

Batch Comparison Method Risk Limiting Audit

First in Virginia

Loudoun County June 28, 2023



Risk Limiting Audits: VA Code 24.2-671.2

- VA Law requires each locality to do a Risk Limiting Audit at least once every 5 years.
- Post Election Audits.
- Conducted prior to the certification of the election results.
- A hand count/manual review of randomly sampled printed ballots.
- The margin of victory must be greater than >1%. If the margin of an election is wide, fewer votes are audited; if the margin is narrow, more votes are audited to confirm the results of the contest.
- The sampling of ballots continues until there is either strong statistical evidence, that the reported outcome is correct, or in the absence of such evidence, a full hand count of all ballots cast in the contested race, determines the outcome.
- The VA State Board of Elections will set the *risk limit* of the RLA, following industry best practices and will announce the risk limit at the State Board of Elections meeting prior to the audit.
- To date Virginia has used a 10% risk-limit.



2 Methods for Conducting Risk Limiting Audits in Virginia:

1. Ballot-Polling Method :

- **Manually reviews a number of individual ballots that are randomly selected, to determine if the overall outcome of an election contest was correctly reported.**
- **The Ballot Polling Method was used for the statewide Risk Limiting Audit of the 2020 Presidential Election.**
- **The Ballot Polling Method was chosen by the VA State Board of Elections to conduct the Risk Limiting Audit of the 2024 statewide US Senate Election.**

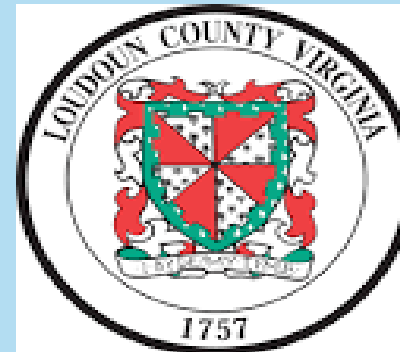
2. Batch Comparison Method:

- **Manually reviews batches of ballots that are randomly selected, such as all the ballots cast in one precinct, and compares those results with corresponding voting machine results.**
- **The State Board of Elections voted for the statutorily required Risk Limiting Audit of a 2024 Congressional race to be conducted using the Batch Comparison Method.**



Risk Limiting Audit History in Virginia:

- February 2021 - VA Statewide Ballot Polling Method, Risk Limiting Audit of 2020 Presidential Election
Loudoun County participated, 63 Ballots were audited out of 224,862 ballots cast.
1,400 ballots were audited statewide in VA out of 4.5 million ballots cast. Some thought this audit was an insufficient.
Batch Comparison Method recommended.
- March 2023, the VA State Board of Elections approved the Batch Comparison Method for VA Risk Limiting Audits.
- June 2023 - Loudoun County Electoral Board unanimously requested to do a Batch Comparison Method, Risk Limiting Audit for House of Delegates Primary race. VA State Board of Elections approve request. First Batch Comparison Method, RLA in Virginia and ELECT Staff attended.
- Since 2022, the VA Code requires RLAs be performed by the Electoral Boards and General Registrars under the supervision of ELECT and in accordance with the procedures prescribed by the State Board of Elections.
- One Electoral Board member representing each party must be present for the Risk Limiting Audit.
- November 2023, Loudoun County, Orange County and Arlington County successfully conducted Risk Limiting Audits using the Batch Comparison Method, for a contested race within their jurisdiction.





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Risk Limiting Audit

MANUAL
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All the forms and procedures needed to conduct a Batch Comparison Method, Risk Limiting Audit, are in the revised 2024 Chapter on Risk Limiting Audits in the GREB manual (General Registrar & Electoral Board) on the VA Department of Elections website and Forms Warehouse.



RLA Preparations By Electoral Board and Staff :

- 1. Location:** Large enough for several Audit Teams, Electoral Board, Staff, Authorized Observers and Public.
- 2. Make Lists of Bipartisan Election Officers for Audit Review Boards:** Election Officers have to have served on Election Day.
Loudoun had 6 Bipartisan Audit Review Boards (12 Election Officers): 1 Republican and 1 Democrat on each Audit Review Board.
- 3. Date and Time:** Dates chosen by State Board of Elections, Thursday, November 21 through Friday, November 22.
Start early (9:00 am) and plan for one full day, however, the audit could continue to the next day.
- 4. Clerk of Circuit Courts:** General Registrar asks Clerk and staff to be available to deliver ballots on day of RLA and to stay to guard ballots and return to custody of Clerk of Circuit Courts after RLA. (See Request to Inspect Sealed Election Materials form).
- 5. Extension for Certification:** for race being audited. **SBE can grant up to a two week extension** for certifying audited race.
- 6. Publically Post RLA at least 3 days in advance.**
- 7. Notification by Registrar to Unit Chairmen of each political party and candidate in audited race.**
- 8. Open to Public and Live streamed** (no audio, as with February 2021, RLA).



Batch Comparison RLA Room Set-Up and Supplies

1. **Audit Teams**: Each Bipartisan Audit Team had Two, six foot multi-purpose tables pushed together with 4 chairs, 2 on each side, so they could work on both sides of the tables to sort, hand-count and tabulate the ballots.
2. **The Electoral Board**: had tables and chairs and another area of tables and chairs for staff and members from ELECT that attended the Audit.
3. **The Public**: A row of tables and chairs were provided for the public and also served as a barrier to keep the Public contained from direct contact with the ballots.
4. **Authorized Observers**: had special identification badges and were allowed to walk through the audit area to observe, while following authorized observer rules and not interfering with audit and asking questions only to the GR and EB members.
5. **Useful RLA Materials**: Tables, chairs, Pens, Tabulation sheets, Sort and Stack Method Instructions, Virginia Hand- Count Instructions, rubber bands, sticky notes, rubber thumbs, Election Officer labels for the #3 envelope boxes and packing tape to re-seal #3 ballot boxes after completion of Audit and lunch for those conducting the Audit.



Creating a Ballot Manifest:

A ballot manifest is a two-column Excel spreadsheet created by localities that includes a list of the “Batch Name” (Column A) and the “Number of Ballots” (Column B).

The ballot manifest creates an inventory of every ballot cast in a locality. Depending on the size of the locality, a ballot manifest should take one hour or less to complete. As a best practice, localities are encouraged to build their ballot manifest as they go.

In order to select random ballots or batches, *all* participating localities must upload a ballot manifest before the audit can begin.

	A	B
1	Batch Name	Number of Ballots
2	Precinct 1	301
3	Precinct 2	302



Create a Candidate Totals by Batch File:

The total number of ballots cast for each candidate in each Batch.

Enter the data for your locality from your Statement of Results.

	A	B	C	D
1	Batch Name	John Doe	Jane Smith	Write-in
2	Precinct 1	100	200	1
3	Precinct 2	200	100	2



Generating the Random Seed Number:

- For each audited race, the RLA Arlo software uses a 20-digit random seed number to select ballots for retrieval. The 20-digit random seed number is generated at the State Board of Elections RLA meeting prior to the audit.
- To create this random number, the State Board of Elections Chairman or designated representative(s) **rolls twenty, ten sided dice (numbered zero through nine), one time each.** As each dice is rolled, the resulting number is recorded on a whiteboard.
- **The 20-digit number generated by this activity will be inputted into the RLA software (ARLO) by the RLA Administrator on ELECT's staff. Once this number is input, the auditing software will randomly select and generate a list of ballots to be retrieved based on the sample size.**
- Review the *Random Seed Number Generation* video on ELECT's YouTube channel.



10 Batches Chosen By ARLO Software for Loudoun Batch Comparison, RLA June 20, 2023 (Batch Retrieval List, HOD 26)

Batch Name	Number of Ballots	Kannan Srinivasan	Sirisha Kompalli	Write-In
Pct 108	200	118	67	0
Pct 112	154	102	45	0
Pct 119	223	134	75	0
Pct 120	256	166	85	0
Pct 121	166	109	49	0
Pct 122	252	154	83	0
Pct 124	163	103	55	0
Pct 126	155	97	50	0
Pct 312	149	85	57	0
Pct 314	379	217	142	0
Pct 321	196	131	57	0
Pct 322	195	139	53	0
Pct 324	109	84	22	0
Pct 325	321	216	94	0
Pct 628	119	75	40	0
Pct 630	273	205	60	0
Pct 712	190	116	66	0
Pct 713	79	14	1	0
Pct 714	355	227	113	0
EV1-Leesburg	2449	150	51	0
EV2-Sterling	639	19	5	0
EV3-South Riding	846	404	194	0
EV4-Purcellville	114	1	0	0
CAP	4708	577	274	0
Post-Election	474	97	37	0
Provisional	267	44	24	0
Totals	13431	3784	1799	0





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Request to Inspect Sealed Election Materials for a Post-Election Audit

Use this form when your locality wants to conduct a post-election audit as required by Va. Code § 24.2-671.2.

Pursuant to Va. Code § 24.2-669, you must receive permission from the Department of Elections to unseal ballots cast on Election Day for a post-election audit. You must fill out and submit this form to the Department of Elections prior to conducting an audit for your locality.

If ELECT provides permission to unseal election materials for a post-election audit, you must provide the form, which will be sent to the email address entered below, to the Clerk of the Circuit Court of your locality.

Election Date: *

Election Type: *

Date of Request: *

Name of Requester *

Position *

Email Address *

Confirm Email Address *

Phone Number *

Locality *

Precinct Name * Precinct #: *

Specific Envelope which needs to be inspected: *

The Envelope needs to be inspected to determine: *

Request to Inspect Sealed Election Materials for a Post-Election Audit

ELECT 659 Form, submitted by GR to ELECT for their signature authorization to present to Clerk of Circuit Courts to access the ballots needed for the RLA.



Chain of Custody Form

Election Date: _____		Audit Date(s): _____			
Date	Name (Please sign)	Title	Precinct Box/Envelope being checked out or back in	Time Out	Time In



10 Batches Chosen By ARLO Software for Loudoun Batch Comparison, RLA June 20, 2023 Democratic Primary (Batch Retrieval List, HOD 26)

A total of 9,703 ballots were opened by the Election Officer Audit Teams.

Each Audit Team was assigned one batch of ballots to:

1. Retrieve
2. Open
3. Sort
4. Hand Tabulate
5. Reseal and Return to the secure storage location
6. When they finished a Batch they could get another Batch of ballots to tabulate.

Batch Name	Number of Ballots	Kannan Srinivasan	Sirisha Kompalli	Write-In
Pct 108	200	118	67	0
Pct 112	154	102	45	0
Pct 119	223	134	75	0
Pct 120	256	166	85	0
Pct 121	166	109	49	0
Pct 122	252	154	83	0
Pct 124	163	103	55	0
Pct 126	155	97	50	0
Pct 312	149	85	57	0
Pct 314	379	217	142	0
Pct 321	196	131	57	0
Pct 322	195	139	53	0
Pct 324	109	84	22	0
Pct 325	321	216	94	0
Pct 628	119	75	40	0
Pct 630	273	205	60	0
Pct 712	190	116	66	0
Pct 713	79	14	1	0
Pct 714	355	227	113	0
EV1-Leesburg	2449	150	51	0
EV2-Sterling	639	19	5	0
EV3-South Riding	846	404	194	0
EV4-Purcellville	114	1	0	0
CAP	4708	577	274	0
Post-Election	474	97	37	0
Provisional	267	44	24	0
Totals	13431	3784	1799	0

The ballots were sorted and stacked using the Sort and Stack Method.

Only the ballots that had the HOD District 26 race on them were pulled out to be hand tabulated.

The ballots designated as not having the HOD District 26 race on them were double checked and labeled with a sticky note signed by the person who double checked them. They had a rubber band around them and were put to one side of the table.



The Ballots with the HOD District 26 race on them were sorted into piles by votes for each candidate.

There were labels taped on top of each table for each candidate.
Then they were double checked and hand tabulated in stacks of 10 ballots at right angles.

There was also a pile labeled Under- votes, Over- votes and an Undecided pile, in the case the 2 bipartisan Election Officers could not agree on the clear intent of the voter from the ballot.

The Sort-and-Stack Method

a. For each ballot: one audit board member picks up a single ballot from the stack and reads the vote for the contest being audited aloud, then hands the ballot to the second audit board member.

- i. The second audit board member verifies the vote that is on the ballot is indeed what the first audit board member read, then places the ballot in the "stack" that corresponds to the vote.
- ii. The first audit board member should watch to make sure the ballot is placed in the correct stack.
- iii. A stack should be created for each contest choice (candidate), overvoted, and undervoted (blank) ballots, and ballots where the audit board cannot agree on the voter's intent.

b. Count the ballots in each stack by having one member of the audit board verbally count the ballot while handing it to the other member for verification.

Example: Candidate A, 1, Candidate A, 2, Candidate A, 3 up to 10. Start over with 1 after reaching 10 to stack in groups of 10.

- i. Count the ballots in groups of 10, stacking the groups at right angles to each other, so you can easily count the complete groups when you are done. For instance, if you have seven groups of 10 ballots each plus an extra 3 ballots, the total tally would be 73.
- ii. Record the total tally for each candidate on the Audit Board Batch Tally Sheet.

Recommendation:
The ballot storage box, #3 Envelope, be verified by both Election Officers that it is empty and be kept out in plain view for observers to see that it is empty throughout that process of the audit.



VIRGINIA'S GUIDE TO
HAND-COUNTING BALLOTS

Can this vote count?

A complete guide to
hand-counting printed
ballots for elections
and recounts

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If the Election Officers can not agree in determining the voter's intent on the ballot, decide on who will adjudicate the ballot, the bipartisan Electoral Board members or the GR to decide if the vote on the ballot is counted or not counted.

Virginia's Guide to Hand-Counting Ballots and the Department of Elections Ballot Examples Booklet should be used to make ballot acceptance decisions during the ballot Adjudication Process.





Ballot Examples

Hand Counting Printed Ballots for Virginia Elections or Recounts

Department of Elections
Commonwealth of Virginia



(Adopted at the 10/6/2015 meeting of the State Board of Elections)

For any printed ballot that can and is to be counted manually, the following guidelines shall be used in determining the voter's intent.

(1) As used below, the "target area" of the official ballot is the square, oval, or incomplete arrow next to the candidate's name on the printed ballot. The "candidate area" is the area between the lines separating candidate names, if the ballot includes such lines, or the area that is clearly closer to one candidate's name than another. The "candidate area" includes the candidate's name and party affiliation if listed, or "I" for any independent using that designation. These instructions only deal with marks that are under the office being recounted, except as provided in items 10 and 11.

(2) These instructions assume that the recount is for a single-seat office. That is, the voter was only permitted to vote for one candidate for the office. For multi-seat offices, the ballot shall be counted pursuant to the guidelines below so long as the voter has not voted for more candidates for that office than he is allowed to vote (in which case no votes are to be counted for the office).

(3) Any ballot that is properly marked (as specified for the type of ballot) in the target area for one candidate only for the office shall be designated as a vote for that candidate.



RLA Tally Sheet:

	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>	<i>Batch</i>	<i>Ballot#</i>		
Office																										
CANDIDATE																										TOTAL
Write-In:																										
Over Votes:																										
Under Votes:																										



Audit Completion:

- 1. The Tally Sheet results for each Batch are entered into the Arlo software by the Audit Board Teams or an **Audit Administrator**.**
- 2. The Audit Administrator can be a specified member of the Staff, an Electoral Board member or the General Registrar.**
- 3. All tallies from the Batches must be uploaded into ARLO.**
- 4. The Audit will remain open until all the tallies have been entered.**
- 5. When the Risk Limit has been met, the “Audit Progress” screen will display the message “ Congratulations- the audit is complete!”**
- 6. If the Risk Limit was not met after all the initial Batches have been audited for the race, then the audit software will initiate another round of sampling, and more batches will have to be audited.**
- 7. After the Audit is completed, the Clerk of Circuit Court’s staff, again takes custody of the ballots that have been resealed and signed by the Election Officer Audit Teams and the ballots are returned to the Office of the Clerk of the Circuit Court.**



In Conclusion :

1. The Audit lasted 3.5 hours. It began at 10:00 am and ended at 1:15pm. (10 Batches, 9,703 ballots retrieved and 2,602 audited).
2. The whole race was not audited, just 10 randomly selected Batches.
3. The upcoming Congressional District Batch Comparison Audit should be easier. Unless it is a Presidential only ballot, All the Ballots should have the District's Congressional race on them and the Audit Teams should be able to immediately start sorting the ballots by candidate.
4. The results for each Batch matched the Statement of Results Tape numbers from the corresponding Voting machine, (with the exception of 5 extra Votes). This verified the accuracy of the voting machines as well as the election outcome and is an extra benefit of the Batch Comparison Method.
5. The 5 additional votes were counted because during the Hand Counting, the 2 bipartisan Election Officers could clearly determine the intent of the Voter and counted the ballot, even though for various reasons the voting machine had not been able to determine that vote.
6. The software created an Audit Report that was shown on a projector screen and read to all those present and the Audit showed the election more than 99% accurate.
7. A new Abstract of the results for the House of Delegates District 26 race was created by the Registrar, which included the 5 additional votes determined by the Audit and were certified by the Electoral Board, sent to ELECT and certified by the State Board of Elections.



Final Thoughts:

1. Advance preparation helped everything run smoothly on the day of the Audit.
2. It is important for transparency for the Audit to be open to the Public and that bipartisan Election Officers and Authorized Observers are part of the Audit process.
3. With the Batch Comparison Method, Risk Limiting Audit:
 - Many more ballots are audited in a relatively easy manner.
 - By auditing an entire batch of ballots or Precinct, the voting machine tabulation results are also verified.
4. Governor Youngkin has referenced these Risk Limiting Audits as part of Virginia's Triple Check for Accuracy Procedures.
5. The Audit results showed 99% Accuracy of the Election which gives Voters, Candidates and Electoral Board Members more confidence in the accuracy of the election results.



Have a Great Batch Comparison Method
Risk Limiting Audit!

