



★ VIRGINIA ★
DEPARTMENT *of* ELECTIONS

Risk Limiting Audit Manual

VIRGINIA DEPARTMENT OF ELECTION

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1. Risk-limiting Audit

REQUIRED FORMS SBE-671.2(D) Form Request for Risk-Limiting Audit Request to Inspect Sealed Election Materials for a Post-Election Audit	ADDITIONAL RESOURCES Virginia's Guide to Handcounting Ballots Chain of Custody Template RLA on FormsWarehouse
REFERENCE RLA Scale Method Video RLA K Cut Method Video Random Seed Number Generation Video RLA Reports	REGULATIONS 1VAC20-60-50. Overfull optical scan ballot container. 1VAC20-60-80. Request for a risk-limiting audit for a contested race within a jurisdiction.

1.1 Overview

Va. Code § 24.2-671.2 requires that electoral boards (EB) and general registrars (GR) perform risk-limiting audits (RLAs) under the supervision of the Department of Elections (ELECT) using procedures prescribed by the State Board of Elections (SBE) outlined in this document. This document describes the SBE procedures and includes guidance on the following:

- Methods for conducting the RLA.
- Randomly selecting contested races and determining the risk limit.
- Preparing for an RLA, including guidelines for organizing ballots, selecting venues, and securing appropriate materials by EBs and GRs.
- Ballot custody, accounting, security, and written record retention procedures that ensure a complete and accurate collection of cast ballots from which samples are drawn.
- Hand counting of the audited ballots.
- Ensuring transparency and understanding of the process by participants and the public, including guidelines for direct observation by members of the public, representatives of the candidates involved in the RLA, and representatives of the political parties.

1.1.1 Definition of an RLA

An RLA is a type of post-election audit that utilizes statistical methods and a manual review of paper ballots to confirm that the electronic voting system accurately reported the correct outcome of an election. RLAs analyze a random sample of hand-counted ballots to confirm election results. If the margin of an election is wide, fewer votes are audited; if the margin is narrow, more ballots are audited until a large enough sample is reviewed to confirm the results of the contest.¹

1.1.2 History of RLAs in Virginia

RLAs provide strong statistical evidence that the declared winner of a contest received the most

¹ See [National Conference of State Legislatures, Risk-Limiting Audits](#)

votes. In 2017, the Virginia General Assembly passed legislation that amended the Code of Virginia to include RLAs of ballot scanner machines in use in the Commonwealth, and the changes went into effect on July 1, 2018. Following enactment, pilot RLAs were conducted throughout the Commonwealth, with the first statewide RLA occurring in 2022. A detailed account of all statutorily required RLAs may be found in reports located on ELECT’s website. Every locality in the Commonwealth participated in a ballot-polling RLA of the 2024 U.S. Senate race, which is explained in greater detail in the 2024 November RLA Report.²

2. RLA Basics

2.1 Methods

Pursuant to Va. Code § 24.2-671.2(B), the SBE is required to set the processes and procedures for each RLA performed.³ While there are three methods available for conducting a RLA, the SBE has approved two RLA methods for use in the Commonwealth of Virginia: *ballot-polling* and *batch-comparison methods*. Ballot-polling audits manually review a randomly selected, sufficiently large sample of ballots to determine if the overall outcome of an election contest was correctly reported. Batch-comparison audits manually review randomly selected physical batches of ballots, such as those cast in one precinct, and compare those results with corresponding machine counts.⁴ Although the ballot polling and batch comparison methods differ in their sampling approaches, both methods aim to confirm that voting systems accurately report the outcome of an election. The SBE will vote on the method for statutorily required RLAs by no later than the September preceding each November General Election. For setting the risk limit of RLAs pursuant to Va. Code § 24.2-671.2 (C)(1), (2), and (3), the vote is by a simple majority. For establishing an RLA and setting the risk limit pursuant to Va. Code § 24.2-671.2(C)(4), the vote is by a two-thirds majority.

2.2 RLA Selection and Notification Process

Pursuant to Va. Code § 24.2-671.2, RLAs must be conducted **before** a race has been certified.⁵ ELECT must ensure that an RLA is conducted for at least one randomly selected contest each year. The Code of Virginia prescribes the contests eligible for selection for an RLA depending on the election cycle, as outlined in Va. Code § 24.2-671.2(C) and illustrated below.⁶

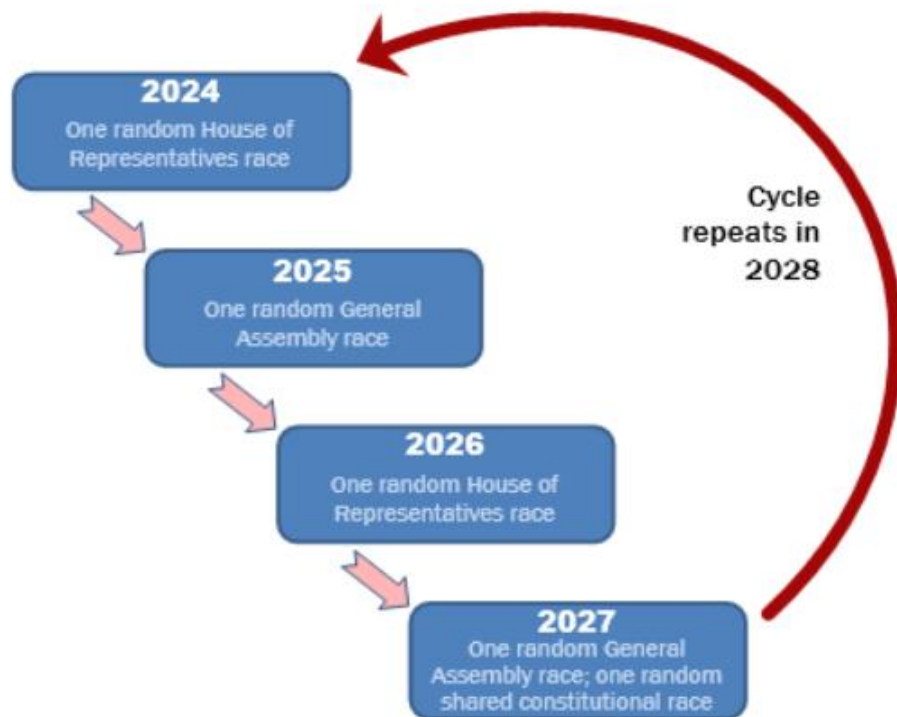
² See [ELECT, Risk-Limiting Audits](#).

³ See Va. Code [§ 24.2-671.2\(B\)](#).

⁴ *Id.*

⁵ See Va. Code [§ 24.2-671.2](#).

⁶ *Id.*



The SBE may also choose to audit a race in:

1. any other year that ensures that each locality participates in an RLA of an office within its jurisdiction at least once every five years or
2. a jurisdiction that the SBE finds appropriate.⁷

The SBE defines participation in an RLA as the uploading of a ballot manifest to Arlo, as uploading a ballot manifest makes the locality available for selection by Arlo to audit ballots.

Additionally, Va. Code § 24.2-671.2(D) allows local EBs to *request* an RLA of a contested race within the EB's jurisdiction. Using *SBE-671.2(D) Form: Request for Risk Limiting Audit*, a locality may submit its request to the SBE for approval.⁸ Examples of election races wholly contained within a locality's jurisdiction *may* include but are not limited to: mayoral, school board, city council, clerk of court, treasurer, or sheriff. Localities that are partially included in a House of Delegates, Senate of Virginia, or U.S. House of Representatives District are not able to request an audit of only the ballots that included those races. Section 2.2.3 of this manual details how to apply for an RLA.

2.2.1 Selecting a Contest for Statutorily Mandated RLAs

For those contests eligible for an RLA as designated by the year in Va. Code § 24.2-671.2(C), the

⁷ See Va. Code [§ 24.2-671.2\(C\)\(4\)](#).

⁸ See [ELECT, SBE-671.2\(D\) Form](#)

SBE will only consider races with margins greater than 1%.⁹ All contests that meet that threshold will be placed in the selection pool and will be drawn at the SBE meeting held on the third Monday in November. There is no statutory requirement to audit a primary election.

For those contests eligible for an RLA in a given year under Va. Code § 24.2-671.2(C), the SBE Chair or designated representative will randomly draw at least one race(s) to audit from this pool. Before the random selection takes place, a member of ELECT staff will explain the selection method. Examples of random selection methods may include drawing a contest from a bowl or rolling dice to determine the audited contest and will be chosen at the discretion of the Commissioner. The selection will be held and recorded during a public meeting to ensure that the chosen race is completely random and observable by the public.

2.2.2 SBE Requested RLAs

Under Va. Code § 24.2-671.2(C)(4), the SBE has the right to require an RLA of:

1. any race to ensure that each locality participates in an RLA at least once every five years or
2. that the SBE otherwise deems appropriate.¹⁰

If the SBE decides to audit a race pursuant to Va. Code § 24.2-671.2(C)(4), the SBE must approve such audit by a two-thirds majority vote. An SBE meeting will be held at least two months prior to the June primary, and no later than the September prior to the November General Election. This allows localities to plan for the audit before the start of early voting. No race may be audited that has a margin of less than 1%. The SBE will ask ELECT to add this item to the Board agenda prior to the SBE meeting where the vote will take place. If a locality requests an RLA, the SBE may approve the audit by simple majority vote.

2.2.3 Applying for an RLA of a Local Contest

In consultation with their local GR, a local EB may request SBE approval for an RLA of a contested local race wholly contained within its jurisdiction. The SBE has promulgated both a regulation to guide EBs in selecting a race for an RLA as well as the *SBE-671.2(D) Form* that localities must use to request a race for an RLA.¹¹ EBs may choose between utilizing the *ballot-polling* or *batch-comparison* method of conducting an RLA.

An EB must cast a majority vote at a public canvass meeting to request an RLA for a particular contested local race that is wholly contained within the EB's jurisdiction.¹² Further, an EB must sign and complete the current *SBE-671.2(D) Form* and identify the local race(s) subject to the requested RLA. All board members should sign and date the form. Once completed, the secretary of the EB must send the form to ELECT via the locality's Elections and Registration Specialist. These forms must be submitted to ELECT no later than the close of business the day

⁹ See Va. Admin. Code, [1VAC20-60-80](#).

¹⁰ See Va. Code [§ 24.2-641.2\(C\)\(4\)](#).

¹¹ See generally Va. Admin. Code, [1VAC20-60-80](#).

¹² *Id.*

prior to the publicly noticed RLA SBE meeting (the date will vary depending on the election cycle).

The SBE will grant an RLA request if the form is properly completed, all statutory requirements are met, and the request is submitted on time. Finally, the regulation specifies that, as needed, the SBE will grant a two-week extension to an EB's local certification deadline under Va. Code § 24.2-671 to accommodate completion of the RLA.¹³

Pursuant to Va. Code § 24.2-673.1, an EB can request an RLA of an election that uses ranked choice voting (RCV), but elections that use RCV are not eligible for random selection to comply with the provisions of subsection C of § 24.2-671.2.¹⁴ RCV RLAs will be limited to the first choice rankings reported by voting systems. If the SBE approves a locality's request for an RLA of an RCV election, the procedures for both ballot polling and batch comparison will apply.

2.2.3.1 Key Factors When Considering Applying for an RLA of Local Contest

There is a lot to consider when applying for an RLA, particularly of a race wholly contained within an electoral board's jurisdiction. The electoral board must choose the sampling method, time, staffing needs, costs, and more. Review the sections below to learn more about the considerations that go into conducting a risk-limiting audit.

2.2.3.1.1 METHOD CHOICE

The SBE gives EBs the option to choose between the use of two RLA methods for applications submitted pursuant to Va. Code § 24.2-671.2(D): ballot-polling and batch-comparison.

Ballot-polling samples a statistically significant number of ballots to test that a reported outcome for an election was correct. Typically, ballot-polling requires pulling fewer ballots than batch-comparison sampling.

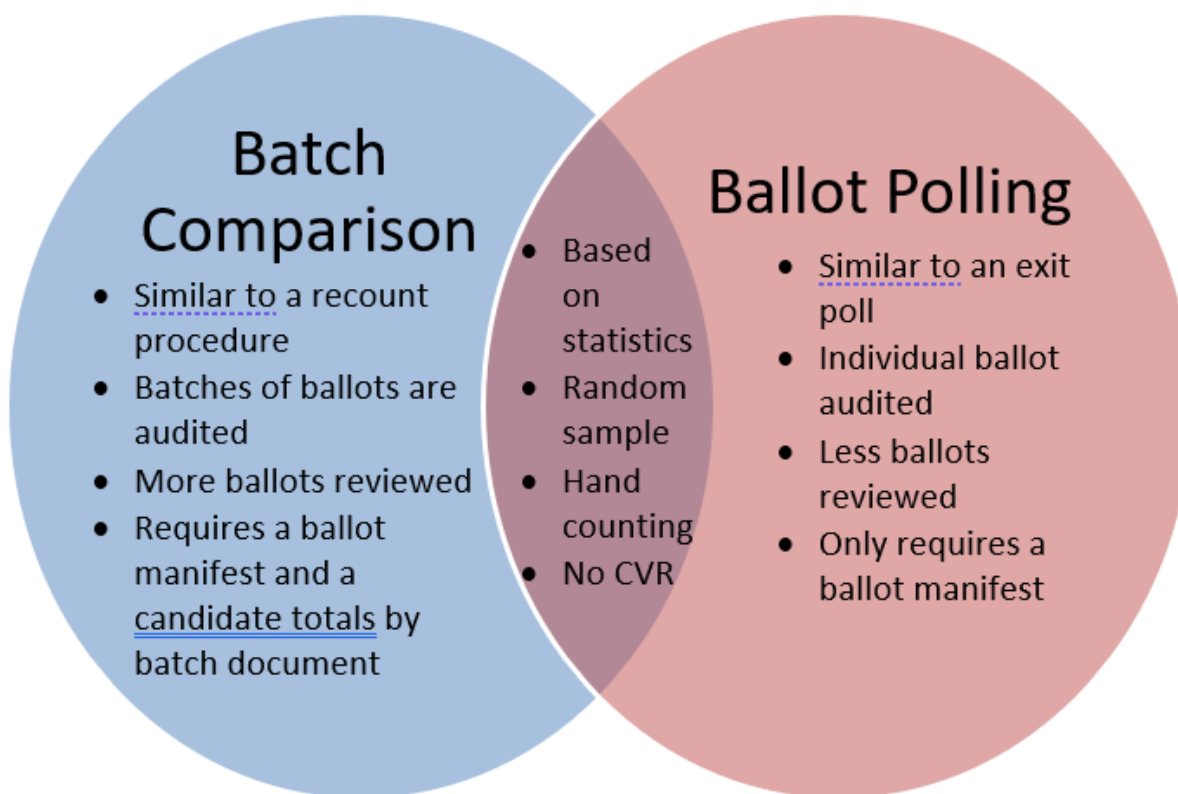
Ballot-polling has been used by the Commonwealth since RLAs were first mandated by statute. In the case of ballot-polling RLAs, a statistically significant number of ballots are randomly sampled to test the general accuracy of the voting system's counts in the election. Conducting a ballot-polling audit requires use of a ballot manifest. A "candidate totals by batch" document is not necessary to conduct an audit using ballot polling, unlike when using batch-comparison sampling.

Batch-comparison samples randomly selected batches of ballots (e.g., all ballots cast in a precinct), which are then counted and compared to test the general accuracy of the voting system's count in the election. This method tends to require pulling more ballots than ballot-polling and may require more staff and time to complete the audit. Conducting a batch-comparison audit requires the use of both a ballot manifest and a "candidate totals by batch"

¹³ See Va. Code [§ 24.2-671](#).

¹⁴ See Va. Code [§ 24.2-673.1](#).

document.



Tip

You can use the Arlo Planner Tool to create an *estimate* of the number of ballots or batches that may be required to conduct an RLA for your race. The Arlo Planner Tool can be found here: [Arlo Planner Tool, by VotingWorks](#). This tool is available to the public and does not require a login to access.

2.2.3.1.1.1 An Example of Sample Sizes for Both Methods

In 2024, a batch comparison method RLA was performed for the U.S. Congressional District 1 race. Below, ELECT shows the number of batches and ballots that were pulled in that RLA as well as the estimated number of ballots that would have been pulled for a ballot polling RLA of the same race, using the same risk limit. This race had 478,906 ballots cast with a margin of 9.78% between the candidate with the most votes and the candidate with the second most votes.

Batch-comparison District 1	Ballot-Polling Estimate for District 1
19 batches with 137,627 ballots total	868 ballots



Note about Performing Both a Ballot-polling RLA and a Batch-comparison RLA

If your locality must perform both a ballot-polling RLA and a batch-comparison RLA, can you use the same ballot manifest for both? Yes, the ballot manifest for one may be used for the other. *However*, in this event, the batches listed in the ballot manifest ***must*** be the same as your precincts. For example, if 100 ballots were cast in Precinct 1, then Batch 1 would have 100 ballots. The candidate by batch file must match with the ballot manifest for a batch-comparison method RLA. For example, if Central Library Precinct had 100 ballots cast, then the Central Library Precinct should have a total of 100 ballots in both the ballot manifest and the candidates by total file. This is discussed in greater detail in 5.2.2 Creating a Candidate Total by Batch File. You may also choose to create two separate ballot manifests for greater ease in locating ballots.



Reminder

ELECT reminds localities that should an EB choose to apply for an RLA the batches or ballots used to conduct the RLA will be randomly chosen by Arlo, no matter which RLA method, and will not be chosen by the applying EB.

2.2.3.1.2 TIME

Pursuant to Va. Code § 24.2-671.2, ELECT is required to ensure that RLAs of certain contests are conducted each year. The SBE will select those contests, approve applications from localities requesting an RLA, and any other RLAs ordered by the SBE during a meeting held on the third Monday in November. This creates a very tight timeline for conducting RLAs, which must be completed before certification and despite the Thanksgiving holiday. This means localities will have either 6 or 11 business days to complete the RLA process after a general election, i.e., 11 days in 2026, 11 days in 2027, 6 days in 2028, 6 days in 2029, and 6 days in 2030.

This timeline may be further compounded during a November General Election by choosing a *different* method than the SBE for an RLA of a local contest. For example, the SBE may choose to conduct an RLA using the ballot-polling method in a jurisdiction. If an EB chooses to utilize a batch-comparison method for a local race, then the EB would be running two different types of RLAs at the same time, which may take additional time to complete.

If an EB applies for an RLA of a primary, the timeline is even more compressed. For a June primary, an EB will have 3-4 business days from the time of approval of the RLA to the date for the SBE to declare a nominee. This timeline may also include the 4th of July, depending on the year. Given these time constraints, an RLA of a primary, while not prohibited by statute, is not recommended.



Reminder

As RLAs are a required step during the post-election period and will be performed after every general election, EB members should expect to be available for the purposes of an RLA after the canvass has been completed and before the SBE certifies a general election.



FAQ: Does applying for a RLA of a local race allow a locality to opt out of other RLAs to meet their statutory requirements?

If a locality opts for an RLA of a race wholly contained within its jurisdiction, it is not exempted from the required yearly, randomly selected RLA or any contest that the SBE may randomly request to be audited.

2.2.3.1.3 STAFFING

As part of the RLA, EBs must recruit audit review boards (see section 3.4 for more information about audit review boards). An audit review board is a two-person team assigned to review ballots and record a hand tally of the results. The required number of audit review boards is based on the number of batches that are needed for an RLA. However, when a single batch contains a large number of ballots, additional audit review boards may be assigned to the batch to tally the ballots more effectively and efficiently. For example, a batch-comparison method RLAs must have batches that are the size of your precincts, as you must report the total number of ballots cast for a candidate in the candidate totals by batch file and the total number of ballots cast for a candidate is reported at the precinct level. Your locality may have only a few batches, but those batches may be large based on the number of ballots cast in a precinct.

Thus, more audit review boards may be needed to tally those ballots effectively and efficiently.

- In ELECT's and localities' experience, on average, an audit review board can pull 20-25 ballots per hour utilizing the ballot-polling method. If many ballot containers must be retrieved, this average decreases to about 15-20 ballots per hour. It may take longer to locate a specific ballot within a stack of ballots utilizing the ballot-polling method, which accounts for the additional time.
- In ELECT's and localities' experience, on average, an audit review board utilizing the batch-comparison method could audit approximately 220 ballots per hour. Batch-comparison audit review boards can work more quickly because they are not searching for specific, random ballots but instead work through all ballots in a "batch." That aside, the review board or boards have substantially more ballots to review. This may be further complicated when the Central Absentee Precinct (CAP) is chosen for audit, as not every ballot will contain the chosen race or if an audit review board must sort out ballots that do not contain the audited race.

2.2.3.1.4 COST

If more ballots or batches are sampled, more people will need to be compensated to complete

the RLA process on time. While Va. Code § 24.2-671.2 does not discuss the compensation of audit review board members, ELECT recommends that audit review board members be compensated similarly to officers of election.

2.3 SBE Administrative Tasks

In addition to the SBE's role in selecting and approving races for audit, the SBE plays a role in setting the risk limit, choosing the method of conducting the RLA, and generating the random seed number, which is a 20-digit number that acts as a starting point for a computer-generated random sequence of numbers to assign to each ballot or batch. These tasks are outlined below and performed at one of two SBE meetings held prior to the RLA.

2.3.1 Setting the Risk Limit

A risk limit is the maximum chance that the RLA will fail to correct an incorrectly reported outcome. For example, a 10% risk limit means that there is a 90% chance that the RLA will correct an incorrect outcome. To date, every RLA in Virginia has used a 10% risk limit. A 5% risk limit has been used in other states, e.g. Georgia, but has not yet been tested in Virginia. The lower the risk limit, the more batches or ballots that are likely to be pulled.

The SBE will set the risk limit of any RLA and will announce the risk limit of each RLA at a public meeting held prior to the RLA. The approval of the risk limit will take place at an SBE meeting held no later than the September prior to the November General Election.

2.3.2 Generating the Random Seed Number

For each audited race, the RLA software uses a 20-digit random seed number to select ballots for retrieval. A random seed number specifies the starting point of a computer-generated random sequence of numbers. The 20-digit random seed number is created during an SBE meeting and is observable by the public.

To create this random number, the SBE Chair or designated representative(s) rolls twenty, ten-sided dice (numbered zero through nine), one time each. As each die is rolled, the resulting number is recorded on a whiteboard. Any person may be designated by the SBE Chair to roll the dice. Further, multiple people may roll the die.

If there are applications approved by the SBE from EBs pursuant to Va. Code § 24.2- 671.2(D), a new, additional 20-digit seed number will be generated via the process explained above.

The 20-digit number generated by this activity will be inputted into the RLA software by the *RLA Administrator* on ELECT's staff. 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* video on ELECT's YouTube channel.

3. RLA Preparation

3.1 Overview

Due to the compressed timeline for RLAs, localities can take actions before Election Day to set themselves up for a successful RLA should they be chosen to audit a race, including

- Determining RLA location;
- Scheduling the public meeting;
- Recruiting Audit Review Boards;
- Reviewing ballot accounting and storage practices; and,
- Logging ballot manifest quantities produced from early voting and pre-processing.

The Appendix provides a generic timeline for a November RLA.

3.2 Determining the Location of the RLA

A locality must consider a space for the RLA that can accommodate the public and that is ADA-compliant. The facility where an RLA takes place must also have an internet connection to download and print retrieval lists, placeholder pages, RLA board credentials, and labels.

If only a few ballots are required for an RLA, it may be possible to conduct the RLA at the courthouse. If more space is needed or if no workspace is available, the RLA may take place in another suitable location, such as: the GR's office, a library, a firehouse, a school, etc. Localities should reach out to their Clerk of Court to discuss the potential for an RLA well ahead of the general election to ensure the availability of the election material required for audit and answer any questions or concerns the Clerk may have about the process. If selected for an RLA, it is important to work with local Clerks of Court to consult on the physical space of the RLA.

3.3 Scheduling the Public Meeting

Pursuant to Va. Code § 2.2-3707 and § 24.2-671.2(G), an RLA must be conducted as a public meeting. The EB and the GR shall conduct an RLA within their jurisdiction. Once the EB has selected a location for the RLA, it must provide the location to ELECT; ELECT will select the date and time for the RLA to begin. ELECT will publish the list of contested races along with the date, time, and location of the RLA as soon as practicable.



Reminder

An RLA round cannot be completed and results known until all localities have submitted their results to Arlo. Therefore, it is imperative that localities start at the time set by ELECT to avoid delays, especially if additional rounds are necessary.

Local party chairpersons involved in the race being audited must also be notified of the date and time of the RLA by the GR. Candidates should also be notified when the local EB has

requested an RLA of that race and the request was approved by the SBE.

Parties and candidates are entitled to send authorized representatives to observe the RLA. Authorized representatives should be provided the same level of observance as they would during the Canvass.¹⁶ Local EBs should set up the location of the RLA to allow the public and authorized representatives the opportunity to observe the RLA.

Additionally, at least one member of the EB representing each political party must participate in and be present for the duration of the RLA.¹⁷ If the EB is unable to have one Republican or one Democrat present for the duration of the RLA, the local EB should seek the appointment of a temporary EB member of the missing political party, pursuant to Va. Code § 24.2-106.¹⁸ For example, if there is only one Democrat on the EB and that person will be unavailable for the RLA, then the EB should notify ELECT and petition the court for the appointment of a temporary EB member to represent the Democrat party during the duration of the RLA.

In addition to EB members and the GR, meeting attendees may include:

- Clerk of Court
- Audit Board members;
- General public;
- Representatives from political parties;
- Candidates;
- Campaign staff; *and*,
- Local party chairs.

Localities should plan for at least one full day to conduct the RLA. For RLAs required by the Code of Virginia, ELECT will set the time and date of the RLA; the public meeting set by the EB to perform the RLA must match the time and date of the RLA unless good cause can be shown as to why that is not possible. Since the sample is random, there is no way to predetermine the number of ballots a locality must retrieve.

For RLAs requested by a local EB, a date and time may be suggested by the local EB to ELECT. The suggestion must be communicated at the same time as submittal of the request for RLA. ELECT will work with the local EB to determine if the date and time suggested are acceptable to ensure that the RLA is performed within the specified timeframe set by the Code of Virginia.

3.4 Recruiting RLA Audit Review Boards

¹⁶ See Va. Code [§ 24.2-671](#). See also ELECT, [GREB Chapter 14](#). See also ELECT, [Do's and Don'ts for Campaigners and Authorized Representatives](#).

¹⁷ See Va. Code [§ 24.2-641.2](#).

¹⁸ See Va. Code [§ 24.2-106](#). See also Va. Code [§ 24.2-671.2\(G\)](#) (requiring at least one EB member from each party be present for the RLA).

An *Audit Review Board* is a two-person team that retrieves specified ballots, records the results of the ballot, and inputs the results into the ballot software. GRs and/or the EB determine the audit board(s). Audit board members can be: staff, officers of election, EB members, GRs, or representatives from each party and/or candidates. ELECT recommends that the audit board consist of one Democrat and one Republican to ensure balanced representation. However, audit boards do not have to declare a party affiliation.

The number of *Audit Review Boards* required is based on the number of ballot storage containers that must be opened, not on the number of ballots to be retrieved. The average numbers for both the ballot-polling and the batch-comparison method are provided below.

- Ballot-polling: based on previous RLAs in Virginia, on average, an audit board can pull 20-25 ballots per hour. If many ballot containers must be retrieved, this average decreases to about 15-20 ballots per hour.
- Batch-comparison: based on previous RLAs in Virginia, on average, an audit board could audit about 220 ballots per hour.

When utilizing the ballot-polling method, it can take audit boards longer to locate the appropriate ballot in a stack of ballots. However, fewer ballots will need to be audited overall.

When using the batch-comparison method, every ballot in a stack is counted in a precinct. While this may be quicker than locating random ballots, more ballots need to be reviewed using the batch-comparison method.

3.5 Reviewing Ballot Accounting and Storage Practices

When preparing for an RLA, it is a good time to review ballot accounting practices, which include ballot tracking, ballot reconciliation, and chain of custody forms and procedures. Ballot accounting provides the number of ballots in an envelope, box, or container. Ballot manifests are explained in greater detail for *ballot-polling* in section 4.3 Creating a Ballot Manifest and for *batch-comparison* in section 5.2.1 Creating a Ballot Manifest. It is imperative that the ballots remain organized and clearly marked within the contents of the box. Having a strategic plan for organizing ballots can save a lot of time when conducting an RLA.



1VAC20-60-50. Overfull optical scan ballot container.

If an optical scan reader is in danger of malfunctioning due to too many ballots, then it may be opened with the appropriate safeguards listed in 1VAC20-60-50. Whether an optical scan reader has become too full is based on the judgment of the GR or EB of the locality. If an optical scan reader is emptied for this reason, a new batch may be created for a ballot manifest.

ELECT has designed a sample chain of custody form to document the control, transfer, and

disposition of ballots during an RLA. Localities may choose to utilize this form or design their own to suit their specific needs. This sample form can be found in FormsWarehouse under the RLA section.

3.6 Suggested Supplies

While not required, the following is a list of helpful supplies for a successful RLA:

- Table and chairs for each audit board;
- Bright colored paper;
- Bright-colored removable labels;
- Weight Scale;
- 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.); *and*,
- Printer (for printing RLA materials if unable to print materials prior to beginning the RLA).

4. The Ballot-Polling Method of the Risk-Limiting Audit

4.1 Overview

Once a locality is selected for an RLA or the EB has requested an RLA, it must do the following:

- Notify the public and participants identified in section 3.2 and 3.4 of this manual;
- Submit an ELECT 659-Request to Inspect Sealed Election Material form;
- Create and upload the ballot manifest; *and*,
- Gather supplies.

For the purpose of this manual, a batch is a documented set of ballots created by a voting system, an officer of election, or other election official.

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

Pursuant to Va. Code § 24.2-659, a locality must receive permission from the ELECT to unseal ballots cast on Election Day for a post-election audit. Localities are required to submit a Request to Inspect Sealed Election Materials for a Post-Election Audit to obtain permission. The form is submitted to ELECT for signature authorization and then presented to the Clerk of the Circuit Court to access ballots from the election. This form may be found in FormsWarehouse under the RLA section.

In the case of a statewide RLA or an RLA that includes multiple localities, ELECT may issue a general letter instead of a Request to Inspect Sealed Election Materials for a Post-Election Audit at the discretion of ELECT staff.

4.3 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).

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

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



Note about Performing Both a Ballot-polling RLA and a Batch-comparison RLA

In the event that your locality has to perform *both* a ballot-polling RLA and a batch-comparison RLA, pay attention to the design of your ballot manifest for each method. While the ballot manifest for one may be used for the other, the batches listed in the ballot manifest ***must*** be the same as your precincts. For example, if 100 ballots were cast in Precinct 1, then Batch 1 would have 100 ballots. This is not only for consistency but also so that the candidate by batch file matches with the ballot manifest for a batch-comparison method RLA, discussed in 5.2.2 Creating a Candidate Total by Batch File. You may also choose to create two separate ballot manifests for each separate method for greater ease in locating ballots.

Batch information can be found on Ballot Record Reports or on Label #3. ELECT encourages localities to have discussions with their Clerk of Court prior to the election. During these conversations, localities should work with their Clerk of Court to discuss storage limitations, the location of the RLA, and chain of custody concerns.¹⁹

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

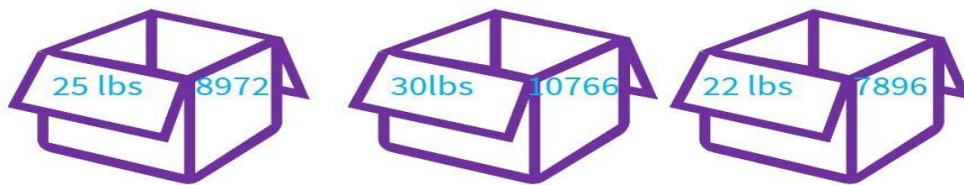
- Ballot Record Reports from precincts
- Inventory the ballot boxes at the Clerk of Court. Label #3 should contain the information needed.

- Electronic Pollbook Data
 - **Reminder:** Check Incident Reports or Officer of Election notes for occurrences of failing to check-in voters. This will allow the EPB number to be increased to the correct number.)

¹⁹ See [Democracy Fund, Knowing It's Right, Part Three, Planning and Conducting a Risk-Limiting Audit Pilot, Jennifer Morrell, June 2020.](#)

- VERIS data from the Final Absentee Report
- 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 divided 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 (see graphic).

Calculating Ballots by Weight



Total Weight = 77lbs

Total ballots from vote history/credit = 27,634

$27634 / 77 = 358.88$

Box 1 = 25lb * 358.88 = 8972

Box 2 = 30lb * 358.88 = 10766

Box 3 = 22lb * 358.88 = 7895

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 may be grouped into smaller units to ease the physical challenges of conducting the RLA, if it is reflected in the batch name (example of “batch names”: Precinct 101 Unit 1; Box 26 Unit 2; Container 8 Unit 3, etc.).



	A	B
1	Batch Name	Number of Ballots
2	Precinct 1, Batch 1	200
3	Precinct 1, Batch 2	200
4	Precinct 1, Batch 3	71
5		

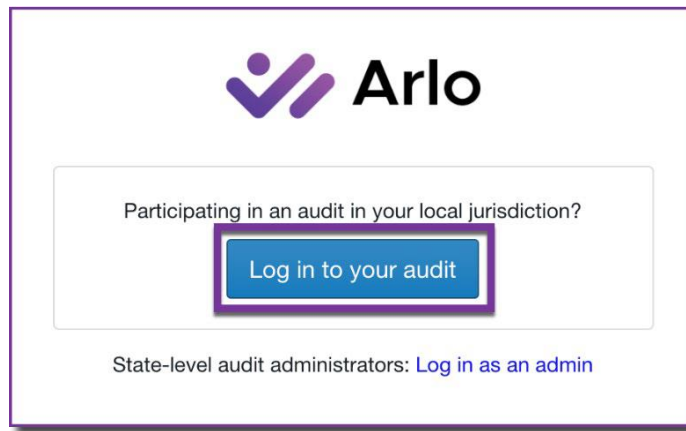
- Keep the spreadsheet simple; avoid color coding and bold, so the ballot auditing software can read it.
- Run a quick equation in Excel to check that all ballots have been accounted for in a locality. After performing this check, make sure to **delete** this sum before uploading the manifest into the RLA software.
- Build a ballot manifest as the ballots are being stored after an election in preparation for future RLAs.
- ELECT staff is available to troubleshoot specific challenges and provide support.

4.4 Uploading a Ballot Manifest

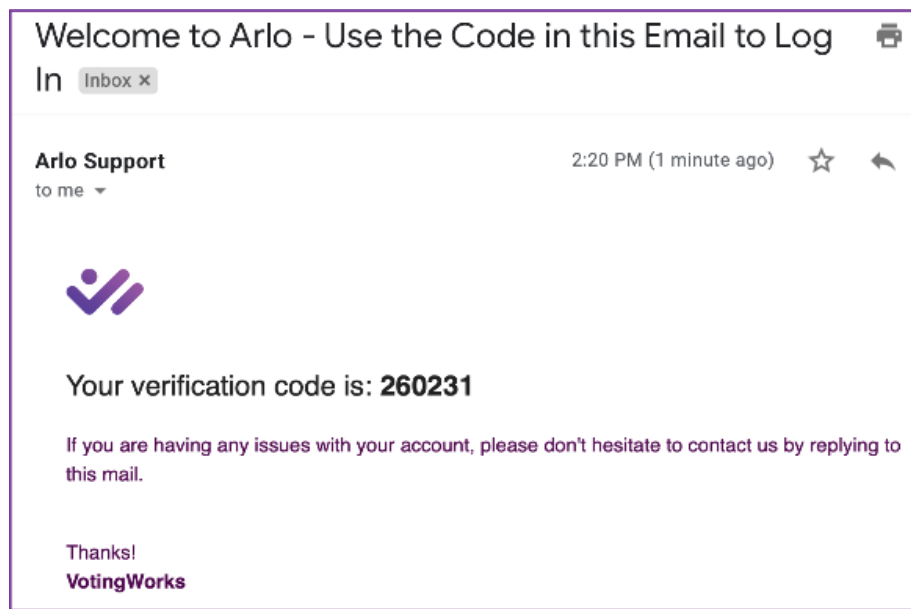
Once the ballot manifest is created, it is saved as a **.csv file** (CSV UTF-8, CSV (Macintosh), and CSV (MS-DOS) are all acceptable) and uploaded into the auditing software. The RLA software lets participants know if a mistake has been made when creating or uploading the manifest by generating an error message. Mistakes may 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 RLA.

Once the software receives all 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. Ballot manifests must be uploaded no later than the Thursday after the SBE's random draw. Once all ballot manifests are uploaded, the RLA can begin. Detailed instructions on how to upload a ballot manifest into the current auditing software are listed below:

1. Using Google Chrome or Safari as your browser, go to this link:
<https://arlo.voting.works>
2. Click Log in to your audit.



3. Enter your email address. Check your email for a new email with the subject.
4. "Welcome to Arlo - Use the Code in this Email to Log In" - enter the verification code.



5. Click on the button with the locality name.



6. Click the Browse button and navigate to the ballot manifest .csv file that was created. Once selected, click Upload File.



The audit has not started.

Ballot manifest not uploaded.

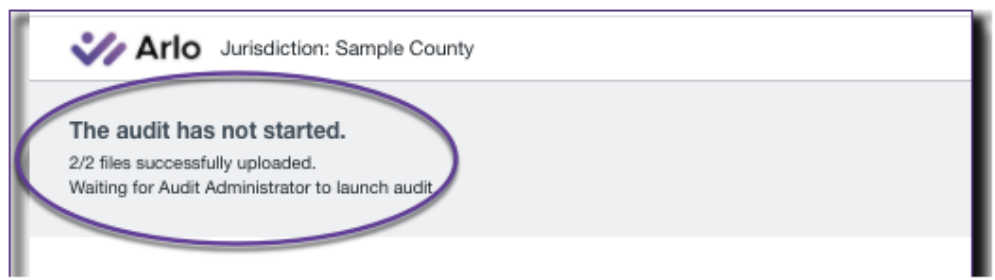
Audit Source Data

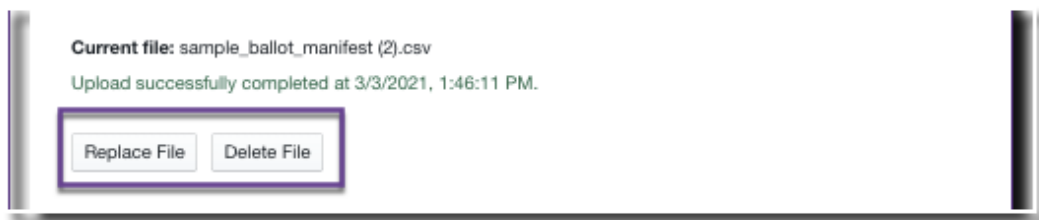
Ballot Manifest

Click "Browse" to choose the appropriate Ballot Manifest file from your computer. This file should be a comma-separated list of all the ballot boxes/containers used to store ballots for this particular election, plus a count of how many ballot cards (individual pieces of paper) are stored in each container.

(Click here to view a sample file in the correct format.)

7. When the upload is successful, a message will appear at the top of the screen that says, "files successfully uploaded." If a mistake is found after a ballot manifest has been uploaded, participants have the option to log back in and use the **Replace File** button to update the file or delete the file by clicking the **Delete File** button.





8. Once the steps for uploading your ballot manifest have been completed, log out before exiting the screen.

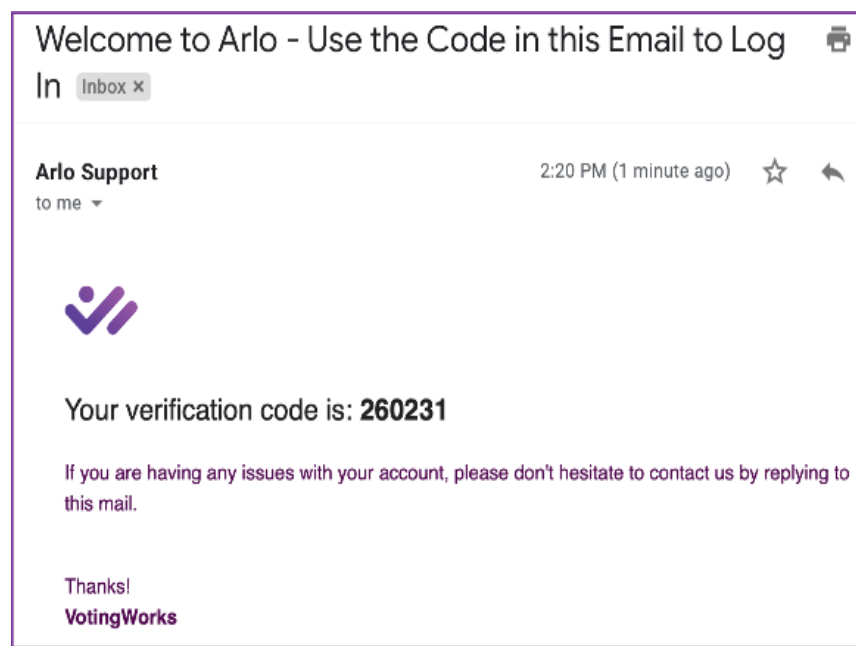
4.5 The Public Meeting

4.5.1 Ballot Retrieval Process

4.5.1.1 Log In to RLA Software

Once the list of ballots to be audited has been generated by the RLA software, participants will log into the RLA software to review the list of ballots they must retrieve to complete the RLA.

1. Using Google Chrome or Safari as your browser, go to this link: <https://arlo.voting.works>
2. Click Log in to your RLA.
3. Enter email address.
4. Check your email for a new email with the subject "Welcome to Arlo - Use the Code in this Email to Log In" - enter the verification code.



5. Click on the button with the locality name.

Sample County

4.5.1.2 Audit Boards

The RLA software will ask how many audit boards will be participating in the RLA.

The screenshot shows the Arlo software interface. At the top, there is a 'Log out' button. Below it, a message states 'Round 1 of the audit is in progress. Audit boards not set up.' The main section is titled 'Round 1 Audit Board Setup'. Under the heading 'Number of Audit Boards', there is a text box with the number '1' and a small up/down arrow icon, which is circled in red. Below this is a 'Save & Next' button. The text below the text box reads: 'Select the appropriate number of audit boards based upon the personnel available and the number of ballots assigned to your jurisdiction for this round of the audit. You will have the opportunity to adjust the number of audit boards before the next round of the audit, if another round is required. Set the number of audit boards you wish to use.'

4.5.1.3 Download and Print

The RLA software will sort ballot retrieval lists, placeholder sheets, ballot labels, and audit board credentials for every audit board. Print each item for each audit board.

TEST RLA ELECTION - April 8, 2021

Round 1 of the audit is in progress.

1 of 1 audit boards complete.

Waiting for all jurisdictions to complete Round 1.

Round 1 Data Entry

0 ballots to audit in Round 1

	Download Aggregated Ballot Retrieval List
	Download Placeholder Sheets
	Download Ballot Labels
	Download Audit Board Credentials

Audit Board Progress

0 of 0 ballots audited



Audit Board #1: no ballots to audit

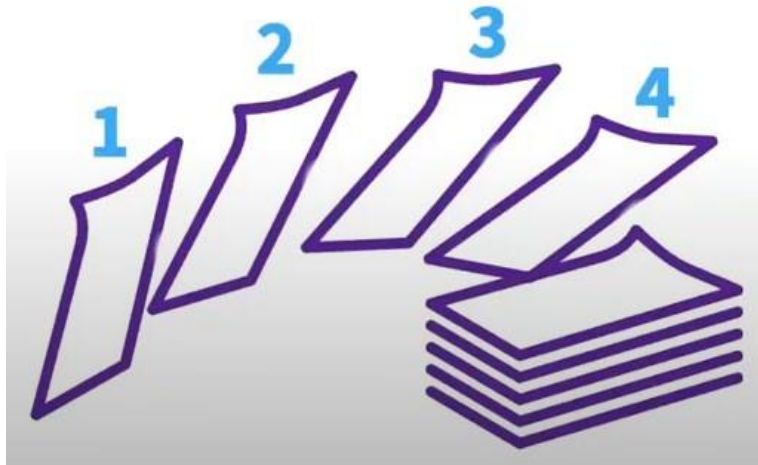
- **Ballot Retrieval List:** A ballot retrieval list is a list of ballots to be retrieved by a locality. The “Batch Name” will be the naming convention used in the ballot manifest. Since the selection is random, precincts may have multiple ballots to be retrieved, and some precincts may have none.

	A	B
1	Batch Name	Ballot Number
2	Precinct 1	90
3	Precinct 2	2
4	Precinct 2	197
5	Precinct 4	27
6	Precinct 5	313
7	Precinct 5	578
8	Precinct 5	587

- The ballot number reflects the numerical order of a specific ballot. To audit ballot number 90 in Precinct 1, for example, a member of the audit board must count from the top, 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 RLA software will create a username and password for the audit board members. The link at the bottom of the audit board credentials or QR code will direct audit board members to the site to enter the ballot totals.

4.5.2 Retrieving and Tallying Ballots

1. Review the list of ballots and 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 the chain of custody, or a locality may design its own form.
3. Remove ballots from the box and place them in a neat stack.
4. Review the *Ballot Retrieval List* to determine which ballot to select.
5. Starting at the top of the stack, count ballots until the desired ballot is reached.



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 RLA software.
7. Once all ballots have been pulled from the containers, the audit board will use the procedures established by the SBE for conducting hand counts of ballots.²⁰ These procedures are outlined in FormsWarehouse under Election Management, Election Day Instructions and Forms, and Virginia's Guide to Hand-Counting Ballots. Include the batch name, ballot number, and the vote on the tally sheet. ELECT has sample tally sheets available for use during an RLA, but a locality may choose to create its own.

 A sample 'Audit Board Tally Sheet' form. It features a header with the title 'Audit Board Tally Sheet'. Below the title is a table with columns for 'Batch', 'Ballot No.', 'YES', 'NO', and 'TOTAL'. The 'Batch' column contains the text 'Batch 1' and 'Batch 2'. The 'Ballot No.' column contains the text '1' and '2'. The 'YES' and 'NO' columns have checkboxes. The 'TOTAL' column has a box for the total count. The form is enclosed in a purple border.

²⁰ See [ELECT, Commonwealth of Virginia, Hand Counting Guide](#).

**What happens if an audit review board cannot agree on how to process a ballot?**

When an audit review board cannot ascertain or agree to the voter's intent on the RLA contest, the audit review team should alert the EB for further review. The ballot should be set aside until the EB is able to review the ballot. The EB will review the ballot pursuant to Virginia's Guide to Hand-counting Ballots and make a final decision regarding the voter's intent.

**How should a duplicate ballot be audited?**

When an audit review board audits a duplicated ballot, the audit review board should review the original, damaged ballot for the purpose of the RLA and reporting in Arlo, as that was the ballot submitted by the voter. The duplicated ballot may be reviewed alongside the original, damaged ballot, but the original ballot's votes are what is put into Arlo.

8. Localities may return ballot(s) to the appropriate container(s) or keep all the ballots from the RLA in a designated envelope/container.
9. The containers should be resealed and returned to the Clerk of the Circuit Courts following the Chain of Custody procedures.

4.5.2.1 Alternative Methods to "Counting Down the Stack"

If a locality has a batch that is too large to locate a single ballot efficiently by counting down the stack of ballots, the locality may perform the **K-Cut Method** to locate the ballot or utilize a **Commercial Scale**. The methods are explained in more detail below:

K-Cut Method

To make a k-cut of a given stack of ballots:

- Cut the stack into two parts at *random*, designating a "top" part and a "bottom" part.
- Switch the order of the parts by moving the "bottom" part to the top and the "top" part to the bottom.
- The two parts are placed together.
- Cut the stack at least five times.
- The ballot at the top of the new stack is selected.²¹

A locality must perform a k-cut five times before selecting the top ballot. A random number must be used to dictate the percentage of the cut. One way to randomize the percentage of the cut is to utilize a random number generator set to 1-100.²² The number generated then becomes the percentage of the cut (*example* 23=23% of the stack is moved to the bottom). After performing the cut five times the top ballot becomes the retrieved ballot. The k-cut method is repeated for each random ballot that must be extracted from the stack of ballots.

²¹ See [k-Cut: A Simple Approximately-Uniform Method for Sampling Ballots in Post-Election Audits, Mayuri Sridhar and Ronald L. Rivest, Massachusetts Institute of Technology](#)

²² See [Sample Random Number Generator](#)

The Department's k-cut method demonstration video is available on FormsWarehouse.²³

Commercial Scale

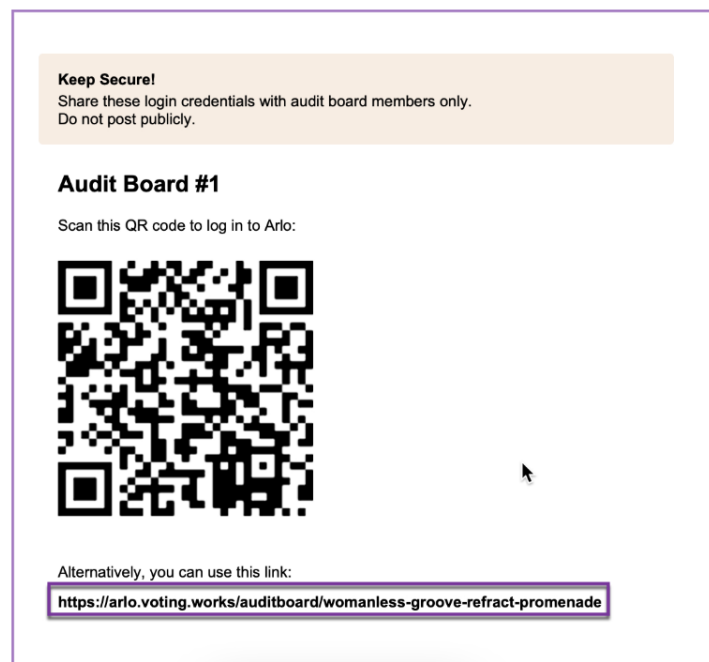
Localities may utilize a commercial scale to locate a ballot. Using a ballot scale is highly accurate, saves time, and places less stress on a locality's audit board. By calculating the average weight of the ballots, a scale can easily identify the corresponding ballot in a ballot retrieval list.²⁴ The Department's scale method demonstration video is available on FormsWarehouse > Risk Limiting Audit.

Helpful Tips and Reminders:

- ELECT has a scale that can be loaned to a locality. Localities may send an email to their Elections and Registration Specialist to request the use of the scale.
- ELECT has sample Chain of Custody forms and Tally Sheets available for use in FormsWarehouse.

4.6 Ballot Entry into the RLA Software

The link and/or QR code found at the bottom of the audit board credentials will take audit board members to the data entry portal to input the results of the RLA. 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.



²³ See FormsWarehouse, [Virginia Dept. of Elections: Risk Limiting Audit](#).

²⁴ See [Weight, Weight, Don't Tell Me: Using Scales to Select Ballots for Auditing](#), Cynthia Sturton, Eric Recorla, and David Wanger, University California Berkeley

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 that 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 **Audit First Ballot** or **Audit Ballot** button to begin.

The screenshot shows the Arlo Audit Board interface for Audit Board #1, Bob, Jane. At the top, it says "0 of 17 ballots have been audited." and "Audited: 0 Not Audited: 17". A green button labeled "Audit First Ballot" is highlighted with a red box. Below this is a table titled "Ballots for Audit Board #1" with columns: Batch, Ballot Number, Status, and Actions. The table lists five ballots, all with a status of "Not Audited". The "Audit Ballot" button in the first row is highlighted with a red box. To the right of the table are instructions for auditing.

Batch	Ballot Number	Status	Actions
ABM-3	1	Not Audited	Audit Ballot
ABM-3	12	Not Audited	Audit Ballot
ABM-3	17	Not Audited	Audit Ballot
ABM-4	10	Not Audited	Audit Ballot
ABM-6	5	Not Audited	Audit Ballot

Instructions

1. Locate and retrieve the list of ballots to audit from storage.
2. Audit each ballot by indicating the votes you see marked.
3. Once all ballots are audited, click Submit Audited Ballots. Once results are submitted, no further edits can be made.

3. Go through the ballots in order.
4. There is a Ballot Card Data Entry screen for each ballot. Under Audit Board Selections the batch name and ballot number of the ballot being audited is listed. If the ballot has not been retrieved, use the “Ballot Not Found” button. Use the “All Ballots” button to return to the full list of ballots selected for audit. Select the candidate marked on the ballot; both audit board members need to agree with the results. Click Review. Verify accuracy before clicking the **Submit & Next Ballot** button.

Arlo Audit Board #1: **Bob, Jane** [Log out](#)

◀ All Ballots **Audit Ballot Selections**

Batch **ABM-3** Ballot Number **1** **Ballot Not Found**

Ballot Contests

Colors

White

Pink

Blue

Green

Yellow

Orange

Blank Vote

Not on Ballot

Invalid Write-In

Add Note

Back Submit Selections

Instructions

1. Confirm that you are looking at the correct ballot for the batch and position. If the ballot was not located, select **Ballot Not Found** at the top of the screen.
2. For each contest, select all the candidate/choices which you see marked on the paper ballot. Select **Blank Vote** if the voter did not make any selections. Select **Not on Ballot** if the contest does not appear on the ballot. Select **Invalid Write-In** for a write-in adjudicated as invalid.
3. Once all votes are recorded, **Submit Selections** and proceed to the next ballot until all ballots have been audited.

5. Select the candidate(s) marked on the ballot. Both audit board members should agree. Then select Submit Selections.

Overvote - select each candidate marked by the voter

Contest not voted - select the Blank Vote button

Contest not on ballot - select Not on Ballot button

Invalid Write-In - select Invalid Write-In (if a contest has valid write-in candidates, a Write-In button will be listed with contest choices)

After each ballot, the audit review board will be prompted to confirm the ballot selections. After confirmation, go to the next ballot.

6. 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.


Audit Board #1: Bob, Jane
Log out

17 of 17 ballots have been audited.
Audited: 17 Not Audited: 0

Submit Audited Ballots

Ballots for Audit Board #1

Batch	Ballot Number	Status	Actions
ABM-3	1	✓ Audited	Re-Audit
ABM-3	12	✓ Audited	Re-Audit
ABM-3	17	✓ Audited	Re-Audit
ABM-4	10	✓ Audited	Re-Audit
ED_14	4	✓ Audited	Re-Audit
ED_17	2	✓ Audited	Re-Audit

Submit Audited Ballots

Instructions

1. Locate and retrieve the list of ballots to audit from storage.
2. Audit each ballot by indicating the votes you see marked.
3. Once all ballots are audited, click Submit Audited Ballots. Once results are submitted, no further edits can be made.

- Audit board members will sign off. Names must be keyed in exactly as 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.


Audit Board #1

Audit Board #1: Board Member Sign-off

Thank you for completing the ballots assigned to your Audit Board. Please sign your name below to confirm that all ballots were audited to the best of your ability and in accordance with the appropriate state statutes and guidelines.

If another round of auditing is needed, you will be notified by election officials.

Audit Board Member: RACHEL LAWLESS

Full Name

Audit Board Member: rachel lawless

Full Name

4.7 Completion of the Ballot-Polling RLA

When all audit boards have completed their ballot entry and the risk limit has been met, the

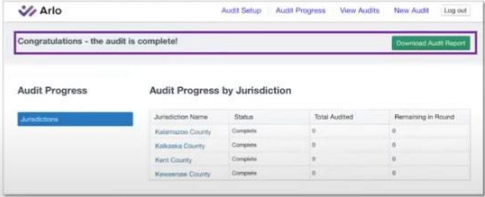
Audit Progress screen will display the message “Congratulations - the audit is complete!”

If the risk limit was not met after all the ballots have been audited for the contest, 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. If more than one locality is auditing for the same office, both localities must complete before the software will determine the need for the second round and subsequently generate the new retrieval list(s)

Audit Completion

Completed

Additional Sampling



The screenshot shows the Arlo Audit Progress screen. At the top, a message says "Congratulations - the audit is complete!" with a "Download Audit Report" button. Below this, there's a section titled "Audit Progress by Jurisdiction" with a table showing the status of audits for four jurisdictions: Audubon County, Buchanan County, Kent County, and Kershaw County. All are marked as "Complete".

Jurisdiction Name	Status	Total Audited	Remaining in Round
Audubon County	Complete	0	0
Buchanan County	Complete	0	0
Kent County	Complete	0	0
Kershaw County	Complete	0	0

Below the table, a message says "Round 2 of the audit is complete - another round is needed" with a "Start Round 2" button.

Pursuant to § 24.2-671.2 (I), if an RLA of a contested race escalates to a full hand count, the results of the hand count shall be used to certify the election in lieu of the tabulation of the unofficial results obtained prior to the conduct of the RLA.²⁵ After a certain number of rounds of RLA and the risk limit has yet to be met, Arlo will indicate that a full hand count is required if it finds the sample size needed is the same as the actual amount of ballots.

²⁵ See Va. Code [§ 24.2-671.2](#).

5. The Batch-comparison Method of the Risk-Limiting Audit

Once a locality has been approved for a batch-comparison RLA, it must do the following:

- Notify the public and participants identified in section 3.2 and 3.4 of this manual;
- Submit a Request to Inspect Sealed Election Materials for a Post-Election Audit form;
- Create and upload the ballot manifest as described in section 5.2.1;
- Create and upload the candidate totals by batch file as described in 5.2.2; and,
- Gather Supplies for the RLA

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

Pursuant to Va. Code § 24.2-659, a locality must receive permission from the ELECT to unseal ballots cast on Election Day for a post-election audit. Localities are required to submit a [Request to Inspect Sealed Election Materials for a Post-Election Audit](#) form to obtain permission. Once submitted, the form is sent to ELECT for signature authorization and then presented to the Clerk of the Circuit Court to access ballots from the election. This form may be found in FormsWarehouse under the RLA section.

In the case of a statewide RLA or an RLA that includes multiple localities, a general letter may be issued instead of a Request to Inspect Sealed Election Materials for a Post-Election Audit at the discretion of ELECT staff.

5.2 Create the RLA Documents

For a batch-comparison RLA, Arlo requires two documents, a *Ballot Manifest* and a *Candidate Totals by Batch* file. Both documents are discussed below. For the purpose of this manual, a batch is a documented set of ballots created by a voting system, an officer of election, or other election official. In Virginia, a batch is the equivalent of a precinct when utilizing the batch-comparison RLA Method.

5.2.1 Creating a Ballot Manifest

The ballot manifest is an inventory of every ballot cast in a locality for a particular race. 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). Unlike in a ballot-polling ballot manifest, the batches listed in the ballot manifest for a batch comparison audit must be the size of your precincts. For example, if precinct 1 had 100 ballots cast, then precinct 1 would be entered under Column A and 100 would be entered under Column B (*see below*).

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



Note about Performing Both a Ballot-polling RLA and a Batch-comparison RLA

In the event that your locality has to perform both a ballot-polling RLA and a batch-comparison RLA, the ballot manifest for one may be used for the other. However, in this event, the batches listed in the ballot manifest ***must*** be the same as your precincts. For example, if 100 ballots were cast in Precinct 1, then Batch 1 would have 100 ballots. This is not only for consistency but also so that the candidate by batch file matches with the ballot manifest for a batch-comparison method RLA, discussed in 5.2.2 Creating a Candidate Totals by Batch File. You may also choose to create two separate ballot manifests for each separate method for greater ease in locating ballots.

5.2.2 Creating a Candidate Totals by Batch File

Unlike a ballot-polling method RLA, a batch-comparison RLA needs the number of ballots cast for each candidate from each batch. Due to various voting systems' capabilities and for the purposes of uniformity across the Commonwealth, the size of a batch must be the size of a precinct, as that is the only way to get the total number of ballots cast for any candidate. The total number of ballots cast for any candidate must, then, be placed into a spreadsheet called the *Candidate Totals by Batch File*, which outlines each batch of ballots and how many ballots were cast for each candidate in a particular batch.

To create a *Candidate Totals by Batch File*, open a spreadsheet program to create a simple spreadsheet.

- Column A labeled “Batch Name” is for your batch name. The batch names in column A must match the batch names in your ballot manifest.
- Additional columns should be labeled with the names of the candidates. You should use the names on the ballot. Write-ins may be lumped together unless they have reached the threshold for a write-in certification.

	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

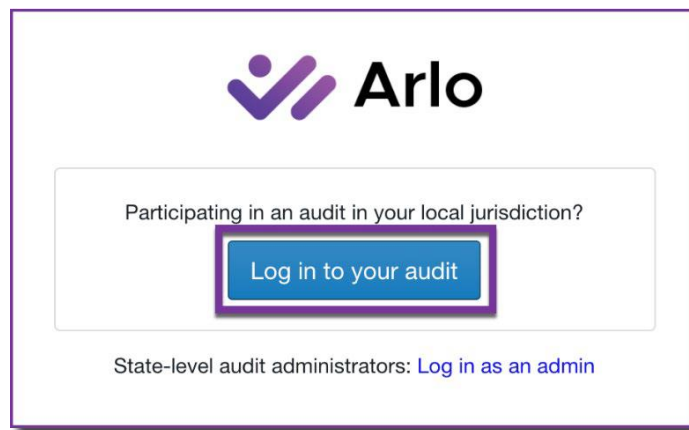
Enter the data for your locality from your statements of results. When you're finished, review the spreadsheet to ensure the total number of batches matches the number of batches in your ballot manifest and that the candidate totals are correct. Then, save the file as a .csv file. More information can be found regarding the construction of candidate totals by batch files in the Learning Management System (LMS) RLA course.

5.3 Uploading the Ballot Manifest and Candidate Totals by Batch files

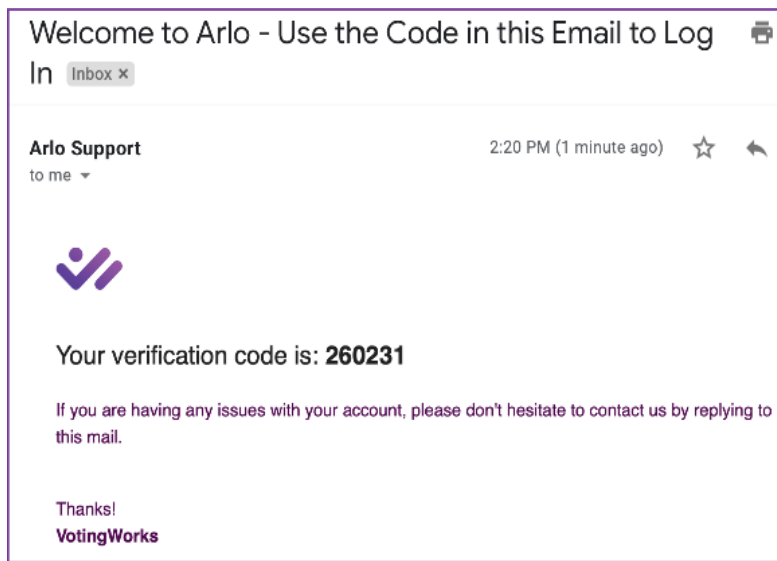
Once the ballot manifest and the candidate totals by batch files are created, participants will

save the ballot manifest and candidate totals by batch files as **.csv files** (CSV UTF-8, CSV (Macintosh), or CSV (MS-DOS) are all acceptable) and upload the spreadsheets into the auditing software. The RLA software will let participants know if a mistake has been made when creating or uploading the files 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. The ballot manifest and the candidate total by batch files must be uploaded no later than the Thursday after the SBE's random draw. Once the files are uploaded, the RLA can begin. Detailed instructions on how to upload a ballot manifest and the candidate totals by batch into the current auditing software are listed below:

1. Using Google Chrome or Safari as your browser, go to this link:
<https://arlo.voting.works>
2. Click Log in to your audit.



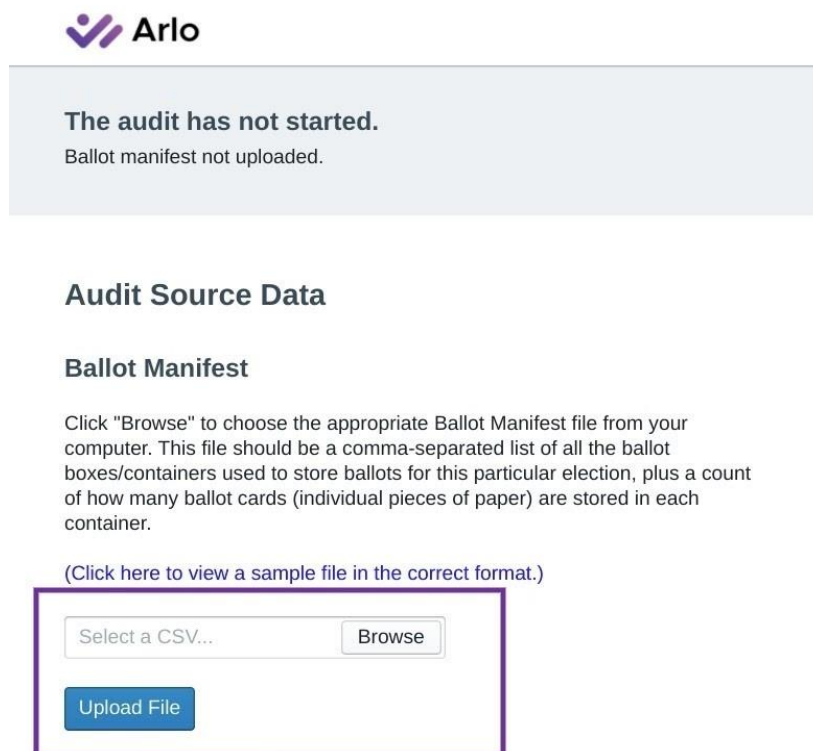
3. Enter email address.
4. Check your email for a new email with the subject "Welcome to Arlo - Use the Code in this Email to Log In" - enter the verification code.



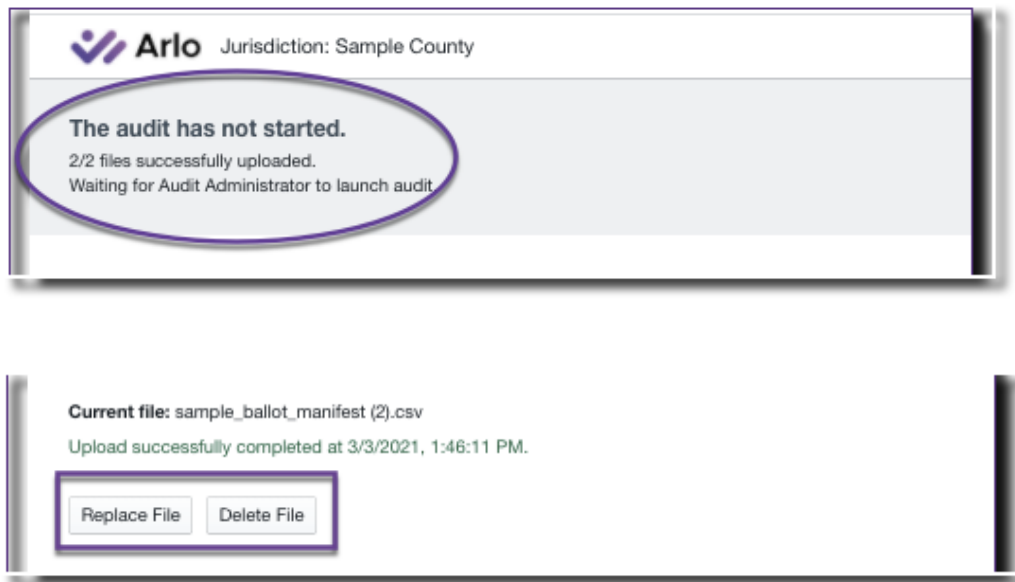
5. Click on the button with the locality name.



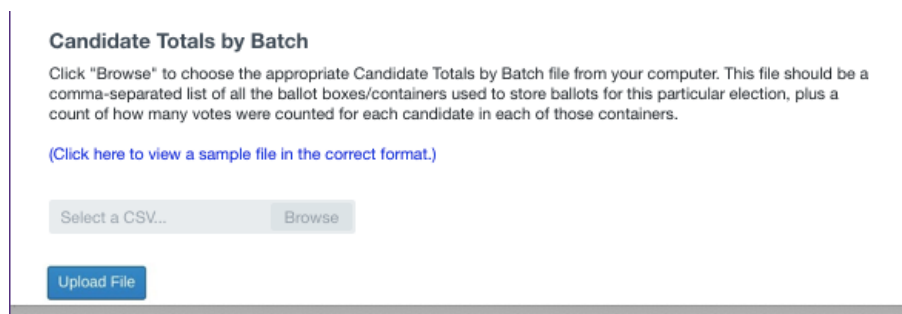
6. Click the Browse button and navigate to the ballot manifest .csv file that was created. Once selected, click Upload File.



- When the upload is successful, a message will appear at the top of the screen that says, "Ballot manifest uploaded." If a mistake is found after a ballot manifest has been uploaded, participants have the option to log back in and use the **Replace File** button to update the file.



- Next, a prompt will appear below the Ballot Manifest section to upload the Candidate Totals by Batch. click the Browse button to navigate to the candidate totals by batch .csv file. Once selected, click the Upload File button. Remember, the batch names in the Candidate Totals by Batch file must match the batch names in the ballot manifest and the totals listed in the Candidate Totals by Batch match your statements of results.



5.4 Retrieving and Tallying

After the audit begins, the locality will receive a batch retrieval list. To retrieve batches, refer to your batch retrieval list to determine what batches are needed.



Best Practice

Unlike in the ballot polling method, Arlo does not assign the audit review boards to specific batches on the batch retrieval list. ELECT recommends assigning more experienced officers of election or staff to audit review boards who will review the larger batches on the batch retrieval list, such as the CAP.

- Retrieve the correct container(s) using the required chain of custody verification steps.
- Pull the entire batch of ballots out of the storage container and organize it into a neat stack of ballots. If the container contains more than 1000 ballots, ballots should be removed from the container and sorted into manageable stacks, leaving the rest of the ballots in the container until the previous stack is tallied.²⁶



Batch Comparison FAQ: What if a ballot does not have the race on it?

These ballots are not to be counted as part of a batch comparison RLA. Arlo and the RLA are only focused on the race being audited. Therefore, only ballots with the race on them should be audited as part of the batch comparison RLA and entered in Arlo.

This typically occurs when the batch selected is the CAP or an early voting AB batch and the locality performing the batch comparison RLA has more than one district race, for example, 2 or more Congressional Districts, House of Delegates Districts, or Virginia Senate Districts.

When auditing a batch, it is recommended that the audit review boards first sort out the ballots that do not have the audited race. For example, if a locality is auditing the race for HOD District A but also had a race for HOD District B during the same election, the audit review board should first sort out the HOD District B ballots from the ballot container since those ballots do not have the HOD District A race on them. Once separated, the audit review board should begin counting the ballots by either method described below.

The ballots that do not have the audited race should be set aside within view of the audit review board, such as in a separate stack on the table or placed back into the box after they have been separated from the ballots that do have the audited race on them. Once the audit review board has completed their tally of the ballots with the race on them, the audit review board should place all ballots back into the container(s) they came in to ensure a proper chain of custody for all ballots in the batch.

These actions should only be done for a batch comparison RLA. Instructions on how to handle ballots that do not have the audited race on them during a ballot polling RLA are described in the ballot polling portion of this manual, specifically Section 4.6.

²⁶ See [VotingWorks, Batch Retrieval & Tally](#)

5.4.1 Methods for Retrieving Ballots

There are two methods for retrieving and tallying during a batch-comparison RLA. For larger batches, multiple audit review boards may be assigned. Audit review boards should be encouraged to prioritize accuracy over speed; it is better to have the correct count the first time, and it takes more time than to have to redo the count.

The Sort-and-Stack Method²⁷

- 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 that 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 (including write-in), overvoted/blank/undervoted ballots, duplicated 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.
 - 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.

The Hashmarking Method²⁸

- a. Prepare a Tally Sheet
 - i. For this method, a tally sheet should be prepared. The tally sheet should:
 1. Be organized in the same order as the ballot.
 2. List each contest and associated choices (including write-ins when applicable) to be audited.
 3. Include a space for overvotes and blank/undervotes for each contest.
 4. Have space for tally marks after each choice.
- b. Tally the Votes: One audit board member reads the choice for the first contest being audited to the second audit board member who makes a tally mark on the tally sheet. Repeat for all contests being audited. Ideally, a third audit board member should observe the ballot marks and tally sheet tallies.

²⁷ *Id*

²⁸ *Id.*

- i. Completing this process in groups of 20, 50, 100, or some other set number allows for verification checks throughout the process. Once the set number is completed, add up the tally marks to ensure the same number was tallied for each contest.
- c. Complete Audit Board Batch Tally Sheet: When all ballots are tallied, total the tally marks and complete the Audit Board Batch Tally Sheet.



What happens if an audit review board cannot agree on how to process a ballot?

When an audit review board cannot ascertain or agree to the voter's intent on the RLA contest, the audit review team should alert the EB for further review. The ballot should be set aside until the EB is able to review the ballot. The EB will review the ballot pursuant to Virginia's Guide to Hand-counting Ballots and make a final decision regarding the voter's intent.



How should a duplicate ballot be audited?

When an audit review board audits a duplicated ballot, the audit review board should review the original, damaged ballot for the purpose of the RLA and reporting in Arlo, as that was the ballot submitted by the voter. The duplicated ballot may be reviewed alongside the original, damaged ballot, but the original ballot's votes are what is put into Arlo.

5.5 Batch Tally Entry into Arlo

All tallies from the batches selected must be uploaded into Arlo; the audit will remain open until all tallies have been uploaded. Tallies can be entered by audit boards, a specified member of the staff, an EB member, or the GR.

To create tally entry accounts for audit boards or for a specified individual, select Set Up Tally Entry Accounts on the Set Up Tally Entry Accounts screen. If only one designated participant will be entering tallies, select *Skip*.²⁹

²⁹ See [VotingWorks, Batch Tally Entry into Arlo, Voting Works](#)


Arlo
jonah+ja.losangeles@...

Test County — General Election
Round 1
0/4 batches audited

1 Prepare Batches
2 Set Up Tally Entry Accounts
3 Enter Tallies

1


Download Batch Retrieval List

For each batch in the retrieval list:

- Find the container in storage
- Perform the required chain of custody verification steps
- Take the batch of ballots out of the container and stack them

2


Download Batch Tally Sheets

There will be one tally sheet for each batch. Use these tally sheets when recording the audited votes in each batch.

Continue >


Arlo
jonah+ja.losangeles@...

Test County — General Election
Round 1
0/4 batches audited


Prepare Batches

2
Set Up Tally Entry Accounts

3
Enter Tallies

Do you want to set up additional tally entry accounts?

If you want to have multiple people entering tallies at the same time, set up tally entry accounts for them. Otherwise, use your account to enter the tally for each batch you audit.

Set Up Tally Entry Accounts
Skip

< Back

Continue >

A designated participant should provide the audit boards or the specified individual with the login link displayed on the screen (each link is unique). Then, the audit board or specified individual should Log In by entering their name(s) and party affiliation, if provided. A login code will be provided. The participants enter that code to authenticate the Tally Entry User(s) by selecting Enter Login Code, entering the code, and selecting Confirm to complete the login

process.³⁰

The screenshot shows the Arlo web application interface. At the top, it says 'Sample County - Batch inventory test' and 'Round 1'. A progress bar indicates '0/4 batches audited'. Below this, there are three steps: 1. Prepare Batches, 2. Set Up Tally Entry Accounts, and 3. Enter Tallies. Step 2 is currently active. It contains two main sections: 'Share Tally Entry Login Link' and 'Confirm Tally Entry Accounts'. The 'Share Tally Entry Login Link' section shows a URL 'https://arlo.voting-works/tallyentry/nyshw-childcare-rutlin' and buttons for 'Copy Link' and 'Download Protocol'. The 'Confirm Tally Entry Accounts' section lists 'Hank Aaron' and 'Bob Jane'. 'Hank Aaron' has a button to 'Enter Login Code' and a red 'X' icon. 'Bob Jane' has a green checkmark and 'Logged In' text. A modal window titled 'Confirm Login: Hank, Aaron' is open, showing a prompt to 'Enter the login code shown on their screen:' and a numeric keypad with the code '340' entered. The modal has 'Cancel' and 'Done' buttons. At the bottom of the main interface are 'Back' and 'Continue' buttons.

Jurisdiction Manager

The screenshot shows the Jurisdiction Manager interface. It contains two overlapping screens. The top screen is titled 'Sample County - Batch inventory test' and 'Tally Entry Login'. It has two rows of input fields for 'Name' and 'Party Affiliation (if required)'. The first row has 'Hank' in the Name field. The second row has 'Aaron' in the Name field. There is a 'Log In' button at the bottom. The bottom screen is titled 'Sample County - Batch inventory test' and 'Login Code'. It shows a large numeric display with the code '340' and a prompt to 'Tell your login code to the person running your audit...'. Both screens have a purple callout bubble with the number '2'.

Tally Entry User

To enter the candidate totals for a batch, select the batch from the list on the left-hand side of the Enter Tallies screen or use the search batches function, and, then, click Edit Tallies, enter the vote totals from the Batch Tally Sheet, and select Save Results.³¹ Once all batches have been entered and reviewed, a designated participant can select Finalize Tallies.²⁷

³⁰ *Id.*

³¹ *Id.*

Arlo

Test County — General Election | Round 1 | 0/4 batches audited

Prepare Batches | Set Up Tally Entry Accounts | **3 Enter Tallies**

Search batches...

- Tabulator A - Batch 1
- Tabulator A - Batch 2
- Tabulator A - Batch 3
- Tabulator A - Batch 4

Tabulator A - Batch 1

Vote Totals

Choice	Votes
Alice Adams	12
Bob Bates	8
Carol Copeland	

Edit Tallies

< Back Finalize Tallies

If multiple Audit Board Batch Tally Sheets were used to tally a batch, select the drop-down next to Edit Tallies and select Use Multiple Tally Sheets to enter more than one tally sheet. The individual who enters the tally sheet should edit the name at the top to identify who completed the entry of the Batch Tally Sheet; this helps keep a chain of custody for the data entered. Next, enter the votes, and select Save Sheet (the Edit Tallies button changes to Save Sheet after selection).³² Select Sheet 2 to add another Batch Tally Sheet, and Select +Add Sheet to add another Tally Sheet as needed.³³ The Vote Totals tab is the sum of votes for all sheets entered.³⁴

³² *Id.*

³³ *Id.*

³⁴ *Id.*

5.6 Completion of a Batch-comparison RLA

When all audit boards have completed their tally 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 batches have been audited for the contest, the audit software will initiate another round of sampling. A new batch retrieval list, placeholders, labels, and audit board credentials will be generated for an additional round of batch retrieval.

Pursuant to Va. Code § 24.2-671.2(I), if an RLA of a contested race escalates to a full hand

count, the results of the hand count shall be used to certify the election in lieu of the tabulation of the unofficial results obtained prior to the conduct of the RLA.³⁵ After a certain number of rounds of RLA and the risk limit has yet to be met, Arlo will indicate that a full hand count is required if it finds the sample size needed is the same as the actual amount of ballots.

6. Results

At the conclusion of the RLA, ELECT will submit a report to the SBE on the findings of the RLA. If your locality is participating in an RLA and would like to provide feedback to be included in the report, contact your RLA Administrator from ELECT with your findings. The report will include the results of the RLA as well as an analysis of any discrepancies detected. ELECT has also created a sample press release template that localities may utilize, which can be found in the RLA section in FormsWarehouse.

³⁵ See Va. Code [§ 24.2-671.2](#).

7. APPENDIX

7.1 General Timeline for a Risk-Limiting Audit after a General Election

