

# **The Metrolina Regional Model's Role in CRTPO's 2045 MTP Development Process**

NCMUG

November 1, 2018

- **Project Prioritization**
- **Scenario Planning**
- **Lessons Learned**

# Project Prioritization



Tier I Criteria	Points
Congestion	100
Safety	50
Accessibility to Employment	50
<b>TOTAL</b>	<b>200</b>

Tier II Criteria	Points
Environmental Justice Impacts	9
Natural Resource Impacts	9
Historic Resource Impacts	9
Community Resource Impacts	9
System Connectivity	14
Benefit Cost Ratio	50
<b>TOTAL</b>	<b>100</b>

## Purpose: How Well the Project Serves Jobs Today

### STEP 1



**Identify  
Employment  
Centers Based on  
CONNECT Data  
and Existing  
Employment  
Density**

### STEP 2



**Estimate Traffic  
Volumes Carried by  
Each Candidate Project  
to/from Employment  
Centers**

### STEP 3

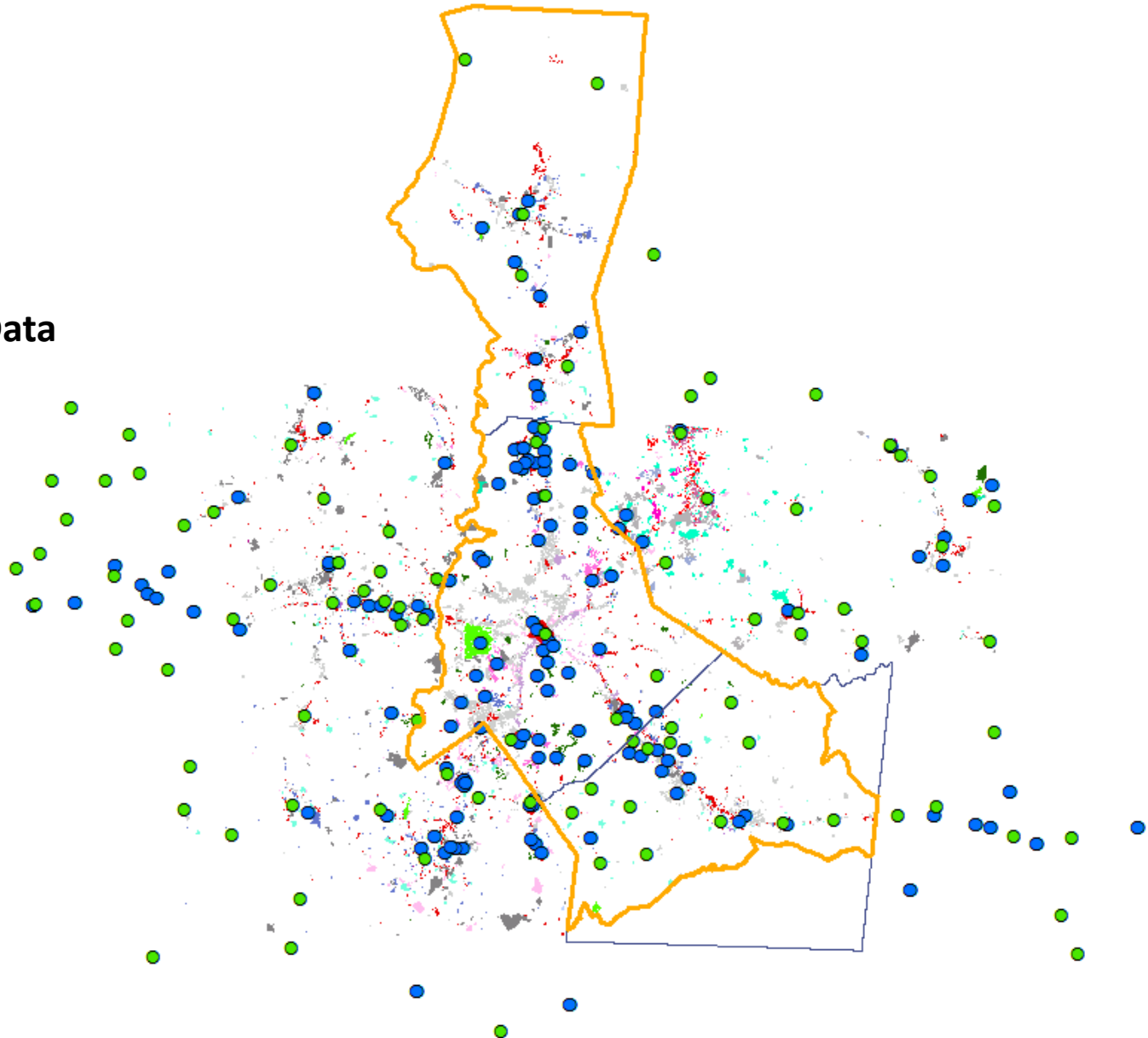


**Projects Assigned  
Points on 1-50  
Scale Based on  
Traffic Volumes**

## STEP 1



### CONNECT Land Use Data

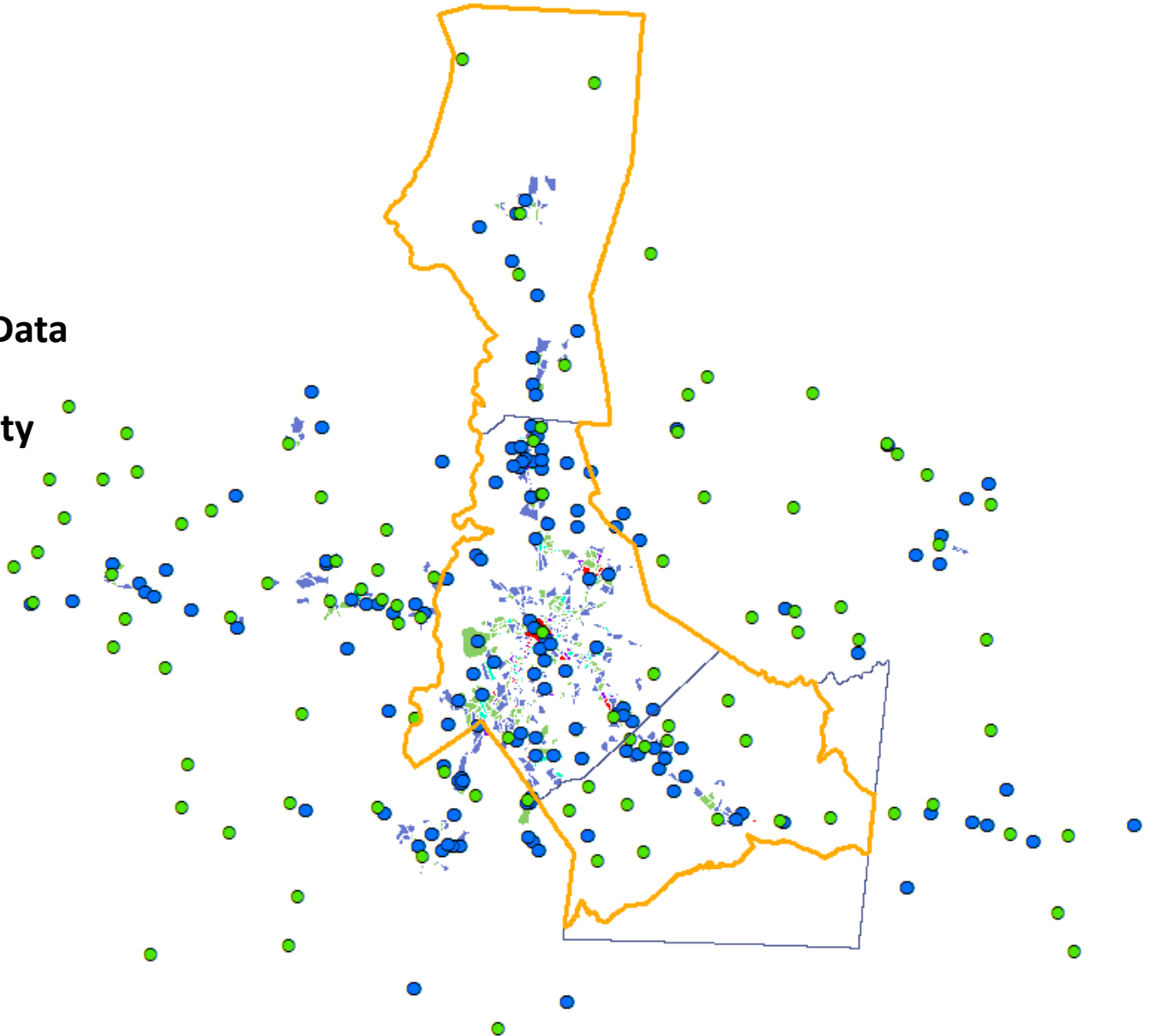


**STEP**

**1**



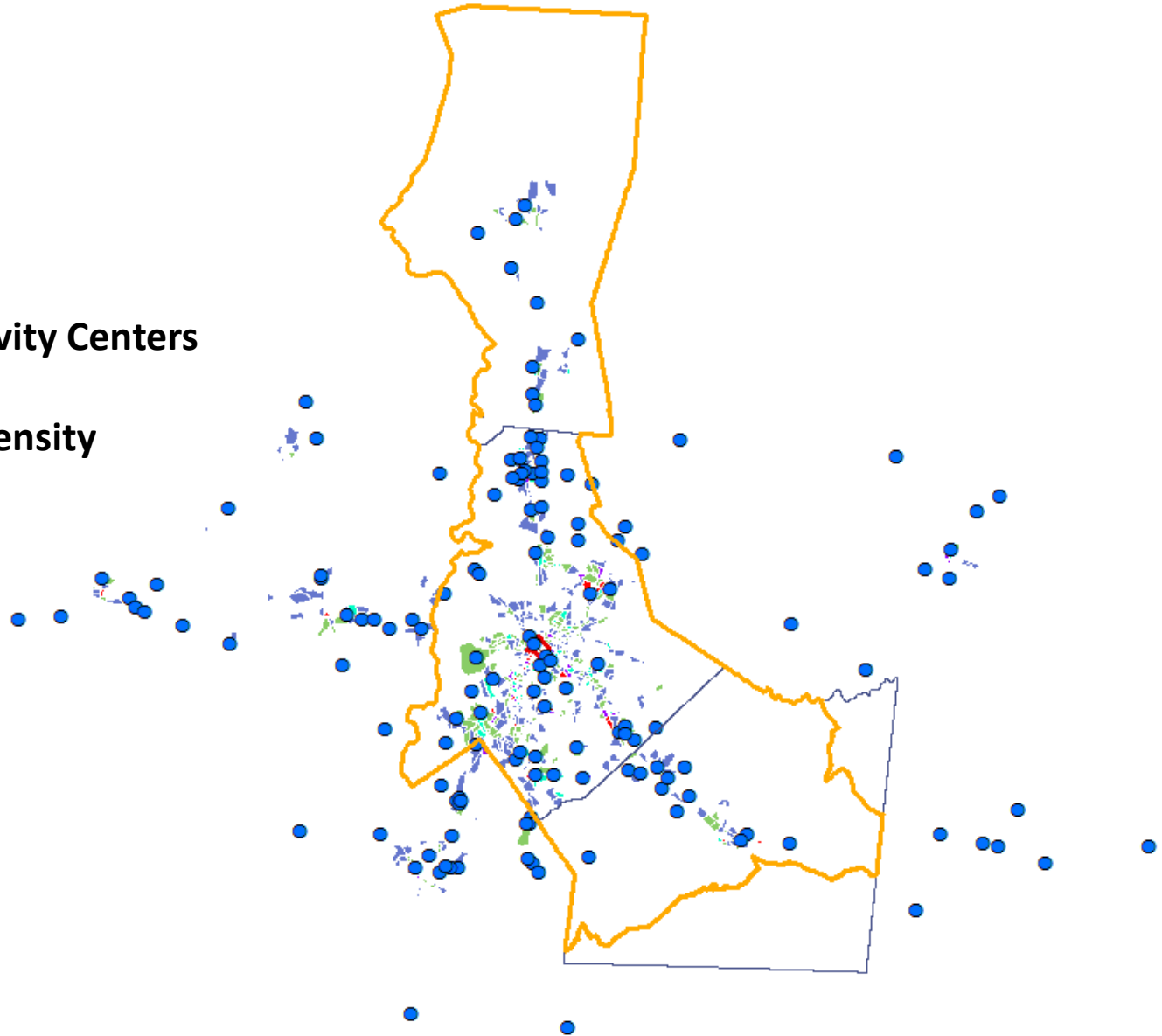
**CONNECT Land Use Data  
&  
Employment Density**



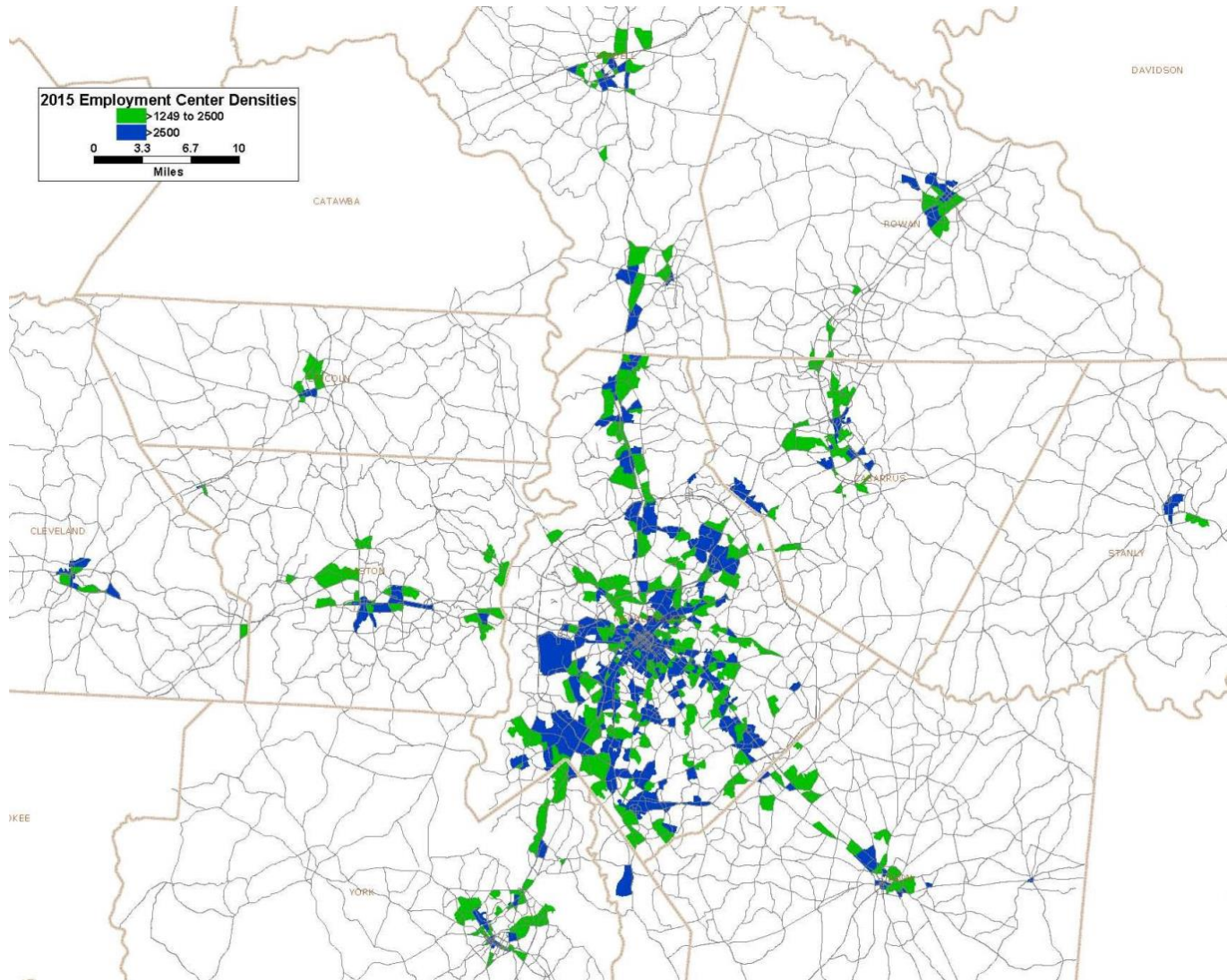
## STEP 1



**CONNECT Major Activity Centers  
&  
Employment Density**

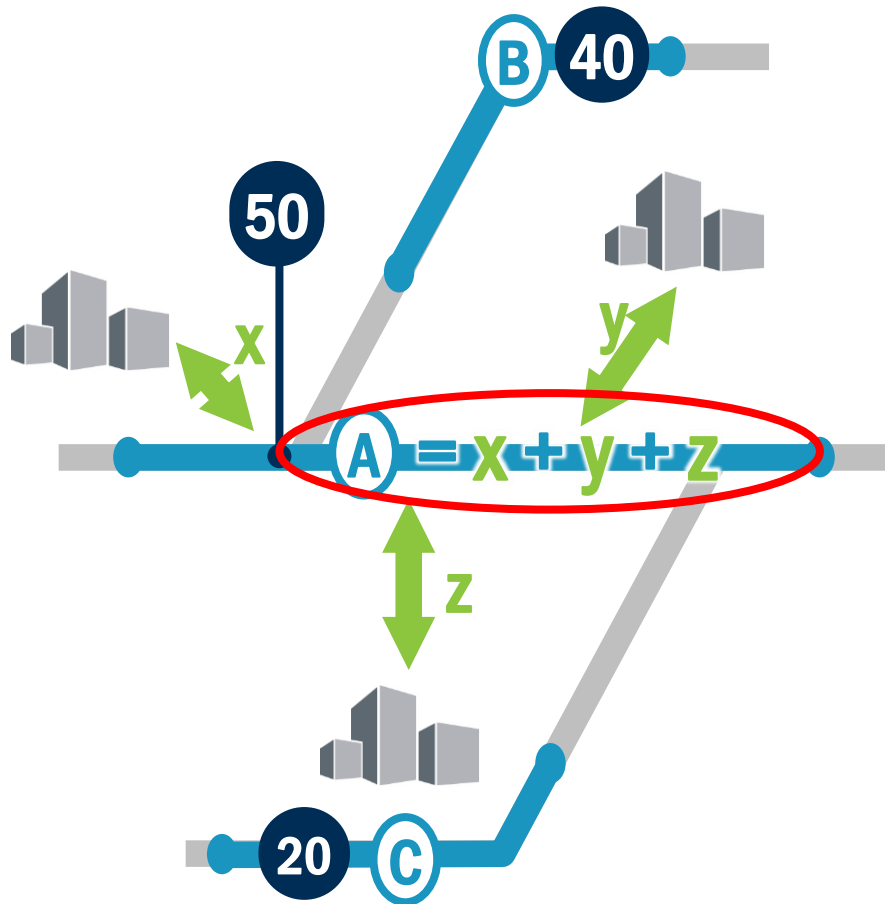


## STEP 1



**Employment Centers Used For Evaluating Candidate Roadway Projects**





Identify Employment Centers



Run MRM & Select Zone Analysis



Estimate Traffic Volumes for All Candidate Projects



Normalize Traffic Volumes & Assign Points 1 to 50



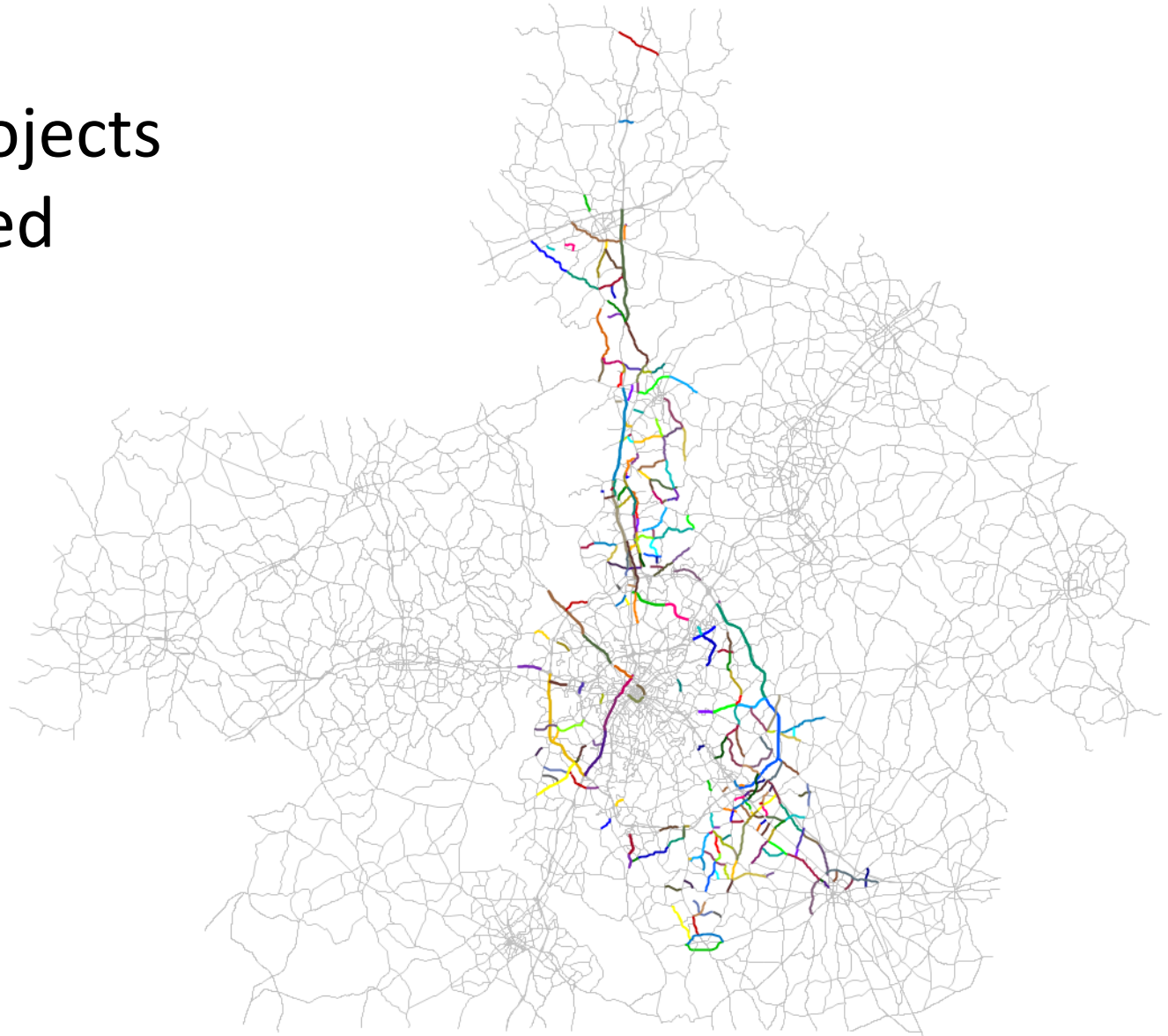
Tier I Criteria	Points
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Tier II Criteria	Points
Environmental Justice Impacts	9
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System Connectivity	14
Benefit Cost Ratio	50
<b>TOTAL</b>	<b>100</b>

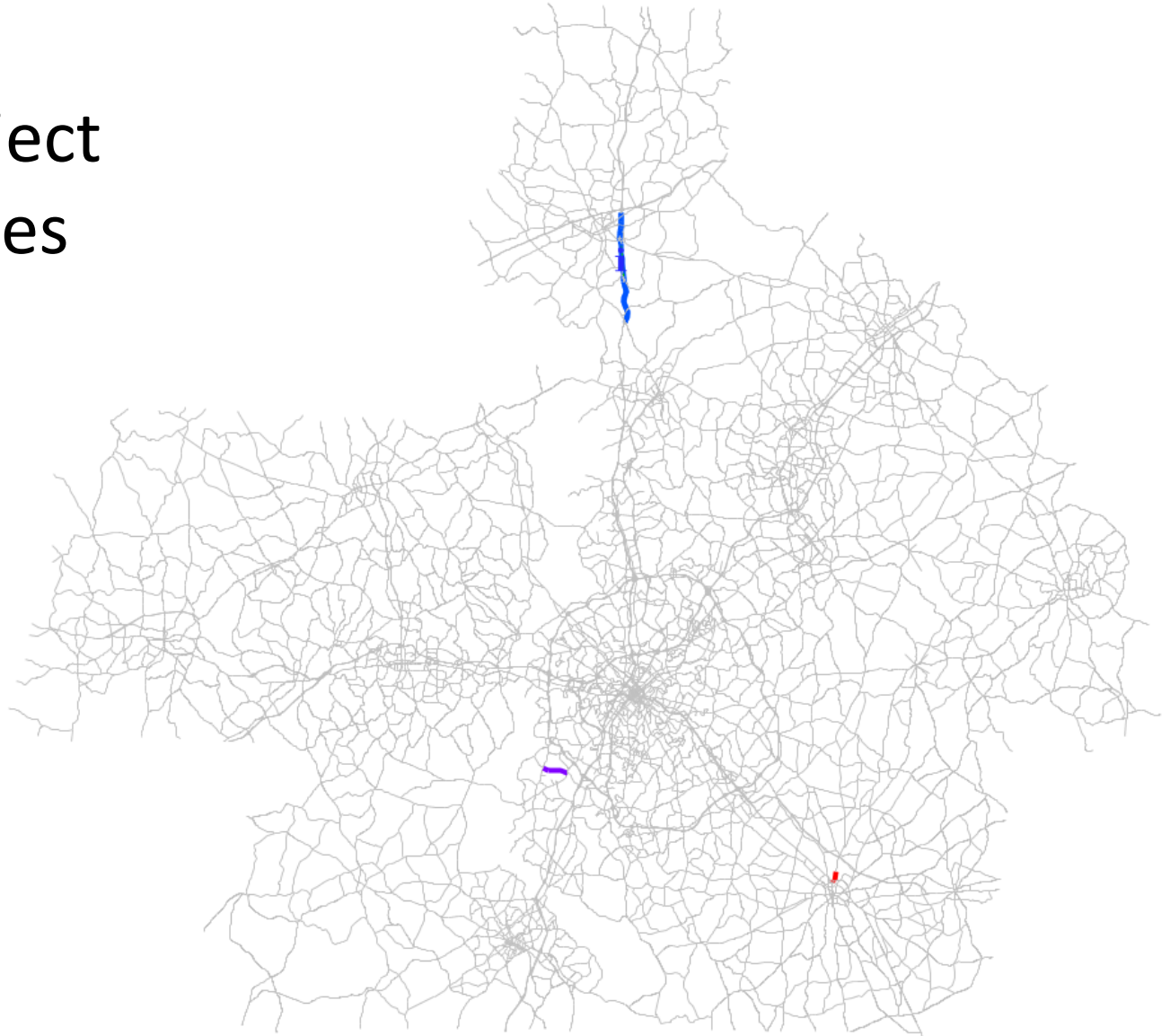
Tier II: Benefit/Cost Ratio	
$\frac{\text{Value of Travel Time Savings} + \text{Value of Safety Benefit}}{\text{Project Cost to NCDOT}}$	$+ \frac{\text{Other Funds}}{\text{Total Project Cost}}$

- Average weekday vehicle hours saved (for autos and trucks) from MRM
- Reductions in travel time are converted to a dollar amount in annual savings provided.
- Value of time for autos = \$12.75; trucks = \$50.003

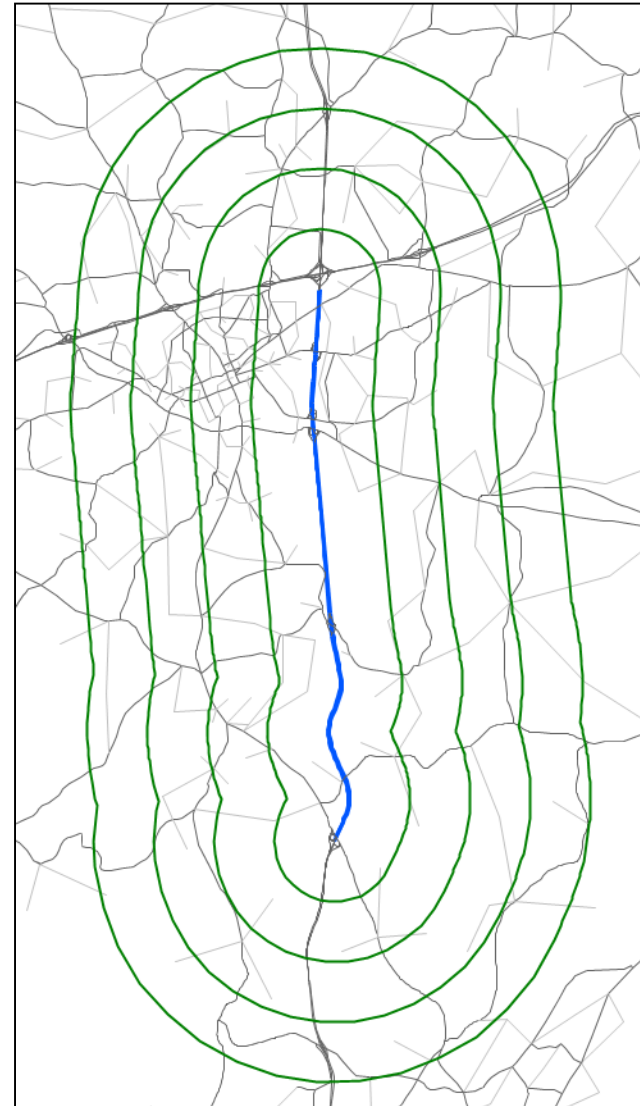
- 122 projects modeled



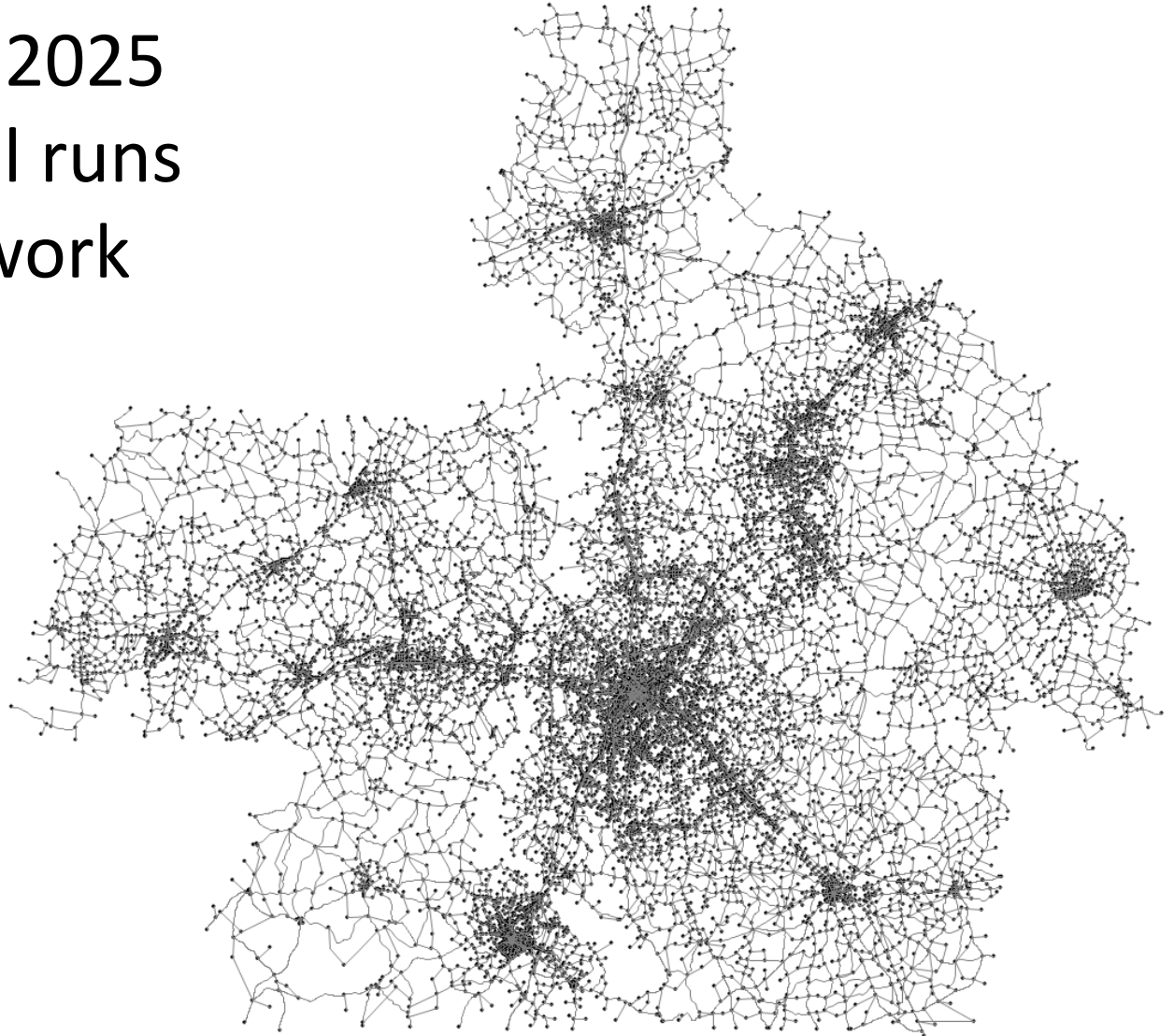
- 27 project packages



- Automatically calculates 1, 2, 3 & 4 mile buffer widths
- Review VMT and VHT results and pick most appropriate buffer



1. Full 2015 & 2025  
MRM model runs  
on E+C network



2. Build “project package” network, then assignment with existing trip tables

Highway Assignment on Existing Trip Tables

Run Directory: C:\TTS AV05\Metrolina\2025

Base Highway Name: RegNet25

Base Run Year: 2025

Area type from this folder is used and CapSpd re-run on alternate network

Alt Hwy name: RegNetTTS AV05

Get Alternate Highway Network

- Use existing alternate highway file
- Copy alternate hwy file from other folder
- Create new alternate highway file

Use this hwy file: C:\TTS AV05\Metrolina\2025\RegNetTTS AV05.dl

Set Alt Hwy

Assignment output put in subfolder Dir\<<AltSubDir>\HwyAssn  
Enter only name - no \\ !

Folder name:

Run Hwy Assn

Messages

Set AltHwyName to: RegNetTTS AV05  
Use network RegNetTTS AV05, areatype (2025). Run CapSpd  
Run MRM Trips, Job 1= CapSpd, Wed Oct 31 13:48:11 2018

Clear Return



3. Buffer Stats  
Toolbox creates  
buffers,  
compiles VMT  
and VHT results,  
& exports to  
output table

Buffer Stats - VMT-VHT Statistics for a Project Buffer

Base Highway Map used to create buffer  
Map: Buffer Base Map, Layer: [empty] [new map] [add to map] [file name] [clear]

Folder for buffer files [change folder]

MRM Network Project .dbf file  
.dbf view: Node:1, Set Name: TTSAV05 [open file] [file name] [clear]

Choose project or type proj num  
3816, 3129, TIP n/a, Westinghouse Blvd, Steele Creek Rd (NC 160) to S Tryon St (NC 49), Meck [dropdown]

Create Buffer  
Buffer this set: [dropdown], Buffer size (mi): 123&4 mi. [checkbox checked] [Create Buffer]

Buffer View [add to map] [file name] [clear]

NO BUILD network  
RegNet25 [dropdown] [add to map] [file name] [clear]  
No Build Tot\_Assn File  
C:\TTSAV05\Metrolina\2015\HwyAssn\HOT\Tot\_Assn\_HOT.bir [open file]

BUILD network  
RegNet25:1 [dropdown] [add to map] [file name] [clear]  
Build Tot\_Assn File  
C:\TTSAV05\Metrolina\2015\HwyAssn\HOT\Tot\_Assn\_HOT.bir [open file]

Base year for No Build: 2025 [input] [Buffer Stats]

Message  
Build Tot\_Assn - Error Opening File

[Close]

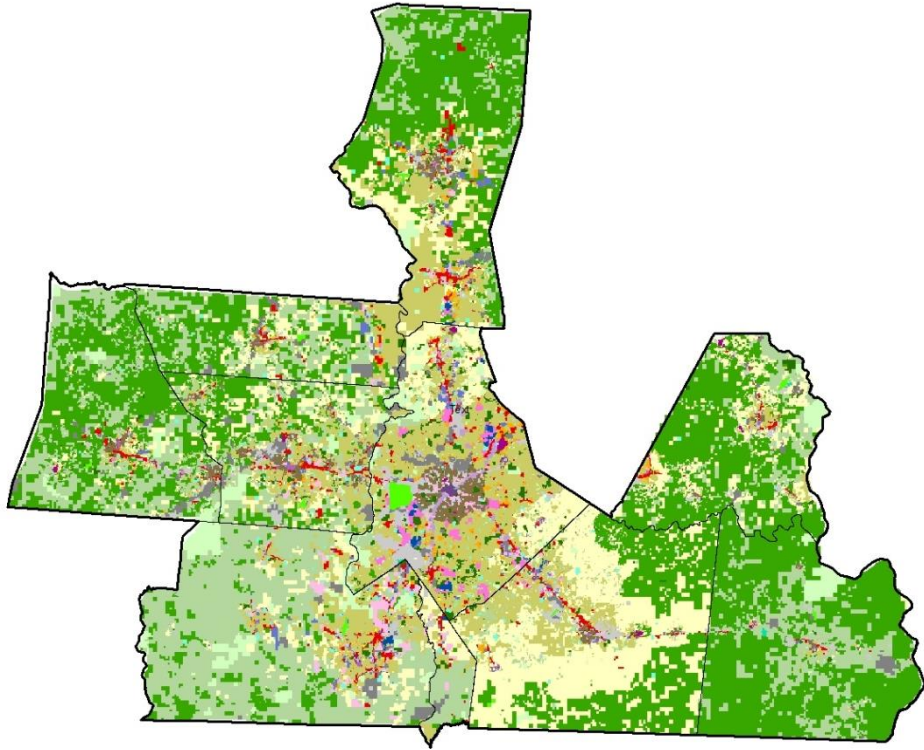
2017 PROJECT RANKINGS									
VEHICLE MILES TRAVELED - VEHICLE HOURS TRAVELED REPORT									
Analysis Year:	2025								
MTP 2045_No:	1015								
Project Index:	1803								
Project NC TIP:									
Project name:	I-77 Widening (Iredell)								
Project limits:	US 21 to I-40								
Project type:	Widen to 8-lanes								
County:	Iredell								
VMT - Vehicle Miles Traveled					VHT - Vehicle Hours Traveled				
Buffer width					Buffer width				
	1 mi.	2 mi.	3 mi.	4 mi.		1 mi.	2 mi.	3 mi.	4 mi.
<u>Auto (not truck)</u>					<u>Auto (not truck)</u>				
NoBuild	1437017	1832635	2596255	3203038	NoBuild	30991.1	42149.6	56761.9	69134.7
Build	1454118	1845514	2607513	3213390	Build	30314.7	41320.5	55874.7	68230.9
Savings	-17100	-12879	-11258	-10352	Savings	676.5	829.1	887.2	903.8
<u>Truck</u>					<u>Truck</u>				
NoBuild	103293	124411	172385	215466	NoBuild	2122.7	2854.9	3906	4847
Build	104146	124686	172234	215204	Build	2054.1	2767.9	3814.8	4754.9
Savings	-853	-276	151	263	Savings	68.6	87	91.2	92.2

2045 MTP Project No. 1015				
Vehicle Hours Saved				
Year	Average Weekday		Annual Weekdays	
	Auto	Truck	Auto	Truck
2015	392.10	47.70	101,946.00	12,402.00
2016	443.27	52.15	115,250.20	13,559.00
2017	494.44	56.60	128,554.40	14,716.00
2018	545.61	61.05	141,858.60	15,873.00
2019	596.78	65.50	155,162.80	17,030.00
2020	647.95	69.95	168,467.00	18,187.00
2021	699.12	74.40	181,771.20	19,344.00
2022	750.29	78.85	195,075.40	20,501.00
2023	801.46	83.30	208,379.60	21,658.00
2024	852.63	87.75	221,683.80	22,815.00
2025	903.80	92.20	234,988.00	23,972.00
<b>Total</b>	<b>7,127.45</b>	<b>769.45</b>	<b>1,853,137.00</b>	<b>200,057.00</b>

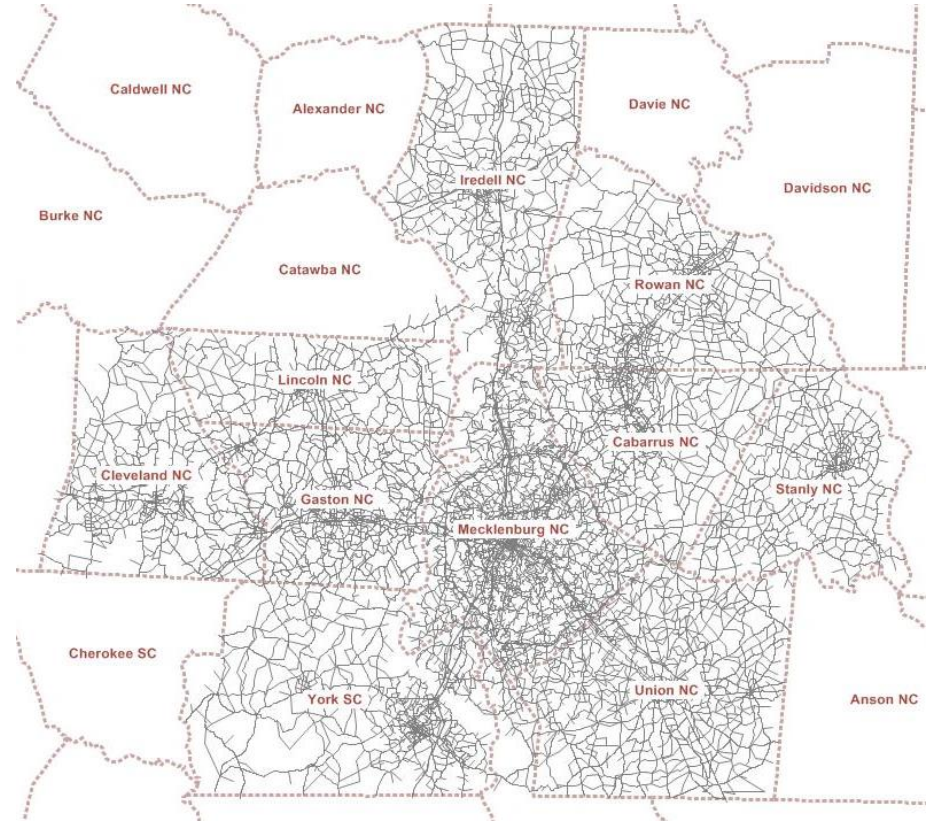
# Project Package QA/QC

1	A	B	C	D	E	F	G	H	I	J	L	M	N											
														PROJECT#	MTP#	INDEX	PROJECT	LIMITS	Description	COUNTY	Run 1		Run 2	
																					Assigned to	4 Mile VHT Saved (auto/truck)		Assigned to
2	3	2015	2025	2015	2025																			
4	TTSAV01	1002	3782	Tomlin Mill Rd Widening	Jennings Rd to Fairmont Rd	Widen to 3 lanes	Iredell		-17 / -3	6 / 1		-17 / -3	6 / 1											
5	TTSAV01	1022	3778	Perth Rd	Cornelius Rd to Massey St	Add median, bike lanes and sidewalk	Iredell		157 / 15	240 / 17		157 / 15	240 / 17											
6	TTSAV01	1047	3760	Coddle Creek Hwy Widening	Rooky River Rd to Cabarrus Co Line	Widen to 4 lanes, median, wost, bike lanes and sidewalks	Iredell		14 / 1	43 / -2		14 / 1	43 / -2											
7	TTSAV01	2077	3186	NC 16 (Providence Rd.)	Cuthbertson Rd to Waxhaw Parkway	Widening (4), Median, Bike lanes	Union	Anna	275 / 10	487 / 29	Martin	275 / 10	487 / 29											
8	TTSAV01	3066	3805	Brookshire Blvd	Gaston Country Line to Bellhaven Blvd	Widen to 6 lanes	Mecklenburg		205 / 31	377 / 33		205 / 31	377 / 33											
9	TTSAV01	3090	3803	Eastern Circumferential Rd	Plaza Rd Ext to Harrisburg	New 4 lane roadway, with multi-use path	Mecklenburg		-84 / -1	-182 / -4		-84 / -1	-182 / -4											
10	TTSAV01	3143	3223	Park Road	Johnston Road to NC 51	Widening (4), Median, wost	Mecklenburg		873 / 53	1,101 / 63		873 / 53	1,101 / 63											
11	TTSAV02	1005	3785	Wilkesboro Highway Widening	Old Wilkesboro Rd to Sullivan Farm Rd	Widen to 4 lanes, median, wost, and sidewalks	Iredell		102 / 6	216 / 7		102 / 6	216 / 7											
12	TTSAV02	1020	3762	S. Main St (US 29/NC 115) Widening	I-77 to Cedar Lane	Widen to 4 lanes, median, wost, multi-use path and sidewalks	Iredell		114 / 9	181 / -3		114 / 9	181 / -3											
13	TTSAV02	1041	3781	Rocky River Rd Widening	Shearers Rd to Coddle Creek Rd (NC 3)	Widen to 4 lanes, median, bike lanes and sidewalks	Iredell		7 / 2	48 / 3		7 / 2	48 / 3											
14	TTSAV02	2064	3828	Monroe Northern Loop	US 74 to Walkup Ave/Bivens Rd	New roadway (2), median, bike lanes	Union		99 / 35	132 / 51		99 / 35	132 / 51											
15	TTSAV02	3051	3101	Hambright Rd. Extension	Everette Keith Rd to Eastfield Road	New (4), Median, Bike lanes	Mecklenburg	Martin	402 / 9	829 / 41	Anna	402 / 9	829 / 41											
16	TTSAV02	3075	3806	Brookshire Blvd	Bellhaven Blvd to I-85	Widen to 6 lanes	Mecklenburg		662 / 20			662 / 20	1,023 / 53											
17	TTSAV02	3099	3079	Eastern Circumferential	Albemarle Rd. to Harrisburg Rd	New Road (4), Median, wost	Mecklenburg		62 / 6	114 / 8		62 / 6	114 / 8											
18	TTSAV02	3132	3052	Carowinds Blvd Extension	South Tryon St to Steele Creek Rd	New Road (2), median, bike lanes	Mecklenburg		456 / 47	912 / 77		456 / 47	912 / 77											
19	TTSAV02	3150	3821	Johnston Rd (US 521)	Lancaster Hwy to Ballantyne Commons Pkwy	Widen to 6 lanes, median	Mecklenburg		514 / 39	878 / 50		514 / 39	878 / 50											
20	TTSAV03	1028	3773	Perth Rd	NC 150 to Cornelius Rd	Add median, bike lanes and sidewalk	Iredell		94/6	86/11		94/6	86/11											
21	TTSAV03	1008	3605	Garner Bagnal Blvd	I-77 to I-77	Widening (4), median, bike lanes	Iredell		8104-104	11721-106		8104-104	11721-106											
22	TTSAV03	2035	3088	Faith Church Extension	US 74 to Monroe Rd	New Road (4), median	Union	Sara	600/22	1475/72	Si	600/22	1475/72											
23	TTSAV03	2069	3830	Morgan Mill Rd (NC 200)	Monroe Connector to US 74	Widen to 4 lanes, median, bike lanes	Union		226/14	522/21		226/14	522/21											
24	TTSAV03	3045	3189	NC 115 (Old Statesville Rd.)	Hambright Rd to Mt Holly Huntersville	Widening (4), Median, Bike lanes	Mecklenburg		49/20	316/99		49/20	316/99											
25	TTSAV03	3112	3076	Eastern Circumferential	Lawyers Rd. to Ildewild Rd	Widening (4) / New Road (4), Median, Bike lanes	Mecklenburg		440/19	525/25		440/19	525/25											
32	TTSAV05	1016	1803	I-77 Widening (Iredell)	US 21 to I-40	Widen to 8-lanes	Iredell	Anna	330 / 48	895/91		330 / 48	895/91											
33	TTSAV05	2063	3831	US 601	US 74 to Monroe Connector	Widen to 4 lanes, median, bike lanes	Union		-91 / -9	-155 / -12	Sara	-91 / -9	-155 / -12											
34	TTSAV05	3129	3816	Westinghouse Blvd	Steele Creek Rd (NC 160) to S Tryon St (NC 49)	Widen to 4 lanes, median, bike lanes	Mecklenburg		439/50	1001/85		439/50	1001/85											
35	TTSAV06	1007	3609	Eastside Dr	Salisbury Rd to East Broad Street	Widening (4), Median, sidewalks	Iredell		19 / 1	19 / -2		19 / 1	19 / -2											
36	TTSAV06	1024	3770	Cornelius Rd Widening	Perth Rd to Bluefield Blvd	Widen to 4 lanes, median, bike lanes and sidewalks	Iredell		78 / -5	114 / -5		78 / -5	114 / -5											
37	TTSAV06	2072	3827	Martin Luther King Jr Blvd (NC 200)	Lancaster Ave to Charlotte Ave	Widen to 4 lanes, median, bike lanes	Union		258 / 7	466 / 21		258 / 7	466 / 21											
38	TTSAV06	3056	3106	Hucks Rd. Extension	Statesville Road to Northlake Ctr Pkwy	New Road (4) Median, Bike lanes	Mecklenburg	Martin	-22 / -22	48 / 10	Si	-22 / -22	48 / 10											
39	TTSAV06	3101	3835	Albemarle Rd	WT Harris Blvd (NC 24) to Eastern Circumferential	Widen to 6 lanes, median	Mecklenburg		225 / 3	257 / 2		225 / 3	257 / 2											
40	TTSAV06	3127	3818	S Tryon St (NC 49)	I-485 to Arrowood Rd	Widen to 6 lanes	Mecklenburg		88 / 10	147 / 13		88 / 10	147 / 13											
41	TTSAV06	3147	3034	Ballantyne Commons Pkwy.	Annalexa Ln to Williams Pond Lane	Widening (4), Median, wost	Mecklenburg		1,573 / 88	2,138 / 120		1,573 / 88	2,138 / 120											
42	TTSAV07	1016	3766	Old Mountain Rd Widening	N Main St (US 21/NC 115) to Buffalo Shoals Rd	Widen to 4 lanes, median, wost, and sidewalks	Iredell		-18 / -17	-17 / -42		-18 / -17	-17 / -42											
43	TTSAV07	2056	3055	Charlotte Ave.	Dickerson Blvd to Airport Rd	Widening (4), Median, Bike lanes	Union		309/20	599/29		309/20	599/29											
44	TTSAV07	3008	3838	Main St (NC 115)	Washam Potts Rd	Widen to 3 lanes, bike lanes	Mecklenburg	Sara	70/2	166/20	Si	70/2	166/20											
45	TTSAV07	3087	3322	US 29/74 (Wilkinson Blvd.)	Little Rock Rd. to I-485(W)	Widening (6)	Mecklenburg		83/0	154/11		83/0	154/11											
46	TTSAV07	3091	3086	Eastway Dr.	Kilborne Dr. to Sugar Creek Rd.	Widening (6) Conc. Median, Bike lanes	Mecklenburg		410/17	580/33		410/17	580/33											
47	TTSAV07	3151	3823	Andrey Kell Rd	Marvin Rd to Tom Short Rd	Widen to 4 lanes, median	Mecklenburg		1517/40	2173/81		1517/40	2173/81											
48	TTSAV08	1033	3600	NC 150	US 21 to NC 801	Widening (2 to 4; 4 to 6), Median, wost; sidewalks	Iredell		304/24	392/25		304/24	392/25											
49	TTSAV08	3070	3178	NC 27 ( Mt. Holly Rd.)	Rhynne Rd to Belmeade Dr.	Widening (4), Median, Bike lanes	Mecklenburg		1109/49	1427/64		1109/49	1427/64											
50	TTSAV08	3079	3305	Harris Blvd. (NC 24)	NC 49 to The Plaza	Widening (6)	Mecklenburg	Si	173/1	286/11	Sara	173/1	286/11											
51	TTSAV08	3124	3819	S Tryon St (NC 49)	Arrowood Rd to Shopton Rd	Widen to 6 lanes	Mecklenburg		370/39	541/58		370/39	541/58											
52	TTSAV08	20312034	3841	Brandon Oaks Pkwy Ext	Old Monroe Rd to CSX Railroad	New Roadway (2)	Union		296/15	704/45		296/15	704/45											
53	TTSAV09	1032	1805	NC 150	NC 801 to Rowan Co. Line	Widening (4), median, side walks, bike lanes	Iredell		84 / -1	136 / -1		84 / -1	136 / -1											
54	TTSAV09	2060	3209	NC 84	Washaw-Indian Tr. Rd. to Airport Rd	Widening (4), Median, Bike lanes	Union		54 / -4	210 / 7		54 / -4	210 / 7											
55	TTSAV09	3044	3839	Verhoeff Dr Ext	Verhoeff Dr Terminus to Asburg Church Rd	New Roadway (2)	Mecklenburg	Anna	149 / 15	547 / 35	Martin	149 / 15	547 / 35											
56	TTSAV09	3074	3840	Eastern Circumferential Rd	Rosemallow Rd to Rooky River Rd	Widen to 4 lanes	Mecklenburg		462 / 5	908 / 14		462 / 5	908 / 14											
57	TTSAV09	3126	3553	I-77 South Widening (HOT)	Woodlawn Rd to SC Line (carried through I-485/W)	HOV/HOT lanes and connectors	Mecklenburg		746 / 30	1,294 / 120		746 / 30	1,294 / 120											
58	TTSAV10	1023	1804	US21/NC115	NC 115 to I-77 (Exit 115)	Widening (4), median, side walks	Iredell		320 / 33	570 / 69		320 / 33	570 / 69											
59	TTSAV10	2046	3309	Wesley Chapel Rd	Old Charlotte Hwy to Goldmine Rd	Widening (4)	Union		74 / -21	264 / -25		74 / -21	264 / -25											
60	TTSAV10	3082	3802	Eastern Circumferential Rd	Rooky River Rd to Plaza Rd Ext	New 4 lane roadway, with multi-use path	Mecklenburg	Martin	13 / 1	37 / 6	Anna	13 / 1	37 / 6											
61	TTSAV10	3102	3552	I-77 South Widening (HOT)	I-277 (Belk) to Woodlawn Rd	HOV/HOT lanes and connectors	Mecklenburg		168 / 2	414 / 40		168 / 2	414 / 40											
62	TTSAV11	1027	3771	Cornelius Rd Widening	Bluefield Rd to US 21	Widen to 4 lanes, median, multi-use path	Iredell		250/5	279 / -21		250 / 5	279 / -21											
63	TTSAV11	3089	3124	I-77 ML Project	I-277 (Belk Fwy.) to 4th St.	Widen from 8 to 10 lanes by adding ML	Mecklenburg		-657 / -81	-701 / -78		-657 / -81	-701 / -78											
64	TTSAV11	3089	3549	I-77 Reconfiguration	I-277 (Belk) to I-277 (Brookshire)	Reconstruction of Morehead Trade/5th St interchan	Mecklenburg		-590 / 70	-626 / 58	Martin	-590 / 70	-626 / 58											
65	TTSAV11	3116	3832	Fairview Rd (NC 218)	Brief Rd to Rock Hill Church Rd	Widen to 4 lanes, median, bike lanes	Mecklenburg-Union		14 / -9	73 / -7		14 / -9	73 / -7											
66	TTSAV11	3148	3824	McKee Rd	Providence Rd (NC 16) to Tilley Morris Rd	Widen to 4 lanes, median, bike lanes	Mecklenburg		169/7	275/13		169 / 7	275 / 13											

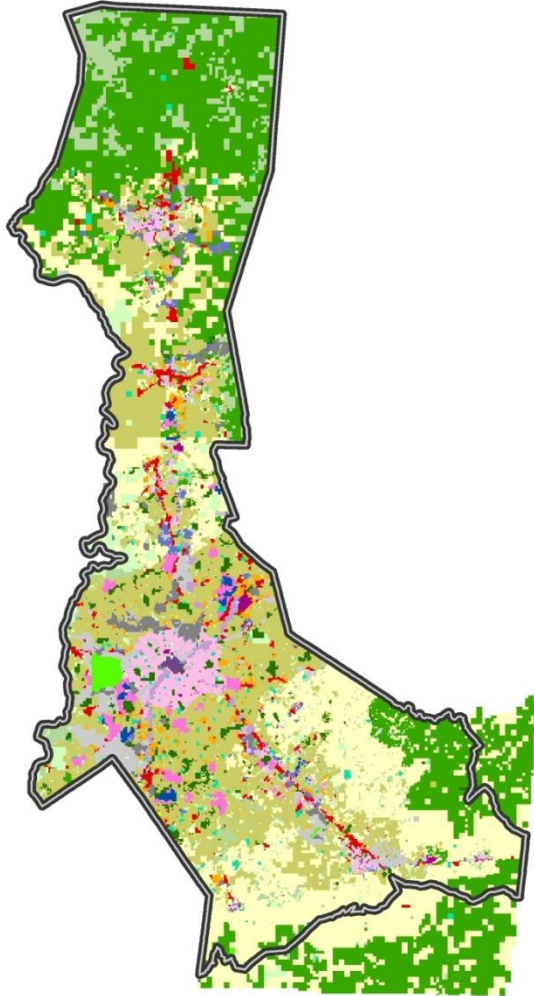
**DISCLAIMER**



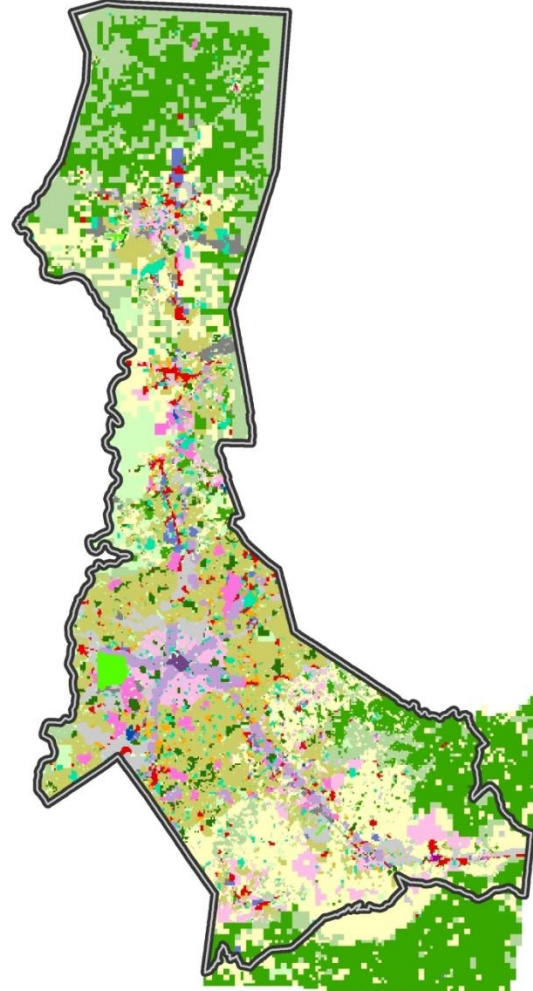
**Metrolina CommunityViz Model**



**Metrolina Regional Model**

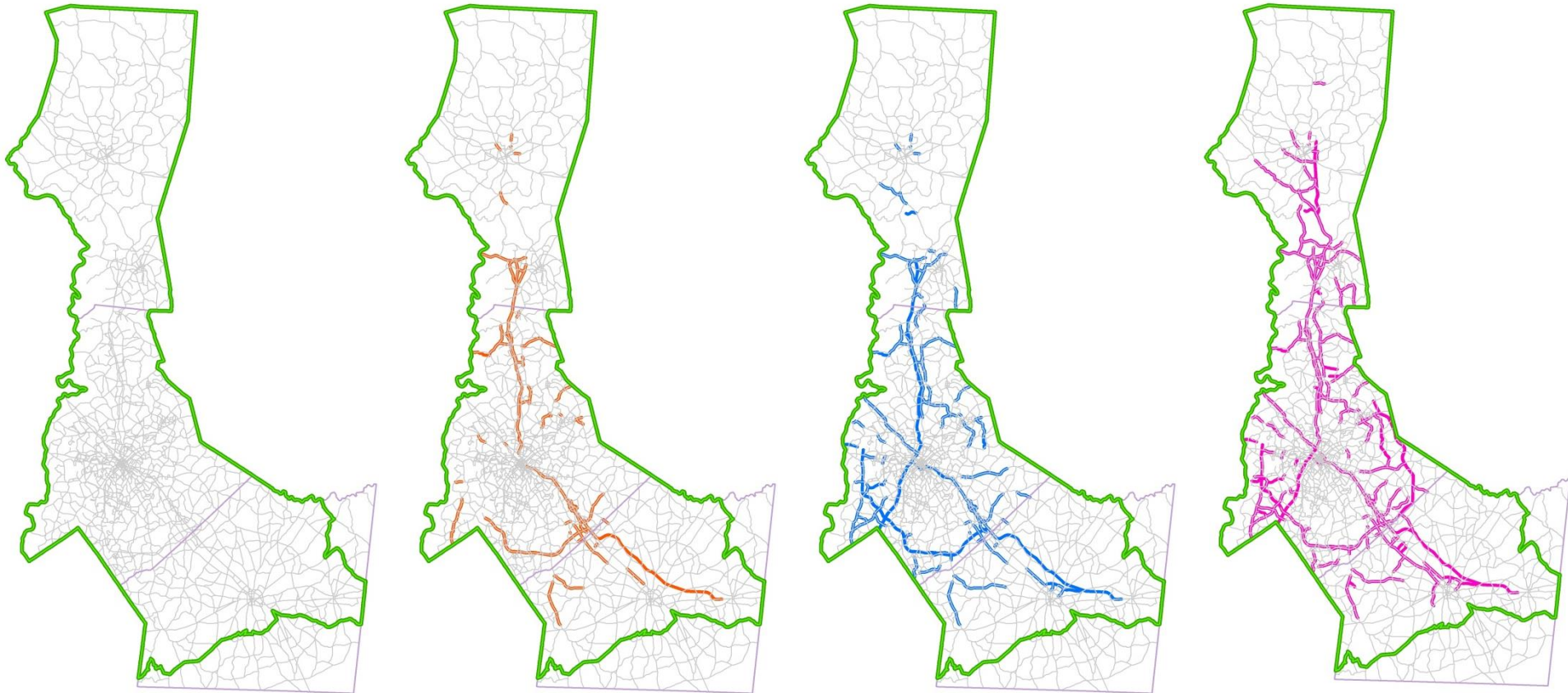


**Community Plans  
Growth Scenario**



**CONNECT Preferred  
Growth Scenario**

## Highway Network Alternatives



**2015**  
Base Year

**2045**  
Existing + Committed Projects  
(Build Out STIP)

**2045**  
MTP Fiscally-Constrained  
Projects

**2045**  
MTP Fiscally-Constrained  
+ All Tier II Projects

10,305 Lane Miles

10,859 Lane Miles (5% ↑)  
36 Interchange & Intersection Projects

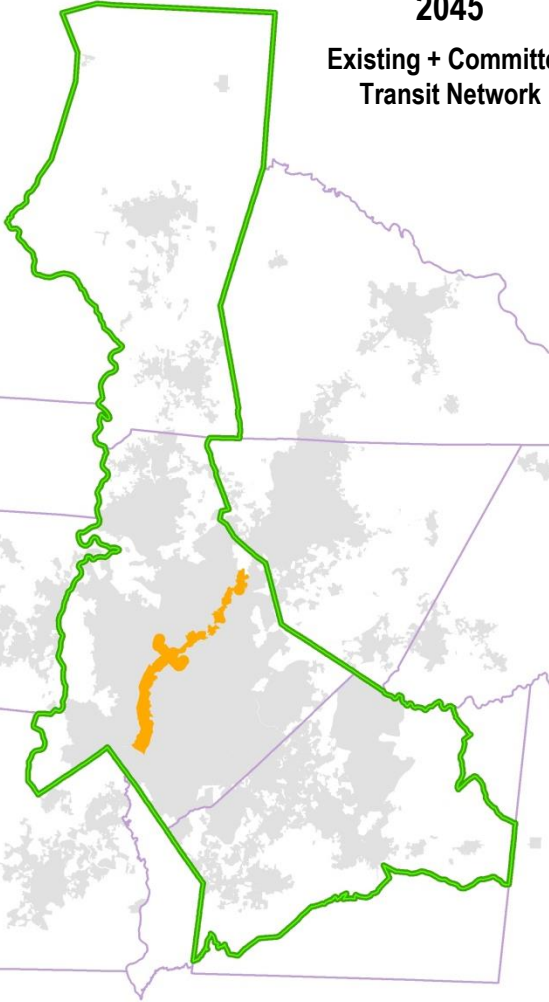
11,045 Lane Miles (7% ↑)  
47 Interchange & Intersection Projects

11,480 Lane Miles (11% ↑)  
52 Interchange & Intersection Projects

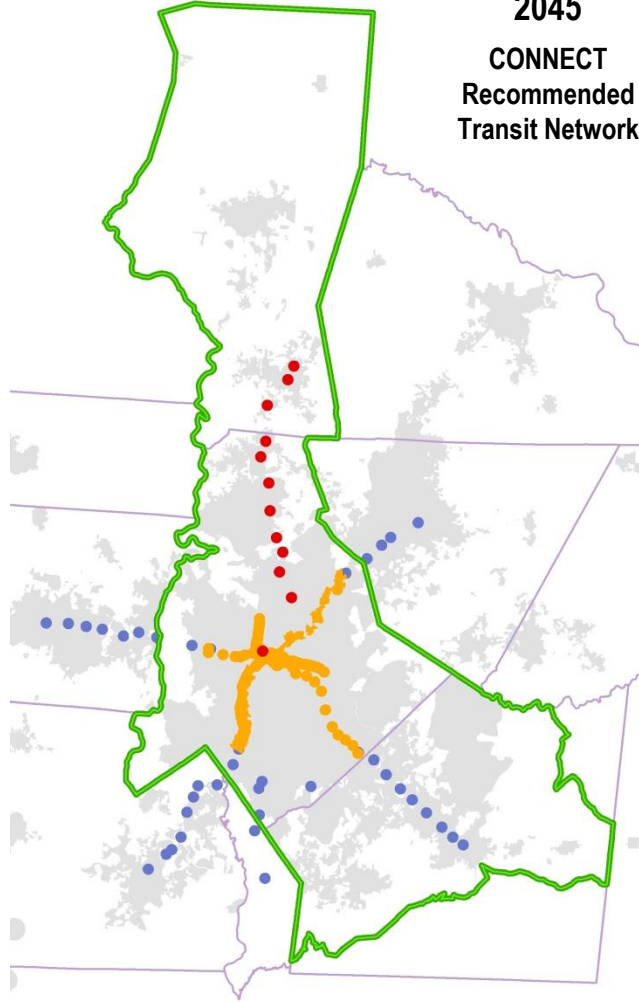


## Transit Network Alternatives

**2045**  
Existing + Committed  
Transit Network



**2045**  
CONNECT  
Recommended  
Transit Network



**Existing + Committed  
Transit Network**

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- LYNX Blue Line (LRT)
- LYNX Gold Line (SC)

**CONNECT Recommended  
Transit Network**

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- LYNX Blue Line (LRT)
- LYNX Gold Line (SC)
- LYNX Red Line (CRT)
- LYNX Silver Line (LRT)
- LYNX Green Line (LRT)
- LYNX to Kannapolis (BRT)
- LYNX to Monroe (BRT)
- LYNX to Ballatyne (BRT)
- LYNX to Indian Land (BRT)
- LYNX to Rock Hill (BRT)
- LYNX to Gastonia (BRT)

● = Streetcar or Light Rail Station Area (½-mile radius)

● = Commuter Rail Station Area (½-mile radius)

● = Bus Rapid Transit Station Area (½-mile radius)

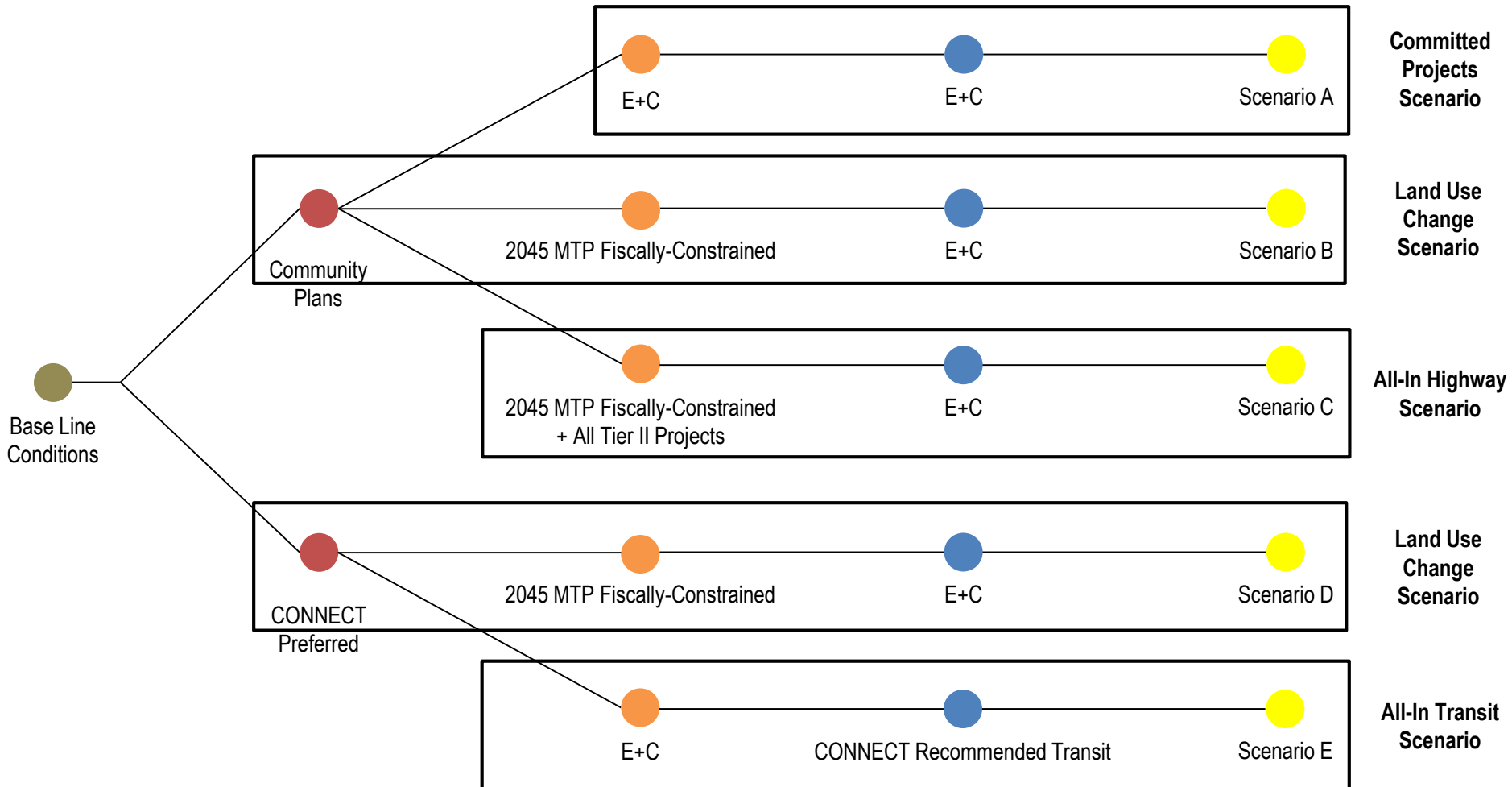
Existing Conditions

Land Use Alternatives

Highway Network Alternatives

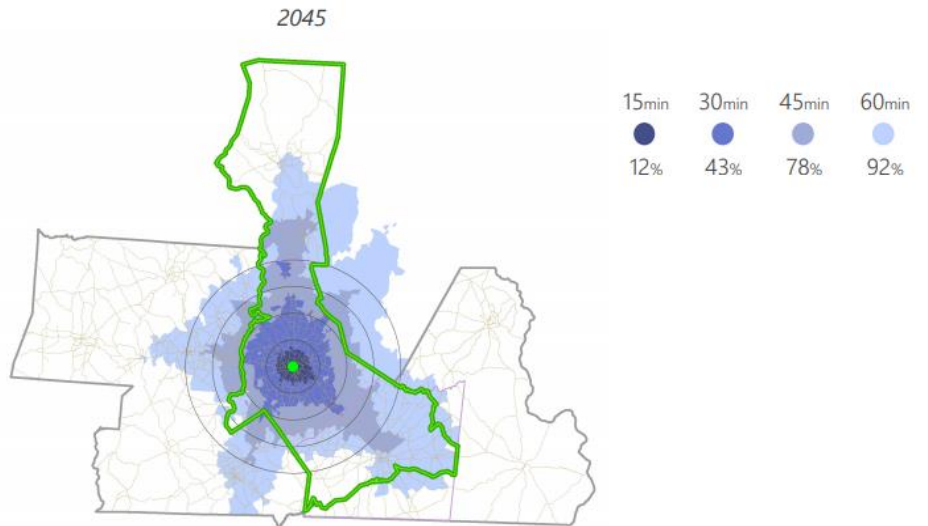
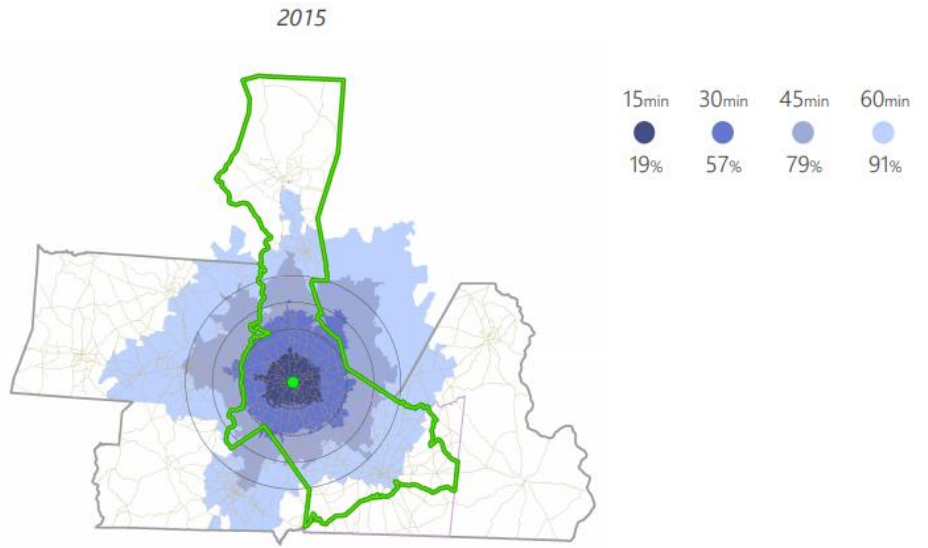
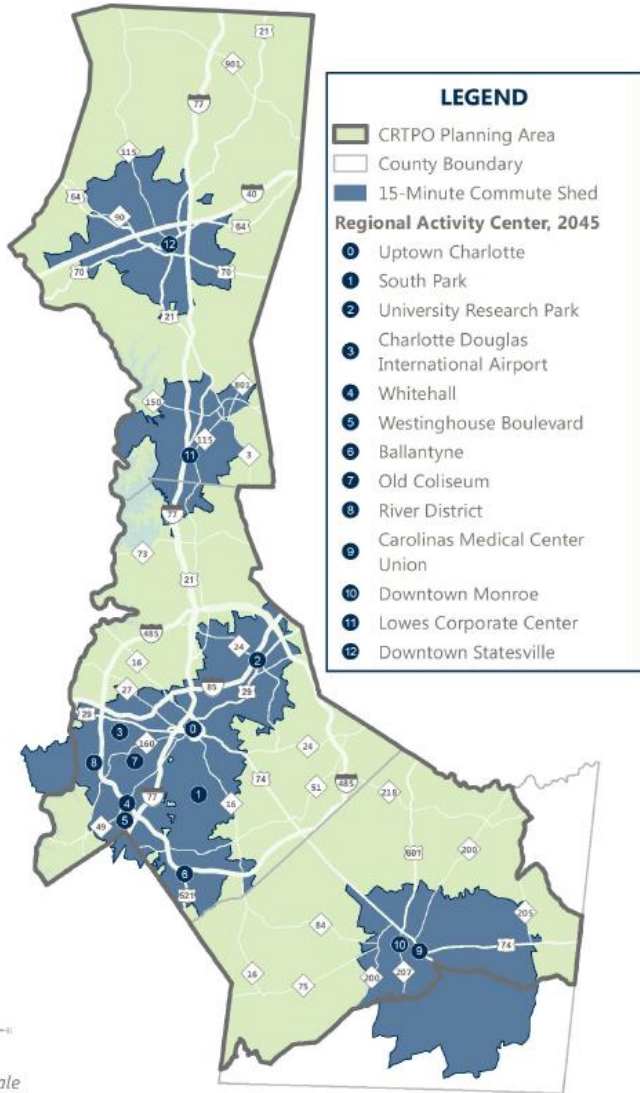
Transit Network Alternatives

Scenario Testing

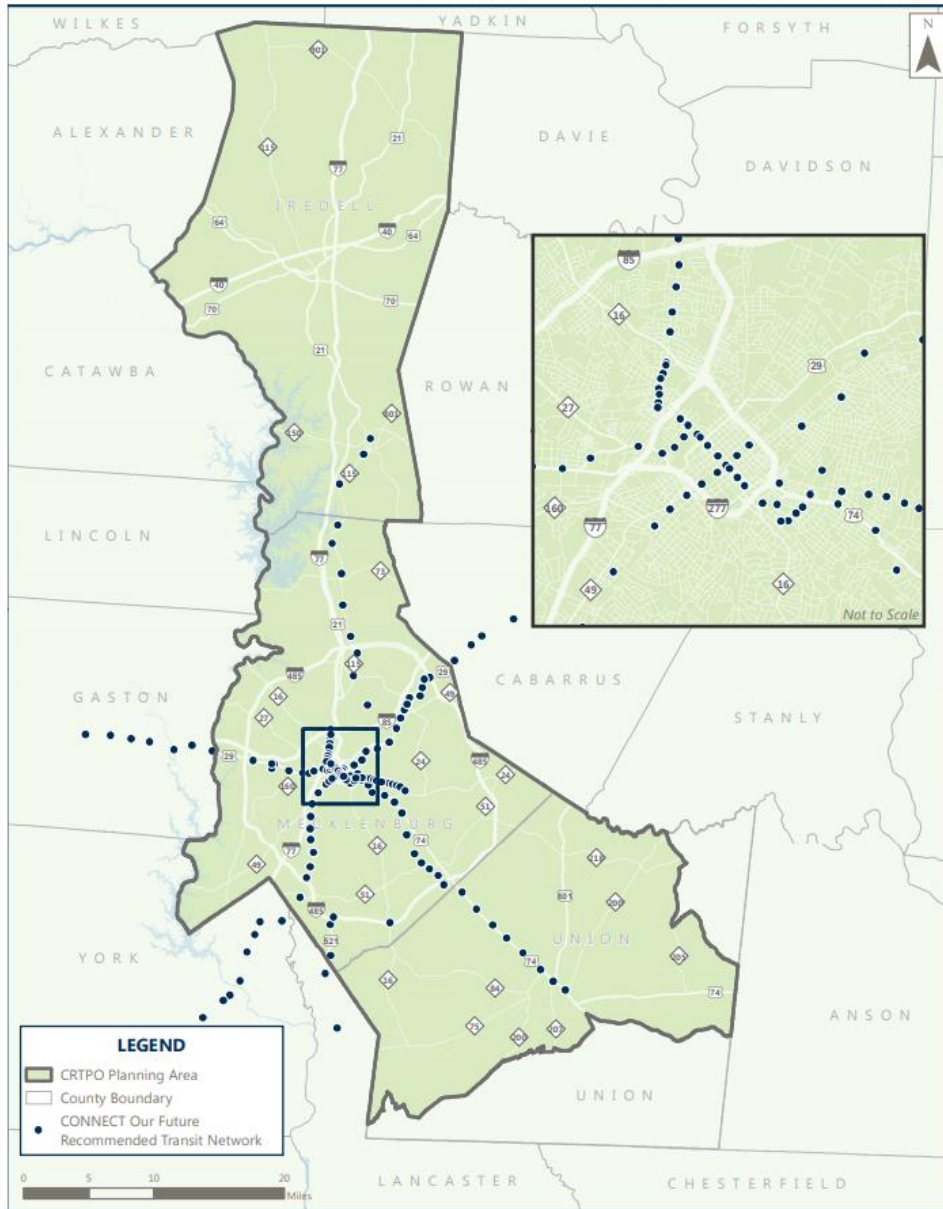


## **Performance Indicators by County & MPO**

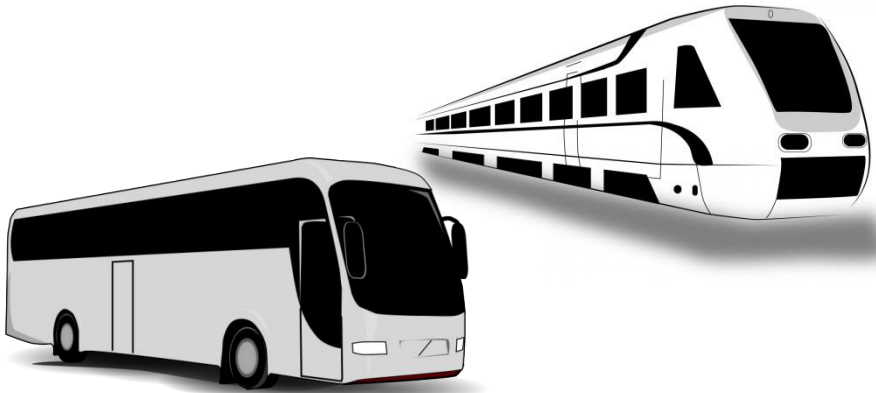
# Performance Indicators



## Access to Regional Activity Centers



## Proximity to Transit Service



- **Transit Person Trips**
- **Vehicle Miles Traveled**
- **Vehicle Hours Traveled**
- **Non-motorized Mode Shift Potential**

## **Project Prioritization:**

- Time spent building Toolboxes well worth it
- Interchanges
  - Need a more consistent methodology
  - Micro-simulation?

## **Scenario Planning:**

- Start early
- Test model sensitivity and report accordingly
- Should we broaden our definition of scenarios?

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