IN THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF VIRGINIA
Richmond Division

GOLDEN BETHUNE-HILL, *et al.*,

Plaintiffs,

v.

VIRGINIA STATE BOARD OF ELECTIONS, *et al.*,

Defendants.

Civil Action No. 3:14cv852

SECOND REPORT OF THE SPECIAL MASTER

January 17, 2019

Bernard Grofman*
Special Master

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SECOND REPORT OF THE SPECIAL MASTER

EXECUTIVE SUMMARY

Because there is no new plan offered by the State of Virginia for the House of Delegates that must be given special deference as a potential remedy, the starting point for any court remedial plan remains the 2011 Enacted Plan. But, to the extent the 2011 Enacted Plan for the House of Delegates "subordinated traditional districting principles to racial considerations" it is "not owed deference" *Abrams v. Johnson*, 521 U.S. 74, at 85 (1997). There were eleven districts in the 2011 Enacted plan identified as unconstitutional: districts 63, 69, 70, 71, 74, 77, 80, 89, 90, 92, and 95. These districts must be redrawn in a constitutional fashion in any remedy. Moreover, any court adopted plan must be narrowly tailored to remedy the constitutional infirmities in the 2011 enacted plan.

One important element of a narrowly tailored remedy is that it should confine its changes to those districts which must be changed in the process of the obligatory redrawing of the 11 unconstitutional districts. At minimum, this principle of narrow tailoring suggests the appropriateness of limiting the changes in any remedial plan to the 11 unconstitutional districts and to the 22 additional districts that are adjacent to the unconstitutional ones -- unless there are compelling geographic or demographic reasons to the contrary. This principle would limit changes to no more than 33 districts.

The principle of narrow tailoring also suggests limiting district changes in the remedial plan to the 23 districts that contain pieces of counties that are also contained within the unconstitutional districts, except as might be needed to assure population balance across the redrawn districts. Unconstitutionality was specifically found for only eleven districts in the 2011 enacted plan –with this finding in all but one of the districts that were drawn with the avowed aim of containing a 55% black voting percentage. However, as a matter of simple geographic logic, if there are districts other than the unconstitutional eleven that contain portions of the populations of some of the 15 counties that have pieces in the eleven districts, at least some of those districts had to have been affected by/implicated in the line drawing that created the unconstitutionality in the eleven districts found to be unconstitutional. This is especially true if the portion(s) of a county not contained within the unconstitutional districts have populations that are racially distinct from the portion(s) of the county found inside the unconstitutional districts. Thus, remedying the unconstitutionality of the eleven districts will, necessarily, require changes in the district boundaries of some of the additional districts containing the counties found within the unconstitutional eleven. In terms of this logic, as many as 34 districts might need to be redrawn.

However, on the one hand, not all of these 34 districts are either unconstitutional or adjacent to one of the unconstitutional districts. And, on the other hand, not all of the districts not found to be unconstitutional that lie adjacent to the unconstitutional districts contain pieces of one or more of the counties found

in an unconstitutional district. There are three districts that are adjacent to one or more of the unconstitutional districts, but which do not contain a piece of any of the 15 counties found in whole or part within the unconstitutional districts (districts 55, 96, 97). And there are five districts that are not adjacent to one or more of the unconstitutional districts, but which do contain a piece of at least one of the 15 counties found in whole or part within the unconstitutional districts (districts 21, 56, 65, 82, 84).

The two sets of constraints on narrowly tailoring, and the fact that they do not perfectly overlap, led me to recommend to the court only maps that confined their boundary changes to the unconstitutional districts and those districts that satisfy both a "district adjacency constraint" and a "potentially implicated county" constraint, i.e. districts that lie in the intersection of these two sets of constraints. There are 19 districts that are both adjacent to one or more the unconstitutional ones and also contain a piece of at least one of the 15 counties found in whole or part within the unconstitutional districts (districts 61, 62, 64, 66, 68, 72, 73, 75, 76, 78, 79, 81, 83, 85, 91, 93, 94, 96, 100). Thus, there are 30 districts in the intersection of a "district adjacency constraint" and a "potentially implicated county" constraint.[1]

However, a careful investigation of redistricting options demonstrates that the number of districts that need to be redrawn in the 2011 enacted map to

[1] There are 38 districts that lie in the union of the "adjacency" and "affected county" constraint.

effectuate a narrowly tailored constitutional map is considerably lower than 30. In other words, in my view, not all the districts that are both adjacent to the unconstitutional ones and contain portions of counties found within the unconstitutional districts need to be redrawn in order to construct a constitutional remedy that is narrowly tailored. The illustrative maps I propose to the Court change no more than 26 districts, and some combinations of the modularized plans would result in a change in as few as 21 districts.

Because there are potential tradeoffs among traditional redistricting criteria (including tradeoffs between limiting the number of districts that are changed from the 2011 Enacted Map and factors such as minimization of unnecessary county splits or improving compactness), other plan feature comparisons may lead the Court, under the totality of circumstances, to a preference for a remedy that changes more than 21 districts. But, plans that changed more than 26 districts would, in my view, require a compelling factual argument that such additional district changes were needed to create a narrowly tailored constitutional remedy. Such an argument would appear to be contradicted by the illustrative map drawing I have done.

Having reached the view, as a political science expert, that no more than 26 districts need to be changed in order to effectuate a constitutional remedy I cannot recommend any of the five remedial plans submitted to the Court on November 2, since each changes from 30 to 33 districts, and four change at least one district not contained in the intersection of "adjacency" and "affected county" constraints

identified above. Moreover, each of these plans has other major deficiencies.[2] These other deficiencies are discussed in more detail in Appendix A to this Report. Appendix A to this Second Report contains text that is virtually verbatim from the Appendix to my Report of December of December 7, 2018.

My goal has been to offer the Court what I view as narrowly tailored illustrative constitutional remedies that are not drawn using race as a preponderant criterion, but in which the African-American community continues to have a realistic equal opportunity to elect candidates of choice in the eleven unconstitutional districts, while also maintaining such an opportunity for the African-American community in district 75. I now turn to the features of the maps I recommended to the Court.[3]

1. The illustrative maps I present to the Court are what I refer to as "modularized"

[2] However, while these maps were not maps I could recommend to the Court, I did examine them to further inform myself about districting options. I should note, moreover, that I have no view about whether or not any of the five remedial plans submitted on November 2 do or do not exhibit a racially preponderant motive, nor would it be appropriate for me, as Special Master, to reach a conclusion about this aspect of a remedial plan, since this requires a legal finding that can only be made by a court. Rather, I seek only to ensure that any plan I recommend to the Court be one that offers a narrowly tailored remedy to the constitutional infirmities found.

[3] I am deeply indebted to Mr. Jonathan Cervas, Ms. Julie Smith, and Mr. Kent Stigall in providing information about Virginia redistricting, demography and geography; reports on submitted remedial plans, and technical map drawing support for plans constructed under my direction. I also appreciate the assistance of Mr. Amigo Wade in obtaining relevant information and in making available technical assistance from his staff.

maps. To facilitate Court review, and to provide the Court with options for alternative ways to provide a narrowly tailored constitutional redrawing, I partitioned the unconstitutional districts into four geographic regions paralleling those used in the Court opinions and provided ways of redrawing each region that were compatible with illustrative configurations in other regions. By partitioning the unconstitutional districts by geography, it is possible to partition the task of line drawing in multiple smaller separable tasks, involving only one or a few unconstitutional districts that need to be drawn in each segment.[4] By this modularization of the redistricting task we can consider alternative plans for each geographic area that involve redrawing the unconstitutional districts and some of the adjacent districts taken as a group without concern for the configuration of districts outside of those in the selected module. The Court can then pick a preferred remedial plan for each geography and combine the chosen separate geographic components so as to create a viable narrowly tailored constitutional plan for the entire state.

The regions are: (1) the Richmond and Henrico area (containing unconstitutional districts 69, 70, 71, 74), the Petersburg area (containing unconstitutional district 63), and the Norfolk-Chesapeake-Portsmouth area (containing unconstitutional districts 79, 80, 89, 90), and (4) the Hampton-Newport News area, also referenced as the Peninsula (containing unconstitutional districts

[4] In the body of the Report I also briefly discuss another way of typologizing unconstitutional districts in terms of whether they are single or multi-county and whether, if multi-county, they contain a preponderant county population.

92 and 95).[5] The illustrative remedial plans differ slightly in the way in which each of the geographic modules is drawn.

I offered to the Court one illustrative module for the Richmond area that has two very minor variations: Richmond 1A and Richmond 1B. These variations differ only in how districts 72 and 73 are treated in the module. One module changes both district 73 and district 72; the other changes just district 73. The only reason to consider a change in both districts is that the incumbent locations in these districts are not the same in 2017 as in 2011, and acknowledging that fact can improve overall district compactness without affecting changes in the unconstitutional districts. However, these changes in the configurations of districts 72 and 73 are not required to effectuate a constitutional remedy. Both of these Richmond area illustrative modules in my view remedy the constitution violation found in districts 69, 70, 71, and 74.

I offered to the Court two illustrative modules for the Petersburg area. The first of these has two very minor variations which differ only in how Dinwiddie is treated in the module: Petersburg illustrative module 1A and Petersburg illustrative module 1B. In one variant the Dinwiddie portion of 2011 District 63 is modified slightly so as to improve overall district compactness, and this change necessitates a slight modification of the Dinwiddie portion of District 75. In the

[5] In the central portion of the state (the Richmond-Petersburg area) district 62 touches districts 70 and 74 as well as district 63. In illustrative map drawing, in order to modularize, the configuration of district 62 must be consistent between the Richmond module and the Petersburg module.

other, the Dinwiddie configurations are left completely unchanged. In Petersburg illustrative module 2, more substantial changes are made, affecting change in five districts, rather than only three districts, or only four districts. However, this map provides the best overall compactness. All these maps, in my view, remedy the constitution violation found in district 63.

I offered to the Court two illustrative module for the Peninsula area. Newport News-Hampton illustrative Module 1 and illustrative Module 2. These differ in how many districts are wholly drawn within Newport News (one or two), though in both modules district 92 is entirely in Hampton, and district 95 is entirely in Newport News. Each of these maps in my view remedies the constitution violations found in district 95 and district 92.

I offered to the Court one illustrative module for the Norfolk-Chesapeake-Portsmouth area that has three very minor variations: Norfolk-Chesapeake 1A, 1B, 1C. These variations differ only very slightly. One variation changes 10 districts in the area, one changes 9, and one changes only 8. The other differences between these variants are in overall compactness and in the number of distinct county pieces found in the plan. These difference occur in districts adjacent to the unconstitutional districts, with the underlying configurations of the four unconstitutional districts in the area either wholly or essentially unchanged across the variants. All of these maps in my view remedy the constitution violation found in districts 77, 80, 89, and 90. However, in the process of reducing the number of districts from the 2011 Enacted Map that need to be changed to achieve a

constitutional remedy, Norfolk Illustrative Module 1C has only one rather than two Norfolk area districts as whole county districts.

2. The plans I drew do not use race as a predominant criterion. As suggested by the *Abrams* decision and many other court cases, a key element of a court adopted plan is that it should be drawn using traditional redistricting criteria. My illustrative remedial maps are each based on the traditional districting criteria identified in U.S. Supreme Court cases and/or the Virginia State Constitution. They also follow the guidelines for addressing issues of unconstitutionality via a narrowly tailored remedy that were laid down in the majority opinion in *Personhuballah v. Alcorn* (Civil Action No. 3:13cv678, January 7, 2016).[6]

As was true for my work as Special Master in *Personhuballah*, I have taken as my first priority to begin the redrawing of the eleven unconstitutional districts at issue here using counties/cities as units to the greatest extent feasible. I have also used other large units of census geography for population equalization purposes to the greatest extent feasible and sought to reduce the splitting of VTDS from what is found in the 2011 Enacted map.

In particular, in my illustrative modules there are nine minority opportunity

[6] That decision ordered the implementation of a remedial plan for the unconstitutionality previously found in Virginia Congressional District 3 -- with that court-ordered plan to be used in the 2016 election.

districts that lie wholly within a single county, compared to only two such districts in the 2011 Enacted Map. These illustrative modules contain two districts wholly in Richmond, one wholly in Henrico, one wholly in Hampton, one wholly in Newport News, two wholly in Norfolk (except for Norfolk Illustrative Module 1C which has only one), one wholly in Portsmouth, and one wholly in Chesapeake. Since, I have reached the conclusion that it is not mathematically possible to draw more than nine minority opportunity districts that lie wholly within a single county, my illustrative modules make use of one important traditional districting principle, reliance on major large pre-existing political subunit boundaries, such as counties/cities, to the greatest extent that is mathematically possible.

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3. Insofar as districts in my illustrative maps are redrawn with substantial African-American populations, it is because following county boundaries to the extent feasible, when taken in conjunction with the existence of concentrated minority populations in various areas of the state, generated such racial proportions. Unlike what is true for the unconstitutional 2011 Enacted map, the observed minority proportions arise because districts in my illustrative remedial modules are drawn following traditional redistricting principles, and not because of any race preponderant motive. Only after traditional districting criteria, such as drawing districts wholly within counties where feasible, have been satisfied, did racial considerations enter into my line-drawing, and even then, race was taken into account only for purposes of seeking to assure that there is no violation of the 14th

Amendment's Equal Protection provision vis-à-vis changes in the racial composition of the unconstitutional districts that might have inadvertently created racial vote dilution. At no time did I seek to adjust the minority population in districts adjacent to the unconstitutional districts to achieve a particular racial result in those adjacent districts. The minority population percentages in those adjacent districts whose boundaries were changed in my illustrative modules resulted from inevitable spillover effects of remedying in a narrowly tailored fashion the packing of African-American voting age population that was done in the 2011 Enacted map.[7]

4. In my illustrative maps, unconstitutional districts are redrawn centered in the county which provided the predominant population in the 2011 plan, when such a

[7] Since the districts found to be unconstitutional are racially packed, with no compelling justification provided for the high level of minority population in any of them, in reconfiguring the eleven unconstitutional districts in a narrowly tailored and non-race preponderant fashion the process of redrawing will necessarily reduce the minority population proportion within these districts. As a matter of simple geographic logic, this minority population will need to be added to districts adjacent to one or more of the unconstitutional districts, since these adjacent districts are the only districts being changed in my illustrative maps. Thus, the African-American population proportion in some of the adjacent districts will necessarily rise. These changes should positively affect the effective representation of African-American voters in some districts adjacent to the unconstitutional districts, and it is possible that some of the reconfigured districts will now be districts in which the African-American community has a realistic equal opportunity to elect a candidate of choice that was previously denied them. But any such consequences were entirely incidental effects of the redrawing of the unconstitutional districts in a constitutional fashion. Moreover, the degree of reduction in black voting age populations in the reconfigured unconstitutional districts varied among them to a substantial extent because that redrawing depended upon the racial geography and demography in the county (9 or 8 districts) or counties (2 or 3 districts) in which the redrawn district is located.

county can clearly be identified.

5. Plans in each geographic area fully remedy identified constitutional infirmities in the districts found unconstitutional and do so in a narrowly tailored fashion, while taking into account equal protection concerns and the need to avoid the potential for violation of Section 2 of the Voting Rights Act with respect to the realistic opportunity of the minority community to elect candidates of choice in those unconstitutional districts (as well as in district 75).

6. The plans are also drawn in a fashion that is blind with respect to partisan outcomes, with partisan data and election outcome data not examined except where needed to avoid minority vote dilution that might inadvertently occur in the two stage (primary and general) election process if the proportion of minority voting age population is changed in the remedial line drawing process.

7. Changes in the 2011 map are limited to those districts that are adjacent to the unconstitutional ones, and those that contain counties found in the unconstitutional districts, and not all of the districts satisfying these two narrow tailoring factors are changed in order to implement a narrowly tailored remedy. In particular, the illustrative maps that could be constructed from combining my illustrative modules in each of the four geographic regions would change at most 26 districts from the 2011 Enacted map, and there would be a combination of modules from each of the

geographic regions that would change only 21 districts from the 2011 Enacted map.

8. Furthermore, the changes made are narrowly drawn in that they are limited to changes that are triggered by redrawing the eleven unconstitutional districts in a constitutional way, and then dealing with the spillover effects on the districts to which they are adjacent in order to satisfy population and geographic constraints. Changes in the configuration of districts adjacent to an unconstitutional district were not a matter of concern, except with respect to avoiding incumbency pairings, and in terms of following traditional districting criteria. Changes in adjacent districts were made in response to the requirement of eliminating the unconstitutionality in the eleven unconstitutional districts that is my obligation as a special master.

9. The plans follow the legal guidance provided to me by the Court, with a population deviation in each district under 1%.

10. In each of the four geographic areas of the state, at least one of my illustrative modules is more compact on average on both the Reock and the Polsby-Popper measures than the corresponding districts in the 2011 Enacted map. Indeed, with only two exceptions, all the illustrative remedial modules I propose are as or more compact on average that their counterparts in the 2011 Enacted map on both the Reock and the Polsby-Popper measures. The two exceptions are higher on one of

these two measures but lower on the other.[8] One such module has the narrow tailoring feature of limiting the changes in the Petersburg area to only three districts, and a variant of that map that changes four district does increase compactness as compared to the 2011 enacted map. The other module that is preferred to the enacted map on only one of the two measures of compactness, retains the positive feature of keeping two districts wholly in Newport News, but draws a constitutional rather than an unconstitutional map for the Newport News district found unconstitutional.

11. The districts in my illustrative maps do not, to the best of my knowledge, contain any "fracking."[9]

12. The districts in the illustrative maps do not, to the best of my knowledge, pair any present (2017) incumbents.[10]

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[8] In general, the fewer district boundaries that are changed from an unconstitutional 2011 map that has a low level of compactness in many of its districts, and the fewer counties whose populations are redrawn to be in more accord with traditional districting principles, the more difficult it is to draw a compact map.

[9] For definition of "fracking," see the text of the Report, which also has a map showing an example of "fracking" in the 2011 Enacted map. Four of the eleven districts in the 2011 Enacted map found to be unconstitutional contained instances of "fracking" (districts 63, 70, 90, and 95).

[10] As part of my extensive exploratory line drawing, I have also been able to draw constitutional maps following traditional districting principles that do not pair any 2009/2011 incumbents but, since these maps are no longer relevant, I have not bothered to reproduce them in this Report or in my Report of December 7, 2018.

In sum, the illustrative plans/maps in modularized form I have created to offer for review by the Court are intended to offer possible versions of the eleven unconstitutional districts that, in my view, remedy the constitutional violation identified in the majority opinion in *Golden Bethune-Hill v. Virginia* in a narrowly tailored fashion by following traditional districting criteria in each of the four geographic areas of the state I have identified, while still avoiding the pairing of any incumbents.

My modularized approach to line drawing also allows the parties and intervenors to comment on how they might propose particular geography be redrawn without forcing a ripple of changes in other geographic areas of the state and/or to express preferences between alternative configurations in each area of the state. All but Defendant-Intervenors availed themselves of the opportunity prior to the January 10, 2019 Hearing express a relative preference among the illustrative modules I suggested to the Court if one of their own plans -- the plan they sought to have the Court adopt, was not chosen. Among the litigants or concerned groups who expressed such relative preferences at or prior to the 2019 Hearing, there was a consensus preference for Petersburg Illustrative Module 2 and Peninsula Illustrative Module 2, that included both the Plaintiffs and the NAACP, with the Defendant prepared to accept any of the illustrative modules. With respect to the Norfolk area and Richmond area illustrative modules there was no such clear consensus among the illustrative modules suggested as the basis for map drawing in those two regions, but there was no support expressed for Norfolk Illustrative

Module 1C. As of the end of the January 10, 2019 Hearing, Defendant-Intervenors had simply rejected all of the illustrative modules and did not choose to indicate a relative preference among them.

Information about the key features of each of the illustrative configurations in each of the four geographic modules is provided in the body of the Report, and shape files for each were made available by the legislative staff of the Virginia House of Delegates when this Report was filed on December 7, 2018. Unfortunately, however, there were relatively minor errors in the Norfolk area shape files that were posted on December 7, which I discovered too late to correct on December 7. However, those errors in the Norfolk area shape files for the illustrative modules in that area were corrected on the next business day. [11]

No comments made about my illustrative modules on or before January 10, 2019 have led me to believe it necessary to provide to the Court additional illustrative modules, other than what is provided in offering the corrected versions

[11] Minor errors in the population and minority population data reported in my December 7, 2018 Report for the Norfolk area illustrative modules were corrected in the Third Addendum to my December 7, 2018 Report, filed on January 4, 2019, which is based on the corrected shape files deposited with DLS and posted on their website on December 10, 2018. However, there remained errors in my Third Addendum that I have only just now recognized that resulted from the fact that two of the column headings of the first three of the tables in that Addendum were inadvertently reversed: the black voting age population percentages labeled as "Reported" contains the "Correct" figures, and the column labeled as "Correct" contains the figures that were reported in my December 7, 2918 Report. This error does not affect the Dif column in these three tables that shows the difference between the percentages reported in the two columns; and none of these errors affected any of the recommendations in my December 7, 2018 Report. These errors are corrected in the tables reported below in this Second Report.

of my illustrative modules for the Norfolk area. The Court has, as yet, issued no orders for me re the general shape of a final remedial map configuration in any of the geographic regions, or for a plan as a whole. I anticipate receiving such detailed instructions sometime after January 17, 2019. With the assistance of legislative staff, I should be able to conduct any needed further map drawing pursuant to those instructions (e.g., to achieve a still further reduction in an already low number of VTD splits) soon after being given these instructions, so that a court-ordered map can be put into place in a timely fashion.

SECOND REPORT OF THE SPECIAL MASTER

I. BACKGROUND

Corrected election data and corrected maps for each of the Norfolk area illustrative modules is presented in aggregated form in the body of this Second Report. This Second Report incorporates the corrections of typos, inadvertent map and data omissions, and other mistakes identified in my First Addendum of December 10, 2018; my Second Addendum of December 28, 2018; my Third Addendum of January 4, 2019, and my Fourth Addendum of January 8, 2019. To the best of my knowledge the data reported in this Second Report uniformly uses the African-American voting age population data provided to me by the DLS staff of the Virginia Legislature.[12] However, other than these corrections, the text of the

[12] In advertently, the DLS definition of black voting age population was not used for the 2011 Enacted Map in my Report of December 7, 2018 and in subsequent addenda, even though the DLS definitions was used for all other maps and illustrative modules in the December 7, 2018 Report and in the three next addenda. The DLS definition takes the mono-racial black voting age population reported by the U.S. Census and adds to it the bi-racial population who report their census racial identities as both black and white. I am indebted to Defendant-Intervenors for calling this error to my attention. This measurement inconsistency between the measurement of black voting age percentage for the 2011 Enacted map and the method used for all other maps and illustrative modules was first noted in my Fourth Addendum of January 8, 2019. This measurement error did not affect any of the recommendations in my December 7, 2018 Report, although there were very minor changes in black population percentages shown for the 2011 Enacted Map in my December 7, 2018 Report that are corrected in my Fourth Addendum of January 8, 2019, and that are shown correctly in this Second Report. At no time did I make use of what has been referred to as the "DOJ method" of measuring black population and voting age population. As I understand it, that method classifies individuals who identify themselves as Hispanic/Latino/Spanish Heritage as Hispanic regardless of their racial identity

body of this Second Report is taken virtually verbatim from ~~my the~~the body of the text of my First Report of December 7, 2018.

On December14, 2018 various briefs were filed that challenged statements or conclusions in my December 7 Report, and some data issues were raised in briefs filed on January 4, 2019. Data issues that have been raised are dealt with in this Second Report in the form of technical corrections to the data reported in my December 7, 2018 Report. More substantive criticisms I have addressed in a second appendix to this Report, Appendix B. Appendix B incorporates almost verbatim and essentially in its entirety my Second Addendum of December 28, 2018, and addresses many of the numerous misleading assertions about my illustrative modules and the process of line drawing that I used that were raised in materials submitted to the Court prior to that date.[13]

On January 15, 2019 Plaintiffs responded to a Court Order requesting a summary table of black voting age data for submitted remedial maps and for the special master's illustrative modules. In a few Norfolk area districts, the black voting age population percentages in Exhibit A of that January 15, 2019 response

[13] There were further assertions and factual claims made by various Counsel during the January 10, 2019 Hearing that I also regard as misleading or erroneous, but I do not respond to these in Appendix B or elsewhere in this Second Report. I also do not incorporate in this Second Report a response to any documents filed after January 10, 2019, with the exception of the Plaintiffs January 15, 2019 response to the Court Order to provide black voting age population data. The exception occurs because investigating the data discrepancies between the black voting age population in various Norfolk area districts provided by Plaintiffs and those reported by DLS were relevant to verifying the accuracy of the data compilations provided in this Second Report. See Appendix C.

show percentages different from those provided by DLS for the 2011 Enacted map, the NAACP map, -and for my illustrative modules for the Norfolk area, even though these percentages are labeled in Exhibit A as DLS based percentages. The possible reasons for these clearly unintended (and very minor) Norfolk area discrepancies in black voting age percentages in Exhibit A vis-à-vis -DLS data for the same districts in my illustrative Norfolk area modules and in a few Norfolk area districts in other maps, including one district in the 2011 Enacted Map, are discussed in Appendix C to this Report. [14]

1. Pursuant to my responsibilities as a special master in *Golden Bethune Hill v. State Board of Elections*, to assist and advise the Court, I have

(a) reviewed the present (2011) legislative plan for the State of Virginia House of Delegate drawn by the Virginia General Assembly

(b) familiarized myself with the Court opinions in *Bethune Hill v. State Board of Elections*, especially with respect to the majority opinion's identification in its 2018 ruling of constitutional infirmities in the present configuration of the eleven unconstitutional districts. I have also reviewed the 2017 Supreme Court decision that resulted in the case being remanded for rehearing by a three-judge panel.

[14] As noted above, the data shown in my Second Report are, to the best of my knowledge, the data used by Virginia's own legislative services (DLS).

(c) reviewed basic geographic data for the State (e.g., county and city boundaries), and demographic information on total population and the racial and ethnic composition of population at various levels of census geography, with a focus on areas of the state contained in or adjacent to the eleven districts found unconstitutional.

(d1) obtained (pursuant to an Order of the Court) technical assistance in map creation from staff of the Division of Legislative Services of the Virginia State Legislature (Kent Stigall, and Julie Smith) and logistic support from their supervisor (Amigo Wade), each of whom has signed an oath of confidentiality drafted by the Court.

(d2) obtained (pursuant to an Order of the Court) technical assistance in map creation from an advanced to candidacy Ph.D. student in political science at the University of California, Irvine, Jonathan Cervas. Cervas has technical Geographic Information System (GIS) skills. Cervas has also signed the oath of confidentiality required by the Court.

(e) reviewed all of the plans that had been submitted to the Court on or before November 2, 2018 in terms of their suitability as potential remedies for all of the constitutional violations in the 2011 House of Delegates plan identified by the

Golden Bethune-Hill court. There were five submissions that contained plans and maps that could be analyzed, which I reference in short form as Plaintiff A and Plaintiff B (from the plaintiffs), DI7002 and DI7003 from Defendant Intervenors, (which I sometimes reference simply as 7002 and 7003 for short, since these maps were introduced into the legislature as HB7002 and HB7003), and the map from Virginia State Conference of NAACP Branches, which I henceforth simply label simply as the NAACP map. With the initial exception of the NAACP map, the state legislative staff provided me shape files and data files for each of the five plans so that I had sufficient information on each of the plans to use identical metrics to describe each. These are metrics that can be used by the Court to evaluate the degree to which each offered a narrowly tailored constitutional remedy. In the case of the NAACP map there was need for a supplemental submission to clarify district numbering in the submitted maps before I was able to generate data reports for the map. With that submission in hand, the NAAP map was given the same status as the four other submitted remedial maps and given the same review. [15]

[15] There were two further remedial map submissions in time for the Court deadline. Unfortunately, as I was informed by legislative staff, the two College of William and Mary student submissions contained too many errors in the allocation of blocks and other census units to make it possible to create meaningful data reports using the state legislative system or *Maptitude*. Accordingly, I do not consider these maps in my Report. There was also a map submitted by the New Virginia Majority as part of their submission in response to the Court's November 16 response deadline. Because this map was submitted after the Court's November 2 deadline, and because it changed 36 districts -- far more than are needed for a narrowly tailored remedy (see below), I do not consider this map in my Report. I also had access to remedial maps publicly posted on the Internet that were created by the non-partisan Redistricting Project run by Professor Sam Wang at Princeton University. Because this group did not provide a formal submission to the Court, I do not

(f) reviewed the response to proposed remedial plans that had been submitted on or before November 16, 2018 by the parties (and intervenors) in this case.

(g) over the period from October 19-November 16 for Julie Smith and Jonathan Cervas (and over the period beginning in early November for Kent Stigall) I provided instructions about how to create multiple very preliminary illustrative legislative maps for various geographic areas of the state in an iterative fashion. These plans were created as a basis for exploring multiple options for redrawing the eleven districts in a narrowly tailored and constitutional fashion, avoiding unnecessary county and city splits, and seeking to satisfy other traditional districting criteria. These very preliminary maps allowed me to explore mapping options where avoidance of incumbent pairings was not a consideration.

(h) in the process of viewing plans submitted to the court on November 2 for purposes of evaluating their suitability for adoption by the Court, I examined the mapping choices offered in the submitted remedial plans to determine if some elements of them might be adopted in whole or in part even if the plan as a whole

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consider these maps in my Report. However, because I believe strongly in the importance of public input into the redistricting process, especially that involving maps based on traditional (good government) redistricting criteria, even though I do not provide specific response to any of the maps proposed by these various groups in my Report, I did briefly examine them for possible useful ideas in remedial line drawing.

was judged unsatisfactory. I also reviewed the feedback about submitted plans from the parties and intervenors received by the Court as of November 16, 2018. Soon after this latter review had been completed, I revisited my preliminary line drawing exercises in order to take into account any criticisms of submitted plans that I might also find relevant to the drafting of the remedial geographically separated modules I was preparing for the Court.

2. There are a number of different criteria that can be used to evaluate a (legislative) redistricting plan as a whole, or used to evaluate the configuration of one or more individual districts. These include

(a) conformity to a standard of one person, one vote;

(b) avoiding either fragmentation or packing of geographically concentrated minority populations that might have the effect or purpose of minimizing or diluting the voting strength of constitutionally protected minorities, and/or lead to retrogression in the ability of minority communities to realistically have an "equal opportunity" to elect candidates of choice in accordance with Section 2 of the Voting Rights Act and the Equal Protection clause of the U.S. Constitution;

(c) avoiding use of race as a predominant criterion for redistricting;

(d) avoiding the creation of districts which are divided into two or more

discontiguous parts;

(e) avoiding splits (partition into two or more legislative districts) of long standing political subunits such as cities or counties,[16] unless these splits become obligatory or near obligatory by the need to satisfy other criteria such as population equality;[17]

(f) avoiding unnecessarily ill-compact districts, i.e., ones which are elongated or have irregularly shaped perimeters. [18]

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[16] In Reports prepared by the State of Virginia's Division of Legislative Services, political entities which are either cities or counties are described as *localities*. Note also that some political entities that have 'city' in the title, such as Charles City, more closely resemble what in other states would be labeled as counties. I have generally used 'county' as a shorthand for all such entities.

[17] As a matter of practicality, one may also wish to minimize splits in what are called VTDs, i.e., the units used to define vote tabulation boundaries. The formation of the boundaries of such units are specified by local jurisdictions for purposes of administrative convenience. And VTDs are frequently redrawn when there are substantial population shifts over the course of a decade. The main reason for avoiding splitting VTDs is simply to avoid inconvenience to localities, but of course, we would also wish to avoid using race as a preponderant factor in the splitting of VTDS.

[18] See below for further elaboration of the two standard tests for compactness used (Polsby-Popper and Reock), which tap the two key different aspects of compactness – giving an area-based and a perimeter-based measure, respectively. These are two measures that were ordered by the Court to be used in creating comparisons across plans/districts.

In situation such as that applying in *Golden Bethune-Hill*, where a court is drawing a map to remedy a constitutional infirmity, there are three other criteria that are relevant:

(g) narrowly tailoring the remedial map so as to avoid changes in existing district boundaries that are not required to create a constitutional map by

(g1) limiting all changes in districts to the districts that are immediately adjacent to the unconstitutional districts;

(g2) minimizing the number of adjacent districts that are redrawn in the process of creating a constitutional map to the extent feasible. Feasibility is determined by a close examination of the population demography of the areas where unconstitutional districts are found, taking into account the need to avoid minority vote dilution, and the desirability of satisfying traditional criteria of redistricting that are appropriate for a court-imposed map that avoids making race its preponderant criterion (e.g., improving or maintaining overall district compactness, using whole counties and large units of census geography to create districts when this is feasible).[19] Also relevant to narrow tailoring is the identification of the districts not found to be unconstitutional that contain population from one or more

[19] Traditional districting criteria are also sometimes referred to as "good government" redistricting criteria.

of the counties found within the unconstitutional districts, since the redrawing of such counties may be necessary as part of the crafting of a constitutional remedy that is done in accord with traditional districting criteria.

(h) neutrality

A court drawn plan should not be drawn to deliberately either favor or disfavor any political party or point of view.

(i) incumbency pairings

Incumbency protection is not a factor that can be permitted to outweigh the need for creation of a plan that satisfies the U.S. Constitution. I began my explorations of possible remedial maps by paying no attention to incumbencies. My aim was to determine the potential for drawing constitutional maps that satisfy traditional districting criteria and provide a narrowly tailored remedy for the constitutional violations found. Only after I had drawn such illustrative maps did I begin to consider incumbency to ascertain whether constitutional maps drawn according to the same principles as my initial illustrative maps could be adapted to also avoid incumbency pairings. Thus, incumbency was the last factor I took into account, and I examined modifications of my initial illustrative maps to see if they could be adapted to avoid incumbent pairings without jeopardizing the narrowly tailored removal of constitutional infirmities in the eleven districts found to be unconstitutional that had been achieved in those initial illustrative maps.

3. Recommendations re the five analyzable remedial plans submitted pursuant to the Court's November 2 deadline

As noted earlier, there were five submissions pursuant to the Court's November 2 deadline that contained plans and maps offered as remedies which had sufficient information provided for me to evaluate them with respect to the relevant criteria discussed in the body of my Report. I reference these as Plaintiff's A and Plaintiff's B (from the plaintiffs), DI7002 and DI7003 from Defendant Intervenors (maps which were first introduced into the legislature), and the map from Virginia State Conference of NAACP Branches, which I henceforth simply label simply as the NAACP map.

The five complete plans/maps offered pursuant to the Court's November 7 deadline are, in my view, fatally flawed by not offered a fully narrowly tailored remedy for the constitutional infirmities in the set of eleven districts found to be unconstitutional instances of race preponderant gerrymandering in that they either modify some legislative districts that, demonstrably, did not need to be changed to deal with the constitutional problems identified (e.g., reconfigurations of more districts than was needed for remedial purposes, or redrawing districts that were not adjacent to the unconstitutional districts) and/or they failed to satisfactorily address the constitutional infirmity in some of the unconstitutional districts in a

narrowly tailored fashion.

I discuss in the Appendix to this report the reasons why I cannot recommend to the Court any of the submitted remedial maps. However, while I cannot recommend the adoption of any of the plans in their present form, I have reviewed the features of each of these submitted proposed remedial maps with an eye toward improving my own understanding of map making possibilities, especially vis-à-vis ways to draw constitutional maps in particular geographic regions of the state.

4. Priorities

(a) Having evaluated the submitted remedial maps and determining that I could not recommend any of them to the Court it became necessary to provide illustrative maps of my own to the Court, indicating ways in which a constitutional map could be drawn. In drawing illustrative maps for consideration by the Court that in my view could serve to remedy the constitutional infirmities identified in the 2018 majority opinion in *Golden Bethune-Hill v. Virginia State Board of Elections*, Civil Action No. 3:14cv852, I have sought to take into account all of the criteria enumerated above. In general, however, there are tradeoffs among the various criteria. In practice, when there are so many distinct criteria to be balance off against one another, it may be impossible to satisfy all criteria fully. For example, strict adherence to a population equality standard may lead to the necessity to split some political subunits, while undue deference to existing district lines may lead to

either fragmentation or packing of minority voting strength. And the more districts that are changed, the easier it may be to avoid county splits in the set of changed districts, and thus in the plan as a whole.

(b) The first three of the criteria listed in Section 2 above, 2.(a), 2.(b), and 2.(c), I treated as of highest priority since they are grounded in provisions of the U.S. Constitution, as these have been interpreted by the U.S. Supreme Court. However, because the indicia used by the majority in the *Golden Bethune-Hill* opinion to infer predominant racial motive included district boundaries that picked up pockets of minority population in a fashion that did not appear in any way compelled by the demography of the state, including ones that required unnecessary split of county/city lines (or VTDs) in a way that appeared linked to race, and because compactness and contiguity are referenced in the State Constitution, I was

especially attentive to issues of contiguity, [20] compactness[21] and avoiding splitting of existing political subunit boundaries within the district in drawing my illustrative remedial configurations of the unconstitutional districts.[22] I have also treated the

[20] Contiguity of legislative districts is required by the Virginia constitution (Article II, Section 6). For redistricting, the standard (mathematical) way to define contiguity is in terms of the ability of voters to move from any one part of the district to any other part of the district without leaving the district, i.e. the district should not consist of multiple geographically separated parts. Special issues of interpretation of this definition of contiguity arise when district boundaries include substantial bodies of water in whole or in part and district contiguity is established over an area of water, especially when the water in question is adjacent to more than one district. In such cases, sometimes contiguity is interpreted in pragmatic terms as connection from any land part of the district to any other land part of the district via land, bridge or tunnel. Alternatively, when the boundaries of political, voting, or census units encompass water areas along with land areas, contiguity by water might also be established when legal boundaries touch, even if the areas that are joined in this way have water at each edge of the boundary. In Virginia, contiguity has also been interpreted as occurring when there is a direct line of sight connection over a body of water between two pieces of land. But the interpretation of contiguity by water has sometimes been controversial, and even the general notion of contiguity can be interpreted in more than one way and is complicated by how the U.S. Bureau of the Census allocates portions of rivers and lakes to different census blocks, and how it deals with islands.

[21] Compactness is a criterion that is identified in Article II, Section 6 of the Virginia Constitution: "Members of the House of Representatives of the United States and members of the Senate and of the House of Delegates of the General Assembly shall be elected from electoral districts established by the General Assembly. Every electoral district shall be composed of contiguous and compact territory and shall be so constituted as to give, as nearly as is practicable, representation in proportion to the population of the district." There are multiple ways to define/operationalize the concept of compactness (see discussion below).

[22] Avoiding the splitting of counties or cities is a traditional districting criterion that has been referenced in many U.S. Supreme Court cases dealing with districting, including *Mahan v. Howell* 410 U.S. 315 (1973). While that case dealt with population inequalities and there have been newer cases clarifying appropriate population equality for legislative districts, in that case the Court also acknowledged the position of the State of Virginia that counties had a special status re legislative redistricting in that: "Under Art. VII, §§ 2 and 3 of Virginia's Constitution, the General Assembly is given extensive power to enact special

eighth criterion, neutrality, as a necessity in a court-adopted plan.

I treated incumbency protection as the least important of the criteria I took into account. However, I was nonetheless able to create maps to remedy the constitutional violations that avoided the pairing of any 2017 incumbents in terms of their home addresses.

III. Operationalization of Districting Criteria for Purposes of Comparing Plans

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legislation regarding the organization of, and the exercise of governmental powers by, counties, cities, towns, and other political subdivisions;" and the Court majority also asserted that "respecting the boundaries of political subdivisions" is a "rational state policy" (at 323-4). The Virginia legislature in 2011 also identified counties as one indicator of community of interest, but listed it as one among many. "Communities of Interest Districts shall be based on legislative consideration of the varied factors that can create or contribute to communities of interest. These factors may include, among others, economic factors, social factors, cultural factors, geographic features, governmental jurisdictions and service delivery areas, political beliefs, voting trends, and incumbency considerations. ...The discernment, weighing, and balancing of the varied factors that contribute to communities of interest is an intensely political process best carried out by elected representatives of the people. Local government jurisdiction and precinct lines may reflect communities of interest to be balanced, but they are entitled to no greater weight as a matter of state policy than other identifiable communities of interest." (http://dls.virginia.gov/pubs/redist/2011Draw1.pdf)

Since counties (and cities) represent identifiable communities of interest, my focus in the constitutional redrawing of the eleven districts was on the maintenance of county (or city) boundaries, since this was the only straightforward and indisputable indicator of communities of interest available to me.

1. I now discuss briefly, and in the abstract, how I measured compliance with each of the nine criteria with respects to potential remedial plans.

(a) population equality

Since the present map and all of the maps offered in briefs submitted on or before November 2 specified district configurations which were within one percentage point of ideal district size, [23] and this level of population equality had been previously achieved by the State of Virginia, the illustrative maps I have offered to the Court also provide this level of strict population equality. This population equality standard ensures population equality consistency across all of Virginia's House of Delegates' districts, and was mandated by the Court.[24]

[23] These population values are based on the 2010 Census. In 2018, because of births, deaths, and migration in and out of the districts, the 2010 census figures can only be regarded as approximations to the present population in the legislative districts in Virginia. Nonetheless, the 2010 Census still provides what is unquestionably the best information now available about Virginia's population demography, and is the appropriate data to use. In fact, it is the only data we could use that can be projected down into units of census geography.

[24] In other jurisdictions with a different factual background, previous redistricting decisions of the U.S. Supreme Court indicate that state legislative plan with greater than a plus or minus one percentage point deviation from ideal may also be constitutional. Except for special circumstances involving a finding of boundary manipulations (see *Larios v. Cox* 300 F.Supp.2d 1320 (N.D. Ga. 2004), summarily affirmed by the Supreme Court) a plus or minus five percent total population deviation has generally been regarded as acceptable for state legislative maps, even though such a deviation would be completely unacceptable for congressional districting.

(b) equal protection, the realistic opportunity of a minority community to elect candidates of its choice, i.e., to create what is sometimes referred to as a "minority opportunity district" or a "minority opportunity to elect" district.

i. the demography and geography of equal protection

a. In seeking to reach a professional judgment as a political scientist specialist on redistricting concerning the realistic opportunity for the minority community to elect candidates of choice – an analysis required by Section 2 of the Voting Rights Act, as well as for the closely related questions of minority fragmentation or packing, a necessary starting point is a review of the demography and geography of the State of Virginia. This review should encompass both the unconstitutional districts and areas of the state proximate to them, including districts adjacent to those districts and districts containing counties that are found in whole or in part within the unconstitutional districts.

b. In conducting my review of the racial demography of the State in the areas near the unconstitutional districts, it became clear that there were substantial minority population concentrations in counties such as Richmond, Henrico, Petersburg, Hampton, Newport News, Norfolk, Portsmouth and Chesapeake. And it also became clear that, even within counties, there was substantial heterogeneity in racial

demography. For example, eastern Henrico has very substantial African-American population while western Henrico is generally heavily white in demographic composition. Similarly, in Richmond, the western portion of the county, especially the northwest corner, is heavily white, while other portions of the county have very substantial African-American populations. And similar differences in racial geographic concentration arise in the eastern portion of the state both across counties and within-counties.

c. In Golden Bethune-Hill we unconstitutional districts are ones where there is a previous history of minority electoral success, but where race has been made the preponderant factor in the redrawing of district lines. In many of the unconstitutional districts black population from adjacent districts have been added to districts in which there was already minority success under a previous plan, and/or white population removed. Under these circumstance, it is inevitable that a narrowly tailored remedy plan will, with near certainty, reduce the black voting age population percentages in many if not all of the districts found to be unconstitutional. And concomitantly such a reduction in the minority population in the unconstitutional districts will, as a mathematical necessity, lead to an increase in the minority population in some of the districts adjacent to those found to be unconstitutional. These changes should positively affect the effective representation of African-American voters in some districts adjacent to the unconstitutional districts. It is also possible that some of the illustrative

reconfigured districts adjacent to the unconstitutional districts will now be districts in which, even though not majority African-American in their voting age population, the African-American community has a realistic equal opportunity to elect a candidate of choice that was previously denied them. But, in my illustrative maps, any such consequences were entirely incidental effects of the need to redraw the unconstitutional districts in a constitutional fashion.

ii. In redrawn unconstitutional districts, in addition to demography, the second essential element in considering the potential to create a "minority opportunity to elect" district involves the study of elections in the relevant areas of the state.

a. In looking to specify the set of elections that it useful to analyze, there are several principles of "best practice:" [25]

a1. The elections analyzed should be ones where a viable minority candidate is a contestant.[26] Usually we examine election results involving contests where there

[25] For further discussion of this and related issues see Grofman, Bernard, Lisa Handley and Richard Niemi. Minority Representation and the Quest for Voting Equality, (Cambridge Univ. Press, 1992). While the discussion of voting rights case law in this work is completely outdated, the technical discussion of statistical tools for use in the voting rights context remains relevant.

[26] Looking at contests where there is no minority candidate can be misleading if white voters are less likely to vote for a minority candidate of a given party than they are to vote for a non-minority candidate of that same party.

are both minority and non-minority candidates, and where there is a least one viable candidate of each race.[27] Information can, however, also be gleaned from contests where only minority candidates are involved, or where there is an election involving a minority candidate in which that candidate wins uncontested.

a2. The elections analyzed should be recent.

a3. The elections analyzed should be in the parts of the state where the proposed remedial district or districts are to be created or, if the election being analyzed is statewide, it needs to be possible to report results of that election for areas of the state that (in whole or part) comprise actual or hypothetical districts, i.e., what are commonly called "recompiled" elections. The nature of the districts sufficient to provide the minority community a realistic opportunity to elect candidates of choice can vary across different areas of a state. Looking at data on "recompiled" elections across different potential districts allows us to take into account local variations in voting behavior and demography.

a4. The elections analyzed should be of the same or very similar type as the type of elections at legal issue. Here the key distinction is between partisan and non-partisan elections: Partisan elections offer voters a partisan cue, and are more likely

[27] Election results where candidates of one race are not viable can be misleading if projected into contexts where we might expect there to be viable candidates of more than one race. However, essentially uncontested contests can still be useful sources of information.

to trigger partisan attitudes and loyalties on the part of voters to the candidate of whichever party they are most attached to. Another difference is that partisan elections are typically a two stage process in which there is a contest for party nomination and then a general election.

a5. If elections are of a partisan nature, then the realistic analysis of potential to elect minority candidates of choice must consider both the likely outcomes at the primary election phase and at the general election phase of the election process. To put it simply: in a partisan election contest, to win, you must first be nominated (in a party primary) and, once nominated by a party, be able to go on to win the general election.[28] Thus while for all elections, for voting rights purposes, analyses must be attentive to the (expected) racial composition of the districts; for partisan contests it is important to be attentive to the expected racial composition of the electorate at both phases of the election process, primary and general.

[28] A more formal way to express this insight is in terms of what statisticians refer to as the *Law of Conditional Probability*. That Law states that the probability of the joint outcome (A and B) equals the probability of the outcome A if the outcome B has occurred, multiplied by the probability of obtaining the outcome B. In the partisan election context, what this means is that the probability of a (minority) candidate of choice of the minority community being elected is the product of the probability that a (minority) candidate of choice of the minority community wins the general election if that candidate is the nominee of a given political party multiplied by the probability that a (minority) candidate of choice of the minority community wins the primary of that party, summed over all parties.

a6. Analyses should be attentive to whether or not there is an incumbent in the election contest, and to the race or ethnicity of that incumbent and, for partisan contests, they should be attentive to the party of the incumbent.

b. My review of the potential for (continued) minority electoral success in in evaluating proposed remedial maps, and comparing the present plan to the illustrative districts I have drawn I draw on these principles of best practices in evaluating minority voting equality issues.

b1. I have looked at contests involving an African-American candidate;

b2. I have looked at recent elections, with the oldest from 2012 and some considerably more recent;

b3. I have looked at contests taking place in the area of the state where there is substantial black population in or proximate to the districts found to be unconstitutional;

b4. I have looked at general election contests that are partisan in character;

b5. I have looked at both primary election contests and general elections;

b6. I have been attentive in my analyses to whether or not there was an incumbent in the contest and to the party of that incumbent.

b7. I have been attentive to what we can learn from compiled elections about potential legislative elections within the same geography.

c. specific data reviewed with respect to equal protection issues

c1. I have reviewed data on general elections and Democratic primary elections in 2016 and 2018 in Congressional District 3 and Congressional District 4 as these districts were reconfigured to be used in the 2016 election. In both 2016 and 2018, the elections in Congressional District 3 and in Congressional District 4 resulted in the election success of an African-American candidate despite the fact that the black voting age population in each of these districts, after they had been reconfigured following the *Personhuballah* litigation, was well under 50%: 48% in current CD3 and 42.7% in current CD4. In 2016, Representative Scott was re-elected in CD3 with 66.7% of the vote, and Mr. McEachin was elected in CD4 with 57.7% of the vote. In 2018, Representative Scott was re-elected with 91.2% of the vote and Representative McEachin was re-elected with 62.6% of the vote. I would call particular attention to the fact that Mr. McEachin was not the incumbent at the time of his initial election in CD4.

In the Democratic primary election in 2016, in the newly reconfigured Virginia congressional district 3, the incumbent, Representative Scott, was uncontested in the Democratic primary. In the Democratic primary election in 2016, in the newly reconfigured Virginia congressional district 4, where there was no incumbent, the only candidates in that primary were African-American, with A. Donald McEachin the overwhelming winner in that primary. Both won in the 2016 general election. In 2018 both the Democratic primary in CD3 and that in CD4 went uncontested and both African-American incumbents went on to win the general election.

These election results provide what I view as compelling evidence that, in the regions of the state where the eleven districts found unconstitutional are located, it may not be necessary to have districts with black majorities in order to allow the African-American community a realistic equal opportunity to elect candidates of choice.

C2. I have reviewed legislative election data on general elections in the unconstitutional legislative districts in 2017 and 2015. In all of these elections, in 2017, the candidate of the Democratic party, a candidate of choice of the African-American community, is uncontested in the general election.

c. For studying the realistic opportunity of an African-American candidate of choice to win elections in different legislative district configurations and in both

primary and general elections, I have also made use of statewide election data at the voter tabulation unit (precinct) level to create a "recompiled" election within any given proposed legislative district in the State. In particular, I examined projections into illustrative districts of the Obama vote in the 2012 general election, and the Fairfax vote in the 2013 Democratic primary to select a Democratic Party candidate for Attorney General of the State of Virginia These are both biracial contests.

c1. In the 2012 contest President Obama was an incumbent; while he was not an incumbent in 2008. However, the choice of the 2012 election rather than the 2008 one is still a conservative one for assessing the likelihood of success of a minority candidate in a reconfigured district in that, in general, in the relevant parts of Virginia Mr. Obama's support was higher in the general election in 2008 than in 2012 – though the differences are not great.[29]

c2. In the 2013 Attorney General Democratic primary the African-American candidate, Justin Fairfax, was not an incumbent, and his principal opponent was a white candidate with a strong background who went on to win the Democratic primary, statewide, and to subsequently be elected Attorney General of the State of

[29] In accord with best practices, since we are now at the remedy phase of this case, it is appropriate to make use of relevant election data for elections closer to the present even though that data was unavailable in 2011, since these more recent elections may be more indicative of contemporary voting patterns.

Virginia. Looking at the Fairfax vote share in a statewide contest recompiled within a (new) district boundary is a conservative estimate of potential minority support in a Democratic primary, since a minority candidate residing locally with some degree of name recognition within the much smaller confines of a legislative district could be expected to win more votes (likely, considerably more votes) in the Democratic primary in the district that what was obtained by Mr. Fairfax. [30]

c3. Similarly, we expect that a minority incumbent, especially one who had been elected more than once, would win more votes in the Democratic primary in the district than did Mr. Fairfax, almost certainly considerably more votes. Focusing on the unconstitutional districts, we see that, in the Richmond area there are very long-time incumbents in districts 69, 70, and 74 and an incumbent elected in district 71 in a special election in February 2017. In district 63 the incumbent from Petersburg was first elected in 2015. In the Norfolk-Portsmouth area, the incumbent in district 77 was elected in a special election in 2016; in district 80 there is a very long-time incumbent; in district 89 the incumbent was first elected in 2017, and in district 90 you have an incumbent first elected in a special election in 2014. In the Hampton-Newport News area, in district 92 you have a very long-time incumbent; in district 95 you have an incumbent first elected in 2015.

[30] The only likely exception to this observation is the legislative district in which Mr. Fairfax has his own home.

iv. minority cohesion and cross-over voting

a. The likelihood that a minority candidate of choice will win an election depends in part and upon the degree of cohesion of minority voters in their voting support for the minority candidate of choice, and the willingness of non-minority voters to vote for the candidate of choice of the minority community (what is often called "cross-over voting"). The level of minority cohesion on the one hand, and cross over voting by non-minority voters, on the other, is captured by the measurement of the level of what is called in the redistricting literature *racially polarized voting* (a.k.a. *racial bloc voting* (RBV)), a measure of the degree to which voting patterns can be predicted largely on the basis of the race of the voter. As noted in my Special Master Report in Personhuballah: "*Ceteris paribus*, high levels of minority political cohesion and substantial levels of white cross-over voting make it much more likely that a minority candidate of choice has a realistic opportunity to be elected, even in contests in Virginia where voting is polarized along racial lines, as long as minority population is large enough to allow for a party nomination and subsequent election with cross-over support from non-minority supporters of that party."

b. I have reviewed the Report of Dr. Bradley Palmer, the only expert witness testimony in this case that I am aware of that provides statistical evidence about the level of racially polarized voting in the various districts in the 2011 legislative plan that were found to have been unconstitutionally drawn. I am reviewing that

portion of the expert witness testimony from Dr. Palmer solely for the limited purpose of assessing, from a social science perspective, proposed reconfigurations in terms of evidence offered about levels of racial bloc voting in different parts of the state.[31] While Dr. Palmer's analyses deal with racial bloc voting patterns in the 2011 unconstitutional districts,[32] his conclusion that a 55% black voting population, or even a 50% black voting age population, are not required in some areas of the state in order to draw districts in which minorities have a realistic equal opportunity to elect candidates of choice is the same as what I have reached through my own independent analyses.

c3. I have also reread and reviewed a portion of the Report of Dr. Lisa Handley in *Personhuballah*, attached as an appendix to a Brief submitted by the Governor of Virginia in that case in 2015. Dr. Handley analyses recompiled elections in the areas in what was Congressional District 3 in the 2011 Virginia congressional map. These areas correspond to geography now largely included in either Congressional District 3 or Congressional District 4 in the 2016 congressional map for the state

[31] While I have read other expert witness reports in this case, and the discussion of these reports and trial testimony in the *Golden Bethune-Hill* opinions, I will not discuss the debate about the credibility/relevance of expert witness testimony offered by experts for plaintiffs or defendants about the issue of whether race had been the preponderant motive in 2011 line drawing in particular districts, since this debate is irrelevant to the remedial line drawing task set me as Special Master. The legal issues relevant to those concerns have already been decided by this Court in the 2018 majority opinion written after Supreme Court remand of the case.

[32] Palmer's Report also presents racial bloc voting analyses of district 75, a district that was subsequently held not to have been drawn in an unconstitutional fashion.

ordered by a federal court, and thus to much of the geography in which the eleven unconstitutional legislative districts are located in whole or in part. Dr. Handley's analyses provide further confirmation of the claim that a 55% black voting population, or even a 50% black voting age population, are not required in some areas of the state in order to draw districts in which minorities have a realistic equal opportunity to elect candidates of choice.[33]

c4. It is my professional judgment that Professor Bradley's analyses and those of Dr. Lisa Handley make use of standard and well accepted social science tools for assessing levels of racial bloc voting, and that each has used those tools in a competent and professional manner. However, I make use of this work only to provide supporting evidence to complement the analyses I have done on my own.

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[33] As I stated in the Report of the Special Master in Personhuballah, "Dr. Handley's analyses of particular biracial elections demonstrate that, in the boundaries of CD3 as it existed in 2011, black voters were almost perfectly cohesive in their voting behavior (giving an average of over 97% of their votes to a particular candidate (the Democrat) in partisan statewide and congressional contests. However, even when whites and blacks support different candidates, a substantial proportion of white voters vote for the minority candidate of choice. For example, Dr. Handley finds that, in the geography specified by the 2011 version of CD3, a (bare) majority of white voters supported Barack Obama in the 2012 presidential general election, while white support for him in the 2008 general election within the 2011 boundaries of CD3 was also high, somewhere between 43% and 46% (see Table 5 in her Report). Even in the 2008 Democratic primary election she estimates projected white support for Obama in the 2011 geography of CD3 was 60.1%. In the 2013 primary election for the Democratic Party nomination for the Office of Attorney General, where white cross-over voting was lower, she still estimates that at least 32% of the white voters in that primary located in the boundaries specified by the 2011 version of CD3 cast a vote for Justin Fairfax, the African-American candidate (Handley Report, p. 13)."

Dr. Handley's conclusions are based on projections into hypothetical congressional districts, and Dr. Palmer's conclusions are based on projections into unconstitutional districts in the enacted map -- in both cases districts which are different from those in the give submitted remedial plans or in my illustrative legislative remedy plans. Accordingly, I have examined recompilations of the Obama and Fairfax votes directly into the actual proposed remedial districts. Such remedial district-specific projections provide a better intensely local appraisal of "minority opportunity to elect," namely one that implicitly takes into variations across different parts of the state in minority voting percentages, in minority level of cohesion, and in the level of white cross-over voting.

v. opportunity to elect

a. The combination of my examination of racial demography and of recompiled elections involving bi-racial contests, in conjunction with my examination of actual past election outcomes in the unconstitutional districts allows me to assess the potential for the minority community's "equal opportunity to elect" in redrawn versions of each of the unconstitutional districts, and to examine the potential the potential for retrogression in the opportunity of the minority community to elect candidates of choice in the unconstitutional districts in the configurations of these districts offered in the illustrative remedial plans I have drawn. Moreover, along

with the geographically rooted analyses I have done, they allow me to address the question of narrow tailoring with respect to minority equal opportunity to elect.

b1. A claimed justification offered by some individual Virginia legislators for the way in which the districts found to be unconstitutional were configured, was that only a district with a 55% black voting age majority could provide African-American voters with a realistic opportunity to elect candidates of choice. That assertion was rejected in the *Golden Bethune-Hill* majority opinion. As the opinion notes, the 55 percent value is unsupported by empirical evidence presented at the time of its adoption, and it fails to acknowledge key differences in racial bloc voting patterns in different parts of the state. Moreover, in my review of the Briefs submitted in the remedy phase of case, I find no empirical evidence presented that would support the conclusion that a 55% black voting age population is needed to assure the African-American community a realistic opportunity to elect candidates of choice in any (much less all) of the eleven districts found to be unconstitutional.

b2. As noted above, my own analyses specific to the unconstitutional legislative districts demonstrate that the claim that a 55% minority voting age population is always needed in a district to assure African-American voters a realistic opportunity to elect candidates of choice is, factually, flatly wrong. Indeed, to the contrary, a lower African-American voting age percentages will permit narrowly

tailored remedies in all of the legislative districts found to be unconstitutional.[34] I have reached this empirical conclusion by my own independent conceptual analyses of the basic elements of elections, such as the two-stage nature of partisan contests, and by my own independent empirical analyses of demographic and electoral data from Virginia, especially that in recompiled bi-racial elections in specific illustrative remedial districts.

c. avoidance of mechanical tests

c1. As the Supreme Court has made clear in recent cases, when judging whether a redrawn district continues to offer an equal opportunity to elect minority candidates of choice, maintenance of existing levels of black population or voting age population is not required as long as there can be a strong demonstration of a continued equal opportunity to elect.[35] There is no single "magic" number vis-à-vis black population or voting age population that will be needed to provide for the African-

[34] Even in district 75, where the Court failed to find unconstitutionality in that district as it was configured in 2011, my exploration of redistricting alternatives has demonstrated to my own satisfaction that, in a slightly reconfigured district 75, black voting age population percentages lower than 55 percent would still be sufficient to maintain that district as a realistic "opportunity to elect" district.

[35] In *Alabama Legislative Black Caucus*, the Supreme Court specifically rejected reliance on "a mechanically numerical view as to what counts as forbidden retrogression" *Id.* at 1273–74. It asserted that retrogression "does not require a covered jurisdiction to maintain a particular numerical minority percentage," but instead "requires the jurisdiction to maintain a minority's ability to elect a preferred candidate of choice." 135 S. Ct. at 1272 (2015).

American community a realistic opportunity to elect candidates of choice. Rather what is required is an intensely local appraisal.

c2. I would emphasize that, in my line drawing, I have not ever sought to achieve any particular predetermined percentage of black voting age population within a district, but rather have drawn districts in accord with traditional districting principles and then afterward checked to make sure that unintentional vote dilution was not present. Essentially, what I found in my exploration of alternative mappings, including those submitted as remedial plans to the Court, is that there were always ways, sometimes rather obvious ones, to redraw unconstitutional districts so as to better preserve counties and improve compactness without minimizing or canceling out the voting strength of any protected group, which involved lower (sometimes substantially lower) African-American voting age populations than what are found in the unconstitutional districts in the 2011 Enacted map.

c3. The African-American share of voting age population varies across unconstitutional districts in the redrawn illustrative versions of the eleven unconstitutional districts I am presenting to the court. One reason for that variation is differences in the degree of geographic concentration of the African-American voting age population in different counties and different geographic areas of the state. I did not find it necessary to seek to determine the absolute minimum

percentage of African-American voting age population needed to create an "opportunity to elect district" for minority voters in particular areas of the state, since my illustrative versions of the unconstitutional districts are already narrowly tailored to remedy the constitutional violation found in them. To reiterate, the process of line drawing I engaged in was to draw remedial districts using traditional districting criteria, and only then to check (based primarily but not entirely on recompiled elections with minority candidates) that the district was one whose new minority population percentage did not, in my view, involve a denial of equal protection.[36]

d. role of primaries

d1. As noted earlier, analysis of the "opportunity to elect" must take into account both the primary election and the general election, since both must be won. As I stated in my Special Master Report in *Personhuballah*, *ceteris paribus*, "voters who vote for Democratic (Republican) candidates in general elections are more likely to vote in the Democratic (Republican) primary than those who do not support Democratic (Republican) party candidates in general elections, if they do vote in a party primary. Because African-American voters are more likely to vote Democrat than Republicans in general elections, while white voters are considerably more

[36] Differences in the degree of geographic concentration of the African-American voting age population in different counties and different geographic areas of the state affected the extent to which the black voting age population in the reconfigured unconstitutional districts in my illustrative modules differed from that in the corresponding unconstitutional district in the 2011 Enacted map.

likely to be Republican voters in general elections than is the case for African-American voters, *ceteris paribus*, the expected proportion of African-American voters is going to be higher among voters in Democratic primaries than the proportion of African-American voters among all voters in a general election. Conversely, the expected proportion of white voters is going to be lower among voters in Democratic primaries than the proportion of white voters among all voters."[37]

d2. Given the demography and geography of the State of Virginia, it is my professional judgment that the most appropriate way to remedy the constitutional violation identified in the 2011 plan is to replace the present unconstitutional districts with contiguous equipopulous districts with fewer city or county splits than

[37] This general theoretical conclusion is reinforced by the relevant expert witness testimony of Dr. Lisa Handley offered in *Personhuballah* about compiled elections in the Richmond, Newport-News and Norfolk areas of the state. As noted in my Special Master Report in *Personhuballah*, she finds clear support for the expectation that black voters would be overrepresented among the voters in Democratic primaries in Virginia relative to the overall African-American share of the potential electorate (those of voting age). For example, she finds that, in the Democratic primary for U.S. President in 2008, blacks "opted to vote in the Democratic primary at a much higher percentage than whites did: approximately 18% of the black voting age population compared to approximately 11% of white voting age population cast a vote in the Democratic Primary in 2008" (Handley Report p.11). As she correctly notes: "The implication of this analysis is that "the percent black voting age population needed to produce an effective black district tends to be lower for Democratic primary elections than for general elections" (Handley Report p.11). *Ceteris paribus*, this finding clearly indicates that there can be a realistic opportunity for a minority candidate of choice to win the Democratic Party nomination even in a district that, overall, is less than majority black (majority minority) in voting age population.

are found in the 2011 plan and with at least as high average level of compactness. As discussed above, such remedial districts can be drawn with a substantial minority population that is sufficient to provide minority voters an equal opportunity to elect candidates of choice. Doing so does not require that the district have a black voting age majority. Rather it requires that voting be such that, when the African-American community votes in a cohesive fashion, a candidate of choice of the minority community can be expected to have a realistic opportunity to win both a primary and a general election -- with success in the general election occurring because the minority candidate of choice wins the support of white voters who share that candidate's partisan preferences (i.e., the minority candidate of choice receives some white "cross-over" voting support). The illustrative remedial districts I have drawn satisfy these conditions.

(c) not making race the preponderant factor

As I have emphasized throughout this Report, the process of line drawing I engaged in was to draw remedial districts using traditional districting criteria, and only then to check (based on recompiled elections with minority candidates) that the district was one whose minority population did not raise issues of equal protection. In reviewing other plans for compliance with this criteria I looked to at factors such as how many counties were split and in how many pieces, and did the choice of black voting age population in the district suggest narrow tailoring. In my own illustrative map drawing I prioritized redrawing the unconstitutional districts so a as to reconfigure as many of them as possible in a constitutional fashion that

allowed them to lie wholly within a single county, and to have more than one redrawn unconstitutional district wholly within the same county when the county population and racial demography permitted (e.g. Richmond, Norfolk).

(d) contiguity

(d1) In general, I sought to maintain contiguity by land rather than by water. In particular, in the Norfolk and Hampton portion of the state, when I redrew districts I redrew the unconstitutional districts either wholly North or wholly South of the James River/ Hampton River.[38] With respect to other water bodies, I have sought to assure contiguity in terms of census defined units of geography. The census often assigns portions of rivers and other water bodies to separate census blocks.

(d2) Discontiguity is normally only considered a legal issue if it applies to a district being itself divided into discontiguous pieces. However, as a specialist on redistricting it is my view that redistricting plans in which two or more discontiguous pieces of some political jurisdiction are found within a single district are either evidence of poor redistricting practices or indicators of gerrymandering. While there is no present name in the redistricting literature for districts that include discontiguous pieces of the same city or county, I have coined the term "fracking" to refer to the creation of such districts, since fracking creates fissures in

[38] With the exception of district 100, which I did not change from the 2011 Enacted map, the redrawn districts in the Peninsula are drawn north of the river, and those in the Norfolk area south of the river.

the earth. This term has the advantage of creating a parallel usage to three standard terms of the redistricting literature that identify tools for gerrymandering: "packing," "cracking," and "stacking." The 2011 map includes a number of districts with this type of discontiguity, and this *fracking* feature is found in at least 4 of the 11 unconstitutional districts (district 63, in Hopewell City; district 70, in Richmond; district 90 in Virginia Beach; and district 95, in Newport News).[39]

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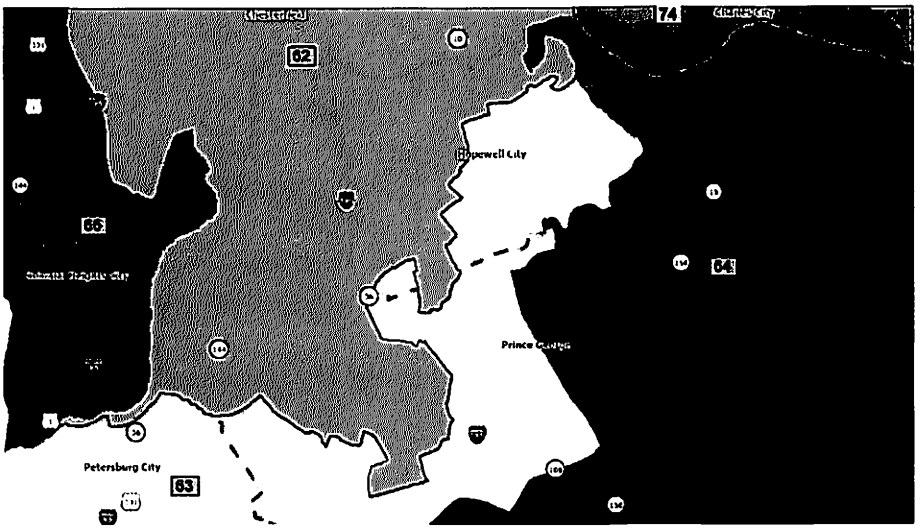
[39] We can illustrate fracking discontinuity with a Hopewell example from the 2011 Enacted map. There are two discontiguous pieces of Hopewell City placed by the 2011 Enacted map in district 63. They have an average black voting age population of (BVAP) of 65%, with one piece having a BVAP of 71.58% and the other having a BVAP of 65.45%. In contrast, the piece of Hopewell City (the remainder of the city) that is located in district 62 has a black VAP of only 20.27%. The map below illustrates this fracking, with yellow indicating District 63, District 62 in green, and 64 in black; with broken lines showing city and county boundaries.



Within these unconstitutional districts in the 2011 enacted map, the discontiguous pieces are, ones of higher black population, often considerably higher black population, than the nearby piece or pieces of the fracked county contained in districts that are not unconstitutional.

(d3) Except for the rare case where a city or county itself is legally defined as consisting of discontiguous pieces, a well-drawn redistricting map completely avoids such discontiguous mappings, as have I in all the maps I have drawn. In reviewing other proposed remedial plans I checked for evidence of *fracking*, and regarded it as a disqualifying feature of a plan. [40]

(e1) county splits

In the illustrative maps I have drawn that I believe deserve consideration by the Court, I have been able to reduce city and county splits in the unconstitutional districts to a considerable extent. The details are provided later in the Report. Since counties (and cities) represent identifiable communities of interest, my focus in the constitutional redrawing of the eleven districts was on the maintenance of

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[40] Unfortunately, fracking discontiguities are not identified in the standard reports of city and country splits prepared by the State of Virginia, or in similar standard reports prepared by mapping packages such as *Maptitude*, and so must be identified visually or by creating a customized report.

county/city boundaries, since this was the only straightforward and indisputable indicator of communities of interest available to me.

(e2) VTD splits

Rather than focus exclusively on the VTD splits identified by the Court in its majority opinion, I have simply sought to minimize VTD splits in general, and have been successful in doing so, especially with respect to VTD splits involving the unconstitutional districts.

(f) compactness

The two main types of compactness, areal compactness (Reock) and perimeter irregularity (e.g., Polsby-Popper), measure two rather different things, and they do not necessarily move in parallel when district lines are changed.[41] In each of the four geographic areas of the state, at least one of my illustrative modules is more compact on average on both the Reock and the Polsby-Popper measures than the corresponding districts in the 2011 Enacted map. Indeed, with only two exceptions, all the illustrative remedial modules I propose are as or more compact on average that their counterparts in the 2011 Enacted map on both the Reock and the Polsby-

[41] See Richard Niemi, Bernard Grofman, Carl Carlucci & Thomas Hofeller, Measuring Compactness and the Role of a Compactness Standard in a Test for Partisan and Racial Gerrymandering, 52 J. Pol. 1155 (1990).

Popper measures.[42] The two exceptions are higher on one of these two measures but lower on the other.[43] One such module has the narrow tailoring feature of limiting the changes in the Petersburg area to only three districts, and a variant of that map that changes four district does increase compactness as compared to the 2011 enacted map. The other module that is preferred to the enacted map on only one of the two measures of compactness retains the positive feature of keeping two districts wholly in Newport News, but draws a constitutional rather than an unconstitutional map for the Newport News district found unconstitutional.

(g) narrow tailoring

i. There were eleven districts in the 2011 Enacted plan identified as unconstitutional: 63, 69, 70, 71, 74, 77, 80, 89, 90, 92, and 95. These districts must

[42] Compactness numbers are very difficult to interpret without some context, and it is virtually impossible to compare compactness values across jurisdictions in different states, or sometimes even within a single state across different parts of the state. The feasibility of drawing compact districts at any particular level of government varies with the geography (e.g., the density of populations, and the degree to which the political or other subunits which are being aggregated are themselves compact, and the existence of natural boundaries such as state lines or large bodies of water), compactness is best understood by comparing plans both for the same geography and for the same types of districts.

[43] In general, because the 2011 enacted map has a low level of compactness in many of its districts, the fewer districts whose populations are redrawn to be in more accord with traditional districting principles, the more difficult it is to draw a compact map. The illustrative maps I provide to the Court redraw many fewer districts than any of the five submitted remedial maps, thus making it harder for the maps I provide to achieve high compactness numbers relative to maps that change more districts.

be redrawn in a constitutional fashion in any remedy. Moreover, any court adopted plan must be narrowly tailored to remedy the constitutional infirmities in the 2011 enacted plan.

As noted earlier, one important element of a narrowly tailored remedy is that it should confine its changes to those districts which must be changed in the process of the obligatory redrawing of the 11 unconstitutional districts. This principle of narrow tailoring suggests the appropriateness of limiting the changes in any remedial plan to the 11 unconstitutional districts and to the 22 additional districts that are adjacent to the unconstitutional ones, a total of 33 districts -- unless there are compelling geographic or demographic reasons to the contrary.

The principle of narrow tailoring also suggests limiting district changes in the remedial plan to the 23 districts that contain pieces of counties that are also contained within the unconstitutional districts, except as might be needed to assure population balance across the redrawn districts. Unconstitutionality was specifically found for only eleven districts in the 2011 enacted plan –with this finding in all but one of the districts that were drawn with the avowed aim of containing a 55% black voting percentage. However, as a matter of simple geographic logic, if there are districts other than the unconstitutional eleven that contain portions of the populations of some of the 15 counties that have pieces in the eleven districts, at least some of those districts had to have been affected by/implicated in the line drawing that created the unconstitutionality in the eleven districts found to be unconstitutional. This is especially true if the portion(s) of a

county not contained within the unconstitutional districts have populations that are racially distinct from the portion(s) of the county found inside the unconstitutional districts. Thus, remedying the unconstitutionality of the eleven districts will, necessarily, require changes in the district boundaries of some of the additional districts containing the counties found within the unconstitutional eleven. In terms of this straightforward geographic logic, as many as 34 districts might need to be redrawn.

ii. However, on the one hand, not all of these 34 districts are adjacent to one of the unconstitutional districts. And, on the other hand, not all of the districts not found to be unconstitutional that lie adjacent to the unconstitutional districts contain pieces of one or more of the counties found in an unconstitutional district. In particular, there are three other districts that are adjacent to one or more of the unconstitutional districts, but which do not contain a piece of any of the 15 counties found in whole or part within the unconstitutional districts (districts 55, 96, 97). And there are five other districts that are not adjacent to one or more of the unconstitutional districts, but which do not contain a piece of at least one of the 15 counties found in whole or part within the unconstitutional districts (districts 21, 56, 65, 82, 84).

Recognition of these two distinct sets of constraints on narrowly tailoring led me to seek to limit boundary changes in my illustrative remedial maps to the unconstitutional districts and to those that satisfy both a "district adjacency

constraint" and a "potentially implicated county" constraint, i.e. districts that lie in the intersection of these two sets of constraints. There are 30 such districts, with 19 districts that are both adjacent to one or more the unconstitutional ones and also containing a piece of at least one of the 15 counties found in whole or part within the unconstitutional districts (61, 62, 64, 66, 68. 72, 73, 75, 76, 78, 79, 81, 83, 85, 91, 93, 94, 96, 100).

iii. In other jurisdictions, with other sets of factual circumstances, to fully resolve the constitutional infirmities, it might be necessary to effectuate a remedy that included the union[44] rather than the intersection of these two sets of constraints. Here however, after careful review of districting alternatives, I am satisfied that both constraints can be simultaneously satisfied so as to create narrowly tailored remedial plans. Thus, in my view, changes to the enacted plan should be limited to no more than 30 districts at maximum.[45]

iv. In my view changing even as few as 30 districts involves changing more districts than are actually needed to implement a constitutional and narrowly tailored redrawing. A careful investigation of redistricting options demonstrates that the

[44] There are 38 districts that lie in the union of the "adjacency" and "affected county" constraint.

[45] The only possible expansion to make changes in districts not in this set would occur if there are Section 2 issues that would require including contiguous minority populations in other areas as part of a compactly drawn majority minority district. But, given the factual circumstances in this case, I do not believe that issues of this type are relevant.

number of districts that need to be redrawn in the 2011 enacted map to effectuate a narrowly tailored constitutional map is actually lower than 30. In other words, in my view, not all the districts that are both adjacent to the unconstitutional ones and contain portions of counties found within the unconstitutional districts need to be redrawn in order to construct a remedy that is narrowly tailored.

v. Complete maps that affect only 21 districts or that affect only 26 districts can be drawn based on the geographically defined illustrative remedial modules I provide to the Court. Because there are potential tradeoffs among traditional redistricting criteria, and minimization of unnecessary county splits is not the only aspect of narrow tailoring (e.g., improving compactness, or reducing splits among counties might also be taken into account) other plan feature comparisons may lead the Court, under the totality of circumstances, to a preference for a remedy that changes more than 21 districts.

vi. I have presented alternative illustrative maps that address tradeoffs among traditional redistricting criteria in slightly different ways. The details are provided later in the Report. But, a remedial plan relying on traditional districting criteria that is seeking to be narrowly drawn, should not, in my view, redraw more than 26 districts.

vii. one element of narrow tailoring involves respect for the existing geographic centering of the districts found unconstitutional, while redrawing the district in a constitutional fashion. In nine of the eleven unconstitutional districts this is straightforward to do since the district has a preponderant (or sole) county population within it and thus can be redrawn centered within that county. In those nine districts I succeed in reconfiguring such districts to be wholly within a single county, and this is true in Norfolk (except in Norfolk Illustrative Module 1C), and in Richmond, even when this required reconfiguring two of the unconstitutional districts so that both were wholly within that County.[46]

In one of the remaining districts, district 63, there is a plurality county, Petersburg, which can used as the core of the redrawn district, though there are multiple options for how that district is to be drawn. In the remaining district, district 70, the combination of pieces of counties in that district means that there are many different ways the district might be redrawn and most of these will involve multi-county combinations, especially if other unconstitutional districts are drawn to lie wholly are largely within given counties.

[46] Given Virginia geography and racial demography I do not believe that it is mathematically possible to have drawn more than nine of the eleven unconstitutional districts so that each would be located wholly within a single county.

vi. One possible element of a narrowly tailored plan is not changing the district numbering scheme. Even though the numbering scheme for the Virginia House of Delegates reflects some historical patterns that in the present day make absolutely no sense (see e.g., the location of district 21 adjacent to districts 78 and 84), I have left the district numbering untouched.

(h) I would emphasize that, in all the illustrative plans I have drawn, I have sought to be entirely neutral with respect to partisanship, with compliance with traditional districting criteria and the remedying of unconstitutionality in a narrowly tailored fashion dictating shapes of redrawn districts, and limiting the number of districts that were redrawn. In reconfiguring both the unconstitutional districts and the redrawn district adjacent to the unconstitutional ones, I have drawn districts in a fashion relying on traditional districting criteria and have been blind to the implications of my line drawing for partisan outcomes. I have considered probable electoral outcomes in the redrawn unconstitutional districts only in the unconstitutional districts, and only with respect to avoiding potential minority vote dilution in the redrawing process, and only after I had drawn a potential remedial district with no concern for race. In the unconstitutional districts, electability issues could not be avoided because of the need to assess whether a redrawn district remained one in which the minority community realistically had an equal

opportunity to elect candidates of choice at both the primary and general election level. [47]

(i). minimizing pairing of incumbents

i. Minimizing pairing of incumbents is sometimes treated as a component of a "least changed" plan.[48] However, in *North Carolina v. Covington*, 138 S. Ct. 2548 2018) the Supreme Court has held that, in a remedial plan, a state redistricting body may not rely on an otherwise legitimate redistricting consideration—such as keeping all incumbent homes in their original district— if doing so would prevent it from completely remedying an identified constitutional violation.

[47] As noted earlier, where not essential to provide equal protection assessment for the African-American community, I did not consider partisan outcomes. This case does not involve any finding of partisan gerrymandering that would need to be addressed in a remedial plan.

[48] The relevant portion of Article IV. Legislature Section 4 of the Virginia Constitution, describing qualifications of senators and delegates states: "Any person may be elected to the Senate who, at the time of the election, is twenty-one years of age, is a resident of the senatorial district which he is seeking to represent, and is qualified to vote for members of the General Assembly. Any person may be elected to the House of Delegates who, at the time of the election, is twenty-one years of age, is a resident of the house district which he is seeking to represent, and is qualified to vote for members of the General Assembly. A senator or delegate who moves his residence from the district for which he is elected shall thereby vacate his office."

ii. Many of the districts in the 2011 Enacted plan were drawn with high levels of fragmentation of county boundaries, and this is true both for the districts found unconstitutional and those immediately adjacent to them which would need to be redrawn. This excessive fragmentation of county populations was one of the types of evidence presented at the trial as to why race was a preponderant motive. In particular, small white majority pieces of counties were disproportionately found in white majority districts, and small black majority pieces of counties were disproportionately found in black majority districts. As a consequence of this high fragmentation of county borders, often in a way that directly involved race, minimizing the fragmentation of county and locality boundaries in the unconstitutional districts and avoiding drawing districts with a racially preponderant motive becomes more complicated if there is added, as the last consideration, a concern to avoid incumbency pairing.

iii. For example, in the 2011Enacted Plan, there are pieces of Richmond in 6 districts, and there are four 2011 incumbents with homes located in Richmond, all residing north of the river, even though the County population is only the equivalent of slightly more than two and a half legislative districts. In 2017 there are still four incumbents residing in Richmond. Thus, if, in a remedial plan, Richmond is divided into only three pieces, it is simply mathematically impossible to avoid pairing at least two of the four Richmond based incumbents. The only way to avoid pairing some of the four present incumbents with homes is Richmond is to

divide Richmond into four pieces. This is the approach taken in the illustrative modules I have drawn in the Richmond area. However, some of the five submitted remedial plans unnecessarily split Richmond into more than four pieces.

iv. My initial line drawing did not take present incumbencies into account.

v. Prior to November 30, the only information available to the staff of the House of Delegates in the form of a geocoding mapping layer was the home addresses for 2009/2011 incumbents.

vi. After I had generated plans that respected the geographic centering of the unconstitutional districts to the extent feasible, without taking any information about incumbent locations into account, I explored plans that did not pair any of the 2009/2011 incumbents. Those map explorations convinced me that one could draw constitutional maps that avoided the pairing of the incumbents who were in place as of the creation of the 2011 Enacted map – though avoiding incumbent pairings did come at the cost of some additional county pieces being created, and doing so reduced the compactness of some districts.

vii. In late November, I requested a Court Order to obtain the present addresses of House of Delegates incumbents in a geocoded fashion that allowed me to overlay present incumbent addresses on maps. After correcting an error in the home

location of one of the incumbents, I then created reconfigured illustrative remedial plans in which all present incumbents had their home in their present districts.

viii. Comparing the exploratory maps I drew without taking incumbency protection into account, drawn solely for the purpose of creating illustrative narrow tailored maps that followed traditional districting criteria, and the illustrative remedial maps I am presenting to the court that do avoid any incumbency pairing, I believe that avoiding incumbency pairing has been accomplished in my illustrative modules in a way that remedies constitutional infirmities in the unconstitutional districts. Moreover, while my map explorations suggest that maps that do not pair incumbents are, on average, marginally less compact and divide counties into somewhat more pieces than maps that pay no attention to incumbent locations, nonetheless, as demonstrated by my illustrative remedial maps, it is possible to create narrowly tailored means of remedying constitutional infirmities in a way that avoids a race preponderant motive while still avoiding the pairing of any incumbents.

IV. Basic features of the illustrative plans developed by the Special Master, with review of potential districts organized according to four geographic modules, and the criteria enumerated above

1. There are two especially useful ways to classify the eleven unconstitutional districts before commencing the process of remedial line drawing. The first is in

terms of the types of changes that will be needed to make the district constitutional (see discussion in the body of the Report); the second is in terms of the geographic area of the state in which the unconstitutional district is located.

(a) By partitioning the unconstitutional districts by geography, it is possible to partition the task of line drawing in multiple smaller separable tasks, involving only one or a few unconstitutional districts that need to be drawn in each segment. By this modularization of the redistricting task we can consider alternative plans for each geographic area that involve redrawing the unconstitutional districts and some of the adjacent districts taken as a group without concern for the configuration of districts outside of those in the selected module. The Court can then pick a preferred remedial plan for each geography, and combine the chosen separate geographic components so as to create a viable narrowly tailored constitutional plan for the entire state

(b) The geographic partitioning I made use of involved four geographic areas within which particular unconstitutional districts were redrawn: (1) the Richmond and Henrico area (containing unconstitutional districts 69, 70, 71, 74), the Petersburg area (containing unconstitutional district 63), and the Norfolk-Portsmouth-Chesapeake area (containing unconstitutional districts 79, 80, 89, 90), and (4) the Hampton-Newport News area, also referenced as the Peninsula (containing unconstitutional districts 92 and 95). This modularized approach to line drawing

allows the parties and intervenors to comment on how they might propose particular geography be redrawn without forcing a ripple of changes in other geographic areas of the state.[49]

(c) Another useful typology I made use of in line drawing involves dividing the set of eleven unconstitutional districts into four categories that cross-cut geographic categorization:

i. This typology involves: (a) districts in which the preponderant population comes from one large county (districts 69, 71, 74, 77, 80, 90, 95), (b) districts in which the entire population comes from a single county (districts 89 and 92), (c) districts in which it is difficult to identify a clearly preponderant county (district 70), and (d) districts in which the preponderant county is a small county which is already included in the county in its entirety, and there are multiple other counties with portions in the district (district 63).

ii. It is possible to redraw in a constitutional fashion all the districts in the first and second categories such that their population now comes from a single county, rather than, as in the 2011 Enacted Plan, including (small) pieces of other counties with a

[49] In the central portion of the state (the Richmond-Petersburg area) district 62 touches districts 70 and 74 as well as district 63. This creates a need for a consistent configuration of district 62 in both the Petersburg and the Richmond modules.

distinctive racial character. For example, districts 77, 80, 89, 90 in the Norfolk area are drawn in all of my illustrative modules to lie within a single county, and two of the three unconstitutional districts in the Richmond area in these categories (districts 69 and 74) are so drawn, and I provided an illustrative module for the Peninsula in which both district 92 and district 95 lie within a single county. Thus, I have drawn illustrative modules with the feature that a composite map can be drawn using them which will have 9 of the eleven unconstitutional districts lying entirely within a single county and thus satisfying a key traditional districting principle. This is in remarkable contrast to the 2011 Enacted map, in which only 2 of the eleven unconstitutional districts are contained wholly within a single county.

iii. With respect to the second category, when remedying constitutional violations in other unconstitutional districts that are adjacent or nearby to the whole county unconstitutional district, there will necessarily be geographically and population mandated spillover effects, and these can operate in a fashion that will, concomitantly, permit change in the single county unconstitutional district so as to remedy the constitutional violation. For example, changes in the configuration of unconstitutional district 95 to make it a district located within a single county facilitate the redrawing of the immediately proximate unconstitutional district 92 in a constitutional fashion as well. Similarly, changes in the configuration of unconstitutional districts 80 and 90 to make each a district located within a single county facilitate the redrawing of district 89 in a constitutional fashion as well.

iv. With respect to the third and fourth categories, it is possible to redraw districts in that category, districts 63 and 70, in a constitutional way, though multi-county versions will still be necessary.

2. Illustrative modularized maps in hour regions of the state, with comparison to the 2011 Enacted Map

(a) Richmond area.

In the Richmond area I have offered to the Court one basic illustrative map, and three quite minor variants of that map that do not differ in the shape of any of the unconstitutional districts (69, 70 71, and 74) in this geographic region, but only in the shapes of districts 72 and 73. The only reason to consider a change in both districts is that the incumbent locations in these districts are not the same in 2017 as in 2011, and acknowledging that fact can improve overall district compactness without affecting changes in the unconstitutional districts. All of these maps in my view remedy the constitution violation found in districts 69, 70, 71, and 74. None contain any districts with more than a 55% black voting age population. Each has three to four fewer county pieces than the 2011 Enacted map. Two of the three are better than the Enacted map on both the Polsby-Popper and Reock compactness measure, and the third is almost as good on one measure and visibly better on the other. None involve any fracking.

A map and key statistics about each of these Richmond area variants is provided below, with comparison to the 2011 Enacted map.

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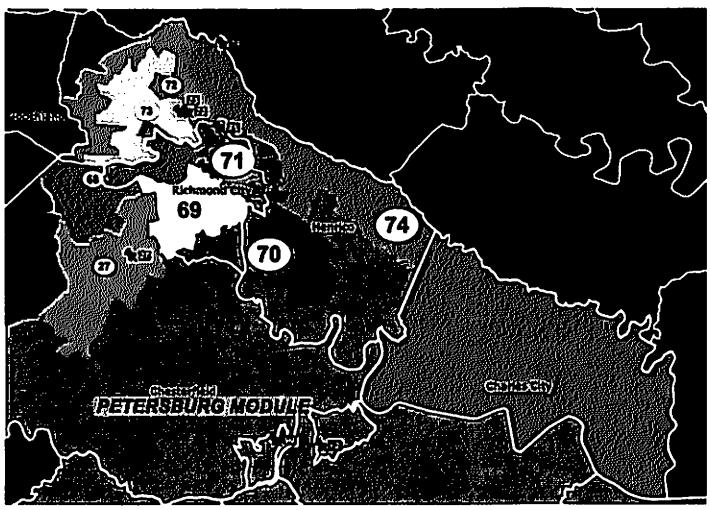

RICHMOND

RICHMOND Enacted Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
27	79,381	-0.79%	18.44%	57.85%	45.79%	0.35	0.25
68	79,611	-0.50%	7.25%	40.25%	44.70%	0.36	0.25
69	79,386	-0.78%	55.19%	61.33%	86.08%	0.52	0.34
70	79,382	-0.78%	56.37%	66.92%	79.82%	0.40	0.19
71	80,322	0.39%	55.35%	50.28%	87.02%	0.33	0.24
72	80,764	0.94%	13.40%	41.33%	45.26%	0.26	0.08
73	80,135	0.16%	13.55%	41.48%	46.75%	0.39	0.15
74	79,594	-0.52%	57.24%	57.50%	75.06%	0.16	0.12
MEAN	*79,822*	*-0.24%*	*34.60%*	*52.12%*	*63.81%*	*0.35*	*0.20*

County Splits

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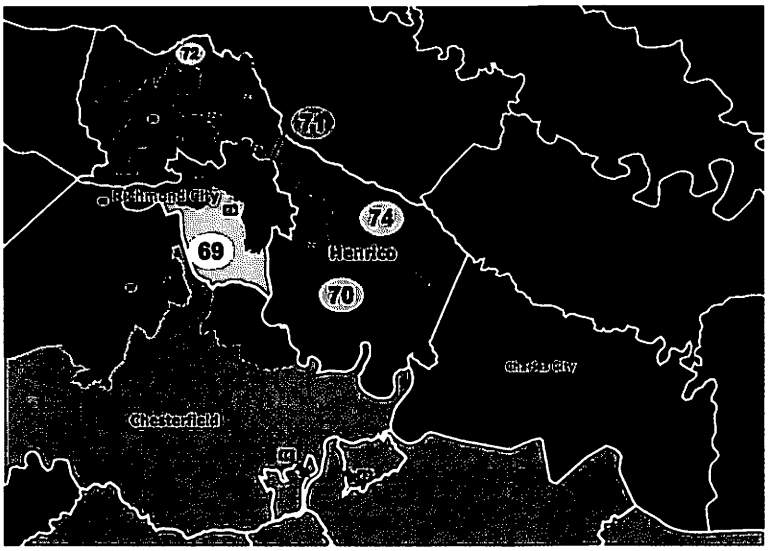
District	Total Counties	Charles City	Chesterfield	Henrico	Richmond City
27	*1*		79,381		
68	*3*		40,203	4,472	34,936
69	*2*		4,994		74,392
70	*3*		33,281	28,615	17,486
71	*2*			5,221	75,101
72	*1*			80,764	
73	*1*			80,135	
74	*3*	7,256		70,039	2,299

RICHMOND

RICHMOND 1A Map



RICHMOND

RICHMOND 1A Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
27	79,381	-0.79%	18.44%	57.85%	45.79%	0.35	0.25
68	79,611	-0.50%	7.25%	40.25%	44.70%	0.36	0.25
69	79,318	-0.86%	54.38%	61.18%	86.24%	0.36	0.36
70	79,924	-0.11%	52.29%	62.48%	72.38%	0.29	0.16
71	79,920	-0.11%	54.01%	51.45%	86.72%	0.20	0.17
72	79,445	-0.71%	15.38%	45.32%	46.23%	0.26	0.08
73	80,135	0.16%	13.55%	41.48%	46.75%	0.39	0.15
74	79,355	-0.82%	54.37%	55.98%	74.10%	0.19	0.18
MEAN	*79,636*	*-0.47%*	*33.71%*	*52.00%*	*62.86%*	*0.30*	*0.20*

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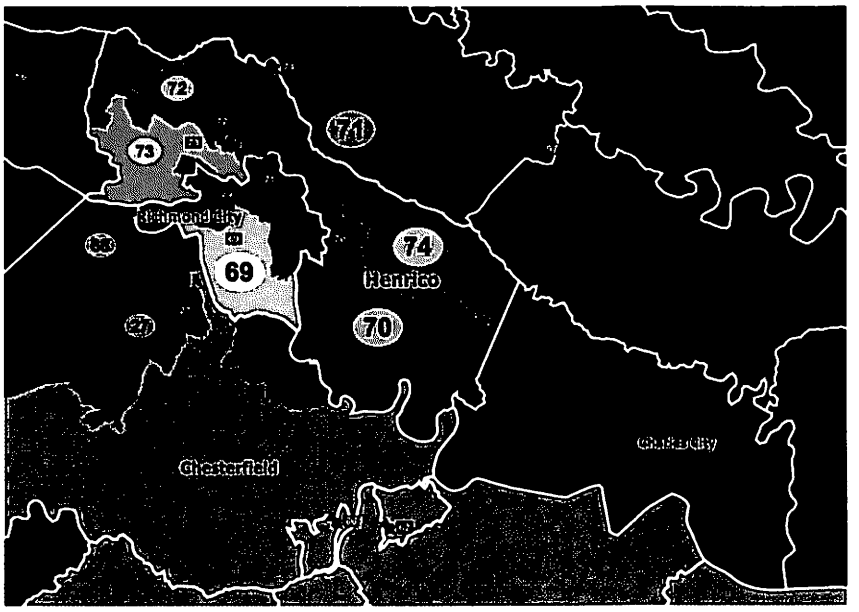
District	Total Counties	Charles City	Chesterfield	Henrico	Richmond City
27	*1*		79,381		
68	*3*		40,203	4,472	34,936
69	*1*				79,318
70	*4*	7,256	28,912	33,716	10,040
71	*1*				79,920
72	*1*			79,445	
73	*1*			80,135	
74	*1*			79,355	

RICHMOND

RICHMOND 1B Map



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RICHMOND 1B Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
27	79,381	-0.79%	18.44%	57.85%	45.79%	0.35	0.25
68	79,611	-0.50%	7.25%	40.25%	44.70%	0.36	0.25
69	79,318	-0.86%	54.38%	61.18%	86.24%	0.36	0.36
70	79,924	-0.11%	52.29%	62.48%	72.38%	0.29	0.16
71	79,920	-0.11%	54.01%	51.45%	86.72%	0.20	0.17
72	80,221	0.26%	19.49%	52.02%	51.35%	0.47	0.28
73	79,359	-0.81%	9.32%	36.17%	42.09%	0.40	0.21
74	79,355	-0.82%	54.37%	55.98%	74.10%	0.19	0.18
MEAN	*79,636*	*-0.47%*	*33.69%*	*52.17%*	*62.92%*	*0.33*	*0.23*

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County Splits

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District	Total Counties	Charles City	Chesterfield	Henrico	Richmond City
27	*1*		79,381		
68	*3*		40,203	4,472	34,936
69	*1*				79,318
70	*4*	7,256	28,912	33,716	10,040
71	*1*				79,920
72	*1*			79,445	
73	*1*			80,135	
74	*1*			79,355	

(b) Petersburg area

I offer to the Court two illustrative modules for the Petersburg area (district 63). The first of these has two very minor variations which differ only in how Dinwiddie is treated in the module: Petersburg illustrative module 1A and Petersburg illustrative module 1B. In one variant the Dinwiddie portion of 2011 District 63 is modified slightly so as to improve overall district compactness, and this change necessitates a slight modification of the Dinwiddie portion of District 75. In the other, the Dinwiddie configurations are left completely unchanged. Thus, one module changes only three districts, while the second changes four. In Petersburg illustrative module 2, more substantial changes are made, affecting change in five districts, rather than only three districts, or only four districts. However, this map provides the best overall compactness and it has the fewest county pieces. Moreover, while all of these maps do a good job in terms of the number of counties that are kept whole within one of the districts, it is Petersburg Module 2 that does the best job in this regard. All of these maps in my view remedy the constitution violation found in district 63. None make race a preponderant criterion. None contain any fracking.

A map and key statistics about each of these Petersburg area variants is provided below, with comparison to the 2011 Enacted map.

PETERSBURG

~~Petersburg~~ PETERSBURG 2011 Enacted Map

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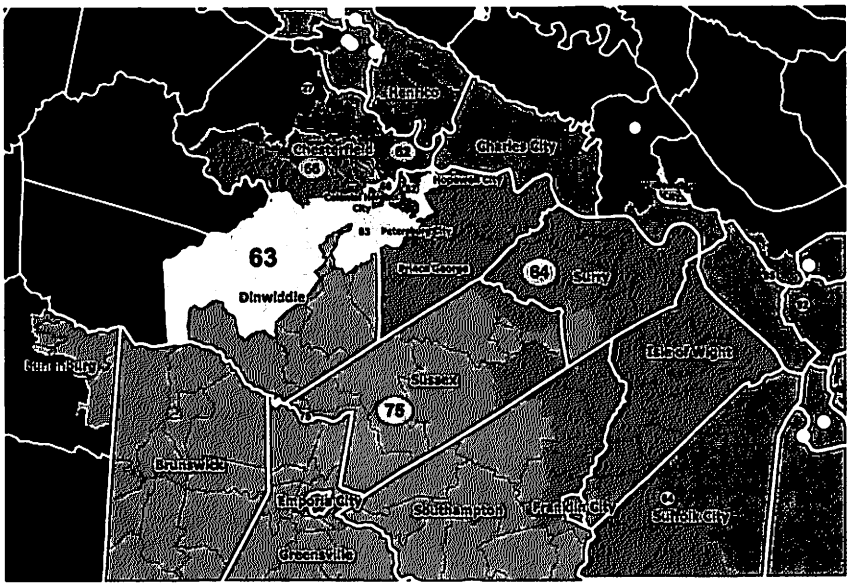

PETERSBURG

PETERSBURG 2011 Enacted Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
62	79,677	0.42%	24.56%	64.83%	46.93%	0.36	0.13
63	79,602	0.51%	59.53%	68.40%	72.18%	0.25	0.16
64	79,262	0.93%	24.24%	63.19%	41.64%	0.37	0.16
66	79,397	0.77%	16.06%	62.36%	37.27%	0.31	0.27
75	79,295	0.89%	55.43%	62.09%	62.71%	0.41	0.19
MEAN	*79,447*	*0.70%*	*35.69%*	*64.17%*	*52.15%*	*0.34*	*0.18*

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
62	79,677	0.42%	24.56%	64.83%	46.93%	0.36	0.13
63	79,602	0.51%	59.53%	68.40%	72.18%	0.25	0.16
64	79,262	0.93%	24.24%	63.19%	41.64%	0.37	0.16
66	79,397	0.77%	16.06%	62.36%	37.27%	0.31	0.27
75	79,295	0.89%	55.43%	62.09%	62.71%	0.41	0.19
MEAN	*79,447*	*0.70%*	*35.69%*	*64.17%*	*52.15%*	*0.34*	*0.18*

District	Total Counties	Brunswick	Chesterfield	Colonial Heights	Dinwiddie	Emporia	Franklin City	Greensville	Henrico
62	4		49,193						7,877
~~63~~	~~5~~		~~13,302~~		~~18,117~~				
64	7						3,631		
66	2		61,986	17,411					
75	10	17,434			9,884	5,927	4,951	12,243	

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County Splits

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District	Hopewell City	Isle of Wight	Lunenburg	Petersburg	Prince George	Southampton	Suffolk City	Surry	Sussex
62	15,215				7,392				
~~63~~	~~7,378~~			~~32,420~~	~~8,387~~				
64		34,445			19,946	6,110	7,112	6,374	1,644
66									
75		825	4,444			12,460		684	10,443

District	Total Counties	Brunswick	Chesterfield	Colonial Heights	Dinwiddie	Emporia	Franklin City	Greensville	Henrico
62	4		49,193						7,877
63	5		13,302		18,117				
64	7						3,631		
66	2		61,986	17,411					
75	10	17,434			9,884	5,927	4,951	12,243	

District	Hopewell City	Isle of Wight	Lunenburg	Petersburg	Prince George	Southampton	Suffolk City	Surry	Sussex
62	15,215				7,392				
63	7,376			32,420	8,387				
64		34,445			19,946	6,110	7,112	6,374	1,644
66									
75		825	4,444			12,460		684	10,443

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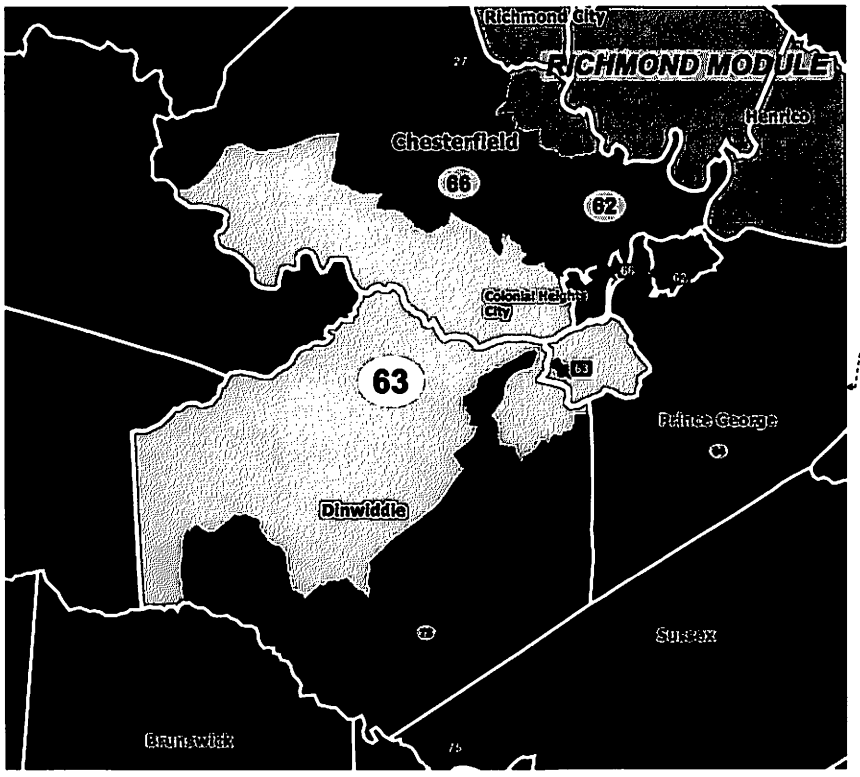
PETERSBURG

PETERSBURG 1A Map



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PETERSBURG

PETERSBURG 1A Data

Dis	District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
	62	80,445	0.54%	29.23%	65.66%	48.64%	0.41	0.19
	63	79,859	0.19%	51.81%	68.11%	63.21%	0.43	0.17
	64	79,262	0.93%	24.24%	63.19%	41.64%	0.37	0.16
	66	79,858	0.19%	25.81%	67.65%	48.56%	0.27	0.14
	75	79,295	0.89%	55.43%	62.09%	62.71%	0.41	0.19
	MEAN	*79,744*	*0.55%*	*37.30%*	*65.34%*	*52.95%*	*0.38*	*0.17*

	District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
	62	80,445	0.54%	29.23%	65.66%	48.64%	0.41	0.19
	63	79,859	0.19%	51.81%	68.11%	63.21%	0.43	0.17
	64	79,262	0.93%	24.24%	63.19%	41.64%	0.37	0.16
	66	79,858	0.19%	25.81%	67.65%	48.56%	0.27	0.14
	75	79,295	0.89%	55.43%	62.09%	62.71%	0.41	0.19
	MEAN	*79,744*	*0.55%*	*37.30%*	*65.34%*	*52.95%*	*0.38*	*0.17*

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County Splits

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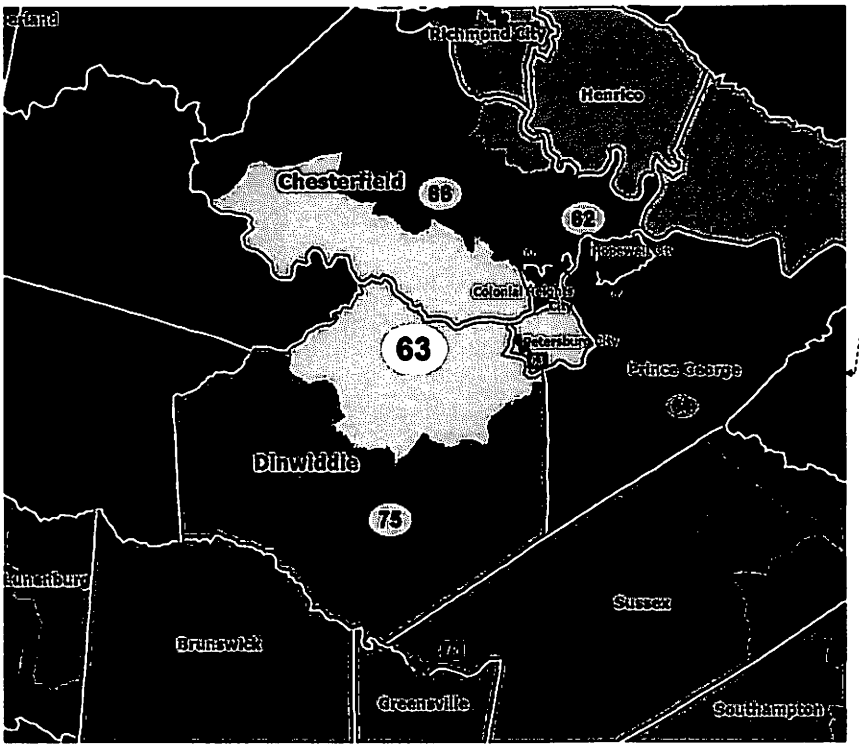
District	Total Counties	Brunswick	Chesterfield	Colonial Heights	Dinwiddie	Emporia	Franklin City	Greensville	Henrico
62	3		42,075						
63	3		29,322		18,117				
64	7						3,631		
66	2		62,447	17,411					
75	10	17,434			9,884	5,927	4,951	12,243	

District	Hopewell City	Isle of Wight	Lunenburg	Petersburg	Prince George	Southampton	Suffolk City	Surry	Sussex
62	22,591				15,779				
63				32,420					
64		34,445			19,946	6,110	7,112	6,374	1,644
66									
75		825	4,444			12,460		684	10,443

PETERSBURG

PETERSBURG 1B Map



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PETERSBURG 1B Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
62	80,445	0.54%	29.23%	65.66%	48.64%	0.41	0.19
63	79,891	0.15%	52.71%	68.40%	64.52%	0.41	0.24
64	79,262	0.93%	24.24%	63.19%	41.64%	0.37	0.16
66	79,858	0.19%	25.81%	67.65%	48.56%	0.27	0.14
75	79,293	0.93%	54.55%	61.10%	61.34%	0.43	0.21
MEAN	*79,750*	*0.55%*	*37.31%*	*65.20%*	*52.94%*	*0.38*	*0.19*

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County Splits

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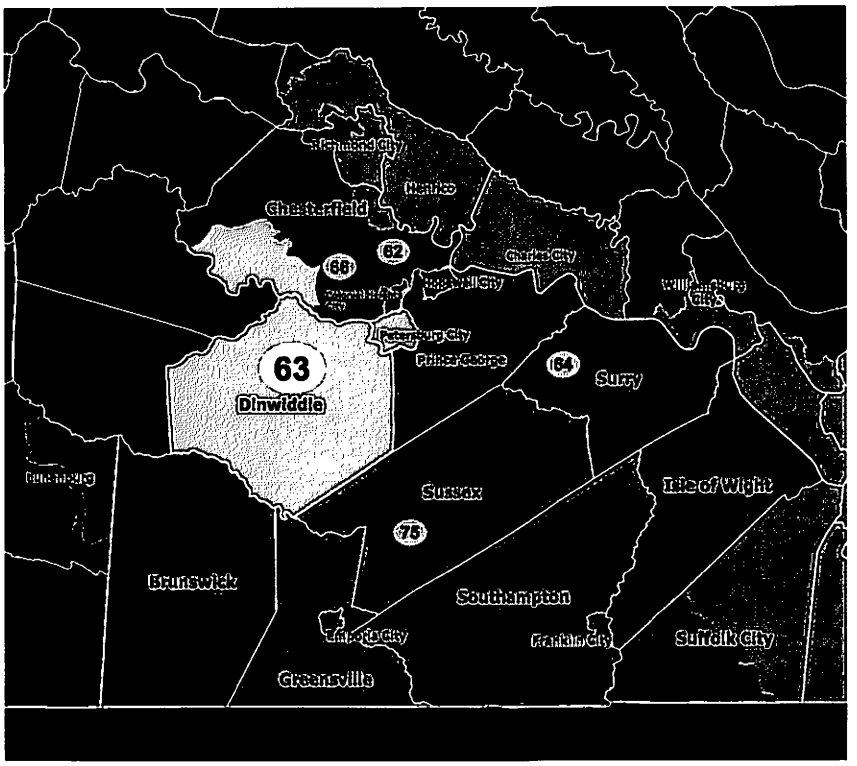
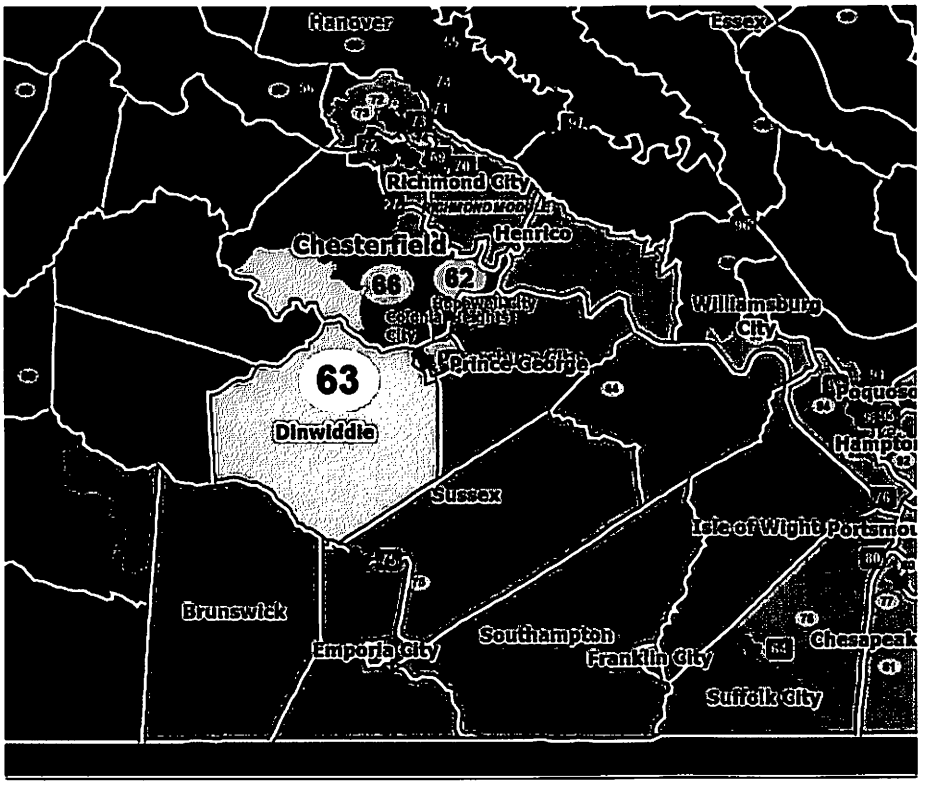
District	Total Counties	Brunswick	Chesterfield	Colonial Heights	Dinwiddie	Emporia	Franklin City	Greensville	Henrico
62	3		42,075						
63	3		29,322		18,149				
64	7						3,631		
66	2		62,447	17,411					
75	10	17,434			9,852	5,927	4,951	12,243	

District	Hopewell City	Isle of Wight	Lunenburg	Petersburg	Prince George	Southampton	Suffolk City	Surry	Sussex
62	22,591				15,779				
63				32,420					
64		34,445			19,946	6,110	7,112	6,374	1,644
66									
75		825	4,444			12,460		684	10,443

PETERSBURG

PETERSBURG 2 Map




Hanover
Essex
Richmond City
Henrico
Chesterfield
66
62
Colonial Heights
Williamsburg City
63
Prince George
Dinwiddie
Sussex
Isle of Wight
Brunswick
Emporia City
Southampton
Franklin City
Suffolk City
Chesapeake

PETERSBURG

PETERSBURG 2 Data

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
62	79,725	-0.36%	27.22%	66.89%	48.12%	0.48	0.18
63	79,814	-0.25%	47.47%	68.50%	59.23%	0.57	0.28
64	80,082	0.09%	27.38%	65.50%	43.38%	0.32	0.19
66	79,811	-0.25%	32.31%	66.39%	53.25%	0.37	0.23
75	79,287	-0.90%	52.45%	58.23%	59.81%	0.41	0.32
MEAN	*79,744*	*-0.33%*	*37.37%*	*65.10%*	*52.76%*	*0.43*	*0.24*

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County Splits

District	Total Counties	Brunswick	Chesterfield	Colonial Heights	Dinwiddie	Emporia	Franklin City	Greensville	Henrico
62	4		52,051						7,877
63	3		19,393		28,001				
64	4								
66	2		62,400	17,411					
75	7	17,434				5,927	8,582	12,243	

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District	Hopewell City	Isle of Wight	Lunenburg	Petersburg	Prince George	Southampton	Suffolk City	Surry	Sussex
62					5,093				
63				32,420					
64		35,270			30,642		7,112	7,058	
66									
75			4,444			18,570			12,087

(c) Newport News-Hampton area.

I offer to the Court two illustrative module for the Peninsula area: Newport News-Hampton illustrative Module 1 and Newport News-Hampton Illustrative Module 2. These two modules differ in how many districts are wholly drawn within Newport News (either one or two), though in both modules district 92 is entirely in Hampton, and district 95 is entirely in Newport News. Each of these maps in my view remedies the constitution violations found in district 95 and district 92. All are drawn in according with traditional districting criteria and do not have race as a preponderant motive. None involve any fracking.

A map and key statistics about each of these Newport News-Hampton Peninsula area variants is provided below, with comparison to the 2011 Enacted map.

PENINSULA – Newport News/Hampton

PENINSULA ENACTED 2011 Map ~~(HB5005)~~

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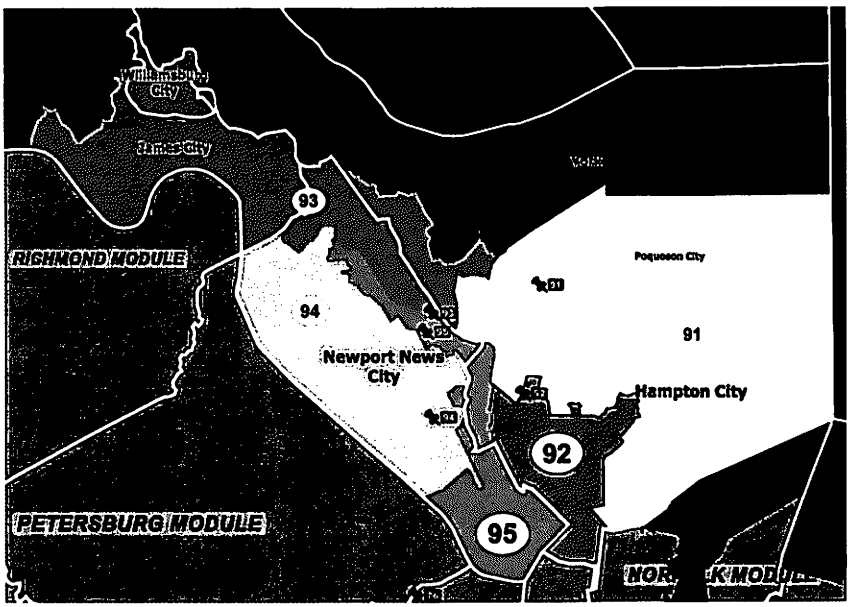

PENINSULA – Newport News/Hampton

PENINSULA ENACTED 2011 Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
91	79,229	-0.98%	19.61%	62.88%	44.26%	0.6	0.47
92	79,689	-0.40%	60.72%	77.89%	80.00%	0.34	0.26
93	79,211	-1.00%	22.58%	52.58%	58.10%	0.22	0.16
94	79,429	-0.73%	21.02%	49.74%	52.27%	0.35	0.38
95	80,071	0.08%	59.97%	79.24%	79.28%	0.14	0.14
MEAN	*79,526*	*-0.61%*	*36.78%*	*64.47%*	*62.78%*	*0.33*	*0.28*

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County Splits

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District	Total Splits	Hampton City	James City	Newport News City	Poquoson	Williamsburg	York
91	1	79,689					
92	2	14,584		65,487			
93	3	43,163			12,150		23,916
94	4		20,694	35,803		14,069	8,646
95	1			79,429			

PENINSULA – Newport News/Hampton

PENINSULA 1 Map

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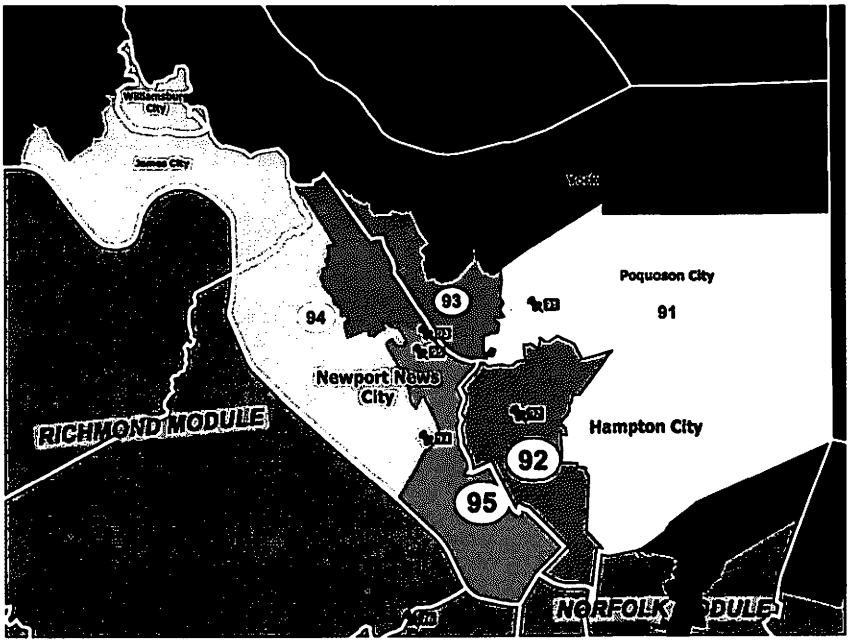

PENINSULA – Newport News/Hampton

PENINSULA 1 Data

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
91	79,546	-0.58%	32.52%	69.63%	54.14%	0.60	0.40
92	79,479	-0.66%	53.87%	77.90%	75.75%	0.33	0.26
93	79,316	-0.87%	32.99%	64.62%	60.58%	0.33	0.27
94	79,672	-0.42%	16.79%	45.44%	51.73%	0.24	0.20
95	79,616	-0.49%	47.48%	70.48%	71.91%	0.27	0.30
MEAN	*79,526*	*-0.60%*	*36.73%*	*65.61%*	*62.82%*	*0.35*	*0.29*

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
91	79,546	-0.58%	32.52%	69.63%	54.14%	0.60	0.40
92	79,479	-0.66%	53.87%	77.90%	75.75%	0.33	0.26
93	79,316	-0.87%	32.99%	64.62%	60.58%	0.33	0.27
94	79,672	-0.42%	16.79%	45.44%	51.73%	0.24	0.20
95	79,616	-0.49%	47.48%	70.48%	71.91%	0.27	0.30
MEAN	*79,526*	*-0.60%*	*36.73%*	*65.61%*	*62.82%*	*0.35*	*0.29*

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County Splits

District	Total Counties	Hampton	James City	Newport News	Poquoson	Williamsburg	York
91	3	57,957			12,150		9,439
92	1	79,479					
93	2			56,193			23,123
94	3		20,694	44,910		14,068	
95	1			79,616			

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PENINSULA – Newport News/Hampton

PENINSULA 2 Map

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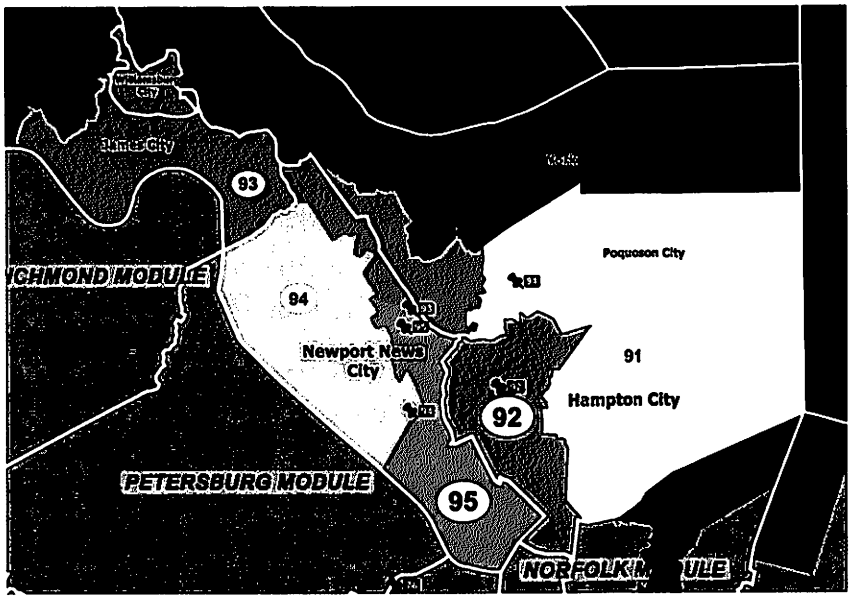

PENINSULA – Newport News/Hampton

PENINSULA 2 Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
91	79,546	-0.58%	32.52%	69.63%	54.14%	0.60	0.44
92	79,479	-0.66%	53.87%	77.90%	75.75%	0.33	0.26
93	79,769	-0.30%	18.18%	50.57%	52.03%	0.20	0.13
94	79,461	-0.69%	31.13%	56.30%	59.06%	0.16	0.51
95	79,374	-0.79%	47.36%	71.03%	72.42%	0.25	0.30
MEAN	*79,526*	*-0.61%*	*36.61%*	*65.08%*	*62.68%*	*0.31*	*0.33*

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
91	79,546	-0.58%	32.52%	69.63%	54.14%	0.60	0.44
92	79,479	-0.66%	53.87%	77.90%	75.75%	0.33	0.26
93	79,769	-0.30%	18.18%	50.57%	52.03%	0.20	0.13
94	79,461	-0.69%	31.13%	56.30%	59.06%	0.16	0.51
95	79,374	-0.79%	47.36%	71.03%	72.42%	0.25	0.30
MEAN	*79,526*	*-0.61%*	*36.61%*	*65.08%*	*62.68%*	*0.31*	*0.33*

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County Splits

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District	Total Counties	Hampton	James City	Newport News	Poquoson	Williamsburg	York
91	3	57,957			12,150		9,439
92	1	79,479					
93	4		20,694	21,884		14,068	23,123
94	1			79,461			
95	1			79,374			

(d) I offer to the Court one illustrative module for the Norfolk-Chesapeake-Portsmouth area that has three very minor variations: Norfolk-Chesapeake 1A, 1B, 1C. These variations differ only very slightly. One variation changes 10 districts in the area, one changes 9, and one changes only 8. The other differences between these variants are in overall compactness and in the number of distinct county pieces found in the plan. These difference occur in districts adjacent to the unconstitutional districts, with the underlying configurations of the four unconstitutional districts in the area either wholly or essentially unchanged across the variants. All of these maps in my view remedy the constitution violation found in districts 77, 80, 89, and 90. None contain any districts with more than a 55% black voting age population, and some have considerably lower BVAP. All create fewer county splits than the 2011 Enacted map. All are, on average, more compact with respect to both the Reock and the Polsby-Popper measure. All are drawn in according with traditional districting criteria and do not have race as a preponderant motive. None involve any fracking.

A map and key statistics about each of these Norfolk-Chesapeake-Portsmouth area variants is provided below, with comparison to the 2011 Enacted map.

NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK ENACTED 2011 Map

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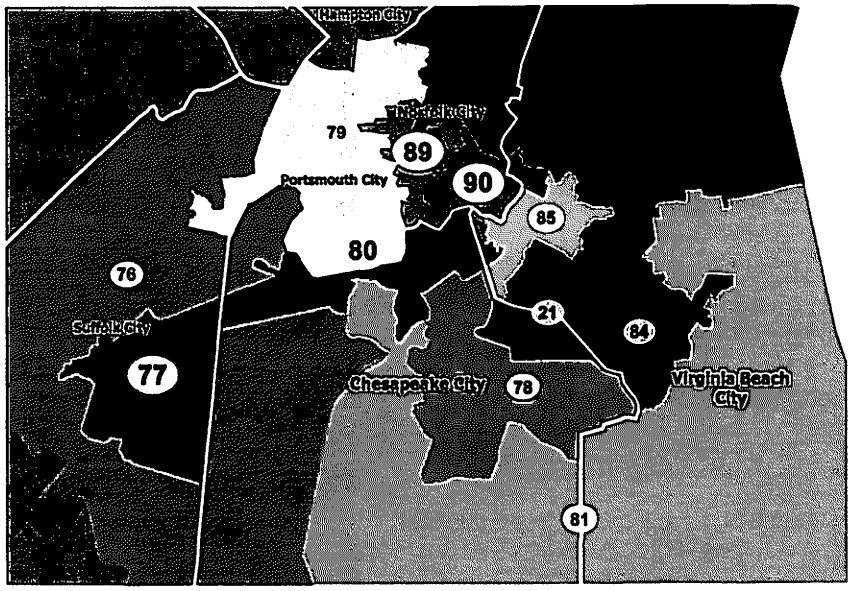

NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK ENACTED 2011 Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
76	80,313	0.38%	25.14%	65.98%	43.89%	0.48	0.17
77	79,627	-0.48%	58.78%	78.92%	77.71%	0.19	0.15
78	80,475	0.58%	17.14%	64.46%	38.82%	0.46	0.35
79	80,243	0.29%	29.46%	48.50%	62.15%	0.45	0.26
80	80,705	0.87%	56.30%	61.01%	75.16%	0.26	0.11
81	79,438	-0.71%	18.60%	54.83%	41.62%	0.40	0.23
83	79,538	-0.59%	15.12%	46.02%	46.69%	0.52	0.34
84	80,281	0.34%	20.45%	56.13%	49.57%	0.44	0.26
85	80,800	0.99%	18.93%	57.51%	49.76%	0.40	0.24
89	79,614	-0.50%	55.46%	51.92%	82.03%	0.40	0.20
90	80,425	0.52%	56.59%	67.78%	79.98%	0.46	0.20
MEAN	*80,089*	*0.10%*	*32.99%*	*59.81%*	*58.32%*	*0.41*	*0.24*

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County Splits

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District	Total Counties	Chesapeake City	Norfolk City	Portsmouth City	Suffolk City	Virginia Beach City
21	2	5,030				74,578
76	2	33,222			47,091	
77	2	62,684			16,943	
78	1	80,475				
79	2		41,702	38,541		
80	4	6,590	3,682	56,994	13,439	
81	2	34,208				45,230
83	2		33,008			46,530
84	1					80,281
85	1					80,800
89	1		79,614			
90	2		50,313			30,112

NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK 1A Map

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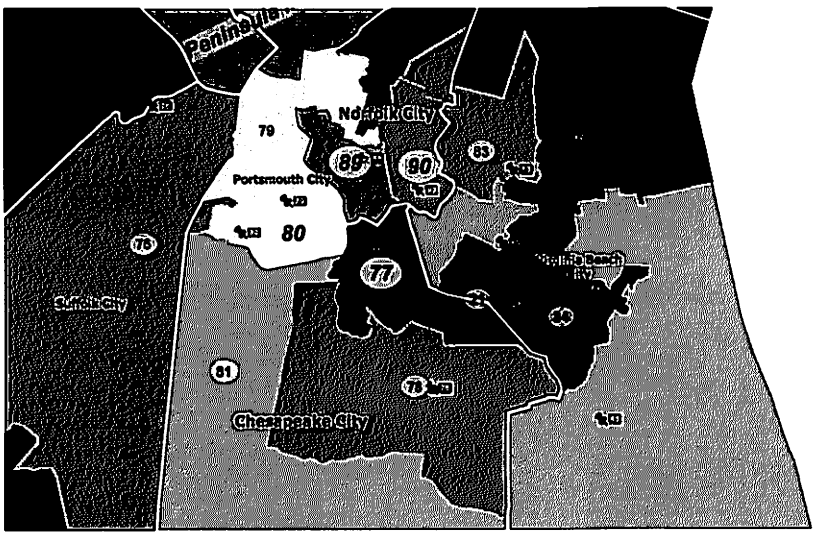

NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK 1A Data

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
76	79,795	-0.27%	42.89%	68.81%	57.60%	0.44	0.45
77	79,810	-0.25%	40.23%	73.03%	63.53%	0.55	0.52
78	80,703	0.87%	16.85%	64.96%	36.04%	0.49	0.42
79	79,895	-0.14%	31.46%	51.27%	59.38%	0.27	0.11
80	79,340	-0.84%	51.38%	57.45%	70.67%	0.55	0.36
81	79,950	-0.08%	25.34%	69.21%	49.65%	0.32	0.20
83	80,805	0.99%	23.10%	52.46%	52.86%	0.50	0.29
84	80,281	0.34%	20.45%	56.13%	49.57%	0.44	0.26
85	80,787	0.97%	21.29%	59.80%	51.13%	0.39	0.30
89	80,481	0.59%	54.92%	51.64%	82.47%	0.38	0.48
90	79,612	-0.50%	41.93%	59.53%	69.71%	0.42	0.52
MEAN	*80,089*	*0.10%*	*32.81%*	*60.75%*	*57.92%*	*0.43*	*0.35*

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County Splits

District	Total Counties	Chesapeake City	Norfolk City	Portsmouth City	Suffolk City	Virginia Beach City
21	2	5,030				74,578
76	2	2,322			77,473	
77	1	79,810				
78	1	80,703				
79	3	19,624	44,076	16,195		
80	1			79,340		
81	2	34,720				45,230
83	2		4,150			76,600
84	1					80,281
85	1					80,842
89	1		80,481			
90	1		79,612			

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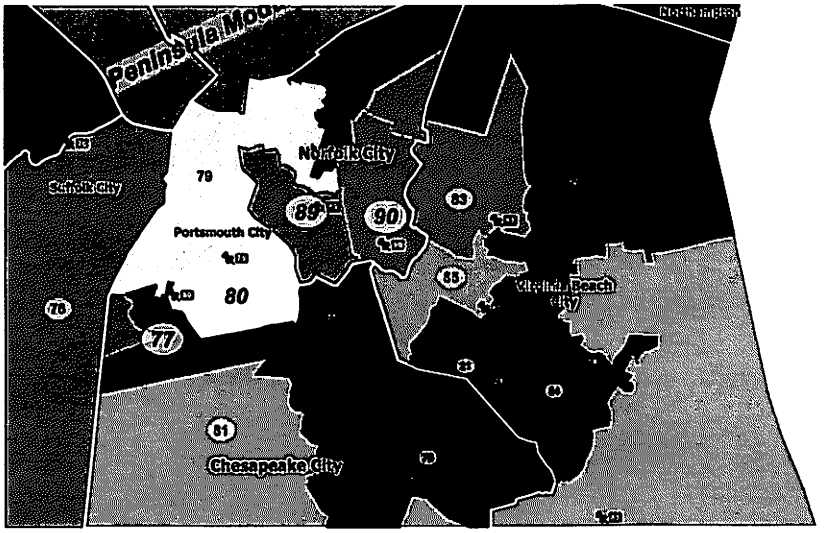
NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK 1B Map~~NORFOLK 1B~~



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NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK 1B Data

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
76	79,530	-0.60%	42.40%	68.63%	56.97%	0.45	0.47
77	79,363	-0.81%	47.03%	78.31%	67.86%	0.24	0.18
78	80,475	0.58%	17.14%	64.46%	38.82%	0.46	0.35
79	80,050	0.05%	31.98%	51.65%	60.38%	0.26	0.13
80	79,340	-0.84%	51.38%	57.45%	70.67%	0.55	0.36
81	80,735	0.91%	19.05%	58.62%	42.43%	0.37	0.27
83	80,463	0.57%	9.13%	37.58%	40.66%	0.50	0.29
84	80,805	0.99%	23.10%	52.46%	52.86%	0.44	0.26
85	80,787	0.97%	21.29%	59.80%	51.13%	0.39	0.30
89	80,481	0.59%	54.92%	51.64%	82.47%	0.38	0.48
90	79,612	-0.50%	41.93%	59.53%	69.71%	0.42	0.52
MEAN	*80,104*	*0.12%*	*31.94%*	*58.73%*	*57.20%*	*0.41*	*0.33*

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District	Total Counties	Chesapeake City	Norfolk City	Portsmouth City	Suffolk City	Virginia Beach City
21	2	5,030				74,578
76	2	2,057			77,473	
77	1	79,363				
78	1	80,475				
79	3	19,779	44,076	16,195		
80	1			79,340		
81	2	35,505				45,230
83	2		4,150			76,600
84	1					80,281
85	1					80,842
89	1		80,481			
90	1		79,612			

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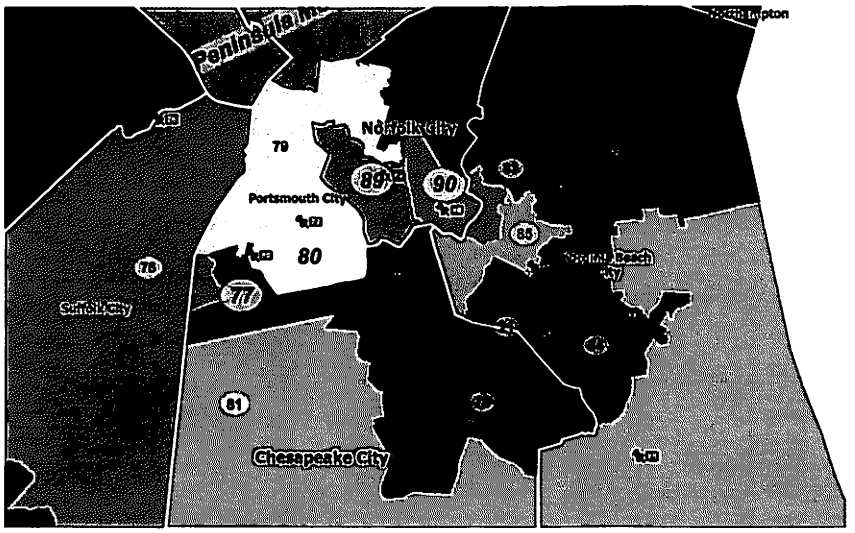
NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK 1C Map



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NORFOLK/PORTSMOUTH/CHESAPEAKE

NORFOLK 1C Map

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
76	79,530	-0.60%	42.40%	68.63%	56.97%	0.45	0.47
77	79,363	-0.81%	47.03%	78.31%	67.86%	0.24	0.18
78	80,475	0.58%	17.14%	64.46%	38.82%	0.46	0.35
79	79,972	-0.05%	32.00%	51.67%	60.34%	0.26	0.13
80	79,340	-0.84%	51.38%	57.45%	70.67%	0.55	0.36
81	80,735	0.91%	19.05%	58.62%	42.43%	0.37	0.27
83	79,538	-0.59%	15.12%	46.02%	46.69%	0.52	0.34
84	80,281	0.34%	20.45%	56.13%	49.57%	0.44	0.26
85	80,721	0.89%	22.32%	61.50%	52.23%	0.36	0.25
89	80,780	0.96%	54.98%	51.67%	82.48%	0.38	0.49
90	80,724	0.89%	48.91%	65.76%	75.02%	0.40	0.40
MEAN	***80,089***	***0.10%***	***32.89%***	***60.41%***	***57.96%***	***0.40***	***0.32***

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County Splits

District	Total Counties	Chesapeake City	Norfolk City	Portsmouth City	Suffolk City	Virginia Beach City
21	2	5,030				74,578
76	2	2,057			77,473	
77	1	79,363				
78	1	80,475				
79	3	19,779	44,076	16,195		
80	1			79,340		
81	2	35,505				45,230
83	2		33,008			46,530
84	1					80,281
85	1					80,721
89	1		80,481			
90	2		50,754			28,244

3. Implementation of equal protection

(a) Recompiling the 2012 Presidential general election, we see that Barack Obama wins in each of the redrawn unconstitutional districts in each of my illustrative modules -- usually by over sixty percent (see full data above). Thus, there can be no doubt that, if a viable African-American candidate wins the Democratic primary in the eleven unconstitutional districts configured as shown in any of my illustrative modules, then that candidate of the Democratic party has a realistic opportunity to win election in the general election due to cohesive voting from within the African-American community and cross-over voting from non-black Democrats – even if that candidate is not an incumbent.

(b) As suggested earlier, one key piece of evidence in determining whether or not we should expect that an African-American candidate has a realistic opportunity to win the Democratic party nomination in these reconfigured versions of the unconstitutional districts is to project into these districts the 2013 vote share of the African-American candidate, Justin Fairfax, in his quest for the Democratic party's nomination to be that party's candidate for statewide office of Attorney General. As noted above Mr. Fairfax was not an incumbent, and his principal opponent was a white candidate with a strong background who went on to win the Democratic primary, statewide, and to subsequently be elected Attorney General of the State of Virginia. Thus, evidence that Mr. Fairfax would have won the 2013 Attorney General Democratic primary within the boundaries of the eleven illustrative

remedial districts that would replace the eleven unconstitutional districts in the 2011 Enacted map in the illustrative modules I have drawn for the Court provides very strong evidence that a viable black candidate, who achieves cohesive support from the minority community and perhaps also some cross-over support from white Democrats, has a realistic opportunity to win the Democratic primary within these districts, even if not an incumbent.

(c) It is my view that an incumbent legislator campaigning in any of the illustrative redrawn versions of these unconstitutional districts would have done even better. Thus, given the recompiled election data presented later in the text, I expect present incumbents in the eleven unconstitutional districts to win the Democratic primary in the districts drawn in any of my illustrative modules, assuming that they run for reelection in 2019. [50] Even if that incumbent were to retire prior to the

[50] In some circumstances, it may be easier for a minority candidate of choice to win the Democratic primary than to win the general election (e.g., when there are few white Democrats relative to the number of African-American Democrats, and the combined African-American and non-African-American vote for the Democratic candidate is not large enough to win a general election); while in other circumstances it may be harder for a minority candidate of choice to win the Democratic primary than to win the general election (e.g., when there are many more white Democrats than black Democrats, but the combined African-American and non-African-American vote for the Democratic candidate is large enough for a Democrat to win a general election). But, as emphasized earlier, to have a realistically drawn "minority opportunity district" it is necessary to have a realistic chance to win both a party primary and a general election, running in the latter as the official candidate of that party. For further discussion of this and related issues see Bernard Grofman, Lisa Handley & David Lublin, Drawing Effective Minority Districts: A Conceptual Framework and Some Empirical Evidence, 79 N.C. L. Rev. 1383 (2001).

2020 election, the seat would still be open seat with a high black voting age percentage and a history of electing a minority candidate.

VI. FINDINGS AND RECOMMENDATIONS

1. Re submitted remedial plans

For reasons elaborated in the Appendix, I cannot recommend to the Court any of the five full plans presented to the Court either as of the Court ordered deadline November 2, 2018, or with purely technical corrections submitted soon thereafter. These plans can be eliminated on grounds of lack of narrow tailoring and/or failure to clearly remedy the constitutional infirmity.

2. Re court ordered map

In evaluating compliance with all the various criteria identified in the body of this report that are elements of a constitutional remedy along traditional districting lines, my recommendation is that the Court adopt a plan of its own that draws on the best elements of plans that have been submitted to the Court. I would also propose that it focus on the illustrative map modules I have developed so as to ultimately select a preferred one from each module and then perfecting the remedial map in that portion of the state.

While the modularized maps I submitted to the Court for the various regions of the state are intended to be illustrative, and there may well be ways of improving them further, it is my professional judgment that each provides an appropriate and narrowly tailored means of remedying the constitutional infirmities in the present unconstitutional districts using traditional districting criteria in a way that clearly that does not have race as a predominant motive. It is also my view that these illustrative maps are attentive to the legal issues in this case to which the Court has called attention. And, to the best of my knowledge, they do not pair any present incumbents.

3. Re -Timeline

~~From December~~From December 7, 2018 up to and including the hearing on January 10, 2019, with response briefs due on December 14, the parties had a full opportunity to present to the Court their comments on the illustrative maps I provide to the Court and suggestions for ways in which they should be redrawn. Since I am providing the Court with modules for different geographic areas of the state, some time after the filing of this Second Report on January 17, I expect that the Court will provide me instructions as to which illustrative geographically specified modules it wishes to see in the final remedial map, and further instructions as to any additional reconfigurations that it wishes to see implemented. In particular, I expect to be given instructions by the Court on any reconfiguring of

the illustrative maps that the Court believes is required by the comments of the parties. Once the Court has agreed on the basic outlines of a remedial map, I should be able to conduct any court-ordered further reconfiguring soon after being given these instructions, so that a court-ordered map can be put into place in a timely fashion.

APPENDIX A

Reasons for Recommending to the Court that it Reject Each of the Five Submitted Remedial Maps

I. Overview

There were five submissions pursuant to the Court's November 2 deadline that contained plans and maps offered as remedies which had sufficient information provided for me to evaluate them with respect to the relevant criteria discussed in the body of my Report. I reference these as Plaintiff's A and Plaintiff's B (from the plaintiffs), DI7002 and DI7003 from Defendant Intervenors (maps which were first introduced into the legislature), and the map from Virginia State Conference of NAACP Branches, which I henceforth simply label simply as the NAACP map.

The five complete plans/maps offered pursuant to the Court's November 7 deadline are, in my view, fatally flawed by not offered a fully narrowly tailored remedy for the constitutional infirmities in the set of eleven districts found to be unconstitutional instances of race preponderant gerrymandering in that they either modify some legislative districts that, demonstrably, did not need to be changed to deal with the constitutional problems identified (e.g., reconfigurations of more districts than needed for remedial purposes, or having redrawn districts that were not adjacent to the unconstitutional districts) and/or they failed to satisfactorily address the constitutional infirmity in some or all of the unconstitutional districts

in a narrowly tailored fashion.

Below I provide summary data charts for each of these five plans, with comparisons to the 2011 Enacted map. Because the five submitted remedial plans differed in the number of districts they changed, and they differ in exactly which districts are changed, the summary charts below are not organized into modules in the same way as in the Report's discussion of my own illustrative modules. Rather they are organized into three groupings of districts that facilitate comparisons across the plans. The first grouping reports data from the eleven unconstitutional districts. The second grouping reports data from the additional ten districts (district 27, 62, 68, 72, 73, 76, 79, 81, 85, and 91) which have been changed in all five plans. However, the summary data on mean and median values reported in the second chart is that for the combined set of twenty-one districts that are found in the first two groupings. This way of reporting data allows for more meaningful comparisons across plans since the set of changed districts being compared in the first two sets of districts is the same for all plans. Note, however, the degree to which there are differences in how each plan redrew the 2011 Enacted map, since there are only 21 districts that have been changed in all five plans, with the plans differing in which districts each changed, so that there are 36 different districts that have been changed in at least one of the submitted remedial maps.

The third grouping identifies the remaining districts that are changed in the given

plan, but that are not changed in all five submitted remedial maps. Thus, this third grouping is not the same for all plans, e.g. since DI7002 changes 30 districts in total, there are nine districts in the third grouping for that plan. The summary data on mean and median values reported in the third chart is that for all districts that are changed in the given plan. This third grouping is not reported for the 2011 Enacted map.

2011 ENACTED DATA~~2011 Enacted Map~~

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
27	79,381	-0.79%	18.44%	57.85%	45.79%	0.35	0.25
62	79,677	-0.42%	24.56%	64.83%	46.93%	0.36	0.13
63	79,602	-0.51%	59.53%	68.40%	72.18%	0.25	0.16
64	79,262	-0.93%	24.24%	63.19%	41.64%	0.37	0.16
66	79,397	-0.77%	16.06%	62.36%	37.27%	0.31	0.27
68	79,611	-0.50%	7.25%	40.25%	44.70%	0.36	0.25
69	79,386	-0.78%	55.19%	61.33%	86.08%	0.52	0.34
70	79,382	-0.78%	56.37%	66.92%	79.82%	0.4	0.19
71	80,322	0.39%	55.35%	50.28%	87.02%	0.33	0.24
72	80,764	0.94%	13.40%	41.33%	45.26%	0.26	0.08
73	80,135	0.16%	13.55%	41.48%	46.75%	0.39	0.15
74	79,594	-0.52%	57.24%	57.50%	75.06%	0.16	0.12
75	79,295	-0.89%	55.43%	62.09%	62.71%	0.41	0.19
76	80,313	0.38%	25.14%	65.98%	43.89%	0.48	0.17
77	79,627	-0.48%	58.78%	78.92%	77.71%	0.19	0.15
78	80,475	0.58%	17.14%	64.46%	38.82%	0.46	0.35
79	80,243	0.29%	29.46%	48.50%	62.15%	0.45	0.26
80	80,705	0.87%	56.30%	61.01%	75.16%	0.26	0.11
81	79,438	-0.71%	18.60%	54.83%	41.62%	0.4	0.23
83	79,538	-0.59%	15.12%	46.02%	46.69%	0.52	0.34
84	80,281	0.34%	20.45%	56.13%	49.57%	0.44	0.26
85	80,800	0.99%	18.93%	57.51%	49.76%	0.4	0.24
89	79,614	-0.49%	55.46%	51.92%	82.03%	0.4	0.2
90	80,425	0.52%	56.59%	67.78%	79.98%	0.46	0.2
91	79,229	-0.98%	19.61%	62.88%	44.26%	0.6	0.47
92	79,689	-0.40%	60.72%	77.89%	80.00%	0.34	0.26
93	79,211	-1.00%	22.58%	52.58%	58.10%	0.22	0.16
94	79,429	-0.73%	21.02%	49.74%	52.27%	0.35	0.38
95	80,071	0.08%	59.97%	79.24%	79.28%	0.14	0.14
MEAN	*79,817*	*-0.24%*	*34.54%*	*59.26%*	*59.50%*	*0.37*	*0.23*

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~~THE FIRST TWO GROUPINGS OF DISTRICTS IN FORMAT PARALLEL TO THE OTHER MAPS~~

DI7002 DATA

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Unconstitutional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
63	79,308	-0.88%	55.09%	66.80%	68.39%	0.66	128.14	0.46
69	79,561	-0.56%	54.41%	83.12%	65.22%	0.43	44.96	0.15
70	79,380	-0.79%	61.77%	85.29%	60.82%	0.47	73.3	0.14
71	80,222	0.27%	56.44%	86.32%	50.95%	0.28	30.5	0.28
74	79,379	-0.79%	44.27%	64.33%	58.56%	0.15	79.04	0.15
77	79,508	-0.63%	46.76%	68.72%	78.49%	0.24	48.88	0.21
80	79,767	-0.30%	47.42%	72.14%	55.96%	0.46	29.22	0.39
89	80,435	0.53%	51.44%	80.43%	50.36%	0.46	30.65	0.2
90	80,805	0.98%	58.59%	80.21%	68.12%	0.39	38.42	0.19
92	79,268	-0.93%	55.27%	76.90%	76.93%	0.35	58.34	0.26
95	79,811	-0.25%	60.02%	78.32%	78.29%	0.4	44.33	0.26
MEAN	79,768	-0.30%	53.77%	76.60%	64.73%	0.39	55.07	0.24
MEDIAN	79,561	-0.56%	55.09%	78.32%	65.22%	0.40	44.96	0.21

Districts Changed In All Plan

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
27	79,511	-0.62%	18.50%	44.74%	61.00%	0.5	49.11	0.28
62	80,627	0.77%	25.46%	46.29%	63.93%	0.42	102.68	0.18
68	79,342	-0.83%	11.38%	49.47%	43.61%	0.33	38.34	0.34
72	80,198	0.24%	14.31%	46.72%	42.92%	0.3	41.1	0.2
73	79,927	-0.10%	11.27%	45.46%	36.32%	0.41	32.29	0.39
76	79,657	-0.44%	27.26%	44.78%	61.66%	0.48	114.69	0.23
79	80,270	0.33%	38.05%	66.76%	56.81%	0.27	57.74	0.19
81	79,236	-0.97%	19.78%	42.87%	58.69%	0.37	148.59	0.27
85	80,479	0.59%	19.57%	50.30%	58.02%	0.39	29.97	0.28
91	79,483	-0.66%	18.16%	43.29%	61.86%	0.29	81.68	0.3
MEAN	79,818	-0.24%	37.87%	63.01%	59.85%	0.38	62.00	0.25
MEDIAN	79,657	-0.44%	44.27%	66.76%	60.82%	0.39	48.88	0.26

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
27	79,511	-0.62%	18.50%	61.00%	44.74%	0.5	0.28
62	80,627	0.77%	25.46%	63.93%	46.29%	0.42	0.18
63	79,308	-0.88%	55.09%	68.39%	66.80%	0.66	0.46
64	79,650	-0.45%	34.07%	66.73%	47.84%	0.29	0.13
66	79,975	-0.04%	20.48%	64.64%	42.29%	0.24	0.14
68	79,342	-0.83%	11.38%	43.61%	49.47%	0.33	0.34
69	79,561	-0.56%	54.41%	65.22%	83.12%	0.43	0.15
70	79,380	-0.79%	61.77%	60.82%	85.29%	0.47	0.14
71	80,222	0.27%	56.44%	50.95%	86.32%	0.28	0.28
72	80,198	0.24%	14.31%	42.92%	46.72%	0.3	0.2
73	79,927	-0.10%	11.27%	36.32%	45.46%	0.41	0.39
74	79,379	-0.79%	44.27%	58.56%	64.33%	0.15	0.15
75	79,823	-0.23%	53.37%	60.11%	60.83%	0.4	0.27
76	79,657	-0.44%	27.26%	61.66%	44.78%	0.48	0.23
77	79,508	-0.63%	46.76%	78.49%	68.72%	0.24	0.21
78	79,662	-0.43%	16.79%	64.43%	38.42%	0.48	0.38
79	80,270	0.33%	38.05%	56.81%	66.76%	0.27	0.19
80	79,767	-0.30%	47.42%	55.96%	72.14%	0.46	0.39
81	79,236	-0.97%	19.78%	58.69%	42.87%	0.37	0.27
83	79,691	-0.40%	15.23%	46.11%	46.76%	0.51	0.31
84	80,281	0.34%	20.45%	56.13%	49.57%	0.44	0.26
85	80,479	0.59%	19.57%	58.02%	50.30%	0.39	0.28
89	80,435	0.53%	51.44%	50.36%	80.43%	0.46	0.2
90	80,805	0.99%	58.59%	68.12%	80.21%	0.39	0.19
91	79,483	-0.66%	18.16%	61.86%	43.29%	0.29	0.3
92	79,268	-0.93%	55.27%	76.93%	76.90%	0.35	0.26
93	79,857	-0.19%	27.40%	53.37%	64.51%	0.2	0.15
94	79,210	-1.00%	22.24%	48.92%	51.14%	0.45	0.38
95	79,811	-0.25%	60.02%	78.29%	78.32%	0.4	0.26
MEAN	*79,798*	*-0.27%*	*34.30%*	*59.40%*	*59.24%*	*0.38*	*0.26*

Field Code Changed

Changed Additional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
64	79,650	-0.45%	34.07%	47.84%	66.73%	0.29	327.24	0.13
66	79,975	-0.04%	20.48%	42.29%	64.64%	0.24	112.95	0.14
75	79,823	-0.23%	53.37%	60.83%	60.11%	0.4	316.31	0.27
78	79,662	-0.43%	16.79%	38.42%	64.43%	0.48	47.76	0.38
83	79,691	-0.40%	15.23%	46.76%	46.11%	0.51	43.59	0.31
93	79,857	-0.19%	27.40%	64.51%	53.37%	0.2	80.25	0.15
94	79,210	-1.00%	22.24%	51.14%	48.92%	0.45	47.25	0.38
97	80,081	0.09%	14.97%	33.09%	48.35%	0.38	218	0.21
100	79,915	-0.12%	27.64%	55.06%	38.85%	0.28	271.3	0.37
MEAN	79,801	-0.26%	34.25%	58.77%	58.28%	0.38	92.22	0.26
MEDIAN	79,729	-0.35%	27.52%	53.10%	59.40%	0.39	53.43	0.26

DI7003 DATA

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Plan Details

Unconstitutional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
63	79,859	-0.19%	51.81%	63.21%	68.11%	0.43	175.72	0.17
69	79,444	-0.71%	52.69%	83.37%	62.80%	0.45	34.51	0.29
70	80,662	0.81%	53.54%	73.51%	64.03%	0.4	107.63	0.13
71	79,973	-0.05%	51.44%	85.12%	50.26%	0.46	26.74	0.28
74	79,626	-0.48%	49.36%	69.85%	57.52%	0.15	99.65	0.11
77	80,076	0.08%	47.41%	70.46%	78.10%	0.29	47.94	0.19
80	79,299	-0.89%	48.39%	71.72%	55.15%	0.49	30.1	0.32
89	80,235	0.28%	52.24%	78.97%	51.68%	0.23	35.19	0.17
90	80,391	0.48%	52.95%	77.09%	66.22%	0.48	36.12	0.22
92	79,305	-0.88%	57.26%	77.83%	76.51%	0.33	54.55	0.3
95	79,367	-0.80%	54.52%	75.68%	79.00%	0.25	59.8	0.15
MEAN	79,840	-0.21%	51.97%	75.17%	64.49%	0.36	64.36	0.21
MEDIAN	79,859	-0.19%	52.24%	75.68%	64.03%	0.40	47.94	0.19

Districts Changed In All Plan

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
27	79,259	-0.94%	15.88%	43.39%	56.01%	0.31	45.95	0.28
62	80,219	0.26%	28.19%	49.51%	66.12%	0.27	101.96	0.17
68	79,236	-0.97%	14.80%	47.83%	41.90%	0.35	45.94	0.23
72	79,666	-0.43%	16.38%	48.66%	44.93%	0.28	46.83	0.16
73	79,478	-0.66%	13.57%	45.96%	38.39%	0.39	42.97	0.22
76	79,975	-0.04%	27.24%	45.12%	64.84%	0.51	153.88	0.18
79	80,714	0.88%	46.80%	69.85%	56.26%	0.19	76.42	0.16
81	80,640	0.79%	20.23%	44.97%	57.86%	0.39	137.28	0.25
85	79,676	-0.42%	20.57%	50.79%	56.78%	0.29	40.75	0.14
91	80,096	0.11%	20.88%	45.19%	65.03%	0.28	88.11	0.26
MEAN	79,866	-0.18%	37.92%	62.77%	59.88%	0.34	70.86	0.21
MEDIAN	79,859	-0.19%	47.41%	69.85%	57.86%	0.33	47.94	0.19

Changed Additional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
21	80,538	0.66%	25.62%	54.05%	66.85%	0.29	33.63	0.2
55	79,697	-0.39%	15.29%	38.08%	48.09%	0.46	213.65	0.19
64	79,225	-0.98%	26.18%	42.78%	62.72%	0.37	333.51	0.14
66	79,703	-0.38%	23.73%	45.31%	67.58%	0.34	76.09	0.2
78	79,451	-0.70%	15.74%	37.24%	62.93%	0.54	47.02	0.44
82	79,675	-0.42%	9.94%	41.72%	37.55%	0.52	56.15	0.45
83	80,727	0.90%	16.49%	48.02%	44.96%	0.3	47.72	0.22
84	79,838	-0.21%	19.50%	48.72%	54.76%	0.5	37.89	0.34
93	79,432	-0.72%	29.74%	64.21%	53.03%	0.21	78.81	0.15
97	79,477	-0.67%	15.10%	33.12%	48.35%	0.38	217.52	0.21
100	80,285	0.34%	27.78%	53.31%	38.77%	0.27	269.15	0.38
MEAN	79,851	-0.20%	31.92%	57.02%	57.60%	0.36	90.60	0.23
MEDIAN	79,700	-0.39%	26.71%	50.15%	57.15%	0.35	55.35	0.21

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	80,538	0.66%	25.62%	66.85%	54.05%	0.29	0.2
27	79,259	-0.94%	15.88%	56.01%	43.39%	0.31	0.28
62	80,219	0.26%	28.19%	66.12%	49.51%	0.27	0.17
63	79,859	-0.19%	51.81%	68.11%	63.21%	0.43	0.17
64	79,225	-0.98%	26.18%	62.72%	42.78%	0.37	0.14
66	79,703	-0.38%	23.73%	67.58%	45.31%	0.34	0.2
68	79,236	-0.97%	14.80%	41.90%	47.83%	0.35	0.23
69	79,444	-0.71%	52.69%	62.80%	83.37%	0.45	0.29
70	80,662	0.81%	53.54%	64.03%	73.51%	0.4	0.13
71	79,973	-0.05%	51.44%	50.26%	85.12%	0.46	0.28
72	79,666	-0.43%	16.38%	44.93%	48.66%	0.28	0.16
73	79,478	-0.66%	13.57%	38.39%	45.96%	0.39	0.22
74	79,626	-0.48%	49.36%	57.52%	69.85%	0.15	0.11
75	79,295	-0.89%	55.43%	62.09%	62.71%	0.41	0.19
76	79,975	-0.04%	27.24%	64.84%	45.12%	0.51	0.18
77	80,076	0.08%	47.41%	78.10%	70.46%	0.29	0.19
78	79,451	-0.70%	15.74%	62.93%	37.24%	0.54	0.44
79	80,714	0.88%	46.80%	56.26%	69.85%	0.19	0.16
80	79,299	-0.89%	48.39%	55.15%	71.72%	0.49	0.32
81	80,640	0.79%	20.23%	57.86%	44.97%	0.39	0.25
83	80,727	0.90%	16.49%	44.96%	48.02%	0.3	0.22
84	79,838	-0.22%	19.50%	54.76%	48.72%	0.5	0.34
85	79,676	-0.42%	20.57%	56.78%	50.79%	0.29	0.14
89	80,235	0.28%	52.24%	51.68%	78.97%	0.23	0.17
90	80,391	0.48%	52.95%	66.22%	77.09%	0.48	0.22
91	80,096	0.11%	20.98%	65.03%	45.19%	0.28	0.26
92	79,305	-0.88%	57.26%	76.51%	77.83%	0.33	0.3
93	79,432	-0.72%	29.74%	53.03%	64.21%	0.21	0.15
94	79,429	-0.73%	21.02%	49.74%	52.27%	0.35	0.38
95	79,367	-0.80%	54.52%	79.00%	75.68%	0.25	0.15
MEAN	*79,828*	*-0.23%*	*34.32%*	*59.40%*	*59.11%*	*0.35*	*0.22*

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Field Code Changed

NAACP DATA

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Field Code Changed

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	80,689	0.85%	21.94%	65.37%	49.07%	0.5	0.5
27	79,287	-0.90%	25.51%	63.58%	51.94%	0.36	0.29
62	79,248	-0.95%	43.83%	59.94%	64.04%	0.31	0.21
63	79,233	-0.97%	58.52%	68.27%	71.93%	0.41	0.2
64	79,226	-0.98%	24.84%	63.79%	42.12%	0.42	0.15
66	79,230	-0.97%	17.42%	63.34%	38.88%	0.48	0.29
68	80,576	0.71%	16.91%	47.78%	49.69%	0.28	0.28
69	79,224	-0.98%	50.37%	62.15%	82.14%	0.44	0.34
70	79,557	-0.57%	46.49%	64.42%	71.37%	0.51	0.36
71	79,237	-0.97%	49.95%	48.70%	80.79%	0.36	0.27
72	79,546	-0.58%	16.53%	45.60%	52.39%	0.63	0.44
73	79,758	-0.32%	7.63%	35.01%	37.14%	0.27	0.2
74	80,604	0.74%	42.49%	54.55%	65.84%	0.23	0.22
75	79,219	-0.99%	54.60%	61.08%	61.41%	0.43	0.2
76	79,382	-0.78%	42.53%	68.51%	57.16%	0.38	0.5
77	80,541	0.66%	47.51%	77.78%	69.18%	0.25	0.24
78	80,023	0.02%	18.24%	67.47%	39.67%	0.57	0.49
79	80,803	0.99%	32.52%	47.09%	61.32%	0.43	0.28
80	80,762	0.94%	49.72%	63.81%	66.23%	0.37	0.28
81	80,142	0.17%	14.35%	46.38%	38.30%	0.55	0.47
83	79,213	-1.00%	16.23%	47.22%	47.45%	0.52	0.35
84	80,100	0.11%	22.99%	60.38%	53.64%	0.4	0.23
85	80,099	0.11%	29.40%	64.93%	60.99%	0.32	0.32
89	80,808	1.00%	52.12%	50.03%	80.34%	0.52	0.39
90	80,414	0.50%	45.97%	64.34%	70.11%	0.34	0.36
91	79,574	-0.54%	22.42%	67.01%	46.07%	0.5	0.47
92	79,344	-0.83%	57.60%	76.13%	78.58%	0.33	0.25
93	79,211	-1.00%	22.58%	52.58%	58.10%	0.22	0.16
94	79,738	-0.34%	29.34%	52.80%	56.52%	0.32	0.49
95	79,762	-0.31%	50.67%	77.99%	74.37%	0.2	0.28
MEAN	***79,818***	***-0.24%***	***34.37%***	***59.60%***	***59.23%***	***0.40***	***0.32***

~~THE DATA FOR 89 AND 79 NEED TO BE CHANGED.~~

Unconstitutional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
63	79,233	-0.97%	58.52%	71.93%	68.27%	0.41	121.22	0.2
69	79,224	-0.98%	50.37%	82.14%	62.15%	0.44	30.42	0.34
70	79,557	-0.57%	46.49%	71.37%	64.42%	0.51	57.06	0.36
71	79,237	-0.97%	49.95%	80.79%	48.70%	0.36	27.37	0.27
74	79,248	-0.95%	43.83%	64.04%	59.94%	0.31	137.06	0.21
77	80,541	0.66%	47.51%	69.18%	77.78%	0.25	47.84	0.24
80	80,762	0.94%	49.72%	66.23%	63.81%	0.37	38.56	0.28
89	61,522	-23.11%	61.66%	84.84%	54.10%	0.47	20.35	0.44
90	80,414	0.50%	45.97%	70.11%	64.34%	0.34	27.14	0.36
92	79,344	-0.83%	57.60%	78.58%	76.13%	0.33	61.21	0.25
95	79,762	-0.31%	50.67%	74.37%	77.99%	0.2	38.33	0.28
MEAN	78,077	-2.42%	51.12%	73.96%	65.24%	0.36	55.14	0.29
MEDIAN	79,344	-0.83%	49.95%	71.93%	64.34%	0.36	38.56	0.28

Districts Changed In All Plan

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
27	80,576	0.71%	16.91%	49.69%	47.78%	0.28	42.49	0.28
62	79,287	-0.90%	25.51%	51.94%	63.58%	0.36	46.57	0.29
68	79,758	-0.32%	7.63%	37.14%	35.01%	0.27	55.9	0.2
72	80,604	0.74%	42.49%	65.84%	54.55%	0.23	51.45	0.22
73	79,546	-0.58%	16.53%	52.39%	45.60%	0.63	26.63	0.44
76	79,382	-0.78%	42.53%	57.16%	68.51%	0.38	87.49	0.5
79	100,089	25.10%	30.76%	62.54%	45.54%	0.48	48.64	0.27
81	80,023	0.02%	18.24%	39.67%	67.47%	0.57	73.96	0.49
85	80,099	0.11%	29.40%	60.99%	64.93%	0.32	24.21	0.32
91	79,574	-0.54%	22.42%	46.07%	67.01%	0.5	62.08	0.47
MEAN	79,894	-0.14%	38.80%	63.67%	60.84%	0.38	53.62	0.32
MEDIAN	79,574	-0.54%	43.83%	65.84%	63.81%	0.36	47.84	0.28

~~NAACP~~

Changed Additional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
21	80,689	0.85%	21.94%	49.07%	65.37%	0.5	27.73	0.5
64	79,226	-0.98%	24.84%	42.12%	63.79%	0.42	317.02	0.15
65	79,318	-0.86%	15.56%	32.02%	50.25%	0.29	214.11	0.21
66	79,230	-0.97%	17.42%	38.88%	63.34%	0.48	73.55	0.29
~~75~~	~~79,219~~	~~-0.99%~~	~~54.60%~~	~~61.41%~~	~~61.08%~~	~~0.43~~	~~373.47~~	~~0.2~~
78	80,142	0.17%	14.35%	38.30%	46.38%	0.55	93.9	0.47
83	79,213	-1.00%	16.23%	47.45%	47.22%	0.52	41.47	0.35
84	80,100	0.11%	22.99%	53.64%	60.38%	0.4	37	0.23
94	79,738	-0.34%	29.34%	36.52%	52.80%	0.32	43.25	0.49
MEAN	79,822	-0.24%	34.40%	58.55%	59.61%	0.40	78.25	0.32
MEDIAN	79,566	-0.56%	30.08%	59.08%	62.74%	0.39	48.24	0.29

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Unconstitutional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
63	79,436	-0.72%	55.79%	67.56%	68.02%	0.59	120.1	0.51
69	79,489	-0.65%	50.79%	80.96%	64.26%	0.46	30.87	0.35
70	79,412	-0.75%	58.47%	81.27%	62.30%	0.41	69.98	0.19
71	79,515	-0.62%	50.89%	83.82%	49.90%	0.38	26.02	0.3
74	79,880	-0.16%	52.30%	72.11%	56.14%	0.26	52.08	0.22
77	80,448	0.55%	46.99%	68.15%	78.51%	0.26	47.16	0.25
80	79,924	-0.11%	51.92%	68.90%	62.06%	0.39	34.46	0.28
89	80,517	0.63%	51.71%	79.31%	50.19%	0.5	24.42	0.43
90	79,228	-0.98%	45.30%	72.38%	60.21%	0.48	25.01	0.46
92	79,959	-0.06%	58.15%	78.84%	76.89%	0.32	53.33	0.31
95	79,667	-0.43%	49.29%	73.33%	72.81%	0.25	39.48	0.34
MEAN	79,770	-0.30%	51.96%	75.15%	63.75%	0.39	47.54	0.33
MEDIAN	79,667	-0.43%	51.71%	73.33%	62.30%	0.39	39.48	0.31

Districts Changed In All Plan

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
27	79,469	-0.68%	23.40%	48.69%	64.54%	0.48	50.57	0.29
62	80,065	0.07%	27.72%	50.65%	61.81%	0.34	152.83	0.18
68	79,218	-0.99%	12.52%	48.30%	44.71%	0.34	38.62	0.31
72	80,432	0.53%	12.64%	45.56%	42.67%	0.29	43.02	0.2
73	79,730	-0.35%	12.55%	45.09%	37.78%	0.39	41.43	0.24
76	79,530	-0.60%	42.40%	56.97%	68.63%	0.45	84.89	0.47
79	80,217	0.26%	31.37%	61.56%	47.50%	0.44	46.26	0.27
81	80,691	0.85%	16.73%	40.40%	57.21%	0.37	144.27	0.28
85	80,754	0.93%	20.75%	50.30%	59.49%	0.39	30.96	0.27
91	79,503	-0.63%	25.11%	48.56%	70.15%	0.48	62.07	0.49
MEAN	79,861	-0.19%	37.94%	62.99%	59.80%	0.39	57.99	0.32
MEDIAN	79,730	-0.35%	45.30%	67.56%	61.81%	0.39	46.26	0.29

District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
27	79,469	-0.68%	23.40%	64.54%	48.69%	0.48	0.29
62	80,065	0.07%	27.72%	61.81%	50.65%	0.34	0.18
63	79,436	-0.72%	55.79%	68.02%	67.56%	0.59	0.51
64	79,452	-0.70%	29.70%	65.81%	44.22%	0.29	0.17
66	79,330	-0.85%	16.65%	63.51%	37.64%	0.3	0.29
68	79,218	-0.99%	12.52%	44.71%	48.30%	0.34	0.31
69	79,489	-0.65%	50.79%	64.26%	80.96%	0.46	0.35
70	79,412	-0.75%	58.47%	62.30%	81.27%	0.41	0.19
71	79,515	-0.62%	50.89%	49.90%	83.82%	0.38	0.3
72	80,432	0.53%	12.64%	42.67%	45.56%	0.29	0.2
73	79,730	-0.35%	12.55%	37.78%	45.09%	0.39	0.24
74	79,880	-0.16%	52.30%	56.14%	72.11%	0.26	0.22
75	79,287	-0.90%	52.45%	58.23%	59.81%	0.41	0.32
76	79,530	-0.60%	42.40%	68.63%	56.97%	0.45	0.47
77	80,448	0.55%	46.99%	78.51%	68.15%	0.26	0.25
78	80,037	0.03%	18.02%	65.24%	39.57%	0.44	0.32
79	80,217	0.26%	31.37%	47.50%	61.56%	0.44	0.27
80	79,924	-0.11%	51.92%	62.06%	68.90%	0.39	0.28
81	80,691	0.85%	16.73%	57.21%	40.40%	0.37	0.28
83	80,774	0.95%	22.24%	51.45%	51.32%	0.44	0.32
84	79,655	-0.44%	21.57%	57.29%	50.70%	0.41	0.3
85	80,754	0.93%	20.75%	59.49%	50.30%	0.39	0.27
89	80,517	0.63%	51.71%	50.19%	79.31%	0.5	0.43
90	79,228	-0.98%	45.30%	60.21%	72.38%	0.48	0.46
91	79,503	-0.63%	25.11%	70.15%	48.56%	0.48	0.49
92	79,959	-0.06%	58.15%	76.89%	78.84%	0.32	0.31
93	79,232	-0.97%	19.92%	50.73%	54.85%	0.21	0.15
94	79,268	-0.93%	30.04%	55.28%	57.85%	0.48	0.63
95	79,667	-0.43%	49.29%	72.81%	73.33%	0.25	0.34
MEAN	***79,791***	***-0.27%***	***34.37%***	***59.60%***	***59.04%***	***0.39***	***0.32***

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Changed Additional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
56	80,046	0.04%	17.49%	38.52%	48.39%	0.45	228.12	0.26
64	79,452	-0.70%	29.70%	44.22%	65.81%	0.29	280.96	0.17
65	79,682	-0.41%	9.96%	31.86%	44.01%	0.49	111.57	0.35
66	79,330	-0.85%	16.65%	37.64%	63.51%	0.3	91.46	0.29
75	79,287	-0.90%	52.45%	59.81%	58.23%	0.41	286.99	0.32
78	80,037	0.03%	18.02%	39.57%	65.24%	0.44	51.45	0.32
82	79,504	-0.63%	10.88%	42.55%	36.62%	0.55	56.5	0.45
83	80,774	0.95%	22.24%	51.32%	51.45%	0.44	38.98	0.32
84	79,655	-0.44%	21.57%	50.70%	57.29%	0.41	39.57	0.3
93	79,232	-0.97%	19.92%	54.85%	50.73%	0.21	86.53	0.15
94	79,268	-0.93%	30.04%	57.85%	55.28%	0.48	35.28	0.63
100	80,680	0.84%	27.23%	54.89%	39.86%	0.29	262.49	0.39
MEAN	79,819	-0.24%	32.51%	57.17%	57.34%	0.39	84.48	0.32
MEDIAN	79,667	-0.43%	27.72%	54.85%	58.23%	0.41	51.45	0.30

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District	Population	Dev%	BVAP%	Fairfax '13	Obama '12	Reock	Polsby Popper
21	79,608	-0.50%	23.86%	64.66%	52.43%	0.42	0.31
27	79,675	-0.42%	23.01%	64.29%	48.86%	0.5	0.24
62	79,916	-0.12%	28.88%	68.47%	54.12%	0.3	0.12
63	79,436	-0.72%	55.79%	68.02%	67.56%	0.59	0.51
64	79,452	-0.70%	29.70%	65.81%	44.22%	0.29	0.17
66	79,397	-0.77%	16.06%	62.36%	37.27%	0.31	0.27
68	79,334	-0.84%	10.39%	43.32%	45.86%	0.36	0.24
69	80,340	0.41%	49.31%	61.26%	81.64%	0.46	0.37
70	79,350	-0.82%	54.09%	61.48%	71.61%	0.3	0.2
71	79,515	-0.62%	50.89%	49.90%	83.82%	0.38	0.29
72	80,257	0.31%	13.65%	45.13%	46.59%	0.32	0.25
73	79,730	-0.35%	12.55%	37.78%	45.09%	0.39	0.24
74	79,242	-0.96%	58.98%	56.66%	77.79%	0.21	0.22
75	79,287	-0.90%	52.45%	58.23%	59.81%	0.41	0.32
76	79,530	-0.60%	42.40%	68.63%	56.97%	0.45	0.47
77	80,448	0.55%	46.99%	78.51%	68.15%	0.26	0.25
78	80,037	0.03%	18.02%	65.24%	39.57%	0.44	0.32
79	80,217	0.26%	31.37%	47.50%	61.56%	0.44	0.27
80	79,924	-0.11%	51.92%	62.06%	68.90%	0.39	0.28
81	80,691	0.85%	16.73%	57.21%	40.40%	0.37	0.28
83	80,774	0.95%	22.24%	51.45%	51.32%	0.44	0.32
84	79,655	-0.44%	21.57%	57.29%	50.70%	0.41	0.3
85	80,754	0.93%	20.75%	59.49%	50.30%	0.39	0.27
89	80,517	0.63%	51.71%	50.19%	79.31%	0.5	0.43
90	79,228	-0.98%	45.30%	60.21%	72.38%	0.48	0.46
91	79,503	-0.63%	25.11%	70.15%	48.56%	0.48	0.49
92	79,959	-0.06%	58.15%	76.89%	78.84%	0.32	0.31
93	79,232	-0.97%	19.92%	50.73%	54.85%	0.21	0.15
94	79,268	-0.93%	30.04%	55.28%	57.85%	0.48	0.63
95	79,667	-0.43%	49.29%	72.81%	73.33%	0.25	0.34
****MEAN****	***79,798***	***-0.26%***	***34.37%***	***59.70%***	***58.99%***	***0.39***	***0.31***

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Unconstitutional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
63	79,436	-0.72%	55.79%	67.56%	68.02%	0.59	120.09	0.51
69	80,340	0.41%	49.31%	81.64%	61.26%	0.46	30.09	0.37
70	79,350	-0.82%	54.09%	71.61%	61.48%	0.3	148.81	0.2
71	79,515	-0.62%	50.89%	83.82%	49.90%	0.38	26.25	0.29
74	79,242	-0.96%	58.98%	77.79%	56.66%	0.21	50.54	0.22
77	80,448	0.55%	46.99%	68.15%	78.51%	0.26	47.16	0.25
80	79,924	-0.11%	51.92%	68.90%	62.06%	0.39	34.46	0.28
89	80,517	0.63%	51.71%	79.31%	50.19%	0.5	24.42	0.43
90	79,228	-0.98%	45.30%	72.38%	60.21%	0.48	25.01	0.46
92	79,959	-0.06%	58.15%	78.84%	76.89%	0.32	53.33	0.31
95	79,667	-0.43%	49.29%	73.33%	72.81%	0.25	39.48	0.34
MEAN	79,784	-0.28%	52.04%	74.85%	63.45%	0.38	54.51	0.33
MEDIAN	79,667	-0.43%	51.71%	73.33%	61.48%	0.38	39.48	0.31

Districts Changed In All Plan

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
27	79,675	-0.42%	23.01%	48.86%	64.29%	0.5	55.36	0.24
62	79,916	-0.12%	28.88%	54.12%	68.47%	0.3	91.19	0.12
68	79,334	-0.84%	10.39%	45.86%	43.32%	0.36	45.49	0.24
72	80,257	0.31%	13.65%	46.59%	45.13%	0.32	36.2	0.25
73	79,730	-0.55%	12.55%	45.09%	37.78%	0.39	41.43	0.24
76	79,530	-0.60%	42.40%	56.97%	68.63%	0.45	84.89	0.47
79	80,217	0.26%	31.37%	61.56%	47.50%	0.44	46.26	0.27
81	80,691	0.85%	16.73%	40.40%	57.21%	0.37	144.27	0.28
85	80,754	0.93%	20.75%	50.30%	59.49%	0.39	30.96	0.27
91	79,503	-0.63%	25.11%	48.56%	70.15%	0.48	62.16	0.49
MEAN	79,868	-0.18%	37.97%	62.93%	60.00%	0.39	58.95	0.31
MEDIAN	79,730	-0.35%	45.30%	67.56%	61.26%	0.39	46.26	0.28

~~PLAINTIFFS B~~

Changed Additional Districts

District	Population	Dev%	BVAP %	Obama '12 %	Fair '13 %	Reock	Perimeter	Polsby-Popper
56	79,641	-0.46%	14.42%	37.81%	46.24%	0.37	196.15	0.25
64	79,452	-0.70%	29.70%	44.22%	65.81%	0.29	280.87	0.17
65	79,871	-0.17%	13.22%	32.29%	46.46%	0.34	179.27	0.25
75	79,287	-0.90%	52.45%	59.81%	58.23%	0.41	286.99	0.32
78	80,037	0.03%	18.02%	39.57%	65.24%	0.44	51.45	0.32
82	79,504	-0.63%	10.88%	42.55%	36.62%	0.55	56.5	0.45
83	80,774	0.95%	22.24%	51.32%	51.45%	0.44	38.98	0.32
84	79,655	-0.44%	21.57%	50.70%	57.29%	0.41	39.57	0.3
93	79,232	-0.97%	19.92%	54.85%	50.73%	0.21	86.96	0.15
94	79,268	-0.93%	30.04%	57.85%	55.28%	0.48	35.28	0.63
100	80,680	0.84%	27.23%	54.89%	39.86%	0.29	262.49	0.39
MEAN	79,832	-0.22%	33.03%	57.73%	57.29%	0.39	86.01	0.32
MEDIAN	79,671	-0.42%	29.29%	54.87%	57.76%	0.39	51.00	0.29

II. Identified flaws

While I cannot recommend the adoption of any of the plans in their present form, I have reviewed the features of each of these submitted proposed remedial maps with an eye toward the possibility of modifying elements of these submitted plans that were consistent with a narrowly tailored remedy in preparing the configurations of my own illustrative remedial maps. I discuss below, in more detail than in the body of the Report, the reasons why I cannot recommend to the Court any of the submitted remedial maps.

1. First, each of the five plans changes 30 or more districts. DI7002 changes 30; DI7003 changes 32; the NAACP changes 30; Plaintiffs' A changes 33 and Plaintiffs' B changes 32. My own examination of alternative mapping demonstrates that reconfiguration of more than 30 of the districts in the 2011 Enacted Plan was certainly not necessitated by the need to address the constitutional infirmities in the eleven districts found to be unconstitutional. Indeed, the illustrative remedial maps that can be constructed from the modules I have submitted to the Court would lead to a change in only from 21 to 26 districts.

Even were an excessive number of changed districts the only flaw, I cannot recommend a plan with this flaw, and so for this reason alone I cannot recommend DI7003, nor can I recommend either of Plaintiffs' plans. As noted in the Report,

changes in even as many as 30 districts are, in my view, not needed to fully remedy the constitutional infirmities in the eleven unconstitutional districts, thus rendering DI7002 and the NAACP plan also highly problematic.

2. Second, four of these plans change districts that are not adjacent to the unconstitutional districts. In particular, both Plaintiffs Plan A and Plaintiffs Plan B change both district 65 and district 56; while the NAACP plan changes district 65, and DI7003 changes district 21. My own examination of alternative mapping demonstrate that reconfiguration of these additional districts was not necessitated by the need to address the constitutional infirmities in the eleven districts found to be unconstitutional. Even were this the only flaw, I cannot recommend a plan with this flaw, and so for this reason alone I cannot recommend DI7003, Plaintiffs Plan A, Plaintiffs Plan B, or the NAACP plan.

In sum, since four of the five submitted plans make changes in some districts that did not need to be changed in order to remedy the constitutional violation, I cannot recommend DI7003, Plaintiffs Plan A, Plaintiffs Plan B, or the NAACP plan to the Court, and the remaining plan, DI7002, by changing 30 districts is also highly problematic. Moreover, each of the plans has other major flaws.

Another indicator of a failure to create a narrowly tailored remedy is redrawing of remedial districts with a greater than 60% black voting age population, without

evidence that such a high black percentage was needed to avoid vote dilution. Even if having some districts which exceed 60% black voting age population were the only problem with a submitted remedial plan, because it is a clear signal of a failure to address the need for a narrowly tailored remedy, in the absence of evidence that such a configuration was needed to avoid vote dilution, or compelled by geographic or demographic factors, I cannot recommend plans which have this feature to the Court. My own illustrative configurations, and the analyses I have done of these configurations, indicate that it not necessary to avoid vote dilution to drawn maps in which any of the redrawn districts exceed 55% black voting age population, with the highest black voting age population in any district in any of my modules being ~~55.01~~54.92% (district 89 in Norfolk Illustrative Module 1C), and the black voting age population in district 89 in the other two illustrative modules in Norfolk at 54.92%.

Similarly, there are simply no good reasons to increase the African-American voting age population in any of the unconstitutional districts above what is found in the 2011 Enacted map. Thus, I cannot recommend to the Court any plan that increases the African-American voting age population in any of the unconstitutional districts above what is found in the 2011 Enacted map.

(a) The HB7002 plan offered by Defendant-Intervenors has 6 of its 11 redrawn unconstitutional districts still with black voting age population above 55%, and two

of these have BVAP at or above 60%, and it increases black voting age population in some of the six districts in it with BVAP above 55% as compared to the 2011 Enacted plan.

(b) The HB7003 plan offered by Defendant-Intervenors has 1 of its 11 redrawn unconstitutional districts with black voting age population above 55%, but that district (district 92) is at 57.26%.

(c) The NAACP plan has 1 of its 11 redrawn unconstitutional districts with black voting age population above 55%, but that district (district 92) is at 57.6%.

(d) Plaintiffs plan A has 3 of its redrawn unconstitutional districts still with a greater than 55% black population -- districts 63 (55.8%), 70 (58.5 %), and 92 (58.2 %), and it increases black voting age population in district 70 as compared to the 2011 Enacted plan.

(e) Plaintiffs plan B also has 3 of its redrawn unconstitutional districts still with a greater than 55% black population (districts 63 and 74, and 92), and it increases black voting age population in district 74 as compared to the 2011 Enacted plan (59.8% vs. 57.2%).

In my view, from a narrow tailoring perspective, there would need to be a clear justification for remedial districts with a black population above 55%, or ones that increase black population in an unconstitutional district over what it had been in the 2011 Enacted map. This is especially problematic when there is more than one district with a black population above 55%. Because a Court-adopted plan must be narrowly tailored, based solely on the black voting age percentages in the reconfigured remedial districts discussed above, I clearly cannot recommend either of Plaintiffs remedial plans A or B, or HB7002 for adoption by the Court, and I find the two others problematic for this reason.

3. A third distinct indicator of a failure to create a narrowly tailored remedy is redrawing of remedial districts (and adjacent redrawn districts) in a way that unnecessarily fragments counties and other pre-existing political units. In general, traditional districting criteria would lead to the creation of districts that are centered in particular counties and do not involve pieces (especially multiple pieces) of multiple counties, and which keep counties and other administrative units whole to the extent feasible, except as required by population or geographic considerations or concern to avoid vote dilution. My own illustrative configurations and the analyses I have done of these configurations indicate that such geographic or population constraints do not apply, nor is it necessary to avoid vote dilution by redrawing maps with large numbers of county splits. Even if having a large number of unnecessary county splits were the only problem with a submitted

remedial plan, because it is a clear signal of a failure to address the need for a narrowly tailored remedy, in the absence of evidence that such a configuration was needed to avoid vote dilution or compelled by geographic or population factors, I cannot recommend plans that have this feature to the Court.[51]

The 2011 Enacted Map is one with a very high number of county splits. The number of county splits is reduced in all five of the submitted remedial maps. Nonetheless, looking at the treatment of particular counties, such as Richmond, the number of county splits in those plans is excessive in my view in terms of a narrowly tailored remedial plan drawn according to traditional districting criteria, and cannot be justified by the need to avoid pairing incumbents.

While I have generated data tables that indicate county splits in each of the remedial plans in the three sets used for the previous data tables (the eleven

[51] I should note that the more districts one changes from their configurations in the 2011 Enacted map, the easier is, *ceteris paribus*, to eliminate unnecessary county splits by reconfiguring all the districts that contain portions of the county in a way more sensitive to traditional districting criteria. Because the illustrative maps I have provided have sought to minimize the number of districts that are changed, they also contain more county pieces than would be the case were the same principles of traditional districting applied in those maps be applied to a wider geographic area encompassing changes in more districts. If we look only at the districts actually changed in my illustrative maps, these maps nonetheless perform better, on average, vis-à-vis the criterion of minimizing county splits, than any of the remedial maps. My illustrative remedial maps perform especially well with respect to this criterion vis-à-vis the eleven unconstitutional districts. In particular, as indicated in the Report, plans can be created based on my illustrative modules that allow for nine of the eleven unconstitutional districts to lie within a single county, and this allows for reduction in the number of splits of that county.

unconstitutional districts, the ten districts that are changed in all plans, and the districts that are changed in a particular plan but not in all plans), because there are compelling reasons to reject each of remedial plans before we get to a county split comparison and because of space considerations, I have not bothered to reproduce those tables in this Appendix. Rather I will simply focus on excessive splits in some counties in each submitted remedial map. In the data reported below I only report the total splits for those districts that were changed in the plan.[52] Here a county split is counted when some portions of a county are contained in a district. I treat the issue of fracking, i.e., where the pieces of that county in the given district are discontiguous from one another and thus might be counted as more than a single piece, as a separate issue.

(a) In the 30 districts redrawn in this remedial map, the D17002 plan splits Chesterfield so that it has pieces in 7 of the changed districts. Even though Chesterfield, too, is a large county, this number of splits is completely unnecessary. And, Norfolk is split in the redrawn districts this plan in 6 pieces, again an unnecessary number of county splits. And Richmond is split in 5 pieces, again an unnecessary number of county splits. And Henrico is split into 6 districts, again an unnecessary number of splits.

[52] Thus there may well be county splits that are not being tallied if those are in districts that were left unchanged from their configuration in the 2011 Enacted map. This tallying process is different from what is provided in the body of the Report for my illustrative modules, where information on unchanged districts in the geographic region of the unconstitutional district(s) is also being reported.

(b) In the 32 districts it has redrawn in its remedial map, the DI7003 plan in its changed districts splits Chesterfield so that it has pieces in 7 redrawn districts. Even though Chesterfield, too, is a large county, this number of splits is completely unnecessary. And Richmond is split in 5 pieces, again an unnecessary number of county splits. And Henrico is split into 7 districts, an unnecessary number of splits. And, Norfolk is split in this plan in 6 pieces, a clearly unnecessary number of splits.

(c) In the 30 districts it has redrawn in its remedial map, the NAACP plan splits Chesterfield so that it has pieces in 8 districts. Even though Chesterfield is a large county, this number of splits is completely unnecessary. And Richmond is split in 5 pieces, again an unnecessary number of county splits. However, Norfolk in the NAACP map is split into only 4 districts, fewer than in Defendant-Intervenors' plans, and it is otherwise generally as good or better with respect to county splits as Defendant–Intervenor plans.

(d) In the 33 districts it has redrawn in its remedial map, Plaintiffs plan A splits Henrico into 6 districts. However, Richmond is split in only 4 pieces in Plaintiffs' Plan A, fewer than in the Defendant-Intervenor plans.

(e) In the 32 districts it has redrawn in Plaintiffs plan B, Richmond is split in 5 pieces, again an unnecessary number of county splits. Henrico, however, is split into 5

districts, fewer than in the Defendant Intervenor plans.

4. The standard way to count county splits is simply to ask whether or not a county has population located within a given district and count the number of districts for which this is true. That is the method employed above and in the body of this Report, and in the customary map analysis reports produced by legislative staff of the Virginia Chamber of Delegates. But, as I reviewed the 2011 Enacted map I realized that, in some districts, including four of the eleven unconstitutional districts (63, 70, 90 and 95), one in each of the four geographic areas of the state identified above which contained one or more legislative districts found to be unconstitutional, the 2011 Enacted plan had a feature that, in my view, should not exist in any court-ordered map. I therefore checked for the presence of this feature in all the proposed remedial maps.

The feature in question is what I have labeled "fracking" (in parallel with other terms in the redistricting literature such as "cracking," "packing" and "stacking"). *Fracking* occurs when the county population found within a given district consists of two or more discontiguous pieces. Absent a situation in which a political jurisdiction is legally defined as having discontiguous pieces, the presence of fracked counties shows what I (and I believe all redistricting specialists) would regard as either a poorly constructed map, or a signal of possible intended racial (or partisan or incumbent protection) gerrymandering, It involves intended manipulation of

county boundaries in a way that violates traditional principles of districting in failing to minimize unnecessary splits of the populations contained within pre-existing political units. By simple geographic logic there can never be a population-based reason for fracking, since any frack can be remedied by simply swapping equal populations from the fracked county across districts so as to eliminate the fracking.

If a proposed remedial map contained fracking, I treated that fact as a sufficient reason not to recommend that remedial plan to the Court, since such a feature would indicate a poorly constructed map with a feature that a court seeking to use traditional districting criteria to the extent feasible would not wish to order into effect. A frack could also serve as a signal of possible gerrymandering intent, and even were the frack to be argued to be directed toward incumbent protection, it would need to be demonstrated that the fracking did not interfere with the drawing of a plan in a constitutional fashion.

District 70 in DI7002 fracks Richmond County; similarly, district 70 in DI7003 also fracks Richmond County. For that reason alone, I cannot recommend that map to the Court. Because identifying fracks is a time consuming process, and because there were compelling reasons to reject the other submitted remedial maps because of features such as the total number of districts reconfigured in each, I did not pursue further my search for fracking in the remedial maps.

5. Compactness: On average, of the five submitted plans, if we look only at the unconstitutional districts, all plans are as good or better than the Enacted Map with respect to both Polsby-Popper and Reock scores. While there are differences in compactness scores across the five submitted remedial plans, with Plaintiffs plans A and B being as good or best with respect to both criteria, and DI7003 being clearly the worst with regard to one of them, I do not regard the differences across the five plans as large enough to justify a clear superiority of one plan over another with respect to compactness, since all are superior to the 2011 Enacted Map on both criteria.

Overall comparisons: None of the five plan is clearly superior to all other plans with respect to all of the relevant criteria, but most importantly:

(a) Three of the five plans fail a narrow tailoring test in terms of changing more districts than need to be changed to remedy constitutional infirmities, with four failing a narrow tailoring test by changing the boundaries of districts that are not adjacent to any of the unconstitutional eleven.

(b) All five plans fail a narrow tailoring test in terms of avoiding the perpetuation of at least one district with a non-trivially greater than 55% black voting age population without evidence that such as percentage is needed to avoid minority

vote dilution; and some of the plans (Plaintiffs A and Plaintiffs B, DI2002) actually increase black voting age population in some of the redrawn unconstitutional districts from what it was in the 2011 Enacted plan. And some of the plans (Plaintiffs A and Plaintiffs B, DI2002) contain more than one district with a black voting age population above 55%.

(c) None of the five plans is narrowly tailored with respect to preservation of county boundaries. Each exhibits an excessive number of avoidable county splits, with a particular issue being the degree to which some large counties are fragmented. Moreover, DI7002 and DI7003 exhibit fracking in district 70.

Thus, each of the plans fail a narrow tailoring test with respect to one or more of the narrow tailoring tests identified above. Hence, my recommendation is that none of the five plans be adopted by the Court, since they fail to offer a narrowly tailored remedy.

Nonetheless, as I indicated earlier, since each of these plans is better than the Enacted Plan with respect to at least one traditional districting criteria, I sought to carefully review key geographic elements of each of these proposed remedial plans with the goal of identifying features of each that might usefully be incorporated in whole or in part in the illustrative remedy maps that I offer to the Court. My careful review of the geography and demography of the state and of the key features

of proposed remedial plans by all of the parties, has allowed me to offer to the Court a modularized approach to effectuating a constitutional map in which I present to the Court a set of options for different geographic areas of the state that resolve tradeoffs among traditional redistricting criteria in slightly different ways.

APPENDIX B

Comments on the Responses to the December 7, 2018 Report of the Special Master that were Filed on December 14, 2018.

1. I have read and reviewed Responses to the December 7 Report of the Special Master that were filed on December 14 by the Plaintiffs, the Defendant, the Defendant-Intervenors, the Virginia State Conference of NAACP Branches (which I henceforth simply refer to as the NAACP), and the Princeton Gerrymandering Project.

2. The Plaintiffs, the Defendant-Intervenors, and the NAACP each reiterate that their preferred solution is for the Court to adopt a plan they have previously offered to the Court as a remedy. For the multiple reasons already elaborated on in my December 7 Report and the Appendix thereto, I cannot recommend any of those previously submitted plans for adoption by the Court. Nothing in any of the submitted briefs affects my previous reasons for not recommending adoption of these plans.

3. Nothing that is said in any of the responses received on December 14 has convinced me to make new recommendations to the Court for illustrative map modules. I do expect, however, that whatever plan the Court ultimately does adopt will require some minor technical corrections. For example, if the Court were to adopt some combination of my illustrative modules, I would expect to review that illustrative map and seek to reduce still further the already low number of VTD splits for the final map. But such technical corrections, or any other form of improvements to submitted maps or illustrative modules, can wait until I have been

given further specific instructions by the Court as to final map drawing after January 10. This has allowed all parties to respond with comments on my illustrative modules in the form that these illustrative modules have been specified in my December 7 Report. As noted in that Report and above, with the aid of legislative staff, once I have the Court's instructions as to how to proceed, I expect to be able to offer the Court a final map in a timely fashion.

4. The Defendant offers no map of its own and Defendant's Response of December 14 indicates that the Court's choice of any of the illustrative modules would be acceptable as a constitutional remedy. For reasons specified in its Response, the Defendant regards each illustrative module as fully satisfying the narrowly tailoring standard needed for a court-ordered remedy and trusts the Court to choose the most appropriate final map. For each of the other groups to file Responses on December 14, I have assessed preferences among the various illustrative modules based on my reading of their Response Briefs to the best of my ability, using in all cases the labels for the modules given in my December 7 Report. [53]

[53] I apologize to the Court and to all parties that, for the Norfolk area, I had inadvertently generated confusion with respect to the ability of parties to express relative preferences among the three illustrative modules for Norfolk, because the labeling of Norfolk 1A and Norfolk 1C appears to have been reversed in the shape files relative to the correct labeling of these illustrative modules on my Report. In this Appendix I will use the same labeling for the three Norfolk illustrative modules as in my December 7 Report, and in the body of the text above, since all the tables in that Report match with this labeling, and this is what I regard as the correct labeling. In this correct labeling, Norfolk 1A is the plan which changes the most districts in the Norfolk area; Norfolk 1C is the plan that changes the fewest districts in the Norfolk area; and Norfolk 1B is intermediate between the two, changing one

5. In the event that the Court does not accept one of the Plaintiffs' proposed remedial maps, I believe that Plaintiffs indicate that they would prefer the Court to adopt Richmond Illustrative Module 1A, Petersburg Illustrative Module 2, Peninsula Illustrative Module 2, and Norfolk Illustrative Module 1A, [54] with whatever further changes, might be directed by the Court.

6. In the event that the Court does not accept the remedial map proposed by the NAACP, my reading of the NAACP Response indicates that they would prefer the Court to adopt Richmond Illustrative Module 1B, Petersburg Illustrative Module 2, Peninsula Illustrative Module 2, and Norfolk Illustrative Module 1B, [55] with whatever further changes, might be directed by the Court.

7. In the event that the Court does not accept Defendant-Intervenors 7002 as a remedial map, Defendant-Intervenors provide no preference among any of the illustrative modules provided to the Court by the Special Master.

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more district than Norfolk 1C and one less district than Norfolk 1A. Labeling was an issue only for two of the three Norfolk illustrative modules, and was not an issue in the other regions of the state. Since only the naming of two of the three Norfolk modules is affected, and to the best of my knowledge, the data on the shape files is correct, this should not impact the ability of parties to carry out analyses of any of these modules or to propose improvements in them.

[54] See footnote 1 re the labeling of illustrative modules in the Norfolk area.

[55] See footnote 1 re the labeling of illustrative modules in the Norfolk area.

8. The Response Brief filed on December 14 by the Princeton Gerrymandering Project, a non-partisan and academically-based group, does not offer a map to be given consideration by the Court. The illustrative map they discuss is simply an illustration of what might be possible were no attention paid to avoiding the pairing of incumbents,[56] and no attention paid to limiting the number of redrawn districts in a remedial map.[57] If illustrative modules proposed by the Special Master were to be ordered by the Court, my reading of their response indicates that they would prefer the Court to adopt Richmond Illustrative Module 1B, Petersburg Illustrative Module 2, Peninsula Illustrative Module 2, and Norfolk Illustrative Module 1A,[58] with whatever further changes, might be directed by the Court.

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[56] As is noted in the December 14 Response Brief by the Princeton Gerrymandering Project: "One key difference in the methods of construction between the Princeton Flan and the plans drawn by Prof. Grofman is the consideration of incumbency: while Prof. Grofman sought to avoid pairing incumbents without degrading other criteria, the creators of the Princeton Plan neither had access to such information" (footnote 2). (Here I assume that the word 'neither' is a typo. The clear meaning of the quote above is that the Princeton Gerrymandering Group did not have access to incumbency location information.) Because of this lack of information about incumbencies the Princeton Gerrymandering map pairs many incumbents in a single district: (91 and 92), (93 and 95), (83 and 85), (78 and 81), (63 and 66), (70 and 71), and (72 and 74), and even has a triplet of incumbents in a single district (68-69-73), and with this excessive number of incumbents paired it is not a candidate for being considered as a possible remedy in this case. Still, it is useful to examine for ideas the features of this fully incumbent blind plan drawn along traditional districting lines by a sophisticated group of mapmakers.

[57] They redraw 33 districts.

[58] See footnote 1 re the labeling of illustrative modules in the Norfolk area.

9A. If we compare the evaluations of the Special Master's illustrative modules across the various Response Briefs, and we disregard each group's primary support of its own plan or plans, there appears to be substantial agreement on two of the illustrative modules. The Plaintiffs, the NAACP, and the Princeton Gerrymandering Project all endorse Petersburg illustrative module 2 and Peninsula illustrative module 2 in preference to any other of my illustrative modules within those two geographic regions, while the Defendant (with no stated preference among the modules within any given geography, but clearly expressed support for whichever of the illustrative modules the Court might choose) would also accept the choice of these two modules. That leaves only the Defendant-Intervenors, but they have expressed no preference among modules, simply rejecting all of them.

9B. If one of my illustrative modules for Norfolk were to be adopted by the Court, based upon this reading, and using the labels for the illustrative modules given in my December 7 Report, there is no consensus among the groups that filed Responses on December 14 with respect to preferences for the Norfolk area when those preferences are limited to comparisons among my various modules for that geographic region. I believe that Plaintiffs and the Princeton Gerrymandering Project have expressed a relative preference for what my December 7 Report has labeled Norfolk 1A, i.e., for the illustrative module that changes the most districts in that region, while the NAACP has expressed a relative preference for what my December 7 Report labeled as Norfolk 1B, i.e., for what is the intermediate module

in terms of number of districts changed. Defendant-Intervenors express no relative preferences across illustrative modules for Norfolk and wish to see none of them adopted, while Defendant will accept any of them. Thus, it is my belief that there is no support for adoption of Norfolk illustrative module 1C among those parties who have expressed a relative preference among the Norfolk modules.

9C. If the Court were to adopt one of my illustrative modules for the Richmond area, both the NAACP and the Princeton Gerrymandering Project prefer Richmond Illustrative Module 1B as their most preferred module among this set. Plaintiffs, in contrast, express a preference among the Richmond illustrative modules for Richmond Illustrative Module 1A. Defendant-Intervenors express no preferences across these illustrative modules, rejecting all of them; while Defendant will accept either of them.

9D. In my comments above, I am merely summarizing statements in the various Responses to the best of my present knowledge. I do not express a preference among the illustrative module options in any of the four regions. My view has consistently been that it is my responsibility as Special Master to offer options to the Court, while is only the Court that has a mandate to choose the configuration that will be used for a court-ordered map that will remedy the unconstitutionalities in these eleven districts in the narrowly tailored fashion appropriate for a court-drawn map

and to make the decisions as to how best to balance off tradeoffs among competing legal and practical desiderata.

Now I turn to more specific comments in the various Responses about the illustrative modules and/or the map drawing criteria used for them.

10. The Defendant affirmed the appropriateness of the criteria I used to craft my illustrative modules, involving "equal population districts," drawn according to "traditional districting principles" in a fashion that "only considered race after traditional districting criteria ha[d] been satisfied" and then "only for [the] purposes of seeking to assure that there is no violation of the 14th Amendment's Equal Protection provision vis-à-vis changes in the racial composition of the unconstitutional districts that might have inadvertently created racial vote dilution" (December 14 Response Brief at p. 1). As noted earlier, the Defendant is prepared to accept any of the illustrative modules drawn by the Special Master as a basis for remedial map drawing in that geographic area of the state.

11. In their December 14 Response Brief, while Plaintiffs express clear preferences among my illustrative modules vis-a-vis each of the regions of the state where Challenged Districts are located, and give clearly stated reasons for those preferences, Plaintiffs agree that the illustrative modules that I have submitted remedy the unconstitutional racial gerrymanders of the Challenged Districts. Plaintiffs reviewed the changes in African-American population in the illustrative

modules' redrawing of the unconstitutional districts, including that in the district with lowest black voting age population (40.23%). Plaintiffs agree with my conclusion that each of these redrawn districts would provide African-American voters with an equal opportunity to elect candidates of choice (see pp. 2-7).

11A. However, Plaintiffs strongly make the point that they do not believe that the changes in districts 72 and 73 in Richmond illustrative module 1B are warranted. They point out these changes are not needed for the constitutional redrawing of any of the eleven unconstitutional districts.[59]

11B. Plaintiffs, while they do not differ with the criteria I identify as traditional redistricting criteria, and they, like me, acknowledge that drawing a narrowly tailored remedial map requires a set of tradeoffs, also strongly express the view that there was no need to restrict the changes in the Enacted map to as few as 26 (or 21) districts. Here I would simply note that, as explained in much more detail in the

[59] I agree with Plaintiffs characterization of the extensive changes made in districts 72 and 73 in my illustrative Richmond module 1B as not being required to implement a constitutional map vis-à-vis the eleven challenged districts, nor (as they correctly point out) did I ever suggest anything to the contrary in my December 7 Report. I indicated in my December 7 Report the unique reasons why I included this option for the Court, namely that the differences between this module and Richmond module 1A had been done to reflect a change in incumbent home location in this part of the state and, in the process, to substantially improve compactness for the district (district 72) which is the least compact district in the state with respect to Polsby-Popper compactness (with a P-P value of .08). Whether Richmond illustrative module 1B makes changes that go beyond the Court's mandate, or should be ruled out for other reasons is, of course, for the Court to decide.

text above, I took my charge to be one of drawing a narrowly tailored plan, and I took one feature of such narrow tailoring to be limiting the number of districts changed.

11C. "The Virginia NAACP believes that each of the illustrative modularized maps submitted to the Court by Dr. Grofman (hereinafter, the "Grofman Plan") offer improvements upon the 2011 Enacted Plan with regard to adherence to traditional redistricting criteria and eliminating the arbitrary 55% BVAP threshold set by the General Assembly in 2011 for districts which elected black representatives—an unjustified threshold which led to the unconstitutional packing of black voters" (NAACP December 14, 2018 Response Brief, p.1). They also agree that all my illustrative modules are ones that only took race into account "after traditional districting criteria ha[d] been satisfied" and "only for the purpose of assuring that there was no racial vote dilution in the reconfigured unconstitutional districts" (NAACP December 14 Response Brief, p.2; citing to Grofman December 7, 2018 Report at p. 11).

11D. However, the NAACP Response Brief (p. 1) also takes the view that my illustrative modules do not "go far enough in remedying the numerous unconstitutional racial gerrymanders identified in the 2011House of Delegates plan." The December 14 NAACP Response Brief notes (p. 2) that "the Virginia NAACP devised a plan that, in the process of fully remedying this extreme harm [in the unconstitutional districts], resulted in the natural formation of five additional districts where black voters will either likely have the opportunity to elect their

candidate of choice, or have their influence over the election outcomes free from artificial diminishment. Specifically, as a consequence of fully unpacking black voters, two legislative districts saw increases in BVAP from the low 20s to the low 40s, thus providing black voters with a real opportunity to elect their candidate of choice in those districts."[60] The two districts in the NAACP with black voting age population above 40% that are not among the 12 districts that were majority minority in the Enacted map are districts 62 and 76. And "additional opportunities for people of color," are identified as 27, 94, and 85 (see p. 22 of the NAACP November Brief).

However, focusing only the comparison districts emphasized above by the NACCP exaggerates the differences between their map and my maps, when looked at in terms of black voting age population percentages in their map as to compared to the illustrative modules I have drawn. In fact, an argument can be made that the positive impact on minority representation might actually be greater in my 26 district illustrative map than in the NAACP map. [61]

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[60] The NAACP Response Brief goes on to assert (p.2) that "This result helped restore black voters to the position they would have held had they not been unlawfully segregated and packed in the 2011 Enacted Plan."

[61] This illustrative map is the combination of my illustrative modules involving exactly 26-districts that was used for analysis purposes by the Pennsylvania Gerrymandering Project in their December 14, 2018 Response Brief. The other map I will refer to is the combination of my illustrative modules involving exactly 21-districts the form that was used for analysis purposes by the Pennsylvania Gerrymandering Project in their December 14 Response Brief.

I show below comparisons between the NAACP map, my 21-district change illustrative map, and my 26 district change illustrative map for the 30 districts that are changed in the NAACP map. If a district changed in the NAACP map was not changed in my map I simply report the black voting age population in the 2011 Enacted map. In this way we are comparing 30 districts in the NAACP map to the same 30 districts in different maps. If we count the number of districts other than those found unconstitutional in the 20 to 40% black voting age category used for comparison purposes by the NAACP in their December 14 Response Brief, we find that there are 8 such districts in the NAACP map, 8 such districts in my illustrative 21-district map, and 11 such districts in my illustrative 26-district map, so either there is no real difference across maps with respect to this categorization, or the 26 district illustrative module is superior with respect to this configuration.[62] On the other hand, if we look at districts adjacent to the unconstitutional districts that have been changed to now be over 40%, there are two such districts in the NAACP map, 62 and 76, and only one in my illustrative map, District 76.[63]

[62] There are seven such districts in the 2011 Enacted Map.

[63] There are no such districts in the 2011 Enacted map.

Black Voting Age Percentage Comparison Across Different Proposed or Illustrative Remedial Maps (unchanged in gray)

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HIGHEST BVAP →

District	NAACP	SM21	SM26	ENACTED
63	58.52%	51.81%	47.47%	59.53%
92	57.60%	53.87%	53.87%	60.72%
75	54.60%		52.45%	55.43%
89	52.12%	~~55.01~~54.98%	54.92%	55.46%
95	50.67%	47.48%	47.36%	59.97%
69	50.37%	54.38%	54.38%	55.19%
71	49.95%	54.01%	54.01%	55.35%
80	49.72%	51.38%	51.38%	56.30%
77	47.51%	47.03%	40.23%	58.78%
70	46.49%	52.29%	52.29%	56.37%
90	45.97%	48.91%	41.93%	56.59%
62	43.83%	29.23%	27.22%	24.56%
76	42.53%	42.40%	42.89%	25.14%
74	42.49%	54.37%	54.37%	57.24%
79	32.52%	32.00%	31.46%	29.46%
85	29.40%	22.32%	21.29%	18.93%
94	29.34%	16.79%	31.13%	21.02%
27	25.51%			18.44%
64	24.84%		27.38%	24.24%
84	22.99%			20.45%
91	22.42%	32.52%	32.52%	19.61%

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LOWEST BVAP ←

HIGHEST BVAP →

District	NAACP	SM21	SM26	ENACTED
63	58.52%	51.81%	47.47%	59.53%
92	57.60%	53.87%	53.87%	60.72%
75	54.60%		52.45%	55.43%
89	52.12%	~~55.01~~54.98%	54.92%	55.46%
95	50.67%	47.48%	47.36%	59.97%
69	50.37%	54.38%	54.38%	55.19%
71	49.95%	54.01%	54.01%	55.35%
80	49.72%	51.38%	51.38%	56.30%
77	47.51%	47.03%	40.23%	58.78%
70	46.49%	52.29%	52.29%	56.37%
90	45.97%	48.91%	41.93%	56.59%
62	43.83%	29.23%	27.22%	24.56%
76	42.53%	42.40%	42.89%	25.14%
74	42.49%	54.37%	54.37%	57.24%
79	32.52%	32.00%	31.46%	29.46%
85	29.40%	22.32%	21.29%	18.93%
21	21.94%			23.86%
78	18.24%		16.85%	17.14%
66	17.42%	25.81%	32.31%	16.06%
68	16.91%			7.25%
72	16.53%	15.38%	19.49%	13.40%
83	16.23%		23.10%	15.12%
65	15.56%			14.63%

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HIGHEST BVAP →

District	NAACP	SM21	SM26	ENACTED
63	58.52%	51.81%	47.47%	59.53%
92	57.60%	53.87%	53.87%	60.72%
75	54.60%		52.45%	55.43%
89	52.12%	~~55.01~~54.98%	54.92%	55.46%
95	50.67%	47.48%	47.36%	59.97%
69	50.37%	54.38%	54.38%	55.19%
71	49.95%	54.01%	54.01%	55.35%
80	49.72%	51.38%	51.38%	56.30%
77	47.51%	47.03%	40.23%	58.78%
70	46.49%	52.29%	52.29%	56.37%
90	45.97%	48.91%	41.93%	56.59%
62	43.83%	29.23%	27.22%	24.56%
76	42.53%	42.40%	42.89%	25.14%
74	42.49%	54.37%	54.37%	57.24%
79	32.52%	32.00%	31.46%	29.46%
85	29.40%	22.32%	21.29%	18.93%
81	14.35%	19.05%	25.34%	18.60%
73	7.63%		9.32%	13.55%

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Since the black voting age population percentages in the various remedial versions of district 76 are essentially indistinguishable between my illustrative maps and the NAACP map (42.5% in the NAACP plan, 42.4% in my 21-district illustrative map, and 42.9% in my 26 district illustrative map), and since my illustrative maps do as good or better in creating/maintaining districts that are in the 20% to 40% black voting age population range, the argument for why the NAACP map should be preferred in racial representation terms seems to comes down to a claim that I should have drawn district 62 with above a 40% level of black voting age population.[64] In my 21-district illustrative map and my 26 district illustrative map, district 62 is drawn with substantial minority population (at 27.2% and a 29.2% black voting age population level, respectively) -- values somewhat higher than what is found in the 2011 Enacted map (24.6%).

The reason that, in none of my modules, is district 62 drawn as a district with an above 40% black population is straightforward. As the NAACP has correctly explained, the exploratory and illustrative maps that I drew in the process of proposing narrowly tailored remedial plans to the Court addressed the unconstitutional violations in the eleven districts that were found to be

[64] It was not clear to me whether the NAACP is asserting that, as a matter of law, under Section 2 of the Voting Rights Act or the 14th Amendment, it was obligatory for me to have created a seventh (new) minority opportunity districts in the Richmond-Petersburg area, even though that district did not have a black voting age majority or a showing that such a seventh black voting age majority district could be drawn. If that is the claim, then it is a legal question for the Court.

unconstitutional. The changes in my various modules in black population levels in districts not found to be unconstitutional but adjacent to redrawn unconstitutional districts were limited to those that resulted simply from the geographic spillovers incidental to the seeking of a narrowly tailored line drawing that would remedy constitutional infirmities in the eleven unconstitutional districts.[65]

While the NAACP version of district 62 is a district which contains all of Hopewell City, it is no longer centered in Chesterfield. In the 2011 Enacted map, 62% of the population in district 62 is from Chesterfield (49,193) while in the NAACP map there only 3,961 people from Chesterfield, i.e., around 5% of the district, and the center of gravity of the district has been completely shifted to Henrico, which provides about 56% of its population. In contrast, district 62 in my illustrative modules it still very much a Chesterfield based district, with between 42,075 and 52,051 people from that County (53-65% of the district).

While I have made extensive changes in some unconstitutional districts for purposes of remedying the unconstitutionality in a fashion consistent with

[65] The only exceptions to the observation that changes in districts adjacent to unconstitutional districts stem entirely from changes in the unconstitutional districts (while taking into account traditional districting criteria, and avoidance of incumbency pairing) are the changes made in districts 72 and 73 in illustrative Richmond module 1B. These changes are discussed above and in my December 7 Report, where I have made explicit the reasons why I offered a module with such changes to the Court -- and why I regarded this as a unique case. My changes in districts 72 and 73 in illustrative Richmond module 1B did not require changes in the redrawn Richmond area unconstitutional districts.

traditional districting principles, and this has had spillover consequences that has also led to extensive changes for some adjacent districts, I have never made extensive changes in adjacent districts solely to improve the racial percentages in those districts. No matter my personal views as a citizen, as an agent of the Court I do not believe that it falls within my task of crafting a narrowly tailored remedy for the constitutional infirmities in the eleven unconstitutional districts to make such extensive changes in an adjacent district without these being ancillary spillover effects from my reconfiguring of unconstitutional districts.

11E. The NAACP December 14 Response Brief also objects to what they describe as the limited changes made in the Norfolk modules in district 89 in terms of black voting age percentage. They assert (p. 5) that the difference in a "mere hundreds of people does not fundamentally alter the racially-segregating effects of the unconstitutional district." But this is a mischaracterization of the degree to which district 89 has been changed, since the configuration of District 89 in my illustrative maps shifts about 35% of the population in this district from what was found in the 2011 Enacted map. And district 89 in my illustrative maps is drawn as one of two districts drawn wholly within Norfolk, and in a fashion that allows district 80 to be drawn wholly within Portsmouth, rather than split as in the NAACP map. While the black voting age population has not changed much, the process by which the district was created has changed greatly. Moreover, there can be no dispute that

district 89 as configured in my illustrative maps is an "opportunity to elect" district.[66]

11F. The NAACP December 14 Response Brief also objects to what they describe as the limited changes made in the Richmond modules in district 71. I agree that only about 15% of the population in district 71 in the 2011 Enacted Map was changed, but these are changes that are part of line drawing that creates two districts wholly within Richmond, and that thus helps effectuate a districting that follows traditional districting principles. In contrast, in finding a way to redraw 71 to reduce its minority population below 50%, the NAACP map has split Richmond into five pieces, rather than four, as in my modules, or the three that would be possible were one or more incumbents with homes in Richmond to be paired with other incumbents. Given the total population of the County, even taking incumbency issues into account, I did not consider any maps which cut Richmond into more than 4 pieces to be appropriate in a narrowly tailored court-ordered plan drawn according to traditional districting principles. Thus, the way in which the NAACP redrew district 71 is not one that I would recommend to the Court.

[66] I would also note that the differences in black voting age population between the NAACP version of 89 and district 89 as it is configured in my illustrative maps are not that large (52.12% in the NAACP plan, 54.98% in the 21-district illustrative module, and 54.92% in the 26-district illustrative module), with all three districts above 50% black voting age population.

11G. The NAACP also object to districts 68 being left untouched in all my Richmond area illustrative modules and to district 73 being left untouched in one of my modules. My reasoning for leaving district 68 untouched is spelled out in my December 7 Report and reiterated below in response to a related issue about district 68 raised by Defendant-Intervenors. In my view the issues raised are ultimately legal ones. For district 68 I refer the reader to that discussion. As for district 73, I do not see a viable argument that this district should have been changed as part of my remedial map drawing. It was a district entirely within Henrico, and it remains so; it was an overwhelmingly white district, and it remains so. Given that the unconstitutionality of the Richmond area districts could be remedied without changing its configuration, I saw no reason to change its configuration.

12. In Defendant-Intervenors December 14 Response Brief, I have identified nine claims about defects in the illustrative modules I have provided to the Court and/or the process for remedial line drawing that is specified in my Report, that were substantive enough to suggest the need for comment on my part.[67] First and

[67] Defendant-Intervenors also asserted in Section I of their December 14 Response Brief that they lacked sufficient time to review my illustrative modules (see pp. 2-7) and had difficulty converting them to maps (see pp. 4,5). Whatever the merits of this claim in the light of the fact that other parties were able to review the modules pursuant to the Court December 14 deadline, the Court extended the time for Response filing to January 4, so this point is now moot. As to alleged inconsistency across my illustrative map modules (see p. 4), I do not understand the nature of the problem. The Petersburg illustrative modules were drawn to be compatible with any of the Richmond illustrative modules. And the Norfolk illustrative modules were drawn to be compatible with any of the Peninsula illustrative modules. The apparent problem with inconsistency in black voting age population numbers

foremost, they assert that the Special Master has engaged in districting that uses race as a preponderant motive, and confused a claim of racial preponderance with one of racial vote dilution due to illegal packing of minority voting strength. Second, they assert that the Special Master has placed a legally inappropriate weight on avoiding unnecessary splits of counties and other pre-existing political subunits. Third, they argue that, the population shifts from the districts in the 2011 Enacted Map to those in my illustrative maps have been excessive. Fourth they assert that some of the unconstitutional districts, namely districts 69, 71 and 74, have not been changed enough to fully remedy the unconstitutionality. Fifth, they argue that my illustrative modules are not adequately compact. Sixth, they argue that there an

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asserted on p. 5 of Defendant-Intervenor's December 14 Response Brief probably reflects some minor technical corrections to the Norfolk area modules made after the December 7 filing deadline and the drafting of my December 7 Report. Corrected shapefiles were filed on the next business day, on Monday, December 10. The fact that such corrections were made in the Norfolk area is noted in the previous Addendum to my Report. I do apologize for the fact that these errors (caused by some conversion issues between *Maptitude* and *ArcGIS*, and by the fact that there was an unassigned zero population census block) were not detected before the filing of my Report, but the difference are trivial and of no substantive importance, and were corrected once the legislative staff received block assignment files from my research assistant. (See, however, the issue of labeling of Norfolk 1A and 1C discussed in footnote 1 of this Appendix). The claim (p. 6) that data was missing that was needed to evaluate modules is erroneous. Census data from 2010 could be combined with the module shape files to generate the same types of reports I presented in the Special Master Report. Moreover, all relevant data for each of the changed districts in each of the ten modules was reported in the Special Master report, starting on page 69.

excessive number of VTD splits in the illustrative modules prepared the Special Master. Seventh, they argue that I have invented a new and inappropriate districting criterion, avoidance of "fracking," that I should not have applied to evaluate potential court-ordered maps. Eighth, they assert that I placed essentially no weight on incumbency. Ninth, they argue (p.23) that the effect of my plans was biased by targeting "the very incumbents the legislature would be most inclined to protect," harming the re-election chances of senior legislative leaders residing in districts adjacent to those found unconstitutional.

I reject all of these claims as factually unfounded.

12A. The assertion that race was the preponderant motive in my line drawing (p.7 of the December 14 Response of Defendant-Intervenors) is flatly wrong, for the reasons carefully documented in my Report. As stated clearly in my Report, and as explicitly acknowledged in Response Briefs such as that of the NAACP, some use of racial data is unavoidable since it is necessary to determine that the districts redrawn according to traditional districting principles did not inadvertently result in violation of Section 2 of the Voting Rights Act in the way they were reconfigured.

i. Furthermore, it is simply wrong to claim that I did not distinguish between unconstitutionality due to a racial preponderant motive and the Section 2 standard for vote dilution. I am well aware of the differences, having been involved previously

in cases of each type. The remedy I sought was for the unconstitutional use of race as a preponderant motive. However, in examining potential remedies, any court-ordered remedial plan must be sensitive to the potential for causing inadvertent vote dilution. This sensitivity required my best judgment as a political science expert that these redrawn districts neither crack nor pack minority voting strength in a manner that is dilutive of minority voting strength.

I have described in detail in my Report my reasons for believing that all of the redrawn unconstitutional districts in all of my modules are ones that continue to provide minorities a realistic equal opportunity to elect candidates of choice, and that this determination includes even those districts in which the black voting age population percentage was most reduced from what it had been in the 2011 Enacted map. Assertions to the contrary by Defendant-Intervenors are unsupported by evidence drawn from empirical election analysis.

ii. As noted in my December 7 Report, in reaching my determinations about opportunity to elect, I used exactly the same criteria that I had used when serving as a Special Master in *Personhuballah* but now applied them to election data compiled in the proposed remedial legislative districts. Contrary to what is suggested by Defendant-Intervenors on p. 20 of their December 14 Response, in my view as a political science expert, the eleven unconstitutional districts remain "opportunity to elect" districts, and not merely influence districts. Since my

reasoning is laid out in full in my December 7 Report, there is no need to repeat it here. As noted earlier, Plaintiffs also characterize my redrawn unconstitutional districts as "opportunity to elect" districts; and so does the NAACP, though the NAACP also argues strongly that district 89 in Norfolk and district 71 in Richmond should each have been reconfigured so that their black voting age population was reduced. [68]

iii. Defendant-Intervenors also appear to assert that my intent was to maximize minority voting influence in districts adjacent to the unconstitutional districts. This, too, is inaccurate. My concern was for the redrawing of the unconstitutional districts in a narrowly tailored fashion to remedy their unconstitutional infirmities. Subject to the need to make use of traditional districting criteria, and my later concern to avoid pairing of incumbents if this could be done within the constraints of traditional districting criteria, what happened in the districts adjacent to the unconstitutional districts was simply the consequences of drawing a constitutional

[68] On p. 21 of Defendant-Intervenor's December 14 Response Brief they assert that Plaintiffs' Counsel rejected the need to redraw any districts below 50% black voting age population in a remedy plan. I would, however, note that whatever Plaintiffs' Counsel once asserted about not drawing maps with a black voting age population below 50%, in fact, there are three districts with a black voting age population below 50% in Plaintiffs' plan A, and four districts with a black voting age population below 50% in Plaintiffs' plan B. The NAACP map also had districts with a less than 50% black voting age population.

map.[69] Moreover, to keep the plan narrowly tailored to the remedy of the unconstitutional infirmities in eleven districts, I sought to limit the number of adjacent districts that were redrawn to the minimum necessary to achieve this purpose.

iv. As noted in my Report, while the constitutional infirmity in the 2011 Enacted map is that it used race as a preponderant motive, the consequences of using race as a preponderant motive were that the unconstitutional districts had levels of minority population higher than what was needed to assure minorities of an equal opportunity to elect candidates of choice, and in a fashion that did not recognize geographic differences in racial demography and in patterns of electoral polarization along racial lines. In contrast, as is apparent from examination of the black voting age population in the redrawn unconstitutional districts in my illustrative modules, the African-American voting age share in the redrawn unconstitutional districts varies considerably across different parts of the state, from 40.2% (district 70 in the 26-district configuration) to 54.98% (district 89 in the 21-district configuration) rather than being consistently near to or above 55%.

The reason that the levels of black voting age population in the districts in my module vary so considerably is that, unlike the 2011 Enacted map, they naturally

[69] In this context, I would also reference my discussion of district 62 in the section above where I review the December 14, 2018 Response of the NAACP to my illustrative modules.

reflect differences across geographic regions in the level of concentration of minority voting strength. By using traditional districting criteria to drawn lines, redrawing seven or eight of the unconstitutional districts to be whole county districts, and not collecting small pockets of black population in neighboring counties to add to a district to achieve an arbitrary 55% level of black voting age population, virtually as a mathematical necessity, the level of minority population in the eleven unconstitutional districts would fall in any neutrally drawn map. But how far it will fall will vary dramatically across different regions of the state, depending upon the racial demography in the area.

v. In Defendant-Intervenors December 14 Response Brief (at p.7) they assert that: "The Special Master concedes that he used a 55% BVAP figure as a fixed, predetermined and non-negotiable number to structure the districts he drew. To be sure, he used it as a ceiling, not a floor, but what matters is that he used the number in structuring his remedial districts." This statement completely mischaracterizes my references to a 55% black voting age population in my Report of December 7.

I did indeed object to districts found above a 55% black voting age percentage in the various remedial plans. But the reason I did so is because my exploration of alternative configurations throughout the relevant areas of the state persuaded me that such high levels of black voting age population did not normally result from the

racial geography of the state when remedial plans were drawn according to neutral criteria without concern for race. Nor was such a high level of African-American voting age population needed to avoid racial vote dilution.

Moreover, in the configurations I drew, once I imposed traditional districting criteria, black voting age proportions in redrawn unconstitutional districts naturally fell below 55% -- in some cases dramatically below, in a few other cases much closer to 55%. I can illustrate this simple point with two configurations based on my illustrative modules, a 21-district configuration and a 26-district configuration. For comparative convenience, I again use the configurations reported by the Princeton Gerrymandering Project.

It is visually apparent from inspection of the black voting age population values in the unconstitutional districts shown in the table below in the 21-district and 26-district illustrative maps that these black voting age population values are far away from what would be found if, as Defendant-Intervenors allege, I had sought to come as close as possible to a 55% value, while still consistently remaining below it, i.e., used a 55% value as a ceiling. Rather this wide range of black voting age population values reflects difference in underlying racial demography such that, in some areas of the state the black voting age populations in the illustrative remedial districts I drew are close to those of the 2011 Enacted map, while in other remedial districts

they are quite distinct from those found in the 2011 Enacted map.[70] However, in all areas of the state the line drawing process I used was completely removed from the race preponderant process that led to eleven districts in the 2011 Enacted map being found unconstitutional.

[70] DI7002 is the plan currently advocated by Defendant-Intervenors as the one which the Court should choose in preference to any of my modules and to any other proposed configurations. However, the infirmities with DI7002 noted in my Report included having two districts with a 60%+ black voting age population without offering any evidence that such a configuration was compelled by geographic or demographic factors or was needed to avoid vote dilution. Moreover, DI7002 actually increased black voting age populations in some of the unconstitutional districts, again with no evidence that such increases were compelled by geographic or demographic factors or were needed to avoid vote dilution. For these and other reasons detailed in my Report, given what is shown in the alternative maps available to this Court, DI7002 can have no claim to be a narrowly tailored remedy.

Comparison of Black Voting Age Percentages in the Eleven Unconstitutional Districts

District	Enacted	SM21	SM26
63	59.53%	51.81%	47.47%
69	55.19%	54.38%	54.38%
70	56.37%	52.29%	52.29%
71	55.35%	54.01%	54.01%
74	57.24%	54.37%	54.37%
77	58.78%	47.03%	40.23%
80	56.30%	51.38%	51.38%
89	55.46%	~~55.01~~54.98%	54.92%
90	56.59%	48.91%	41.93%
92	60.72%	53.87%	53.87%

vi. The inclusion of water territory in district 91 discussed in Defendant-Intervenor's December 7, 2018 Response Brief was not, as Defendant-Intervenors claim, racially driven. Instead it was simply part of a remedy to unconstitutionalities in districts 92 and 95 that came about by using neutral districting criteria for the whole peninsula, with an emphasis on drawing districts within a single county where possible. In the text of my Report I discuss the meaning of contiguity and point out that the U.S. census often assigns portions of rivers and other water bodies to separate census blocks. District 91 is a contiguous district according to census geography.

vii. There are two main assertions in Defendant-Intervenors December 7 Response Brief about VTD splits in my modules. The first is some of these VTD splits reflect an impermissible racial purpose. The second is the claim that the number of VTD splits are excessive. Neither of these assertions is accurate.[71] In fact, the number of VTD splits in my illustrative modules is considerably fewer than in the 2011 Enacted Map and not very different from the number of VTD splits found in DI7002. Indeed, as I show later in this Addendum, there are actually fewer VTD splits in the 26-district illustrative map that can be created from my illustrative

[71] For example, on p.11 of their December 14 Response Brief, Defendant-Intervenors identify three VTD splits that between Districts 91 and 92 that they claim are evidence of race conscious districting. Here I would simply note that these particular splits were for compactness improvement purposes, and not at all for race conscious districting. (As with other VTD splits, if a module including these VTD splits is part of a plan adopted by the Court, they can be addressed as final technical cleanup is performed on that plan by legislative staff under my direction.)

modules than in DI7002, the map recommended by Defendant-Intervenors for adoption by the Court.

In this subsection, however, I focus on the VTD splits between district 68 and district 69 singled out by Defendant Intervenors' December 14 Response Brief on p. 22. because these have a different cause than population balancing or compactness concerns. These VTD splits are due to my decision that it was not necessary to redraw district 68 in the process of remedying the unconstitutional infirmities in the eleven districts found unconstitutional.

District 68 was not found by the Court to be an unconstitutional district, and I have preferred to leave undisturbed the configurations of districts adjacent to the unconstitutional districts where possible when I found no need to do so to redraw the unconstitutional districts in a constitutional fashion. Leaving district 68 untouched also has another reason in its favor. As I noted in my Report, there are four current incumbents with homes located in Richmond. If I maintain district 68 in its present form (or very close to it), I need not pair any of the incumbents in the Richmond area with another incumbent.

It would be quite simple to eliminate the VTD splits between district 68 and district 69 and redraw the border using whole VTDs. But it would be easier still to redraw these few VTDS. Moreover, if we do not opt simply for administrative change in the

configuration of these few VTDs, and instead opt for redrawing the border between district 68 and 69 using whole VTDs, this choice increases by one the number of legislative districts that would be changed in all my illustrative remedial maps. Nonetheless, if the Court instructs me to eliminate the VTD splits between district 68 and district 69, and thus slightly change district 68 from its configuration in the 2011 Enacted map, of course I will do so.

12B. The claim that the Special Master has placed a legally inappropriate weight on avoiding unnecessary splits of counties and other pre-existing political subunits is a legal issue to be left to the Court. In Virginia, as in virtually all states, counties (or their equivalent) are vitally important units of local government. As indicated clearly in my December 7, 2018 Report, avoiding county splits is both a central component of any map drawn in accordance with traditional districting criteria and one that has been very important in court-ordered maps (including that in *Personhuballah v. Alcorn*), and it is a criterion that the legislature itself has identified as relevant to its concerns to avoid splitting communities of interest.[72]

[72] I would also note that the two assertions by Defendant-Intervenors identified immediately above are very close to logically contradictory. If, as seems to be alleged, I took preserving county boundaries (and those of other pre-existing political subunits) as a dominant criterion in redrawing the unconstitutional districts (after equal population) than, *ipso facto*, race was not a preponderant motive in my line drawing. And, of course, as I have stated repeatedly in my Report, race was not a preponderant factor in my illustrative line drawing. In that Report I clearly laid out the process by which my illustrative modules were created, a process in which race clearly was subordinated to traditional redistricting concerns. In this context I would note that, in contrast to the 2011 Enacted map, where only two of the eleven districts found unconstitutional were within a single county, either 7 and

Moreover, it is the only community of interest criterion for which I had an objective indicator. In their Response the Defendant-Intervenors do not identify other community of interest factors that should take precedence over avoiding jurisdictional splits, and none could outweigh the need to provide a narrowly tailored constitutional remedy. [73]

12C. The assertion that some of the unconstitutional districts, namely districts Richmond area districts of 69, 71, and 74, have not been changed enough to fully remedy the unconstitutionality (see Defendant-Intervenor December 14 Response Brief at pp 19-23) is wrong. This set of Richmond area districts has been redrawn using traditional districting criteria. A key feature of the Richmond area districts in my illustrative modules is that now two districts are drawn wholly within Richmond, rather than one. Even when lines were drawn in a constitutional fashion, the racial demography in Richmond and surrounding counties was such that these three districts would remain ones where minorities had an equal opportunity to elect candidates of choice. I have previously addressed district 71 in my review of the December 2018 NAACP Response Brief and refer the reader to

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8 of the eleven redrawn unconstitutional districts in my illustrative modules are drawn as whole county districts.

[73] In footnote 5, page 24 of their December 14 Response Brief, the Defendant-Intervenors note that legislators from a county have input on judicial nominations from that county, a fact also referenced in my December 7 Report. If this fact is intended to support a legal claim that creating districts that span multiple counties is a legitimate state interest, the weight to be given that claim in the context of this case, is a matter to be left to the Court.

that discussion. My response to a complaint about failure to drastically change the boundaries of districts 69 and 74 would be virtually identical to that given above for district 71. The question for me has been to determine what levels of black population occur "naturally" when we draw plans in a way that prioritizes traditional districting criteria. I do not make use of any mechanical numerical test. I expect that, when we prioritize traditional districting criteria, differences in geographic racial concentration will create different levels of black population across districts, with high levels in some of the districts drawn in areas of the state such as Norfolk, Richmond, and eastern Henrico. As I made quite clear in my December 7 Report, only after I have drawn districts do I check to make sure that I have avoided inadvertent minority vote dilution.

12D. Defendant-Intervenors call attention to the total population shifted across districts in the illustrative modules versus that in DI7002. In my view, as stated clearly in my Report, the need to redraw a constitutional map takes precedence over the maintenance of existing district lines, when district lines needed to be changed to assure a constitutional plan. And sometimes, the need to draw a narrowly tailored map according to good government criteria can lead to substantial change in unconstitutional districts that then spills over into extensive changes in other adjacent districts. Moreover, since, for the reasons stated in my Report, I do not regard DI7002 as a plan which satisfactorily addresses the constitutional violations

in the eleven unconstitutional districts, the fact that it may have moved fewer people than my illustrative maps is in my view, irrelevant.

But I should also note that my illustrative modules are, in fact, very responsive to a concern to limit changes to what is constitutionally required, since they change only 21 to 26 districts rather than the 30 districts of DI 7002 and the NAACP map or the 32 of DI 7003 and Plaintiffs A, or the 33 districts changed in Plaintiffs Map B.

Moreover, the differences in population shifts between my illustrative maps and DI 7002 are not large. For comparison purposes regarding population changes, I will discuss the same two maps based on my illustrative modules that are discussed in the December 14 Response of the Princeton Gerrymandering Project, a 21-district configuration and a 26-district configuration. The proportion of state population changed across districts from the configurations found in the 2011 Enacted Map is not that different between DI7002 and my illustrative maps. For DI7002, by my calculations it is roughly 6%; for the 21-district illustrative plan that can be constructed from my illustrative modules it is a little under 7%; for the 26-district illustrative plan my calculation it is a little under 8%.[74]

[74] Similar figures are given in the Defendant Intervenor December 14 Response Brief, with more detail provided in Appendix D of that Response Brief.

Defendant-Intervenors (at p. 26) further object to the fact that, in the process of remedying unconstitutionality, I made major changes in a few districts. But some of the unconstitutional districts required substantial changes (e.g., districts 77 and 80), and those changes had substantial spillover effects in adjacent districts once proper concern was placed on traditional districting principles appropriate for a court-ordered plan.

12E. The Defendant-Intervenors note in their December 14, 2018 Response Brief (at p. 13) that, "on the Reock compactness test, the enacted versions of HD69, HD70, and HD71 are more compact than the proposed districts, and on the Polsby-Popper compactness test, enacted districts HD70 and HD71 are more compact than the proposed districts."[75] I have discussed compactness issues in my Report. Here I would simply note that, for the state as a whole, all remedial maps proposed to the Court are, to two significant digits, either as good as the 2011 Enacted map with respect to the Reock and the Polsby-Popper measures of compactness, or they are

[75] But I believe that it is also true that four of the eleven unconstitutional districts in DI7002 are less compact than the corresponding districts in the 2011 Enacted Map on the Reock measure of compactness (districts 69, 71, 74, 90) , and three are less compact on the Polsby-Popper measure (69, 70, 90), which means that two of the redrawn unconstitutional districts in DI7002 are also less compact than their counterparts in the 2011 on both measures. But in my December 7, 2018 Report I placed no weight on these particular facts about compactness in evaluating DI7002. Rather, I asserted that all five of the complete remedial maps suggested to the Court in Briefs filed in November 2018 were, in my view, sufficiently compact, since they each were as or more compact than the 2011 Enacted map on average. And I also asserted that I saw no reason to choose among them on compactness grounds, I also noted in my Report that, in this set of five proposed remedial maps, DI7002 was not the most compact, though it was also not the least compact.

(marginally) better (see Table below). Since the 2011 Enacted map has already been unsuccessfully challenged in the Virginia Supreme Court as a violation of the State's compactness requirement specified in the State Constitution, the fact that the compactness level in the 2011 map was sustained against challenge under state law (see *Veselind v. Virginia State Board of Elections,* Virginia Supreme Court, May 31, 2018) made it seem reasonable to me to use its average compactness as a benchmark in assessing the compactness of proposed remedial maps under state law standards. But that is a legal judgement best left to the Court.

100 districts average	Reock	Polsby-Popper
2011 Enacted Map	.36	.24
DI 7002	.36	.25
Special Master 21	.36	.25
Special Master 26	.36	.26

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12F. The Defendant-Intervenors call attention in their December 14 Response (footnote 6 at p. 24) to what they regard as an excessive number of VTD splits in some of my illustrative modules. I would again repeat the point made clearly in my Report that the configurations in the modules I present to the Court were meant to

be illustrative, and further changes can be made as required by the Court. [76] As noted above, once the Court has agreed on a basic map, I will ask the legislative staff to examine the possibility of some purely technical changes to reduce still further the VTD splits in that map. That is something which can be done very quickly once the Court has made clear its preferences, and these minor and essentially technical corrections can wait till then.[77] As I noted in my discussion above, VTD splits in my illustrative modules were not for racial purposes but

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[76] I would also reiterate that VTDs are simply units of administrative convenience and can be and readily are changed. While splits in VTDS can be used as one tool among many to effectuate race preponderant districting, that a large and unjustified number of VTD splits has been shown to have been, on balance, racially motivated does not mean that a few VTD splits, even ones involving some of the same VTDs, are necessarily racially motivated. Avoiding all VTD splits is virtually impossible, especially in districts whose lines cross county borders or those of other government units. Some VTDS are irregularly shaped and/or large in population (see discussion of VTDs in Virginia in the text), so splits in VTDs can be driven by reasons such as population balancing, or the desire for minor improvements in the shape of district borders. These are the key factors for VTD splits in my own illustrative map drawing, And, once the basic structure of a final map has been ordered by the Court, legislative staff can undoubtedly find ways to still further reduce VTD splits in that map beyond the extensive reductions in VTD splits I have already provided (se below).

[77] Given the need for a new map to be promptly promulgated, if the conversion matrix between new and old VTD lines at the census block level has already been completed by legislative staff so as to allow for updated reports of the type presented in my December 7 Report to be created for a Court-ordered map, I expect to use the most recent VTD map available to the legislative staff. Otherwise, I will continue to use the 2010 VTDs, since that is one for which full census and archival election data at the census block level is available. However, I have been informed by legislative staff that there may be an administrative problem if new VTD lines are used in 2019 for the House of Delegates election, but older VTD lines are used for all other election contests. On this point I will consult further with legislative staff once a Court ordered map configuration is specified.

involved population balancing and, in some cases, improving compactness because of the somewhat peculiar shapes of some VTDs,[78] or they reflect decisions to avoid changes not ancillary to remedying the constitutional violation by limiting the number of districts changed, thus necessarily perpetuating cross-district VTD splits involving one of the unchanged districts and a changed district.[79]

I would also emphasize the simple fact that, in all my illustrative modules, VTD splits are lower than in the 2011 Enacted map, sometimes much lower.
For comparison purposes regarding VTD splits I will discuss the same two maps based on my illustrative modules that are discussed in the Response of the Princeton Gerrymandering Project. The illustrative modules I prepared contained 39 VTD splits in the 21-district configuration (Illustrative modules Richmond 1A, Petersburg 1A, Peninsula 1 and Norfolk 1C), and 35 VTD splits in the 26-district configuration (Richmond Illustrative Module 1B, Petersburg Illustrative Module 2, Peninsula Illustrative Module 2, and Norfolk Illustrative Module 1A). This compares with 43 VTD splits in the same 21-districts in the 2011 Enacted map and 57 VTD splits in the same 26 districts in the 2011 Enacted map.

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[78] For example, on page 11 of their Response Brief the Defendant-Intervenors point out a "notch" in the northern part of District 74 and claim this a clear sign that I used race as a preponderant motive. This claim is wrong. The notch is a result of an irregularly shaped VTD and the constraints to draw a district in which it was not necessary to pair the incumbent of district 74 with any other incumbent.

[79] See earlier discussion in this Addendum of the reason for some of the VTD splits in district 69 in my illustrative modules, namely the fact that district 68 remained unchanged.

The tables below show VTD split comparisons for my 21-district illustrative map and my 26-district illustrative map, versus the same districts in the 2011 Enacted map, along with data on number of County Splits and numbers of County pieces in those changed districts in each map. As is apparent, both illustrative maps are better than the 2011 Enacted map regarding VTD splits, and as good or better concerning county splits and better in having fewer county pieces.

But I have also included comparison data in these table on DI7002. Here I would observe that my 26-district illustrative map has fewer VTD splits than found in the same 26 districts in DI7002, though the reverse is true for my 21-district illustrative map. But I would emphasize that differences across remedial maps in VTD splits are simply not large. However, that 26-district illustrative map is not just superior to DI701 in limiting VTD splits, it is also superior to DI 7002 with respect to total number of split counties, and to total number of county splits, and with respect to the latter consideration, the differences between it and the HB7002 are more substantial.

	21-district Changed Plan		
	Enacted	HB7002	SM21
Total VTD Pieces	**43**	**33**	**39**
County Splits	**16**	**16**	**15**
Total County Pieces	41	38	31

	26 District Changed Plan		
	Enacted	HB7002	SM26
Total VTD Pieces	**57**	**39**	**35**
County Splits	**22**	**19**	**14**
Total County Pieces	51	47	33

12G. Defendant-Intervenors object to my rejection of plans that contain "fracked" districts. They assert that the "Court's injunction is not properly used as an opportunity to impose freewheeling good-government ideas neither endorsed by a political process nor tethered to what was litigated in this case or found by this Court (Defendant-Intervenor December 14 Response Brief, p. 24). Here, my Report is being completely mischaracterized. While I coined the phrase "fracking" to refer to a particular kind of discontiguity in the multiple portions of a county contained within a given district for which there was no standard term in the redistricting literature, the undesirability of this practice is actually well known. For example, in the most recent district court majority opinion in the North Carolina legislative case, *Common Cause v. Rucho* No 1:16-CV-1026 (U.S. District Court, Middle District of North Carolina, 2018, slip op at p. 105 [p. 194]), the North Carolina legislature is quoted as asserting that one of the districting criteria that it implicitly relied upon was that "a district line should not traverse a county line more than once." Of course, that is simply another way to describe what I have called "fracking".

And, further, as I said in my December 7, 2018 Report and reiterated above: there are two good reasons to avoid "fracking" in a court-ordered map. First, it gives the appearance of improper manipulation of district boundaries. Second, regardless of the motivation for the "fracking," it is evidence of sloppy craftsmanship that has no place in a court-ordered map.

12H. The Defendant-Intervenors claimed in their December 14 Response Brief that I have given "practically *no* weight to 'incumbency considerations'" (emphasis theirs, p. 22), and that I have "done the bare minimum" to avoid pairing incumbents. While I did not introduce incumbency considerations until after I had drawn maps satisfying traditional districting criteria, in the actual illustrative modules I have presented to the Court, I have taken great care to avoid incumbent pairing, even at the cost of some reduction in compactness and some increase in county fragmentation -- within the context, of course, of modules that are being based on traditional districting principles. In fact, to the best of knowledge no present incumbents are paired in any of my modules.

They also assert that I have "failed to preserve the cores of districts" (p. 23). It is simply wrong that no special care was taken to preserve central elements of the unconstitutional districts (see Defendant-Intervenors' December 14 Response, p. 22). As stated clearly and unequivocally in my Report, in those unconstitutional districts where there was a clearly preponderant county in terms of population (9 of the 11) I took care to assure that this County remained the predominant one in the district. In a tenth unconstitutional district, district 63, where Petersburg was the plurality county, I assured that Petersburg was kept whole in all modules involving changes in the configuration of district 63. As I have reiterated, the drawing of

adjacent districts came about as a consequence of seeking narrowly tailored remedies for the infirmities in the unconstitutional districts.

12I. The Defendant-Intervenors have claimed the Special Master's proposals all have "the uncanny attribute of targeting the very incumbents the legislature would be most inclined to protect. For example, HD66 is the district of Speaker Kirkland Cox, and no proposed version of that district leaves it even mildly unscathed. Similarly, no proposed version of HD76, represented by the House Chairman of Appropriations, Delegate Chris Jones, allows the incumbent to be competitive in the district. And the Special Master's "1-A" version of Norfolk may render Delegate Barry Knight, the most senior member of the Norfolk delegation, uncompetitive in his own district." The only response that I can give to the claim that I have "uncannily" targeted legislative leaders, with its implication that I have done so deliberately, is that this claim is not just wrong but nonsensical. I could not have targeted legislative leaders since neither I nor my research assistant had knowledge of which districts were the ones in which legislative leaders resided. The map drawing software my research assistant used at the University of California, Irvine simply showed home locations by district of incumbent, without names attached. Additionally, the initial shape of districts was done prior to receiving the current incumbent addresses, so the district designs are primarily a product of good government criteria, with emendations provided later to avoid incumbency pairings.

As stated repeatedly in my Report, I have done line drawing that is blind to politics except insofar as I needed political information to ensure that there was not unintentional vote dilution in the unconstitutional districts vis-à-vis the ability of the African-American community to elect candidates of choice. After I had information on incumbent home addresses, all incumbents were treated equally[80]. District configurations in the districts adjacent to the unconstitutional ones emerged from decisions as to how best to remedy the constitutional infirmities in the unconstitutional districts. No incumbent was intentionally favored or disfavored as I sought to create narrowly tailored remedies for the constitutional violations to be proposed as illustrative maps to the Court. As stated clearly in my Report, my map drawing was based on traditional districting criteria, including the preservation of county integrity to the extent feasible, while drawing a narrowly tailored remedy that only changed districts that were adjacent to unconstitutional districts, and that kept the number of changed districts as low as possible given the need to remedy the constitutional violation.

13. The Princeton response directly compares the 2011 Enacted map and two plans that can be created from the Special Master's modules, a 21-district plan

[80] If Defendant-Intervenors are making the legal claim that the Special Master was required to give special deference to preserving the districting configurations in the districts where incumbents held senior legislative offices, that claim is one best left to the Court.

(Illustrative modules Richmond 1A, Petersburg 1A, Peninsula 1 and Norfolk 1C) and a 26-district plan (Richmond Illustrative Module 1B, Petersburg Illustrative Module 2, Peninsula Illustrative Module 2, and Norfolk Illustrative Module 1A).

13A. This non-partisan and academically-based group concludes that the 26-district plan (Richmond Illustrative Module 1B, Petersburg Illustrative Module 2, Peninsula Illustrative Module 2, and Norfolk Illustrative Module 1A) offers a distribution of minority voting strength "that most closely aligns with the distribution which would be expected in race-neutral redistricting ..." and further state that this combination of illustrative modules "best eliminates the unnatural sorting of voters on the basis of race which is unlikely to have occurred by chance [in the 2001 Enacted map]." They also find that even the 21-district plan based on the Special Master's illustrative modules is not far from the 26-district plan with respect to the distribution of black voting age population across districts.

13B. Neither the Princeton Gerrymandering Project nor I are asserting that there are no other districting maps whose black voting age distribution might also provide evidence that race was not a preponderant motive in their creation. Rather, the analysis undertaken by the Princeton Gerrymandering Project offers a direct rebuttal to the completely unfounded claim by Defendant-Intervenors in the December 7 Response Brief that the illustrative modules I have drawn are instances of districting done with a race preponderant motive. Instead, the

Princeton Gerrymandering characterizes my illustrative modules as exactly the opposite. Moreover, the illustrative modules I have drawn not only avoid race as a preponderant motive, but they do so in terms of a narrowly tailored remedy with no incumbent pairings.

14. As I review the various Response briefs, I find that the responses to the illustrative maps are not at all consistent. Some Responses (or, at least, parts of these responses) criticize the illustrative modules because the changes they make from the 2011 Enacted map are too extensive (e.g., a claim that the number of voters shifted in the illustrative modules is excessive, and the associated claim that the changed illustrative districts fail to adequately protect the reelection chances of legislative leaders). On the other hand, some responses (or, at least, parts of these responses) also criticize the illustrative modules because the changes they make from the 2011 Enacted map are viewed as not extensive enough (e.g., a claim that the configuration of some unconstitutional districts should have been changed to a greater extent than was done in my illustrative modules, or a claim that the illustrative modules do not go far enough in increasing the ability of the African-American community to influence electoral outcomes in the state in districts other than the ones found to be unconstitutional). On the other hand, the Defendant is willing to accept any the implementation of any of the illustrative modules.

APPENDIX C

Data Errors in the Plaintiffs' Response to a Court Order Requesting a Summary Table of Black Voting Age Data for Submitted Remedial Maps and for the Special Master's Illustrative Modules

1. On January 15, 2019 Plaintiffs responded to an earlier Court Order requesting that they provide a summary table of black voting age data for submitted remedial maps and for the Special Master's illustrative modules. The requested data table is appended to their response as Exhibit A.

2. There are errors in the data on black voting age population percentages in Exhibit A for some Norfolk area districts in several maps and in all my illustrative modules of the Norfolk area.

3. There are errors made in characterizing the black voting age populations in my Norfolk area illustrative modules in districts 79 and 89. To the best of my knowledge the black voting age population percentage data reported in the text above for these Norfolk area modules is identical to what is calculated by DLS from the corrected shape file deposited with DLS on December 10 and posted on their website. The only difference between the two shape files (that filed on December 7 and the corrected version filed on December 10) was in the Norfolk area, so the black voting age population DLS percentages reported by Plaintiffs for my illustrative modules in Exhibit A of their January 15, 2019 filing are correct for the Richmond, Petersburg, and Peninsula areas of the state.

4. There are minor mistakes in a Norfolk area district in other maps as well. In the 2011 Enacted Map, Appendix A reports district 79 as having a black voting

age population of 29.70% according to DLS data measurement; however, the correct figure according to DLS data I received directly from legislative staff is 29.46%. In the NAACP map, Appendix A reports district 89 as having a black voting age population of 52.4%; the correct figure according to DLS data I received directly from legislative staff is 52.1%. And there may be an error of similar magnitude in either district 79 or district 89 in Plaintiffs Map A.

5. As best as I can assess, one reason (though possibly not the only reason) for these minor discrepancies is that the data reported by Plaintiffs for Norfolk do not correct a mistake in the Maptitude data files for this county. Census Block # 517100009021044 in the Norfolk area has zero population in the *Maptitude* data file but has 19,279 persons in the DLS file. Census block 517100038001000, also in Norfolk, has 19,352 in the *Maptitude* data file but 73 persons in the DLS file. These population discrepancies also affect black population and black voting age population numbers (and percentages) for districts that contain one but not both of these districts. To the best of my knowledge my data reports have the same numbers as DLS because my research assistant, Jonathan Cervas, went to the *Maptitude* data file on his computer and recoded by hand those two census blocks to be consistent with the DLS data.[81] Because the problem is confined to a few census

[81] As I later learned, this problem with *Maptitude* data for Norfolk had been previously identified by DLS staff.

blocks in Norfolk, the black voting age population DLS percentages reported by Plaintiffs in Appendix A of their January 15, 2019 response to the Court Order appear to me to be correct for the Richmond, Petersburg, and Peninsula areas of the state for the other plans reported in the Exhibit.

6. I have done no analyses of the black voting age population percentages reported in Exhibit A under the rubric of "DOJ." At no time did I make use of this metric. Rather, I took all the data on black voting age percentage reported in the text of this Second Report from information provided me by DLS staff, and to the best of my knowledge that data should be consistent with data as it would be directly calculated by DLS.

CERTIFICATION

I swear that, to the best of my knowledge, the data and figures provided in the Second Report of the Special Master in *Golden Bethune-Hill* dated January 17, 2019 are correct, as are the statements made in that Report.

Bernard Grofman Bernard Grofman

Signed January 17 **2019**

Irvine, California USA