

# 2040 Long Range Transportation Plan (LRTP) and Comprehensive Transportation Plan (CTP)

## Deficiency Analysis and Need Assessment

Transportation Advisory Committee

June 13, 2012

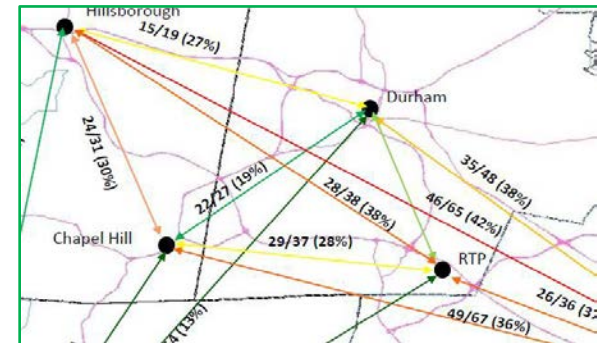


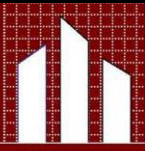
# Presentation Outline

- SE Data Update
- Triangle Regional Model Output Performance Measures

Travel Isochrones  
Travel Time Congestion  
Maps (V/C)

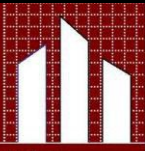
|        |   | SE Data                |            |            |
|--------|---|------------------------|------------|------------|
|        |   | 2010                   | 2040       | 2040       |
|        |   | Transportation Network |            |            |
|        |   | 2010                   | E+C        | 2035       |
| 1      | <b>Performance Measures</b>                   |                        |            |            |
| 1.1.1  | Total Vehicle Miles Traveled (VMT-daily)      | 13,217,550             | 20,368,697 | 20,581,822 |
| 1.1.1a | Total Vehicle Miles Traveled (VMT-per cap)    | 33                     | 32         | 33         |
| 1.2.1  | Total Vehicle Hours Traveled (VHT-daily)      | 312,669                | 581,776    | 536,746    |
| 1.2.1a | Total Vehicle Hours Traveled (VHT-per cap)    | 0.77                   | 0.92       | 0.85       |
| 1.3    | <b>Average Speed by Facility (miles/hour)</b> |                        |            |            |
| 1.3.1  | - Freeway                                     | 63                     | 57         | 61         |
| 1.3.2  | - Arterial                                    | 42                     | 38         | 39         |
| 1.3.3  | - All Facility                                | 51                     | 47         | 50         |





# Presentation Purpose

- Purpose: staff, public and TAC familiar with deficiencies.
- Today's presentation has highlights.
- Full complement of tables and maps on Web site:
  - Close up maps
  - Breakdown by county and MPOs
- We will often reference deficiency maps and documents through LRTP development.
- Receive comments – no TAC action required.



# Socioeconomic Data

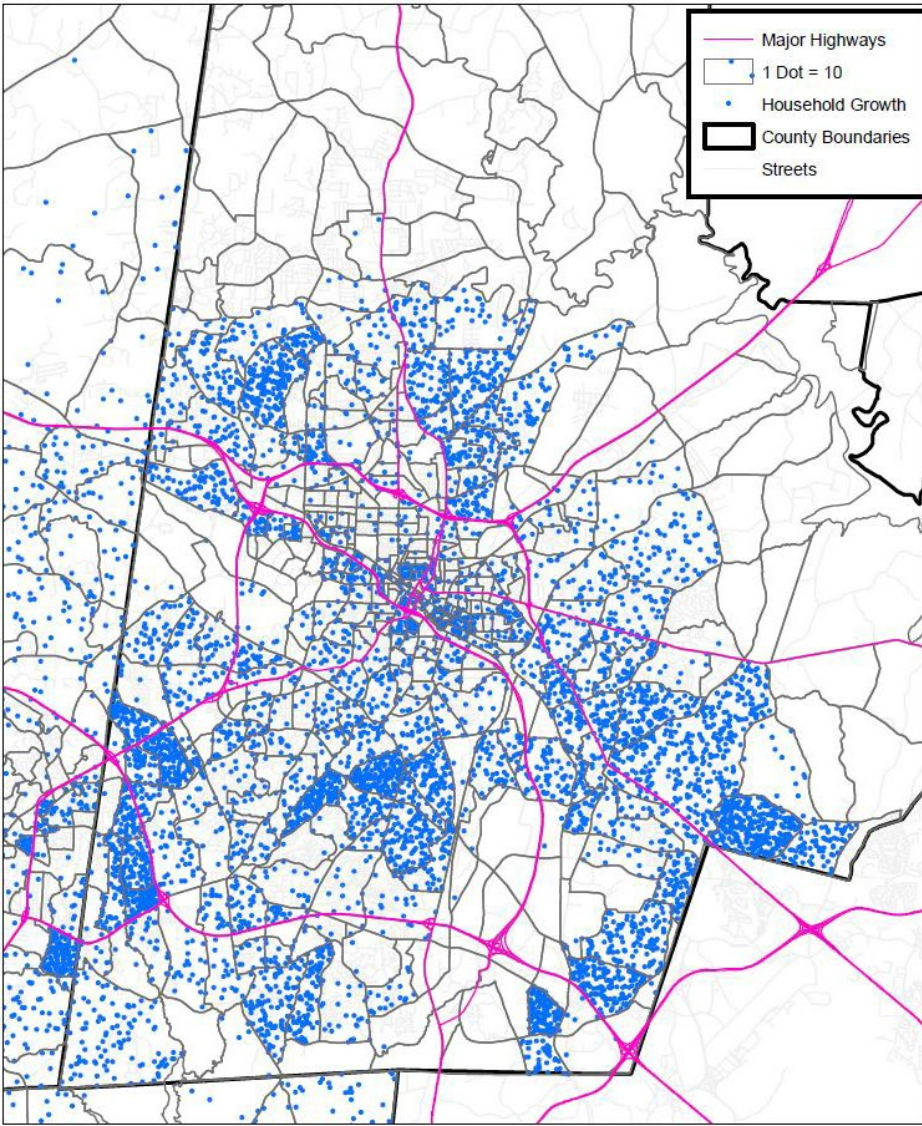
## Updated

- Released draft 2040 SE Data in March for public comment.
- Residential and employment growth (2010 to 2040) appeared too concentrated in urban and town centers (strict order allocation).
- Made adjustments to CommunityViz land use model (probability allocation).
- Expect only minor adjustments to baseline SE Data
- Two land use scenarios for Alternatives Analysis:
  - All-in-Transit – additional rail stations and transit emphasis
  - Managed Growth – emphasis on water and sewer service areas



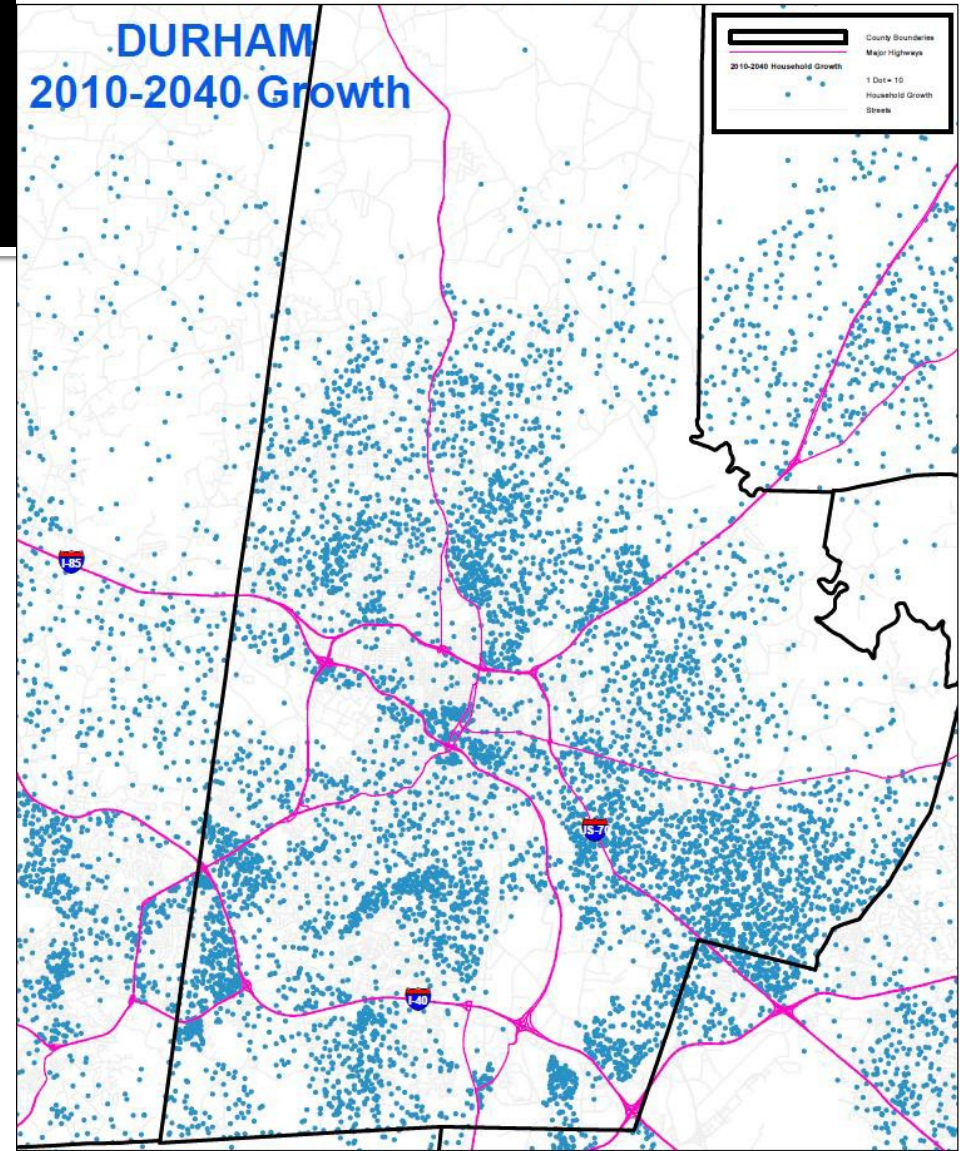
March 2012

Durham County  
Community Plan--Household Growth 2010-2040



# SE Data--Household

## DURHAM 2010-2040 Growth

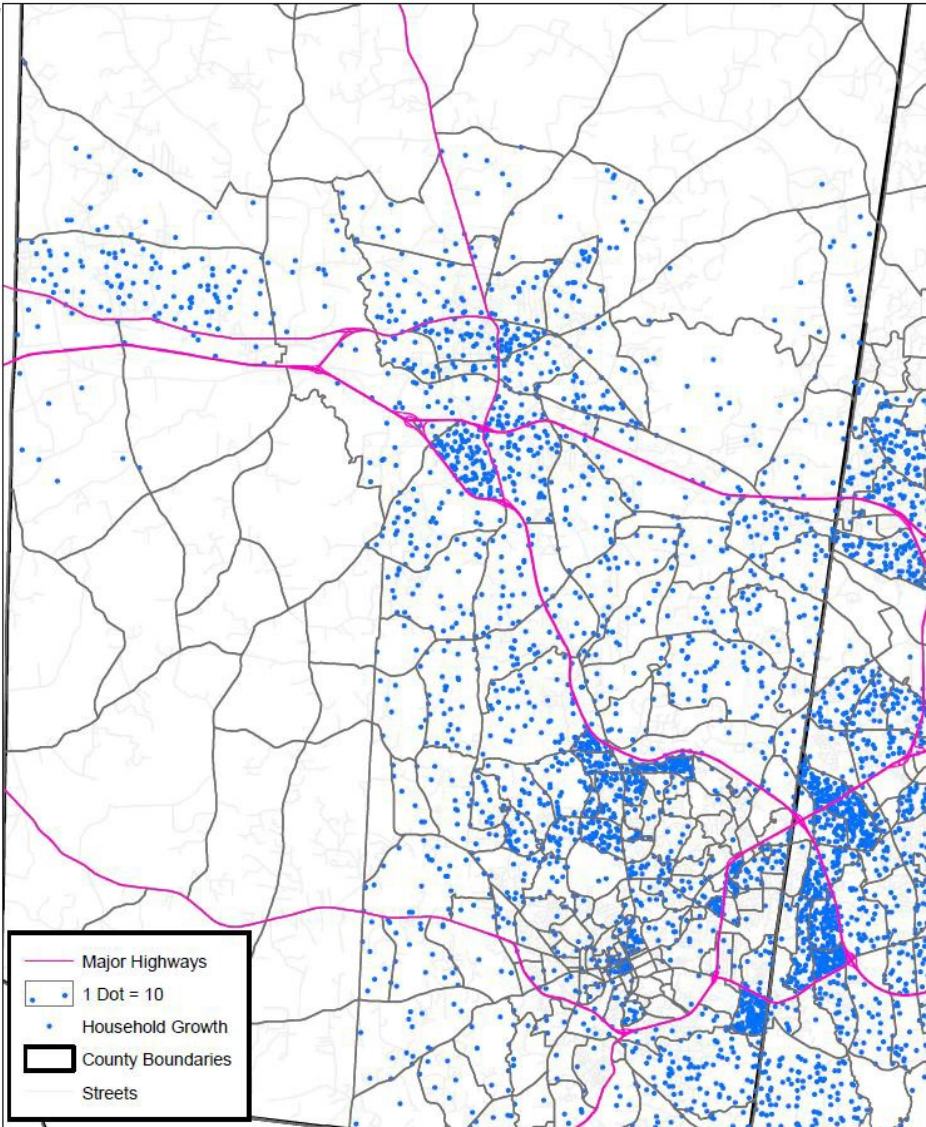


Updated - June 2012



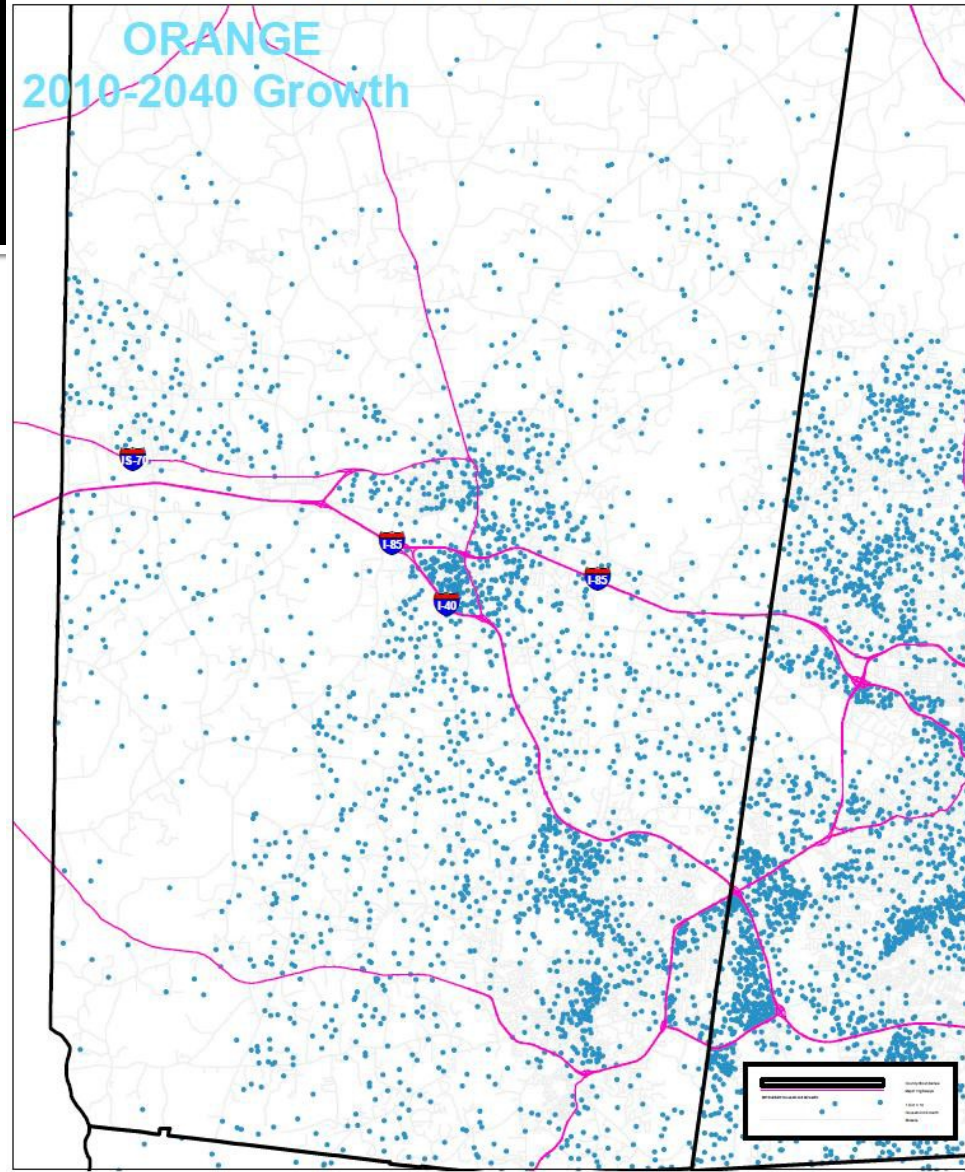
March 2012

Orange County  
Community Plan--Household Growth 2010-2040



# SE Data--Household

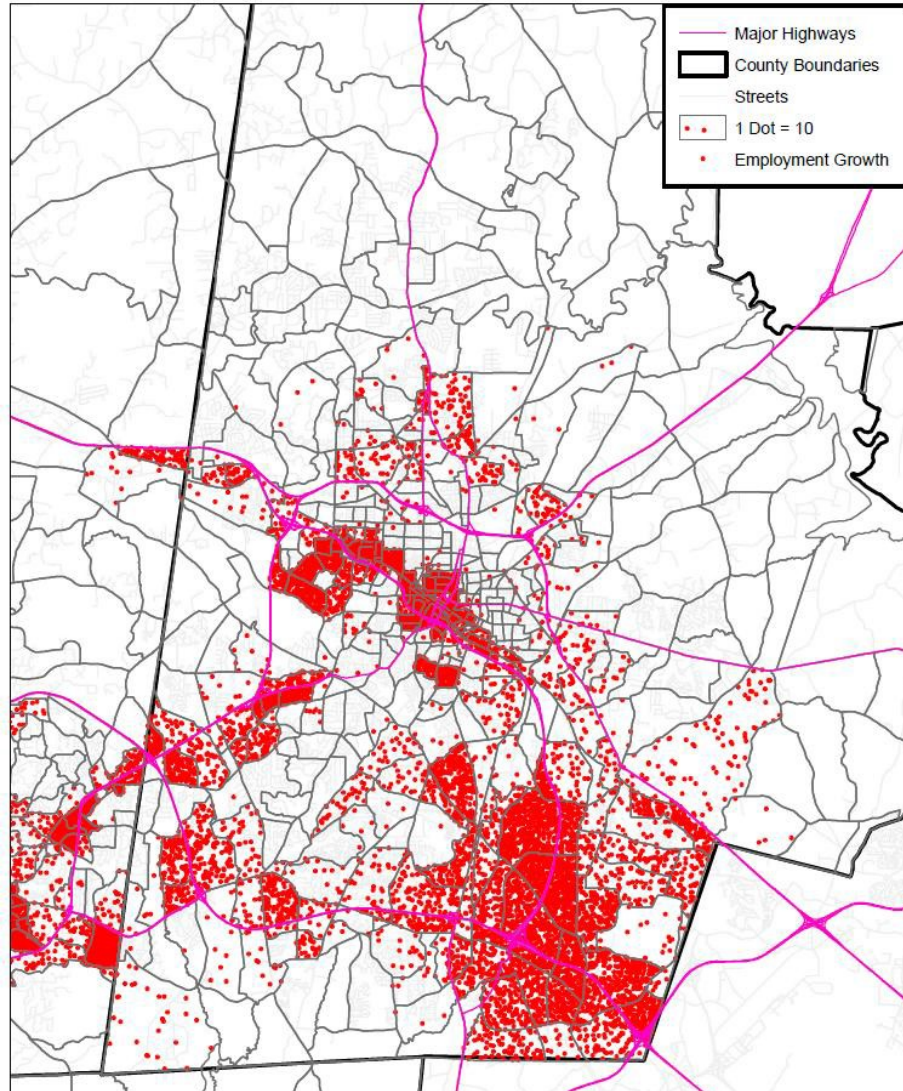
ORANGE  
2010-2040 Growth





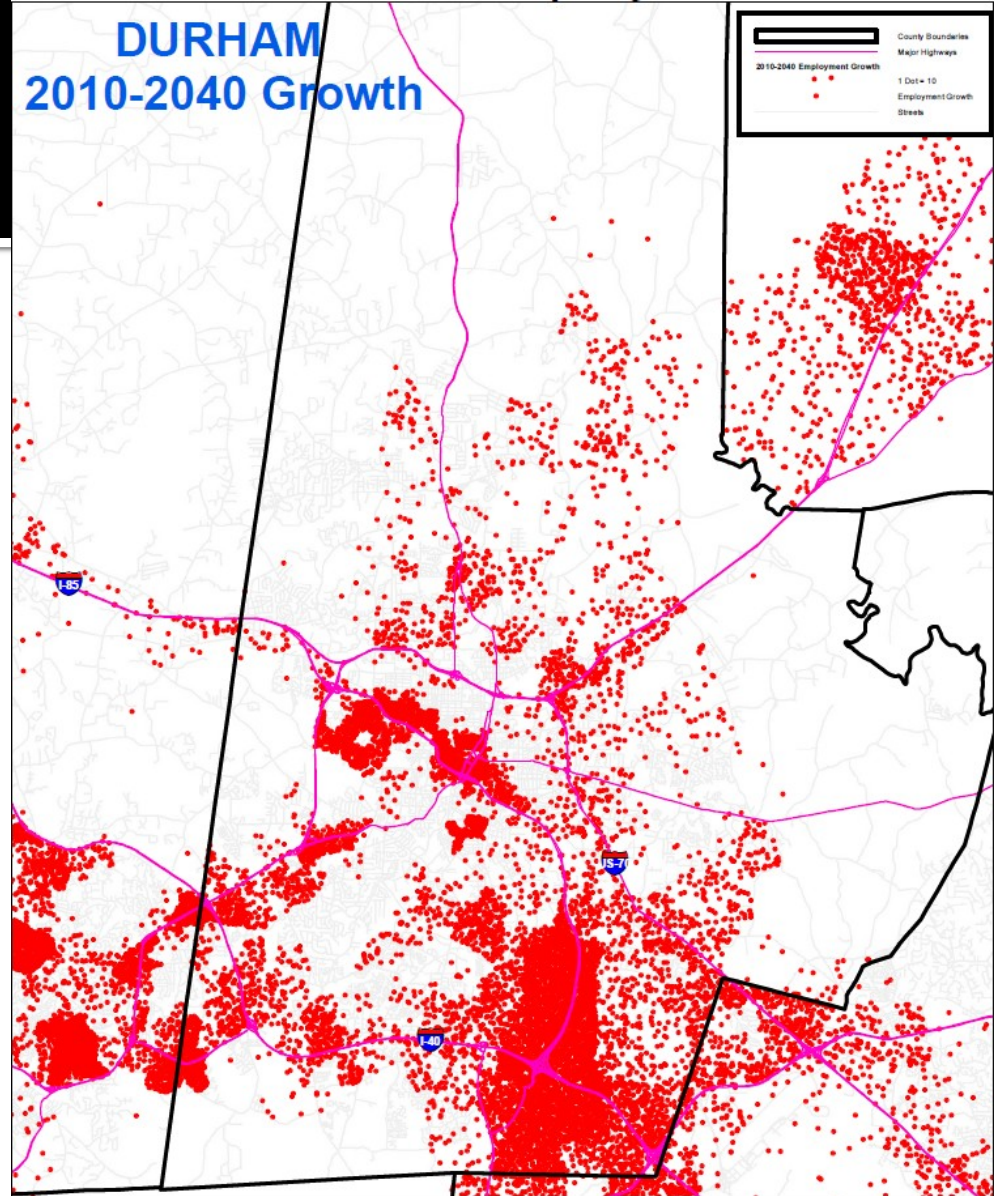
March 2012

### Durham County Community Plan--Employment Growth 2010-2040



# SE Data--Employment

## DURHAM 2010-2040 Growth

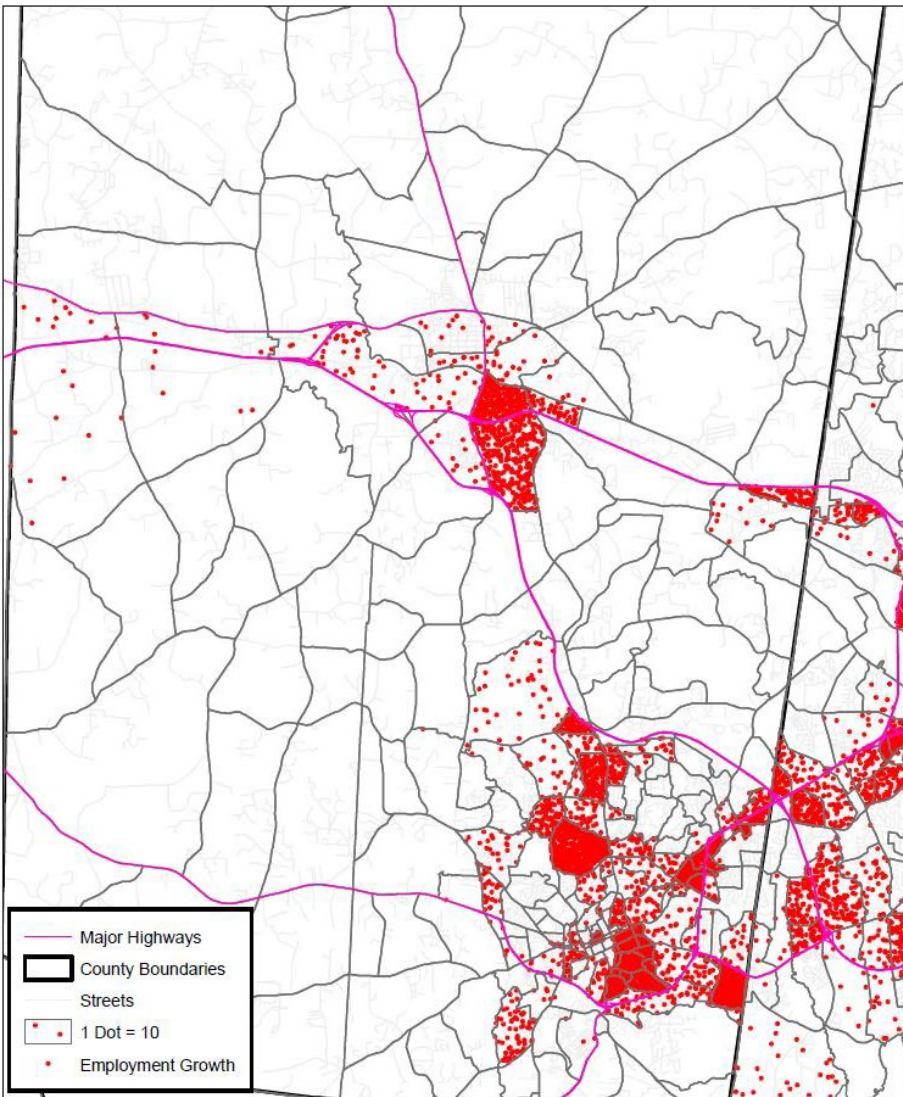


Updated - June 2012



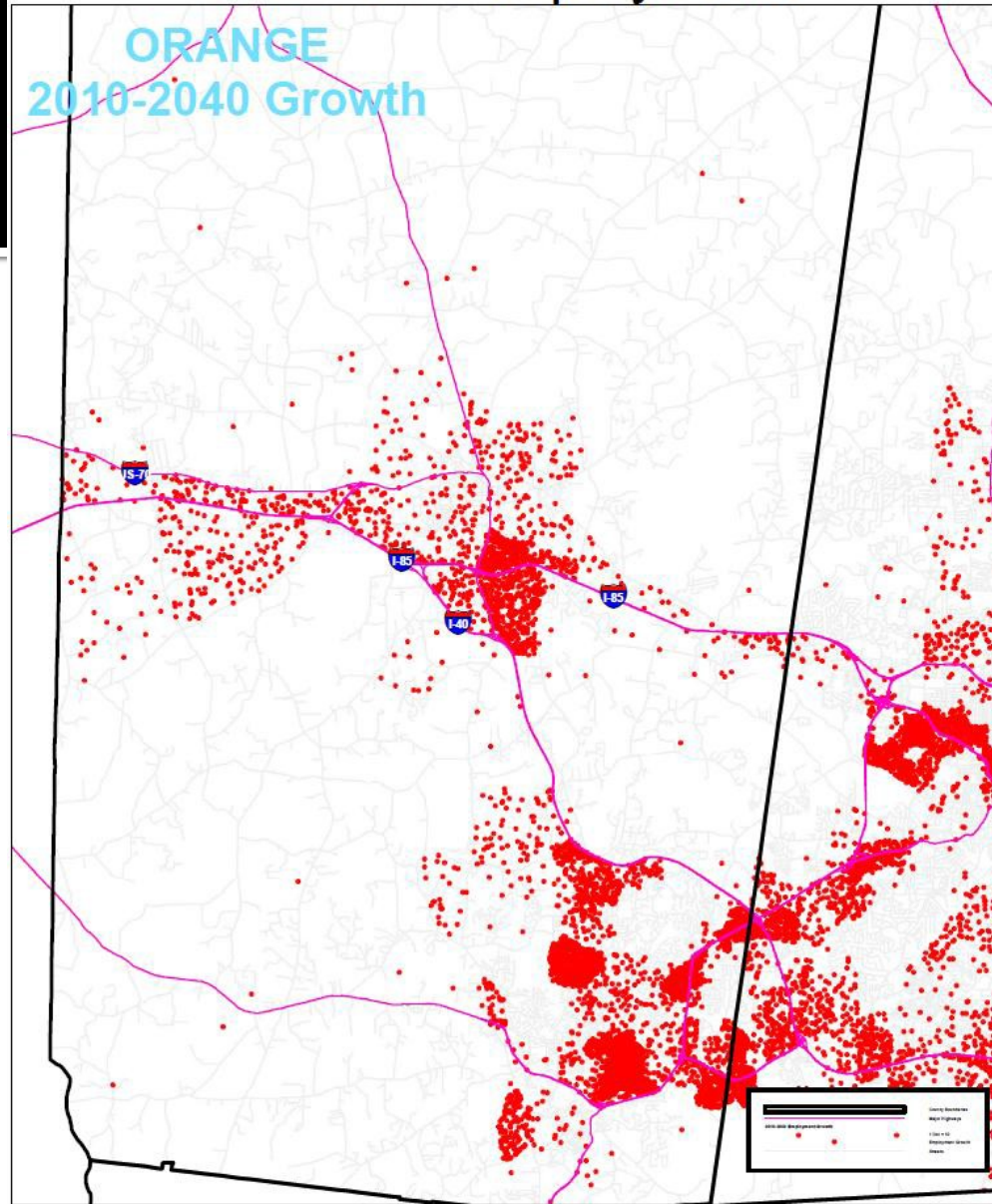
March 2012

Orange County  
Community Plan--Employment Growth 2010-2040



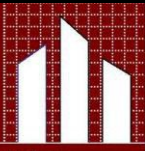
# SE Data--Employment

ORANGE  
2010-2040 Growth



Updated – June 2012





# Performance Measures Background

- General indicators of overall system:
  - Mobility Performance (e.g., travel time)
  - Mode Choice
  - Travel volume (e.g., VMT, VHT)
- Not specific to corridor or project.
- Useful for overall comparison of LRTP Alternatives



# Performance Measures

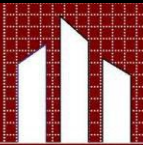
## Vehicle Miles Traveled (VMT) & Vehicle Hours Traveled (VHT)

|          |   | 2010       | 2040       | 2040       | 2010 to 2040 E+C | 2040 E+C to 2035 |
|----------|---|------------|------------|------------|------------------|------------------|
|          |   | 2010       | E+C        | 2035       | Change           | Change           |
| <b>1</b> | <b>Performance Measures</b>                   |            |            |            |                  |                  |
| 1.1.1    | Total Vehicle Miles Traveled (VMT-daily)      | 13,217,550 | 20,368,697 | 20,581,822 | 54%              | 1%               |
| 1.1.1a   | Total Vehicle Miles Traveled (VMT-per capita) | 33         | 32         | 33         | -2%              | 1%               |
| 1.2.1    | Total Vehicle Hours Traveled (VHT-daily)      | 312,669    | 581,776    | 536,746    | 86%              | -8%              |
| 1.2.1a   | Total Vehicle Hours Traveled (VHT-per capita) | 0.77       | 0.92       | 0.85       | 19%              | -8%              |

VMT and VHT will dramatically increase in the Existing-plus-Committed (E+C) scenario. VHT growth outpaces VMT growth.

- VMT growth persists with the implementation of the 2035 LRTP network.
- VMT driven by population (57% pop increase)

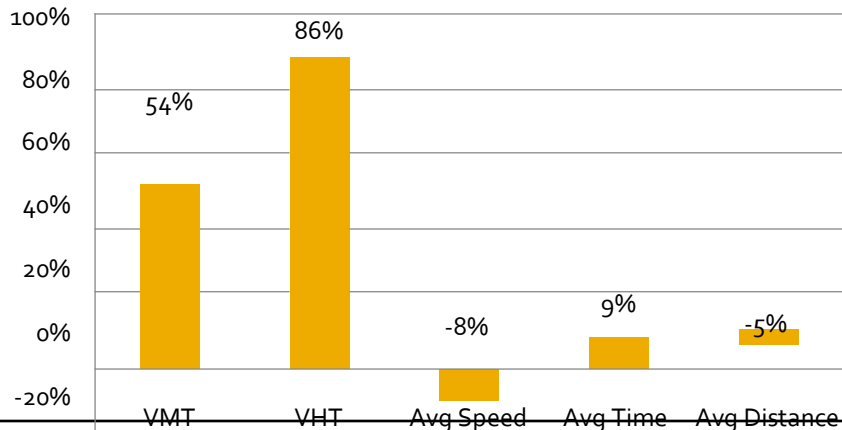




# Performance Measures

## Changes in Mobility Measures

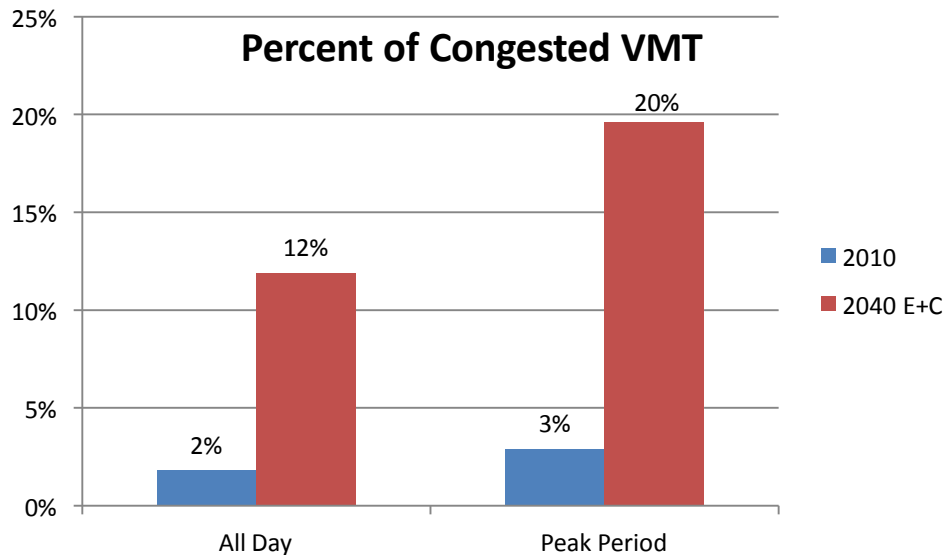
Percent Change: 2010 to 2040 E+C

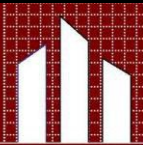


- Speed and distance decline.
- Travel time increases.

Large increase in congested VMT

Percent of Congested VMT





# Performance Measures

## Transit Ridership

|          |   |                        |        |         | 2010 to | 2040 E+C |          |
|----------|---|------------------------|--------|---------|---------|----------|----------|
|          |   | SE Data                | 2010   | 2040    | 2040    | 2040 E+C | 2040 E+C |
|          |   | Transportation Network | 2010   | E+C     | 2035    | Change   | to 2035  |
|          |   |                        |        |         |         |          |          |
| <b>3</b> | <b>Transit Measures</b>                   |                        |        |         |         |          |          |
| 3.1      | Transit System Ridership (regionwide)     |                        |        |         | Total   |          |          |
| 3.1.1    | - TTA (rail not included in 2010 and E+C) |                        | 5,362  | 8,571   | 52,702  | 60%      | 515%     |
| 3.1.2    | - CAT                                     |                        | 16,639 | 23,080  | 40,227  | 39%      | 74%      |
| 3.1.3    | - CHT                                     |                        | 26,788 | 38,258  | 46,756  | 43%      | 22%      |
| 3.1.4    | - DATA                                    |                        | 17,637 | 25,977  | 57,749  | 47%      | 122%     |
| 3.1.5    | - NCSU                                    |                        | 12,147 | 21,366  | 14,885  | 76%      | -30%     |
| 3.1.6    | - DUKE                                    |                        | 14,007 | 17,381  | 14,108  | 24%      | -19%     |
| 3.1.7    | - OPT                                     |                        | N/A    | N/A     | N/A     |          |          |
| 3.1.8    | - CARY                                    |                        | 1,412  | 2,139   | 9,491   | 51%      | 344%     |
| 3.1.9    | Total                                     |                        | 93,988 | 136,768 | 235,915 | 46%      | 72%      |

■ As population increases, transit ridership increases.

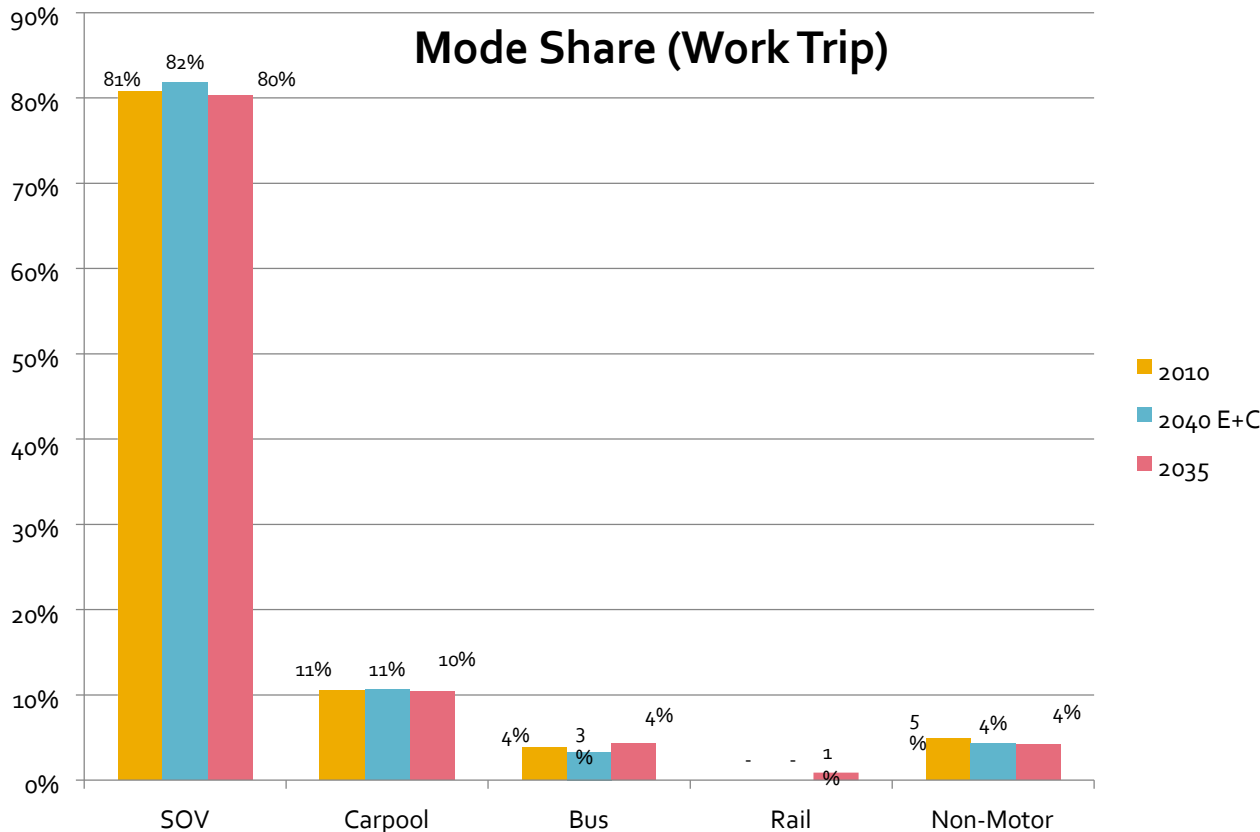
■ 2035 transit improvements substantially increases ridership.



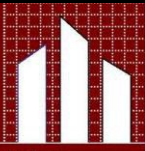


# Performance Measures

## Mode Share



- For Mode Choice, the travel model is fairly insensitive to changes in population and employment, and network (E+C and 2030 LRTP scenarios)



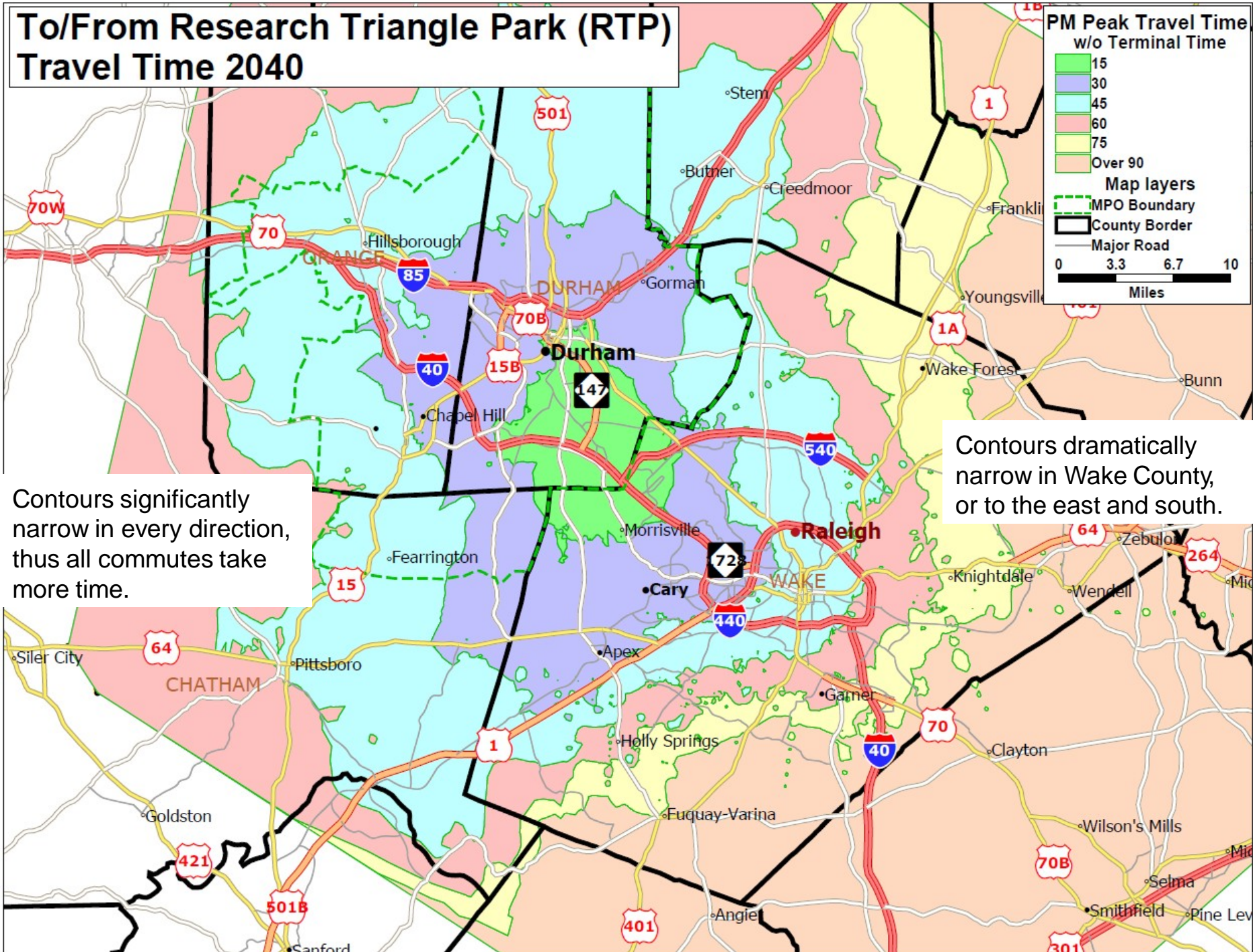
# Travel Isochrones

## Background

- More specific than Performance Measures – can start to see corridor mobility.
- Based on afternoon commute from four selected centers:
  - Downtown Durham
  - Chapel Hill/Carrboro
  - RTP
  - Downtown Raleigh
- Map illustrates “contours” for 15-, 30-, 45-minute, etc. commutes from the centers.
- Two maps for each center:
  - 2010
  - E+C (2040 SE Data using E+C network)
- This presentation shows RTP. Other centers on Web site.

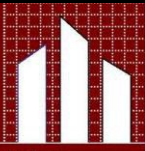


# To/From Research Triangle Park (RTP) Travel Time 2040



Contours significantly narrow in every direction, thus all commutes take more time.

Contours dramatically narrow in Wake County, or to the east and south.



# Travel Time

## Background

- Shows mobility forecasts to/from regional centers.
- Uses four-hour peak period (3:30pm to 7:30pm). Thus, peak hour times will actually be longer.
- Based on commute to/from six selected centers:
  - Downtown Durham
  - Chapel Hill/Carrboro
  - RTP
  - Hillsborough
  - Pittsboro
  - Downtown Raleigh
- Presented two ways 2010 and E+C:
  - Tables with morning and afternoon peak
  - Map of afternoon peak
- Full set of tables on Web site.



# Travel Time

## 2010 and E+C Travel Time Table

**2010 PM Peak Travel time (minutes)**

|             |              | <u>To</u> |     |         |     |             |              |           |
|-------------|--------------|-----------|-----|---------|-----|-------------|--------------|-----------|
|             |              | Durham    | RTP | Raleigh | RDU | Chapel Hill | Hillsborough | Pittsboro |
| <b>From</b> | Durham       |           | 14  | 35      | 24  | 22          | 28           | 48        |
|             | RTP          | 16        |     | 27      | 16  | 30          | 29           | 43        |
|             | Raleigh      | 35        | 25  |         | 26  | 50          | 46           | 46        |
|             | RDU          | 23        | 14  | 27      |     | 38          | 34           | 44        |
|             | Chapel Hill  | 22        | 28  | 49      | 38  |             | 24           | 45        |
|             | Hillsborough | 29        | 27  | 46      | 34  | 25          |              | 31        |
|             | Pittsboro    | 48        | 39  | 44      | 42  | 44          | 29           |           |

**E+C PM Peak Travel time (minutes)**

|             |              | <u>To</u> |     |         |     |             |              |           |
|-------------|--------------|-----------|-----|---------|-----|-------------|--------------|-----------|
|             |              | Durham    | RTP | Raleigh | RDU | Chapel Hill | Hillsborough | Pittsboro |
| <b>From</b> | Durham       |           | 17  | 54      | 30  | 27          | 33           | 56        |
|             | RTP          | 20        |     | 43      | 20  | 39          | 37           | 48        |
|             | Raleigh      | 43        | 29  |         | 30  | 62          | 57           | 56        |
|             | RDU          | 28        | 15  | 40      |     | 47          | 43           | 47        |
|             | Chapel Hill  | 26        | 35  | 72      | 48  |             | 28           | 50        |
|             | Hillsborough | 40        | 40  | 73      | 50  | 35          |              | 41        |
|             | Pittsboro    | 51        | 39  | 56      | 43  | 46          | 31           |           |

Raleigh-Durham afternoon commute increases, especially commute to Raleigh.





# Travel Time

## Travel Time Percent Increase

Hotter the color = larger % increase

Compare 2010 and E+C: PM Peak Travel time (percent increase)

|                    | <u>To</u> |     |         |     |             |              |           |
|--------------------|-----------|-----|---------|-----|-------------|--------------|-----------|
|                    | Durham    | RTP | Raleigh | RDU | Chapel Hill | Hillsborough | Pittsboro |
| <u>From</u> Durham |           | 23% | 54%     | 28% | 20%         | 16%          | 17%       |
| RTP                | 27%       |     | 58%     | 23% | 29%         | 27%          | 11%       |
| Raleigh            | 23%       | 15% |         | 14% | 25%         | 24%          | 22%       |
| RDU                | 22%       | 8%  | 49%     |     | 26%         | 24%          | 6%        |
| Chapel Hill        | 18%       | 26% | 47%     | 29% |             | 18%          | 12%       |
| Hillsborough       | 39%       | 49% | 60%     | 45% | 41%         |              | 34%       |
| Pittsboro          | 8%        | -1% | 28%     | 1%  | 4%          | 6%           |           |

Commutes toward Raleigh and Hillsborough have largest increases in travel time.

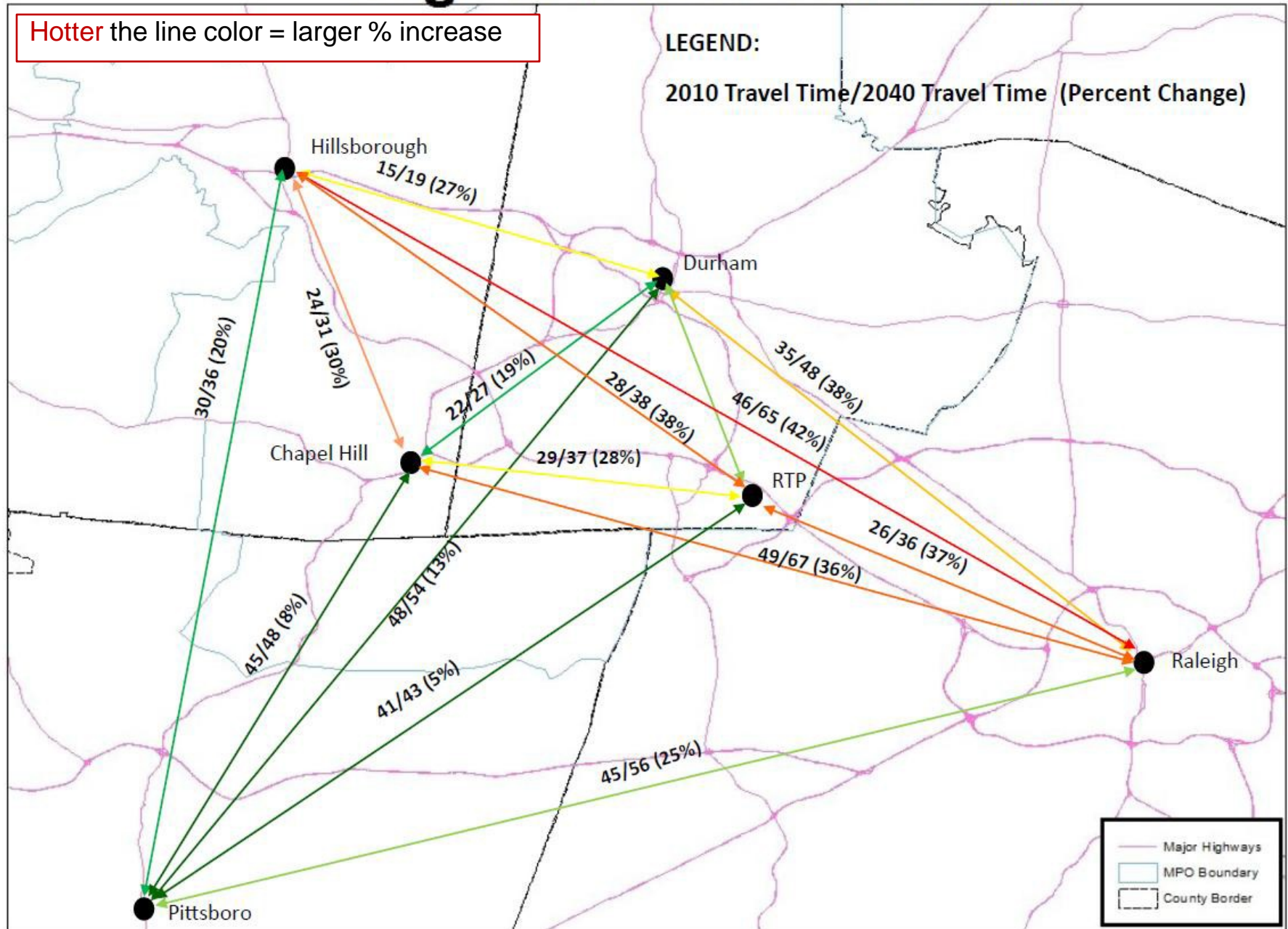
# Regional Travel Time

In Minutes

Hotter the line color = larger % increase

LEGEND:

2010 Travel Time/2040 Travel Time (Percent Change)



- Major Highways
- MPO Boundary
- County Border

(based on afternoon peak travel time)



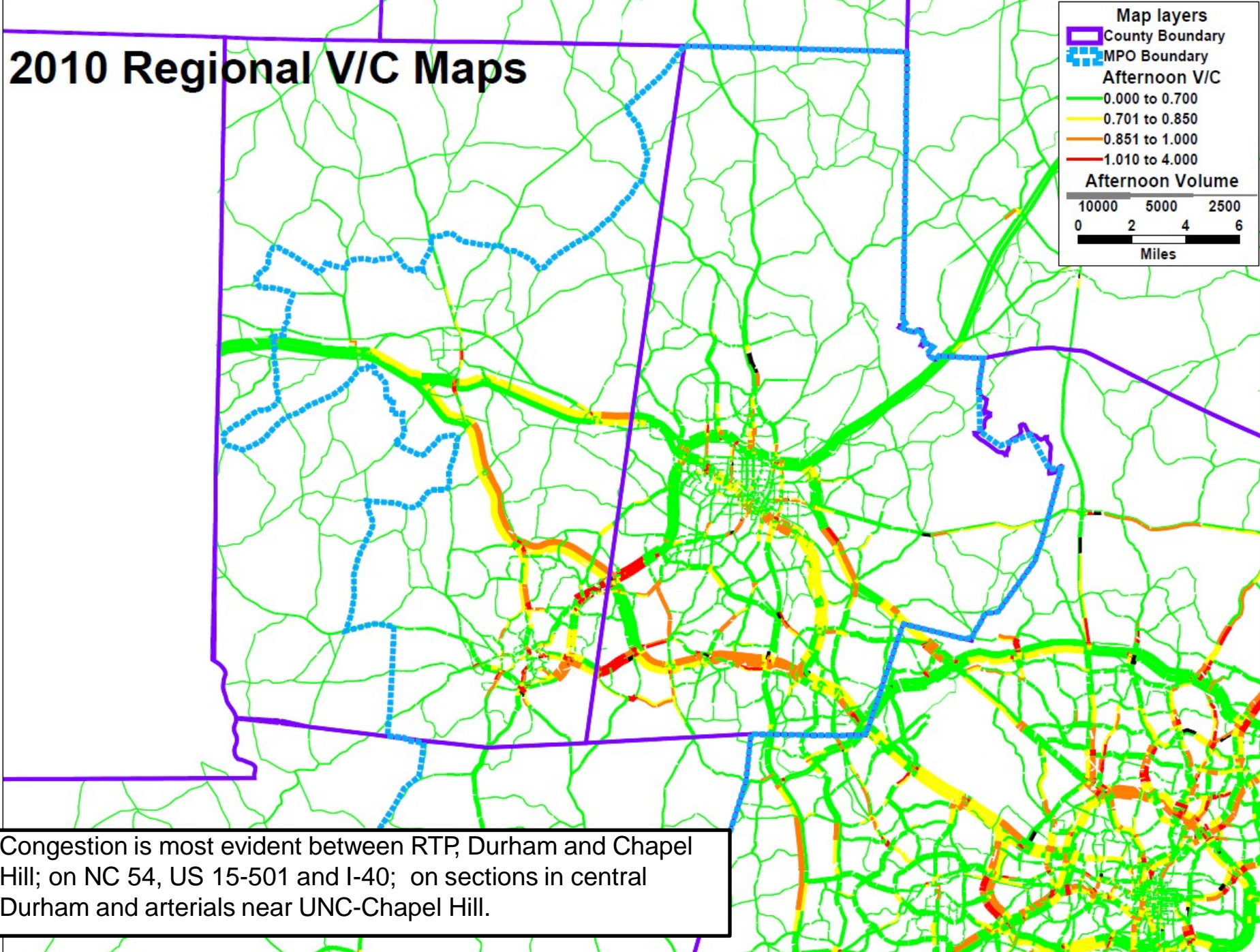
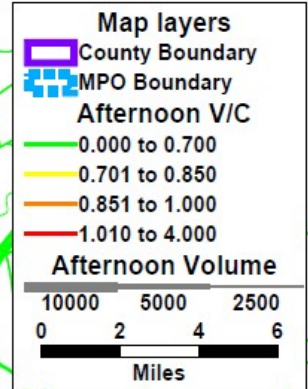
# Congestion Maps (V/C)

## Background

- Maps show the current and forecasted congestion on specific road segments based on the afternoon peak hour.
- "V/C" means the traffic volume divided by the traffic capacity of the road segment. For example, a volume of 9,000 vehicles on a road that is capable of carrying 10,000 vehicles will produce a V/C of 0.9.
- A V/C of 1.0 is equal to a Level of Service (LOS) of "E", which can be described as:
  - Limit of acceptable delay, unstable flow, poor signal progression, traffic near roadway capacity, frequent cycle failures.
- The width of the line showing the roadway also indicates the relative traffic volume on that roadway.
- Web sit has county-level and close-up map views.



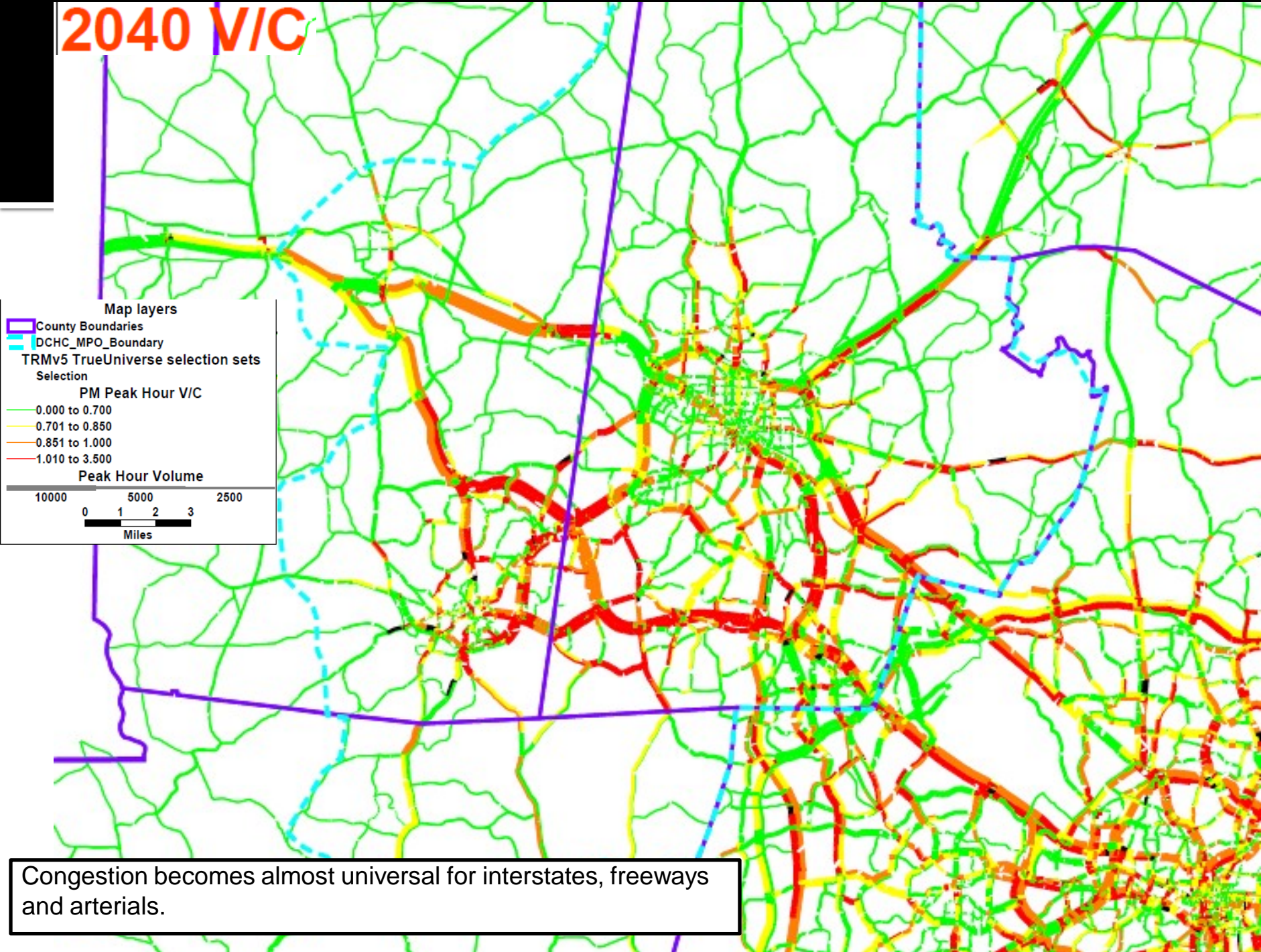
# 2010 Regional V/C Maps



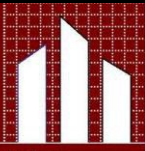
Congestion is most evident between RTP, Durham and Chapel Hill; on NC 54, US 15-501 and I-40; on sections in central Durham and arterials near UNC-Chapel Hill.



# 2040 V/C



Congestion becomes almost universal for interstates, freeways and arterials.

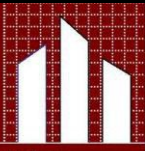


# Additional Challenges

- Loss of purchasing power -- Highway and transit costs rise faster than revenues.
- Relatively static funding – e.g., state cap on gas tax.
- Many unknowns – e.g., federal transportation legislation (SAFETEA-LU) on continuing resolution for over two years.
- Transit dependent population growing -- Proportion of minority, Hispanic and senior population will increase.



DCHC



Durham-Chapel Hill-Carrboro

**METROPOLITAN**  
Planning Organization

# Wrap Up

- TAC comments and questions today?
- Next Steps (August TAC meeting)
  - Draft LRTP Alternatives based on these Deficiencies and Needs.