North Central Florida Regional Planning Council

Serving Alachua
Bradford • Columbia
Dixie • Gilchrist • Hamilton
Lafayette • Levy • Madison
Suwannee • Taylor • Union Counties

2009 NW 67th Place, Gainesville, FL 32653-1603 • 352.955.2200

April 16, 2020

TO: Year 2045 Long-Range Transportation Plan Technical Working Group

FROM: Scott R. Koons, AICP, Executive Director

SUBJECT: Meeting Announcement and Agenda

Due to the COVID-19 Public Health Emergency, the Metropolitan Transportation Planning Organization Year 2045 Long-Range Transportation Plan Technical Working Group will meet virtually on April 23, 2020 at 2:00 p.m. The meeting will be conducted via communications media technology at the following formats:

https://global.gotomeeting.com/join/535818781

1.669.224.3412 Access Code: 535-818-781

STAFF RECOMMENDATION

Call to Order

I. Introductions (if needed)*

Page #1 **II. Approval of Meeting Agenda** — **APPROVE AGENDA**

Page #3 **III. Year 2045 Long-Range Transportation Plan Update Year 2015 Model Validation** — **RECEIVE PRESENTATION**

The Corradino Group, Inc. has developed the Year 2015 model validation of the Gainesville Urbanized Area Transportation Study model for review and comment.

Page #17 **IV. Year 2045 Long-Range Transportation Plan Update - Next Steps** — **NO ACTION REQUIRED**

The Corradino Group, Inc. and staff will discuss the next steps in the long-transportation plan update process.

Adjournment

* No materials are provided for these agenda items

North Central Florida Regional Planning Council

Serving Alachua
Bradford • Columbia
Dixie • Gilchrist • Hamilton
Lafayette • Levy • Madison
Suwannee • Taylor • Union Counties

2009 NW 67th Place, Gainesville, FL 32653-1603 • 352.955.2200

April 16, 2020

TO: Year 2045 Long-Range Transportation Plan Technical Working Group

FROM: Scott R. Koons, AICP, Executive Director

SUBJECT: Year 2045 Long-Range Transportation Plan Update - Year 2015 Model Validation

STAFF RECOMMENDATION

Receive presentation on the Year 2015 Model Validation.

BACKGROUND

For review and comment by the Working Group, the Corradino Group, Inc. has completed development of the Year 2045 Long-Range Transportation Plan Gainesville Urbanized Area Transportation Study Year 2015 Base Model and Validation that incorporates traffic analysis zone modifications to account for network changes, including those in the Existing plus Committed Network.

Attachment

Gainesville 2015 Model Version 1 (2015V1)

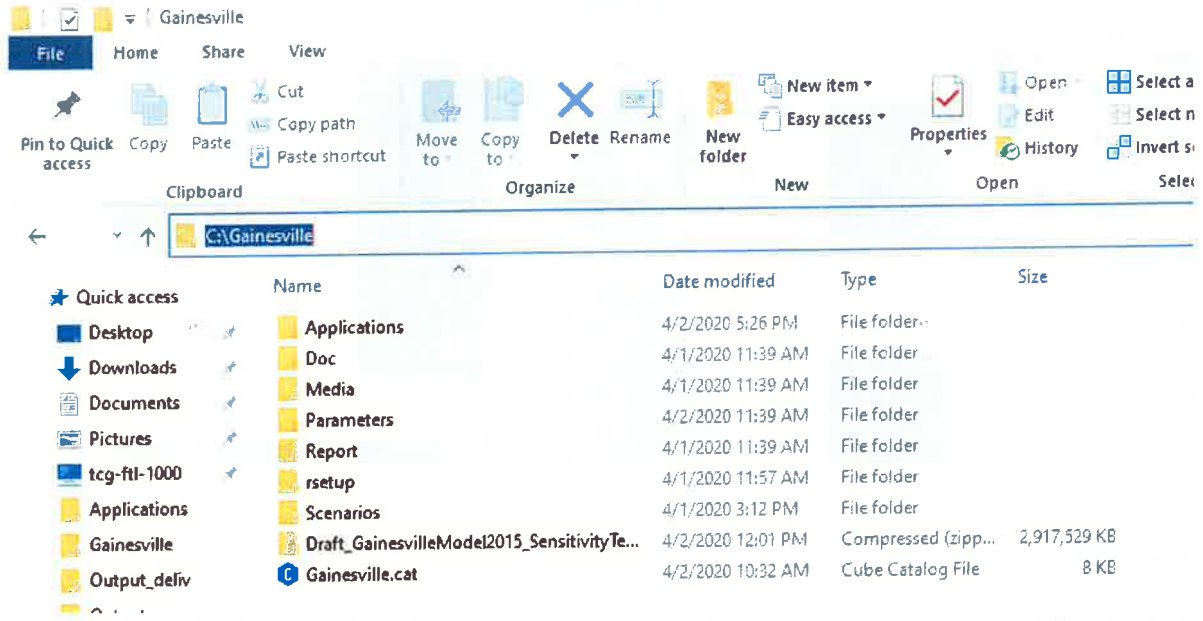
April 3, 2020

This memorandum provides information on installing and using the Gainesville 2015 Model Version 1. It also illustrates the summary of improvements made and presents the key calibration/validation statistics of the 2015 model.

1. Installation and Model Structure:

The model has been calibrated to 2015 conditions using the 2015 Socioeconomic data developed in coordination with the 2045 LRTP working committee members. The model volumes have been validated against the 2015 traffic counts obtained from FDOT and the local counts obtained from the City of Gainesville.

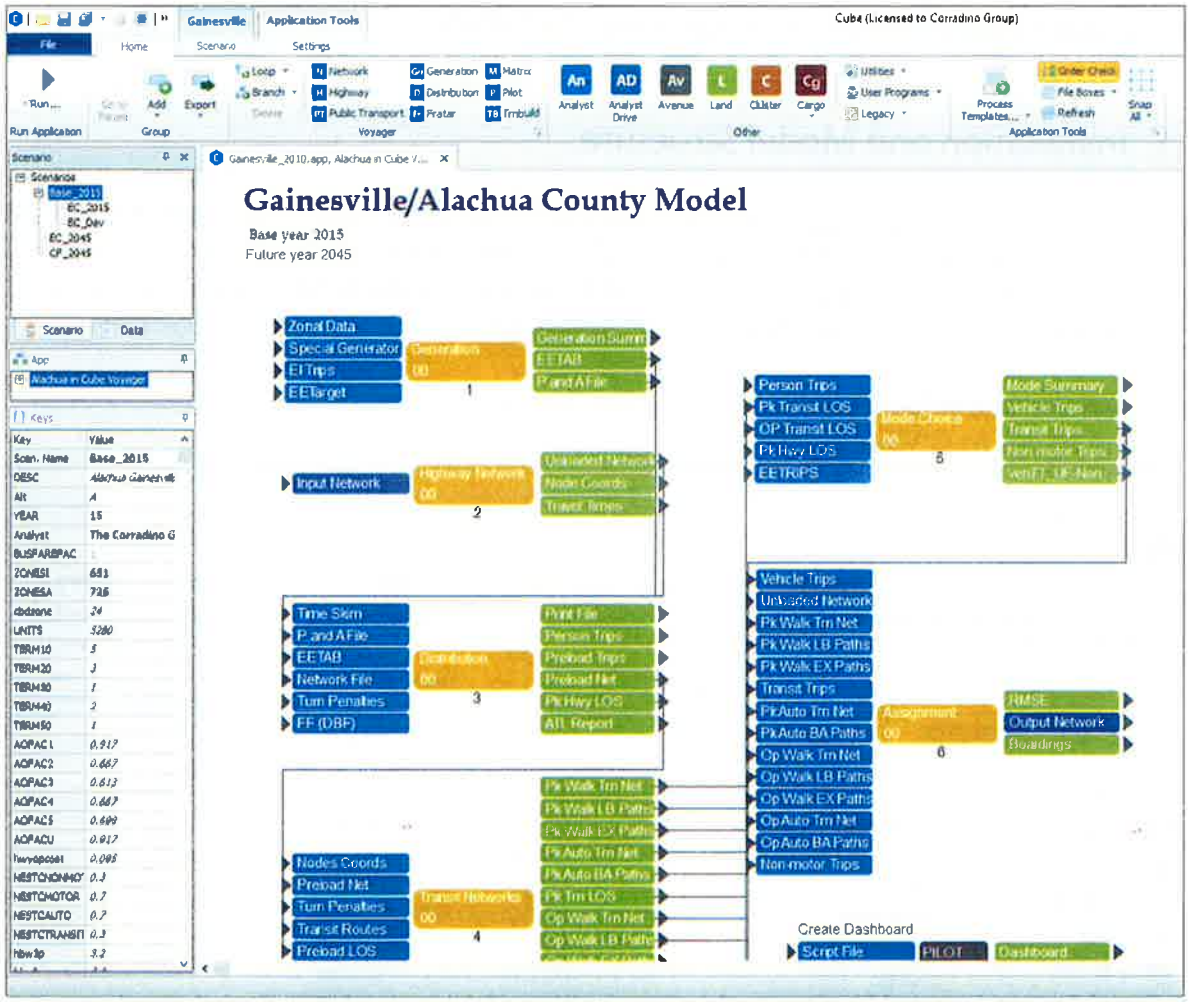
Download the latest Gainesville Model using the link provided
Unzip the folder to C:\Gainesville



Gainesville Model Folder Structure:
Applications: It hosts the cube applications and corresponding cube scripts

Doc: Placeholder for 2015 Model Development Reports
Media: Placeholder for 2015 data – traffic counts, shapefiles, transit ridership, transit routes and stops
Parameters: Model input parameters files like VFACTORS.csv, SPDCAP.dbf etc.
Reports: Cube based reporting scripts (placeholder)
rsetup: It hosts the entire R program related dependencies and scripts for generating transit summaries and R-based Model Dashboard.
Scenarios: It hosts the scenario specific folders and corresponding input/output folders

Use CUBE to open the model catalog file "Gainesville.cat"

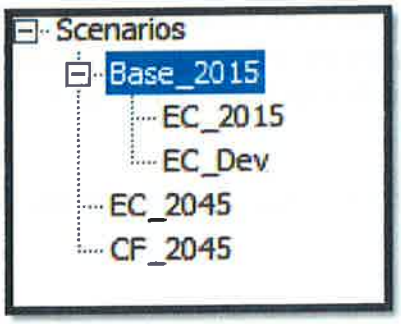


Scenarios:

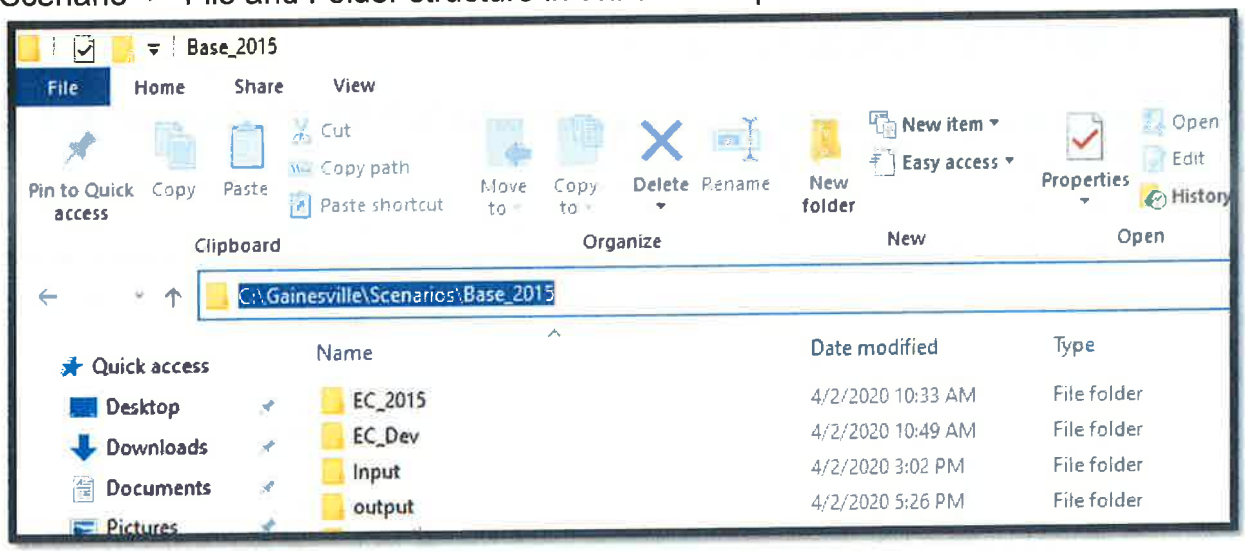
"Base_2015" -> The 2015 validation scenario using 2015 network, SE data, traffic counts

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

The following are the Child Scenarios created for sensitivity testing (for later use. No need for the reviewer uses at this time):
"EC_2015" -> Existing-plus-committed (E+C) improvements are coded on top of 2015 network. As a sensitivity test, the model run was performed using the 2015 SE data.
"EC_DEV" -> Existing-plus-committed (E+C) improvements are coded on top of 2015 network. As a sensitivity test, the model run was completed by adding development to 2015 SE data. Few TAZs along Archer Rd were considered for hypnotical increase in development intensities to test the model sensitivity.



Scenario -> File and Folder structure in Windows Explorer



To run the model, simply open the model catalog in CUBE Voyager, and highlight the Base_2015 scenario. Press F2 in the computer keyboard or Press "Run" button. The output folder is automatically created.

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

2. 2015 Model Improvements and Key Model Calibration/Validation Measures:

The 2015 Gainesville model follows the same structure as the earlier versions. The following Key changes have been made in different steps of the model.

1. TAZ Structure Changes:

The model has undergone extensive revisions in terms of the TAZ structure. Because of extensive development in recent years within the urban area, the model's TAZ structure was revised in coordination with the working committee members. C:\Gainesville\Scenarios\Base_2015\Input folder holds the TAZ shape file called zonedata15.shp.

The following table provides a comparison of the new TAZ structure with the old TAZ structure:

	Internal Zones	External Zones	Dummy Zones
2010	1-576	600 - 625	39, 91, 110, 111, 119, 129, 131, 145, 175, 212, 230, 333, 344, 353, 431, 443, 577-599
2015	1-652	700 - 725	651-699

The following table presents the correspondence between the 2010 TAZs and 2015 TAZs where the TAZ splits were made:

TAZ_2010	SPLIT_FLAG	TAZ2015	TAZ_2010	SPLIT_FLAG	TAZ2015	TAZ_2010	SPLIT_FLAG	TAZ2015	TAZ_2010	SPLIT_FLAG	TAZ2015	TAZ_2010	SPLIT_FLAG	TAZ2015
49	1	39	150	1	353	200	1	585	276	1	776	556	1	617
49	1	49	150	1	150	200	1	200	276	1	600	556	1	556
52	1	52	152	1	431	201	1	201	284	1	601	573	1	618
52	1	91	152	1	152	201	1	586	284	1	284	573	1	573
53	1	53	154	1	154	208	1	208	303	1	602	573	1	645
53	1	110	154	1	627	208	1	637	303	1	303	573	1	643
76	1	76	155	1	155	208	1	638	334	1	603	573	1	644
76	1	111	155	1	443	208	1	649	334	1	334			
77	1	77	157	1	157	219	1	219	334	1	604			
77	1	119	157	1	628	219	1	621	339	1	605			
85	1	85	158	1	629	219	1	622	339	1	339			
85	1	646	158	1	158	219	1	623	355	1	355			
86	1	86	163	1	630	222	1	222	355	1	606			
87	1	129	163	1	163	222	1	624	463	1	608			
87	1	87	165	1	620	224	1	224	463	1	463			
89	1	89	165	1	165	224	1	587	463	1	607			
89	1	131	165	1	631	226	1	226	467	1	467			
102	1	145	171	1	632	231	1	231	467	1	609			
102	1	102	171	1	577	231	1	588	468	1	468			
107	1	175	178	1	171	236	1	236	468	1	640			
107	1	107	178	1	178	236	1	639	469	1	469			
112	1	112	178	1	633	239	1	591	469	1	610			
112	1	651	178	1	634	239	1	239	471	1	611			
113	1	212	180	1	648	239	1	589	471	1	471			
113	1	113	180	1	180	239	1	590	472	1	612			
120	1	230	182	1	578	241	1	593	472	1	472			
120	1	120	182	1	635	241	1	241	500	1	500			
122	1	122	185	1	185	241	1	592	500	1	613			
122	1	650	186	1	579	246	1	594	502	1	619			
127	1	127	186	1	186	246	1	246	502	1	502			
127	1	626	188	1	188	263	1	263	544	1	614			
138	1	138	188	1	636	263	1	595	544	1	544			
138	1	333	192	1	582	268	1	268	544	1	625			
143	1	143	192	1	580	268	1	597	545	1	615			
144	1	344	192	1	581	268	1	596	545	1	616			
144	1	144	196	1	192	270	1	270	545	1	545			
149	1	149	196	1	583	270	1	599	548	1	548			
149	1	647	197	1	197	270	1	598	548	1	641			
			197	1	584				548	1	642			

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

2. 2015 TAZ Data Development.

The 2015 TAZ data was developed by reviewing the American Community Survey (ACS) and the Bureau of Economic and Business Research (BEBR) control totals.

The following table summarizes the employment, population and household growth controls within the region.

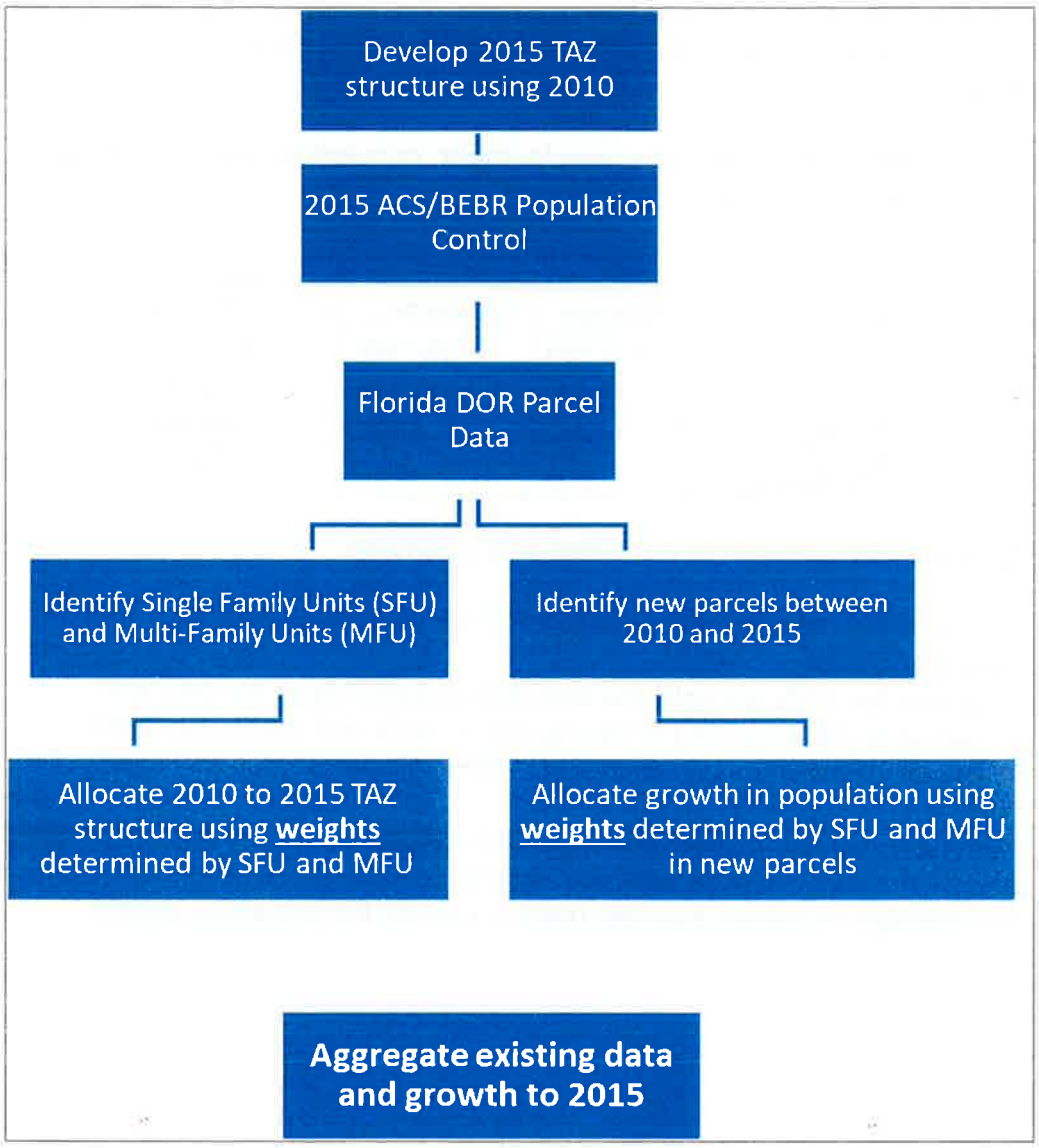
	Employment	Population	Households
2010	137,594	247,336	112,766
2015	154,640	253,316	115,697
Growth	17,046	5,980	2,931
% Growth	2.48	0.48	0.52

The SE data was updated using the following procedure:

1. First the 2010 data was allocated to the 2015 TAZs using the TAZ correspondence.
2. Wherever the TAZs are split, the data was allocated using the TAZ split percentages (developed by reviewing single family and multifamily unit's development density within each TAZ). The DOR parcel data was used in this effort.
3. The growth has been allocated to the TAZs where new units between 2010 and 2015. The new units were used as "weights" to allocate the household growth.
4. The average household size was used to allocate the population growth.

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

The TAZ allocation method is illustrated in the following flowchart.



5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

3. Highway and Transit Network Changes

1. The highway ad transit networks were developed to match the 2015 conditions.
2. 2015 traffic counts were coded
3. 2015 screenlines were coded.
4. All key network attributes, such as the number of lanes, facility types, geometric connections, turn penalty files were reviewed and updated as needed.

The input highway network is stored at the following location in the model folder:
C:\Gainesville\Scenarios\INPUT\HNET2015.NET

The input transit network is stored at the following location in the model folder:
C:\Gainesville\Scenarios\input\troute2015.lin

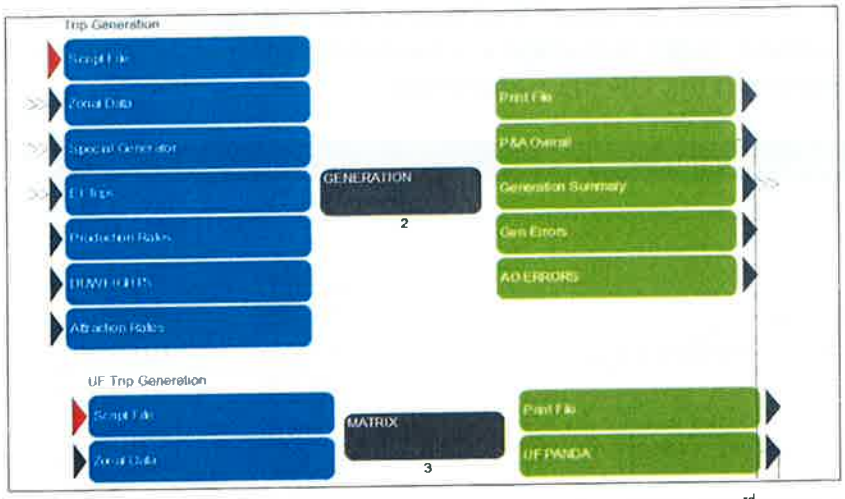
4. External Model Changes.

The External Model control totals such as External-internal and External-external control files were updated to match the 2015 traffic counts. The external-external percentages were updated during final model validation.

5.Trip Generation changes

The overall trip rates in the region seemed reasonable from the earlier version of the model. A few additional changes were made to better calibrate the University off Campus Trips generated.

1. Gainesville model has two Trip Generation Modules- Regular Trip Generation and the UF Trip Generation. All student trips to the University are generated in the UF Trip Generation. There are 24,202 off campus students estimated living in the non-UF TAZS. These students make UF trips at the rate of 2.2 trips per student. In addition, the earlier models considered the students in the general population.



5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

Thus, some of these trips have been overestimated in the earlier version of the model. To better calibrate the student's non-UF trip generation, iterative calibration/validation runs were performed. To discount the overestimation of the non-UF trips made by the students, the student population was reduced from the general population. Instead of removing the entire student population from the general population (that would have been unrealistic since some students make non-UF trips), about 40% of the student households were assumed to be making the non-UF trips.

2. Another important change in the trip generation module was related to the UF trip generation rates of the off-campus students. The 2010 model assumed a trip rate of 2.96 trips per off campus student versus 2.2 trips per on campus student. In coordination with the UF staff, it was determined that the off campus UF trip rates are too high, when compared to the on-campus UF trip rates. Intuitively, more UF trips per day are expected by the on-campus students due to their proximity to the campus. The off-campus students are expected to make their long trips and limit traveling back and forth between the University and their homes due to the longer travel times involved. Hence, the project team determined to reduce this trip rate during the calibration. A trip rate of 2.2 trips per student was assumed for the off-campus students as result of the final calibration.

3. Additionally, a change has been made in trip generation module related to the student trip attractions. The off-campus students are attracted to the parking lots, instead of the classrooms. Hence the location of student parking becomes critical on where the students are headed to. By extensive coordination with the UF staff, the student parking lots were, and their data were populated into the model. In the earlier versions of the model, both student and the employee parking were combined and used in the trip generation. By separating student parking, students in the model distribution will only be sent to the student parking TAZs.

The following table summarizes the trip generation outputs and compares to those of the 2010 model. The 2010 model validation measures were overestimated with a high volume to count ratio of 1.06. It should be noted that due to the changes made in the off-campus student trip generation, slight reduction in student dwelling units is shown in this table. They are accounted for in the UF trip generation.

Trip Generation Summary	2015	2010
Permanent Population	253,316	247,336
Total Population	258,663	251,951
Permanently Occupied Dwelling Units	94,493	99,089
Transient and Permanently Occupied Dwelling Units	97,425	101,996
Total Service Employment	98,379	91,399
Total Commercial Employment	39,876	32,669
Total Manufacturing Employment	4,863	4,048

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

Total Other Industrial Employment	11,528	9,478
Total Employment	154,646	137,594
Permanent Population per Permanently Occupied Dwelling Unit	2.68	2.5
Total Population per Total Occupied Dwelling Unit	2.655	2.47
Total Employment per Permanent Population	0.61	0.556
Service to Total Employment	0.636	0.664
Commercial to Total Employment	0.258	0.237
Manufacturing to Total Employment	0.031	0.029
Other Industrial to Total Employment	0.075	0.069
Internal Person Trips per Permanently Occupied Dwelling Unit	12.27	11.63
Internal Person Trips per Total Occupied Dwelling Units	11.9	11.29
Internal Person Trips per Employee	7.494	8.372
Internal Person Trips per Person	4.575	4.657

6. Trip Distribution

No additional trip distribution changes were deemed necessary, except fending the UF students to the student parking lots. The trip distribution results are compared in the following table. The average trip distance statistic is reasonable, compared to the 2010 model results.

Description	Type	2015		2010	
		Average Trip Distance	Total Trips	Average Trip Distance	Total Trips
HOME-BASED WORK	HBW	15.03	174,050	14.67	185,993
HOME-BASED SHOPPING	HBSH	13.67	130,305	13.09	135,821
HOME-BASED SOCIAL-RECREATION	HBSR	12.76	117,113	12.49	120,838
HOME-BASED OTHER	HBO	13.52	259,998	13.24	270,822
NON-HOME-BASED	NHB	10.68	386,793	10.51	354,086
HOME BASED UNIVERSITY	HBU	9.2	53,244	9.31	64,423
CAMPUS UNIVERSITY	HDORMU	6.21	23,771	6.2	22,767

7. Mode Choice

Slight adjustments to the non-UF purposes mode split targets were made to match the system wide boarding targets.

The 2015 RTS weekday transit ridership was considered for overall mode choice calibration. The following table shows the overall mode choice model results comparison.

Transit	2015	Counts	Volume/ Count
Total System Ridership	45,577	47,923	0.95
Service Distance (Miles)		357	

Extensive changes were made to the mode choice targets of the homebased university trips. These targets were developed based on the UF Master Plan existing conditions report prepared by the UF/VHB.

Availability of this data allowed developing more confident student mode choice targets. The model choice model was recalibrated to match with high non-motorized, transit and car- pooling percentages.

The following table presents the results of the mode choice model compared to those of the 2010 model. A big shift in trip mode to transit and non-motorized has been achieved, and which correctly represents the current existing conditions.

HOME BASED UNIVERSITY MODE CHOICE RESULTS	2015	Percent	2010	Percent
HBU TOTAL	**53,245**	**100.00%**	**64,424**	**100.00%**
DRIVE ALONE	10,132	19.00%	32,167	49.90%
CARPOOL 2	3,627	6.80%	3,915	6.10%
CARPOOL 3+	2,240	4.20%	1,960	3.00%
WALK TO LOCAL TRANSIT	14,379	27.00%	13,268	20.60%
WALK TO PREMIUM TRANSIT	0	0.00%	0	0.00%
DRIVE TO BEST AVAILABLE TRANSIT	189	0.40%	229	0.40%
NON-MOTORIZED WALK	8,218	15.40%	6,803	10.60%
NON-MOTORIZED BICYCLE	14,461	27.20%	6,082	9.40%
Average Auto Occupancy	**1.27**		**1.1**	

8. Highway Assignment

Extensive changes to the Highway Assignment module were made as part of the 2015 calibration.

Significant improvements to the equilibrium assignment closure criteria were made using the CUBE's latest highway assignment functions. The assignment iterations were

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

increased to 100 and the "relative gap" closing criteria of 0.0001 was used. This will ensure the highway assignment runs enough iterations and provides "stable" forecasts. To facilitate this process, the "converge" phase was added.

Furthermore, an attempt was made to apply separate volume-delay functions by different facility types. This process dd not result in any better than the original single volume-delay function in the model. However, it is a best practice to have the volume-delay functions sensitive to the network facility types. This place holder is in place in the model, however, currently all facility types used a single volume-delay function.

The following table provides the model validation by facility types. A comparison of the 2015 model validation against the 2010 model validation was performed. An overall Volume to count ratio of 1.03 is a good improvement over the earlier model versions. All of the major facilities except the collectors have good volume to count ratio results. It is generally considered acceptable to have higher V/C ratios for low volume facilities such as collectors.

Facility Type	Facility Type	2015				2010			
		Links	Volume	Count	Volume/ Count	Links	Volume	Count	Volume/ Count
1	Freeway	16	512,842	510,912	1.00	16	458,595	477,755	0.96
2	Divided Arterial	254	3,086,744	3,024,934	1.02	256	3,240,575	2,943,468	1.10
3	Undivided Arterial	110	657,392	640,216	1.03	127	765,370	716,269	1.07
4	Collectors	308	687,603	613,102	1.12	258	739,194	800,251	0.92
5	External Connector	2	1,242	1,237	1.00	2	1,242	1,237	1.00
6	One-Way/Frontage	4	15,747	15,058	1.05	2	14,017	13,608	1.03
7	Ramps	30	166,854	159,273	1.05	30	156,146	136,368	1.15
100	**Overall**	**724**	**5,128,424**	**4,964,732**	**1.03**	**691**	**5,375,139**	**5,088,957**	**1.06**

The following tables provides the Percent Root Mean Square Error (%RMSE) model validation statistic by volume groups. As can be seen, the percent RMSE measures are within acceptable ranges and in most cases performing better than the acceptable ranges. An exception, again, is the low volume facilities, where higher degree of uncertainty is expected even in traffic counts.

Volume Group	Volume Range	Target %	2015		2010	
			Links	% RMSE	Links	RMSE %
1	1- 5,000	45 - 55	369	77.70%	313	47.10%
2	5,000- 10,000	35 - 45	172	30.40%	202	28.50%
3	10,000- 20,000	27 - 35	145	20.30%	138	23.40%
4	20,000- 30,000	24 - 27	30	17.10%	30	23.00%
5	30,000- 40,000	22 - 24	6	14.40%	8	11.70%
6	40,000- 50,000	20 - 22	2	3.70%	-	-
13	**1-500,000**	**32 - 39**	**724**	**31.50%**	**691**	**31.30%**

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

The following table provide the Screenline/Cutline validation. Screenlines and Cutlines have reasonable volume/count statistics, indicating that the model has been sufficiently calibrated/validated.

Screen/Cut-Line	Description	Volume	Count	Vol/Count	Count Links	Total Links	Max Guideline Deviation
1	Crossing West of I-75	177,257	147,624	1.2	12	20	0.20 ***
2	Crossing East University of Florida Campus	99,855	84,762	1.18	8	10	0.28
3	Crossing State Road 121	130,273	134,094	0.97	12	20	0.21
4	East-West Cutline west of I-75	32,737	24,356	1.34	4	8	0.44
5	North-South Crossing State Road 222 (39th Av	139,620	129,024	1.08	12	18	0.21
6	North-South Cutline in Northwest County/High	98,199	91,784	1.07	18	18	0.28
7	La Crosse Area	12,835	9,962	1.29	8	8	0.55
8	East-West Crossing U.S. 301	34,797	34,467	1.01	12	12	0.38
9	Micanopy Area	107,840	121,682	0.89	14	14	0.22
10	External Cordon	229,711	230,477	1	48	48	0.16
11	Crossing East of I-75	200,067	193,526	1.03	16	18	0.18
ALL		**1,263,191**	**1,201,759**	**1.03**	**164**	**194**	

9. Model Usability Improvements and Dashboard

Extensive improvements to the model's reporting statistics have been made.

1. The model now generates Screenline summary in the RMSE.prn file.

2. The model generates Transit Boarding Statistics.xlsx (STEP6 Assignment-> STEP15) that summarizes the transit ridership data by routes, modes and stops in separate tabs. This is a product of specialized software using R. The R software files are also provided to the user in the Gainesville model distribution package called Rsetup. These are automatically called during the model run without user intervention.

3. The model also generated a reporting dashboard in HTML format (STEP7- right click and open in Windows). This can be opened in any internet browser.

5200 NW 33rd AVENUE · SUITE 203 · FORT LAUDERDALE, FL 33309
TEL 954.777.0044
FAX 954.777.5157
WWW.CORRADINO.COM

North Central Florida Regional Planning Council

Serving Alachua
Bradford • Columbia
Dixie • Gilchrist • Hamilton
Lafayette • Levy • Madison
Suwannee • Taylor • Union Counties

2009 NW 67th Place, Gainesville, FL 32653-1603 • 352.955.2200

April 16, 2020

TO: Year 2045 Long-Range Transportation Plan Technical Working Group

FROM: Scott R. Koons, AICP, Executive Director

SUBJECT: Year 2045 Long-Range Transportation Plan Update - Next Steps

STAFF RECOMMENDATION

No Action Required.

BACKGROUND

The Corradino Group, Inc. and staff will provide an overview of the next steps for the Year 2045 Long-Range Transportation Plan update.

T:\Scott\SK20\MTPO\Memo\next_step_tacwg_apr23.docx