

Amended Rebuttal Expert Report of Anthony E. Fairfax

Stone v. Allen, No. 2:21-cv-01531 (N.D. Ala.)

April 30, 2024

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I. Introduction

1. This report provides my responses and opinions regarding the March 29, 2024 expert report of Dr. Sean Trende.

II. Software, Data, and Technical Process Utilized

2. The software I utilized for my analysis and development of the illustrative plans was Maptitude for Redistricting (“Maptitude”) by Caliper Corporation. Maptitude is one of the leading redistricting software applications utilized by consultants, major nonprofit groups, and governmental entities.¹ ESRI’s Arc Map software was used to develop several maps in the report and appendices.
3. Several datasets were utilized through the development and analysis of the Illustrative Plans:
 - a. The 2020 census data for the total population were obtained from Caliper Corporation’s datasets for the state of Alabama.² 2020 census data on landmark areas were also obtained from the Caliper datasets (used to delineate communities of interest areas such as military bases, colleges and universities, and Native American reservations). Also, I utilized 5-Year ACS Data at the census tract level that comes with Caliper’s dataset.
 - b. To evaluate district configurations, I downloaded the most recent race/ethnicity citizenship data from RDH.³ This included 2021 5-Year (ACS) Citizen Voting Age Population dataset at the census block group level for the state of Alabama.⁴ I also downloaded the 2022 5-Year ACS CVAP data from the U.S. Census Bureau’s website.
 - c. In order to review the 2021 and 2022 5-Year ACS data at various geographic levels for the illustrative plans, I utilized Maptitude’s disaggregation/aggregation process. The disaggregation/aggregation process is an industry acceptable process when evaluating

¹ See <https://www.caliper.com/mtrnews/clients.htm> for Maptitude for Redistricting’s client list.

² Caliper Corporation provides 2010 and 2020 Census Data (PL94-171 data) in a format readable for their software, Maptitude for Redistricting. The population data are identical to the data provided by the Census Bureau.

³ The RDH aggregates various Census and election result data into a central website and reformats the data into a readily available format for download.

⁴ See <https://www.census.gov/programs-surveys/decennial-census/about/voting-rights/cvap.html>

citizenship data or other data that is not provided at the census block or other levels.⁵ Once the disaggregation/aggregation process was completed, estimated CVAP data was available for review at the district level (as well as other Census levels).

III. Summary of Opinions

4. A summary of my conclusions and opinions⁶ on Dr. Trende's report includes:
 - a. The use of the U.S. Census Bureau's 5-Year CVAP Data is standard and reliable in litigation under Section 2 of the Voting Rights Act when evaluating citizens above the age of 18 years, particularly for areas of sufficient population like Alabama's state senate districts. Furthermore, the U.S. Department of Justice ("DOJ") states that the ACS CVAP data continues to meet its statistical needs in enforcing Section 2 of the VRA. The ACS's 5-Year CVAP data is also reasonably accurate when used to estimate CVAP contained within Alabama's state senate districts.
 - b. It is possible to draw an illustrative plan that complies with traditional redistricting criteria and contains two additional majority-Black VAP and CVAP state senate districts for a total of ten (versus the current eight) and does so in the Montgomery and Huntsville regions.
 - c. An illustrative plan that is reasonably configured by all relevant measures can be created that adheres to the U.S. Constitution, Alabama Constitution, and the Federal Voting Rights Act, and complies with Equal Population [one-person-one-vote] requirements. The illustrative plan is reasonably configured based on well-established traditional redistricting criteria: 1) Contiguity, and 2) Compactness; and 3) Respect for Communities of Interest and Political Subdivisions; and 4) Minimizing the number of county splits and counties within each district.

IV. Methodology

5. To respond to Dr. Trende's allegations, I downloaded and analyzed the 2022 5-Year ACS Citizen Voting Age Population (CVAP) data in regard to potential errors and margins of errors. I also generated Illustrative Plans 2 and 3 using the latest version of CVAP data,

⁵ Disaggregation apportions a population to a lower geographic area from a higher geographic area using a percentage of a matching population field at both geographic levels. In this instance, voting age population was used as the weighted variable to apportion amounts to census blocks. Aggregation sums up the lower-level results to all other higher geographic levels that are to be used. Maptitude also includes a pure geographic disaggregation/aggregation process that was not utilized during this analysis.

⁶ I have been told by counsel for the *Stone* plaintiffs, that another expert will be addressing CVAP in a detailed manner. Thus, I only address CVAP regarding certain aspects of Dr. Trende's report.

the 2022 5-Year ACS CVAP data. Illustrative Plans 2 and 3 resolve Dr. Trende’s concern that SD 7 in Illustrative Plan 1—which was drawn as a majority Black district using 2021 5-year ACS CVAP data—would not be majority Black according to the 2022 5-Year ACS CVAP data.⁷

6. Illustrative Plans 2 and 3 adhere to the state’s redistricting criteria and meet the first precondition of *Gingles*⁸ using 2022 5-Year ACS CVAP data. To determine majority Black status, I followed my last report and used Not Hispanic Black CVAP plus Not Hispanic Black and White combined race CVAP, which is presented as “BCVAP” for district metrics.⁹ Illustrative Plan 3 also satisfies majority Black status using both BVAP (“Any Part” Black)¹⁰ and BCVAP.¹¹

V. Response to Dr. Trende’s Assertions on the U.S. Census Bureau’s CVAP Data

Introduction

7. Dr. Trende provides several examples that purport to show substantial error margins in ACS CVAP data. He states that “All estimates produced from sample surveys have uncertainty associated with them as a result of being based on a sample of the population rather than the full population.”¹² Dr. Trende’s report presents part of the data picture for

⁷ See Trende March 29, 2024 Report, Page 20.

⁸ See *Thornburg v. Gingles*, 478 U.S. 30.

⁹ It is important to note that a corresponding aggregation of “Any Part” Black for CVAP data would also add the Not Hispanic Black and American Indian combined race CVAP. Doing so would only increase the stated BCVAP value.

¹⁰ Any Part Black includes persons who self-identify as single race Black as well as those of combined race.

¹¹ Appendix B includes data reports with column headings of BCVAP. These columns contain data for only Not Hispanic Black CVAP single race. The columns titled, BBWCVAP, contains Not Hispanic Black CVAP plus Not Hispanic Black and White combined race CVAP. Two additional columns include BWCVAP which include only Not Hispanic Black and White combined race CVAP and BAICVAP which contained Not Hispanic Black and American Indian combined race CVAP.

¹² Trende March 29, 2024 Report, Page 10.

ACS CVAP but not the complete picture of its accuracy. His report includes several major assertions that I address below.

A. CVAP is a Standard in Redistricting Litigation

8. Before I address any specific assertion by Dr. Trende, I would first like to offer that the U.S. Census Bureau's 5-Year ACS CVAP estimate data is utilized as a standard in litigation when evaluating citizens above the age of 18 years. In fact, there is no other coast to coast database for the U.S. that provides CVAP data estimates down to the neighborhood or group of neighborhoods level. In addition, courts have found that ACS five-year estimates are reliable for the purpose of Section 2 analysis.¹³ Furthermore, the U.S. Department of Justice states that the ACS CVAP data continues to meet its statistical needs for enforcing Section 2 of the VRA.¹⁴

B. Comparing Two Different Types of Data

9. Dr. Trende compares the decennial data from the 2020 Census to the 5-Year ACS data to put forth that the total CVAP is larger than the Voting Age Population (VAP) for certain Block Groups. The 2020 Census is a snapshot taken on April 1, 2020, while the 5-Year ACS is a monthly survey taken over the entire year for five years.
10. Thus, the 2022 5-Year survey gathers surveys taken each month from January 2018 to December 2022. However, Dr. Trende uses the discrepancy of the 2020 Census data and the 5-Year ACS as a foundation for his argument of the inaccuracies of the ACS CVAP

¹³ Cisneros v. Pasadena Indep. Sch. Dist., No. 4:12-CV-2579, 2014 WL 1668500, at *9 (S.D. Tex. Apr. 25, 2014) ("ACS's five-year estimates of CVAP are reliable for the purposes of a Section 2 analysis."); Rodriguez v. Harris Cty., 964 F. Supp. 2d 686, 728 (S.D. Tex. 2013) (concluding that "the five-year aggregated ACS citizenship data is sufficiently probative on the issue of citizen voting age population and Plaintiffs may rely upon this data in establishing the first Gingles precondition").

¹⁴ <https://www.census.gov/newsroom/press-releases/2021/statement-american-community-survey.html>

data. Thus, comparing the two compares two different timeframes. In fact, Dr. Trende also concedes that the two represent two different timeframes. This could have caused the block group's CVAP to be larger than the VAP for certain block groups in his analysis.

C. Collectively Block Group Estimates Are Accurate

11. Dr. Trende correctly states that “Sampling error is a mathematical reality that even the most careful analyst cannot eliminate entirely.”¹⁵ As Dr. Trende explains, sometimes the error results in an estimate with a greater population that is higher than the actual value, and other times the estimate results in a lower population than the actual value. Dr. Trende and I are in agreement with that aspect. However, he focuses on the first half of that data picture while ignoring the second. That is, it matters greatly that there are also block groups that are lower than the actual CVAP value.

12. Dr. Trende states that a block group's CVAP should contain a value that is always lower than the VAP. However, the fact that some block groups show a higher CVAP does not matter when considered collectively. A close inspection of the data reveals that there are more block groups that have population that with greater VAP than CVAP. Moreover, some block groups' CVAP value estimates are significantly “lower” than they should be. Importantly, block groups with high and low CVAP estimates are randomly dispersed across the state and across individual districts. Consequently, when both types of block groups are aggregated together, the net effect is the cancellation of each of the high and low errors.

¹⁵ Trende March 29, 2024 Report, Page 9.

13. To verify this effect, I first looked at Alabama statewide data. I also reviewed the statewide block group data. The statewide block group data shows that there are a total of 3,925 blocks groups, 1,699 of which have 2022 5-Year ACS CVAP greater than 2020 Census VAP and 2,226 of which have 2020 Census VAP greater than 2022 5-Year ACS CVAP. Dr. Trende's assertion would be that these block groups with 2022 CVAP larger than 2020 Census VAP would yield inaccurate results for the state and also for individual districts. However, this is not the case.
14. When reviewing the "state level" 5-Year 2022 ACS Total CVAP, the estimate is 3,824,040 persons with a margin of error of +/- 3,037 persons or +/- 0.08%. For comparison, when the 2022 5-Year CVAP "block group level" estimates are aggregated to the state level, the sum of the total CVAP is 3,824,110 persons with calculated margin of error of +/- 0.54%.
15. In the context of my analysis, the most important data point is that the difference between the state level estimate of CVAP and the aggregated block group level estimates of CVAP is only 70 persons. Thus, after including block groups where CVAP is greater than VAP and VAP greater than CVAP, the aggregated amount is highly accurate at the statewide level. The high and low estimate errors from the block groups when aggregated together cancel each other and produce an accurate CVAP total.
16. A similar cancelling pattern is seen at the senate district level. For example, in Illustrative Plan 2's senate district 7 (SD7) there is a random dispersion of block groups where CVAP is greater than VAP and VAP greater than CVAP. When aggregated together, these estimate errors cancel each other and produce an accurate CVAP total.

Although state legislative districts routinely split block groups on the edge of the districts, I am able to use disaggregation—a technique that is included within the Maptitude for Redistricting software and is well known and widely used without issue in many states—to calculate CVAP.¹⁶

D. The Margin of Error is not the Error of the Data

17. Trende admits that he cannot calculate the margin of error for SD7's BCVPAP with precision. Without taking a position on Dr. Trende's methods for approximating the margin of error for SD7, Trende himself estimates that it is around 3% (and is likely lower).¹⁷ His own approximated margin of error is very reasonable in the context of a district with over a hundred thousand persons.
18. Importantly, a critical aspect of the margin of error is that it does not reflect the error, it reflects the potential error with a 90 percent confidence level. The data estimates of many of the block group populations may be accurate and equate to the stated value.
19. Second, more important to the context of Section 2 and the minority community, regardless of the size of the margin of error, the BCVPAP of a majority-Black district

¹⁶ Dr. Trende mentions a few techniques to estimate CVAP at the district level. However, even using the techniques that Trende describes or substantially similar alternative methods, Illustrative Plan 2's SD7 has a BCVPAP majority. First, Trende discusses disaggregation, which estimates CVAP in a smaller geographic area, such as census blocks, by using a known weighted ratio. See Trende March 29, 2024 Report, Pages 19 and 20. That weighted ratio can either be for the total VAP (as Trende uses) or for VAP by racial category. Elsewhere, Dr. Trende mentions a whole block group technique of aggregating "all of the census block groups included, in whole or in part, in Illustrative District 7, before splitting them." See Trende March 29, 2024 Report, Pages 14 and 17. This closely resembles an alternative method that uses block groups wholly contained in the district and block groups where greater than 50% of the population are contained within the district to calculate the CVAP. The results from all of these techniques are similar. Using the whole block group method, Illustrative Plan 2's SD7 has a BCVPAP% of 51.66%, and the whole block groups greater than 50% allocation method shows a BCVPAP% of 50.19%. Using the disaggregation technique, the BCVPAP% is 50.05%. The alternative disaggregation option of matching the weighed disaggregated fields with the same race yields a BCVPAP% of 50.60%. Thus, the results of this district are validated by multiple different approaches.

¹⁷ Trende March 29, 2024 Report, Pages 15 and 22.

stands at a greater chance of being larger than 50% than it is being lower than 50%, specifically in considering *Gingles 1*. The reason is that the first component of the 1st precondition of *Gingles* is to show that a district can be created where the minority is 50% plus 1. The plus 1 person makes it a greater chance that the number including the margin of error is larger than 50%. Thus, every person above the 50% point makes it even more likely that the actual value falls above 50% despite any small, estimated margin of error.

VI. Response to Dr. Trende's Additional Assertions

20. Dr. Trende has several other assertions pertaining to the Illustrative Plan's SD7 and SD25. This included assertions concerning people with felony convictions, population compactness, and an analysis of Illustrative District 25.

A. People with Felony Convictions

21. Dr. Trende suggests that the estimated number of eligible voters is inaccurate because it does not account for people disenfranchised by certain felony convictions. However, the standard for utilizing the 5-Year ACS CVAP Data is not to deduct an estimated number for prison population or other factors that may affect eligible voting pools at the margins in a given state. Dr. Trende does not point to other cases in which courts have required or even suggested this. In addition, Dr. Trende references only a statewide estimate for the percentage of eligible voters barred from voting. Specifically, Dr. Trende states, "Dr. Burch reports that in Alabama, 8.6% of the voting eligible population is barred from voting because of a felony conviction." This percentage, even if accurate, is a statewide percentage and has no relevancy locally for calculating the number of persons barred

from voting within SD 7 in Illustrative Plan 1 or Illustrative Plan 2. And even if it were relevant, Dr. Trende does not offer any of his own calculations. Regardless, as shown below for Illustrative Plans 2 and 3, both of the new majority BCVAP districts in each plan (SD 7 and SD 25) have over 51% Black registered voters, undermining the notion that statewide felony conviction rates make these illustrative districts unreliable or below 50%+1.

B. Population Compactness

22. Dr. Trende evaluates the compactness of the population of SD 7. Compactness has standard measures for evaluating the configuration of districts, which Dr. Trende does not employ. First, Dr. Trende uses a precinct color thematic map and a dot density map to visually display the population of White and Black persons within SD7. The implication is that SD7 contains a considerable number of precincts with a significant amount of BCVAP. Neither of the two maps provide quantifiable metrics to determine the population compactness only a presentation of dots and colored precincts.
23. Second, the dot density maps that Dr. Trende uses present a picture of higher populated areas and lower populated areas. It is common during the map drawing process to have a district where rural areas and urban areas are combined within the same districts. The map visualizations that Dr. Trende includes in his report show this dynamic of urban and rural contained within the same district.
24. The more important measures to use are the compactness measure utilized to compare the districts of the 2021 Enacted Plan and the illustrative plans. When comparing the compactness of SD 7 in the 2021 Enacted plan with the illustrative plans, the illustrative

plans are more compact than the Enacted Plan's minimum compactness measures (See Appendix B).

C. Analysis of Illustrative District 25

25. Dr. Trende recognizes that SD25 in Illustrative Plan 1 is a majority Black district. He states, "There appears to be little dispute that Illustrative District 25 is majority BVAP." However, he provides dot density maps that present Black and White populations throughout SD25. Once again, Dr. Trende presents a map that shows SD25 includes both urban and rural areas of the district. Again, this is a common practice, specifically in states that have considerable amount of rural and urban areas, and one reflected in the State's own enacted plan.

VII. Illustrative Plan 2 - Description

A. Illustrative Plan 2 Introduction

26. Since the latest 2022 5-Year CVAP data was just released around the time of my first report, I have also developed Illustrative Plan 2 which does not differ significantly from the previous illustrative plan but uses this more recent data (See Figure 1). To develop the Illustrative Plan 2, I used the Illustrative Plan 1 as a starting point. The only changes occur in the surrounding districts of 1, 2, 3, 8, and 9. Every other district in Illustrative Plan 2 remains the same as Illustrative Plan 1.

Alabama State Senate Districts Illustrative Plan 2

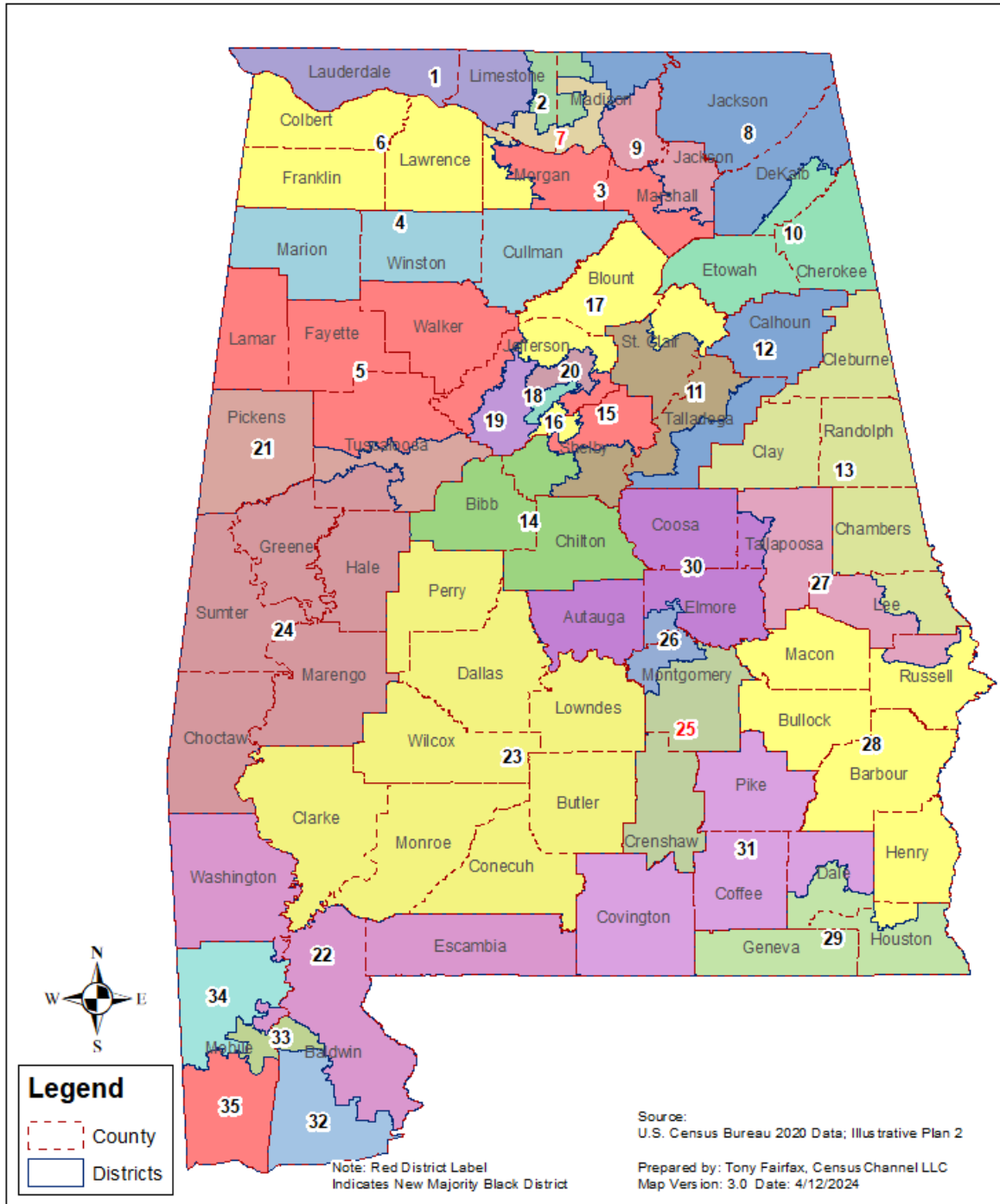


Figure 1 - Illustrative Plan 2's Alabama State Senate Districts

27. The resulting configuration and demographic data for the Illustrative Plan 2 demonstrates that Alabama can create two additional majority Black state senate districts beyond those in the Enacted Plan while adhering to traditional redistricting criteria and meeting or beating the Enacted Plan on these criteria.

B. Illustrative Plan 2 - Equal Population (Population Deviation)

28. The Illustrative Plan 2 falls within the acceptable deviation of +/-5% for each district and an overall range less than 10% with an overall percentage of 9.78% lower than the 2021 Enacted Plan (See Appendix B).

C. Illustrative Plan 2 – Adherence to Section 2 of the Voting Rights Act and the U.S. Constitution (Majority Black Districts)

29. The Illustrative Plan 2 avoids violating the Constitution or potentially running afoul of Section 2 of the VRA, as it includes two additional majority Black Senate Districts that adhere to traditional redistricting criteria without eliminating any of the eight existing majority Black Senate Districts, and the Illustrative Plan 2 did not prioritize race over other factors. (See the section below on *Gingles* 1 Analysis for a detailed analysis of the Illustrative Plan 2's majority Black districts.)

Senate District 7

30. Illustrative Plan 2's Senate District 7 is a new majority Black district in northern Alabama. The Illustrative Plan 2's SD7 continues to connect the core of Huntsville in the northeast of the district to a portion of the city of Decatur in the southwest (See Figure 2). The southern end of SD7 follows the natural boundary of the Tennessee River from the Redstone Arsenal to the city of Decatur.

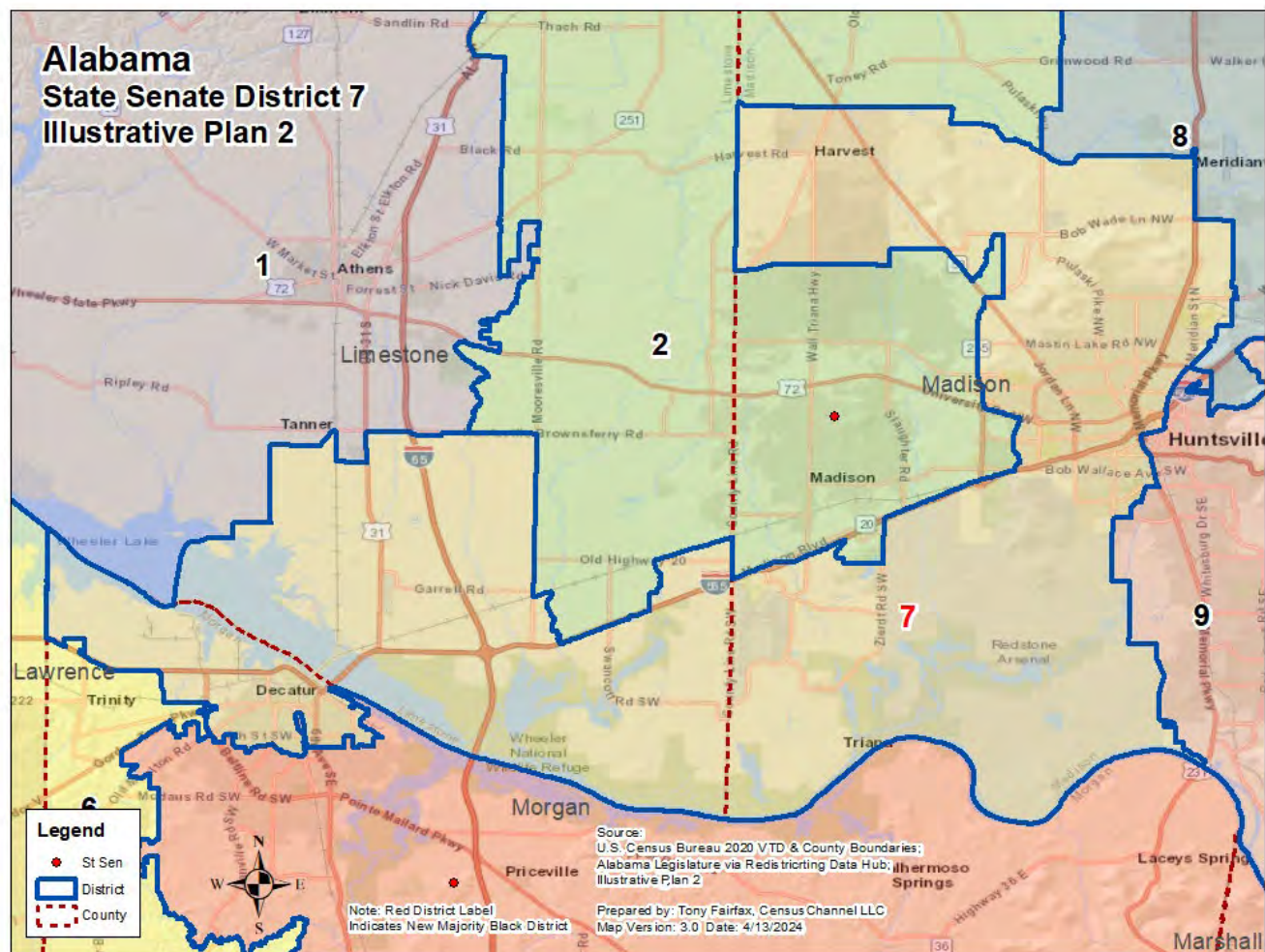


Figure 2 – Illustrative Plan 2’s State Senate District 7 Zoom

32. Illustrative Plan 2 improves on the VTD splits from Illustrative Plan 1 and 2021 Enacted Plans by unsplitting the Athens Rec/Sr Ctr/Linsay/Friendship/Elkton VTD. Thus, the total number of split VTDs for the Illustrative Plan 2 reduces to only ten.

33. Approximately a third (31%) of the city of Decatur is contained within the Illustrative Plan 2's SD7 consisting of only whole VTDs (See Appendix B). Huntsville and Decatur are part of the third largest Combined Statistical Area (CSA) within the state of Alabama (the Huntsville-Decatur CSA). In Illustrative Plan 2, additional parts of Huntsville were added (with one VTD removed), and two VTDs in Decatur were removed in order to reconfigure the district from Illustrative Plan 1 and meet the equal population guidelines.

34. Although SD7 crosses the Tennessee River in Decatur, the district boundaries bring together the northern part of the city of Decatur, located in Limestone County with the southern portion located in Morgan County. The two parts of the city and district are connected by the river and by Bee Line Highway. A sizable portion of the SD7 community in Decatur on the Morgan County side has a similar socioeconomic makeup (i.e., median household income and median housing values) as another sizable area within SD7 that exists in the city of Huntsville (See Appendix C).

35. Finally, one of the notable communities of interest that is included in the Illustrative Plan 2's majority Black SD7 is Alabama A&M University. Alabama A&M University is the state's largest Historically Black College and University (HBCU). The school has over 6,000 undergraduate, graduate, and doctoral students and the Illustrative Plan 2 keeps the

entire campus whole within SD7.¹⁸ In the Enacted Plan, Alabama A & M was nearly wholly contained within SD8, which is a more rural district and has less communities in common than the more urban areas of SD7 in the Illustrative Plan 2.

Senate District 25

36. The Illustrative Plan 2's SD25 has not changed from Illustrative Plan 1.

D. Illustrative Plan 2 – Contiguity

37. The Illustrative Plan 2 and the Enacted Plan includes one point contiguous area as part of SD8.¹⁹ Since the Illustrative Plan used the Enacted Plan as a starting point to minimize differences, the point contiguity is replicated in the Illustrative Plan 2.

E. Illustrative Plan 2 – Compactness

38. The Illustrative Plan 2's districts are reasonably geographically compact. (See the section below on *Gingles I* Analysis for a detailed analysis of the compactness of the Illustrative Plan 2's districts.)

F. Illustrative Plan 2 – Respect for Communities of Interest/Political Subdivisions

39. The Illustrative Plan 2 sufficiently preserves census places to include cities, towns, and Census Designated Places. Since the Illustrative Plan 2 utilizes the Enacted Plan as a starting point (via the original Illustrative Plan 1) the number of split cities, towns, and

¹⁸ The U.S. Census Bureau geographic landmark area file that is included with the Maptitude application has a sliver of area that overlaps the boundaries of Alabama A & M University with SD9. Thus, the report shows a zero populated split for the university.

¹⁹ Census Blocks 010719507003083, 010719507003081, 010719507003080, 010719507003084, 010719507003082 are contained within an area that is point contiguous for the Enacted and Illustrative Plans 2.

CDPs are similar. The Illustrative Plan 2 splits 103 census places, one fewer than Illustrative Plan 1. The Enacted Plan splits 100 (See Appendix B).

40. When reviewing Landmark Areas (to include COIs such as colleges & universities, military bases, and airports) the Illustrative Plan 2 splits fewer of these geographic areas than the Enacted Plan. The Illustrative Plan 2 splits 94 Landmark Areas while the Enacted Plan splits 99 See Appendix B).

41. The Illustrative Plan 2 minimizes political subdivision splits. The Illustrative Plan 2 splits one fewer VTD than Illustrative Plan 1 with only 10 VTDs split while the Enacted Plan splits 13 (See Appendix B).

42. The Illustrative Plan 2 minimizes county splits. Both Illustrative Plan 2 and the Enacted Plan split 19 counties (See Appendix B).

G. Illustrative Plan 2 – Preserve District Cores

43. The Illustrative Plan 2 used the Enacted Plan as a baseline starting point, with the goal to answer the *Gingles* 1 test but still minimize differences between the two maps and thus replicate the Enacted Plan's district cores and existing boundaries to the extent feasible.²⁰

44. As previously referenced, twenty of the 35 state senate districts of the Illustrative Plan 2 are identical to those in the Enacted Plan's. Twelve additional districts include between 53.37% (greater than 50%) and 98.66% of the Enacted Plan's districts, which is an

²⁰ The Enacted Plan largely preserved district cores, as a result of using that plan as a starting point, so does the Illustrative Plan 2. Accordingly, both Illustrative Plan 2 and Enacted Plan are largely comparable in their preservation of the district cores of the previous plan configuration used in 2020 (the original 2010 plan had been altered due to litigation).

improvement on Illustrative Plan 1's preservations of district cores. Only three districts in the Illustrative Plan 2 have less than 50% of the correlated Enacted Plan's district.

H. Illustrative Plan 2 – Incumbent Pairing

45. The Illustrative Plan 2 performs satisfactorily when minimizing incumbent pairings.

Illustrative Plan 2 only pairs two incumbents in one district (SD9). The Enacted Plan does not pair any incumbents.

VIII. Illustrative Plan 2 - *Gingles* 1 Analysis

46. *Thornburg v. Gingles*, 478 U.S. 30, 50-51 (1986) established that the plaintiffs in a Section 2 minority vote dilution case must show that the minority group “is sufficiently large and geographically compact to constitute a majority in a single-member district.” In my opinion, the Illustrative Plan meets both components²¹ of the first precondition of *Gingles*.

A. Illustrative Plan 2 Districts – “Sufficiently Large” (Majority-Black Districts)

47. The first component of the first precondition of *Gingles* requires demonstrating that one or more majority-minority districts can be developed in which the minority population is “sufficiently large” to constitute a majority. For this analysis, I show that two additional majority-Black senate districts can be created in Alabama, beyond those in the Enacted Plan. Once again, the term “majority” under the context of this Illustrative Plan 2 means greater than 50% CVAP for the Black population within the district.²²

²¹ Using BVAP and BCVP for all districts except for SD7, as the determinant of majority Black status for the sufficiently large component of the first precondition of *Gingles*. SD7 used BCVP as the determinant of majority Black status for the first component of the first precondition of *Gingles*.

²² *League of United Latin Am. Citizens v. Perry*, 548 U.S. 399, 427 (2006).

48. All of the Illustrative Plan 2's majority-Black state senate districts, with the exception of SD7, are majority Black using VAP and CVAP. However, in my previous report²³ performed additional analysis to determine whether only CVAP could be used as the racial population group to determine majority Black status for SD7. Given the magnitude of noncitizens within the counties and major cities of SD7, I determined that BCVAP is an appropriate racial population group to determine majority Black status for the district. In addition, CVAP analysis in this report shows that the recently released 2022 5-Year ACS Data is sufficiently accurate to provide relevant CVAP estimates.
49. SD7 contained within the Illustrative Plan 2 has a BCVAP of 50.05%.²⁴ Illustrative Plan 2 also contains SD25 with a BCVAP of 54.84% and is identical to the same district in Illustrative Plan 1. The other eight majority Black state senate districts within the Illustrative Plan, which were also contained within the Enacted Plan, are greater than 50% BCVAP as well (See Appendix B).
50. To further emphasize how Illustrative Plan 2's SD7 meets the Gingles sufficiently large requirement, I also imported the state of Alabama's registered voter's list and determined the percentage of Black and White registered voters for SD7. Out of 93,932 registered voters in SD7 48,181 (51.28%) were Black and 38,939 (41.45%) were White.
51. The resulting demographic data for the Illustrative Plan 2 demonstrates that the first component of the first precondition of *Gingles* has been satisfied. In other words, the

²³ Fairfax February 2, 2024 Expert Report, Page 40

²⁴ Using Maptitude disaggregated data method versus the whole block allocation method. Also, this includes Not Hispanic Black single race plus Not Hispanic Black and White combined race summed together.

Alabama state senate district map can contain ten districts²⁵ with a majority BCVAP and adhere to federal and state redistricting criteria.

B. Illustrative Plan 2 Districts – “Geographically Compact” (Compactness Analysis)

52. The second component of the first *Gingles* precondition is to show that the majority-minority districts are “geographically compact.” Various measures have been developed to quantify a district’s and a plan’s compactness.
53. All of the majority Black state senate districts within the Illustrative Plan are reasonably compact. I used three measures to determine compactness: Reock, Polsby-Popper, and Convex Hull. Thus, Table 1 compares the compactness measures of the Illustrative Plan 2 and the Enacted Plan in three different ways.
54. One of the methods of comparing compactness between two plans is to compare district-by-district. Using this method, the Illustrative Plan 2 has 8 districts that are more compact than their Enacted Plan counterparts, while the Enacted Plan has 6 districts that are more compact than the analogous districts in the Illustrative Plan 2.²⁶
55. Even when comparing district by district for the ten majority Black districts in the Illustrative Plan with the analogous districts in the Enacted Plan, two of the districts are more compact than the Enacted Plan’s (i.e., the additional majority Black districts SD7 and SD25). Only one of the Enacted Plan’s majority Black districts is more compact than

²⁵ The Illustrative Plan contains nine state senate districts with a majority BVAP.

²⁶ When using three compactness measures, a district is considered to be more compact when two or more of the three measures are more compact.

the Illustrative Plan 2's. Finally, seven of the Illustrative Plan 2's majority Black districts are equal in compactness to the Enacted Plan's.

56. Comparing the mean (i.e., the average) of the plans' district compactness measurements, the Illustrative Plan 2 fairs very close to the Enacted Plan. The difference between the means for the two plans is either .01 for the Polsby-Popper and Convex Hull measures and .02 for the Reock measure. Thus, comparing the means, the Illustrative Plan 2 and Enacted Plans are similarly compact.

57. Third, reviewing the majority Black Districts 7, 18, 19, 20, 23, 24, 25, 26, 28, and 33 in the Illustrative Plan 2 shows that each is more compact than the least compact district in the Enacted Plan. For instance, the Enacted Plan has 0.19, 0.12, and 0.54 as the lowest compactness measures for Reock, Polsby-Popper, and Convex Hull, respectively. All of the Illustrative Plan 2's majority Black districts have higher or more compact measures than those corresponding minimum values. The least compact measures for the Illustrative Plan 2's majority Black districts are .26, .15, and .57 for the measures for Reock, Polsby-Popper, and Convex Hull, respectively.

58. Fourth, both of the new majority Black Districts, SD7 and SD25 are more compact than their numeric counterparts in the Enacted Plan. SD25 was more compact for all measures while SD7 was more compact for Reock and Polsby-Popper. Thus, the compactness analysis results clearly show that the Illustrative Plan 2 satisfies the "Geographically Compact" component of the first precondition of *Gingles*.

IX. Illustrative Plan 3 - Description

59. I also developed a third illustrative plan in response to Mr. Trende's criticisms to show there are multiple ways to create a majority Black senate district 7 that is sufficiently large for both BVAP and BCVAP. Illustrative Plan 3 contains a BVAP and BCVAP (using 2022 5-Year ACS CVAP) that are greater than 50%, Illustrative Plan 3 also meets *Gingles 1* and as well as adheres to traditional redistricting criteria (See Figure 3).

Alabama State Senate Districts Illustrative Plan 3

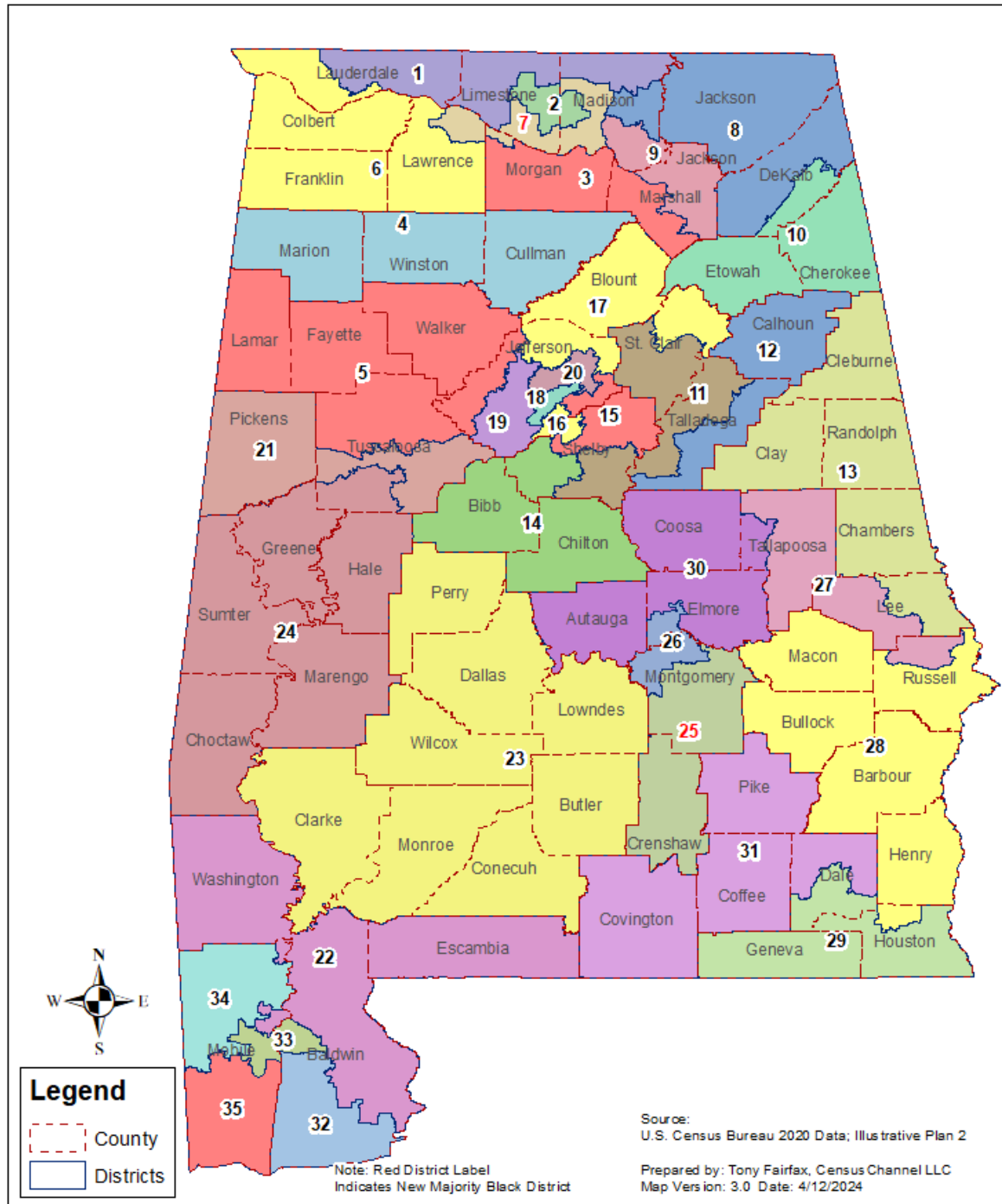


Figure 3 - Illustrative Plan 3's Alabama State Senate Districts

60. The resulting configuration and demographic data for the Illustrative Plan 3 demonstrates that Alabama can create two additional majority Black VAP and CVAP state senate districts beyond those in the Enacted Plan while adhering to traditional redistricting criteria and meeting or beating the Enacted Plan on nearly all of these criteria.

A. Illustrative Plan 3 – Equal Population (Population Deviation)

61. The Illustrative Plan 3 falls within the acceptable deviation of +/-5% for each district and an overall range less than 10% with an overall percentage of 9.66% lower than the 2021 Enacted Plan (See Appendix B).

B. Illustrative Plan 3 – Adherence to Section 2 of the Voting Rights Act and the U.S. Constitution (Majority Black Districts)

62. The Illustrative Plan 3 avoids violating the Constitution or potentially running afoul of Section 2 of the VRA, as it includes two additional majority Black Senate Districts that adhere to traditional redistricting criteria without eliminating any of the eight existing majority Black Senate Districts, and the Illustrative Plan did not prioritize race over other factors. (See the section below on *Gingles I Analysis* for a detailed analysis of the Illustrative Plan 3's majority Black districts.)

Senate District 7

63. Illustrative Plan 3's Senate District 7 is a new majority Black district in northern Alabama. The Illustrative Plan 3's SD7 connects the core of Huntsville in the northeast of the district to a portion of the city of Decatur in the southwest and wholly contains the towns of Courtland and North Courtland to the west (See Figure 4). The southern end of SD7 follows the natural boundary of the Tennessee River from the Redstone Arsenal to

the city of Decatur. After the SD7 passes Decatur, the northern boundary follows the Tennessee River.

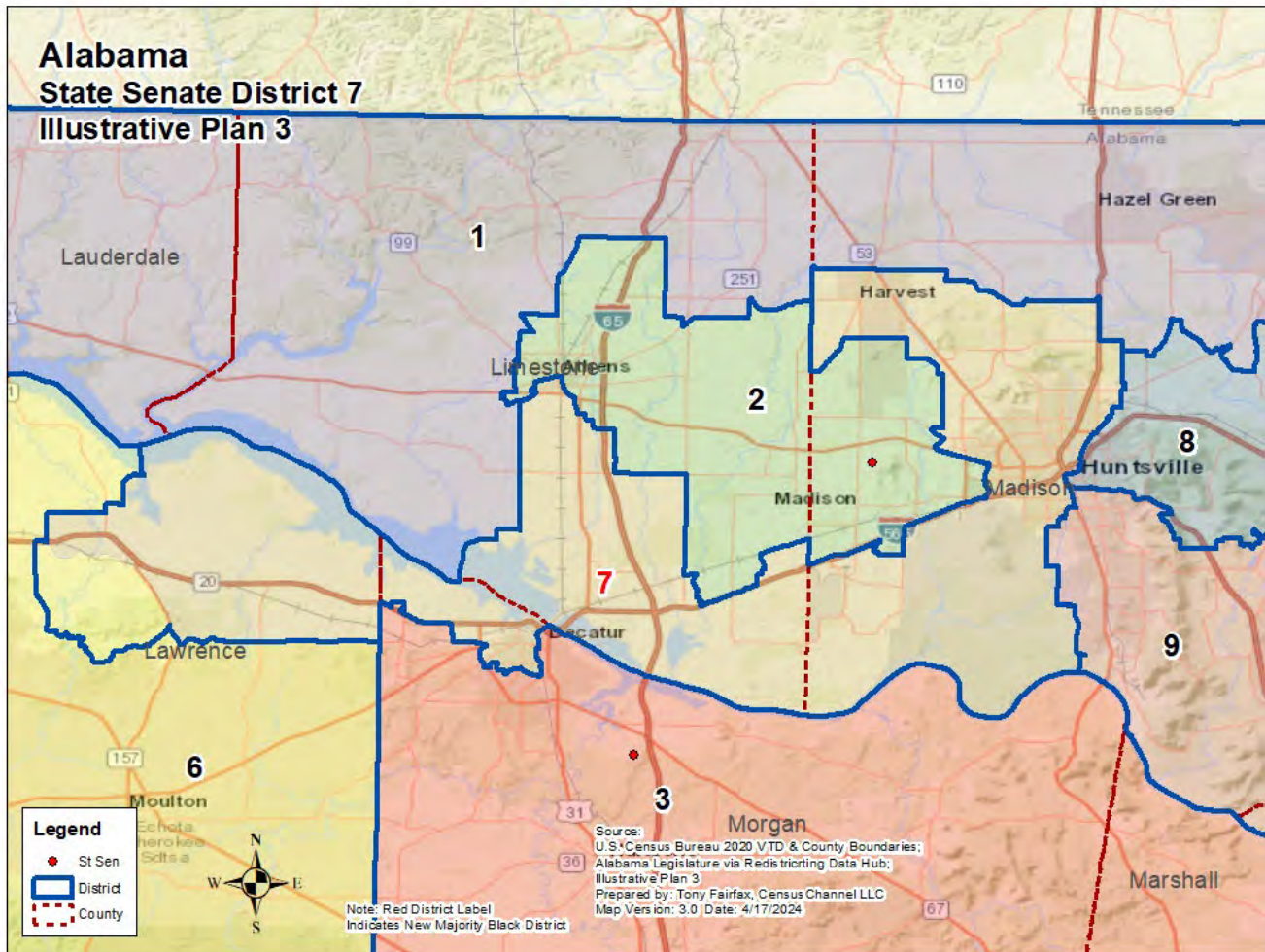


Figure 4 – Illustrative Plan 3’s State Senate District 7 Zoom

64. The district wholly encompasses the towns of Triana and Mooresville and the CDP of Redstone Arsenal (see Appendix B). Similar to the 2021 enacted Plan, Illustrative Plan 3’s SD7 splits and expands into the city of Athens. SD7 adds additional areas of Athens from the prior illustrative plans but follows the same west boundaries of First Baptist

Church Tanner VTD as the 2021 Enacted Plan's SD3 and SD6 and in the Illustrative Plans 1 and 2.

65. The city of Madison remains wholly in the adjacent SD2 with only a zero populated area contained within SD7 (due to keeping the Intergraph Corp VTD whole). Finally, there are two zero populated census blocks that are part of the town of Trinity. Similar to Illustrative Plan 3, the two census blocks are once again also part of a VTD that has been added to SD7.
66. A portion of the city of Decatur is contained within the Illustrative Plan 3's SD7 consisting of only whole VTDs. Huntsville, Decatur, as well as the towns of Courtland and North Courtland are part of the third largest Combined Statistical Area (CSA) within the state of Alabama (the Huntsville-Decatur CSA). In Illustrative Plan 3, additional parts of Huntsville (with one VTD removed) and the expansion into Lawrence were added, and three VTDs in Decatur were removed in order to reconfigure the district from Illustrative Plan 1 and meet the equal population guidelines.
67. Although SD7 crosses the Tennessee River in Decatur, the district boundaries bring together the northern part of the city of Decatur, located in Limestone County with the southern portion located in Morgan County. The two parts of the city and district are connected by the river. A sizable portion of the SD7 community in Decatur on the Morgan County side and the towns of Courtland and North Courtland have similar socioeconomic makeup (i.e., median household income and median housing values) as another sizable area within SD7 that exists in the city of Huntsville (See Appendix C).

68. Finally, as with my other illustrative plans, one of the notable communities of interest that is included in the Illustrative Plan 3's majority Black SD7 is Alabama A&M University and keeps the entire campus whole within SD7.²⁷ In the Enacted Plan Alabama A & M was nearly wholly contained within SD8, which is a more rural district and has less communities in common than the more urban areas of SD7 in the Illustrative Plan 3.

Senate District 25

69. The Illustrative Plan 3's SD25 has not changed from Illustrative Plan 1.

C. Illustrative Plan 3 – Contiguity

70. The Illustrative Plan 3 and the Enacted Plan includes one point contiguous area as part of SD8.²⁸ Since the Illustrative Plan 3 used the Enacted Plan as a starting point to minimize differences, the point contiguity is replicated in the Illustrative Plan 3.

D. Illustrative Plan 3 – Compactness

71. The Illustrative Plan 3's districts are reasonably geographically compact. (See the section below on *Gingles I* Analysis for a detailed analysis of the compactness of the Illustrative Plan 3's districts.)

E. Illustrative Plan 3 – Respect for Communities of Interest/Political Subdivisions

72. The Illustrative Plan sufficiently preserves census places to include cities, towns, and Census Designated Places. Since the Illustrative Plan 3 utilizes the Enacted Plan as a

²⁷ The U.S. Census Bureau geographic landmark area file that is included with the Maptitude application has a sliver of area that overlaps the boundaries of Alabama A & M University with SD9. Thus, the report shows a zero populated split for the university.

²⁸ Census Blocks 010719507003083, 010719507003081, 010719507003080, 010719507003084, 010719507003082 are contained within an area that is point contiguous for the Enacted and Illustrative Plans 2 and 3.

starting point the number of split cities, towns, and CDPs are similar. The Illustrative Plan 3 splits 105 census places. The Enacted Plan splits 100 (see Appendix B).

73. When reviewing Landmark Areas (to include COIs such as colleges & universities, military bases, and airports) the Illustrative Plan 3 splits fewer of these geographic areas than the Enacted Plan. The Illustrative Plan 3 splits 98 Landmark Areas while the Enacted Plan splits 99 (See Appendix B).

74. The Illustrative Plan 3 minimizes political subdivision splits. The Illustrative Plan 3 splits only 12 VTDs while the Enacted Plan splits 13 (See Appendix B).

75. The Illustrative Plan 3 splits a similar number of counties as the Enacted Plan. Illustrative Plan 3 splits 21 counties²⁹ while the Enacted Plan splits 19 counties (See Appendix B).

F. Illustrative Plan 3 – Preserve District Cores

76. The Illustrative Plan 3 used the Enacted Plan as a baseline starting point, with the goal to answer the *Gingles* 1 test but still minimize differences between the two maps and thus replicate the Enacted Plan's district cores and existing boundaries to the extent feasible.³⁰

77. As previously referenced, twenty of the 35 state senate districts of the Illustrative Plan 3 are identical to the Enacted Plan's. Thirteen additional districts include between 53.88% (greater than 50%) and 98.66% of the Enacted Plan's districts, which is an improvement

²⁹ My original rebuttal report of April 19, 2024 inadvertently included the county splits of Illustrative Plan 2 in this discussion of Illustrative Plan 3. The correct information appeared in my prior rebuttal report's Appendices.

³⁰ The Enacted Plan largely preserved district cores, as a result of using that plan as a starting point, so does the Illustrative Plan 2 and 3. Accordingly, Illustrative Plans 2/3 and Enacted Plan are largely comparable in their preservation of the district cores of the previous plan configuration used in 2020 (the original 2010 plan had been altered due to litigation).

on Illustrative Plan 1's preservations of district cores. Only two districts in the Illustrative Plan 3 have less than 50% of the correlated Enacted Plan's district.

G. Illustrative Plan 3 – Incumbent Pairing

78. Illustrative Plan 3 performs satisfactorily when minimizing incumbent pairings. The Illustrative Plan only pairs two incumbents in one district (SD8). The Enacted Plan does not pair any incumbents.

X. **Illustrative Plan 3 - *Gingles* 1 Analysis**

79. *Thornburg v. Gingles*, 478 U.S. 30, 50-51 (1986) established that the plaintiffs in a Section 2 minority vote dilution case must show that the minority group “is sufficiently large and geographically compact to constitute a majority in a single-member district.” In my opinion, Illustrative Plan 3 meets both components of the first precondition of *Gingles*.

A. Illustrative Plan 3's Districts – “Sufficiently Large” (Majority-Black Districts)

80. The first component of the first precondition of *Gingles* requires demonstrating that one or more majority-minority districts can be developed in which the minority population is “sufficiently large” to constitute a majority. For this analysis, I show that two additional majority-Black senate districts can be created in Alabama, beyond those in the Enacted Plan. For Illustrative Plan 3, the term “majority” means greater than 50% VAP and CVAP for the Black population within the district.

81. SD7 contained within the Illustrative Plan 3 has a BCVAP of 50.41% and a BVAP of 50.04%.³¹ Illustrative Plan 3 also contains SD25 with a BCVAP of 54.84% and a BVAP of 51.59% and is identical to the same district in Illustrative Plan 1. The other eight majority Black state senate districts within the Illustrative Plan, which were also contained within the Enacted Plan, are greater than 50% BVAP and BCVAP as well (See Appendix B).

82. To further emphasize how Illustrative Plan 3's SD7 the district meets the *Gingles* sufficiently large requirement, I also imported the state of Alabama's registered voter's list and determined the percentage of Black and White registered voters for SD7. Out of 96,931 registered voters in SD7, 51,124 (52.74%) were Black and 38,847 (40.08%) were White.

83. The resulting demographic data for the Illustrative Plan 3 demonstrates that the first component of the first precondition of *Gingles* has been satisfied. In other words, the Alabama state senate district map can contain ten districts³² with a majority BVAP and BCVAP and adhere to federal and state redistricting criteria.

B. Illustrative Plan Districts - "Geographically Compact" (Compactness Analysis)

84. The second component of the first *Gingles* precondition is to show that the majority-minority districts are "geographically compact." Various measures have been developed to quantify a district's and a plan's compactness.

³¹ Using Maptitude disaggregated data method versus the whole block group allocation method. Also, this includes Not Hispanic Black single race plus Not Hispanic Black and White combined race summed together.

³² The Illustrative Plan 3 contains ten state senate districts with a majority BVAP and BCVAP.

85. All of the majority Black state senate districts within the Illustrative Plan are reasonably compact. I used three measures to determine compactness: Reock, Polsby-Popper, and Convex Hull. Thus, Table 2 compares the compactness measures of the Illustrative Plan 3 and the Enacted Plan in three different ways.
86. One of the methods of comparing compactness between two plans is to compare district-by-district. Using this method, the Illustrative Plan 3 has 8 districts that are more compact than their Enacted Plan counterparts, while the Enacted Plan has 6 districts that are more compact than the analogous districts in the Illustrative Plan 3.³³
87. Even when comparing district by district for the ten majority Black districts in the Illustrative Plan with the analogous districts in the Enacted Plan, one of the districts is more compact than the Enacted Plan's (i.e., the additional majority Black district SD25). Two of the Enacted Plans' majority Black districts are more compact than the Illustrative Plan 3's. Finally, seven of the Illustrative Plan 3's majority Black districts are equal in compactness to the Enacted Plan's.
88. Comparing the mean (i.e., the average) of the plans' district compactness measurements, the Illustrative Plan 3 fares very close to the Enacted Plan. The difference between the means for the two plans is either .01 for the Polsby-Popper and Convex Hull measures and .02 for the Reock measure. Thus, comparing the means, the Illustrative Plan 3 and Enacted Plans are similarly compact.

³³ When using three compactness measures, a district is considered to be more compact when two or more of the three measures are more compact.

89. Third, reviewing the majority Black Districts 7, 18, 19, 20, 23, 24, 25, 26, 28, and 33 in the Illustrative Plan 3 shows that each is more compact than the least compact district in the Enacted Plan. For instance, the Enacted Plan has 0.19, 0.12, and 0.54 as the lowest compactness measures for Reock, Polsby-Popper, and Convex Hull, respectively. All of the Illustrative Plan 3's majority Black districts have higher or more compact measures than those corresponding minimum values. The least compact measures for the Illustrative Plan 3's majority Black districts are .25, .13, and .56 for the measures for Reock, Polsby-Popper, and Convex Hull, respectively.

90. Fourth, Illustrative Plan 3's SD25 is more compact than its numeric counterparts in the Enacted Plan. SD25 was more compact for all measures. SD7 is similarly compact, with Reock and Polsby-Popper measures only differing by .01. Thus, the overall compactness analysis results show that the Illustrative Plan 3 satisfies the "Geographically Compact" component of the first precondition of *Gingles*.

XI. Comparative Analysis with the Enacted Plan

91. The results from my analysis reveal that the Illustrative Plan contains reasonably configured majority Black districts. Among other considerations, the Illustrative Plans 2 and 3 fare equal to or better than the Enacted Plan using the state's redistricting criteria (*See* Tables 1 and 2).

Table 1 - Illustrative Plan 2 and Enacted Plans' Criteria Comparison

Criteria	Illustrative Plan 2	Enacted Plan	Best Criteria
U.S. Constitution, Alabama Constitution, and the Federal Voting Rights Act - Section 2 (<i>Gingles</i> Prong 1)	10 Maj Black	8 Maj Black	Illustrative
Equal Population	Y (9.78%)	Y (9.97%)	Illustrative
Contiguity	Y	Y	Same
Compactness [^] - Plan Mean (R-PP-CH) [~] - District by District - Comparing Maj Black Districts - Minimum Enacted Plan Values: Compared to 10 Maj Black SDs	.39 .24 .73 8 of 35 2 10 of 10	.41 .26 .74 6 of 35 1 0 of 10	Illustrative
Respect COIs/Political Subdivisions* - Census Places (cities, towns, CDPs) - Landmark Areas - Voting Districts (VTDs)	103 94 10	100 99 13	Illustrative
Minimizing County Splits	19	19	Same

Source: Illustrative and Enacted Plans extracted from Maptitude for Redistricting reports

[^]See the *Gingles* Analysis section *Illustrative Plan 2 Districts* – “Geographically Compact” (*Compactness Analysis*).

[~]R-Reock, PP- Polsby-Popper, CH-Convex Hull

*The Illustrative Plan 2 split fewer COI/political subdivisions in two of the three metrics, landmark areas and VTDs.

Table 2 - Illustrative Plan 3 and Enacted Plans' Criteria Comparison

Criteria	Illustrative Plan 3	Enacted Plan	Best Criteria
U.S. Constitution, Alabama Constitution, and the Federal Voting Rights Act - Section 2 (<i>Gingles</i> Prong 1)	10 Maj Black	8 Maj Black	Illustrative
Equal Population	Y (9.66)	Y (9.97%)	Illustrative
Contiguity	Y	Y	Same
Compactness [^] - Plan Mean (R-PP-CH) [~] - District by District - Comparing Maj Black Districts - Minimum Enacted Plan Values: Compared to 10 Maj Black SDs	.39 .25 .73 8 of 35 1 10 of 10	.41 .26 .74 6 of 35 2 0 of 10	Same
Respect COIs/Political Subdivisions* - Census Places (cities, towns, CDPs) - Landmark Areas - Voting Districts (VTDs)	105 98 12	100 99 13	Illustrative
Minimizing County Splits	21 ³⁴	19	Enacted

Source: Illustrative and Enacted Plans extracted from Maptitude for Redistricting reports

[^]See the *Gingles* Analysis section *Illustrative Plan 3 Districts - "Geographically Compact" (Compactness Analysis)*.

[~]R-Reock, PP-Polsby-Popper, CH-Convex Hull

*The Illustrative Plan 3 and 2021 Enacted Plan split fewer COI/political subdivisions in one of the three metrics and equal in one.

92. The Illustrative Plan 2 and 3 perform the same or better than the 2021 Enacted Plan on the criteria set out by the Constitution and federal VRA as well as those identified as emblematic of traditional redistricting criteria by the Supreme Court³⁵ to create a reasonably configured district: 1) adhering to the U.S. Constitution, Alabama Constitution, and the Federal Voting Rights Act; 2) Equal Population; 3) Compactness;

³⁴ My original rebuttal report of April 19, 2024 inadvertently included the county splits of Illustrative Plan 2 in Table 2's summarization of Illustrative Plan 3. The correct information appeared in my prior rebuttal report's Appendices.

³⁵ See *Milligan v. Allen*.

and 4) Respect for COI/Political Subdivisions. The Illustrative Plan 2 and Enacted Plan performed equally with the criteria of Contiguity and County Splits. Illustrative Plan 3 performed equally with the Enacted Plan with the criteria of Contiguity, while the Enacted plan performed slightly better than the Illustrative Plan 3 on the criteria of County Splits.

93. When comparing the remaining two ARC criteria, district cores the Illustrative Plans and Enacted Plan are comparable. Also, when comparing incumbent pairing the Illustrative Plan only has one incumbent pair while the Enacted Plan pairs zero. It is important to note that these two criteria were not identified by the Supreme Court as relevant to the *Gingles* 1 inquiry in the recent *Allen v. Milligan* case. In fact, in *Allen v. Milligan*, the court gave virtually no weight to district cores.³⁶

XII. Conclusions

94. Dr. Trende's analysis of CVAP is incomplete and only looks at blocks groups at the individual level. My analysis shows that when block groups are aggregated together the resultant CVAP for district is reasonably accurate.

95. Alternative Illustrative Plans 2 and 3 using the 2021 or 2022 5-Year ACS Data can be developed that are reasonably configured when measured by its adherence to the requirements of the U.S. Constitution, including Equal Population (one-Person, one-vote); Alabama Constitution; and the Federal Voting Rights Act.

96. The Illustrative Plan 2 performs the same or better when viewing traditional redistricting criteria of 1) Contiguity, 2) Compactness, 3) Respecting Communities of Interest, and 4)

³⁶ *Allen v. Milligan*, 599 U. S. 1

Minimizing County Splits. The Illustrative Plan 3 performs the same or better when viewing traditional redistricting criteria of 1) Contiguity, 2) Compactness, and 3) Respecting Communities of Interest.

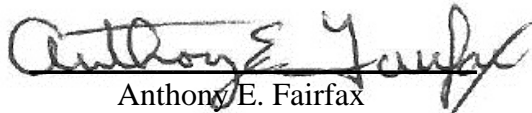
97. Given the analysis and results of the Illustrative Plans, I continue to conclude that the Black population in the state of Alabama is sufficiently large and geographically compact to create a map with two additional single-member majority-Black districts that adheres to traditional redistricting criteria.

XIII. Appendices

98. The following appendices produced with my original April 19, 2024 report are included by reference with this report:

- Appendix A - Maps of Illustrative Plans 2 & 3
- Appendix B - Redistricting Criteria Reports Illustrative Plans 2 & 3
- Appendix C - Misc Maps

I declare under penalty of perjury that the foregoing is true and correct.


Anthony E. Fairfax
Executed on: April 30, 2024