

Environmental Engineers/Consultants

**LOMBARDO ASSOCIATES, INC.**

49 Edge Hill Road

Newton, Massachusetts 02467

(617) 964-2924

Portable: (617) 529-4191

Fax: (617) 332-5477

E-mail: [pio@LombardoAssociates.com](mailto:pio@LombardoAssociates.com)

23852 Pacific Coast Highway, #502  
Malibu, CA 90265-4191

January 19, 2010

Ms. Wendy Phillips  
Los Angeles Regional Water Quality Control Board  
320 West 4th Street, Suite 200  
Los Angeles, CA 90013

Dear Ms. Phillips:

Re: Malibu La Paz – No Discharge Design Criteria

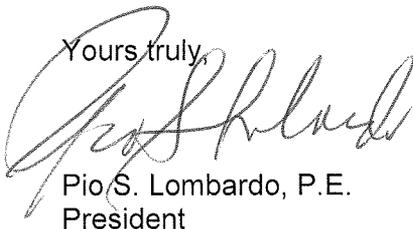
In response to the Los Angeles Regional Water Quality Control Board's (LARWQCB) request for documentation on the operation of existing irrigation systems to confirm the ET estimates in the LaPaz wastewater Plan, we have provided the Board data that illustrates that the Malibu Civic Center ET is greater than the Santa Monica CIMIS data that was used as the basis of the LaPaz Wastewater Plan. Therefore the design basis is conservative. Further to this issue, we hereby provide the attached summary of 10 years of irrigation and ET information from the nearby (less than one mile from the project site) Pepperdine University Title 22 recycled water irrigation system and ET measurement facilities which substantiate the following significant matters:

- a. ET in the Malibu Civic Center area is 120% of CIMIS, data that was used as the basis of the LaPaz wastewater Plan. The implications of this data is that the LaPaz reuse system is conservatively designed – in other words estimates on wastewater reuse for irrigation are conservative.
- b. Groundwater recharge occurring below irrigated areas is not materially different than in non-irrigated areas of the Malibu Civic Center – Lagoon watersheds. Consequently there is no basis that any appreciable groundwater mounding impacts are likely to occur and it validates the No Discharge design methodology.

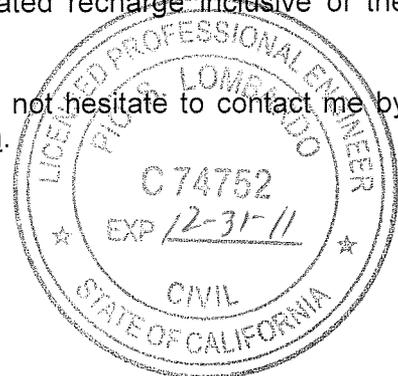
The data contained in the attached Table was extracted from the Pepperdine University Reports which are in the LARWQCB files. I trust that this issue is no longer a matter of debate as the record is clear that the No Discharge system is technically sound, as well as environmentally superior method for wastewater management. Please note that the Pepperdine drain discharge is for dewatering purposes for geotechnical reasons. We have calculated recharge ~~inclusive~~ of the drainage discharge amounts.

If you have any questions or comments on this matter, please do not hesitate to contact me by telephone (617) 964-2924 or E-mail [Pio@LombardoAssociates.com](mailto:Pio@LombardoAssociates.com).

Yours truly,



Pio S. Lombardo, P.E.  
President



Pepperdine Hydrogeologic Annual Report Data Summary

Pepperdine Hydrogeologic Annual Report Evapotranspiration ET <sub>o</sub> Data (inches)								
Month	Year							
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
OCT	4.33	3.12	3.04	4.91	3.55	5.38	5.74	4.47
NOV	4.03	2.71	4.20	3.42	4.07	5.43	5.62	2.94
DEC	3.57	3.34	2.98	3.44	3.95	3.88	5.60	3.41
JAN	3.86	3.50	4.25	4.03	3.47	4.78	5.76	3.26
FEB	3.47	4.31	3.44	3.59	2.88	5.79	4.18	3.55
MAR	4.73	5.07	4.52	5.96	4.32	3.70	6.56	4.94
APR	2.14	4.36	4.47	5.32	5.51	4.03	5.37	5.43
MAY	5.21	5.39	3.85	6.54	5.61	5.31	6.80	4.40
JUN	5.51	5.01	3.27	4.79	5.33	6.52	6.98	4.31
JUL	6.63	5.25	4.51	6.42	6.88	7.51	7.68	4.47
AUG	5.64	4.76	5.50	5.76	6.49	6.62	7.79	3.58
SEP	5.41	4.50	3.41	6.25	5.57	6.61	6.71	3.30
MIN	2.14	2.71	2.98	3.42	2.88	3.70	4.18	2.94
MAX	6.63	5.39	5.50	6.54	6.88	7.51	7.79	5.43
AVG	4.54	4.28	3.95	5.04	4.80	5.46	6.23	4.01

Annual Total	54.53	51.32	47.44	60.43	57.63	65.56	74.79	48.06	459.76	57.47
Santa Monica CIMIS ET <sub>o</sub>	48.51	49.24	46.34	47.6	45.6	44.23	48.26	49.13	378.91	47.36
Pepperdine/SM	112%	104%	102%	127%	126%	148%	155%	98%	121%	121%

Pepperdine Hydrogeologic Annual Report Water Balance Summary (acre-feet)											
Parameter	Year								MIN	MAX	AVG
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008			
Precipitation (P)	222.77	48.70	127.61	93.45	376.49	239.73	79.34	146.57	48.70	376.49	166.83
Irrigation (I)	236.47	250.48	263.17	355.33	246.31	292.19	321.67	299.22	236.47	355.33	283.11
Subtotal In	459.24	299.18	390.78	448.78	622.80	531.92	401.01	445.79	299.18	622.80	449.94
Surface Runoff (RO)	106.94	5.75	81.24	28.24	196.11	119.85	12.30	37.04	5.75	196.11	73.43
Actual Evapotranspiration (AET)	307.09	257.20	281.11	420.07	403.34	411.27	386.13	386.77	257.20	420.07	356.62
Change in Storage (ΔS)	-11.50	4.23	8.37	-10.92	-0.33	-2.27	1.27	7.53	-11.50	8.37	-0.45
Sub-Drain Flow (SDF)	46.10	62.50	31.63	56.32	70.20	37.20	24.96	30.57	24.96	70.20	44.94
Subtotal "Loss"	448.63	329.68	402.35	493.71	669.32	566.05	424.66	461.91	329.68	669.32	474.54
Groundwater Recharge	10.61	-30.50	-11.57	-44.93	-46.52	-34.13	-23.65	-16.12	-46.52	10.61	-24.60
SubDrain Flow + GW Recharge (1)	56.71	32.00	20.06	11.39	23.68	3.07	1.31	14.45			
Units	SubDrain Flow + GW Recharge										
gpd	50,556	28,528	17,883	10,154	21,110	2,737	1,168	12,882			
gpd/sf	0.0132	0.0070	0.0035	0.0017	0.0034	0.0004	0.0002	0.0021			
inches/year	7.73	4.12	2.07	0.97	2.01	0.26	0.11	1.23			
% of Irrigation + Precipitation	12%	11%	5%	3%	4%	1%	0%	3%			

Precipitation (in)							
2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
24.10	5.24	13.12	7.95	32.03	20.47	6.80	12.47

Irrigated Areas								
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
acres	88	93	116	141	141	141	141	141
sq. ft.	3,831,102	4,051,080	5,052,960	6,141,960	6,141,960	6,141,960	6,141,960	6,141,960

Applied Water								
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
feet/year	5.22	3.22	3.37	3.18	4.42	3.77	2.84	3.16
gpd/sf	0.107	0.066	0.069	0.065	0.091	0.077	0.058	0.065

Recycled Water from Tapia to Pepperdine								
	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
acre-feet/year	122.00	93.00	91.50	145.80	107.70	118.10	160.80	160.90
gpd	108,762	82,908	81,571	129,979	96,013	105,285	143,351	143,440

Notes:

- (1) Deep sub-drains are installed at the base of the fill material in each of the three on-campus canyons during initial campus construction in the early 1970s to keep the fill material dewatered and convey the water to storm drains. There are also several locations throughout the campus where shallow sub-drains have been installed to facilitate near surface drainage - most notably the baseball field and the 440 track infield. Consequently the Sub-Drain Flow shown herein is significantly greater than drainage under irrigated areas and therefore the estimates for sub-drain + groundwater flows from the wastewater irrigated areas are conservative maximum amounts. Actual values would be less than estimated herein.