

11 November 2016

Chairman McManus, Vice-Chair Hogan, State Board of Elections Members,

I did receive a description of the Post-Election Ballot Tabulation Audit Plan this morning, thank you. I will try to respond in detail in a few days.

During the SBE meeting of 28 October 2016, Chair McManus had asked me how many ballots would need to be audited. Because the vote counts are now known, I can provide some numbers. While in a previous message I had suggested you could limit the number of locations whose ballots were examined, I would like to bring to your attention the extremely small number of ballots you need to audit if you do a statewide audit.

You will be able to provide very good confidence in both the statewide outcomes by examining only 112 randomly chosen ballots.

By sampling about 700 of your 2.5 million ballots, you will be able to greatly improve confidence in each federal outcome, including local ones.

Note that this proposal will not use any of the scan data and does not scan any ballots. It simply inspects randomly chosen ballots. The ballots do not need to be stored in any particular order. All the auditors need to know is how the bundles (i.e., batches) of ballots are labeled, and how many ballots are in each bundle.

For a ballot polling audit, where ballots are chosen at random from all relevant collections, and a risk-limit of 5% (if the contest outcome is wrong, the chance that the audit will conclude the outcome is right is at most 5%), assuming your counts are all correct, you will need to sample, on average the following numbers of ballots:

President: 100

Senate: 112

Local Races (House)

District 1: 40

District 2: 76

District 3: 77

District 4: 23

District 5: 44

District 6: 297

District 7: 22

District 8: 111

Our estimates are based on the unofficial results posted on your website: <http://elections.maryland.gov/elections/2016/results/General/index.html> at about 7 pm on 10 November.

Note that we estimated the total number of ballots cast by adding the total of the counts listed for the Presidential contest. We can provide better estimates if we know how many ballots were cast in all, and in each individual district. Further, as the audit progresses, we would gauge whether we needed a larger or smaller number of ballots than listed above for the chosen risk level. If you would prefer to have a hard limit on how many ballots are drawn, we could stop after drawing a pre-determined number of ballots and provide you with a risk measurement based on what those ballots show.

You may also decide that you prefer to audit only the statewide contests, or that you would like to audit a single close local contest. And, of course, you may choose to perform a fixed-time-fixed-manpower audit of a precinct (or scanner) or two instead, a possibility I had mentioned in my previous letter dated 6 November 2016. **Anything you do that involves independent examination of the paper ballots will provide an infinite improvement in election confidence over what you have now.**

As I had offered earlier, I can commit to organizing a team of 4-5 experts including myself and other academics, with members chosen for their expertise in election audits and/or voting technology. Our expert team would be very happy to provide you with all the guidance you need to execute the ballot polling audit described above, or other more localized audits as described in my letter of 6 November, and can be present when you carry out an audit. **Our assistance will be at no cost to the state.**

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