

APPENDIX

E

GROUNDWATER USAGE
ANALYSIS

DURHAM VILLAS PLANNED UNIT DEVELOPMENT
GROUNDWATER USEAGE COMPARISON
BETWEEN AGRICULTURAL AND DURHAM VILLAS PROJECT USES
October 28, 2013

As a part of the analysis of the Durham Villas Project impacts, W. Gilbert Engineering has computed the amount of groundwater used by the existing almond orchard on the 49.423 acre project and the amount of groundwater used by the proposed uses in the Durham Villas Project.

The amount of groundwater used by a typical almond orchard is monitored annually by the UC Cooperative Extension and the information published for use by the public. This analysis used a value of 39" annually which is consistent with the irrigation water usage for the existing orchard, distributed in accordance with published pan evaporation data for the Durham area. For the 49.423 acre orchard this amounts to 160.23 acre-feet per year. The monthly computed water usage for the orchard is shown in Exhibit "A"

The amount of groundwater used by the different uses in the Durham Villas Project were computed using data collected from California Water Service Company for similar uses in the Chico area. The values used to compute the water usage are shown in Exhibit "A". For the Project this amounts to 107.68 acre-feet, which equates to a 33% annual reduction in groundwater usage.

The California Department of Water Resources and Butte County have been monitoring groundwater levels in the Durham area for over 40 years and with the exception of drought cycles the groundwater levels have remained fairly consistent over the monitoring period. The levels have dropped during drought cycles, but recover to their pre-drought levels after a normal rainfall year. With the conversion of the existing orchard to non-orchard related uses, groundwater usage will be reduced. Exhibit "A" shows a tabular comparison and Exhibit "B" shows a graphical comparison of monthly groundwater usage between the orchard and project uses. The orchard water usage over the months of April through October exceeds Project water usage by 53.421 acre-feet.

The well(s) for the Project will be drilled and cased to depths below the surrounding residential water wells and interference from pumping will be eliminated. Additionally, the well(s) will be sited in accordance with the setbacks prescribed by Butte County Code Section 23B-5c, "Well Spacing Requirements".

Exhibit "A"

Durham Villas Planned Unit Development vs Agricultural Annual Water Consumption

	Evapo- transpiration (inches)	Residential Water Use (acre-feet)	Community Center Water Use (acre-feet)	Neighborhood Commercial Water Use (acre-feet)	Park Landscaping Water Use (acre-feet)	Street Landscaping Water Use (acre-feet)	Monthly Development Usage (ac-ft)	Monthly Agricultural Usage (ac-ft)	Difference* (ac-ft)
January	0.80	4.665	0.023	0.032	0.000	0.000	4.720	3.295	1.425
February	1.37	4.618	0.021	0.029	0.114	0.479	5.261	5.642	-0.381
March	2.47	5.927	0.023	0.032	0.380	1.325	7.687	10.173	-2.485
April	3.80	6.689	0.023	0.031	0.777	2.307	9.826	15.651	-5.824
May	4.95	7.763	0.023	0.032	0.887	3.444	12.149	20.387	-8.238
June	5.63	8.000	0.023	0.031	0.981	3.845	12.880	23.188	-10.308
July	5.97	8.518	0.023	0.032	1.098	4.238	13.910	24.588	-10.678
August	5.23	7.970	0.023	0.032	0.929	3.709	12.664	21.540	-8.877
September	4.03	6.853	0.023	0.031	0.654	2.564	10.125	16.598	-6.473
October	2.72	6.112	0.023	0.032	0.422	1.589	8.180	11.203	-3.023
November	1.27	4.877	0.023	0.031	0.123	0.513	5.566	5.231	0.335
December	0.76	4.662	0.023	0.032	0.000	0.000	4.717	3.130	1.587
Annual Totals	39.00	76.653	0.276	0.376	6.367	24.012	107.685	160.625	-52.940

* negative amount indicates that the Durham Villas project uses less water than the existing agricultural uses for the month.

Exhibit "B"
Orchard vs. Subdivision
Water Usage Comparison

