Report on Analysis of Camping Petition

We estimate that there are 19,122 valid signatures on the Camping petition. Using a random sample of a size required by law, the City is 95% confident that the true number of valid signatures on the entire petition exceeds 18,887 and is 95% confident that the true number of valid signatures on the entire petition is less than 19,356. Furthermore, the City is virtually certain that the true number is less than 20,000.

A total of 24,201 lines of names were submitted on the petition. A random sample of 6,051 of these lines was checked. 1,147 of the sample lines were disqualified on account of being duplicate signatures of registered voters who signed more than once (41), or for other reasons (1,106). The remaining 4,904 sample lines were validated as bearing signatures of qualified voters.

Using these figures, we estimate that there are 19,122 valid signatures on the Camping petition. The method used for calculating this estimate is based on Goodman's method (*The Annals of Mathematical Statistics*, 1949, pp. 572-579), supplemented with variance estimate based on Haas and Stokes (*Journal of the American Statistical Association*, 1998, pp. 1475-1487.) The estimate of 19,122 valid signatures adjusts properly for the effect of multiple signatures. In principle, it is incorrect to extrapolate the 4,904 valid signatures that were found in the sample by simply multiplying 4,904 by the petition-to-sample-size ratio 24,201 ÷ 6,051 = 4 (approximately). Also, the presence of multiple signatures in the sample substantially increases the margin of error for the estimate even when the multiplicities are relatively few, as in this petition. The method used correctly calculates both the estimate and the margin of error; the simple extrapolation does not. The effect of increased margin of error is to increase uncertainty about the actual number of valid signatures in the whole petition. However, the correct margin of error is still small relative to the difference between the estimate of 19,122 and the benchmark minimum figure of 20,000. The probability that checking all 24,201 submitted signatures would find a total of at least 20,000 valid signatures is less than 3 in one billion. Therefore, the confidence is nearly 100% that the petition contains fewer than 20,000 valid signatures. Details on proper ways to adjust for multiple signatures are given in the cited references.

Random number generation for the sample and all programming were done with SAS® (Statistical Analysis System) software.

Number of Valid Signatures on Camping Petition is Estimated to be 19,122

The City of Austin has determined that the Camping petition does not meet the requirement for the minimum number of signatures of valid voters if the required minimum is 20,000. 24,201 lines of names were submitted on the petition. A random sample of 6,051 of the submitted lines was checked. 1,147 of the sample lines were disqualified on account of being duplicate signatures of registered voters who signed more than once (41), or for other reasons (1,106). The remaining 4,904 sample lines were validated as bearing signatures of qualified voters.

Furthermore, using the random sample, the City estimates that there are 19,122 valid signatures on the Camping petition. The City is 95% confident that the true number of valid signatures on the entire petition exceeds 18,887 and is also 95% confident that the true number is less than 19,356. Furthermore, the City is virtually certain that the true number of valid signatures is fewer than 20,000.