APPENDIX A

GROUND RULES

When setting out to do this project, we wanted to create a balanced and fair method of determining where these lines are to be drawn. Our goal is to do what the Legislative Reapportionment Commission did not do, which is be as fair as possible to as many citizens of the Commonwealth and create a plan to unite as many counties and municipalities and their common interests. Therefore, we created these Ground Rules to give us guidance in this process. We do not take this task lightly, which is why we developed these rules as well as a very detailed explanation of why we drew districts the way we did, and how our plan is both in accordance with the Constitution but also superior to the LRC plan. Of course, we kept the the following in mind when developing the plan: Keeping population per district as equal as possible, keeping all districts contiguous, keeping districts as compact as possible, splitting as few municipalities as possible, and adhering to the Voting Rights Act.

1. Keep the population deviation under 10% per House and Senate District. A 10% population deviation has been found to be an acceptable deviation for State House and Senate Districts since *Abate v. Mundt, 403 U.S. 182 (1971).*

For the House map, when you calculate the 2010 Census population for Pennsylvania of 12,702,309 and divide by the 203 House districts, you get an ideal statistical mean of 62,572.951, which we will round to 62,573. Petitioners plan has a a maximum district population of 65,570 and a minimum of 59,456, for a deviation of 9.77%. The LRC plan has a maximum district population of 65,036 and a minimum of 60,110, for a deviation of 8.19%. However, when you compare each district to that mean, we find that 101 of the Petitioners' districts are closer to this ideal statistical mean than the LRC plan, as demonstrated in Exhibit J. (3, 4, 5, 6, 8, 9, 11, 14, 15, 18, 21, 22, 24, 25, 26, 27, 29, 30, 32, 35, 37, 38, 39, 40, 43, 47, 51,

54, 56, 59, 61, 63, 64, 66, 68, 70, 71, 73, 75, 80, 84, 85, 86, 88, 89, 90, 91, 95, 97, 100, 101, 102, 105, 107, 110, 113, 114, 116, 117, 118, 119, 123, 124, 126, 127, 128, 131, 132, 133, 134, 135, 136, 140, 142, 146, 150, 151, 152, 153, 158, 161, 165, 169, 170, 172, 173, 175, 176, 177, 179, 183, 186, 188, 193, 194, 196, 197, 199, 201, 202, 203). Three Districts are ties, due to the fact the LRC and Petitioners drew the same exact district (53, 154, and 200). The remaining 99 districts (1, 2, 7, 10, 12, 13, 16, 17, 19, 20, 23, 28, 31, 33, 34, 36, 41, 42, 44, 45, 46, 48, 49, 50, 52, 55, 57, 58, 60, 62, 65, 67, 69, 72, 74, 76, 77, 78, 79, 81, 82, 83, 87, 92, 93, 94, 96, 98, 99, 103, 104, 106, 108, 109, 111, 112, 115, 120, 121, 122, 125, 129, 130, 137, 138, 139, 141, 143, 144, 145, 147, 148, 149, 155, 156, 157, 159, 160, 162, 163, 164, 166, 167, 168, 171, 174, 178, 180, 181, 182, 184, 185, 187, 189, 190, 191, 192, 195, and 198) have the LRC's plan closer to the ideal statistical mean than the Petitioner's plan.

Not only were we able to draw more districts that had a smaller population deviation from the ideal, we were able to significantly reduce the number of unnecessary splits. Not counting splits required due to the population of the municipality being too large, or splits that were required because of a municipality that crossed county lines (where, by definition, either the county or the municipality must be split), the LRC had districts with 92 County Splits, 135 Municipal Splits, and 197 Ward Splits. In contrast, Petitioners' Alternative Plan had districts with 67 County Splits, 13 Municipal Splits, and 25 Ward Splits. When calculating the splits, we calculated each split in each district, for example, if a township was split twice in three districts, we counted this as three splits, even though only one municipality was actually split. We were able to therefore reduce the number of overall municipalities that were split across the state that were not required to due to population to 6: Lancaster City, (Lancaster) Manheim Township, (Lancaster) , Hempfield Township, (Westmoreland) , Upper Gwynedd Township,

(Montgomery) , Upper Dublin Township, (Montgomery) , and Middletown Township, (Bucks) .

The LRC on the other hand, split 60 municipalities that are not required to be split due to population: Yeadon Borough (Delaware), Stroud Township (Monroe), Lower Merion Township (Montgomery), West Manchester Township (York), Silver Spring Township (Cumberland), Darby Township (Delaware), Ferguson Township (Centre), Haverford Township (Delaware), Radnor Township (Delaware), Marple Township (Delaware), Ridley Township (Delaware), Springfield Township (Delaware), Phoenixville Borough (Chester), Pottstown Borough (Montgomery), West Goshen Township (Chester), Upper Chichester Township (Delaware), Upper Dublin Township (Montgomery), Plymouth Township (Montgomery), Whitpain Township (Montgomery), West Norriton Township (Montgomery), Upper Providence Township (Montgomery), Lower Gwynedd Township (Montgomery), Middletown Township (Bucks), Buckingham Township (Bucks), Bethlehem Township (Northampton), Moore Township (Northampton), Bristol Township (Bucks), Salisbury Township (Lehigh), Whitehall Township (Lehigh), Palmer Township (Northampton), Lower Saucon Township (Northampton), Exeter Township (Berks), South Whitehall Township (Lehigh), Pottsville City (Schuylkill), Hanover Township (Luzerne), Hazle Township (Luzerne), Swatara Township (Dauphin), Manheim Township (Lancaster), Lancaster Township (Lancaster), West Hempfield Township (Lancaster), Hempfield (Westmoreland), Springettsbury Township (York), Allegheny Township (Blair), Patton Township (Centre), Lawrence Township (Clearfield), Unity Township (Westmoreland), East Huntingdon Township (Westmoreland), Penn Township (Westmoreland), Harrison Township (Allegheny), Scott Township (Allegheny), South Park Township (Allegheny), Bethel Park Borough (Allegheny), East Hempfield (Lancaster), West Mifflin Borough (Allegheny), Baldwin Borough (Allegheny), O'Hara Township (Allegheny),

Morrisville Borough (Bucks), Plum Township (Allegheny), Shaler Township (Allegheny), and Millcreek Township (Erie)

In the Senate map, both Petitioners and LRC were able to not split any municipalities that were unnecessary. However, not only were Petitioners able to achieve fewer county splits than in the LRC plan, they were able to do so with a much smaller deviation. In the LRC plan, the largest district size was 264, 160 and the smaller was 243,936, for a deviation of 7.96%. Petitioners maximum was 258,699 and minimum was 249,882, for a deviation of 3.47%. Additionally, when doing the district by district comparison, the Petitioners plan was able to come closer to the ideal district size than the LRC plan in a whopping 42 out of 50 districts. (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 33, 34, 36, 37, 39, 40, 41, 42, 43, 44, 45, 47, 49 and 50) while the LRC comes closer in just 8 districts. (11, 29, 31, 32, 35, 38, 46, 48).

2. **Divide as few counties and municipalities as possible.** In the House plan, we started to try to keep as many counties as whole as possible. As demonstrated in Exhibit G, by using the 10% maximum deviation, we find that since the ideal district has 62,573, he minimum that a district could be and be in accordance with our rules (and the law), would be 59,445, and the maximum would be 65,702. Exponentially, if you take a county's (or municipality's) population and multiply by additional seats, you get the following chart.:

1	59,445	62,573	65,702
2	118,889		131,404
3	178,334		197,106
4	237,779		262,808
5	297,224		328,510
6	356,669		394,212
7	416,114		459,914
8	475,559		525,616
9	535,004		591,318
10	594,449		657,020
11	653,894		722,722
12	713,339		788,424
13	772,784		854,126
14	832,229		919,828
15	891,674		985,530
16	951,119		1,051,232
17	1,010,564		1,116,934
18	1,070,009		1,182,636
19	1,129,454		1,248,338
20	1,188,899		1,314,040
21	1,248,344		1,379,742
22	1,307,789		1,445,444
23	1,367,234		1,511,146
24	1,426,679		1,576,848
25	1,486,124		1,642,550
26	1,545,569		1,708,252

So therefore, certain counties, such as Carbon County for instance, with a population of 65, 249, can fit into one house district with no splits. Bucks County, with a population of 625,249, can fit into 10 House Districts. In addition, we would find that certain counties that were adjacent to each other can combine nicely into 2 (or more) seats, such as Lycoming and Sullivan Counties, without having additional splits. So we separated out these counties and assigned those counties seats and tried to not split the municipalities in those blocked off counties or groups or counties.

In some cases it worked. The math indicates that Philadelphia could fit into 24 or 25 districts. It currently had 26 districts so we eliminated one immediately. When trying to draw the lines without excessive ward splits, and also trying to comply with the Voting Rights Act (VRA), we found that 24 seats worked the best, and we were able to fit 24 seats into

Philadelphia without having to cross county lines. In some cases it did not, for instance Delaware County could in theory fit into 9 House Districts. But, due to numerous issues in Delaware County, including large municipalities, some of which that were non-contiguous, we found that we would have to split numerous municipalities, and instead opted to split county lines to avoid unnecessary municipal splits.

The populations of the counties are listed in Exhibit G. Additionally, the populations of 8 municipalities in Pennsylvania exceed the upper limit of 65,702 for the House that will by definition require at least one split. They are Philadelphia (1,526,006), Pittsburgh, (305,704), Allentown (118,032), Erie (101,786), Reading (88,082), Upper Darby (82,795), Scranton (76,089), and Bethlehem (74,982). For the Senate, only two municipalities exceeded the upper limit of a Senate district, Philadelphia, and Pittsburgh. As the LRC was able to create a plan that did not divide any other municipality, our focus will be to not divide as many counties as possible.

3. **Divide the state into regions to determine whether seats had to be moved due to population changes.** The LRC did something similar to this but they were not as specific as we were. We used the following regions: Philadelphia, Southeastern, Northeastern, South Central, Southern Alleghenies, Southwest, North Central, and Northwest. For the house, adding up the population in each region and dividing by the ideal mean of 62,573, we found that the following regions should ideally have the following number of seats:

North Central - 7.2
North East - 39.8
North West - 9.8
Philadelphia - 24.4
Southern Alleghenies - 9.8
South Central 30.2
South East - 39.7

Then, we took each seat and assigned it to a county and region based on where the largest portion of the district was. In the case where it was about even, we used the county/region that the incumbent lived in. By doing so we found the following seats existed according to the 2001 lines:

North Central - 7
North East - 38
North West - 11
Philadelphia - 26
Southern Alleghenies - 11
South Central - 28
South East - 38
South West - 45

So therefore, the following changes needed to be made:

North Central - No Change
North East - Add 2 seats
North West - Lose 1 Seat
Philadelphia - Lose 2 Seats
Southern Alleghenies - Lose 1 Seat
South Central - Gain 2 Seats
South East - Gain 2 Seats
South West - Lose 2 Seats.

A total of 6 seats needed to be moved.

Additionally, within regions, the following moves had to be made to keep the counties to have the correct number of seats:

1 Seat should move from Lackawanna County to Monroe County
1 Seat should move from Delaware County to Montgomery County

For the Senate, it was more difficult to properly assign regions due to the size of the Senate districts and that many districts overlapped regions. But from doing the analysis, it appeared that 1 district should be moved from Philadelphia to Chester County, and 1 district should be moved from Allegheny County to South Central. Then, one additional seat should be moved from somewhere in Western Pennsylvania to the Southeast Region.

4. **Determine which seats to move.** For the House, now that we have determine that 6 seats need to move between regions in the state, and 2 seats have to move within regions in the state for a total of 8 moves of at least one county to another county. We therefore came up with criteria to determine which seats should move. It makes the most sense to try to avoid displacing as many incumbents as possible that are seeking reelection. So therefore, we were able to successfully move the following districts of incumbents that were not running for reelection.

District 5 from Erie/Crawford Counties in Northwestern PA. We moved this to Chester County in Southeastern PA.

District 22 from Allegheny County in Southwestern PA. We moved this to Lehigh County in Northeastern PA.

District 74 from Clearfield County in Southern Alleghenies. We moved this to York County in South Central.

District 115 from Lackawanna County in Northeastern PA. We moved this to Monroe County in Northeastern PA.

For additional seats that needed to be moved, we then went by member seniority. The first group that were chosen to move would be incumbents that won special elections in 2012, as they have the least seniority. We were then able to move the following seat:

District 169 from Philadelphia in Philadelphia Region to Chester County in Southeast.

Continuing to follow this rule, we used both seniority and also common sense to prevent additional county and municipal splits, and moved the following seats:

District 15 from Beaver County in Southwestern PA to Cumberland/Franklin Counties in South Central PA.

District 161 from Delaware County in Southeastern PA to Montgomery County in South Central PA.

District 195 from Philadelphia County in Philadelphia Region to Berks County in Northeastern PA.

For the Senate, we determined the following:

District 1 should move from Philadelphia to Chester County

District 21 should move from Northwest Region to Southeast Region

District 38 should move from Allegheny to Adams/York Counties

For District 1, as is discussed in the justifications section, the City of Philadelphia fit nicely into six districts, however due to multiple county splits there were 7 Philadelphia based districts in the 2001 plan. We were able to maintain 4 majority-minority districts in Philadelphia. Therefore, one of the 3 remaining non-majority-minority districts had to be moved. We chose District 1 as is further discussed in the justifications exhibit.

For District 21, we chose this seat to move because the incumbent, Mary Jo White, is retiring this year. We could have chosen District 49 for the same reason, however, if we were to do so, the resulting district shifts would make cause more county splits and more districts to be non-compact than if we moved District 21.

For District 38, as this is a seat which comes up for election in 2014, we do not know if the incumbent intends to run for another term. So therefore, even though the incumbent for District 40 has resigned and there is a Special Election scheduled, we chose to move this district, as if we were to move District 40, the resulting shifts would basically create a new district similar to District 40 that would just be numbered District 38. A more detailed analysis is in the justifications exhibit.

5. **Start drawing the seats using the above criteria.** We first started in each district where an incumbent was seeking reelection and tried to keep his or her county and municipality whole. As we continued to draw the map, we found that a few seats had particular issues that required slight moves which in some cases displaced incumbents that were seeking reelection. We tried to avoid this as much as possible, but we would not agree to make a municipal split for the sole reason to keep an incumbent in their district. As a result, we wound up having to make minor moves that caused the representatives in Districts 1, 56, and 77 to not remain in their districts. Fortunately, it is likely that these representatives can simply move if this plan were to be put into law and still remain in adherence with the Constitutional requirements that a representative must live in their districts for at least 1 year prior to their next election. In additional, certain issues arose that resulted in the need for additional necessary municipal splits in Lancaster and Westmoreland Counties.

6. **If a municipality crosses county lines, split the municipality instead of the county if possible.** A few municipalities cross county lines. We do not count these as splits when doing our analysis as by definition either the county of municipality would have to be split and thus it would be unavoidable.

7. **We considered a district contiguous when it touches on a corner at a 90 degree angle, but that district cannot be "leapfrogged" by another.** For example, if four municipalities meet at a corner, where each corner has a different municipality, a district can be contiguous via a line connecting the northwest corner and the southeast corner. However, it would not be contiguous if another district was on the northeast corner and the southwest corner.

8. **We try to accommodate incumbents and their residences, but we will not create a split solely to protect an incumbent.** Out of all of the House and Senate incumbents that are seeking reelection, outside of those districts that had to be moved to a population shift, only 3 House Members were displaced from their districts due to our inability to create a legally justifiable split.