Monterey Regional Water Pollution Control Agency

"Dedicated to meeting the wastewater and reclamation needs of our member agencies, while protecting the environment."

Administration Office:
5 Harris Court, Bldg. D, Monterey, CA 93940-5756
(831) 372-3367 or 422-1001, FAX: (831) 372-6178
Website: www.mrwpca.org

MEETING
NOTICE AND AGENDA
RECYCLED WATER COMMITTEE

Ralph Rubio, Chair
Libby Downey, Ron Stefani, Kenneth Nishi, and Dennis Allion
[Alternate Lou Calcagno]

DATE:	**Thursday, August 12, 2010**
TIME:	**3:00 p.m.**
LOCATION:	**Admin Conference Room** **5 Harris Court, Building D** **Monterey, CA**

PUBLIC COMMENTS
Anyone wishing to address the Committee on matters not appearing on the Agenda may do so now. Comments on any other matter listed on the Agenda are welcome at the time the matter is being considered by the Committee.

1. **UPDATE ON REGIONAL URBAN WATER AUGMENTATION PROJECT (RUWAP)**
   (verbal)
2. **UPDATE ON USE OF MRWPCA OUTFALL FOR BRINE DISPOSAL**
   (see attachment)
3. **CONSIDER SUPPORT FOR NORTH VALLEY REGIONAL RECYCLED WATER PROJECT**
   (see attachment)
4. **UPDATE ON SEPTEMBER WATEREUSE CONFERENCE IN WASHINGTON DC**
   (see attachment)

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This Committee Meeting Notice and Agenda was hereby posted at:

MRWPCA
5 Harris Court, Building D,
Monterey, California 93940

POSTED: Monday, August 9, 2010

By: /s/ Betty Nebb
Executive Assistant

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MEMORANDUM

TO: RECYCLED WATER COMMITTEE

FROM: BOB HOLDEN, PRINCIPAL ENGINEER
(via Keith Israel, General Manager)

DATE: AUGUST 9, 2010

SUBJECT: UPDATE ON USE OF MRWPCA OUTFALL FOR BRINE DISPOSAL

The MOU with MCWD for use of the Outfall for Brine Disposal (attached) requires two actions by MRWPCA:

- **Environmental Analysis** – have an agreement with Denise Duffy & Associates (DDA) to complete this analysis.
- **Technical Feasibility Analysis** – DDA concluded that much of this analysis needs to be completed before they can properly determine environmental impacts.

DDA's work has been put on hold. MRWPCA met with MCWD's Regional Project design engineer, RMC Water and Environment (RMC), and developed a five-part plan for completing the **Technical Feasibility Analysis**.

1. Flow Science, another MCWD consultant, would revise the outfall dilution calculations developed as part of the Regional Project analysis to reflect the Regional Water Quality Control Board's (RWQCB's) permit requirements.
2. RMC and MRWPCA would work together to analyze the various components of MRWPCA's secondary effluent and the projected components of the Regional Project brine to determine which, if any,

would be a concern for meeting the National Pollution Discharge Elimination System (NPDES) discharge permit limits.

3. CH2M Hill (CH2) would conduct a corrosion and capacity study to determine the potential effects of brine on the pipelines, valves, and other components of the ocean outfall system.
4. CH2 would prepare a preliminary design for a brine receiving structure as described in MRWPCA's current NPDES permit.
5. MRWPCA would submit the above information to the RWQCB and begin the process to modify the outfall's NPDES permit to allow Regional Project desal brine to be discharged.

Flow Science prepared a draft report which identifies the reduction in dilution that will result in different flows of brine and secondary effluent through the outfall. Flow Science will be finalizing their report to reflect changes proposed by MRWPCA.

RMC and MRWPCA have completed their initial analysis of the various components to be discharged by the outfall. The next steps are to devise an acceptable dilution flow ratio, determine the acceptable threshold for each component, and to use additional source water and/or pilot brine water analyses are needed to complete the study.

CH2 has completed their corrosion and capacity study (attached). It concludes that there is sufficient capacity in the outfall for the brine and current expected secondary effluent flows. It also concludes that corrosion of the interior of the concrete pipe and of stainless steel components should increase. It recommends annually inspections of outfall system to observe the corrosion and to anticipate when remedial action might be needed.

CH2 is preparing the scope of work and proposed costs for the preliminary design of the brine receiving structure. MRWPCA expects to get that proposal and to send it to MCWD for joint review by August 19, 2010.

MRWPCA has contacted other facilities that accept desal brine into their outfall. MRWPCA will contact the RWQCB to discuss permit options for inclusion of the brine in the MRWPCA outfall.

- **Information only – no action needed.**

MRWPCA Outfall Brine Addition Analysis

PREPARED FOR: Bob Holden/MRWPCA

PREPARED BY: James Albertoni/CH2M HILL
Vince Rybel/CH2M HILL
Lorin Davis/CH2M HILL

REVIEWED BY: Jerry Duppong/CH2M HILL
Roger Lindquist/CH2M HILL
Jeff Smith/CH2M HILL

COPIES: Tom Price/CH2M HILL

DATE: August 3, 2010

Project Scope and Background

The existing Monterey Regional Water Pollution Control Agency (MRWPCA) outfall consists of four miles of 60-inch-diameter reinforced concrete pipeline and appurtenances that convey treated wastewater from the Regional Treatment Plant for ocean disposal. The pipeline is buried for the land portion, while the balance (about half) lies on or below the ocean floor in Monterey Bay. The outfall currently conveys secondary effluent during a majority of the year, but flow decreases to near zero during the agricultural growing season when the treatment facilities are used to produce recycled water for irrigation.

Marina Coast Water District (MCWD) is evaluating the construction of a groundwater desalination facility and is interested in using the MRWPCA outfall pipeline to dispose of the waste brine solution generated by the desalination operations. MRWPCA has requested that an analysis of potential impacts to the outfall be completed prior to agreeing to accept brine solution. Two areas of concern are 1) evaluating the potential for accelerated corrosion of the outfall due to brine addition and 2) ensuring there is sufficient hydraulic capacity.

The proposed MCWD desalination facility is expected to produce a continuous flow of 12.7 million gallons per day (mgd) of concentrate (brine) as waste during the reverse osmosis process. The brine will be discharged to the outfall after going through a proposed mixing, sampling, and metering facility that blends the brine solution with treated wastewater when it is available. MRWPCA produces recycled water sometime during February through December. Typically all wastewater is recycled during the five months of April through August. During these months the only flow to the outfall would be brine. The remaining months there will be some amount of secondary effluent being mixed with and discharged with the brine. This study looks at two dilution scenarios for the seven month (September through March) "winter" time. Scenario 1 is for those times when there is no agricultural demand for recycled water so that 20 mgd of secondary effluent would be mixed with the brine. Scenario 2 is for those times when there is agricultural demand so that only 12 mgd of secondary effluent would be mixed with the brine.

Corrosion Evaluation

The effect of brine addition to the materials of construction of the outfall was evaluated using a desktop approach based on relevant literature and experience. Recommendations are presented for a baseline inspection and for periodic or occasional monitoring that should be conducted by MRWPCA after the desalination facility is operational, including confirmation of the characteristics of the brine.

Materials of Construction

A review of the available contract documents and as-builts for the outfall indicate the following materials will come into contact with the brine:

- Reinforced concrete pipe (ASTM C-361) with ASTM C150 Type V cement and 1.5-inches of concrete over interior reinforcement
- Reinforced concrete structure (e.g. pressure manhole) with ASTM C150 Type V cement and 3-inches of cover over interior reinforcement
- Ductile iron manhole lid with Type 316 stainless steel bolts
- Air release/vacuum valve assembly (epoxy lined cast iron with T316 SST internals) with epoxy lined valves and ductile or cast iron pipe and fittings
- Blow-off assembly consisting of ductile or cast iron pipe and fittings and epoxy lined valves
- Type 316 stainless steel taping saddle, pipe, and blind flange
- Weko-seals used in prior pipe repairs, containing stainless steel bands and hardware
- Monel hardware used for certain frames and hardware for plugs
- Check valves plates made from Type 316 stainless steel
- Various stainless steel fasteners

Water Corrosivity Assessment

Existing water quality data was provided by MRWPCA. Projected brine water quality data was calculated, assuming a 45% recovery, based on the Santa Cruz Water Department's Seawater Reverse Osmosis Desalination Pilot Test Program Report. An assessment of the water corrosivity towards possible materials of construction for submerged metals and concrete was performed using this existing data. Water qualities for those constituents considered to be corrosive factors are presented in Table 1. The blended water quality is presented for two scenarios and is based on recent flow data. The scenarios are described in the Project Scope and Background section, above.

TABLE 1
Average Water Quality for MRWPCA Effluent and Projected MCWD Brine

Parameter (mg/L, or as noted)	Existing Secondary Effluent	Summer Projected MCWD Brine	Winter Scenario 1 Outfall Blend	Winter Scenario 2 Outfall Blend
Chloride	226	43,680	17,103	22,569
Sulfate	101	7,280	2,889	3,792
Calcium, as $CaCO_3$	58	819	354	449
Total Alkalinity, as $CaCO_3$	282	237	265	259
Total Dissolved Solids	815	74,620	29,479	38,763
pH, units	7.3	7.9	7.5	7.6

The water quality data was studied using computer software from the AWWA (American Water Works Association, 1994). The software performs calculations to determine various water parameters, including the Langelier Index (LI), the Ryznar Stability Index (RI), and the Aggressiveness Index (AI), which are described in the following subsections.

Langelier Saturation Index

The LI is used to assess the degree of saturation with calcium carbonate of a particular water. If the water is undersaturated (i.e., LI<0), surfaces that the water contacts may incur leaching (dissolution of calcium carbonate from susceptible materials) and corrosive action resulting from the characteristics of the water. If the water is exactly saturated (LI=0) with calcium carbonate, theoretically, neither precipitation nor leaching will occur.

The LI is considered to be a semiquantitative indicator of the intensity of precipitation or scaling tendency. It is not valid for predicting corrosion rates of metals, because corrosivity toward metals is determined by many other factors. The LI is helpful in assessing the leaching potential toward surfaces made with Portland cement. Products made with Portland cement contain alkaline products similar to calcium carbonate. Waters that are undersaturated with calcium carbonate dissolve or leach these products when they are in contact. The more undersaturated the water, the greater the driving force for leaching to occur.

Ryznar Stability Index

The RI calculation is used for predicting the scaling or corrosive tendencies of water. This index uses part of the LI calculation, but it was derived empirically; that is, it was based on an actual study of operating systems where the RI was correlated with observed effects of corrosion and scaling.

The RI was developed to improve the accuracy of the LI approach in predicting corrosion in water systems constructed from iron pipe. Because the RI is empirically derived, it is considered roughly quantitative. RI values below 7 indicate calcium carbonate scaling tendency that increases as the RI decreases. As the RI value increases above 7, progressively

increasing corrosivity toward ferrous metals is indicated. Values higher than 9 are considered indicative of very corrosive conditions.

Aggressiveness Index

The AI is based on the same parameters as the LI but is used in determining the leaching potential of a water towards the Portland cement-based components in asbestos cement. Because concrete and cement-mortar also contain cementitious products, the AI is useful, although not strictly applicable, in assessing the potential for leaching in these materials.

AI values less than 10 are considered highly aggressive; values of 12 or greater are nonaggressive; and values between 10 and 12 are moderately aggressive.

Alkalinity Ratio

The Alkalinity Ratio, or ratio of the total alkalinity to the sum of chloride and sulfate concentrations, is another index of potential corrosivity. It is calculated by dividing the total alkalinity by the sum of chloride plus sulfate, when all parameters are expressed in mg/L as calcium carbonate. The logic for this index is that alkalinity provides chemical buffering which can offset the corrosive effects of chloride and sulfate ions on metal surfaces. The ratio should be 5:1 or higher for minimal corrosion.

Calcium Carbonate Precipitation Potential

The Calcium Carbonate Precipitation Potential (CCPP) is a quantitative assessment of the water's tendency to deposit a calcium carbonate film on surfaces that it contacts. A CCPP value in the range of 4 to 10 mg/L is considered ideal for minimal corrosion and avoidance of excessive scaling.

Results of the analysis of the MRWPCA secondary effluent, the projected MCWD brine, and blended outfall waters are shown in Table 2.

TABLE 2
Water Quality Analysis Results

Index	Existing Secondary Effluent	Summer Projected MCWD Brine	Winter Scenario 1 Outfall Blend	Winter Scenario 2 Outfall Blend	'Desirable Range'
Langelier	0.23	3.40	1.32	1.77	>0*
Ryznar	6.84	1.09	4.86	4.07	6 to 7
Aggressiveness	11.51	13.19	12.47	12.67	>12
Alkalinity Ratio	0.86	0.00	0.01	0.01	>5
CCPP	13.29	219.42	114.39	153.19	4 to 10 mg/L

*It is desirable for the LI to be greater than zero, because it indicates that the water is not corrosive. However, when the LI is significantly greater than zero, scale may form that could be an issue for pipeline hydraulics. Therefore, when the LI is greater than zero, the potential for scaling effects should be evaluated.

The impacts of the results shown in Table 2 are described individually as follows:

- The Langelier Saturation Index is slightly positive for the MRWPCA secondary effluent, which is an indication that the water is slightly scaling. The Langelier Saturation Indices for the brine and blended waters are more positive than for the secondary effluent, indicating that the brine will likely increase the scaling potential of the water conveyed by the outfall.
- The Ryznar Index is between 6 and 7 for the MRWPCA secondary effluent, which is an indication that the water has a slight scaling potential. The Ryznar Indices for the brine and blended waters are less than 5 for the secondary effluent, again indicating the brine will likely increase the scaling potential of the water conveyed by the outfall.
- The Aggressiveness Index is almost 12 for the MRWPCA secondary effluent, which is an indication that the water is relatively non-aggressive towards concrete and cement mortar. The Aggressiveness Indices for the brine and blended waters are above 12, indicating the waters should be expected to be non-aggressive towards cement mortar.
- The Alkalinity Ratios are low for the MRPWCA secondary effluent, the brine, and the blended waters, relative to the desirable range, which is an indication that the alkalinity is not sufficient to provide the chemical buffering needed to offset the corrosive effects of chloride and sulfate ions in the water. However, the total concentration of chlorides and sulfates in the water is relatively low in the secondary effluent compared to the brine and blended waters; therefore, chlorides and sulfates are expected to significantly increase the corrosion potential of the brine and blended waters towards ferrous metals.
- The Calcium Carbonate Precipitation Potential is positive in the MRPWCA secondary effluent. The Calcium Carbonate Precipitation Potential for the brine and blended waters is significantly more positive than the secondary effluent, supporting the conclusion that the brine will increase the scaling potential of the water conveyed by the outfall.
- The chloride content of the brine and blended waters is significantly greater than the MRWPCA secondary effluent, indicating that the brine will significantly increase the corrosion potential towards ferrous metals of the water conveyed by the outfall. Chloride levels above 1,000 mg/L, as seen in the brine water quality projections, suggest that type 316 stainless steel will experience corrosion. Additionally, at chloride levels below 1,000 mg/L, type 316 stainless steel is still at risk for crevice corrosion in certain geometric conditions and pitting corrosion under stagnant or low flow conditions.
- The sulfate content of the brine and blended water is significantly greater than the MRWPCA secondary effluent, indicating that the brine will significantly increase the corrosion potential towards ordinary cement of the water conveyed by the outfall, however, this is not expected to affect the Type V cement used in the outfall construction.

Overall, the analysis shows that the brine and blended waters will increase the scaling potential of the water conveyed by the outfall. However, the brine and blended waters will significantly increase the corrosion potential, towards ferrous metals (including Type 316 stainless steel) of the water conveyed by the outfall.

Chloride Content Evaluation

The increase in corrosion rate of submerged, reinforced concrete due to increased chloride content was evaluated using the Caltrans Test 532, Time-to-Corrosion model. The model uses the mix design, chloride content of the water, and inches of cover over the rebar to estimate the time to measurable corrosion of the reinforced concrete. This model does not take into account the fact that alternating wetting and drying cycles can concentrate chloride in the concrete; however, the past outfall operation has essentially created one wetting and drying cycle per year, which is negligible, and the future operation will create no wetting and drying cycles.

The available documents did not contain the actual mix design of the concrete used for the vault structures or the RCP. Therefore, the calculations assume a total water mix of 15 percent and six sacks of cement per cubic yard of concrete. Additionally, the future operation estimates assume that the future operation of the outfall will consist of 5 months of brine only conveyance and 7 months of blended water conveyance. The chloride concentrations used for the various waters are the same as what was shown in Table 1. The available contract documents indicated that the steel in the RCP had 1.5-inches cover on the interior and 2-inches cover on the exterior and the rebar in concrete structures had 3-inches cover. The results of the calculations are presented in Table 3.

TABLE 3
Time-to-Corrosion Model Results

Material	Interior Existing MRWPCA Secondary Effluent	Interior Future Operation Summer Brine Only, Winter Scenario 1	Interior Future Operation Summer Brine Only, Winter Scenario 2	Exterior Seawater
RCP	48 years	7 years	6 years	10
Concrete Structures	111 years	16 years	14 years	NA

Note: This estimate assumes new concrete and therefore may not reflect the remaining useful life, depending on the condition of the outfall.

The estimates indicate that the conveyance of the MCWD brine will reduce the time to corrosion by over 85 percent. However, this is just an estimate and doesn't take into account that continuous immersion (from being submerged or maintaining the pipe full) results in a very low supply of oxygen at the steel-concrete interface thus significantly reducing the potential for corrosion. It should also be noted that the model estimates that the exterior of the outfall submerged in seawater should experience corrosion within 10 years, yet the outfall has been in operation since 1984 and no corrosion of the submerged outfall has been observed during outlet valve inspections. It was reported that during those inspections significant marine life growth was observed on the majority of the exterior of the outfall, which could also potentially affect the time to corrosion. Therefore, while the actual time to corrosion calculated may not produce results that can be used to estimate the actual life of the outfall, the results can show a relative comparison on the affect of the brine introduction on the life of the outfall. This relative comparison shows a significant impact and justifies inspection and monitoring of the outfall condition, as well as consideration of future operational scenarios to maintain the pipe full.

Inspection Recommendations

The interior condition of the outfall is currently unknown. Therefore, it is recommended that a baseline inspection be performed to establish the condition for comparison during future inspections once the brine is introduced into the outfall. Such a baseline inspection would include manned entry of the pipeline and vaults at several locations, including the transition from the land outfall to ocean outfall in addition to operational testing of blowoffs, air/vacuum valves, sluices gates, etc. The inspection should document the depth of penetration of concrete paste leaching (if present), thickness of scaling (if present), any exposure or corrosion of reinforcing steel, significant cracking or spalling of concrete, and thickness loss or pitting of metals (if present). Photo documentation should be provided for all areas of the inspection, regardless of findings, to allow a direct photographic comparison over time. This baseline inspection can determine recommended repairs prior to MCWD brine conveyance and can be compared to future inspections to more accurately estimate remaining useful life of the outfall.

Future inspections should be conducted to monitor any deterioration or corrosion of the outfall due to brine conveyance. The inspection should be similar to the baseline inspection in regards to inspection locations and data collected. This will allow a direct comparison of the condition of the outfall over time. Based on the results of the desktop corrosion analysis, outfall inspections should be conducted every year for the first five years of receiving brine. If inspections are conducted in intervals greater than one year, it is possible that corrosion of the outfall during that period may progress to a point where typical repairs are no longer feasible. The inspection frequency should be re-evaluated after the first five years based on the findings.

Additionally, the water quality of the MCWD brine and blended water is only an estimated projection at this point. Therefore, the water quality of the brine and blended water should be monitored once the proposed desalination facility is operational. This will allow a more accurate assessment of the corrosion potential of the water conveyed by the outfall. If the water quality is more corrosive than estimated, the inspection frequency should be increased. If the water quality is less corrosive than estimated, the inspection frequency may be decreased pending results of the baseline inspection.

Hydraulic Description of Outfall

As stated previously, the ocean outfall pipeline is approximately 4 miles in length. Specifically, the outfall consists of 12,745 feet of 60-inch-diameter pipe on land before transitioning underwater. The portion of the outfall that is underwater is approximately 10,392 feet in length and is 60 inches in diameter, except the last 907 feet, which is 48 inches in diameter. The Monterey outfall system is shown schematically in Figure 1. Note that as-built elevations for the treatment plant and land outfall are Mean Sea Level (msl) datum, while the ocean outfall uses Mean Lower Low Water (mllw) vertical datum.

The end of the ocean outfall is a diffuser consisting of 907 feet of 48-inch-diameter diffuser and 500 feet of 60-inch-diameter diffuser. The end of the outfall diffuser is at an elevation of -104 ft mllw (-106.9 msl). The 48-inch-diameter diffuser section contains one hundred and six 2-inch outlet ports fitted with 4-inch duckbill valves (Red Valve Company aka rubber

tide check valves). The 60-inch-diameter diffuser section contains sixty five 2-inch ports fitted with 4-inch duckbill valves. Presently, forty-two of the sixty-five ports are plugged in the 60-inch diffuser section.

The upstream end of the 60-inch ocean outfall pipeline is fitted with a pressurized junction box on the beach, which connects to the 12,745-foot-long, 60-inch-diameter land outfall pipeline. Inside the plant, the pipeline connects to three non-pressurized structures. The furthest upstream is the rapid mix structure. The maximum allowable water surface is controlled by this structure at 101 ft above msl.

Hydraulic Analysis

Based on information provided by MRWPCA, a hydraulic capacity analysis was completed for the outfall system and included the following:

- Review of available hydraulic information
- Creation of a hydraulic model
- Capacity calculations for various flow scenarios

The outfall system was analyzed for maximum allowable flows without overtopping the rapid mix structure under the following conditions:

- Combined flows with the 42 ports closed
- Combined flows with all ports open
- Treatment plant effluent only (no brine) 42 ports closed
- Treatment plant effluent only (no brine) all ports open

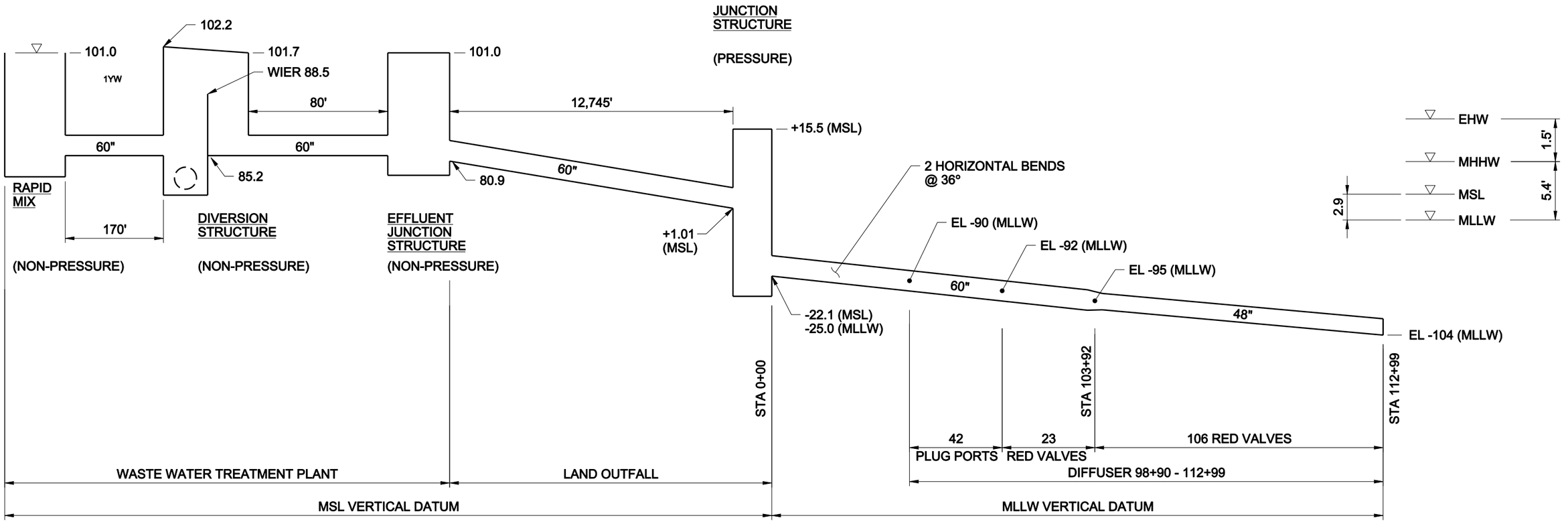
All hydraulic conditions were analyzed assuming extreme high tide at +6.9 ft mllw (4.0 msl) and a seawater specific gravity of 1.025, a brine specific gravity of 1.07 (60-70 ppt salinity) and treatment plant effluent specific gravity of 1.0. With combined flows, the effluent specific gravity was determined using a mass balance between plant effluent and brine. Initially, a Hazen-Williams C value of 100 was used to approximate the internal condition of the pipe. Since the internal condition of the outfall pipe and the true pipe internal diameter are not known, modeling was also completed using Hazen-Williams C values of 80 and 120. If new information from internal inspections becomes available in the future, the C value could be refined to be more accurate.

Calculations were iteratively made using CH2M HILL's WinHydro program that models fluid hydraulics for a variety of flow elements including diffusers, pressurized pipes, weirs, and open channel structures. The results of this analysis, to determine maximum outfall flow for each condition, are summarized in Table 4. The results are also presented graphically in Figure 2. For the blended water condition where treated water and brine are combined, it was assumed that 12.7 mgd of the total flow is brine and the remainder is treated water.

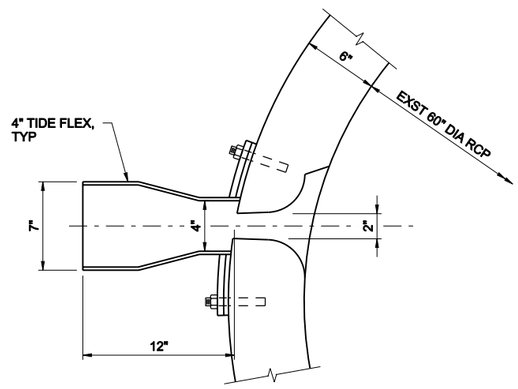
TABLE 4
Maximum Outfall Flow (MGD)
Assumes No Overflow at Rapid Mix Box and Extreme High Tide of +6.9 (mllw) or +4.0 (msl)

	Outfall Capacity (Includes Discharge of 12.7 MGD Brine)		Outfall Capacity Without Brine	
C=	**Ports Plugged**	**Ports Open**	**Ports Plugged**	**Ports Open**
80	66.9	71.2	66.5	70.8
100	77.6	84.2	77.1	83.7
120	86.0	95.2	85.6	94.6

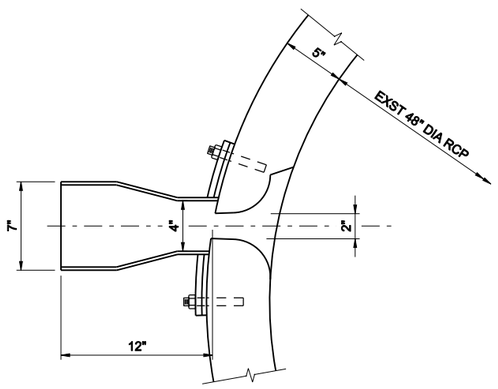
In summary, in the worst case scenario, where 12.7 mgd of brine is discharged to the outfall, the amount of MRWPCA-treated water that could be discharged to the outfall ranges from 54.2 to 73.3 mgd (66.9 to 86.0 mgd total outfall capacity) if the ports remained plugged (current condition). If the currently closed ports are opened and retrofit with rubber valves, the amount of MRWPCA-treated water that could be discharged to the outfall range from 58.5 to 82.5 mgd (71.2 to 95.2 mgd total outfall capacity).



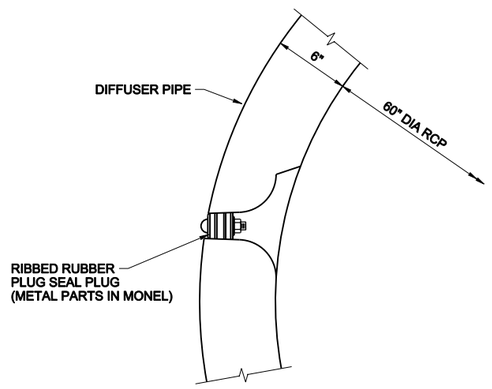
SCHEMATIC OUTFALL PROFILE
NTS



60" DIFFUSER CHECK VALVE DETAIL
2"=1'-0"



48" DIFFUSER CHECK VALVE DETAIL
2"=1'-0"



EXISTING PLUGGED DIFFUSER PORT
2"=1'-0"

FIGURE 1
MONTEREY BAY OUTFALL
HYDRAULIC SCHEMATIC

MRWPCA
FEBRUARY 2010

CH2MHILL

5:46:35 PM
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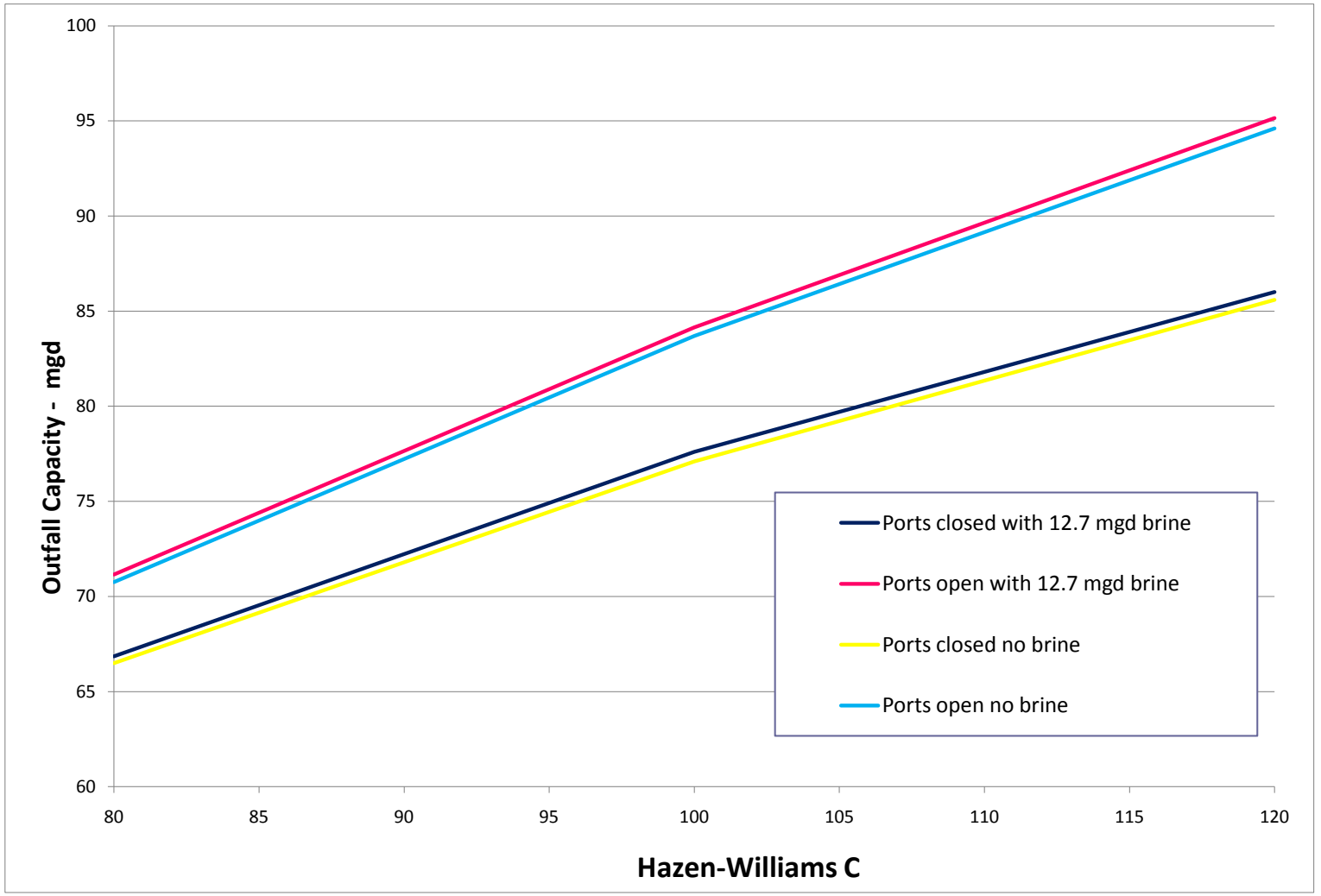
FIGURE 2
Maximum Allowable Flow in Outfall



MEMORANDUM OF UNDERSTANDING
PLANNING FOR USE OF MRWPCA OUTFALL FOR BRINE DISPOSAL

This Memorandum of Understanding ("MOU") is made by and between Marina Coast Water District ("MCWD") and the Monterey Regional Water Pollution Control Agency ("the MRWPCA"), individually each a Party and collectively the Parties to this MOU, who agree as follows:

1. Recitals. MRWPCA owns and operates the Regional Treatment Plant ("RTP") for wastewater from the northern region of Monterey County. The RTP includes an ocean outfall ("outfall") that has available, unused capacity. MCWD wishes to use a portion of the available capacity to transfer desalination brine for ocean discharge. MRWPCA wants to cooperate with MCWD to enable such use of the outfall. This Agreement is intended to provide the terms and conditions for planning, evaluating and negotiating such use of the outfall.

2. Environmental Analysis. Upon execution of this Planning Agreement, MRWPCA acting as lead agency, in consultation with MCWD, will undertake immediately and prosecute diligently to completion, at MCWD's cost, analysis pursuant to the California Environmental Quality Act of using the outfall for desalination brine disposal.

3. Technical Feasibility Analysis. Upon execution of this Planning Agreement, MCWD and MRWPCA, at MCWD's cost and with MCWD consultation will retain a consultant to conduct the analysis and make recommendations, will cooperatively analyze within 60 days the technical and financial feasibility of using the outfall for brine discharge.

4. Negotiation of Terms for Use. If the analyses conducted pursuant to paragraphs 1 and 2 of this Planning Agreement demonstrate that MCWD's proposed use of the outfall for brine discharge is technically feasible and would not have immitigable, adverse, environmental impacts, MCWD and MRWPCA will meet and confer in good faith to negotiate the terms and conditions of MCWD's use of the outfall for brine disposal. Such negotiations will include consideration of any mitigation measures determined necessary by the environmental analysis and measures such as additional facilities and scheduling needed to introduce MCWD's brine into the outfall and to address any issues identified by the technical feasibility analysis. Such negotiations will also include responsibility for regulatory compliance and allocation of risk from such use of the outfall, and the concept that MCWD will pay all costs associated with such use of the outfall, including, without limitation, for any debt service on funds borrowed by MCWD to pay capital costs in connecting to the outfall, and proportional costs of operating and maintaining and replacing the outfall, including costs of administration and insurance, increased costs from any necessitated purchase of supplemental power and increased regulatory costs occasioned by MCWD's use of the outfall for brine disposal.

5. Priority Right for Use of Unused Outfall Capacity. During the term of this MOU, MCWD shall have the right prior to any other person, including any agency or entity, to use a portion of the capacity of the outfall, not used for discharge and disposal of treated sewage, for brine generated by up to a 25 MGD desalination plant.

6. Term. This MOU shall be effective upon execution and shall continue in effect thereafter for five years, unless sooner terminated or superseded by further agreement of MRWPCA and MCWD.

7. No Commitment to Use. This MOU is not intended to and shall not be interpreted to make an irreversible commitment of resources for any activities mentioned in this MOU that may result in changes to the physical environment and that are not described and analyzed in a document that complies with the requirements of the California Environmental Quality Act. The parties specifically intend to avoid any commitments and actions that would, in light of all surrounding circumstances, commit MRWPCA and MCWD as a practical matter to use the outfall for brine discharge before completion of environmental analysis pursuant to the California Environmental Quality Act.

8. General Provisions.

8.1 Remedies. By reason of the specialized nature of the outfall capacity, and for the further reason that the extent of any damage caused to either party by the other by reason of any breach of this MOU or agreement may be extremely difficult to determine, it is agreed by the parties hereto that an action for damages is an inadequate remedy for any breach, and that specific performance, without precluding any other remedy available in equity or law, will be necessary to furnish either party hereto with an adequate remedy for the breach thereof.

8.2 No Third Party Beneficiaries. This MOU is not for the benefit of any person, corporation or other entity, other than the parties hereto, and no person, corporation or other entity except the parties hereto, shall have any rights or interest in or under this MOU unless otherwise specifically provided herein.

8.3 MOU Modification. This MOU may be amended or modified only by mutual written agreement of the parties.

8.4 Notices. All notices or other writings in this MOU provided to be given or made or sent, or which may be given or made or sent, by one party hereto to another, shall be deemed to have been fully given or made or sent when made in writing and deposited in the United States mail, registered, certified or first class, postage prepaid, and addressed as follows:

To MRWPCA:

General Manager
Monterey Regional Water Pollution Control Agency
5 Harris Court, Building D
Monterey, Ca 93940

To DISTRICT:

General Manager
Marina Coast Water District
11 Reservation Road
Marina, CA 93933

The address to which any notice or other writing may be given or made or sent to any party may be changed upon written notice given by such party as provided above.

8.5 Severability. If any one or more of the terms or conditions set forth in this MOU to be performed on the part of MRWPCA or the District, or either of them, should be contrary to any provisions of law or contrary to the policy of law to such an extent as to be unenforceable in any court of competent jurisdiction, then such terms or conditions, shall be null and void and shall be deemed severable from the remaining terms or conditions and shall not affect the validity of the remaining provisions of this MOU.

8.6 Section Headings. Section headings in this MOU are for convenience only and are not to be construed as a part of this MOU or in any way limiting or amplifying the provisions hereof.

8.7 Waiver. None of these terms or conditions herein contained can be waived except by mutual written consent.

8.8 Use of Information. Both Parties shall have access to and any party may use and have copies of any information and writings associated with performance of this MOU, including but not limited to working papers, plans, specifications, designs, and environmental data and documents, developed by or for either party relating to the Connection. One copy of such information shall be provided to the requesting party at no cost. Agreements entered into by either Party for the performance of this MOU will include a requirement that a copy of all such information and writings be made available to the Party at the Party's office for use by both Parties.

8.9 Interpretation. This MOU has been negotiated by and between persons knowledgeable in the subject matter of this MOU and each party has had the opportunity to have this agreement and all exhibits to it reviewed by legal counsel. Accordingly, any rule of law (including Civ. Code § 1654) or legal decision that would require interpretation of any ambiguities in this MOU against the party that has drafted it is not applicable and is waived. The provisions of this MOU and the exhibits to this MOU shall be interpreted in a reasonable manner to effect the purpose of the parties and this MOU.

8.10 Counterparts. This MOU may be executed in counterparts, and each fully executed counterpart shall be deemed an original document, constituting one agreement, binding on and benefiting the parties and their successors and assigns.

8.11 Compliance With Law. This MOU and the performance of each term of this agreement are subject to compliance with applicable laws, ordinances, rules, regulations and orders.

8.12 Further Actions. The parties agree to execute such other documents and take such actions as may be necessary to give effect to the provisions of this agreement.

8.13 Approval; Cooperation. Whenever consent or approval or cooperation of a party is required to give effect to any of the provisions of this MOU, that party shall not unreasonably withhold such consent or approval or cooperation.

8.14 Effect; Amendment. This MOU constitutes the full and complete agreement of the parties regarding its subject matter, and any prior agreements or arrangements are hereby superseded. This MOU may be amended or modified only by a writing signed by the parties.

8.15 Severability. If any of the provisions of this MOU are determined to be invalid or unenforceable, those provisions shall be deemed severable from the remainder of this MOU and shall not cause the invalidity or unenforceability of the remainder of this MOU, unless this MOU without the severed provision would frustrate a material purpose of any party in entering into this MOU.

8.16 Duty to Meet and Confer. If any dispute under this MOU arises, the Parties shall first meet and confer, in an attempt to resolve the matter between themselves. Each Party shall make all reasonable efforts to provide to the other party all the information that the Party has in its possession that is relevant to the dispute, so that both Parties will have ample information with which to reach a decision.

8.17 Disputes. The Parties must submit any disputes arising under this MOU to non-binding mediation before filing suit to enforce or interpret this MOU. Upon request by either Party, the Parties will within ten days select a single mediator to mediate the dispute within fifteen days of such selection. If the Parties cannot agree on a mediator within ten days, either Party may ask the then presiding Judge of the Monterey County Superior Court to select a mediator to mediate the dispute within fifteen days of such selection. If the dispute is not resolved within forty-five days of such selection, either Party may file suit to specifically enforce or interpret this MOU and to seek any damages to which the Party may be entitled.

8.18 Notices. All communications under this MOU shall be deemed completed by one Party when delivered personally to the principal office of the other Party; when faxed to the other Party, to the fax number provided by the receiving Party; or five days after the document is placed in the United States mail, first class, registered mail, or certified mail, postage prepaid, addressed to the other Party as follows:

To DISTRICT:
General Manager
11 Reservation Road
Marina, CA 93933-2099
Phone No.: (831) 384-6131
Fax No.: (831) 384-2479

To MRWPCA:
General Manager
5 Harris Court, Building D
Monterey, CA 93940
Phone No.: (831) 372-3367
Fax No.: (831) 372-6178

The address or fax number to which any notice or other writing may be given or made or sent may be changed upon written notice to all parties.

8.19 Administrators. MRWPCA and MCWD hereby designate their respective General Managers as their Administrators for this MOU. All matters concerning this MOU shall be

submitted to the MOU Administrators or such other representatives as the MOU Administrators may designate for their respective agencies. Either party may, in its sole discretion, change its designation of the MOU Administrator and shall promptly give written notice to the other party of any such change.

WHEREFORE, the parties have caused this MOU to be executed by persons authorized to execute the MOU on behalf of the parties, effective on the date of the last signature.

MRWPCA:

Lou Calcagno, Chair

Keith Israel, Secretary

Date: 4/15/09

DISTRICT:

Howard Gustafson, President

Jim Heitzman, Secretary

Date: 4-15-09

APPROVED AS TO FORM:

Dated: April 14, 2009

NOLAND, HAMERLY, ETIENNE & HOSS
A Professional Corporation

By Lloyd W. Lowrey, Jr.
Lloyd W. Lowrey, Jr.
Legal Counsel for MARINA COAST WATER DISTRICT

Dated: 4/15, 2009

ROBERT R. WELLINGTON
Legal Counsel for MRWPCA

Monterey Regional Water Pollution Control Agency

"Dedicated to meeting the wastewater and reclamation needs of our member agencies, while protecting the environment."

Administration Office:
5 Harris Court, Bldg. D, Monterey, CA 93940-5756
(831) 372-3367 or 422-1001, FAX: (831) 372-6178
Website: www.mrwpca.org

MEMORANDUM

TO: RECYCLED WATER COMMITTEE

FROM: BOB HOLDEN, PROJECT ENGINEER
(via Keith Israel, General Manager)

DATE: AUGUST 4, 2010

SUBJECT: CONSIDER SUPPORT FOR NORTH VALLEY REGIONAL RECYCLED WATER PROJECT

The North Valley Regional Recycled Water Project (NWRRWP) proposes to provide 31,252 acre-feet of recycled water available for irrigating crops on the west side of the Central Valley. The NWRRWP is a regional effort of the Cities of Modesto, Ceres, and Turlock plus Del Puerto Water District. Both the City of Turlock and Del Puerto Water District have visited the Monterey County's Water Recycling Facilities.

They have requested that MRWPCA support their regional project through letters to their representatives in Congress and to California's Senators. Their correspondence requesting this support is attached. Staff requests the RWC discuss issuing supporting letters for the NWRRWP.

RECOMMENDATION:
Authorize the General Manager to provide letters of support for the North Valley Regional Recycled Water Project (NWRRWP).

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Dan Madden
MUNICIPAL SERVICES DIRECTOR
dmadden@turlock.ca.us

MUNICIPAL SERVICES
ADMINISTRATION

156 S. BROADWAY, SUITE 270 | TURLOCK, CALIFORNIA 95380 | PHONE 209-668-5599 EXT 4401 | FAX 209-668-5695

July 27, 2010

Bob Holden
Monterey Regional Water Pollution Control Agency
5 Harris Court, Bldg D
Monterey, CA 93940

Dear Mr. Holden,

The City of Turlock is partnering with the City of Modesto, the City of Ceres, Stanislaus County and Del Puerto Water District in the development of a regional recycled water supply project. The North Valley Regional Recycled Water Project, upon completion, will supply over 31,000 acre feet of tertiary-treated recycled water from the Cities of Turlock and Modesto to the Del Puerto Water District for agricultural irrigation purposes.

Very preliminary estimates place the capital cost of this project at $200,000,000. Consequently, we are actively pursuing federal funding to make this project viable. A letter of support from your organization/firm will assist us in demonstrating to our elected officials in Washington, D.C. that this project is worthy of their endorsement and funding.

Attached for your use, is a sample support letter that highlights the positive aspects of this project, to assist you in composing a letter of support from your organization/firm. I ask that you kindly print correspondence on your company letterhead and return directly to me at the address listed at the top portion of this letter. We will then forward all the compiled letters of support to our Representatives.

We appreciate your consideration of our request and would be happy to discuss this request further should you require additional information.

Sincerely,

Dan Madden
Municipal Services Director

Monterey Regional Water Pollution Control Agency

"Dedicated to meeting the wastewater and reclamation needs of our member agencies, while protecting the environment."

Administration Office:
5 Harris Court, Bldg. D, Monterey, CA 93940-5756
(831) 372-3367 or 422-1001, FAX: (831) 372-6178
Website: www.mrwpca.org

MEMORANDUM

TO: RECYCLED WATER COMMITTEE

FROM: KEITH ISRAEL, GENERAL MANAGER

DATE: AUGUST 9, 2010

SUBJECT: UPDATE ON SEPTEMBER WATERUSE CONFERENCE IN WASHINGTON DC

The WateReuse Annual Symposium is being held in Washington DC from September 12 to 15. As always, and as indicated in the attached brochure, there are a number of excellent presentations regarding water reuse and desalination. What is unique about this event is that it is being held in Washington DC. Therefore, there may be opportunities to combine the Symposium with Federal funding efforts.

While September is not the traditional time to look for project funding, our experience is that the agencies that are the most successful in obtaining funding are those who have the most contact with legislators and staff. We are working with MCWD to determine if such an effort would be valuable.

Should we reach a positive conclusion, it would be most productive if one or more of our Board Members was available to support the effort.

RECOMMENDATION:
Consider Board Member participation in joint WateReuse/Funding trip in September 2010.

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25th Annual WateReuse Symposium

The 25th Annual WateReuse Symposium, presented by the WateReuse Association and cosponsored by the American Water Works Association and the Water Environment Federation, will feature more than 100 technical presentations, pre-conference workshops, poster presentations, technical tours, a national legislative and water policy outlook session, receptions, an awards luncheon, and the ever-popular exhibition component.

The WateReuse Association is a nonprofit organization whose mission is to advance the beneficial and efficient uses of high-quality, locally produced, sustainable water sources for the betterment of society and the environment through advocacy, education and outreach, research, and membership. The vision of the WateReuse Association is to be the world's leader of new water sources, advocating the right water for the right use.

We invite you to join more than 750 leading water professionals from the water reuse and desalination industry to celebrate 25 years of helping communities address critical water supply issues in our nation's capital.

Who Should Attend

- Academics
- Consulting Engineers
- Desalination Industry Leaders
- Environmental Advocates
- Government Officials
- Legislative and Water Policy Advocates
- Manufacturers
- Regulators
- Suppliers
- Water and Wastewater Utility Managers
- Water Reuse Industry Leaders

For more information, go to the WateReuse website.
www.watereuse.org/conferences/symposium/25

Schedule of Events

Sunday, September 12

9:00 am – 5:30 pm	Registration Open
9:00 am – 4:00 pm	**Tour #1:** Technical Tour of Two Water Reclamation Facilities (WRF) – the Broad Run WRF and the Upper Occoquan Service Authority WRF (Limited to 40 people)
1:00 pm – 4:00 pm	**Pre-Conference Workshops** • **WS1:** Reuse 101 (Limited to 50 people) • **WS2:** Understanding How to Communicate for Public Understanding: the Key to Public Acceptance (Limited to 50 people)
4:00 pm – 5:00 pm	WateReuse Association State Section Meetings
5:30 pm – 7:00 pm	Exhibit Hall Open
5:30 pm – 7:00 pm	Welcome Reception

Monday, September 13

7:00 am – 3:30 pm	Registration Open
7:00 am – 12:00 pm	Exhibit Hall Open
7:00 am – 8:00 am	Continental Breakfast
8:00 am – 9:30 am	**Opening Session**
9:30 am – 10:00 am	Refreshment Break
10:00 am – 12:00 am	**Technical Sessions** • **A1:** Health Effects & Risk Assessment • **B1:** Water Reuse Finance • **C1:** Advanced Disinfection Technologies • **D1:** Desalination 101 – An Overview of Desalination Practices
12:00 pm – 1:30 pm	Awards Luncheon and Annual Membership Meeting
1:30 pm – 3:30 pm	Exhibit Hall Open
1:30 pm – 5:00 pm	**Technical Sessions** • **A2:** Industrial Reuse Applications • **B2:** Groundwater Issues • **C2:** Potable Reuse – Challenges and Opportunities • **D2:** Membrane Separation Technologies for Water Reuse • **E2:** Reuse Treatment Technologies
3:00 pm – 3:30 pm	Refreshment Break
5:30 pm – 7:00 pm	President's Reception

Tuesday, September 14

7:00 am – 2:00 pm	Registration Open
7:00 am – 3:00 pm	Exhibit Hall Open
7:00 am – 8:30 am	Continental Breakfast
7:30 am – 8:30 am	**Early Bird Sessions** • Water Reuse • Energy Issues Related to Desalination
8:30 am – 10:00 am	**National Legislative and Water Policy Plenary Session**
10:00 am – 10:30 am	Refreshment Break
10:30 am – 12:00 pm	**Technical Sessions** • **A3:** Membrane Technologies – Part 1 • **B3:** Graywater Reuse • **C3:** Water Quality Issues • **D3:** Desalination Research
12:00 pm – 1:00 pm	Lunch on Your Own
12:00 pm – 1:00 pm	WateReuse Association Committee Meetings
1:00 pm – 2:30 pm	**Technical Sessions** • **A4:** Membrane Technologies – Part 2 • **B4:** Climate Change and Water Reuse • **C4:** Microconstituents – Part 1 • **D4:** Planning for Desalination Projects
2:30 pm – 3:00 pm	Refreshment Break
3:00 pm – 5:00 pm	**Technical Sessions** • **A5:** Reuse, Regulatory & Institutional Issues • **B5:** Public Acceptance of Alternative Water Supplies • **C5:** Microconstituents – Part 2 • **D5:** Concentrate and Brine Management

Wednesday, September 15

6:30 am – 8:30 am	Registration Open
6:30 am – 8:00 am	Continental Breakfast
7:00 am – 8:00 am	**Early Bird Sessions** • National and International Planning for Water Reuse • Inland Desalination
8:00 am – 10:00 am	**Technical Sessions** • **A6:** Planning: A Critical Step for Water Reuse Projects • **B6:** Innovative Applications for Water Reuse Projects • **C6:** Urban Reuse • **D6:** Desalination Case Studies
10:00 am – 12:00 pm	**Closing Plenary Session** – International Panel Discussion: Water Reuse and Desalination around the Globe in 2030
12:00 pm – 12:15 pm	Executive Director's Closing
12:30 pm – 4:00 pm	**Tour #2:** Broad Run Water Reclamation Facility Technical Tour (Limited to 20 people)
12:30 pm – 4:00 pm	**Tour #3:** Upper Occoquan Service Authority Water Reclamation Facility Technical Tour (Limited to 20 people)

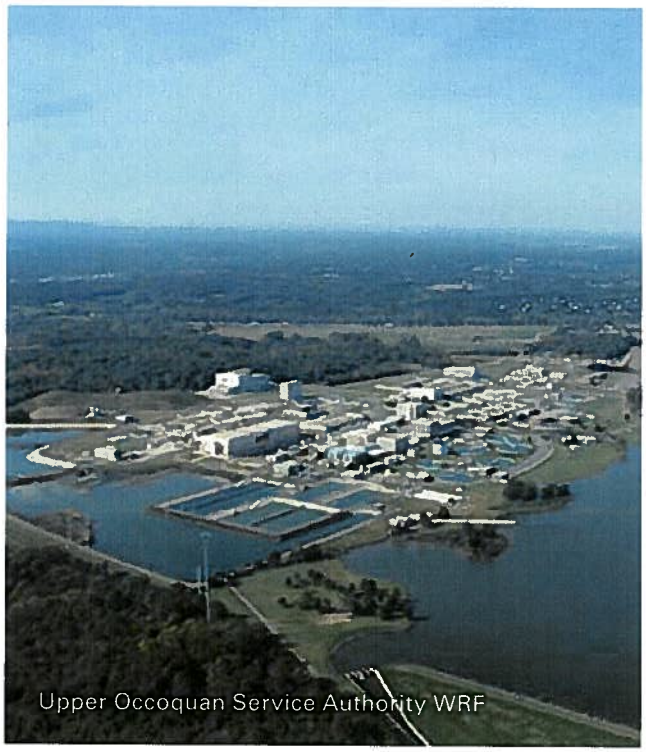
Technical Tours

While you are in Washington, D.C. for the conference, we would like to invite you to take advantage of a unique opportunity – register for a tour of two local water reclamation facilities on either Sunday or Wednesday afternoon. All tours will depart from the main entrance of the hotel. Please check the schedule of events as the tours may conflict with other scheduled conference activities.

Tour #1: Technical Tour of Two Water Reclamation Facilities (WRF) – the Broad Run WRF and the Upper Occoquan Service Authority WRF
Sunday, September 12
9:00 am – 4:00 pm
Fee: $55 (includes a box lunch)
Limited to 40 people

This day-long tour will be action packed and will take attendees to two premier water reclamation facilities within the Washington, D.C. metropolitan area. The first stop will be at Loudoun Water's new 11 mgd Broad Run Water Reclamation Facility located in Ashburn, Virginia. After the facility tour, the group will be served lunch and then travel to the Upper Occoquan Service Authority's (UOSA) 54 mgd Water Reclamation Facility located in Centreville, Virginia. At each stop, attendees will first receive an overview of the technical, water quality, and regulatory drivers for each facility and then be given a guided tour. This day-long tour is being conducted in cooperation with the Virginia Department of Environmental Quality (VDEQ). The VDEQ Water Reclamation & Reuse Coordinator, Valerie Rourke, will be in attendance to answer questions about Virginia's water reuse program and vision. Each facility is described below.

The 11 mgd Broad Run WRF is a community-friendly, campus based facility that was designed to deliver a message of water stewardship. The plant tour will include major processes, the water reuse system, and Loudoun Water's public education center – the Aquiary. The facility uses membrane bioreactor technology followed by activated carbon treatment and ultraviolet disinfection. The facility is designed with biological and chemical nutrient removal to meet extremely stringent nitrogen and phosphorus permit limits. The reclaimed water meets the most stringent Virginia water reuse standards and is used for local nonpotable water reuse applications.


Upper Occoquan Service Authority WRF

The UOSA 54 mgd WRF is the largest, most mature, surface water, indirect potable reuse facility of its kind in the world. UOSA has successfully supplemented the safe yield of the Occoquan Reservoir, a principal drinking water supply for nearly 1.5 million northern Virginians, for more than three decades. The high quality water, which meets the most stringent Virginia water reuse standards, is also used for a wide range of onsite nonpotable reclaimed water uses. The UOSA plant employs several treatment processes to cost effectively produce high quality water including conventional preliminary and primary treatment, secondary treatment using biological nitrogen removal, lime clarification, two stage recarbonation with intermediate settling, multimedia filtration, granular activated carbon adsorption, disinfection and dechlorination.

For attendees not able to take this tour on Sunday or wanting more time to tour one of these water reclamation facilities, individual tours of the UOSA WRF and Broad Run WRF will be also offered on Wednesday afternoon after the closing session of the Symposium (see next page).