

Post-Election Audit Report

2009 Coordinated Election - Boulder County

This report summarizes the post-election audit of the 11/3/2009 Boulder County Coordinated Election. The audit included a hand count of a statistical sample (roughly 3%) of the votes cast in the election. The results of the hand count were then compared with the Election Day tally. Discrepancies were investigated.

The 2009 Coordinated election comprised:

- 183979 mailed ballots; 63320 voted and returned
- 41 contests with an average of 11.27 contests per ballot. 21 contests were multi-county.
- 425 individually tallied batches of ballots: min 45, ave 149, max 300 ballots per batch
- One contest result was within the margins for a mandatory recount

By statute, the audit was conducted before certification of the election. The audit was based on a snapshot of the election taken Nov 6, three days after Election Day. At that time 63247 ballots had been returned, verified and counted, representing 99.88% of the election's final 63320 ballots.

Plans for the audit were announced on Oct 30 and the public was encouraged to participate and observe. A county website (<http://www.bouldercounty.org/clerk/elections/2009ElectionAudit.htm>) was used to distribute the audit plan, the schedule and the election data that would drive the audit. Press Releases were issued to alert the public.

- On Oct 30, four days before the election, the audit plan and the election data schemas were posted. The audit plan included details on the audit constraints, its budget, how contests and batches would be selected and how discrepancies would be handled.
- On Nov 6, the snapshot of the election's data was released. This included the tally of each of the 425 audit units (MBBs) used in the election so far. The snapshot also included a pre-processed spreadsheet containing margin calculations that would drive selection of contests and the MBB probabilities that would drive selection of MBBs. Background on these calculations and the algorithms involved can be found in the Audit Plan, which is available on the above website.

Audit Setup Meeting

On Nov 7 the Audit Board met to review the audit plan, select contests and select batches of ballots for the hand count. The Audit Board consisted of a three-person subset of the Canvass Board. Each jurisdiction participating in the election had a representative on the Canvass Board; three self-selected to serve as the Audit Board. The Audit Board:

1. Reviewed the techniques used for contest and MBB selection. Both selection techniques were encapsulated in the parameterized spreadsheet released to the public on Nov 6:
 - **Contests:** selected randomly with probability proportional to margin

M = Margin = diff between winner & loser
V = ballots voted in contest
m = relative margin = M/V

Small relative margin → more likely to select contest.

How many contests: select contests as long as there are resources to audit them. Target for at least 10.

- **MBBs**: selected randomly using the NegExp statistical technique for greater efficiency

For each contest:

Which MBBs → random with probability proportional to # contest ballots

How many MBBs → weighted by margin and two NegExp parameters

wpm = a bound on the miscount expected per MBB

confidence = a measure of statistical effectiveness of the algorithm

Limit on # MBBs: to allow the audit to include more contests, limit the number of MBBs: for any one contest to no more than 40.

2. Solicited corrections. One correction to a margin calculation was suggested and adopted. The margin for the Boulder Council contest was recorded as 668 (difference between 5th and 6th place). The tighter margin was between 4th and 5th (158 votes) which determined a four year or a two year elected term.
3. Fine-tuned the MBB selection parameters. Each contest had tunable MBB selection parameters wpm and confidence, which are defined above.
 - MBB defaults were to set to (wpm=0.20, confidence=0.80) in general and (0.20, 0.85) for countywide and multi-county races. After the audit we noticed that several contests were mis-classified. School districts are the bulk of the multi-county races but there are a few other contests that slightly spill over into other counties. For consistency, these few contests should have been classified as multi-county. These few errors had no impact on the conduct of the audit.
 - The value of wpm puts a bound on the amount of error (or miscount) that is expected in an MBB. This error bound must be greater than the margin for each contest. When the default value of wpm=0.20 was used in the spreadsheet the error bound turned out to be less than the contest margin for a few contests. For these contests (Erie 2A, Louisville 2A, Louisville 2B) the spreadsheet was changed to increase wpm therefore increasing the error bound above the margin. Erie 2A was increased to 0.30 and both Louisville 2A and Louisville 2B were increased to 0.35.
 - To prevent the selection of any one contest from exhausting all audit resources, the audit board put a ceiling on the number of MBBs that would be audited per contest. To enforce this, the confidence level was adjusted for four contests: Boulder Council (0.20, 0.60), Lafayette Council (0.15, 0.75), DA (0.20, 0.04) and Ned Lib Bond 2B (0.20, 0.55). These adjustments dropped the expected number of audited MBBs for these contests below the target of 40.

Note 1: After contest and MBB selection we noticed that we had inadvertently changed both the wpm and confidence parameters on the Lafayette Council contest when limiting the number of MBBs audited for the contest. The parameters used (0.15, 0.75) are roughly equivalent to (0.20, 0.65).

Note 2: We also noticed that the parameters used for Rocky Mt Fire 5A were (0.20, 0.99). The change in confidence was inadvertent and resulted in the audit of 7 additional MBBs over the number when default parameters were used.

4. Selected MBBs to audit. The wpm and confidence parameters selected above determined a selection probability for each MBB for each contest. To determine if an MBB is selected in the audit of the contest, its probability was tested against a randomly generated number – if the selection probability was greater than the random number then the MBB was tagged as an

audit unit for the contest. Because a large number of random numbers were needed for this, the Audit Board used a pseudorandom number algorithm to generate a list of random numbers. The algorithm required a 15-digit seed, which itself was randomly built by combining 3 secret & random digits from each of 5 people. The resulting seed was 569-985-350-872-703.

5. Selected contests. The final task during the Audit Setup Meeting was for the Audit Board to select contests. This was done using dice against contest probabilities that were weighted by margin. We had one contest (DA Term Limit) with an extremely close margin, making that contest very likely to be selected with every dice throw. This meant that unless adjusted, 80% of our dice throws would be unproductive (i.e., would keep selecting the same DA Term Limit contest). To improve the efficiency of the selection process, we artificially adjusted the DA Term Limit probability and then non-randomly forced its selection as the first selected contest. The remaining contests were then selected using dice. The random numbers generated with each dice throw and the contests selected are contained in Attachment 1.

Note: The Audit Team chose not to audit unopposed contests. One was selected, but excluded from the hand count.

Attachment 2 summarizes the complete set of contests and MBBs that were selected. In total, 21815 votes were to be hand counted for 20 selected contests. These votes were included on 78 MBBs, which contained 11559 ballots.

Before starting the hand counting, a check was made to ensure that the set of selected MBBs represented all hardware paths through the scanning/counting system in use on Election Day. They were. If all paths were not included, additional MBBs/contests would have been manually added to ensure all paths were covered.

Hand Counting Selected Contests on Selected MBBs

The manual count was organized by MBB. An audited MBB was selected and all audited contests on it manually tallied. This minimized the movement of ballot boxes and minimized the wear and tear on ballots. Voter Intent was a key element of the hand tally and the teams were trained to use the same voter intent guidelines that were used on Election Day.

The hand count was performed in four-person teams. The technique used was similar to that pioneered in several California counties¹. Each four-person team consisted of

- a Caller who handled the ballots, located the contest and called out the vote
- an Observer who watched the Caller and confirmed the accuracy of the spoken vote
- two Talliers who independently recorded what they heard.

The teams used prepared tally sheets that were unique for each MBB in that they contained pre-filled tally areas for each contest that needed to be counted on the MBB. The tally sheet also included the ballot styles that the contests would be found on. But it did not include either the number of ballots on the MBB or the number of ballots that contained the contest. An example is in Attachment 3.

The two Observers would independently record the spoken vote in groups of 10. After each group of 10 ballots, the Observers would compare their tallies and go back, if needed.

Hand Count Throughput

The bulk of the hand tally was completed in the first three days of the audit. On the first day, 5 teams tallied 41 of the MBBs. These were the easiest to tally – those with an average of just one contest to audit. On day two, 7 teams tallied 19 of the “intermediate” MBBs – those with an average of 4 contests

¹ See “Improving the Security, Transparency and Efficiency of California’s 1% Manual Tally Procedures”, J. L. Hall, US Berkeley, http://josephhall.org/papers/jhall_evt08.pdf.

to count. And on the third audit day, the 7 teams tallied the remaining 18 MBBs – each with an average of 8 contests.

Comparison with Election Day Results

Election Day results were prepared for each MBB (see example in Attachment 4) and compared with the hand tally. If there was a discrepancy, the contest in question was recounted (not necessarily by the original tally team). The tally teams were told which contest to recount but were not told what the discrepancy was.

For each MBB the manual tally was documented by combining the tally results (i.e., Attachment 3) with the Election Day results (i.e., Attachment 4) into a Comparison Worksheet. An example is seen in Attachment 5. The worksheet automatically compared the two results, flagged differences and allowed for any discrepancy to be documented.

Community Nominations

Early on in the audit process the public was invited to analyze the election data and participate by nominating MBB/Contest pairs to include in the audit. This was posted on the county website and advertised through Press Releases. Two members of the community did make recommendations. One was a nomination to include the Nederland Library 5B contest. No specific MBBs were recommended. This nomination was satisfied because the contest was already included in the audit.

A second community nomination was more specific:

- DA Term Limit, p416_mb_284, high undervotes
- DA Term Limit, p068_mb_342, high margin
- Boulder Council, p372_mb_364, high undervotes
- St Vrain District D, p313_mb_348, high undervotes
- BVSD District F, p314_mb_347, high undervotes

Of these five nominations, the 3rd was already included in the audit and the 4th was for an unopposed contest. Of the remaining three nominations we had time on the last day of the audit to include two of them. The audit was extended with the first two nominations. These two MBB/contest pairs included 324 votes, bringing the total audited MBBs from 78 up to 80 and the total audited vote count to 22139.

Discrepancy Investigations

Initial comparisons of Election Day tallies against hand count tallies resulted in 37 MBB/contest discrepancies, roughly 13% of the total 283 MBB/contest audits performed.

The first step in resolving a discrepancy was to check the accuracy of the hand count tally sheets and if those looked OK then redo the manual count. This resolved 30 of the 37 discrepancies. Another was resolved when a third recount was necessary because the second failed to identify “unusual” ballots. The remaining six discrepancies represented real differences between the manual counts and the Election Day tallies and each was investigated and tracked down to a single ballot in each MBB. Attachment 6 shows the Comparison Worksheet and contest image on the pertinent ballot for each:

1. p394_mb_262 and the DA Term Limit contest – Voter marked both the “yes” and “no” boxes. Yes box then had an X through it. Election Day resolution team determined the vote as a “no”. The audit team determination was an overvote. Discrepancy is a difference of opinion of voter intent between the two teams.
2. p134_mb_490 and the BVSD District E contest – The voter made a small mark in the Miers box. Election Day resolution team judged this as a vote for Miers. The audit team judged it as an undervote. Discrepancy is a difference of opinion of voter intent between the two teams.

3. p388_mb_258 and the Open Space 0.25% contest – The voter marked both the “yes” and “no” boxes and then circled the “no” box and drew an arrow to it. Election Day resolution team could not determine voter intent and judged this to be an overvote. The audit team judged it to be a “no”. Discrepancy is a difference of opinion of voter intent between the two teams.
4. p086_mb_508 and the DA Term Limit contest – The voter made an X between the “yes” and “no” boxes, with part of the X extending into the “yes” box. The Election Day resolution team judged this to be a “yes” vote. The audit team judged it to be an undervote. Discrepancy judged to be a difference of opinion on voter intent between the two teams.
5. p205_mb_390 and the DA Term Limit contest – The voter marked the “yes” box and drew an X in the “no” box. The Election Day resolution team judged it to be a “yes” vote. The audit team decided it was an overvote. Discrepancy is a difference of opinion on voter intent between the two teams.
6. p021_mb_559 and the Boulder Council contest – The voter put a large X through the entire contest, making it clear that he/she didn’t intend to vote on this contest. However, part of the X extended into the Ageton box. On Election Day this was resolved as a vote for Ageton. The audit team judged it to be an undervote.

Conclusions

No systemic errors were found in the voting system. No trends or differences were noticed in the various equipment paths. No discrepancies were found when voters marked ballots as instructed.

There were six voter intent judgment differences out of the 22139 votes audited, or 0.0271% of the audited ballots. Resolution Teams consistently resolve most of the votes that aren’t clearly marked. A few, however, aren’t and those few – these 0.0271% – represent an estimate of voter-intent uncertainty.

For contests with close margins the audit team may consider it important to recommend to the Canvass Board that voter-intent uncertainty be included in the recount decision. Voter-intent uncertainty has the effect of increasing the threshold that triggers a recount. A state mandated recount is required if:

$$W - L < 0.005 * W \quad \text{where } W \text{ and } L \text{ are the Winner and Loser vote totals}$$

If we assume that unclear votes are randomly distributed through contests and ballots, then the worst-case (i.e., no unders or overs and all uncertain votes swing to reduce margin²) recount decision becomes:

$$W - L < 0.005 * W + 1.995 * U * V \quad \text{where } U \text{ is our voter-intent uncertainty, } 0.000271, \text{ and } V \text{ is the number of votes cast in the contest, } W+L.$$

Using data from the Nov 6 snapshot, Attachment 7 provides both calculations for all contests. The attachment shows that only the DA Term Limit contest is close enough to trigger a recount, with or without voter-intent uncertainty included.

The audit of the 2009 Coordinated Election was concluded on Nov 13, 2009. Attachment 8 contains the statement from the Audit Board.

² That is, W is reduced by 0.000271*V and L is increased by 0.000271*V.

Attachment 1: Contest Selection

Rolled Dice	Contest Selected	Already Selected?	Contest Ballots	Total Ballots	Num Contests
0.6000	DA Term Limits Extension to Three Terms. Vote For 1		5850	21812	20
0.4888	ClimateSmart (CEOLID) \$85M Bond Authorization. Vote For 1		5250		
0.3747	Park School District R-3 School Director At Large (4 Years) Vote For 2		9		
0.8780	Form of Bond Ballot Issue Vote For 1		228		
0.0719	City of Boulder Council Candidates Vote For 5		2239		
0.0262	City of Boulder Council Candidates Vote For 5	Already Picked			
0.8482	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.4371	Thompson School District R2-J Director District E (4 Years) Vote For 1		0		
0.9321	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.2560	City of Lafayette Council Candidates Vote For 4		815		
0.2504	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.8231	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.9090	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.2184	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.8824	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.2026	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.7691	Form of Mill Levy Increase Ballot Issue Vote For 1		116		
0.8302	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.2285	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.7482	Rocky Mountain Fire Protection District Ballot Issue 5A Vote For 1		132		
0.4206	St. Vrain Valley School District School Board Candidates (4 Years) Director District C Vote For 1		68		
0.0481	City of Boulder Council Candidates Vote For 5	Already Picked			
0.6401	Changes To Housing Excise Tax Vote For 1		463		
0.8731	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.6975	City of Longmont Ballot Question 2D Vote For 1		129		
0.7236	Town of Lyons Ballot Issue 2A Vote For 1		66		
0.9076	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.3787	Park School District R-3 School Director At Large (4 Years) Vote For 2	Already Picked			

Attachment 1: Contest Selection

Rolled Dice	Contest Selected	Already Selected?	Contest Ballots	Total Ballots	Num Contests
0.0205	City of Boulder Council Candidates Vote For 5	Already Picked			
0.0587	City of Boulder Council Candidates Vote For 5	Already Picked			
0.7236	Town of Lyons Ballot Issue 2A Vote For 1	Already Picked			
0.9960	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.3302	Boulder Valley School District Director District E (4 Years) Vote For 1		2225		
0.9183	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.2919	City of Longmont Council Member Ward 2 Vote For 1		55		
0.7236	Town of Lyons Ballot Issue 2A Vote For 1	Already Picked			
0.1984	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.2373	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.1559	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.7367	Town of Lyons Ballot Issue 2A Vote For 1	Already Picked			
0.6340	Pension Bond Funding Vote For 1		207		
0.1105	City of Boulder Council Candidates Vote For 5	Already Picked			
0.8887	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.3787	Park School District R-3 School Director At Large (4 Years) Vote For 2	Already Picked			
0.3840	Park School District R-3 School Director At Large (4 Years) Vote For 2	Already Picked			
0.8131	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.1704	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.5432	\$6.1M Bond Authorization for Energy Conservation Projects. Vote For 1		600		
0.0431	City of Boulder Council Candidates Vote For 5	Already Picked			
0.6152	DA Term Limits Extension to Three Terms. Vote For 1	Already Picked			
0.3173	Boulder Valley School District Director District E (4 Years) Vote For 1	Already Picked			
0.2314	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.4443	Open Space Countywide 0.25% Sales and Use Tax Extension and \$50M Bond Authorization Issue. Vote For 1		3300		
0.4794	ClimateSmart (CEOLID) \$85M Bond Authorization. Vote For 1	Already Picked			
0.1515	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.8066	Form of Bond Ballot Issue Vote For 1	Already Picked			

Attachment 1: Contest Selection

Rolled Dice	Contest Selected	Already Selected?	Contest Ballots	Total Ballots	Num Contests
0.6580	Town of Erie Ballot Question 2B Vote For 1		60		
0.5880	DA Term Limits Extension to Three Terms. Vote For 1	Already Picked			
0.1498	City of Boulder Council Candidates Vote For 5	Already Picked			
0.4016	Park School District R-3 School Director At Large (4 Years) Vote For 2	Already Picked			
0.1536	City of Lafayette Council Candidates Vote For 4	Already Picked			
0.9512	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.4962	ClimateSmart (CEOLID) \$85M Bond Authorization. Vote For 1	Already Picked			
0.3373	Boulder Valley School District Director District E (4 Years) Vote For 1	Already Picked			
0.5603	DA Term Limits Extension to Three Terms. Vote For 1	Already Picked			
0.9899	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.2906	City of Longmont Council Member Ward 2 Vote For 1	Already Picked			
0.5592	DA Term Limits Extension to Three Terms. Vote For 1	Already Picked			
0.5715	DA Term Limits Extension to Three Terms. Vote For 1	Already Picked			
0.8599	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.8666	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.7310	Town of Lyons Ballot Issue 2A Vote For 1	Already Picked			
0.7600	Form of Mill Levy Increase Ballot Issue Vote For 1	Already Picked			
0.9403	Form of Bond Ballot Issue Vote For 1	Already Picked			
0.1295	City of Boulder Council Candidates Vote For 5	Already Picked			
0.7462	Rocky Mountain Fire Protection District Ballot Issue 5A Vote For 1	Already Picked			
0.0366	City of Boulder Council Candidates Vote For 5	Already Picked			
0.4232	St. Vrain Valley School District School Board Candidates (4 Years) Director District D Vote For 1 (UNOPPOSED)		0		

Attachment 2: Summary of the Contests and MBBs Selected for the Audit

	City of Boulder Council Candidates Vote For 5	City of Lafayette Council Candidates Vote For 4	City of Longmont Council Member Ward 2 Vote For 1	Boulder Valley School District Director District E (4 Years) Vote For 1	Park School District R-3 School Director At Large (4 Years) Vote For 2	St. Vrain Valley School District Board Candidates (4 Years) Director District C Vote For 1	Thompson School District R2-J Director District E (4 Years) Vote For 1	Open Space Countywide 0.25% Sales and Use Tax Extension and \$50M Bond Authorization. Vote For 1	ClimateSmart (CEOLID) \$85M Bond Authorization. Vote For 1	\$6.1M Bond Authorization for Energy Conservation Projects. Vote For 1	DA Term Limits Extension to Three Terms. Vote For 1	Pension Bond Funding Vote For 1	Changes To Housing Excise Tax Vote For 1	Town of Erie Ballot Question 2B Vote For 1	City of Longmont Ballot Question 2D Vote For 1	Town of Lyons Ballot Issue 2A Vote For 1	Rocky Mountain Fire Protection District Ballot Issue 5A Vote For 1	Form of Mill Levy Increase Ballot Issue Vote For 1	Form of Bond Ballot Issue Vote For 1		
MBBs to Audit	32	29	2	19	3	1	1	22	35	4	39	2	5	5	1	14	9	18	40	78	MBBs selected
Ballot-Contests	2239	815	55	2225	9	68	3	3300	5250	600	5850	207	463	60	129	66	132	116	228	21815	# Ballot-Contests
																					# MBB Ballots
p007_mb_569											150								5	150	2
p015_mb_632																			3	150	1
p021_mb_559	62	20							150		150									150	4
p025_mb_562	14			55				150	150		150					3	17			150	7
p035_mb_556																12				150	1
p039_mb_576	116																			150	1
p040_mb_660																			4	150	1
p043_mb_658																7				150	1
p049_mb_665	29	4		68				150	150		150						7	1	1	150	9
p064_mb_686																			8	150	1
p069_mb_341							3													150	1
p076_mb_471		13						150	150		150					1				150	5
p077_mb_322	46	15		101				150	150		150					2	13	3	3	150	10
p080_mb_319		46																		149	1
p086_mb_508	40	2	15	81	1	68		150	150	150	150		40	14		10	6			150	14
p092_mb_527																			9	150	1
p095_mb_523	32							150	150		150									150	4
p098_mb_522																7				150	1
p099_mb_602	47	9		95	6			150	150		150					1				150	8
p101_mb_513	59	31																		150	2
p103_mb_510	57			107				150	150		150							4	4	150	7
p104_mb_560		35		144					150		150									150	4
p114_mb_695											150									150	1
p118_mb_449	109	3		135				150	150	150	150	109	109			3	6	2	2	150	13
p119_mb_451	38								150		150								3	150	4
p122_mb_369									150		150									150	2
p124_mb_443		51		139				150	150		150			8			19			150	7
p133_mb_489	99			135				150	150		150					4		4	4	150	8
p134_mb_490	114			144					150		150									150	4
p147_mb_517																			5	150	1
p156_mb_588																		22	22	149	2
p157_mb_589																			4	150	1
p161_mb_654	18	27		82				150	150		150					3	12	5	5	150	10
p162_mb_655									150		150									150	2
p165_mb_581																			6	150	1
p168_mb_684	62	26																		150	2
p172_mb_644																		28	28	150	2
p181_mb_409																			8	150	1
p183_mb_332		44																		150	1
p193_mb_605	25							150	150		150			8				2	2	150	7
p205_mb_390	98	5		137				150	150	150	150	98	98				8	4	4	150	12
p226_mb_359	72								150		150			21						150	5
p228_mb_311		46																		149	1
p244_mb_543																			4	150	1
p249_mb_601		38														8			5	150	3
p253_mb_625																			3	150	1
p272_mb_698								150	150		150					3				150	4
p275_mb_519	48								150		150							9	9	150	5

Attachment 2: Summary of the Contests and MBBs Selected for the Audit

	City of Boulder Council Candidates Vote For 5	City of Lafayette Council Candidates Vote For 4	City of Longmont Council Member Ward 2 Vote For 1	Boulder Valley School District Director District E (4 Years) Vote For 1	Park School District R-3 School Director At Large (4 Years) Vote For 2	St. Vrain Valley School District School Board Candidates (4 Years) Director District C Vote For 1	Thompson School District R2-J Director District E (4 Years) Vote For 1	Open Space Countywide 0.25% Sales and Use Tax Extension and \$50M Bond Authorization Issue. Vote For 1	ClimateSmart (CEOLID) \$85M Bond Authorization. Vote For 1	\$6.1M Bond Authorization for Energy Conservation Projects. Vote For 1	DA Term Limits Extension to Three Terms. Vote For 1	Pension Bond Funding Vote For 1	Changes To Housing Excise Tax Vote For 1	Town of Erie Ballot Question 2B Vote For 1	City of Longmont Ballot Question 2D Vote For 1	Town of Lyons Ballot Issue 2A Vote For 1	Rocky Mountain Fire Protection District Ballot Issue 5A Vote For 1	Form of Mill Levy Increase Ballot Issue Vote For 1	Form of Bond Ballot Issue Vote For 1			
p276_mb_616																		5	150	1		
p278_mb_623	43							150		150								6	150	5		
p281_mb_484	97			140				150	150	150			9					3	150	8		
p284_mb_460	52	26		107				150	150	150								2	150	8		
p286_mb_458		52																	150	1		
p287_mb_457																		12	150	2		
p294_mb_498			40		2			150	150	150	150			129					150	7		
p305_mb_402		41							150		150								150	3		
p310_mb_351	100	7		139				150	150		150		100					4	150	9		
p311_mb_350																			8	150	1	
p328_mb_398																			5	150	1	
p341_mb_380	99	6		137				150	150		150				2				1	150	8	
p344_mb_405		59																		149	1	
p349_mb_433																			7	150	1	
p353_mb_363		37																		150	1	
p356_mb_414	101			133					150		150							3	150	6		
p365_mb_417								150	150		150									150	3	
p372_mb_364	105										150									150	2	
p375_mb_266		44																		150	1	
p378_mb_269	104																			150	1	
p381_mb_245	77																			139	1	
p384_mb_254		29									150									150	2	
p386_mb_423		45																		150	1	
p387_mb_265		44																		150	1	
p388_mb_258	116	10		146				150	150		150		116					2	150	9		
p394_mb_262	95								150		150									150	3	
p411_mb_280	65								150		150									150	4	
p415_mb_242																				4	134	1
p421_mb_294																				6	145	1
p425_mb_289																44					45	1

Attachment 3: Example Hand Count Tally Sheet (for MBB p007_mb_569)

Audit Batch ID	Batch Number(s)	System	PART	Date
p007_mb_569	23	C	1 of 3	/ /2009

	Print First and Last Name	Affiliation
Caller		
Observer		
Recorder 1		
Recorder 2		

COUNTY QUESTION 1D

Districts Styles ALL

VOTE FOR 1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
NOT ON BALLOT						
Yes						
No						
Over						
Under						
Group Totals						0

NEDERLAND LIBRARY DISTRICT ISSUE

5B

Districts Styles DS-05, DS-20

VOTE FOR 1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
NOT ON BALLOT						
Yes						
No						
Over						
Under						
Group Totals						0

Attachment 3: Example Hand Count Tally Sheet (for MBB p007_mb_569)

Audit Batch ID	Batch Number(s)	System	PART	Date
p007_mb_569	23	C	2 of 3	/ /2009

	Print First and Last Name	Affiliation
Caller		
Observer		
Recorder 1		
Recorder 2		

COUNTY QUESTION 1D

Districts Styles ALL

VOTE FOR 1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
NOT ON BALLOT						
Yes						
No						
Over						
Under						
Group Totals						0

NEDERLAND LIBRARY DISTRICT ISSUE

5B

Districts Styles DS-05, DS-20

VOTE FOR 1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
NOT ON BALLOT						
Yes						
No						
Over						
Under						
Group Totals						0

Attachment 3: Example Hand Count Tally Sheet (for MBB p007_mb_569)

Audit Batch ID	Batch Number(s)	System	PART	Date
p007_mb_569	23	C	3 of 3	/ /2009

	Print First and Last Name	Affiliation
Caller		
Observer		
Recorder 1		
Recorder 2		

COUNTY QUESTION 1D

Districts Styles ALL

VOTE FOR 1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
NOT ON BALLOT						
Yes						
No						
Over						
Under						
Group Totals						0

NEDERLAND LIBRARY DISTRICT ISSUE

5B

Districts Styles DS-05, DS-20

VOTE FOR 1

Option	Group 1	Group 2	Group 3	Group 4	Group 5	Total
NOT ON BALLOT						
Yes						
No						
Over						
Under						
Group Totals						0

Individual_MBB - p007_mb_569

p007_mb_569	DA Term Limits Extension to Three Terms. Vote For 1	Absentee	Early	Election	Total
	Yes	64	0	0	64
	No	82	0	0	82
	Cast Votes	146	0	0	146
	Over Votes	0	0	0	0
	Under Votes	4	0	0	4
	Contest Ballots				150

p007_mb_569	Form of Bond Ballot Issue Vote For 1	Absentee	Early	Election	Total
	Yes	1	0	0	1
	No	4	0	0	4
	Cast Votes	5	0	0	5
	Over Votes	0	0	0	0
	Under Votes	0	0	0	0
	Contest Ballots				5

Individual_MBB - p007_mb_569

p007_mb_569	DA Term Limits Extension to Three Terms. Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Yes	64	0	0	64	64		
	No	82	0	0	82	82		
	Cast Votes	146	0	0	146	146		
	Over Votes	0	0	0	0	0		
	Under Votes	4	0	0	4	4		
	Contest Ballots				150	150		

p007_mb_569	Form of Bond Ballot Issue Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Yes	1	0	0	1	1		
	No	4	0	0	4	4		
	Cast Votes	5	0	0	5	5		
	Over Votes	0	0	0	0	0		
	Under Votes	0	0	0	0	0		
	Contest Ballots				5	5		

P394_mb_262 - Discrepancy between Election Day Tally and Audit Hand Count

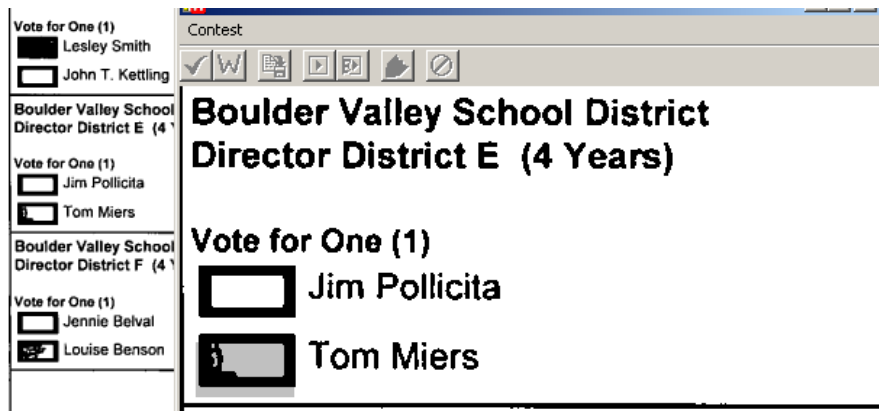
----- Results of Election Day Tally ----->						<----- Results of Audit Tally ----->		
p394_mb_262	DA Term Limits Extension to Three Terms. Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Yes	76	0	0	76	76	76	Both boxes filled in. Yes Box crossed out along with "Yes". Machine resolution was No. Manual count resolved as Overvote
	No	61	0	0	61	60	60	
	Cast Votes	137	0	0	137			
	Over Votes	0	0	0	0	1	1	
	Under Votes	13	0	0	13	13	13	
	Contest Ballots				150		150	

Fragment of actual ballot:

The image shows a fragment of an actual ballot. On the left, a green box contains the question: "DA Term Limits Extension to Three Terms. Shall the term limits imposed by State Law and in Article XVIII, Section 11(2), of the Colorado Constitution on the Office of District Attorney of Boulder County, Twentieth Judicial District, be modified so as to permit an elected officeholder in that office to seek and, if the voters of Boulder County choose to re-elect that person as a third term in office, to serve a third consecutive term?" Below the question, a white mark is visible over the "Yes" option, and the "No" option is selected. A red stamp "Deser: User" is placed over the "No" option. To the right, a separate window titled "Resolved contest" displays the same question. A box with the text "Voter's signature removed" has lines pointing to the area where a signature would typically be on the ballot.

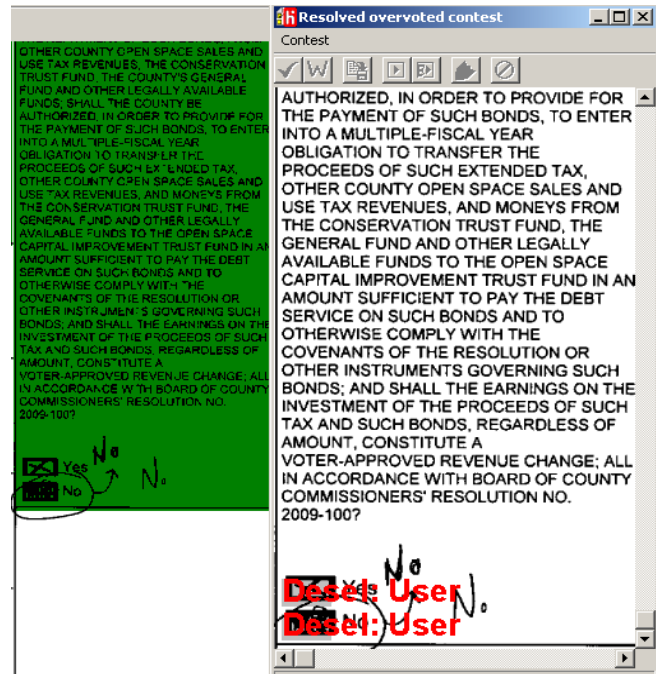
P134_mb_490 - Discrepancy between Election Day Tally and Audit Hand Count

p134_mb_490	Boulder Valley School District Director District E (4 Years) Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Jim Pollicita	44	0	0	44	44	44	Small portion of Miers box was filled in and machine counted as a vote. Manual count considered it an undervote.
	Tom Miers	52	0	0	52	51	51	
	Cast Votes	96	0	0	96			
	Over Votes	0	0	0	0	0	0	
	Under Votes	48	0	0	48	49	49	
	Contest Ballots				144		144	



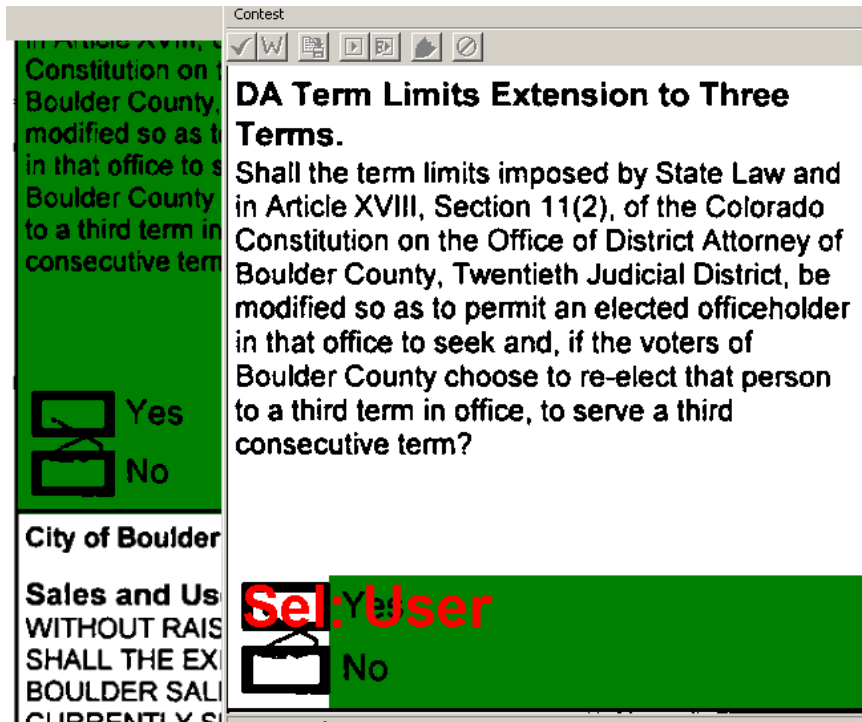
P388_mb_258 - Discrepancy between Election Day Tally and Audit Hand Count

p388_mb_258	Open Space Countywide 0.25% Sales and Use Tax Extension and \$50M Bond Authorization Issue. Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Yes	98	0	0	98	98	98	Yes vote had an X, No vote was filled in, circled, and notes said No with an arrow. Machine resolution Overvoted. Manual count resolution was No.
	No	43	0	0	43	44	44	
	Cast Votes	141	0	0	141			
	Over Votes	1	0	0	1	0	0	
	Under Votes	8	0	0	8	8	8	
	Contest Ballots				150		150	



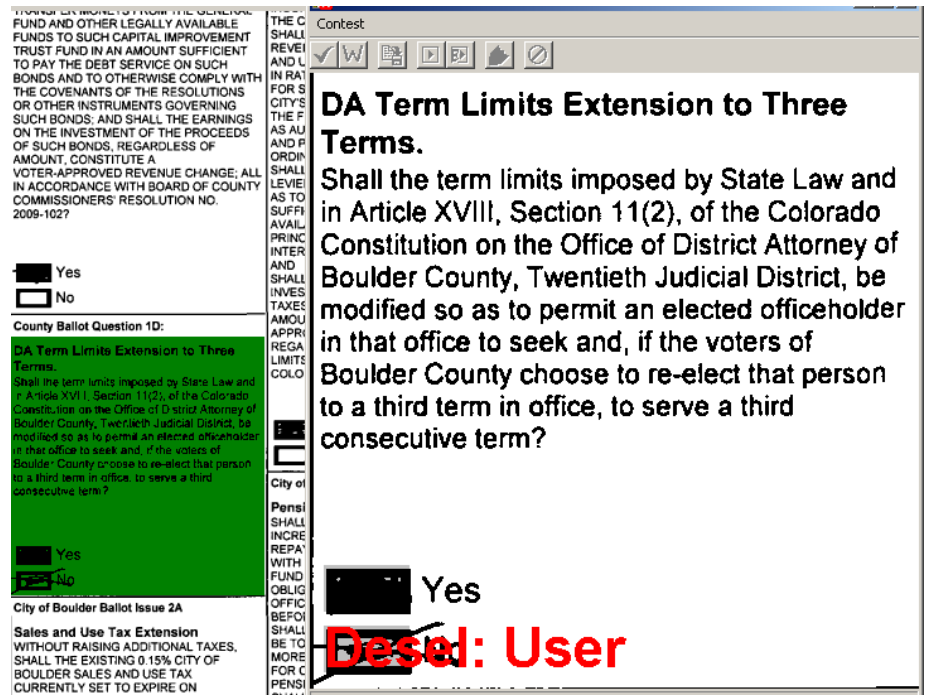
P086_mb_508 - Discrepancy between Election Day Tally and Audit Hand Count

p086_mb_508	DA Term Limits Extension to Three Terms. Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Manual Tally #3	Discrepancies
	Yes	73	0	0	73	72	73	72	X in between Yes & No. Manually counted as Undervote. Machine resolved as Yes
	No	73	0	0	73	73	72	73	
	Cast Votes	146	0	0	146				
	Over Votes	1	0	0	1	2	1	1	
	Under Votes	3	0	0	3	3	4	4	
	Contest Ballots				150	150	150	150	



P205_mb_390 - Discrepancy between Election Day Tally and Audit Hand Count

p205_mb_390	DA Term Limits Extension to Three Terms. Vote For 1	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Yes	92	0	0	92	91	91	Two errors. First, on the manual tally paperwork, 1 undervote erroneously recorded as an overvote. Second error was a difference in the two tallies: partially filled in box recorded as an overvote but voter intent is a Yes.
	No	47	0	0	47	48	47	
	Cast Votes	139	0	0	139			
	Over Votes	0	0	0	0	0	2	
	Under Votes	11	0	0	11	11	10	
	Contest Ballots				150	150	150	



P021_mb_559 - Discrepancy between Election Day Tally and Audit Hand Count

p021_mb_559	City of Boulder Council Candidates Vote For 5	Absentee	Early	Election	Total	Manual Tally #1	Manual Tally #2	Discrepancies
	Suzy Ageton	43	0	0	43	42	42	Voter put a giant X through the contest indication he didn't want to vote the contest. Line went through Ageton and machine counted the vote. Manual count resolved as an Undervote
	Matthew Appelbaum	29	0	0	29	29	29	
	KC Becker	31	0	0	31	31	31	
	Seth Brigham	3	0	0	3	3	3	
	Macon Cowles	22	0	0	22	22	22	
	Fenno Hoffman	18	0	0	18	18	18	
	Kevin Hotaling	6	0	0	6	6	6	
	George Karakehian	35	0	0	35	35	35	
	Valerie Mitchell	6	0	0	6	6	6	
	Tim Plass	20	0	0	20	20	20	
	Jyotsna Raj	16	0	0	16	16	16	
	Barry Siff	31	0	0	31	31	31	
	Rob Smoke	7	0	0	7	7	7	
	Cast Votes	267	0	0	267			
	Over Votes	0	0	0	0	0	0	
	Under Votes	43	0	0	43	44	44	
	Contest Ballots				62	62	62	

City of Boulder Council Candidates

Following are the candidates for City Council. You may vote for up to five (5) candidates. If you vote for five (5) or less, your votes in this race will be counted. If you vote for more than five (5), your votes in this race will not be counted.

Suzy Ageton
 Matthew Appelbaum
 KC Becker
 Seth Brigham
 Marlon Cowles
 Fenno Hoffman
 Kevin Hotelling
 George Karakehian
 Valerie Mitchell
 Tim Plass
 Jyotsna Raj
 Barry Siff
 Rob Smoke

Boulder Valley School District Director District B (4 Years)

Vote for One (1)
 Lesley Smith
 John T. Kotling

Boulder Valley School District Director District E (4 Years)

Vote for One (1)
 Jim Pollicita
 Tom Miers

Boulder Valley School District Director District F (4 Years)

Vote for One (1)

Ballot Number 1 Set

City of Boulder Council Candidates

Following are the candidates for City Council. You may vote for up to five (5) candidates. If you vote for five (5) or less, your votes in this race will be counted. If you vote for more than five (5), your votes in this race will not be counted.

Suzy Ageton
 Matthew Appelbaum
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 Kevin Hotelling
 George Karakehian
 Valerie Mitchell
 Tim Plass
 Jyotsna Raj
 Barry Siff
 Rob Smoke

Boulder Valley School District Director District B (4 Years)

Vote for One (1)
 Lesley Smith
 John T. Kotling

Boulder Valley School District Director District E (4 Years)

Vote for One (1)
 Jim Pollicita
 Tom Miers

Boulder Valley School District Director District F (4 Years)

Vote for One (1)
 [Candidate Name]

Attachment 7: Recount Threshold Calculations when Voter-Intent Uncertainty is Approximated

	W	L	W - L	V = W+L	Recount Threshold 0.0005*W	Voter Intent Uncertainty (1.995*U*V) with U = 0.000271	Threshold with Voter Intent Uncertainty Included
City of Boulder Council Candidates Vote For 5	7790	7632	158	15422	38.95	8.34	47.29
City of Lafayette Council Candidates Vote For 4	1162	1112	50	2274	5.81	1.23	7.04
City of Longmont Mayor Vote For 1	9155	7798	1357	16953	45.78	9.17	54.94
City of Longmont Council Member At-Large Vote For 2	8151	5409	2742	13560	40.76	7.33	48.09
City of Longmont Council Member Ward 2 Vote For 1	4287	2762	1525	7049	21.44	3.81	25.25
City of Louisville City Council Person Ward I (4 Years) Vote For 1	1075	630	445	1705	5.38	0.92	6.30
City of Louisville City Council Person Ward II (4 Years) Vote For 1 (UNOPPOSED)	869	0	869	869	4.35	0.47	4.81
City of Louisville City Council Person Ward III (4 Years) Vote For 1	927	557	370	1484	4.64	0.80	5.44
Boulder Valley School District Director District B (4 Years) Vote For 1	18627	8750	9877	27377	93.14	14.80	107.94
Boulder Valley School District Director District E (4 Years) Vote For 1	14010	12687	1323	26697	70.05	14.43	84.48

Attachment 7: Recount Threshold Calculations when Voter-Intent Uncertainty is Approximated

	W	L	W - L	V = W+L	Recount Threshold 0.0005*W	Voter Intent Uncertainty (1.995*U*V) with U = 0.000271	Threshold with Voter Intent Uncertainty Included
Boulder Valley School District Director District F (4 Years) Vote For 1	15973	10920	5053	26893	79.87	14.54	94.40
Park School District R-3 School Director At Large (4 Years) Vote For 2	1876	1774	102	3650	9.38	1.97	11.35
St. Vrain Valley School District School Board Candidates (4 Years) Director District B Vote For 1	13433	8266	5167	21699	67.17	11.73	78.90
St. Vrain Valley School District School Board Candidates (4 Years) Director District C Vote For 1	14510	6302	8208	20812	72.55	11.25	83.80
St. Vrain Valley School District School Board Candidates (4 Years) Director District D Vote For 1 (UNOPPOSED)	17218	0	17218	17218	86.09	9.31	95.40
St. Vrain Valley School District School Board Candidates (4 Years) Director District F Vote For 1 (UNOPPOSED)	17349	0	17349	17349	86.75	9.38	96.12
Thompson School District R2-J Director District B (4 Years) Vote For 1 (UNOPPOSED)	13127	0	13127	13127	65.64	7.10	72.73
Thompson School District R2-J Director District D (2 Years) Vote For 1 (UNOPPOSED)	13086	0	13086	13086	65.43	7.07	72.50

Attachment 7: Recount Threshold Calculations when Voter-Intent Uncertainty is Approximated

	W	L	W - L	V = W+L	Recount Threshold 0.0005*W	Voter Intent Uncertainty (1.995*U*V) with U = 0.000271	Threshold with Voter Intent Uncertainty Included
Thompson School District R2-J Director District E (4 Years) Vote For 1	6774	4113	2661	10887	33.87	5.89	39.76
Thompson School District R2-J Director District F (4 Years) Vote For 1 (UNOPPOSED)	13025	-180	13205	12845	65.13	6.94	72.07
Open Space Countywide 0.25% Sales and Use Tax Extension and \$50M Bond Authorization Issue. Vote For 1	32249	29697	2552	61946	161.25	33.49	194.74
ClimateSmart (CEOLID) \$85M Bond Authorization. Vote For 1	31357	30194	1163	61551	156.79	33.28	190.06
\$6.1M Bond Authorization for Energy Conservation Projects. Vote For 1	34400	26909	7491	61309	172.00	33.15	205.15
DA Term Limits Extension to Three Terms. Vote For 1	29941	29919	22	59860	149.71	32.36	182.07
Sales and Use Tax Extension Vote For 1	12199	5730	6469	17929	61.00	9.69	70.69
Open Space General Obligation Bonds Vote For 1	10210	7488	2722	17698	51.05	9.57	60.62
Pension Bond Funding Vote For 1	11558	5598	5960	17156	57.79	9.28	67.07
Changes To Housing Excise Tax Vote For 1	9767	7179	2588	16946	48.84	9.16	58.00
Town of Erie Ballot Question 2A Vote For 1	1918	555	1363	2473	9.59	1.34	10.93
Town of Erie Ballot Question 2B Vote For 1	1318	1162	156	2480	6.59	1.34	7.93

Attachment 7: Recount Threshold Calculations when Voter-Intent Uncertainty is Approximated

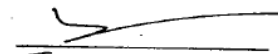
	W	L	W - L	V = W+L	Recount Threshold $0.0005*W$	Voter Intent Uncertainty $(1.995*U*V)$ with $U = 0.000271$	Threshold with Voter Intent Uncertainty Included
City of Longmont Ballot Issue 2A Vote For 1	11535	6968	4567	18503	57.68	10.00	67.68
City of Longmont Ballot Question 2B Vote For 1	10517	7832	2685	18349	52.59	9.92	62.51
City of Longmont Ballot Question 2C Vote For 1	10358	8102	2256	18460	51.79	9.98	61.77
City of Longmont Ballot Question 2D Vote For 1	10339	5746	4593	16085	51.70	8.70	60.39
City of Louisville Ballot Question 2A Vote For 1	3782	587	3195	4369	18.91	2.36	21.27
City of Louisville Ballot Question 2B Vote For 1	3878	653	3225	4531	19.39	2.45	21.84
City of Louisville Ballot Question 2C Vote For 1	2648	1782	866	4430	13.24	2.40	15.64
Town of Lyons Ballot Issue 2A Vote For 1	273	254	19	527	1.37	0.28	1.65
Rocky Mountain Fire Protection District Ballot Issue 5A Vote For 1	1902	1415	487	3317	9.51	1.79	11.30
Form of Mill Levy Increase Ballot Issue Vote For 1	503	469	34	972	2.52	0.53	3.04
Form of Bond Ballot Issue Vote For 1	489	483	6	972	2.45	0.53	2.97

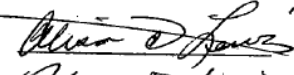
Statement from the 2009 Election Audit Board:

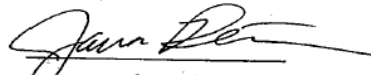
The audit of the 2009 election produced six discrepancies out of 22,139 audited votes. All discrepancies were caused by human error, either because of voters incorrectly following instructions or resolution teams not following voter intent guidelines. Of these six discrepancies, three were on the contest for County Issue 1D, which is already scheduled for a legally required recount. The other three did not have a significant statistical impact on the affected contests.

With this noted, the 2009 Election Audit Board accepts the results of the audit, as presented by the Boulder County Clerk and Recorder's Office.

Done this 13th Day of November, 2009


Tanya S. Murray


Alisa D Lewis
11/13/09


11/13/09