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2533-1.02.002

April 27, 2018

Puente Basin Water Agency
c/o Walnut Valley Water District
271 S. Brea Canyon Road
Walnut, CA 91789

RE: Puente Narrows Underflow

Dear Ms. Angelico:

Enclosed for your files is a signed copy of the letter to the Main San Gabriel Basin Watermaster concerning the annual measurement of Puente Narrows subsurface flow.

Sincerely,

A handwritten signature in black ink that reads "Kevin R. Smead".

Kevin R. Smead
Stetson Engineers Inc.

Enclosure

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April 16, 2018

Main San Gabriel Basin Watermaster
725 N. Azusa Avenue
Azusa, CA 91702

RE: Puente Narrows Underflow, Fiscal Year 2017-18

Ladies and Gentlemen:

Pursuant to the Judgment in Upper San Gabriel Valley Municipal Water District v. City of Alhambra, et al. and its Exhibit J, Puente Narrows Agreement, the subsurface flow passing from Puente Basin to the Main San Gabriel Basin was determined for fiscal year 2017-18. This determination of subsurface flow was made in accordance with Appendix C, Engineering Criteria, to Exhibit J of the Judgment and consisted of measuring the water levels at the two key wells.

The field measurements of the water levels at the upstream well, 2S/10W-9Q, and downstream well, 2S/10W-8E3, for Fall 2017 were collected on October 5, 2017 by Mr. Tuan Nguyen of Stetson Engineers Inc. representing Upper San Gabriel Valley Municipal Water District and Mr. Charlie Devine of Civiltec Engineering Inc. representing Puente Basin Water Agency. The field measurements of the water levels at the upstream well, 2S/10W-9Q, and downstream well, 2S/10W-8E3, for Spring 2018 were collected on April 5, 2018 by Mr. Tuan Nguyen of Stetson Engineers Inc. representing Upper San Gabriel Valley Municipal Water District and Mr. Charlie Devine of Civiltec Engineering Inc. representing Puente Basin Water Agency. Based on the Fall 2017 and Spring 2018 static water levels at the key wells, the subsurface flow was determined to be 995 acre-feet for fiscal year 2017-18, as shown on Table 1.

Field inspections of the concrete-lined San Jose Creek channel were made concurrently with the field water level measurements and indicated no apparent withdrawal of flow in the San Jose Creek channel from the boundary of Spadra Basin with Puente Basin and downstream to Puente Narrows.

The Puente Narrows Agreement requires that a perpetual accounting of the subsurface flow through Puente Narrows be maintained. Presented in Table 2 is the accounting to date, showing the Accumulated Base Underflow (at 580 acre-feet per year in accordance with Paragraph 8 of the Agreement), the Annual and Accumulated Subsurface Flow to date under the Agreement, the Accumulated Credit or Debit of Puente Agency and the Adjusted Accumulated Credit or Debit of Puente Agency (from Table 3).

By Agreement dated November 30, 1989, Puente Basin Water Agency and Upper San Gabriel Valley Municipal Water District agreed that groundwater extracted from Puente Basin that is treated and discharged to the lined channel, and then percolated in the Main Basin as part of Carrier Corporation's cleanup program, which is required by the Regional Water Quality Control Board, shall be credited to

Puente Agency as subsurface outflow from Puente Basin. Evaporation losses and unusable surface outflow to the ocean are deducted from such groundwater extraction from Puente Basin. As shown on Table 3, Column 6, since fiscal-year 2007-08, Carrier stopped discharging this treated water and the water is being beneficially used in the Puente Basin.

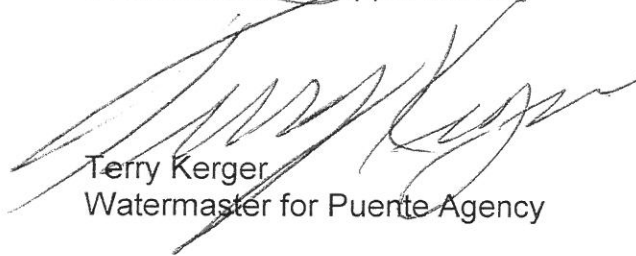
Table 3 shows the Groundwater Extraction for Cleanup Purposes, Deliveries to Rowland Water District, Discharge to Sanitary Sewer, Total Evaporation Losses, Unusable Outflow to Ocean, Annual Cleanup Extraction Credit, accumulated Annual Cleanup Extraction Credit, Accumulated Credit or Debit of Puente Agency (from Table 2), and the Adjusted Accumulated Credit or Debit of Puente Agency.

Respectfully Submitted,

PUENTE NARROWS WATERMASTER



Stephen B. Johnson
Watermaster for Upper District



Terry Kerger
Watermaster for Puente Agency

cc: Upper San Gabriel Valley Municipal Water District
Puente Basin Water Agency

TABLE 1
DETERMINATION OF
PUENTE NARROWS UNDERFLOW

<u>WELL</u>	<u>DATE OF MEASUREMENT</u>	<u>REFERENCE POINT ELEVATIONS (FEET)</u>	<u>DISTANCE TO WATER (FEET)</u>	<u>ELEVATION OF WATER TABLE (FEET)</u>	<u>DIFFERENCE IN WATER LEVELS (FEET)</u>	<u>DISTANCE BETWEEN WELLS (FEET)</u>	<u>HYDRAULIC GRADIENT</u>	<u>AVERAGE WATER LEVEL ELEVATION (FEET)</u>	<u>UNDERFLOW FOR 2017-18 (ACRE-FEET)</u>
<u>FALL 2017</u>									
2S/10W-9Q ¹	10/5/2017	371	30.7	340.3					
2S/10W-8E3	10/5/2017	327	49.1	277.9	62.4	7,700	0.00810	309.1	--
<u>SPRING 2018</u>									
2S/10W-9Q ¹	4/5/2018	371	38.6	332.4					
2S/10W-8E3	4/5/2018	327	50.7	276.3	56.1	7,700	0.00729	304.4	--
TOTAL:							0.01539	613.5	
AVERAGE:							0.00770	306.8	995 ²

1. As described in a memo dated, November 9, 2006, the Watermaster representatives agreed to use Rowland Well No. 1 as a replacement well for the destroyed Faure Well.

2. From Appendix C of Exhibit "J" of Main San Gabriel Basin Judgment

TABLE 2

DETERMINATION OF SUBSURFACE OUTFLOW
FROM
PUENTE BASIN TO MAIN SAN GABRIEL BASIN
(ACRE-FEET)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Fiscal Year	Accumulated Base Underflow In Acre-feet (580 AF/Yr)	Subsurface Flow In Acre-feet Annual	Accumulated	Deficiency By Reason Of Interference With Surface Flow, In Acre-feet	Offsetting Credit For Make-up Payments In Acre-feet	(3-4-5) Total Accumulated Subsurface Flow	(6-1) Accumulated Credit(+) or Debit(-) of Puente Agency	Adjusted Accumulated Credit(+) or Debit(-) of Puente Agency (from Table 3)
1972-73	580	692	692	0	0	692	+112	+112
1973-74	1,160	796	1,488	0	0	1,488	+328	+328
1974-75	1,740	710	2,198	0	0	2,198	+458	+458
1975-76	2,320	732	2,930	0	0	2,930	+610	+610
1976-77	2,900	658	3,588	0	0	3,588	+688	+688
1977-78	3,480	730	4,318	0	0	4,318	+838	+838
1978-79	4,060	850	5,168	0	0	5,168	+1,108	+1,108
1979-80	4,640	930	6,098	0	0	6,098	+1,458	+1,458
1980-81	5,220	820	6,918	0	0	6,918	+1,698	+1,698
1981-82	5,800	845	7,763	0	0	7,763	+1,963	+1,963
1982-83	6,380	850	8,613	0	0	8,613	+2,233	+2,233
1983-84	6,960	798	9,411	0	0	9,411	+2,451	+2,451
1984-85	7,540	820	10,231	0	0	10,231	+2,691	+2,691
1985-86	8,120	840	11,071	0	0	11,071	+2,951	+2,951
1986-87	8,700	850	11,921	0	0	11,921	+3,221	+3,221
1987-88	9,280	880	12,801	0	0	12,801	+3,521	+3,521
1988-89	9,860	890	13,691	0	0	13,691	+3,831	+3,902
1989-90	10,440	910	14,601	0	0	14,601	+4,161	+4,490
1990-91	11,020	905	15,506	0	0	15,506	+4,486	+5,239
1991-92	11,600	925	16,431	0	0	16,431	+4,831	+5,943
1992-93	12,180	890	17,321	0	0	17,321	+5,141	+6,579
1993-94	12,760	845	18,166	0	0	18,166	+5,406	+7,289
1994-95	13,340	860	19,026	0	0	19,026	+5,686	+7,811
1995-96	13,920	810	19,836	0	0	19,836	+5,916	+8,342
1996-97	14,500	820	20,656	0	0	20,656	+6,156	+9,004
1997-98	15,080	840	21,496	0	0	21,496	+6,416	+9,385
1998-99	15,660	750	22,246	0	0	22,246	+6,586	+9,796
1999-00	16,240	760	23,006	0	0	23,006	+6,766	+10,347
2000-01	16,820	860	23,866	0	0	23,866	+7,046	+11,033
2001-02	17,400	890	24,756	0	0	24,756	+7,356	+11,550
2002-03	17,980	940	25,696	0	0	25,696	+7,716	+12,045
2003-04	18,560	960	26,656	0	0	26,656	+8,096	+12,554
2004-05	19,140	960	27,616	0	0	27,616	+8,476	+13,018
2005-06	19,720	860	28,476	0	0	28,476	+8,756	+13,433
2006-07	20,300	950	29,426	0	0	29,426	+9,126	+13,925
2007-08	20,880	940	30,366	0	0	30,366	+9,486	+14,366
2008-09	21,460	960	31,326	0	0	31,326	+9,866	+14,746
2009-10	22,040	945	32,271	0	0	32,271	+10,231	+15,111
2010-11	22,620	985	33,256	0	0	33,256	+10,636	+15,516
2011-12	23,200	890	34,146	0	0	34,146	+10,946	+15,826
2012-13	23,780	930	35,076	0	0	35,076	+11,296	+16,176
2013-14	24,360	985	36,061	0	0	36,061	+11,701	+16,581
2014-15	24,940	980	37,041	0	0	37,041	+12,101	+16,981
2015-16	25,520	1,010	38,051	0	0	38,051	+12,531	+17,411
2016-17	26,100	970	39,021	0	0	39,021	+12,921	+17,801
2017-18	26,680	995	40,016	0	0	40,016	+13,336	--

TABLE 3

ADJUSTMENT TO SUBSURFACE FLOW
DUE TO GROUND-WATER CLEANUP*
(ACRE-FEET)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Fiscal Year	Groundwater Extraction For Cleanup Purposes	Less: Deliveries To Rowland Water District	Discharge To Sanitary Sewer	Evaporation Losses	Unusable Outflow To Ocean	(1-2-3-4-5) Annual Cleanup Extraction Credit	Accumulated Annual Cleanup Extraction Credit	Accumulated Credit(+) or Debit(-) of Puente Agency (from Table 2)	(7 + 8) Adjusted Accumulated Credit(+) or Debit(-) of Puente Agency
1972-73	--	--	--	--	--	--	--	+112	+112
1973-74	--	--	--	--	--	--	--	+328	+328
1974-75	--	--	--	--	--	--	--	+458	+458
1975-76	--	--	--	--	--	--	--	+610	+610
1976-77	--	--	--	--	--	--	--	+688	+688
1977-78	--	--	--	--	--	--	--	+838	+838
1978-79	--	--	--	--	--	--	--	+1,108	+1,108
1979-80	--	--	--	--	--	--	--	+1,458	+1,458
1980-81	--	--	--	--	--	--	--	+1,698	+1,698
1981-82	--	--	--	--	--	--	--	+1,963	+1,963
1982-83	--	--	--	--	--	--	--	+2,233	+2,233
1983-84	--	--	--	--	--	--	--	+2,451	+2,451
1984-85	--	--	--	--	--	--	--	+2,691	+2,691
1985-86	--	--	--	--	--	--	--	+2,951	+2,951
1986-87	--	--	--	--	--	--	--	+3,221	+3,221
1987-88	--	--	--	--	--	--	--	+3,521	+3,521
1988-89	77	--	3	2	1	71	71	+3,831	+3,902
1989-90	264	--	0	2	4	258	329	+4,161	+4,490
1990-91	441	--	0	8	9	424	753	+4,486	+5,239
1991-92	386	--	0	7	20	359	1,112	+4,831	+5,943
1992-93	389	--	0	7	56	326	1,438	+5,141	+6,579
1993-94	456	--	0	5	6	445	1,883	+5,406	+7,289
1994-95	288	--	0	4	42	242	2,125	+5,686	+7,811
1995-96	317	--	0	5	11	301	2,426	+5,916	+8,342
1996-97	455	--	0	9	24	422	2,848	+6,156	+9,004
1997-98	172	--	0	3	48	121	2,969	+6,416	+9,385
1998-99	247	--	0	2	4	241	3,210	+6,586	+9,796
1999-00	386	--	0	6	9	371	3,581	+6,766	+10,347
2000-01	424	--	0	6	12	406	3,987	+7,046	+11,033
2001-02	213	--	0	4	2	207	4,194	+7,356	+11,550
2002-03	157	--	0	3	19	135	4,329	+7,716	+12,045
2003-04	156	--	0	1	26	129	4,458	+8,096	+12,554
2004-05	137	--	0	2	51	84	4,542	+8,476	+13,018
2005-06	143	--	0	1	7	135	4,677	+8,756	+13,433
2006-07	123	--	0	1	0	122	4,799	+9,126	+13,925
2007-08	84	--	0	1	2	81	4,880	+9,486	+14,366
2008-09	59	59	0	0	0	0	4,880	+9,866	+14,746
2009-10	48	48	0	0	0	0	4,880	+10,231	+15,111
2010-11	78	78	0	0	0	0	4,880	+10,636	+15,516
2011-12	241	241	0	0	0	0	4,880	+10,946	+15,826
2012-13	77	63	14	0	0	0	4,880	+11,296	+16,176
2013-14	110	110	0	0	0	0	4,880	+11,701	+16,581
2014-15	69	69	0	0	0	0	4,880	+12,101	+16,981
2015-16	60	53	7	0	0	0	4,880	+12,531	+17,411
2016-17	99	99	0	0	0	0	4,880	+12,921	+17,801

*Agreement Re Determination of Impact of "Cleanup" Production by Carrier Corporation Upon "Subsurface Outflow" Under "Puente Narrows Agreement," November 30, 1989.

Note: Fiscal year 2017-18 adjustment to subsurface flow was not made due to incomplete data. The adjustment will be included in the Spring 2019 measurements.