

## Appendix 10. Detailed Transportation and Growth Maps and Measures of Effectiveness Table

### Detailed Transportation and Growth Maps

To provide greater levels of detail and the ability to focus in on specific portions of the region to see what investments are planned in what time frames, the MPOs have created online mapping tools rather than include paper copies of maps in a separate appendix. The maps for each MPO may be accessed at the web pages linked below:

[CAMPO](#)

[DCHC MPO](#)

### Measures of Effectiveness

Evaluation measures provide a comparative set of metrics for statistical analyses between transportation systems and land use scenarios. They also provide an opportunity to validate the usefulness of the Triangle Regional Model (TRM) as a tool to perform travel forecasts and create output necessary for staff, elected officials, and the public to determine the best approach to invest limited financial resources in the regional transportation system. Comparisons can be performed in a number of ways for different purposes to depict the 2050 MTP. As a result, measures of effectiveness for future TRM runs may vary slightly from those presented in this appendix.

The table on the next few pages compares the transportation network performance for the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO planning areas for the 2016 Base network, the 2050 Deficiency network (Existing + Committed), and the 2050 Metropolitan Transportation Plan (MTP) network. The 2016 network represents the current state of the system. The 2050 E+C (existing plus committed) network includes only those projects that will be operational in the next few years but serving the forecast 2050 population and employment. The 2050 MTP network represents the highway and transit networks from the 2050 MTP, serving the 2050 forecasted population and employment.

The measures of effectiveness in this summary table are system-wide metrics and therefore do not provide performance information on specific roadways or travel corridors, or at the scale of a municipality or type of area (e.g., urban and suburban). The congestion maps (V/C maps), presented in Section 6.3 of the full report, provide a more localized picture of transportation performance for individual roadways or roadway segments. The conclusions drawn from the measures of effectiveness (system-wide) and congestion maps (roadway specific) tend to be similar. For example, the 2050 Deficiency Congestion Map illustrates a high degree of regional congestion as compared to the 2016 congestion map. This is validated by comparing performance measure values for the 2050 Deficiency and 2050 MTP networks such as daily “Vehicle Hours Traveled” (VHT daily – Row 1.2.2). Vehicle Hours Traveled is highest for the 2050 Deficiency roadway network as compared to the 2016 base year and 2050 MTP networks.

Measures of Effectiveness By Scenario (Based on Triangle Regional Model)

		2016 Base Year		2050 Existing + Committed		2050 MTP	
		CAMPO	DCHC	CAMPO	DCHC	CAMPO	DCHC
<b>1</b>	<b>Performance Measures</b>						
1.1.2	Total Vehicle Miles Traveled (VMT-daily)	31,922,919	13,612,286	60,768,564	21,264,845	61,507,129	20,994,897
1.1.2a	Total Vehicle Miles Traveled (VMT-per capita)	26	31	28	32	28	31
1.2.2	Total Vehicle Hours Traveled (VHT-daily)	807,481	335,601	2,336,887	677,058	1,873,311	645,006
1.2.2a	Total Vehicle Minutes Traveled (VHT-per capita)	40	45	65	61	51	57
<u>1.3</u>	<u>Average Speed by Facility (miles/hour)</u>						
1.3.1	- Freeway	62	59	50	48	56	51
1.3.2	- Arterial	35	35	28	30	32	30
1.3.3	- All Facility	45	46	37	39	42	40
<u>1.4</u>	<u>Peak Average Speed by Facility (miles/hour)</u>						
1.4.1	- Freeway	60	57	45	45	53	48
1.4.2	- Arterial	34	34	26	28	30	29
1.4.3	- All Facility	44	45	33	36	39	38
<u>1.5</u>	<u>Daily Average Travel Length - All Person Trips</u>						
1.5.1	- Travel Time (minutes)	15	13	21	16	18	16
1.5.2	- Travel Distance (miles)	7.1	6.1	7.3	6.1	7.4	6.1
<u>1.6</u>	<u>Daily Average Travel Length - Work Trips</u>						
1.6.1	- Travel Time	23	20	36	25	28	23
1.6.2	- Travel Distance - Work Trips	13.1	10.4	12.9	10.2	13.5	10.3
<u>1.7</u>	<u>Peak Average Travel Length - All Person Trips</u>						
1.7.1	- Peak Travel Time	15	14	21	18	18	18
1.7.2	- Peak Travel Distance	7.1	6.4	6.9	6.4	7.0	7.1
<u>1.8</u>	<u>Daily Avg. Travel Length - Commercial Vehicle Trips</u>						
1.8.1	- Travel Time	11	10	12	11	11	11
1.8.2	- Travel Distance	7.1	6.7	6.7	6.5	7.0	6.5
<u>1.9</u>	<u>Daily Average Travel Length - Truck Trips</u>						
1.9.1	- Travel Time	12	11	14	13	13	13
1.9.2	- Travel Distance	8.5	7.9	8.1	7.8	8.5	7.8
<u>1.10</u>	<u>Hours of Delay (daily)</u>	92,019	37,909	917,621	195,359	472,608	163,466
1.10a	Minutes of Delay (daily) (per capita)	5	5	26	18	13	14
1.10.1	Truck Hours of Delay (daily)	3,522	1,939	27,164	10,911	14,501	8,996

		2016 Base Year		2050 Existing + Committed		2050 MTP	
		CAMPO	DCHC	CAMPO	DCHC	CAMPO	DCHC
1.10.1a	Truck Minutes of Delay (daily) (per trip)	1.5	2.1	6.7	8.0	3.6	6.5
<b>1.11</b>	<b>Percent of Congested VMT (volume &gt; capacity) - All Day</b>						
1.11.1	- Freeway	5%	6%	40%	52%	22%	36%
1.11.2	- Arterial	4%	5%	26%	18%	13%	16%
1.11.3	- All Facility	4%	5%	29%	33%	16%	24%
<b>1.12</b>	<b>Percent of Congested VMT (volume &gt; capacity) - Peak</b>						
1.12.1	- Freeway	8%	10%	54%	61%	33%	44%
1.12.2	- Arterial	7%	7%	39%	26%	20%	24%
1.12.3	- All Facility	7%	8%	41%	39%	24%	31%
1.12.4	- Designated truck routes	3%	6%	34%	26%	11%	26%
1.12.5	- Facilities w/bus routes	7%	8%	39%	49%	24%	32%
<b>2</b>	<b>Mode Share Measures</b>						
<b>2.1</b>	<b>All Trips - Mode Share (%)</b>						
2.1.1	- Drive alone (single occupant vehicle -SOV)	50%	45%	48%	44%	48%	44%
2.1.2	- Carpool (Share ride)	42%	37%	42%	36%	42%	36%
2.1.3	- Bus	1%	2%	1%	2%	1%	3%
2.1.4	- Rail	N/A	N/A	N/A	N/A	0.2%	0.1%
2.1.5	- Non-Motorized (Bike and Walk)	7%	15%	9%	17%	9%	17%
<b>2.2</b>	<b>Work Trips - Mode Share (%)</b>						
2.2.1	- Drive alone (single occupant vehicle -SOV)	85%	78%	79%	79%	80%	77%
2.2.2	- Carpool (Share ride)	10%	11%	10%	10%	10%	9%
2.2.3	- Bus	2%	6%	2%	4%	3%	7%
2.2.4	- Rail	N/A	N/A	N/A	N/A	0.8%	0.2%
2.2.5	- Non-Motorized (Bike and Walk)	3%	5%	8%	6%	5%	7%
<b>2.3</b>	<b>Peak Trips - Mode Share (%)</b>						
2.3.1	- Drive alone (single occupant vehicle -SOV)	48%	45%	46%	44%	46%	43%
2.3.2	- Carpool (Share ride)	45%	40%	45%	39%	44%	39%
2.3.3	- Bus	1%	2%	1%	2%	1%	3%
2.3.4	- Rail	N/A	N/A	N/A	N/A	0.3%	0.1%
2.3.5	- Non-Motorized (Bike and Walk)	7%	13%	9%	14%	9%	15%

		2016 Base Year		2050 Existing + Committed		2050 MTP	
		CAMPO	DCHC	CAMPO	DCHC	CAMPO	DCHC
<b>3</b>	<b>Transit Measures</b>						
<b>3.1</b>	<b>Transit Ridership (regionwide)</b>						
3.1.1	- GoTriangle (rail included in rail scenarios)	17,035		30,363		82,031	
3.1.2	- GoRaleigh	23,853		62,385		120,633	
3.1.3	- CHT	29,797		59,794		57,815	
3.1.4	- GoDurham	23,286		26,842		32,006	
3.1.5	- NCSU	11,873		18,999		13,274	
3.1.6	- DUKE	8,018		12,727		10,289	
3.1.7	- OPT	576		109		780	
3.1.8	- GoCary	2,597		3,688		6,172	
3.1.9	Total	117,036		214,908		323,001	
3.2	Total Rail Ridership	N/A		N/A		14,215	
<b>4</b>	<b>Other Measures</b>						
4.1	Population	1,217,431	446,275	2,146,157	666,483	2,187,196	676,414
4.2	Employment	609,931	289,221	1,265,265	518,726	1,268,563	519,320
4.3	Total Daily Person Trips	5,213,978	2,068,634	9,849,516	3,320,199	10,036,354	3,341,508
4.3.1	Work Person Trips	812,095	258,122	1,450,155	415,076	1,475,396	419,180
4.4	Total Daily CV (commercial vehicle) Trips	331,836	133,002	590,191	202,059	597,112	204,050
4.4.1	Daily Truck Trips	137,572	54,882	241,819	82,260	244,249	82,882
4.5	Total Highway Lane Miles	6,781	2,597	7,061	2,675	9,034	2,781
4.6	Transit Service Miles	54,448		60,015		139,356	

Notes:

N/A = Not available

Travel time is in minutes, and travel distance is in miles. VMT does not include travel on centroid connectors.

CV = Commercial vehicles (which includes large and small trucks and vans).

Trucks = Subset of Commercial Vehicles that includes only large trucks.

Transit ridership is higher than transit trips because a trip involving a transfer counts as two riders in ridership numbers.

Average Speed (1.3 and 1.4), Percent of Congested VMT (1.11 and 1.12) and Hours of Delay (1.10) calculations do not include local streets or centroid connectors (which often represent local streets in modeling networks).

The 2050 population and employment vary slightly between the 2050 E+C and 2050 MTP Adopted scenarios because those totals were identified at different phases of the 2050 MTP development process. The 2050 MTP Adopted values include both land-use model and U.S. Census updates.