Dudek, "Oak Tree Estimate for High Country SMA and the Salt Creek Area" (January 10, 2007; 2007D)

DUDEK

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MEMORANDUM

3738-67

January 10, 2007

T o: Matt Carpenter, Newhall Land
Sam Rojas, Newhall Land

F r o m: Andy Thomson, Dudek

Re: Oak Tree Estimate for High Country SMA and the Salt Creek Area

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Dudek conducted an oak tree estimate within the High Country SMA and the Salt Creek Area in 2006. The number of oak trees onsite was initially estimated by utilizing high resolution aerial photography to count the number of trees within all oak vegetation communities onsite. The initial oak tree estimate was field checked to determine if the estimate was accurate. During the field check, a random sample of oak tree vegetation community polygons were sampled by counting the number of oaks by species within defined areas within the various oak vegetation communities. Oak trees with a diameter at breast height (DBH) of three inches or greater were counted in this estimate. After field checking, it was determined that the estimates made by aerial photo interpretation in oak woodland vegetation communities were not accurate. This was due to factors such as canyon shading in the aerial image, burned trees in some portions of the site, and a merged canopy in dense areas, among other factors. In contrast, oak tree estimates by aerial photo interpretation in valley oak savannah were accurate, likely because valley oak savannah typically occurs on less steep terrain (resulting in less shading in the aerial photo) and has a much lesser density than the oak woodland vegetation communities.

After determining that the aerial photo estimate was not accurate for oak woodland vegetation communities, an alternative method of estimating the number of trees onsite was utilized, wherein the density of oaks in the various oak vegetation communities onsite was estimated from a series of random samples within each oak woodland vegetation community. The number of oak trees was counted in the field within several polygons. A regression analysis was used to generate a linear formula relating number of acres to number of trees. The polygons were treated

cumulatively, comparing the cumulative acreage to the cumulative number of trees for statistical purposes. The slope of the resulting regression varied depending on the order in which polygons were added to the analysis. To account for this, the regression analysis was repeated 1,000 times using random ordering of the polygons and the mean value of the resulting slopes was used as the estimated density. A regression analysis was suitable, because in all cases, a substantial portion of the total acreage had been completely sampled (11% to 88% depending on the oak vegetation community, *Table 1*), so the amount of estimated acreage was not too large to produce valid estimates using linear regression equations. To calculate confidence limits for the estimated number of trees, an arbitrary regression analysis was chosen from the 1,000 repetitions.

The results of the analysis described above revealed a significant distinction between some areas with a low density of live oaks and other areas with a high density of live oaks. Live oak woodland was divided into low and high density stands based on the digital signature of the aerial photo and field experience onsite. Low density live oak woodland has an average density of 12.79 oak trees per acre within the study area. High density live oak woodland was estimated to have 27.41 oak trees per acre. Similar distinctions of low and high density oak trees in mixed oak woodland and valley oak woodland were not apparent in this study. Therefore, stands of mixed oak woodland and valley oak woodland were not divided up by low and high tree density in this analysis. Accordingly, mixed oak woodland has an average density of 18.91 oak trees per acre. Valley oak woodland has an estimated density of 16.33 oak trees per acre.

The total number of oak trees within oak woodland vegetation communities was estimated by extrapolating these calculated densities across all oak woodland vegetation communities within the study area that were not surveyed as part of this analysis.

Using the density estimates for oak woodlands described above in combination with the aerial photo estimate of oaks in valley oak savannah and individual oak trees mapped in non-oak vegetation communities, the estimated number of oaks in NRHC SMA is 13,731 and in the Salt Creek area is 5,640 (*Table 1*).

Oak trees within the proposed open space areas within Newhall Ranch Specific Planning Area (NR SPA) were mapped in the field with global positioning system equipment by Impact Sciences in 2006. Results of that survey indicate that there are 1,903 oak trees within the NR SPA proposed open space areas with a DBH of three inches or greater (*Table 1*).

TABLE 1
NEWHALL RANCH HIGH COUNTRY SMA
AND SALT CREEK AREA OAK TREE ESTIMATE

	Surveyed Acres	Censused Trees	Unsurveyed Acres	Estimated Trees	Confidence Interval (± trees)	Total Trees
High Country SMA						
Low Density Live Oak	48.33	508	91.46	1,170	32	1,678
High Density Live Oak	46.41	1,269	256.39	7,028	121	8,297
Mixed Oak Woodland	25.36	513	48.87	924	57	1,437
Valley Oak Woodland	23.71	475	24.1	394	43	869
Valley Oak Savannah		1,451	0	-	-	1,451
Total High Country	143.81	4,216	420.82	9,515		13,731
Salt Creek Area SMA						
Low Density Live Oak	46.71	682	13.13	168	30	850
High Density Live Oak	9.19	270	81.763	2,241	12	2,511
Mixed Oak Woodland	63.4	1,121	31.23	591	60	1,712
Valley Oak Woodland	20.98	244	2.95	48	54	292
Valley Oak Savannah	-	275	0	-	-	275
Total Salt Creek Area	140.28	2,592	129.07	3,048		5,640
GRAND TOTAL	**284.09**	**6,533**	**549.89**	**12,563**		**19,371**