



★ VIRGINIA ★
DEPARTMENT *of* ELECTIONS

the Handbook

Chapter 19
Risk Limiting Audits
(RLA)

July 2021

19. Risk-Limiting Audits

REQUIRED FORMS Request to Inspect Sealed Election Material (Form ELECT-659)	ADDITIONAL RESOURCES RLA Manual Sample AP Style Press Release Sample Tally Sheet Sample Chain of Custody Log
REFERENCE VA Code § 24.2-671.1 Envelope 3A ELECT-Management-Handcounting-Ballots-Examples	REGULATIONS NA

19.1 Risk-Limiting Audits: Introduction and Chapter Organization

A Risk Limiting Audit (RLA) is a type of post-election audit that utilizes statistical methods and a manual review of paper ballots to check that the voting equipment accurately reported the correct outcome of an election. RLAs provide strong statistical evidence that the declared winner of a contest actually received the most votes.

RLAs utilize statistical principles to provide a more cost-effective and efficient alternative to other forms of post-election audits. By hand counting a randomized limited sample of votes, election officials can provide evidence that vote tallies were correct without having to review every ballot. If the margin of an election is wide, fewer votes are audited; if the margin is narrow, more votes will be audited until enough evidence can confirm the results of the

Pursuant to [§ 24.2-671.1](#)¹ of the Code of Virginia, the Department of Elections (ELECT) shall coordinate a RLA annually adhering to the following requirements:

- An audit will not be conducted until after an election has been certified.
- The results of the audit will have no effect on the election results.
- The audit will be performed by the local electoral boards and general registrars in accordance with the procedures outlined by the Department.
- Localities will be selected at random with every locality participating in the Department's annual audit at least once in a five-year period.

¹ Code of Virginia [§ 24.2-671.1](#)

- The local electoral boards shall report the results of the audit to the Department of Elections and the Department will compile a report, which will include a detailed analysis of any detected discrepancies. ²

This chapter will serve as a resource to registrars Electoral Board members, who have been selected to complete a Risk Limiting Audit in accordance with [§ 24.2-671.1](#) of the Code of Virginia. This chapter will break down the RLA into three basic components: audit preparation, ballot retrieval, and audit results to provide a detailed overview of the process.

The Department of Elections Risk Limiting Audit Manual is an essential resource for planning and conducting a RLA. Refer to that guide for more specific information on how to conduct your Risk Limiting Audit and for specific software instructions. The manual may be found in Forms Warehouse under the Risk Limiting Audit section.

19.2 AUDIT BASICS

19.2.1 Audit Software

The Department of Elections currently uses Arlo, an open-source auditing software created by the non-profit organization VotingWorks. The audit software manages the data produced by the audit. The software sets the sample size of the audit, generates a list of randomly selected sample ballots, and calculates all statistical analysis. The RLA manual, found on Forms Warehouse, gives specific instructions on how to use the current auditing software.

19.2 Key Roles

There are four key roles in a RLA: administrators, participants, audit review boards, and the general public.

ELECT will function as the Administrator of the ballot software. As an *Administrator* of the audit software, an ELECT staffer will add elections to be audited, set the *risk-limit*, add participants, input the random seed number into the auditing software, as well as review the progress of the audit throughout the process. Any questions regarding audit preparation, retrieval, and results should be directed towards this individual or a localities corresponding liaison.

Participants are defined as the general registrar or an appointed person that will be responsible for coordinating the audit and taking on a leadership role during the RLA in their locality. They will be responsible for uploading ballot manifest, entering audit boards, and downloading ballot retrieval lists from the audit software. Typically, this is the role of the general registrar. Although, a general registrar may choose to appoint a staff member to take on these duties. ELECT will automatically list general registrars as *Participants* in the audit software for each RLA. If additional members of staff or

² Code of Virginia, [§ 24.2-671.1](#) Audits of ballot scanner machines,
<https://law.lis.virginia.gov/vacode/title24.2/chapter6/section24.2-671.1/>

electoral board members need to be added to the participant list, general registrars should send their names and emails to their liaisons. Additional participants must be added before any ballot manifest can be uploaded. Participants **do not** include audit review board members.

An *Audit Review Board(s)* plays an essential role in a RLA by retrieving specific ballot(s) and recording the votes for the contest on a tally sheet. The audit board members also input the results of each ballot into the audit software. Each board consists of two people. Localities must appoint at least one audit board per RLA but may choose to have more than one. Guidance on selecting an *Audit Review Board* is detailed in section 3.1.

The *General Public* will be invited to observe the ballot retrieval and tallying process during a public meeting. This creates transparency and integrity in both the audit and the election process.

19.2.3 Time Required

Localities should plan for a full day to conduct the audit. This will allow for additional time, if a second round of ballot retrieval is required. Since the sample is random, there is no way to officially determine the amount of ballots a locality may need to retrieve ahead of time. A RLA is designed, however, to sample the least amount of ballots necessary to gain statistical confidence that the outcome of an election is correct; therefore, most RLAs can be completed in one day. As a best practice it is recommended that the public meeting begin before noon, so the afternoon may be free, if a second round of ballot retrieval is required.

19.3 Audit Preparation

Pursuant to [§ 24.2-671.1](#)³, RLAs will be conducted after a race has been certified.⁴ If a race has been selected to participate in an RLA, ELECT will notify the corresponding localities via a letter from the Commissioner. The locality will be notified three-weeks before an audit to allot time to prepare and alert the public of the audit. To prepare for the audit, localities will have to submit an ELECT 659-Request to Inspect Sealed Material Form, secure a location for the audit, notify the public, notify local party chairs of the audit, and create and upload a ballot manifest. Each component is explained in more detail in the subsequent sub-sections.

19.3.2 Submitting an ELECT 659-Request to Inspect Sealed Election Material Form

Once a locality receives notice of their participation in an upcoming RLA, localities are required to submit an [ELECT 659-Request to Inspect Sealed Election Material form](#) to request permission, pursuant to Va. Code [§ 24.2-669](#)⁵, to unseal ballots cast on Election Day for a post-election audit. Once submitted, the form is sent to ELECT for signature authorization and then

³ Code of Virginia, § 24.2-671.1

⁴ Code of Virginia, § 24.2-671.1

⁵ Code of Virginia, § 24.2-669

presented to the Clerk of the Circuit Courts. This form may be found in Forms Warehouse under the Risk-Limiting Audit section.

19.2.3 Determining Location

In addition to entering the tally results, the facility where an audit takes place must have an internet connection to download and print retrieval lists, placeholder pages, audit board credentials, and labels. If only a few ballots need to be pulled for an audit, a locality may choose to conduct its audit at the courthouse. If more space is needed or if no workspace is available, the audit may take place in another location such as: the general registrar's office, a library, firehouse, school, etc. Localities should work with their Clerk of Courts to consult on the physical space of the audit.

19.2.4 Notifying the Public

Pursuant to § 2.2-3707⁶, localities must plan for a public meeting for the ballot retrieval and ballot entry portion of the audit. The meeting must be published no less than three working days prior to the meeting. Local party chairpersons must also be notified. In addition to general registrars and a localities electoral board members, meeting attendees may include:

- Clerk of the Court or his/her designee to ensure chain of custody
- Audit Board Members
- General Public
- Representatives from Political Parties
- Candidates
- Campaign Staff
- Local Party Chairs

19.2.5 Creating a Ballot Manifest

Localities must create and upload a ballot manifest into the auditing software. 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.

⁶ Code of Virginia, § 2.2-3707

	A	B
1	Batch Name	Number of Ballots
2	Pct 101	75
3	Pct 102	112
4	Pct 103	52

The number of ballots in each batch should be verified independent of the tabulator. The information to create a ballot manifest may be found in the following places:

- Ballot Record Reports from Precincts
- Inventory the ballot boxes at the Clerk of Court. Label #3 should contain the information needed.
- Mail-Ins: Voter Credit/History Information
- Calculating the Number of Ballots in a container by weight.
 - If the number of ballots in a specific container is unknown, a locality can perform a simple equation to approximate the number of ballots in each box. To do this, each container box must be weighed. The weight of each box is added together. The total of this sum is then divide by the total number of ballots cast. The result of this equation is then multiplied by the weight of the corresponding box to get the number of ballots.

Helpful Tips and Reminders:

- All types of ballots are included (in person, mail-in, provisional, etc.) in the manifest.
- Localities may label the “Batch Name” in any way that helps keep them organized (example: Precinct 101, Box 26, Container 8, etc.). Batch names are unique to each locality.
- Boxes/Containers/Envelopes that contain large amounts of ballots can be broken down into smaller units to ease the physical challenges of performing the audit as long as it is reflected in the batch name (example of batch names: Precinct 101 Unit 1; Box 26 Unit 2; Container 8 Unit 3 etc.).
- Keep the spreadsheet simple; avoid color coding and bold, so the ballot auditing software can read it.
- Run a quick equation in excel to check that all ballots have been accounted for in a locality. After performing this check, make sure to **delete** this sum before uploading the manifest into the audit software.
- Build a ballot manifest as the ballots are being stored after an election in preparation of future audits.
- ELECT staff is available to troubleshoot specific challenges and provide support.

19.2.6 Uploading a Ballot Manifest

Once the ballot manifest is created, participants will save the manifest as a **.csv file** (CSV UTF-8, CSV (Macintosh) or CSV (MS-DOS) are all acceptable) and upload the spreadsheet into the

auditing software. The audit software will let participants know if a mistake has been made when creating or uploading the manifest by generating an error message. Mistakes can include: empty rows, incorrect file formats (the manifest must be saved as a .csv file), or ballot totals in any rows or columns. All ballot manifests must be submitted by all participating localities to start the audit. Once the software receives all of the ballot manifests, it will compile them into one large ballot list. This master list will be used to select random ballots across participating localities. Detailed instructions on how to upload a ballot manifest into the current auditing software can be found in the RLA Manual located in Forms Warehouse under the RLA section.

19.2.7 Suggested Supplies

While not required, the following is a list of helpful supplies to be made useful for the day of the audit:

- Table and chairs for each audit board
- Bright colored paper
- Bright colored removable labels
- Tally sheets
- Pens
- Rubber fingers
- Device to open containers
- Materials to reseal containers, if necessary
- Device with Wi-Fi/cellular to enter ballot tallies (laptop, smartphone, etc.)
- 20, 10 sided-dice
- Printer

19.3. Public Meeting

Pursuant to § 2.2-3707⁷, localities must plan for a public meeting for the ballot retrieval and ballot entry portion of the audit. During this public meeting, localities will generate a random seed number, retrieve ballots, tally results, and upload results into the audit software. The Risk Limiting Audit Manual gives step-by-step instructions on utilizing the auditing software.

19.3.1 Generating a Random Seed Number

The audit software uses a 20-digit random seed number to select ballots to be retrieved. A random seed number specifies the starting point of a computer generated random sequence of numbers. To create this random number, a designated person(s) will roll a ten-sided dice twenty times and record each number. This step is done before ballot retrieval and during the public meeting. Any person in attendance may be designated to roll the dice, it can be done by one person or several people. The number generated by this activity will be inputted into the

⁷ Code of Virginia, § 2.2-3707

audit software by the audit *Administrator*. Once this number is inputted, the auditing software will randomly select and generate a list of ballots to be retrieved based on the sample size. For an illustrated example of this process, please review the Random Seed Number Generation on the Virginia Department of Elections YouTube page.⁸

19.3.2 Ballot Retrieval Process

19.3.2.1 Setting Audit Review Boards and Printing Essential Documents

Once the list of ballots to be audited has been generated by the audit software, *Participants* will log into the audit software to enter the number of audit boards. The software will then produce *ballot retrieval list, placeholder sheets, ballot labels, and audit board credentials* for each *Audit Review Board*; the *Participants* will download and print each of these items to begin the audit:

- **Ballot Retrieval List:** A ballot retrieval list is a list of ballots to be retrieved by a locality. The “Batch Name” will be the naming convention used in the ballot manifest. Since the selection is random, precincts may have multiple ballots to be retrieved and some precincts will have none.
 - The ballot number reflects the numerical order of a specific ballot. In order to audit ballot number 90 in Precinct 1 for example, a member of the audit board must count each stored ballot until they reach the 90th ballot in the batch.
- **Placeholder sheets:** Placeholder sheets are individual sheets that contain each batch name and number (ex. Precinct 1, Ballot Number 90). They come in the form of a pdf and are printed on brightly colored paper. These sheets will be used to mark the place of the ballot that is being retrieved in the stack of ballots.
- **Ballot Labels:** Ballot Labels should be placed on ballots when retrieved. A bright colored removable label is recommended but not required.
- **Audit Board Credentials for Data:** The audit software will create a username and password for the audit board members. The link at the bottom of the audit board credentials will direct audit board members to the site to enter in the ballot totals.

19.3.2.2 Retrieving and Tallying Ballots

The ballot retrieval list generated by the auditing software will contain every ballot that must be audited. Follow these steps to retrieve and tally the results:

- 1) Review list of ballots, retrieve the necessary containers.
- 2) Perform any change of custody that may be required by the Clerk of Court. The Chain of Custody needs to be documented. ELECT has a sample form that may be used to document Chain of Custody or a locality may design its own form.
- 3) Remove ballots from box and place in a neat stack.
- 4) Review *Ballot Retrieval List* to determine what ballot to select.
- 5) Starting at the top of the stack, count ballots until the desired ballot is reached.

⁸ Virginia Department of Elections, Random Seed Number Generator, <https://www.youtube.com/watch?v=Jw1DajGxvQ&t=42s>

- 6) Once the ballot needed to be retrieved is reached, pull it out of the stack and insert the placeholder sheet in the stack to mark its position. Place the removable label on the ballot. The placeholder sheets and ballot labels are generated by the audit software.
- 7) Once all ballots have all been pulled from the containers, the audit board will use the procedures established by ELECT for conducting hand counts of ballots.⁹These procedures are outlined in Forms Warehouse under the Risk Limiting Audit Section, *ELECT-Management-Hand Counting-Ballots-Examples*. Include the batch name, ballot number, and the vote on the tally sheet. ELECT has sample tally sheets available for use during a RLA but a locality may choose to create their own. These forms may be found in Forms Warehouse.
- 8) Localities may return ballot(s) to the appropriate container(s) or keep all the ballots from the RLA in a designated envelope.
- 9) The containers should be resealed and returned to the Clerk of the Circuit Courts following the chain of custody procedures.

Helpful Tips and Reminders:

- ELECT has a limited number of counting scales to loan. Localities may send an email to their liaison to request use of a scale.
- ELECT has sample Chain of Custody forms and Tally Sheets available for use in Forms Warehouse.

19.3.2.3 Ballot Entry into the Audit Software

A device with a Wi-Fi connection is needed to record the paper tally sheet. This may include a laptop or a smartphone. If using a smartphone, scan the QR code or type in the URL into the web browser. This link and/or QR code will take audit board members to the data entry portal to input the results of the audit.

- 1) The audit board members will be prompted to sign-in. The audit board will see the list of ballots. Audit board members will “key-in” results from the list of ballots. If a locality has 22 ballots to retrieve, there will be 22 separate fields to record each ballot. ELECT recommends both audit board members participate with one audit board member reading the results and one audit board member entering the results. Audit board members must **both** agree on the results of each ballot.
- 2) Click the **Start Auditing** button to begin.
- 3) Go through the ballots in order.
- 4) Select the candidate marked on the ballot, both audit board members need to agree with the results. Click Review. Verify accuracy before clicking Submit & Next Ballot button.

⁹ Virginia Department of Elections, Commonwealth of Virginia, Ballot Examples, Hand Counting Printed Ballots for Virginia Elections or Recounts, <https://www.elections.virginia.gov+/media/formswarehouse/election-management/election-day-instructions-and-forms/ELECT-Management-Handcounting-Ballots-Examples.pdf>

- 5) When all Ballots have been inputted, audit boards should return to the audit overview screen to verify every ballot has been entered into the audit software. Once everything has been verified, click the **“Auditing Complete-Submit Results”** button.
- 6) Audit board members will sign-off. Names must be keyed in exactly how the audit board member signed-in. For example, if the caps lock was on when the audit board member signed in, then the caps lock must be on when the audit board member signs out.

19.3.4 Audit Completion

When all audit boards have completed their ballot entry and the risk limit has been met, the *Audit Progress* screen will display the message “Congratulations - the audit is complete!” If the risk limit was not met after all the ballots have been audited, the audit software will initiate another round of sampling. A new ballot retrieval list, placeholders, labels, and audit board credentials will be generated for an additional round of ballot retrieval.

19.3.5 Results

Pursuant to [§ 24.2-671.1](#)¹⁰ at the conclusion of the audit, the electoral boards will report the results of the audit to the Department. ELECT will submit a report to the State Board of Elections on the findings of the RLA. The report will include the results of the audit as well as an analysis of any detected discrepancies.

¹⁰ Code of Virginia, [§ 24.2-671.1](#)