November 8, 2004

George Gilbert
Director of Elections
Guilford County Board of Elections
Greensboro, NC

Dear George,

As you know, Tuesday's election drew an unprecedented number of voters to the polls. This unanticipated level of voter participation was a challenge that we believe was managed very well in Guilford County.

On behalf of the team at Election Systems & Software, I would like to congratulate you and your staff on running a very successful election. And, all of us at ES&S want to thank you for the opportunity to partner with you to carry out our important roles in the democratic process. The success of this election was the result of a tremendous amount of hard work from everyone involved. Where challenges did arise, we worked together to address them quickly and effectively so the election process continued uninterrupted. The countless hours of preparation paid off, and all in all, it was a very good day.

One challenge we did face was the incorrect information contained in preliminary and unofficial returns for certain contests in the Guilford County "One Stop" precinct used to collect totals for early voting. As you know, this occurred because exceptional voter participation generated a number of ballots and votes cast that exceeded the capacity of single precinct vote counters accepting this amount of data in the Election Reporting Manager results reporting software.

This limitation in the results reporting software was previously documented and known to ES&S. To clarify further, the limitation has nothing to do with the Votronic tabulation systems. No votes were lost. All ballot data and vote counts were correctly captured and reported by the Votronic touch screen tabulation systems.

We regret any confusion the discrepancy in early vote totals has caused.

We would like to explain in further technical detail what caused this issue, should you or others at the county have questions. The 32,767 capacity limitation at a single precinct level is a function of the design and definition of the results database used by ERM. The data storage element used to record votes at the precinct level is a two byte binary field. 32,767 is 2 to the 15th power, which is the maximum number held by a two byte word (16 bits) in memory, where the most significant bit is reserved as the sign bit (a plus or minus indicator). Additionally, ERM precinct

count level data is stored in a binary computer format known as two's complement. Data on ERM results reports are printed as the absolute value of the two's complement of the associated data in the ERM database. This means that once the 32,767 limitation is reached, additional incremental tallies of vote results would not be printed correctly (32,768 through 65, 536 would actually be represented as 65,536 to 32,768).

While this value, 32,767 is certainly higher than any practical value that could be tabulated in a single election day precinct, the consideration of reporting all absentee ballots or early voting into a single absentee or "One Stop" precinct does hold the possibility of yielding much higher totals than what may be possible in single election day precincts.

While the discrepancy in preliminary vote totals did cause some early confusion, it is very important to note that the final results reported to the state were accurate and complete. Final counts based on the Votronic systems and paper tapes were fully accurate and correct.

To avoid this limitation in elections where the One Stop early voting totals may exceed the 32,767 limitation, ES&S would recommend one of the following:

1. Using the Unity EDM software, code multiple precincts to support the larger counts. Create a split for each ballot style for each precinct. Configure early voting terminals and follow vote collection procedures that would ensure no individual precinct totals would approach the 32,767 limitation.

2. Collect early voting "One Stop" and other absentee votes into Election Day precincts.

3. Upgrade systems and software to the Unity 2.5 or Unity 3.0 versions, when available in North Carolina. The ERM database has been expanded in these versions to accommodate vote totals in excess of millions of votes in any individual precinct.

Heretofore, in previous elections, Guilford County had configured, collected and distributed the early voting results into multiple separately defined precincts (as suggested above, avoiding this limitation). ES&S was not aware that this practice had changed. Had we been aware of this change, we would have advised Guilford County of this limitation and suggested one of the other configuration options.

ES&S shares Guilford County's commitment to making sure every vote cast is counted accurately. We are absolutely confident in the accuracy of the final results that were reported. If you have additional questions on this issue, please do not hesitate to contact me.

Sincerely,

Ken Carbullido
Senior Vice President, Product and Software Development
Election Systems & Software Inc.