

# memo

To: The Chief Justice and Justices of the Supreme Court of Virginia  
From: Bernard Grofman, Ph.D. and Sean Trende  
CC:  
Date: 12/27/2021  
Re: Redistricting maps

## INTRODUCTION

Over the past few weeks, we have listened to the voices of dozens of Virginians, read thousands of their comments, and consulted with this Court. We have done our best to incorporate the comments that we received, and we are now pleased to present this Court with the final version of our maps for its review.

As described in this Court's Redistricting Appointment Order ("Redistricting Order"), we have once again proposed "a single redistricting map for the Virginia House of Delegates, a single redistricting map for the Senate of Virginia, and a single redistricting map for Virginia's representatives to the United States House of Representatives." Redistricting Order at 1-2. We are also pleased to report that we have once again "work[ed] together to develop any plan to be submitted to the Court for its consideration," Code § 30-399(F). These maps still reflect a true joint effort on our part. We agreed on almost all issues initially, and the few issues on which we initially disagreed were resolved by amicable discussion.



We feel that these comments greatly improved the quality of our work overall. We were familiar with the Commonwealth before – Dr. Grofman has extensive experience drawing maps in Hampton Roads, while Mr. Trende resided in Northern Virginia and in the Richmond area for almost half of his adult life – but hearing from residents from all walks of life and from all corners of the Commonwealth gave us a much deeper understanding of the issues involved and brought to our attention things that we had honestly missed.

Not only that, but as the resulting maps should demonstrate, we have paid attention, and have tried to incorporate as many of the suggestions as possible. At the same time, we reiterate an observation from our initial memorandum: Redistricting is a complex task, one that requires the balancing of multiple competing factors. Unfortunately, it simply was not possible to incorporate every request while remaining within the bounds of Virginia and federal law. Moreover, there are likely thousands of maps that accomplish certain goals of redistricting that we did not accomplish, but they come at the expense of other goals we sought to achieve. We did, however, read every comment and, where appropriate, explored ways to address the suggestion.

The following pages describe the features of the new maps, and the ways in which we worked to accommodate the various requests. It also seeks to explain why certain suggestions were or were not accepted. Before describing the features of the new maps, though, it seemed simplest to make some “global” comments to explain our reasoning with respect to general criticisms that appeared throughout the public comments on the maps. We do emphasize that we consulted with each other in several zoom calls, sometimes stretching over the better part of a day. Therefore, while this list reflects our weightiest considerations, it is not an exclusive list.

### GENERAL CRITICISMS

1. **Incumbency.** Perhaps the most common criticism was that we paid insufficient attention to incumbency, weakened several congressional incumbents and paired together multiple senators and delegates.

We felt that it was important to reiterate here that we began this process largely naïve as to the residences of legislators. With a few exceptions, we remain so. It is true that each of us knew some locations for Members of Congress, with Dr. Grofman generally familiar with the locations of minority incumbents, and Mr. Trende generally familiar with incumbent locations in some other districts. However, this is not as probative as many suggest. Given the convoluted nature of the current district lines, Rep. Jennifer Wexton could have been placed in the newly drawn 6<sup>th</sup>, 7<sup>th</sup>, 10<sup>th</sup>, or 11<sup>th</sup>. Likewise, Rep. Abigail Spanberger might have resided in the newly drawn 1<sup>st</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 7<sup>th</sup>, or 10<sup>th</sup>. We only learned at the second hearing that we had placed Rep. Morgan Griffith in the 6<sup>th</sup>.

Much of this is simply a function of the fact that the existing lines split municipalities and counties regularly, and we have eliminated those splits. The existing congressional map splits 14 counties 16 times. The existing Senate of Virginia map splits 46 counties 78 times. The existing House of Delegates map splits 60 counties 138 times. By comparison, the submitted congressional map splits 10 counties a total of 11 times. The submitted Senate of Virginia map splits 25 counties 34 times. The submitted House of Delegates map splits 51 counties 98 times.

Any redistricting map featuring this degree of geographic consolidation will almost certainly pair incumbents together; if those incumbents live in a narrowly defined geographic area the chances of being paired together are increased. In this respect, we consider the treatment of incumbents to be an example of the redistricting process working as intended.



This leads to our second point: In consultation with the Court, we have rejected calls to actively educate ourselves further on the residences of incumbents. Incumbency protection is, as many have pointed out, frequently listed as an allowable consideration in redistricting. *See, e.g.*, Alabama Reapportionment Committee Redistricting Guidelines (“Contests between incumbents will be avoided whenever possible.”); Arkansas Redistricting Standards and Requirements (“It is permissible to try to avoid making current officeholders run against other incumbents by not drawing a new district that includes two or more incumbents.”); Guidelines and Criteria for 2012 Kansas Congressional and Legislative Redistricting (“Contests between incumbent members of the Legislature or the State Board of Education will be avoided whenever possible.”).

Incumbency protection is not, however, mentioned among the many factors listed in Code § 24.2-304.04 (hereinafter “Statutory Criteria”). This alone would not preclude us from using incumbency, at least as a prudential consideration. We believe that one reason for employing redistricting commissions, however, is to minimize the power of politicians over the drawing of lines, and a frequently voiced objection to partisan line drawing is that it “allows politicians to choose their voters, rather than allowing voters to choose the politicians.” *E.g.*, Editorial Board, “Politicians Can Pick Their Voters, Thanks to the Supreme Court,” *N.Y. Times* (June 27, 2019). As the Supreme Court of the United States has noted, the history of gerrymandering is a tale of “protecting incumbents” in a manner that effectively “enshrines a particular partisan distribution.” *Rucho v. Common Cause*, 139 S. Ct. 2484, 2500 (2019).

In Virginia, “[t]he remnants of incumbency protection . . . helped trigger the amendment that created the [Virginia Redistricting Commission].” Henry L. Chambers, Jr., *The Fight over the Virginia Redistricting Commission*, 24 Rich. Pub. Int. L. Rev. 81, 95 (2021). Moreover, while “incumbency considerations” were built into considerations for communities of interest in the 2011 redistricting cycle, communities of interest are now statutorily defined as “not

includ[ing] a community based upon political affiliation or relationship with a political party, elected official, or candidate for office.” *Compare* S. Comm. on Privileges & Elections, Comm. Res. No. 1 (Va. 2011), *with* Code § 24.2-304.04(5).

In other words, adopting this prudential consideration would seem to be at odds with the overall redistricting scheme enacted by Virginia voters. Having established compact districts that respect communities of interest, however, our hope is that future redistrictings utilizing the same criteria will be less severe.

2. **Preservation of Various District Cores.** While we understand the views of speakers and commentators who implored us not to eliminate their districts, or who advocated for a “minimal changes” map, we did not see that as our mission here. In fact, a minimal changes map based upon districts drawn with heavy political considerations would, in our view, bless those districts and contravene the intent of the voters when they passed the Virginia Redistricting Amendment. We do note again that, having effectively undone decades of convoluted line drawing, future remaps should not involve the same amount of disruption, since they would presumably be drawn in a fashion that permits population adjustments to existing districts without substantially affecting the preservation of cities and counties.

3. **Requests to Preserve the 7<sup>th</sup> District.** This is a specific case of the above objection. While we understand the frustration of residents of the 7<sup>th</sup> (one of us lived in the 7<sup>th</sup> for six years) we don’t believe that there is a way to preserve something akin to the 7<sup>th</sup> without splitting the Shenandoah Valley, which we have received praise for avoiding in the comments and against which we made a policy from the outset. We also note that many of the official commission-drawn maps broke up the 7<sup>th</sup> and, like our draft submission, paired much of central Virginia with the Tidewater. The only commission-drawn map that preserves the 7<sup>th</sup> district, map B5, did so at a cost of splitting western Virginia roughly into thirds. Finally, we reiterate our



basic view from the initial memorandum that Northern Virginia's population entitles it to four districts and requires us to resolve the seven-way split of the region that the current map perpetuates.

Although we were unable to identify a global resolution to this complaint that would not set off a cascade of secondary problems, we did feel it incumbent upon ourselves to pay extra care to specific complaints in this region. We have identified a series of changes that do not give these residents what they are ultimately seeking, but that do address some of the valid points that they raise regarding communities of interest.

4. **Competitiveness.** Several commenters bemoaned the lack of competitive districts. Competitiveness can be a legitimate factor in non-partisan redistricting, but it is not among the factors included in the Virginia Code. While we might consider it as a prudential factor, we believe that doing so would contravene our stated goal of drawing maps without respect to partisanship. Moreover, we wish to point out that competitive districts are often at odds with maps that do not "unduly" favor one party or the other. A map with five Democratic seats, three highly competitive districts, and three Republican seats would tend to flip back-and-forth between an 8-3 Democratic majority and a 6-5 Republican majority, instead of gently oscillating around a midpoint. While maps have been submitted that do create more competitive districts, those tend to do so at the expense of fracturing western Virginia.

5. **Nesting.** As many have pointed out, nesting is not required by the Virginia Code. We allowed ourselves to be guided by it because, unlike the protection of district cores or incumbents, employing a nesting criteria seemingly enhanced the goals of the Redistricting Amendment by reducing our discretion, creating an additional neutral criteria to follow, and ensuring that communities of interest would be respected across maps. We do, however, understand it to be a prudential consideration, and have not followed it religiously in either the initial map drawing phase or in our remap.

6. **Partisan Balance.** We reiterate our approach to partisan balance: We drew the proposed maps without referencing partisanship, except to ensure that our ability-to-elect districts would, in fact, function to elect the minority candidate of choice. At the end of the inquiry, we “unblinded” ourselves to partisanship. We believed this approach best encapsulated the spirit of the independent commission. We agreed beforehand that we would work, if necessary, to ensure that the median district in the state roughly reflected the statewide performance of the parties. We also recognized that while Democrats in recent years have been winning a majority of the statewide vote, as shown in 2021 it is still possible for Republicans to win in the Commonwealth. Thus, a balanced map should give each party a realistic chance to control the congressional delegation and each of the branches of the legislature when that party has a good year, even if the overall partisanship of the Commonwealth makes it substantially easier for Democrats to do so in most years (though the high concentration of Democrats in cities such as Richmond does lead to some “wasting” of Democratic votes). As it turned out, we accomplished this task of creating an unbiased map naturally, using neutral principles, and did not need to adjust the maps we had drawn in a partisan blind fashion.

But this partisan information has now been made widely available and we cannot re-blind ourselves to this information. More importantly, we must also be aware that other parties that are now participating in the redistricting process have access to this information. We are wary of allowing ourselves to be used as cat’s paws by those who might have seen the comment period as an opportunity to guide us toward a partisan gerrymander under the guise of preserving communities of interest or drawing compact districts. To that end, we only implemented changes to the maps if could be done in a way that was neutral as to partisanship, since the maps are already well-balanced (a central concern of the reformers who pushed for the adoption of the Virginia Redistricting Amendment).



7. **Population Equality.** Federal courts do allow mapmakers some discretion when drawing congressional districts, so long as those map-makers can demonstrate that such discretion was exercised in pursuit of legitimate interests. Here, the population deviations in our proposed maps all came about from a desire to avoid splitting precincts, census designated places (“CDPs”), cities, or counties. With that said, it was always our intention to reduce these discrepancies further in the final version of the maps. Block work in pursuit of a minimal deviation is time-consuming work, and it made little sense to engage in this pursuit until the overall shape of the maps is finalized. The final congressional maps have zero population deviation in ten districts, and a single person in the eleventh district.

Briefly, on the Senate of Virginia maps: We noted that the Senate Democrats’ proposed map involved deviations as large as 10,000 residents. This appears to be justified by interpreting the Statutory Criteria’s demand that “a deviation of no more than five percent shall be permitted for state legislative districts” as allowing districts to be drawn with deviations of +/- 5%, for a total maximum deviation of 10%. That is not our understanding of what maximum deviations typically refer to in the redistricting context. We intend to continue to confine ourselves to a maximum deviation of +/- 2.5%, for an overall maximum deviation of 5%.

We also observe that the NAACP memo has called attention to differences between CVAP estimates of African-American proportions (taken from 2019 ACS data) and VAP estimates (taken from the 2020 census). We would simply note that (a) we have examined both VAP and CVAP data, and (b) that the presence of non-citizen Latinos and Asian-Americans in a district can raise the black CVAP share above the black VAP share, making it a useful metric for assessing a district’s actual electorate.

8. **14<sup>th</sup> Amendment and Ability-to-Elect Districts.** Three proposed maps from legally sophisticated entities illustrate the difficulties presented when trying to follow the 14<sup>th</sup> Amendment, Voting Rights Act of 1965 (VRA) and Statutory Criteria’s command to draw



“ability to elect” districts. One group demanded that we lower the BVAPs to avoid “packing.” One map asked that we raise the BVAP without using a “50% +1” threshold for BVAP to avoid “cracking”. The third asked that we raise the BVAP while using a “50% +1” threshold. It is obviously impossible for these various views of the VRA’s commands to coexist.

None of these approaches, however, reflects how we viewed racial considerations. We began with the good government criterion of preserving whole counties and cities to the greatest extent feasible. The racial geography of Virginia then effectively compels the drawing of districts with substantial minority populations when redistricting is done using good government criteria. Only after we had drawn districts that satisfied good government criterion did we examine racial effects. We were pleased that the congressional districts we drew using these neutral criteria allowed for the continuation of two minority ability to elect districts in the U.S. House of Representatives, CD3 and CD4, and enhanced the number of ability to elect districts in the legislature.<sup>1</sup>

One final note is important: Many asked that we retain the district cores Dr. Grofman drew in the *Personhuballah* and *Golden Bethune-Hill* cases, since these had already been approved by a federal court. This misses the overall context that resulted in the drawing of those district lines. Those lines were drawn as part of a remedial plan after a federal court struck down certain of the previously existing districts as racial gerrymanders. In this context, the map drawer was ordered to make only those changes needed to remedy the previous violations. It does not follow that those districts would be appropriate for a map that substantially redraws the lines for the entire Commonwealth.

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<sup>1</sup> We would note that this strategy of placing good government criteria as first priority was accepted by the federal courts in *Personhuballah* and *Golden Bethune-Hill* as an appropriate way to avoid *Shaw v. Reno* issues.

9. **Splitting precincts.** While we sought to avoid the splitting of precincts, equal population concerns often commanded it, particularly for Congress (where zero population deviations are the ideal) and the House of Delegates (where population deviations must be no more than approximately 2,100 people). Additionally, we opted to preserve towns and CDPs over precinct lines, since CDPs more likely reflect communities of interest and cannot be drawn in the future in such a way as to protect incumbents or facilitate partisan concerns.

10. **Optimization.** Finally, we address a catalogue of suggestions that might fall under the umbrella of “optimization” complaints: Maps that purport to perform better than the maps we have drawn on various metrics. While there may be states that insist upon optimization, our review of the statutory criteria lead us to conclude that Virginia does not clearly require optimization, *e.g.*, the Code requires that maps not *unduly* favor one party or the other. Additionally, we emphasize the tension between the criteria. We identified preservation of the Shenandoah region as reflecting an important community of interest worth preserving. Yet that comes at the expense of drawing compact districts, particularly at the congressional level; the resulting district will perform poorly on certain compactness standards (many of which are based upon approximating circular districts). Tradeoffs are simply inevitable.

We drew maps which did not unduly favor either party. These maps came about as part of a partisan and incumbency blind process based on good government map making. We recognize that the map we drew are not optimal; they do not have zero partisan bias, for example. We also recognized that once the maps were made publicly available analyses of their partisan implications were inevitable. Thus, once having released to the public the first draft of the good government proposals that the Court brought forth for public comment, in our revisions to those maps we maintained the basic partisan characteristics of each map in our redrawing



rather than seeking to put our thumb on the scale in a way that would now tilt the map toward either political party.

**UNITED STATES CONGRESS**

**District Changes**

**Districts 8 and 11 (Fairfax and Arlington counties, Alexandria, Fairfax and Falls**

**Church cities:**

Following the advice of several written comments, we have made a number of small changes to our maps here. Both of these districts are heavily Democratic, so we were not concerned with the political implications of these changes.

1. We allowed ourselves to cross the I-495 boundary to keep Tyson's CDP whole.
2. The lines were altered to keep Kingstowne CDP together.
3. The lines were altered to keep Lorton intact.
4. The 8<sup>th</sup> district was extended down to Mason Neck (facilitating 2 and 3 above).
5. A precinct near Annandale was trimmed, at the urging of a submitted comment.

This had the benefit of keeping I-495 as a boundary between the districts.

6. Because of the redrawing of districts 7 and 10 (see below), it no longer made sense to extend the 7<sup>th</sup> into Fairfax County to pick up the 18,000 or so residents who could not be placed in either the 8<sup>th</sup> or 11<sup>th</sup> districts due to equal population considerations. Instead, the 10<sup>th</sup> now crosses over into the Bull Run and Clifton areas.
7. Slight changes were then made to ensure population equality.

**Districts 6 and 9 (Appalachia, Shenandoah Valley)**

We made only minimal changes here. Some commenters expressed dismay that Roanoke County was not kept intact. Doing so would require drawing Cave Spring's substantial population into the 6<sup>th</sup>, which in turn would require significant alterations elsewhere. We did learn, however, that if Craig County were placed into the 9<sup>th</sup> – increasing the number of Virginia's Appalachian counties placed into the 9<sup>th</sup> – that we could add a few additional precincts



in Roanoke County to the 6<sup>th</sup>. We have done so. We also made some slight changes to ensure population equality.

**Districts 2 and 3 (Hampton Roads and Virginia Beach)**

Many of the comments here urged us to either utilize the district cores from the *Bethune-Hill* case, or to pair Norfolk with Virginia Beach. As an initial matter, it was difficult to separate legitimate concerns about compactness or communities of interest from concerns based upon a desire to protect an incumbent or desires to alter the partisan balance of the plan by taking the 5<sup>th</sup> most Republican district in the state and giving it a substantial Democratic lean (see General Criticisms #6 above). We did explore options that would keep northern Norfolk together with Virginia Beach without altering the partisan balance, but that required a larger number of county splits. We simply note that we drew the 3<sup>rd</sup> district first and identified early on that it was possible to keep Norfolk, Newport News, Hampton and Portsmouth together in a single compact district that, when combined with neighboring precincts, would preserve minority groups' ability to elect a candidate of choice. This was our starting point, and we did not see a reason to abandon it this late in the game. We made slight changes to ensure population equality.

**Districts 1, 4, 5, 7, and 10 (North Tidewater, Richmond Area, and outer Northern Virginia)**

This is the one area where we made significant alterations to the map. We heard a substantial number of residents of Louisa County testify that they were unhappy to be placed in a district with the Tidewater area. We received a number of written comments expressing unhappiness with the split in Albemarle County. Finally, we heard from a number of residents of Chesterfield County arguing that they did not wish to be placed in the 5<sup>th</sup> district, but rather wanted to be paired with Henrico County.

The inclusion of Fluvanna, Louisa, and Goochland counties in the tidewater area is indeed not a natural fit. Similarly, northern Albemarle County is not a natural fit with Northern

Virginia. But often population considerations force the combining of counties that are far apart in terms of distance and/or in terms of shared economic and social characteristics or communities of interest.

We decided that if we could find a roughly politically neutral way to address these issues that improved the features of the map otherwise, we would do so. Further analysis of options allowed us to substantially redraw central Virginia without substantially affecting the drawing of most congressional districts. While our solution is imperfect, we believe it improves the map overall. Albemarle County is kept intact and placed wholly within the 5<sup>th</sup> (where it resides today) with the exception of a small sliver needed for population equality purposes. Joining it are Louisa, Fluvanna, and Goochland counties, along with a portion of outer Hanover County. While it is still not a perfect match, it aligns the agricultural portions of their economy more with other piedmont areas, and not with the distinct economy of the tidewater.

Offsetting this, Chesterfield is removed from the 5<sup>th</sup> district, and is paired with Henrico County in the 1st district. The Tidewater area is simply not large enough in population terms to form a congressional district of its own; here we have joined it with a highly populated areas to the west of it in a way that preserves the Richmond, Henrico, Chesterfield area in only two congressional districts, ending the three way split of this area found in our original map.

This forced changes in Northern Virginia. Having lost northern Albemarle County, the 10<sup>th</sup> needed to pick up population. We looked to add northern Prince William County, which kept the I-66 corridor intact. This set off a sequence of shifts until we were left with a compact 10<sup>th</sup> district, with the northern Piedmont counties moved to the 7<sup>th</sup>. Our concern, though, was that the resulting 7<sup>th</sup> district was too Republican, resulting in a map that did not fairly reflect the partisanship of the state. We also felt that it no longer achieved our goal of creating a district largely anchored in Prince William County. We then pushed the 7<sup>th</sup> up almost to the Occoquan River in Prince William County and pushed the 10<sup>th</sup> down to include Rappahannock County (whose officials had expressed



an interest in being paired with Fauquier County) and Culpeper County. This effectively flips the partisanship of the two districts from the initial proposed districts, while preserving the overall partisan balance, while improving compactness and making more sense from a community of interest perspective. Slight changes were then made to ensure population equality.

**Assessment of Congressional Districts Under Statutory Criteria**

**Equal Representation:** We have effectively zeroed out the population deviations.

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**Evaluation of Equal Population Criteria, Virginia Congressional Districts**


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District	Population	Deviation	Pct. Deviation
1	784,672	0	0.00%
2	784,672	0	0.00%
3	784,672	0	0.00%
4	784,672	0	0.00%
5	784,672	0	0.00%
6	784,672	0	0.00%
7	784,672	0	0.00%
8	784,672	0	0.00%
9	784,672	0	0.00%
10	784,672	0	0.00%
11	784,673	1	0.00%

**Equal Protection and Ability-to-Elect Districts:** The following table provides racial breakdowns for the draft Congressional Districts. Districts three and four are minority-majority districts, and Black voters represent 42.14% and 45.37% of the voting age populations, respectively. We believe this is sufficient to elect a Black candidate of choice in both districts. These minority proportions are very similar to those drawn by the federal court in *Personhuballah v. Alcorn*, No. 3:13cv678 (E.D. Va.). We also note that we now report voting age population, rather than citizen voting age population, following numerous comments to the draft maps.

### Evaluation of Racial Criteria, Virginia Congressional Districts

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
1	73.06%	26.94%	4.45%	14.17%	6.34%	1.84%	0.17%
2	61.29%	38.71%	6.29%	23.95%	6.94%	2.16%	0.37%
3	41.96%	58.04%	7.37%	45.37%	4.42%	2.37%	0.41%
4	45.18%	54.82%	8.26%	42.14%	3.35%	1.95%	0.19%
5	69.99%	30.01%	3.56%	21.73%	2.96%	1.69%	0.11%
6	80.88%	19.12%	6.38%	8.66%	2.14%	1.96%	0.12%
7	54.15%	45.85%	15.32%	22.44%	6.66%	2.56%	0.30%
8	52.17%	47.83%	18.41%	13.99%	14.51%	1.94%	0.23%
9	86.97%	13.03%	2.46%	6.41%	2.16%	1.74%	0.09%
10	55.83%	44.17%	16.04%	9.90%	16.93%	1.88%	0.21%
11	51.25%	48.75%	12.84%	9.45%	25.41%	1.43%	0.22%

**Contiguity:** The districts are all contiguous under both standards for contiguity (described above).

**Compactness:** Below are the Reock and Polsby-Popper scores for the districts. These are two commonly used measures of spatial compactness. To simplify greatly, Reock scores measure how “stretched” a district is, while Polsby-Popper scores measure how “dimpled” the district is. Under both metrics, higher scores are better.

Districts 2, 6, and 9 score relatively poorly using Reock scores. This is to be expected, given the geographic constraints placed upon them. All of the districts perform well under the Polsby-Popper metric.



However, since we are drawing a whole map for the state, the most important compactness comparison is for the state as whole. Dave's Redistricting App provides a composite compactness score for a whole map. The Special Masters' ("SMs") congressional map is more compact than the current congressional map, a value of 46 for the SMs map as compared to a value of only 25 for the current map. In other words, we have nearly doubled the degree to which the congressional map is a compact one.

### Evaluation of Compactness Criteria, Virginia Congressional Districts

District	Reock	Polsby-Popper
1	0.4084	0.2031
2	0.2214	0.2008
3	0.4233	0.3305
4	0.4923	0.2941
5	0.4595	0.3545
6	0.2319	0.2060
7	0.3158	0.2078
8	0.3979	0.3144
9	0.1696	0.1769
10	0.4843	0.2854
11	0.5384	0.2697

**Partisanship:** A summary of the average Democratic performance in Virginia statewide races from 2016 to 2020 is provided below. The results are sorted by Democratic vote share. Over this time, the average Democratic performance was 54.01% to the Republicans' 44%. The median district, district 7, went for Democrats by, on average, a seven-point margin, making it a

little more than a point more Republican than the Commonwealth overall. In a very good Republican year, Republicans could win a majority of the seats in Virginia's delegation. Generally, however, we would expect to see a 6-5 Democratic edge in Virginia's delegation. In very good Democratic years, Democrats might perhaps achieve the same 7-4 advantage that they now enjoy from having won two highly competitive seats in 2020. Overall, this map is well-balanced, does not unduly favor any party, and does not require further adjustment. We also provide, for further context, the 2020 presidential election results.

### 2016-2020 Composite Election Results, Virginia Congressional Districts

Average Dem Performance = 54.01%

District	Democratic	Republican
8	75.6%	22.0%
3	68.3%	29.7%
11	67.8%	29.9%
4	66.8%	31.6%
10	56.2%	41.7%
7	52.3%	45.7%
2	49.6%	48.4%
5	45.2%	53.0%
1	44.8%	53.2%
6	38.6%	59.4%
9	30.7%	67.7%

## 2020 Presidential Results, Virginia Congressional Districts

Average Dem Performance = 54.11%

District	Democratic	Republican
8	76.7%	21.1%
11	69.5%	28.4%
3	68.1%	29.9%
4	67.1%	31.3%
10	58.0%	40.0%
7	52.4%	45.7%
2	49.9%	48.1%
1	45.7%	52.4%
5	45.0%	53.2%
6	38.0%	60.1%
9	28.3%	70.2%



### SENATE OF VIRGINIA

We made a number of slight changes to the Senate of Virginia map, some of which were significant, particularly in Northern Virginia. We also examined a number of suggestions that we were not able to accommodate. While we cannot list all of these suggestions, nor can we list every reason for accepting or rejecting a suggestion, the major reasons follow.

Outside of Northern Virginia, our changes were minimal:

- Many people asked to keep Augusta County intact. We could not make this work with equal population concerns.
- The Roanoke Valley/New River Valley areas were perhaps the most vexing areas to assess, especially since we received so many contradictory claims regarding what areas should be included in which districts and where exactly the COIs lay. Had we started in this area we might have drawn different districts, but we ultimately decided we could not enact major changes here. The Roanoke suburb of Vinton was placed with Roanoke to accommodate a request that appeared to be sensible given transportation lines and population patterns. We also kept Glenvar whole.
- We allowed an additional county split to keep the city of Scottsville intact for both the House of Delegates and Senate.
- The precinct lines in Louisa County create an odd-shaped appendage and split the community surrounding the county seat. To eliminate this feature, we split a precinct and utilized the South Anna River as a boundary between districts.
- We utilized Forest Hill Avenue as a more consistent boundary between the 14<sup>th</sup> and 15<sup>th</sup> districts near Westover Hills.

- The boundaries between the 25<sup>th</sup> and 26<sup>th</sup> districts were altered to improve compactness and to accommodate a reasonable request to keep the Northern Neck intact.
- Per a comment, Shell and Wesleyan Chase in Virginia Beach are kept together as a part of a COI.
- We were unable to use Garrisonville Rd. as a boundary in Stafford County, as requested by Supervisor Crystal Vanuch, due to equal population concerns. We did, however, strive to use it as a boundary in the House of Delegates map. We also received multiple requests to keep the Battlefield District south of Fredericksburg intact. Doing so would negatively affect the compactness of the districts and make changes to the partisanship of a swing district (see General Criticisms #6 above).

We made more significant changes in Northern Virginia. In particular, we paid less attention to precinct lines, and more attention to CDP lines:

- We received a number of complaints regarding placing Falls Church in a district with Arlington. We ultimately decided that these complaints were well-founded. Addressing these complaints also allowed us to create a senate district entirely within Arlington County. This, however, set off a chain reaction of map shifts that we accepted since they allowed us to also correct some splits of CDPs.
- Bailey's Crossroads and Seven Corners were made intact and placed with Alexandria in the 39<sup>th</sup>. The 39<sup>th</sup> is now also paired with the Crystal City area as a more natural division of the districts between Arlington and Alexandria.
- The precincts from Difficult Run CDP were moved into the 37<sup>th</sup>, along with Falls Church.
- Fair Oaks was moved in its entirety to the 36<sup>th</sup>.

- Kings Park West was kept intact in the 35<sup>th</sup>. While we believe the George Mason CDP made more sense in the 37<sup>th</sup>, we moved it to the 35<sup>th</sup> for population equality purposes. Springfield and West Springfield were placed in the 35<sup>th</sup> due to changes made to the surrounding districts.
- Following the advice of numerous online requesters, the 34<sup>th</sup> district was extended south to Mason Neck; we also placed Lorton and Laurel Hill in this district.
- Burke Center was placed in the 33<sup>rd</sup>. Burke is now split at Burke Station Park.
- While we liked the idea suggested in one of the online comments to place Nokesville in with the 30<sup>th</sup> district, the swaps required between the 30<sup>th</sup> and 29<sup>th</sup> would result in a substantial change in the partisanship in a swing district. The change was therefore rejected (see General Criticisms #6 above).
- We made some minor changes to better follow CDP lines in Loudoun County. While we wanted to accommodate requests to increase the Asian population in district 32 by taking in some population in Fairfax County, doing so would require an additional county split and would still not likely result in an ability to elect district. We do believe that we have drawn a reasonable ability to elect district in the area in the House of Delegates, however.



**Assessment of Senate Districts Under Statutory Criteria**

**Equal Representation:** The ideal population size for a senate district in Virginia is 215,785. The largest positive deviation from the ideal population comes in district 32, which is overpopulated by 5,000 residents. The largest negative deviation from the ideal population comes in district 29, which is underpopulated by 5,118 residents. All absolute percentage deviations are under 2.5%, as required by Virginia law.

## Evaluation of Equal Population Criteria, Virginia Senate Districts, 1-20

District	Population	Deviation	Pct. Deviation
1	219,464	3,679	1.70%
2	213,860	-1,925	-0.90%
3	213,402	-2,383	-1.10%
4	220,600	4,815	2.20%
5	219,146	3,361	1.60%
6	213,557	-2,228	-1.00%
7	217,620	1,835	0.90%
8	214,868	-917	-0.40%
9	214,702	-1,083	-0.50%
10	214,277	-1,508	-0.70%
11	214,453	-1,332	-0.60%
12	219,101	3,316	1.50%
13	213,623	-2,162	-1.00%
14	219,881	4,096	1.90%
15	219,647	3,862	1.80%
16	218,175	2,390	1.10%
17	216,724	939	0.40%
18	213,095	-2,690	-1.20%
19	212,136	-3,649	-1.70%
20	217,760	1,975	0.90%

## Evaluation of Equal Population Criteria, Virginia Senate Districts, 21-40

District	Population	Deviation	Pct. Deviation
21	214,208	-1,577	-0.70%
22	214,017	-1,768	-0.80%
23	215,570	-215	-0.10%
24	211,657	-4,128	-1.90%
25	211,418	-4,367	-2.00%
26	217,507	1,722	0.80%
27	213,276	-2,509	-1.20%
28	211,795	-3,990	-1.80%
29	210,667	-5,118	-2.40%
30	215,164	-621	-0.30%
31	220,298	4,513	2.10%
32	220,785	5,000	2.30%
33	218,140	2,355	1.10%
34	216,619	834	0.40%
35	220,336	4,551	2.10%
36	212,521	-3,264	-1.50%
37	213,326	-2,459	-1.10%
38	215,783	-2	0.00%
39	220,720	4,935	2.30%
40	211,495	-4,290	-2.00%

**Equal Protection and Ability-to-Elect Districts:** The following table provides racial breakdowns for the draft senate districts. As above, we now report the BVAP populations, to



better align our numbers with numbers being used by other groups. We note, however, that the actual electorate would probably be slightly more heavily African-American due to higher rates of non-citizenship among Hispanic and Asian-American populations.

## Evaluation of Racial Criteria, Virginia Senate Districts, 1-20

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
1	81.85%	18.15%	8.27%	5.41%	2.12%	2.23%	0.12%
2	83.08%	16.92%	8.40%	4.98%	2.25%	1.63%	0.13%
3	86.43%	13.57%	2.81%	6.93%	1.66%	1.91%	0.13%
4	74.24%	25.76%	4.74%	15.75%	3.19%	2.04%	0.11%
5	85.60%	14.40%	2.65%	4.84%	4.88%	1.68%	0.09%
6	93.13%	6.87%	1.21%	3.15%	0.54%	1.70%	0.09%
7	82.33%	17.67%	3.52%	11.71%	0.64%	1.70%	0.10%
8	76.42%	23.58%	3.06%	16.40%	1.97%	1.88%	0.11%
9	60.87%	39.13%	2.61%	34.53%	0.77%	1.45%	0.07%
10	75.07%	24.93%	2.98%	18.57%	1.32%	1.87%	0.12%
11	72.60%	27.40%	5.31%	13.07%	7.21%	1.70%	0.12%
12	71.90%	28.10%	4.97%	16.68%	4.84%	1.73%	0.14%
13	41.15%	58.85%	5.11%	50.60%	1.65%	2.20%	0.23%
14	49.39%	50.61%	4.88%	40.40%	4.50%	1.57%	0.15%
15	39.31%	60.69%	16.95%	39.39%	3.51%	2.25%	0.17%
16	62.55%	37.45%	6.43%	15.34%	14.05%	1.38%	0.13%
17	51.50%	48.50%	3.04%	42.21%	1.86%	1.91%	0.19%
18	44.27%	55.73%	5.69%	45.27%	3.44%	2.41%	0.32%
19	68.58%	31.42%	6.22%	16.67%	6.69%	2.18%	0.41%
20	69.87%	30.13%	7.03%	16.67%	4.64%	2.16%	0.37%

## Evaluation of Racial Criteria, Virginia Senate Districts, 21-40

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
21	41.19%	58.81%	8.80%	43.89%	5.44%	2.28%	0.48%
22	49.61%	50.39%	8.26%	28.30%	12.91%	2.28%	0.50%
23	37.60%	62.40%	6.54%	51.24%	3.90%	2.43%	0.38%
24	56.37%	43.63%	7.66%	28.88%	5.94%	2.18%	0.44%
25	67.19%	32.81%	5.35%	23.03%	2.21%	2.48%	0.19%
26	81.18%	18.82%	3.30%	10.37%	2.76%	2.14%	0.18%
27	60.77%	39.23%	11.61%	20.57%	5.19%	2.71%	0.31%
28	76.79%	23.21%	7.48%	11.26%	2.15%	2.32%	0.18%
29	41.80%	58.20%	22.37%	24.34%	10.59%	2.64%	0.36%
30	45.71%	54.29%	26.53%	13.63%	13.20%	2.36%	0.21%
31	66.55%	33.45%	12.25%	7.56%	12.02%	1.65%	0.21%
32	44.35%	55.65%	13.53%	9.49%	31.79%	1.43%	0.21%
33	42.56%	57.44%	20.17%	21.96%	14.86%	1.99%	0.33%
34	46.12%	53.88%	18.88%	20.77%	13.49%	2.01%	0.35%
35	44.60%	55.40%	20.16%	10.18%	24.10%	1.79%	0.19%
36	48.89%	51.11%	11.19%	7.95%	31.00%	1.29%	0.20%
37	53.04%	46.96%	14.65%	5.99%	25.09%	1.47%	0.20%
38	57.21%	42.79%	11.99%	7.86%	21.68%	1.33%	0.19%
39	49.58%	50.42%	18.41%	19.50%	11.80%	2.20%	0.24%
40	61.22%	38.78%	14.82%	9.87%	13.03%	1.74%	0.20%

**Contiguity:** The districts are all contiguous.



**Compactness:** Below are the Reock and Polsby-Popper scores for the districts. These are two commonly used measures of spatial compactness. To simplify greatly, Reock scores measure how “stretched” a district is, while Polsby-Popper scores measure how “dimpled” the district is. Under both metrics, higher scores are better.

## Evaluation of Compactness Criteria, Draft Virginia Senate Districts 1-20

District	Reock	Polsby-Popper
1	0.3745	0.4002
2	0.2564	0.2493
3	0.2540	0.2264
4	0.3342	0.2264
5	0.3402	0.2451
6	0.2509	0.2898
7	0.2332	0.2985
8	0.4159	0.3181
9	0.3268	0.3734
10	0.3604	0.2151
11	0.2845	0.2724
12	0.3853	0.3010
13	0.5010	0.2871
14	0.3220	0.2294
15	0.3081	0.1676
16	0.4649	0.2839
17	0.2757	0.2549
18	0.4424	0.4223
19	0.3812	0.4630
20	0.3215	0.4040

## Evaluation of Compactness Criteria, Draft Virginia Senate Districts 21-40

District	Reock	Polsby-Popper
21	0.3860	0.3615
22	0.5711	0.4223
23	0.3648	0.3497
24	0.3029	0.2435
25	0.3346	0.2931
26	0.1924	0.1326
27	0.5667	0.3387
28	0.4889	0.3274
29	0.3377	0.2161
30	0.4421	0.3111
31	0.4003	0.2657
32	0.4404	0.4185
33	0.4891	0.2570
34	0.4524	0.4216
35	0.3872	0.3004
36	0.5244	0.3276
37	0.3019	0.2897
38	0.3123	0.3527
39	0.3467	0.2428
40	0.4605	0.5049

However, since we are drawing a whole map for the state, the most important compactness comparison is for the state as whole. Dave's Redistricting App provides a



composite compactness score for a whole map. The Special Masters' ("SMs") Senate map is more compact than the current Senate map, a value of 46 for the SMs map as compared to a value of 9 for the current Senate map. In other words, we have effectively more than quintupled the degree to which the senate map is a compact one.

**Partisanship:** Because state races occur in the off-years, which can have very different turnout patterns from presidential and midterm election years, we determined that it was important not to use elections from presidential or midterm elections to evaluate partisanship. In the draft maps, we used the Attorney General's race as our benchmark. The median districts, districts 31 and 17, gave the Democratic Attorney General candidate 54.3% and 53.2% of the vote, respectively. Under these proposed maps, those districts give the Democratic Attorney General candidate 54.2% and 53.2% of the vote, respectively, which reflect nominal changes and still suggests a marginal Democratic advantage to the map. We also provide data on the Lieutenant Governor's race from 2017 to give a better view of how the districts perform with an African-American candidate. Overall, this map is well-balanced, does not unduly favor any party, and does not require further adjustment.

## 2017 Attorney General Election Results, Virginia Senate Districts, Part 1

Average Dem Performance = 53.33%

District	Democratic	Republican
40	79.8%	20.1%
14	79.5%	20.4%
39	77.8%	22.1%
21	74.8%	25.1%
23	71.0%	28.9%
37	70.1%	29.8%
34	69.3%	30.6%
35	68.4%	31.5%
38	67.8%	32.1%
18	65.0%	34.9%
33	64.7%	35.2%
32	63.9%	36.0%
36	62.9%	37.0%
15	62.3%	37.6%
11	62.2%	37.7%
13	62.0%	37.9%
29	59.5%	40.3%
22	57.4%	42.6%
30	54.9%	45.0%
31	54.2%	45.7%

## 2017 Attorney General Election Results, Virginia Senate Districts, Part 2

Average Dem Performance = 53.33%

District	Democratic	Republican
17	53.2%	46.8%
16	52.3%	47.6%
24	51.6%	48.2%
4	47.9%	52.0%
27	47.6%	52.2%
20	46.1%	53.8%
12	43.1%	56.8%
19	42.1%	57.8%
25	42.0%	57.9%
9	39.6%	60.3%
26	37.2%	62.7%
28	37.1%	62.8%
1	36.4%	63.5%
5	36.3%	63.6%
10	36.0%	63.9%
3	35.8%	64.1%
2	33.2%	66.7%
8	31.8%	68.1%
7	30.6%	69.3%
6	23.3%	76.6%



## 2017 Lt. Gov. Election Results, Virginia Senate Districts, Part 1

Average Dem Performance = 52.7%

District	Democratic	Republican
14	79.7%	20.2%
40	79.5%	20.4%
39	77.7%	22.2%
21	73.7%	26.1%
23	70.8%	29.0%
37	70.2%	29.7%
34	69.4%	30.5%
35	68.6%	31.3%
38	67.6%	32.3%
33	64.8%	35.1%
18	64.0%	35.9%
32	63.1%	36.9%
36	63.0%	36.9%
15	62.4%	37.5%
13	61.8%	38.1%
11	61.6%	38.3%
29	59.7%	40.2%
22	56.4%	43.5%
30	54.6%	45.2%
17	52.3%	47.7%

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## 2017 Lt. Gov. Election Results, Virginia Senate Districts, Part 2

Average Dem Performance = 52.7%

District	Democratic	Republican
16	52.2%	47.6%
31	52.0%	47.9%
24	51.2%	48.7%
27	47.3%	52.6%
4	45.9%	54.0%
20	44.3%	55.7%
12	43.3%	56.6%
25	41.3%	58.6%
19	41.2%	58.7%
9	38.9%	61.1%
26	37.0%	63.0%
28	36.0%	63.8%
10	35.5%	64.4%
5	34.8%	65.1%
3	34.2%	65.7%
1	33.8%	66.1%
2	32.7%	67.2%
8	30.0%	69.9%
7	29.2%	70.7%
6	24.4%	75.5%

**VIRGINIA HOUSE OF DELEGATES**

Because there are so many districts, we will not endeavor to describe each one. The basic underlying changes that we made were:

- As with the state Senate, we decided to place Falls Church with Fairfax County, which set off a cascade of changes throughout the area. We tried to keep the three Arlington districts situated in North, South and East Arlington. We likewise attempted to realign the districts along U.S. 1 on north-south axes, pursuant to multiple public comments. We tried to avoid the split of Centreville but were unable to do so given population concerns. Beyond this, the Fairfax districts were realigned to better reflect the underlying CDPs.
- We realigned the precincts in the Occoquan Basin to make them more compact and to better reflect CDPs. We also took some suggestions from the comments on how best to split places like Dale City.
- In Loudoun County, we worked to better follow CDP lines, and to make districts more compact.
- Pursuant to a comment from local officials, we altered the lines in southern Frederick County to reflect new precincts. We considered altering the lines in north-central Frederick County, but the change created a jagged peninsula that we would not have otherwise drawn.
- We examined different configurations for the 34<sup>th</sup> district to make it more compact and centered around Harrisonburg, but the changes made the 35<sup>th</sup> district unacceptably non-compact.
- We once again examined changes in the Roanoke area and New River Valley. We once again found ourselves in a situation where multiple commenters had conflicting



definitions of the communities of interest, where the equal population criteria imposed limitations on what we could accomplish, and where most of the proposed changes had significant political consequences on the districts. We ultimately did not change the districts.

- We attempted to place the Hurt precinct in Pittsylvania County with the rest of that county, per a comment, but could not do so without substantially reconfiguring the map due to population equality concerns.
- We made a few minor changes in the Charlottesville area to place certain suburbs of Charlottesville in the Charlottesville district, per comments.
- As with the Senate districts, the district line within Louisa County was moved to the South Anna River.
- The district line between the 57<sup>th</sup> and 59<sup>th</sup> districts was slightly altered to keep a subdivision intact, per a comment.
- We attempted to keep Culpeper County intact, per a comment, but ultimately could not do so without substantially reconfiguring the map.
- We examined ways to address those who wanted Williamsburg in a Hampton Roads-based district, as well as those who complained about the inclusion of a portion of Gloucester County in that district for equal population purposes, but ultimately could not find a satisfactory solution to the problem, given the second- and third-order “ripple” effects.
- We shifted the boundary between district 64 and district 23 to Garrisonville Rd., per a comment.
- We made some minor changes in the Virginia Beach area districts, per comments.

**Statutory Criteria**

**Equal Representation:** The ideal population size for a House of Delegates district in Virginia is 86,314. The largest positive deviation from the ideal population comes in district 75, which is overpopulated by 2,149 residents. The largest negative deviation from the ideal population comes in district 27, which is underpopulated by 2,101 residents. All absolute percentage deviations are under 2.5%, as required by Virginia law.

## Evaluation of Equal Population Criteria, Virginia House Districts, 1-25

District	Population	Deviation	Pct. Deviation
1	85,070	-1,244	-1.40%
2	84,583	-1,731	-2.00%
3	86,111	-203	-0.20%
4	88,352	2,038	2.40%
5	88,099	1,785	2.10%
6	84,634	-1,680	-1.90%
7	85,669	-645	-0.70%
8	87,350	1,036	1.20%
9	86,572	258	0.30%
10	85,775	-539	-0.60%
11	88,267	1,953	2.30%
12	87,110	796	0.90%
13	84,507	-1,807	-2.10%
14	85,276	-1,038	-1.20%
15	88,404	2,090	2.40%
16	86,719	405	0.50%
17	84,241	-2,073	-2.40%
18	87,676	1,362	1.60%
19	87,408	1,094	1.30%
20	85,357	-957	-1.10%
21	85,907	-407	-0.50%
22	84,821	-1,493	-1.70%
23	86,276	-38	0.00%
24	85,355	-959	-1.10%
25	86,403	89	0.10%

## Evaluation of Equal Population Criteria, Virginia House Districts, 25-50

District	Population	Deviation	Pet. Deviation
26	85,307	-1,007	-1.20%
27	84,213	-2,101	-2.40%
28	87,454	1,140	1.30%
29	87,418	1,104	1.30%
30	87,404	1,090	1.30%
31	87,248	934	1.10%
32	85,153	-1,161	-1.30%
33	87,217	903	1.00%
34	86,651	337	0.40%
35	87,055	741	0.90%
36	86,397	83	0.10%
37	87,329	1,015	1.20%
38	87,965	1,651	1.90%
39	84,495	-1,819	-2.10%
40	86,918	604	0.70%
41	87,677	1,363	1.60%
42	84,571	-1,743	-2.00%
43	86,222	-92	-0.10%
44	87,779	1,465	1.70%
45	85,313	-1,001	-1.20%
46	85,468	-846	-1.00%
47	85,048	-1,266	-1.50%
48	86,018	-296	-0.30%
49	84,673	-1,641	-1.90%
50	84,359	-1,955	-2.30%



## Evaluation of Equal Population Criteria, Virginia House Districts, 51-75

District	Population	Deviation	Pct. Deviation
51	85,784	-530	-0.60%
52	87,218	904	1.00%
53	86,080	-234	-0.30%
54	88,233	1,919	2.20%
55	85,332	-982	-1.10%
56	86,824	510	0.60%
57	87,140	826	1.00%
58	84,577	-1,737	-2.00%
59	86,095	-219	-0.30%
60	85,394	-920	-1.10%
61	84,921	-1,393	-1.60%
62	87,359	1,045	1.20%
63	84,966	-1,348	-1.60%
64	84,809	-1,505	-1.70%
65	87,139	825	1.00%
66	85,065	-1,249	-1.40%
67	85,966	-348	-0.40%
68	85,450	-864	-1.00%
69	87,386	1,072	1.20%
70	88,236	1,922	2.20%
71	84,328	-1,986	-2.30%
72	88,033	1,719	2.00%
73	87,751	1,437	1.70%
74	88,305	1,991	2.30%
75	88,463	2,149	2.50%

## Evaluation of Equal Population Criteria, Virginia House Districts, 76-100

District	Population	Deviation	Pct. Deviation
76	85,270	-1,044	-1.20%
77	87,759	1,445	1.70%
78	87,774	1,460	1.70%
79	87,800	1,486	1.70%
80	85,693	-621	-0.70%
81	84,718	-1,596	-1.80%
82	86,012	-302	-0.30%
83	86,459	145	0.20%
84	87,624	1,310	1.50%
85	87,829	1,515	1.80%
86	85,949	-365	-0.40%
87	87,516	1,202	1.40%
88	86,371	57	0.10%
89	86,704	390	0.50%
90	87,890	1,576	1.80%
91	87,076	762	0.90%
92	86,158	-156	-0.20%
93	85,906	-408	-0.50%
94	84,653	-1,661	-1.90%
95	85,171	-1,143	-1.30%
96	85,578	-736	-0.90%
97	86,997	683	0.80%
98	86,690	376	0.40%
99	84,766	-1,548	-1.80%
100	84,882	-1,432	-1.70%

**Equal Protection and Ability-to-Elect Districts:** The following table provides racial breakdowns for the draft House districts. Once again, we use Voting Age Population, rather than Citizen Voting Age Population, to better align the data with those being used by outside groups.

## Evaluation of Racial Criteria, Virginia House Districts, 1-25

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
1	71.51%	28.49%	10.25%	5.42%	11.44%	1.35%	0.16%
2	62.28%	37.72%	10.59%	9.35%	16.63%	1.50%	0.22%
3	50.29%	49.71%	21.69%	15.61%	11.80%	2.31%	0.27%
4	32.02%	67.98%	27.17%	26.61%	14.07%	2.68%	0.20%
5	59.96%	40.04%	14.02%	16.96%	7.90%	2.04%	0.24%
6	68.32%	31.68%	5.10%	2.72%	22.20%	0.82%	0.16%
7	64.84%	35.16%	10.73%	8.66%	14.43%	1.43%	0.21%
8	40.79%	59.21%	16.69%	10.21%	31.57%	1.55%	0.17%
9	45.45%	54.55%	13.64%	8.55%	31.43%	1.39%	0.19%
10	51.95%	48.05%	10.99%	6.87%	29.06%	1.36%	0.24%
11	50.88%	49.12%	12.86%	9.75%	25.28%	1.42%	0.21%
12	53.65%	46.35%	10.16%	6.24%	28.73%	1.10%	0.23%
13	49.82%	50.18%	21.62%	6.02%	21.38%	1.90%	0.18%
14	39.14%	60.86%	23.39%	12.01%	24.69%	1.94%	0.18%
15	59.14%	40.86%	11.68%	7.22%	20.77%	1.41%	0.21%
16	47.43%	52.57%	23.83%	19.37%	8.48%	2.12%	0.30%
17	48.64%	51.36%	16.28%	18.33%	15.93%	1.91%	0.32%
18	43.59%	56.41%	18.56%	12.25%	24.90%	1.73%	0.30%
19	28.72%	71.28%	29.69%	28.44%	13.17%	2.50%	0.40%
20	35.61%	64.39%	39.65%	13.68%	10.30%	2.88%	0.18%
21	50.95%	49.05%	20.19%	13.54%	14.25%	2.19%	0.22%
22	60.62%	39.38%	12.74%	11.91%	13.16%	2.10%	0.20%
23	29.69%	70.31%	20.75%	38.86%	10.46%	2.60%	0.49%
24	35.88%	64.12%	25.29%	26.70%	11.60%	2.47%	0.34%
25	42.23%	57.77%	21.81%	22.62%	12.79%	2.29%	0.33%



## Evaluation of Racial Criteria, Virginia House Districts, 26-50

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
26	36.97%	63.03%	7.42%	10.31%	44.72%	1.10%	0.20%
27	44.74%	55.26%	24.26%	8.47%	21.56%	1.80%	0.22%
28	57.12%	42.88%	11.55%	9.20%	20.96%	1.44%	0.20%
29	59.56%	40.44%	14.52%	9.46%	15.34%	1.45%	0.21%
30	75.10%	24.90%	7.16%	5.50%	10.09%	1.85%	0.23%
31	82.96%	17.04%	6.64%	5.44%	2.31%	2.32%	0.13%
32	77.70%	22.30%	10.97%	6.83%	2.46%	2.16%	0.13%
33	89.49%	10.51%	4.96%	2.48%	1.02%	1.93%	0.07%
34	73.97%	26.03%	14.39%	6.74%	4.16%	1.60%	0.16%
35	88.00%	12.00%	4.81%	4.55%	0.99%	1.67%	0.12%
36	83.74%	16.26%	3.74%	8.80%	1.36%	2.05%	0.12%
37	90.26%	9.74%	1.82%	4.53%	1.22%	1.87%	0.14%
38	57.45%	42.55%	7.36%	30.36%	2.95%	2.29%	0.09%
39	86.93%	13.07%	2.49%	7.20%	1.27%	1.86%	0.11%
40	82.10%	17.90%	3.60%	8.60%	3.88%	1.71%	0.12%
41	79.04%	20.96%	3.97%	4.05%	11.33%	1.36%	0.10%
42	85.89%	14.11%	2.83%	6.98%	1.84%	1.97%	0.10%
43	94.35%	5.65%	0.87%	2.54%	0.49%	1.46%	0.10%
44	93.18%	6.82%	1.36%	2.58%	0.72%	1.93%	0.08%
45	91.74%	8.26%	1.35%	4.32%	0.47%	1.76%	0.09%
46	91.49%	8.51%	1.69%	4.11%	0.58%	1.86%	0.05%
47	89.12%	10.88%	3.57%	4.80%	0.52%	1.76%	0.12%
48	66.13%	33.87%	3.95%	27.92%	0.77%	1.39%	0.09%
49	55.12%	44.88%	2.96%	39.79%	1.04%	1.45%	0.07%
50	58.70%	41.30%	2.92%	36.32%	0.76%	1.47%	0.10%

## Evaluation of Racial Criteria, Virginia House Districts, 51-75

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
51	83.13%	16.87%	2.01%	11.50%	1.11%	1.95%	0.06%
52	65.52%	34.48%	4.42%	25.30%	2.82%	1.81%	0.16%
53	80.79%	19.21%	2.39%	12.96%	1.35%	2.24%	0.09%
54	62.69%	37.31%	7.65%	15.36%	13.10%	1.37%	0.12%
55	81.93%	18.07%	4.09%	8.14%	3.84%	1.59%	0.13%
56	72.14%	27.86%	2.49%	22.55%	0.99%	1.69%	0.13%
57	64.61%	35.39%	4.26%	9.82%	19.71%	1.10%	0.07%
58	70.61%	29.39%	6.52%	11.00%	10.12%	1.30%	0.12%
59	74.63%	25.37%	3.54%	15.99%	3.57%	2.10%	0.13%
60	83.22%	16.78%	2.45%	9.30%	2.59%	2.01%	0.13%
61	79.62%	20.38%	7.63%	8.07%	2.35%	2.25%	0.20%
62	73.87%	26.13%	8.44%	13.58%	2.07%	2.17%	0.18%
63	72.16%	27.84%	8.33%	14.07%	3.05%	2.57%	0.18%
64	59.05%	40.95%	12.33%	21.35%	5.77%	2.71%	0.40%
65	63.08%	36.92%	10.16%	19.64%	4.90%	2.82%	0.27%
66	61.77%	38.23%	8.49%	24.20%	3.62%	2.56%	0.23%
67	69.59%	30.41%	4.19%	22.33%	1.58%	2.30%	0.22%
68	77.84%	22.16%	2.37%	15.81%	1.15%	2.77%	0.13%
69	70.15%	29.85%	6.54%	16.71%	4.92%	2.14%	0.37%
70	45.23%	54.77%	9.04%	39.58%	5.66%	2.22%	0.45%
71	70.59%	29.41%	4.79%	18.91%	3.77%	1.99%	0.25%
72	75.84%	24.16%	3.14%	16.52%	2.62%	1.74%	0.12%
73	77.38%	22.62%	4.23%	10.67%	6.09%	1.50%	0.13%
74	62.35%	37.65%	5.28%	27.68%	3.10%	2.14%	0.23%
75	50.76%	49.24%	9.72%	34.38%	3.92%	2.08%	0.29%

## Evaluation of Racial Criteria, Virginia House Districts, 76-100

District	Non-Hispanic White	Total Minority	Hispanic	Black	Asian	Native	API
76	43.60%	56.40%	15.30%	36.20%	3.91%	2.17%	0.15%
77	37.15%	62.85%	17.49%	41.74%	2.87%	2.13%	0.13%
78	71.44%	28.56%	5.07%	15.79%	6.67%	1.14%	0.15%
79	28.80%	71.20%	6.69%	60.99%	3.02%	1.94%	0.17%
80	36.70%	63.30%	7.61%	49.42%	5.32%	1.90%	0.15%
81	38.81%	61.19%	7.50%	50.08%	1.62%	2.79%	0.14%
82	45.77%	54.23%	3.95%	47.62%	1.36%	1.98%	0.20%
83	52.87%	47.13%	2.27%	42.57%	0.95%	1.64%	0.19%
84	49.30%	50.70%	3.59%	43.24%	2.61%	1.87%	0.19%
85	38.68%	61.32%	8.52%	48.09%	4.01%	2.41%	0.36%
86	61.47%	38.53%	5.26%	25.62%	5.88%	2.57%	0.41%
87	30.24%	69.76%	5.32%	60.39%	3.74%	2.15%	0.42%
88	40.56%	59.44%	4.01%	51.87%	2.27%	2.30%	0.33%
89	59.00%	41.00%	4.24%	30.69%	4.25%	2.34%	0.32%
90	70.96%	29.04%	4.59%	16.78%	5.75%	2.10%	0.30%
91	38.68%	61.32%	7.63%	48.64%	3.96%	2.50%	0.33%
92	38.00%	62.00%	5.07%	52.07%	4.23%	1.89%	0.30%
93	36.87%	63.13%	7.95%	49.16%	5.27%	2.31%	0.39%
94	55.65%	44.35%	12.77%	24.35%	5.80%	3.00%	0.74%
95	46.58%	53.42%	8.94%	34.73%	9.08%	2.32%	0.45%
96	45.61%	54.39%	8.23%	27.48%	17.96%	2.22%	0.54%
97	58.53%	41.47%	8.06%	22.50%	9.42%	2.54%	0.52%
98	72.22%	27.78%	6.84%	11.64%	7.42%	2.09%	0.45%
99	77.10%	22.90%	6.17%	10.52%	4.40%	1.91%	0.40%
100	66.76%	33.24%	7.26%	20.29%	4.08%	1.96%	0.22%



**Contiguity:** The districts are all contiguous under the census standard for contiguity (described above). To our knowledge, they are contiguous under functional contiguity as well.

**Compactness:** Below are the Reock and Polsby-Popper scores for the districts. Only a handful of districts perform poorly under the Reock metric, while all perform well under the Polsby-Popper metric. Looking at the map as a whole using the metric in Dave's Redistricting App the Special Masters' ("SMs") House map is more compact than the current House map, a value of 51 for the SMs map as compared to a value of 34 for the current House map. In other words, compactness in the proposed map is nearly 1.5 times that of the current House map.



## Evaluation of Compactness Criteria, Virginia House Districts 1-25

District	Reock	Polsby-Popper
1	0.4902	0.5468
2	0.3822	0.3474
3	0.3861	0.3926
4	0.3354	0.2671
5	0.2929	0.2607
6	0.3001	0.3448
7	0.4644	0.4180
8	0.3815	0.3723
9	0.4539	0.3368
10	0.4461	0.3361
11	0.5194	0.2964
12	0.4919	0.3453
13	0.4920	0.4496
14	0.3645	0.2778
15	0.4529	0.2343
16	0.4905	0.4878
17	0.2869	0.4601
18	0.3555	0.2565
19	0.4033	0.3741
20	0.4235	0.2633
21	0.4523	0.3663
22	0.4069	0.2684
23	0.3927	0.3236
24	0.3562	0.3819
25	0.3237	0.2712

## Evaluation of Compactness Criteria, Virginia House Districts 26-50

District	Reock	Polsby-Popper
26	0.3178	0.2402
27	0.2221	0.2628
28	0.4628	0.3288
29	0.4388	0.3025
30	0.3883	0.3326
31	0.4288	0.3249
32	0.3910	0.3116
33	0.4441	0.2838
34	0.3476	0.2749
35	0.3534	0.2405
36	0.3706	0.2259
37	0.3585	0.2932
38	0.5652	0.2847
39	0.5563	0.3235
40	0.3254	0.1642
41	0.3280	0.1609
42	0.5063	0.1996
43	0.2108	0.2210
44	0.4157	0.5079
45	0.2414	0.2815
46	0.3722	0.2945
47	0.3658	0.2875
48	0.3312	0.2616
49	0.2936	0.2619
50	0.5403	0.3644

## Evaluation of Compactness Criteria, Virginia House Districts 51-75

District	Reock	Polsby-Popper
51	0.2930	0.2405
52	0.4074	0.3101
53	0.2978	0.2068
54	0.4819	0.3008
55	0.3830	0.2913
56	0.3319	0.2729
57	0.2769	0.2567
58	0.4107	0.3229
59	0.3249	0.2767
60	0.2959	0.1781
61	0.3927	0.3311
62	0.2850	0.2468
63	0.4321	0.3886
64	0.3547	0.3084
65	0.4605	0.2728
66	0.4118	0.2028
67	0.2321	0.1991
68	0.3129	0.2365
69	0.2061	0.1396
70	0.3304	0.2576
71	0.3202	0.1584
72	0.5226	0.2916
73	0.5351	0.3079
74	0.4351	0.3665
75	0.3916	0.1766

## Evaluation of Compactness Criteria, Virginia House Districts 76-100

District	Reock	Polsby-Popper
76	0.4152	0.3846
77	0.3409	0.2858
78	0.2761	0.2205
79	0.3078	0.2349
80	0.2617	0.2236
81	0.3001	0.2181
82	0.2051	0.2037
83	0.2805	0.2561
84	0.2388	0.1770
85	0.2800	0.3213
86	0.5226	0.5063
87	0.3463	0.3023
88	0.4524	0.4121
89	0.2984	0.2447
90	0.5333	0.4835
91	0.2538	0.1600
92	0.3579	0.2764
93	0.4740	0.2882
94	0.3017	0.3996
95	0.4016	0.3158
96	0.3406	0.4120
97	0.2774	0.2391
98	0.5686	0.5319
99	0.5732	0.4714
100	0.3051	0.4110



**Partisanship:** The results below are sorted by Democratic vote share. In the draft maps, the median districts, districts 97 and 65, gave the Democratic Attorney General candidate 52.6% and 51.2% of the vote, respectively. Under the revised maps, he received the exact same vote shares. This suggests a small Republican advantage in the House of Delegates. Overall, this map is well-balanced, does not unduly favor any party, and does not require further adjustment. As with the Senate map, we now provide the data for the Lieutenant Governor election as well.

## 2017 Attorney General Election Results, Virginia House Districts, Part 1

Average Dem Performance = 53.3%

District	Democratic	Republican
79	91.6%	8.2%
4	81.4%	18.4%
3	80.4%	19.5%
54	79.3%	20.6%
2	78.8%	21.1%
92	78.6%	21.3%
87	77.8%	22.0%
1	77.7%	22.2%
5	77.0%	22.9%
80	76.8%	23.1%
93	76.7%	23.2%
13	74.6%	25.2%
77	72.6%	27.3%
78	72.6%	27.3%
23	72.4%	27.5%
17	71.7%	28.2%
91	71.7%	28.2%
7	71.0%	28.8%
12	70.5%	29.4%
19	70.4%	29.5%
14	69.8%	30.1%
85	69.0%	30.9%
8	68.9%	30.9%
16	68.2%	31.7%
88	68.0%	31.8%

## 2017 Attorney General Election Results, Virginia House Districts, Part 2

Average Dem Performance = 53.33%

District	Democratic	Republican
11	67.6%	32.2%
81	67.0%	32.9%
18	66.7%	33.2%
26	65.3%	34.6%
24	64.8%	35.0%
27	64.2%	35.7%
25	63.5%	36.3%
38	63.2%	36.8%
9	62.6%	37.3%
28	61.9%	38.0%
15	61.5%	38.4%
6	61.3%	38.6%
95	61.0%	38.9%
76	60.8%	39.2%
10	60.6%	39.3%
29	59.5%	40.5%
96	59.1%	40.8%
70	58.6%	41.2%
20	58.1%	41.8%
55	57.5%	42.5%
94	56.5%	43.4%
82	55.8%	44.1%
84	55.8%	44.2%
21	52.8%	47.1%
97	52.6%	47.3%

## 2017 Attorney General Election Results, Virginia House Districts, Part 3

Average Dem Performance = 53.33%

District	Democratic	Republican
65	51.2%	48.7%
89	51.1%	48.8%
41	50.6%	49.4%
58	49.6%	50.3%
86	48.8%	51.0%
71	48.6%	51.3%
22	48.4%	51.5%
83	48.3%	51.6%
30	47.9%	52.1%
66	47.8%	52.1%
75	47.4%	52.5%
57	47.2%	52.7%
34	46.1%	53.8%
100	45.7%	54.2%
69	45.4%	54.4%
49	44.6%	55.3%
64	44.3%	55.6%
99	44.2%	55.7%
52	44.2%	55.7%
40	42.5%	57.4%
73	42.4%	57.5%
74	41.6%	58.3%
59	41.3%	58.6%
50	41.2%	58.7%
98	41.1%	58.8%



## 2017 Attorney General Election Results, Virginia House Districts, Part 4

Average Dem Performance = 53.33%

District	Democratic	Republican
32	39.7%	60.2%
67	39.7%	60.2%
36	39.5%	60.4%
56	39.4%	60.5%
63	38.8%	61.1%
42	38.6%	61.3%
62	38.2%	61.7%
90	38.2%	61.7%
31	37.4%	62.5%
61	37.4%	62.5%
48	37.1%	62.8%
68	35.6%	64.3%
72	34.7%	65.2%
37	32.9%	67.0%
60	31.3%	68.5%
39	31.1%	68.8%
53	31.1%	68.8%
33	27.7%	72.2%
47	26.6%	73.4%
35	26.5%	73.4%
46	24.8%	75.1%
44	24.6%	75.3%
51	24.5%	75.4%
43	22.0%	77.9%
45	20.8%	79.1%

## 2017 Lt. Gov. Election Results, Virginia House Districts, Part 1

Average Dem Performance = 52.7%

District	Democratic	Republican
79	92.0%	8.0%
4	81.4%	18.5%
3	80.4%	19.5%
54	79.0%	20.9%
2	78.5%	21.4%
87	78.0%	21.8%
92	77.6%	22.2%
1	77.2%	22.7%
5	77.0%	22.9%
80	76.7%	23.2%
93	75.9%	24.0%
13	74.8%	25.1%
77	73.0%	26.9%
78	72.7%	27.3%
23	72.6%	27.3%
17	71.8%	28.1%
91	71.4%	28.5%
7	70.9%	29.0%
19	70.7%	29.2%
12	70.5%	29.3%
14	70.2%	29.7%
8	68.9%	31.0%
85	68.8%	31.2%
16	67.9%	31.9%
11	67.8%	32.1%

## 2017 Lt. Gov. Election Results, Virginia House Districts, Part 2

Average Dem Performance = 52.7%

District	Democratic	Republican
18	66.9%	33.0%
81	66.8%	33.1%
88	66.7%	33.2%
24	64.9%	34.9%
26	64.6%	35.3%
25	63.7%	36.1%
27	63.6%	36.3%
9	62.8%	37.1%
15	61.6%	38.3%
38	61.6%	38.3%
76	61.0%	38.9%
6	60.9%	39.0%
28	60.7%	39.2%
10	60.6%	39.3%
95	60.2%	39.7%
96	58.5%	41.4%
70	58.5%	41.5%
20	58.0%	41.8%
29	57.1%	42.8%
55	56.8%	43.1%
82	55.6%	44.4%
84	54.5%	45.5%
94	54.2%	45.7%
21	52.3%	47.6%
97	51.3%	48.6%

## 2017 Lt. Gov. Election Results, Virginia House Districts, Part 3

Average Dem Performance = 52.7%

District	Democratic	Republican
65	50.7%	49.1%
89	50.3%	49.6%
58	49.6%	50.3%
41	48.7%	51.2%
71	48.4%	51.5%
86	48.0%	51.9%
83	47.8%	52.1%
57	47.4%	52.4%
22	47.4%	52.4%
66	47.4%	52.6%
75	47.1%	52.8%
34	46.0%	53.9%
30	45.3%	54.6%
69	45.0%	54.9%
100	44.4%	55.6%
64	44.0%	55.9%
49	43.6%	56.4%
73	42.6%	57.3%
52	42.2%	57.7%
99	41.8%	58.2%
74	41.1%	58.8%
59	40.8%	59.1%
50	40.8%	59.1%
40	40.1%	59.8%
98	40.1%	59.8%



## 2017 Lt. Gov. Election Results, Virginia House Districts, Part 4

Average Dem Performance = 52.7%

District	Democratic	Republican
67	38.9%	61.0%
56	38.8%	61.1%
36	38.7%	61.2%
63	38.3%	61.5%
62	37.3%	62.6%
90	37.2%	62.7%
32	37.0%	62.9%
42	36.3%	63.6%
48	36.0%	63.9%
61	35.9%	64.0%
31	35.0%	64.9%
68	35.0%	64.9%
72	34.8%	65.1%
60	31.1%	68.8%
37	30.7%	69.2%
53	29.6%	70.3%
39	28.9%	71.0%
35	25.9%	74.0%
33	25.5%	74.4%
47	25.4%	74.5%
44	25.1%	74.8%
46	23.8%	76.1%
51	22.9%	77.0%
45	22.4%	77.5%
43	22.2%	77.6%

