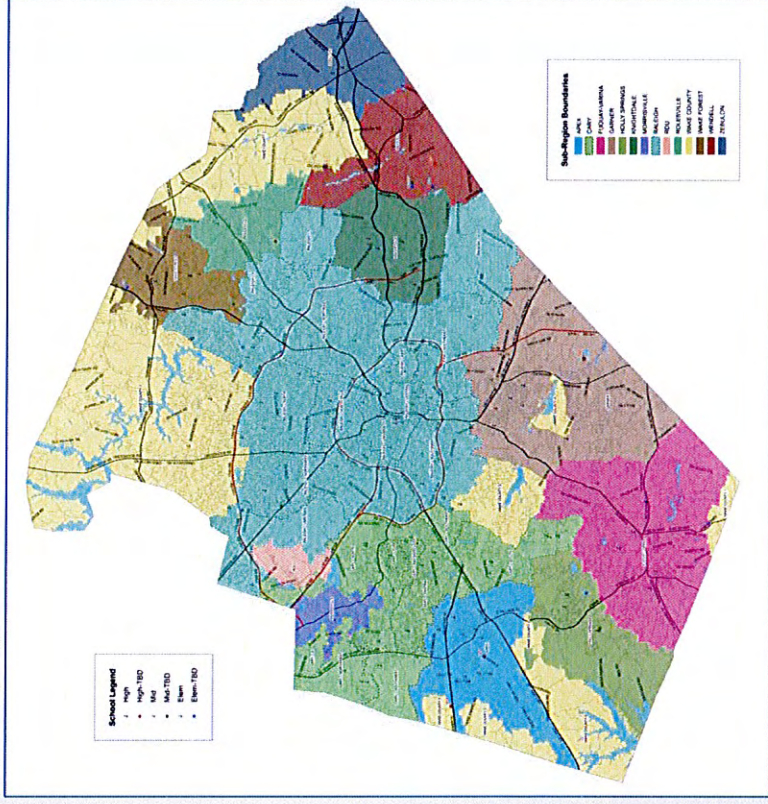


# WCPSS Long-Range School Building Plan 2012-13 Update



WCPSS Facilities Committee  
September 11, 2012

Presented by:  
Operations Research and Education Laboratory,  
ITRE @ NCSU, Centennial Campus

# WCPSS Long-Range School Building Plan 2012-13 Update

- Background
- Methodology
- Some Preliminary Data
- Preliminary Optimal Target  
Areas

## WCPSS Long-Range School Building Plan

The on-going collaboration between the Wake County Public School System, Wake County planning agencies and the Operations Research and Education Laboratory to:

- **Collect and analyze county/municipal Land Use data**
- **Explore long-range growth trends**
- **Optimally determine target areas for new school sites**

Since 2006, membership forecasts driven by Land Use data supplied by the Wake County planning community have helped WCPSS determine where and when new schools should be built.

## History: WCPSS Long-Range School Building Plan

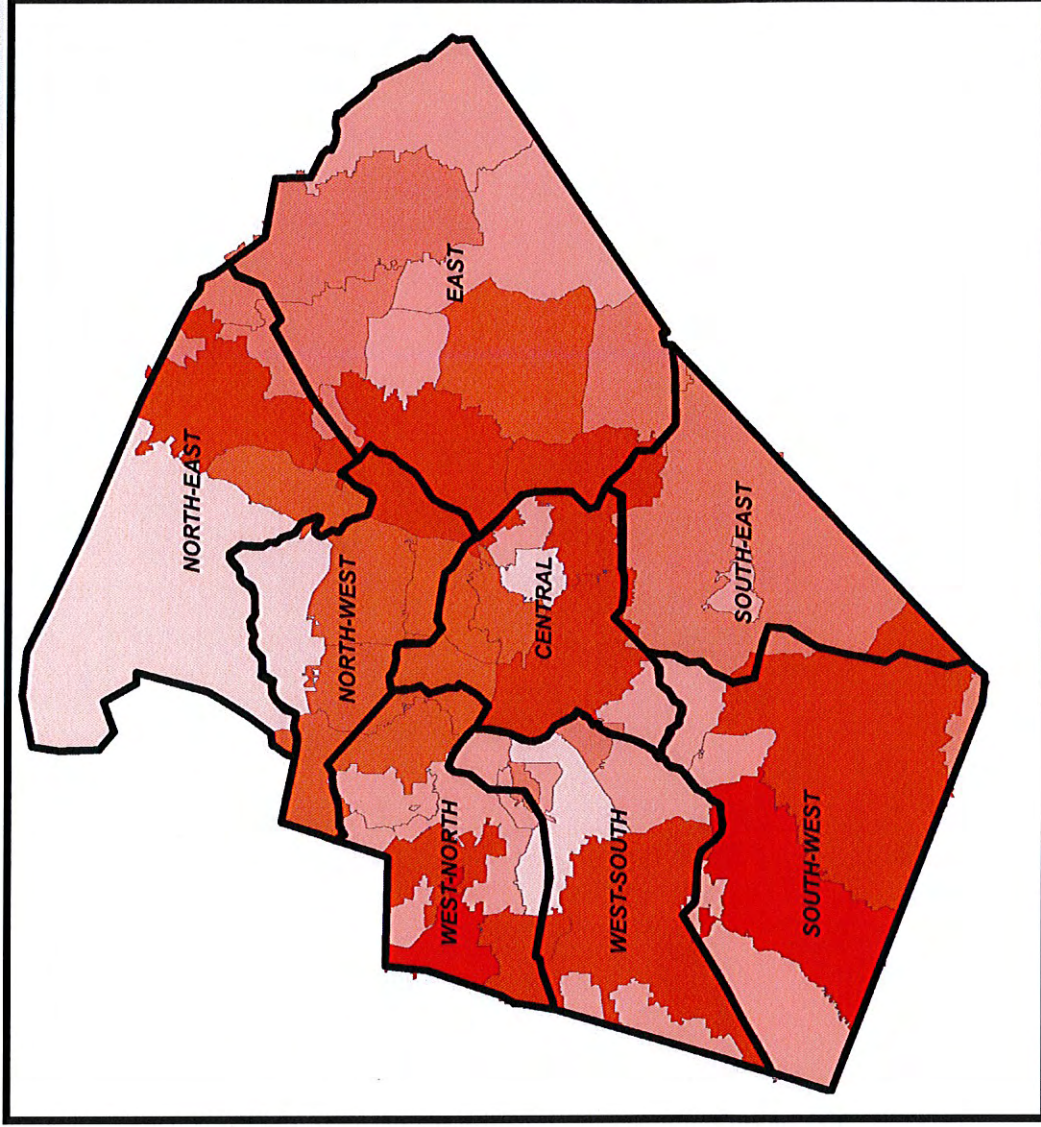
- 2005-06 – Initial Project
  - Fall 2005 – Land Use data collection
  - Spring 2006 – Student Potential Distribution Model (**SPDM**)
  - Summer 2006 – Optimal target areas for future school sites
- 2008-09 Update
  - Data collection and SPDM changes
  - Fall 2008 – Land Use data collection
  - Winter 2008-2009 – SPDM
  - Spring 2009 – Optimal target areas for future school sites
- 2012-13 Update

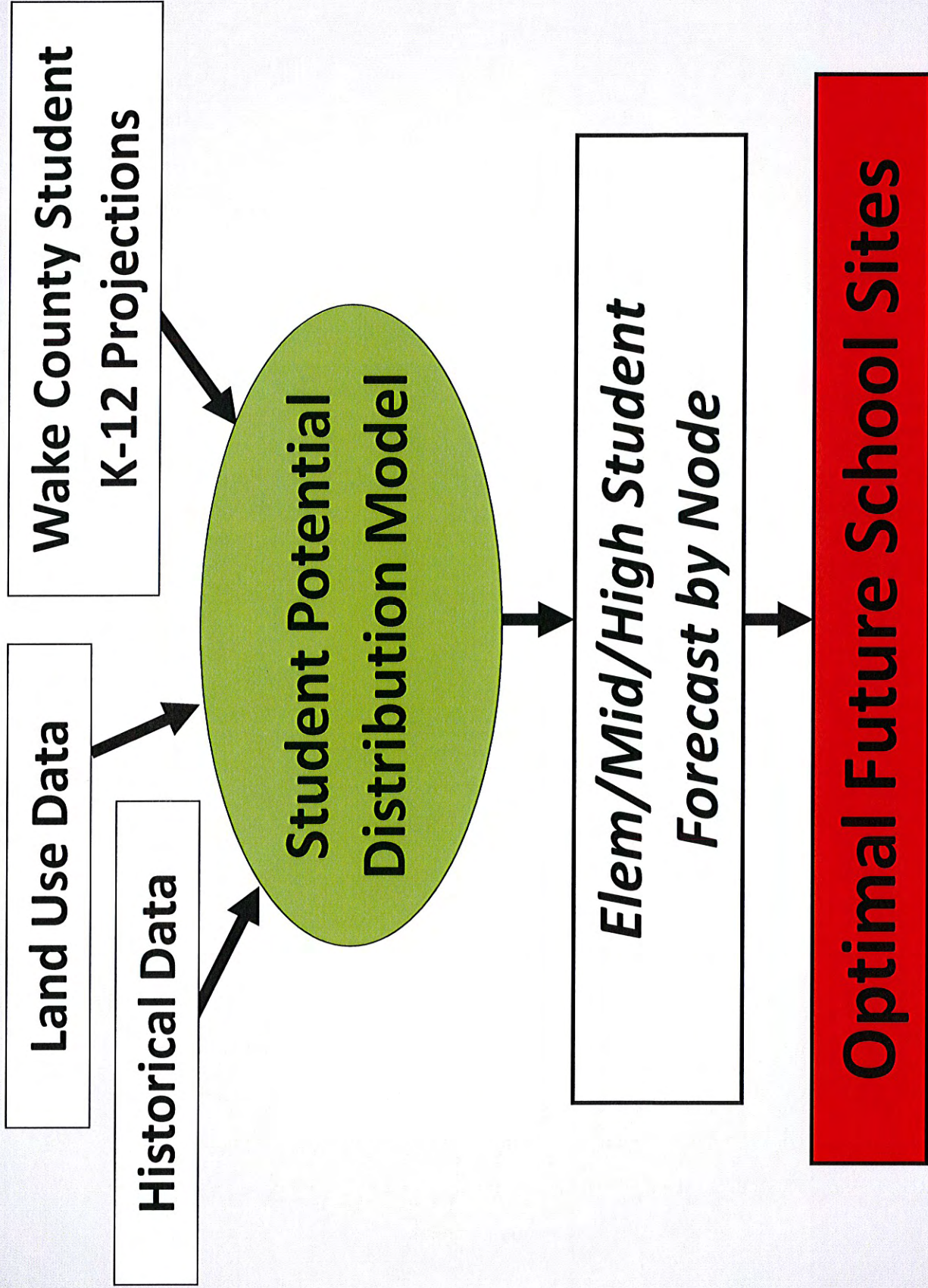
# 2012-13 Update Timeline

- March – June 2012
  - OREd Planning Unit review
  - Calibrate SPDM
- July – August 2012
  - County/Municipal Planning Department Data Entry: Review of targeted Planning Units
- September 2012
  - **Preliminary Optimal Target Areas**
- October 2012 – January 2013
  - Load 2012-13 WCPSS data
  - Calibrate SPDM
  - Load 2012 K-12 Forecast
  - Generate Optimal Target Areas for new schools

# K-12 Growth: 2008 - 2011

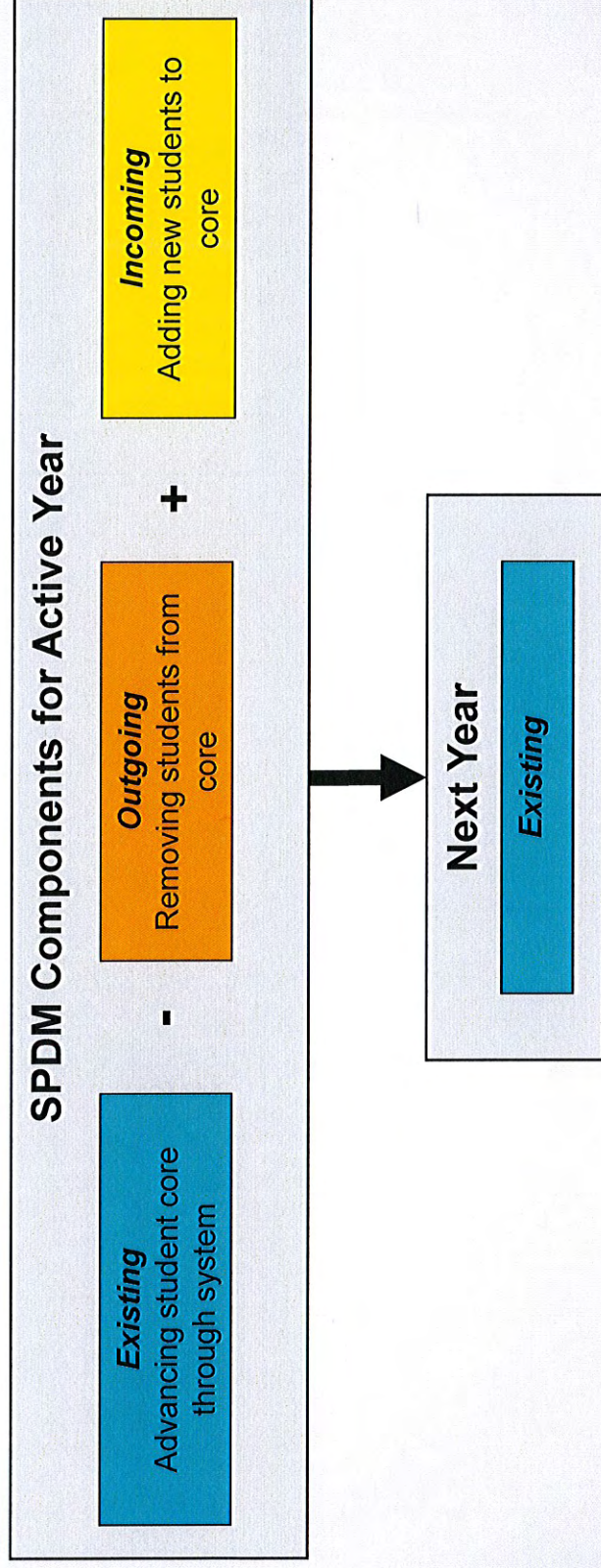
Central	658
East	1072
North-East	1151
North-West	719
South-East	90
South-West	1834
West-North	2621
West-South	527





# SPDM: Transition Matrices

- Existing – How do students advance through the system?
- Outgoing – How do students leave the system?
- Incoming – How do students enter the system?





# SPDM: Elem/Mid/High

*(calculated by geocode)*

## 2008 SPDM Forecast:

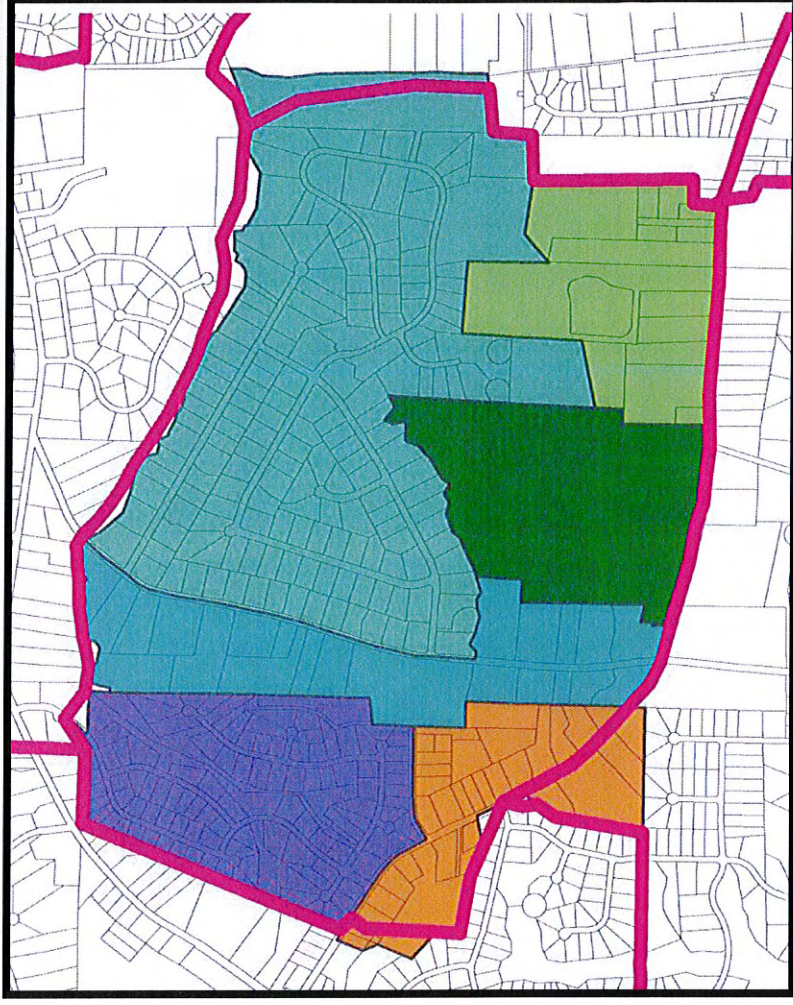
	2008-09	2009-10	2010-11	2011-12
<b>Elem</b>	49.12%	48.62%	48.34%	48.22%
<b>Mid</b>	22.43%	22.83%	23.06%	23.17%
<b>High</b>	28.45%	28.55%	28.60%	28.61%

## Actual:

	2008-09	2009-10	2010-11	2011-12
<b>Elem</b>	49.12%	48.66%	48.35%	48.13%
<b>Mid</b>	22.43%	22.64%	22.79%	22.98%
<b>High</b>	28.45%	28.69%	28.86%	28.89%

# SPDM: Planning Unit Database

- 6405 Planning Units
- Land Use data (2005, 2008, 2012)
  - Residential Profile
  - Residential build-out timeline
- Based on WCPSS node geometry
- **Homogenous Land Use characteristics**
- Student Generation Potential (**SGP**)



# Planning Unit Data Entry

The screenshot shows the ArcMap interface with a map of a residential area. A large, irregularly shaped area in the center is highlighted in teal, representing a planning unit. The map shows street layouts and property boundaries. The software window title is 'WORKING.mxd - ArcMap - ArcInfo'. The menu bar includes File, Edit, View, Bookmarks, Insert, Selection, Geoprocessing, Customize, Windows, and Help. The toolbar contains various mapping tools. At the bottom right, a data table is displayed for the 'PlanUnit\_1213\_20120828' layer.

DEED_ACRES	RES_DEV	RES_AVAIL	U_ACRES	NR_ACRES	RES_UNITS	ORED_PROF	RES_PROF	R_12	BEGIN	END	FINAL_BO	REVIEW	comment_12
71.754121	1.753168	6.281143	0	63.719811	1   VL	L	0.2182	2012	2015	0.6			
167.555748	0	167.555748	0	0	2   RR	L	0	2015	2021	0.968985			RES_DEV, RES_AVAIL, R_12, BEGIN, END

At the bottom of the table, it indicates '14 of 0' and '(1 out of 6405 Selected)'. The status bar at the very bottom shows 'PlanUnit\_1213\_20120828'.

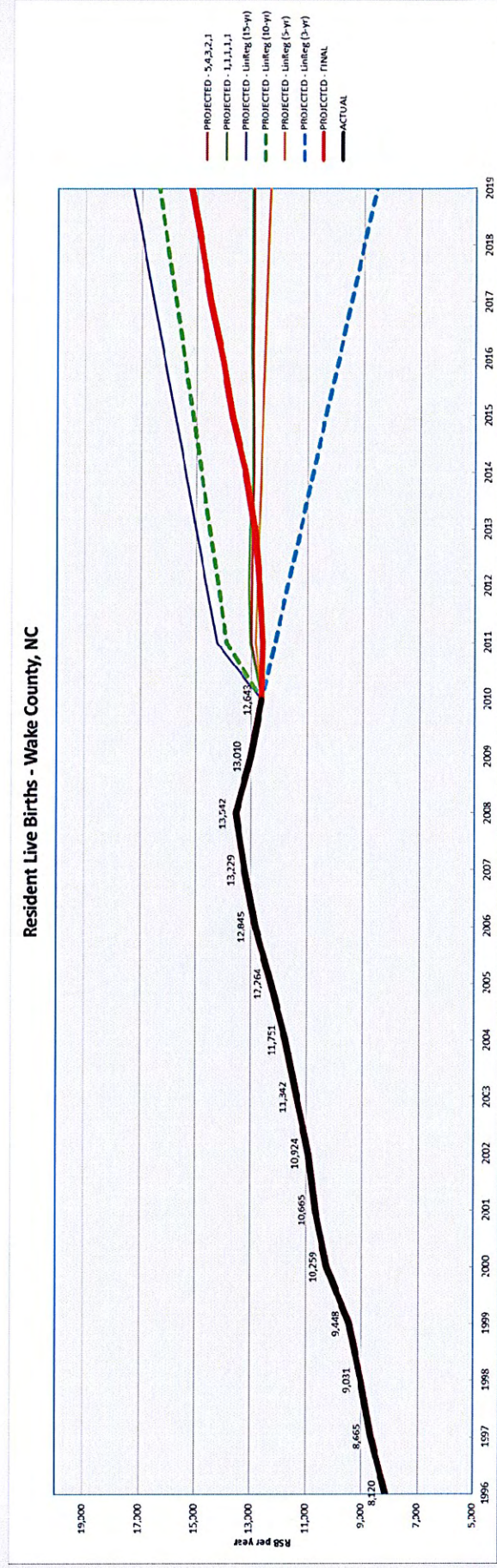
# Student Potential Distribution Model

The county-wide K-12 forecast is distributed by the SPDM according to Planning Unit Land Use data supplied by 13 planning agencies in Wake County.

This allocated forecast drives the optimization process.

# 2012 – 2031 WCPSS K-12 Forecast

## Resident Live Birth Trends

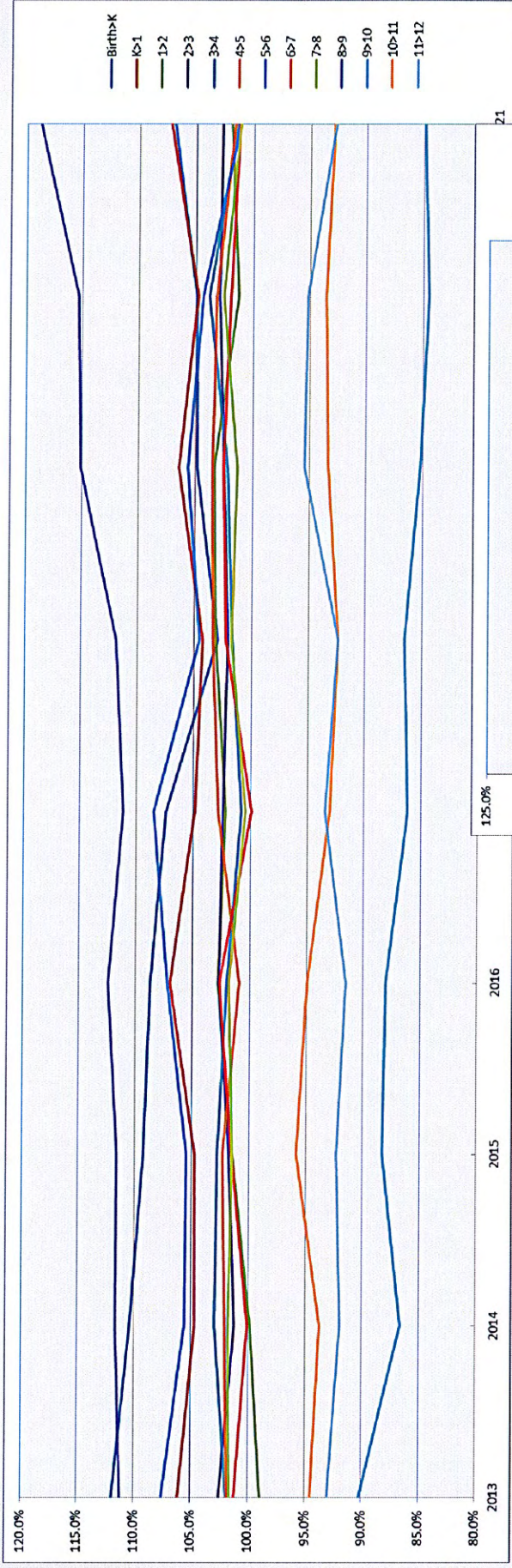


2011 – 2019 RLB projected from a blend of 10-year and 3-year linear trends.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
12643 (est)	12,599	12,713	12,892	13,223	13,706	14,064	14,497	14,831	15,203	
Annual rate	-0.35%	0.90%	1.41%	2.57%	3.65%	2.61%	3.09%	2.30%	2.51%	

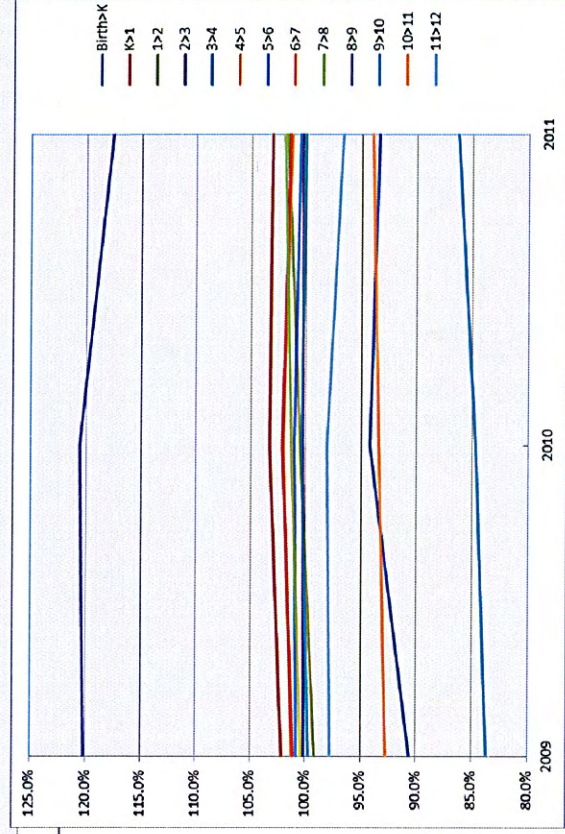
# 2012 – 2031 WCPSS K-12 Forecast

## Cohort Trends



^^^ Economic cohort profile has higher cohort values and decreasing general trend.

Recent cohort ratios show lower values and increasing general trend. >>>



# 2012 – 2031 WCPSS K-12 Forecast

## 2012 – 2021 K-12 “Adjusted Economic Cycle” Forecast (December 2011)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
<b>Total</b>	128,072	134,002	137,706	139,599	143,289	146,687	150,418	154,381	158,404	162,594	167,178	171,446	175,823	181,236	187,020	193,012
<b>Gain</b>	7568	5930	3704	1893	3690	3398	3731	3963	4023	4190	4584	4268	4377	5413	5784	5992
<b>% Gain</b>	6.28%	4.63%	2.76%	1.37%	2.64%	2.37%	2.54%	2.63%	2.61%	2.65%	2.82%	2.55%	2.55%	3.08%	3.19%	3.20%

### Average annual growth rate

2006-07 – 2011-12: 3.34%

2012-13 – 2021-22 (forecast): 2.78%

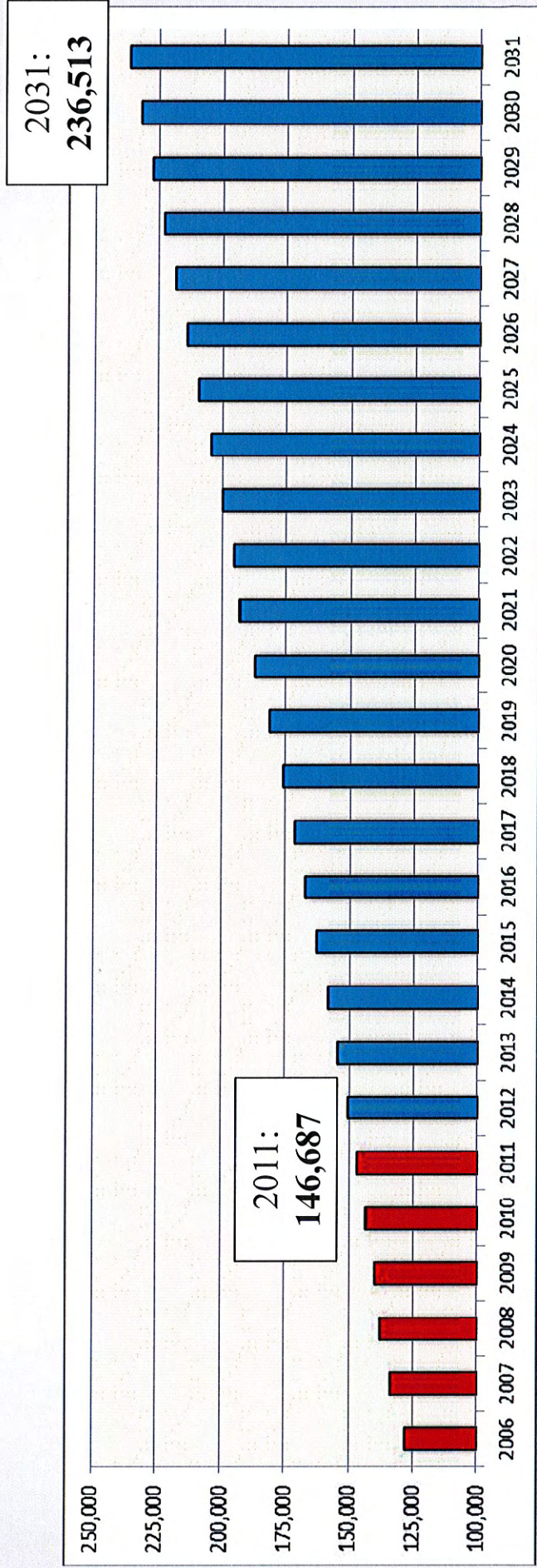
(Average projected annual growth rate for total population, 2010-2020: 2.88%)

### Average annual gain

2006-07 – 2011-12: 4364 K-12 students

2012-13 – 2021-22 (forecast): 4633 K-12 students

# 2012 – 2031 WCPSS K-12 Forecast *(December 2011)*



2012 – 2021 “Economic Cycle” Forecast + 2022 – 2031 Linear Forecast



# SPDM Stats

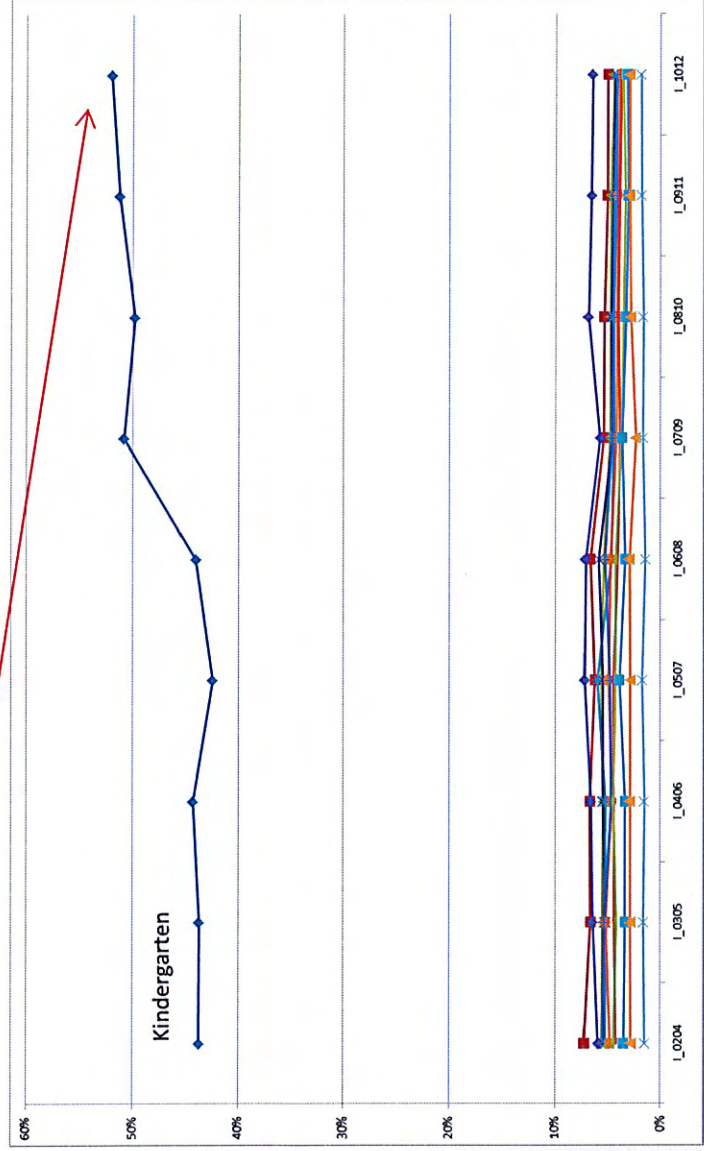
## Student Generational Potential *(2012 Update)*

Municipality	Mean SGP (std./dev. res. ac.)
Apex	0.98
Cary	1.38
Fuquay-Varina	0.62
Garner	0.64
Holly Springs	1.24
Knightdale	0.86
Morrisville	1.95
Raleigh	1.20
Rolesville	0.35
Wake Forest	0.96
Wendell	0.39
Zebulon	0.34
Non-Urban	0.24

# SPDM Stats: Kindergarten (2012 Update)

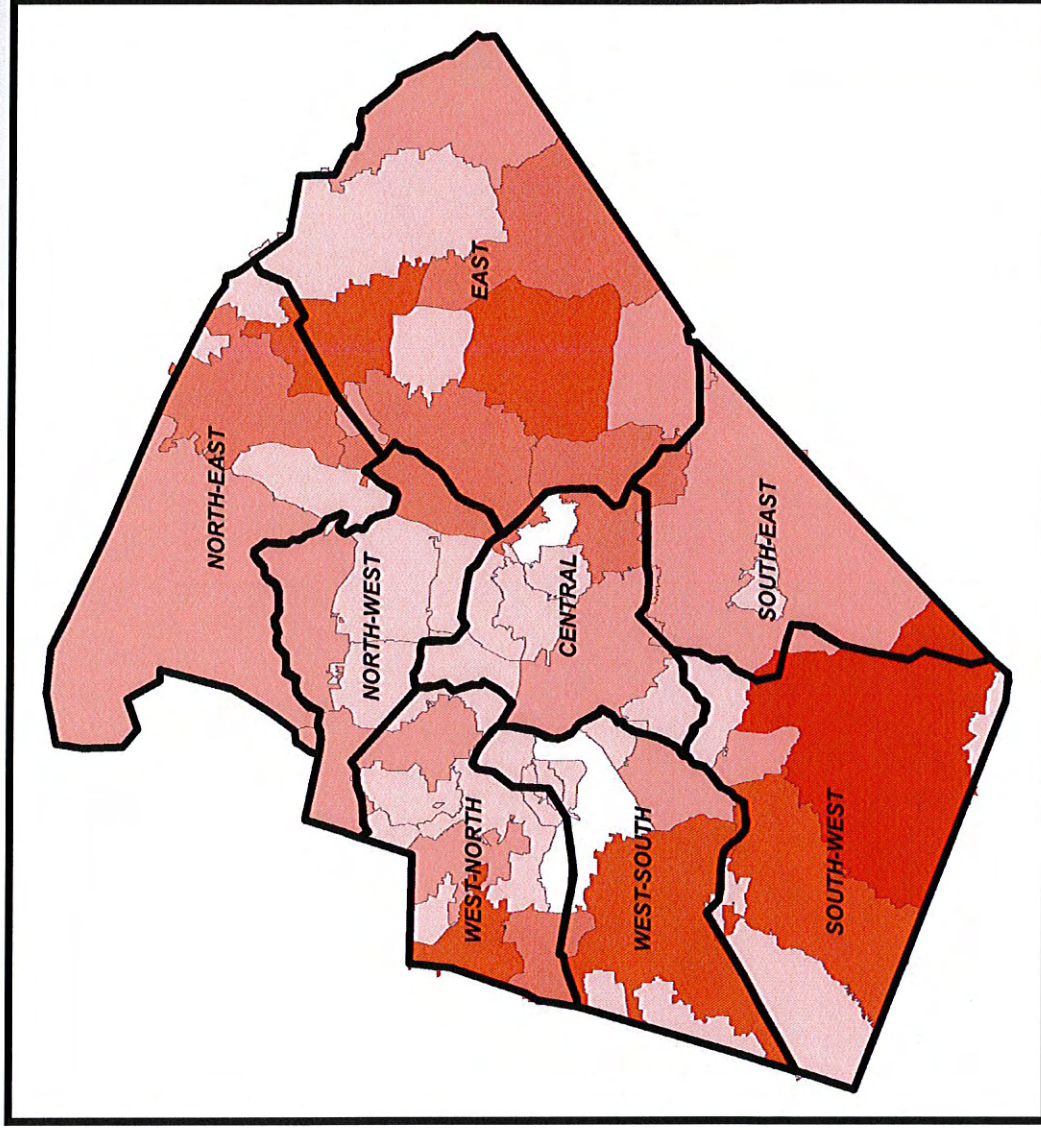
2011-12 Incoming Grade Distribution:

K	1	2	3	4	5	6	7	8	9	10	11	12
0.5203	0.0503	0.0448	0.0431	0.0415	0.0391	0.0421	0.0373	0.0363	0.0653	0.0319	0.0295	0.0187

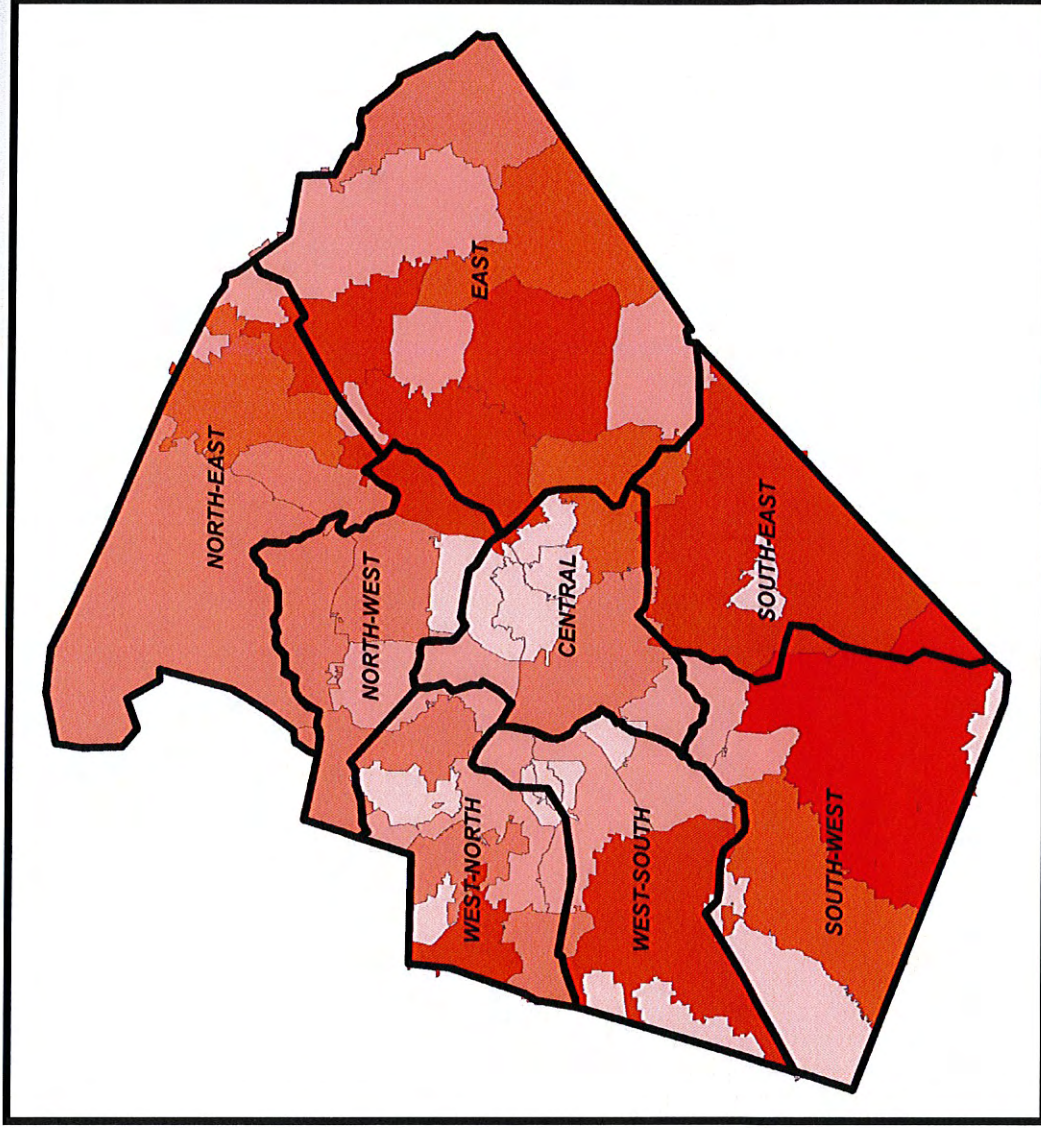


# Forecasted K-12 Growth: 2016

Central	950
East	5200
North-East	2300
North-West	650
South-East	750
South-West	4400
West-North	3300
West-South	2100



# Forecasted K-12 Growth: 2021



Central	2650
East	12,850
North-East	5450
North-West	2300
South-East	3650
South-West	8350
West-North	5250
West-South	5200

# Optimization

The signature feature of OREd analysis is the use of Operations Research optimization techniques to locate future school sites.

- Inputs:
  - Planning Unit Database with SPDM forecast
  - Building capacities for all existing and planned schools
- Output:
  - Optimal locations of future schools that:
    - **Anticipate residential growth**
    - **Satisfy building capacities**
    - **Minimize system transportation distance**

# Preliminary Optimal Target Area Scenarios

- **Elementary**
  - Target year: 2016
  - Forecast membership (Dec 2011 K-12 Forecast, Aug 2012 SPDM): 79,500
  - Projected K-5 capacity: 67,500
  - 16 new elementary schools, at full capacity: 740
- **Middle**
  - Target year: 2016
  - Forecast membership (Dec 2011 K-12 Forecast, Aug 2012 SPDM): 37,700
  - Projected 6-8 capacity: 35,300
  - 3 new middle schools, at full capacity: 1200
- **High**
  - Target year: 2016
  - Forecast membership (Dec 2011 K-12 Forecast, Aug 2012 SPDM): 49,500
  - Projected 9-12 capacity: 43,100
  - 3 new high schools, at full capacity: 2180

# Circle Maps

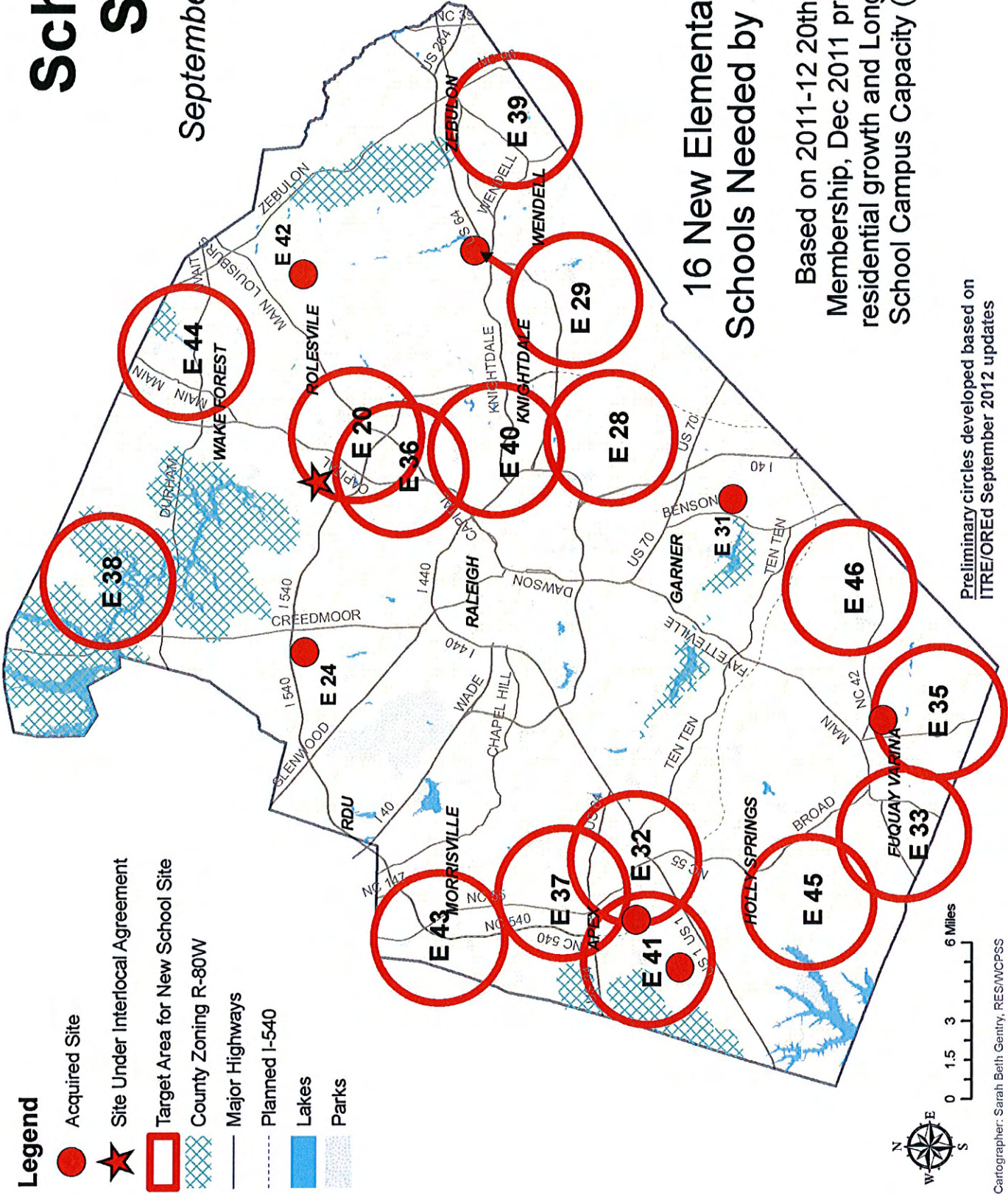
- Parameters:
  - New school needs are based on traditional calendar schools
  - Long Range School Campus Capacity (LRSCC) reflects @95% utilization for elementary and middle schools
  - Long Range School Campus Capacity (LRSCC) reflects @97.5% utilization for high schools
  - Magnet/Choice impact on area crowding to be determined
  - Middle schools reflect an additional 2 schools due to grandfathering
  - High schools reflect an additional 4 schools due to grandfathering

# School Sites

September 2012 Update

## 16 New Elementary Schools Needed by 2016

Based on 2011-12 20th Day Membership, Dec 2011 projected residential growth and Long Range School Campus Capacity (LRSCC)



Preliminary circles developed based on ITR/ORED September 2012 updates

Cartographer: Sarah Beth Gentry, RES/WCPSS



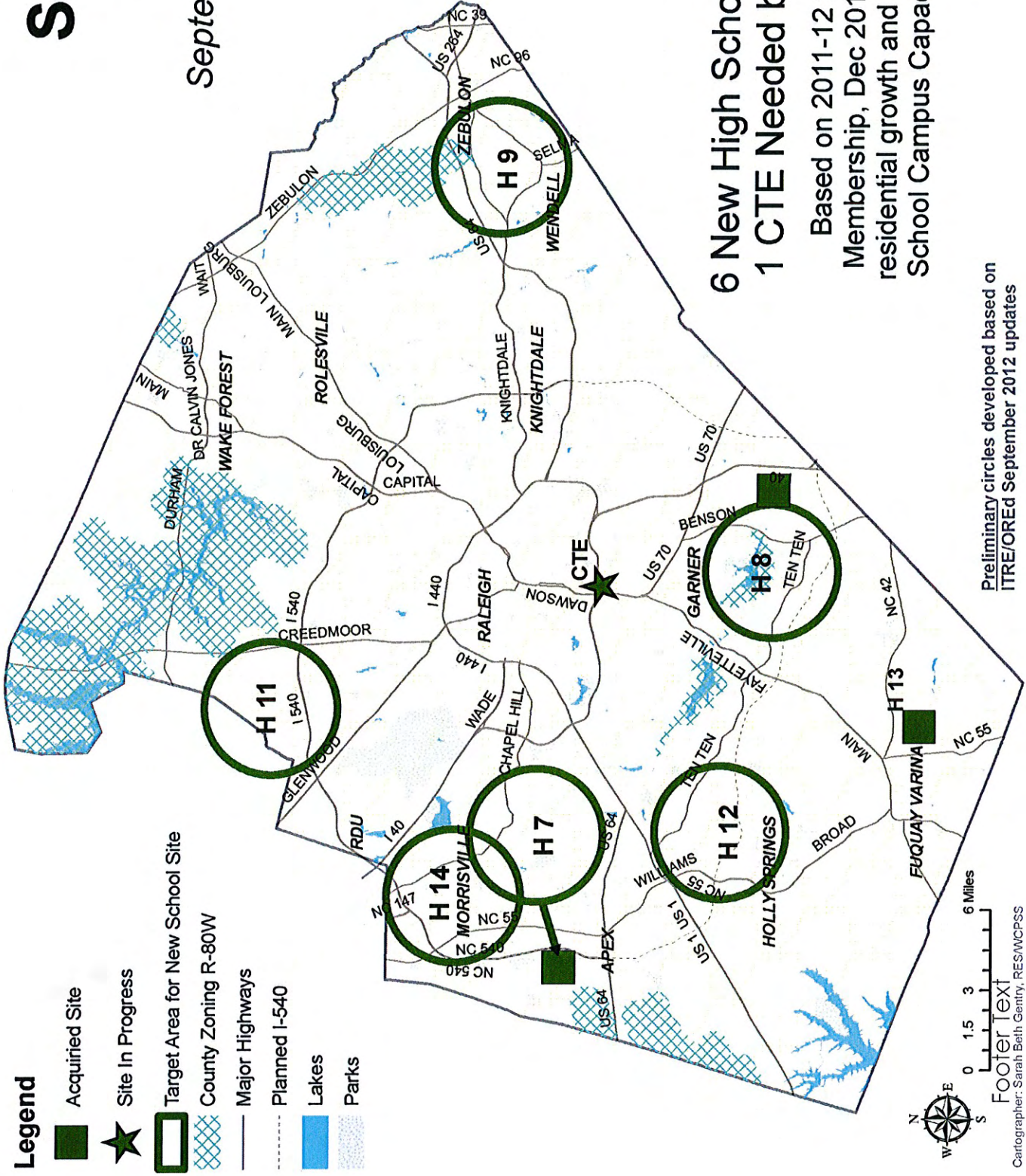


# School Sites

September 2012 Update

6 New High Schools and  
1 CTE Needed by 2016

Based on 2011-12 20th Day Membership, Dec 2011 projected residential growth and Long Range School Campus Capacity (LRSCC)



Preliminary circles developed based on ITRE/ORED September 2012 updates

Cartographer: Sarah Beth Genitty, RES/WCPSS

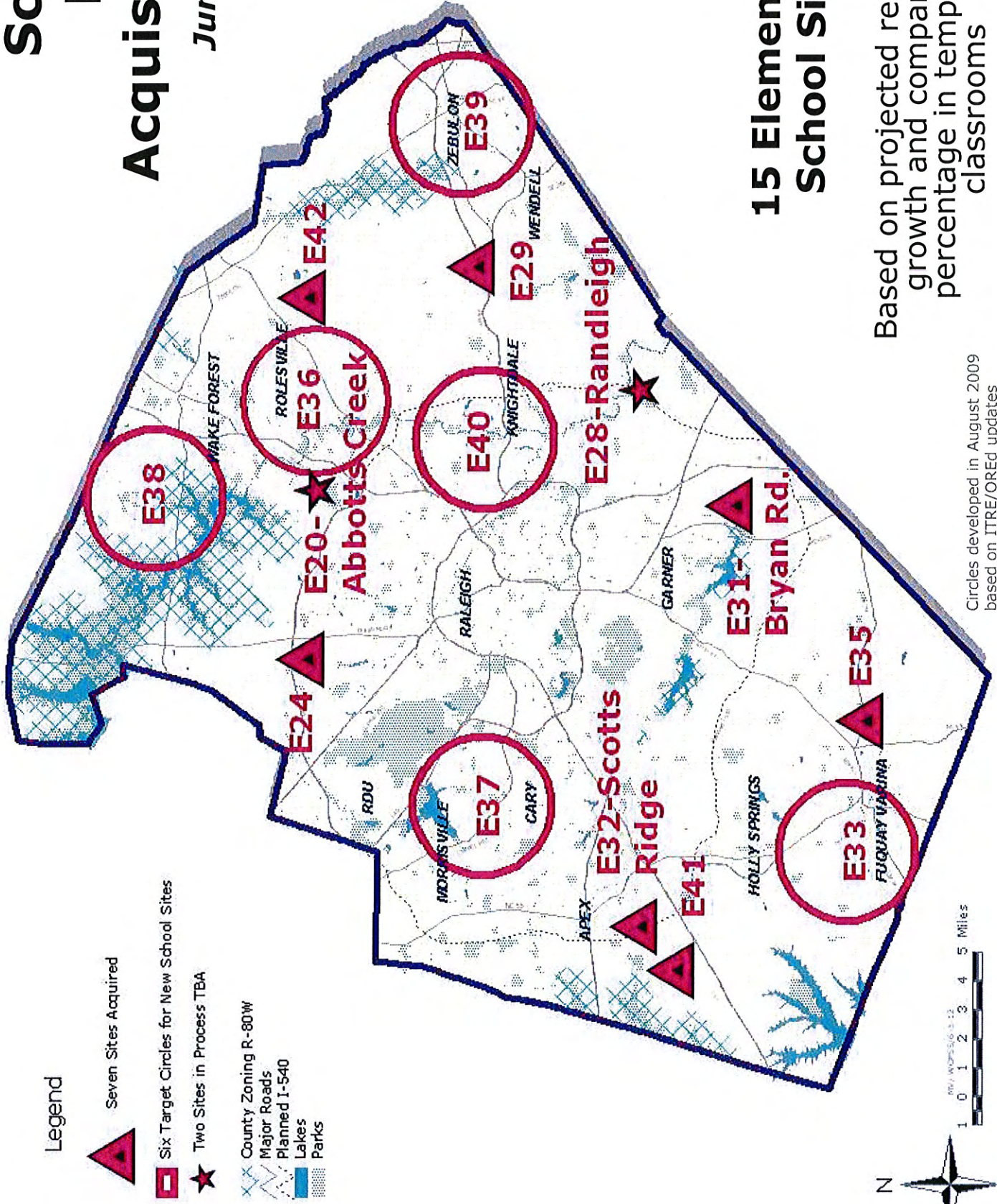


# School Land Acquisition

## June 2012 Update

# 15 Elementary School Sites

Based on projected residential growth and comparable percentage in temporary classrooms



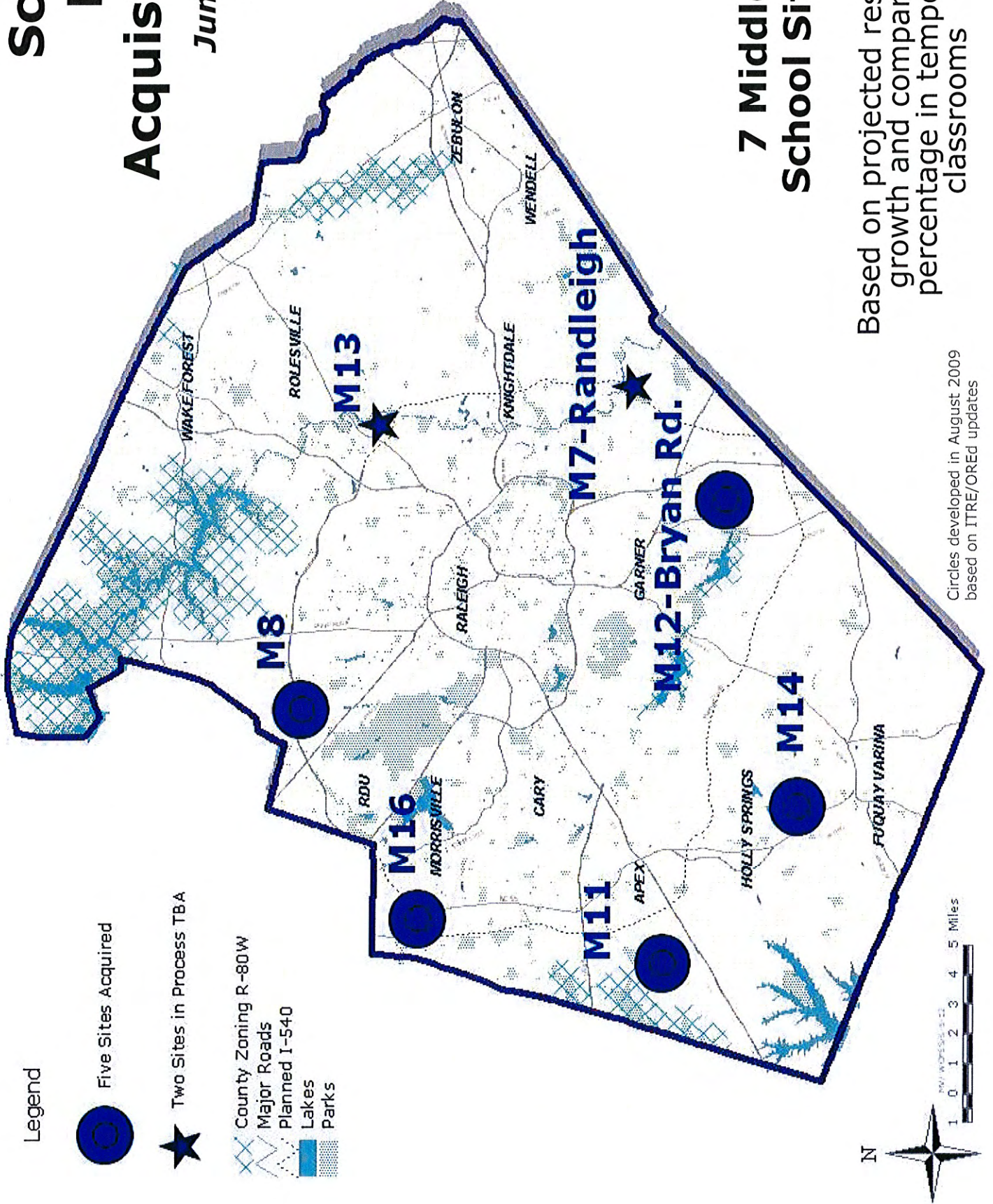
### Legend

- Seven Sites Acquired
- Six Target Circles for New School Sites
- Two Sites in Process TBA
- County Zoning R-80W
- Major Roads
- Planned I-540
- Lakes
- Parks

Circles developed in August 2009 based on ITRE/OREd updates

# School Land Acquisition

June 2012 Update



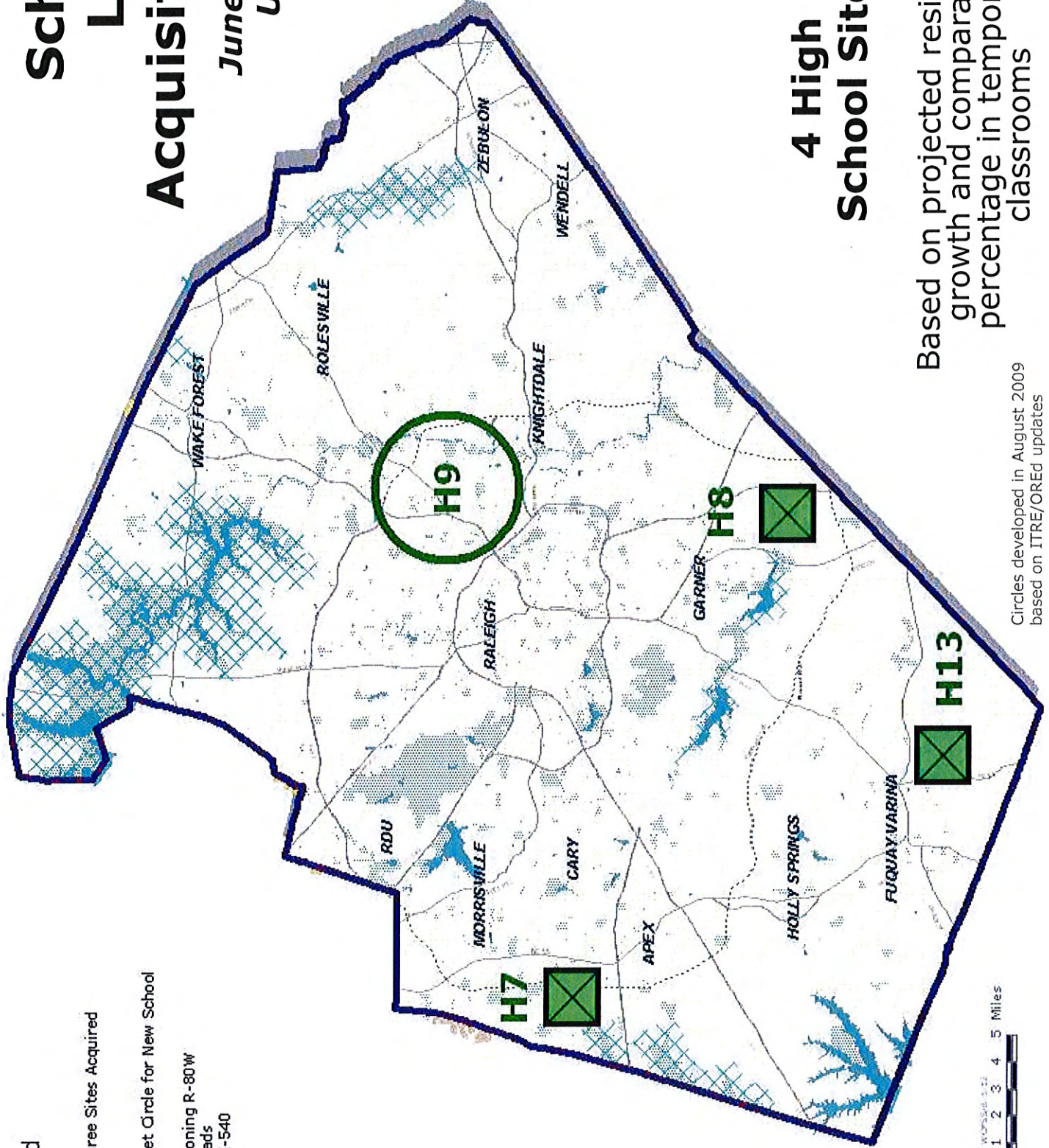
## 7 Middle School Sites

Based on projected residential growth and comparable percentage in temporary classrooms

Circles developed in August 2009 based on ITRE/ORED updates

# School Land Acquisition

## June 2012 Update



# 4 High School Sites

Based on projected residential growth and comparable percentage in temporary classrooms

Circles developed in August 2009 based on ITRE/OREd updates