



# NORTH CAROLINA MODELING GUIDELINES

THE NEXT GENERATION AND BEYOND

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# INTRODUCTION AND MOTIVATION

- North Carolina Profile
- Motivation
  - Changing workforce
  - Changes in scope and responsibility
  - Loss of institutional knowledge
- Development of standard modeling guidelines and procedures

# EXISTING APPLICATIONS AND FINDINGS

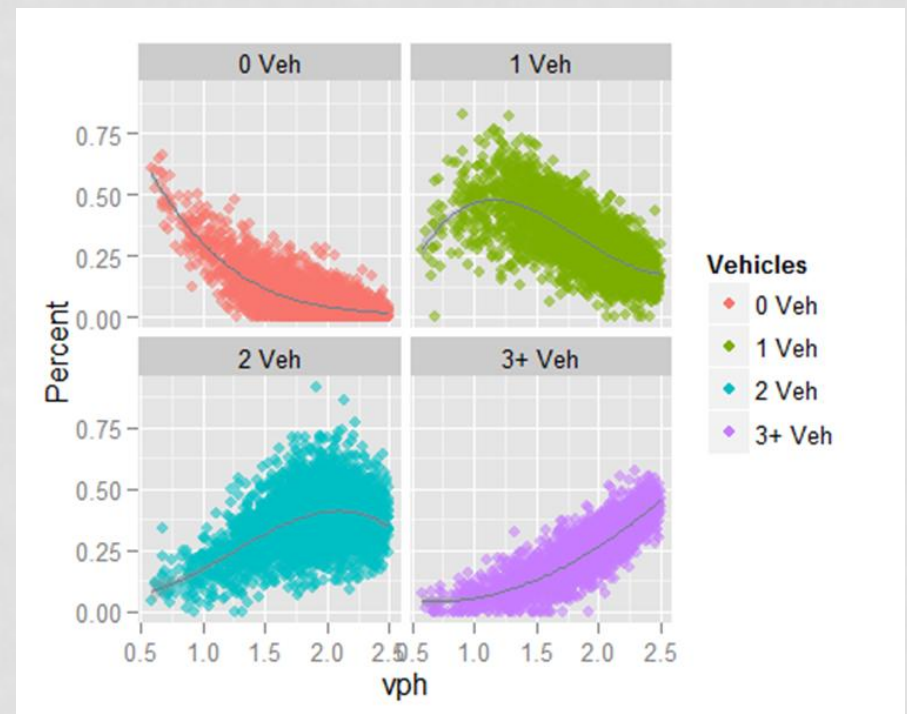
- NCDOT
  - Used across North Carolina
  - Measures of success
  - Four rounds of staff training
  - Challenges
- Implementation outside of North Carolina
- Insights
- Identified enhancements (focus of this presentation)

# GEN2 - ENHANCEMENTS

- Updated household classification model
- Special generators and special markets
- Commercial vehicle model
- External trip model
- Formula based capacity calculations
- Graphical User Interface and Improved Reporting

# HOUSEHOLD CLASSIFICATION MODEL

- Updated Census data
  - SF1
  - 5-year ACS
- Cluster Analysis
- Models
  - Household size
  - Household vehicles
  - Joint disaggregation



# SPECIAL GENERATORS AND SPECIAL MARKETS

## **Special Generator**

- Specialized land use like regional shopping or hospital
- Trip attraction characteristics not reflected by standard rates

## **Special Market**

- Specialized land use like university or airport
- Trip generation, distribution, time-of-day and or mode choice not reflected by other trip purposes
- Best captured through a separate trip purpose or separate submodel

# SPECIAL GENERATORS AND SPECIAL MARKETS

## Special Generator

- Three standard classes:
  - Hospitals
  - Regional malls
  - Universities
- Rates by trip purpose
- Implementation
  - New SE data fields
  - Script modifications

## Special Market

- Separate sub-model
  - Trip generation
  - Trip distribution
  - Time of day
- Generalized integration
- Default parameters

# COMMERCIAL VEHICLE MODEL

## Original

- Three vehicle classes
  - Autos/vans, pickups, trucks
- Productions: TAZ CVs by type
- Attractions: TAZ employment by type

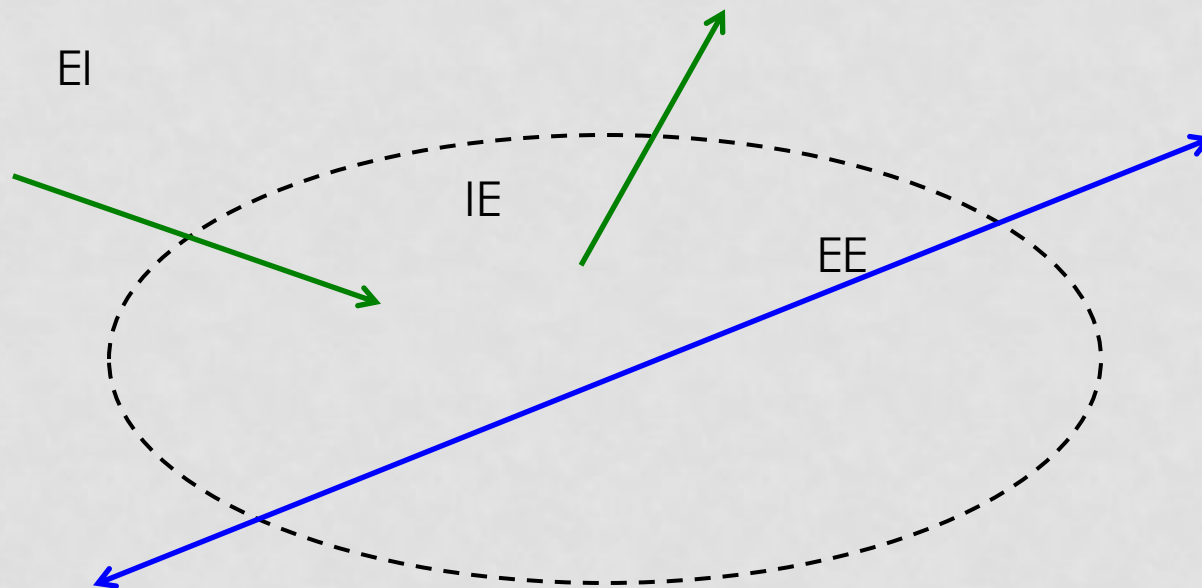
## Revised

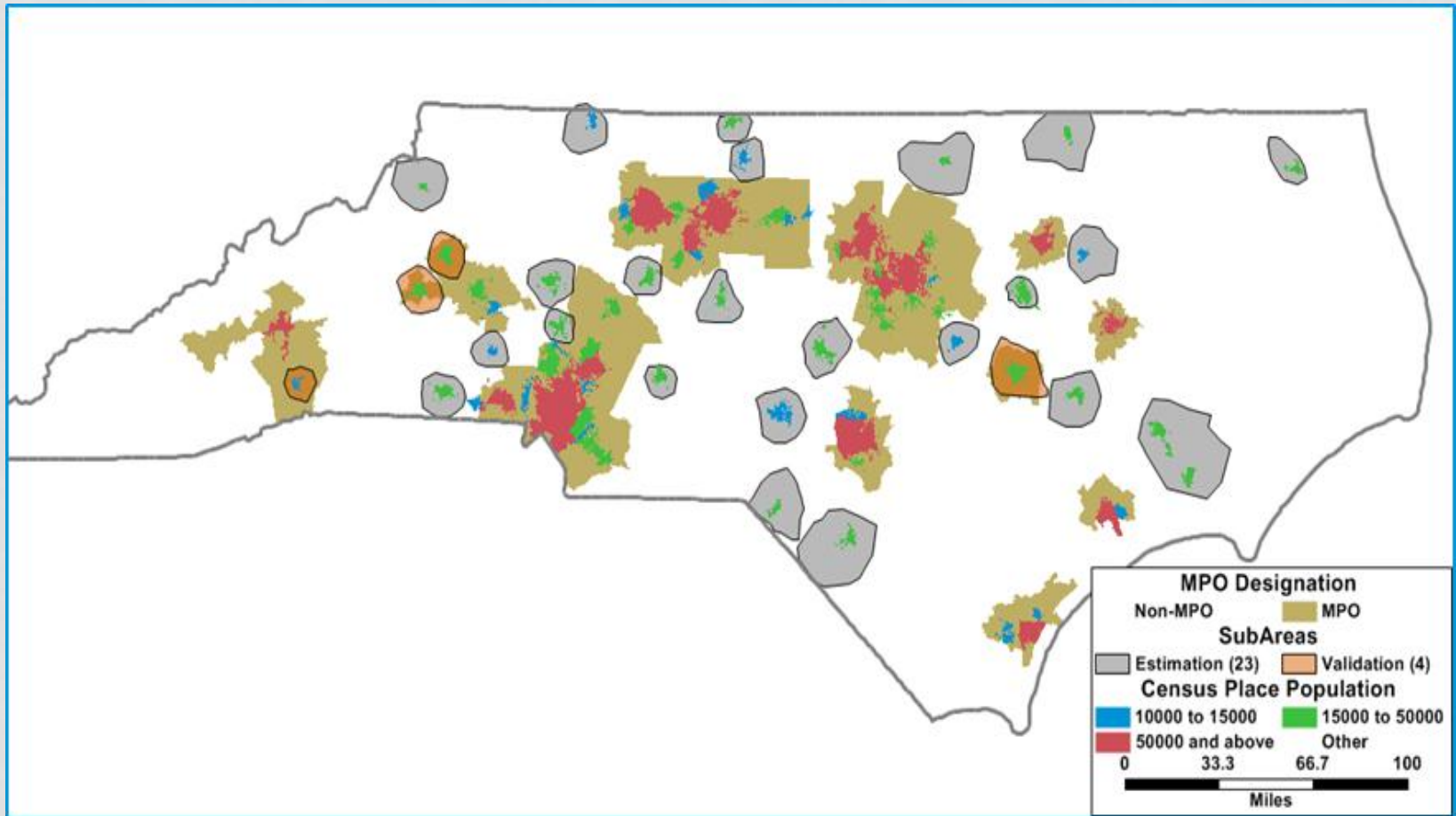
- New vehicle classes
  - CVs, SUT, MUT
- Productions/Attractions: TAZ employment by type
- Rates developed from recent CV survey



# EXTERNAL STATION ANALYSIS

- Trip Purposes:
  - Through Trips (EE)
  - External Internal (EI) and Internal External (IE)





## EXTERNAL TRIP MODEL

DEFINING SUBAREAS

# EXTERNAL TRIP MODEL

- IE/EI Model

- Population (S, Z)
- Households (S, Z)
- Area (S)
- IX productions (S)
- Emp. By Type (Z)
- Dist. to nearest station (Z)
- Avg. distance nearest 3 stations (Z)
- Avg. IE/EI productions at nearest 3 stations (Z)

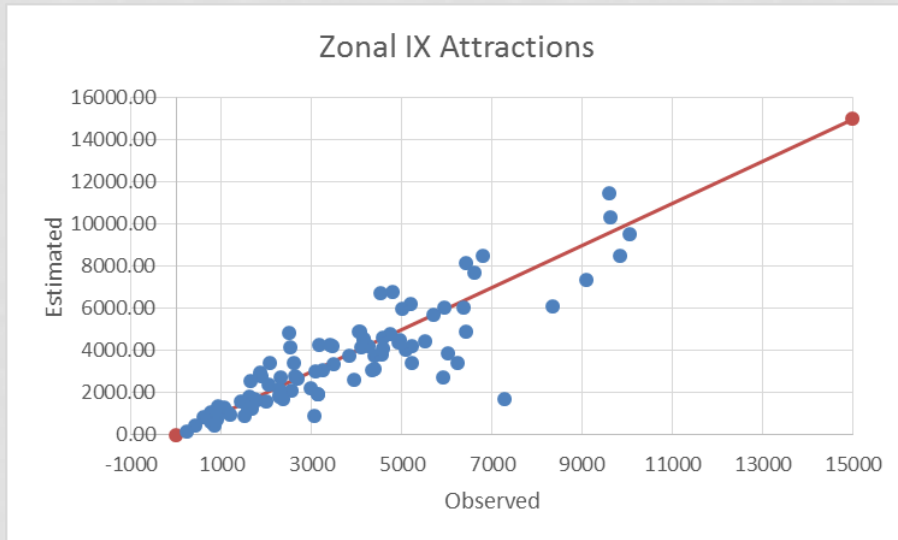
- EE Model

- Population (S)
- Employment (S)
- Area (S)
- AWDT (L)
- External volume (L)
- Facility type:  
Interstate, Arterial,  
Local (L)

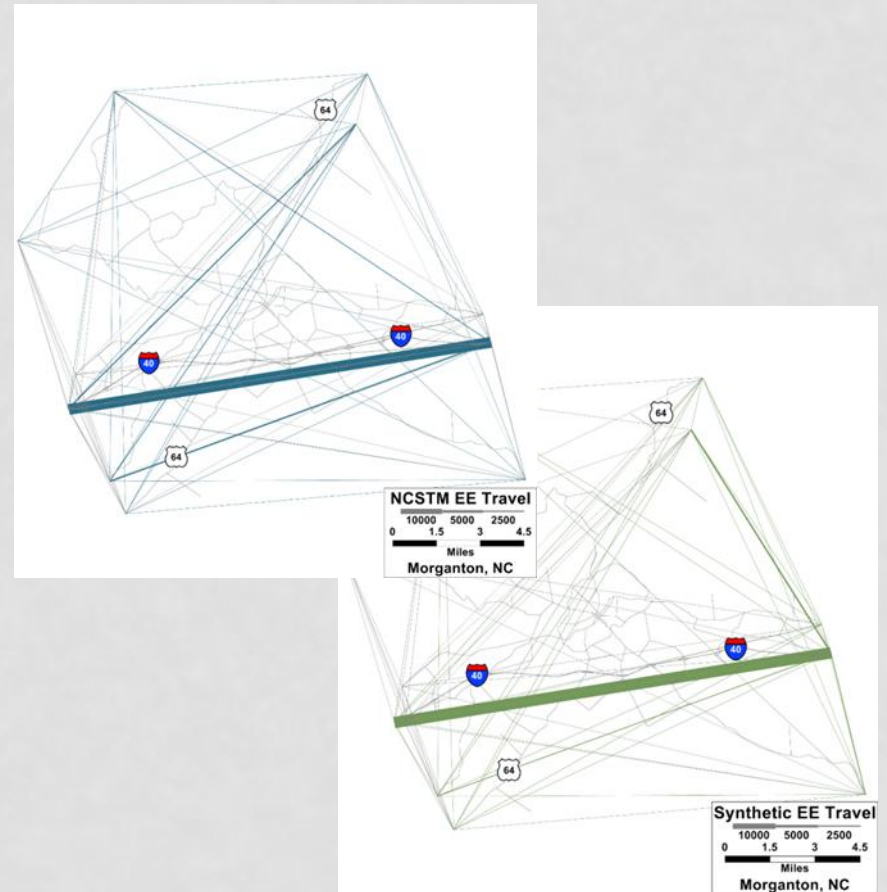
**S = subarea; Z = TAZ; L = link**

# EXTERNAL TRIP MODEL

## IE/EI Validation

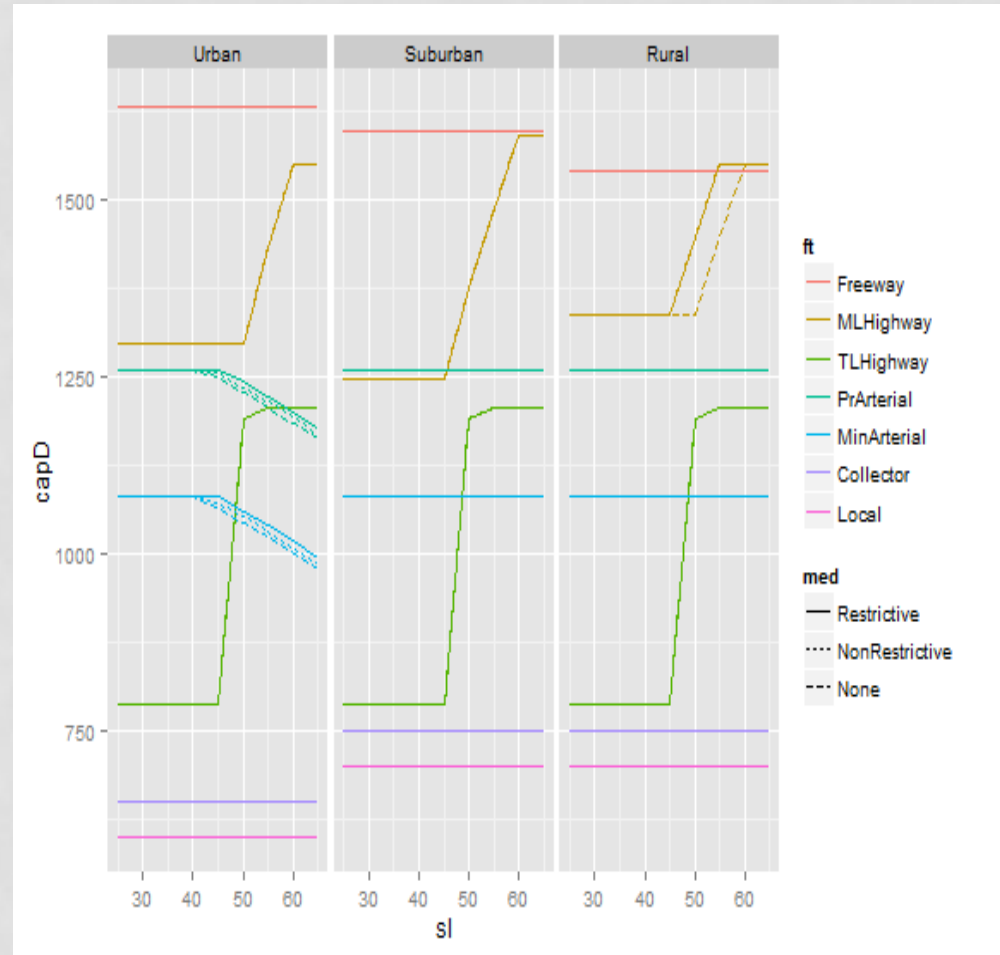


## EE Validation



# FORMULA BASED CAPACITY

- R-package (hcmr)
- Link variables
  - Facility type
  - Area type
  - Speed limit
  - Median treatment
  - Lanes per direction
  - Terrain
- Includes error handling
- Populates link database



# GUI

Modifications and Enhancements

The screenshot displays the 'NCDOT Small Area Model' software interface. At the top, the NCDOT logo is visible with the text 'TRANSPORTATION PLANNING DIVISION'. Below the logo, there is a 'Scenarios' section with a dropdown menu currently set to 'Base\_Year'. Underneath the dropdown are two radio buttons: 'Stop after stage' (which is selected) and 'Run all steps', followed by a 'Setup' button. The main area of the interface consists of a vertical column of buttons, each with a small icon to its left. From top to bottom, these buttons are: 'Prepare Network' (with a grid and wrench icon), 'Create Network' (with a grid and building icon), 'External Trips' (with a red triangle icon), 'Trip Generation' (with a house and car icon), 'Trip Distribution' (with a grid icon), 'Mode Split' (with icons for bus, train, and car), 'Commercial Vehicles' (with a truck icon), 'Time of Day' (with a clock icon), 'Traffic Assignment' (with car and truck icons), and 'Reports' (with car and truck icons). A red arrow points from the right side of the screen to the 'Reports' button. Below this column is an 'Interactive Tools' section containing four buttons: 'Isochrone', 'Select Link', 'V/C Map', and 'Desire Lines'. A red arrow points from the bottom left towards the 'Interactive Tools' section. At the very bottom of the window is a 'Quit' button and the text 'Requires TransCAD V6 Build 9025'.

**Travel Time Map** [Close]

Node ID

Destination

AM

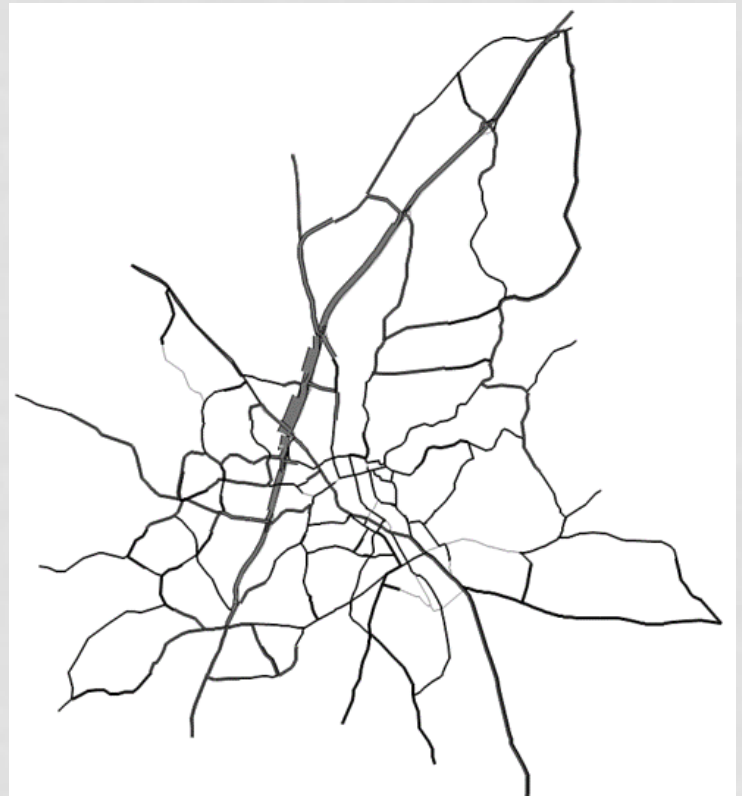
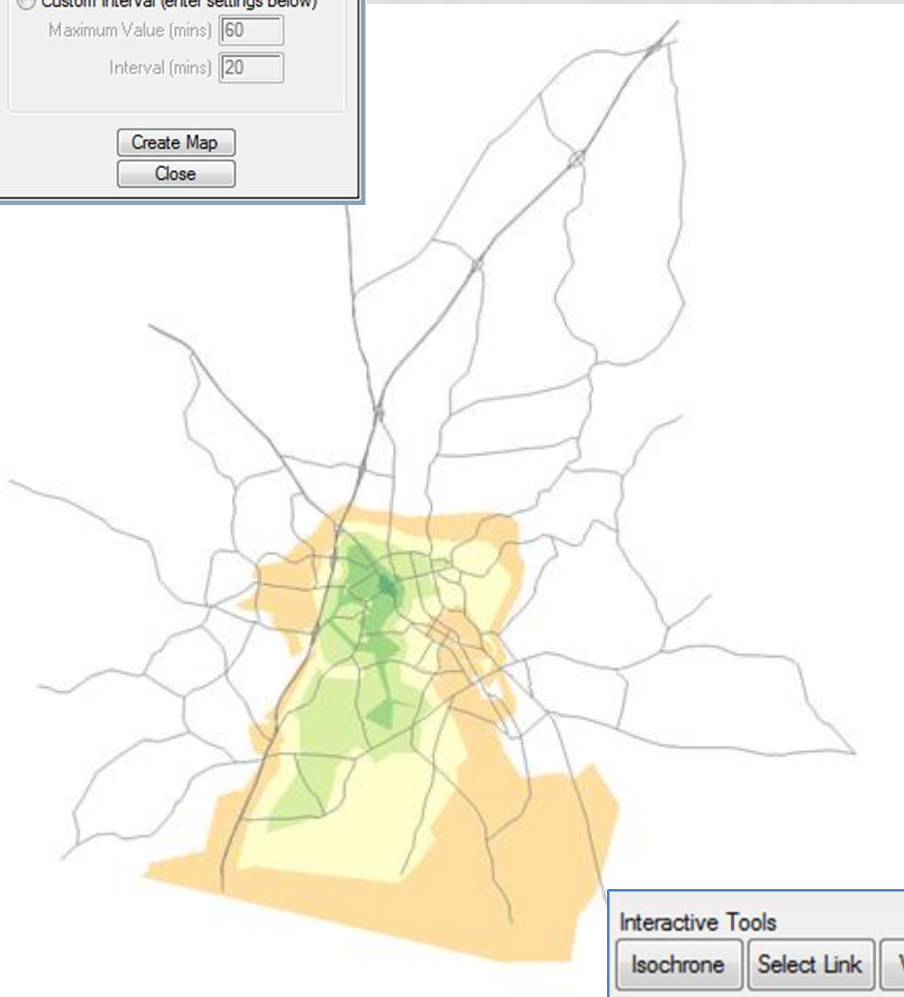
3. Interval Settings

Standard Interval (60 mins by 20 mins)

Custom Interval (enter settings below)

Maximum Value (mins)

Interval (mins)

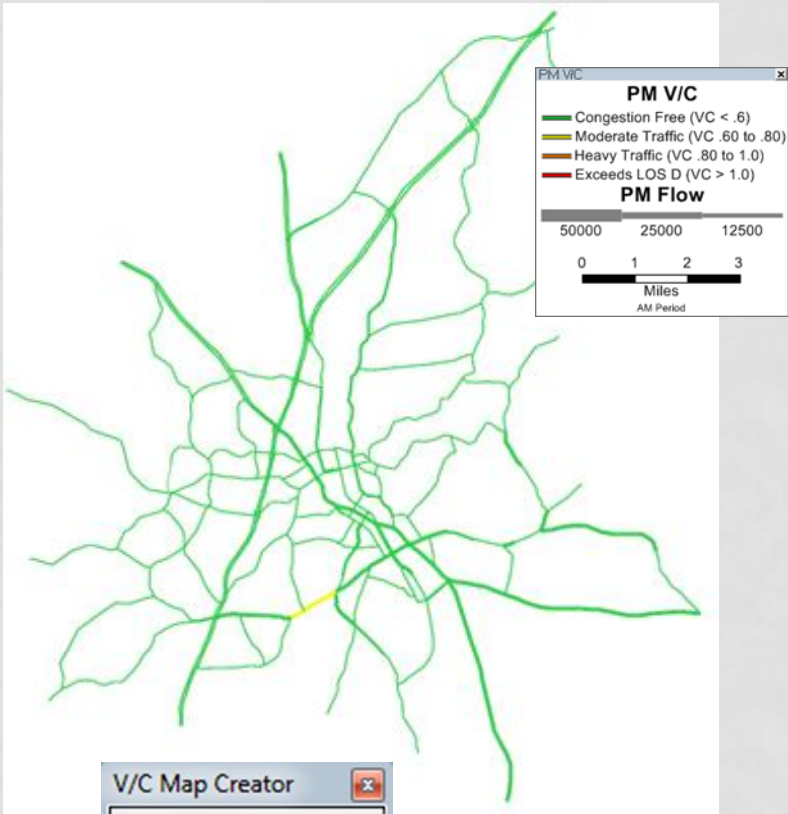


**Select Link** [Close]

Query File   Name:

**Interactive Tools**

Requires TransCAD V6 Build 9025

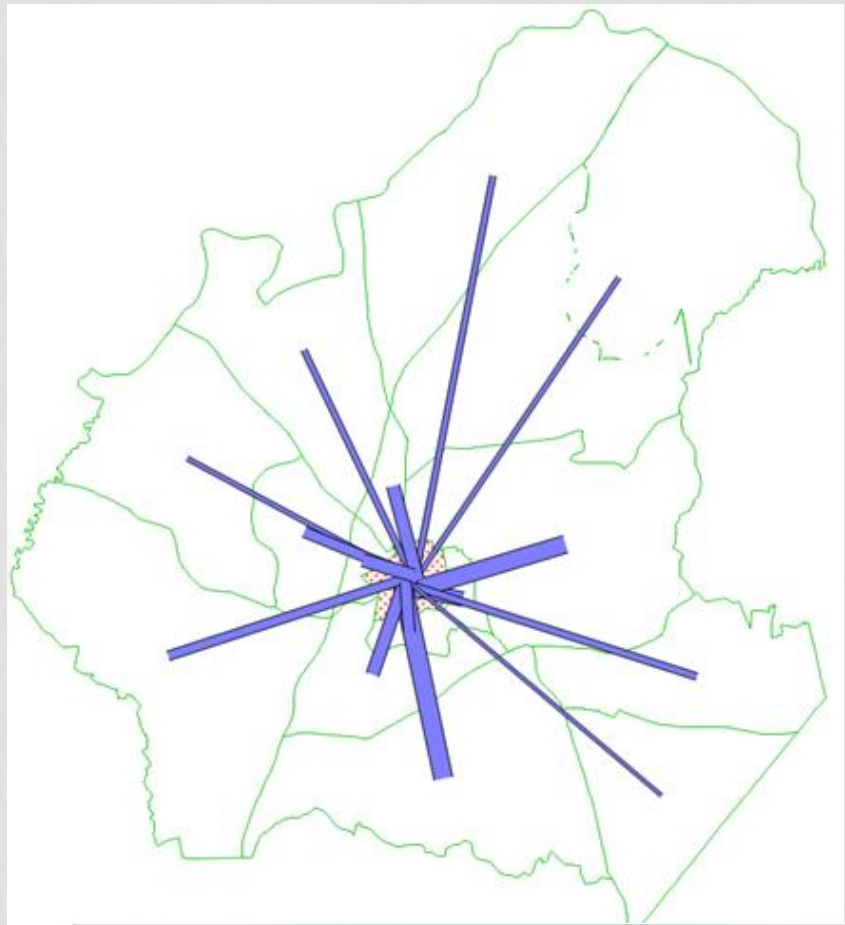


**V/C Map Creator**

Select LOS

Select TOD

Create Map Close



**Desire Line Toolbox**

1. Origin or Destination

2. Aggregation

3. Create Selection Set

4. Time of Day

Help

"I want to see trips originating from the zones I select aggregated to a district."

"I want to see trips in the AM period."

Create Map Quit

**Interactive Tools**

Isochrone Select Link V/C Map Desire Lines

Quit

Requires TransCAD V6 Build 9025



# NEXT STEPS

## Update default rates and parameters

- NCDOT participated in NHTS add-on program
- Use new NHTS data to re-estimate models

## GitHub

- Current model maintained on several computers and distributed via DVD
- Move platform to GitHub to facilitate updates, version tracking, and delivery

## Wiki

- All documentation currently maintained in MS Word files and delivered via PDF
- Move documentation to interactive Wiki document

## Expand Training

- Current training is provided to NCDOT staff only
- Expand training to include MPOs and RPOs

## Other

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