Prepared for:

Metropolitan Transportation Planning Organization

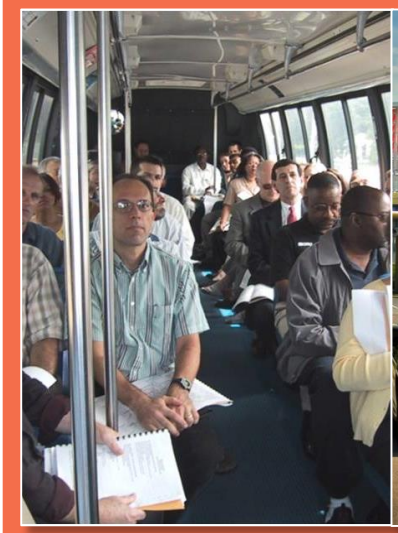
for the

Gainesville Urbanized Area

Year 2040 Long Range Transportation Plan

TECHNICAL REPORT 3

Data Review and Verification

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Metropolitan Transportation Planning Organization

For the Gainesville Urbanized Area

YEAR 2040 LONG RANGE TRANSPORTATION PLAN

TECHNICAL REPORT 3

The preparation of this report has been financed in part through grants from the Federal Highway Administration, Federal Transit Administration and U.S. Department of Transportation, under the State Planning and Research Program, Section 505 (or Metropolitan Planning Program, Section 104 (f) of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

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Task 3.1 Review Zonal Data (ZDATA) Inputs

A comprehensive review of the Zonal Data (ZDATA) was conducted as part of this task. During the last model update in 2007, the ZDATA files were converted to the new FSUTMS file formats to be consistent with the Cube-Voyager scripting. The previous base year Alachua County 2000 model used the NERGEN FORTRAN program for trip generation and relied on a number of ASCII text file formats for input data. Conversely, the base year 2007 model uses Cube-Voyager scripting in place of NERGEN FORTRAN routines and uses input files in a database, rather than text, format. As part of the 2010 effort, the MTPO staff updated the 2007 socioeconomic data files to the new base year 2010, which were reviewed and refined by the consultant team in coordination with the MTPO. Special generator and external trip files were updated by the consultant team (discussed in Task 2.3).

Like the Alachua Country 2007 model, the 2010 model study area covers the entirety of Alachua County, including all nine municipalities within the county. The zonal structure of the 2007 model was reviewed by the consultant team and no changes were deemed necessary.

As mentioned earlier, the MTPO staff developed the 2010 and 2040 socioeconomic datasets which includes information on population disaggregated by single family, multifamily, and hotel/ model units. It also provides information on auto availability, property vacancy rates, and seasonal use. On the employment side, the dataset contains information disaggregated by service, commercial, manufacturing, and other industrial sectors. It also contains information on school enrollment, university employment, dormitory students, and parking. The parking costs in the 2010 and 2040 datasets were borrowed from the 2007 and 2035 datasets, respectively, based on discussions with the MTPO staff. The zonal data structure is discussed in detail under Task 2.3. The data review process involved reviewing aggregate statistics from a FSUTMS standards perspective (the details of which will be documented in the Tech Memo 4 – Model Validation Report), GIS mapping and spatial analysis of the data at a TAZ level, and checking reasonableness of the growth reflected in the datasets against other data sources.

Iterative adjustments to the datasets were made based on the review findings and coordination with the MTPO staff.

Figures 1 through 6 show the comparison of 2007 and 2010 socioeconomic datasets, which reflect the recent changes in population and employment patterns in the region. Table 1 shows aggregate level comparison of the 2010 and 2040 datasets. The 2010 and 2040 datasets will be utilized as input to the model for base year validation and future forecasting purposes, respectively.

Table 1: Comparison of 2010 and 2040 Datasets

Socioeconomic Data Variable	2010	2040
Permanent Population	247,336	305,400
Total Population	251,951	311,100
Total Service Employment	91,399	130,325
Total Commercial Employment	32,669	41,332
Total Manufacturing Employment	4,048	6,072
Total Other Industrial Employment	9,478	14,251
Total Employment	137,594	191,980

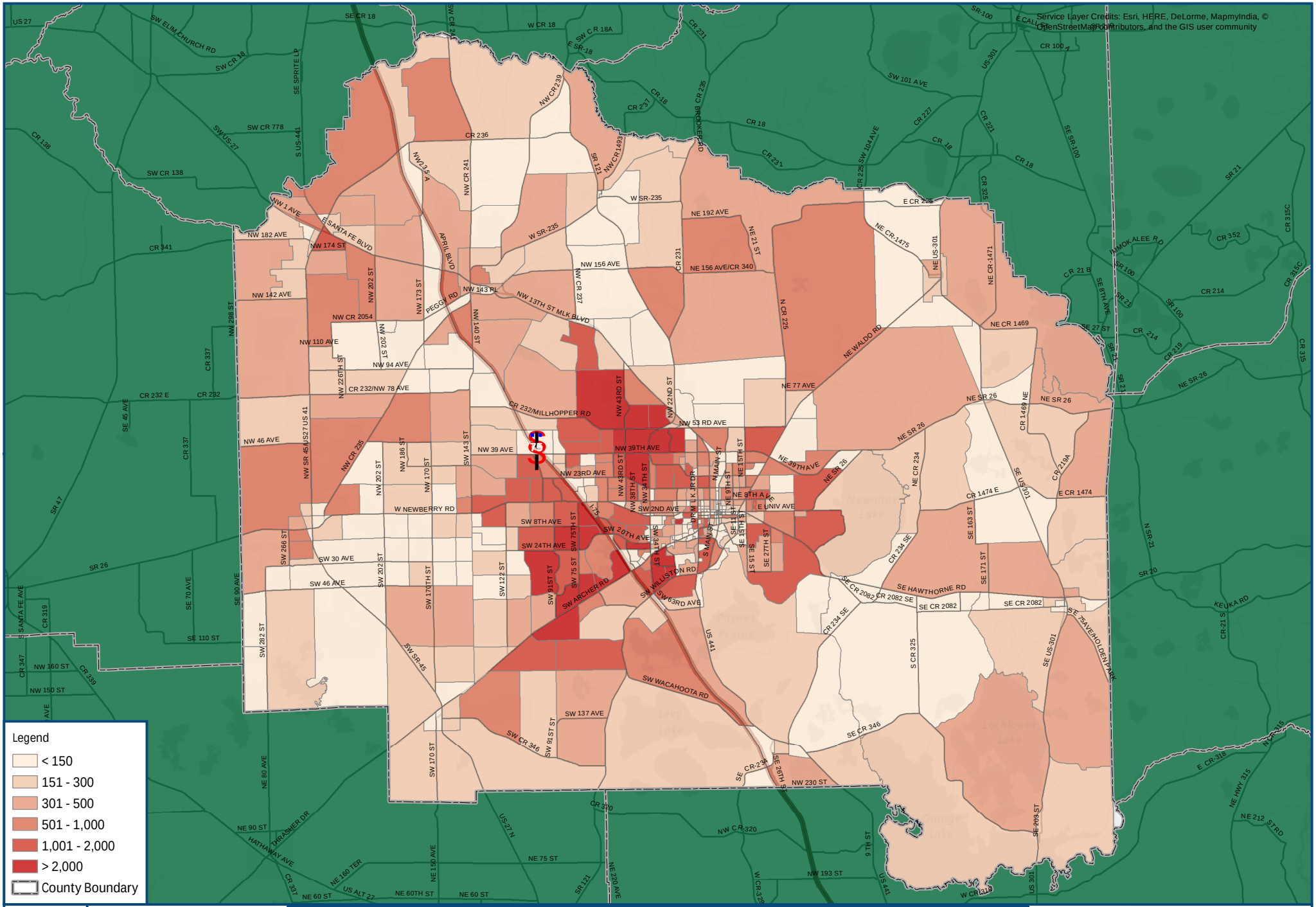


Figure 1

Year 2010 Population by TAZ

2040 Long Range Transportation Plan

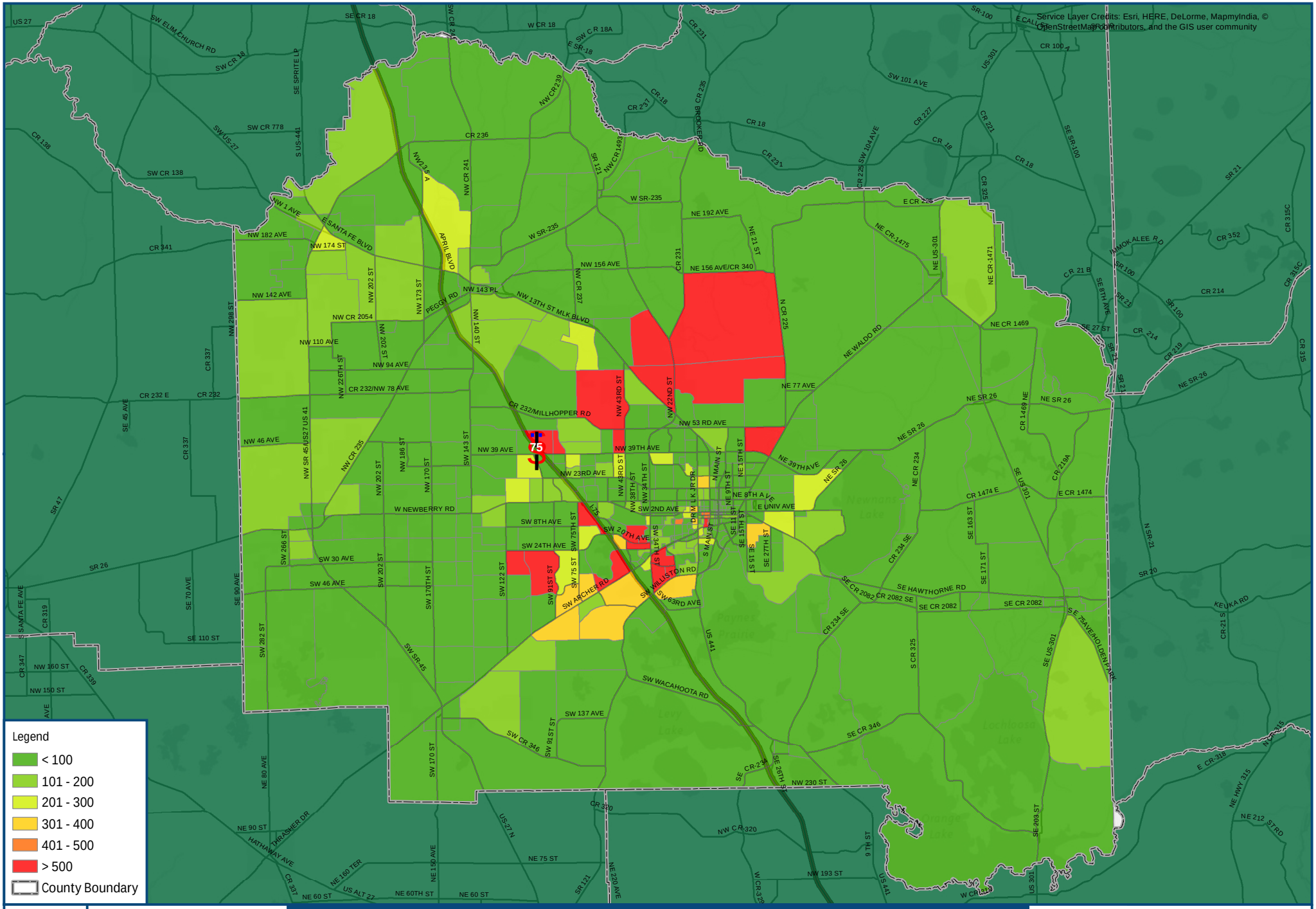


Figure 2

Population Growth 2010-2040 by TAZ

2040 Long Range Transportation Plan

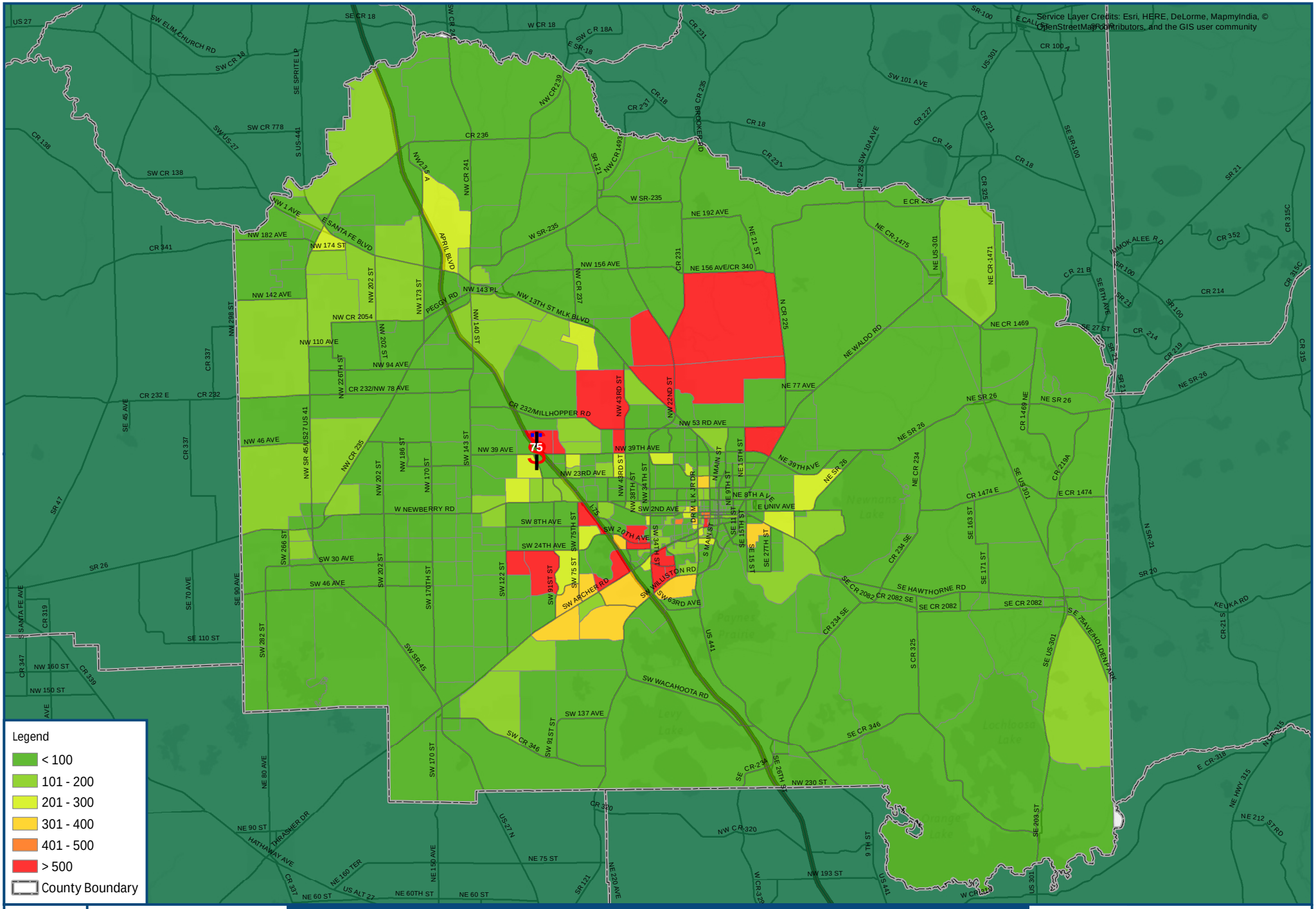


Figure 3

Population Growth 2010-2040 by TAZ

2040 Long Range Transportation Plan

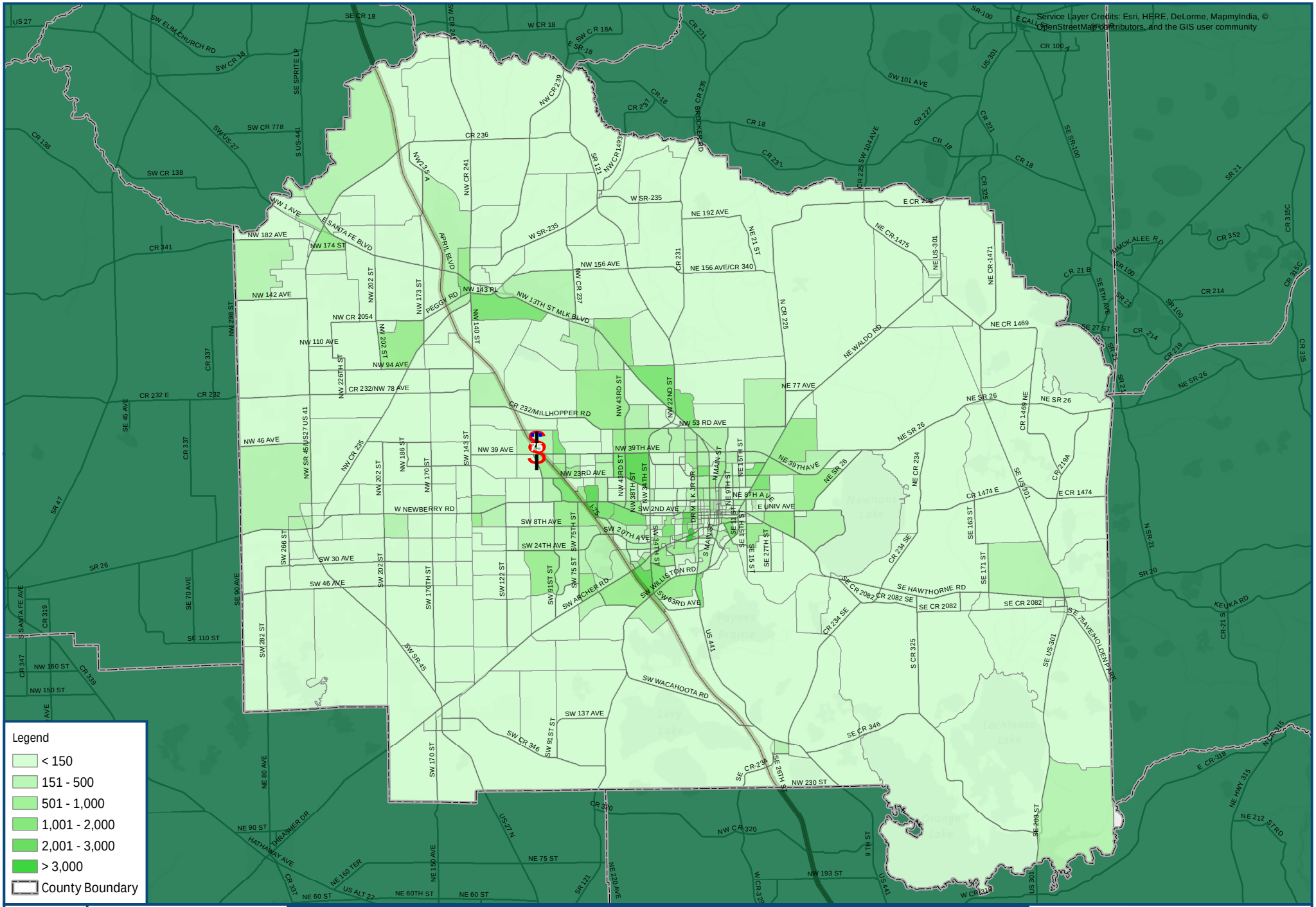


Figure 4

Year 2010 Employment by TAZ

2040 Long Range Transportation Plan

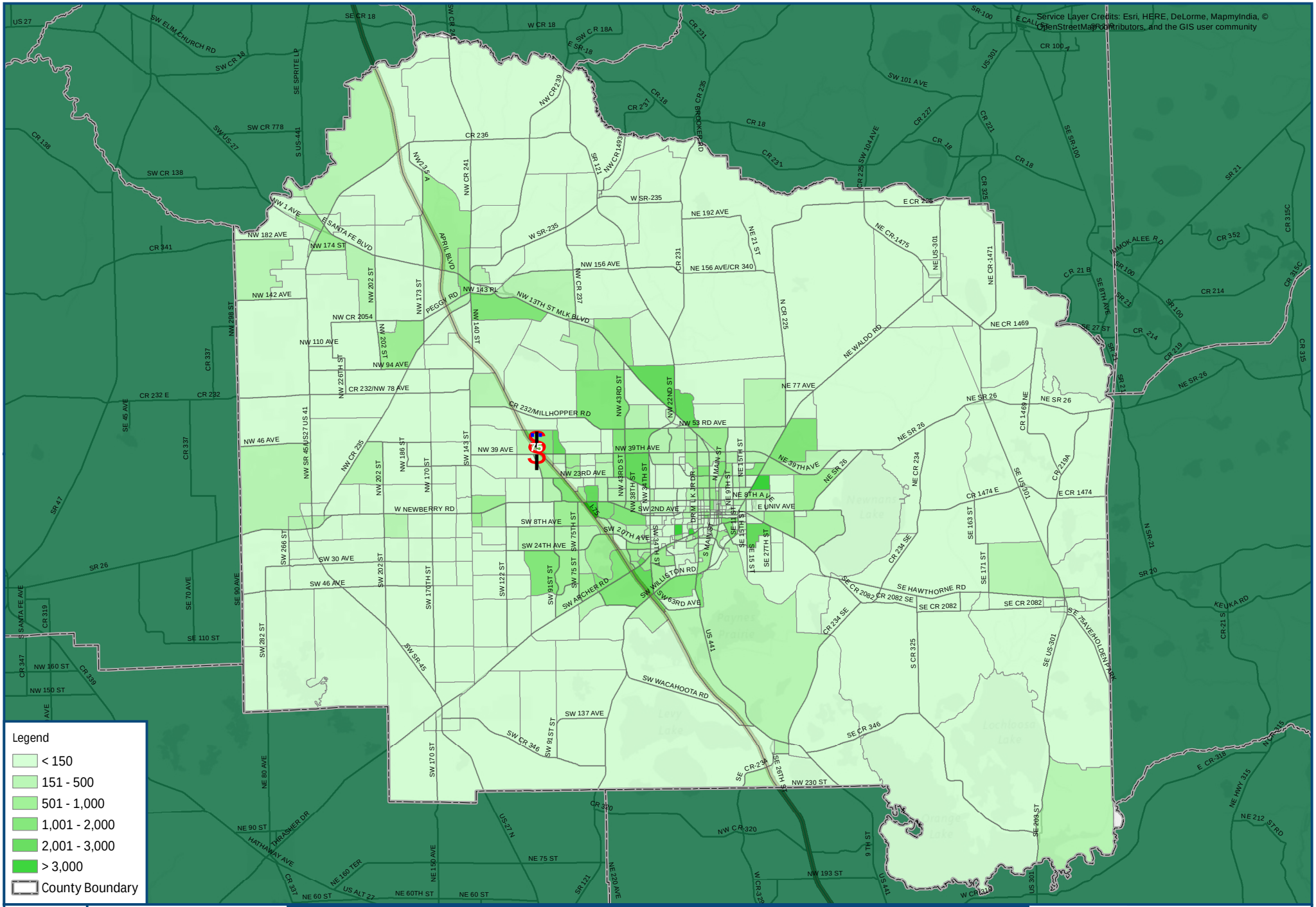


Figure 5

Year 2040 Employment by TAZ

2040 Long Range Transportation Plan

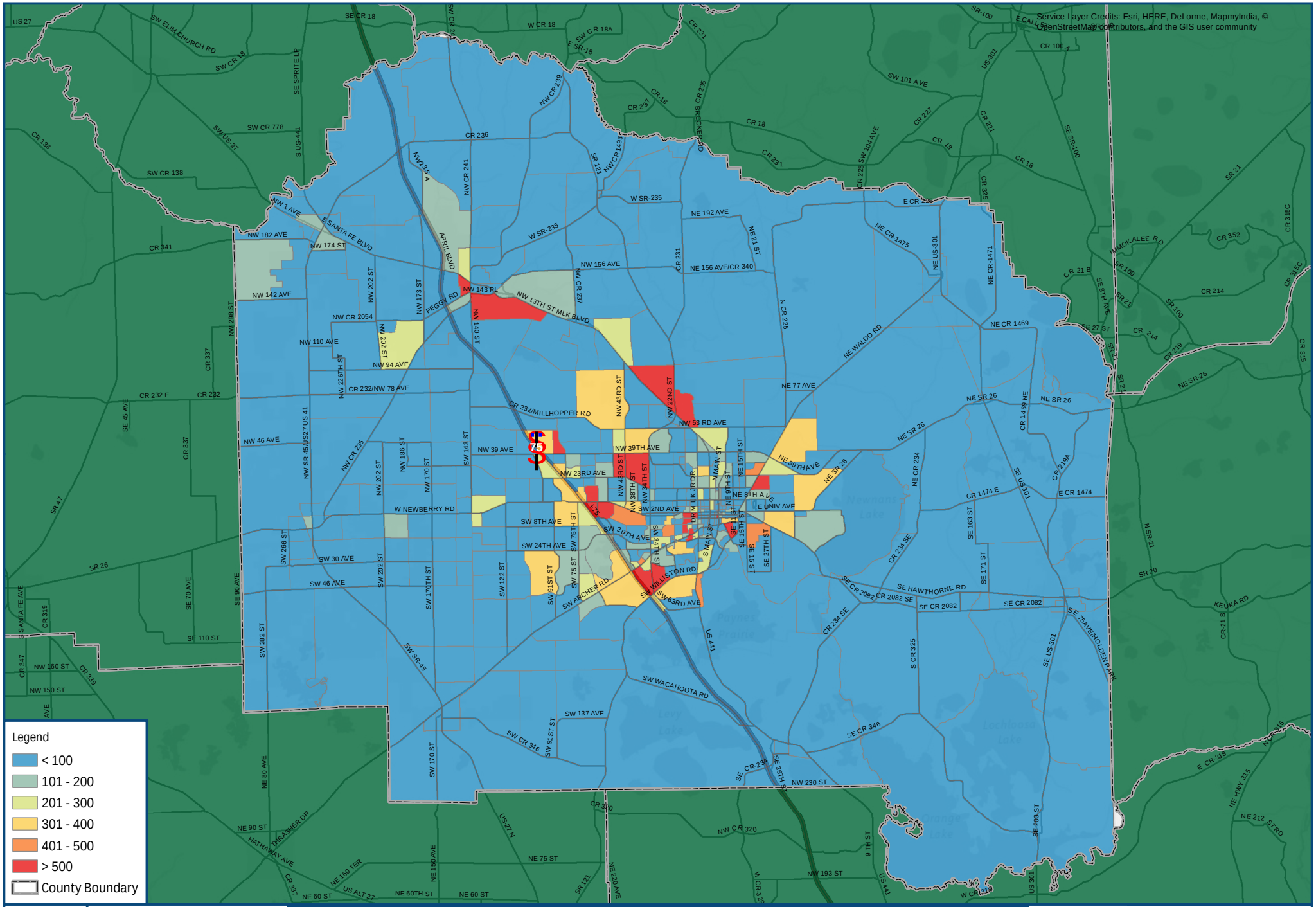


Figure 6

Employment Growth 2010-2040 by TAZ

2040 Long Range Transportation Plan

Task 3.2 Review 2010 Highway and Transit Networks

As part of the 2010 model validation effort, the base year highway and transit networks were updated starting with the 2007 base year networks. Data needed for the validation process were gathered from the Florida Department of Transportation (FDOT), the MTPO, the Regional Transit Service (RTS), and University of Florida staff. The data were used to make roadway edits, including number of lanes and traffic counts as well as transit edits related to routes, stop locations, fares, headways, and other service variables. The following section provides details on data collection and modifications made to the highway and transit networks.

3.2.1 Updating Highway Network Data

Updates to the highway network were made primarily by editing the 2007 base year network to represent 2010 network conditions. The number of lanes and traffic counts were updated for 2010 conditions. The FDOT Roadway Characteristics Inventory (RCI) data was utilized as the primary data source for the highway network update. Local knowledge and 2010 base aerials were also utilized for updating the non-state facilities. The 2010 Base Year Network incorporates changes since the last plan update, to reflect the current facility configurations. Figures 7 and 8 depict the directional number of lanes of the highway network. The 2010 traffic counts coded in the network were obtained from the MTPO, Florida Department of Transportation, and the City of Gainesville. The MTPO Year 2010 Multimodal Level of Service Report included counts on state roads, Alachua County arterials, and City of Gainesville/ University of Florida Arterials. The FDOT RCI provided 2010 counts on the State Highway System (SHS). In addition, 2010 traffic counts were also obtained from the City of Gainesville.

Other network attributes such as area types, facility types, were reviewed and no changes were necessary. Tables 2 and 3 show the area type and facility type codes for the highway network. Figures 9 through 12 show the area type and facility type codes of the 2010 network, respectively.

Table 2: Area Type Codes

AT 1	CBD Areas
AT 11	Urbanized Area (over 500,000) Primary City Central Business District
AT 12	Urbanized Area (under 500,000) Primary City Central Business District
AT 13	Other Urbanized Area Central Business District & Small City Downtown
AT 14	Non-Urbanized Area Small City Downtown
AT 2	CBD Fringe Areas
AT 21	All Central Business District (CBD) Fringe Areas
AT 3	Residential Area
AT 31	Residential Area of Urbanized Areas
AT 32	Undeveloped Portions of Urbanized Areas
AT 33	Transitioning Areas/Urban Areas over 5,000 Population
AT 34	Beach Residential (not used)
AT 35	Residential Divided Arterial with a speed limit of 35 mph (BROWARD only case)
AT 4	OBD Areas
AT 41	High Density Outlying Business District (OBD)
AT 42	Other Outlying Business District (OBD)
AT 43	Beach Outlying Business District OBD (not used)
AT 44	Low Density Industrial Area
AT 45	OBD Divided Arterial with a speed limit of 35 mph
AT 5	Rural Areas
AT 51	Developed Rural Areas/Small Cities under 5,000 Population
AT 52	Undeveloped Rural Areas

AT = Area Type

Table 3: Facility Type Codes

FT 1	Freeways and Expressways
FT 11	Freeway Group 1 (City of 500,000+)
FT 12	Other Freeway (Group 2)
FT 15	Collector/Distributor Lanes
FT 16	Controlled-Access Expressway
FT 17	Controlled-Access Parkway
FT 2	Divided Arterials
FT 21	Divided Arterial 55 mph
FT 22	Divided Arterial 45 mph
FT 23	Divided Arterial Class Ia
FT 24	Divided Arterial Class Ib
FT 25	Divided Arterial Class II/III
FT 26	Low Speed Divided Arterial
FT 3	Undivided Arterials
FT 31	Undivided Arterial 45 mph (TB)
FT 32	Undivided Arterial Class Ia (TB)
FT 33	Undivided Arterial Class Ib (TB)
FT 34	Undivided Arterial Class II/III (TB)
FT 35	Undivided Arterial 45 mph (NTB)
FT 36	Undivided Arterial Class Ia (NTB)
FT 37	Undivided Arterial Class Ib (NTB)
FT 38	Undivided Arterial Class II/III (NTB)
FT 4	Collectors
FT 41	Major Divided Collector
FT 42	Major Undivided Collector (TB)
FT 43	Major Undivided Collector (NTB)
FT 44	Other Divided Collector
FT 45	Other Undivided Collector (TB)
FT 46	Other Undivided Collector (NTB)
FT 47	Low Speed Collector
FT 48	Very Low Speed Collector
FT 5	Centroid Connectors
FT 51	Centroid Connector
FT 52	External Centroid Connector
FT 53	Used as DUMMIES

FT=Facility Type

Table 3: Facility Type Codes, Cont.

FT 6	One Way
FT 61	One-Way Street 45 mph
FT 62	One-Way Street Class Ia
FT 63	One-Way Street Class Ib
FT 64	One-Way Street Class II/III
FT 65	Frontage Roads 45 mph
FT 66	Frontage Roads Class Ia
FT 67	Frontage Roads Class Ib
FT 68	Frontage Roads Class II/III
FT 7	Ramps
FT 71	Freeway On-Ramp
FT 72	Freeway Loop On-Ramp
FT 73	Other On-Ramp
FT 74	Other Loop On-Ramp
FT 75	Freeway Off-Ramp
FT 76	Freeway Loop Off-Ramp
FT 77	Other Off-Ramp
FT 78	Other Loop Off-Ramp
FT 79	Freeway – Freeway Ramp
FT 8	Exclusive HOV
FT 81	High Occupancy Vehicle (HOV) Lane Group 1 (Separated)
FT 82	High Occupancy Vehicle (HOV) Lane Group 2 (Separated)
FT 83	High Occupancy Vehicle (HOV) Lane Group 1 (Non-Separated)
FT 84	High Occupancy Vehicle (HOV) Lane Group 2 (Non-Separated)
FT 85	Non-Freeway High Occupancy Vehicle (HOV) Lane
FT 86	AM & PM Peak High Occupancy Vehicle (HOV) Ramp
FT 87	AM Peak Only High Occupancy Vehicle (HOV) Ramp
FT 88	PM Peak Only High Occupancy Vehicle (HOV) Ramp
FT 89	All Day High Occupancy Vehicle (HOV) Ramp
FT 9	Toll Facilities
FT 91	Toll Freeway Group
FT 92	Other Toll Freeway
FT 93	Toll Expressway/Parkway
FT 94	Toll Divided Arterial
FT 95	Toll Undivided Arterial
FT 97	Toll On-Ramp
FT 98	Toll Off-Ramp
FT 99	Toll Plaza

FT=Facility Type

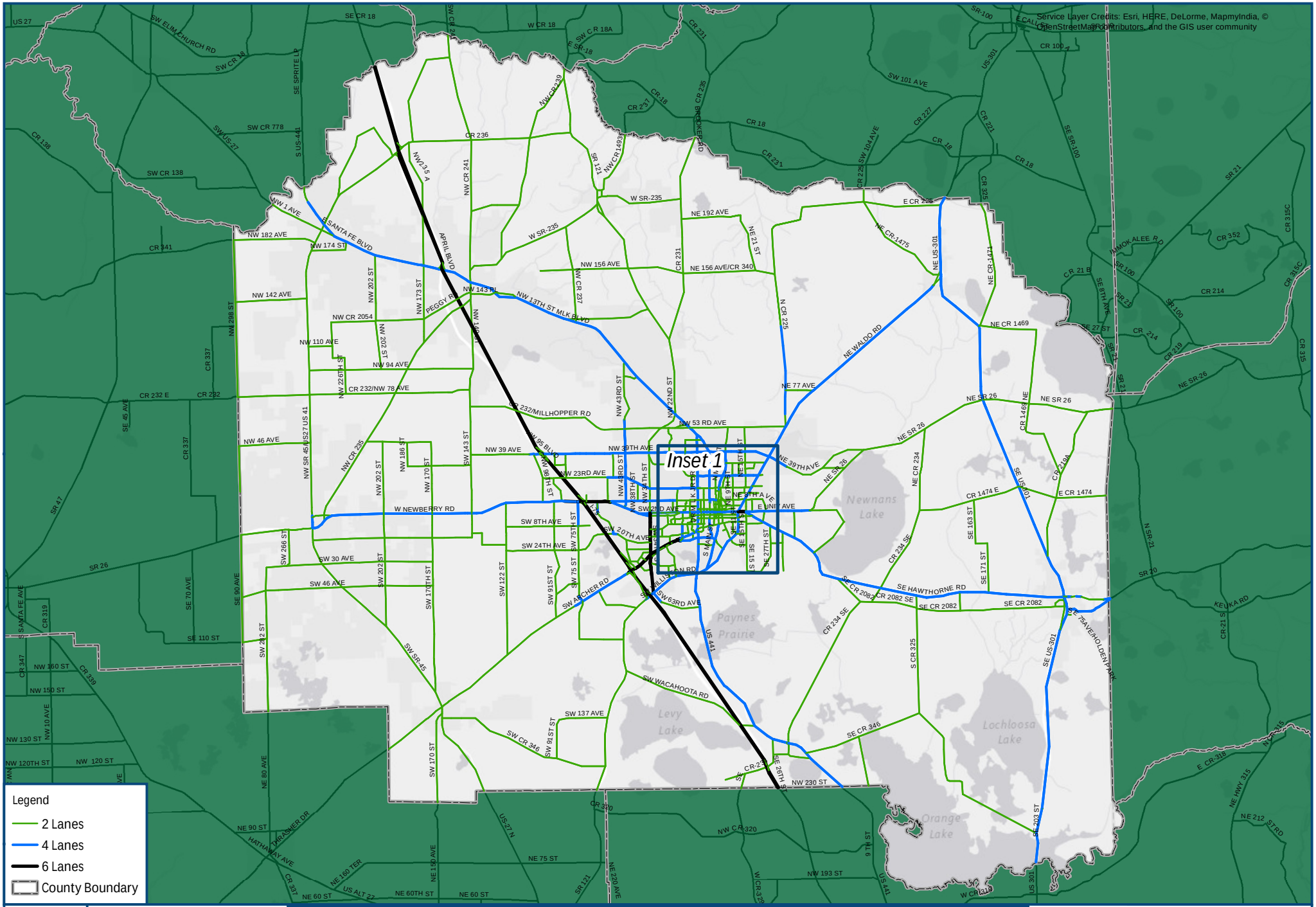


Figure 7

Highway Systems Network - Number of Lanes

2040 Long Range Transportation Plan

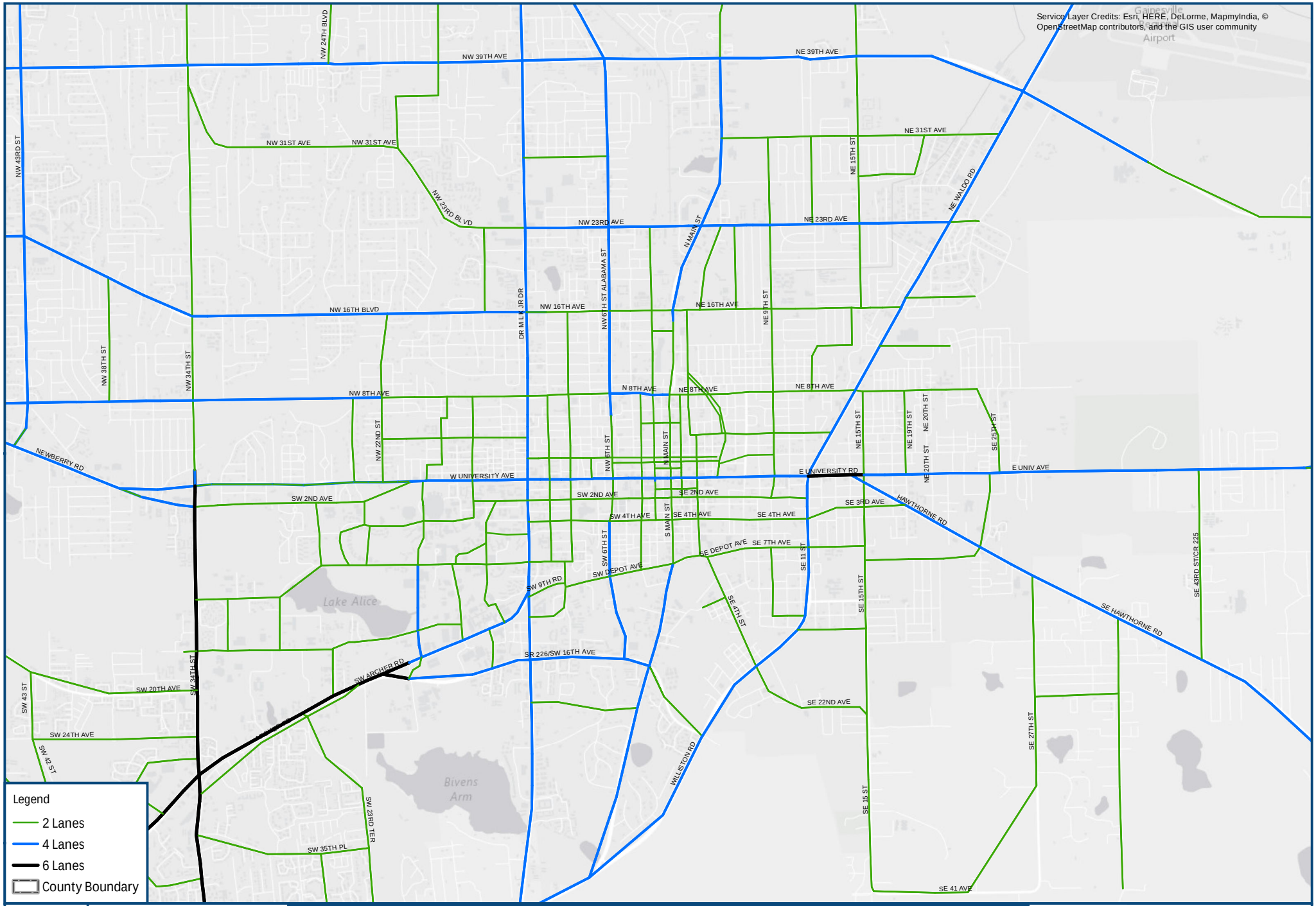
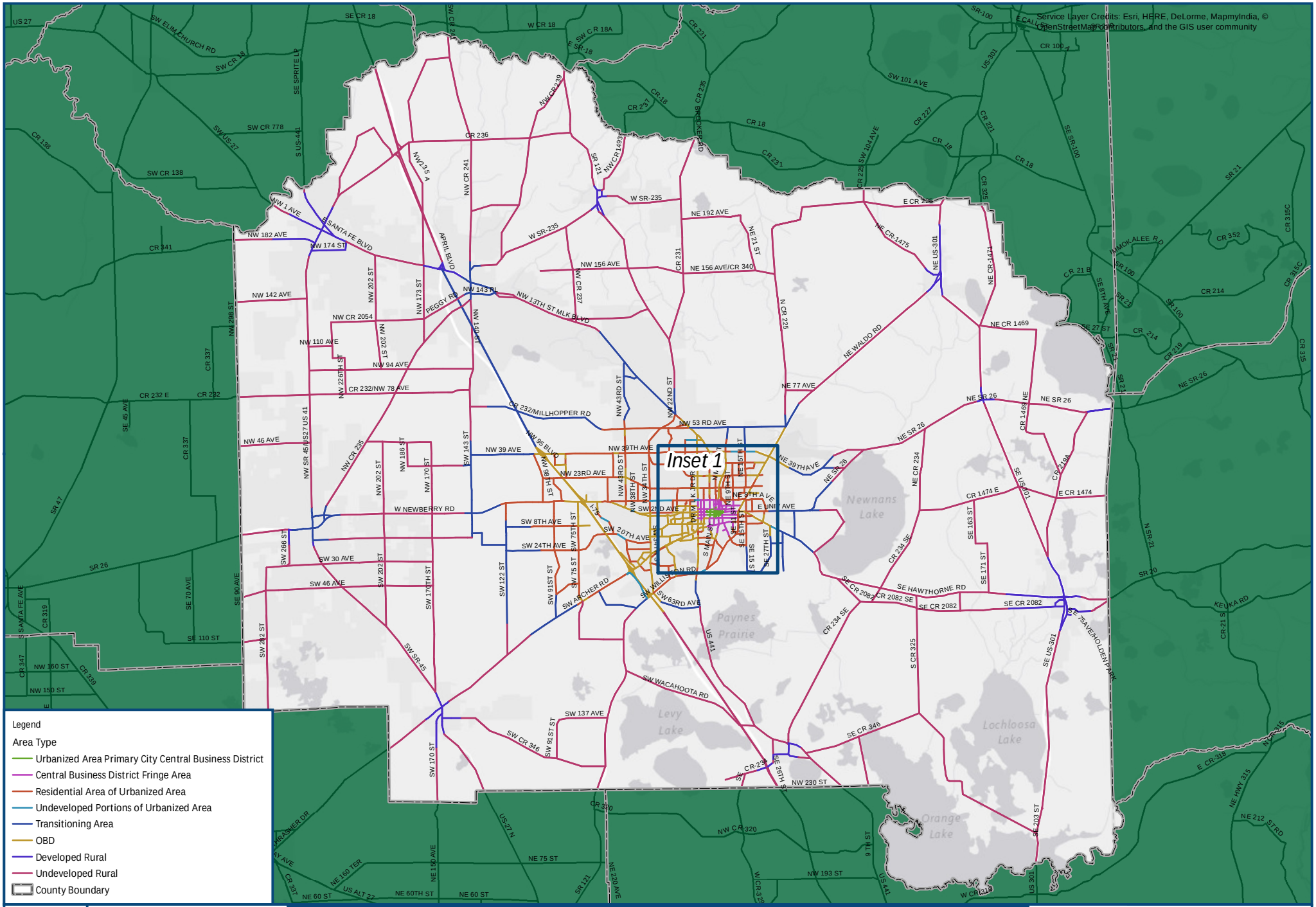


Figure 8

0 0.25 0.5 Miles

Highway Systems Network - Number of Lanes
Inset 1

2040 Long Range Transportation Plan


Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Inset 1
Legend
Area Type
Urbanized Area Primary City Central Business District
Central Business District Fringe Area
Residential Area of Urbanized Area
Undeveloped Portions of Urbanized Area
Transitioning Area
OBD
Developed Rural
Undeveloped Rural
County Boundary
Figure 9
0 2 4 Miles
Highway Systems Network - Area Type
2040 Long Range Transportation Plan

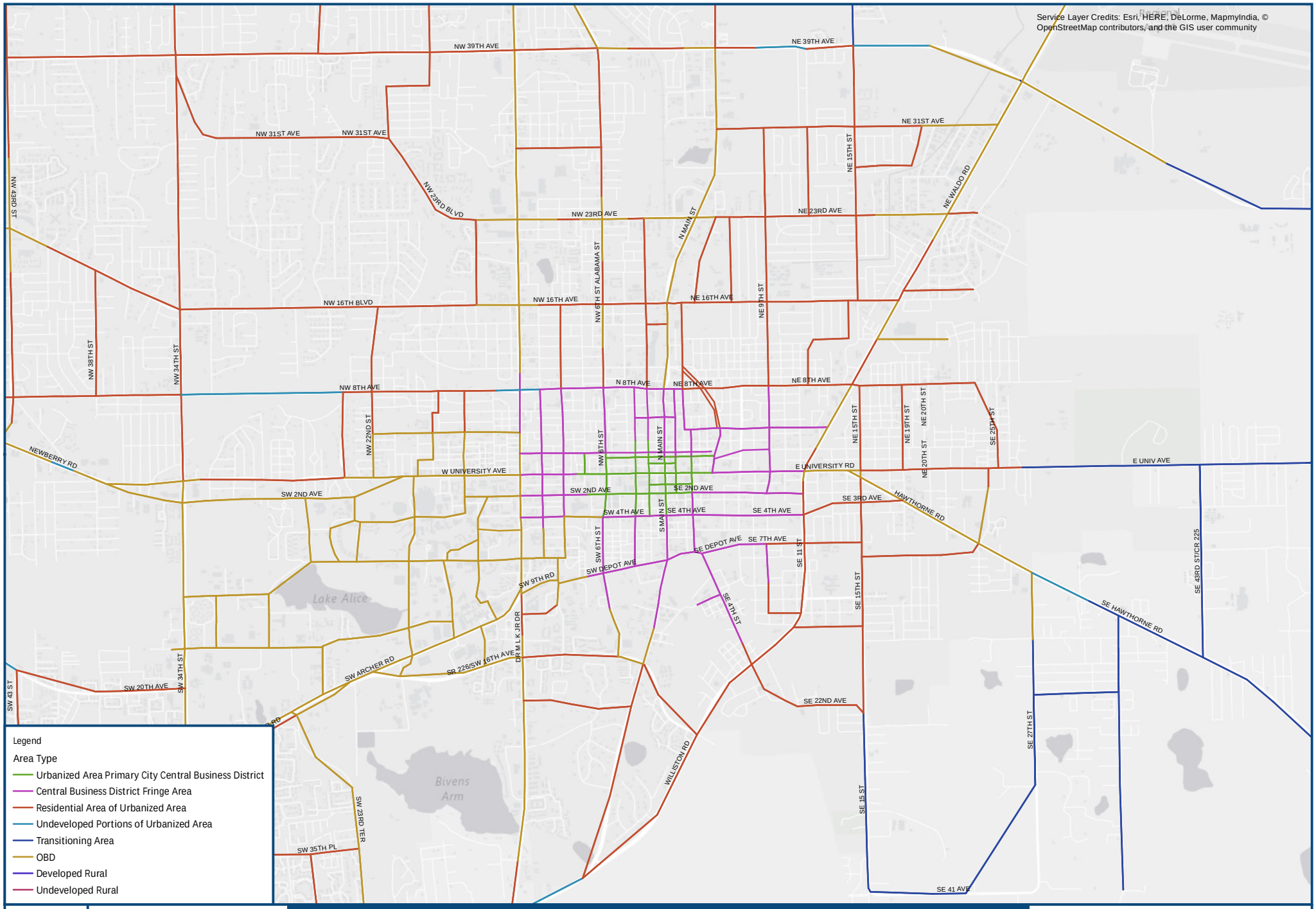


Figure 10

0 0.25 0.5 Miles

Highway Systems Network - Area Type
Inset 1

2040 Long Range Transportation Plan

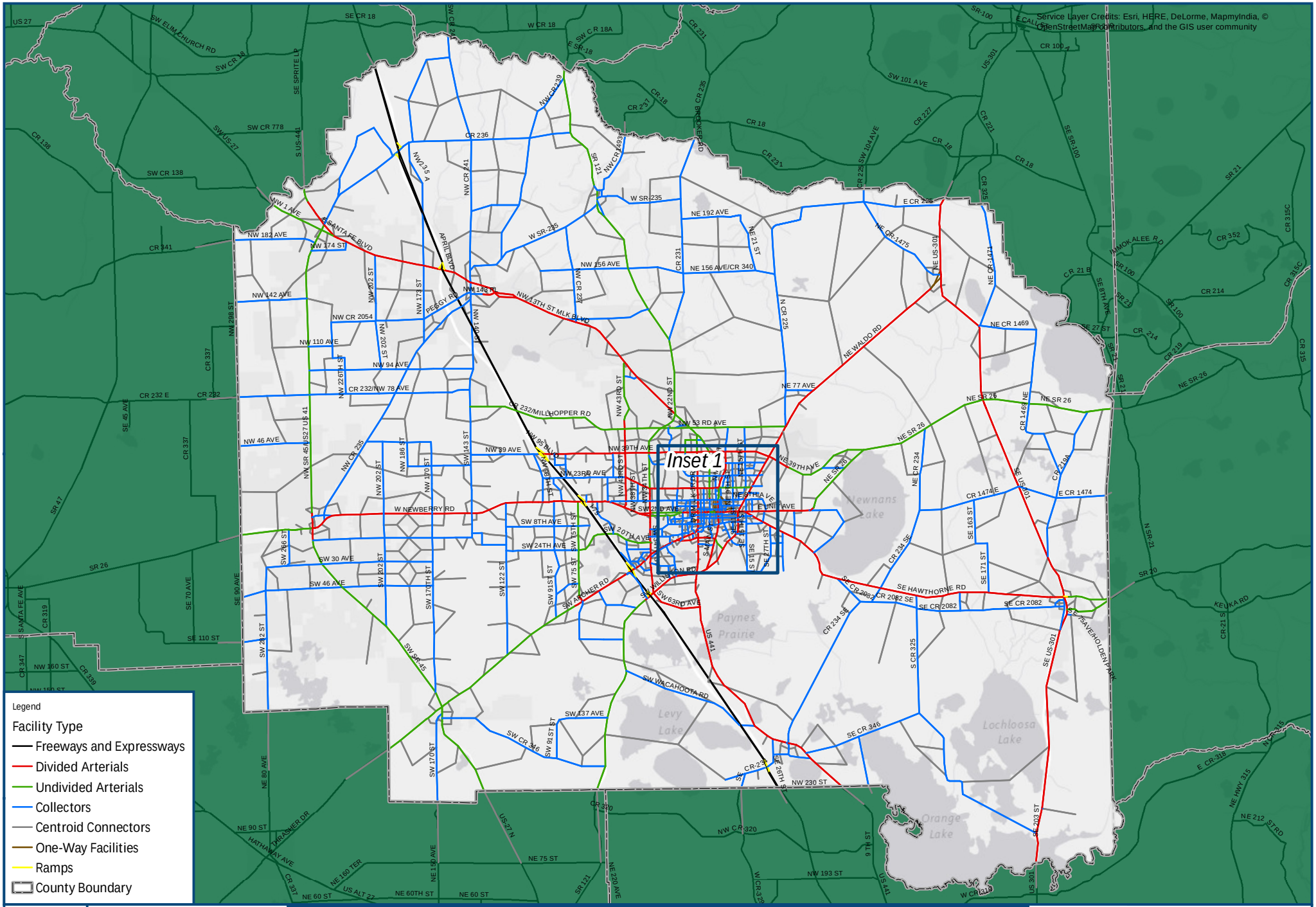


Figure 11

0 2 4 Miles

Highway Systems Network - Facility Type

2040 Long Range Transportation Plan

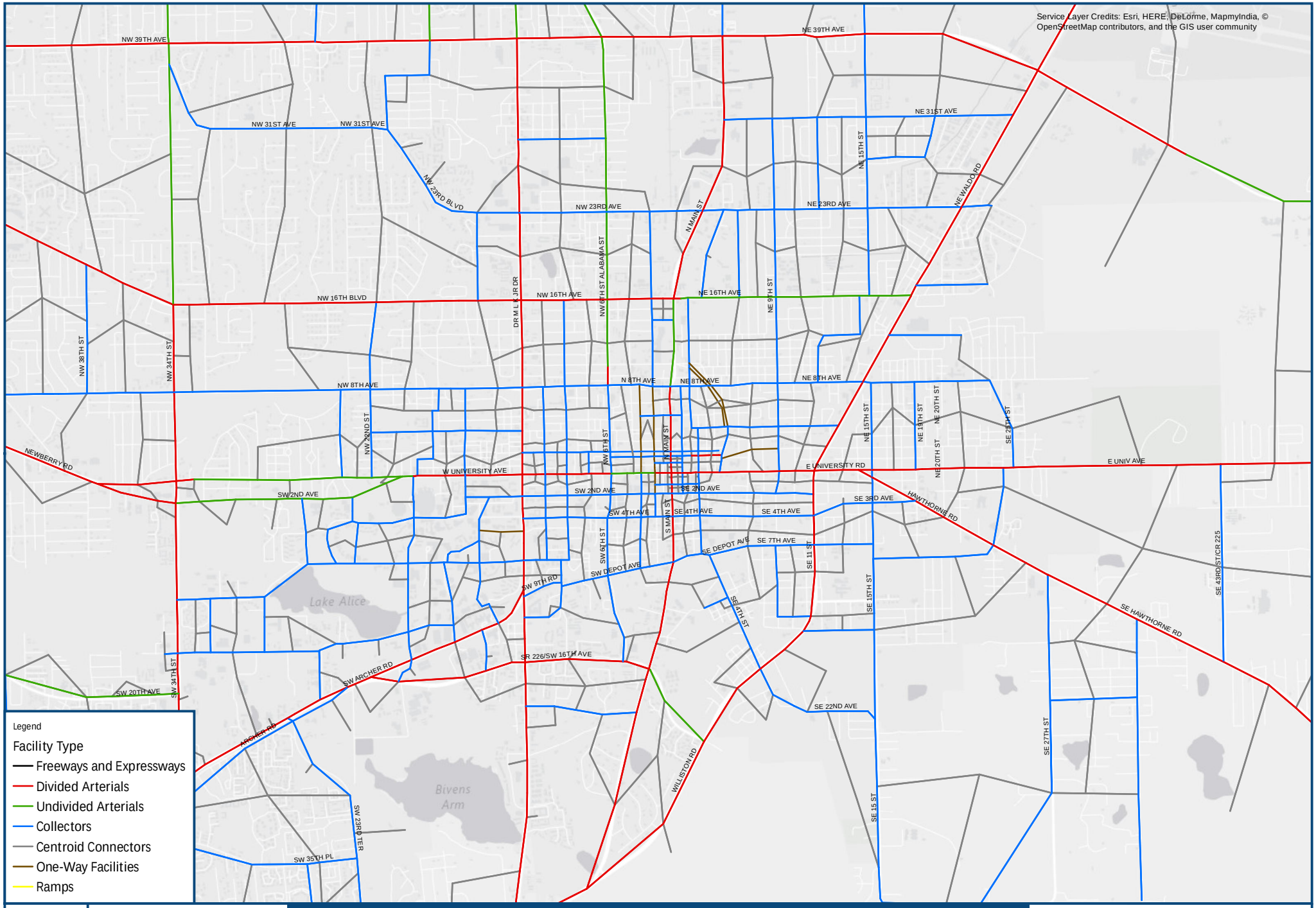


Figure 12

Highway Systems Network - Facility Type
Inset 1

2040 Long Range Transportation Plan

3.2.2 Updating Transit Network Data

Data for each transit route in the 2010 model are stored in transit line (troute10.lin) file. Each route was coded into the previous 2007 transit line file, including mode, operator, and peak and off-peak headway attributes. To ensure that each of the routes was updated properly to 2010 conditions, transit data in General Transit Feed Specification (GTFS) format was obtained from RTS. The GTFS files provide information on routes, stop locations, and service characteristics (fare, frequency, run times, span of service, etc.) of the system. This data was used to update the existing routes and stops, modify headways, and add eight new routes (17, 20, 22,23,25,29, 38 and 126) that did not exist in the 2007 model. Table 4 contains a listing of all the transit routes that are coded into the transit system and Figure 13 shows the 2010 transit routes.

The transit route file had to be overlaid with the highway network when new bus locations were added due to the necessity of splitting highway links where a bus stop exists. The highway network was updated at the same time as the transit route file was updated. “Later Gator” bus routes that were not included as these are evening bus services specifically for University of Florida students and operate for only limited hours while the model is designed to estimate daily peak and off-peak transit ridership.

Transit fare data can be found within the Cube Voyager script file ALACHUA.FAR. According to the bus fare data provided by RTS, the year 2010 bus fare was $1.50. While the full 2010 bus fare amount was applied to transit trips for the home-based other (HBO) trip purposes, discounted bus fare amounts were assumed for the home-based work (HBW) and home-based university/dormitory (HBU/HBDORM) trip purposes. Based on employee pass program information provided by the RTS, 25 percent of the full fare was assumed for the HBW trip purpose. University students are charged with bus fare as part of class registration fees which generally help increase bus ridership for students (i.e., it is prepaid whether used or not and does not require students to pay upon boarding the bus). Therefore, 10 percent of full fare was assumed for HBU/HBDORM trip purposes, consistent with the 2007 model.

Extensive network testing will be conducted as part of the model validation effort, which may result in additional changes to the networks.

Table 4: Transit Routes

Route	Original-Destination Stops
1	Downtown - Butler Plaza
2	Downtown - Health Department
5	Downtown - Oaks Mall
6	Downtown - Gainesville Mall
7	Downtown - Eastwood Meadows
8	Shands - Northwood Village
9	McCarty - Hunters Run
10	Downtown - Santa Fe
11	Downtown - Eastwood Meadows
12	McCarty - Butler Plaza
13	Shands - Florida Works
15	Downtown - Gainesville Mall
16	Shands - Sugar Hill
17	Shands – Downtown
20	McCarty - Oaks Mall
21	McCarty - Cabana Beach
22	McCarty - SW 43rd Street at 24th Avenue
23	Oaks Mall - Santa Fe
24	Downtown - Job Corps
25	Commuter Lot - GNV Airport
29	Beaty Towers – Cobblestone
34	Hub - Lexington Crossing
35	McCarty – Homestead
36	McCarty - Williston Plaza
38	Hub - Gainesville Place
43	Downtown - Santa Fe
75	Oaks Mall - Butler Plaza
117	McCarty - SW 34th Street Lot
118	Hub - Cultural Plaza
119	Family Housing

Table 4: Transit Routes

Route	Original-Destination Stops
120	Fraternity Row
121	Commuter Lot
122	Animal Science
125	Lakeside
126	University of Florida East/West Circulator
127	Sorority Row

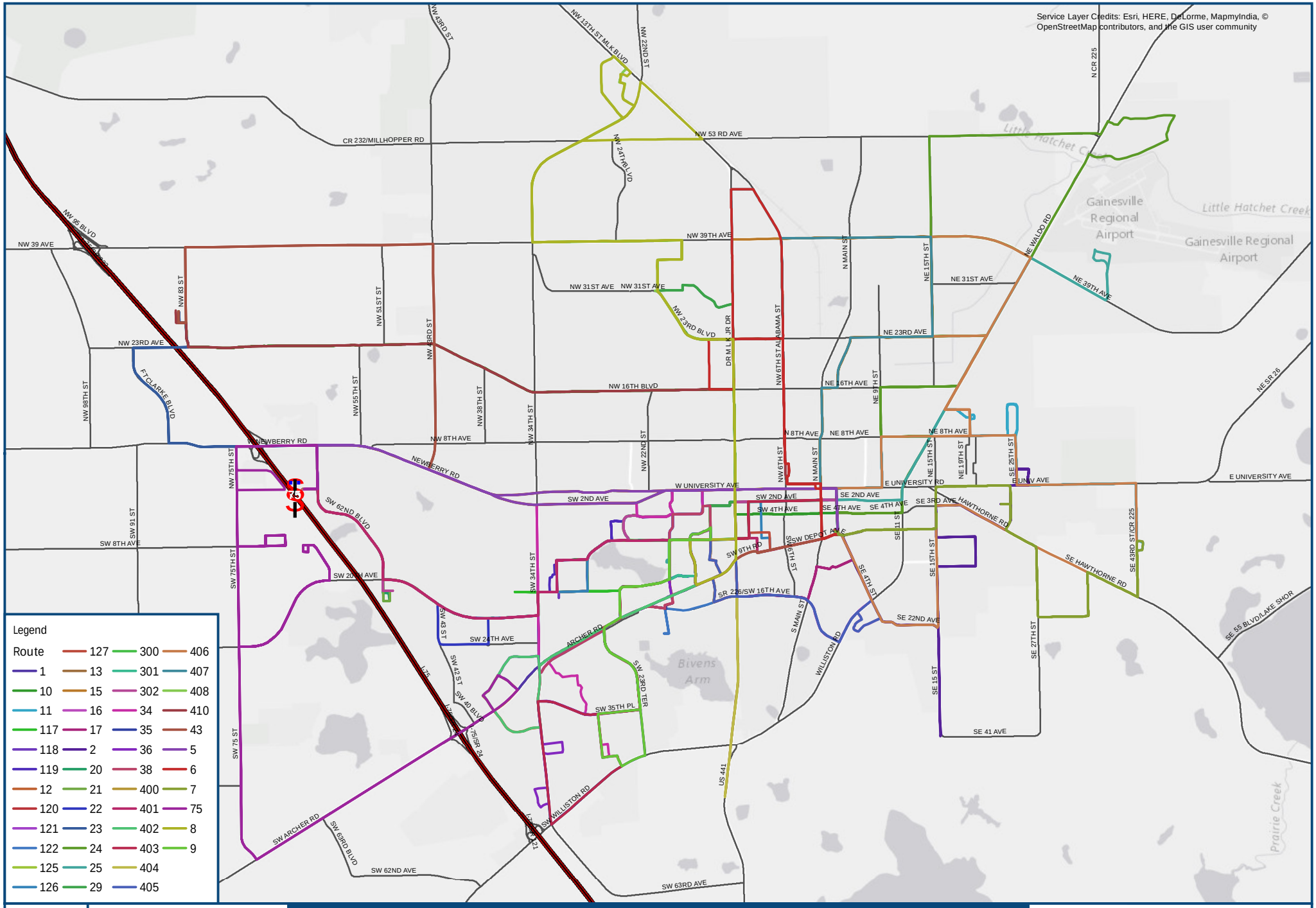


Figure 13

0 0.5 1 Miles

2010 Transit Network

2040 Long Range Transportation Plan

Task 3.3 Review 2010 Traffic Count and Transit Ridership Data

3.3.1 Traffic Count

Validation of any travel demand model relies on the existence of a comprehensive set of base year traffic count data. Volume-over-count ratios generated by the model are used to measure the ability of a travel demand highway assignment model to simulate observed traffic conditions. Traffic counts are needed for a variety of different roadway categories distributed throughout the study area in order to validate highway assignment performance along screenlines, and by each facility type, area type, and lane category.

The 2010 traffic counts coded in the network were obtained from the MTPO, Florida Department of Transportation, and the City of Gainesville. The MTPO Year 2010 Multimodal Level of Service Report included counts on state roads, Alachua County arterials, and City of Gainesville/ University of Florida Arterials. The FDOT Roadway Characteristics Inventory (RCI) provided 2010 counts on the state highway system (SHS). In addition, 2010 traffic counts were also obtained from the City of Gainesville. No field data collection was undertaken as part of this modeling effort given the regional nature of this study.

Like most FSUTMS models, the Alachua County 2010 model assigns trips to the highway network in terms of peak-season weekday average daily traffic (PSWADT). Traffic count data from various sources are reported in average annual daily traffic (AADT). AADT values are converted to PSWADT using the inverse of the model output conversion factor (MOCF) from the Florida Traffic Information DVD. Ultimately the PSWADTs are coded in the highway network using the COUNT10 attribute, which is shown in Figures 14 and 15. Extensive data checks were conducted during this process in order to ensure that the counts coded in the model are reliable. Counts were cross referenced between different sources for consistency and also compared with the 2007 model as part of the reasonableness checking. Table 5 provides a system-wide statistical summary of the 2007 and 2010 traffic counts coded in the model

network. As seen from the summary, several new counts were coded in the model network to enhance the model validation.

Table 5: System-wide Statistical Summary of Traffics Counts

	2007 AADT	2010 AADT
Observations	690	730
Mean	2,033	2,181
Sum	9,680,750	10,384,906
Standard Deviation	7,287	8,449

3.3.2 Transit Ridership

The 2007 transit network was updated using the 2010 transit data provided by RTS in GTFS format. Ridership of the RTS system has increased steadily over the years. RTS continues to set new ridership records through its partnerships and enhanced services. In FY 2013, RTS provided over 10.8 million trips system-wide. Over the last three years, RTS has moved over ten million passengers per year which has kept the transit agency ranked as the top agency in the state of Florida when comparing ridership to population. Table 6 shows the 2010 route level ridership by month and Figure 16 shows the boarding intensive areas. The seasonal fluctuations in ridership are heavily influenced by the university schedule and when students are in break. As the model represents peak season travel conditions, the model will be validated to represent peak season ridership.

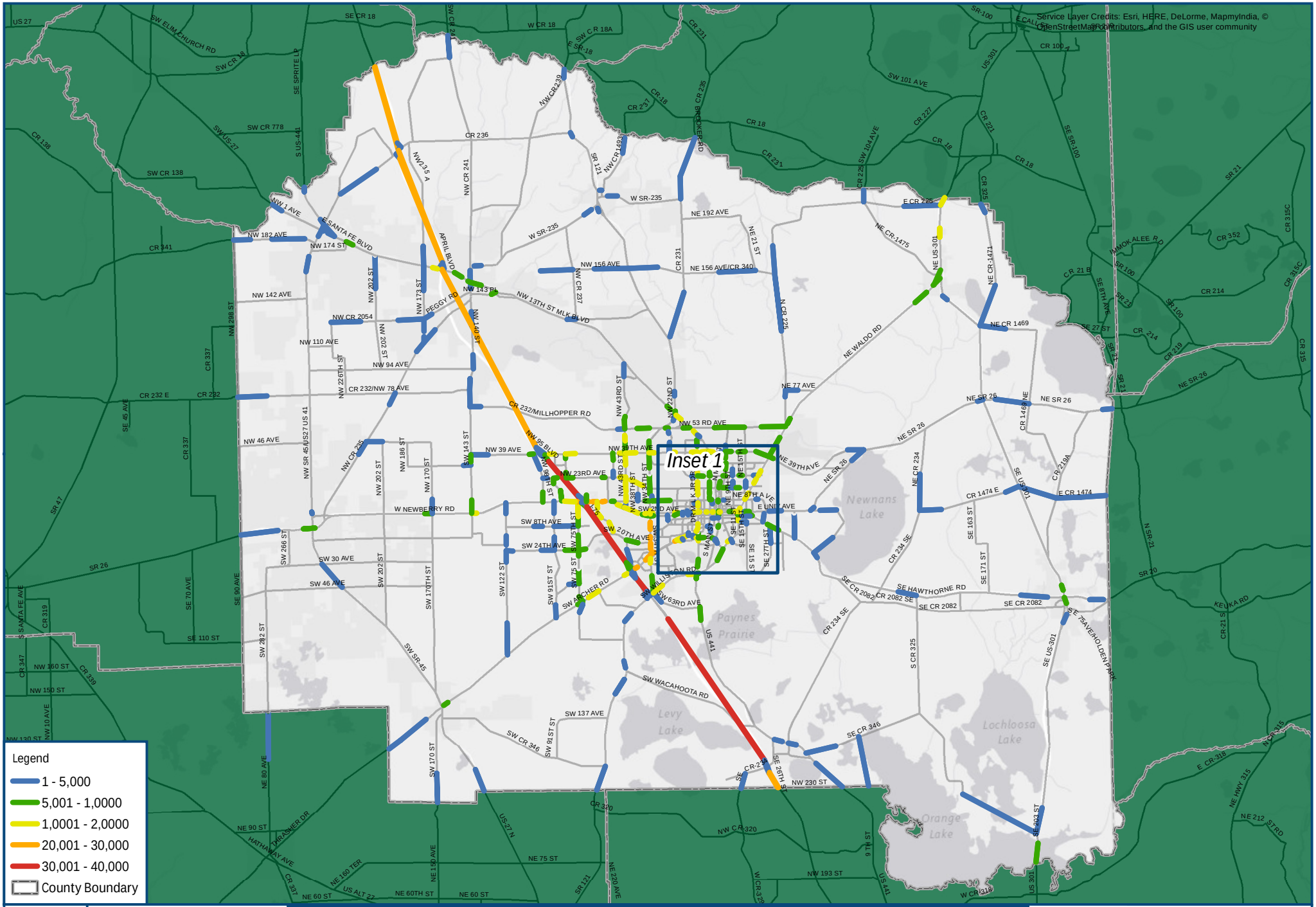


Figure 14

2010 Directional Peak Season Weekday Average Daily Traffic (PSWADT)

2040 Long Range Transportation Plan

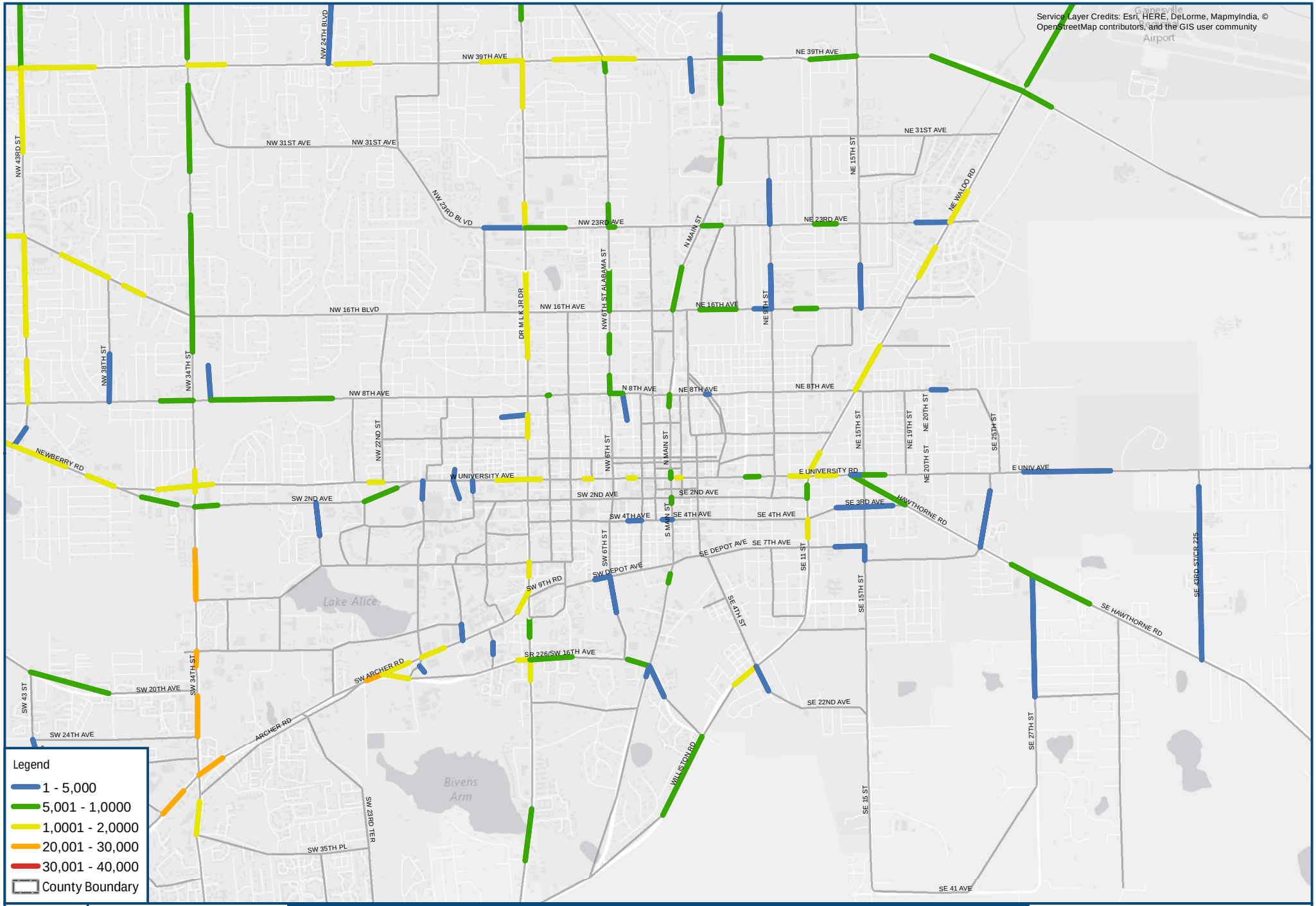


Figure 15

0 0.25 0.5 Miles

2010 Directional Peak Season Weekday Average Daily Traffic (PSWADT) - Inset 1

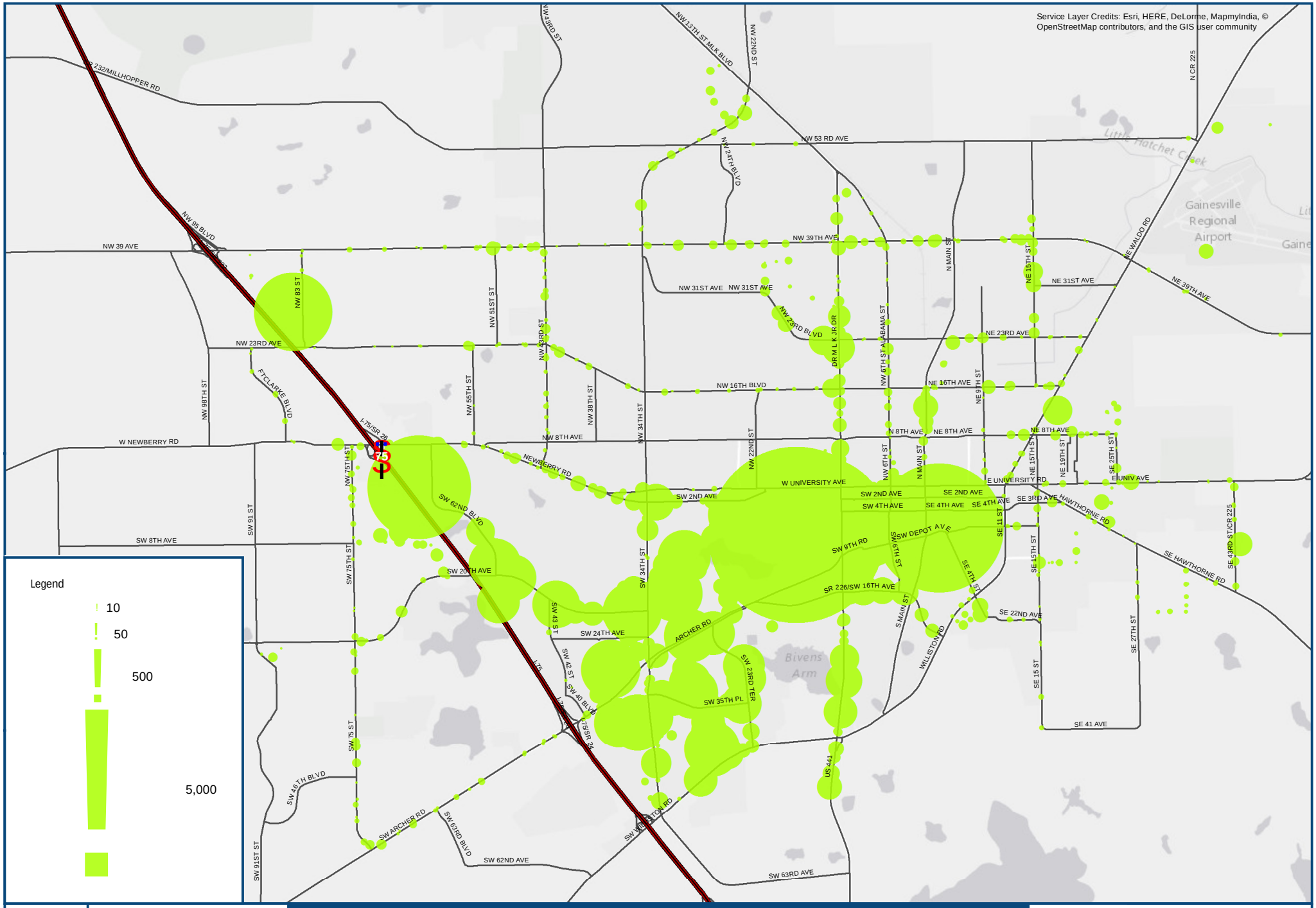
2040 Long Range Transportation Plan

Table 6: Transit Ridership by Route

Route	City Routes	December Passengers	November Passengers	October Passengers	September Passengers	August Passengers	July Passengers	June Passengers	May Passengers	April Passengers	March Passengers	February Passengers	January Passengers
1	Downtown to Butler Plaza via Archer Road	31,183	41,605	46,776	51,310	44,425	39,233	36,647	32,279	40,098	41,085	40,795	40,261
2	Downtown to Health Department via SE 15th Street	6,800	7,082	8,575	8,658	8,003	6,908	7,093	6,605	7,483	8,128	7,092	7,563
5	Downtown to Oaks Mall via University Avenue	27,048	32,950	37,936	40,136	29,897	24,327	24,280	23,063	35,533	34,947	36,025	35,400
6	Downtown to Gainesville Mall via 6th Street	7,615	8,503	9,462	9,888	8,506	8,088	8,141	8,430	7,751	7,907	6,680	7,251
7	Downtown to Eastwood Meadows	7,792	9,017	9,367	9,364	8,480	7,887	8,089	7,990	9,580	9,297	7,957	9,036
8	Shands to Northwood Village via NW 13th Street	18,994	25,204	27,887	31,701	24,288	20,732	19,504	18,221	23,528	24,684	24,459	24,725
9	McCarty to Hunters Run	35,111	71,352	82,596	92,966	46,071	39,635	33,470	31,809	56,206	60,391	68,170	65,372
10	Downtown to Santa Fe via NW 16th Ave	4,626	8,846	10,021	10,827	6,690	5,190	5,046	5,224	7,875	7,757	7,678	8,296
11	Downtown to Eastwood Meadows via University Ave.	10,091	10,709	11,478	10,978	10,267	8,263	9,241	9,497	10,070	10,277	9,156	9,373
12	McCarty to Butler Plaza	39,882	70,270	79,368	85,955	49,528	32,000	30,086	30,185	65,463	66,295	71,648	71,178
13	Shands to Florida Works via SW 13th Street	23,857	41,638	47,755	51,692	30,881	19,863	19,737	18,916	32,665	35,604	38,256	35,969
15	Downtown to Gainesville Mall	22,963	22,179	24,769	25,941	23,667	21,661	21,105	20,631	21,231	22,013	19,402	19,388
16	Shands to Sugar Hill via SW 16th Avenue	9,879	14,226	16,143	17,651	13,672	14,741	13,764	12,217	21,346	20,794	22,012	20,932
17	Shands to Downtown	11,410	15,308	17,044	18,114	13,321	9,985	11,185	10,828	15,535	17,216	18,115	17,493
20	McCarty to Oaks Mall via SW 20th Avenue	59,168	102,236	118,714	126,568	71,409	61,022	52,141	49,262	89,090	90,717	99,181	94,102
21	McCarty to Cabana Beach	20,702	45,269	52,450	60,382	24,347	6,669	4,817	4,483	32,405	36,570	43,191	43,124
22	McCarty to SW 43rd St @ SW 24th Avenue	3,658	7,178	8,730	10,599	4,355	-	-	-	5,614	6,400	8,218	7,813
23	Oaks Mall to Santa Fe	2,138	4,420	5,047	5,402	2,045	0	0	0	0	0	0	0
24	Downtown to Job Corps via SR 24 (Waldo Rd.)	6,719	7,999	8,617	8,700	7,685	5,744	6,449	6,681	6,854	7,799	6,666	6,901
25	McCarty to Airport	1,123	1,352	1,464	1,282	519	0	0	0	0	0	0	0
29	Beaty Towers to Cobblestone	1,839	3,785	4,538	5,115	1,980	-	-	-	2,587	3,062	3,550	3,511
34	HUB to Lexington Crossing	21,529	42,426	48,143	57,668	30,249	22,523	18,251	17,296	40,905	43,982	50,799	49,674
35	McCarty to Homestead Apartments	35,498	64,765	73,904	81,028	41,814	28,090	25,882	25,385	59,584	61,764	69,126	66,952
36	McCarty to Williston Plaza	7,439	14,470	15,990	17,002	6,655	-	-	-	9,745	11,437	13,813	13,169
38	HUB to Gainesville Place	8,285	19,915	22,373	25,599	9,099	-	-	-	3,637	4,510	3,728	2,833
43	Downtown to Santa Fe via 43rd Street	11,025	18,514	19,935	21,442	15,067	12,733	12,396	11,052	15,713	16,437	16,094	16,324
75	Oaks Mall to Butler Plaza via 75th Street	21,597	22,380	25,037	22,989	21,584	19,555	20,167	19,589	20,986	21,563	19,329	18,791
300	Later Gator A (Downtown to Reitz Union)	1,968	3,275	5,100	6,142	3,639	5,906	12	-	4,153	2,682	3,965	4,854
301	Later Gator B (Downtown to Lexington Cr.)	1,559	2,680	4,995	4,948	3,104	2,594	-	-	2,840	1,744	2,923	3,035
302	Later Gator C (Downtown to Oaks Mall)	1,824	2,890	5,960	5,590	2,562	4,012	-	-	3,496	2,033	3,147	3,478
305	Later Gator F : Downtown to Butler Plaza	-	-	-	0	0	0	0	0	0	0	0	0
400-410	Saturday Service Routes (400-410) (excluding 407)	8,518	11,756	15,534	14,460	10,988	10,132	7,759	10,148	11,249	9,613	11,468	12,277
400-408	Sunday Service Routes (400-408) (excluding 409 & 410)	4,523	5,563	7,100	5,685	7,098	3,997	4,308	4,988	4,449	4,118	5,152	6,370
	City totals	476,363	759,762	872,808	945,782	581,895	441,490	399,570	384,779	667,671	690,826	737,795	725,445

Route	Campus Route	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers	Passengers
117	Park-N-Ride 2 (SW 34th Street)	7,251	16,435	18,228	21,543	7,796	-	-	-	12,896	13,318	15,781	14,769
118	Park-N-Ride 1 (Harn Museum)	18,460	44,360	49,462	53,437	16,385	-	-	-	46,075	50,718	61,204	56,022
119	Family Housing	3,748	7,514	7,414	8,361	4,603	6,642	3,545	2,506	8,263	7,317	8,281	8,063
120	West Circulator (Fraternity Row)	17,151	35,537	40,831	47,689	25,869	31,560	11,050	6,943	31,005	32,325	40,491	37,036
121	Commuter Lot	12,637	22,791	27,661	34,041	16,201	19,082	12,130	9,128	19,732	22,189	26,336	24,389
122	UF North/South Circulator	1,346	3,144	3,219	4,147	1,782	1,079	831	810	3,221	3,304	3,980	4,002
125	Lakeside	8,129	18,615	21,669	25,523	16,650	27,374	9,329	7,867	18,466	19,237	22,815	21,542
126	UF East/West Circulator	3,139	6,401	8,512	9,949	5,971	2,317	739	575	5,488	5,405	7,606	6,428
127	East Circulator (Sorority Row)	11,804	25,173	26,550	33,399	13,428	6,842	5,314	5,076	20,867	25,653	31,713	30,794
	Campus totals	83,665	179,970	203,546	238,089	108,685	94,896	42,938	32,905	166,013	179,466	218,207	203,045

	Systemwide Totals	560,028	939,732	1,076,354	1,183,903	690,580	536,417	442,508	417,684	833,756	870,292	956,002	928,490


Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Legend
10
50
500
5,000
Gainesville Regional Airport
Little Hatchet Creek
Bivens Arm
NW 53 RD AVE
NW 39TH AVE
NW 31ST AVE
NW 23RD AVE
NW 16TH BLVD
NW 8TH AVE
W NEWBERRY RD
NEWBERRY RD
W UNIVERSITY AVE
SW 2ND AVE
SW 4TH AVE
SE 2ND AVE
SE 4TH AVE
E UNIVERSITY RD
NE 8TH AVE
NE 16TH AVE
NE 23RD AVE
NE 31ST AVE
NE 39TH AVE
SW 8TH AVE
SW 20TH AVE
SW 24TH AVE
SW 35TH PL
SW 62ND BLVD
SW 62ND AVE
SW 63RD AVE
SW ARCHER RD
SW 46TH BLVD
SW 40 BLVD
SW 42 ST
SW 43 ST
SW 75 ST
SW 75TH ST
SW 91 ST
SW 91ST ST
SW 98TH ST
SW 9TH RD
SW DEPOT AVE
SR 226/SW 16TH AVE
ARCHER RD
HAWTHORNE RD
SE HAWTHORNE RD
SE 41 AVE
SE 22ND AVE
SE 27TH ST
SE 43RD ST/CR 225
NW 83 ST
NW 75TH ST
NW 55TH ST
NW 51ST ST
NW 43RD ST
NW 38TH ST
NW 34TH ST
NW 22ND ST
NW 6TH ST
N MAIN ST
S MAIN ST
NW 6TH ST ALABAMA ST
DR M L K JR DR
NW 23RD BLVD
NW 24TH BLVD
NW 22ND ST
NW 43RD ST
NW 13TH ST MLK BLVD
NW 95 BLVD
NW 39 AVE
NW 98TH ST
F T CLARKE BLVD
I-75/SR 93
I-75/SR 93A
US 441
SR 232/MILLHOPPER RD
N CR 225
NE WALDO RD
NE 39TH AVE
NE 31ST AVE
NE 15TH ST
NE 19TH ST
NE 9TH ST
SE 25TH ST
SE 15TH ST
SE 11 ST
SE 4TH ST
SE 15 ST
SW 16TH ST
SW 23RD TER
WILLISTON RD
SW WILLISTON RD
S MAIN ST
E UNIV AVE
SE 3RD AVE
Figure 16
0 0.5 1 Miles
2012 Daily Transit Ridership
Alighting Intensity
Livable Community - Creating Connections
Year 2040
2040 Long Range Transportation Plan

Task 3.4 Review Trip Generation Rate

Like most FSUTMS models, the Alachua County 2010 model uses cross classification trip production rates stratified by auto availability (0, 1, 2, and 3+ auto households), dwelling unit type (single family, multifamily, and hotel/motel units), and household size (1, 2, 3, 4, and 5+ persons per household). Trip production rates for home-based work, home-based shopping, home-based social/ recreational, and home-based other purposes are shown in Table 7. The production rates were developed using the North Florida Household Travel Survey and were also utilized by the 2007 model.

Trip attraction rates were originally derived from the 2005 Northeast Florida Regional Planning Model (NERPM) and are shown in Table 8. Both model regions share a few similar socioeconomic characteristics such as less of a reliance on tourism and seasonal residents than other parts of Florida. The rates were reviewed as part of the 2010 update and deemed reasonable.

Table 7: Trip Production Rates

Home-Based Work						
		Number of Persons in Household				
Dwelling Unit Type	Number of Autos Available	1	2	3	4	5+
Single Family	0	0.35	0.64	1.01	1.5	2.08
	1	0.69	0.98	1.35	1.84	2.42
	2	1.35	1.64	2.01	2.5	3.08
	3+	1.76	2.05	2.42	2.9	3.49
Multifamily	0	0.41	0.7	1.01	1.31	1.62
	1	0.95	1.49	2.02	2.56	3.1
	2	1.65	2.3	2.95	3.6	4.25
	3+	2.21	2.89	3.59	4.27	4.96
Hotel/Motel		1.04	0.72	0.5	0.39	0.39

Home-Based Shopping						
		Number of Persons in Household				
Dwelling Unit Type	Number of Autos Available	1	2	3	4	5+
Single Family	0	0.3	0.53	0.95	1.55	2.34
	1	0.59	1.02	1.55	2.18	2.89
	2	0.65	1.08	1.61	2.23	2.95
	3+	0.77	1.22	1.76	2.39	3.1
Multifamily	0	0.22	0.57	1.02	1.54	2.11
	1	0.5	0.95	1.4	1.83	2.27
	2	0.72	1.22	1.66	2.08	2.46
	3+	0.84	1.35	1.79	2.2	2.56
Hotel/Motel		0.33	1.43	2.2	2.75	3.19

Table 7: Trip Production Rates, Cont.

Home-Based Social/Recreational						
		Number of Persons in Household				
Dwelling Unit Type	Number of Autos Available	1	2	3	4	5+
Single Family	0	0.21	0.28	1.28	1.47	2.2
	1	0.48	0.85	1.43	1.31	2.37
	2	0.53	0.89	1.85	2.07	2.77
	3+	0.7	1.07	2.04	2.24	2.97
Multifamily	0	0.18	0.63	1.08	1.53	1.98
	1	0.22	0.67	1.12	1.57	2.02
	2	0.64	1.09	1.54	1.99	2.44
	3+	0.84	1.29	1.74	2.19	2.64
Hotel/Motel		0.66	1.81	2.97	4.29	6.49

Home-Based Other						
		Number of Persons in Household				
Dwelling Unit Type	Number of Autos Available	**1**	**2**	**3**	**4**	**5+**
Single Family	0	0.29	0.64	1.67	3.38	5.78
	1	0.48	1.29	2.59	4.38	6.67
	2	0.62	1.79	3.34	5.2	7.33
	3+	0.68	1.94	3.58	5.59	7.99
Multifamily	0	0.35	0.78	2.28	4	6.23
	1	0.74	1.36	3.16	4.92	6.91
	2	1.12	1.87	3.71	5.59	7.34
	3+	1.17	2.09	4.05	5.75	7.56
Hotel/Motel		0.55	1.32	2.31	3.63	4.84

Table 8: Attraction Rates

Purpose	Manufacturing	Other Industrial	Commercial	Service	Total	Dwelling Units	School Enrollment
Home-Based Work	0	0	0	0	1.8	0.5	0
Home-Based Shopping	0	0	6.1	0	0	0	0
Home-Based Social/ Recreational	0	0	0.5	0.5	0	1.61	0
Home-Based Other	0	0	1.5	1.5	0	0.3	1.5
Non Home-Based	0	0	3.54	1.71	0	0.3	0
Four-Tire Truck	0.47	0.55	0.45	0.22	0	0.13	0
Single-Unit Truck	0.12	0.15	0.13	0.04	0	0.05	0
Tractor-Trailer	0.05	0.09	0.04	0.01	0	0.02	0

The dwelling unit weights have been utilized from the 2007 model and are shown in Table 9.

Table 9: Dwelling Unit Weights

Average Persons Per Dwelling Unit	One-Person Households	Two-Person Households	Three-Person Households	Four-Person Households	Five-Person Households
0.00-1.12	0.89	0.11	0	0	0
1.13-1.37	0.76	0.22	0.02	0	0
1.38-1.62	0.59	0.34	0.05	0.01	0.01
1.63-1.87	0.46	0.34	0.11	0.06	0.03
1.88-2.12	0.32	0.36	0.16	0.11	0.05
2.13-2.37	0.24	0.36	0.18	0.14	0.08
2.38-2.62	0.21	0.33	0.19	0.16	0.12
2.63-2.87	0.12	0.35	0.19	0.23	0.11
2.88-3.12	0.13	0.34	0.18	0.16	0.19
3.13-3.37	0.12	0.29	0.18	0.17	0.24
3.38-3.62	0.08	0.24	0.2	0.2	0.28
3.63-3.87	0.05	0.2	0.19	0.23	0.33
3.88-4.12	0.04	0.16	0.17	0.24	0.39
4.13-4.37	0.02	0.15	0.14	0.21	0.48
4.38-4.62	0.01	0.15	0.13	0.17	0.54
4.63-5.99	0	0.05	0.07	0.14	0.74
6.00+	0	0	0.02	0.05	0.93

Home-based university (HBU) and UF Campus/Dorm (DORM) trip purposes are unique to the Alachua County model. These additional purposes also were used in the Alachua County 2007 and 2000 models, as it was found that this was necessary to properly model a region with a university town such as the City of Gainesville as a major trip attractor. The home-based university purpose is for trips traveling from off-campus housing to parking spaces within the UF Campus. On the other hand, the UF Campus/Dorm (DORM) trip purpose is trips from UF on-campus dormitories to classrooms that are specified in the ZONEDATA file. It should be noted that the model has limited capabilities in simulating parking capacity beyond the number of parking spaces being stored in the ZONEDATA file and used in the attraction equations.

HBU and DORM trip production and attraction equations for the HBU and DORM purposes are listed below, as extracted from model scripts. During validation, these trip rates were relocated to the Cube catalog keys (names depicted in {brackets}) to enhance model transparency.

Home-Based University Productions:

RO.HBUP = {RATE_HBUP}*ZI.1.UF_OC_ST

; UF_OC_ST is off-campus (students)

; Default value of {RATE_HBUP} is 2.996

Home-Based University Attractions:

RO.HBUA = {RATE_HBUA}*ZI.1.UF_PARKING

; PARKING is UF Parking Spaces

; Default value of {RATE_HBUA} is 1.375

UF Campus/Dorm Productions:

RO.HDORMUP = {RATE_HDORMUP} *ZI.1.UF_DORM_ST

; UF_DORM_ST is Campus housing/Dormitory students

; Default value of {RATE_HDORMUP} is 2.262

UF Campus/Dorm Attractions:

RO.HDORMUA = {RATE_HDORMUA} *ZI.1.SEATS

; SEATS is UF Classroom Seats

; Default value of {RATE_HDORMUA} is 0.7513

The impacts of these rates will be comprehensively assessed during the trip generation validation of the 2010 model.

Task 3.5 Review Trip Length Distribution

Trip length frequency distribution is an important component of the trip distribution model that pairs the productions and attractions estimated by the trip generation model. Gravity models are implemented as mathematical procedures designed to preserve the observed frequency distribution of trip lengths for each modeled trip purpose. The travel time matrix from highway skimming and PA matrices from the trip distribution process are used to determine the average trip length and the trip length frequency distribution for each trip purpose.

3.5.1 Friction Factors

Friction factors are used in the gravity model to represent the effects of travel impedance. These factors define the measure of separation based on travel impedances between TAZs. The friction factors from the 2007 model were reviewed and no updates were necessary for the 2010 model validation (refer to Table 10). Average trip lengths seemed reasonable, intrazonal percentages made sense, and aggregate trip distribution patterns looked logical. In addition, there were no updated household travel diary survey data for Alachua County to allow for calibration of new friction factors.

3.5.2 Travel Time Skims

Trip travel time contains three parts. First is in vehicle travel time on the road, second is intrazonal time which represents travel time within TAZ, and last one is terminal time which approximately estimates the travel time from/to vehicle at trip ends.

In vehicle travel time skims between zone pairs are developed as the last substep in the "Highway Network" step, including the updating of travel time skims with intrazonal and terminal times. Highway network characteristics are input to this process. In addition to the

highway network characteristics, the TCARDS file is used as input to the process. The TCARDS file contains a record of all prohibited movements in the network. The TCARDS file also can include time penalties; however, time penalties were not recommended in the model area as the highway assignment validated reasonably well without supplemental travel time factors.

Intrazonal times represent the travel time it takes to travel within or across a zone. These times are calculated as one-half the travel time from one zone to the nearest adjacent zone. Terminal times represent the time required at either end of a trip to travel from an origin to a vehicle or from the vehicle to a final destination. More specifically, this accounts for the time necessary to walk to or from the vehicle used for any given trip. Terminal times are typically greatest in central business districts and lowest in residential areas. Table 11 lists the terminal times by area type used in the Alachua County 2010 model.

Table 10: Friction Factors

TIME	HBWFF	HBSHFF	HBSRFF	HBOFF	NHBFF	TK4FF	TKSGLFF	TKTRLRFF	SOVIEFF	HOVIEFF	TKLTIEFF	TKHTIEFF	IHBUFF	IHDORMUFF
1	25208	126687	126687	126687	198262	9231	9048	9704	222	222	222	222	126687	126687
2	21983	47324	47324	47324	71259	8521	8187	9418	333	333	333	333	47324	47324
3	19282	25585	25585	25585	37571	7866	7408	9139	444	444	444	444	25585	25585
4	16953	16092	16092	16092	23174	7261	6703	8869	555	555	555	555	16092	16092
5	14924	10997	10997	10997	15577	6703	6065	8607	666	666	666	666	10997	10997
6	13149	7919	7919	7919	11056	6188	5488	8353	777	777	777	777	7919	7919
7	11591	5913	5913	5913	8147	5712	4966	8106	888	888	888	888	5913	5913
8	10222	4534	4534	4534	6170	5273	4493	7866	1333	1333	1333	1333	4534	4534
9	9018	3548	3548	3548	4773	4868	4066	7634	1666	1666	1666	1666	3548	3548
10	7957	2820	2820	2820	3753	4493	3679	7408	3333	3333	3333	3333	2820	2820
11	7023	2271	2271	2271	2991	4148	3329	7189	6666	6666	6666	6666	2271	2271
12	6199	1849	1849	1849	2410	3829	3012	6977	7777	7777	7777	7777	1849	1849
13	5473	1519	1519	1519	1960	3535	2725	6771	8888	8888	8888	8888	1519	1519
14	4833	1257	1257	1257	1607	3263	2466	6570	9999	9999	9999	9999	1257	1257
15	4267	1047	1047	1047	1326	3012	2231	6376	9999	9999	9999	9999	1047	1047
16	3769	877	877	877	1101	2780	2019	6188	9999	9999	9999	9999	877	877
17	3328	739	739	739	919	2567	1827	6005	9999	9999	9999	9999	739	739
18	2940	625	625	625	771	2369	1653	5827	9999	9999	9999	9999	625	625
19	2597	531	531	531	649	2187	1496	5655	9999	9999	9999	9999	531	531
20	2294	452	452	452	548	2019	1353	5488	6666	6666	6666	6666	452	452
21	2026	387	387	387	465	1864	1225	5326	3333	3333	3333	3333	387	387
22	1790	331	331	331	395	1720	1108	5169	1111	1111	1111	1111	331	331
23	1582	285	285	285	337	1588	1003	5016	444	444	444	444	285	285
24	1397	246	246	246	288	1466	907	4868	222	222	222	222	246	246
25	1235	212	212	212	247	1353	821	4724	111	111	111	111	212	212
26	1091	184	184	184	212	1249	743	4584	66	66	66	66	184	184
27	964	159	159	159	183	1153	672	4449	22	22	22	22	159	159
28	852	138	138	138	157	1065	608	4317	16	16	16	16	138	138
29	753	120	120	120	136	983	550	4190	13	13	13	13	120	120
30	665	105	105	105	118	907	498	4066	11	11	11	11	105	105
31	588	92	92	92	102	837	450	3946	16	16	16	16	92	92
32	519	80	80	80	88	773	408	3829	3	3	3	3	80	80
33	459	70	70	70	77	714	369	3716	1	1	1	1	70	70
34	406	61	61	61	67	659	334	3606	1	1	1	1	61	61
35	358	54	54	54	58	608	302	3499	1	1	1	1	54	54
36	317	47	47	47	51	561	273	3396	1	1	1	1	47	47
37	280	41	41	41	44	518	247	3296	1	1	1	1	41	41
38	247	36	36	36	39	478	224	3198	1	1	1	1	36	36
39	219	32	32	32	34	442	202	3104	1	1	1	1	32	32
40	193	28	28	28	29	408	183	3012	1	1	1	1	28	28
41	171	25	25	25	26	376	166	2923	1	1	1	1	25	25
42	151	22	22	22	23	347	150	2837	1	1	1	1	22	22
43	133	19	19	19	20	321	136	2753	1	1	1	1	19	19
44	118	17	17	17	17	296	123	2671	1	1	1	1	17	17
45	104	15	15	15	15	273	111	2592	1	1	1	1	15	15
46	92	13	13	13	13	252	101	2516	1	1	1	1	13	13
47	81	12	12	12	12	233	91	2441	1	1	1	1	12	12
48	72	11	11	11	10	215	82	2369	1	1	1	1	11	11
49	64	9	9	9	9	198	74	2299	1	1	1	1	9	9
50	56	8	8	8	8	183	67	2231	1	1	1	1	8	8
51	50	7	7	7	7	169	61	2165	1	1	1	1	7	7
52	44	7	7	7	6	156	55	2101	1	1	1	1	7	7
53	39	6	6	6	6	144	50	2039	1	1	1	1	6	6
54	34	5	5	5	5	133	45	1979	1	1	1	1	5	5
55	30	5	5	5	4	123	41	1920	1	1	1	1	5	5
56	27	4	4	4	4	113	37	1864	1	1	1	1	4	4
57	24	4	4	4	3	105	33	1809	1	1	1	1	4	4
58	21	3	3	3	3	97	30	1755	1	1	1	1	3	3
59	19	3	3	3	3	89	27	1703	1	1	1	1	3	3
60	16	3	3	3	2	82	25	1653	1	1	1	1	3	3
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 11: Terminal Time

Terminal Times	Area Type	Area Type Descriptions
5	12	Urbanized Area (under 500,000) Primary City Central Business District
5	13	Other Urbanized Area Central Business District and Small City Downtown
5	14	Non-urbanized Area Small City Downtown
3	21	Central Business District Fringe Areas
3	22	Industrial
1	31	Residential Area of Urbanized Areas
1	32	Undeveloped Portions of Urbanized Areas
1	33	Transitioning Areas/Urban Areas over 5,000 Population
2	42	Other Outlying Business District
1	51	Developed Rural Areas/Small Cities under 5,000 Population
1	52	Undeveloped Rural Areas

3.5.3 Trip Length Frequency Distribution and Average Trip Length by Purpose

Table 12 shows a comparison of average trip length statistics generated by the 2000 and 2007 Alachua County models and applicable FSUTMS standards. Comparisons between the Alachua County 2010 model and the Alachua County 2007 model show no significant changes in average trip length in minutes. The model results are also within the standard ranges for the most part (please note that the LRTP model validation standards utilized are more stringent compared to the general standards noted on Table 12). Figures 17 through 20 depict the trip length distribution by purpose, which will be further refined as part of the model validation process as needed. The 2007 and 2010 trip length frequency distributions are found to be very similar.

Table 12: Average Trip Length Comparison (in Minutes)

Purpose	2010 Alachua County Model	2007 Alachua County Model	FSUTMS Standard*
Home-Based Work	14.67	14.73	15-28
Home-Based Shop	13.09	13.1	10-18
Home-Based Social/Recreation	12.49	12.55	11-19
Home-Based Other	13.24	13.37	10-20
Nonhome-Based	10.51	10.79	10-18
Home-Based University	9.31	9.14	9-16
UF Campus/Dorm	6.2	6.22	NA
Truck-Taxi	15.40	15.18	12-20
Internal-External	25.77	25.69	27-45

** Source: FSUTMS-Cube Framework Phase II Model Calibration and Validation Standards (Table F1)*

Figure 17: Trip Length Frequency Distribution for Home Based Work

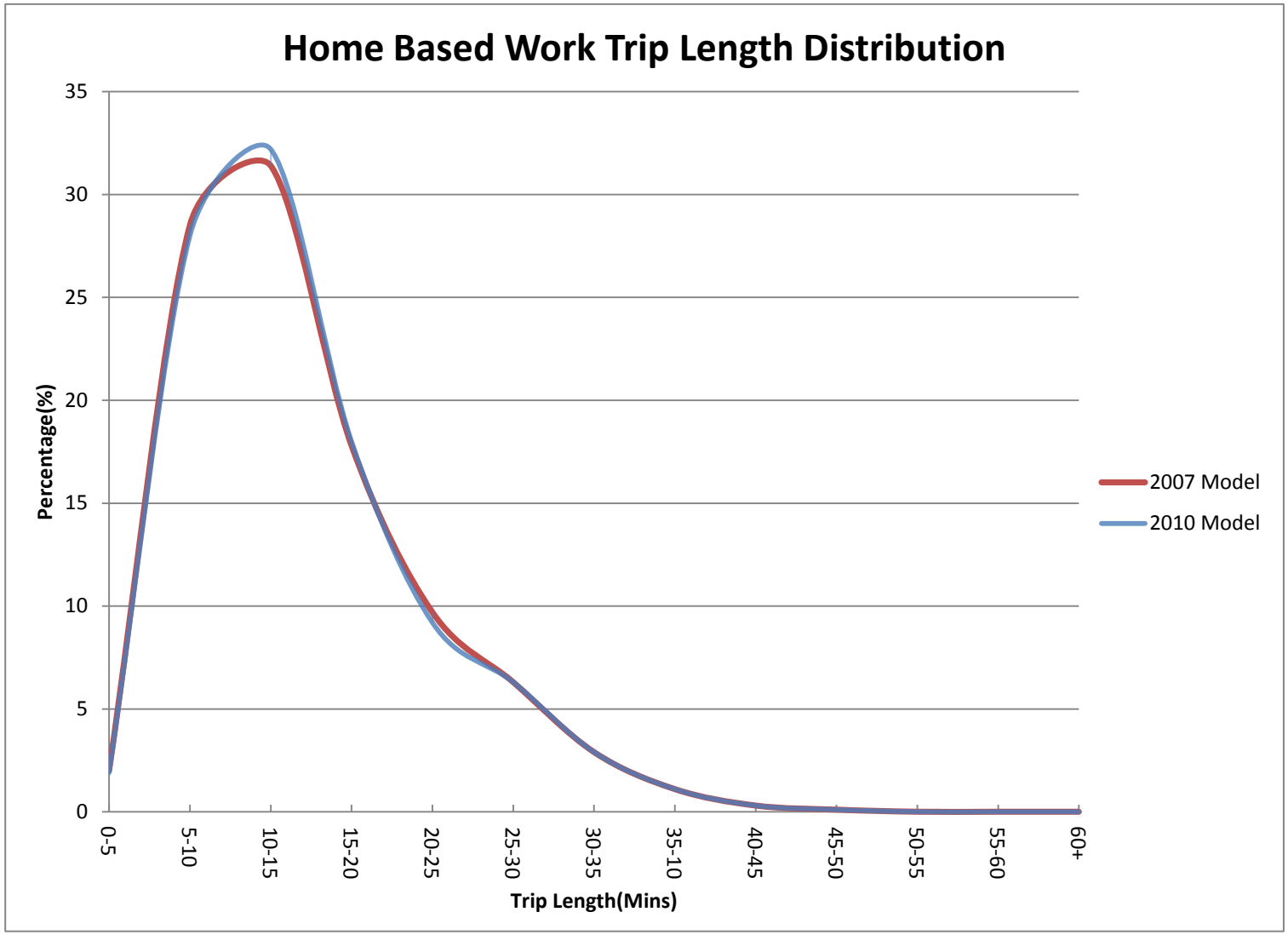


Figure 18: Trip Length Frequency Distribution for Home Based Shop

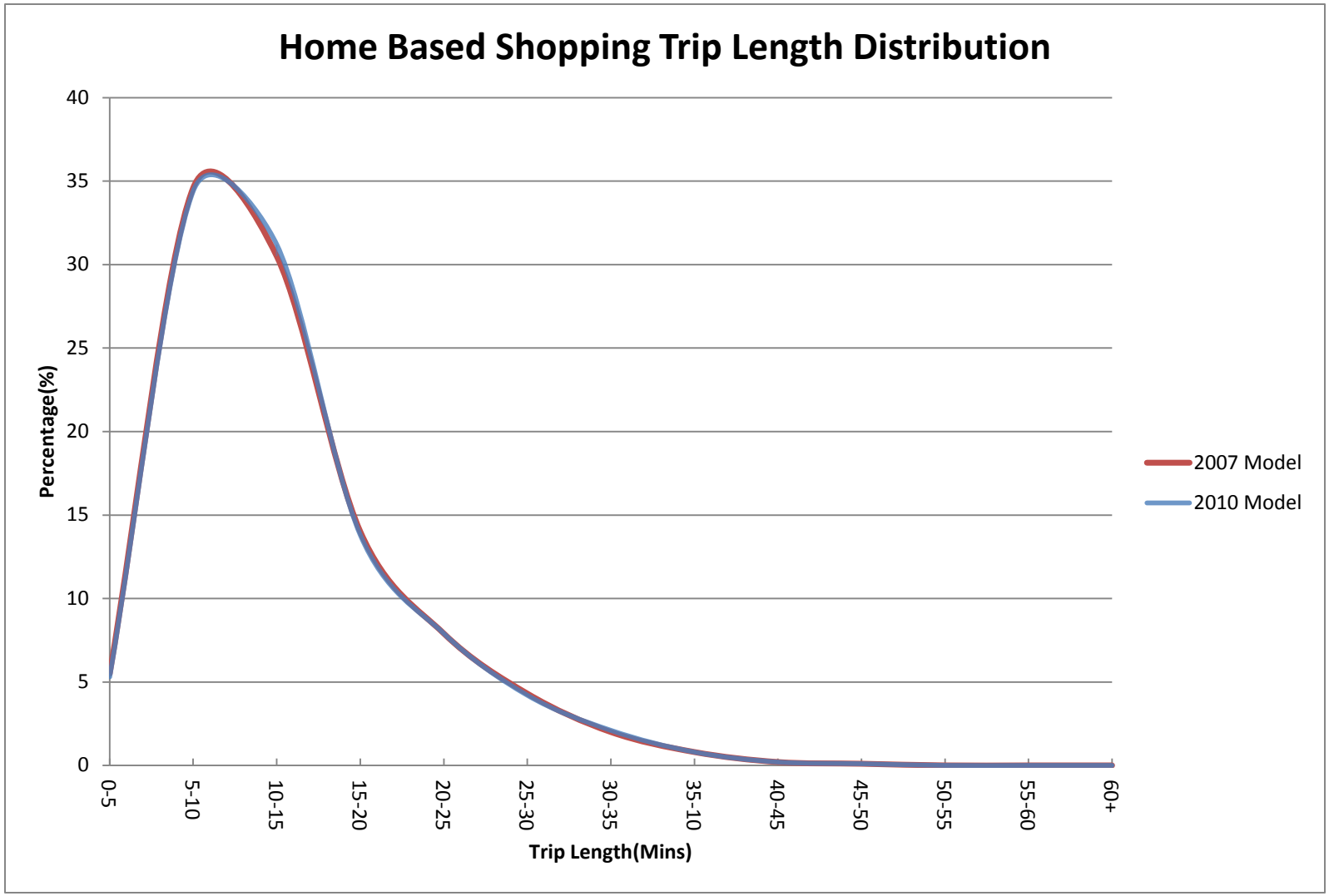


Figure 19: Trip Length Frequency Distribution for Home Based Social/ Recreational

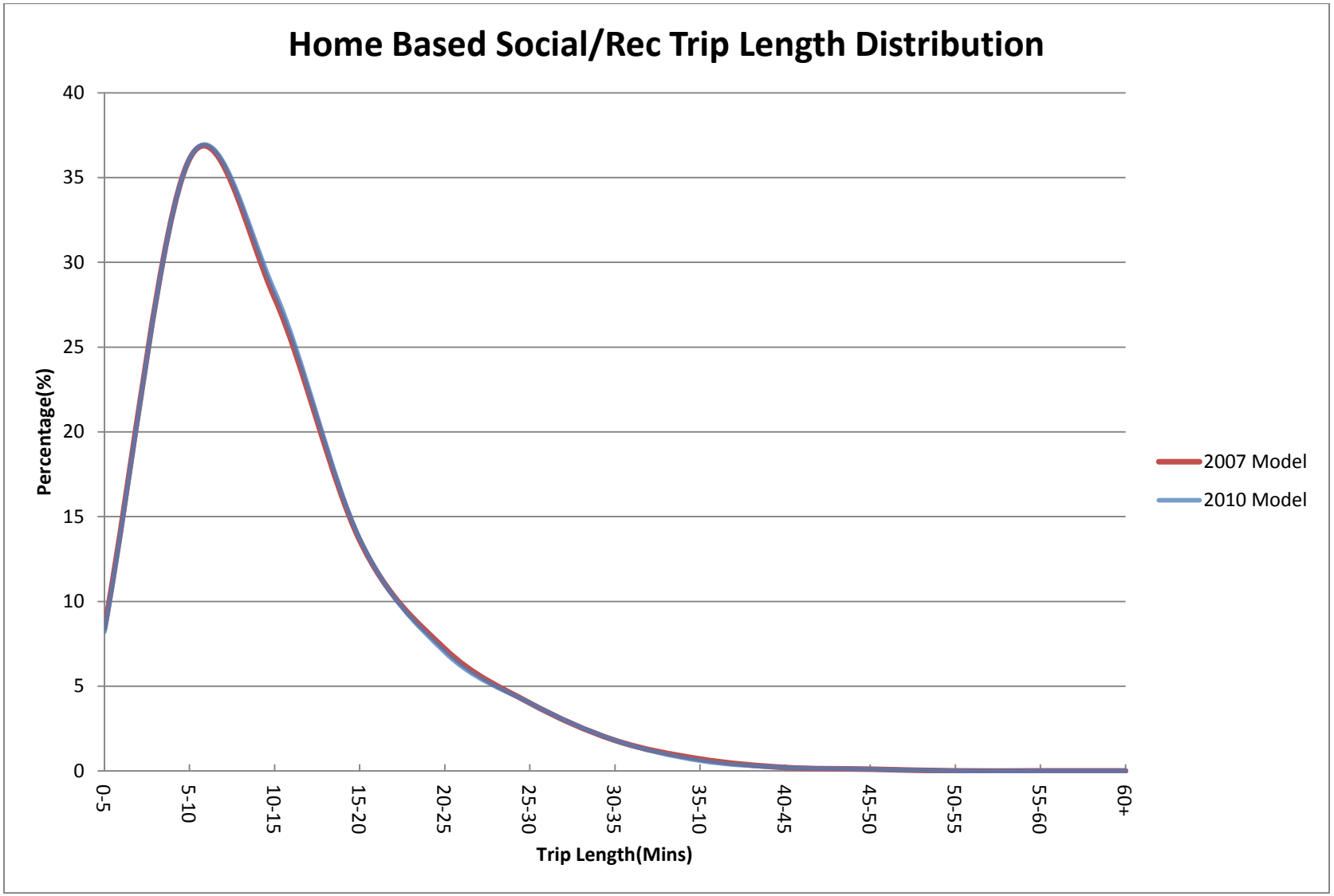
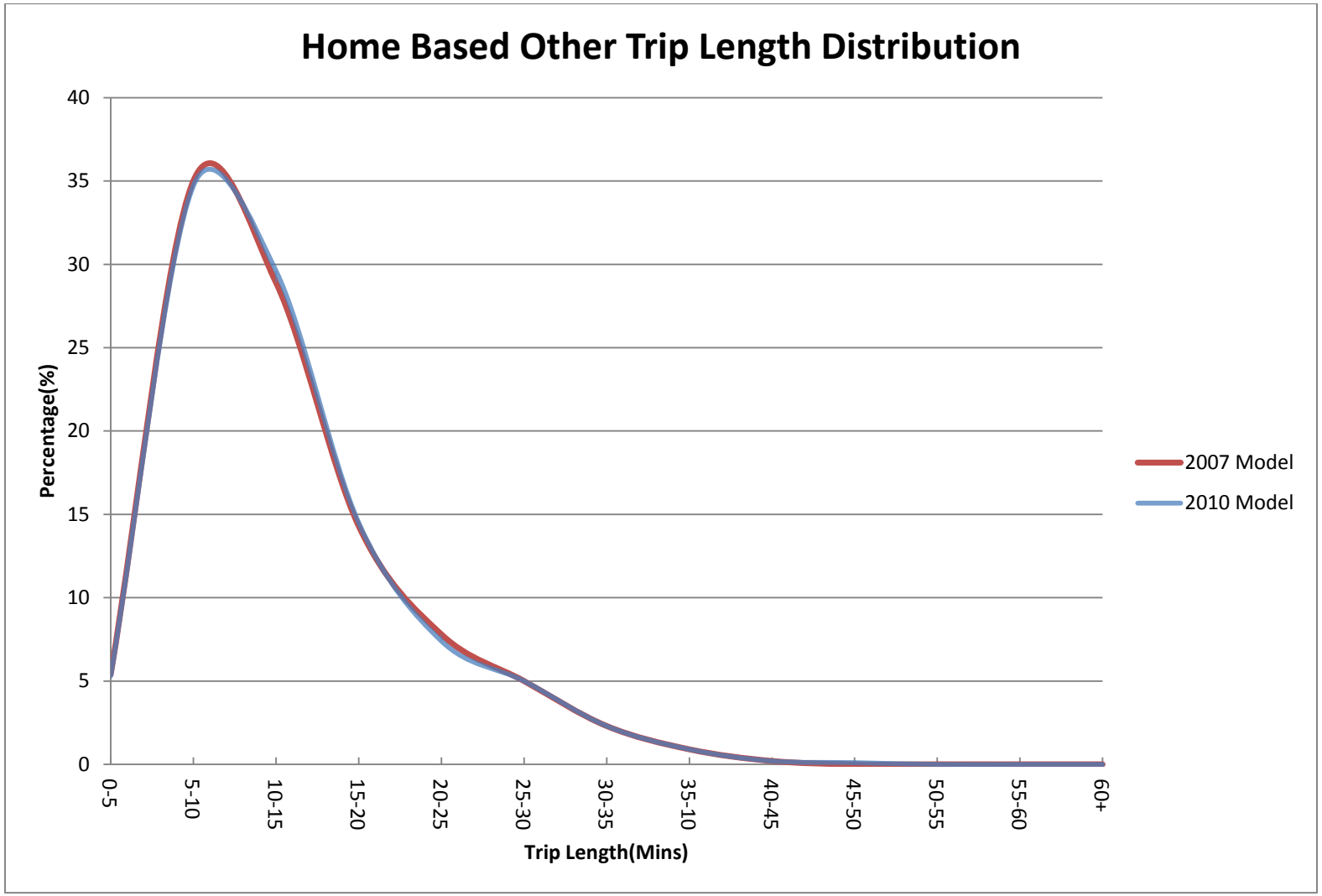


Figure 20: Trip Length Frequency Distribution for Home Based Other



Task 3.6 Review Auto Occupancy Rates

Auto occupancy rate is the average number of persons per vehicle. In the model chain, the trips are treated as person trips from generation through mode choice and subsequently converted into vehicle trips before assignment. The following script has been used in the model to accomplish this task by trip purpose.

```
MW[1]=(MI.1.1+MI.1.1.T)*0.5*{AOFAC1}+  ; HBW
(MI.1.2+MI.1.2.T)*0.5*{AOFAC2}+  ; HBSH
(MI.1.3+MI.1.3.T)*0.5*{AOFAC3}+  ; HBSR
(MI.1.4+MI.1.4.T)*0.5*{AOFAC4}+  ; HBO
(MI.1.5+MI.1.5.T)*0.5*{AOFAC1}+  ; NHB
(MI.1.6+MI.1.6.T)*0.5+
(MI.1.7+MI.1.7.T)*0.5+
(MI.1.8+MI.1.8.T)*0.5+
(MI.1.9+MI.1.9.T)*0.5+
(MI.1.10+MI.1.10.T)*0.5+
(MI.1.11+MI.1.11.T)*0.5+
(MI.1.12+MI.1.12.T)*0.5+
 mi.2.EETRIPS+
(MI.1.13+MI.1.13.T)*0.5*{AOFACU}  ; HBU
```

Table 13 shows the auto occupancy factors utilized in the model to convert person trips to vehicle trips. The factors are shown in the Cube catalog key to enhance model transparency. The rates remain unchanged from the 2007 model validation.

Table 13: Auto Occupancy Rates

Vehicle Occupancy Factors	Vehicle Occupancy Rate	For Purpose
AOFAC1	0.917	Home Based Work
AOFAC2	0.667	Home Based Shopping
AOFAC3	0.613	Home Based Social Recreation
AOFAC4	0.667	Home Based Other
AOFAC5	0.699	None Home Based
AOFACU	0.917	Home Based University

Truck trips and external-external trips are forecasted as vehicle trips. Thus, this conversion is not necessary for such trips.

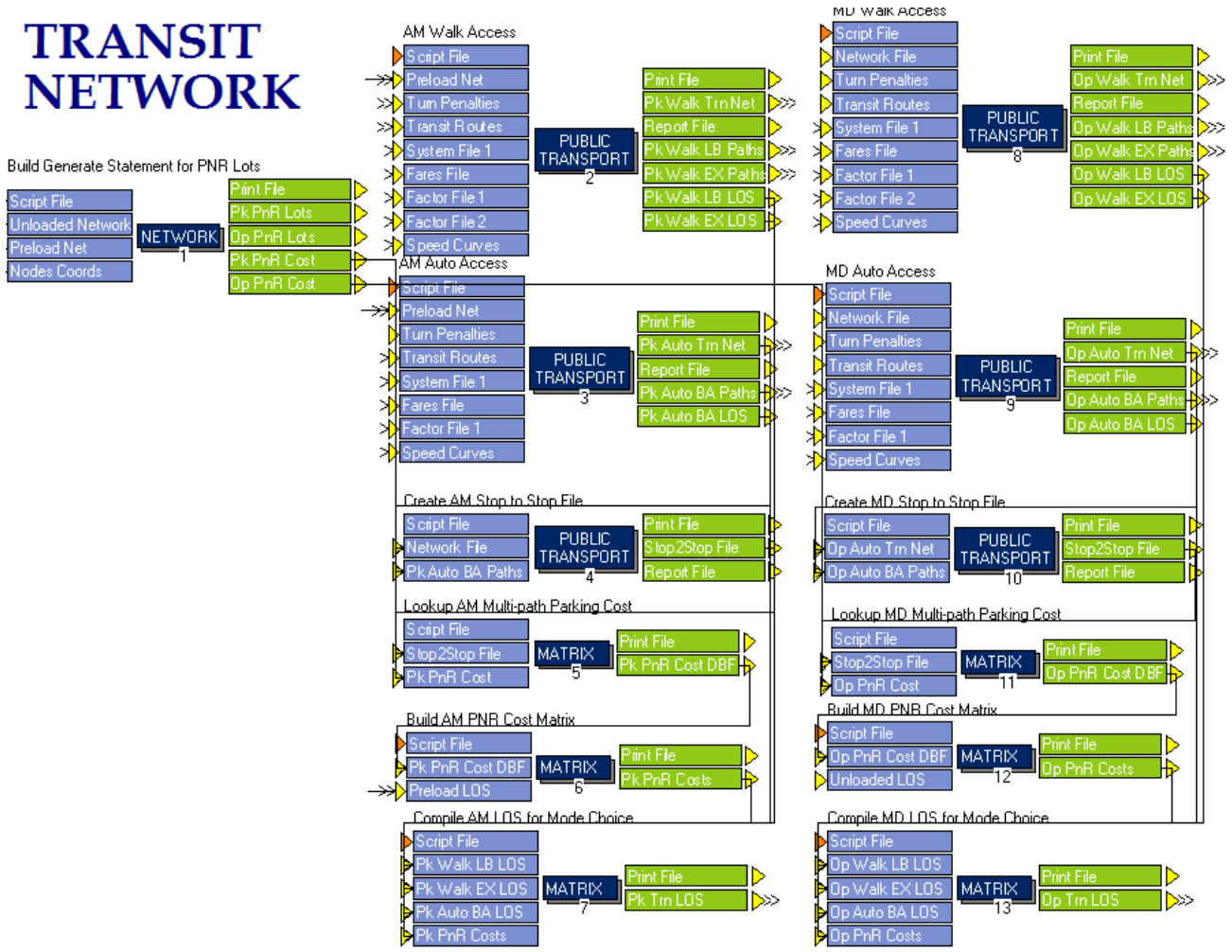
Task 3.7 - Review Transit Parameters

3.7.1 Transit Skimming and Path Building

Transit level of service is computed separately for peak hours and off-peak hours. During the process of distribution, the highway network is loaded with pre-mode choice trips to create an initial congested time network. During the process of transit path creation, this preloaded network is used to calculate the time skim for transit during peak hours. The unloaded free-flow network is used to compute the time skim for off-peak transit.

Figure 21 shows the process flow for calculating the two sets of transit time skims. During this path building process, transit route path files are saved for later use in transit assignment. The following sections (0 - 0) describe the inputs and parameters used in transit path building and skimming.

Figure 21: Transit Network Level of Service Flow Chart



3.7.2 Transit Travel Speed (Speed Curves)

Transit vehicle speed (link travel time) is determined as a function of the automobile speed on each link. There are three types of relationship between auto speed and transit speed, which are shown in Table 14 below. Type 1 is used when the auto and transit speed are pretty close, such as limited stops. Type 2 shows a slight slowdown in transit speed. Type 3 represents the common local bus with plenty of stops.

Table 14: Auto/Transit Speed Relationships

Auto Travel Speed	Type 1 Transit Speed	Type 2 Transit Speed	Type 3 Transit Speed
5	5	4	3
10	10	8	5
15	15	12	7
20	20	15	9
25	25	17	12
30	30	19	15
35	30	23	16
40	38	25	18
45	42	32	20
50	48	35	27
55	52	36	35
60	62	42	45
70	65	50	45
80	70	50	45
90	70	50	45

These auto/transit speed relationships are used in a lookup function. The type of relationship used for each transit service type is identified based on area type and facility type of the link. The scripts assign the relationship type as shown in Table 15.

Table 15: Auto/Transit Speed Relationship Assignment

Facility Type	Area Type	Local Bus Curve Type	Express Bus Curve Type	Rail Curve Type	Comment
10-19, 80-99	All	1	1	1	Free Flow
20-79	10-19	2	2	1	Buses hitting resistance
20-79	20-29	3	2	1	Buses hitting resistance
20-79	30-39	3	2	1	Buses hitting resistance
20-79	40-49	2	2	1	Buses hitting resistance
20-79	50-59	2	1	1	Buses hitting resistance

3.7.3 Transit Fare

The transit fare was $1.00 during 2007, as used for the Alachua County base year 2007 model validation. The fare has since increased to $1.50 in 2010, according to the Gainesville Regional Transit System (RTS) General Transit Feed Specification (GTFS) data. The fare control file (ALACHUA.FAR) will be modified to reflect the new base fare. A scenario key named BUSFAREFAC represents a multiplier on the base dollar amount of transit fare, which the subsequent mode choice script uses to apply any fare change for future year scenarios. BUSFAREFAC is set to 1.0 for base year 2010 and future years to represent a $1.50 transit fare. BUSFAREFAC can be changed to model fare increase scenarios.

3.7.4 Headway Time and Transit Stop Location

As validation efforts moved towards reasonable transit assignments, headway data also was provided from RTS and the transit route file (troute10.lin) was updated. Headway 1 represents peak headway and is calculated from AM peak trips (6 AM to 9 AM). Headway 2 represents off-peak headway and calculated from midday trips (10 AM to 1 PM). The transit route file was overlaid with the highway network when new bus locations were added due to the necessity of splitting highway links where a bus stop exists.

Table 16 shows the headways that were computed for each route.

Table 16: Computed Headway by Route

Route	Headway 1 (Min.)	Headway 2 (Min.)
1	16	16
2	60	60
5	8	9
6	19	20
7	60	60
8	60	60
9	30	30
10	60	60
11	60	60
12	11	10
13	10	14
15	30	30
16	24	24
17	24	24
20	42	30
21	12	10
22	25	25
23	50	50
24	60	60
25	65	65
29	30	30
34	20	20
35	9	10
36	25	25
38	39	45
43	35	35
75	35	53
117	15	15
118	8	8
119	30	30
120	9	9
121	6	18
122	45	45
125	10	10
126	22	23
127	10	20

3.7.5 Transit Accessibility

Transit accessibility is represented by each zone's Pedestrian Environmental Variables (PEV) that are stored in the ZONEDATA file. The PEV defines several factors that are essential to have sufficient accessibility to bus stops, such as sidewalk availability, ease of street crossing, non-motorized connections, and building setbacks. Each variable is given a score between 0 and 3, and the accumulated scores of all the four PEVs are saved as "SUM", which ranges from 0 to 12, in the ZONEDATA file. Future changes to the zonal transit accessibility will require modification of PEV scores as well as updating "SUM" values to get total PEV scores for each TAZ. Table 17 indicates what each PEV value represents. These variables and categories remain unchanged from the 2007 model.

Table 17: Pedestrian Environment Variable (PEV) Values

Variables	PEV = 0	PEV = 1	PEV = 2	PEV = 3
Sidewalk Availability	No sidewalks	<10 percent have sidewalks	10 to 90 percent have sidewalks	>90 percent have sidewalks
Ease of Street Crossing	Crossing difficult	<10 percent have easy crossing	10 to 90 percent with easy crossing	>90 percent with easy crossing
Non-motorized Connections	No connections	<10 percent have connections	10 to 90 percent have connections	>90 percent have connections
Building Setbacks	All large setbacks	<10 percent have minimum setbacks	10 to 90 percent have minimum setbacks	>90 percent have minimum setbacks

PEV = Pedestrian Environmental Variables

3.7.6 Waiting Times

The waiting times for initial boardings and transfer boardings are computed from the headway of the route to be boarded. If there are multiple bus routes that serve the desired trip boarding and alighting locations then Cube combines these headways in the waiting time calculation. These times are computed using the curves shown in Table 18 on the following page. The initial waiting curve follows a standard convention of ½ the headway up to 30 minutes headway, decreasing to ¼ the headway at 160 minutes headway. The transfer waiting curve gives a

waiting time that is a few minutes less than the transfer headway. This is higher than the normal convention of ½ the headway, but not unreasonable given that the transit assignment validates well.

Table 18: Waiting Time Curves

Initial Route(s) Headway (Min.)	Initial Waiting Time (Min.)	Transfer Route(s) Headway (Min.)	Transfer Waiting Time (Min.)
1	0.5	1	0.5
6	3	4	3
15	7.5	6	5
30	15	10	8
160	40	12	10
		15	13
		20	18
		40	35
		60	55
		160	100

3.7.7 Transit Path Building Parameters

Table 19 shows the parameters and factors used during the path building processes. In general, these factors should be consistent between path building and mode choice. All of these parameters are reasonable, with the high XFERCONST causing the path builder to greatly prefer the path with fewest transfers.

Table 19: Transit Path Building Parameters and Factors

Parameter / Factor	Value for Walk to Local Bus	Value for Walk to Premium Bus/Rail	Value for Drive to Transit
MAXFERS – Maximum Transfers	4	4	4
RUNFACTOR[1] – multiplicative factor of weighted walk access time	2.5	2.5	2.5
RUNFACTOR[101] – multiplicative factor of weighted walk egress time	2.5	2.5	2.5
RUNFACTOR[2] – multiplicative factor of weighted drive access time	1.0	1.0	1.0
RUNFACTOR[3] – multiplicative factor of weighted transfer walk time	2.5	2.5	2.5
RUNFACTOR[4] – multiplicative factor of weighted transit in-vehicle time	1.0	1.0	1.0
WAITFACTOR – multiplicative factor of weighted waiting time	1.4	1.4	2.5
VALUEOFTIME – used to relate times and fares	15.0	15.0	15.0
XFERCONST – Constant added to the weighted transfer penalty	999.0	3999.0	0

3.7.8 Transit Mode Choice

The Alachua County model uses a nested logit approach for mode choice. HBW trips are assigned to the peak period network while Home Based Other (HBO), None Home Based (NHB), Home Based University (HBU) and Home Based Dorm University (HDORMU) trips are assigned to the off-peak network. Within each period there are three transit mode choices available: walk to local bus, walk to express bus, and drive to best available transit.

For HBW trips, the local bus fare is discounted to 25% since there is an employee pass program. Since the transit fare is covered by tuitions of University of Florida students the local bus fare for HBU and HDORMU walk to local transit is discounted to 10%. For HBU walk and drive to premium transit the bus fare is free.

The BUSFAREFAC is used in mode choice to adjust the transit fares for future changes. However, only 10% of the change in BUSFAREFAC is used in the mode choice calculations. I.e. if BUSFAREFAC is set to 1.5, mode choice calculations use a factor of 1.05. This represents an inelastic response to fare increases.

Table 20 shows the coefficients used in the mode choice utility calculations. The computed utilities are used in a nested logit model to compute the mode shares for each mode. Table 21 shows the ratio of the path coefficients to the IVT coefficient. These ratios are fairly consistent with the factors used in transit path building with a few exceptions. First, the time driving to transit is counted as OVT and has a coefficient ratio between 1.96 and 2.92 in mode choice. However, during path building, drive access time has a factor of 1.0. Second, transfer waiting time is also counted as OVT in mode choice but has a factor of 1.4 during walk access path building.

Consistency between path building factors and mode choice coefficients is highly desired by the Federal Transit Agency (FTA) when models are used for New Starts purposes. However, from

the perspective of using this model for regional purposes, such as long range planning, these inconsistencies may not have a significant impact.

The path building parameters will be adjusted for consistency and the results checked during the model validation process. If it is determined that these parameters have a impact on model results that will require significant effort in model recalibration then this will be discussed with the MTPO staff.

Table 20: Mode Choice Utility Coefficients

Coefficient	HBW	HBO	NHB	UNIV
civt - IVT Coefficient	-0.025	-0.02	-0.024	-0.024
covt - OVT Coefficient	-0.049	-0.048	-0.07	-0.048
ccst - Cost Coefficient	-0.005	-0.011	-0.009	-0.011
cwt - Walk only Coef	-0.042	-0.083	-0.052	-0.083
cbt - Bike Coefficient	-0.109	-0.117	-0.096	-0.117
pti - Walk to Transit PEV Coef	1.15	0.6	0.45	0.25
pwi - Walk PEV Coef Origin	0.35	0.175	0.22	0.4
pwj - Walk PEV Coef Dest.	0.3	0.164	0.164	0.35
pbi - Bike PEV Coef Origin	0.47	0.07	0.066	0.3
pbj - Bike PEV Coef Dest.	0.006	0	0.006	0.006

Table 21: Mode Choice Utility Coefficient Ratios

Coefficient	HBW	HBO	NHB	UNIV
civt - IVT Coefficient	1	1	1	1
covt - OVT Coefficient	1.96	2.4	2.916667	2
ccst - Cost Coefficient	0.2	0.55	0.375	0.458333

Table 22 shows the cost conversion factors used for each mode and purpose. Most factors are 100, representing 100 cents per dollar of cost. This factor is needed because the mode choice equations require all cost to be in cents for consistency. The factors that are not 100 are consistent with the special fare categories detailed above, except for the values highlighted in

red. The red highlighted values should all be 100 instead of 1 or 0. These errors should not have a significant impact on model results given that premium transit and drive access are not significant modes for HBO and NHB trips. During validation the effect of these errors will be reviewed and if it is not significant then these errors will be corrected. If correcting this requires significant recalibration effort then this will be discussed with the MTPO staff.

Table 22: Mode Choice Cost Conversion Factors

Mode	HBW No Car	HBW W/Car	HBW Student	HBO No Car	HBO W/Car	HBO Student	NHB	HBU	DORM
Drive Alone	N/A	100	100	N/A	100	100	100	100	N/A
Carpool 2	100	100	100	100	100	100	100	100	N/A
Carpool 3+	100	100	100	100	100	100	100	100	N/A
Walk to Bus	25	25	25	100	100	100	100	10	10
Walk to Premium	100	100	100	1	1	1	1	0	N/A
Drive to Transit	100	100	100	0	0	0	1	0	N/A

Table 23 contains the mode choice calibration constants. These values are added to each of the utility calculations to calibrate the base year mode choice results to observed values. Overall these constants look reasonable and generally in line with other comparable mode choice models.

Table 23: Mode Choice Utility Calibration Constants

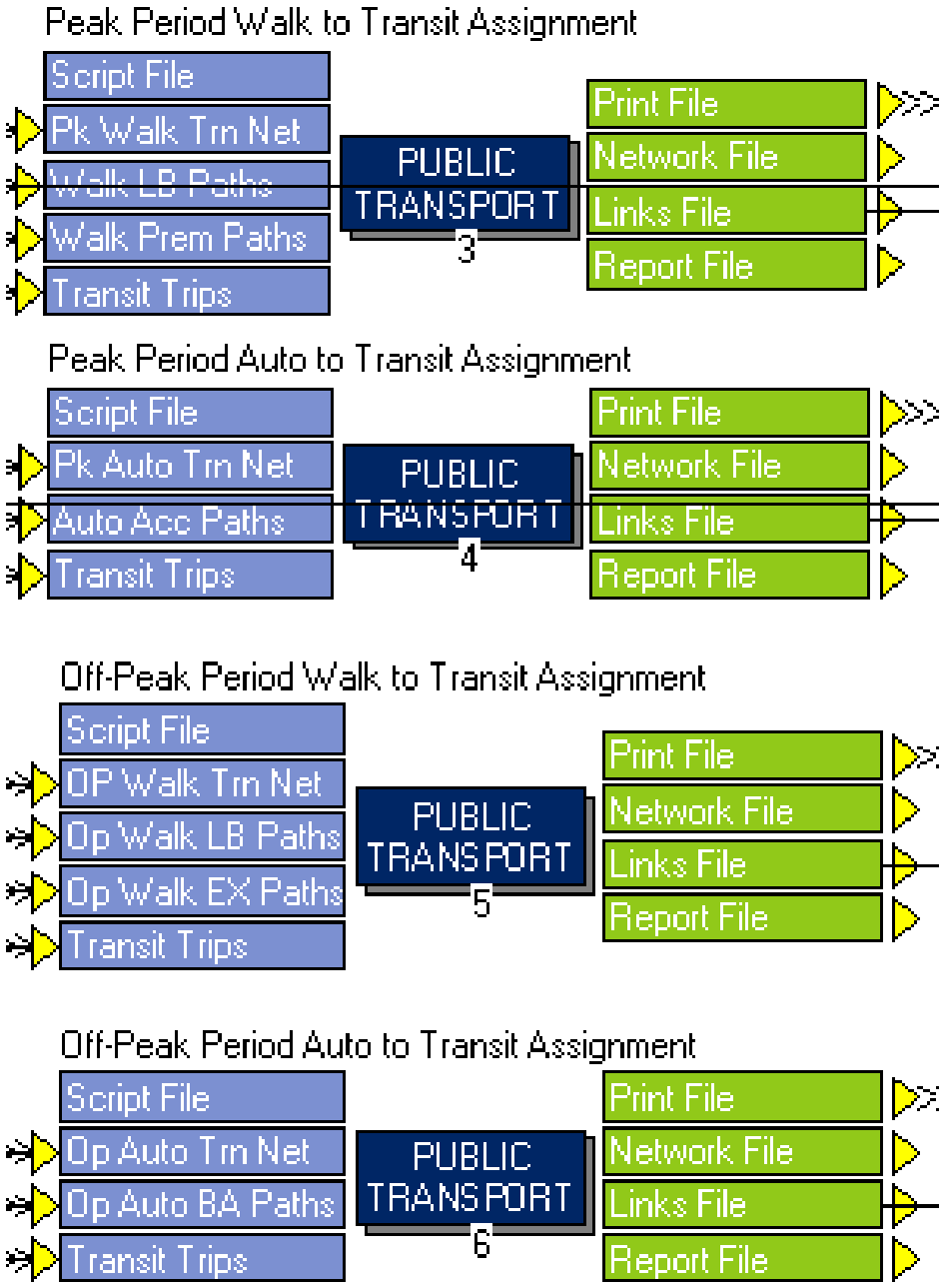
Mode	HBW No Car	HBW W/Car	HBW Student	HBO No Car	HBO W/Car	HBO Student	NHB	HBU	DORM
Drive Alone	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Carpool 2	0.000	-1.555	-1.177	0.000	-0.475	-0.235	-0.773	-1.363	0.000
Carpool 3+	-0.411	-1.989	-1.575	-0.571	-1.124	-0.845	-1.604	-1.836	0.000
Walk to Bus	-1.219	-1.578	-1.914	-0.912	-1.421	-1.806	-3.100	-0.150	0.000
Walk to Premium	-1.219	-1.578	-1.914	-0.912	-1.421	-1.806	-3.100	-0.150	0.000
Drive to Transit	0.000	-2.303	-2.401	0.000	-4.825	-4.807	-4.966	-1.633	0.000
Walk only	-1.024	-1.700	-2.134	0.258	-0.541	-1.048	-4.725	0.793	1.229
Bike only	-1.583	-2.338	-2.509	-2.693	-3.509	-3.547	-4.897	-0.640	0.282

HBW – Home Based Work
HBO – Home Based Other
NHB – None Home Based
HBU – Home Based University
DORM - Dormitory

3.7.9 Transit Assignment

The transit assignment flow shown in Figure 22 is very simple in this model. It loads the transit trips from mode choice onto the transit paths computed during path building. There are no parameters used in this procedure.

Figure 22: Transit Assignment Flow Chart



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