

# iVote system performance issue

Assessment of potential impacts to the  
2021 local government elections

23 December 2021

# Executive Summary

## Objective of assessment

- A number of electors' online applications to vote by technology assisted voting (**iVote**) at the 2021 local government elections (**LGE**) were approved but they were unable to access the voting component of the iVote system on election day 4 December 2021 to cast their votes. This was because these electors were not issued with the necessary security credential before the close of voting on election day, which is a prerequisite to accessing the voting component of the system.
- Prior to his approval of the declaration of the result of a specific mayor or councillor election (**contest**) in accordance with the *Local Government Act 1993*, the Electoral Commissioner has considered whether the iVote system performance issue could have had a material impact on the result of each contest. One of the inputs into that consideration was an assessment of the extent to which the results could have been different if every elector who did not receive their credentials in time cast a formal vote.
- The methodology used in this statistical assessment has been to:
  - a. Identify contests where it was *not possible* for a result to change – because there were too few electors unable to use the iVote issue to make any difference
  - b. Identify contests where it was *possible* for a result to change, given the difference in votes at key points in the count and the potential number of additional ballot papers of the electors unable to use iVote (**additional iVote ballot papers**).
  - c. Estimate the *likelihood* of the result to change by running simulations of counts in which additional random samples of ballots are included to simulate the additional iVote ballot papers.

# Contents

Section	Page Reference
1. Overview of counting system in NSW	<a href="#">4</a>
2. Assessment Approach	<a href="#">5</a>
Stage 1 - Identification of contests which require further analysis	
Stage 2 - Calculation of impact likelihood	
3. Assumptions	<a href="#">12</a>
4. Validation	<a href="#">13</a>
5. Results	<a href="#">14</a>
Appendix A: Sensitivity Analysis	
Appendix B: Detailed Results of simulation using iVote preference data	

# Overview of counting system in NSW

It is important to note that during a councillor election count, ballot papers (in paper or electronic form) take on a different (lesser) value as the count progresses and candidates are progressively elected or excluded. This is why it is necessary for any analysis of the likelihood of change from additional ballot papers being included in a count to simulate that count process, and not compare only the number of additional ballots with the smallest difference in votes that was observed in the official count.

## Optional Preferential system – mayoral elections

The optional preferential system is described in Schedule 4 of the *Local Government (General) Regulation 2021*. This sets out the method of vote counting for elections where one candidate is to be elected, including the election of a mayor.

The optional preferential voting system requires a candidate to receive more than 50 per cent of the non-informal, non-exhausted ballot papers. This is called the absolute majority of votes.

If a candidate is not elected after the count of first preferences, the candidate with the lowest number of votes is excluded - each ballot paper is distributed to the candidates remaining in the count according to the next highest preference. If there is none, the ballot paper is set aside as exhausted.

After the distribution of ballot papers, if a candidate has an absolute majority, that candidate is declared elected. If there is still no candidate with an absolute majority, the next continuing candidate with the lowest number of ballot papers has their unexhausted ballot papers distributed as before. This process repeats until a candidate is elected with an absolute majority.

## Proportional representation system – councillor elections

The proportional representation system is described in Schedule 5 of the *Local Government (General) Regulation 2021*. This sets out the Weighted Inclusive Gregory Method (WIGM) of vote counting for councillor elections in NSW.

In a proportional voting system, a candidate is elected if they receive votes equal to or exceeding the quota. The quota is determined by first dividing the aggregate number of first preferences by one more than the number of candidates to be elected. The quotient (disregarding the fraction) is increased by 1 to give the quota. After the count of first preferences is complete, each candidate who has reached quota is elected.

Where an elected candidate has a surplus of ballot papers over the quota, this surplus is transferred to the continuing candidates (i.e. those not yet elected or excluded). If multiple candidates are elected, each candidate's surplus is transferred (one at a time) to the continuing candidates, from the highest surplus to the lowest.

To transfer a surplus, all the ballot papers received by the elected candidate are sorted to their next preferred continuing candidate. Each ballot paper is then worth a portion of that surplus. This portion is called the **transfer value**. *Example: if an elected candidate had 100 ballot papers and their surplus was 10 votes, then each ballot paper would be worth 0.1 of a vote. A continuing candidate receiving 20 of these ballot papers would therefore receive 2 of the 10 surplus votes.* After each transfer of ballot papers (and their associated votes), if any more candidates have reached quota, they are elected and added to the queue of surpluses to be transferred. This transfer of surpluses continues (one at a time) until all have been transferred. Then, if vacancies remain, the candidate with the lowest number of votes is excluded. All the ballot papers received by this candidate, including those received from surplus transfers, are sorted to the continuing candidates according to their next available preference. This process continues with candidates being:

- elected when their votes equal or exceed quota, with their surplus distributed as above or
- excluded, with their ballot papers distributed as above until either:
  - no vacancies remain to be filled or
  - the number of remaining candidates equals the number of remaining vacancies or
  - all remaining vacancies can be filled by candidates whose total votes cannot be overtaken by the remaining candidates in the count.

In these circumstances, the elected candidates are elected despite not reaching the quota.

# Impact Assessment Approach Overview

The impact of the potential additional iVote ballot papers was assessed in two ways: (1) identify contests for which there was no possibility of a different result and (2) calculate the likelihood of a different result for all contests using a simulated count.

## Stage 1: Identification of contests: no possibility of different result

The first stage of analysis assessed whether or not there are indicators that the potential additional iVote ballot papers may be able to change each mayoral and councillor contest. For a given contest, the methodology was as follows:

1. Perform the count of ballot papers for the mayor (if applicable) and each councillor contest. This was conducted by the official NSWEC count system using the applicable preferences rules.
2. Identify the *decision points* for each contest, including:
  - Election of candidate(s)
  - Exclusion of candidates
  - Surplus transfers
  - Measurement against absolute majority/quota
3. Examine the closest difference of votes involved in each decision point (e.g. difference between lowest two candidates in an exclusion, or the additional votes required to lift the absolute majority/quota above a candidate's vote total).
4. If the number of potential additional iVote ballot papers exceeds the decision point difference at any point in the count, then the contest is identified for further (if it is a mayoral contest, any councillor contests in which a relevant mayoral candidate is standing is also analysed further).
  - effects of changes in the transfer value of votes arising from changes in the quota are not being tested at this stage but may affect the overall outcome.

### Outputs:

- A list of all mayor and councillor contests requiring further analysis.
- The difference in votes for each decision point in each contest, alongside the number of potential additional iVotes for that contest.

## Stage 2: Calculation of impact likelihood for all context using simulated counts

The second stage of analysis estimated the *likelihood* of a change in the result for each mayoral and councillor contest. For a given area/ward, the methodology was as follows:

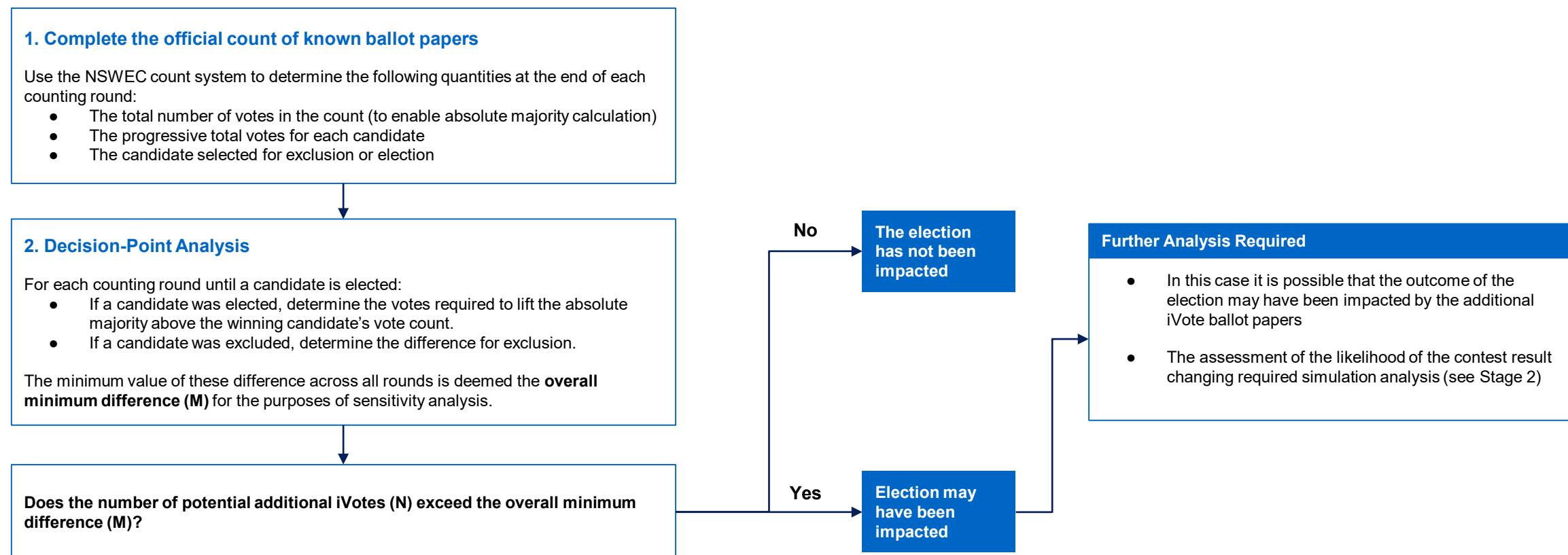
1. Perform the count of ballot papers for the mayor (if applicable) and each councillor contest. This was conducted by a count simulation engine which applies the same preference rules as the official count system.
2. Identify the 'provisionally-elected' mayor and councillors for each contest.
3. Produce two random samples of ballot papers representing the potential additional iVote ballot papers for each contest. The random samples were sampled from (1) the voting patterns present in the known iVote ballot papers for the contest and (2) all of the ballot papers for the contest.
4. Simulate the election counts to observe the outcome with randomly sampled additional ballot papers added to the actual ballot papers. (Note an elected mayor cannot be elected to a councillor position, and in simulations where the mayor result changes this will impact on the councillor contest in which they were standing, i.e. the elected mayor is deemed ineligible in the simulation of the count for the relevant councillor contest.)
5. Repeat Steps 3 and 4 a large number of times to obtain a statistically significant set of results.
6. Determine the frequencies for (1) each distinct result for each contest and (2) each candidate being elected (including the provisionally-elected candidates)
7. Estimate the likelihood of impact for each contest as the sum of frequencies for any result other than the provisional result. Calculate confidence intervals for each of these likelihoods.

### Outputs:

- Provisionally-elected mayors and councillors for each contest
- An estimate of the likelihood of a change in result for each contest
- A confidence interval on the likelihood of a change to the result of each contest

# Identification of mayoral contests requiring further analysis

The Stage 1 assessment process identified mayoral contests where the number of electors who did not receive their credentials was greater than the minimum difference of votes at various decision points during the count






# Identification of mayoral contests requiring further analysis

The following example shows how a mayoral contest result is assessed at Stage 1. In this illustration, the result could have been changed by a single additional vote in the first round. Note that in this example all of the ballot papers for the excluded candidates E and D were not exhausted and candidate A was next in the order of the voter's preferences on each of those ballot papers.

## Illustrative Example

Total votes	53
Absolute Majority	27

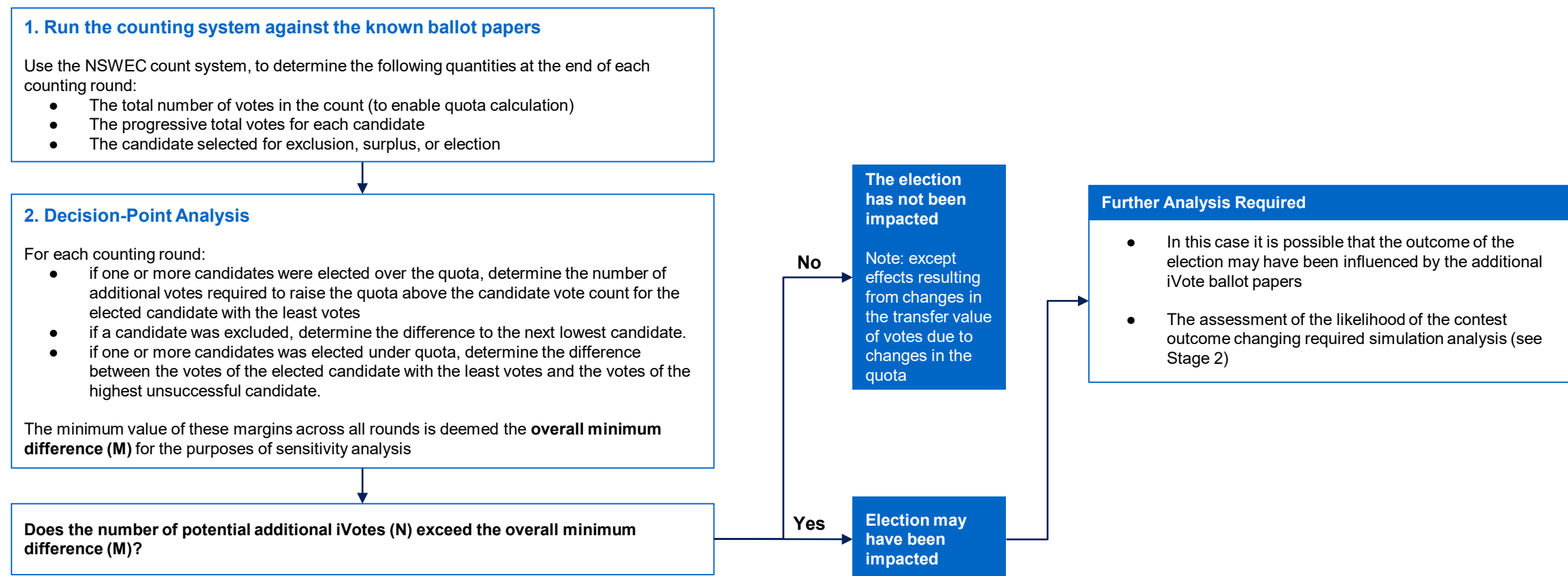
Elected this round	
Excluded this round	
Smallest margin	

Round	Candidate					Margin for exclusion	New votes required to raise absolute majority above winner total	Preference Distribution
	A	B	C	D	E			
1	10	12	12	10	9	10 - 9 = 1	N/A	E is excluded. All of E's secondary preferences flow to A.
2	19	12	12	10		12 - 10 = 2	N/A	D is excluded. All of D's secondary preferences flow to A.
3	29	12	12			N/A	29 * 2 - 53 = 5	N/A

- The lowest number of votes that might potentially change the result is one vote, the margin by which candidate E was excluded at the first round of counting.
- If candidate E had one additional vote, they would have tied with candidates A and D at the first round of counting and potentially not have been excluded. A method of random selection to determine the excluded candidate would have been used, i.e. a 'tiebreaker' used where two or more candidates have the fewest number of votes and one has to be excluded. Candidate A may have been excluded by that process and could not have won the election.
- If the potential number of iVote ballot papers was equal to or greater than one, the impact of the issue on the election result would require further assessment.

# Identification of councillor contests requiring further analysis

The Stage 1 assessment process identified councillor contests that could possibly have had a different result had all users applying to use iVote been able to cast a vote.





# Identification of councillor contests requiring further analysis

The following example shows how a councillor contest result is assessed at Stage 1. In this illustration, the result could have changed with six additional votes at the ninth round of counting..

## Illustrative Example

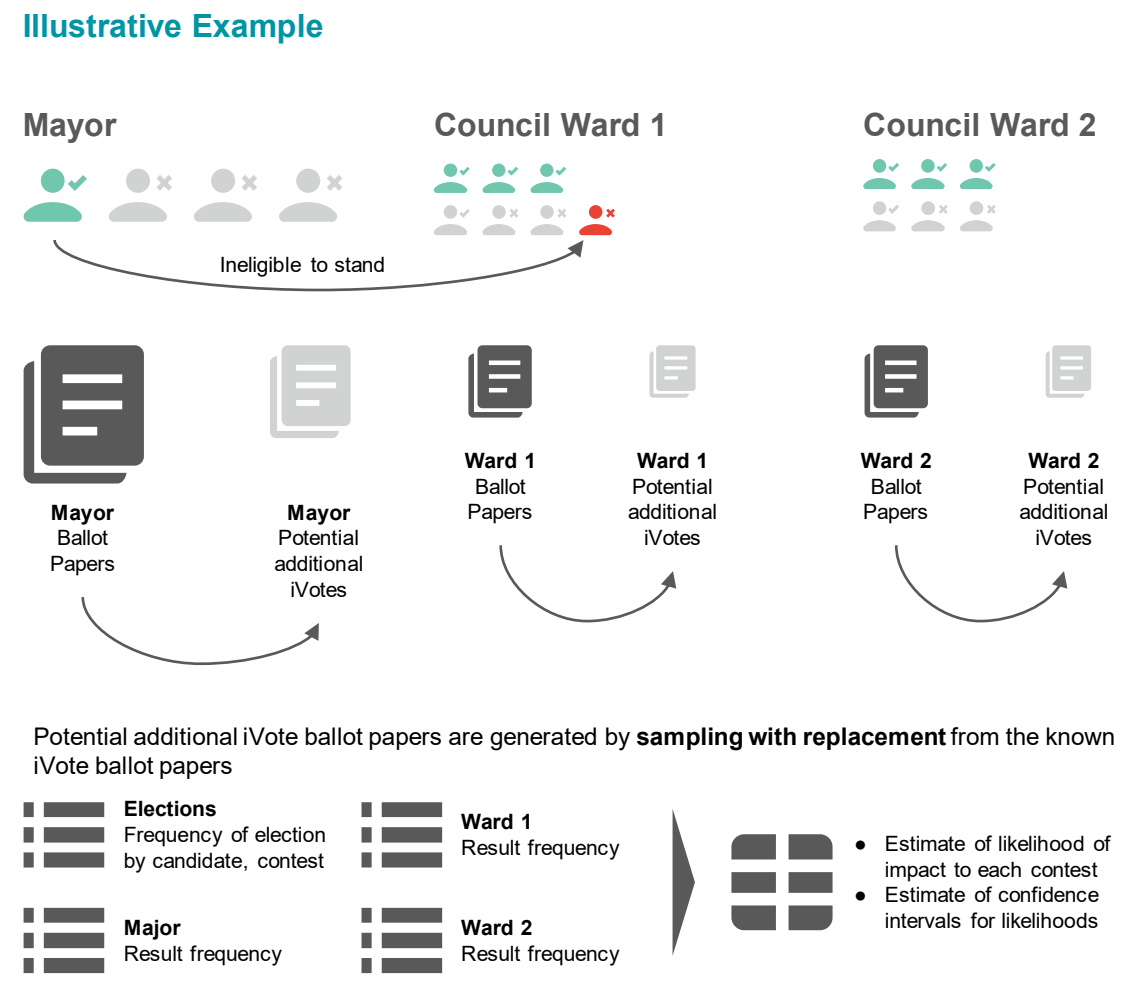
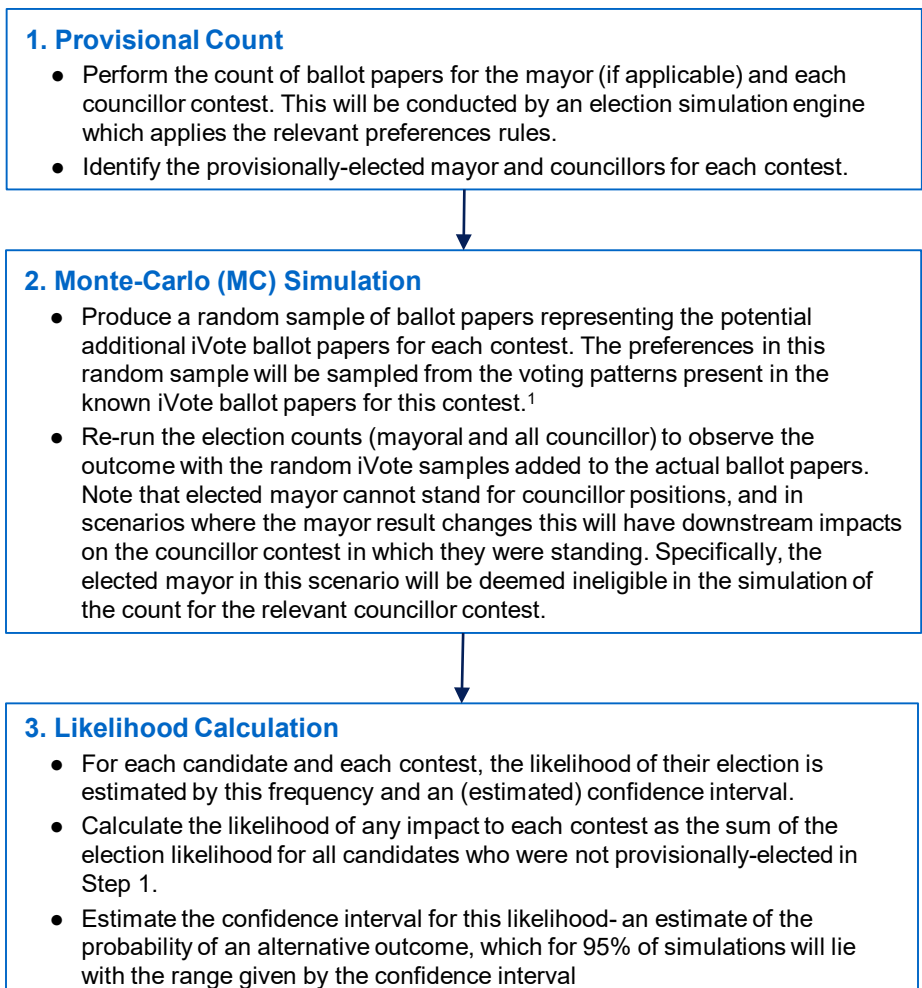
Based on Bogan 2016 if counted with WIGM

Formal BPs		1,546														Elected this count		
Vacancies		9														Excluded this count		
Quota		155														Smallest margin		
Count	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Votes * (Vacancies + 1) - Formal BPs	Difference for exclusion		
1	60	352	87	66	25	213	79	100	86	133	61	68	154	62	584			
2	72	155	121	77	31	213	94	117	90	160	84	76	177	72	54			
3	74	155	127	82	32	155	104	121	97	160	91	79	177	80				
4	74	155	129	83	32	155	106	122	99	160	93	80	155	84				
5	74	155	129	83	32	155	106	122	99	155	93	80	155	84		42		
6	75	155	134	89	0	155	107	126	103	155	98	82	155	85		7		
7	0	155	150	95	0	155	119	139	108	155	101	85	155	96		10		
8	0	155	169	105	0	155	132	153	116	155	108	0	155	101	144			
9	0	155	155	107	0	155	133	154	116	155	108	0	155	101		6		
10	0	155	155	119	0	155	158	173	123	155	125	0	155	0	184			
11	0	155	155	122	0	155	158	155	126	155	130	0	155	0	34			

- The lowest number of votes that might potentially change the result is six votes, the margin by which candidate N was excluded at the ninth round of counting. If candidate N received six additional votes, they would have tied with candidate D and may not have been excluded at this stage.
- If the potential number of iVote ballot papers was equal to or greater than six, the impact of the issue on the election result would require further assessment

# Monte-Carlo Simulation Analysis

A simulation of the election counting process will be used to conduct a *Monte Carlo* (MC) analysis and estimate the likelihood and confidence interval of changes to the contest results



<sup>1</sup> For the purposes of sensitivity analysis, a scenario was also run where the additional ballots were sampled from the overall set of ballot papers for each contest

# Calculation of Impact Likelihood

The *Monte Carlo* (MC) simulation analysis enables the estimation of the probability of alternative outcomes, as well as a confidence interval of the probability of alternative outcomes

## Probability of alternative outcome

In a contest where the number of potential additional votes is  $n$  and the number of iterations simulated is  $N$ :

- In each iteration of the simulation, a set of  $n$  preference patterns are generated to represent the potential additional votes.
- These are randomly sampled (with replacement) from the set of iVote preference patterns from the same contest.
- Each iteration has the same probability,  $P(S)$ , of generating a particular set of preferences,  $S$ .
- The set of preference patterns generated for each iteration is independent from all other iterations, and each set of preference patterns will lead to either the baseline or an alternative outcome.
- In each iteration, the probability  $p$  of reaching an alternative outcome is the probability of generating any set of preferences which leads to an alternative outcome:

$$p = \text{Sum of } P(S) \text{ for all } S \text{ leading to an alternative outcome}$$

Under these circumstances, the **probability of an alternative outcome in each iteration is a binary (yes/no) random variable, and the collection of iterations are *identically and independently distributed* (iid)**. The number of iterations in which an alternative outcome occurs,  $X$ , is a random variable following the **binomial distribution**:<sup>1</sup>

$$P(X) \sim B(N, p)$$

<sup>1</sup>See [https://en.wikipedia.org/wiki/Binomial\\_distribution](https://en.wikipedia.org/wiki/Binomial_distribution) for further details

## Estimating the probability of an alternative outcome

Suppose that  $N$  iterations of a contest are run and  $x$  of these lead to an alternative outcome. Then the *maximum likelihood estimator* (MLE) for  $p$  is the observed frequency of an alternative outcome:

$$p = x/N$$

A *confidence interval* at a *confidence level* of  $(1-\alpha)$  (e.g. 95%) can be constructed using the Copper-Pearson approach from the equation:

$$\beta(\alpha/2; x, N - x + 1) < p < \beta(1 - \alpha/2; x + 1, n - x)$$

In the above,  $\beta(q; v, w)$  is the  $q^{\text{th}}$  quantile from a beta distribution with shape parameters  $v$  and  $w$ .<sup>2</sup>

?

### What does the MLE and the confidence interval tell us?

- The MLE value is the best possible estimate of the (unknown) probability of an alternative result, given the sample of  $N$  iterations.
- The confidence interval provides a measure of how precise this estimate is, by providing an upper and lower limit on the estimate. The size of the range reflects the fact that the estimate is based on a finite sample of  $N$  iterations.
- A confidence interval is set at a *confidence level*, commonly chosen as 95%. This means that, if the run of 1000 iterations were itself repeated a large number of times, the confidence interval would 'cover' the true value of  $p$  95% of the time.

<sup>2</sup>See [https://en.wikipedia.org/wiki/Binomial\\_proportion\\_confidence\\_interval](https://en.wikipedia.org/wiki/Binomial_proportion_confidence_interval) for further details

# Assumptions

Analysis Stage	Assumption
General	The test environment contains the same ballot papers as used in the final count.
	The test environment PRC engine produces the same outputs at the main election environment.
	The number of additional iVotes is equal to the number of iVote applications with no iVote number allocated
	All additional iVotes are formal votes
	Candidate names in individual contests are unique.
Identification of contests requiring further analysis	Results per output files are a true reflection of the results of what the actual election count would be on the same input voting data.
	Minimum number of potential additional votes required to allow possibility of result change are overall minimum difference or one vote, whichever is greater, where overall minimum margin is calculated as described in the methodology slides.
	Councillor elections effects resulting from changes in the transfer value of votes due to changes in the quota are not considered in this analysis.
Calculation of impact likelihood	The preference patterns of the additional iVote ballots are distributed as per the preference patterns in the received iVote ballots for each contest. I.e. the preferences for the additional iVote ballots can be sampled from the known iVote ballots for statistical purposes. <sup>2</sup>
	The number of simulations run for each contest is limited to 1000. This was chosen as a balance between the desire to achieve as precise a result as possible (i.e. minimising the confidence interval) and practical considerations on the computational power and time taken to complete the analysis.
	The inherent level of precision of the maximum likelihood estimate of the probability of an outcome change is represented by the confidence interval estimate. This interval is constructed assuming that the probability of a change in result to the contest is independent and identically distributed (iid).
	Where a random draw occurs in the count, a random number generator is used with a fixed seed.
	The confidence interval is estimated using the Clopper-Pearson method <sup>1</sup> .

<sup>1</sup> See [https://en.wikipedia.org/wiki/Binomial\\_proportion\\_confidence\\_interval#Clopper%E2%80%93Pearson\\_interval](https://en.wikipedia.org/wiki/Binomial_proportion_confidence_interval#Clopper%E2%80%93Pearson_interval) for further details.

<sup>2</sup> When sampling from all ballots, the same assumption is applied as per the preference patterns of all ballots.

# Validation

Tests and peer reviews were conducted on both the high-level and the simulation engine to validate the results against each other and the official PRCC counting engine.

Analysis Element	Validation Tests	Outcome
High-level analysis workflows	Parallel analysis of the intermediate outputs of the workflows to recalculate the margins and ensure these match the final result	Exact match
	Comparison of intermediate outputs, detailing the status at the end of each counting round, are identical to the results generated by the simulation engines	Exact match
	Peer review of entire codebase to identify inconsistencies, inefficiencies, and logical errors	No issues encountered
Optional Preferential System (OPS) simulation engine	Compare the outputs from the official PRCC engine for all contests to confirm the outcomes, number of counting rounds, decisions on elections and exclusions, and the progressive total candidate and exhausted votes are identical	Exact match
Proportional Representation System (PRS) simulation engine	Compare the outputs against the Bogan 2016 test scenario to confirm the algorithm follows identical steps and logic to the official PRCC engine, including: <ul style="list-style-type: none"> <li>Contest outcome, number of rounds, and all decisions on elections, surplus distribution, and exclusion of candidates</li> <li>Individual round and progressive totals for candidate ballot papers and votes, exhausted ballot papers and votes, votes lost by fraction, and votes set aside</li> <li>All disregarded fractions, transfer values, continued transfer values</li> <li>Metrics for every ballot paper parcel transfer</li> </ul>	Exact match (to within floating point precision)
	Comparison to the outputs from the official PRCC engine for all contests, including the contest outcome and the progressive total votes as at the end of every counting round	Exact match, except in cases where a random draw event occurred and the two counting systems drew different random outcomes
	Automated validation checks to ensure that all ballot papers and votes are accounted for whenever: <ul style="list-style-type: none"> <li>A parcel of ballot papers is transferred in a surplus or exclusion distribution</li> <li>At the end of each counting round/</li> </ul>	No validation issues were encountered
OPS and PRS codebase	Peer review of entire codebase to identify inconsistencies, inefficiencies, and logical errors	No issues encountered

# Results

Detailed results for contests where the simulation results using iVote preference data indicated a non-zero observed frequency of an alternate outcome are shown in the table below. See *Appendix B: Detailed Results* for the results for all contests.

The number of simulations where the outcome was different to the baseline outcome

The observed frequency (as a percentage) of alternative outcomes

The 95% lower and upper limits on frequency of alternative results

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Kempsey Councillor	CO	22,812	16,204	1,790	34	Yes	No	Yes	1	1,000	2	610	61.0%	57.9%	64.0%
Singleton Councillor	CO	17,137	12,745	2,467	55	Yes	No	Yes	3	1,000	2	432	43.2%	40.1%	46.3%
Shellharbour A Councillor	CO	15,740	13,138	2,772	54	Yes	No	Yes	4	1,000	2	70	7.0%	5.5%	8.8%
Hay Councillor	CO	2,158	1,747	180	6	Yes		Yes	4	1,000	2	7	0.7%	0.3%	1.4%
Kiama Councillor	CO	18,083	15,016	2,006	57	Yes		Yes	1	1,000	2	3	0.3%	0.1%	0.9%
Parramatta Rosehill Councillor	CO	29,921	22,283	5,648	119	Yes		Yes	5	1,000	2	1	0.1%	0.0%	0.6%

The overall status of the high-level analysis for each contest is flagged as "yes" in this column if either its own count or the linked mayoral count require further analysis.

If this is a councillor contest with a linked mayoral contest, any change to the mayoral contest may impact its outcome. This column indicates the high-level analysis outcome for the linked mayoral contest, if one exists.

If the high-level analysis revealed an exclusion point difference less than or equal to the number of potential additional iVote ballot papers, this column is flagged as "Yes"

The minimum difference in the count at points of exclusion as determined by the analysis – note that "vote" used here does not mean a ballot paper.

The number of simulations run for this contest

The number of distinct contest outcomes, including the baseline result

# **Appendix A: Sensitivity Analysis**



# Sensitivity Analysis

In addition to the core stages of the approach, the following two analyses were conducted to inform the sensitivity of the results to the assumptions

## 1 Varying the number of additional votes

### Objective

Determine the relationship the number of additional iVotes and the frequency of alternative outcomes, including the threshold point at which the frequency drops to zero (if this occurs)

### Approach

For each of the 7 contests that were originally identified with instances of alternative outcomes (before cross-checking electors against attendance voting records):

- Repeat the analysis under 5 different scenarios for the number of additional iVotes
- Recalculate the frequency of alternative outcomes
- Recalculate the confidence intervals
- Plot the results on a line graph

## 2 Sampling vote preferences from all ballots

### Objective

Determine the sensitivity of the results to the underlying set of ballot papers used to generate the preference patterns for the additional iVotes

### Approach

1. Repeat the simulation analysis, but rather than sample the preference patterns from the iVote ballots from that contest, sample the preference patterns for the entire set of ballots for that contest (including the iVote portion).
2. Recalculate the frequency of alternative outcomes
3. Recalculate the confidence intervals
4. Compare the results to the core set of analysis results to identify:
  - Cases where the observed frequency significantly decreases
  - Cases where the observed frequency significantly increases (including contests which showed no alternative outcomes in the core analysis)



# Appendix B: Detailed Results

# Detailed Results (1 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
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Singleton Councillor	CO	17,137	12,745	2,467	55	Yes	No	Yes	3	1,000	2	432	43.2%	40.1%	46.3%
Shellharbour A Councillor	CO	15,740	13,138	2,772	54	Yes	No	Yes	4	1,000	2	70	7.0%	5.5%	8.8%
Hay Councillor	CO	2,158	1,747	180	6	Yes		Yes	4	1,000	2	7	0.7%	0.3%	1.4%
Kiama Councillor	CO	18,083	15,016	2,006	57	Yes		Yes	1	1,000	2	3	0.3%	0.1%	0.9%
Parramatta Rosehill Councillor	CO	29,921	22,283	5,648	119	Yes		Yes	5	1,000	2	1	0.1%	0.0%	0.6%
Albury Councillor	CO	37,968	28,378	2,866	142	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Armidale Councillor	CO	19,358	15,223	1,569	71	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Ballina A Councillor	CO	10,843	7,947	789	35	Yes	No	Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Bathurst Councillor	CO	31,017	24,704	2,943	137	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Bayside 1 Councillor	CO	22,431	17,379	3,046	170	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Bayside 2 Councillor	CO	22,840	17,168	3,907	245	Yes		Yes	5	1,000	1	-	0.0%	0.0%	0.4%
Bayside 3 Councillor	CO	19,837	15,212	2,887	145	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Bayside 4 Councillor	CO	20,809	16,519	2,999	167	Yes		Yes	15	1,000	1	-	0.0%	0.0%	0.4%
Bayside 5 Councillor	CO	19,481	14,990	2,578	130	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Bega Valley Councillor	CO	26,877	21,435	1,435	49	Yes		Yes	13	1,000	1	-	0.0%	0.0%	0.4%
Bellingen Councillor	CO	10,346	8,270	730	29	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Berrigan Councillor	CO	6,217	4,720	306	20	Yes		Yes	9	1,000	1	-	0.0%	0.0%	0.4%
Blacktown 1 Councillor	CO	54,553	44,012	11,752	611	Yes		Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Blacktown 2 Councillor	CO	43,758	34,854	7,595	356	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (2 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Blacktown 4 Councillor	CO	44,925	35,351	7,645	343	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Blacktown 5 Councillor	CO	50,215	36,254	8,141	419	Yes		Yes	5	1,000	1	-	0.0%	0.0%	0.4%
Blue Mountains 1 Councillor	CO	14,515	11,435	1,271	65	Yes		Yes	8	1,000	1	-	0.0%	0.0%	0.4%
Blue Mountains 2 Councillor	CO	14,749	12,493	1,513	73	Yes		Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Blue Mountains 3 Councillor	CO	14,763	12,567	1,639	94	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Blue Mountains 4 Councillor	CO	14,344	12,338	1,540	79	Yes		Yes	21	1,000	1	-	0.0%	0.0%	0.4%
Bogan Councillor	CO	1,929	1,467	187	13	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Broken Hill Councillor	CO	13,412	10,395	978	38	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Burwood Councillor	CO	21,155	17,250	3,285	149	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Byron Councillor	CO	25,610	17,735	1,921	127	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Byron Mayor	MA	25,610	18,165	1,921	127	Yes		Yes	65	1,000	1	-	0.0%	0.0%	0.4%
Cabonne Councillor	CO	10,113	7,836	1,598	57	Yes		Yes	13	1,000	1	-	0.0%	0.0%	0.4%
Camden Central Councillor	CO	25,419	20,735	4,732	269	Yes		Yes	30	1,000	1	-	0.0%	0.0%	0.4%
Camden North Councillor	CO	28,541	22,975	5,898	362	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Camden South Councillor	CO	22,419	18,016	3,743	201	Yes		Yes	88	1,000	1	-	0.0%	0.0%	0.4%
Campbelltown Councillor	CO	113,732	89,337	14,776	764	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Canada Bay Councillor	CO	58,599	47,472	9,851	491	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Canterbury-Bankstown Bass Hill Councillor	CO	44,589	33,153	7,087	363	Yes		Yes	227	1,000	1	-	0.0%	0.0%	0.4%
Canterbury-Bankstown Canterbury Councillor	CO	46,726	37,276	8,041	369	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Canterbury-Bankstown Revesby Councillor	CO	47,204	38,446	7,034	391	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (3 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Carrathool A Councillor	CO	909	694	74	4	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Cessnock A Councillor	CO	11,873	9,176	1,668	73	Yes	No	Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Cessnock B Councillor	CO	10,214	7,893	1,345	69	Yes	No	Yes	6	1,000	1	-	0.0%	0.0%	0.4%
Cessnock C Councillor	CO	12,169	9,552	1,800	86	Yes	No	Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Cessnock D Councillor	CO	11,304	8,997	1,829	89	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Clarence Valley Councillor	CO	38,776	30,661	3,883	143	Yes		Yes	15	1,000	1	-	0.0%	0.0%	0.4%
Coffs Harbour Councillor	CO	56,943	43,587	5,249	251	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Coffs Harbour Mayor	MA	56,943	45,155	5,249	251	Yes		Yes	35	1,000	1	-	0.0%	0.0%	0.4%
Coolamon Councillor	CO	3,247	2,576	261	19	Yes		Yes	9	1,000	1	-	0.0%	0.0%	0.4%
Coonamble Councillor	CO	2,741	2,096	374	10	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Cowra Councillor	CO	9,732	7,764	588	32	Yes		Yes	13	1,000	1	-	0.0%	0.0%	0.4%
Cumberland Granville Councillor	CO	26,129	19,325	4,001	215	Yes		Yes	7	1,000	1	-	0.0%	0.0%	0.4%
Cumberland Regents Park Councillor	CO	24,851	19,749	4,460	184	Yes		Yes	27	1,000	1	-	0.0%	0.0%	0.4%
Cumberland Wentworthville Councillor	CO	25,762	20,211	4,696	221	Yes		Yes	6	1,000	1	-	0.0%	0.0%	0.4%
Dubbo Dubbo North Councillor	CO	8,252	6,291	1,022	45	Yes		Yes	18	1,000	1	-	0.0%	0.0%	0.4%
Dubbo Dubbo South Councillor	CO	8,457	6,876	1,181	47	Yes		Yes	29	1,000	1	-	0.0%	0.0%	0.4%
Eurobodalla Councillor	CO	32,183	24,875	2,686	114	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Federation Councillor	CO	9,961	7,402	594	22	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Forbes Councillor	CO	6,997	5,628	737	37	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Georges River Blakehurst Councillor	CO	19,390	16,142	3,122	122	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (4 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Georges River Hurstville Councillor	CO	18,482	14,773	3,215	133	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Georges River Kogarah Bay Councillor	CO	20,060	15,797	3,232	159	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Georges River Mortdale Councillor	CO	17,784	14,452	2,877	124	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Georges River Peakhurst Councillor	CO	19,604	16,286	3,007	161	Yes		Yes	18	1,000	1	-	0.0%	0.0%	0.4%
Glen Innes Severn Councillor	CO	6,317	5,496	334	8	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Goulburn Mulwaree Councillor	CO	21,656	17,394	2,674	93	Yes		Yes	12	1,000	1	-	0.0%	0.0%	0.4%
Griffith Councillor	CO	16,876	12,556	1,659	73	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Griffith Mayor	MA	16,876	14,179	1,659	73	Yes		Yes	72	1,000	1	-	0.0%	0.0%	0.4%
Gunnedah Councillor	CO	9,088	7,164	925	50	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Hawkesbury Councillor	CO	48,584	39,488	6,522	300	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Hilltops Councillor	CO	14,374	11,021	1,298	45	Yes		Yes	21	1,000	1	-	0.0%	0.0%	0.4%
Hornsby A Councillor	CO	33,902	28,734	4,633	200	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Hornsby B Councillor	CO	33,943	28,273	5,810	241	Yes	No	Yes	14	1,000	1	-	0.0%	0.0%	0.4%
Hunters Hill North Councillor	CO	5,119	4,172	767	37	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Hunters Hill South Councillor	CO	4,862	4,062	596	34	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Inner West Ashfield - Djarrawunang (Magpie) Councillor	CO	26,718	21,310	3,681	220	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Inner West Balmain - Baludarri (Leather Jacket) Councillor	CO	27,025	21,240	3,015	196	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Inner West Leichhardt - Gulgadya (Grass Tree) Councillor	CO	26,251	20,783	3,304	199	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Inner West Marrickville - Midjuburi (Lillypilly) Councillor	CO	26,385	20,347	3,666	242	Yes		Yes	26	1,000	1	-	0.0%	0.0%	0.4%
Inner West Stanmore - Damun (Port Jackson Fig) Councillor	CO	26,868	20,355	4,013	266	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (5 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Junee Councillor	CO	4,012	3,262	405	13	Yes		Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Ku-ring-gai Comenarra Councillor	CO	16,746	13,804	2,379	120	Yes		Yes	8	1,000	1	-	0.0%	0.0%	0.4%
Ku-ring-gai Gordon Councillor	CO	17,062	13,720	2,731	117	Yes		Yes	62	1,000	1	-	0.0%	0.0%	0.4%
Ku-ring-gai Roseville Councillor	CO	16,592	13,785	2,630	128	Yes		Yes	8	1,000	1	-	0.0%	0.0%	0.4%
Ku-ring-gai St Ives Councillor	CO	16,630	13,940	2,436	83	Yes		Yes	6	1,000	1	-	0.0%	0.0%	0.4%
Ku-ring-gai Wahroonga Councillor	CO	16,352	13,513	2,047	125	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Lake Macquarie East Councillor	CO	51,679	41,593	6,148	336	Yes	No	Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Lake Macquarie North Councillor	CO	52,187	42,316	7,887	429	Yes	No	Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Lake Macquarie West Councillor	CO	57,812	44,643	6,514	364	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Lane Cove Central Councillor	CO	8,541	7,259	1,069	58	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Lane Cove East Councillor	CO	8,608	6,974	1,325	81	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Lane Cove West Councillor	CO	9,028	7,362	1,394	61	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Leeton Councillor	CO	7,736	6,105	602	32	Yes		Yes	5	1,000	1	-	0.0%	0.0%	0.4%
Lismore Councillor	CO	31,825	25,948	3,756	123	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Lithgow Councillor	CO	15,903	13,061	1,396	70	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Liverpool North Councillor	CO	69,702	51,345	10,948	518	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Liverpool South Councillor	CO	75,782	58,279	13,338	661	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Maitland Mayor	MA	64,895	54,181	9,591	451	Yes		Yes	241	1,000	1	-	0.0%	0.0%	0.4%
Maitland Central Councillor	CO	16,130	13,083	2,119	110	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Maitland East Councillor	CO	15,253	12,397	2,299	96	Yes	Yes	Yes	3	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (6 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Maitland North Councillor	CO	17,702	14,761	3,081	122	Yes	Yes	Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Maitland West Councillor	CO	15,810	12,720	2,092	123	Yes	Yes	Yes	17	1,000	1	-	0.0%	0.0%	0.4%
Mid-Coast Councillor	CO	76,413	61,696	6,429	259	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Mid-Western Councillor	CO	18,699	15,023	1,560	74	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Moree Plains Councillor	CO	8,298	5,789	1,121	41	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Mosman Councillor	CO	20,731	16,197	2,470	131	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Muswellbrook Councillor	CO	11,684	8,756	1,686	69	Yes		Yes	17	1,000	1	-	0.0%	0.0%	0.4%
Nambucca Valley Councillor	CO	16,029	12,043	1,215	35	Yes	No	Yes	11	1,000	1	-	0.0%	0.0%	0.4%
Narrabri Councillor	CO	9,284	7,042	1,013	53	Yes		Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Narrandera Councillor	CO	4,313	3,398	354	22	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Newcastle 1 Councillor	CO	30,881	23,428	3,738	248	Yes	No	Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Newcastle 2 Councillor	CO	32,368	26,089	4,087	287	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Newcastle 3 Councillor	CO	30,945	24,468	3,904	256	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Newcastle 4 Councillor	CO	30,461	24,317	4,149	220	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
North Sydney Cammeraygal Councillor	CO	25,092	19,088	3,794	251	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
North Sydney St Leonards Councillor	CO	23,757	18,541	3,903	257	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Northern Beaches Curl Curl Councillor	CO	38,054	29,742	5,335	305	Yes		Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Northern Beaches Frenchs Forest Councillor	CO	36,360	30,625	5,317	258	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Northern Beaches Manly Councillor	CO	36,626	28,981	4,642	270	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Northern Beaches Narrabeen Councillor	CO	36,947	30,124	4,945	256	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (7 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Northern Beaches Pittwater Councillor	CO	36,852	29,642	4,032	204	Yes		Yes	13	1,000	1	-	0.0%	0.0%	0.4%
Oberon Councillor	CO	4,001	3,215	293	13	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Orange Councillor	CO	30,258	23,740	4,084	172	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Orange Mayor	MA	30,258	24,355	4,084	172	Yes		Yes	146	1,000	1	-	0.0%	0.0%	0.4%
Parkes Councillor	CO	10,551	8,027	945	41	Yes		Yes	11	1,000	1	-	0.0%	0.0%	0.4%
Parramatta Dundas Councillor	CO	28,207	22,076	5,663	259	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Parramatta North Rocks Councillor	CO	26,954	22,525	5,121	213	Yes		Yes	5	1,000	1	-	0.0%	0.0%	0.4%
Parramatta Parramatta Councillor	CO	26,815	20,440	4,495	227	Yes		Yes	28	1,000	1	-	0.0%	0.0%	0.4%
Port Macquarie-Hastings Councillor	CO	66,817	52,517	6,314	266	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Port Stephens Central Councillor	CO	20,311	16,289	3,147	118	Yes	No	Yes	11	1,000	1	-	0.0%	0.0%	0.4%
Port Stephens West Councillor	CO	19,268	15,425	2,705	105	Yes	No	Yes	18	1,000	1	-	0.0%	0.0%	0.4%
Queanbeyan-Palerang Councillor	CO	43,799	33,813	3,521	143	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Randwick Central Councillor	CO	18,079	13,840	2,496	135	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Randwick South Councillor	CO	18,430	14,468	2,031	134	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Randwick West Councillor	CO	17,811	13,609	2,384	140	Yes		Yes	5	1,000	1	-	0.0%	0.0%	0.4%
Richmond Valley Councillor	CO	16,590	13,229	1,362	52	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Ryde Central Councillor	CO	26,869	21,826	4,737	211	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Ryde East Councillor	CO	26,703	22,323	4,510	220	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Ryde West Councillor	CO	24,586	20,370	3,938	145	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Shellharbour B Councillor	CO	13,461	10,527	1,938	86	Yes	No	Yes	22	1,000	1	-	0.0%	0.0%	0.4%



# Detailed Results (8 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Shoalhaven Mayor	MA	84,563	67,030	7,772	403	Yes		Yes	158	1,000	1	-	0.0%	0.0%	0.4%
Shoalhaven 1 Councillor	CO	28,338	21,724	2,627	145	Yes	Yes	Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Shoalhaven 2 Councillor	CO	28,448	21,863	2,771	131	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Snowy Monaro Councillor	CO	14,630	11,746	798	45	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Snowy Valleys Councillor	CO	10,121	8,310	616	13	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Strathfield Councillor	CO	24,428	19,500	4,374	197	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Sutherland A Councillor	CO	34,272	28,011	4,452	311	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Sutherland B Councillor	CO	34,189	28,585	4,993	280	Yes		Yes	61	1,000	1	-	0.0%	0.0%	0.4%
Sutherland C Councillor	CO	34,069	27,880	4,940	283	Yes		Yes	42	1,000	1	-	0.0%	0.0%	0.4%
Sutherland D Councillor	CO	33,289	28,543	4,656	201	Yes		Yes	4	1,000	1	-	0.0%	0.0%	0.4%
Sutherland E Councillor	CO	32,653	28,313	4,375	235	Yes		Yes	203	1,000	1	-	0.0%	0.0%	0.4%
Sydney Councillor	CO	176,088	117,362	39,528	2,003	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Sydney Lord Mayor	MA	176,088	118,511	39,528	2,003	Yes		Yes	1,635	1,000	1	-	0.0%	0.0%	0.4%
Tamworth Councillor	CO	44,740	35,318	4,183	194	Yes		Yes	20	1,000	1	-	0.0%	0.0%	0.4%
Temora Councillor	CO	4,624	4,046	355	13	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
The Hills Central Councillor	CO	31,148	26,375	6,847	312	Yes	No	Yes	17	1,000	1	-	0.0%	0.0%	0.4%
The Hills North Councillor	CO	32,697	27,025	7,041	360	Yes	No	Yes	103	1,000	1	-	0.0%	0.0%	0.4%
Tweed Councillor	CO	66,934	50,020	3,984	166	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Upper Hunter Councillor	CO	10,312	8,300	1,214	47	Yes		Yes	20	1,000	1	-	0.0%	0.0%	0.4%
Wagga Wagga Councillor	CO	46,543	35,885	3,975	229	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (9 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Walgett Councillor	CO	3,658	2,507	421	23	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Warrumbungle Councillor	CO	6,917	5,530	1,125	30	Yes		Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Waverley Bondi Councillor	CO	11,627	7,152	1,266	117	Yes		Yes	64	1,000	1	-	0.0%	0.0%	0.4%
Waverley Waverley Councillor	CO	11,292	8,052	1,213	74	Yes		Yes	20	1,000	1	-	0.0%	0.0%	0.4%
Weddin Councillor	CO	2,817	2,380	328	23	Yes		Yes	10	1,000	1	-	0.0%	0.0%	0.4%
Wentworth Councillor	CO	4,365	3,318	327	12	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Willoughby Middle Harbour Councillor	CO	11,702	9,385	1,634	81	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Willoughby Naremburn Councillor	CO	11,108	8,633	1,739	43	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Willoughby Sailors Bay Councillor	CO	11,843	9,502	1,569	86	Yes	No	Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Willoughby West Councillor	CO	12,076	9,425	1,979	88	Yes	No	Yes	12	1,000	1	-	0.0%	0.0%	0.4%
Wollondilly Mayor	MA	37,015	31,355	5,060	211	Yes		Yes	18	1,000	1	-	0.0%	0.0%	0.4%
Wollondilly East Councillor	CO	18,618	15,133	2,381	95	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Wollondilly North Councillor	CO	18,397	14,655	2,679	116	Yes	Yes	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Wollongong 1 Councillor	CO	52,849	42,730	6,389	345	Yes	No	Yes	3	1,000	1	-	0.0%	0.0%	0.4%
Wollongong 2 Councillor	CO	51,853	41,073	7,743	438	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Wollongong 3 Councillor	CO	50,820	40,706	6,601	304	Yes	No	Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Woolahra Cooper Councillor	CO	7,927	5,892	1,047	69	Yes		Yes	1	1,000	1	-	0.0%	0.0%	0.4%
Yass Valley Councillor	CO	12,588	9,452	1,782	70	Yes		Yes	2	1,000	1	-	0.0%	0.0%	0.4%
Shoalhaven 3 Councillor	CO	27,777	22,029	2,374	127	Yes	Yes	No	861	1,000	1	-	0.0%	0.0%	0.4%
Ballina Mayor	MA	33,097	26,913	3,166	140	No		No	618	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (10 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Ballina B Councillor	CO	11,639	9,087	1,244	53	No	No	No	175	1,000	1	-	0.0%	0.0%	0.4%
Ballina C Councillor	CO	10,615	8,237	1,133	52	No	No	No	354	1,000	1	-	0.0%	0.0%	0.4%
Bellingen Mayor	MA	10,346	8,374	730	29	No		No	1,534	1,000	1	-	0.0%	0.0%	0.4%
Blacktown 3 Councillor	CO	43,388	33,681	6,737	304	No		No	775	1,000	1	-	0.0%	0.0%	0.4%
Bland Councillor	CO	4,154	3,211	499	25	No		No	109	1,000	1	-	0.0%	0.0%	0.4%
Blayney Councillor	CO	5,471	4,560	393	23	No		No	120	1,000	1	-	0.0%	0.0%	0.4%
Brewarrina Councillor	CO	893	550	55	-	No		No	19	1,000	1	-	0.0%	0.0%	0.4%
Broken Hill Mayor	MA	13,412	10,812	978	38	No		No	924	1,000	1	-	0.0%	0.0%	0.4%
Burwood Mayor	MA	21,155	17,797	3,285	149	No		No	3,119	1,000	1	-	0.0%	0.0%	0.4%
Canada Bay Mayor	MA	58,599	48,542	9,851	491	No		No	1,500	1,000	1	-	0.0%	0.0%	0.4%
Canterbury-Bankstown Bankstown Councillor	CO	45,230	34,062	7,416	337	No		No	4,434	1,000	1	-	0.0%	0.0%	0.4%
Canterbury-Bankstown Roselands Councillor	CO	45,144	33,553	6,907	360	No		No	1,583	1,000	1	-	0.0%	0.0%	0.4%
Cessnock Mayor	MA	45,560	36,497	6,642	317	No		No	2,910	1,000	1	-	0.0%	0.0%	0.4%
Cootamundra-Gundagai Councillor	CO	8,629	6,922	666	19	No		No	98	1,000	1	-	0.0%	0.0%	0.4%
Cumberland Greystanes Councillor	CO	26,009	20,779	3,935	208	No		No	3,393	1,000	1	-	0.0%	0.0%	0.4%
Cumberland South Granville Councillor	CO	24,889	17,397	3,328	196	No		No	5,815	1,000	1	-	0.0%	0.0%	0.4%
Dubbo Dubbo Central Councillor	CO	6,908	5,320	717	36	No		No	1,316	1,000	1	-	0.0%	0.0%	0.4%
Dubbo Dubbo East Councillor	CO	6,858	5,231	789	28	No		No	30	1,000	1	-	0.0%	0.0%	0.4%
Dubbo Wellington Councillor	CO	6,885	5,524	600	24	No		No	26	1,000	1	-	0.0%	0.0%	0.4%
Dungog A Councillor	CO	2,386	1,987	228	9	No		No	78	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (11 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Dungog B Councillor	CO	2,547	2,107	419	16	No		No	155	1,000	1	-	0.0%	0.0%	0.4%
Dungog C Councillor	CO	2,518	2,041	345	8	No		No	161	1,000	1	-	0.0%	0.0%	0.4%
Edward River Councillor	CO	6,354	4,559	273	9	No		No	71	1,000	1	-	0.0%	0.0%	0.4%
Eurobodalla Mayor	MA	32,183	25,526	2,686	114	No		No	158	1,000	1	-	0.0%	0.0%	0.4%
Gilgandra Councillor	CO	3,174	2,492	270	11	No		No	20	1,000	1	-	0.0%	0.0%	0.4%
Greater Hume North Councillor	CO	2,733	2,048	149	8	No		No	108	1,000	1	-	0.0%	0.0%	0.4%
Greater Hume West Councillor	CO	2,494	1,989	181	5	No		No	55	1,000	1	-	0.0%	0.0%	0.4%
Gwydir Councillor	CO	3,788	2,940	461	17	No		No	100	1,000	1	-	0.0%	0.0%	0.4%
Hornsby Mayor	MA	100,291	85,656	15,810	653	No		No	12,474	1,000	1	-	0.0%	0.0%	0.4%
Hornsby C Councillor	CO	32,446	28,064	5,367	212	No	No	No	312	1,000	1	-	0.0%	0.0%	0.4%
Hunters Hill Mayor	MA	9,981	8,356	1,363	71	No		No	218	1,000	1	-	0.0%	0.0%	0.4%
Inverell Councillor	CO	12,942	9,887	1,128	26	No		No	103	1,000	1	-	0.0%	0.0%	0.4%
Kempsey Mayor	MA	22,812	17,585	1,790	66	No		No	118	1,000	1	-	0.0%	0.0%	0.4%
Kyogle B Councillor	CO	2,211	1,753	138	6	No		No	41	1,000	1	-	0.0%	0.0%	0.4%
Kyogle C Councillor	CO	2,250	1,666	228	2	No		No	118	1,000	1	-	0.0%	0.0%	0.4%
Lachlan E Councillor	CO	916	649	50	1	No		No	68	1,000	1	-	0.0%	0.0%	0.4%
Lake Macquarie Mayor	MA	161,678	130,336	20,549	1,129	No		No	7,874	1,000	1	-	0.0%	0.0%	0.4%
Lismore Mayor	MA	31,825	26,474	3,756	123	No		No	2,390	1,000	1	-	0.0%	0.0%	0.4%
Liverpool Mayor	MA	145,484	115,177	24,286	1,179	No		No	1,584	1,000	1	-	0.0%	0.0%	0.4%
Liverpool Plains Councillor	CO	5,717	4,460	592	27	No		No	33	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (12 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
Lockhart A Councillor	CO	759	599	54	2	No		No	25	1,000	1	-	0.0%	0.0%	0.4%
Lockhart B Councillor	CO	777	615	75	3	No		No	29	1,000	1	-	0.0%	0.0%	0.4%
Mosman Mayor	MA	20,731	16,425	2,470	131	No		No	444	1,000	1	-	0.0%	0.0%	0.4%
Murrumbidgee Jerilderie Councillor	CO	898	686	96	3	No		No	6	1,000	1	-	0.0%	0.0%	0.4%
Murrumbidgee Murrumbidgee Councillor	CO	871	649	60	1	No		No	15	1,000	1	-	0.0%	0.0%	0.4%
Murrumbidgee Murrumbidgee East Councillor	CO	903	698	152	12	No		No	122	1,000	1	-	0.0%	0.0%	0.4%
Nambucca Valley Mayor	MA	16,029	12,482	1,215	35	No		No	4,562	1,000	1	-	0.0%	0.0%	0.4%
Newcastle Lord Mayor	MA	124,655	100,275	15,878	1,011	No		No	1,075	1,000	1	-	0.0%	0.0%	0.4%
Parramatta Epping Councillor	CO	28,169	23,461	4,882	226	No		No	292	1,000	1	-	0.0%	0.0%	0.4%
Port Macquarie-Hastings Mayor	MA	66,817	54,499	6,314	266	No		No	5,357	1,000	1	-	0.0%	0.0%	0.4%
Port Stephens Mayor	MA	57,880	47,807	7,663	306	No		No	567	1,000	1	-	0.0%	0.0%	0.4%
Port Stephens East Councillor	CO	18,301	14,813	1,811	83	No	No	No	1,659	1,000	1	-	0.0%	0.0%	0.4%
Randwick East Councillor	CO	17,147	12,801	2,372	146	No		No	783	1,000	1	-	0.0%	0.0%	0.4%
Randwick North Councillor	CO	17,382	13,121	2,242	147	No		No	1,799	1,000	1	-	0.0%	0.0%	0.4%
Richmond Valley Mayor	MA	16,590	13,405	1,362	52	No		No	5,821	1,000	1	-	0.0%	0.0%	0.4%
Shellharbour Mayor	MA	56,056	46,273	8,512	399	No		No	2,595	1,000	1	-	0.0%	0.0%	0.4%
Shellharbour C Councillor	CO	13,336	10,617	1,661	69	No	No	No	1,233	1,000	1	-	0.0%	0.0%	0.4%
Singleton Mayor	MA	17,137	13,755	2,467	104	No		No	869	1,000	1	-	0.0%	0.0%	0.4%
Tenterfield D Councillor	CO	979	747	27	-	No		No	16	1,000	1	-	0.0%	0.0%	0.4%
The Hills Mayor	MA	123,651	105,384	25,819	1,227	No		No	7,148	1,000	1	-	0.0%	0.0%	0.4%

# Detailed Results (13 of 13)

Contest Summary						High Level Analysis Results				Simulation Results					
Contest name	Contest type	No. of electors	No. of formal ballot papers	No. of iVote ballot papers	Potential additional iVote ballot papers	Contest requires further analysis	Mayoral contest requires further analysis	Count requires further analysis	Min. vote difference during count	No. of simulations	No. of distinct election outcomes	No. of simulations with an alternative outcome	Observed frequency of alternative outcome	Estimated alternative frequency lower limit	Estimated alternative frequency upper limit
The Hills East Councillor	CO	29,615	24,594	5,618	250	No	No	No	2,490	1,000	1	-	0.0%	0.0%	0.4%
The Hills West Councillor	CO	30,191	25,507	6,313	305	No	No	No	3,773	1,000	1	-	0.0%	0.0%	0.4%
Upper Lachlan Councillor	CO	6,435	5,219	660	19	No		No	49	1,000	1	-	0.0%	0.0%	0.4%
Uralla Mayor	MA	4,551	3,781	403	18	No		No	1,865	1,000	1	-	0.0%	0.0%	0.4%
Uralla A Councillor	CO	2,217	1,837	195	8	No	No	No	18	1,000	1	-	0.0%	0.0%	0.4%
Uralla B Councillor	CO	2,334	1,818	208	10	No	No	No	19	1,000	1	-	0.0%	0.0%	0.4%
Walcha B Councillor	CO	588	488	120	4	No		No	55	1,000	1	-	0.0%	0.0%	0.4%
Walcha D Councillor	CO	602	467	47	2	No		No	55	1,000	1	-	0.0%	0.0%	0.4%
Warren A Councillor	CO	492	332	63	5	No		No	8	1,000	1	-	0.0%	0.0%	0.4%
Warren B Councillor	CO	499	347	75	1	No		No	5	1,000	1	-	0.0%	0.0%	0.4%
Warren D Councillor	CO	492	335	25	-	No		No	1	1,000	1	-	0.0%	0.0%	0.4%
Waverley Hunter Councillor	CO	10,787	8,114	1,601	91	No		No	986	1,000	1	-	0.0%	0.0%	0.4%
Waverley Lawson Councillor	CO	11,839	8,770	1,366	98	No		No	550	1,000	1	-	0.0%	0.0%	0.4%
Willoughby Mayor	MA	46,729	37,942	6,921	333	No		No	2,531	1,000	1	-	0.0%	0.0%	0.4%
Wollongong Lord Mayor	MA	155,522	127,240	20,733	1,087	No		No	1,812	1,000	1	-	0.0%	0.0%	0.4%
Woollahra Bellevue Hill Councillor	CO	7,755	5,519	1,095	89	No		No	1,181	1,000	1	-	0.0%	0.0%	0.4%
Woollahra Double Bay Councillor	CO	8,051	5,716	1,127	67	No		No	860	1,000	1	-	0.0%	0.0%	0.4%
Woollahra Paddington Councillor	CO	8,291	5,834	1,165	87	No		No	1,298	1,000	1	-	0.0%	0.0%	0.4%
Woollahra Vacluse Councillor	CO	8,045	5,997	1,177	57	No		No	2,371	1,000	1	-	0.0%	0.0%	0.4%