JILL N. WILLIS, # 200121
STEFANIE D. HEDLUND, # 239787
BEST BEST & KRIEGER LLP
3750 University Avenue
P.O. Box 1028
Riverside, California 92502
Telephone: (951) 686-1450
Telecopier: (951) 686-3083

CITY OF RIVERSIDE
GREGORY PRIAMOS, City Attorney # 136766
SUSAN WILSON, Dep. City Attorney # 157652
3900 Main Street
Riverside, California 92522
Telephone: (951) 826-5567
Telecopier: (951) 826-5540

Attorneys for City of Riverside

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

In the matter of:

Santa Ana River Water Right Applications 31165, 31174, 31369, 31370, 31371, and 31372 and Wastewater Change Petition No. WW-0045.

Hearing Officer: Arthur Baggett, Jr.

WRITTEN TESTIMONY OF NICK BONSIGNORE ON BEHALF OF THE CITY OF RIVERSIDE

Date: May 2, 2007
Time: 9:00 a.m.
Dept: 1001 I Street, Second Fl.
Costal Hearing Room
Sacramento, CA

Riverside Ex. 2-0

1. I am a registered Civil Engineer in California and a Principal in the firm of Wagner & Bonsignore, Consulting Civil Engineers, a Corporation. I have a Bachelor of Science degree in Civil Engineering from the University of the Pacific, Stockton California, and over 24 years of experience in the field of water resources engineering. I have specific experience in the acquisition and administration of appropriative water rights pursuant to Title 23 of the California Code of Regulations, hydrologic analyses in connection with water availability studies and water diversion projects, and design of water storage and conveyance facilities including pipelines, pump stations and reservoirs. Attached as Riverside Ex. 2-1 is a true and correct copy of my professional resume.

I. CITY OF RIVERSIDE'S PENDING WATER RIGHT ACTIONS

Application 31372

2. The City of Riverside ("City") submitted an application to appropriate water to the State Water Resources Control Board, Division of Water Rights ("State Water Board"), on March 15, 2002. The application was accepted by the State Water Board on November 6, 2002 and assigned No. A031372. Attached is Riverside Ex. 2-2, which lists salient provisions of Application 31372. To summarize, Application 31372 seeks to appropriate treated effluent from the City's Regional Water Quality Control Plant ("RWQCP") year round at a rate of up to 75 cfs, not to exceed 41,400 acre-feet per annum. Treated effluent will be used for municipal, industrial, and irrigation uses within the city limits and Water Service Area Boundary of the City of Riverside.

3. At a meeting with the State Water Board Division Staff on November 20, 2006, the State Water Board Division Staff advised the City that an appropriative water right permit might not be required because the subject effluent never leaves the City's control. The City was also advised that the proposed action of redirecting treated effluent presently discharged to the

Santa Ana River to recycled water uses requires that a Petition for Change in Wastewater Discharge be filed in accordance with California Water Code Section 1211(a).

Wastewater Change Petition WW-0045

4. On December 1, 2006, the City submitted a Petition for Change in Amount of Discharge, Place of Use, and Purposes of Use of Treated Wastewater to the State Water Board. The State Water Board subsequently assigned the petition No. WW-0045. Attached as Riverside Ex. 2-3 is a list of salient provisions of Petition WW-0045. The Petition proposes to use treated effluent for municipal, industrial, and irrigation purposes by reducing the amount of treated effluent presently discharged to the Santa Ana River, and by directing future effluent that was previously intended for discharge to the Santa Ana River to recycled water uses. The Petition states that the City presently generates about 36,000 acre-feet of effluent annually and discharges the great majority of it to the Santa Ana River.

5. The City has projected the following schedule of future treated effluent availability, recycled water demand, and Santa Ana River discharges (all values in acre-feet per year):[1]

Effluent Component	**2010**	**2015**	**2020**	**2025**	**2030**
Total Effluent	48,000	54,000	60,000	66,400	67,400
Diverted to Recycled Water System	11,000	21,000	31,000	41,400	41,400
Discharged to Santa Ana River	37,000	33,000	29,000	25,000	26,000

As shown, the minimum amount to be discharged to the Santa Ana River in future years would be about 25,000 acre-feet annually, or about 11,000 acre-feet less than is presently discharged. Upon full build-out recycled water use would be about 41,400 acre-feet, and about 26,000 acre-feet would be discharged to the Santa Ana River annually (about 10,000 acre-feet less than is

[1] Kevin Milligan, Assistant Director of Public Utilities, City of Riverside, personal communication.

presently discharged).

II. PROJECT LOCATION AND SETTING

6. The Santa Ana River watershed is shown on Riverside Ex. 2-4. The City's RWQCP is located on the south side of the Santa Ana River near the landmark labeled "Riverside Narrows."

7. Maps to accompany Water Right Application 31372 and Petition WW-0045, respectively, prepared by Wagner & Bonsignore Consulting Civil Engineers, are provided in Exhibit SWRCB-1. The location of the RWQCP and point of diversion/discharge (RWQCP outfall) are shown on each map along with the boundary of the proposed place of use.

8. Riverside Ex. 2-5 is an aerial photograph showing the location of the RWQCP, Hidden Valley Wetlands Enhancement Project (HVWEP), the main conveyance channel from the RWQCP to the HVWEP, other conveyance channels, and the discharge points to the Santa Ana River. As shown, treated effluent can be discharged directly to the Santa Ana River instead of being conveyed to the HVWEP. Treated effluent that passes through the HVWEP is discharged to the Santa Ana River near California Avenue.

III. WATER AVAILABILITY

9. The RWQCP is designed and permitted for a design capacity of about 44,800 acre-feet (40 MGD) of treated effluent annually.[2] Presently the RWQCP generates about 36,000 acre-feet annually. Of this amount the City is obligated to discharge 15,250 acre-feet to the Santa Ana River in accordance with the Prado Settlement between the City and Western Municipal Water District dated November 30, 1968, which was ultimately incorporated into the Judgment in

[2] City of Riverside, Recycled Water Phase I Feasibility Study and Citywide Master Plan, September 2003.

Orange County Water District v. City of Chino, et al.(Orange County Superior Court No. 117628, April 17, 1969) (See Applicants' Joint Ex. 2-1.). Accordingly, under present conditions, about 20,750 acre-feet is available annually for recycled water uses.

10. The City has identified potential future recycled water demand of up to 41,400 acre-feet. The City's RWQCP is master planned for an ultimate capacity of about 67,400 acre-feet annually (about 60 mgd).[3] This will leave about 26,000 acre-feet available for discharge to the Santa Ana River, which exceeds the City's obligation under the Prado Settlement. Accordingly, under ultimate conditions sufficient water is expected to be available to meet the City's projected demand for recycled water and comply with its obligations under the Prado Settlement.

IV. EXISTING HYDROLOGIC CONDITIONS

Precipitation

11. The Santa Ana River Watermaster has tabulated annual water year precipitation at San Bernardino for the years 1935 through 2006. Riverside Ex. 2-6 shows graphically the historical annual precipitation at San Bernardino.

Santa Ana River Gaged Flows

12. Riverside Ex. 2-7 shows monthly and water year flow records for USGS Gaging Station #11066460 Santa Ana River at MWD Crossing, which is located about 0.8 miles upstream of the RWQCP in the area known as the Riverside Narrows. The period of record for the gage is October 1971 to September 2006. Over this 36-year period annual flows have ranged from a low of about 21,000 acre-feet to a high of about 355,000 acre-feet, and have averaged

[3] Ibid.

about 102,100 acre-feet.

13. The Santa Ana River Watermaster has analyzed Santa Ana River flow patterns to separate the total flow into two components: base flow and storm flow. Riverside Ex. 2-8 presents the Santa Ana River Watermaster's estimate of base flow and storm flow at the Riverside Narrows for the Water Years 1935 to 2006. Increasing urbanization of the watershed has resulted in increased base flow and storm flow as a result of increased urban water use and increased runoff from paved areas. (See Exhibit SWRCB-3.) Examining two historical periods, 1935 to 1977 and 1978 to 2006, illustrates that both base flow and storm flow have increased while average annual precipitation during these periods has been about the same:

	1935 - 1977 Average	1978 – 2006 Average
Total Flow*	42,322	120,553
Base Flow *	19,582	51,315
Storm Flow *	22,740	67,111
Precipitation **	16.33	17.16
* Units: acre-feet per water year; Source: Santa Ana River Watermaster Report.		
** Units: inches per water year at San Bernardino; Source: 1935-1970: Western Regional Climate Center, 1971-2006: Santa Ana River Watermaster Report.		

V. HISTORIC TREATED EFFLUENT PRODUCTION AND DISCHARGE

14. Riverside Ex. 2-9 shows monthly and water year treated effluent production data for the RWQCP for the period of Water Years 1991 through 2006 in units of MGD, cfs, and acre-feet, respectively. A longer period of record for RWQCP effluent flows is provided in the Santa Ana River Watermaster's report and is shown graphically in Riverside Ex. 2-10 for Water Years

1971 to 2006. As can be seen, there has been a steady increase in effluent generated by the City since 1977. Except for some very limited use of recycled water near the RWQCP, the overwhelming majority of the treated effluent flow has historically been discharged to the Santa Ana River.

As shown in Riverside Ex. 2-5, treated effluent leaving the plant at the RWQCP outfall is conveyed in an earthen channel (the main channel) about 4,700 feet westerly along the southerly bank of the Santa Ana River to flow splitter structure #1. At structure #1, a portion of the flow is directed further west to the HVWEP, and the balance of flow is shunted into a channel that flows directly to the Santa Ana River. This direct discharge channel is approximately 220 feet in length. From Structure #1, the flow destined for the HVWEP is conveyed in an earthen channel westerly about 2,900 feet to a second flow dividing structure at the HVWEP (flow splitter structure #2), where it is distributed to shallow ponds covering about 50 acres for the purpose of nutrient reduction. A portion of the flow entering the HVWEP is lost to evaporation and a portion seeps into the alluvium. The majority of the flow eventually enters a channel that conveys the water about 14,000 feet westerly and discharges to the Santa Ana River near California Avenue (HVWEP discharge point). The HVWEP was designed for an average capacity of 16 cfs. (See written testimony of Kevin Milligan.) The City's records for recent years indicate that the average diversion to the wetlands has been about 21 cfs, with about 4 cfs lost to evaporation and seepage and about 17 cfs leaving the HVWEP.

15. The total effluent flow discharged to the Santa Ana River as surface flow is the sum of the flow directly discharged to the Santa Ana River at structure #1 and the flow discharged from the HVWEP, less any uptake by phreatophytes and seepage in the respective channels.

VI. EFFECT OF EFFLUENT DISCHARGE ON RIVER FLOWS

Historical Santa Ana River Conditions:

16. Riverside Ex. 2-5 shows the proximity of the USGS gage to the City's discharge points. The discharge from the RWQCP supplements the flow of the Santa Ana River downstream of the Narrows. The sum of the Santa Ana River at the Narrows plus the City's effluent (both as reported by the Santa Ana River Watermaster) from 1971 through 2006 is depicted graphically on Riverside Ex. 2-11.

Future Santa Ana River Conditions:

17. The recycled water project is staged to occur over several years, as discussed earlier. Rediverting a portion of the effluent to beneficial uses will reduce the amount of effluent discharged to the Santa Ana River. The minimum amount of effluent discharged to the River in future years will be 25,000 acre-feet annually. Relative to current conditions (36,000 acre-feet per year of effluent discharge) the reduction in the amount discharged will be about 11,000 acre-feet. Riverside Ex. 2-12 shows what the effect of reducing annual effluent discharges to the Santa Ana River by 11,000 acre-feet would have been for historic flows during the period of 2000 to 2006. The top of the hashed bar on Riverside Ex. 2-12 shows the estimated historical annual sum of the MWD Crossing river gage plus actual RWQCP effluent discharged. The bottom of the hashed bar shows what the annual sum of gaged Santa Ana River flow and effluent discharge would have been if 11,000 af had been redirected for recycled water use. In this case, 25,000 acre-feet would have been discharged to the Santa Ana River instead of 36,000 acre-feet.

VII. EFFECT OF EFFLUENT DISCHARGE ON CHANNEL CONDITIONS

Existing Conditions

18. Riverside Ex. 2-13 is a schematic prepared by the City showing average effluent flows within the channel system downstream of the RWQCP outfall under exiting conditions. As shown, effluent production has been about 49 cfs on average, of which about 21 cfs has been directed to the HVWEP and about 28 cfs has been discharged directly to the Santa Ana River by way of the direct discharge channel at flow splitter structure #1.

19. Riverside Exs. 2-14 through 2-16 are photographs taken by my staff during a site visit on April 10, 2007. The direct discharge channel was accessible at the upper end (immediately downstream of structure #1) and at the confluence with the Santa Ana River. The direct discharge channel was not accessible between these two locations due to depth of flow and dense vegetation. Riverside Ex. 2-14 is a view of the direct discharge channel looking downstream from structure #1. As shown, the effluent was flowing freely for as far as could be seen. Riverside Exs. 2-15 and 2-16 are photographs showing the confluence of the direct discharge channel and the Santa Ana River. The flow was relatively quiescent at the confluence, although there exists a scour hole in the Santa Ana River bottom at this location. As can be seen by comparing Riverside Exs. 2-15 and 2-16, the depth of flow in the Santa Ana River was less than about 1 foot (about ankle-deep on the gentleman standing in the Santa Ana River in Riverside Ex. 2-15), whereas the scour hole is much deeper, estimated to be perhaps 5 feet (darker submerged area adjacent to gentleman standing in the Santa Ana River in Riverside Ex. 2-16). Depth of flow in the lower reach of the direct discharge channel appears to be controlled by Santa Ana River stage to an unknown distance upstream from the confluence, i.e., depth of the flow in the lower reach of the channel is more a function of Santa Ana River stage than effluent flow. This back-water effect does not appear to extend upstream all the way to structure #1, as the flow at that location was free-flowing.

Future Conditions

20. Riverside Ex. 2-17 is a schematic provided by the City showing average future effluent flows in the channel system. Under future conditions, average flows in the main channel will be reduced from about 49 cfs to about 35 cfs. At Structure #1 the portion of effluent flow directed to the HVWEP is expected to conform to the HVWEP design flow of 16 cfs (about 5 cfs less than in recent years), and about 19 cfs will be directly discharged to the Santa Ana River by way of the direct discharge channel from structure #1. The direct discharge channel will experience reduced flows relative to current conditions. The change in average flow in the direct discharge channel will be about 32 percent (28 cfs to 19 cfs). Based on some rough hydraulic calculations and assumptions of the configuration of the inaccessible channel downstream of structure #1, a reduction in flow of about 32 percent is expected to result in proportionately lesser reduction in depth. Thus, the depth under future conditions in freely flowing reaches of the channel would be greater than 68 percent of the depth under current conditions. Because the depth of flow in the lower reach of the direct discharge channel is controlled by Santa Ana River stage, I do not believe that the reduced flows in the lower reach of the direct discharge channel will result in a substantive decrease in depth in the lower reach of the channel.