upper aquifer zone, which the Mocho Wells were designed to exclude because of its known higher salinity and hardness and higher risk for contamination. The potential pathways for the vertical migration being investigated are:

- Direct conduits caused by improperly sealed abandoned wells in the immediate area of the Mochos 3 and 4 sites;
- Poor annular seals in Mocho Wells 3 and 4;
- Increased leakage through the semi-confining layer(s) which separate the Upper Aquifer Zone from the Lower Aquifer Zone caused by the induced head difference across it when the wells are pumping.

Zone 7's investigation efforts include:

- Analyzing drawdown data that is being collected from Upper Aquifer monitoring wells and from nearby abandoned wells as the Mocho wells are routinely operated;
- Comparing individual characteristic constituents of the water being produced from the Mocho wells with those found in upper aquifer monitoring wells; and
- Preparing detailed stratigraphic cross-sections through the area of interest to identify whether discontinuities exist in the confining layer(s) that is believed to separate the Upper Aquifer Zone from the Lower Aquifer Zones.

Completion of the investigation is anticipated for Summer 2010. The results and conclusions will be summarized in a technical memorandum and addressed in the Annual Report of the Groundwater Management Program for Water Year 2010. Also planned for 2010, is the destruction (sealing) of all abandoned and improperly sealed wells in the immediate vicinity of the Mocho Wellfield.

3.3 Surface Water Monitoring Program

3.3.1 Program Description

The objectives of Zone 7's Surface Water Monitoring Program are to:

- **Surface Water Flow Monitoring** – Quantify inflow and outflow of surface water entering and leaving the groundwater basin. Also, to quantify the portions recharging the groundwater basin's aquifers and the amounts being discharged from the groundwater basin by the gravel quarries' dewatering operations;

- **Surface Water Quality Monitoring** - Provide a record of water quality for the basin's recharge and discharge waters with which the groundwater basin's annual salt loading is calculated;

- **Del Valle Water Rights** - Satisfy the requirements of Zone 7's and Alameda County Water District's 'water rights' for the Arroyo Valle. This involves quarterly sampling and continuous flow monitoring at two surface water stations; and

- **NPDES Permitting** - Monitor Zone 7's treated water discharges at the Del Valle Water Treatment Plant (DVWTP), Patterson Pass Water Treatment Plant (PPWTP) (as required by National Pollutant Discharge Elimination System (NPDES) No. CAG382001, Order No. R2-2003-0062). Samples are taken above and below existing treatment plant discharge points during the first significant rainfall event of the season.

The Surface Water Monitoring Program focuses on the four main gaining and losing streams that impact the groundwater basin (i.e., Arroyo Valle, Arroyo Mocho, Arroyo Las Positas, and Arroyo De La Laguna), and the diversions and accretions that affect the flows into or from each of them. The program utilizes a network of telemetered recorder stations, meters, and staff gage sites (all shown on Figure 3.3-1 and Table 3.3-1) to compute the quantity of water flowing past each station (flow). In addition, grab water samples are taken monthly at all recorder stations and tested for electrical conductivity (EC) which correlates to TDS. Once per year, water samples are collected from all ten recorder sites and four NPDES sites in the program and submitted to Zone 7's laboratory for analysis of metals and minerals; the same parameters that are routinely analyzed for in the Groundwater Monitoring Program.

3.3.2 2009 Results

3.3.2.1 General

The 2009 Surface Water Monitoring Program included ten surface water recorder stations (Table 3.3-2). Monthly total flows for the 2009 Water Year from the recording stations are presented in Table 3.3-3. All stations were maintained throughout the year and all records have been reviewed and archived as part of the long-term historical record.

Table 3.3-4 shows monthly EC throughout the year for each of the stations. The variations in monthly quality are caused by the differing mixtures of natural and artificial flows and the seasonal variations of the SBA water that were used for the artificial flows. For the 2009 Water Year, four of the ten recorder stations were sampled and analyzed for metals and mineral. These results are presented on Table 3.3-5

The following sections outline the Surface Water Program activities for the 2009 Water Year (listed by stream) and highlight the findings and conclusions from these activities:

3.3.2.2 Arroyo Valle

The following bulleted items are items that have changed from the 2008 Water Year or are items of note for the 2009 Water Year for the Arroyo Valle:

- During the 2009 Water Year, watershed runoff total into Lake Del Valle was 11,220 AF, approximately 52% of average.

- There were no flood releases made from Lake Del Valle (LDV_FLD_TTL) in 2009. Releases to the Arroyo Valle from the SBA (SBA_AV_TTL) totaled 4,290 AF for the 2009 Water Year.

- Cemex discharged 204 AF into the Arroyo Valle (see Section 3.5.2).

- The Arroyo Valle recharge capacity was about six cubic feet per second (cfs) in 2009, and has been less than 6 cfs for the last 20 years. However, prior to that, recharge capacity was much higher (over 10 cfs).

- Zone 7 has been collecting water samples at the Arroyo Valle below Lang Canyon station (AVBLC), located upstream of Lake Del Valle, since 1972. TDS concentrations have been consistently between 200 mg/L and 400 mg/L. Nitrate levels are consistently below 5 mg/L, and recently have been non-detectable, indicating that nitrate loading in the upper watershed is not significant. The water is moderately hard; historically from about 200 mg/L to 300 mg/L as $CaCO_3$.

- For the 2009 Water Rights objective, recorder flow data and four grab samples were collected at both Arroyo Valle near Livermore (AVNL) and Arroyo Valle at Pleasanton (ADVP) (see Table 3.3-5). Zone 7 is required to maintain a 'Live Stream' condition on the Arroyo Valle whenever water stored under the permit is available in Lake Del Valle. Zone 7's recorder station record at ADVP verified that this permit condition was met during the 2009 Water Year. The results from the flow recorders and the water quality sampling are submitted to the State Water Rights Board each year to satisfy permit requirements.

- For Zone 7's NPDES objective, Zone 7 is required to sample the South Tributary of the Arroyo Valle above and below the DVWTP following periods of high precipitation. During the 2009 Water Year, a sample was taken below the DVWTP on March 10, 2009, the results of which are displayed in Table 3.3-5. However, no water was present in the South Tributary above DVWTP on March 10, so no sample could be taken.

3.3.2.3 Arroyo Mocho

The following bulleted items are items that have changed from the 2008 Water Year or are items of note for the 2009 Water Year for the Arroyo Mocho:

- The peak flow measured at the Arroyo Mocho at Livermore station (AMHAG) during the 2009 Water Year was 375 cfs on March 4, and there was no flow at AMHAG about 92% of the water year.

- 1,900 AF of SWP water was released from the SBA to the Arroyo Mocho (SBA_AM) during the 2009 Water Year as part of Zone 7's artificial recharge and conjunctive use programs.

- Vulcan Materials discharged 2,417 AF into the Arroyo Mocho (see Section 3.5.2).

- The stream gaging station down-stream of the mining discharge (AM_KB) was without remote access telemetry in 2009. Access telemetry will be installed as part of the Zone 7's Chain of Lakes Recharge project (Section 5.4.1).

3.3.2.4 Arroyo Las Positas

The following bulleted items are items that have changed from the 2008 Water Year or are items of note for the 2009 Water Year for the Arroyo Las Positas:

- No artificial stream recharge releases were made into the Arroyo Las Positas (SBA_ALTC_Z7R); however, the stream flowed continuously throughout the 2009 Water Year. The peak flow measured at the Arroyo Las Positas at Livermore station (ALPL) during the water year was 258 cfs on March 3.

- The City of Livermore purchased 162 AF of untreated water which was released from the South Bay Aqueduct into Altamont Creek/Arroyo Las Positas for diversion to Springtown Golf Course's irrigation system (SBA_ALTC). Stream flow measurements were made to provide permitting assistance for the delivery of untreated water to the City of Livermore. Stream flow measurements and impact assessments were made in the spring and fall associated with the installation of the City's temporary diversion facility.

- In general, Arroyo Las Positas had the poorest water quality of the three major recharging streams in the valley. Its TDS concentrations (converted from EC) were mostly greater than 1,000 mg/L.

- The Arroyo Las Positas near the PPWTP, which was inspected after every significant rainfall event during the 2009 Water Year, remained dry throughout the year. As a result no water samples could be taken for the NPDES objective during the 2009 Water Year.

3.3.2.5 Arroyo De La Laguna

The following bulleted items are items that have changed from the 2008 Water Year or are items of note for the 2009 Water Year for the Arroyo De La Laguna:

- Water flowed continuously down the Arroyo De La Laguna throughout the 2009 Water Year. The Peak flow measured at the Arroyo De La Laguna at Verona station (ADLLV) during the 2009 Water Year was 2,400 cfs on March 3.

- A stream flow recorder station with water quality sensors was maintained on the Arroyo De La Laguna in 2009. The water quality data for the Arroyo De La Laguna is available on line from the USGS (http://nwis.waterdata.usgs.gov/ca/nwis/uv?11176900).

Table 3.3-1
Zone 7 Water Agency
List of Surface Water Stations
2009 Water Year

(Sites are ordered by stream from origin to terminus)

DRAINAGE STREAM		***Station***		***Frequency***	
Site Id	***Station Name***	***Type***	***Device***	***Flow ****	***Quality ****
ARROYO VALLE - LINE E					
AVNL	Arroyo Valle Near Livermore	Measurement	Recorder	R	Q
AV_VINEYARD	Arroyo Valle at Vineyard	Measurement	None		
AV_ISABEL	Arroyo Valle at Isabel	Measurement	Staff	D	
AV_ASTRIB	Arroyo Valle Inflow above South Trib	Measurement	None	D	
AV_VBRDG	Arroyo Valle at Vallecitos Bridge	Measurement	Staff	D	
AV_AVBRDG	Arroyo Valle Above Vallecitos Bridge	Measurement	None	D	
AV_UPPERBR	Arroyo Valle above Upper Bridge	Measurement	Staff		
AV_CROHARE	Arroyo Valle at Crohare Ford	Measurement	None		
AV_APONDS	Arroyo Valle Above Ponds	Measurement	None		
SBA_TO1_AV	SBA Turnout 1 to Arroyo Valle	Inflow/Outflow	Meter	D	
DRYC_AV	Dry Creek at Arroyo Valle	Measurement	None		
AV_ACWD	Arroyo Valle to ACWD - Calc	Measurement	Calculate		
SBA_TO2_AV	SBA Turnout 2 to Arroyo Valle	Inflow/Outflow	Meter	D	
AV_BDAM	Arroyo Valle Below Dam	Measurement	None		
AVRUNOFF	Arroyo Valle Runoff	Measurement	Calculate	D	
LDV_FLD_TTL	Lake Del Valle Total Flood Release	Inflow/Outflow	Calculate	D	
LDV_FLD_GATE	Lake Del Valle Flood Gate	Inflow/Outflow	Meter	D	
AVBLC	Arroyo Valle Below Lang Canyon	Measurement	Recorder	R	A
AVALC	Arroyo Valle above Lang Canyon Near Liv	Measurement	None		
SBA_AV_TTL	SBA Turnouts to Arroyo Valle - Total	Inflow/Outflow	Calculate	D	
AV_FIRST	Arroyo Valle at First Street	Measurement	Staff		
AV_ASGP	Arroyo Valle above Sycamore Grove Park	Measurement	Calculate	D	
AV_PONDS	Arroyo Valle at Ponds	Measurement	Staff	D	
AV_AADLL	Arroyo Valle Above De La Laguna	Measurement	None		
AV_VALLEY	Arroyo Valle at Pleasanton	Measurement	Staff		
AV_MAIN	Arroyo Valle at Main Street	Measurement	Staff		
AV_BERNAL	Arroyo Valle at Bernal Ave	Measurement	Staff		
AV_BPONDS	Arroyo Valle Below Ponds	Measurement	None		
MA_KAI_SC	Kaiser Discharge to Shadow Cliffs	Inflow/Outflow	Meter		
MA_KAI_AV	Kaiser Discharge to Arroyo Valle	Inflow/Outflow	Meter		
ADVP	Arroyo Valle at Pleasanton	Measurement	Recorder	R	Q
MA_KAI_AV_EXP	Kaiser Discharge to AV - Exported from basin	Inflow/Outflow	Calculate		
MA_LS_AV_EXP	Lonestar Discharge to AV - Exported from basin	Inflow/Outflow	Calculate	D	
MA_LS_SC	Lonestar Discharge to Shadow Cliffs	Inflow/Outflow	Meter	D	
MA_LS_AV	Lonestar Discharge to Arroyo Valle	Inflow/Outflow	Meter	D	
AV_DIV_SC	Arroyo Valle Diversion to Shadow Cliffs	Inflow/Outflow	Meter	D	
ARROYO MOCHO - LINE G					
AM_ARROYORD	Arroyo Mocho at Arroyo Road	Measurement	Staff		
AM_DRYC	Arroyo Mocho Dry Creek	Measurement	Staff		

* MAX DATA SET FREQUENCY (All Objectives): R = Recorder (15 minute); A = Annual; Q = Quarterly; W = Weekly; D = Daily.

DRAINAGE STREAM		*Station*		*Frequency*	
Site Id	*Station Name*	*Type*	*Device*	*Flow* *	*Quality* *
MA_CM_AM_E1	Calmat Dishcarge to AM at Site E1	Inflow/Outflow	Meter	D	
MA_RJ_AM	R&J Discharge to Arroyo Mocho	Inflow/Outflow	Meter		
AMH_NAT	Arroyo Mocho at Livermore - Natural Component	Measurement	Calculate		
AMHAG	Arroyo Mocho At Livermore	Measurement	Recorder	R	A
AM_STAN	Arroyo Mocho at Stanley Blvd	Measurement	Staff		
SSD_AM	Stanley Storm Drains to Arroyo Mocho	Inflow/Outflow	None		
ARSD_AM	Arroyo Rd Storm Drain at Arroyo Mocho	Inflow/Outflow	None		
AM_RJ_BR	Arroyo Mocho at R&J Bridge	Inflow/Outflow	Meter		
RPSD_AM	Robertson Park Storm Drains to Arroyo Mocho	Inflow/Outflow	None		
AM_RPK	Arroyo Mocho at Robertson Park	Measurement	Staff		
AM_WS	Arroyo Mocho Wente Street	Measurement	None		
AM_BWP	Arroyo Mocho Below Wente Pump	Measurement	None		
WEN_DIV_AM	Wente Diversion from Arroyo Mocho	Inflow/Outflow	Meter		
AM_WF	Arroyo Mocho at Wente Ford	Measurement	Calculate		
AMNL	Arroyo Mocho Near Livermore	Measurement	Recorder	R	A
AM_ACWD	Arroyo Mocho to ACWD - Calc	Measurement	Calculate		
MA_CM_AM_E3	Calmat Dishcarge to AM at Site E3	Inflow/Outflow	Meter	D	
MA_CM_AM	Calmat Dishcarge to Arroyo Mocho	Inflow/Outflow	Calculate	D	
SBA_AM	SBA Turnout to Arroyo Mocho	Inflow/Outflow	Meter	D	
MOC4_AM	Mocho 4 Waste to Arroyo Mocho	Inflow/Outflow	Meter	D	
MA_CM_AM_EXP	Calmat Dishcarge to AM - Exported from basin	Inflow/Outflow	Calculate	D	
AM_ADLL	Arroyo Mocho above ADLL	Measurement	None		
MA_CM_AM_E2	Calmat Dishcarge to AM at Site E2	Inflow/Outflow	Meter	D	
HOP6_AM	Hopyard 6 Waste to Arrroyo Mocho	Inflow/Outflow	Meter	D	
MOC3_AM	Mocho 3 Waste to Arroyo Mocho	Inflow/Outflow	Meter	D	
MOC1_AM	Mocho 1 Waste to Arroyo Mocho	Inflow/Outflow	Meter	D	
AMP	Arroyo Mocho Near Pleasanton	Measurement	Recorder	R	A
SR1_AM	Stoneridge 1 Waste to Arroyo Mocho	Inflow/Outflow	Meter	D	
AM_BALP	Arroyo Mocho Below Arroyo Las Positas	Measurement	None		
AM_KB	Arroyo Mocho at Kaiser Bridge	Measurement	Recorder	R	A
MA_KAI_AM_EXP	Kaiser Discharge to AM - Exported from basin	Inflow/Outflow	Calculate		
MA_KAI_AM	Kaiser Discharge to Arroyo Mocho	Inflow/Outflow	Meter		
MA_KAI_AM_E4	Kaiser Dishcarge to AM at Site E4	Inflow/Outflow	Calculate		
MA_KAI_AM_E3	Kaiser Dishcarge to AM at Site E3	Inflow/Outflow	Calculate		
AM_RJ_2BR	Arroyo Mocho at R&J Second Bridge	Measurement	None		
AM_AALP	Arroyo Mocho Above Arroyo Las Positas	Measurement	None		
AM_BTC	Arroyo Mocho Below Tassajara Creek	Measurement	Staff		
ARROYO LAS POSITAS - LINE H					
LLNL_ALP	LLNL Treated Groundwater Discharge to ALP	Inflow/Outflow	Meter	D	D
CLRCC_ALP	Collier Canyon Creek above Arroyo Las Positas	Measurement	None		
ALP_APPWTP	Arroyo Las Positas above PPWTP	Measurement	None		A
ALP_KITTY	Arroyo Las Positas at Kittyhawk Rd	Measurement	None		
ALP_580	Arroyo Las Positas at I-580	Measurement	None		
CAYC_ALP	Cayetano Creek above Arroyo Las Positas	Measurement	None		
ALPL	Arroyo Las Positas at Livermore	Measurement	Recorder	R	A
ALP_BALTC	Arroyo Las Positas Below Altamont Creek	Measurement	None		
ALP_AALTC	Arroyo Las Positas Above Altamont Creek	Measurement	Staff		
LLNL_SECO	LLNL Treated Groundwater Discharge to ALP	Inflow/Outflow	Meter	D	D
ALP_BPPWTP	Arroyo Las Positas below PPWTP	Measurement	None		A
PPWTP_DISCH	PPWTP Discharge to Arroyo Las Positas	Inflow/Outflow	Meter	D	
ALP_ELCH	Arroyo Las Positas at El Charro	Measurement	Recorder	R	A

* MAX DATA SET FREQUENCY (All Objectives): R = Recorder (15 minute); A = Annual; Q = Quarterly; W = Weekly; D = Daily.

DRAINAGE STREAM		Station		Frequency	
Site Id	**Station Name**	**Type**	**Device**	**Flow ***	**Quality ***
ALP_FIRST	Arroyo Las Positas at First Street	Measurement	Staff		
ALP_MOLDT	Arroyo Las Positas at Moldt Ranch	Measurement	None		
CTWC_ALP	Cottonwood Creek above Arroyo Las Positas	Measurement	None		
ALP_AIRWAY	Arroyo Las Positas at Airway	Measurement	None		
ALTAMONT CREEK - LINE R					
SBA_ALTC	SBA Turnout to Altamont Creek	Inflow/Outflow	Meter	D	
ALTC_VASCO	Altamont Creek at Vasco Rd	Measurement	Staff		
BPT_VASCO	Brushy Peak Tributary at Vasco Rd	Measurement	None		
LIV_DIV_BPT	Livermore Diversion from Brushy Peak Trib	Inflow/Outflow	Meter	D	
DAGD_ALTC	Dagnino Rd Drainage to Altamont Creek	Measurement	Staff		
ALTC_ALP	Altamont Creek Above Las Positas	Measurement	Staff		
SOUTH TRIBUTARY					
DVWTP_DISCH	DVWTP Discharge to South Tributary	Inflow/Outflow	Meter	D	
STRIB_ADVWTP	South Tributary Above DVWTP	Measurement	None		A
STRIB_KB	South Tributary at Kalthoff Bridge	Measurement	None		A
STRIB_AAV	South Tributary Above Arroyo Valle	Measurement	None	D	
ALAMO CANAL - LINE F					
AC_AM	Alamo Canal above Arroyo Mocho	Measurement	Staff		
AC_SSRC	Alamo Canal above South San Ramon Crk	Measurement	Staff		
AC_DUBC	Alamo Canal above Dublin Creek	Measurement	None		
DUBC_DUBRD	Dublin Creek at Dublin Rd	Measurement	None		
AC_580	Alamo Canal at I580	Measurement	None		
DUBC_AC	Dublin Creek Above Alamo Canal	Measurement	Staff		
AC_NP	Alamo Canal Near Pleasanton	Measurement	Staff		
SSRC_ALCBLVD	San Ramon Creek at Alcosta Blvd	Measurement	Staff		
ARROYO DE LA LAGUNA - LINE B					
ADLLP	Arroyo De La Laguna Near Pleasanton	Measurement	Recorder		
ADLL_BAM	Arroyo De La Laguna Below Mocho	Measurement	Staff		
HOP9_PC	Hopyard 9 Waste to Pleasanton Canal (ADLL)	Inflow/Outflow	Meter	D	
ADLL_BERNAL	Arroyo De La Laguna at Bernal	Measurement	Staff		
ADLL_CSTDR	Arroyo De La Laguna at Bernal	Measurement	None		
CST_DIV_ADLL	Castlewood Diversion at Arroyo De La Laguna	Inflow/Outflow	Meter		
ADLLV	Arroyo De La Laguna at Verona	Measurement	Recorder	R	A
TASSAJARA CREEK					
TCNP	Tassajara Creek Near Pleasanton	Measurement	Staff		
Number of Sites:	***118***	***Sites in Program:***		***45***	***16***

* MAX DATA SET FREQUENCY (All Objectives): R = Recorder (15 minute); A = Annual; Q = Quarterly; W = Weekly; D = Daily.

TABLE 3.3-2
Zone 7 Water Agency
Surface Water Monitoring
Recorder Station Details

	Station Name	Site Id	Gage	Gage Datum	Drainage and Area	Data Collected By	Location* Lat.	Long
Arroyo Valle (AV)	Arroyo Valle below Lang Canyon	AVBLC	Water stage (Stilling well) Concrete control	N/A	Upland Valle Drainage Basin; 130 mi^2	USGS	2029018	6218632
	Arroyo Valle Near Livermore	AVNL	Water stage (Stilling well) Concrete control	510.44'	AV below dam and SBA Releases; 147 mi^2 (restricted flow due to dam)	USGS	2051872	6197234
	Arroyo Valle at Pleasanton	ADVP	Water stage (transducer) Concrete control	312.66'	Valle Drainage Basin; 171 mi^2	Zone 7	2068336	6161483
Arroyo Mocho (AM)	Arroyo Mocho near Livermore	AMNL	Water stage (transducer) Concrete control	746.47'	Upland Mocho Drainage Basin; 38.2 mi^2	Zone 7	2052947	6212841
	Arroyo Mocho at Livermore	AMHAG	Water stage (manometer) Concrete control	374.78'	AM before mining discharges; 50.8 mi^2	Zone 7	2071596	6181235
	Arroyo Mocho at Kaiser Bridge	AM_KB	Water stage (transducer) Concrete control	325.47'	AM before confluence with ALP; 60.2 mi^2	Zone 7	2077841	6171655
	Arroyo Mocho near Pleasanton	AMP	Water stage (Stilling well) Concrete control	323.77'	Mocho Drainage Basin; 141 mi^2	Zone 7	2076846	6164322
Arroyo Las Positas (ALP)	Arroyo Las Positas at Livermore	ALPL	Water stage (manometer) Concrete control	460.99'	Upland Positas Drainage Basin; 53.3 mi^2	Zone 7	2079760	6193222
	Arroyo Las Positas at El Charro	ALP_ELCH	Water stage (transducer) Conductivity Concrete control	338.82'	Positas Drainage Basin; 75.0 mi^2	Zone 7	2078400	6172552
Arroyo De La Laguna (ADLL)	Arroyo de la Laguna near Verona	ADLLV	Water stage (manometer) Conductivity Concrete control	280.00'	Laguna Drainage Basin; 403 mi^2	USGS	2053613	6161313

* State Plane Coordinates Ca. Zone III, NAD83

TABLE 3.3-3
ZONE 7 WATER AGENCY
SURFACE WATER MONITORING
MONTHLY SUMMARY OF STREAM FLOWS (ACRE-FEET)
RECORDER STATIONS
2009 WATER YEAR

MONTH	ARROYO VALLE Below LANG CANYON* AVBLC	ARROYO VALLE Near LIVERMORE* AVNL	ARROYO VALLE At PLEASANTON ADVP	ARROYO MOCHO Near LIVERMORE AMNL	ARROYO MOCHO At LIVERMORE AMH	ARROYO MOCHO At KAISER BRIDGE AM_KB	ARROYO MOCHO Near PLEASANTON AMP	ARROYO LAS POSITAS At LIVERMORE ALPL	ARROYO LAS POSITAS At EL CHARRO ALP_ELCH	ARROYO De LA LAGUNA At VERONA* ADLLV
OCT	0	18	137	0	0	0	230	218	180	1,016
NOV	0	88	176	0	0	0	561	385	372	2,616
DEC	40	32	137	7	0	54	648	447	395	2,817
JAN	55	32	134	27	3	280	847	453	412	1,696
FEB	3,829	41	486	578	311	732	1,914	755	848	7,347
MAR	6,979	47	529	803	1,041	1,162	1,874	805	957	6,988
APR	236	28	64	45	0	0	308	284	181	1,083
MAY	78	333	89	23	0	0	334	331	178	1,301
JUN	3	714	102	4	0	73	293	335	149	837
JUL	0	550	58	2	0	39	254	273	97	678
AUG	0	519	99	0	12	304	574	255	122	909
SEP	0	115	64	0	10	197	404	244	174	878
TOTAL	**11,220**	**2,516**	**2,075**	**1,490**	**1,378**	**2,841**	**8,240**	**4,786**	**4,064**	**28,165**

* USGS Stations

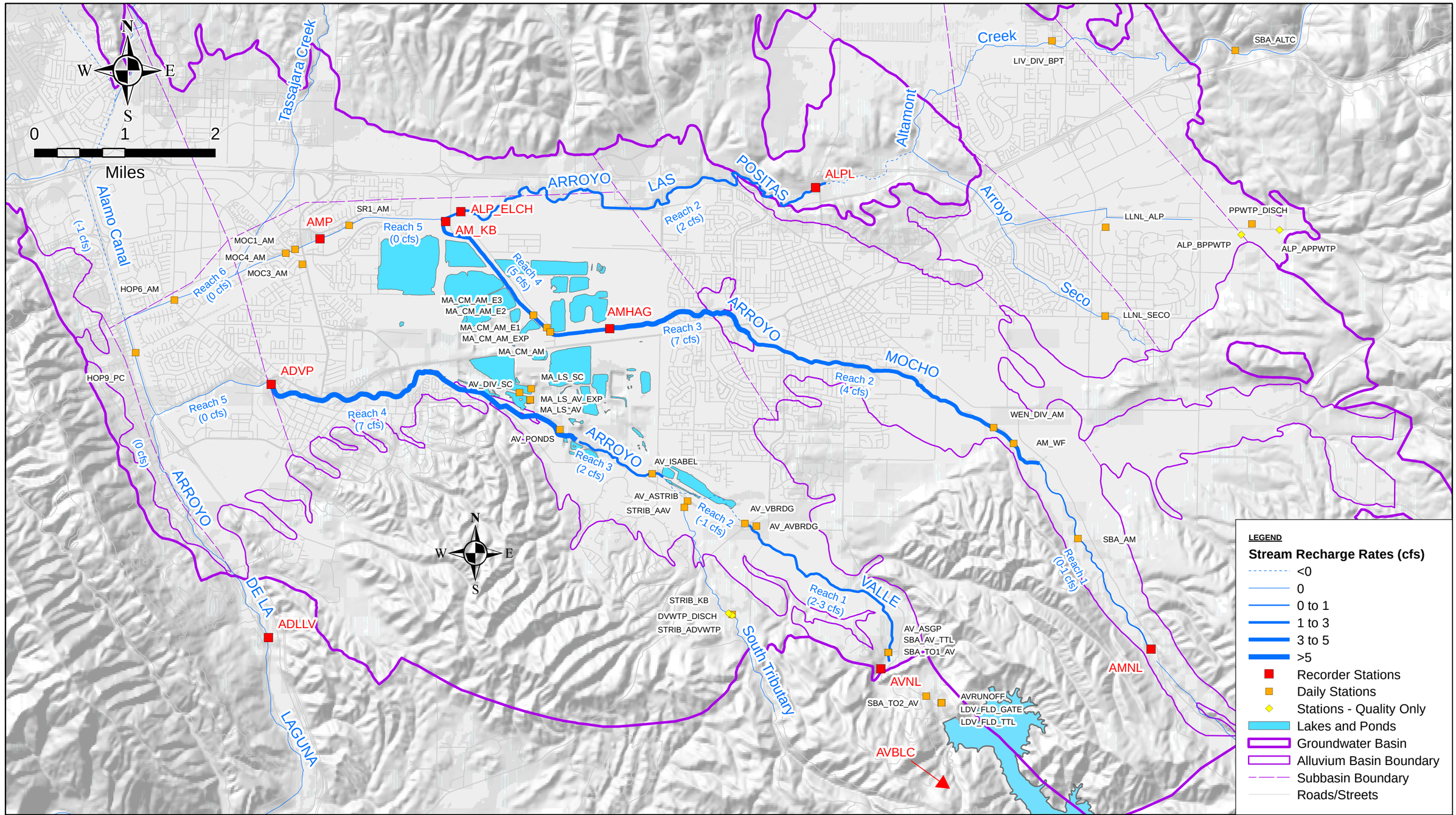
TABLE 3.3-4
ZONE 7 WATER AGENCY
SURFACE WATER MONITORING
MONTHLY CONDUCTIVITY SAMPLING
(EC in micromhos/cm. Flow in CFS)
2009 WATER YEAR

	ARROYO VALLE Near LIVERMORE AVNL		ARROYO VALLE At PLEASANTON ADVP		ARROYO MOCHO Near LIVERMORE AMNL		ARROYO MOCHO At LIVERMORE AMHAG		ARROYO MOCHO At KAISER BRIDGE AM_KB		ARROYO MOCHO Near PLEASANTON AMP		ARROYO LAS POSITAS At LIVERMORE ALPL		ARROYO LAS POSITAS At EL CHARRO ALP_ELCH		ARROYO de LA LAGUNA at VERONA ADLLV		DATE OF SAMPLING
	EC	FLOW	EC	FLOW	EC	FLOW	EC	FLOW	EC	FLOW	EC	FLOW	EC	FLOW	EC	FLOW	EC	FLOW	
OCT	680	0.25	910	1.5	DRY	0	DRY	0	DRY	0	1570	2.6	1460	2.1	1110	2	1300	10	Oct 15, 2008
NOV	760	0.9	800	0.15	DRY	0	DRY	0	DRY	0	1570	3	1160	3.2	980	2	1380	11	Nov 19, 2008
DEC	890	0.5	780	4	700	0.1	DRY	0	DRY	0	2040	5.1	1890	4.2	680	6.5	680	30	Dec 17, 2008
JAN	520	0.45	490	1.8	680	0.15	DRY	0	690	5	1140	11	755	3	1100	2.1	1130	15	Jan 15, 2009
FEB	610	0.75	650	21	740	3.3	740	3.3	1230	4	2110	8	1860	11.5	550	21	320	250	Feb 14, 2009
MAR	740	0.6	800	2.1	750	2.1	DRY	0	1380	11.6	1870	4.2	1850	6	1150	3.5	1130	24	Mar 19, 2009
APR	780	0.5	890	1	710	0.8	DRY	0	DRY	0	1800	3.3	1750	3.3	1080	2.5	1280	18	Apr 14, 2009
MAY	850	0.4	900	0.45	680	0.3	DRY	0	DRY	0	1620	2.3	1590	5	880	2	1360	12	May 19, 2009
JUN	870	11	880	2.2	DRY	0	DRY	0	DRY	0	1470	2.3	1570	3	820	3	1200	13	Jun 17, 2009
JUL	820	11	850	0.1	DRY	0	DRY	0	DRY	0	1260	2.1	1250	3.2	800	1.6	1140	11	Jul 17, 2009
AUG	770	9	860	1	DRY	0	DRY	0	870	4	1240	2.1	1420	4.5	990	2.1	1100	12	Aug 18, 2009
SEP	410	4.5	540	1.5	DRY	0	DRY	0	1050	2.8	1430	2.1	1320	3	1100	3	1180	15	Sep 12, 2009

To convert from EC to TDS in mg/L, multiply EC by 0.58

TABLE 3.3-5
ZONE 7 WATER AGENCY
WATER QUALITY RESULTS FOR SURFACE WATER SAMPLES
2009 Water Year

		TEMP.	EC		Mineral Constituents (mg/L)									Select Metals (mg/L)				TDS	Hard
SITE ID	DATE	°C	umhos/cm	pH	Ca	Mg	Na	K	HCO3	SO4	Cl	NO3	SiO2	B	As	Fe	Mn	mg/L	mg/L
ADVP	10-Dec-08	8.0	690	8.0	47	24	60	2.9	203	34	94	<0.44	10.0	0.33	0.0014	<0.05	0.012	374	214
ADVP	10-Mar-09	10.0	552	7.5	39	17	47	2.7	157	39	71	<0.44	8.7	0.24	0.0013	<0.05	0.011	302	169
ADVP	17-Jun-09	0.0	644	8.0	36	24	54	1.8	176	47	84	<0.44	5.2	0.21	0.0013	<0.05	0.01	340	190
ADVP	10-Sep-09	0.0	594	7.8	33	19	51	2.2	175	34	71	<0.44	4.5	0.38	0.001	<0.05	0.014	302	160
AMNL	10-Mar-09	9.9	610	8.2	29	50	26	2.0	308	40	19	<0.44	9.2	0.51	0.0011	<0.05	<0.01	331	278
AVBLC	10-Mar-09	8.2	403	8.2	40	19	14	1.4	192	32	8.9	<0.44	11.6	0.22	<0.001	<0.05	<0.01	224	178
AVNL	10-Dec-08	8.0	1183	7.7	80	47	102	3.4	318	191	106	<0.44	21.8	1.39	0.0013	<0.05	0.074	709	392
AVNL	10-Mar-09	10.4	1244	7.5	85	48	124	3.9	338	185	128	<0.44	20.5	1.8	<0.001	<0.05	0.077	762	409
AVNL	17-Jun-09	19.1	456	7.9	25	13	43	2.2	109	43	52	<0.44	8.4	0.19	0.0014	<0.05	0.019	241	118
AVNL	10-Sep-09	0.0	908	7.8	51	26	86	3.2	226	70	131	<0.44	16.2	1.00	0.0019	<0.05	0.12	496	234
MA_CM_AM_E2	30-Jul-09	0.0	850	8.5	38	53	54	2.1	273	54	107	<0.44	13.9	0.36	<0.001	0.013	<0.01	464	315
STRIB_KB	10-Mar-09	10.6	744	7.3	39	21	74	3.3	140	67	112	2.83	14.0	0.35	0.0015	<0.05	0.021	402	186



ZONE 7 WATER AGENCY 100 North Canyons Parkway Livermore, CA	DRAWN: GG / TR	SCALE: 1 in = 1 Mile	**FIGURE 3.3-1** **Surface Water Monitoring Program** **Surface Water Sites in 2009 Program** **Livermore Valley Groundwater Basin**
	REVIEWED: TR	DATE: May 6, 2010	
	FILE: E:\MONITOR\SW\2009WY\GWMPSubmittals\Fig3.3-1Stations09.mxd		