increase Notice on Water Bill

All times are approximate and for reference only.
The Board of Directors may consider an item at a different time than set forth herein.

(Continued)

Est. Time	Item	Subject
		News Articles: Marin special district pay tops $108,000, study says Marin's Municipal wasteful water district Dennis Rodoni says diverse experience drives his bid for Marin supervisor 50 years ago – February 1966 Dennis Rodoni joins supervisor race
8:00 p.m.	14.	***ADJOURNMENT***

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DRAFT
NORTH MARIN WATER DISTRICT
MINUTES OF REGULAR MEETING
OF THE BOARD OF DIRECTORS
February 16, 2016

CALL TO ORDER

President Schoonover called the regular meeting of the Board of Directors of North Marin Water District to order at 7:00 p.m. at the District headquarters and the agenda was accepted as presented. Present were Directors Rick Fraites, Stephen Petterle, Dennis Rodoni and John Schoonover. Also present were General Manager Chris DeGabriele, District Secretary Katie Young, and Auditor-Controller David Bentley. Director Jack Baker and Chief Engineer Drew McIntyre were absent

Novato Resident, Mike Jolly, District employees Ryan Grisso (Water Conservation Coordinator), Robert Clark (Operations/Maintenance Superintendent) and Tony Arendell (Construction/Maintenance Superintendent) were in the audience.

MINUTES

On motion of Director Rodoni, seconded by Director Petterle, the Board approved the minutes from the previous meeting as presented by the following vote:

AYES: Directors Fraites, Petterle, Rodoni and Schoonover

NOES: None

ABSENT: Director Baker

GENERAL MANAGER'S REPORT

CSMART Meeting

Mr. DeGabriele advised the Board that he attended a CSMART TAC meeting last Wednesday. He stated that there was continued discussion to refine adaptation actions in preparation for issuance of a draft report by the end of this month. He noted that the grant funding ends April 30th, but the County is figuring out how to keep the effort going. Mr. DeGabriele stated that the final adaptation report is due to the CA Coastal Commission by the end of April. He advised the Board that there were questions of how to fund the adaptation actions. He stated that State representatives were at the meeting and suggested that Enhanced Infrastructure Financing Districts (EIFD) be established to take on the projects. He noted that the EIFDs ostensibly would get money from property tax increments as assessed values increase, similar to redevelopment agencies of the past.

Friends of Novato Creek

Mr. DeGabriele advised the Board that he had a conversation with Sue Latanzio of Friends of Novato Creek about how to broaden the scope of their efforts. He followed up with the City of Novato on the trash concerns in the Hamilton/Ammo Hill area and contacted Friends of Petaluma River to find out how they fund their staff and resources.

Grossi Dairy

Mr. DeGabriele advised the Board that he, Robert Clark and Pablo Ramudo met with the Grossi Dairy on Friday. He stated that it was a good discussion, but there is a lot more to go. He informed the Board that internally staff has discussed some goals to strive and achieve before the next rainfall season to improve ranch manure management and resulting water quality.

Meeting with SCWA

Mr. DeGabriele informed the Board that this Thursday he and District legal counsel Carl Nelson will meet with Sonoma County Water Agency and their legal counsel to discuss the Russian River Water Rights, Potter Valley Project, Biological Opinion/RRIFR and other issues so the District can understand where they're headed and hopefully can continue to support their decisions in the future.

OPEN TIME

President Schoonover asked if anyone in the audience wished to bring up an item not on the agenda and there was no response.

STAFF / DIRECTORS' REPORTS

President Schoonover asked if staff or Directors wished to bring up an item not on the agenda and there was no response.

MONTHLY PROGRESS REPORT

Mr. DeGabriele provided the Board with the Monthly Progress Report for January. He stated that water production in Novato during January was down 13% and year-to-date down 30% from 2013. He informed the Board that in West Marin, January water production was down 26% from January 2013 and that water production in 2013 is the metric the State Board is using for measurement to comply with the Emergency Urban Water Conservation Regulations. Mr. DeGabriele advised the Board that Stafford Lake rainfall and storage is a little below average, but hopefully will be on track at the end of this fiscal year. He noted that Stafford Lake is now at 81% of capacity. He informed the Board that on the Russian River, Lake Mendocino has encroached into

the flood control pool and holds over 100% of its water supply pool, Lake Sonoma is 10,000AF below the top of water supply pool and holds 235,000AF.

Mr. DeGabriele informed the Board that a Pipeworker twisted his knee, in late January and he is now back to work but on modified duty and the District had to restart the lost time calendar.

Mr. DeGabriele reviewed the Summary of Complaints and Service Orders and advised the Board that complaints were down considerably, 33%, in all categories, except that in-house generated work orders were up by almost 60%. He noted that he queried the consumer service staff and they stated that there were a lot more meter dig outs that were flooded from this winter's rain.

Mr. Bentley reviewed the Monthly Report of Investments showing the District holds $11.5M in reserves, earning a 0.63% rate of return.

ACTION CALENDAR

REQUEST TO SOLICIT FINANCIAL AUDIT PROPOSALS

Mr. Bentley advised the Board that staff is requesting to solicit financial audit proposals to perform the annual audit for a four year period. He reminded the Board that Charles Z. Fedak and Company has held the contract for the last four years. He stated that a preliminary letter will be sent to firms who have expressed interest in conducting the independent audit in the past and those indicating continued interest will be requested to submit a proposal.

On motion of Director Rodoni, seconded by Director Fraites, the Board authorized staff to solicit proposals to perform the District's annual audit for a four-year period by the following vote:

AYES: Directors Fraites, Petterle, Rodoni and Schoonover

NOES: None

ABSENT: Director Baker

AGREEMENT WITH AMI METER UPGRADE PROGRAM PROJECT MANAGER

Mr. Bentley advised the Board that in November the District requested proposals from five firms that had verbally expressed interest in recommending hardware selection and installation oversight of an Advanced Metering Infrastructure (AMI) system. He noted that Utiliworks Consulting was the only company to submit a proposal. He informed the Board that Utiliworks is headquartered in Louisiana, but has team members assigned to other accounts in the Bay Area and Northern California. He stated that Utiliworks is a small boutique firm, which specializes in AMI and will assist in identifying the appropriate technology, develop a cost benefit analysis, and road map for a pilot project to confirm effectiveness. Mr. Bentley advised the Board that should a pilot project move forward; Utiliworks would manage same and provide an assessment and recommendation for

overall project implementation for the District. He informed the Board that some of the budgeted $500K for the work and not expended by the consultant would be used on hardware, software and any materials needed for the AMI pilot study. He noted that the consultant work is scheduled to be wrapped up by the end of January 2017.

Director Fraites asked how many meters would be installed. Mr. Bentley stated that the number of meters to be included in the Pilot study is not yet determined and will be addressed by the consultant.

Director Fraites informed staff the Marin Municipal Water District received a grant and asked what the possibility of the District receiving a grant would be. Mr. Bentley stated that MMWD's grant was for irrigation meters only and he is not aware of any grant opportunity for the District's Pilot Study.

Director Fraites asked what the cost effectiveness is of AMI. Mr. Bentley replied that the cost/benefit analysis is part of consultant scope to determine effectiveness.

Director Rodoni requested that an extensive customer outreach program be implemented early on to address any perceived "smart meter" impacts which may arise in the community.

Director Petterle questioned employee impacts and was advised that it's not anticipated there would be any resulting staff reduction but there may be repurposing of staff to customer service/water conservation needs in the future, should full AMI implementation move forward.

On motion of Director Petterle, seconded by Director Rodoni, the Board authorized the General Manager to execute an agreement with Utilliworks to provide project planning services and oversee deployment and assessment of the AMI Pilot Project for a fee not to exceed $218,700 by the following vote:

AYES: Directors Fraites, Petterle, Rodoni and Schoonover

NOES: None

ABSENT: Director Baker

INFORMATION ITEMS

WATER CONSERVATION MID-YEAR UPDATE (JULY – DECEMBER 2015)

Ryan Grisso, Water Conservation Coordinator provided the Board with the Water Conservation Mid-Year Update for July – December 2015. He stated that the Cash For Grass Rebates are the big story and since 1989 there has been 1.1MSF turf replaced in Novato. He informed the Board that the toilet/washer rebates are proposed to continue as now and offered are

authorized through calendar year 2016 (both High-Efficiency and Ultra-High Efficiency) with grant money still available. He informed the Board that the Sonoma Marin Saving Water Partnership Fair Display will be set up in the District's Administration Building Lobby later this spring.

MID-YEAR OPERATIONS/MAINTENANCE 2015/16 UPDATE

Robert Clark, Operations/Maintenance Superintendent provided the Board with the Mid-Year 2015/16 Update and advised the Board that the safety incidents were mostly field related and staff is looking back at the root cause of those accidents to try and prevent them from occurring in the future. He informed the Board that Shawn Kane was promoted to Storekeeper/Safety Coordinator last spring and is doing a great job. Mr. Clark stated that there have been several opportunities for training with other local agencies including a Stafford Dam failure flood inundation table top exercise.

2016 URBAN AREA ANNUAL WATER COST COMPARISON

Mr. Bentley provided the Board with the 2016 Urban Area Water Cost Comparison, which indicates that Novato's cost of water for a typical single-detached family home totals $672 per year and is ranked 10th out of the 17 agencies with which the District compares. He stated that in Novato, the median single family residential household annual consumption has dropped to 100,500 gallons, so even though the District's rates have increased, water consumption has fallen and many customers pay less than prior years due to the conserved water.

DRAFT PLANNING WORKSHOP SUMMARY – FEBRUARY 9, 2016

Mr. DeGabriele provided the Board with the draft of the planning workshop summary for review and comment and informed them that the final summary will be brought back for approval at the March 1st meeting.

MARIN LAFCO COUNTYWIDE WATER SERVICE STUDY – FINAL REPORT

Mr. DeGabriele advised the Board that he attended the LAFCo meeting last Thursday and LAFCo unanimously accepted the Final Countywide Water Service Study Report and adopted a Resolution. He informed the Board that there were two changes from the prior report, discussed at the January 15th meeting, including: 1) amended recommendation in response to the East Shore Planning Group request for community input regarding a potential boundary change for North Marin in the Inverness, Tomales Bay and Marshall vicinity, and 2) removal of the recommendation to explore and discuss potential to establish community waste water systems in the small West Marin communities.

Mr. DeGabriele advised the Board that the District will receive a hard copy of report for the District library.

MISCELLANEOUS

The Board received the following miscellaneous information: Disbursements, Novato Flood Protection and Watershed Program Community Meeting, and Marin LAFCo Notice of Special Meeting.

The Board received the following news articles: Marin water conservation efforts slip in January, but still ahead of goals and To make the most of rain, state needs Delta tunnels.

ADJOURNMENT

President Schoonover adjourned the meeting at 7:38 p.m.

Submitted by

Katie Young
District Secretary

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ITEM #5

MEMORANDUM

To: Board of Directors February 26, 2016

From: Drew McIntyre, Chief Engineer

Subject: Water Service Agreement – Valley Memorial Park Office Expansion

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RECOMMENDED ACTION: The Board approve authorization of this agreement.

FINANCIAL IMPACT: None: Developer Funded

The Valley Memorial Park Expansion project is located at 650 Bugeia Ln, Novato (see vicinity map, attachment A). Existing office/chapel building space is 4100 sq ft. The expansion of facilities will bring the total facilities to 12,400 sq. ft. including chapel, office and crematorium uses, and 6,400 sq. ft. of maintenance and storage uses. Existing water meters will continue to be used for domestic and recycled water deliveries.

Proposed new zone 1 water facilities include a new 6-inch fire service, 20 ft of 6-inch PVC pipe, and the replacement of an existing fire hydrant with a commercial fire hydrant.

Service for this property was established in 1977 with a 1-inch meter and collection of 2 Facility Reserve Charges (FRC). In 1986, a new agreement was executed, a 2-inch meter was installed and 28 additional FRCs were collected. In 2012 an agreement was executed including the installation of a 2-inch recycled water meter and expansion of entitlement to 66 equivalent dwelling units (EDU). The existing facilities water use history for domestic uses only have averaged 2 EDU, as currently defined as 500 gal per day average day of the maximum month. No changes to the irrigation demands are anticipated with this project. The estimated potable water demand for the expanded facilities is 5 EDUs; the total new water demand is 3 EDUs. Therefore, fees for three FRCs will be collected by this project.

Sanitary sewer service will continue to be provided by Novato Sanitary District.

Environmental Document Review

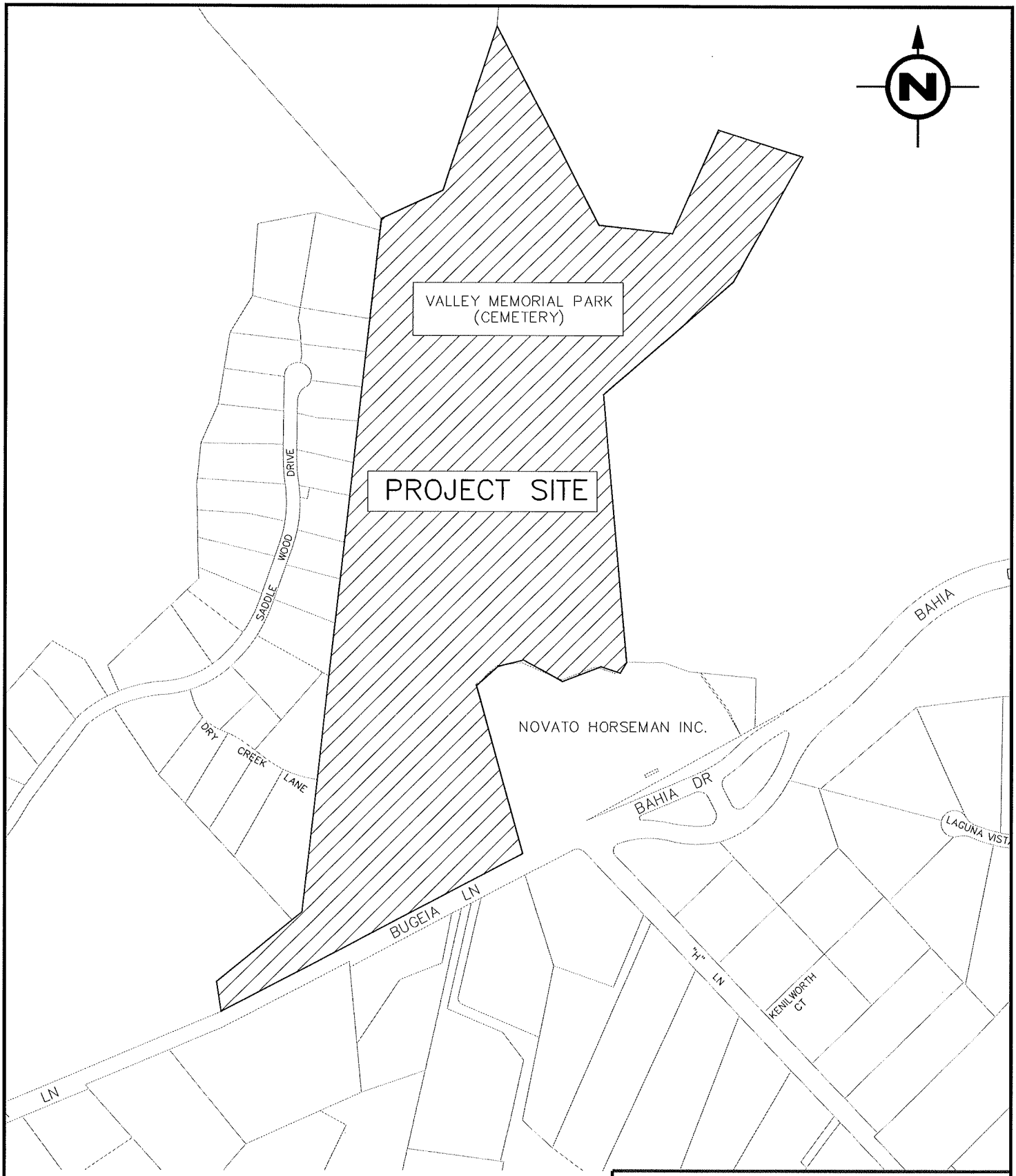
This project has been determined to be exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Sections 15301 and 15304.

RECOMMENDATION:

That the Board approve authorization of this agreement.

Approved by GM CD

Date 2/26/2016



VALLEY MEMORIAL PARK 6-INCH FIRE SERVICE APN: 143-151-15			
DATE	SCALE	JOB.NO.	DWG.NO.
02/24/16	NTS	2789	MAP

Feb 24, 2016 - 2:25pm W:\JOB\SET_UP\TEMP_MAP_TEMPLATE.dwg User: ACANTILLER

ATTACHMENT A

RESOLUTION NO. 16-
AUTHORIZATION OF EXECUTION
OF
WATER SERVICE FACILITIES CONSTRUCTION AGREEMENT
WITH
VALLEY MEMORIAL PARK INC.

BE IT RESOLVED by the Board of Directors of NORTH MARIN WATER DISTRICT that the President and Secretary of this District be and they hereby are authorized and directed for and on behalf of this District to execute that certain water service facilities construction agreement between this District and Valley Memorial Park Inc., a California Corporation, providing for the installation of water distribution facilities to provide domestic water service to that certain real property known as 650 BUGEIA LANE, Marin County Assessor's Parcel Number 143-151-15, NOVATO, CALIFORNIA.

* * *

I hereby certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the 1st day of March, 2016, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAINED:

(SEAL)

Katie Young, Secretary
North Marin Water District

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PART ONE
WATER SERVICE FACILITIES CONSTRUCTION AGREEMENT
FOR
VALLEY MEMORIAL PARK OFFICE EXPANSION

THIS AGREEMENT, which consists of this Part One and Part Two, Standard Provisions, attached hereto and a part hereof, is made and entered into as of _____, 2016, by and between NORTH MARIN WATER DISTRICT, herein called "District," and VALLEY MEMORIAL PARK, INC., A California Corporation, herein called "Applicant."

WHEREAS, the Applicant, pursuant to District Regulation 1, the State of California Subdivision Map Act and all applicable ordinances of the City of Novato and/or the County of Marin, has pending before the City or County a conditionally approved Tentative Subdivision Map, Precise Development Plan, Tentative Parcel Map or other land use application for the real property in the District commonly known as Marin County Assessor's Parcel Number 143-151-15 and the project known as VALLEY MEMORIAL PARK OFFICE EXPANSION, consisting of one (1) lot for commercial development; and

WHEREAS, prior to final approval by the City or County of a Subdivision Map, Precise Development Plan, Parcel Map or other land use application and recording of a final map for the project, the Applicant shall enter into an agreement with the District and complete financial arrangements for water service to each lot, unit or parcel of the project;

WHEREAS, the Applicant is the owner of real property in the District commonly known as 650 Bugeia Lane, Novato (Marin County Assessor's Parcel 143-151-15): and

WHEREAS, the District entered into a Water Service Facilities Construction Agreement for 650 Bugeia Lane (Valley Memorial Park) on January 26, 1977 with Valley Memorial Park, and fees were collected for water use entitlement of two EDUs; and

WHEREAS, the District entered into a new Water Service Facilities Construction Agreement for 650 Bugeia Lane (Valley Memorial Park) on August 26, 1986, to upgrade to a 2-inch meter and fees were collected for water use entitlement of twenty-eight additional EDUs, for a total of 30 EDUs; and

WHEREAS, the District entered into an additional Water Service Facilities Construction Agreement for 650 Bugeia Lane (Valley Memorial Park) on September 11, 2012, to provide recycled water and no fees were collected, but Valley Memorial Park paid all retrofit costs in lieu of fees equivalent to a total water demand of 66 EDU; and

WHEREAS, the total demand for the new project is expected to add an additional three (3) EDUs, for a total of 69 EDUs; and

NOW THEREFORE, the parties hereto agree as follows:

1. The Applicant hereby applies to the District for water service to said real property and project and shall comply with and be bound by all terms and conditions of this agreement, the District's regulations, standards and specifications and shall construct or cause to be constructed the water facilities required by the District to provide water service to the real property and project. Upon acceptance of the completed water facilities, the District shall provide water service to said real property and project in accordance with its regulations from time to time in effect.

2. Prior to the District issuing written certification to the City, County or State that financial arrangements have been made for construction of the required water facilities, the Applicant shall complete such arrangements with the District in accordance with Section 5 of this agreement.

3. Prior to release or delivery of any materials by the District or scheduling of either construction inspection or installation of the facilities by the District, the Applicant shall:

a. deliver to the District vellum or mylar prints of any revised utility plans approved by the City or County to enable the District to determine if any revisions to the final water facilities construction drawings are required. The proposed facilities to be installed are shown on Drawing No. 1 2789.001, entitled, "VALLEY MEMORIAL PARK OFFICE EXPANSION", a copy of which is attached, marked Exhibit "A", and made a part hereof. (For purposes of recording, Exhibit "A" is not attached but is on file in the office of the District.)

b. grant or cause to be granted to the District without cost and in form satisfactory to the District all easements and rights of way shown on Exhibit "A" or otherwise required by the District for the facilities.

c. deliver to the District a written construction schedule to provide for timely withdrawal of guaranteed funds for ordering of materials to be furnished by the District and scheduling of either construction inspection or construction pursuant to Section 5 hereof.

4. Except for fire service, new water service shall be limited to the number and size of services for which Initial Charges are paid pursuant to this agreement. Initial Charges for new services, estimated District costs and estimated applicant installation costs are as follows:

Initial Charges

Meter Charges (Domestic) (Included in Estimated District Costs)	.....One 2-inch @	$ 0.00	$ 0.00
Meter Charges (Fire Service) (Included in Estimated District Costs) ...	...One 5/8-inch @	$ 0.00	$ 0.00
Reimbursement Fund Charges	.....One 2-inch @	$ 3,140.00	$ 3.140.00
Facilities Reserve Charges.....	.....Five @	$ 28,600.00	$ 143,000.00
Credit for Existing Services (one 2" w/2 EDU ($3,140) +2x$28,600).....	.....@	$<60,340.00>	$ <60,340.00>

Subtotal - Initial Charges	**$ 85,800.00**

Estimated District Costs

Pipe, Fittings & Appurtenances	$ 11,259.00
District Construction Labor	$ 17,331.00
Engineering & Inspection	$ 3,225.00
Bulk Materials	$ 297.00
Subtotal –Estimated District Costs	**$ 32,112.00**

Estimated Applicant Installation Costs

Installation Labor	$ 0.00
Contractor Furnished – Pipe Fittings & Appurtenances	$ 0.00
Bulk Materials	$ 0.00
Subtotal- Estimated Applicant Installation Costs	**$ 0.00**
TOTAL ESTIMATED WATER FACILITIES COSTS	**$117,912.00**

(Bulk materials are such items as crushed rock, imported backfill, concrete, reinforcing steel, paving materials, and the like, which are to be furnished by the contractor performing the work.)

5. Financial Arrangements to be made by the Applicant shall consist of the following:

Initial Charges and Estimated District Costs

The Applicant shall either pay to the District or provide a two (2) year irrevocable letter of credit in form satisfactory to the District and payable at sight at a financial institution in the Novato area the sum of Initial Charges and Estimated District Costs as set forth in Section 4 hereof in the amount of **$ 117,912**. If the Applicant provides the two (2) year irrevocable letter of credit, the District shall immediately draw down Initial Charges and shall draw upon the remaining funds guaranteed by the letter at any time the District deems appropriate to recover the Estimated District Costs which normally will be at least thirty (30) days prior to the anticipated start of construction for the ordering of materials to be furnished by the District.

Estimated Installation Costs

Installation By District: Due to the proprietary nature of construction required to install said facilities, the District reserves the right to install the facilities utilizing District construction forces. The Applicant shall either pay to the District the total Estimated Installation Costs set forth in Section 4 hereof in the amount of **$117,912** or shall include such amount in the irrevocable letter of credit provided for the Initial Charges and Estimated District Costs set forth first above. The District shall

draw upon installation funds guaranteed by the letter at any time the District deems appropriate which normally will be at least thirty (30) days prior to the anticipated start of construction.

Whenever an irrevocable letter of credit is required by this agreement, the Applicant may substitute a certificate of deposit at a financial institution in the Novato area provided the certificate may be cashed at sight by the District at any time.

6. The applicant shall not resell any water furnished pursuant to this agreement. If multiple services from a single connection to the District's system through a master meter are allowed pursuant to District Regulation 4(b) the Applicant shall not submeter the individual services. The District's bills for water measured by a master meter shall be paid by the Applicant or a responsible homeowner's association. If a rental unit served through a master meter is converted into a separately owned unit the District may require the installation of a separate connecting main and meter for water service to the unit at the cost of the owner of the unit.

7. Water service through the facilities to be installed pursuant to this agreement will not be furnished to any building unless the building is connected to a public sewer system or to a waste water disposal system approved by all governmental agencies having regulatory jurisdiction. This restriction shall not apply to temporary water service during construction.

8. New construction in the District's Novato service area is required to be equipped with high efficiency water conserving equipment and landscaping specified in Regulation 15 sections e. and f.

9. All estimated costs set forth in this agreement shall be subject to periodic review and revision at the District's discretion. In the event the Applicant has not completed financial arrangements with the District in accordance with Section 5 hereof prior to expiration of six (6) months from the date of this agreement, all Initial Charges and estimated costs set forth in Section 4 hereof shall be revised to reflect then current District charges and estimates. In the event the Applicant has not secured final land use approval for the project from the City of Novato or County of Marin, recorded a final map and diligently commenced construction of improvements required by those agencies and the District prior to expiration of one (1) year from the date of this agreement, the District may, at its option, either retract financial certifications issued to City, County and State agencies and terminate this agreement or require amendment of this agreement and review of all Initial Charges and estimated costs contained herein. The Applicant shall pay any balance due upon demand or furnish a guarantee of such payment satisfactory to the District.

10. All extensions of time granted by the City of Novato or the County of Marin for the Applicant to comply with conditions of land use approval or to construct improvements pursuant to a

subdivision improvement agreement shall require concurrent extensions of this agreement and shall be cause for review and revision of all Initial Charges and estimated costs set forth in Section 4 hereof. The Applicant shall apply to the District for extension of this agreement prior to approval of the Applicant's requests for such extensions by either the City of Novato or the County of Marin.

11. This agreement shall bind and benefit the successors and assigns of the parties hereto; however, this agreement shall not be assigned by the Applicant without the prior written consent of the District. Assignment shall be made only by a separate document prepared by the District at the Applicant's written request.

NORTH MARIN WATER DISTRICT
"District"

ATTEST:

_____
John Schoonover, President

_____
Katie Young, Secretary

(SEAL)

VALLEY MEMORIAL PARK, INC.
A California Corporation
"Applicant"

_____
George B. Estes, General Manager

(SEAL)

NOTES: *If the Applicant executing this agreement is a corporation, a certified copy of the bylaws or resolutions of the Board of Directors of said corporation authorizing designated officers to execute this agreement shall be provided.*

This agreement must be executed by the Applicant and delivered to the District within thirty (30) days after it is authorized by the District's Board of Directors. If this agreement is not signed and returned within thirty days, it shall automatically be withdrawn and void. If thereafter a new agreement is requested, it shall incorporate the Initial Charges (connection fees) and cost estimates then in effect.

ALL SIGNATURES MUST BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC.

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MEMORANDUM

To: Board of Directors

February 26, 2016

From: Chris DeGabriele, General Manager CD

Subject: Board Planning Workshop Summary
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RECOMMENDED ACTION: Adopt the Board of Directors Planning Workshop Summary from February 9, 2016

FINANCIAL IMPACT: None

Attached is the Draft Summary from the February 9, 2016 Planning Workshop. The Draft Summary remains unchanged from that included in your agenda at the February 16th meeting. No comments on the summary were received from the Board. Staff is requesting that the Board approve the Summary. It will then be used as a reference throughout the next two years.

RECOMMENDATION:

Board approve the Board of Directors Planning Workshop Summary dated February 9, 2016.

Approved by GM CD

Date 2/26/2016

DRAFT
NORTH MARIN WATER DISTRICT
Board of Directors Planning Workshop
Summary
February 9, 2016

Key Issues

a. Water Supply

- Reviewed water demand comparison chart showing total water demand now projected in the 2015 UWMP has been reduced from the 2005 UWMP and the 2010 UWMP due to population/employment projections going down, conservation requirements of SBx7-7 and drought.
- 2015 actual water demands are 1909 AF below that projected in 2040 per the 2015 UWMP. Additional conservation, recycled water, and SCWA supply will occur to meet future demand.
- SBx7-7 target for NMWD is 143 GPCD. 2015 actual is 112 GPCD.
- SCWA and all Water Contractors will update Potential Projects for Future Evaluation to consider a new water project. Contractors have proposed a range (High/Low) of water demand to bracket uncertainty. SCWA has many pending important initiatives to consider including: 2015 UWMP, RR Instream Flow Draft EIR, Potter Valley Project FERC Relicensing, and Pending Water Rights Application with SWRCB for re-diversion of RR water above the now authorized 75,000AFA. The discussions among SCWA and the Water Contractors on these initiatives is now ongoing.
- i. Local Supply
    - a. STP Sanitary Discharge

      Existing 3" diameter, thin walled plastic force main sanitary discharge from STP to Novato Sanitary District is nearing the end of its' useful life. Budgeted replacement is planned 4 years out. NSD also claims a collection system constraint downstream in the Center Road sewer line due increased STP discharge.

      b. Stafford Lake Water Quality

      Stafford Lake and Water Treatment Taste and Odor Control Study identifies nutrient loading with resultant algae growth and metals release from the lake bed are the biggest challenges to address in the current treatment process. Cooperative efforts to-date to reduce nutrients entering the lake have not materialized in benefit to treatment.

      c. Novato Creek Water Rights/Fisheries

      Review of current NMWD water rights provisions for diversion/storage within Novato Creek indicates time extension is needed for Permit 18800 which will likely trigger fishery agencies review in light of recent steelhead recovery planning effort.

      d. Gallagher Well #2

      Efforts to perfect additional well on Gallagher Ranch and improve WM water supply reliability appear headed in right direction.

ii. Water Conservation

Continuing current water conservation program keeping dialogue open with SWRCB for spring relief from current water conservation standard under the Extended Emergency Urban Water Conservation Regulation.

iii. Recycled Water

Completion of Central Service Area RW Expansion is next milestone.

iv. Russian River

Big picture items regarding SCWA RR supply discussed.

ACTION:

- **Continue to work with contractors and SCWA in developing new water project**
- **Update UWMP in 2015 (schedule likely to be extended to 6/30/2016) and review status at that time.**
- **Investigate reducing and/or reuse of STP waste stream discharge and modification of NSD permit to increase discharge flow limit.**
- **Engage Marin County Environmental Health Department and Regional Water Quality Control Board to focus on Stafford Lake private property watershed practices.**
- **Engage Grossi Dairy to remove confined animal waste from Stafford Lake watershed.**
- **Move forward with Novato Creek steelhead population density validation and hydrologic analysis. Urge other agencies with SF Bay Coastal steelhead streams to share in population density validation effort.**
- **Encourage Friends of Novato Creek to expand focus further up watershed and enlist other Novato Creek Watershed Program partners to participate.**
- **Pursue negotiation for 2nd well at Gallagher Ranch when MALT easement is concluded.**
- **Consider revised Water Shortage Contingency Plan with drought surcharge based on SWRCB mandated restrictions.**
- **Consider continued participation in North Bay Water Reuse Authority at the associate level.**
- **Stay involved and keep BOD apprised of SCWA "big picture" items (B.O./RRIFR EIR/Water Rights/PVP/UWMP).**

b. <u>Cooperating Agencies</u>

i. SCWA

- Board has several opportunities to interface with SCWA Board members (TAC, WAC, NBWA, NBWRA, PPFC). Maintaining relationships is important. TAC leadership and WAC involvement provides excellent opportunity to continue

close working relationships. Support of Washington D.C. outreach should continue.

ii. MMWD

- GM's have great relationship. Staff's have good working relationship.

iii. NSD

- Continue cooperation on recycled water, assisting with laboratory services.
- NSD BOD wants assurance NMWD will continue to support NBWRA.
- NSD Treatment expansion necessary for buildout of RW delivery. Revised interagency agreement needed to clean up payment provision.
- RW Subcommittee should continue to meet periodically.

iv. LGVSD

- LGVSD Treatment expansion planned to accommodate MMWD. Revised interagency agreement needed with NMWD to clean up payment provision.

v. City of Novato

- DLB active in Chamber of Commerce Government Affairs Committee and City Measure F Oversight/Citizens Finance Committee.

vi. County of Marin

- Good working relationship with County Supervisors and staff.
- Novato watershed program and Stafford Lake master plan offers opportunity for continuing cooperation.

ACTION:

- **Continue to participate and be involved with SCWA. If another trip to DC occurs, it would be great for Board member to attend.**

c. **Facilities & Financing**

1) Novato Water

- Reviewed District fin
- ancial plan dashboard. Assumptions modified to reflect reduced water sales. Water Shortage Contingency Plan revision enables trigger for drought surcharge to assist with revenue reduction due reduced water sales.
- Bank of Marin loan interest rate still at ~3.5% but likely need more than $3M for Admin Bldg renovation.
- AMI $5M cost anticipated to be funded with 1.5% SRF loan.
- Consider adding $1 to the bimonthly service charge for Watershed Maintenance

2) Recycled water

- Reviewed recycled water system financial plan update.

- Plan continues to look promising at this time with a positive cash balance projected
- 33 connection fees required each year to pay debt service.

3) West Marin Water

Drought surcharge also anticipated for WM Water.

4) Oceana Marin Sewer

- Revenue and expenses stable.
- Major projects added per Master Plan by Nute Engineering triggers proposed rate increase recommendation of 10%/year and proposed doubling of sewer system connection fee. Will likely still need debt financing in future to address all Master Plan projects.

ACTION:

- **January/February workshop is better to look at dashboard when rate adjustment needed.**
- **Add line showing # of RW customer by owner, not meters.**
- Contact **Huffman's office re PRS USCG Housing closure and acquisition of additional property.**

d. <u>Employees</u>

i. Employee Succession Planning/Staffing Update

- Reviewed charts of FTE history and Succession Planning table.

ii. Employee Assisted Housing Program

- Employer Assisted Housing Program loan enabled Pipeworker to purchase Gustafson property.

ACTION:

- **Reach out to County of Marin Fire/Parks/Sheriff, NPS, Shoreline USD, MALT for interest in 25 Giacomini Way rental.**

7

ITEM #7

MEMORANDUM

To: Board of Directors

From: David L. Bentley, Auditor-Controller

Subj: Asset Appraisal Report
r:\ac\word\insurance\17\assetworks board report.docx

February 26, 2016

RECOMMENDED ACTION: Accept Report

FINANCIAL IMPACT: $38,500 Appraisal Report Fee

Annually the District purchases property insurance to protect against loss or damage that occurs to the District's structures, contents and water storage tanks. The FY15/16 insured value of the District's property, excluding land and mobile equipment, is insured at $57.9 million.

The District's insurance broker recommended that the District obtain a formal appraisal on its buildings, pump stations and water storage tanks to minimize negotiation with the insurance adjuster when a loss is incurred. Last July the Board authorized Staff to employ the services of AssetWorks to provide a certified appraisal of District assets, and their report has been received. The AssetWorks appraiser inspected all assets, and provided a 1 page valuation report, including photograph, for each of the District's 104 insured assets.

In summary, the appraisal found that the District was underinsuring its assets by $900,000 (1.5%), which finding will likely increase the FY16/17 annual insurance premium by approximately $800. However, the report shows that buildings, contents & pump stations were over-insured by $3.1 million, resulting in a higher than necessary insurance premium expense. Conversely, water storage tanks were under-insured by $4.0 million, exposing the District to a potentially costly out-of-pocket expense in the event of damage to a tank.

Significant variances between the insured value and appraised value were found in the following asset categories:

Asset	Over/(Under) Insured
Administration Building and Contents	$780,000
Warehouse, Shop & Yard Buildings	1,940,000
Stafford Water Treatment Plant	(1,550,000)
Deer Island Recycled Water Plant	450,000
Pump & Regulator Stations (45)	1,620,000
Storage Tanks (46)	(4,000,000)
Other Assets	(140,000)
Total Variance	($900,000)

Recommendation:

Accept AssetWorks Appraisal Report and revise insured values for FY16/17 accordingly.

Approved by GM CD

Date 2/26/2016

8

ITEM #8

MEMORANDUM

To: Board of Directors Date: February 26, 2016

From: Drew McIntyre, Assistant General Manager/Chief Engineer

Subject: Aqueduct Energy Efficiency Project (Reach A-D) – Progress Report No. 5 - Final (Vali Cooper & Associates)

R:\Folders by Job No\7000 jobs\7118\B3 - Construction 7118.03\Construction Management\BOD Memos\7118.03 B3 Reach A-D VCA Final Report BOD Memo 3-16.doc

RECOMMENDED ACTION: Information only

FINANCIAL IMPACT: None, information only

An oral presentation will be provided by Mr. Ken Sinclair, Construction Manager, with Vali Cooper & Associates, regarding final progress on NMWD's Aqueduct Energy Efficiency Project (Reach A-D). Attached is the final Construction Manager's Progress Report for Board review in preparation of the presentation provided by Vali Cooper & Associates (Attachment 1). Total NMWD costs are still estimated to be below the February 2014 estimate of ~$7.5M. A cost update will be provide to the Board at a future meeting when action will be requested for filing of a Notice of Completion (tentatively scheduled for one of the regular Board meetings in April 2016).

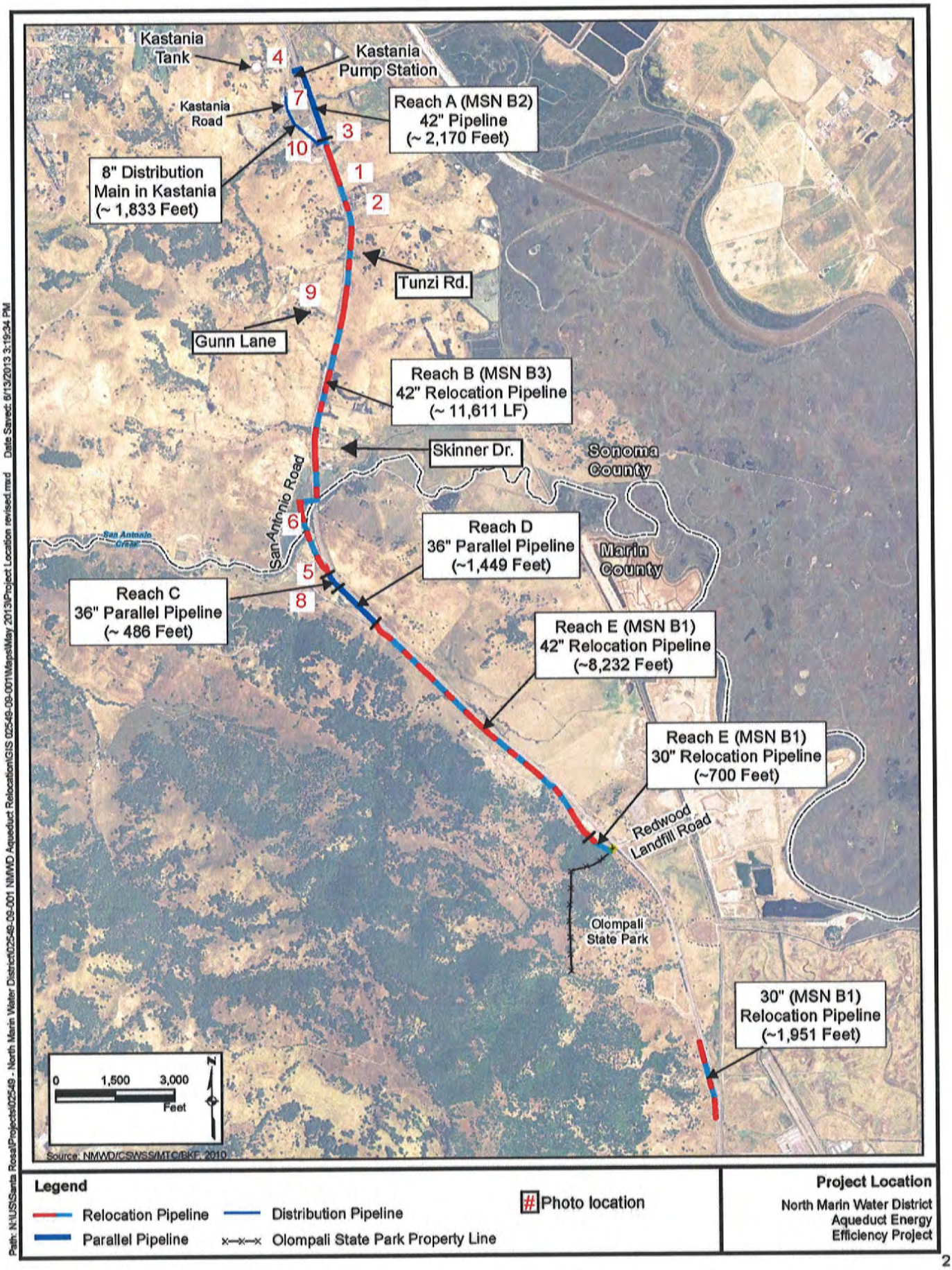
NORTH MARIN WATER DISTRICT
AQUEDUCT ENERGY EFFICIENCY PROJECT
REACHES A - D / MSN B3

NORTH MARIN WATER DISTRICT

Construction Management NMWD Board
Progress Report No. 5
Through February 26, 2016

Presented By:

Vali Cooper & Associates, Inc.
CONSTRUCTION & PROGRAM MANAGEMENT

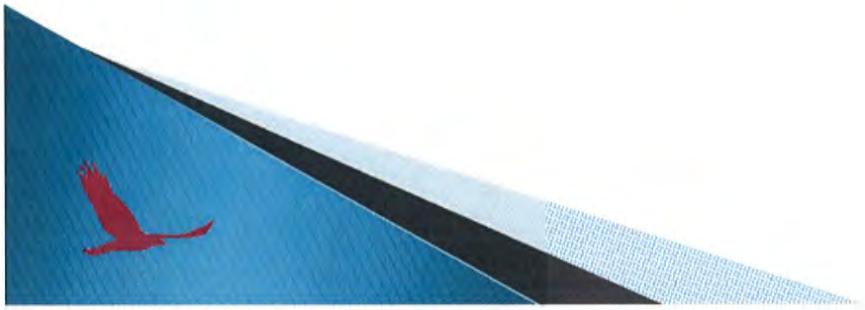

Kastania Tank
Kastania Pump Station
Kastania Road
Reach A (MSN B2)
42" Pipeline
(~ 2,170 Feet)
8" Distribution Main in Kastania (~ 1,833 Feet)
Tunzi Rd.
Gunn Lane
Reach B (MSN B3)
42" Relocation Pipeline
(~ 11,611 LF)
Skinner Dr.
Sonoma County
San Antonio Road
San Antonio Creek
Reach D
36" Parallel Pipeline
(~1,449 Feet)
Marin County
Reach C
36" Parallel Pipeline
(~ 486 Feet)
Reach E (MSN B1)
42" Relocation Pipeline
(~8,232 Feet)
Reach E (MSN B1)
30" Relocation Pipeline
(~700 Feet)
Redwood Landfill Road
Olompali State Park
30" (MSN B1)
Relocation Pipeline
(~1,951 Feet)
1
2
3
4
5
6
7
8
9
10
0
1,500
3,000
Feet
N
Source: NMWD/CSWSS/MTC/BKF, 2010
Legend
Relocation Pipeline
Parallel Pipeline
Distribution Pipeline
Olompali State Park Property Line
Photo location
Project Location
North Marin Water District
Aqueduct Energy Efficiency Project
Path: N:\US\Santa Rosa\Projects\02549 - North Marin Water District\02549-09-001 NMWD Aqueduct Relocation\GIS 02549-09-001\Maps\May 2013\Project Location revised.mxd Date Saved: 6/13/2013 3:19:24 PM

Summary of Construction Status

Contractor: Ghilotti Construction Company

- Base Contract Amount $12,275,517.00
- Change Orders Executed $1,712,353.40
- **Total Contract Cost $13,987,870.40**
- Contract Amount Earned $13,986,668.64
- Retention Withheld (total) $349,666.72
- Payments to Ghilotti Construction

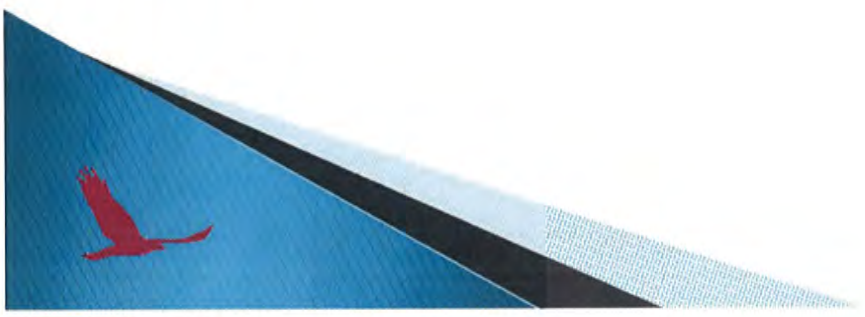
  (total) excludes retention $13,557,638.49
- **Estimated Percent Complete 99.9%**



Summary of Construction Status

Schedule

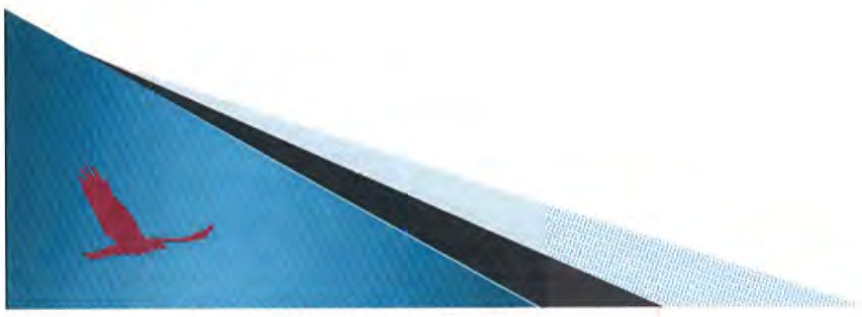
- Notice to Proceed..... March 17, 2014
- Base Contract Duration ..... 490 Consecutive Days
- Original Completion Date ..... July 19, 2015
- Time Extension Authorized..... 121 Days
- Revised Duration ..... 611 Consecutive Days
- Revised Completion Date .....November 17, 2015
- Weather Days (included in base duration)..... 15 Days
- Weather Days Expended (included in time expended)... 6 Days
- Time Expended..... 490 Days
- Percent Time Expended..... 100.0%



Construction Manager's Summary

1. SCHEDULE

- The contractor completed the project within the established contract duration. The project was determined to be substantially complete on October 30, 2015
- The contractor has submitted an as-built schedule documenting the construction of the project.
- A portion of the W8 pipeline near Kastania remained to be installed after substantial completion (location # 10 on slide 2). In this area, the Caltrans contractor working on the B2 contract had to construct a soil nail wall and remove several feet of a hillside before the segment of pipeline could be installed. This portion of the W8 pipeline was installed, tested and put into service on January 26, 2016.
- Additional work that remains to be completed in the area of the soil nail wall includes raising a valve can to grade, setting a meter box to grade and completing the installation of an ARV. This work cannot be completed until the paving is completed at the location of the soil nail wall. The paving is scheduled to be completed by the Caltrans contractor on Feb. 26, 2016. GCC is currently planning on completing the work on Feb. 29, 2016.



Construction Manager's Summary

2. WORK PROGRESS

- On December 5, 2014 the State Water Board issued a Notice of Violation (NOV) to NMWD for sediment leaving the site in surface runoff. There were several factors that contributed to the NOV that were outside the limits of the NMWD project.
- On December 23, 2015, we received notification from the WaterBoard that the Notice of Termination that was filed for the project was accepted and the project was closed. This will also close the exposure for the District related to the Notice of Violation noted above.
- The installation of the 42 inch pipeline was completed, the new pipeline was pressure tested, chlorinated and put into service when all tests were successfully passed.
- GCC competed the construction of the Windhaven and Gunn Pump Stations, tested the facilities and connected them to the new aqueduct (location # 9 on slide 2).

Construction Manager's Summary

- After the new system was put into service, the existing aqueduct was filled with grout.
- GCC cleaned up the work zone, applied hydroseed to disturbed areas, and removed all the equipment and materials from the site.
- Substantial completion was achieved on October 30, 2015. At that time, the project was in service and operating for its intended purpose, except for 660 feet of the W8 pipeline south of Kastania.
- The remaining portion of the W8 pipeline south of Kastania was installed, tested and tied into the system in January 2016.

3. TESTING

- Testing of compacted backfill material and the welds were completed as necessary during the period.
- The new aqueduct and all laterals and services were pressure tested, chlorinated and tested for water quality prior to being put into service.

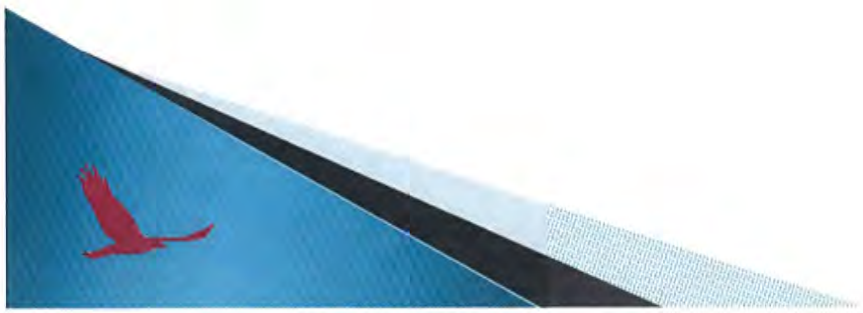
4. ANTICIPATED WORK IN MARCH 2016

- Raise a valve can and meter box to grade and complete the installation of an air relief valve after the Caltrans contractor completes work just south of Kastania.

Construction Manager's Summary (Con't)

5. CHANGE ORDERS

- One hundred eleven change orders have been prepared for the project. Several of these changes have supplements associated with them increasing the total number of change orders prepared. The total value of all change orders processed to date is $1,712,353.
- The potential exists for two additional change orders to be requested by GCC One is for difficulties with ground water and trench stability in the area of the Caltrans soil nail wall during the installation of the W8 pipeline at that location. The other change order would be to address drainage issues at the Yee driveway (Location #1 on Slide 2). The total value of both changes is anticipated to be less than $10,000.
- Caltrans provides reimbursement of many of the change orders that have been processed. Of the $1,712,353 in total change orders, Caltrans reimbursement has been requested in the amount of $1,612,837 (or 94%) of the total change order value. The majority of the two pending change orders would be reimbursed by Caltrans.



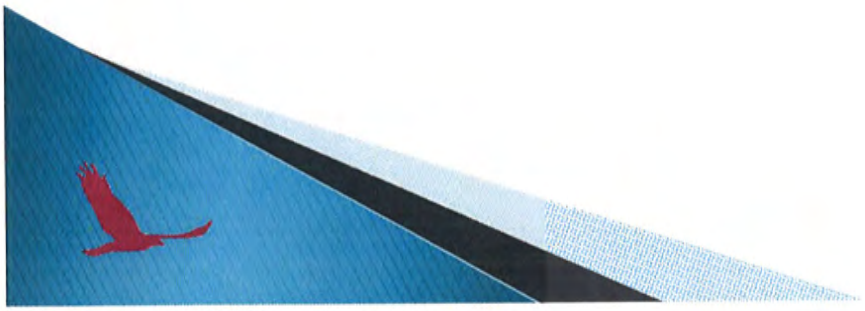
Project Administration

SUBMITTAL STATUS

	RECEIVED TO DATE	July Through Feb	RETURNED	PENDING
First Time Shop Drawing Submittals	123	27	123	0
Request for Information	129	38	129	0

FIELD ORDERS

	TOTAL	July Through Feb	ACTIVE	TOTAL COST OF ACTIVE ORDERS
Field Orders Issued	7	0	0	$0.00



Project Administration

CHANGE ORDER SUMMARY

	TOTAL	July through Feb		TOTAL COST OF CHANGE ORDERS
Value of Change Orders Executed		60		$762,262.10
Value of Change Orders Executed to Date	111			$1,712,353.40
Percent to Date of Original Contract				13.9%

WEATHER RELATED DELAYS

				DAYS
Base Contract Allowance				15
Weather Related Days in March, April and May				0
Weather Related Days to Date				6

Project Photos

Mainline Installation North of Yee Driveway (8/6/15)
(See Photo Location # 1 on Slide 2)

Project Photos

2" Service off of D2 Crossing (8/9/15)

(See Photo Location #2 on Slide 2)

Project Photos

Installation of the Final Piece of 42 inch Pipe East of Kastania Rd. (8/9/15)

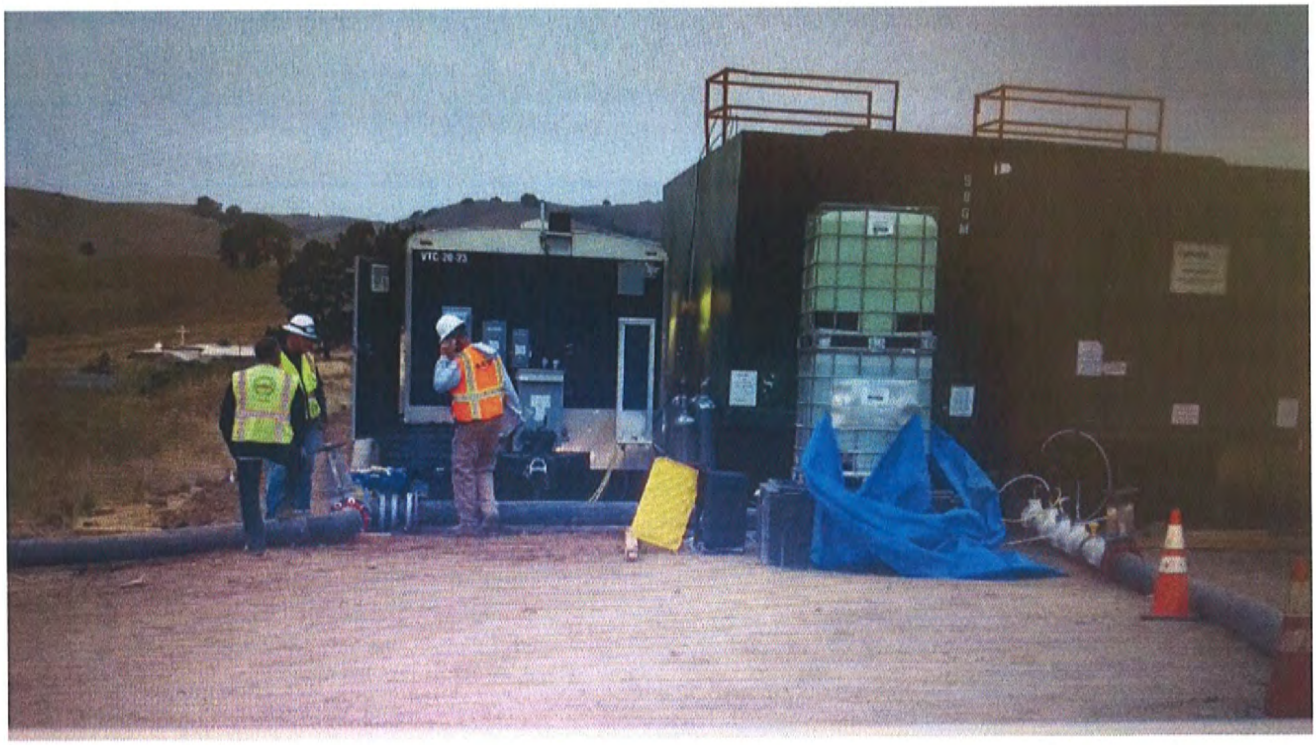
(See Photo Location # 3 on Slide 2)

Project Photos

Preparation for Flushing of 42-inch Pipeline at Northern Connection (8/12/15)

(See Photo Location # 4 on Slide 2)

Project Photos



Active Treatment System to Remove Chlorine from Flushing of 42-inch Pipeline (8/21/15)

(See Photo Location # 8 on Slide 2)

Project Photos

Discharge of Flushing Water in Majauskas Field (8/19/15)

(See Photo Location # 5 on Slide 2)

Project Photos

Flushing Discharge Into San Antonio Creek (8/21/15)
(See Photo Location # 6 on Slide 2)

Project Photos

Project Dedication at Olompali State Park (10/1/15)

Project Photos

Tie into Existing Pipeline on Kastania (10/1/15)

(See Photo Location # 7 on Slide 2)

Project Photos

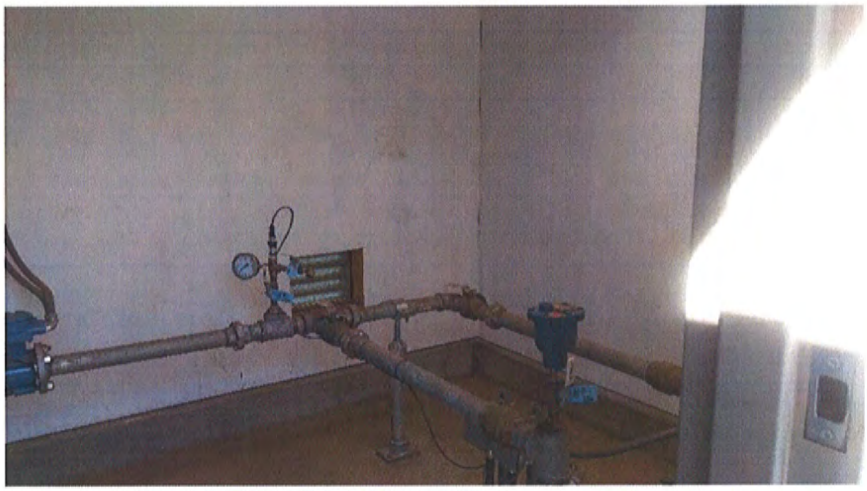
Grading of Field at Korean Church (10/12/15)

(See Photo Location # 8 on Slide 2)

Project Photos

Reconstruction of San Antonio Road (10/22/15)
(See Photo Location # 8 on Slide 2)

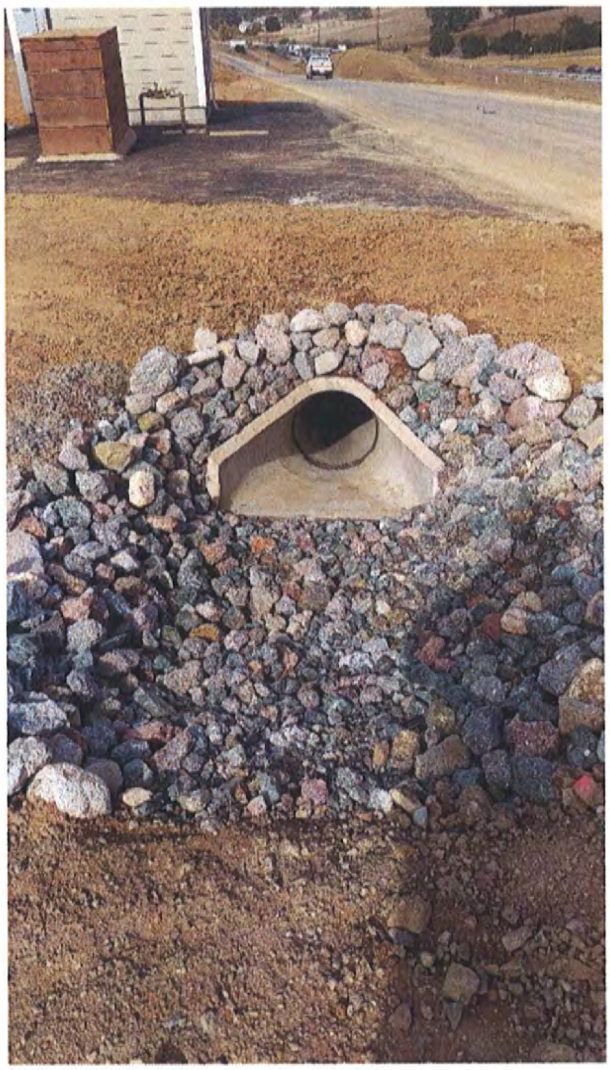
Project Photos



Windhaven Pump Station Interior (8/20/2015)

(See Photo Location # 9 on Slide 2)

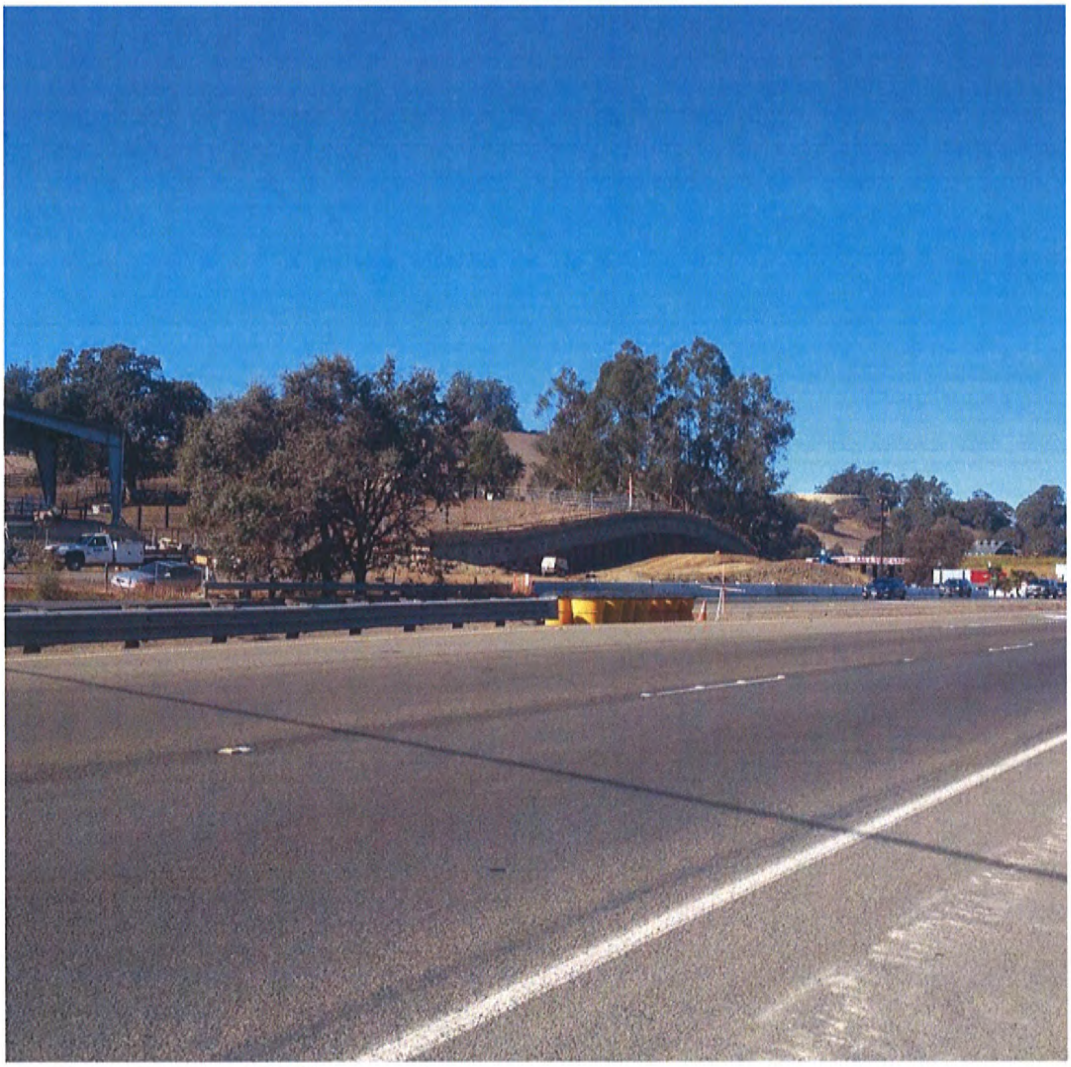
Project Photos



Storm Drain Inlet at Windhaven Pump Station (10/23/15)

(See Photo Location # 9 on Slide 2)

Project Photos



Construction of Caltrans Soil Nail Wall (11/10/15)

(See Photo Location #10 on Slide 2)

Project Photos

Installation of W8 Pipeline at Soil Nail Wall (1/14/16)
(See Photo Location # 10 on Slide 2)

Project Photos

Tie-in of W8 Pipeline at Soil Nail Wall (1/26/16)
(See Photo Location # 10 on Slide 2)

9

MEMORANDUM

To: Board of Directors February 24, 2016

From: Pablo Ramudo, Water Quality Supervisor PR

Subject: Second Quarter FY 15/16– Water Quality Report
P:\LAB\WQ Supv\WQ Reports\2016\2nd Qtr FY16 WQ Rpt.doc

RECOMMENDED ACTION: Information

FINANCIAL IMPACT: $0

The water served to the communities of Novato and Point Reyes met federal and state primary and secondary water quality standards during the Second quarter of fiscal year 2015-2016.

Following is a review of the activities and water quality issues in regards to:

- Source Water
- Treatment Performance
- Distribution System Water Quality
- Novato Recycled Water

NOVATO SYSTEM

Source Water: Stafford Lake

Stafford Lake water was used as a source of drinking water in the second quarter until November 25th when Stafford Treatment Plant was shut down for the season. Water quality was monitored on a weekly basis for chemical and mineral components as well as microbiological activity.

Algae from the raw water intake were identified and enumerated. Total algae numbers were down from the summer months as was diversity. Only seven species of algae were recorded in large numbers. Some of the species present were those which produce compounds that can cause adverse taste and odor.

Total organic carbon (**TOC**) concentrations were at record highs, 10.2-10.6 mg/L. Anoxic conditions were present at the bottom of the lake in the beginning of the quarter and several metals were present in moderate concentrations, chiefly iron and manganese.

Treatment Performance: Stafford Treatment Plant

At 71-80%, TOC removal remained above the 40% requirement of the Enhanced Surface Water Treatment Rule. Finished water TOC concentration was 2.1-3.0 mg/L compared to the districts goal of 2.0 mg/L. The majority of TOC removal was accomplished through optimized coagulation and filtration.

Operators continued to experience difficulty in completely removing manganese from the raw water. Stafford Treatment plant was off for the first week of October as manganese concentrations rose above the secondary maximum contaminant limit of 0.050 mg/L. This limit is for

Treatment Performance: Stafford Treatment Plant (continued)

aesthetics as elevated manganese concentration has no standard for health effects. Water produced at Stafford intermittently had a very slight yellow color due to manganese. In addition to a slight discoloration, the presence of manganese in finished water will lead to an increased volume of sediments that can be deposited along distribution main pipelines.

Distribution System: Novato

There were 242 samples collected for compliance with the Total Coliform Rule, none were positive for coliform bacteria. Chlorine residual concentrations throughout the system were variable and intermittently low, especially in upper zones. Low water demand from customers contributes to this condition as detention times in tanks increases, allowing chlorine to dissipate. Operators combat this by boosting chlorine in some tanks and, when possible, modify the set points for drain and fill cycles to increase turnover.

Disinfection byproducts were moderate for the quarter and well within standards of the Stage 2 Disinfection By-Product Rule.

We received several reports of discolored water, particularly in Zone 1. This is likely a result of the buildup of manganese-containing sediments which can be stirred up with any atypically heavy flow in main lines, such as from the use of fire hydrants or during main breaks.

POINT REYES SYSTEM

Source Water: Coast Guard Wells

Raw water quality was good throughout the quarter. Water quality parameters affected by salt water increased markedly in October and climbed throughout the quarter. The sodium concentration ranged from 39 – 56 mg/L, chloride ranged from 35 –180 mg/L, and bromide ranged from 0.14 – 0.61 mg/L. Hardness increased from 140mg/L to 240 mg/L.

Pending rehabilitation, Coast Guard Well #2 remained off during the quarter.

Source Water: Gallagher Well

Raw water quality was good throughout the quarter. Water quality parameters affected by saltwater are very low from this source and are not prone to intrusion from seawater. Sodium concentration remained steady at 11 mg/L, chloride ranged from 11 – 12 mg/L, and bromide ranged from 0.06 – 0.07 mg/L. Hardness was also fairly steady- from 120 – 130 mg/L. Iron and manganese concentrations are higher at Gallagher Well than in Coast Guard Well #4.

Treatment Performance: Point Reyes Treatment Plant

Treatment was optimal throughout the quarter and finished water quality was good. Iron and Manganese removal was excellent; neither of the metals was detected in the treated water. Water was primarily sourced from Gallagher Well which was supplemented with Coast Guard Well #4 during times of higher demand. Water from the two sources is blended prior to treatment.

Distribution System: Point Reyes

There were 23 samples collected for routine monitoring and compliance with the total coliform rule. None of the samples were positive for coliform bacteria. Chlorine residual concentrations throughout the West Marin water distribution system were good.

Disinfection byproducts remained relatively low during the quarter despite the increased potential from saltwater intrusion at Coast Guard Well #4.

NOVATO RECYCLED WATER

Deer Island Recycled Water Facility

The Deer Island plant was off during the quarter

10

ITEM #10

MEMORANDUM

To: Board of Directors February 26, 2016

From: Pablo Ramudo, Water Quality Supervisor PR

Subject: Taste and Odor Control Strategy for Stafford Lake Treatment Plant
p:\lab\2016\memo to board re t and o study.doc

RECOMMENDED ACTION: Information only.

FINANCIAL IMPACT: None at this time

For many years NMWD has been aware that concentrations of nutrients in Stafford Lake provide favorable conditions for taste and odor causing algae blooms. These nutrients wash in from several tributaries that drain into the lake form different areas of the watershed. Through more than two decades of monitoring from these tributaries NMWD has quantified high concentrations of nitrogen and phosphorus entering the lake from areas where agricultural activity is present. NMWD has used a variety of measures to control adverse tastes and odors (**T&O**) in drinking water produced at Stafford Lake Treatment Plant (**STP**) to varying success. Some recent tests showed that geosmin, the compound responsible for T&O, was present in raw water at extremely high concentrations during algae blooms but was being removed at greater than 95% efficiency. Even with that example of industry leading removal, geosmin was present in treated water above the threshold where most people can perceive it. In 2015 North Marin Water District contracted SRT Consultants to help develop a comprehensive control strategy for the T&O which still occurs periodically in water sourced from Stafford Lake Reservoir (full report available in electronic version of current agenda package). NMWD asked SRT to study the causes of algae blooms in the lake and then to develop a comprehensive strategy, taking into account watershed controls to limit nutrient inputs, controls in the lake to limit nutrient cycling and reduce algae growth, as well as enhanced treatment options for removal of taste and odor compounds.

The SRT study concluded that although influent nutrients are indeed a long term problem which will ultimately contribute to algal blooms, those nutrients already present in the lake

(continued from page 1)

and stored in its sediments are likely responsible for the bloom cycles in summer and fall. The same cyclical process is also responsible for problematic concentrations of dissolved iron and manganese that are difficult to remove through treatment and cause discolored water complaints in the distribution system.

The SRT report includes a phased schedule for implementation of all the recommended control measures. Many of these measures have relatively low cost and may be offset by savings on the cost of chemicals and consumables as improvements in treatment are projected to lower their use. The schedule prioritizes low capital cost options in the first years and brings on pilot testing of treatment enhancements with greater capital cost in later years. The schedule for implementation of all control measures in SRT's plan is 10 years.

Phased Approach Recommended Alternatives

	Category	**Recommended Alternatives**
Phase 1 Projects	Source Control	Additional Water quality Monitoring
		Strategic Planning
		Nutrient Management at Grossi Dairy
	Operations Optimization	Installation of Water Champ mixer
		GAC Specification
		GAC Replacement Strategy
	Treatment Process Improvements	Pilot Scale conversion of Actifloc Filter from Anthracite to GAC-Capped
Phase 2 Projects	Source Controls	Pilot Scale Installation of In-Situ Oxygenation
		Full Scale Installation of In-Situ Oxygenation
		Upsize the Existing 12 Acre Aeration Bed
	Treatment Process Improvements	Full Scale Conversion of Actifloc Filters from Anthracite to GAC-Capped

There are two recommendations in the report that NMWD has already begun to put into practice: The first of these is increased monitoring for the taste and odor compound *geosmin* in order to better understand and gauge the relationship between individual algal blooms and taste and odor exceedances, and trend the efficiency of removal through current treatment. The second is working with dairy operators to improve control of nutrients carried into Stafford Lake by rains from areas where manure is present or applied as fertilizer for grazing. The report provides guidance on tracking the success of our efforts and finding ways to continue progress.

The report shows that our efforts to keep aeration in the lake optimized has been a step in the right direction, but so far it has been insufficient to meet the oxygen demands necessary to keep nutrients and metals stationary in lake sediments. SRT recommends the use of pure oxygen to keep these constituents oxidized and fixed in the lake sediments. In-Situ oxygenation is a technology borrowed from wastewater treatment that is being implemented in some highly eutrophic water bodies similar to Stafford Lake.

Operation of Stafford Treatment Plant has continually changed in response to challenges in raw water quality. The report gives a number of suggestions to improve management of granular activated carbon (**GAC**) and recommends several novel improvements for enhancing the removal of algae, T&O compounds, and metals. This relieves some of the constant burden on the GAC in existing adsorption units, extending its useful life so that more capacity for removal of geosmin is available when algal blooms occur.

The schedule provided by SRT along with the high quality of cost analysis and projections will allow NMWD to incorporate many of the measures into our operating budget and the long term CIP plan. The implementation schedule indicated by SRT has been modified by NMWD to conform to our operations and goals, and to provide time to research the use of

(continued from page 3)

the Water Champ mixer. The implementation of the use of biologically active GAC as a cap on the Actifloc filters (replacing anthracite coal) has been moved from early 2016 to mid-2018. The pilot testing of oxygen treatment will be targeted for mid-2017 instead of 2018.

The future implementation of the long-term T&O control strategies will focus in large part on nutrient management and treatment plant optimization. Nutrient reduction activities to be conducted over the next three years are proposed to be developed in a detailed agreement with the Dairy to reduce nutrient loading, increase water quality monitoring on tributaries impacted by agricultural activity, continued watershed management and lake oxygenation improvements. Treatment plant improvement activity will continue to focus on optimizing annual GAC replacement, operation scheduling, and pre-oxidation for removal of iron and manganese; coagulation improvements to optimize chemical use and the evaluation of a GAC capped filter beds.

TASTE & ODOR CONTROL STRATEGY

PREPARED FOR:
NORTH MARIN WATER DISTRICT

SRT CONSULTANTS | 792 BAY STREET, SAN FRANCISCO, CA 94109

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SECTION 1 INTRODUCTION & PURPOSE

The North Marin Water District (NMWD or District) retained SRT Consultants (SRT) to evaluate the causation and potential mitigation of taste and odor (T&O) issues observed in the water of Stafford Lake. NMWD experiences seasonal T&O issues at Stafford Lake and within the distribution system indicative of Geosmin-producing algal blooms.

Stafford Lake, as shown in Figure 1, is a 1,210 acre-foot surface water detention lake within Marin County and the Novato Creek Watershed. Stafford Lake was created with the construction of Stafford Dam on Novato Creek in 1951 in order to provide a drinking water supply source for the growing community of the City of Novato, which lies four miles east of the lake.

Figure 1 Stafford Lake

Stafford Lake has a surface area of approximately 183 acres and drainage basin for a watershed of approximately 8.3 square miles. Primary land uses in the Stafford Lake watershed include: the Indian Valley Golf Club, Stafford Lake Park, the George Grossi & Sons Dairy, small wineries, low-density residential housing with septic systems, and a horse ranch with associated grazing. Additional Stafford Lake and its watershed uses include incidental flood control and cattle grazing.

NMWD is committed to the protection of the source of drinking water for Novato. NMWD serves a suburban population of approximately 61,000 people over a 75 square mile service area, as shown in Figure 2.

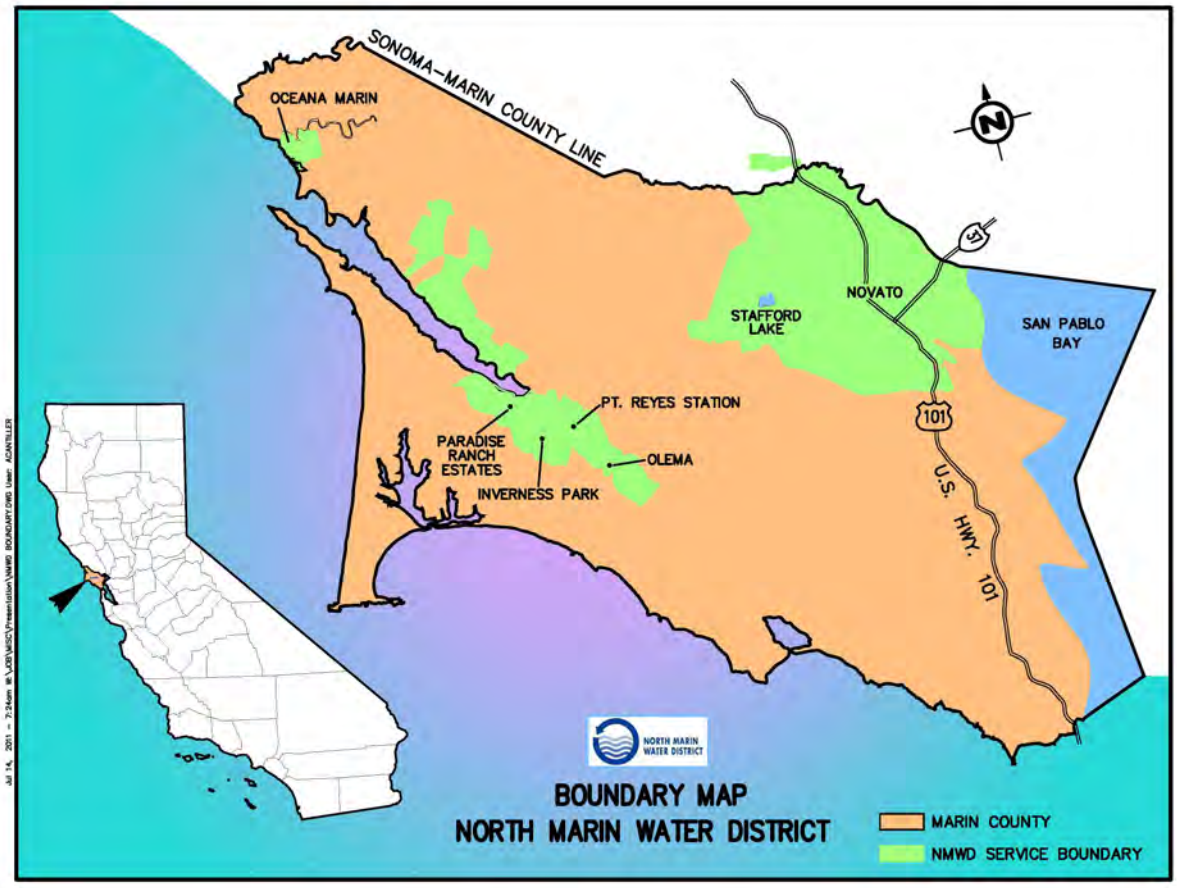


Figure 2 North Marin Water District Service Area

Water from Stafford Lake is treated at the Stafford Lake Water Treatment Plant (STP) located directly below the Stafford Dam. Stafford Lake provides, on average, 20-percent of the water served by NMWD, when the STP is in operation.

1.1 Purpose

Due to a continuous occurrence of customer T&O complaints resulting from water quality issues at Stafford Lake, NMWD has initiated the Stafford Lake Taste and Odor Control Project (Project). This Comprehensive T&O Control Strategy Technical Memorandum (TM) is the project's final deliverable.

Per the NMWD objectives, a successful T&O Control Strategy would optimize the current water treatment system to the best of its ability, while minimizing capital improvement costs, to effectively control T&O. NMWD used copper sulfate previously as the primary approach for managing algae and T&O issues, however it was found ineffective and was discontinued. NMWD does not intend to use copper sulfate in the future and instead will continue to

implement other measures to control T&O. A graphical depiction of the NMWD T&O Control Strategy objective is presented in Figure 3.

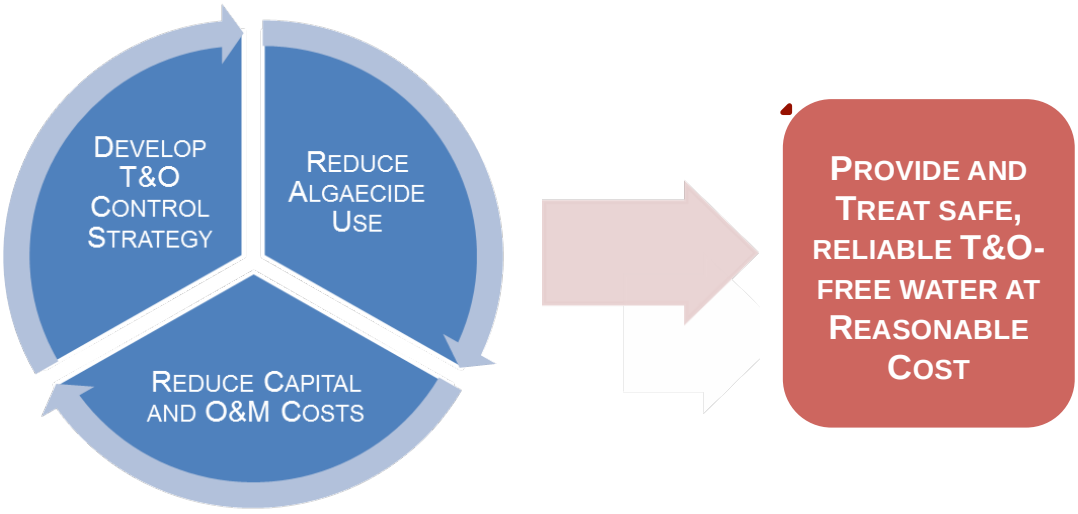


Figure 3 Comprehensive T&O Control Study Objectives

The primary task for the T&O Control Project was the completion of the Water Quality Evaluation TM, which included a comprehensive water quality evaluation and characterization of T&O causation at Stafford Lake. The findings and recommendations of this TM form the basis of this T&O Control Strategy TM.

The T&O Control Strategy includes the following:

(1) Characterization of the T&O issues at Stafford Lake;

(2) Descriptions of preferred T&O mitigation measures for NMWD and associated costs, as applicable;

(3) A phased strategy for T&O control at Stafford Lake, including cost estimates for capital improvements and cost-savings for optimized operations;

(4) A long-term implementation schedule of the T&O control strategy; and

(5) An annual T&O mitigation schedule for operational optimization.

SECTION 2 CHARACTERIZATION OF T&O CAUSATION

The Stafford Lake water quality evaluation demonstrated that nutrient loading encourages Geosmin-producing algae growth in the late spring/summer, and subsequent algae die-off in the summer/fall, causing T&O issues and mid- and end-of-season STP shutdowns. This phenomenon occurs due to thermal stratification, anoxic conditions in the hypolimnion, and external and internal nutrient loading to Stafford Lake. Although significant efforts have been attempted by NMWD in the past to mitigate the T&O issues, the existing source control and treatment methods do not appear to adequately control the STP finished water quality. A summary of the observations that led to this conclusion follows:

1. **Nutrient Loading**: Nutrient concentrations – specifically phosphorus, as the lake is phosphorus-limited – are sufficiently high to cause significant algal blooms.
    - **External Nutrient Loading:** The watershed sampling points at the Fishing Bridge and Grossi Culvert, both of which drain Grossi & Sons Dairy property, and Park Residence, which drains the Stafford Lake Park area, release higher concentrations of nutrients, specifically phosphorus. External nutrient loading from sources in the watershed over time has led to the accumulation of nutrients in the sediments of the lake, and is responsible for the high concentration of nutrients available for release into the water column (internal nutrient loading).
    - **Internal Nutrient Loading:** Increased levels of Manganese (Mn) at the intake during anoxic conditions and recurrent algal bloom patterns indicate that significant internal nutrient loading is occurring in the lake. Internal nutrient loading perpetuates the algae growth cycle by feeding nutrients into the water column during anoxic conditions, and subsequently becoming available to algae in the epilimnion after a winter turnover event. Internal nutrient loading is likely the dominant form of nutrient loading in the lake.
2. **Algae Growth**: Based on algae data recorded by NMWD, high concentrations of algae occur annually in the late spring/early summer after a turnover event.
    - Cell counts for the Geosmin-producing algae (*Anabaena, Aphanizomenon, Planktothrix*) are much greater than for the MIB-producing bacteria, and algal peaks occur with a slight lag to the phosphorus concentration peaks.
3. **Taste and Odor**: T&O events occur in the summer/fall, typically following periods of Geosmin-producing algae growth and subsequent die-off. Algae decomposition also decreases DO concentrations in the hypoliminion to anoxic levels and releases nutrients from the lake sediments into the water column.
    - Limited Geosmin concentration data indicates that Stafford Lake's Geosmin concentrations before treatment are extremely high (450-500 ppt), and even though removal is approximately 97 percent, effluent Geosmin concentrations are well above the average human detection limit (9-14 ppt).
4. **Existing Treatment**: Source control and treatment methods have been implemented to mitigate the T&O causing compounds in the lake and in the STP finished water.

- The reservoir is actively aerated using a 12-acre aeration bed; however, the hypolimnion remains anoxic during certain times of the year resulting in the release of nutrients from the reservoir sediments.
- Epilimnetic SolarBees® are utilized to mix the epilimnion and disrupt the algae growth cycle. It is inconclusive as to whether the SolarBees® are effective.
- Efforts to improve primary coagulation have proved inefficient in removing suspended/dissolved solids without substantial chemical additions. Inefficient coagulation impedes the filtration efficiency.
- The removal of Mn with oxidation in the influent chamber followed by filtration has proved difficult during peaks of Mn in source water. High levels of Mn that remain in the water at STP ultimately use up capacity in the GAC units that should be reserved for Geosmin treatment.

SECTION 3 RECOMMENDED T&O CONTROL MITIGATION MEASURES

T&O mitigation strategies have been developed for Stafford Lake and the STP based on the findings presented in the Water Quality Evaluation TM and are summarized in Section 6 therein. SRT and NMWD staff reviewed the recommended mitigation strategies to determine feasibility and to prioritize the recommendations based on anticipated effectiveness, ease of implementation, and cost.

The mitigation strategies considered to be effective and feasible for implementation are detailed in the sections below. Cost of implementation and/or anticipated cost savings are included for each mitigation strategy, as applicable. Mitigation strategies are categorized as follows:

1) Source Control at Stafford Lake;
2) Optimized Removal of Geosmin; and
3) Treatment Process Improvements at STP.

The selected alternatives were evaluated to create an initial phased approach for the T&O Control Strategy, as presented in Section 4.

3.1 Source Control

In congruence with the actions that NMWD has already taken to improve the source water quality conditions, mitigating the source of the algae blooms is recommended as the primary means of facilitating T&O control at Stafford Lake. Although NMWD staff has previously employed several different methods to prevent algal blooms, the growth of algae continues to recur in Stafford Lake on an annual basis. The following section details the recommended mitigation alternatives that would control internal and external nutrient loading and subsequent algae growth in the lake.

3.1.1 Additional Water Quality Monitoring

Additional monitoring of key water quality parameters should be implemented to better understand the algae growth cycles and to optimize treatment techniques. Specifically, the following parameters need to be monitored on a more frequent schedule:

- Geosmin in raw water and in the STP finished water to better understand the levels of Geosmin that are occurring in the lake and the efficiency of Geosmin removal provided at STP. Additionally, if NMWD decides to convert to GAC-Capped Actifloc units, Geosmin should be sampled after the Actifloc units and prior to the GAC units to quantify the effectiveness. Geosmin should be sampled at least weekly during the time of year when T&O episodes most commonly occur (May through October, depending on the annual weather patterns).
- Oxygen Reduction Potential (ORP), Mn, Iron (Fe), and DO at the lake bottom to track the internal nutrient loading that is occurring in Stafford Lake on a daily basis. NMWD staff has indicated that it was feasible to install a monitoring probe near the intake, close to the bottom of the lake.

The water quality monitoring already conducted by NMWD with the addition of the above

parameters forms the basis of a T&O control water quality action plan that includes identified triggers to assist NMWD staff in addressing T&O-causing conditions before a significant T&O event occurs. Section 4.2 includes an initial template for the water quality action plan, which can be adjusted at the discretion of NMWD operations staff based on water quality data trends.

Schedule and Estimated Cost

It is recommended that additional water quality monitoring be initiated immediately to further inform NMWD as to the algal growth cycles within Stafford Lake. The cost of additional water quality monitoring will vary based on the resources currently available (i.e., monitoring probe, installation equipment). Additional monitoring of Geosmin will cost about $10,000 per year, based on a monitoring schedule of 24 weeks per year and the collection of 3 samples per week (raw water, after the GAC-cap, and finished water).[1,2]

3.1.2 Strategic Planning for Watershed

Strategic planning for any watershed that feeds a drinking water reservoir is necessary. For Stafford Lake, specifically, a comprehensive Sanitary Survey is recommended to better quantify the external nutrient loading sources coming from the watershed. A Sanitary Survey would inform a general strategic plan for watershed management, would specifically aid in the development of a nutrient management approach and sampling plan, and would provide further insight into Phosphate sources within the watershed.

Schedule and Estimated Cost

It is recommended that NMWD conduct a Sanitary Survey of the Stafford Lake Watershed in the first or second quarter of 2016. It is anticipated that a qualified consultant can complete a Sanitary Survey for approximately $30,000.

3.1.3 Nutrient Management at Grossi Dairy

The most substantial external source of phosphates is the Grossi Dairy Farm (Dairy) in close proximity to Stafford Lake, as indicated by the relative phosphorus concentrations entering Stafford Lake from eight (8) points throughout the watershed between 2010 and 2013. Based on the *Grossi & Sons Dairy Nutrient Management Best Management Practices* Report (Report) prepared for Marin County, the Dairy is prohibited from causing any nutrient loading to Stafford Lake. Although the Dairy has developed a set of nutrient management BMPs, run-off from the Dairy continues to feed nutrients into Stafford Lake. Additionally, there is no required nutrient or water quality monitoring component included in the report as a means of tracking the nutrient loading from the Dairy.

It is critical that the Dairy institutes a more effective nutrient management program that includes a water quality monitoring component to ensure that nutrient loading is not occurring

[1] This estimate based on $129/sample from EMSL Analytics in San Leandro, and 3 samples a week for 24-weeks. If this is determined to be cost-prohibitive for the District, the number of samples and/or number of weeks can be reduced, however the results will not be as comprehensive.

[2] Marin Municipal Water District (MMWD) was contacted to obtain an estimate for a Geosmin sample, as the only data received by SRT for Geosmin testing was completed at MMWD. MMWD was not able to provide a sample cost, however, it is recommended that NMWD explore this option based on the existing relationship between the water districts.

from agricultural run-off. It is anticipated that monitoring requirements will be included in the new waste discharge permit (or waiver) from the Regional Water Quality Control Board (RWQCB) and an annual report should be generated from the monitoring program for review by the RWQCB and NMWD. If the Dairy is not meeting the stated requirement that nutrient loading is prohibited, additional BMPs may be requested by the RWQCB and/or NMWD. Attachment A includes several BMPs that could be considered for implementation at the Dairy to control nutrient run-off.

Controlling the nutrient inputs to Stafford Lake is essential to resolving the algal blooms and T&O issues at STP, and would not be effective without managing nutrient concentrations from the Dairy run-off. If the implementation of BMPs and specific monitoring requirements are not possible at the Dairy, it is recommended that NMWD consider negotiations with the landowner to relocate high waste facilities to land further removed from the drinking water source, or outside of the drinking water source watershed. Additionally, NMWD could consider purchasing the land on which the Dairy currently operates to increase control and oversight on the watershed should external nutrient loading into Stafford Lake from the Dairy continue.

Schedule and Estimated Cost

It is recommended that NMWD continue discussions with Grossi Dairy Farm and Marin County regarding the external nutrient inputs that have been feeding Stafford Lake and the alternatives for nutrient management, as listed above. A general schedule of key implementation milestones is proposed below:

- **January 2016**: Development of a joint-party annual monitoring program (NMWD and Grossi Dairy) to track the nutrient inputs to Stafford Lake.
- **March 2016** (prior to STP startup): Based on the historical nutrient data, implement additional BMPs to ensure that external nutrient inputs are not entering Stafford Lake. See BMP recommendations included in Attachment A.
- **January 2017:** Development of first annual monitoring report, to be delivered to the County and NMWD for review and evaluation for compliance. The annual report will include the monitoring results and summary of BMPs currently in use.
- **March 2017** (prior to STP start up): Based on the data reported, evaluate the effectiveness of the additional BMPs. If deemed ineffective, initiate discussions to mitigate external nutrient inputs, including relocation of high waste facilities and grazing lands where nutrients are applied.

It is anticipated that external nutrient management will not be an additional expense for the District. As the responsible party, Grossi Dairy has been directed to protect the Lake from external nutrient input from the Dairy operation, and, therefore, should bear the cost of implementing additional water quality monitoring, implementation of BMPs, and additional mitigation actions, as necessary. The foreseen District expenses will be the staff and legal counsel hours committed to meetings and negotiations with the Dairy.

3.1.4 Installation of In-Situ Oxygenation (I-SO)

Maintaining DO concentrations above 2.5 mg/L at the bottom of the lake is critical for mitigating internal nutrient loading, which is likely the most significant form of nutrient loading

in the lake under the current conditions. Although data is inconclusive as to the degree of internal nutrient loading in the lake, the recurrent cycle of algal growth and anoxic conditions at the intake tower indicate that Stafford Lake is being fed phosphorus internally, stimulating the growth of algae after the nutrients are mixed during the winter turnover event. Maintaining oxygenated conditions in the bottom levels of the lake will also prevent Mn from reducing and dissolving into the water column, which would ultimately improve treatment efficiency.

Although NMWD currently aerates Stafford Lake utilizing a 12-acre aeration bed, it is likely that using pure oxygen to oxygenate the hypolimnion between the Stafford Lake Island and the STP's intake would be a more effective method of controlling algae growth. Since Stafford Lake is not sufficiently deep to utilize pure oxygen through diffusors (see Attachment B), different methods were researched to provide appropriate oxygen rates and pressures for effective oxygenation.

The installation of one Praxair® In-Situ Oxygenation (I-SO™) unit is one option for increased oxygenation near the intake. The eleven-foot diameter, transportable, floating I-SO™ system operates by feeding oxygen into a water body at a depth of six feet through a draft tube facing the lake bottom, as shown in Figure 4. Oxygen is pumped as a jet stream to the bottom of the lake and is recirculated to the lake's surface after reaching the lake floor. The power of the jet stream breaks through the thermocline and efficiently oxygenates the hypolimnion.

I-SO™ units offer improved oxygen utilization efficiency of at least 90%, compared to 25% with air-based aeration systems. I-SO™ units are typically used for aeration at wastewater treatment plants; however, they have also been successfully used in the oxygenation of shallow drinking water reservoirs of up to sixty feet in depth.[3]

At Stafford Lake, it is anticipated that an I-SO™ unit would aerate an area near the STP intake, which would help control internal nutrient loading at the one of the deepest parts of the lake, as well as reduce Mn loading, a critical improvement for treatment process efficiency at STP.

[3] Contra Costa Water District, Contra Loma Reservoir since 2000.

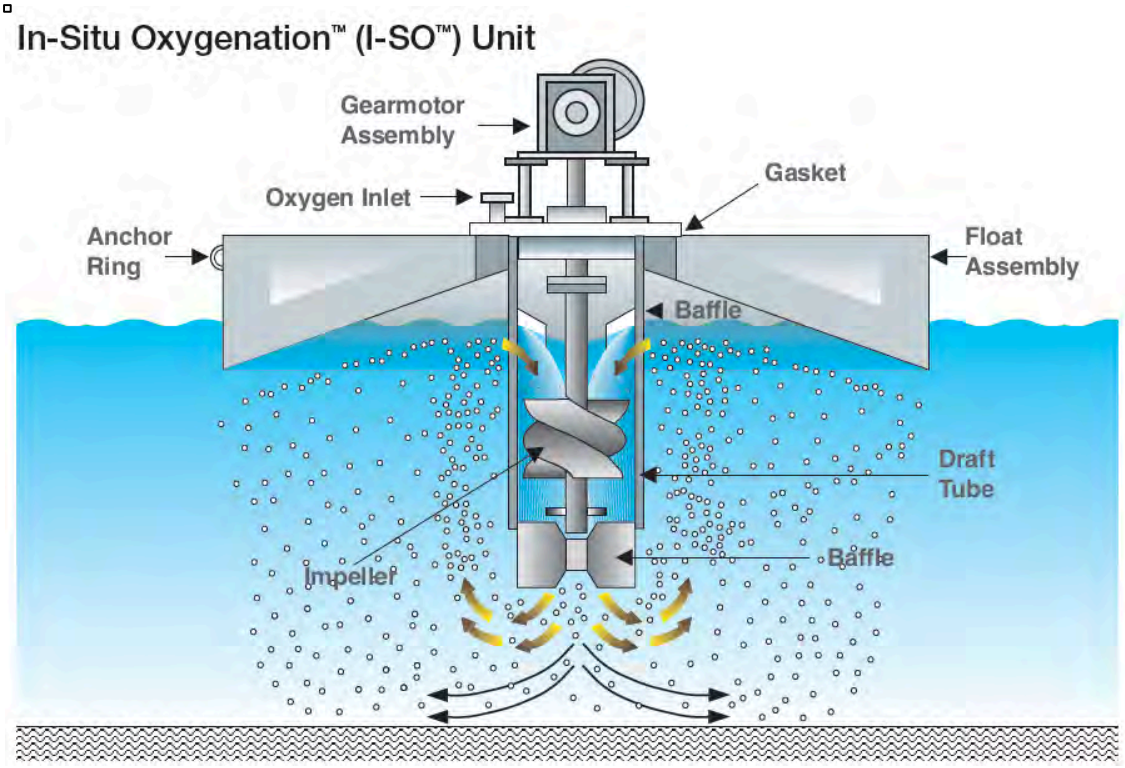


Figure 4 In-Situ Oxygenation Unit

Design Parameters

The amount of oxygen delivered by the I-SO™ system is automatically or manually regulated according to a pre-determined target concentration. An I-SO™ system should be sized for Stafford Lake based on the basic design parameters included in Table 1.

Since the I-SO™ units are typically utilized for wastewater treatment ponds, it is recommended that a pilot study with one (1) I-SO™ unit be conducted to determine their effectiveness at Stafford Lake. Equipment rental is available through Praxair and should be installed at the lake temporarily to establish whether full-scale implementation is feasible and cost-effective for the District. Additionally, system operation can be optimized during an I-SO™ system pilot study, as reservoir conditions will impact oxygenation efficiencies. It is recommended that the pilot study be carefully documented, as the results at Stafford Lake could form the basis of critical industry developments for hyper-eutrophic surface water sources as well as provide a wealth of information for the District's source water management.

Table 1 Oxygenation Design Parameters

Parameter	Value
Maximum Oxygen Depletion Rate[4]	0.17 mg/L/day
Average Oxygen Depletion Rate[5]	0.11 mg/L/day
Target Oxygen Level	4 mg/L
Anoxic Oxygen Level	2.5 mg/L
Maximum Period of Anoxic Oxygen Level	April – November (8 months)
Average Elevation of Lake[6]	186.7 ft
Average Volume per Acre[7]	4.53 MG
Maximum Oxygen Requirement *per Acre*	6.43 lb/acre/day
Average Oxygen Requirement *per Acre*	4.16 lb/acre/day

The requirements for an I-SO™ system at Stafford Lake were established based on the assumption that a system would be sized to oxygenate the deepest 35 acres near the intake, as shown in Figure 5, below. Assuming an oxygenation area of 35 acres and an oxygen utilization efficiency of 90%, the I-SO™ unit would require a supply of 162 lb/day of pure liquid oxygen, on average, when in use. I-SO™ units are capable of oxygenating at rates of approximately 150 lb/hr, therefore the capacity of one I-SO™ unit is sufficient for Stafford Lake's estimated needs. The estimated requirements for an I-SO™ unit at Stafford Lake are included in Table 2. These design parameters are based on the recorded conditions at Stafford Lake, however, a pilot test of one (1) I-SO™ unit, as discussed above, is necessary to understand the sizing and effectiveness of an I-SO™ system.

[4] Based on Stafford Lake depletion periods between 2010 and 2014, a maximum oxygen depletion rate of 0.17 mg/L/day was established.
[5] Based on Stafford Lake depletion periods between 2010 and 2014, an average oxygen depletion rate of 0.11 mg/L/day was established.
[6] The average elevation of the lake for April through November (1957-2014) was used as an input for the total volume calculation, as the volume to be oxygenated is considered the entire reservoir.
[7] The volume per acre was calculated by using the formula developed by NMWD (Lake Elevation vs. Volume.xls), based on a lake elevation of 186.7' and ratio of: *surface water area to be oxygenated to total surface water area at 186.7'*; 1 acre : 173.6 acres = 0.0058.

Figure 5 Proposed Oxygenation Area in Stafford Lake

Table 2 I-SO Unit Estimated Requirements

Parameter	Value
Surface Area to be Oxygenated[8]	4 acres
Volume of Reservoir to be Oxygenated[9]	159 MG
Estimated Oxygen Transfer Efficiency	90%
Daily Average Oxygen Requirement	162 lb/day
Maximum System Capacity	250 lb/day

Operational Requirements

Operation of the I-SO™ unit requires a pure oxygen source and storage, oxygen tubes, and a 40-Volt power supply, and ideally can be connected at the existing compressor station near Stafford Dam. Power operation is required semi-continuously; the I-SO™ units may be turned off for a few hours or days at a time, however extraction from lake and proper indoor storage is recommended if the I-SO™ units would not be in use for months at a time. Using integrated energy turndown automation, I-SO™ systems may reduce power consumption by at least 40% compared to mechanical aeration systems. Pure oxygen and power are transmitted to

[8] The surface area to be oxygenated could change depending on the effectiveness of the I-SO unit. A pilot test of the unit will confirm surface area and equipment requirements.

[9] The volume to be oxygenated by an I-SO unit was calculated by using the formula developed by NMWD (Lake Elevation vs. Volume.xls), based on a lake elevation of 186.7' and ratio of: *surface water area to be oxygenated to total surface water area at 186.7'*; 35 acres : 173.6 acres = 0.202.

the I-SO™ unit via the hose assembly shown in Figure 6. Pure oxygen supply may be contracted directly with Praxair®, or with a supplier of NWMD's preference.

Installation Requirements

For installation, two subassemblies, as shown in Figure 7, are bolted together on-site and are lifted into the lake for immediate floating. The approximate weight of each unit is 4,100 pounds and no support structure would be required. A minimum of five (5) feet should be maintained between the I-SO™ system and the existing aeration bed to prevent oxygen stripping.

It is recommended that the I-SO™ system be installed close to the intake tower to maximize the precipitation of nutrients (Mn, Fe) back into the lake sediment prior to treatment at STP. The effectiveness of the location can be tested when the technology is piloted at Stafford Lake.

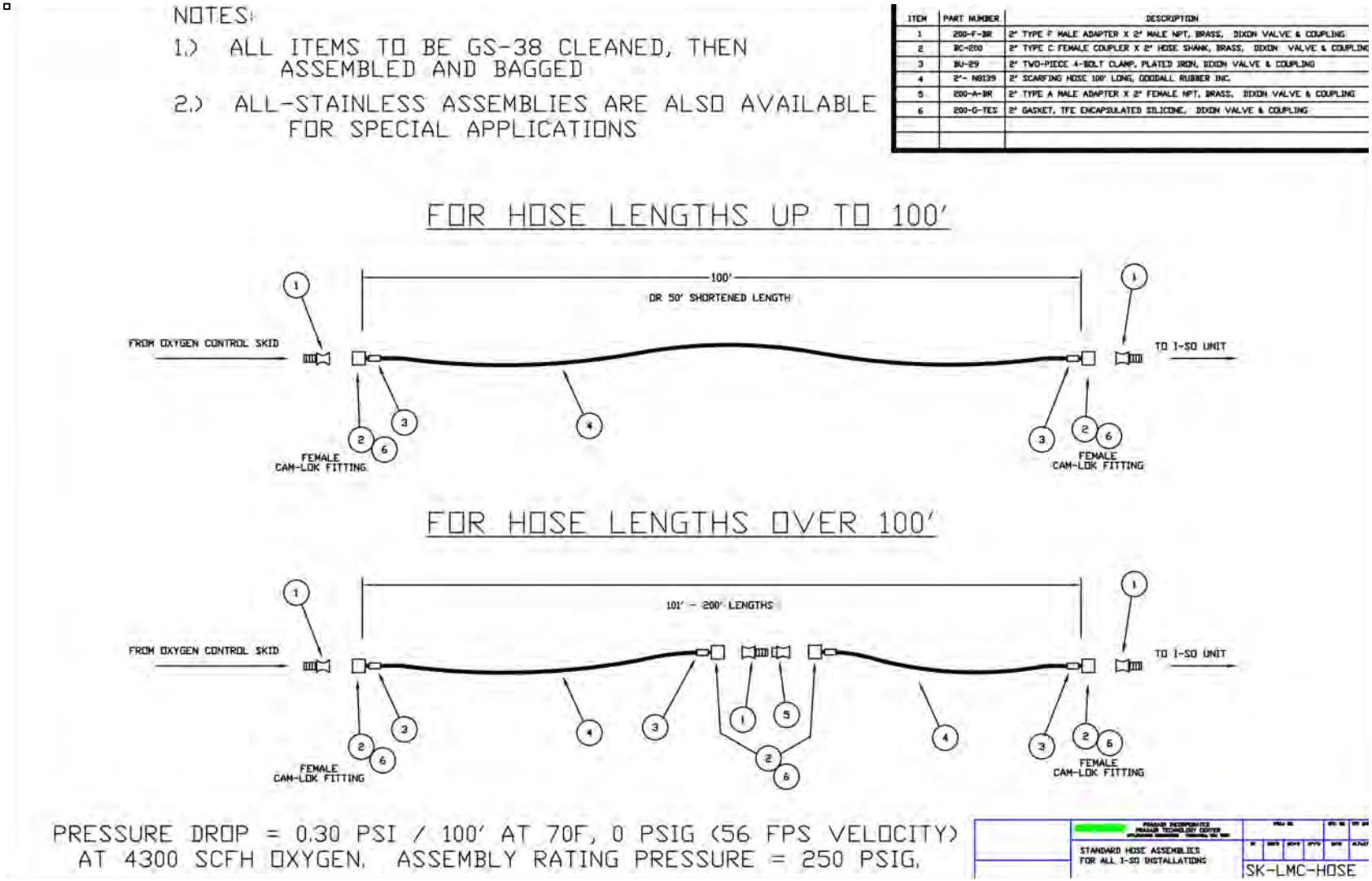


Figure 6 I-SO™ Unit Hose Installation

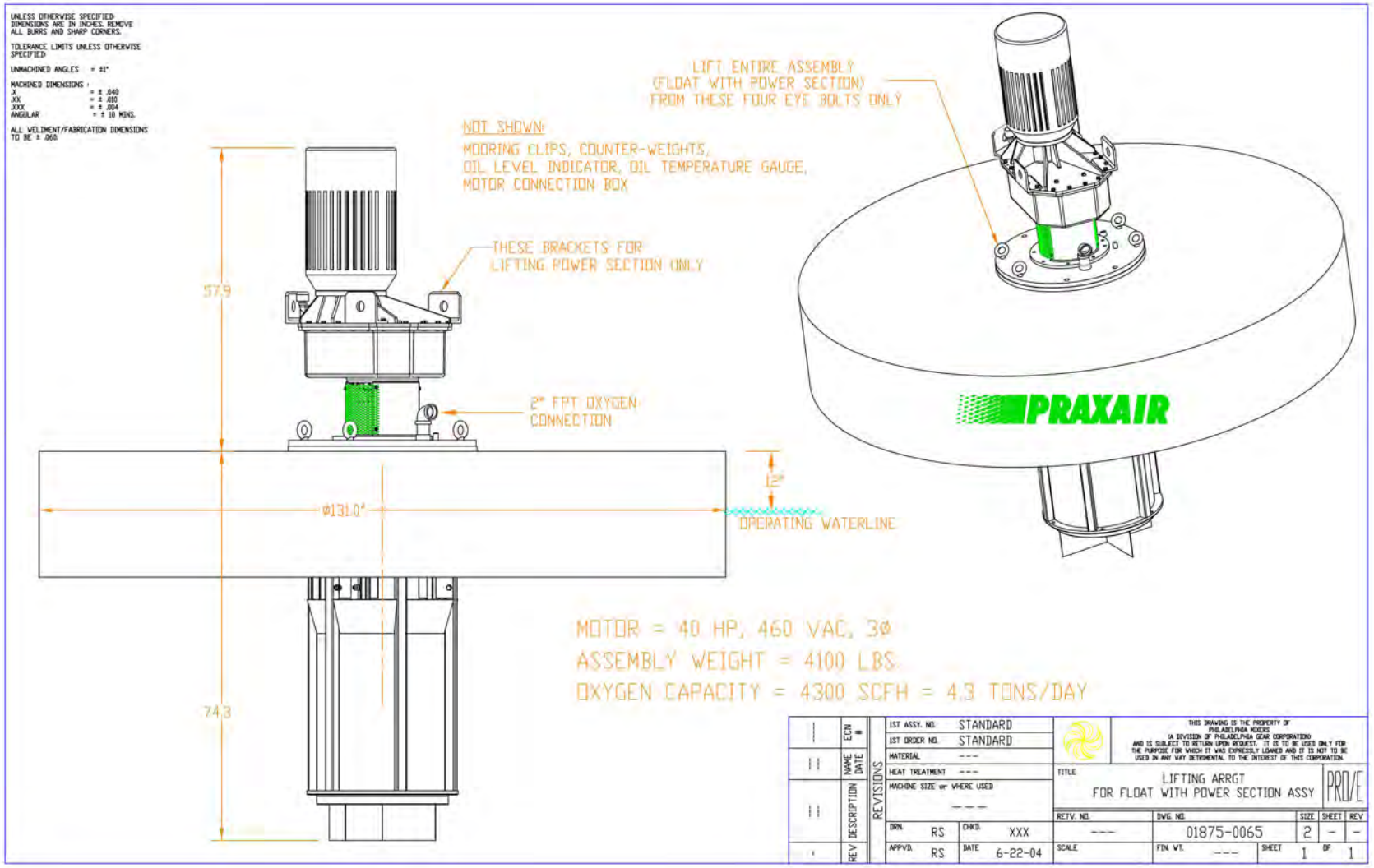


Figure 7 I-SO™ Unit Assembly

Schedule and Cost Estimate

Implementation schedules and cost estimates have been developed for both a pilot-scale ISO system and a full-scale system, as well as annual O&M costs for the full-scale system:

Pilot System

Praxair® offers a monthly pilot rental of an I-SO™ unit that could be installed at the Stafford Lake for the next T&O season, at the request of the District. It is recommended that the pilot unit be installed for a total of one (1) or two (2) months, depending on available budget, during the T&O season to observe its effectiveness. It is recommended that the system be installed during the T&O season in 2018, pending budget approval. The schedule for the pilot unit installation will depend on reservoir conditions and reported water quality, however, the pilot unit should be installed for one (1) or two (2) months between May and October of 2018, preferably early in the season.

Rental of the I-SO™ unit would cost approximately $10,695 per month (*Praxair*® quote). The rental package includes one (1) I-SO™ unit ($10,000), including mixing and hose equipment and assembly parts and the control system, and a 1,500-gallon temporary liquid oxygen storage tank ($695).

As-needed oxygen supply would be purchased separately at a rate of $0.08125/lb[10]. Based on the preliminary calculations, NMWD would need a maximum of 250 lb/day ($20.31/day) or 7750 lb/month ($630/month). Based on initial calculations, a 1,500-gallon storage tank would be sufficient to store liquid oxygen for approximately 1.5 months[11].

For a one (1) month pilot study, the I-SO™ system would cost approximately $12,000. For a two (2) month pilot study, the I-SO™ system would cost approximately $24,000.

Full-scale System

Installation of a full-scale Praxair® I-SO™ system would depend on the success and schedule of the pilot study. A full-scale system could be installed prior to the 2019 or 2020 T&O season.

The estimated capital cost of the full-scale installation is about $200,000 for a package including one (1) I-SO™ unit, mixing and hose equipment and assembly parts, a liquid oxygen storage tank, and the control system.

- The average annual O&M Costs include the following components:
  - Oil change: approximately $300 annually
  - Pure oxygen: $0.02174/lb[12] at 162 lb/day = $3.52/day
    $3.52/day, April – November (244 days) = $859.33 annually
  - Power: 24 kW at $0.12/kWh (est. 2015), 8 hrs/day = $23.04/day
    $69.12/day April – November (244 days) = $5,622 annually

[10] Rate provided by Praxair, includes delivery fees.
[11] 7750 lbs of liquid oxygen is equal to approximately 814 gallons of liquid oxygen. Therefore, a 1,500-gallon tank would not need to be re-filled if the District decides to conduct a month-long pilot test.
[12] Rate provided by Praxair, does not include delivery fees.

- Liquid Oxygen Telemetry Unit Servicing: $520 annually
- Hazardous material handling, freight, and energy and fuel charge[13]: $550
- Total Annual O&M Costs, Approximately: $7,900/year

o Long-term O&M Costs include the following:

- Gearbox reconstruction: approximately $8,000, every ten years

3.1.5 Upsizing of Existing 12-Acre Aeration Bed

The existing 12-acre aeration diffusion system near the intake tower is likely increasing the DO at the bottom of the lake, however it is not sufficiently sized for the sharp drop in DO caused by a mass algae die-off. Based on conversations with Keeton representatives, this system was designed as a pilot installation to test the level at which aeration in Stafford Lake can augment Fe and Mn oxidation.

It is possible that expanding the existing system to cover 35 acres near the intake (see Figure 5) could oxygenate Stafford Lake to a level at which anoxic conditions are prevented and algae growth is controlled. The existing NMWD system, shown in Figure 8, is a Keeton QR Series aeration system comprised of two ½-HP Model QR-16DP-2 compressors in two long (20″W x 36″L x 27″T) recycled plastic cabinets. Each cabinet contains one 275 cfm cooling blower, a sound reduction package, and operation controls.

Figure 8 Stafford Lake Existing Keeton Aeration System

[13] Based on the installation of a 1,500-gallon tank, a delivery of liquid oxygen every 1.5 months, and five (5) liquid oxygen deliveries per season.

An expanded system would include two (2) additional aeration beds located near the inlet and at the deepest parts of the lake. The deepest parts of Stafford Lake are north and east of the Stafford Lake Island and across the inlet, as shown in Figure 9, and have been identified for expansion of the aeration system. Two (2) additional aeration systems, both of equivalent capacity to the existing system and with dedicated compressor stations, are proposed to be installed as shown in Figure 9.

This arrangement is proposed as the most cost-effective solution, as the installation of two (2) new compressors would cost significantly less than utilizing the existing compressor to supply the proposed area of Stafford Lake (see Attachment B). Installation of these compressors assumes use of NMWD-owned shoreline land, with no leasing or land use costs, based on preliminary conversations with operations staff.

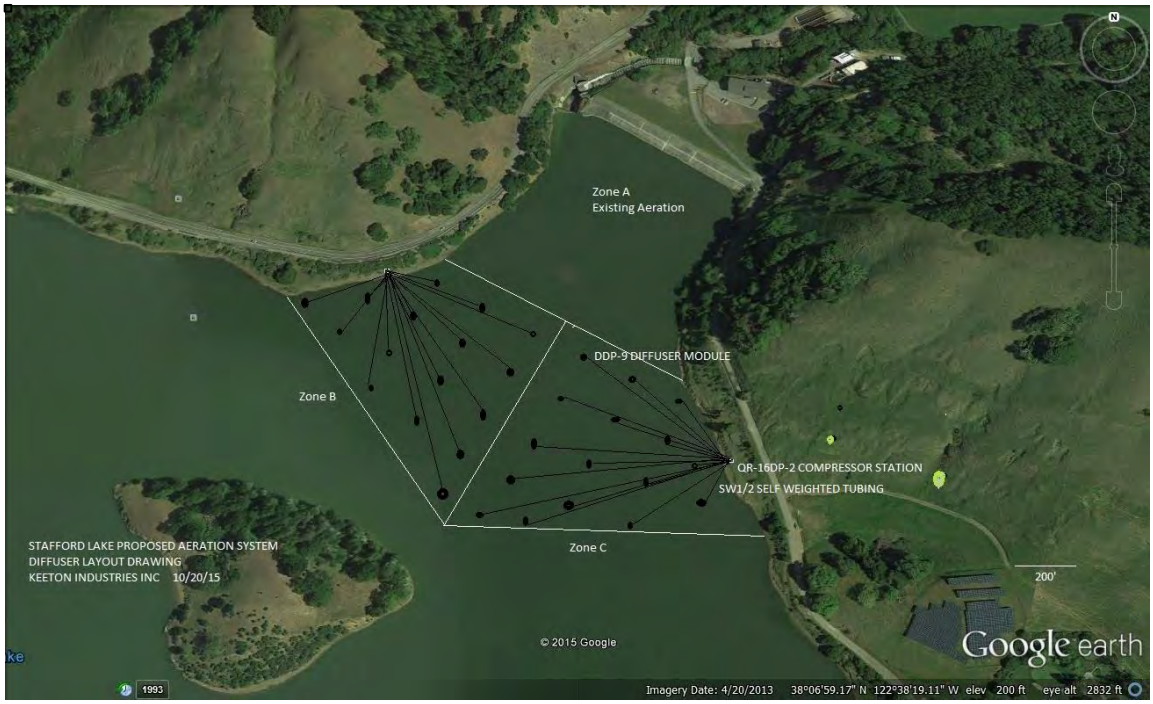


Figure 9 Proposed Stafford Lake Keeton Aeration System Expansion

Each compressor continuously provides 21.2 cfm of air flow (1.1 to 1.3 cfm per emitter) at 5 psi pressure, and requires a 230-Volt power source. The proposed aeration bed expansion would therefore provide 63.3 cfm of air to the area of Stafford Lake shown in Figure 9. However, aeration may not to able to provide enough oxygen to counteract the average oxygen depletion rate of 0.11 mg/L/day during the T&O season in Stafford Lake.

The most reliable method to calculate the expected oxygenation level from the proposed aeration bed expansion is to shut down the existing aeration system for one month and to monitor DO concentration at various depths. After one month, the existing aeration system should be restarted, and DO concentrations at various depths should be monitored on a

weekly basis for two months. The resulting data could then be extrapolated to quantify the estimated level of aeration with the proposed aeration bed expansion.[14]

Schedule and Cost Estimate

It is recommended that the Keeton QR Series aeration bed expansion, as proposed, is not installed until several other alternatives are piloted and/or implemented. It is likely that this alternative would not be installed until the 2018-2019 off-season (December – March), after several other mitigation measures have been tested and/or deemed infeasible.

It is recommended that the effectiveness of the existing aeration system be tested shortly after STP start-up in 2016, as described above, prior to expanding the system. Testing the existing system will also assist in estimating the effectiveness of the proposed expanded aeration bed.

Keeton Industries estimates a cost of $39,500 for the expanded system as proposed in Figure 9, including the equipment pad, tubing, emitters, compressors, cabinets, and all ancillary equipment. There is no known additional cost of using the NMWD-owned land for the two new compressor stations.

The Keeton aeration system requires the following O&M:

- Annual O&M Costs:
  - Air filter replacement: $60.00, every three months, per system
    Annual Cost for two (2) additional systems, 3 replacements per year: $360
  - Power, excluding consumption by the existing aeration system: 3.22 kW at $0.12/kWh (est. 2015) for 24 hours per day = $9.27/day
    $9.27/day, April – November (244 days) = $2,263
  - Annual Cost: $2,600
- Long-term O&M Costs:
  - Compressor replacement: $2,000, every four years, per system
  - Cooling blower replacement: $150, every four years, per system

3.2 Optimized Removal

Optimized removal of Geosmin is dependent upon maximizing the efficiency of all treatment processes at the STP. It is critical that the GAC units maintain a high capacity for Geosmin adsorption throughout the operating season, which is reliant upon removal of solids and Mn prior to the GAC units. The recommendations below are designed as improvements to the current treatment processes at STP that would indirectly influence Geosmin removal.

3.2.1 GAC Specification and Bidding Process

Optimization of the STP purchasing procedures is recommended to ensure the technologies in place function to the best of their capacity. Specifically, it is recommended that NMWD

[14] Recommendation provided by Keeton Industries.

develop very stringent specifications for the GAC procurement. Currently, the STP purchases GAC based on the most competitive price and has previously used various types of GAC.

Without having WWTP effluent data, it is difficult to determine if the conversion from coconut-based GAC to coal-based GAC increased or decreased the capacity for T&O removal. However, because of the continued T&O complaints after the change, it is assumed that there was no significant improvement. Example purchasing specifications for GAC are presented in Attachment C. The adoption of specifications that are specific to the water quality received by the GAC units would help ensure that the STP utilizes the most effective GAC for Geosmin removal.

Schedule and Cost Estimate

Developing specifications for the purchase of GAC can be initiated by the District immediately and be completed by District staff. The foreseen District expenses will be the staff hours committed to the development of GAC specifications.

3.2.2 GAC Testing and Replacement Strategy

It is recommended that the GAC units undergo substantial performance and capacity testing throughout the operating season and specifically prior to the T&O season at Stafford Lake. Evaluating the state of the GAC on a regular basis would better inform NMWD staff as to whether or not the GAC can handle a potential algal bloom. This information is critical in establishing trigger points for GAC replacement, and ultimately a replacement strategy that can be anticipated by the District at regular intervals. The replacement strategy will likely change when improvements are made to the system that will extend the life of the GAC. Generally, GAC replacement should be coordinated such that fresh GAC is available at the onset of the T&O season.

Schedule and Cost Estimate

Implementing a testing and replacement strategy for GAC can be initiated by the District immediately and can be completed by District staff. A testing and replacement strategy needs to include monitoring the removal efficiency of the GAC units, evaluating the condition of the media, and determining appropriate schedules for replacement. The foreseen District expenses will be the staff hours committed to the implementation of a testing and replacement strategy.

3.2.3 Coagulant Optimization

Enhanced removal of suspended and dissolved solids at the influent chamber of the STP is a critical treatment recommendation for optimizing the effectiveness of the filtration units at STP. Optimizing coagulant dosing upstream of STP's filtration units can both enhance removal of suspended and dissolved solids and significantly reduce NMWD's chemical expenditures. Installation of a submersible Evoqua (formerly Siemens) 5FX 5-HP Water Champ® FX Chemical Induction System (Water Champ®) in place of the existing mechanical flash mixer would provide the conditions necessary for instantaneous mixing of ferric chloride coagulant, while requiring at least 50% less of the volume of coagulant currently used.

The submersible Water Champ® FX Chemical Induction System, shown in Figure 10, includes a hermetically-sealed motor constructed of stainless steel and chemically wetted components made of Grade II unalloyed Titanium.

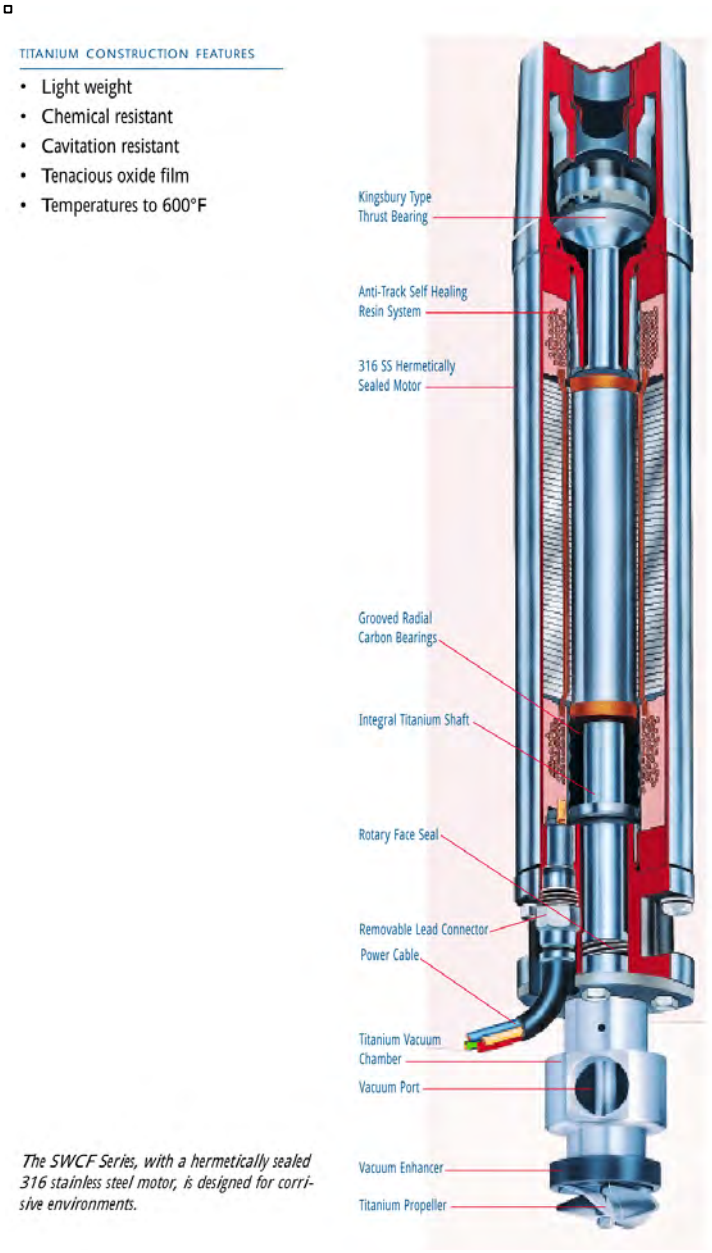


Figure 10 Water Champ® FX Chemical Induction Unit

The STP currently doses 35 to 50 mg/L Ferric Chloride using a flash mixer in an 18-inch diameter tee downstream of the chlorine contact basin. One (1) Water Champ® can be installed in place of the flash mixer to feed and mix ferric chloride or other coagulant; no ancillary pumps, strainers, mixers, injectors or diffusers would be required. The Water Champ® system may be equipped with an "Alternate Feeding System," to simultaneously dose two liquid or gas chemicals, if desired.

The horizontal counter-flow configuration in a pipeline, shown in Figure 11, is recommended for the STP and achieves the greatest chemical diffusion zone without requiring major infrastructure modifications. With this configuration, rapid mixing of the coagulant occurs in the "zone of influence," which is approximated as a three-dimensional cone with a highly turbulent axial flow pattern, extending away from the Water Champ® propeller and against the flow of water. Facilitated by a 4-blade 2,450 rpm propeller, the coagulant is dispersed directly into the process stream without the need for dilution water, and a homogeneous solution is instantly created. The flexible guiderails and the unit's pivot bracket design are positioned to optimize the zone of influence for mixing.

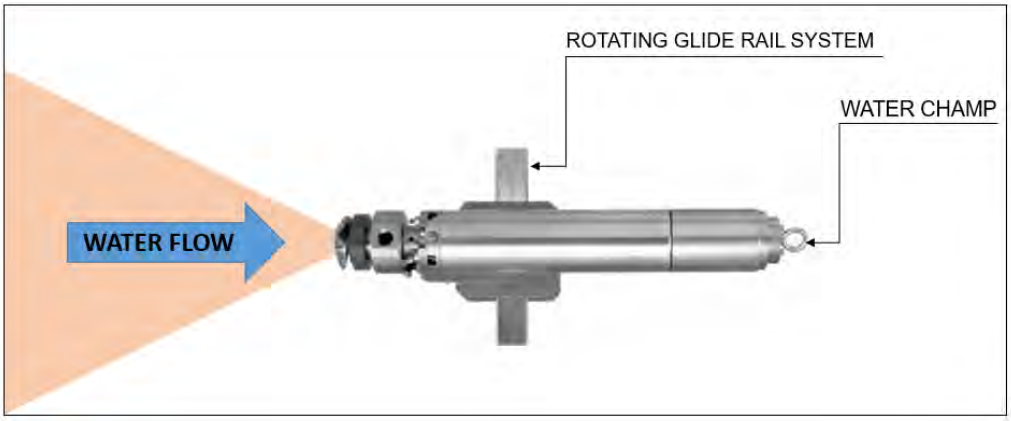


Figure 11 Water Champ® Horizontal Counter-flow Configuration

Operational Requirements

Water Champ® is recommended as an optimization strategy for STP, as the system provides significant chemical and energy savings over conventional mechanical mixing methods. The lightweight airfoil design of the propeller enables the Water Champ® to achieve maximum energy transfer, and eliminates the need for energy-intensive pumps. Process connections are made via flexible PVC-hose and couplings to the unit and via a 1-½-inch FPT chemical hose assembly. A continuous power supply of 460-Volt is required; the electrical supply is connected to the motor control panel and to the power cable from the unit.

Installation Requirements

The Water Champ® unit is approximately six (6) inches in diameter and 34 inches long, and weighs 90 pounds with all components. The system is mounted on stainless steel rails and may be installed in a pipe or contact basin; the rails allows the system to automatically move and pivot into positions that optimally release target doses of chemicals in varying flow conditions. The package includes a control panel with a motor protection device housed in a corrosion-resistant enclosure.

The unit is shipped pre-assembled and the guiderail system is designed to fit each application, requiring minimal downtime for installation. Once the rail system is installed, the pipeline does not need to be drained to initiate operation of the unit or to remove it for inspection and service. Since the STP shuts down for several months a year, NMWD could

also install the system off-season. Installation of the guiderail requires use of a davit crane or other lifting device.

Overall, the Water Champ® offers reduced downtime and less maintenance than mechanical mixing systems. The system utilizes a close-coupled connection between the vacuum body, propeller, and submersible motor so that the motor shaft is isolated and may be serviced in the field. Serviceable components are limited to the motor, stationary bushings, and o-ring seals.

Schedule and Cost Estimate

The Water Champ® installation, as proposed, could be implemented as early as the 2015-2016 off-season (December – March).

G3 Engineering, Inc., the local Evoqua Water Champ® representative, estimates a total cost of $50,000 for a Water Champ® FX Chemical Induction System package including one Water Champ® unit (approximately $25,000), one control panel (approximately $7,000), one customized guiderail system (approximately $10,000), and miscellaneous ancillary equipment (approximately $8,000). This price excludes installation costs.

If redundancy is desired, two Water Champ® units of the same capacity can be installed in parallel on separate guiderails for an estimated additional cost of $38,000, or in series on one guiderail system for an estimated additional cost of $28,000.

The Water Champ® system requires the following O&M:

- Annual O&M Costs[15]:
  - Ferric Chloride (1.40% sp. gr.) Coagulant: est. $25,000, annually for coagulated pH target of 6.3[16]
  - Power: 3.7 kW at $0.12/kWh (est. 2015) = $0.44/hour
    $0.44/hour[17], April – November (3,490 hours in 244 days) = $1,550
  - Annual Cost: $27,000
- Long-term Costs:
  - O-ring seal replacement: $800, every five to ten years
  - Chemical feed hose replacement: $200, every five years

Annual Chemical Cost Savings

It is estimated by operations staff that NMWD uses approximately 390,000 lbs of ferric chloride annually to maintain a pH of 6.3, at a cost of approximately $50,000. To maintain the same pH, it is estimated that the Water Champ unit would use 50% of the coagulant at 50% of the cost. Therefore, the annual chemical cost savings is anticipated to be $25,000. The chemical costs savings realized through the installation of the Water Champ would cover the

[15] The system will require additional O&M, including annual and monthly service inspections, which are assumed to be completed by District staff internally.
[16] The vendor will need to know specific flow volumes and levels within the pipe in order to confirm the amount and cost of coagulant.
[17] Assuming 16 and 10 hours of operation per day on weekdays and weekends, respectively.

cost of installation after 2 years in operation, and would provide an additional $75,000 of savings after 5 years in operation.

3.3 Treatment Process Improvements

Another method of treating T&O problems would be to improve treatment processes at the STP to maximize removal of Geosmin. Several recommendations were presented in the Water Quality Evaluation, however, it has been determined that only one recommended treatment process improvement is feasible at STP: GAC-Capped Actifloc™ filters[18]. The following section details the installation, operational, and cost requirements of installing GAC-Capped filters.

3.3.1 GAC-Capped Filters

Improved T&O control is possible by using GAC in place of anthracite in the existing Actifloc™ filters. It is anticipated that GAC-capping of the Actifloc™ filters would improve the Geosmin removal at STP and extend the lifetime of the downstream post-filtration GAC adsorption units.

GAC-capped filters have been shown to remove as much as 50-percent of Geosmin when utilized early in the treatment train. Given that the STP currently removes a high percentage of Geosmin, using GAC-capped filters would likely improve the removal of Geosmin in STP to below detection limits and increase the life of the GAC units when the Geosmin level in the reservoir remains below the 500 ppt level.

The 18-inch depth of anthracite in the existing Actifloc™ filters may be replaced with an 18-inch depth of GAC, at the top layer of each filter, where “Mixed Media” is labeled in Figure 12. Based on the existing flow rates and treatment processes at STP, it is estimated that GAC-capped filtration would increase EBCT by approximately two (2) to five (5) minutes.

[18] Ozonation was determined to be too expensive of a capital improvement for the District and powered activated carbon (PAC) was determined to be operationally infeasible and too expensive of an O&M cost.

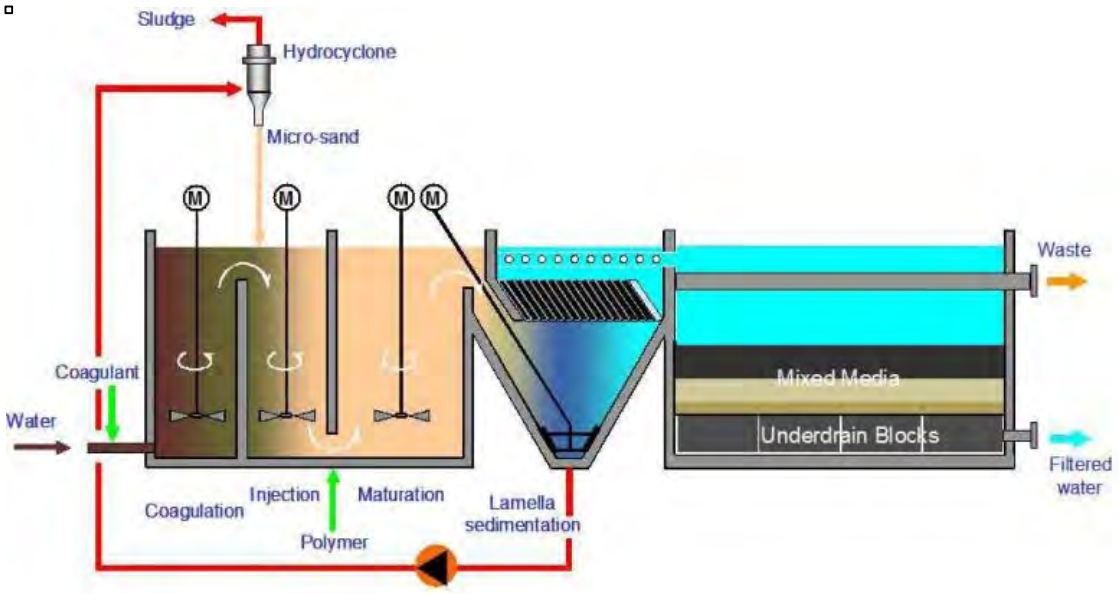


Figure 12 Actifloc™ Unit GAC-cap Location

This GAC will be operated as biologically activated carbon (BAC) whereby an active, aerobic microbial community on the filter media will be maintained. The significant surface area provided by the porous GAC filtration media offers ample opportunity for microbial growth. The objective of BAC is to grow bacterial filaments to assist in the attachment of contaminant particles in the influent to the GAC media.

GAC as BAC is typically installed at depths of 24 to 36 inches. Greater depths do not improve fresh GAC removal efficiency, however, depth increases the lifetime of the GAC-cap. With time, GAC's media depth degrades with use and through loss of GAC by underlying media intermixing. Therefore, greater initial installation depths of GAC media would increase the overall lifetime of the GAC-cap. For the STP, it is recommended that the maximum depth of GAC-cap (18 inches) be installed for lifetime cost savings. According to the Actifloc™ manufacturers, there are no concerns with using a GAC-cap in the filters, and a maximum GAC-cap depth of 18 inches may be installed. Carbon for the GAC-cap should be selected based on comparative testing and carbon that has been effective in the existing GAC units. It is recommended that the effective size of the carbon is approximately 1.5mm so that the media is not compromised during backwash.

A GAC-cap may be installed on one (1) existing Actifloc™ unit and used to pilot this T&O mitigation alternative as a means to test the effectiveness prior to full-scale installation in all three of STP's Actifloc™ filters. Pilot tests should be run to ensure that a reduction in the depth of the finer sand does not reduce the quality of the effluent and to optimize operation of the GAC-cap and chemical dosing throughout the treatment process before full-scale installation. Additionally, the lifetime extension of the downstream post-filtration GAC adsorption units may be measured during the GAC-cap pilot installation.

Operational Requirements

The GAC-cap is expected to last approximately five (5) years before replacement is required, as opposed to the current biannual replacement/refilling of anthracite filter media in the Actifloc™ units. The GAC in the Actifloc™ filters can be replaced less frequently than with typical adsorption units in order to allow stalked bacteria to colonize carbon granules.

Lower dosages of chlorine will be critical in maintaining healthy conditions for the biological activity of the GAC-capped filter. The conversion to GAC-capped filters necessitates that dosing of free chlorine, currently utilized as an oxidant, upstream of the Actifloc™ filters be substantially lowered or discontinued in order to maintain an active microbial community on the GAC-cap. Should manganese removal be optimized in the reservoir, the use of free chlorine can be discontinued.

Schedule and Cost Estimate

Implementation schedules and cost estimates have been developed for both pilot-scale and full-scale installation, as well as annual O&M costs for the full-scale system:

Pilot System

One (1) Actifloc™ filter could be converted to a GAC-capped filter at STP before the next T&O season, at the request of the District. It is recommended that one (1) Actifloc™ filter be converted in the STP off-season this year (December 2015 – March 2016), prior to plant start-up in 2016.

Conversion of one (1) Actifloc™ filter from anthracite to GAC would cost approximately $21,000. Calgon Carbon Corp. estimates that 12,000 pounds of either Filtrasorb 300-M or 400-M would be required for an 18-inch GAC-cap over a 260 square foot area of the filter. Both Filtrasorb GAC media are estimated to cost $1.75/lb, including installation.

Full-scale System

Conversion of the additional two (2) Actifloc™ filters would depend on the success and schedule of the pilot-scale conversion. A full-scale conversion could be completed no earlier than the STP off-season of 2017, and would more likely be installed during the STP off-season of 2018 or 2019.

Conversion of the two (2) remaining Actifloc™ filters from anthracite to GAC would cost approximately $42,000. Calgon Carbon Corp. estimates that 12,000 pounds of either Filtrasorb 300-M or 400-M would be required for an 18-inch GAC-cap over the 260 square foot area of each filter. Both Filtrasorb GAC media are estimated to cost $1.75/lb, including installation.

The GAC-capping system requires the following O&M:

- Annual O&M Costs: None; maintain aggressive Actifloc™ backwashing frequency
- Long-term O&M Costs:
  - Replace GAC-cap: $21,000 per Actifloc™ filter, every five years
  - Total Cost for GAC-cap Replacement: $63,000, every five years

O&M Cost Increase

The installation of GAC-caps in the Actifloc units would eliminate any costs associated with O&M of the anthracite filters. NMWD currently spends approximately $4,000 every two (2) years to top-off anthracite in all three filters. Assuming that the full-scale GAC-capped system is installed, and that the GAC will require replacement every five years, as discussed above, the following table projects the estimated O&M costs for the District over the next ten (10) years.

Table 3 Estimated O&M Cost Increases

Year	Anthracite Cost Savings	GAC-Capping Costs
2016 (Pilot Installation)		$21,000
2017	($4,000)	
2018 (Full-Scale Implementation)		$42,000
2019	($4,000)	
2020		
2021 (Replacement of 1 GAC Cap)	($4,000)	$21,000
2022		
2023 (Replacement of 2 GAC Caps)	($4,000)	$42,000
2024		
2025	($4,000)	
Total O&M Cost Increase		$106,000
Average Annual O&M Cost Increase		$10,600

SECTION 4 TASTE & ODOR CONTROL STRATEGY SCHEDULE

That T&O control strategy for NMWD has been developed as a combination of various measures to maximize effectiveness while minimizing cost-intensive capital improvements. Based on conversations with District staff, evaluation of feasibility, and cost estimates, SRT has developed long-term and annual T&O Control Strategies presented in this section.

4.1 Long-Term T&O Control Strategy

The long-term T&O Control Strategy includes two phases:

(1) **Phase 1:** Initial Implementation Strategies and Associated Cost and/or Cost Savings
(2) **Phase 2:** Secondary Implementation Strategies: Recommended Capital Improvements

The long-term T&O Control Strategy was developed in phases based on the District's interest in implementing low-cost capital and operational improvements prior to implementing more expensive capital improvements. This strategy is an effort to control T&O issues as quickly as possible and utilize operational optimization strategies to save on O&M costs and ultimately fund future cost-intensive capital improvements, if required.

Development of cost estimates and discussions with NMWD have informed the long-term T&O Control Strategy, and the recommended alternatives presented above have been categorized into Phase 1 or Phase 2 projects. Phase 1 projects are lower cost options that can be initiated within the next two (2) years, while Phase 2 projects are more cost-intensive and can be implemented within the next ten (10) years, depending on the results of Phase 1 implementation. Table 4, below, defines each phase based on recommended alternatives, and Table 5 and Table 6 on the following pages detail each phase and the associated recommended projects.

Table 4 Phased Approach Recommended Alternatives

	Category	Recommended Alternatives
PHASE 1 PROJECTS	Source Control	Additional Water Quality Monitoring
		Strategic Planning
		Nutrient Management at Grossi Dairy
	Operations Optimization	Installation of Water Champ®
		GAC Specifications
		GAC Replacement Strategy
	Treatment Process Improvements	Pilot-Scale Conversion of an Actifloc™ Filter from Anthracite to GAC-Capped
PHASE 2 PROJECTS	Source Control	Pilot-Scale Installation of In-Situ Oxygenation
		Full-Scale Installation of In-Situ Oxygenation
		Upsize the Existing 12-acre Aeration Bed
	Treatment Process Improvements	Full-Scale Conversion of an Actifloc™ Filter from Anthracite to GAC-Capped

Table 5 Initial Implementation Strategies, Estimated Costs and Associated Cost Savings

Category	Task Description	Implementation Schedule	Estimated Cost	Cost and/or Savings at 5 Years
Source Control: Additional Monitoring	**Additional Water Quality Monitoring:** Additional monitoring of Geosmin and ORP will allow NMWD to better understand the conditions in Stafford Lake that lead to T&O episodes, and the effectiveness of the STP in removing Geosmin. Additional monitoring includes defining trigger points and establishing actions in a water quality action plan (Section 4.2).	Initiated April 2016, May – October Annually	Geosmin Sampling[19,20]: $10,000/year	TBD[21]
Source Control: External Nutrient Management	**Strategic Planning:** Conduct a sanitary survey of the Stafford Lake watershed.	1st or 2nd Quarter, 2016	Sanitary Survey: $30,000	TBD
	Nutrient Management at Grossi Dairy: Continue negotiations with Grossi Dairy and the County regarding the elimination of nutrient input from Dairy run-off.	Immediate, continuous	Work completed by NMWD staff	TBD
Operations Optimization	**Installation of Water Champ®:** Install Water Champ® hydraulic mixing system to optimize coagulation at STP and reduce the amount of coagulant necessary.	STP Off-Season, 2016	Installation: $50,000 O&M: $27,000 annually for coagulant and power costs.	O&M Cost Savings - Installation = $125,000[22] - $50,000 = $75,000 (Savings, 5 Years)
	GAC Specifications: Develop GAC specifications for the primary GAC units based on water quality and observed performance.	1st Quarter, 2016 Prior to next purchase of media, if possible	Work completed by NMWD	TBD[23]
	GAC Replacement Strategy: Implement a media replacement strategy that will maximize the GAC adsorption for the start of T&O season.	1st Quarter, 2016 Prior to next start of T&O season, if possible	Work completed by NMWD	TBD[24]
Treatment Process Improvements	**Pilot-Scale Conversion of an Actifloc™ Filter from Anthracite to GAC-Capped:** Convert one (1) Actifloc™ filter from anthracite to GAC to quantify the effectiveness of this strategy in reducing Geosmin loading to GAC units.	STP Off-Season, 2016	Pilot purchase and installation in one Actifloc™ filter would cost $21,000.	Pilot: $3,333[25] - $21,000 = -$17,667[26] (Cost, 5 Years)
Minimum Anticipated O&M Savings (5 Years)				Approx. $57,500

[19] Cost is not included for a probe to measure ORP and other water quality parameter, as it is likely that NMWD has this equipment.
[20] This estimate is based on $129/sample from EMSL Analytics in San Leandro, and 3 samples a week for 24-weeks. If this is determined to be cost-prohibitive for the District, the number of samples and/or number of weeks can be reduced, however the results will not be as comprehensive. Marin Municipal Water District (MMWD) was contacted to obtain an estimate for a Geosmin sample, as the only data received by SRT for Geosmin testing was completed at MMWD. MMWD was not able to provide a sample cost, however, it is recommended that NMWD explore this option based on the existing relationship between the water districts.
[21] Additional water quality monitoring could result in additional cost savings due to less frequent replacement of the existing GAC units due to early mitigation of T&O episodes.
[22] Cost savings is based on $25,000 savings in coagulant annually. Power costs (approximately $2,000) were considered to be negligible, as the power costs of mechanical mixing is likely higher than the power costs of hydraulic mixing.
[23] The development of GAC specifications and GAC replacement strategy could result in additional cost savings due to less frequent replacement of the existing GAC units.
[24] The development of a GAC replacement strategy could result in additional cost savings due to less frequent replacement of the existing GAC units.
[25] Installation of anthracite typically costs $1,333/filter every 2 years.
[26] Conversion of the Actifloc™ filter could result in additional cost savings due to less frequent replacement of the existing GAC units. The effectiveness of the pilot conversion will be evaluated through Geosmin removal effectiveness.

Table 6 Secondary Implementation Strategies: Recommended Capital Improvements

	Task Description	Implementation	Estimated Capital Cost	Long-Term Cost (10-Year)[27]
Source Control: Aeration Optimization	**Pilot-Scale Installation of In-Situ Oxygenation:** Rent and install one (1) I-SO unit near the intake to increase DO levels in Stafford Lake and control internal nutrient loading, algal growth, and subsequent die-off. Monitor the results of the I-SO unit to determine the effectiveness in increasing oxygen, decreasing algal counts, and decreasing Mn loading to STP.	STP Off-Season, 2018	$11,000	$11,000 No Additional O&M Requirements
	Full-Scale Installation of In-Situ Oxygenation: If the pilot-scale installation is deemed effective, purchase and install one (1) or more I-SO units near the intake to increase DO levels in Stafford Lake and control internal nutrient loading, algal growth, and subsequent die-off. The number of units required will be based on the results of the pilot-scale installation.	STP Off-Season, 2019[28]	$130,000	Capital Cost: $200,000 Annual O&M Costs: $6,700 10-Year O&M Costs: $75,000[29,30]
	Upsizing 12-acre Aeration Bed: Upsize the existing aeration bed to three (3) times the size of the existing design to cover a 35-acre area near the intake. Upsizing the aeration bed is only recommended if I-SO is cost-prohibitive and other methods of T&O Control are deemed ineffective.	STP Off-Season 2019	$40,000	Capital Cost: $40,000 Annual O&M Costs: $2,600 10-Year O&M Costs: $35,000[31,32]
Treatment Process Improvements	**Full-Scale Conversion of an Actifloc™ Filter from Anthracite to GAC-Capped***:* Convert the remaining (2) Actifloc™ filters from anthracite to GAC to reduce Geosmin loading to GAC units.	STP Off-Season, 2017[33]	$42,000	Capital Cost: $42,000 10-Year O&M Costs: $105,000 O&M Savings: $20,000 Net additional O&M Cost, 2016-2025: $126,000[34] - $20,000 = $106,000[35]

[27] All final values are estimated and rounded to the nearest thousand.
[28] Schedule of installation highly dependent upon performance of I-SO pilot.
[29] Summation of annual O&M costs and the cost to replace the gearbox after 10 years ($8,000).
[30] The implementation of I-SO could result in additional cost savings due to less frequent replacement of the existing GAC units.
[31] Summation of annual O&M costs and the cost to replace the compressors ($2,000) and cooling blowers ($150) every four years for each system ($8,600).
[32] The implementation of the 12-acre aeration bed could result in additional cost savings due to less frequent replacement of the existing GAC units
[33] Schedule of installation highly dependent upon performance of GAC-Capped Actifloc™ pilot.
[34] Includes 10-year costs for GAC conversion of all three (3) Actifloc™ filters. Excludes costs of the initial Actifloc™ pilot conversion.
[35] Based on the assumption that GAC would need to be replaced every 5 years. Anthracite is currently being replaced every 2 years (at $4,000 total).

As noted above, the phased T&O Control Strategy is based on the objective to limit significant capital expenditures upfront, and instead implement low-cost projects that would allow the District to save money over time. As shown in Table 5, above, it is recommended that the District implement seven (7) strategies to mitigate T&O at Stafford Lake and the STP. Implementation of hydraulic mixing (Water Champ® technology) is the most expensive alternative recommended for initial implementation, however, it is anticipated to offer the long-term savings for the District over time. After five (5) years, it is projected that the Water Champ® would have saved the District about $125,000 in chemical costs, with a net savings of $75,000 after taking into account the capital cost of installation of about $50,000.

The conversion of one (1) Actifloc™ filter would also require an upfront investment at an estimated cost of $21,000. Additionally, it is anticipated that the O&M cost on this filter would be approximately $21,000 every 5 years as the media would need to be replaced. However, the improvement is highly recommended, as it is likely that the installation of a GAC-cap would reduce loading of Geosmin and other contaminants (Mn, etc.) to the existing GAC units, improving the overall removal of Geosmin and life of the existing GAC units.

Cost savings associated with the conversion of the Actifloc™ filters have not been calculated, as it is unknown to what extent the conversion would extend the life of the media in the existing GAC units. However, it should be noted that it is likely that savings would be realized from the conversion of the Actifloc™ filters and additional recommended alternatives. Given that the replacement of GAC currently costs the District over $150,000 every year, extending the life of this media would result in significant savings for the District. Table 7, below, presents the savings that would be realized should the life of the GAC media be extended by either one (1) or two (2) years.

Table 7 Extended Life of GAC Filter Media: Potential Savings

Life of Filter Media	Cost per Year	Annual Savings
1 Year (Current)	$150,000	NA
2 Years	$75,000	$75,000
3 Years	$50,000	$100,000

Should the life of the filter media be extended by even one (1) year, the District would save $75,000 annually, which would increase the amount of funding available for capital improvements and advance the implementation schedule of Phase 2 projects substantially.

Phase 2, presented in **Table 6**, is highly dependent on the success of the projects implemented during Phase 1 and the budget available for capital improvements. Increasing aeration to the reservoir is one of the most sustainable solutions to the T&O issues at Stafford Lake, however these options are also the most expensive to implement. The conversion of the remaining Actifloc™ filters would be dependent upon the results of the pilot test; as noted above, the conversion of the filters could result in substantial savings for the District.

The long-term strategy (Phase 1 and Phase 2) and associated costs for the next ten (10) years is summarized in the implementation schedule included on the following pages.

Table 8 Implementation Schedule

			2016				2017				2018				2019	
		Task	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**
Source Control	Phase 1	Additional Water Quality Monitoring		WQ Monitoring, May - October				WQ Monitoring, May - October				WQ Monitoring, May - October				WQ Monitoring, May - October
		Cost/Savings			-$10,000				-$10,000				-$10,000			
	Phase 1	Strategic Planning: Conduct a Sanitary Survey	Conduct Survey, 1st or 2nd Quarter													
			-$30,000													
	Phase 1	Nutrient Management at Grossi Dairy	Develop Monitoring Program	Implement Additional BMPs			Dairy submits 2016 Monitoring Report	Implement BMPs or negotiate with Dairy			Dairy submits 2017 Monitoring Report	Implement BMPs or negotiate with Dairy			Dairy submits 2018 Monitoring Report	Implement BMPs or negotiate with Dairy
			Monitor Nutrient Inputs (Continuous)				Monitor Nutrient Inputs (Continuous)				Monitor Nutrient Inputs (Continuous)					
	Phase 2	Pilot-Scale Implementation of I-SO										Install Pilot I-SO Unit	Monitor Effectiveness			
		Cost/Savings										-$12,000				
	Phase 2	Full-Scale Implementation of I-SO														
		Cost/Savings														
	Phase 2	Upsize 12-acre Aeration Bed	Test existing Aeration Bed (April)													
		Cost/Savings														
Operational Optimization	Phase 1	Installation of Water Champ	Install during STP Off-Season		Monitor Effectiveness				Monitor Effectiveness				Monitor Effectiveness			
		Cost/Savings		-$50,000		$25,000				$25,000				$25,000		
	Phase 1	Develop GAC Specifications	Develop Specs prior to Plant Start-up													
	Phase 1	Implement GAC Replacement Strategy			Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season		Replace GAC as necessary	
Treatment Process	Phase 1	Pilot-Scale Conversion of an Actifloc™ Filter	Convert 1 Actifloc Filter	Measure Effectiveness of Actifloc Conversion				Measure Effectiveness of Pilot Actifloc Conversion								
		Cost/Savings	-$21,000													
	Phase 2	Full-Scale Conversion of an Actifloc™ Filters									Convert 2 Additional Actifloc Filters	Measure Effectiveness of Full-scale Actifloc Conversion				Measure Effectiveness of Actifloc Conversion
		Cost/Savings								$4,000	-$42,000					
		Estimated Savings for increased life of GAC												$75,000		
		Quarterly Change in Expenditures	-$51,000	-$50,000	-$10,000	$25,000	$0	$0	-$10,000	$29,000	-$42,000	-$12,000	-$10,000	$100,000	$0	$0
		Cumulative Change in Expenditures		-$101,000	-$111,000	-$86,000	-$86,000	-$86,000	-$96,000	-$67,000	-$109,000	-$121,000	-$131,000	-$31,000	-$31,000	-$31,000

Table 8 (Continued) Implementation Schedule

			2019		2020				2021				2022			
		Task	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
Source Control	Phase 1	Additional Water Quality Monitoring	WQ Monitoring, May October			WQ Monitoring, May - October				WQ Monitoring, May - October				WQ Monitoring, May - October		
		Cost/Savings	-$10,000				-$10,000				-$10,000				-$10,000	
	Phase 1	Strategic Planning: Conduct a Sanitary Survey														
	Phase 1	Nutrient Management at Grossi Dairy			Dairy submits 2019 Monitoring Report	Implement BMPs or negotiate with Dairy			Dairy submits 2020 Monitoring Report	Implement BMPs or negotiate with Dairy			Dairy submits 2021 Monitoring Report	Implement BMPs or negotiate with Dairy		
			Monitor Nutrient Inputs (Continuous)						Monitor Nutrient Inputs (Continuous)				Monitor Nutrient Inputs (Continuous)			
	Phase 2	Pilot-Scale Implementation of I-SO														
		Cost/Savings														
	Phase 2	Full-Scale Implementation of I-SO				Install Full-scale I-SO system, if deemed best option		Monitor effectiveness, correlate with WQ		Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP		
		Cost/Savings				-$200,000	-$7,900				-$7,900				-$7,900	
	Phase 2	Upsize 12-acre Aeration Bed		Expand Aeration Bed, if deemed best option		Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP		
		Cost/Savings			-$40,000		-$2,600				-$2,600				-$2,600	
Operational Optimization	Phase 1	Installation of Water Champ	Monitor Effectiveness				Monitor Effectiveness				Monitor Effectiveness				Monitor Effectiveness	
		Cost/Savings		$25,000				$25,000				$25,000				$25,000
	Phase 1	Develop GAC Specifications														
	Phase 1	Implement GAC Replacement Strategy	Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season	
Treatment Process	Phase 1	Pilot-Scale Conversion of an Actifloc™ Filter							Replace GAC in 1 Actifloc Filter							
		Cost/Savings							-$21,000							
	Phase 2	Full-Scale Conversion of an Actifloc™ Filters	Measure Effectiveness of Actifloc Conversion			Measure Effectiveness of Full-scale Actifloc Conversion				Measure Effectiveness of Full-scale Actifloc Conversion				Measure Effectiveness of Full-scale Actifloc Conversion		
		Cost/Savings		$4,000								$4,000				
		Estimated Savings for increased life of GAC		$75,000				$75,000				$75,000				$75,000
		Quarterly Change in Expenditures	-$10,000	$104,000	-$40,000	-$200,000	-$20,500	$100,000	-$21,000	$0	-$20,500	$104,000	$0	$0	-$20,500	$100,000
		Cumulative Change in Expenditures	-$41,000	$63,000	$23,000	-$177,000	-$197,500	-$97,500	-$118,500	-$118,500	-$139,000	-$35,000	-$35,000	-$35,000	-$55,500	$44,500

Table 8 (Continued) Implementation Schedule

			2023				2024				2025			
		Task	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
Source Control	Phase 1	Additional Water Quality Monitoring		May - October				May - October				May - October		
		Cost/Savings			-$10,000				-$10,000				-$10,000	
	Phase 1	Strategic Planning: Conduct a Sanitary Survey												
	Phase 1	Nutrient Management at Grossi Dairy	Dairy submits 2022 Monitoring Report	Implement BMPs or negotiate with Dairy			Dairy submits 2023 Monitoring Report	Implement BMPs or negotiate with Dairy			Dairy submits 2024 Monitoring Report	Implement BMPs or negotiate with Dairy		
			Monitor Nutrient Inputs (Continuous)				Monitor Nutrient Inputs (Continuous)				Monitor Nutrient Inputs (Continuous)			
	Phase 2	Pilot-Scale Implementation of I-SO												
		Cost/Savings												
	Phase 2	Full-Scale Implementation of I-SO		Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP		
		Cost/Savings			-$7,900				-$7,900				-$7,900	
	Phase 2	Upsize 12-acre Aeration Bed		Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP				Monitor Effectiveness, correlate with WQMP		
		Cost/Savings			-$2,600				-$2,600				-$2,600	
Operational Optimization	Phase 1	Installation of Water Champ			Monitor Effectiveness				Monitor Effectiveness				Monitor Effectiveness	
		Cost/Savings				$25,000				$25,000				$25,000
	Phase 1	Develop GAC Specifications												
	Phase 1	Implement GAC Replacement Strategy	Replace GAC as necessary		Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season		Replace GAC as necessary		Determine GAC Efficiency at end of STP Season	
Treatment Process	Phase 1	Pilot-Scale Conversion of an Actifloc™ Filter												
		Cost/Savings												
	Phase 2	Full-Scale Conversion of an Actifloc™ Filters	Replace GAC in 2 Actifloc Filters	Measure Effectiveness of Actifloc Conversion				Measure Effectiveness of Actifloc Conversion				Measure Effectiveness of Actifloc Conversion		
		Cost/Savings	-$42,000			$4,000				$4,000				$4,000
		Estimated Savings for increased life of GAC				$75,000				$75,000				$75,000
		Quarterly Change in Expenditures	-$42,000	$0	-$20,500	$104,000	$0	$0	-$20,500	$100,000	$0	$0	-$20,500	$104,000
		Cumulative Change in Expenditures	$2,500	$2,500	-$18,000	$86,000	$86,000	$86,000	$65,500	$165,500	$165,500	$165,500	$145,000	$249,000

4.2 Annual T&O Control Strategy

The annual T&O control strategy recommended for NMWD includes a Water Quality Action Plan and Annual Monitoring and Maintenance Schedule.

The water quality monitoring already conducted by NMWD with the addition of the recommended parameters forms the basis of a T&O control water quality action plan that includes identified triggers to assist NMWD staff in resolving T&O-causing conditions before a significant T&O event occurs. An initial template for the water quality action plan is included as Table 11 below, and can be adjusted at the discretion of operations staff based on water quality data trends.

The annual monitoring and maintenance schedule is based on the long-term strategy recommendations, and is included as Table 12 on the following page.

Table 11 Water Quality Action Plan

Parameter	Action Level	Action Taken
Geosmin in Raw Water	12 ppt	More frequently monitor Geosmin in raw water and STP finished water. Reduce dependency on surface water source, if possible.
Geosmin in STP Finished Water	3 ppt	More frequently monitor Geosmin in raw water and STP finished water. Reduce dependency on surface water source, if possible.
	6 ppt	Remove source from system.
Geosmin Removal Efficiency	< 85%	It is anticipated that the removal efficiency should be uniform up to breakthrough. If the removal efficiency drops below 85 to 90%, GAC should be replaced.
ORP	0 (Neutral)	Increase aeration efforts, if possible.

Table 10 Annual T&O Control Strategy

<table>
<tr><th>January</th><th>February</th><th>March</th><th>April</th><th>May</th><th>June</th><th>July</th><th>August</th><th>September</th><th>October</th><th>November</th><th>December</th></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="7">Monitor for Geosmin once per week</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Install probe to measure ORP, DO</td><td colspan="6">Measure ORP, DO continuously</td><td></td><td></td></tr>
<tr><td colspan="12">Analyze water quality data and make decisions based on Water Quality Action Plan</td></tr>
<tr><td colspan="2">Dairy submits Annual Monitoring Report from previous year</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="3">Dairy implements BMPs deemed necessary</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="12">Dairy conducts monitoring of runoff nutrient concentrations, as applicable</td></tr>
<tr><td></td><td></td><td colspan="3">Replace GAC, as necessary, based on GAC specifications</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="7">Measure removal efficiency of GAC units based on Geosmin data (before and after filtration)</td><td></td></tr>
<tr><td colspan="2">Determine GAC Efficiency at end of STP Season</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Determine GAC Efficiency at end of STP Season</td></tr>
</table>

ATTACHMENT A

Recommended Best Management Practices

Recommended Best Management Practices

The following section details BMPs that are recommended for implementation at the Dairy. Several of the recommended BMPs are included in the *Grossi & Sons Dairy Nutrient Management Best Management Practices,* however they were not implemented, based on the provided information.

Best Management Practices

While nutrients - phosphorus in particular – are essential for profitable Animal Feeding Operations (AFOs), their loss in watershed runoff accelerate eutrophication of receiving surface waters, as is the case for Stafford Lake. The USEPA specifies Best Management Practices (BMPs) to protect coastal waters from agricultural animal non-point pollution sources within Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990; these BMPs are commonly adopted and are deemed effective for dairy waste management into and near surface freshwater bodies.

BMPs range from measures that involve a change in farming operations, like conservation tillage and crop rotation, to simple actions such as not land-applying manure before forecasted rainfall. Costs for these measures may range from none to significant infrastructure investments. When properly applied to Grossi Dairy and Stafford Lake, BMPs will support the following:

- Prevent direct discharge of manure or wastewater into Stafford Lake;
- Minimize run-off potential from grazing pastures and feeding areas;
- Prevent nuisance conditions that interfere with normal use and enjoyment of adjacent land; and
- Collect and use dairy manure and wastewater for beneficial purposes such as fertilizer, compost or bedding.

No single waste management practice guarantees comprehensive runoff prevention, and it is recommended that a combination of BMPs be selected based on a site-specific analysis of runoff volume and quality into Stafford Lake. Waste management practices recommended by the USEPA, USDA, NRCS and agricultural cooperatives that are not currently implemented at Grossi Dairy based on the information provided, and should be considered for implementation:

1. **Holding Ponds for Milking/Feeding Center Wastes:** Construct holding ponds on the Grossi property that are sized to hold liquid waste from milking center and any rainfall that occurs between pond drainage intervals.
2. **Runoff Management:** Slope dairy land to direct runoff away from cattle areas and manure collection structures.
3. **Scrape and Haul:** Remove manure for land application elsewhere; holding area shall have cover and impervious base sloped to drain liquid manure into waste storage pond which may be same as holding pond for milking/feeding center waste.
4. **Dairy Waste Lagoon:** earthen structure designed for biological treatment and long-term waste storage constructed to prevent groundwater contamination; lagoons result in less odor during land application than waste storage ponds due to natural biological acclimation.

5. **Waste Storage Pond Agitation**: Using a propeller-type or chopper pump to suspend solids in storage ponds and ensure both liquid and solid waste are removed during pond drainage.
6. **Solid/liquid Separation of Water:** Separate dairy waste using settling basins or mechanical separators, which increases the efficient use of storage ponds or lagoons by extracting 12-14% of solids in dairy waste; the solids may be used for composting.
7. **Soil and Water Assessment Tool (SWAT):** Assess the nutrient content of waste and soil reaction to waste application for safe land application.
8. **Land Application and Wastewater Irrigation:** Evaluate the timing of irrigation based on anticipated rainfall events and soil absorption capacity to minimize stormwater runoff potential.

The USDA has conducted extensive research on BMPs designed to mitigate phosphorus transfers to surface water. These BMPs include soil and water conservation practices, extreme actions such as changing animal feed rations or adding feed additives that increase livestock phosphorus-use efficiency, and alternative practices such as treating manure to lower its soluble phosphorus content and managing riparian zones and grass waterways to trap eroded phosphorus and disperse or contain runoff. These BMPs are specifically designed to limit runoff and leaching as important pathways of phosphorus loss.

ATTACHMENT B

Aeration Alternatives Considered

Aeration Alternatives Considered

Several alternatives were considered for the expansion of the aeration bed, including expansion using a singular pump station, increasing the density of emitters, and utilizing pure oxygen in the diffusion system. These three alternatives were discounted, and the reasoning is detailed in the sections below.

Aeration Bed Expansion Using a Singular Pump Station

An alternative design for the 63.3 cpm system was developed based on the assumption that it was not possible for two additional compressor stations to be installed on the shores of Stafford Lake, as noted in Section 3.1.5. The aeration bed expansion may instead be connected to the existing compressor station near Stafford Dam. The estimated cost of this system would be $84,000, due to the increased tubing requirement. The cost of installing this system is approximately $45,000 more than the recommended aeration bed expansion.

Figure B-1 Keeton QR Series Aeration Bed Expansion

Aeration Bed Expansion by Increasing Density of Emitters

An alternative design for the 63.3 cpm system was considered based on the assumption that it could be more effective to install the emitters closer together. However, an increased density of emitters is not recommended because the density of emitters in the proposed aeration bed expansion is already greater than recommended by industry guidelines. The density of emitters recommended by industry guidelines is one emitter per 1-½-surface acres, and adjusted accordingly with water body depth. In large, shallow water bodies such as

ATTACHMENT C

Granular Activated Carbon (GAC) Purchasing Specifications

GAC Purchasing Specifications

The following specification template was provided by Calgon Carbon Corporation and is recommended for the reliable and competitive purchase of GAC for wastewater treatment. This template is not specific to Calgon Carbon Corporation products.

GRANULAR ACTIVATED CARBON

1. SCOPE OF WORK

This specification section is for the turnkey exchange of spent Granular Activated Carbon (GAC) with new virgin GAC as follows:

a. Furnish all labor, materials, equipment, and supervision for the removal, transport, reactivation or disposal of spent GAC from the filters.

b. Furnish all labor, materials, equipment, and supervision for the supply, and installation of virgin GAC into the filters.

Whenever a brand name is mentioned in the bid request, the naming of the item is intended to establish the type, function, performance and quality required.

2. PRE-BID SITE INSPECTION

a. Each bidder shall visit the site and shall inform themselves of all existing conditions. Proof of site visitation is mandatory and must be attached to bid documents.

b. Failure to comply with site inspection requirements shall be considered non–responsive and bid shall be rejected.

3. PRE-BID AND PRE-SHIPMENT SAMPLES

a. Pre-bid samples:

i. Samples shall be submitted to the (Engineer/City) prior to the bid date. One (1) sample shall be submitted for each activated carbon type to be supplied. Samples shall be no less than 2 lb. and shall be accompanied with a Certificate of Analysis and shall include the following parameters:

a) Iodine number, mg/g (ASTM D4607)

b) Moisture (as packed), wt% (ASTM D2867)

c) Effective size, mm (ASTM D2862)

d) Uniformity coefficient (ASTM D2862)

e) Abrasion number (AWWA B604 – latest edition)

f) Trace capacity number (TCN), mg/cc

g) Particle size distribution (US mesh size), wt% (ASTM D2862)

ii. Failure to comply with the pre-bid sample requirement shall be considered non–responsive and bid shall be rejected.

b. Pre-shipment samples:

i. After award but prior to GAC delivery to site, pre-shipment samples shall be submitted to an independent laboratory mutually agreed upon between the Engineer/City and the manufacturer.

ii. The samples shall be accompanied with a Certificate of Analysis and shall also include the above parameters (3.a.i.a. through g.).

iii. The number of samples to be submitted shall be in accordance with AWWA B604, latest edition. Based on the project size, the manufacturer shall determine the lot size and in turn shall provide the appropriate number of samples to be considered representative.

iv. Failure of the pre-shipment samples to meet specifications shall be cause for rejection. Manufacturer shall then resubmit new pre-shipment samples for testing. Manufacturer shall not be given approval to ship GAC until pre-shipment samples meet specification.

v. The Certificate of Analysis shall certify that the GAC sample shipped to the site is 100% virgin activated carbon and in full compliance with the specifications stated herein.

c. Costs for pre-bid and pre-shipment sample testing shall be borne by the manufacturer.

4. BIDDER'S QUALIFICATIONS

a. Bids shall only be accepted from manufacturers of bituminous coal based reagglomerated activated carbon.

b. Bidders shall have a minimum of 15 years experience manufacturing virgin granular activated carbon and shall submit proof via a Manufacturer's Certificate and/or an Affidavit of Compliance.

c. The bidder shall certify that it is the owner and operator of a potable reactivation facility capable of receiving and reactivating spent GAC from this water treatment facility.

d. Bidder shall furnish evidence of comprehensive general liability insurance in the minimum amount of $2,000,000 to provide protection from any and all claims that may arise from the supplier's supply, shipping, installation, removal and reactivation/disposal of the spent carbon.

e. Field Service personnel performing the exchange must be directly employed by the bidder.

f. Bidder's virgin and reactivation manufacturing processes shall produce NSF/ANSI 61 certified products.

g. Failure to comply with any of the above qualification requirements shall be considered non–responsive and bid will be rejected.

5. PRODUCT SPECIFICATION – VIRGIN GAC

The bidder shall supply 100% virgin GAC for the initial fill of the filters. The virgin GAC

shall meet the following specifications:

a. Virgin GAC shall be (INSERT MODEL) as manufactured by Calgon Carbon Corporation or Approved Equal.

b. The coal shall be mined and the corresponding GAC manufactured in the United States of America. (*alternately, the following language may be substituted as required:* The coal shall be mined and the corresponding GAC manufactured in a nation which is a signatory to the World Trade Organization plurilateral Agreement on Government Procurement (GPA))

c. The GAC product designated by the Bidder as the material to be supplied for this bid shall have five (5) years of history of use in municipal drinking water facilities in North America. Bidder shall submit references per Section 7.

d. The GAC shall be manufactured in a facility certified to conform to the Management System Standard: ISO 9001:2000 or later quality standards and at the specific plant or site holding such certification. A copy of the valid certificate must be submitted with bid, with the understanding by all parties that ANSI/NSF assures the GAC against toxicological hazards only. ISO 9001:2000 or later certification assures the GAC of consistent conformance to stated product quality and standards listed in the specifications.

e. The GAC shall comply with AWWA B604, latest edition.

f. The GAC shall conform to the requirements of the NSF/ANSI 61 Drinking Water System Components – Health Effects standard.

g. The GAC shall comply with the requirements for activated carbon as defined by the Food Chemical Codex (FCC)' latest edition, as published by the U.S. Pharmacopeia.

h. The GAC must be a 100% reagglomerated bituminous coal based product, sized to a granular form prior to thermal activation. The following materials shall not be accepted if submitted in lieu of the required product, nor may any amount of these materials be blended into a mix with the required reagglomerated, bituminous coal-based product:

    a. Broken pellets, regardless of base material

    b. Direct activated GAC, regardless of base material

    c. Lignite-based GAC

    d. Peat-based GAC

    e. Wood-based GAC

    f. Coconut-based GAC

    g. Sub-bituminous based GAC

    h. Anthracite based GAC

i. The GAC shall be capable of removing color, tastes, odors and other organic contamination from previously pretreated water by conventional treatment processes.

j. Bidder shall indicate the source of coal, carbon manufacturing location, a description of the reagglomeration/thermal process and capacity of the manufacturing facility. The (Engineer/City) reserves the right to inspect the GAC manufacturing and thermal processing facility.

k. Product as packaged (confirmed by pre-shipment sample testing) shall meet the following specifications:

Product Specification: (INSERT MODEL)	**Value**	**Test Method**
Iodine Number (mg/g), min.		ASTM D4607
Moisture, weight %, max.		ASTM D2867
Effective size, mm		ASTM D2862
Uniformity Coefficient, max.		ASTM D2862
Abrasion No., min.		AWWA B604
Trace Capacity Number, (mg/cc), min.		TM-79, TM-85 (converted to TCN)
Screen Size (US Sieve), weight %		
* Larger than No. 8, max.		ASTM D2862
* Smaller than No. 30, max.		ASTM D2862
Typical Property		
Apparent Density, g/cc, min.		ASTM D2854
Ash		ASTM D2866
Water Extractables		AWWA B604
Non-Wettable		AWWA B604

l. The Certificate of Analysis shall certify that the GAC sample shipped to the site is 100% virgin carbon and in full compliance with the specifications stated herein. Failure to comply shall be considered non–responsive and the GAC shall be rejected.

6. POST-DELIVERY SAMPLES

a. After delivery to the site, but before GAC installation occurs, the Engineer may take random samples of each media prior to loading of the GAC into the filters.

   i. Sieve analysis may be performed on each sample by a laboratory selected by the Engineer.

   ii. Additional tests may be performed on the GAC including, but not limited to, iodine, ash, and apparent density.

   iii. This testing shall be for informational and record purposes only.

   iv. Costs for sample testing shall be borne by the Engineer.

   v. Number of samples taken shall be determined by the Engineer.

b. “In-situ” samples after installation of GAC into filters/vessels may be taken as directed by the Engineer.

i. Such in-situ samples are not to be considered representative of the GAC installed due to inherent inaccuracies involved in sampling from filters and vessels.

ii. Any test results obtained from testing of in-situ samples shall be for informational and record purposes only.

iii. Costs for sample testing shall be borne by the Engineer.

iv. Number of samples taken shall be determined by the Engineer.

7. REFERENCES

a. Should the bidder not be the current supplier, bidder must provide three (3) references for which the bidder has provided services as noted above. All information requested must be filled in. Failure to provide the information requested will be considered non-responsive and the bid rejected.

Account #1: _____

City/State: _____

Contact: _____

Phone No.: _____

GAC Supplied: _____
Carbon Transfer Service Provided: Yes/ No
Laboratory Service Provided: Yes/ No

Account #2: _____

City/State: _____

Contact: _____

Phone No.: _____
GAC Supplied: _____

Carbon Transfer Service Provided: Yes/ No
Laboratory Service Provided: Yes/ No

Account #3: _____

City/State: _____

Contact: _____

Phone No.: _____

GAC Supplied: _____
Carbon Transfer Service Provided: Yes/ No
Laboratory Service Provided: Yes/ No

8. CARBON EXCHANGE PROCEDURES

a. Field Service personnel performing the GAC exchange must be directly employed by the manufacturer of the GAC having a minimum of 5 years experience in performing carbon exchanges. Performance of the GAC exchange by a third party or sub-contractor shall not be allowed.

b. Bidder shall submit resumes of supervisors capable of performing carbon installations, indicating qualifications, years of experience and location.

c. Bidder shall submit a detailed carbon exchange procedure.

d. The preferred method for spent GAC removal shall be hydraulic eduction. City shall be responsible for water and air supply.

e. GAC shall be transported, delivered and placed in a careful manner to exclude all dust, dirt or deleterious material and to prevent physical damage to the particles.

f. Failure to provide the information requested will be considered non-responsive and the bid rejected.

9. FILTER/ VESSEL DATA (City/Engineer to insert information)

Filter/ Vessel Design	
Number of Filters	
Filter Dimensions (LxWxD)	
Number of Cells/Filter	
Cell Dimension (LxWxD)	
Backwash and Drain Volume (cu. Ft.)	
Drain to Waste (dia.)	
Total Existing GAC Volume (cu. Ft.)	

MANDATORY PRE-BID SITE INSPECTION SIGNOFF

I hereby certify that _____ from
(Individual's name)

_____ has visited the site(s) necessary for
(Prospective Bidder's Company)

the fulfillment of this bid and has demonstrated his/her ability to be able to provide the technical services associated with this bid.

_____	_____
(Company)	(Eng/City)
_____	_____
(Signature)	(Signature)
_____	_____
(Title)	(Title)
_____	_____
(Date)	(Date)

PRICING

Bidder is to provide a simple unit price including product cost, delivery cost, and all services related to the removal and disposal of spent GAC and installation of virgin GAC.

All unit prices and all lump sum prices in the bid proposal shall include all applicable fees, cost and taxes (if any) related to the project. The successful bidder will not be responsible for real property tax on the property, including the site of the project in addition to local taxes assessed

By submitting a unit price and entering into a contract, the bidder agrees to abide by all the criteria set forth in this bid for a period of time as set forth in the contract. Failure to do so will result in the original contract being voided and an award will be made to the next lowest responsible bidder.

Lump Sum Pricing:

Product Name	
Price per pound in place	
Total lump sum	

Optional – Monthly payment over _____ month period:

Product Name	
Monthly Payment	
Total Payment	

Bidder's Contact Information:

Primary Contact	
Phone Number	
Primary Customer Service Contact	
Phone Number	

11

ITEM #11

MEMORANDUM

To: Board of Directors February 26, 2016

From: Drew McIntyre, Assistant General Manager/Chief Engineer

Subject: North Bay Water Reuse Authority Board Meeting – January 25, 2016

R:\Folders by Job No\7000 jobs\7127\Board Memos\7127 NBRWA Update 1_25_16.doc

RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: None

Supplemental information is provided as follows using item numbers referenced in the attached meeting agenda and draft minutes (Attachment 1).

2. Roll Call

NMWD Board was represented by Director Schoonover.

7. Financial Report for the Period Ending December 31, 2015

The program manager reports that all budget items are tracking normally six months into the FY15/16 budget. Discretionary expenses to date total $10,514 for meeting room rentals and Federal/State Congressional tour expenses. Associate member dues are used for these expenses (current Associate Members are: Marin Municipal Water District, Marin County and City of American Canyon). Associate member dues are currently $5,000 per year. An additional $500 was authorized for sponsorship of the 2016 WaterReuse California Annual Conference in Santa Rosa March 13-15. There was also a discussion on pending cost increases primarily related to expanded work for Phase 2 activities. A revised two-year budget will be discussed at future meetings prior to approval of said budget at the April 25, 2016 NBWRA Board meeting.

8. Program Development, Federal, and State Advocacy Reports

The attached meeting minutes appropriately summarize the key actions at both the federal level with Ginger Bryant and state level with Pilar Onate-Quintana. Pilar has organized another NBWRA State capitol visit for March 9, 2016. Director Baker, NMWD's alternate Board member, will be attending this meeting.

9. Outreach Program Update

As a sponsor, NBWRA will have a booth at the annual WateReuse conference in Santa Rosa from March 13-15. I have volunteered to participate in staffing this booth and will be providing an overview of NMWD's recycled water projects.

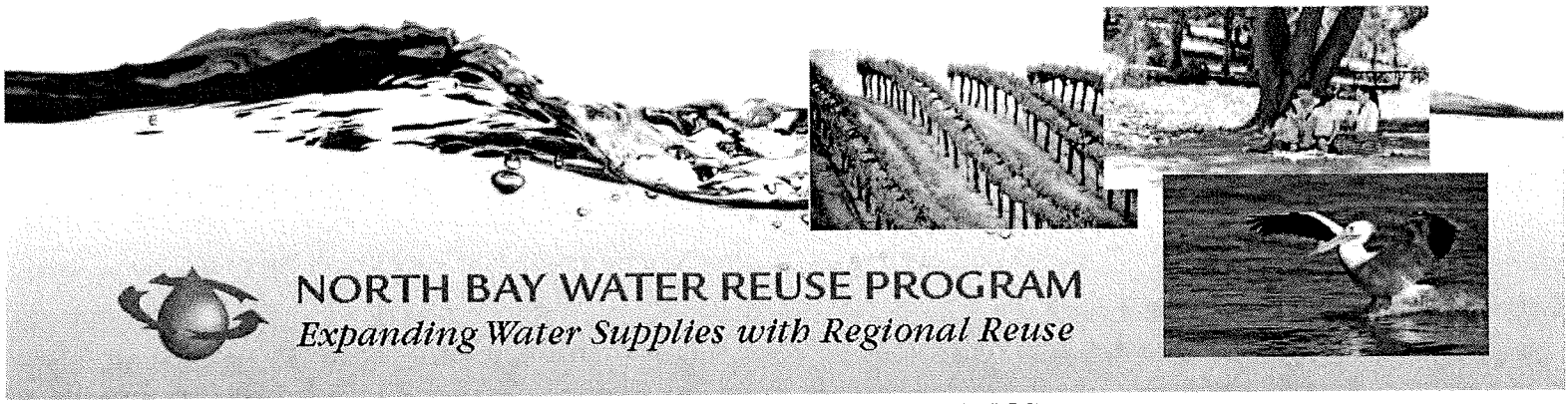
11. Approve Final List of Phase 2 Projects

The final list of Phase 2 projects was unanimously approved by the Board. This list is provided as Attachment 2 and will serve as the basis for development of the Phase 2 Feasibility Report by Brown and Caldwell.

12. NBWRA Beyond Phase 2

As the meeting minutes identify, there are ongoing discussions about expanding NBWRA beyond Phase 2. Additional water management projects are proposed to include groundwater management, storage and floodplain management (some of which are already included in Phase 2 projects shown in Attachment 2). This expanded NBWRA role may result in additional member agencies from other water and wastewater agencies, counties, cities, nonprofit organizations and resource conservation districts (among others).

This expanded role beyond strictly recycled water would also require modifications to the MOU and will be an on-going topic of discussion at the next NBWRA Board meeting on March 28, 2016. Proposed changes to the MOU purpose and objectives are identified in highlighted/strikeout mode in Attachment 3. As NBWRA continues to discuss its future and expanding roles, NMWD staff is still recommending that NMWD stay focused on completing Phase 1 projects and, once completed, transition to an associate level membership in support of NBWRA.



NORTH BAY WATER REUSE PROGRAM

Expanding Water Supplies with Regional Reuse

BOARD OF DIRECTORS MEETING

AGENDA

Monday, January 25, 2016
9:30 A.M.

Novato City Hall Council Chambers
901 Sherman Avenue, Novato, CA 94945

Consultants unable to attend in person may call in: Phone: +1 (602) 567-4030 Access code: 1980; *https://conferencing.brwncald.com/conference/1980*

1. **Call to Order (1 minute)**

2. **Roll Call (1 minutes)**

3. **Public Comment (3 minutes)**
(Any member of the public may address the Board at the commencement of the meeting on any matter within the jurisdiction of the Board. This should not relate to any item on the agenda. It is the policy of the Authority that each person addressing the Board limit their presentation to three minutes. Any member of the public desiring to provide comments to the Board on an agenda item should do so at the time the item is considered. It is the policy of the Authority that oral comments be limited to three minutes per individual or ten minutes for an organization. Speaker's cards will be available in the Boardroom and are to be completed prior to speaking.)

4. **Introductions (2 minutes)**

Action **Pages 3 - 6**

5. **Board Meeting Minutes of December 14, 2015 (1 minute)**
(The Board will consider approving the minutes from the December 14, 2015 Board meeting.)

Information **Pages 7 - 12**

6. **Report from the Program Manager (2 minutes)**
6.a Consultant Progress Reports
(The Board will review the Report from the Program Manager and Consultant Progress Reports.)

Information **Pages 13 - 23**

7. **Financial Report for the Period Ending December 31, 2015 (5 minutes)**
(The Board will review the financial report for the period ending November 30, 2015.)

Information	**8.**	**Program Development, Federal, and State Advocacy Status Reports (20 minutes)** (The Board will be updated on the status of Program Development, Federal Advocacy, and State Advocacy.)
Information	**9.**	**Outreach Program Update (5 minutes)** (The Board will be updated on the Outreach Program.)
Information **Pages 24 -25**	**10.**	**Engineering, Environmental, and Public Involvement Services Report (5 minutes)** (The Board will be updated on the Engineering, Environmental, and Public Involvement Services Report.)
Action **Page 26**	**11.**	**Approve Final List of Phase 2 Projects (3 minutes)** (The Board will consider approving the Final List of Phase 2 Projects and associated activities.)
Discussion **Pages 27 - 56**	**12.**	**Joint Board and TAC Work Session: NBWRA Beyond Phase 2 (45 minutes)** (The Board and TAC will hold a work session focusing on Alternatives for Engagement and Participation.)
Action **Page 57**	**13.**	**Consider the Continuation of Joint Board and TAC meetings and Workshops through the Remainder of FY2015/16 (5 minutes)** (The Board will consider the continuation of Joint Board and TAC Meetings and Workshops through the remainder of FY2015/16.
	14.	**Adjournment (1 minute)**

Next Board Meeting
Monday, March 28, 2016, 9:30 A. M. Novato City Hall Council Chambers

(In compliance with the Americans with Disabilities Act of 1990, if you need special assistance to participate in a Board meeting, or you need a copy of the agenda, or the agenda packet, in an appropriate alternative format, please contact the Program Manager at (510) 410-5923. Notification of at least 48 hours prior to the meeting or time when services are needed will assist in assuring that reasonable arrangements can be made to provide accessibility to the meeting or service. A copy of all the documents constituting the agenda packet is available for public inspection prior to the meeting at 500 Davidson Street, Novato, CA 94945. Any person may request that a copy of the agenda or the agenda packet be mailed to them for a fee of $.10 per page plus actual mailing costs. If you wish to request such a mailing, please contact Chuck Weir, Weir Technical Services, 3026 Ferndale Court, Pleasanton, CA 94588, 510-410-5923, chuckweir@sbcglobal.net. The agenda for each meeting is also available on-line at www.nbwra.org and will be available at the meeting.)

North Bay Water Reuse Authority
Board of Directors Meeting
Minutes
January 25, 2016

1. Call to Order

Chair Rabbitt called the meeting to order at 9:41 a.m. on Monday, January 25, 2016 at the Novato City Hall Council Chambers, 901 Sherman Avenue, Novato, CA 94945. Consultants and others who were unable to attend participated via telephone, 1 (602) 567-4030, passcode 1980; https://conferencing.brwncald.com/conference/1980.

2. Roll Call

PRESENT:	David Rabbitt, Chair	Sonoma County Water Agency
	Bill Long, Vice Chair	Novato Sanitary District
	Keith Caldwell	Napa County
	Jack Gibson	Marin Municipal Water District
	Susan Gorin	Sonoma Valley County Sanitation District
	Tim Healy	Napa Sanitation District
	Susan McGuire	Las Gallinas Valley Sanitary District
	John Schoonover	North Marin Water District
	Leah Walker	City of Petaluma

ABSENT: Marin County, City of American Canyon

OTHERS PRESENT:	Chuck Weir, Program Manager	Weir Technical Services
	Jack Baker	North Marin Water District
	Kevin Booker	Sonoma County Water Agency
	Ginger Bryant	Bryant & Associates
	Grant Davis	Sonoma County Water District
	Robin Gordon	Data Instincts
	Pam Jeane	Sonoma County Valley Sanitation District
	Sandeep Karkal	Novato Sanitary District
	Drew McIntyre	North Marin Water District
	Mark Millan	Data Instincts
	Phillip Miller	Napa County
	Pilar Oñate-Quintana	The Oñate Group
	Jim O'Toole	ESA
	Larry Russell	Marin Municipal Water District (by telephone)
	Mike Savage	Brown & Caldwell (by telephone)
	Jake Spaulding	Sonoma County Water Agency
	Jeff Tucker	Napa Sanitation District

3. Public Comments

There were no comments from the public

4. Introductions
Introductions were not made.

5. Board Meeting Minutes of December 14, 2015.
A motion by Director Schoonover, seconded by Director Gorin to approve the December 14, 2015 minutes was unanimously approved.

6. Report from the Program Manager
The Board reviewed the consultant progress reports for December 2015. The Program Manager highlighted the remaining agenda items.

a. Consultant Progress Reports
The Board reviewed the consultant progress reports for December 2015.

7. Financial Report for the Period Ending December 31, 2015
The Board reviewed the Financial Report and noted expenses for Fiscal Year 2015/16 are tracking within budget. Drew McIntyre inquired about the percent remaining column and the Program Manager indicated he would check and bring and updated version to the next meeting.

8. Program Development, Federal, and State Advocacy Update
Pilar Oñate-Quintana, discussed state issues. She highlighted activities in 2015, including: NBWRA Day in Sacramento 2015, draft guidelines for recycled water funding, activities with WateReuse, state legislative staff tour, state dynamics as related to federal efforts, and legislative efforts including SB163. She highlighted planned activities for 2016, including: March 9, 2016 NBWRA Day in Sacramento, NBWRA's letter on SB163, monitoring the introduction on new bills, budget negotiations, the Governor's efforts on the Delta tunnels, stormwater management funding, and possible changes in the Legislature as a result of the November election.

Ginger Bryant discussed program development and federal issues, including: how the Phase 2 list of projects has evolved from "purple pipe" projects to treatment, storage, environmental enhancement, distribution, groundwater management, and stormwater management; Phase 2 construction authorization; plans for Washington D.C. meetings; RE-Act activities; and RE-Act outreach to other western states.

Pilar Oñate-Quintana and Ginger Bryant gave an update on state and federal funding opportunities for Phase 2 projects, including: a possible State constitutional amendment to ease Proposition 218 restrictions; the Meral Bond; greenhouse gas funding; Title XVI and various WaterSMART grant programs; RIFIA loans through RE-ACT; WIFIA loans; and other loan programs through federal agencies such as EPA, USDA, FEMA, and the Economic Development Administration.

Chair Rabbitt discussed the White House Water Summit as part of World Water Day that took place during the recent Washington D.C. trip.

9. Outreach Program Update.
Mark Millan provided an update for the Board. He also discussed the upcoming WateReuse conference in Santa Rosa, March 13-15. NBWRA is a sponsor and there will be a booth featuring NBWRA's projects. NBWRA presentations will be on March 14, 2016.

10. NBWRP Engineering Report
Mike Savage discussed the final list of Phase 2 Projects that are to be considered by the Board for approval in Agenda Item No. 11 as well as the next activities.

11. Approve Final List of Phase 2 Projects
Director Caldwell noted that the MST projects would likely not be built as there were insufficient users. He wanted to make sure that cost sharing would be adjusted accordingly. Once the EIR/EIS is issued the cost sharing will be adjusted based on the final estimated costs of each agency's projects. Deletion of the MST projects from the Title XVI list would also allow other projects shown as non-Title XVI or Programmatic Level could be moved to the Title XVI list. A motion by Director Long, Seconded by Director Gorin to approve the Final List of Phase 2 Projects was unanimously approved.

12. Joint Board and TAC Work Session: NBWRA Beyond Phase 2
Ginger Bryant led the Board and TAC in a discussion of Alternatives for Engagement and Participation. She provided a summary from the December 14, 2015 Work Session, including possible changes to the Purpose and Objectives from the Memorandum of Understanding (MOU). There was discussion about the concept of not discharging to rivers or San Pablo Bay and how to accommodate that goal in the MOU without creating an opportunity for that becoming a mandate.

She then led a discussion of possible different levels of membership based on services received. She listed the various services, including: program development, technical support, public information support, grant support, technical analysis of projects, environmental support, program management, and lead agency administration. There was discussion regarding engaging other organizations not yet part of NBWRA. These could include water and wastewater agencies, counties, cities, non-profit organizations, and resource conservation districts, among others. It was agreed that changes to membership and cost sharing would require modifications to the MOU and that would be the primary topic of the March 28, 2016 meeting.

13. Consider the Continuation of Joint Board and TAC Meetings and Work Sessions through the Remainder of FY2015/16
At the December 14, 2015 meeting, the Board approved holding joint Board and TAC meetings and a Work Session at the March 28, 2016 meeting. The Board was asked to affirm that decision. A motion by Director Gorin, seconded by Director Long to hold joint Board and TAC meetings and a Work Session at the March 28, 2016 meeting was unanimously approved.

14. Adjournment
Chair Rabbitt adjourned the meeting at 11:32 a.m. The next meeting will be Monday, March 28, 2016 at 9:30 a.m. at Novato City Hall Council Chambers.

Minutes approved by the Board _____.

Charles V. Weir
Program Manager

Phase 2 Program

Agency	Project Type	Project Title	Total Project Capital Costs ($mil)	Title XVI Project Level EIR/ EIS		Non- Title XVI Project Level EIR/ EIS	Programmatic Level
Novato SD	Treatment	Novato SD WRP Capacity - 1st Expansion (+0.85 MGD)	$4.8	$4.8	$6.2		
		Novato SD WRP Capacity - 2nd Expansion (+0.85 MGD)	$4.8			$4.8	
	Seasonal Storage	Option 1: Site Near Highway 37 (Tertiary) 150 AF	$5.6				$5.6
		Option 2: Site Near Highway 37 (Secondary) 150 AF	$8.0				$8.0
		Option 3: Hamilton Site (Secondary) 150AF	$14.2				$14.2
	Environmental Enhancement	Marin County Lower Novato Creek Project - Distribution	$0.9	$0.9			
		Marin County Lower Novato Creek Project - Restoration	$21.5				$21.5
		Turnout to Transitional Wetlands	$0.6	$0.6			
SVCSD	Seasonal Storage	Option 1: Mulas Site (Tertiary) 49 AF	$2.4		$6.2		$2.4
		Option 2: Robledo Site (Tertiary) 49 AF	$2.6	$2.6			
	Distribution	Napa Road Pipeline	$3.6	$3.6			
SCWA	Groundwater Management	Valley of the Moon ASR	$3.4	$3.4	$7.0		
		Sonoma ASR	$3.6	$3.6			
		Sonoma Valley Groundwater Management and Recharge Study	TBD				TBD
Petaluma	Treatment	Increase ECWRF Capacity	$9.0	$9.0	$30.6		
	Seasonal Storage	Option 1a: Site Southeast of ECWRF (Secondary) 300 AF	$14.3				$14.3
		Option 1b: Site Southeast of ECWRF (Secondary) 150 AF	$7.3				$7.3
	Distribution	Urban Recycled Water Expansion	$11.4	$11.4			
		Agricultural Recycled Water Expansion Phase 1	$4.2	$4.2			
		Agricultural Recycled Water Expansion Phase 2	$6.0	$6.0			
		Agricultural Recycled Water Expansion Phase 3	$6.5				$6.5
Napa SD	Treatment	Soscol WRF Increased Filter Capacity	$2.2	$2.2	$33.2		
	Operational Storage	Additional Soscol WRF Covered Storage	$2.9	$2.9			
		Napa State Hospital Storage Tank	$7.4				$7.4
	Seasonal Storage	Option 1a: Raise Existing Pond Levees (Secondary) 300 AF	$9.9			$9.9	
		Option 1b: Raise Existing Pond Levees (Secondary) 1,100 AF	$30.2				
		Option 2: Somky Ranch Site (Secondary) 300 AF	$15.3				
		Option 3a: Jameson Ranch Site (Tertiary) 600 AF	$17.3	$17.3			
		Option 3b: Jameson Ranch Site (Tertiary) 300 AF	$11.8				
	Distribution	MST Northern Loop	$6.9	$6.9			
		MST Eastern Extension	$3.9	$3.9			
			$242	$83	$83	$15	$87

ATTACHMENT 2

ORIGINAL

Purpose. The purpose of NBWRA is to provide recycled water for agricultural, urban, and environmental uses thereby reducing reliance on local and imported surface water and groundwater supplies and reducing the amount of treated effluent released to San Pablo Bay and its tributaries.

Objectives. NBWRA projects will promote the expanded beneficial use of recycled water in the North Bay Region to:
(a) Offset urban and agricultural demands on surface water and groundwater supplies;
(b) Enhance local and regional ecosystems;
(c) Improve local and regional water supply reliability;
(d) Maintain and protect public health and safety;
(e) Promote sustainable practices;
(f) Give top priority to local needs for recycled water, and
(g) Implement recycled water facilities in an economically viable manner.

REDLINE VERSION

Purpose. The purpose of NBWRA is to ~~provide~~support recycled water ~~for~~and other related water management opportunities to benefit agricultural, urban, and environmental uses thereby reducing reliance on local and imported surface water and groundwater supplies~~ and reducing the amount of treated effluent released to San Pablo Bay and its tributaries~~.

Objectives. NBWRA projects will promote the expanded beneficial use of recycled water and other related water management opportunities in the North Bay Region to:
(a) Offset urban and agricultural demands on surface water and groundwater supplies;
(b) Enhance local and regional ecosystems;
(c) Improve local and regional water supply reliability;
(d) Maintain and protect public health and safety;
(e) Promote sustainable practices;
(f) ~~Give top priority to local needs for recycled water, and~~Maximize the development of recycled water projects to the extent practicable;
(~~f~~g) Implement ~~recycled water facilities~~the Program in an economically viable manner.

12

NOTICE OF MEETING OF
NORTH BAY WATERSHED ASSOCIATION

Notice is hereby given that a meeting of the North Bay Watershed Association will be held as follows:

Date: Friday, March 4, 2016
Time: 9:30 a.m. – 11:30 a.m.
Location: Novato Sanitary District
500 Davidson Street, Novato Ca. 94945

AGENDA Item and Recommendation

1. Call to Order (Jack Gibson, Chair) 9:30

2. Public Comment
3. Approval of the Agenda (1 min.) *Approve*
4. Approval of Minutes (5 min) *Approve*
5. Treasurer's Report *handout* (1 min.) *Accept*

6. ***Surviving the Storm***-the Bay Area Council looks at storm damage potential in the region. *Information* 9:40

   Adrian Covert, Policy Director, Bay Area Council

7. **Proposed Stormwater/trash Project** *Approve* 10:20

   Judy Kelly, NBWA Executive Director.

   Terry Flashing, DPW Marin County

8. **NBWA 2016-17 Budget.** *Approve* 10:50

   Judy Kelly, NBWA Executive Director

9. Items of Interest 11:20

10. Items for next agenda 11:25

Next Meeting Information: [Due to April 22 NBWA conference there will be no April NBWA Board meeting]

May 6, 2016
Marin Community Foundation
5 Hamilton Landing, Novato CA 94949

NORTH BAY WATERSHED ASSOCIATION

Minutes for the meeting of the North Bay Watershed Association (NBWA) Board of Directors.

Date: February 5, 2015
Time: 9:30 a.m.
Location: Petaluma (Lucchesi) Community Ctr., 320 N. McDowell Blvd., Petaluma, CA 94954-Conf. Rm. 2

Directors Present:

Board Member	Agency/Organization	Board Member	Agency/Organization
Jack Baker	North Marin Water District	Damon Connolly	County of Marin
Keith Caldwell	Napa Sanitation District	Madolyn Agrimonti	City of Sonoma
Judy Schriebman	Las Gallinas Valley Sanitary District	Paul Jensen	City of San Rafael
Brant Miller	Novato Sanitary District	Pam Drew	City of Novato
Jack Gibson	Marin Municipal Water District	Michael Boorstein	Ross Valley Sanitary District
Mike Healy	City of Petaluma	Sandeep Karkal	Novato Sanitary District
Adrian Cormier	Bel Marine Keys Community Services District	Frank Egger	Central Marin Sanitation Agency

Directors present represented 14 out of the 18 agencies signatory to the Association MOU.

Board Actions:

1. **Call to Order.** Jack Gibson, Chair, called the meeting to order at 9:33 a.m and introductions followed.

2. **Public Comment.** None.

3. **Approval of the Agenda.** (See Handout) The Board unanimously approved the agenda.

4. **Approval of the Minutes of the Board Meeting held January 8, 2016.** (See Handout) The Minutes of the Board Meeting held on January 8, 2015 were unanimously approved.

5. **Treasurer's Report.** (See Handout) The Treasurer's Report was accepted as presented by Judy Kelly.

6. **Game of Floods**. Chris Choo, Marin County Public Works, provided a PowerPoint about the background on Game of Floods. She then introduced Roger Leventhal, Marin County Flood Control, who discussed the elements of the "game". Roger explained the game arouse out of Marin's shoreline vulnerability study which includes a vulnerability assessment and adaptation options. Roger described the three major adaptation strategies and components for flood and sea level rise adaptation as 1) protection, 2) accommodation, and 3) managed retreat. Roger walked through a number of examples of protection options both hard (sea walls, levees, flood wall & pump station, tidal gates) and soft (horizontal ecotone levees, wetland/shoreline vegetation, tidal wetlands and eco levees, engineered beaches, offshore structures) and presented pros and cons for each. Roger also covered infrastructure and lifestyle changes with a number of examples (elevate buildings, floodable development, new elevated roads). He then presented some cost estimates for the various options. Roger explained how the Game of Floods has been presented and played in Marin County and talked about the latest version that shows a game board called the "North Bay Island". Chris described the communities on the island, game steps, and approach to costs that would be used in the game. [See posted presentation for details]. The NBWA Board members then split into three groups -- with Chris Choo, Roger Leventhal, Greg Andrew, and Caitlin Cornwall facilitating -- and spent the following hour debating responses to the flood risks identified on the map [i.e. the game board for the Game of Floods]. Members discussed areas of risk and what approaches could be applied to reduce risk. Each of the three teams approached the game from a slightly different perspective but discussion was lively within each group. At the end of the hour, each of the three groups reported out on their team's approach and lessons learned. All three groups arrived at consensus approaches. Groups noted the surprising complexity of the alternatives and the need to move thoughtfully through decision-making. Costs for solutions ranged from $120 million to nearly a billion dollars depending on the solutions applied to each risk area. All remarked that while "real life" situations in the North Bay could be inferred from the map, it was better to have a theoretical place to attend to as it made decision-making for purposes of the game more dispassionate. Roger and Chris encourage the Board members to follow up within their own agencies and set up a game workshop locally. The game board, the pieces, and instructions are downloadable from www.MarinSLR.org.

7. **Items for Next Agenda.**

* Trash/Stormwater project proposal for NBWA funding
* Surviving the Storm – Adrian Covert, Policy Director, Bay Area Council
* 2016-2017 Budget review and approval

Jack Gibson, Chair, adjourned the meeting at 11:27 a.m.

SUBJECT TO BOARD APPROVAL
Submitted By: Judy Kelly,
Executive Director

NEXT MEETING INFORMATION:
March 4 – Novato Sanitary District
500 Davidson St. Novato, CA 94945

North Bay Watershed Association (NBWA) Regional Project Proposal

Project Title: Bay Area Stormwater Management Agencies (BASMAA) Phase II Committee Trash Amendments Planning Project

Introduction:
The Statewide Trash Amendments[1] were adopted on April 7, 2015[2] by the State Water Resources Control Board (State Water Board). In FY 2018 it is expected that the State Water Board will incorporate the Trash Amendments trash reduction requirements into the next iteration of the National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) Permit (Phase II Permit). This will require each North Bay Phase II Permittee to comply with the Trash Amendments within 10 years from the effective date of the reissued Phase II Permit (~2028 – ~2030). Permittees are given the option of two (2) compliance tracks:

1. Track 1: Install, operate, and maintain full trash capture devices to capture all trash 5mm and greater in the municipally-owned storm drain network within commercial, industrial, mixed use, and high density residential priority land use areas and immediately down-stream of bus stations and bus stops ; or,

2. Track 2: Install, operate, and maintain any combination of full trash capture systems, multi-benefit projects, other treatment controls, and/or institutional controls to achieve Full Capture System Equivalency. Required to install full trash capture systems where feasible.

Permittees choosing Track 2 implementation requirements will each need to submit a Trash Reduction Implementation Plan (Track 2 Plan) by ~October 2017 (based on current information from the State). The Track 2 Plan must be designed to achieve interim milestones to demonstrate progress to full implementation. Permittees choosing Track 1 are not required to submit a plan but must demonstrate achievement of interim milestones such as an average of ten (10%) of the full capture systems installed every year or other progress to full implementation. Track 1 permittees in the North Bay will prepare local trash capture device installation and maintenance plans. At this time, most BASMAA Phase II Permittees are planning to implement Track 2.

On behalf of its Phase II Committee, the Bay Area Stormwater Management Agencies Association (BASMAA) released a Request for Proposals (RFP) to perform planning and

[1] Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to Control Trash and Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (ISWEBE Plan). Together, they are collectively termed as "the Trash Amendments". The provisions in the Trash Amendments include the following six elements: (1) water quality objective, (2) applicability, (3) prohibition of discharge, (4) implementation provisions, (5) time schedule, and (6) monitoring and reporting requirements.
[2] The Trash Amendments went into effect in December 2015 after they were approved by the Environmental Protection Agency and the Office of Administrative Law.

compliance tasks in response to the Trash Amendments and in anticipation of forthcoming trash reduction requirements in the Phase II Permit. The BASMAA RFP review committee received and scored three proposals and recommended the proposal from EOA, Inc. and Geosyntech Consultants to the BASMAA Board of Directors. The BASMAA Board approved the recommendation and has begun contract negotiations with EOA, Inc. and is working on finalizing the *BASMAA Phase II Committee Trash Amendments Planning Project* (Project) Scope of Work and total project cost. The Project will assist the 23 of the 24 BASMAA Phase II Permittees[3] with planning and compliance tasks that will also support future grant applications to fund the installation of full trash capture systems and other trash management or control activities (County of Solano is electing to not participate in the project). The anticipated total cost of the project will be $162,048.

The BASMAA Phase II Committee requests funding from the North Bay Watershed Association in the amount of $30,293 to pay for a portion of the Project described in the Scope of Work below. By supporting the project, the North Bay Watershed Association will assist the majority of North Bay Phase II Permittees to complete Trash Amendments compliance and planning tasks. Specifically, NBWA funds would cover the cost of Task 1 in its entirety and Task 2.2. The remaining funding for the project will be provided by the participating agencies. Tasks 1 and Task 2.2 will benefit each participating agency equally.

Project Team: BASMAA Phase II Committee Trash Work Group members[4]

Collaborative Partners: BASMAA Phase II Committee: Marin's cities, towns and County of Marin through Marin County Stormwater Pollution Prevention Program (MCSTOPPP); Napa's cities, towns and County of Napa through Napa Countywide Stormwater Pollution Prevention Program (NCSPPP); Sonoma County Water Agency, Sonoma's cities and towns, and a portion of the County of Sonoma draining to the San Francisco Bay; and City of Benicia.

Timing: Complete tasks by October 2016, with milestones identified in the Schedule of Completion below.

Request to NBWA: $30,293
Match: $131,755
Total Project Budget: $162,048

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[3] The 23 Permittees are: from the Marin County Stormwater Pollution Prevention Program (County of Marin, Cities of Belvedere, Larkspur, Mill Valley, Novato, San Rafael and Sausalito and Towns of Corte Madera, Fairfax, Ross, San Anselmo, and Tiburon), from the Napa Countywide Stormwater Pollution Prevention Program (County of Napa, City of American Canyon, City of Calistoga, City of Napa, City of St. Helena, Town of Yountville), County of Sonoma, City of Sonoma, City of Petaluma, Sonoma County Water Agency, and City of Benicia.

[4] Terri Fashing and Howard Bunce (Marin County Stormwater Pollution Prevention Program); Rob Carson (County of Marin); Will Stockard (County of Sonoma); Jamison Crosby (Napa Countywide Stormwater Pollution Prevention Program); and Gerardo Medez (City of Napa).

Products: The written materials will identify NBWA and agencies providing match (in-kind services) as project sponsors. Project deliverables are summarized below in the Scope of Work and in the Schedule of Completion.

Summary of Proposed Draft Scope of Work (to be considered for adoption by the BASMAA Board of Directors March 24, 2016)

TASK 1 – **PROPOSED NBWA FUNDED TASK** - COMPLIANCE FRAMEWORK AND FULL CAPTURE EQUIVALENCY APPROACH

1.1. **Develop Compliance Road Map Technical Memorandum (Memo #1)** – CONSULTANT will prepare a technical memorandum outlining and describing the steps that Permittees will need to take to comply with Trash Amendment requirements.

1.2. **Initial Meetings with Program and Permittee Representatives** – The Project Team will meet with Program and Permittee representatives at two initial introductory meetings (one in Napa, one in Marin) to discuss the compliance road map (as outlined in Memo #1), including tasks that will need to be completed by the CONSULTANT and Permittees, and the proposed framework for complying with the trash amendment requirements, including an approach to demonstrating full capture equivalency. CONSULTANT will prepare and give a presentation at each initial meeting and solicit input at each meeting on the proposed approaches/framework.

1.3. **Develop DRAFT Trash Reduction Framework and Full Capture Equivalency Approach and Monitoring Plan Technical Memorandum (Draft Memo #2)** - Based on input provided at the initial meeting and building upon the information included in Memo #1, the CONSULTANT will develop a brief draft technical memorandum (Draft Memo #2) describing the draft framework for complying with trash reduction requirements and the approach to demonstrating full capture equivalency.

1.4. **Attend Meeting with Permitting Authority** – CONSULTANT will attend one meeting with the Permitting Authority (The Trash Amendments identify the State Water Resources Control Board as the Permitting Authority. However, it is likely that Regional Water Quality Control Board staff will participate in the meeting) and Program/Permittee staff to present and discuss the framework/approach and receive initial feedback. Comments provided in writing and verbally by the Permitting Authority will be incorporated into a Final Memorandum. The CONSULTANT will also assist in answering follow up questions from the Permitting Authority as needed.

1.5. **Develop FINAL Trash Reduction Framework and Full Capture Equivalency Approach Technical Memorandum (Final Memo #2)** – The CONSULTANT will then develop a final memorandum (Final Memo #2) describing the proposed trash reduction framework and full capture equivalency approach.

TASK 2 – BASELINE TRASH GENERATION MAPS

2.1. **Develop Preliminary Baseline Trash Loading Estimates and Generation Maps (Map #1)** - Utilizing the baseline trash generation rates and quantitative model developed by the CONSULTANT for the *BASMAA Regional Trash Generation Rates Project*, the CONSULTANT will develop a preliminary baseline trash load estimate for priority land uses in each Permittee's jurisdiction.

2.2. **PROPOSED NBWA FUNDED TASK - Develop Guidance on Revising Baseline Trash Generation Maps (Memo #3)** - To assist in tailoring trash generation maps and prioritizing trash controls in areas where significant trash generation occurs, the CONSUTLANT will develop guidance for Permittees to use when revising their preliminary baseline trash generation maps developed in Task 2.1. Methods to revise baseline generation rates for priority land use areas depicted on the preliminary maps, and to identify areas outside of priority land uses that are trash problem areas will be included in the memo. Methods will be similar to those successfully used by Bay Area Phase I communities to establish baseline trash generation maps. The CONSULTANT will also provide a spreadsheet for tracking revisions to maps and documenting information used to refine trash generation rates for land areas.

2.3. **Meet with Permittees to Refine Baseline Maps** – CONSULTANT will meet with each Permittee to review proposed refinements to trash generation maps and discuss implications of map revisions.

2.4. **Develop Revised Baseline Trash Loading Estimates and Generation Maps (Map #2)**

TASK 3 – OPTIMAL FULL CAPTURE SYSTEM LOCATIONS

3.1 **Identify Optimal Full Capture Locations (Map #3) and Estimate % Progress (Memo #4)** – Based on the Revised Trash Generation Maps developed in Task 2.4 and the structure of the stormwater conveyance systems, the CONSULTANT will conduct a desktop analysis and identify optimal locations for full trash capture devices for each Permittee.

TASK 4 – IMPLEMENTATION PLANNING TOOLS

4.1 **Implementation Plan Template (Template #1)** - The CONSULTANT will develop one draft and one final Trash Implementation Plan Template that will incorporate the trash reduction framework, full capture equivalency approach and monitoring plan (developed in Task 1), and guidance on control measure implementation documentation.

4.2 **Full Capture O&M Plan Template (Template #2)** - The CONSULTANT will also develop one draft and one final Trash Full Capture Device Operations and Maintenance (O&M) Plan Template to assist Permittees in implementing adequate O&M programs.

4.3 **Tracking and Reporting Tools** - Trash load reduction tracking and reporting tools will also be developed by the CONSULTANT.

TASK 5 – ADDITIONAL ON-CALL TASKS

Upon request of the BASMAA Project Manager, the CONSULTANT will provide additional technical and regulatory support as the project budget allows. Tasks will be completed on an on-call basis, shall be tasks of regional benefit to the participating North Bay Phase II Permittees.

FEES AND PAYMENT

	Tasks	Total Cost Estimate
Task 1 - Compliance Framework and Full Capture Equivalency Approach		
1.1	Develop Compliance Road Map Technical Memorandum (Memo #1)	$ 5,365
1.2	Initial Meetings with Program and Permittee Representatives	$ 7,877
1.3	Develop DRAFT Trash Reduction Framework and Full Capture Equivalency Approach Technical Memorandum (Draft Memo #2)	$ 5,361
1.4	Attend Meeting with Permitting Authority	$ 2,452
1.5	Develop FINAL Trash Reduction Framework and Full Capture Equivalency Approach Technical Memorandum (Final Memo #2)	$ 4,281
		$ 25,336
Task 2 - Baseline Trash Generation Maps		
2.1	Develop Preliminary Baseline Trash Loading Estimates and Generation Maps (Map #1)	$ 11,468
2.2	Develop Guidance on Revising Baseline Trash Generation Maps (Memo #3)	$ 4,957
2.3	Meet with Permittees to Refine Baseline Maps	$ 15,717
2.4	Develop Revised Baseline Trash Loading Estimates and Generation Maps (Map #2)	$ 17,052
		$ 49,194
Task 3 - Optimal Full Capture System Locations		
3.1	Identify Optimal Full Capture Locations (Map #3) and Estimate % Progress (Memo #4)	$ 35,518
		$ 35,518
Task 4 - Implementation Planning Tools		
4.1	Implementation Plan Template (Template #1)	$ 12,937
4.2	Full Capture O&M Plan Template (Template #2)	$ 11,823
4.3	Tracking and Reporting Tools	$ 11,539
		$ 36,298
Task 5 - Additional On-Call Tasks		
5.1	On-call Services	$ 15,702
		$ 15,702
		$ 162,048

SCHEDULE OF COMPLETION

#	Task	Deliverable	Due Date
1.1	Develop Compliance Road Map	• Technical Memorandum #1	April 2016
1.2	Initial Meeting with Program and Permittee Representatives	• Meeting Presentation • Meeting Summary	April 2016
1.3	Develop DRAFT Trash Reduction Framework and Full Capture Equivalency Approach	• Draft Technical Memorandum #2	May 2016
1.4	Attend Meeting with Permitting Authority	• Meeting Presentation • Meeting Summary	May 2016
1.5	Develop FINAL Trash Reduction Framework and Full Capture Equivalency Approach	• Final Technical Memorandum #2	June 2016
2.1	Develop Preliminary Baseline Trash Loading Estimates and Generation Maps	• Baseline Loading Estimates • Trash Generation Maps #1	June 2016
2.2	Develop Guidance on Revising Baseline Trash Generation Maps	• Technical Memorandum #3 • Revisions Tracking Spreadsheet	June 2016
2.3	Meet with Permittees to Refine Baseline Maps	• Meeting Attendance	July 2016
2.4	Develop Revised Baseline Trash Loading Estimates and Generation Maps	• Revised Baseline Loading Estimate • Trash Generation Maps #2	July-August 2016
3.1	Identify Optimal Full Capture Locations and Estimate % Progress (Memo #4)	• Proposed Full Capture Maps #1 • Technical Memo #4	August 2016
4.1	Develop Implementation Plan Template	• Template #1	August 2016
4.2	Develop Full Capture O&M Plan Template	• Template #2	August 2016
4.3	Develop Tracking and Reporting Tools	• Tracking and Reporting Spreadsheet	September-October 2016
5.1	On-call Services	• To be determined	On-going

Updated 2/24/2016

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DISBURSEMENTS - DATED FEBRUARY 18, 2016

Date Prepared 2/16/16

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq	Payable To	For	Amount
4	101 Office Products	Quarterly Toner Supply: Black ($1,460) & Color ($298-Engineering)	$1,758.01
2	Able Tire & Brake	Tires (2) ('13 Vacuum Trailer) ($400), Tires (4) ('15 F250) ($934), Tires (4) ('08 F250) ($1,090)	2,424.04
3	Asbury Environmental Services	Used Oil Recycling (100gal)	45.00
4	AT&T	Voice Lines	57.83
5	AWWA CA-NV SEC	AWWA Conference Registration (3/21-3/24) Sacramento (McIntyre)	445.00
6	Bank of Marin	Bank of Marin Loan Principal & Interest (Pymt 52 of 240)	46,066.67
7	Bartley Pump	Replacement Pump End for Well #2-Pt Reyes	3,058.06
8	Borges & Mahoney	Monitor Module for Chlorine Leak Detector in STP Chlorine Building	1,471.85
9	Buck's Saw Service	Drive Shaft Hub Bushings (2), Air Filters (6), Sparkplugs (12), 18" Chain Saw Bar (2) ($96), Cut off Saw Air FIlters (3), Pre-Mix Gas (2 gal) & Spark Plug	377.67
10	California State Disbursement	Wage Assignment Order	859.87
11		Vision Reimbursement	129.00
12	Clipper Direct	Commuter Benefit Program (1)	23.00
13	Contractors State Lic Board	Contractor's License Renewal Fee (Arendell)	360.00
14	Diggs, James	Retiree Exp Reimb (February Health Ins)	306.09
15	Evoqua Water Technologies	Service on Deionization System	224.50

Seq	Payable To	For	Amount
16	Fisher Scientific	Sulfate, Bromide, Phosphorus (100 mL), Nitrite (120 mL), Calcium Carbonate, Nitric Acid, Lab Water Filter, Disinfectant Cleaner (1 gal) ($162), Glass Wool for Desiccant Retention, pH Probe Storage Solution, Buffer (16 liters), Cap (20), & Ethanol Pint Glass (200)	877.43
17	Ghilotti Construction	Refund of RW Load Security Deposit Less Charge for 8 Recycled Water Loads	10.00
18	Golden Gate Petroleum	Gear Oil (STP) ($3.64/gal) ($303), Tellus Oil (10 gal) ($171), Hydraulic Oil (10 gal) ($144) Off-Road Diesel for Generator (1.55/gal), Gas ($2.00/gal) & Diesel ($1.85/gal)	2,398.36
19	Grainger	Hand Sanitizer (4-20 oz bottles), Tape Measure, Knee Boots, Vacuum ($104), Microwave (STP) ($164), & Full Body Harness (3) ($748) (Maintenance)	1,215.98
20	Groeniger	Meter Stops (30) ($974), Double Check Valves (2), Hydrant Extension (5) ($289), & Nipples (2)	1,476.08
21	HCC Surety Group	Contractor's Bond for License (Arendell)	690.00
22	Holton, Nancy	Exp Reimb: Meet With Caltrans in Oakland to Review AEEP Invoices	55.56
23	Idexx Laboratories	Media to Test Coliforms (Lab)	2,483.79
24	Industrial Scientific	Gas Monitor Repair	434.39
25	International Fire	Replacement Fire Extinguisher ('08 Ford F350 4x4)	264.69
26	Irish & Son Welding	Welding Services	720.00
27		Cafeteria Plan: Uninsured Medical Reimbursement	111.65
28	Kessler, Sue	Retiree Exp Reimb (February Health Ins)	315.28
29	LGVSD	Recycled Water Deliveries (8.9 MG) (10/1-12/31/15)	14,128.77
30	Lincoln Life	Deferred Compensation PPE 2/15/16	13,839.26

Seq	Payable To	For	Amount
31	Marin County Ford	Lower Seat Foam Pad ('15 F250) ($201), Keys (2) ('15 F250), Mirror Assembly ('15 F250) ($465), Rear Brake Rotors ($321), Brake Pad Kit, & Rear Hub Oil Seals (2)	1,202.57
32	McLellan, WK	Misc Paving ($2,529), Restriping (Crest) ($630), (Wilson) ($420), & Traffic Control ($788)	4,367.57
33	Mello, John	Retiree Exp Reimb (February Health Ins)	949.78
34	Michael Paul Company	Refund of RW Load Security Deposit less charge for 1 Recycled Water Load	95.00
35	Minuteman Press	"Recycled Water" Signs (28)	403.47
36	Moore, Doug	Retiree Exp Reimb (February Health Ins)	949.78
37	MSC Industrial Supply	Utility Pump, Couplings (10)	294.90
38	Musco Excavators	Refund of RW Load Security Deposit less charge for 6 Recycled Water Loads	70.00
39	National Meter & Automation	1" Meters (45)	7,202.40
40	Nationwide Retirement Solutions	Deferred Compensation PPE 2/15/16	1,400.00
41	North Marin Auto Parts	Rags (60 lbs), Gloves (300), Grease, Motor Oil (24 qts), Masking Tape, Drive Belts for Sand Filter Pumps (8) ($193), Oil Filters (5), Air Filters (5), Wiper Blades (2), Track Bar ('08 F250), Diesel Engine Oil (14 gal), Cabin Air Filter (2), Wiper Blades (6), Transmission Fluid (4 qts), Elbow for Air Brake Piping (6), Trailer Wiring Kit, Spark Plugs (4), Brake Fluid (12 oz), Electric Brake Controller ($204), Nut Socket, Thread Lock Sealant, Belts for Sand Pumps (12) ($264)	1,705.30
42	North Bay Gas	Mig Welder Parts, Carbon Dioxide, Nitrogen, January Cylinder Rental	206.85
43	Novato Builders Supply	Concrete Nails (3lbs), Concrete (1 yd), & Lumber	216.52
44	Novato, City of	Street Excavation Moratorium Fee (1212 Lynwood Dr & Cambridge & Eldridge)	1,000.00
45	Novato Chevrolet	Keys (2)	14.34

Seq	Payable To	For	Amount
46	Office Depot	Quarterly Office Supply Order: Premium Paper (2), Message Stamps (4) ($33), Adding Machine Tape, Chair Mat ($98) (Solar), Post-it Notes (60) ($46), Colored Paper (7 reams) ($50), Pens (144) ($145), Sharpie Pens (108) ($98), Tri-Color Ink ($31), Desk Chair ($163) (Lemos), Lettering Tape (2), Pencil Sharpener, Desk Chair ($294) (Construction), Hanging Folders (50)($35) & Deposit Bag (5) (Cons Svc)	1,342.24
47	Pace Supply	Brass Pipe (20), Nipples (12) ($236), Elbows (20), 1" Copper Pipe (3,780') ($12,113), & 2" Couplings (3) ($252)	12,905.46
48	PG&E	Power: Bldgs/Yard ($3,822), Treatment ($216), Rectifier/Controls ($461), Pumping ($15,570), & Other ($122)	20,192.67
49	Pini Hardware	Ant Bait, PVC Pipe Fittings for Drains (STP), Shoe Covers (10), Hammer, Sealant for Warehouse Roof, Drywall Repair Materials for Office, Keys for Warehouse (10), Valve & Nipple, Motor Sensor Yard Light for Front Office, Large Trash Bags (STP), Light Bulbs, Copper Pipe & Fittings for STP, Air Filters, Air Filter, Misc Hardware (16), Dish Soap(14oz) (2), Pan, Screwdriver, Plier, & Ring Wax, Garden Hose (2), Plunger, Chain Coil, Cable, Rope Clips (7), Pipe Clamps (7), Angle Brackets (2), Irrigation Filters.	321.30
50	Scott, Lydia	Novato "Toilet" Rebate	200.00
51	Sequoia Safety Supply	Bandages (400), Vests (5), Wipes (100), & Earplugs (400)	287.55
52	Shirrell Consulting Services	January Dental Expense	4,059.50
53	Specified Fittings	Sunset Tank Chlorine Mixing System Inlet Manifold	13,048.74
54	Stafford, Vernon	Retiree Exp Reimb (February Health Ins)	315.28
55	State Water Resources Control	Water TP Operator Exam Fee (Jeff Corda) (T4) (Budget $0)	130.00
56		Cafeterial Plan: Uninsured Medical Reimbursement	756.56
57	Syar Industries	Asphalt (6 tons)	755.24

Seq	Payable To	For	Amount
58	Teeters & Schact	Repair Water Leaks Inside Passenger Compartment ('06 Chevy Colorado)	498.59
59	US Bank	Jan Safekeeping Fee-Treasury Securities	83.25
60	Van Bebber Bros	Access Hatch (Cabro Ct Tank)	228.30
61	Verizon California	Leased Line	86.97
62	Verizon Wireless	Cellular Charges: Data ($111), Airtime ($102) (19) & Replacement of Waterproof Phone for On-Call ($117)	330.94
63	White & Prescott	Progress Payment #2: Engineering Services: Slade Park Water Line Easement, Olompali Park Freeway Frontage, Fox Drive Water Line Easement (Balance Remaining on Contract $13,060)	3,170.00
64	Workforce Boots & Clothing	Safety Boots (Barrilleaux)	194.84
65	ZFA Structural Engineers	Fox Drive Bridge Water Pipe Addition Drawing Delivery Charge	14.48
		TOTAL DISBURSEMENTS	**$175,628.22**

The foregoing payroll and accounts payable vouchers totaling $175,628.22 are hereby approved and authorized for payment.

Auditor-Controller 2/16/16 Date

General Manager 2/16/2016 Date

DISBURSEMENTS - DATED FEBRUARY 25, 2016

Date Prepared 2/25/16

The following demands made against the District are listed for approval and authorization for payment in accordance with Section 31302 of the California Water Code, being a part of the California Water District Law:

Seq No.	Payable To	For	Amount
P/R*	Employees	Net Payroll PPE 2/15/16	$123,197.25
EFT*	US Bank	Federal & FICA Taxes PPE 2/15/16	55,554.76
EFT*	State of California	State Taxes & SDI PPE 2/15/16	9,821.00
EFT*	CalPERS	Pension Contribution PPE 2/15/16	32,505.81
1	Able Tire & Brake	Tires (4) ('05 Honda Civic) ($558), Flat Tire Repair ('10 Ford F150 4x4)	589.36
2	Alpha Analytical Labs	Lab Testing	131.00
3	AT&T	Leased Lines	66.58
4	Automation Direct	PLC Power Supply for STP Spare Pressure Transducer	210.00
5	Building Supply Center	Lumber, Brackets & Screws	63.89
6	Casabonne, Daniel	Refund Overpayment on Closed Account	18.80
7	CDW-Government	PLC Battery Backup for O.M. Tahiti Way P/S	119.03
8	Clark, Robert E.	Exp Reimb: AWWA Conference Registration in Sacramento (3/24-3/26)	555.00
9	Comcast	Feb Office Internet Connection	153.38
10	CSW/Stuber-Stroeh Engineering	Progress Pymt#35: Marin Sonoma Narrows AEEP Project (Balance Remaining on Contract $35,809)	11,688.50
11	Deckelman, R.	Refund Overpayment on Closed Account	41.20
12	Farwest Corrosion Control	Holiday Detector Kit (Engineering Dept)	4,385.09
13	Fisher Scientific	Potassium Chloride Solution, Fluoride (120 ml), Fiber Filter ($127), Pipete Tips (200) ($120), Iron Solution, Iron Standard Evaporation Dishes for Solids Analysis ($104), Reagent Refill ($192), Nitrate (100 ml), Reagent & Sulfuric Acid, Calcium Carbonate ($140), Reagent, Sodium (500 ml), Pipete ($289)	1,333.78

*Prepaid

Seq No.	Payable To	For	Amount
14	GFS Chemicals	Turbidity Standard (STP)	408.26
15	Golden Gate Petroleum	Gas ($2.00/gal) & Diesel ($1.85/gal)	867.23
16	Grainger	Sump Pump	230.79
17	Harrington Industrial Plastics	Flaring Tool	210.75
18	InfoSend	January Processing Fee for Water Bills ($1,057) & Postage ($3,098)	4,155.72
19	Ladd, David	Exp Reimb: Coffee & Doughnuts for Backflow Training Session	57.70
20		Vision Reimbursement	18.41
21	McMaster-Carr Supply	Insulation for Hot Water Pipe	451.64
22	Neopost USA	Feb Postage Meter Rental, Ink Cartridge ($186) & Label Strips ($49) (1,200)	376.91
23	Novato Sanitary District	November Recycle Water Operating Expense (0.8 MG)	5,226.35
24	Office Depot	Expandable File Folder Pockets (75) ($151) & Staples, less credit for items returned ($70)	89.78
25	Pace Supply	Elbows (5) ($294), 2 1/2" Hydrant ($1,442), Garlock Gaskets (7), 14" PVC Pipe (120') ($7,300), Reducer Bushings (3), Nipples (13) & Corp Stops (2)	10,030.51
26	Parkinson Accounting Systems	Add open Purchase Orders to Budget vs. Actual Reports ($780) Quarterly Support Contract (2/1/16-4/30/16) ($1,500)	2,280.00
27	Point Reyes Prop Mgmt	Feb HOA Fees (25 Giacomini Rd)	75.05
28	Sequoia Safety Supply	Safety Vests (6)	51.99
29	Sonoma County Water Agency	January Contract Water	155,698.77
30	SPG Solar	January Energy Delivered under Solar Service Agreement	4,097.45
31	State Water Resources Control	T2 Exam Fee (Steele), T3 Exam Fee (Foster)	165.00
32	Teeters & Schact	Re-cover Bench Seat ('08 F250 4x4)	1,418.00
33	Township Building Services	Jan Janitorial Services	1,822.84

Seq No.	Payable To	For	Amount
34	United States Plastic	Screw Cap (5) & 5 gal Chemical Container (20)	79.48
35	Univar	Sodium Hypochloride (4-53 gal drums)	857.54
36	Van Bebber Bros	Steel to Construct Hatch Cover for Cabro Ct. Tank	228.30
37	Verizon California	Leased Lines	664.65
38	VWR International	pH Probe (STP), Filter Membrane (1,000)	562.53
39	Waste Management	Misc Debris Dump Charge	85.00
40	Wiley Price & Radulovich	Dec Venegas Claim Expense ($25,000 deductible fully paid)	5,609.80
41	Winzer Corporation	Cutting Wheel Blades (20) ($307) & Wire	435.45
42	Yeager, Jenni & Ian	Refund Overpayment on Closed Account	13.62
		TOTAL DISBURSEMENTS	**$436,703.95**

The foregoing payroll and accounts payable vouchers totaling $436,703.95 are hereby approved and authorized for payment.

Auditor-Controller Date 2/23/16

General Manager Date 2/23/2016

*Prepaid

Public Policy Facilitating Committee

Agenda

Thursday, March 3, 2016
9 a.m. - 1:00 p.m.
Westside Water Education Center, 9703 Wohler Road
(Overflow parking west of Wohler Bridge)

8:30 MIRABEL FISH PASSAGE IMPROVEMENT PROJECT
(optional site visit, meet at Westside Water Education Center)
Brian Paulson & David Cuneo, Sonoma County Water Agency

9:45 WELCOME & PPFC PANEL INTRODUCTIONS *(Westside Water Education Center)*
PPFC Chairman Efren Carrillo

10:00 BRIEF OVERVIEW OF MAJOR MILESTONES AND UPDATES

Dry Creek Habitat Enhancement

- Dry Creek Habitat Enhancement Milestones and Timeline, Miles 2-6
  David Manning and Greg Guensch, Sonoma County Water Agency
- Corps CAP and General Investigation
  Kelly Janes, U.S. Army Corps of Engineers
- Safe Harbor Agreement
  Bob Coey, National Marine Fisheries Service

Estuary Management and Final Jetty Study
Jessica Martini-Lamb, Sonoma County Water Agency

Fish Flow Draft Environmental Impact Review Timeline
Jessica Martini-Lamb

10:40 PUBLIC COMMENT

10:55 CLOSING REMARKS
Chairman Carrillo

PPFC panel members and the public are welcome to join the National Oceanic and Atmospheric Administration and the Sonoma County Water Agency for the Dry Creek Safe Harbor Agreement signing ceremony. This is NOAA's first Safe Harbor Agreement. The ceremony will also include Dry Creek Vineyard, which is the first landowner to participate in this nationally historic agreement. Parking is limited. Please carpool or take a shuttle from the PPFC meeting to the signing ceremony. To ensure adequate transportation, parking and seating, please RSVP by emailing ann.dubay@scwa.ca.gov.

11:45 SAFE HARBOR AGREEMENT (Dry Creek Vineyard, 3770 Lambert Bridge Road, Healdsburg)
Speakers include Samuel D. Rauch III, Deputy Assistant Administrator for Regulatory Programs, NOAA Fisheries; Colonel Eric McFadden (invited), South Pacific Division Deputy Commander, USACE; Charlton Bonham, Director, California Department of Fish & Wildlife (invited); Water Agency Chairman Efren Carrillo and Director James Gore; and Don Wallace, Proprietor, Dry Creek Vineyard

12:15 REFRESHMENTS & DRY CREEK HABITAT ENHANCEMENT (optional site visit)

Disabled Accommodation: If you have a disability which requires an accommodation, an alternative format, or requires another person to assist you while attending this meeting, please contact the Sonoma County Water Agency at (707) 547-1930, as soon as possible to ensure arrangements for accommodation.

RRIFR
Russian River Instream Flow and Restoration

Visit habitat enhancement site, learn about new projects & witness signing of historic agreement

When: Thursday, March 3, 2016
8:30 - 1:00 p.m.
Where: Westside Water Education Center, 9703 Wohler Road
& Dry Creek Vineyard, 3770 Lambert Bridge Road, Healdsburg

The Public Policy Facilitating Committee (PPFC) is holding its annual meeting to discuss and take public comment on the Russian River Biological Opinion. The Biological Opinion was released by National Marine Fisheries Service in September 2008. This 15-year plan requires the Sonoma County Water Agency and the U.S. Army Corps of Engineers to modify Russian River water supply and flood control operations to prevent harm to endangered coho salmon and threatened Chinook salmon and steelhead trout.

This year's meeting will be preceded by a tour of the Mirabel Fish Passage Improvement Project (meet at Westside Water Education Center) and followed by the Dry Creek Safe Harbor Agreement signing ceremony and a habitat enhancement site tour (Dry Creek Vineyard, 3770 Lambert Bridge Rd, Healdsburg)

Sonoma County Water Agency
404 Aviation Blvd
Santa Rosa CA 95403-1069
Return Service Requested

Chris DeGabriele General Manager/Chief Engineer
North Marin Water District

PO Box 146
Novato, CA 94948-0146

AIWWTPI 94948

Public Policy Facilitating Committee Members

- Efren Carrillo, Sonoma County Board of Supervisors
- James Gore, Sonoma County Board of Supervisors
- Shirlee Zane, Sonoma County Board of Supervisors
- Carre Brown, Mendocino County Board of Supervisors
- Lisa Van Atta, National Marine Fisheries Service
- Michael Dillabough, U.S. Army Corps of Engineers
- Eric Larson, California Department of Fish and Wildlife
- Matt St. John, North Coast Regional Water Quality Control Board
- Sean White, representative, Mendocino County
- Richard Shoemaker, Mendocino County Russian River Flood Control & Water Conservation Improvement District

BOD MISC

Chris DeGabriele

From: Ann DuBay <Ann.DuBay@scwa.ca.gov>
Sent: Sunday, February 21, 2016 11:04 AM
Subject: March 3 PPFC Meeting, Site Visits and Safe Harbor Signing Ceremony
Attachments: 3-3-16 draft agenda_FINAL.docx; DIRECTIONS.docx

Dear WAC and TAC members,
We hope to see you on **Thursday, March 3 at the annual Public Policy Facilitating Committee meeting and Safe Harbor Agreement Signing Ceremony. The** final meeting agenda is attached.

This year's meeting is a combination of site visits, a short meeting and the signing of NOAA's first-ever salmonid Safe Harbor Agreement. Because we are combining several elements into one action-packed morning, there are several logistical details that you will need to know (below). Please contact me with **any** questions or clarifications and to RSVP for Safe Harbor Signing Ceremony and light lunch!
Thank you,
Ann

Time, Parking for Optional Site Visit to Mirabel Fish Passage Improvement Project:

- The Biological Opinion required the Sonoma County Water Agency to replace an outdated fish screen on an intake pipe at our river diversion facility. The fish screen replacement provided the opportunity to replace an outmoded fish ladder, and to build a viewing gallery for school children to see migrating fish. This project won't be completed for a few months, but (if the river isn't too high) is very impressive to see as construction is coming to completion.
- **Parking for the tour and the meeting** will be at the Westside Water Education Center (9703 Wohler Road, at the intersection of Wohler and Westside, directions attached) and the parking lot immediately next door.
- There will be two shuttle vans leaving for the tours, one at 8:45 and one at 9:00. Please plan to arrive at the Westside Water Ed Center between **8:30-8:45.**

PPFC Meeting Location, Time:

- The meeting will take place at the new Westside Water Education Center.
- The meeting will start promptly at 9:45 and will end at about 10:40.

Safe Harbor Agreement Signing Ceremony Location, Time, Parking (RSVP REQUESTED TO ann.dubay@scwa.ca.gov TO PLAN FOR PARKING, SEATING AND LUNCH!):

- The Dry Creek SHA signing ceremony will take place at **Dry Creek Vineyard (3770 Lambert Bridge Road, Healdsburg).** Dry Creek Vineyard is the first landowner to participate in the SHA. NOAA's Deputy Assistant Administrator for Regulatory Programs, Sam Rauch, will be the keynote speaker at this short ceremony. We hope you will attend this landmark occasion!
- The ceremony will begin at **11:45 and should end close to 12:15.**
- We will be driving **two vans from the PPFC meeting to the signing ceremony**, and encourage people to use the van transportation. If the vans are inconvenient, please plan to carpool if possible. Parking at the winery is limited.

Dry Creek Habitat Enhancement Site Visit, Lunch, End time:

- Following the ceremony there will be a **light lunch and optional tours of some of the Dry Creek Habitat Enhancement sites**. If the weather is nice, we can walk to the sites. If it's rainy/muddy, we will take the shuttle vans.
- The entire event should wrap up around 1ish, although the site visits might take a little longer, depending on interest.

Ann DuBay
Sonoma County Water Agency
Community & Government Affairs Manager
(707) 524-8378 (office)
(707) 322-8185 (cell)

MEMORANDUM

To: Board of Directors

From: David L. Bentley, Auditor-Controller

Subj: Rate Increase Notice on Water Bill
t:\ac\word\memo\16\notice on bill 2016.docx

February 26, 2015

RECOMMENDED ACTION: Information Only

FINANCIAL IMPACT: No Cost

In conjunction with the individually addressed letters to customers regarding the proposed rate increase, the District traditionally adds a message onto the water bill. The notice will read:

> ***A public hearing to consider 1) a rate increase averaging 5% ($3/mo for the typical residence) & 2) enactment of a temporary drought surcharge will be held May 17 at 7pm at NMWD's office. View the impact on your account at www.nmwd.com/accountbalance.php or call us at 415-897-4133.***

The proposed message is succinct (236 characters) as the message space on the water bill is limited to about 250 characters. Some wordsmithing is possible should the Board be so inclined.

The Water Cost Calculator on the District's website calculates the cost and impact of the approved increases in dollars and percentages for every customer account based on each account's individual water use history. An example, using NMWD's typical single-family customer, who uses 100,500 gallons of water annually, is shown on the following page. A prominent link to the Water Cost Calculator has been placed on the District home page.

NMWD's customer base is divided into eight groups billed bimonthly. The message will be included on water bills mailed commencing March 17, thereby ensuring that all customers will receive the notice prior to the May 17 public hearing.

NMWD ANNUAL WATER COST CALCULATOR

Service Location: 123 Main Street
Zone: A (0'-60')

Account No: 123456
Meter Size: 0.625"

Basic Data	Existing **6/1/15**	Proposed **6/1/16**
Water Use (Annual Gallons) *	100,500	100,500
Service Charge (Bimonthly)	$30.00	$30.00
Water Rate/1,000 Gallons **	$4.46	$4.77
Annual Cost		
Service Charge	$180	$180
Water Use Charge	$448	$479
Total Annual Cost	$628	$659
Annual Increase		$31
Percentage Increase		5%
Monthly Increase:		**$3**
Temporary Drought Surcharge (Note 1)		
Average Gallons Per Day (GPD) ***	275	275
Average GPD Exceeding 300	0	0
Average Monthly Use Exceeding 300 GPD (Avg GPD Exceeding 300 X 30 Days)	0	0
Temporary Drought Surcharge/1,000 Gallons	-	$1.00
Monthly Drought Surcharge:	-	**$0**

* Water Use shown is based on your prior 12 months billed consumption.

** Water Rate shown is your annual average. The Water Rate and Water Use Charge assume your seasonal water use pattern remains consistent with your prior 12 months billed consumption.

*** Annual Water Use divided by 365 days

Note 1: The Proposed Temporary Drought Surcharge would be in effect from June 1 through October 31. The Drought Surcharge can be avoided by maintaining your average daily water use at or below 300 GPD. The Monthly Drought Surcharge amount shown above assumes no reduction in water use.

This Annual Water Cost Calculator is for estimating purposes only and may not provide all of the information contained on your specific customer bill or be precisely accurate. Your future water cost will vary based upon your actual water use. If you have questions about this calculator please call the District at 415.897.4133 and ask for customer service.

Marin special district pay tops $108,000, study says

Jason Dow, general manager of the Central Marin Sanitation Agency, walks in 2010 at the treatment facility in San Rafael with Luke McGarva of Western Water Constructors. Dow said Central Marin's compensation program was in line with other wastewater agencies. IJ photo — Jeff Vendsel

By **Nels Johnson**, *Marin Independent Journal*

POSTED: 02/20/16, 4:00 PM PST | UPDATED: 2 HRS AGO2 COMMENTS

If you're looking for a public service job in Marin County that provides robust benefits, don't forget to check out the special districts that provide an average $108,100 paycheck.

A new study of Marin's top 20 special service districts indicates the average pay for full-time workers in four Marin sanitation districts, for example, exceeds $100,000, or at least 15 percent more than average pay at the Marin County Civic Center.

The study by Transparent California, a website detailing public employee compensation run by analyst Robert Fellner for a Nevada think tank, is based on 2014 pay and benefit schedules.

Fellner called the $108,100 average paycheck for full-time special district workers in Marin "shocking," although several district officials called it competitive pay in line with what similar agencies pay for skilled employees.

The average annual paycheck for 37 employees of the Central Marin Sanitation District topped $121,000 two years ago, some 39 percent more than the $87,000 annual average pay at the county Civic Center last year.

Among the 20 special districts studied, the average full-time employee cost $153,204 in total compensation, including benefits and an average $108,100 paycheck. Average cost of pay and benefits for special district workers in the Bay Area was $155,488; in Los Angeles County, $117,617, and Sacramento Valley, $110,301. The state special district average was $122,458.

CENTRAL MARIN

At Central Marin Sanitation, the average tab was nearly $172,000. "Central Marin Sanitation Agency's $172,000 average full-time compensation is off the charts in terms of sanitation districts," Fellner said. "The biggest driver is their extremely high retirement costs, which are directly related to the extremely generous nature of their benefits." But Jason Dow, general manager of Central Marin Sanitation, said he was not alarmed by Fellner's findings and asserted Central Marin's compensation program was in line with other wastewater agencies. Compensation is typically based on the mid-range in a periodic "independent competitive market survey of 13 to 15 other wastewater agencies in the region," Dow said.

Transparent California contacted Central Marin Sanitation last summer, seeking the figures, Dow noted. "We provided that data," he said, adding the numbers reflect wastewater jobs that "are pretty specialized and require focused skills."

Just as they do at Central Marin, salaries and benefits at Sausalito Marin City Sanitary District are based on a survey of what similar agencies provide, according to Vince Pasquini, a district supervisor. "It keeps us in check," he said. Average pay for 9 full-time employees was $101,000, and average compensation $141,000.

TOP FIVE EARNERS

At Sanitary District No. 5 in Belvedere and Tiburon, average pay for seven full-time employees was $102,000, and average compensation $145,000. Average pay in the Las Gallinas Valley Sanitation District topped $101,000, and average compensation with benefits topped $138,000 in 2014.

The Novato Sanitary District got the job done for much less, with average pay of $88,500, and average compensation, $118,000. The district cut costs several years ago by outsourcing some operations to independent contractors and "it has worked out quite well for our ratepayers," general manager Sandeep Karkal said, noting district fees are lower than others. "We try to provide value for what we charge."

Marin's top five special district pay and benefit earners in 2014 were Southern Marin Fire Chief James Irving, now retired, $374,456; Sonoma Marin Area Rail Transit chief Farhad Mansourian, $352,262, (in addition to a $168,000 county pension for service as county public works director); Novato Fire Chief Mark Heine,

$370,145; Novato Fire Deputy Chief Adam Brolan, $340,874, and Central Marin Sanitation general manager Dow, $333,590.

$1 MILLION PACKAGE

Across the Bay Area, San Francisco Bay Area Rapid Transit District chief transportation officer Rodolfo Crespo cashed in $410,945 in unused sick and vacation leave at retirement — the largest such payout statewide and more than double his $171,000 salary, Fellner reported. Crespo also received a $155,248 CalPERS pension, increasing his total 2014 income to more than $565,000.

"Being able to collect over twice your salary in unused leave before immediately collecting a six-figure pension is like getting a golden parachute for your platinum one," Fellner said.

In Fremont, Washington Hospital Healthcare System CEO Nancy Farber's $1,068,348 compensation package was the largest of any Bay Area special district worker studied, and two colleagues were the runner-ups: Washington Hospital Healthcare System chief of medical services Albert Brooks had a package costing $532,137, and Washington Hospital senior associate administrator Kimberly Hartz was next at $518,807.

Other top pay and benefit packages included former Central Contra Costa Sanitation District director of operations Curtis Swanson, who cashed in $323,000 in unused leave to boost his total compensation to: $483,722; San Ramon Valley Fire Protection District Chief Paige Meyer, $469,650, and Santa Clara Valley Transportation Authority general manager Nuria Fernandez, $449,450.

OVERTIME EARNERS

Marin agencies did not rank in the top tier of Bay Area special districts with the highest average compensation packages for full-time employees. The first four were fire districts, topped by San Ramon Valley Fire Protection, $269,435. Rodeo-Hercules Fire Protection followed at $256,684.

The three highest overtime earners among Bay Area special districts were BART employees. Police officer Youn Seraypheap's $169,060 overtime bill increased his total compensation to $359,187; senior police officer David Greene's $165,743 overtime tab increased total compensation to $344,305, and senior operations worker Andrew Williams' $137,617 overtime bill increased his total compensation to $267,640.

Finally, of the 681 special districts across the state ranked by Stanford academics, the average unfunded pension liability per capita was $114. But for the 20 Marin special districts, it was more than double that at $252.

Topping the unfunded liability list as reflected by per person served was the Marinwood Community Services District, $646 per capita, followed by Tiburon Fire Protection District, at $574 per capita. Also: Novato Fire Protection District, $502; Kentfield Fire Protection, District, $407; Sanitary District No. 5, $356; Marin Municipal Water District, $333, Central Marin Police Authority, $325; Tamalpais Community Services District, $313; Southern Marin Fire Protection District, $309, and Ross Valley Fire Service, $293.

DEBT PER PERSON

In better shape from the perspective of debt per person they serve is the relatively new Sonoma Marin Area Rail Transit District, serving residents in two counties, $1 per capita. Others include Marin Sonoma Mosquito

District, $10; Novato Sanitary District, $52; Belvedere-Tiburon Library Agency, $66 and the Central Marin Sanitation Agency, $74.

Critics note that elected officials have failed to bank enough money to pay for all the benefits they've promised employees, leaving a future generation of Marin's special district taxpayers on the hook to pick up the tab if the stock market fails to meet optimistic investment assumptions. Optimistic assumptions allow officials to minimize upfront payments.

Here's a link to special district data on Transparent California: http://transparentcalifornia.com/agencies/salaries/special-districts/

Here's a link to the Marin district study: http://blog.transparentcalifornia.com/2016/01/14/analysis-of-marin-countys-special-districts-2014/

Marin's municipal wasteful water district

After looking at the IJ's picture of a spillway releasing excessive water from the Alpine Lake reservoir, I opened my water bill to find that I will be paying over $120 during the next year because Marin saved water as Gov. Jerry Brown mandated.

He allowed no exceptions, even for a county which had lots of water before his last mandate; a county which didn't have the ability to share our wealth of water with other counties.

Because Marinites have been marinated to follow the mandate and didn't buy as much water as usual, the Marin Municipal Water District lost money. So, our rates are going up. This is going to cost every household in Marin a thousand dollars over the next eight years or so.

Was the government Water Resources Board too inflexible to tolerate an exception? The water district seems strangely silent on this.

This month, Brown mandated a continuation of the cuts, so as our April El Nino rains approach and water runs over the spillways of our full reservoirs, we are being forced yet again to cut back, which will continue to deprive our water district of funds.

The water district newsletter states, "Even though rates are going up, your conservation efforts are paying dividends: Success at conservation means that we do not have to find and pay for costly new water supplies, which would require even larger rate increases. These 'avoided costs' represent good fiscal management ..."

Could someone please explain to me how mandating cutbacks when our reservoirs are full and spilling over rains approaching represents "good fiscal management"?

Does Lewis Carroll work for the water district?

— John McCorkindale, Sausalito

Dennis Rodoni says diverse experience drives his bid for Marin supervisor

Dennis Rodoni is running for a seat on the Marin County Board of Supervisors. Frankie Frost — Marin Independent Journal

By **Nels Johnson**, *Marin Independent Journal*

POSTED: 02/24/16, 8:17 PM PST | UPDATED: 6 HRS AGO 4 COMMENTS

Contractor Dennis Rodoni of Olema, a veteran North Marin Water District director who lost a 2004 bid for county supervisor, is giving it another try after supporters persuaded him to run for Steve Kinsey's seat in the June 7 primary.

The 64-year-old Rodoni, who at the time had a Sierra Club endorsement and advocated pension reform, transit and other improvements, won more than 36 percent of the vote in a three-way contest for Kinsey's 4th District post 12 years ago. Supervisor Kinsey, who retires next December, romped with 54 percent of the vote.

Rodoni initially ruled out a bid for the seat this time around, saying there were more important things for him to do, including spending time with his family. But over the past month or so, friends and acquaintances urged him to reconsider and mounted an online petition drive. He had a change of heart as supporters rallied. "Many people... have asked me to run for this seat on the Board of Supervisors," he said, adding he has "figured out I can put my kids and grandkids first and still be a supervisor."

NOTES EXPERIENCE

Rodoni bills himself as the most experienced candidate in the race, pointing to 20 years as a water director, service on the Local Agency Formation Commission and as president of the county Special Districts Association, as well as board or commission memberships on panels including the Point Reyes National Seashore Association, Point Reyes Village Association, Coastal Health Alliance, Tomales Bay Association and Golden Gate National Recreation Area.

"I have the experience and background that make me a likely frontrunner," he said of the crowded field of candidates. Eight others have taken out papers for the $113,000 post: Alex Easton-Brown of Lagunitas; construction manager Brian Staley of Woodacre; rancher Dominic Grossi of Novato; emergency management trainer Tomas Kaselionis of Novato; housing advocate Wendi Kallins of Forest Knolls; Mari E. Tamburo of Mill Valley; Sean Scullion of Novato, and Scott Wilmore of Dillon Beach.

DIVERSE DISTRICT

The sprawling district is Marin's most diverse, covering West Marin and Corte Madera and slivers of Larkspur, Novato, San Rafael and Southern Marin. "I'm running because West Marin deserves to have a strong supervisor," he said. He noted other parts of the district require detailed attention as well, including Corte Madera, where he counts two Town Council members as supporters. "I want to work with the council to see how I can help them with issues including sea level rise, fire protection and traffic," among other concerns, he said. "We definitely want to get the third lane open on the Richmond-San Rafael Bridge."

He has a favorable view of county government, saying that officials for the most part have "done a good job of having an open process, of listening to people, and staff has done a great job working on tough issues." He said that while he is not yet in a position to know whether county budget spending priorities should be shifted, "One of the areas we need to look at is infrastructure, our roads. They are in great need of more dollars." He wants to get more aid from the federal government to help pay for wear and tear of tourist traffic in federal parkland. "I have worked with state and federal people, looking for funding" for water and infrastructure projects, he said. "I have walked the halls of Congress and Sacramento."

TRAFFIC ISSUES

Traffic is a numbing problem across the county, he said, with Sir Francis Drake Boulevard gridlocked on holidays in West Marin, making a recent trip from Inverness to Point Reyes Station take 90 minutes at one point over the Presidents Day weekend. "We have a situation where a fire truck or ambulance can't get through," Rodoni said. "We need to have a plan for those weekends. God help us if we have a major earthquake."

Mental health spending is another area that needs a close look, Rodoni said, adding that unlike the county board, he supports Laura's Law that in some cases compels treatment of the mentally ill. "Go walk the streets

of San Rafael and tell me people don't need help," he said.

He supports ranching in Point Reyes National Seashore, and said "more enforcement would be helpful" as far as policing the county trails network, and added that while dogs must remain on leashes in many areas, the county should provide places pets can run free. He noted county officials have made some progress on pension reform, but added the Civic Center must continue to pay down its unfunded liability.

HOUSING STATEGY

Rodoni, a 34-year businessman as head of Rodoni Construction in Point Reyes Station, supports the county's new strategy of acquiring existing housing in order to retain affordable rents. He called for a review of second-unit regulations to find out why few have been built, and backs incentives such as tax breaks and elimination of fees to make providing such units more attractive. As for building near the shore, "I want to make sure any improvements we make on the coast have climate change in mind."

"I'm a guy that gets things done," he said, citing examples including his chairmanship of the panel that got a Point Reyes Station assisted living facility up and running in two years, providing housing for eight people. He won the "west Marin Senior Services Award" for his leadership. Other honors include the Mount Vision Award from Coastal Health Alliance, the Sis Arndt Award for work on the Tomales Bay watershed, and the Department of the Interior's Partners in Conservation Award for work preserving the Giacomini wetlands.

STAFFING PROMISE

Among things he intends to do if elected is require department heads at the Civic Center to work the front counter at least four hours a month. "They need to face the taxpayers," he said. "I will make it happen."

Rodoni was born in San Rafael, the son of a milk truck driver who sold insurance as well, and a mother whose family owned the old Bloom Ranch in Olema. He attended West Marin School and Tomales High School and worked as a seasonal firefighter for then county fire Chief Louis Bloom. He earned an honors degree in economics at Chico State University, and taught economics and business in Australia and Geyserville High School before starting his contracting business.

Rodoni and his wife, Judy, have two daughters and two grandchildren.

Novato History Museum / *Pages from the past*

1966: Novatans faced IBM voting machines for the first

By Mike Reed
Novato History Museum

85 YEARS AGO | February 1931

Constable Fred DeLucch went to San Francisco and arrested George Cash, a section man of the N. W. P. R. R. Company and took him before Judge Rudolff. It appears Cash had the bad habit of appropriating to himself bottles of milk left at front doors. Judge Rudolff found him guilty and taxed him $25, and ordered him to make good his thefts. The same offender was also found guilty of stealing several pay checks, claiming he found them between railroad ties, but instead of returning them to the office cashed them. For this offense Judge Rudolff fined him $25, ordered him to repay the money and sent him to jail for sixty days.

75 YEARS AGO | February 1941

Robert "Babe" Manzoni, night man at the fire house, has resigned his position and Larry Chavis is now holding down the job.

Ed Gnoss, Poultry Producer driver, suffered the loss of the end of his middle finger on his left hand Thursday when he and Herbert Graham were trying to dislodge a truck from the mud on Canyon Road. The men had the truck jacked up, when somehow the under pinning slipped, catching Gnoss's finger. The finger was badly mangled, necessitating amputation just below the first knuckle. Dr. R. J. Weseman performed the operation.

50 YEARS AGO | February 1966

How much will anyone bid to buy the North Marin Water District building and half-acre site at 834 Vallejo Avenue? District directors will find out March 1, when bids will be opened starting at 11 am. The board set a minimum acceptable price of $85,000 for the 150 by 140-foot site, 3600 square feet of office space and 1600 square feet of garage. The district is hoping that at least several bids are substantially higher than the $85,000 minimum. Sometime between April 1 and April 15, water district headquarters will move to a new location at 999 Atherton Avenue.

The Novato Office Equipment Company opened yesterday in the new Roberts and Aguirre building at 1608 Grant Avenue. The new store is owned and operated by Harvey Martin, John Leininger and Earl White. Both Martin and Leininger are Novatans. White is a Cotati resident. According to Martin, the store will feature the sale of all types of office furniture and machines, including desks, chairs, filing cabinets, typewriters, adding machines, calculators and duplicators.

Scheduled for tomorrow, Friday and Saturday is the grand celebration marking the arrival of Woody's TV and Stereo shop at the Tresch Triangle, South Novato Boulevard at Center Road. The store, owned and operated by Woody Binford, has occupied quarters at the Triangle since early last week. Binford has had his store in Novato for the past 17 years. He was first located on Grant Avenue and then for the past nine years at the Nave Shopping Center.

Novatans going to the polls June 7 for the primary election will be faced for the first time with IBM voting machines. The Marin County board of supervisors recently voted to accept a proposal by the IBM Company for free use of their Votomatic recorders throughout Marin County for the election as a demonstration of the machine's skill, accuracy, speed, and economy. The county will also test-hop a Votronic Vote Counter produced by the Cubic Corp. to count absentee ballots.

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DUI suspect arrested following pursuit with o

Bay City News

A Novato man was arrested Saturday morning following a vehicle pursuit with police officers, according to the Novato Police Department.

Samuel Ramirez-Saquiche, 21, was arrested on suspicion of felony evading, DUI, driving on a suspended license and resisting arrest.

Around 2:17 a.m., an officer observed a white Honda sedan on De-long Avenue that had been observed driving erratically, according to police.

The Honda turned onto U.S. Highway 101 and began to accelerate, exited onto Rowland Boulevard and led officers on a six-mile pursuit through various city streets, police said.

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Dennis Rodoni joins supervisor race

By Samantha Kimmey and Beau Evans
02/18/2016

Olema resident Dennis Rodoni says he will run for supervisor in District 4, in a race that now has eight people seeking to replace Steve Kinsey. "It's a done deal," Mr. Rodoni, the owner of Rodoni Construction and a longtime board member of North Marin Water District, said yesterday.

On Tuesday he filed paperwork to start collecting signatures for his bid; every signature reduces the $1,113 filing fee by 25 cents.

Mr. Rodoni, who unsuccessfully challenged Mr. Kinsey over a decade ago, said that late last year he had decided not to run. But supporters—including Inverness resident Jerry Meral, who started an online petition to persuade him to run—helped changed his mind.

Mr. Rodoni and Sean Scullion, a realtor from West Novato, are the two most recent individuals who have started collecting signature for a run.

While running for a seat on the North Marin Water District's board in 1995, Mr. Rodoni said he walked 90 hours around the neighborhoods of his 30,000 or so constituents, meeting and greeting individuals as he went. It's this sort of effort, he said, that won him the seat he's held now for two decades.

"It seemed to work," he said. "Then the realities of being elected to a public agency begin to sink in."