

# Lessons from West Chester SD Redistricting

(Bob Schoch attended November 10 meeting of School Board)

- Redistricting is an iterative process (refine definition of problem, require more specific data, test solutions against uncertain future, etc.)
- Also experiencing birth rate decline, which may impact final decision making regarding waiting for relief vs. moving students now who would not need to be moved in five years
- Objective is to provide extra space in each school by 2018 for flexibility
- Moving approximately 600 students, originally approximately 1400
- Discussed QCSD situation (Dr. Scanlon was Superintendent from 1999 to mid-2000s). Most concern was about assignments not announced until late summer.
- No mention that Open Areas were important to balancing class sizes, but school board member commented that class sizes range from 10 to 30 students.
- Valuable to view items on their website and other districts

# Prioritized Guidelines/Objectives

Rank	Guideline/Objective
1	Assign neighborhoods to the same school
2	Balance class size to minimize the number of classrooms and teachers needed
3	Keep siblings together at the same school
4	Minimize the number of times a student is transferred
5	Develop redistricting boundaries that remain valid for 5 to 8 years with only minor adjustments
6	Transition implementation by allowing voluntary moves to new school
7	Develop consistent feeder patterns from elementary to middle school
8	Minimize the number of students affected by redistricting
9	Assign students to school closest to home
10	Maintain diversity while minimizing the number of students transferred
11	Minimize transportation costs

# Guidelines Specific to Developing New Boundaries and Implementing Options

- Developing new boundaries
  - Neighborhoods to the same school
  - Assign students to school closest to home
  - Balance class size to minimize the number of classrooms and teachers needed
  - Minimize transportation cost
  - Minimize the number of students transferred
  - Develop consistent feeder patterns from elementary to middle school
  - Maintain socioeconomic diversity
  - Develop boundaries that remain valid for 5 to 8 years with minimal adjustment (also affected by implementation alternatives)
- Implementing options
  - Keep siblings together at the same school
  - Minimize the number of times a student has been moved
  - Transition by allowing voluntary early moves (help balance class size by setting annual targets)

# Establishing Capacity of Elementary Schools

- Identify use of each space on school floor plan
- Count spaces for regular education classrooms
- Multiply classroom spaces by:
  - Plancon at 25 students per classroom
  - QCSD Oct 2014 at average class size by grade level
- Special education spaces
  - Each school
    - Learning Support
    - Speech
    - Therapy-occupational and physical
  - District wide programs
    - District operated
    - IU operated

# Elementary Space Utilization

## October 2014

School	Regular Education	Art Classroom	Music Classroom	Special Education Classrooms	Small Group Instruction Rooms	Vacant
Neidig	17			1	4	
Pfaff	16	1	1	5	8	2
Quakertown	12			1	3	
Richland	17	1	1			
Tohickon Valley	16	1 shared		3	1	
Trumbauersville	17	1	stage	3	1	

Note: Special education space requirements, location, and ability to move uses are subject to state and federal regulations and approval by the PA Department of Education.

# Enrollment vs. Capacity

Regular Education at Oct. 2014 Class Sizes  
 Special Education at Plancon Capacity

	Enrollment Regular Education Only	QCSD Capacity at Oct. Class Sizes	Excess Capacity Regular Education	Enrollment with Special Education	Plancon Capacity Including Special Education	Excess Capacity Special Education
<b>Elementary</b>						
Neidig	422	411	-11	422	425	3
Pfaff	398	438	40	435	525	90
Quakertown	294	295	1	294	325	31
Richland	393	412	19	423	450	27
Tohickon Valley	385	391	6	398	500	102
Trumbauerville	<u>423</u>	<u>414</u>	-9	<u>436</u>	<u>500</u>	<u>64</u>
Total	2315	2361	46	2408	2725	317
<b>Middle School</b>						
Milford MS	382			408	604	196
Strayer MS	<u>828</u>			<u>852</u>	<u>1414</u>	562
Total	1210			1260	2018	758

# Methodology for Establishing Targets of How Many Students to Redistrict

- What is the capacity of each school?
- What will the enrollments of each school be based on current school boundaries?
- How will recent birth rates affect future enrollments in the attendance area?
- How many students will additional residential development add within current school boundaries?

# Birth Rate Impact Future Enrollments

- Birth rates are down from an average of 513 per year in years affecting current elementary enrollment to an average of 400 in the two most recent years.
- If birth rates of recent years continue, future enrollments will be approximately 78% of current enrollments.
- These birth rates vary significantly by elementary school attendance area.
- Birth rates must be monitored closely each year so that plans can be reevaluated if necessary.



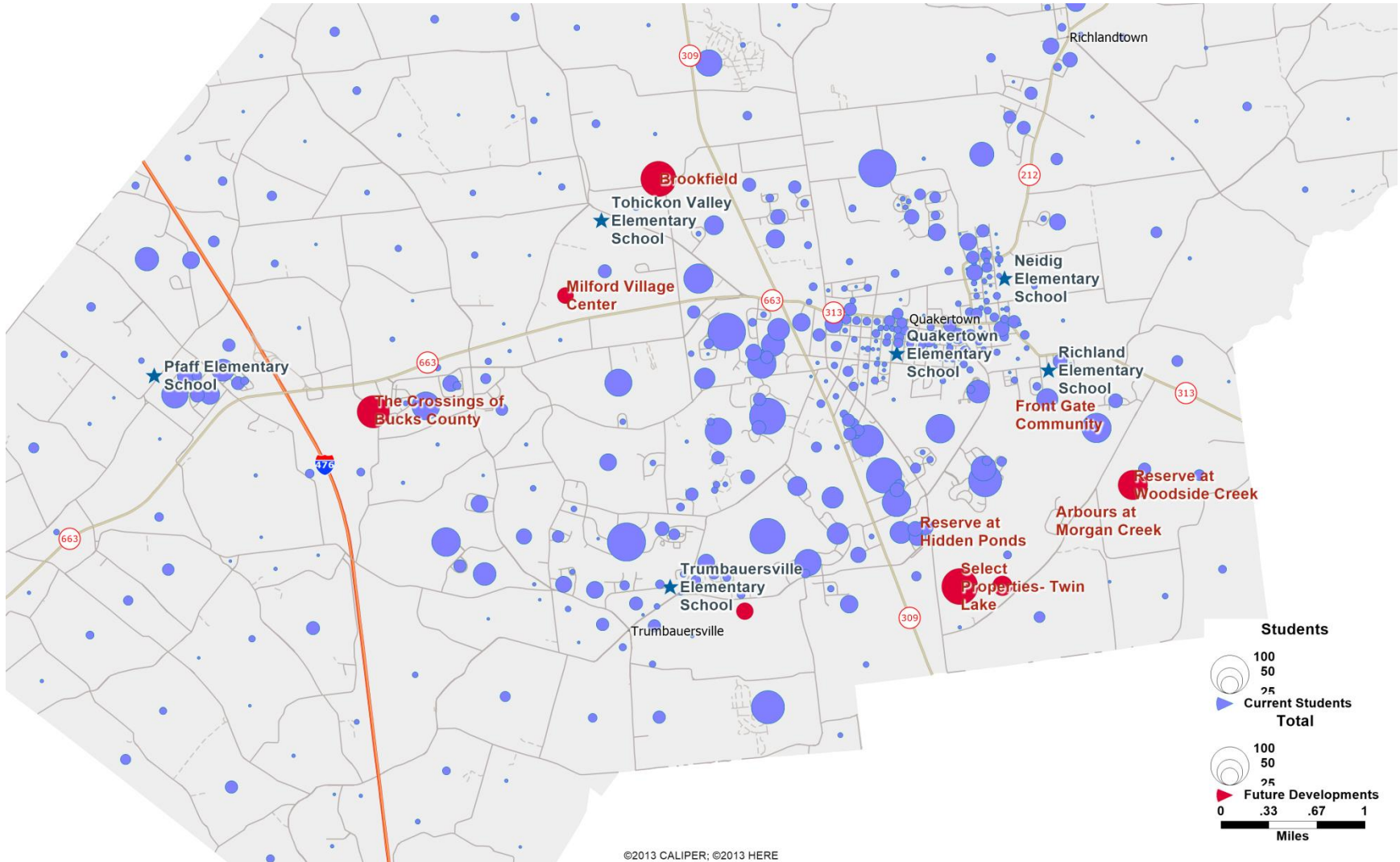
# Residential Growth Impact by Elementary School

Project Name	Elementary School	Structure Type	Age Qualified	Housing Units	Demographic Multipliers			Students Generated				Per Year or Built by Oct 2014	Elementary per Buildout Schedule			
					Elementary	Middle School	High School	Elementary	Middle School	High School	Total		2015-16	2016-17	2017-18	2018-19
Renaissance at Morgan Creek	Richland	Single Family	Yes	141												
Arbours at Morgan Creek	Richland	Townhomes, Multiplex	Yes	134												
The Crossings of Bucks County	Pfaff	Single Family, 4BR	no	90	0.56	0.22	0.19	50	20	17	87	56%	22			
Reserve at Hidden Ponds	Quakertown	Single Family, 4BR	No	24	0.56	0.22	0.19	13	5	5	23	25%	3.36	3.36	3.36	3.36
Front Gate Community	Richland	Mid-rise, Own 3BR	?	402	0.09	0.07	0.08	36	28	32	96	25%	9.045	9.045	9.045	9.045
Reserve at Woodside Creek	Richland	Single Family, 4BR	no	75	0.56	0.22	0.19	42	17	14	73	25%	10.5	10.5	10.5	10.5
Select Properties-Twin Lake	Richland	Single Family, 4BR	no	107	0.56	0.22	0.19	60	24	20	104	25%	14.98	14.98	14.98	14.98
Steeple Run	Richland	Single Family, 4BR	no	39	0.56	0.22	0.19	22	9	7	38	25%	5.46	5.46	5.46	5.46
Brookfield	Tohickon Valley	Single Family, 4BR	no	106	0.56	0.22	0.19	59	23	20	103	25%	14.84	14.84	14.84	14.84
Milford Village	Tohickon Valley	Apartments, <2BR	?	208	0.03	0	0.01	6	0	2	8	25%	1.56	1.56	1.56	1.56
Milford Village	Tohickon Valley	Assisted Living	Yes	140				0	0	0	0	25%	0	0	0	0
Milford Village	Tohickon Valley	Congregate Care	Yes	576				0	0	0	0	25%	0	0	0	0
Milford Village	Tohickon Valley	Cottages	?	33	0.09	0.04	0.03	3	1	1	5	25%	0.7425	0.7425	0.7425	0.7425
Milford Village	Tohickon Valley	Townhomes	?	41	0.27	0.09	0.07	11	4	3	18	25%	2.7675	2.7675	2.7675	2.7675
Tollgate Crossing	Trumbauersville	Single Family, 4BR	no	30	0.56	0.22	0.19	17	7	6	29	25%	4.2	4.2	4.2	4.2

# Elementary Students from New Residential Developments Under Construction or in Municipal Planning Process

<u>School Totals</u>	2015-16	2016-17	2017-18	2018-19
Pfaff	22	0	0	0
Quakertown	3	3	3	3
Richland	40	40	40	40
Tohickon Valley	20	20	20	20
Traumbauersville	4	4	4	4
<u>Per Grade Totals</u>				
Pfaff	4	0	0	0
Quakertown	1	1	1	1
Richland	7	7	7	7
Tohickon Valley	3	3	3	3
Traumbauersville	1	1	1	1

# Potential additional enrollment due to residential development that is approved or in the approval process.



# School Specific Enrollment Projections

- The following slides indicate how enrollments are projected for each elementary school.
  - Progression rates from grade level to grade level are based on actual rates in previous five years
  - Kindergarten and First Grade are based on historic percentages of births five years prior that enter these grade levels
  - Adjustments are made for planned residential development in the current boundaries
  - Adjustments are made for different birth rates in the current boundaries
- Note: Enrollment projections become less reliable with smaller populations

# Combined Impact of Birth Rates and Growth Resulting in the Number to Transfer to/from Each School (- means transfer into)

	Neidig	Pfaff	Quakertown	Richland	Tohickon Valley	Trumbauerville
2014-15	11	-40	-1	-19	-3	9
2015-16	-9	-28	-3	48	-13	5
2016-17	-3	-30	-5	104	-5	1
2017-18	-17	-47	-21	134	-7	-17
2018-19	-15	-52	-25	183	1	-22

Note: Richland ES numbers are high according to municipal officials.

## CONCLUSIONS:

- 1) Neidig ES and Quakertown ES gain space, approximately 1 classroom, in the future due to decreasing birth rates
- 2) Richland ES need 30 to 50 students transferred out every year due to residential growth and birth rates OR it needs a major addition
- 3) Pfaff ES can accommodate approximately 2 classrooms now due to 2 vacant rooms now
- 4) Trumbauerville ES can accommodate approximately 1 classroom, but not until Years 3 and 4

# Conclusions from Combined Impacts on School Specific Enrollment Projections

- As enrollments decrease, balancing class sizes can increase the number of classrooms available and reduce the number of teachers required. But, this will take annual updating of information as well as adjustments of boundaries to balance class size.

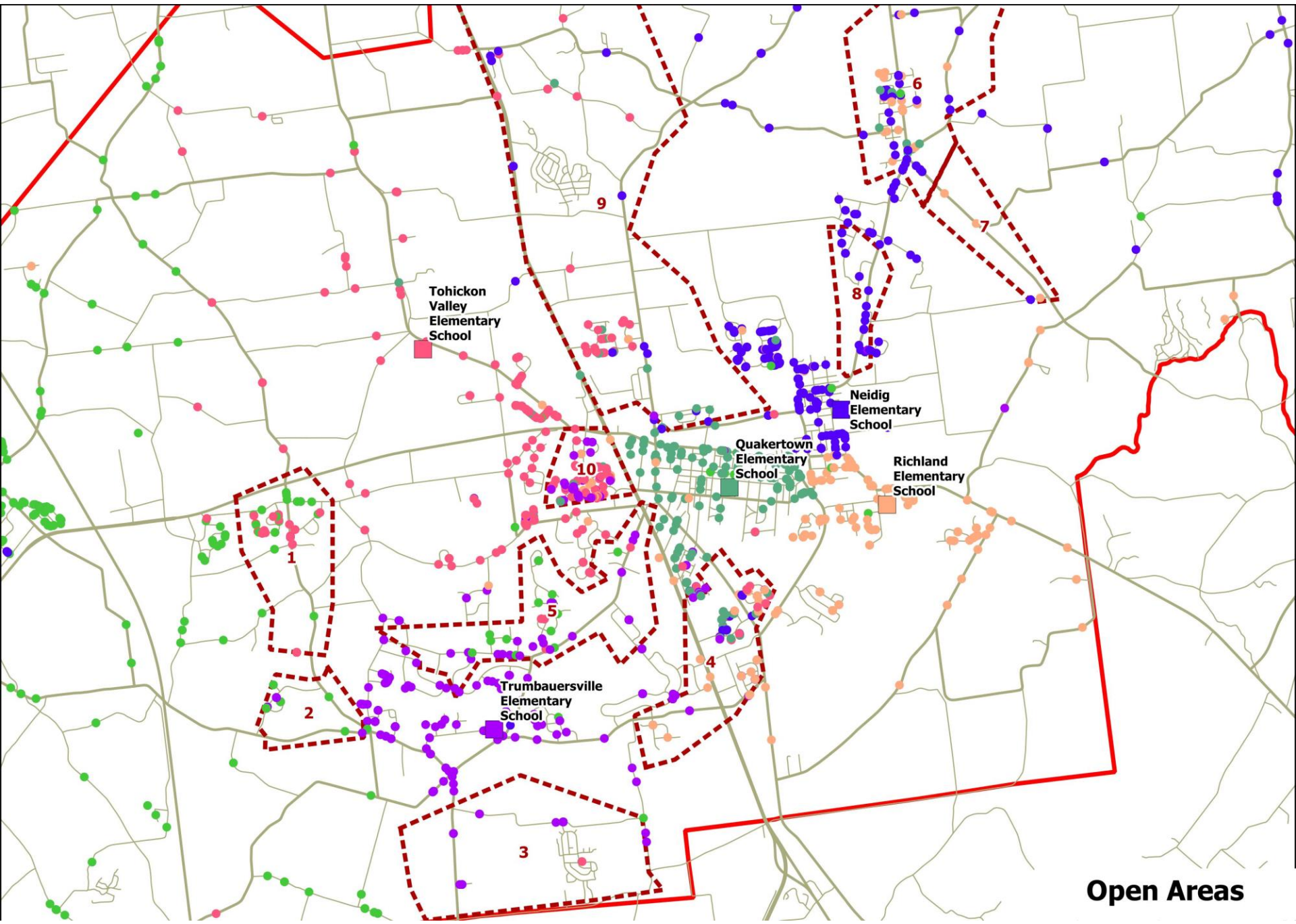
# Options Studied

- Option 1: Divide Open Areas into Neighborhoods and Redistrict to Nearby School
- Option 2: Send Students to Closest School
- Option 3: Assign Entire Open Areas into Nearby School
- Option 4: Assign Each Neighborhood Using Objectives Pertinent to that Neighborhood

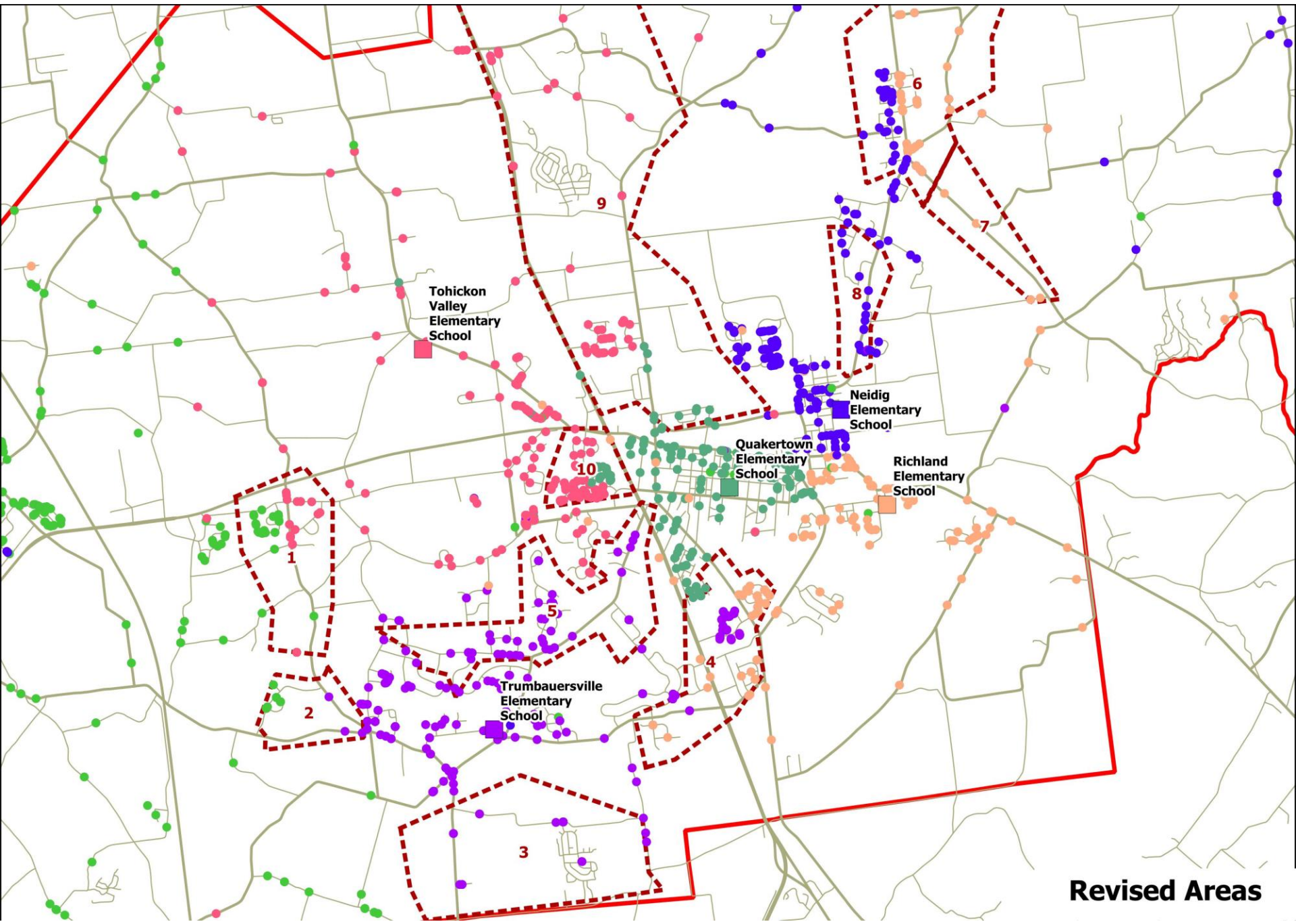
# Option 1: Divide Open Areas

- Two maps follow:
  - Existing situation showing Open Areas with different colored dots for each school
  - Proposed Sample Solution showing open areas divided to two schools
- Evaluation:
  - Good balance of class sizes
  - Western shift accomplished
  - But, some students outside of Open Areas should be considered for redistricting also to clean up attendance areas allowing for more efficient transportation.





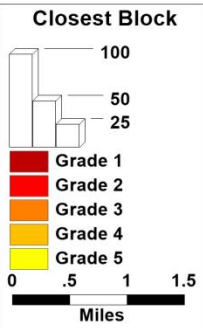
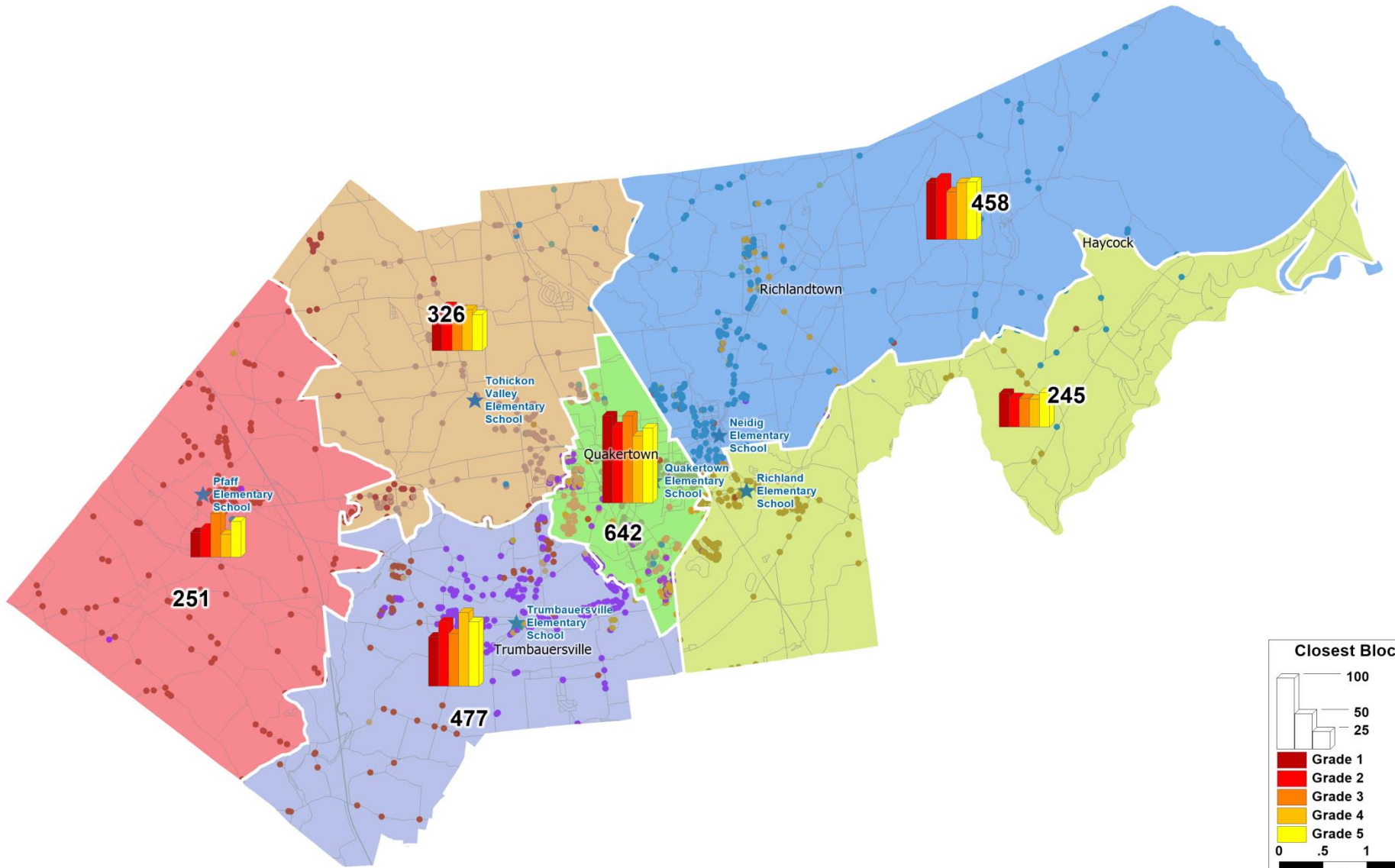
**Open Areas**



**Revised Areas**

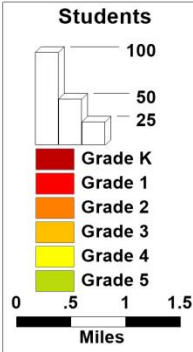
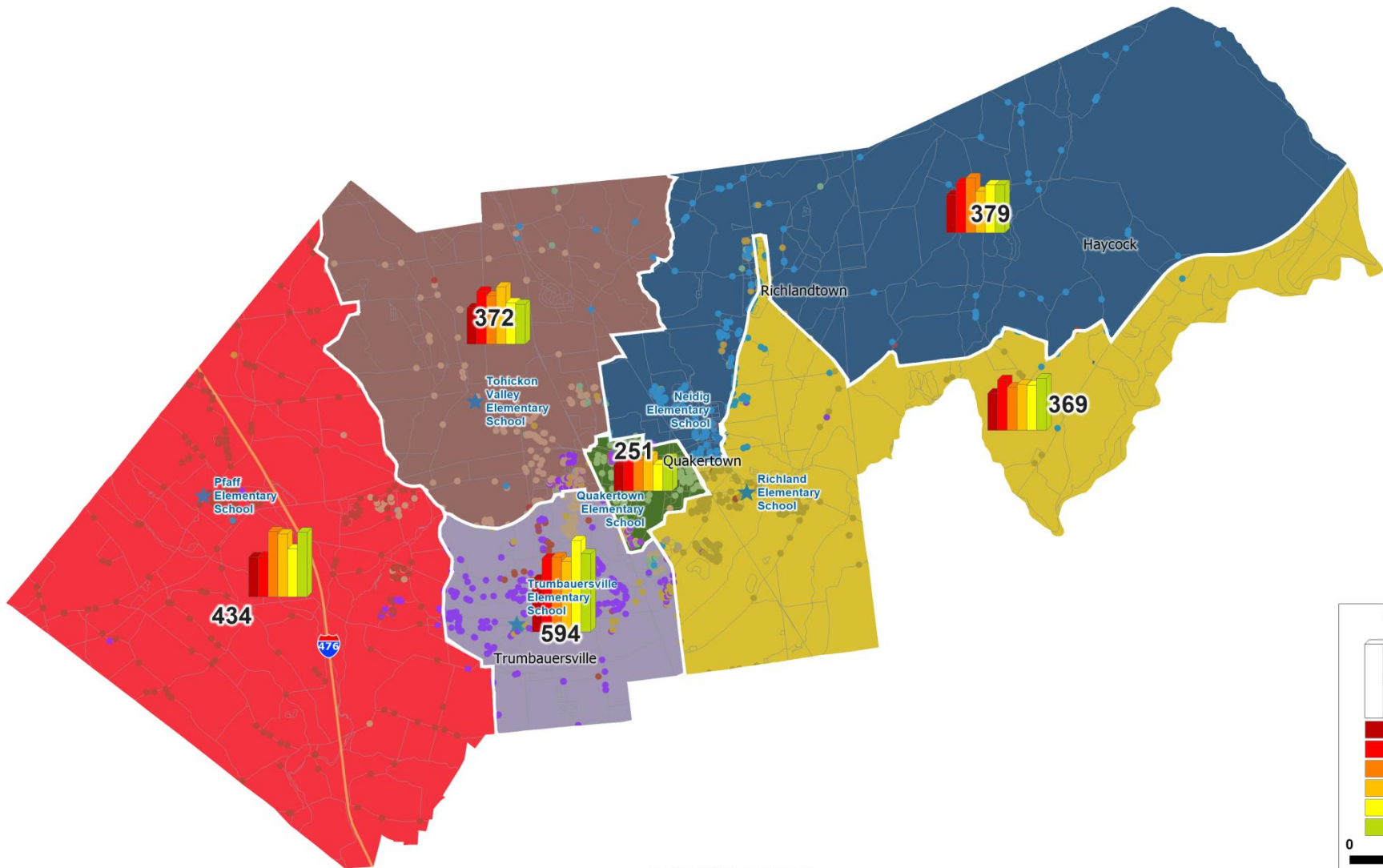
# Option 2: Assign Students to the Closest School

- Method
  - Draw equidistant boundaries and then count number of students assigned to each school
  - Analyze enrollment vs. school capacity
- Lessons learned
  - School over capacity
    - Neidig, Quakertown
  - Schools under capacity
    - Pfaff, Tohickon Valley
  - Schools with little change
    - Richland, Trumbauersville
  - Does not anticipate future growth



# Option 3: Assign Entire Open Areas into Nearby School

- Method: Open Areas were identified and assigned entirely to nearby schools
- This solution does not work for the following reasons:
  - Schools exceed capacity
    - Trumbauersville ES would have 594 students
  - Class sizes are not balanced
    - Pfaff has a difference of 33 students between the current 1<sup>st</sup> and 2<sup>nd</sup> grade (class sizes would be 18 in 1<sup>st</sup> grade and 30 in 2<sup>nd</sup> grade)
  - Richland ES would decrease enrollments by 50 students
  - Quakertown ES would decrease enrollment by 42 students
  - Richlandtown Open Area students would still go to school farther from home



# Lessons from Three Options Refine Methods for Developing Future Options

- Remove special education students from the redistricting decisions
- Develop school specific enrollment projections to set a target for the number to move in/out of each school based on:
  - Birth rates in the attendance area
  - Residential growth
- Identify and quantify objectives that cannot be met by establishing fixed boundary lines
- Do not consider current 5<sup>th</sup> graders since they will not be in elementary schools after redistricting
- Eliminate options that have critical failure
  - Exceed school capacity
  - Address Open Areas but not scattered students
  - Significant imbalance in class size
- Develop some adjustment method to balance class sizes each year

# Option 4: Multiple Objectives

- Methodology
  - Set a target number to move to/from each school based on proposed residential development and birth rates
  - Assign using census blocks (by definition neighborhoods)
  - Upon each redistricting change, always checking school capacity
  - Apply one or more objectives pertinent to each neighborhood



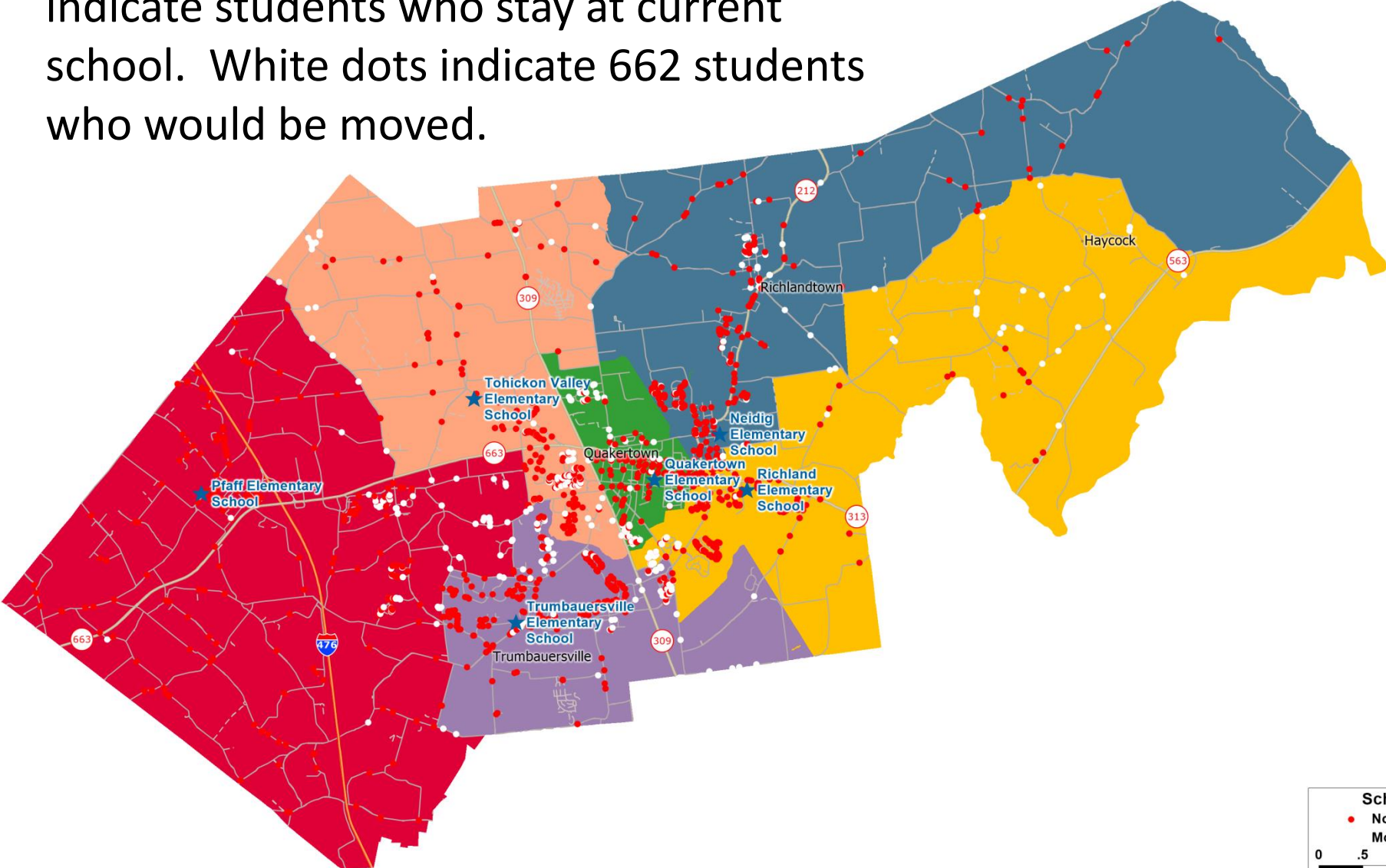
# Option 4: Multiple Objectives Applied to Neighborhoods

- Assign to the closest school by driving distance
- Minimize students redistricted
  - Keep students in the school they are already attending
  - Assign neighborhood to the school attended by the majority of students in the neighborhood
- Longevity of solution
  - Future residential development potential
  - Demographic shifts within attendance area
- Balance the number of students at each grade level at a school (may be impossible without an adjustment method)
- Transportation cost-consider side of major road

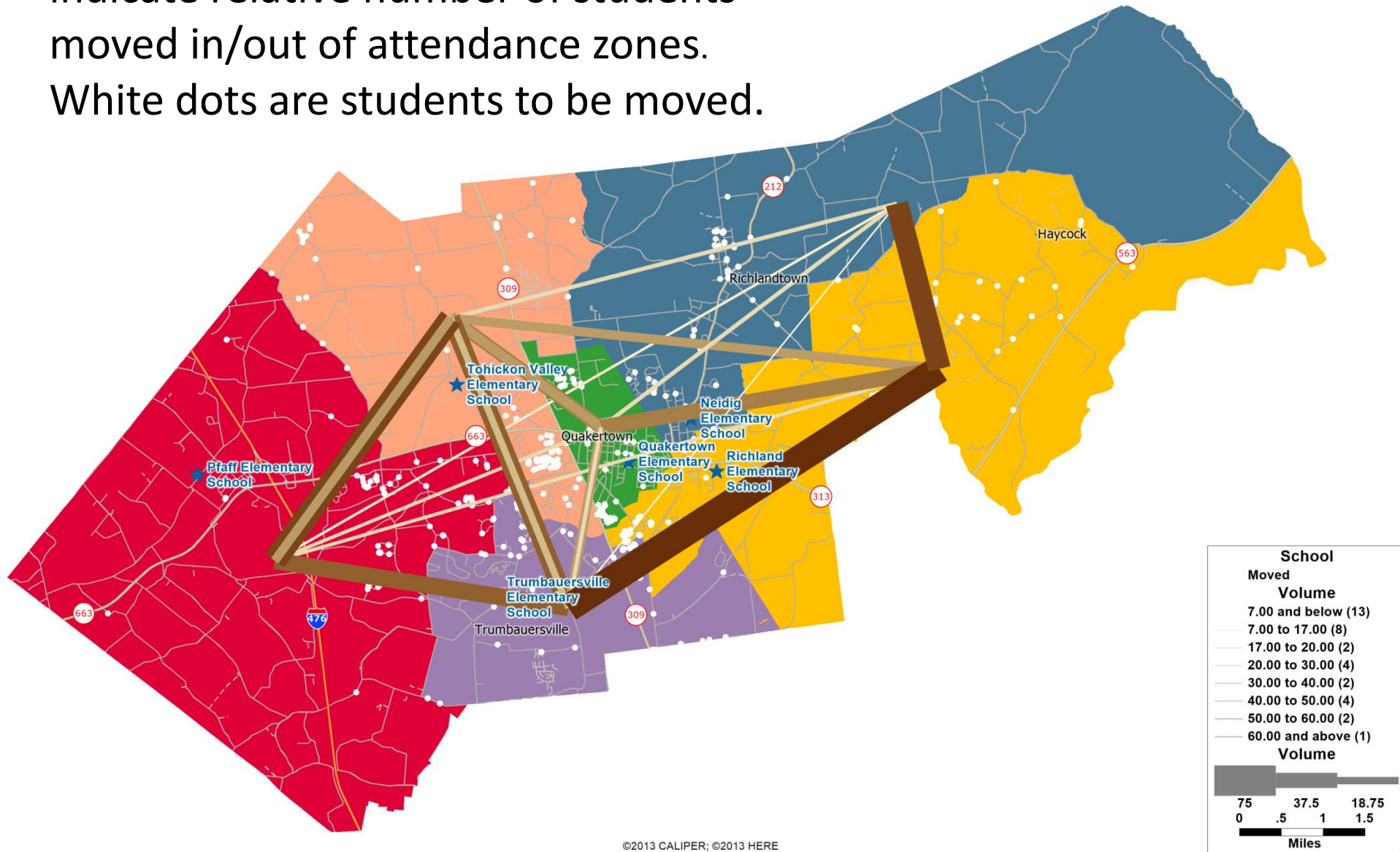
# Option 4: Evaluation

- Evaluation
  - 662 students moved
  - Class sizes are reasonably consistent at most schools except Pfaff

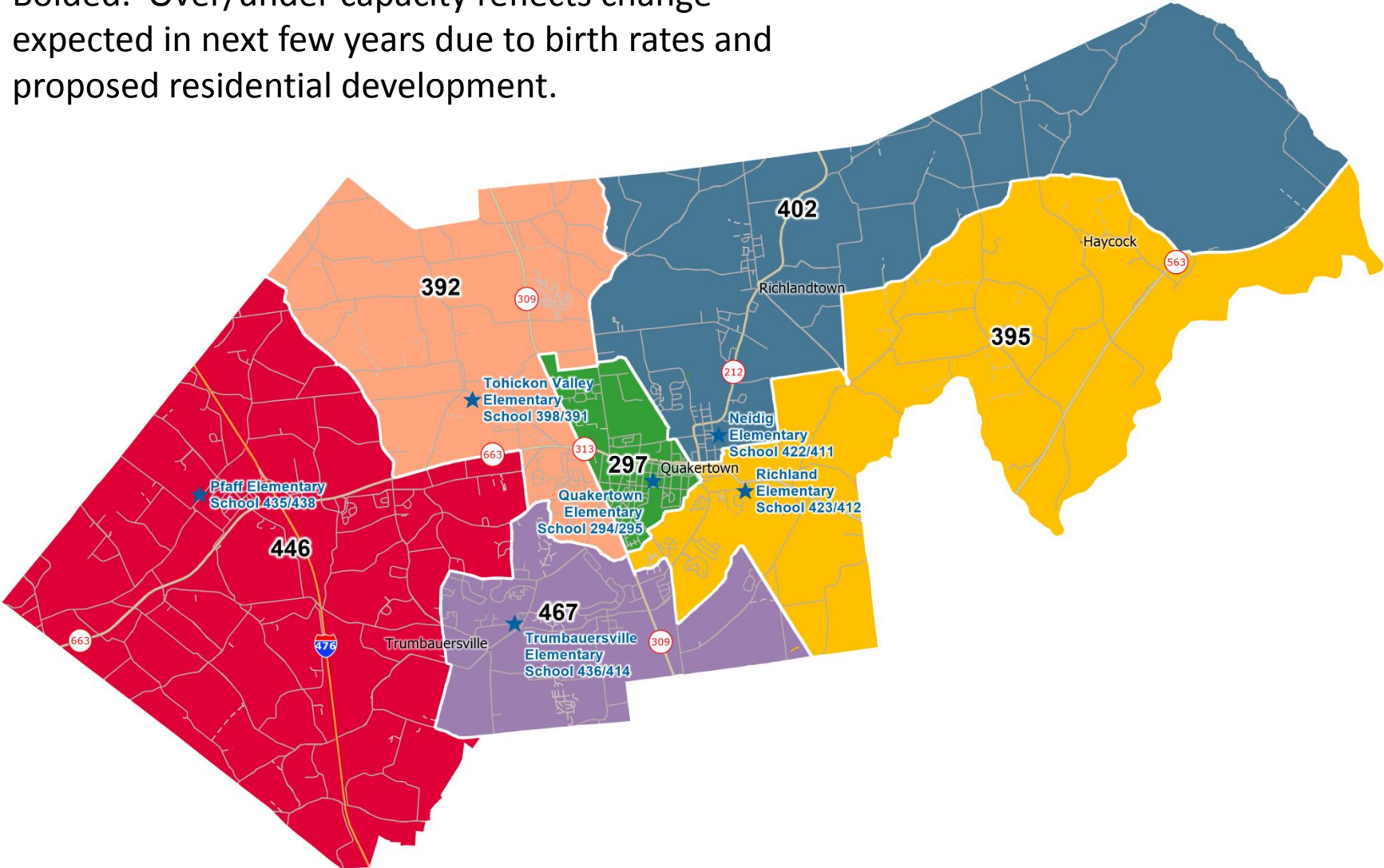
Multiple Objectives Option: Red dots indicate students who stay at current school. White dots indicate 662 students who would be moved.



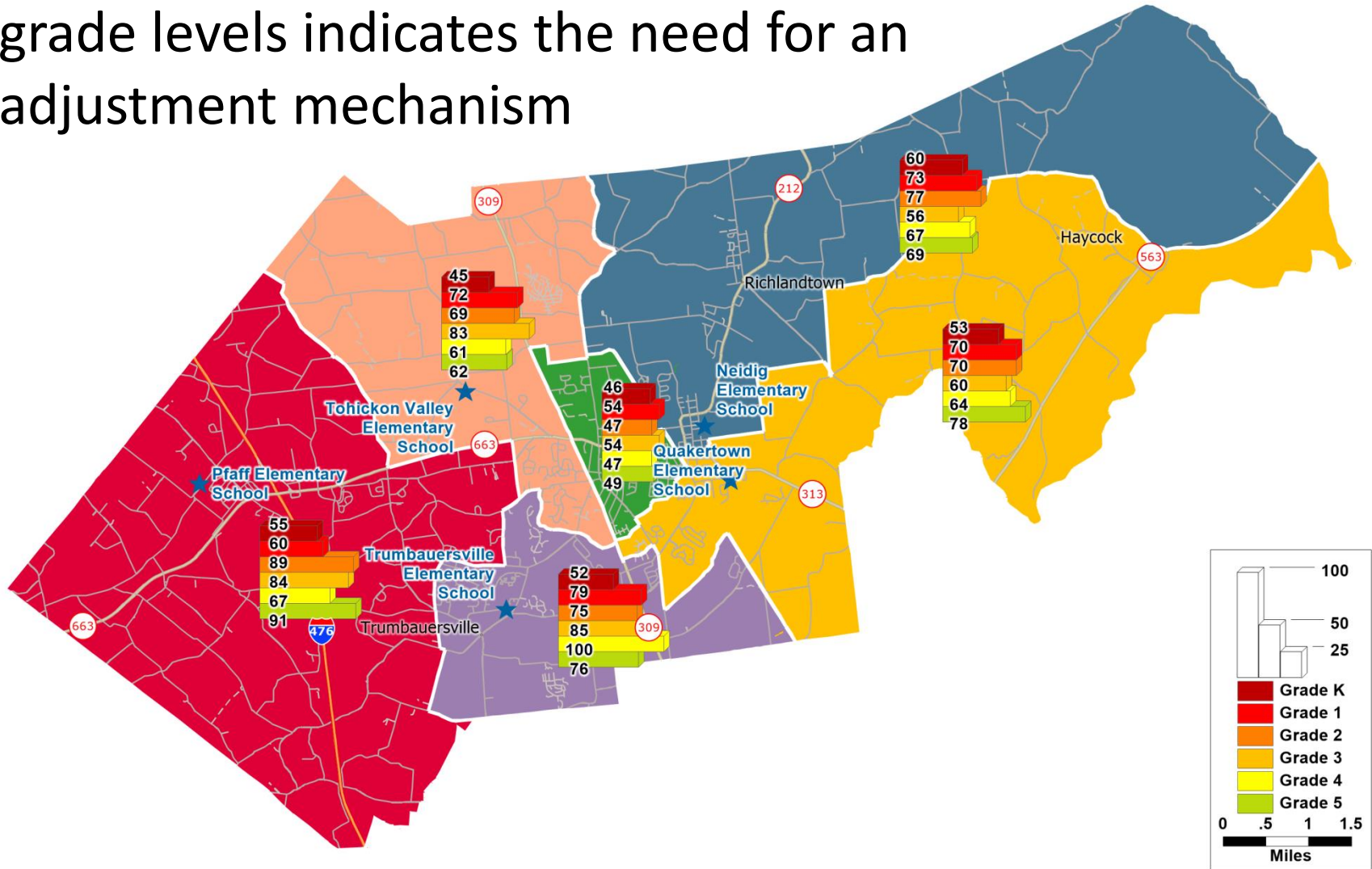
Multiple Objectives Option: Lines indicate relative number of students moved in/out of attendance zones. White dots are students to be moved.



Multiple Objectives-Current Enrollment/QCSD  
Capacity with Redistricted Enrollment in Center  
Bolted. Over/under capacity reflects change  
expected in next few years due to birth rates and  
proposed residential development.



Multiple Objectives-Significant variation in size of classes progressing through grade levels indicates the need for an adjustment mechanism



# Option 4: Enrollment vs. Capacity

## Regular Education at Oct. 2014 Class Sizes

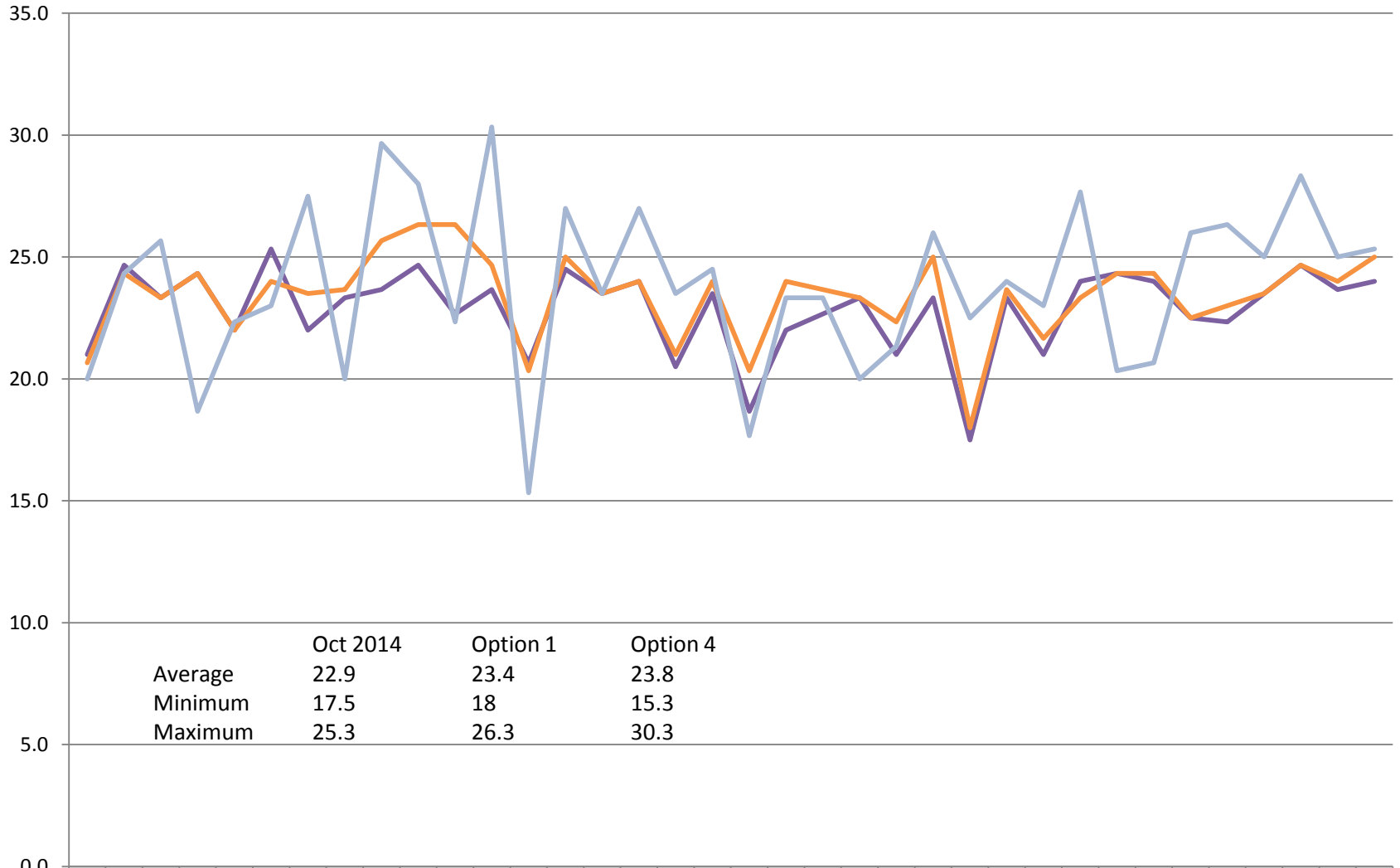
	Enrollment October 2014 Regular Education Only	QCSD Capacity at October 2014 Class Sizes	Option 4 Proposal, with sp. ed.	Special Education
<b>Elementary</b>				
Neidig	422	411	409	0
Pfaff	398	438	448	37
Quakertown	294	295	312	0
Richland	393	412	421	30
Tohickon Valley	385	391	394	13
Trumbauerville	<u>423</u>	<u>414</u>	<u>415</u>	<u>13</u>
Total	2315	2361	2399	93

# Demonstration of Method that Applies Pertinent Objective to Each Neighborhood

- Set capacities as targets, understand how target may differ in early vs. later years
- Select contiguous census blocks to move
- Monitor that building capacity is not exceeded with each possible redistricting
- Be aware of future enrollments in the proposed attendance area
  - Under 5 years



# Options 1 and 4 Compared to October 2014 Class Sizes



	Oct 2014	Option 1	Option 4
Average	22.9	23.4	23.8
Minimum	17.5	18	15.3
Maximum	25.3	26.3	30.3

	NES K	NES 1	NES 2	NES 3	NES 4	NES 5	PES K	PES 1	PES 2	PES 3	PES 4	PES 5	QES K	QES 1	QES 2	QES 3	QES 4	QES 5	RES K	RES 1	RES 2	RES 3	RES 4	RES 5	TVE SK	TVE S1	TVE S2	TVE S3	TVE S4	TVE S5	TES K	TES 1	TES 2	TES 3	TES 4	TES 5
Oct-14	21.0	24.7	23.3	24.3	22.0	25.3	22.0	23.3	23.7	24.7	22.7	23.7	20.7	24.5	23.5	24.0	20.5	23.5	18.7	22.0	22.7	23.3	21.0	23.3	17.5	23.3	21.0	24.0	24.3	24.0	22.5	22.3	23.5	24.7	23.7	24.0
Option 1	20.7	24.3	23.3	24.3	22.0	24.0	23.5	23.7	25.7	26.3	26.3	24.7	20.3	25.0	23.5	24.0	21.0	24.0	20.3	24.0	23.7	23.3	22.3	25.0	18.0	23.7	21.7	23.3	24.3	24.3	22.5	23.0	23.5	24.7	24.0	25.0
Option 4	20.0	24.3	25.7	18.7	22.3	23.0	27.5	20.0	29.7	28.0	22.3	30.3	15.3	27.0	23.5	27.0	23.5	24.5	17.7	23.3	23.3	20.0	21.3	26.0	22.5	24.0	23.0	27.7	20.3	20.7	26.0	26.3	25.0	28.3	25.0	25.3

# Evaluation of Options

- The following slide is a draft to be used in evaluating how well each option meets the prioritized objects.
- The Notes column on the right indicates additional information needed or other considerations.

Prioritized Objectives	Rank	Option 1-Divide Open Areas	Option 2-Closest to School	Option 3-Open Areas Together, Move West	Option 4-Multiple Objectives	Notes:
Meets School Capacity						
Neighborhoods to same school	1	For most Open Areas, except Open Area 1 and urbanized areas.			Yes, Sent to school where most attended. One exception in Richland.	
Balance class sizes	2	Very good with increase of 2 students per grade level at one grade level in Pfaff ES.			Generally good, except Pfaff has 89 followed by 60, Trumbauersville at 100 followed by 76, etc.	
Siblings together	3	Yes				
Minimize moves of students already moved in prior years	4	Need history in order to consider				
Redistricting longevity	5	Objective of moving students to the west to relieve eastern schools expected to grow.		Objective of moving students to the west to relieve eastern schools expected to grow.	Evaluated per U.S. Census data	Fixed boundaries make redistricting vulnerable to residential growth.
Voluntary moves	6					
Feeder patterns	7	Objective is 1/3 to Milford MS and 2/3 to Strayer MS. For optimal team size, each grade level should be 130 to 140 at Milford MS and 260 to 280 at Strayer MS. Upon final recommendation, this can be analyzed to determine if Pfaff ES/Trumbauersville ES or Pfaff/Tohickon Valley ES is better and how many students would be moved.				
Minimize number of students redistricted	8	409	780		662, considered in each neighborhood decision	Can be reduced by transition alternatives.
Assign to closest school	9		Primary objective of this option but school capacities were exceeded badly.		Using driving time as general measure, but not possible given school capacities.	
Maintain diversity	10	Not evaluated yet.				Must decide which factors to consider-U.S. Census data already developed. Free and Reduced lunch data must be confidential.
Minimize transportation cost	11				Yes, based on closest school, road network review, and closest by drive time.	

# Conclusions: Lessons Learned from Developing Options

- Attendance areas have significant differences in the numbers of students at each grade level, which means that an adjustment mechanism is necessary to balance class size-classrooms and teachers needed.
- Birth rates are unpredictable and need to be monitored annually along with updating of enrollment projections and redistricting decisions.
- Residential development may increase enrollments, particularly at some schools, before decreases in birth rates begin to impact enrollments.
- Decisions are needed on whether certain educational spaces should be considered in this planning
- A variety of approaches are available to reduce the impact on families and students.

# Middle Schools

- Concept:
  - Balance class sizes
  - Determine if a direct feeder pattern is possible (2 schools to Milford MS and 4 schools to Strayer MS)
  - Optimize student numbers to facilitate teaming

# Middle School Feeder Patterns

Grade Level	Now-Milford MS	Now-Strayer MS	Ideal-Milford MS (1/3)	Ideal-Strayer MS (2/3)
8 <sup>th</sup>	124	289	130-140	260-280
7 <sup>th</sup>	125	275		
6 <sup>th</sup>	133	264		
5 <sup>th</sup>	Total of 408			

Conclusion: Need to move approximately 10 per grade level to reach ideal class and team size for Middle School program.

# Can Consistent Middle School Feeder Patterns be Created at 130 to 140 per grade level at Milford MS?

Oct. 2014	Pfaff	Trumbauersville	Tohickon Valley	Pfaff/ Trumbauersville	Pfaff/ Tohickon Valley
Grade 2	71	94	63	165	134
Grade 3	74	74	72	146	146
Grade 4	68	71	73	141	141
Grade 5	71	72	72	143	143

## CONCLUSION:

1) If more students are sent to Pfaff because of two vacant classrooms in October 2014, then it will become more difficult to create consistent feeder patterns with Pfaff and Trumbauersville than with Pfaff and Tohickon Valley.

# Possible Transition Plan

- Create new future attendance areas in 2015-16 based on best knowledge of population shifts, varying birth rates by school attendance area, and likely residential growth areas.
- Begin transition to new attendance areas in 2015-16, with approach that balances class sizes.
  - Assign new developments along attendance area boundaries to school with most space.
  - Assign 2015-16 Kindergarten students to new school
  - Option: Assign 2015-16 First Grade students to new school since no past guarantee to attend same school in K and First Grade.
  - Assign new move-in students to new attendance areas.



# Future Meetings

- Next Meeting (Fourth)
  - Middle School
  - Special Education
  - Refine Option 4 regarding class sizes
  - Outline Transition Options in detail
  - Identify any final information needed
- Fifth Meeting
  - Select recommended option
  - Draft recommendation
- Sixth Meeting
  - Finalize recommendation