

A stylized map of Michigan is centered in the background, filled with a fine grid pattern. The map is rendered in a dark blue color against a lighter blue gradient background.

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*Southeast Michigan Council of Governments*

# Network Management in SEMCOG's E5 Travel Demand Model

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*Transportation Technical Committee Meeting*

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# Network Management: E4 Model

- Multi-Year Database System: MYDBS
  - For coding projects, extracting highway network for RTP/TIP
- “Mid-Term” Network Management System: NMS
  - For modeling impacts of MDOT Metro Region construction projects

# Using MYDBS

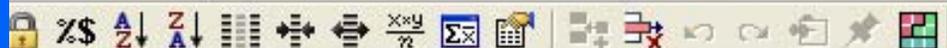
- Single TransCAD line layer containing highway links for all RTP scenarios
- Scenarios (years) were predefined
- 0/1 fields indicated which links were “turned on” in each scenario
- Separate columns for number of lanes in each scenario

TransCAD (Licensed to SEMCOG) - [Dataview1 - HWYLINK:1]

File Edit Dataview Selection Tools Procedures Networks/Paths Route Systems Planning Transit Routing/

All Records

ID	Length	Dir	YR02	YR05	YR07	YR08	YR09	YR10	YR11	YR15	YR18	YR20	YR25	YR30
14223	0.36	-1	1	1	1	1	1	1	1	1	1	1	1	1
27575	0.01	0	0	0	0	0	0	1	1	1	1	1	1	1
1070	0.50	1	1	1	1	1	1	1	1	1	1	1	1	1
20350	0.03	1	1	1	1	1	1	0	0	0	0	0	0	0
27417	0.17	-1	0	0	1	1	1	1	1	1	1	1	1	1
20293	0.17	1	0	0	0	0	0	0	0	1	1	1	1	1
27361	0.07	0	0	0	0	0	0	0	0	1	1	1	1	1
27362	0.04	0	0	0	0	0	0	0	0	1	1	1	1	1
27357	0.19	1	0	0	0	0	0	0	0	1	1	1	1	1
27370	0.09	-1	0	0	0	0	0	0	0	1	1	1	1	1
27366	0.27	1	0	0	0	0	0	0	0	1	1	1	1	1
27435	0.14	1	0	0	1	1	1	1	1	1	1	1	1	1
26797	0.10	0	1	1	1	1	1	1	1	1	1	1	1	1
20141	0.42	1	1	1	1	1	1	1	1	0	0	0	0	0
20140	0.15	1	1	1	1	1	1	1	1	0	0	0	0	0
20139	0.68	1	1	1	1	1	1	1	1	1	1	1	1	1
27273	0.37	1	0	0	0	0	0	0	0	1	1	1	1	1

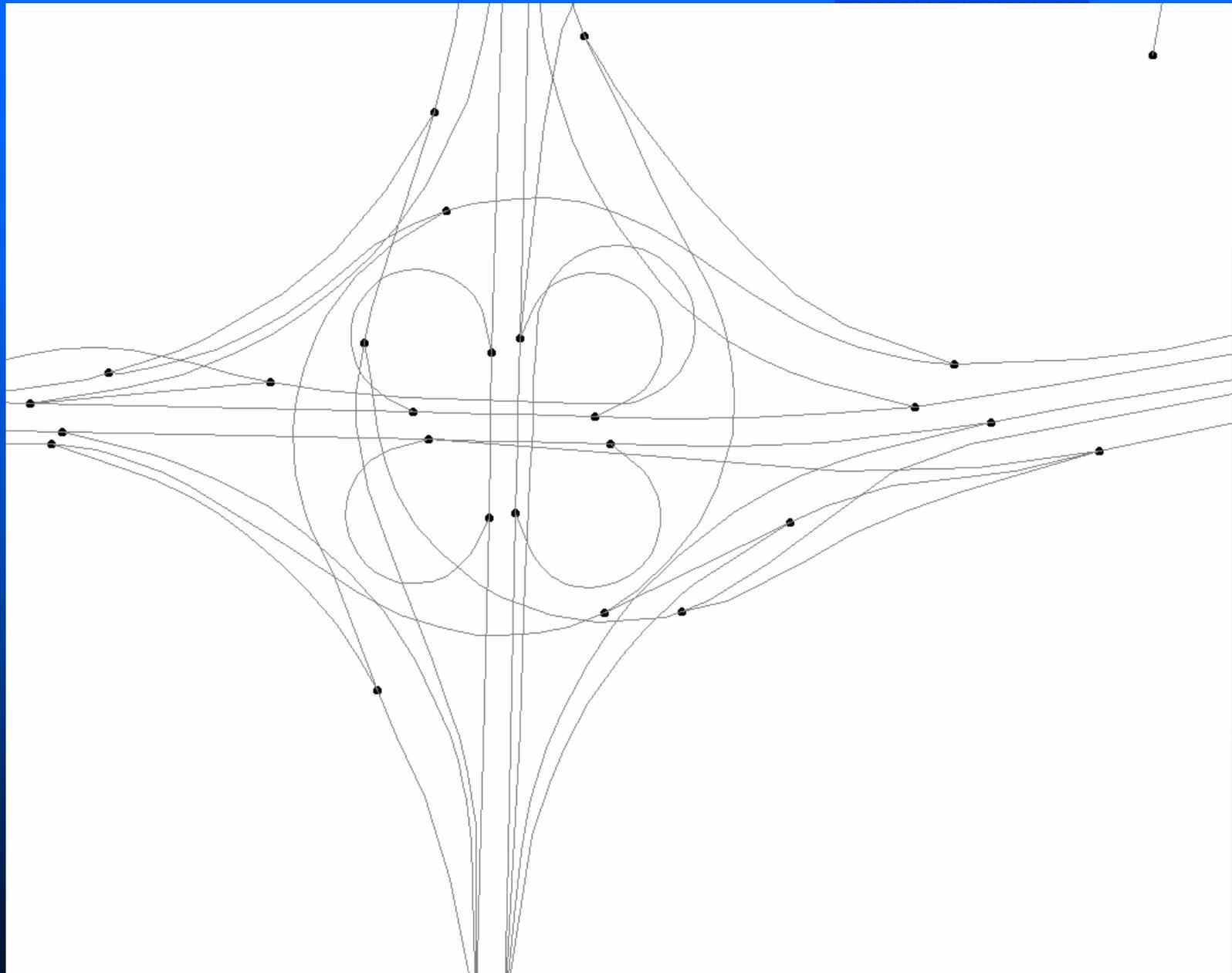


20	YR25	YR30	AB_LANES02	AB_LANES05	AB_LANES07	AB_LANES08	AB_LANES09	AB_LANES10	AB_LANES11	AB_LANES15	AI
1	1	1	0	0	0	0	0	0	0	0	0
1	1	1	0	0	0	0	0	1	1	1	1
1	1	1	2	2	2	2	2	2	2	2	2
0	0	0	2	2	2	2	2	0	0	0	0
1	1	1	0	0	0	0	0	0	0	0	0
1	1	1	0	0	0	0	0	0	0	0	1
1	1	1	0	0	0	0	0	0	0	0	2
1	1	1	0	0	0	0	0	0	0	0	2
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1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	1	1	1	1	1	1	1	1	0
0	0	0	1	1	1	1	1	1	1	1	0
1	1	1	2	2	2	2	2	2	2	2	2
1	1	1	0	0	0	0	0	0	0	0	2
1	1	1	0	0	0	0	0	0	0	0	1
1	1	1	0	0	0	0	0	0	0	0	2
1	1	1	0	0	0	0	0	0	0	0	1
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1	1	1	0	0	0	0	0	0	0	0	0

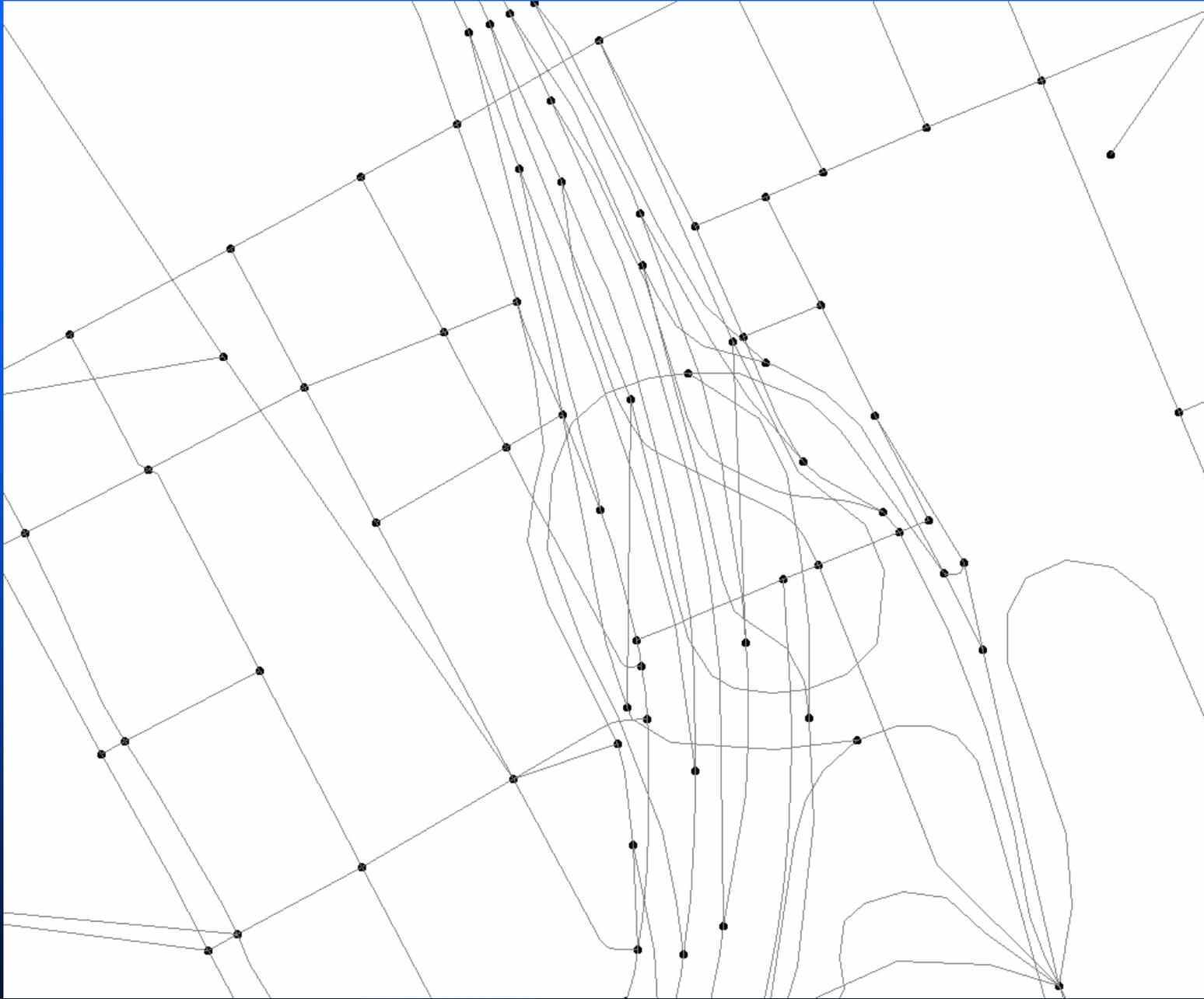


# MYDBS: Problems

- Adding new scenarios
- Finding all links associated with individual projects
- Multiple columns for lane attributes
- Error control
- Visual clutter for complicated projects



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# Using “Mid-Term” NMS

- Add-in tool within TransCAD
- Allowed user to modify link attributes, with changes stored in separate table
- Each change had start/end date
- Changes could be grouped into projects
- User picked specific date to model, then changes were posted to line layer

Network Management Toolbox (Layer: HWYLINK)

Data: ScenNet1

Project: 100

Links:

Start: 2006/01/01 End: 2006/01/15 Update On: 2006/01/08

Dataview1 - scenario1

Link	Project	Start_Date	End_Date	[AB Lanes]	[BA Lanes]	[AB Capacity]	[BA Capacity]	[AB Speed]	[BA Speed]	Comments
1111	A1	2006/01/01	2006/12/01	1	1	1560.00	1560.00	30.00	30.00	
19067	100	2006/01/01	2006/01/15	1	1	1800.00	1800.00	35.00	35.00	
19068	100	2006/01/01	2006/01/15	1	1	1800.00	1800.00	35.00	35.00	
19071	100	2006/01/01	2006/01/15	1	1	1800.00	1800.00	35.00	35.00	
19072	100	2006/01/01	2006/01/15	1	1	1800.00	1800.00	35.00	35.00	Temp

# “Mid-Term” NMS: Problems

- Topological changes not allowed
- Did not allow two or more scenarios to include projects from same time period
- Application bugs
- Limited application usefulness
- No relationship with MYDBS

# Solution: *Master Network* Add-In Tool

- Joined Caliper's project to create an enhanced TransCAD scenario management tool: *Master Network*
- Cost to participate: \$40,000
- SEMCOG's role: identifying bugs
- Caliper's role: fixing bugs, very limited customization

# Using *Master Network*

- Transform ordinary TransCAD line layer into “master network” base
- Use *Master Network Interface* toolbox:
  - Add scenarios, projects, activities
  - Group projects/activities into scenarios
- Use TransCAD’s standard editing tools to code topology/attribute changes

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The screenshot shows the ArcGIS software interface. The menu bar includes 'Data View', 'Selection', 'Tools', 'Procedures', 'Networks/Paths', 'Route Systems', 'Planning', 'Transit', 'Routing/Logistics', and 'Statistics'. The 'Tools' menu is open, displaying a list of tool categories and their keyboard shortcuts. The 'Add-Ins' option is highlighted, and a sub-menu is visible with the following items:

- Master Network
- Export to Master Network

The background of the application window shows a network diagram with various nodes and connections.

**Master Network** [X]

Scenario

Base Year [v]

**Master Network Design** [X]

Master Network

- Master Network
  - + Scenario 1
  - + Scenario 2
  - + Scenario 3

All Scenarios

Name	Description	Date
Scenario 1	2010 Projects	01/01/2010
Scenario 2	2015 Projects, Alt A	01/01/2015
Scenario 3	2015 Projects, Alt B	01/01/2015

Master Network

Scenario

Base Year

Master Network Design

Master Network

- Master Network
  - Scenario 1
    - + Project 1
    - + Project 2
    - + Project 3
  - Scenario 2
    - + Project 1
    - + Project 2
    - + Project 3
    - + Project 4
    - + Project 5
  - Scenario 3
    - + Project 4
    - + Project 5

All Projects

In	Name	Description
<input type="checkbox"/>	Project 1	Rochester, Wattles, Long Lake
<input type="checkbox"/>	Project 2	Griswold, Jefferson, Larned
<input type="checkbox"/>	Project 3	15 Mile, Schoenherr, Moravian
<input checked="" type="checkbox"/>	Project 4	I-696 @ I-94
<input checked="" type="checkbox"/>	Project 5	I-75 @ M-59

Add Project   Copy Project   Move Up

Delete Project   Sort by Name   Move Down

OK   Cancel

Master Network

Scenario

Base Year

Master Network Design

Master Network

- Master Network
  - Scenario 1
    - + Project 1
    - + Project 2
    - + Project 3
  - Scenario 2
    - + Project 1
    - + Project 2
    - + Project 3
    - + Project 4
    - + Project 5
  - Scenario 3
    - + Project 4
    - + Project 5

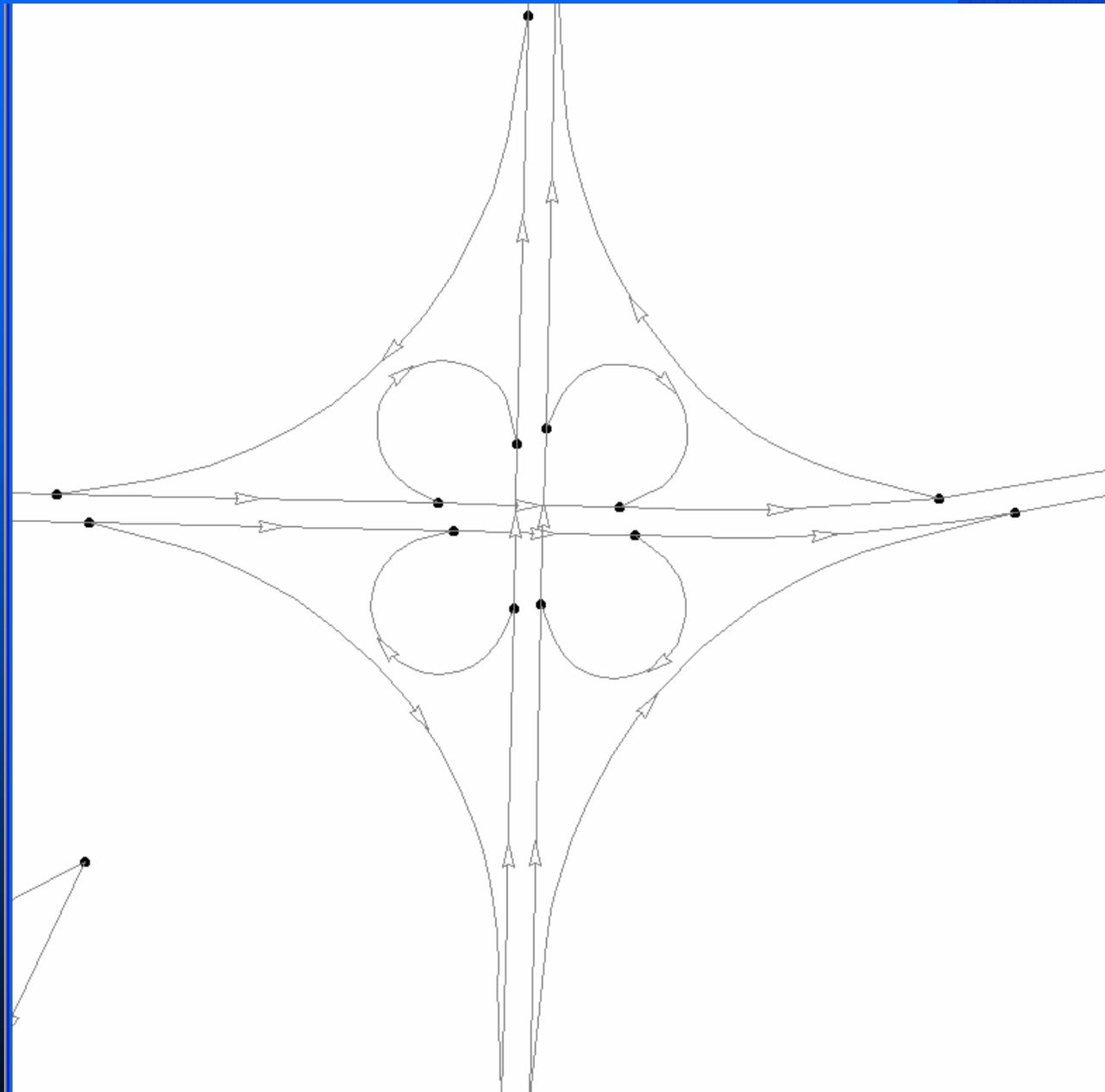
All Activities

Name	Description	Effective Date	Discontinue
Project 5	I-75 @ M-59	11/28/2014	01/01/2040

Add Activity      Move Up

Delete Activity      Move Down

OK      Cancel



**Master Network** [X]

Scenario  
Base Year [v]

[Icons: Home, Back, Forward, Stop, Refresh, Zoom In, Zoom Out, Search, Erase, Undo, Redo]

Projects [v]

[Empty list box]

Activities [v]

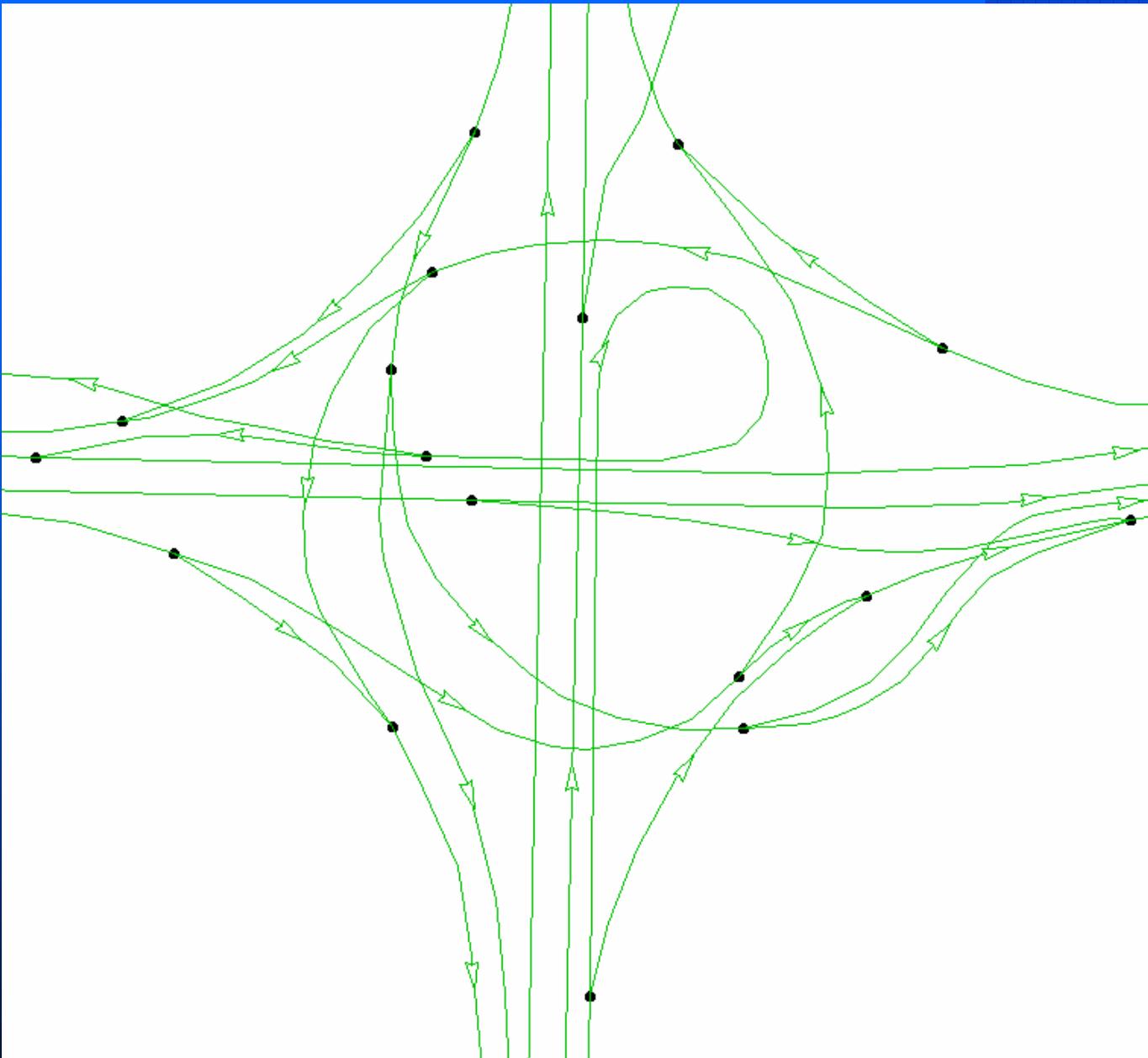
[Empty list box]

**Endpoints Selection**

[Icons: Home, Back, Forward, Stop, Refresh, Zoom In, Zoom Out, Search, Erase, Undo, Redo]

Selection

[Navigation arrows] | 0 of 0



**Master Network** [Close]

Scenario  
All Projects [Dropdown]

[Home] [Back] [Forward] [Up] [Info] [Print]

[Layers] [Refresh] [Delete] [Add] [Search] [Tools]

Projects [Filter]

- Project 2530
- Project 4429
- Project 958
- Project 6022
- Project 6023
- Project 1235
- Project 6502
- Project 2591
- Project 4037**
- Project 2514

Activities

- Project 4037**

**Network Selection**

[Home] [Back] [Forward] [Up] [Info] [Print]

[Layers] [Refresh] [Delete] [Add] [Search] [Tools]

Selection

# Using *Master Network* for 2035 RTP

- Created base network
- Coded past, present, future projects (back to 2002, forward to 2035)
- Coded all 400+ projects in one scenario
- Modified the scenario date, exported network as new TransCAD line layer
- Exported 8 networks for 8 RTP runs

# Using *Master Network* for MDOT Construction Coordination

- Created new master network, using 2010 RTP highway network as base
- Set up network to allow changes to free-flow speed, capacity
- Worked with Metro Region to identify 2010 projects/scenarios to model
- Coded 2 scenarios, 21 projects

# *Master Network Concerns*

- SEMCOG transit network not integrated into tool
- Difficulties with projects coded “on top” of previous projects
- Difficulties modifying the same link in scenarios covering the same time frame
- Migration to newer MGF versions