Model Reporting: Understanding the Performance Measures Reported from a Travel Demand Model

presented by

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Transportation Planner

AECOM

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Reporting

FSUTMS model reports are useful to

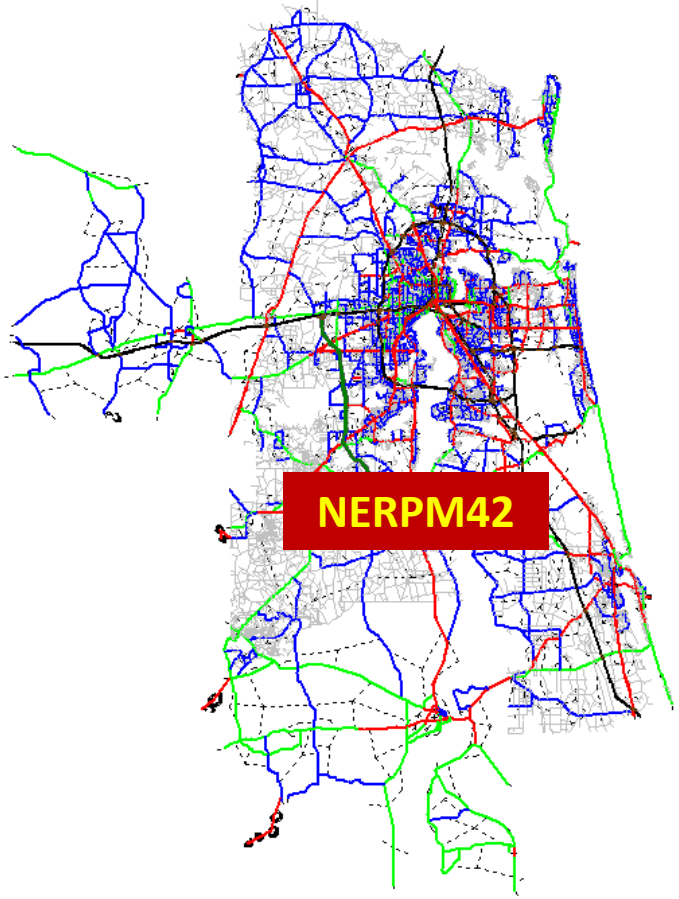
- Assess the overall model performance
- Compare results with other model runs
- Spot potential errors or illogical results

Model Output Reports

This webinar will address model output reports for each of the major model steps:

1. Trip Generation
2. Trip Distribution
3. Mode Choice
4. Assignment

FSUTMS Models



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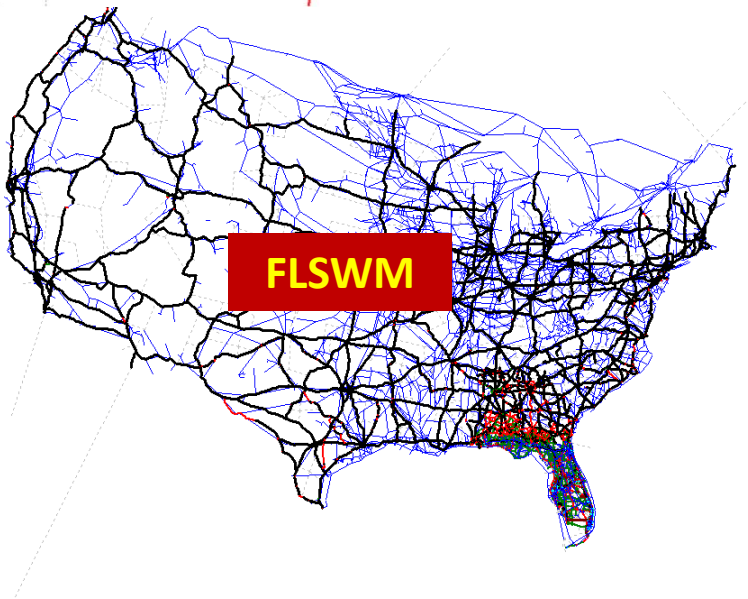
Alachua



FLSWM

Trip Generation

Trip generation determines the number of trips for a specific purpose based on the characteristics of land use and those making the trip.

Trip generation models predict the number of trips from a traffic analysis zone (TAZ) by trip purpose.

Trip Generation—Trip Purposes

Purpose 1-Home Base Work
Purpose 2-Home Base Shopping
Purpose 3-Home Base Social/Recreational
Purpose 4-Home Base Other
Purpose 5-Non Home Based

Person Trips

Purpose 6-Truck-Taxi
Purpose 7-External-Internal
Purpose 8-External-External

Vehicle Trips

Some models may have more and different trip purposes.

Trip Generation-Trips and Trip Ends

Trip generation predicts trip ends by zone

Trip distribution develops trips by pairing the trip ends.

There are two types of trip ends:

Production is the home end of a home-based trip or the origin of a non-home-based trip

Attraction is the non-home end of a home-based trip or the destination of a non-home-based trip

Productions and Attractions

Productions

Origin

Home-Base Work Trips

Attractions

Destination

In the travel demand model, the end result of trip generation is to identify and quantify all the trip ends beginning and ending in a zone.

Trip Generation Input and Output Files

Trip Generation Input Files

- Zonedata
- Specgen
- Eiprods
- Prodrates
- Attrates
- Duweight

Trip Generation Output Files

- P and A
- Gen Report/Summary

Trip Generation—FSUTMS Models

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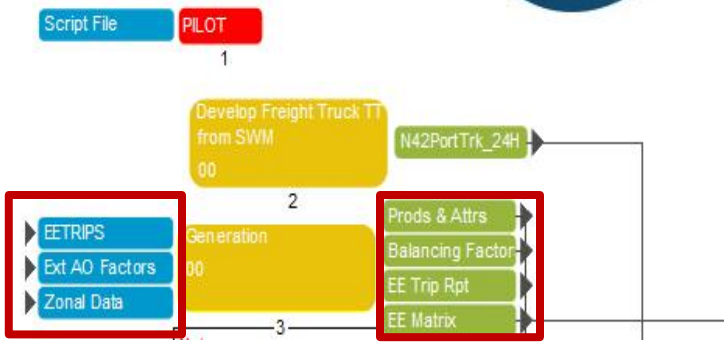
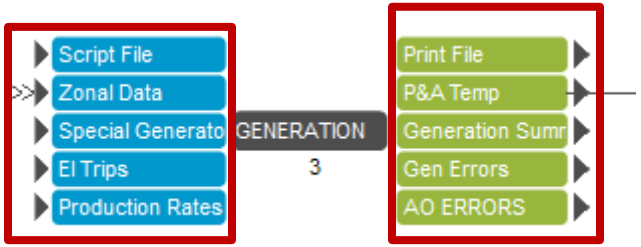
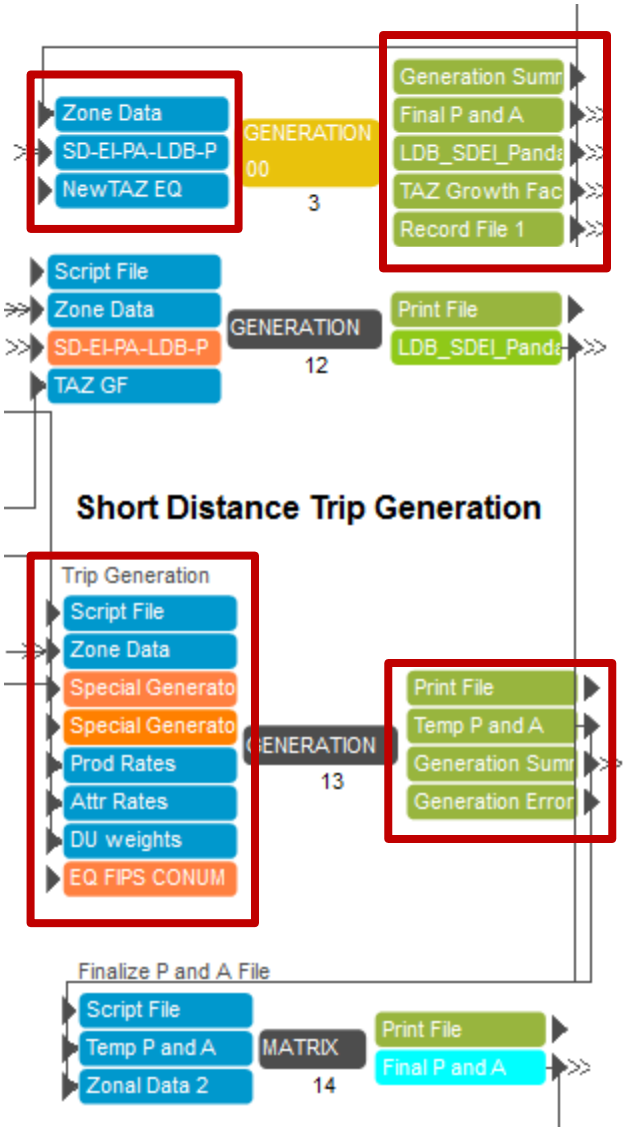
North Florida TPO
Transportation Planning Organization





FLSWM

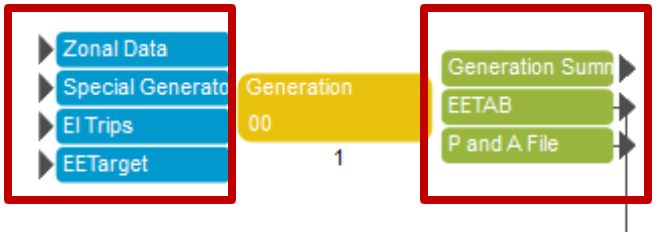


Trip Generation–FSUTMS Models

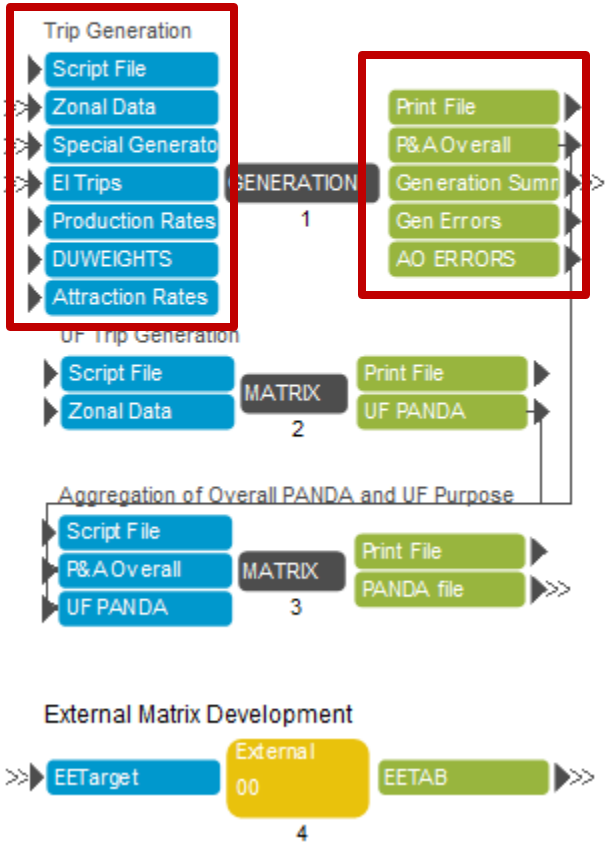
Alachua

Gainesville/Alachua Co

Validated to base year 2007 by Cambridge Systema



GENERATION



Trip Generation Reporting

Trip generation step generates three reports

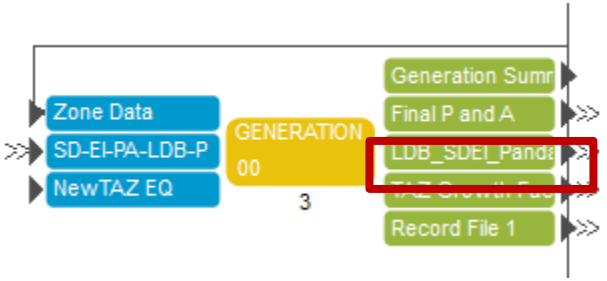
Generation Summary—productions, unbalanced attractions and balanced attractions by trip purpose

Socioeconomic Data Errors—population less than the number of households

Land Use Errors—errors in household size, employment, and auto ownership

Generation Summary

FLSWM Generation Summary File



Purpose 1-Home Base Work
Purpose 2-Home Base Shopping
Purpose 3-Home Base Social/Recreational
Purpose 4-Home Base Other
Purpose 5-Non Home Based
Purpose 6-Truck-Taxi

```
TRIP PRODUCTION AND ATTRACTION REPORT BY PURPOSE
  Purpose= 1   Productions=  12,032,733 Unbalanced Attractions=  19,908,468
  Purpose= 2   Productions=   8,597,913 Unbalanced Attractions=  20,953,700
  Purpose= 3   Productions=   9,716,120 Unbalanced Attractions=  17,137,194
  Purpose= 4   Productions=  13,720,728 Unbalanced Attractions=  16,891,444
  Purpose= 5   Productions=  13,247,267 Unbalanced Attractions=  13,247,267
  Purpose= 6   Productions=   1,773,092 Unbalanced Attractions=   1,773,092
  Purpose= 1   Productions=  12,032,733   Balanced Attractions=  12,032,733
  Purpose= 2   Productions=   8,597,913   Balanced Attractions=   8,597,913
  Purpose= 3   Productions=   9,716,120   Balanced Attractions=   9,716,120
  Purpose= 4   Productions=  13,720,728   Balanced Attractions=  13,720,728
  Purpose= 5   Productions=  13,247,267   Balanced Attractions=  13,247,267
  Purpose= 6   Productions=   1,773,092   Balanced Attractions=   1,773,092
```

Large differences between balanced and unbalanced trips by purpose could mean zonal data errors or trip rates.

Generation Summary

FLSWM Trip Generation Reporting Script

```
 IF (PURP=1) PRINT LIST="TRIP PRODUCTION AND ATTRACTION REPORT BY PURPOSE", PRINTO=1
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C)," Unbalanced Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP
; . . . . . .

BALANCE A2P=1-4,7
BALANCE P2A=5-6
; . . . . .

; KDK LOOP PURP=1,7
LOOP PURP=1,6
 P[PURP]=ROUND(P[PURP])
 A[PURP]=ROUND(A[PURP])
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C),"   Balanced Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP

; . . . . . .
```

Balances attractions to productions or vice versa depending on the trip purpose

Generation Summary

NERPM42 Generation Summary File

Purpose= 1	Productions=	929,616	Unbalanced Attractions=	928,731
Purpose= 2	Productions=	472,447	Unbalanced Attractions=	488,909
Purpose= 3	Productions=	446,173	Unbalanced Attractions=	468,343
Purpose= 4	Productions=	996,292	Unbalanced Attractions=	1,052,434
Purpose= 5	Productions=	971,961	Unbalanced Attractions=	991,581
Purpose= 6	Productions=	298,831	Unbalanced Attractions=	298,831
Purpose= 7	Productions=	83,018	Unbalanced Attractions=	83,018
Purpose= 8	Productions=	31,088	Unbalanced Attractions=	31,088
Purpose= 9	Productions=	78,161	Unbalanced Attractions=	0
Purpose=10	Productions=	52,569	Unbalanced Attractions=	0
Purpose=11	Productions=	4,985	Unbalanced Attractions=	0
Purpose=12	Productions=	19,434	Unbalanced Attractions=	0
Purpose= 1	Productions=	929,616	Balanced Attractions=	928,731
Purpose= 2	Productions=	472,447	Balanced Attractions=	488,909
Purpose= 3	Productions=	446,173	Balanced Attractions=	468,343
Purpose= 4	Productions=	996,292	Balanced Attractions=	1,052,434
Purpose= 5	Productions=	971,961	Balanced Attractions=	991,581
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Purpose= 8	Productions=	31,088	Balanced Attractions=	31,088
Purpose= 9	Productions=	78,161	Balanced Attractions=	78,161
Purpose=10	Productions=	52,569	Balanced Attractions=	52,569
Purpose=11	Productions=	4,985	Balanced Attractions=	4,985
Purpose=12	Productions=	19,434	Balanced Attractions=	19,434
Total	Productions=	4,384,574	Attractions=	4,498,084

Purpose 1-Home Base Work
Purpose 2-Home Base Shopping
Purpose 3-Home Base Social/Rec
Purpose 4-Home Base Other
Purpose 5-Non Home Based
Purpose 6-Four-wheeled Truck
Purpose 7-Single-unit Truck
Purpose 8-Comb. Truck-trailer
Purpose 9-SOV IE
Purpose 10-HOV IE
Purpose 11-Light-duty truck IE
Purpose 12-Heavy-duty truck IE

Balances productions to attractions depending on the trip purpose

Generation Summary

NERPM42 Trip Generation Reporting Script

```
LOOP PURP=1,12
 IF (PURP=1) PRINT LIST="TRIP PRODUCTION AND ATTRACTION REPORT BY PURPOSE for All Counties:", PRINTO=1
 IF (PURP=1) PRINT LIST="================================================================== ", PRINTO=1

 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C)," Unbalanced Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP

 PRINT LIST=" ", PRINTO=1

TOTSTDATTR=A[1][0]+A[2][0]+A[3
A[9]=P[9][0]*(A[1]+A[2]+A[3]+A
A[10]=P[10][0]*(A[1]+A[2]+A[3
A[11]=P[11][0]*(A[7]/A[7][0])
A[12]=P[12][0]*(A[8]/A[8][
BALANCE A2P=9-12
LOOP PURP=1,12
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C),"   Balanced Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP


  PTOTAL=P[1][0]+P[2][0]+P[3][0]+P[4][0]+P[5][0]+P[6][0]+P[7][0]+P[8][0]+P[9][0]+P[10][0]+P[11][0]+P[12][0]
  ATOTAL=A[1][0]+A[2][0]+A[3][0]+A[4][0]+A[5][0]+A[6][0]+A[7][0]+A[8][0]+A[9][0]+A[10][0]+A[11][0]+A[12][0]


PRINT LIST="  Total","       Productions=",PTOTAL(12.0C),"           Attractions=",ATOTAL(12.0C), PRINTO=1
PRINT LIST=" ", PRINTO=1
```

Balances attractions to productions only for trip purposes 9 through 12

Generation Summary

Alachua Generation Summary File

TRIP PRODUCTION AND ATTRACTION REPORT BY PURPOSE

Purpose= 1	Productions=	183,299	Unbalanced Attractions=	334,938
Purpose= 2	Productions=	132,480	Unbalanced Attractions=	192,495
Purpose= 3	Productions=	119,659	Unbalanced Attractions=	246,954
Purpose= 4	Productions=	253,457	Unbalanced Attractions=	317,271
Purpose= 5	Productions=	329,228	Unbalanced Attractions=	329,947
Purpose= 6	Productions=	59,933	Unbalanced Attractions=	59,933
Purpose= 7	Productions=	15,927	Unbalanced Attractions=	15,927
Purpose= 8	Productions=	5,642	Unbalanced Attractions=	5,642
Purpose= 9	Productions=	86,297	Unbalanced Attractions=	0
Purpose=10	Productions=	9,797	Unbalanced Attractions=	0
Purpose=11	Productions=	3,448	Unbalanced Attractions=	0
Purpose=12	Productions=	14,521	Unbalanced Attractions=	0
Purpose= 1	Productions=	183,299	Balanced Attractions=	183,299
Purpose= 2	Productions=	132,480	Balanced Attractions=	132,480
Purpose= 3	Productions=	119,659	Balanced Attractions=	119,659
Purpose= 4	Productions=	253,457	Balanced Attractions=	253,457
Purpose= 5	Productions=	329,228	Balanced Attractions=	329,947
Purpose= 6	Productions=	59,933	Balanced Attractions=	59,933
Purpose= 7	Productions=	15,927	Balanced Attractions=	15,927
Purpose= 8	Productions=	5,642	Balanced Attractions=	5,642
Purpose= 9	Productions=	86,297	Balanced Attractions=	86,297
Purpose=10	Productions=	9,797	Balanced Attractions=	9,797
Purpose=11	Productions=	3,448	Balanced Attractions=	3,448
Purpose=12	Productions=	14,521	Balanced Attractions=	14,521
Total	Productions=	1,213,690	Attractions=	1,214,409

Purpose 1-Home Base Work
Purpose 2-Home Base Shopping
Purpose 3-Home Base Social/Rec
Purpose 4-Home Base Other
Purpose 5-Non Home Based
Purpose 6-Four-wheeled Truck
Purpose 7-Single-unit Truck
Purpose 8-Tractor-trailer
Purpose 9-SOV IE
Purpose 10-HOV IE
Purpose 11-Light-duty truck IE
Purpose 12-Heavy-duty truck IE

Balances productions to attractions depending on the trip purpose

Generation Summary

Alachua Trip Generation Reporting Script

```
LOOP PURP=1,12
 IF (PURP=1) PRINT LIST="TRIP PRODUCTION AND ATTRACTION REPORT BY PURPOSE", PRINTO=1
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C)," Unbalanced Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP

 PRINT LIST=" ", PRINTO=1

; . . . . . .
; Balancing attractions as similarly done in Olympus model.
BALANCE A2P=1-4
; . . . . . .

TOTSTDATTR=A[1][0]+A[2][0]+A[3][0]+
A[9]=P[9][0]*(A[1]+A[2]+A[3]+A[4]+A
A[10]=P[10][0]*(A[1]+A[2]+A[3]+A[4]
A[11]=P[11][0]*(A[7]/A[7][0])
A[12]=P[12][0]*(A[8]/A[8][0])
BALANCE A2P=9-12
LOOP PURP=1,12
 PRINT LIST="  Purpose=",PURP(2.0),"  Productions=",P[PURP][0](12.0C),"   Balanced Attractions=",A[PURP][0](12.0C), PRINTO=1
ENDLOOP


  PTOTAL=P[1][0]+P[2][0]+P[3][0]+P[4][0]+P[5][0]+P[6][0]+P[7][0]+P[8][0]+P[9][0]+P[10][0]+P[11][0]+P[12][0]
  ATOTAL=A[1][0]+A[2][0]+A[3][0]+A[4][0]+A[5][0]+A[6][0]+A[7][0]+A[8][0]+A[9][0]+A[10][0]+A[11][0]+A[12][0]
```

Balances attractions to productions or vice versa depending on the trip purpose

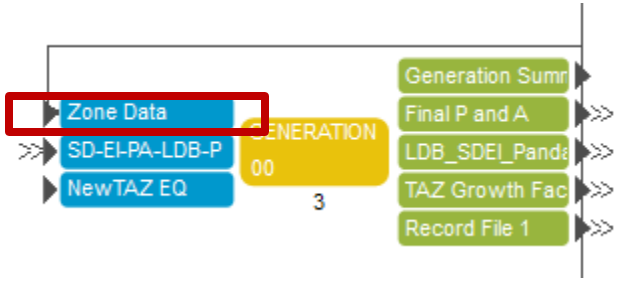
Socioeconomic Data Errors

Reports zones and values where the population is less than the number of households.

```
TAZ= 5788   POP/DU ERROR, HHTYPE=HM Population=    0 Occupied Units=    1
TAZ= 6430   POP/DU ERROR, HHTYPE=HM Population=    0 Occupied Units=    1
TAZ= 6432   POP/DU ERROR, HHTYPE=HM Population=    0 Occupied Units=    1
```

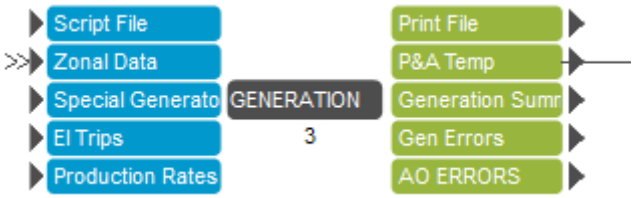
FLSWM socioeconomic data errors shown here

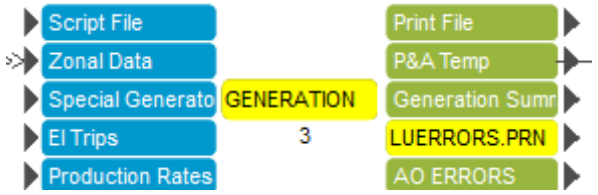
Where would you fix these errors?



Auto Ownership and Land Use Errors

NERPM42 Auto Ownership and Land Use Errors Summary Report



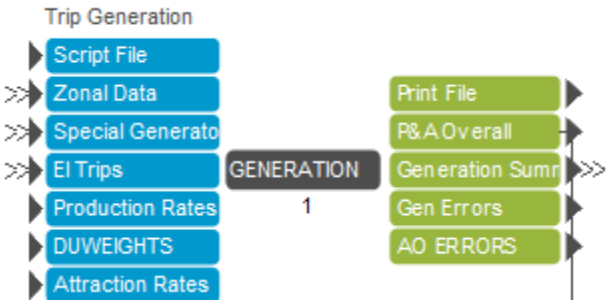


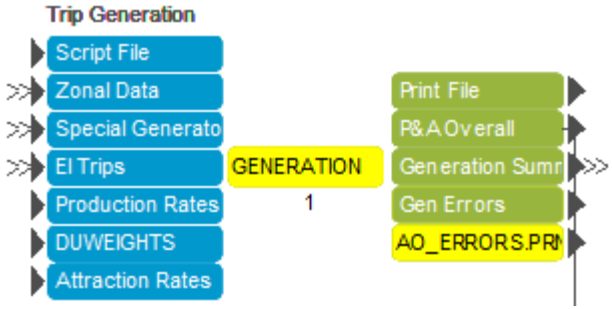

```
AUTO OWNERSHIP ERRORS WHERE POPULATION EXISTS BUT AUTO OWNERSHIP DOES NOT
CHECK LISTED ZONES IN ZDATA_05A FILES FOR AUTO OWNERSHIP PERCENTAGES!!!

************Error Report Summary*************
TOTAL AUTO OWNERSHIP ERRORS FOR SINGLE FAMILY=       0
TOTAL AUTO OWNERSHIP ERRORS FOR MULTI FAMILY=        0

THERE ARE NO AUTO OWNERSHIP = 0 BUT POPULATION > 0 ERRORS
```

NERMP42
Auto Ownership Check

Auto Ownership or Land Use Errors

Alachua Auto Ownership and Land Use Errors Summary Report






```
AUTO OWNERSHIP ERRORS WHERE POPULATION EXISTS BUT AUTO OWNERSHIP DOES NOT
CHECK LISTED ZONES IN ZONEDATA07 FILES FOR AUTO OWNERSHIP PERCENTAGES!!!

************Error Report Summary*************
TOTAL AUTO OWNERSHIP ERRORS FOR SINGLE FAMILY=       0
TOTAL AUTO OWNERSHIP ERRORS FOR MULTI FAMILY=        0

THERE ARE NO AUTO OWNERSHIP = 0 BUT POPULATION > 0 ERRORS
```

Alachua
Auto Ownership Check

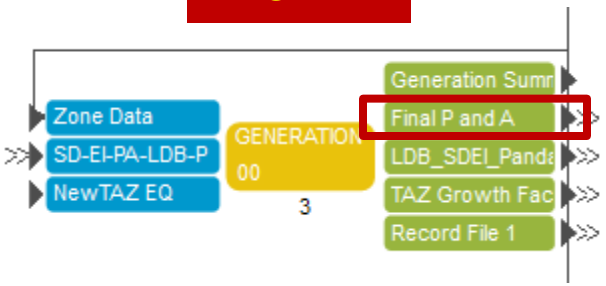
Productions and Attractions

P and A.DBF file shows the productions and attractions by TAZ for each trip purpose. The file can be used to create histograms and compare the results to standards for reasonability.

Z	DISTRICT	HBWKP	HBWKA	HBSHP	HBSHA	HBSRP	HBSRA	HBOTP	HBOTA	NHBSP	NHBSA	LTRKP	LTRKA
1	1	194.26	37.13	152.03	0	134.68	14118.13	266.59	73.04	81.88	6081.88	30.86	30.86
2	1	1058.94	172.39	811.93	171.6	802.04	448.41	1781.36	261.39	358.68	358.68	145.06	145.06
3	1	98.99	15.91	66.37	0	68.87	45.7	125.69	23.24	25.58	25.58	14.05	14.05
4	1	492.4	98.13	397.83	65.72	347.86	337.44	705.24	174.41	217.98	217.98	100.66	100.66
5	1	582.12	2543.38	592.8	2281.85	623.27	605.4	1037.26	2201.38	3071.58	3071.58	744.17	744.17
6	1	61.87	491.97	54	36.51	44.33	98.39	81.71	703.84	339.59	339.59	133.47	133.47
7	1	615.52	729.33	529.12	456.37	459.33	478.19	1201.84	693.88	994.33	994.33	249.26	249.26
8	1	430.92	323.56	365.27	18.25	324.35	286.58	649.31	3036.69	412.9	412.9	111.37	111.37
9	1	468.76	645.79	438.38	94.93	419.82	405.95	761.79	645.19	797.92	797.92	185.98	185.98
10	1	890.65	621.92	758.24	624.31	814.97	426.85	1556.76	463.03	782.32	782.32	276.5	276.5
11	1	126.56	1905.55	124.71	1927.71	101.71	266.71	293.65	1576.78	2117.93	2117.93	568.69	568.69
12	1	448.85	2618.97	372.26	1920.41	301.51	637.86	632.21	2185.67	3372.1	3372.1	648.08	648.08
13	1	778.27	285.1	561.16	401.61	559.62	376.04	1202.58	328.9	535.04	535.04	157.57	157.57
14	1	1420.01	568.88	1233.09	836.07	1157.21	943.59	2048.91	752.98	1187.42	1187.42	349.38	349.38
15	1	769.52	474.73	614.98	620.66	588.81	355.33	1332.78	868.07	751.45	751.45	202.19	202.19
16	1	773.53	879.18	546.38	1989.77	550.13	406.25	1209.7	774	1696.06	1696.06	353.97	353.97
17	1	293.47	762.48	221.64	460.02	205.29	196.12	435.99	396.85	651.11	651.11	258.32	258.32

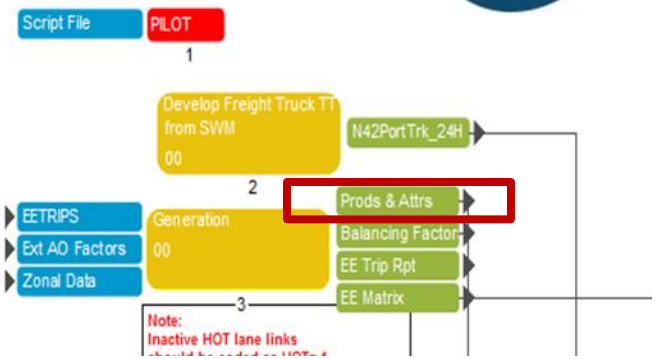
P and A File

FLSWM



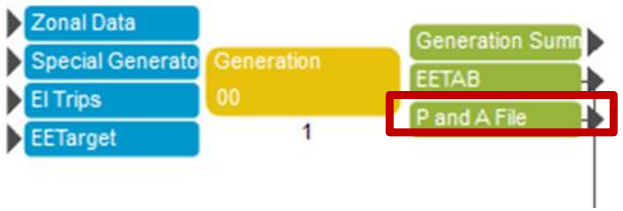
NERPM42

North Florida TPO
Transportation Planning Organization



Alachua

Gainesville/Alachua Co
Validated to base year 2007 by Cambridge Systema



Validation & Calibration Standards

Table 2.3 Percent Trips by Purpose

Statistic	Benchmarks	
	Low	High
Percent Trips by Purpose – HBW	12%	24%
Percent Trips by Purpose – HBSH	10%	20%
Percent Trips by Purpose – HBSR	9%	12%
Percent Trips by Purpose – HBSC	5%	8%
Percent Trips by Purpose – HBO[a]	14%	28%
Percent Trips by Purpose – HBNW[b]	45%	60%
Percent Trips by Purpose – NHB[c]	20%	33%

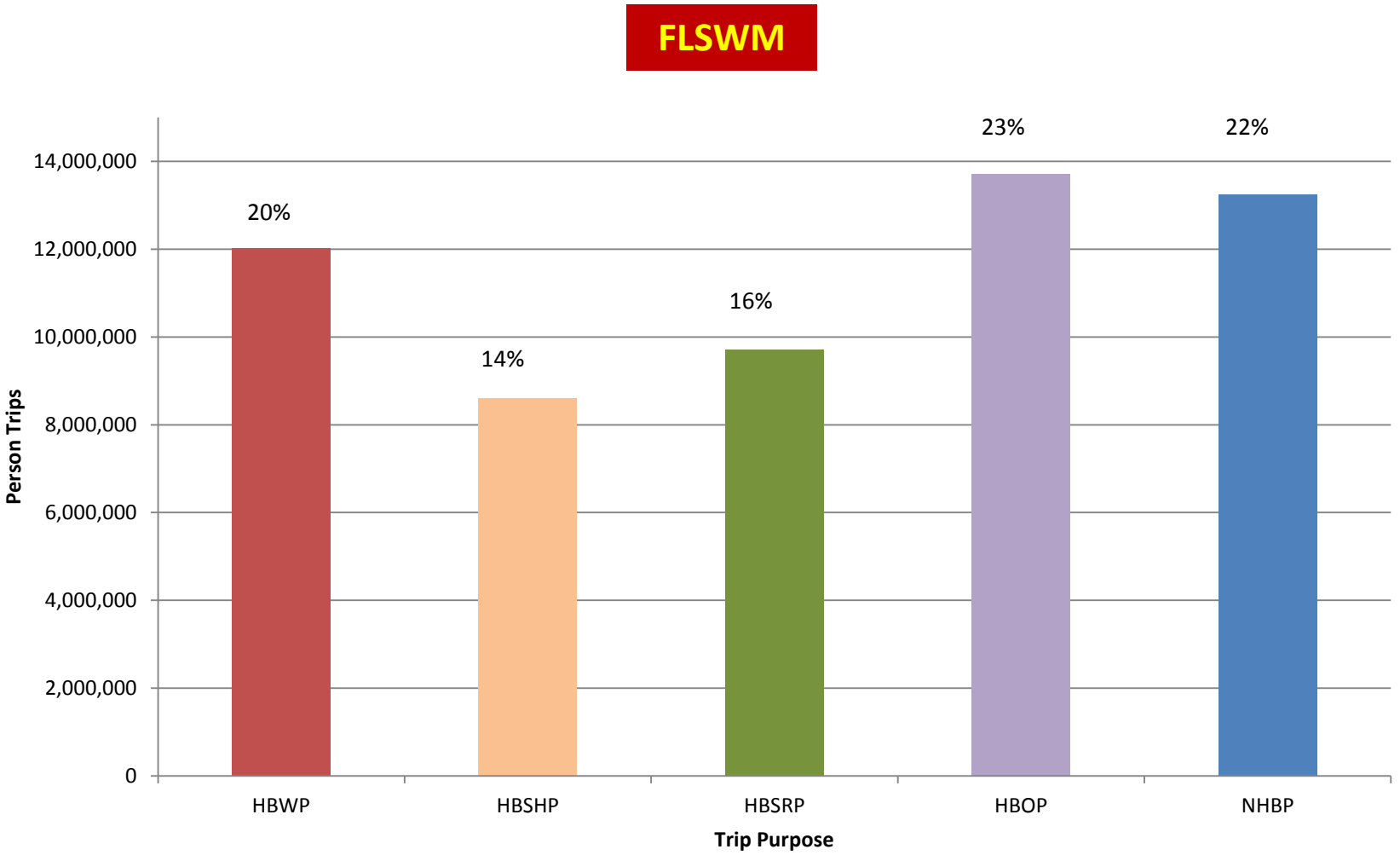
[a] HBO includes a variety of special trip purposes depending on the model (e.g., airport, college, and shop).

[b] HBNW accounts for all home-based trip purposes except HBW.

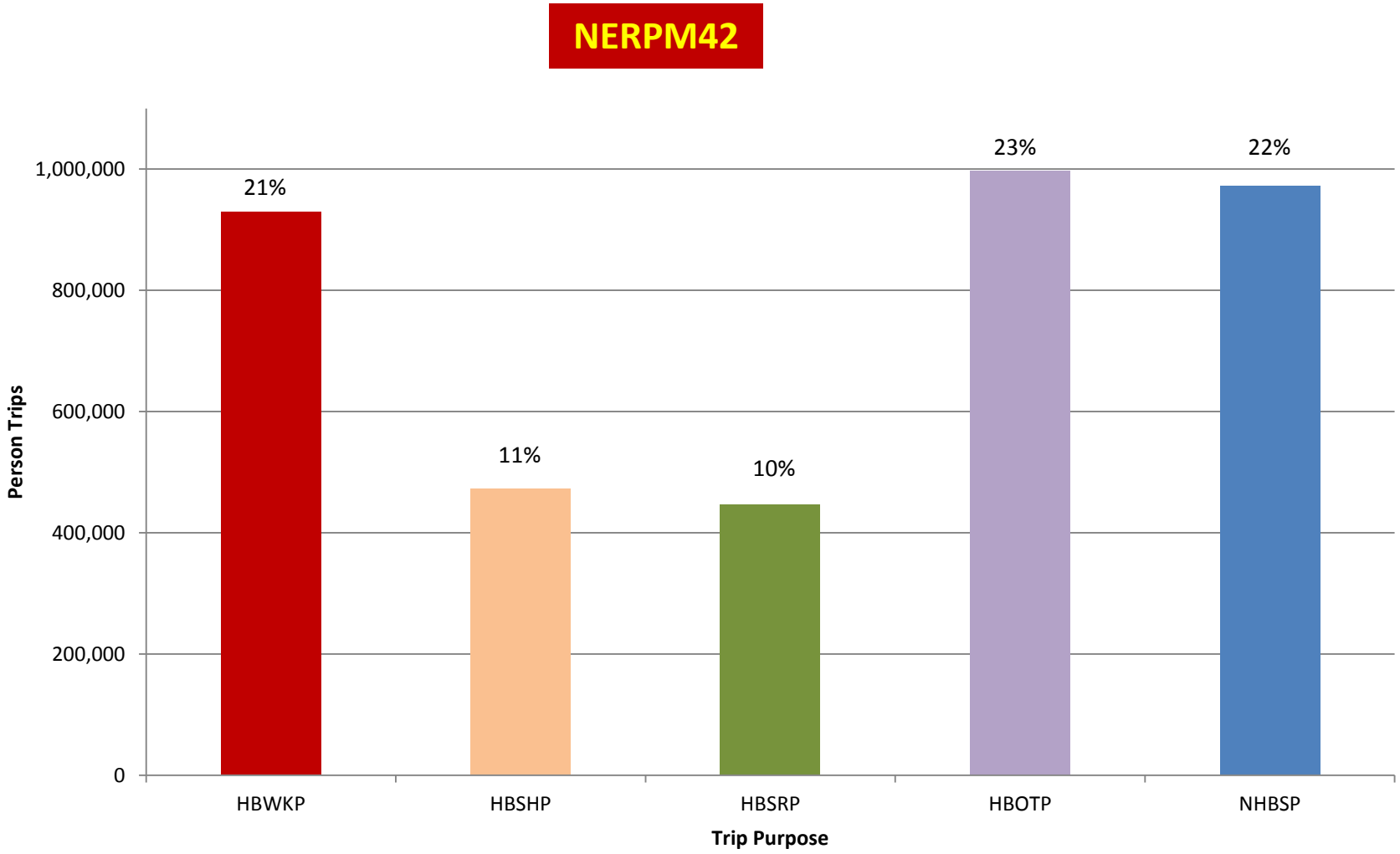
[c] NHB includes combined purposes for NHB Work and NHB Nonwork, where appropriate.

FSUTMS-Cube Framework Phase II: Model Validation and Calibration Standards
October 2, 2008

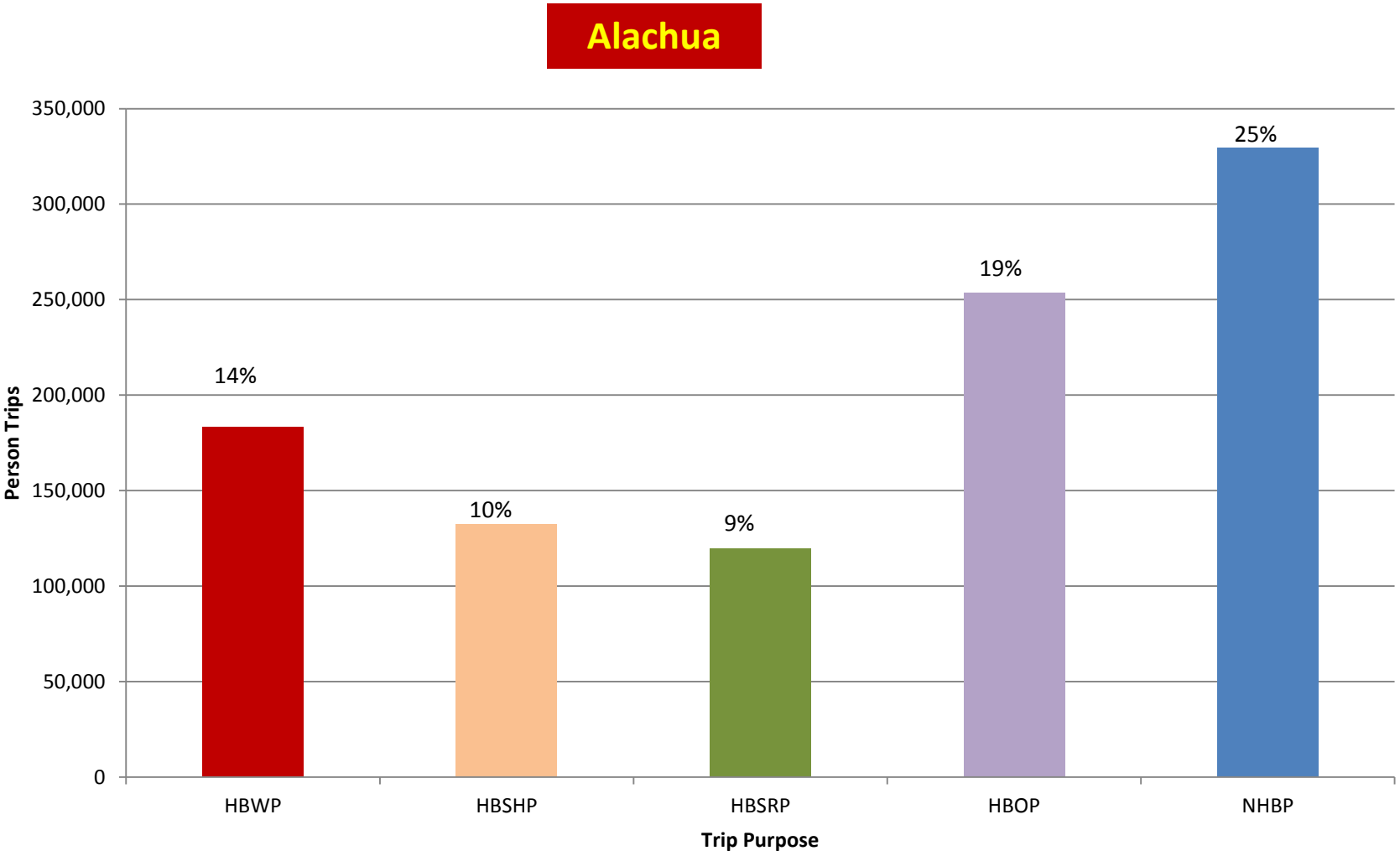
Statewide Model Productions



NERPM42 Productions



Alachua Model Productions



Calibration and Validation Standards

Percent by Trip Purpose

Model	HBW	HBSH	HBSR	HBO	NHB
Statistic	12%-24%	10%-20%	9%-12%	14%-28%	20%-33%
FLSWM	20%	14%	**16%**	23%	22%
NERPM42	21%	11%	10%	23%	22%
Alachua	14%	10%	9%	19%	25%

The trip production or attraction rates should be reviewed for trip purpose percentages that are out of range.

Trip Distribution

Trip distribution matches the production trip ends to the attraction trip ends which creates a trip table of the trips between zone to zone.

Trip distribution models link the trip origins to the trip destinations based on accessibility and activity of the destination zone.

Trip Distribution Input & Output Files

Trip Distribution Input Files

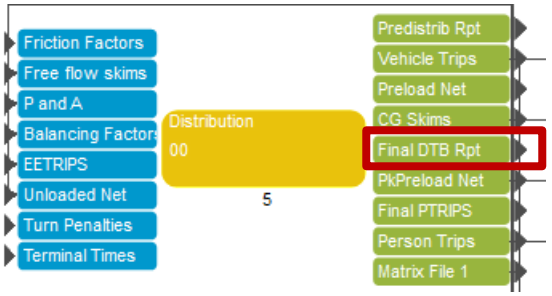
- Free-flow skims matrix
- P and A
- Friction factors
- Preassignment network
- Turn Penalties

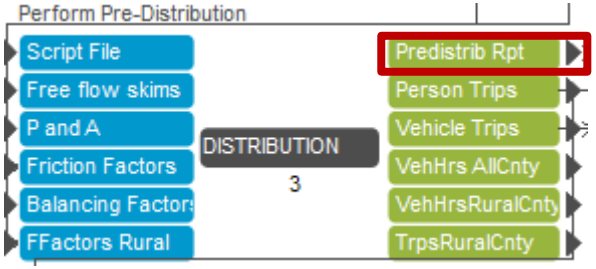
Trip Distribution Output Files

- Person trip table matrix by trip purpose
- Restrained skim network

Trip Distribution

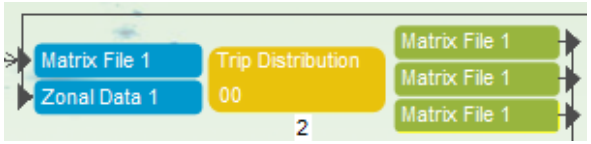
NERPM42

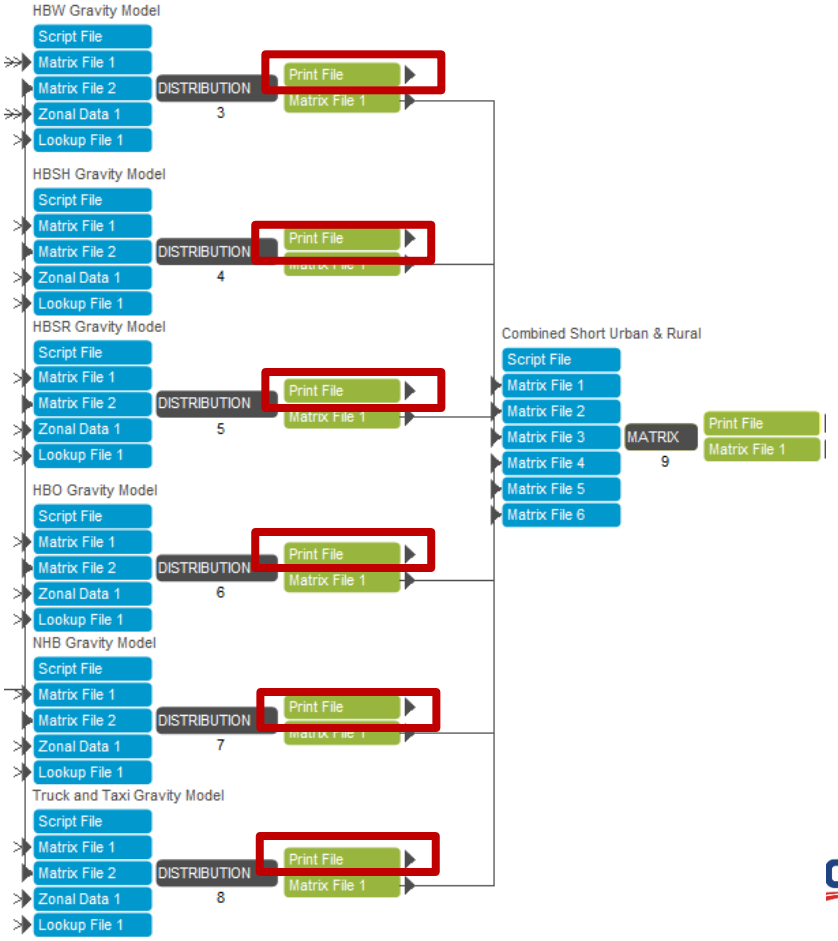




Alachua

FLSWM





Trip Distribution Trip Length Frequency

Florida Statewide Model—TLF Distance

```
FREQUENCY (Iter=65) HBW TLF-Mile
  BASEMW=12 VALUEMW=1 RANGE=0,200,5
    MW[12]                                      Accum
 >=     -   <       Obs          Sum       Pct   Pct
-------------------------------------------------
   0.0 -   5.0    349,402 4,573,594.79 38.0   38.0 |====================================
   5.0 -  10.0    574,250 3,313,599.09 27.5   65.6 |============================
  10.0 -  15.0    643,250 1,592,107.35 13.2   78.8 |=============
  15.0 -  20.0    673,712   811,098.00  6.7   85.5 |======
  20.0 -  25.0    723,635   430,885.86  3.6   89.1 |===
  25.0 -  30.0    706,350   247,314.94  2.1   91.2 |==
  30.0 -  35.0    698,190   153,644.46  1.3   92.4 |=
  35.0 -  40.0    675,420   105,514.22  0.9   93.3 |
  40.0 -  45.0    668,500    75,723.55  0.6   93.9 |
  45.0 -  50.0    695,621    59,307.33  0.5   94.4 |
  50.0 -  55.0    746,068    46,616.53  0.4   94.8 |
  55.0 -  60.0    777,860    39,853.61  0.3   95.2 |
  60.0 -  65.0    777,515    37,125.92  0.3   95.5 |
  65.0 -  70.0    811,608    33,182.44  0.3   95.7 |
  70.0 -  75.0    860,875    30,791.81  0.3   96.0 |
  75.0 -  80.0    889,007    31,000.11  0.3   96.3 |
```

```
FREQUENCY (Iter=65) HBW TLF-Mile
  BASEMW=12 VALUEMW=1 RANGE=0,200,5
    MW[12]                                      Accum
 >=     -   <       Obs          Sum       Pct   Pct
-------------------------------------------------
Total Obs = 32,257,044
Total Sum = 12,032,188
Mean      = 14.15
@I=J      = 835,804.42
```

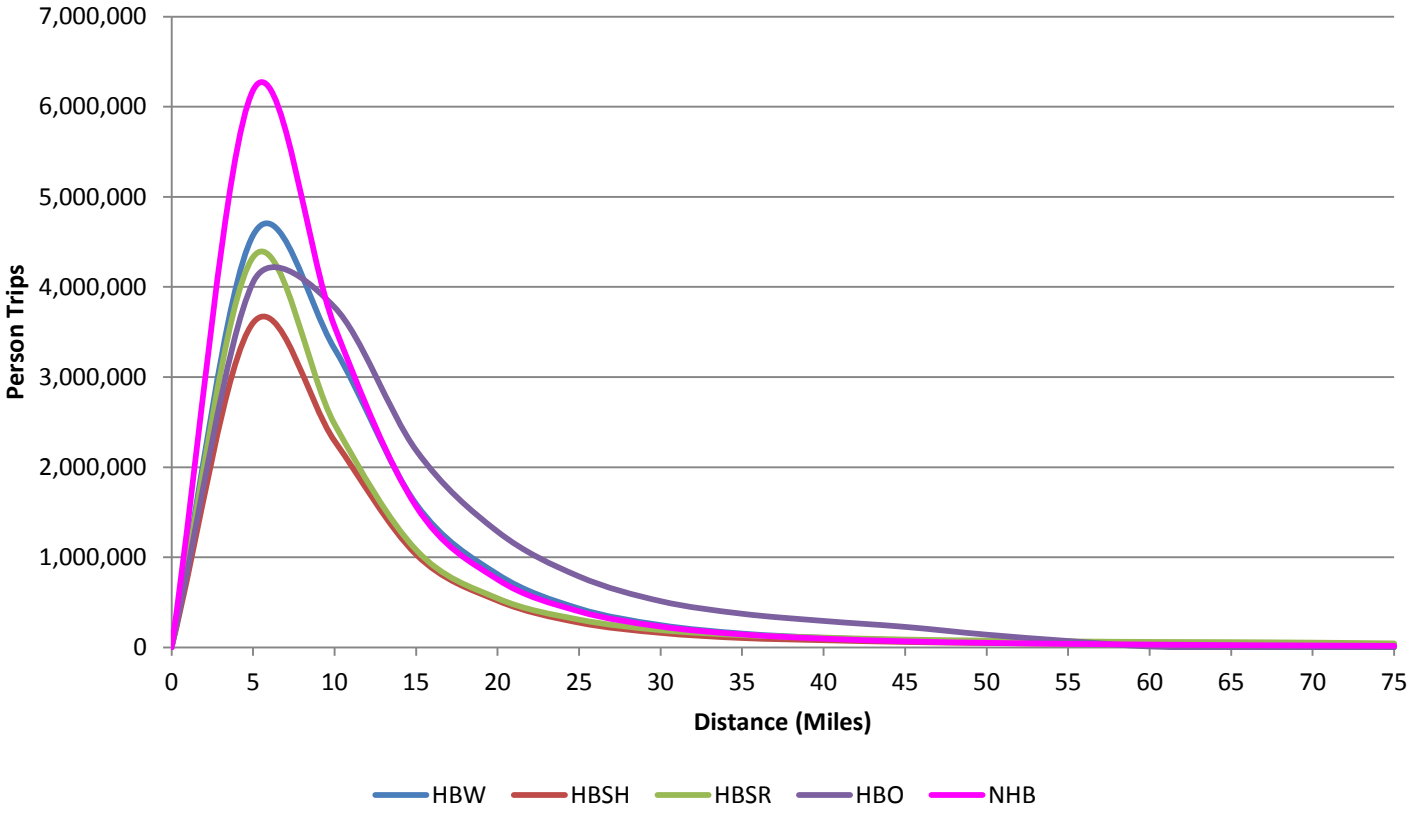
Trip Distribution Trip Length Frequency

Florida Statewide Model-TLF Minute

```
FREQUENCY (Iter=65) HBW TLF-Minute
  BASEMW=11 VALUEMW=1 RANGE=0,180,5
    MW[11]                                    Accum
 >=     -   <       Obs          Sum       Pct  Pct
-------------------------------------------------------
   0.0 -   5.0    36,323 1,101,985.92  9.2   9.2 |=========
   5.0 -  10.0   240,579 3,498,035.55 29.1  38.2 |==============================
  10.0 -  15.0   500,974 2,847,480.00 23.7  61.9 |========================
  15.0 -  20.0   585,034 1,671,275.87 13.9  75.8 |=============
  20.0 -  25.0   643,707   939,294.35  7.8  83.6 |=======
  25.0 -  30.0   723,444   528,428.93  4.4  88.0 |====
  30.0 -  35.0   742,561   302,603.95  2.5  90.5 |==
  35.0 -  40.0   723,795   186,387.22  1.5  92.0 |=
  40.0 -  45.0   718,784   126,222.19  1.0  93.1 |=
  45.0 -  50.0   707,666    87,392.23  0.7  93.8 |
  50.0 -  55.0   735,138    64,862.35  0.5  94.4 |
  55.0 -  60.0   782,257    51,736.97  0.4  94.8 |
  60.0 -  65.0   813,066    43,861.11  0.4  95.2 |
  65.0 -  70.0   838,583    39,117.63  0.3  95.5 |
  70.0 -  75.0   866,550    35,667.23  0.3  95.8 |
  75.0 -  80.0   917,479    31,798.20  0.3  96.0 |
  80.0 -  85.0   968,872    31,158.13  0.3  96.3 |
  85.0 -  90.0 1,007,865    30,834.54  0.3  96.6 |
  90.0 -  95.0 1,010,193    31,020.20  0.3  96.8 |
  95.0 - 100.0 1,015,393    29,003.24  0.2  97.1 |
 100.0 - 105.0 1,085,962    29,981.57  0.2  97.3 |
 105.0 - 110.0 1,124,342    29,752.37  0.2  97.6 |
 110.0 - 115.0 1,120,194    30,916.16  0.3  97.8 |
 115.0 - 120.0 1,113,004    30,943.96  0.3  98.1 |
 120.0 - 125.0 1,115,084    29,945.47  0.2  98.3 |
 125.0 - 130.0 1,114,242    29,619.00  0.2  98.6 |
 130.0 - 135.0 1,149,504    27,935.01  0.2  98.8 |
 135.0 - 140.0 1,199,369    27,520.23  0.2  99.0 |
 140.0 - 145.0 1,203,877    25,072.60  0.2  99.2 |
 145.0 - 150.0 1,161,391    21,406.60  0.2  99.4 |
 150.0 - 155.0 1,129,759    18,013.63  0.1  99.6 |
 155.0 - 160.0 1,105,491    15,925.22  0.1  99.7 |
 160.0 - 165.0 1,058,114    14,599.32  0.1  99.8 |
 165.0 - 170.0 1,004,707     9,963.36  0.1  99.9 |
 170.0 - 175.0   991,532     7,252.83  0.1 100.0 |
 175.0 - 180.0 1,000,206     5,166.43  0.0 100.0 |
 180.0+            2,003         8.44  0.0 100.0 |
-------------------------------------------------------
Total Obs = 32,257,044
Total Sum = 12,032,188
Mean      = 19.15
@I=J      = 835,804.42
```

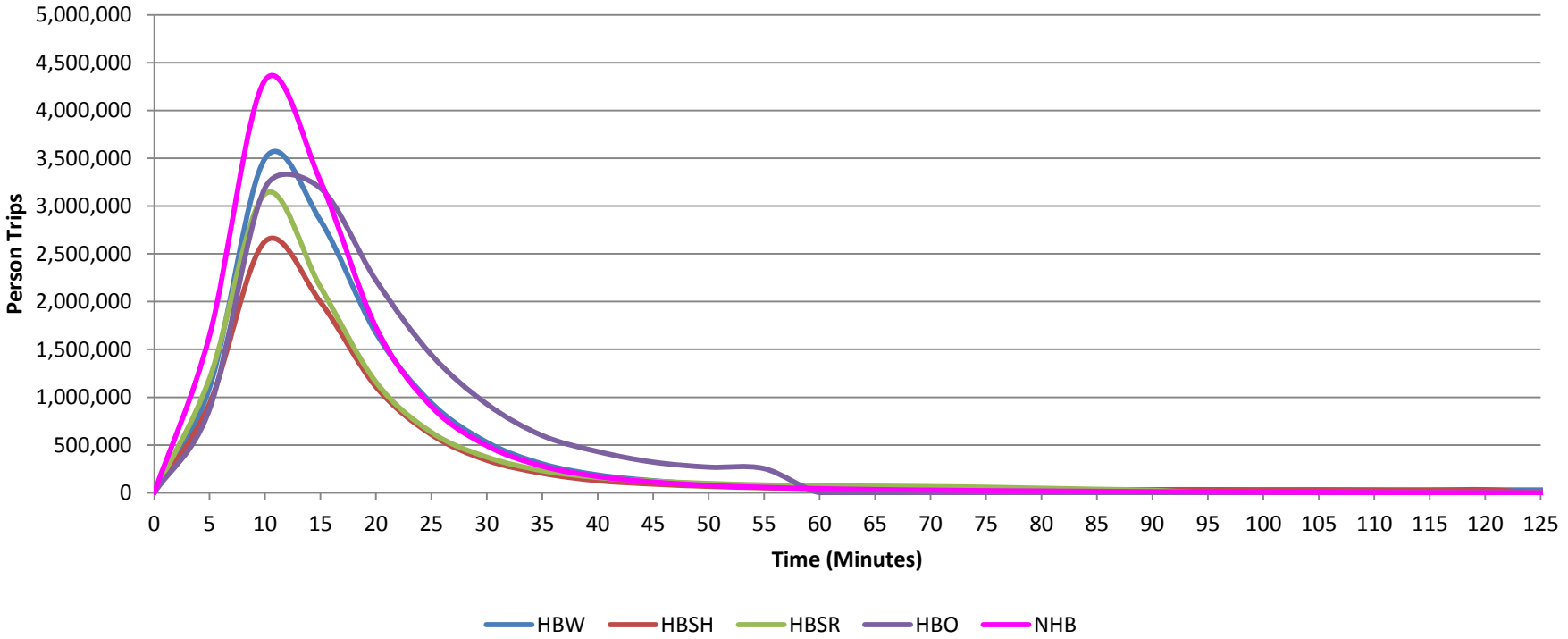
Trip Distribution Chart

FLSWM Trip Distribution Trip Length Frequency



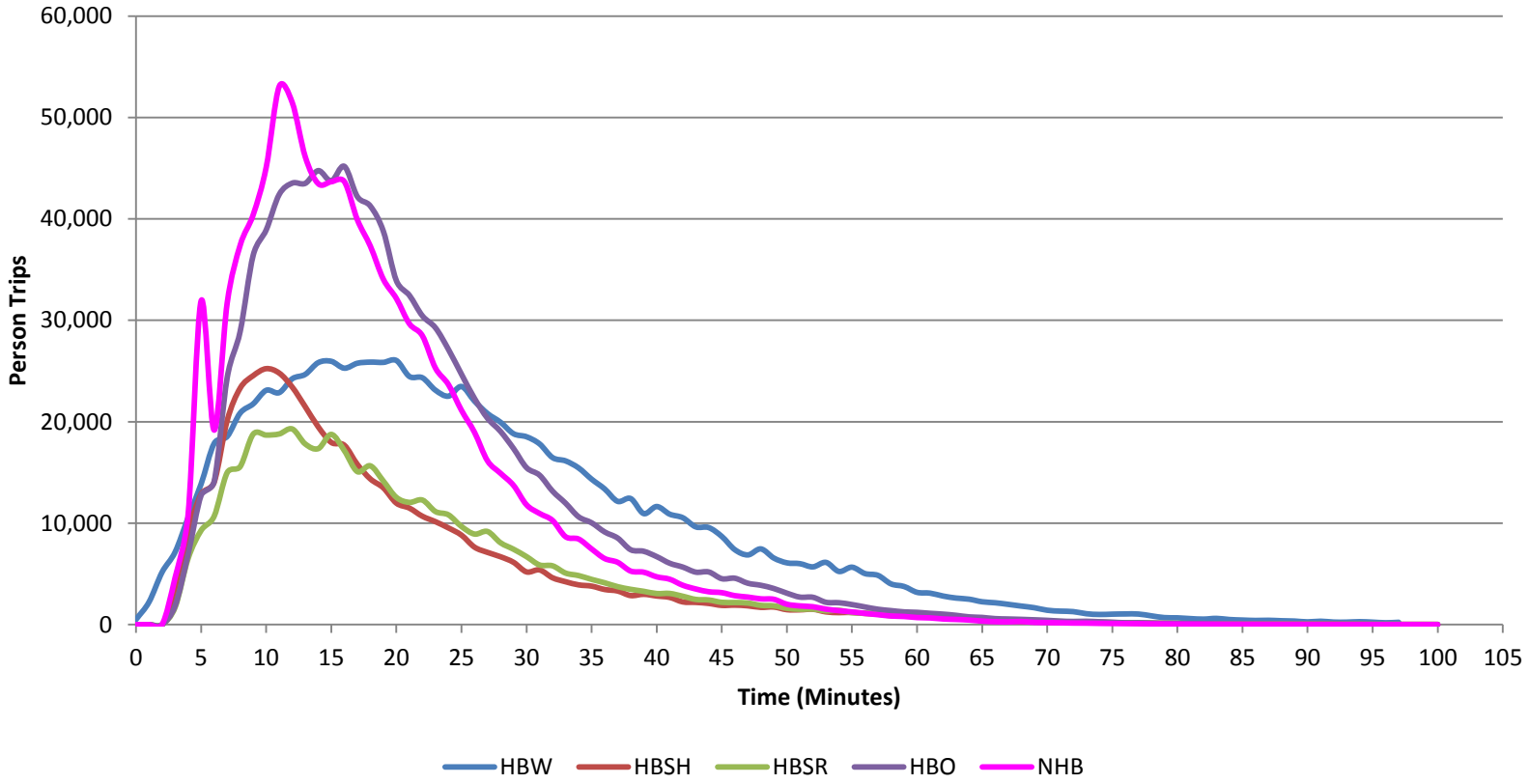
Trip Distribution Chart

FLSWM Trip Distribution Trip Length Frequency



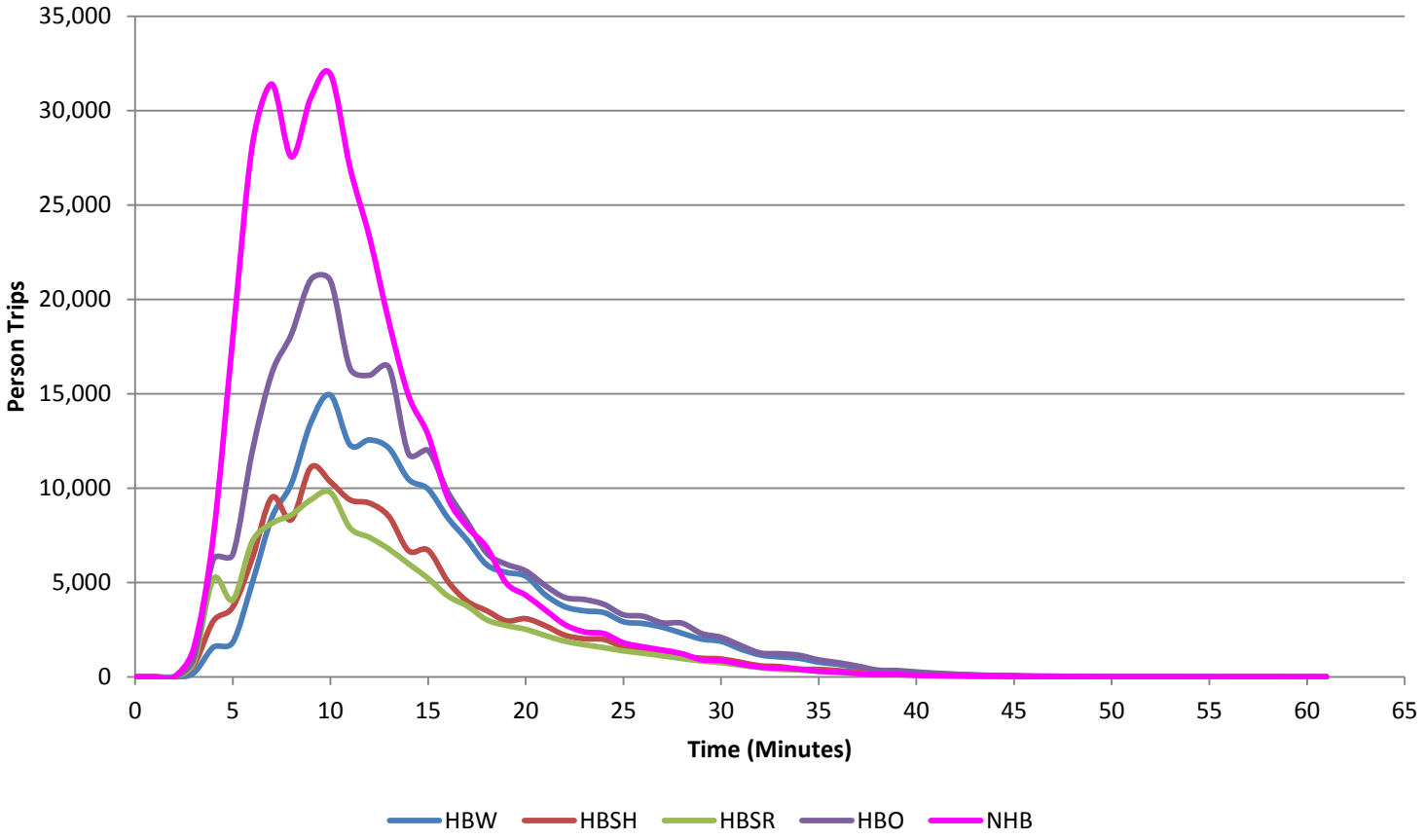
Trip Distribution Chart

NERPM42 Trip Distribution Length Frequency



Trip Distribution Chart

Alachua Trip Distribution Trip Length Frequency



Calibration and Validation Standards

FSUTMS-Cube Framework Phase II
Model Calibration and Validation Standards

Table 2.4 Average Trip Length and Frequencies by Purpose

Statistic	Benchmarks	
	Low	High
Average Trip Length – HBW (minutes)	12	35
Average Trip Length – HBSH (minutes)	9	19
Average Trip Length – HBSR (minutes)	11	19
Average Trip Length – HBSC (minutes)	7	16
Average Trip Length – HBO[a] (minutes)	8	20
Average Trip Length – NHB[b] (minutes)	6	19
Average Trip Length – IE (minutes)	26	58
Statistic	**Standards**	
Mean Trip Length, Observed Total Trips	+/-3%	
Trip Length Frequency Distribution versus observed	+/-5%	
Coincidence Ratios by Purpose[c]	70%	

FSUTMS-Cube Framework Phase II: Model Validation and Calibration Standards
October 2, 2008

FSUTMS Standards Comparison

Average Trip Length and Frequencies by Purpose

Model	HBW	HBSH	HBSR	HBO	NHB
Statistic (minutes)	12-35	9-19	11-19	8-20	6-19
FLSWM	19	17	16	17	14
NERPM42	30	19	21	20	18
Alachua	15	13	13	13	11

If observed and model trip length frequencies do not match, check the friction factors, the use of highway travel time as impedance, internal-external trips, socioeconomic data, and land use.

Calibration and Validation Standards

Table 2.5 Percent Intrazonal Trips

Statistic	Benchmarks	
	Low	High
Percent Intrazonal – HBW	1%	4%
Percent Intrazonal – HBSH	3%	9%
Percent Intrazonal – HBSR	4%	10%
Percent Intrazonal – HBSC	10%	12%
Percent Intrazonal – HBO[a]	3%	7%
Percent Intrazonal – NHB[b]	5%	9%
Percent Intrazonal – Total Trips	3%	5%
	Standards	
Statistic	Acceptable	Preferable
Percent Intrazonal, Observed Total Trips	+/-5%	+/-3%

[a] HBO includes a variety of special trip purposes, depending on the model (e.g., airport, college, and school).

[b] NHB includes combined purposes for NHB Work and NHB Nonwork, where appropriate.

FSUTMS-Cube Framework Phase II: Model Validation and Calibration Standards
October 2, 2008

FSUTMS Standards Comparison

Percent Intrazonal Trips

Model	HBW	HBSH	HBSR	HBO	NHB
Statistic	1%-4%	3%-9%	4%-10%	3%-7%	5%-9%
FLSWM	**7%**	7%	10%	5%	**10%**
NERPM42	1%	4%	4%	**2%**	5%
Alachua	2%	4%	8%	4%	7%

If the percentage of intrazonal trips is out of range, check the friction factors, intrazonal times, or TAZ structure.

Mode Choice

Mode choice is the step where the person trips are separated into either transit, automobile, or bicycle/pedestrian trips.

Mode choice models determine which travel mode the trips will use based on the level of service of the mode and traveler and household characteristics.

Mode Choice

- For highway-only models, mode choice is an auto occupancy model
- Auto occupancy model converts person trips to vehicle trips using auto occupancy factors
- The FLSWM is a highway-only model
- For transit models, mode choice determines the split among highway and transit modes
- NERPM42 and Alachua are transit modes

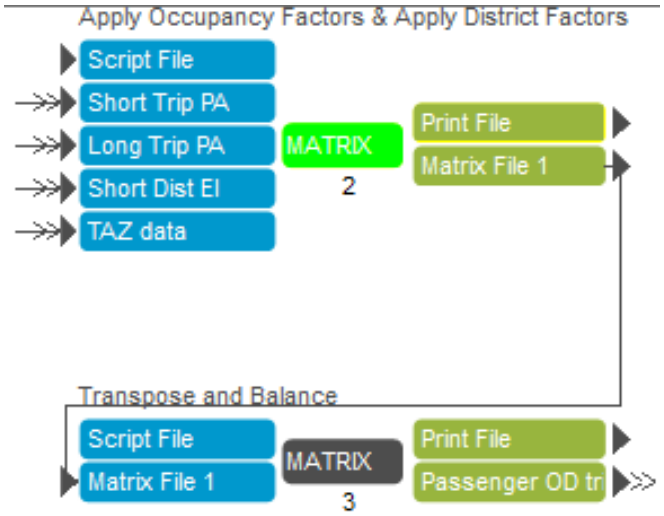
Highway-Only Input and Output Files

Highway-Only Mode Input Files

- Auto occupancy rates by trip purpose
- External-to-external vehicle trip table
- Internal-to-external vehicle trip table
- Truck/taxi vehicle trip table
- Person trip tables for all other trip purposes

FLSWM Auto Occupancy

FLSWM



The following auto occupancy rates are used

- HBW 1.10
- HBSH 1.80
- HBSR 2.10
- HBO 1.80
- NHB 1.71
- Truck/taxi 1.10

Source: FHWA Travel Model Improvement Program (TMIP)

Mode Choice for TDMs with Transit

Transit Mode Choice Model Input Files

- Person Trips
- Free Flow Skims
- Restrained Highway Skims
- Off Peak Transit Skims
- Peak Transit Skims
- Parking Cost
- Mode Choice Coefficients
- Mode Choice Constants

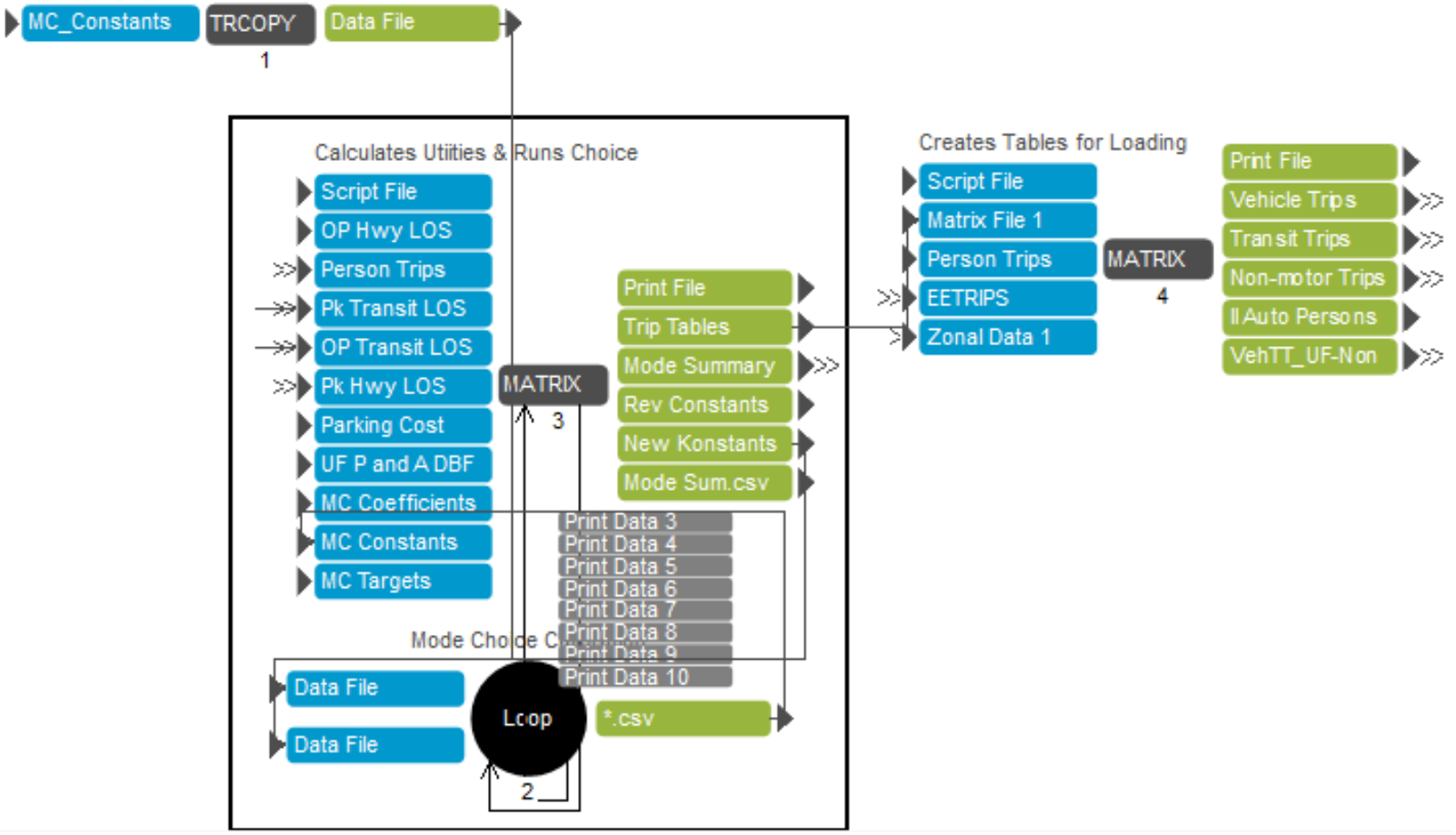
Mode Choice for TDMs with Transit

Transit Mode Choice Model Output Files

- Print File
- Vehicle Trips
- Transit Trips

Mode Choice Reporting

Alachua



Model Choice Reporting

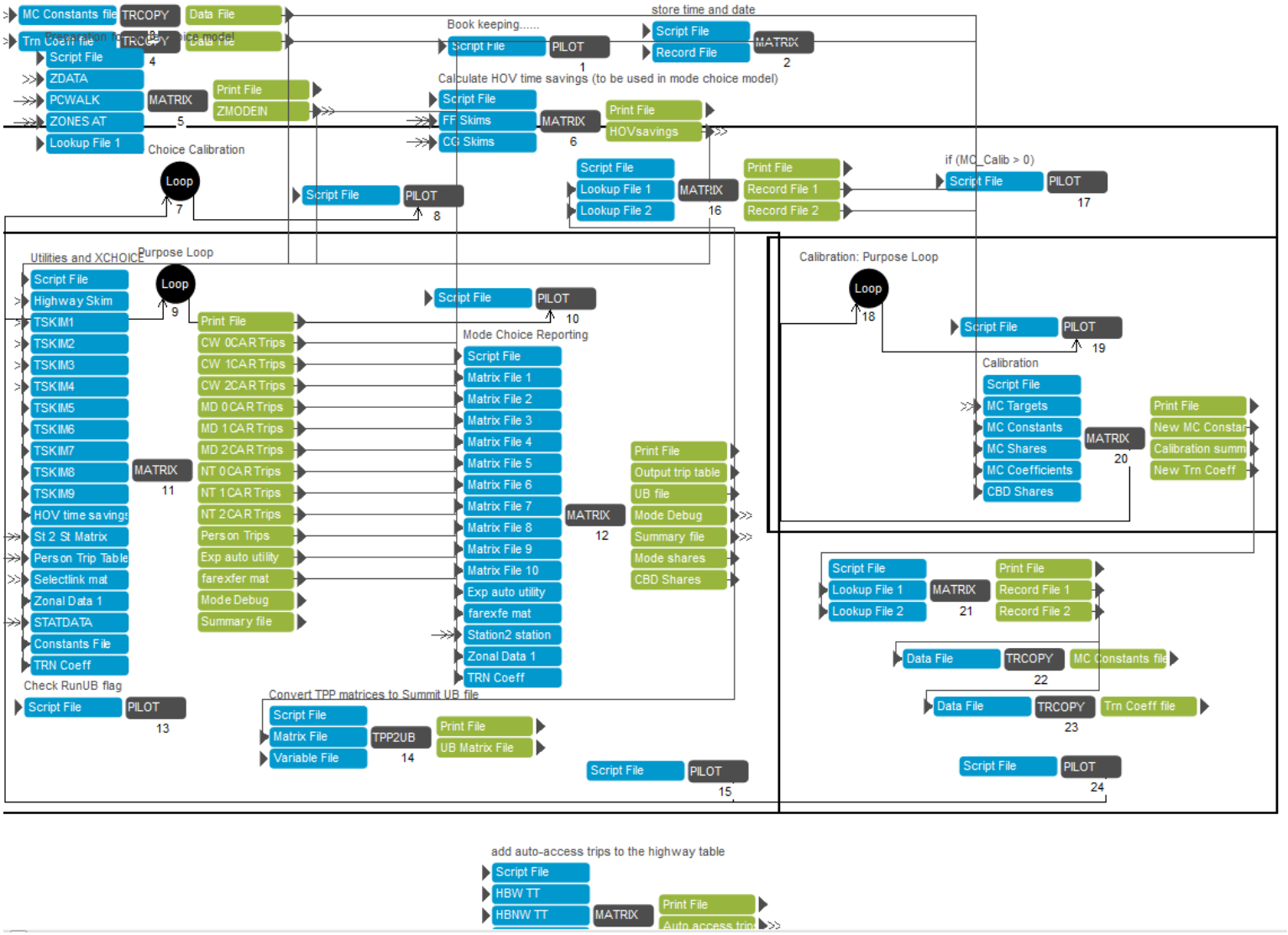
Alachua Model Mode Choice Summary

```
 +++++ MODE CHOICE SUMMARY +++++

Alachua Gainesville Model
Base 2007

HOME-BASED WORK MODE CHOICE RESULTS
HBW TOTAL                          = 183,268   1.000
DRIVE ALONE                        = 143,880   0.785
CARPOOL 2                          =  15,951   0.087
CARPOOL 3+                         =   8,019   0.044
WALK TO LOCAL TRANSIT              =   8,007   0.044
WALK TO PREMIUM TRANSIT            =       0       0
DRIVE TO BEST AVAILABLE TRANSIT=          36   0.000
NON-MOTORIZED WALK                 =   4,098   0.022
NON-MOTORIZED BICYCLE              =   3,278   0.018
   Average Auto Occupancy          =1.09

HOME-BASED OTHER MODE CHOICE RESULTS
HBO TOTAL                          = 505,442   1.000
DRIVE ALONE                        = 200,318   0.396
CARPOOL 2                          = 191,683   0.379
CARPOOL 3+                         =  90,914   0.180
WALK TO LOCAL TRANSIT              =   2,917   0.006
WALK TO PREMIUM TRANSIT            =       0       0
DRIVE TO BEST AVAILABLE TRANSIT=          26   0.000
NON-MOTORIZED WALK                 =  17,952   0.036
NON-MOTORIZED BICYCLE              =   1,631   0.003
   Average Auto Occupancy          =1.49
```

```
NON-HOME BASED MODE CHOICE RESULTS
NHB TOTAL                          = 329,199   1.000
DRIVE ALONE                        = 166,902   0.507
CARPOOL 2                          = 106,625   0.324
CARPOOL 3+                         =  45,341   0.138
WALK TO LOCAL TRANSIT              =   2,551   0.008
WALK TO PREMIUM TRANIST            =       0       0
DRIVE TO BEST AVAILABLE TRANSIT=          36   0.000
NON-MOTORIZED WALK                 =   5,105   0.016
NON-MOTORIZED BICYCLE              =   2,640   0.008
   Average Auto Occupancy          =1.36

HOME BASED UNIVERSITY MODE CHOICE RESULTS
HBU TOTAL                          =  75,940   1.000
DRIVE ALONE                        =  34,900   0.460
CARPOOL 2                          =   4,399   0.058
CARPOOL 3+                         =   2,261   0.030
WALK TO LOCAL TRANSIT              =   8,877   0.117
WALK TO PREMIUM TRANSIT            =       0       0
DRIVE TO BEST AVAILABLE TRANSIT=         301   0.004
NON-MOTORIZED WALK                 =  15,025   0.198
NON-MOTORIZED BICYCLE              =  10,179   0.134
   Average Auto Occupancy          =1.10

CAMPUS UNIVERSITY MODE CHOICE RESULTS
CAMPUS HOUSING TOTAL               =  23,570   1.000
WALK TO LOCAL TRANSIT              =   1,981   0.084
NON-MOTORIZED WALK                 =  15,615   0.662
NON-MOTORIZED BICYCLE              =   5,974   0.253
```

Mode Choice Reporting

NERPM42



Mode Choice Summary

NERPM42 Mode Choice Results--HBW

HBW - PK MODE XCHOICE RESULTS

****

MARKET SEGMENT	Total Person	Drive Alone	One Pax	Two+ Pax	Total Auto	Walk Bus	Walk Project	PNR Bus	PNR Project	KNR Bus	KNR Project	CBDKNR Bus	CBDKNR Project	Total Transit	Fringe PNR
Zero Car HHs	64348.3	0	44595.3	15395.9	59991.1	4162.6	0	0	0	181.1	0	13.4	0	4357.2	0
One Car HHs	311514.4	241110.8	47799.0	19433.8	308343.6	2505.7	0	32.7	0	119.6	0	8.6	0	2666.6	504.2
Two+ Car HHs	553753.4	431409.4	85353.8	34938.2	551701.4	1075.4	0	83.8	0	163.1	0	11.4	0	1333.7	718.3
TOTAL	929616.1	672520.2	177748.1	69767.9	920036.1	7743.8	0	116.4	0	463.9	0	33.4	0	8357.4	1222.5
Can Walk	202794.1	138538.2	42424.2	13451.1	194413.5	7743.8	0	31.1	0	120.2	0	20.3	0	7915.4	465.3
Must Drive	283742.4	210180.3	50490.2	21872.5	282543.1	0	0	85.3	0	343.7	0	13.0	0	442.1	757.2
No Access	443079.6	323801.7	84833.7	34444.2	443079.6	0	0	0	0	0	0	0	0	0	0
TOTAL	929616.1	672520.2	177748.1	69767.9	920036.1	7743.8	0	116.4	0	463.9	0	33.4	0	8357.4	1222.5
Productions:															
CBD	11108.1	6133.9	3285.0	1204.9	10623.8	482.3	0	0	0	0	0	0	0	482.3	2.0
Exurban	37749.5	27593.4	7232.2	2651.2	37476.8	205.1	0	4.6	0	13.1	0	2.7	0	225.5	47.2
Other	880758.5	638792.9	167230.8	65911.8	871935.5	7056.3	0	111.8	0	450.8	0	30.7	0	7649.7	1173.3
Attractions:															
CBD	82632.5	55799.1	15864.8	8431.3	80095.1	1096.0	0	92.3	0	127.6	0	0.0	0	1315.9	1221.5
Exurban	80633.4	59144.9	15168.0	5638.2	79951.2	637.7	0	2.6	0	41.9	0	2.3	0	682.2	0
Other	766347.8	557576.2	146715.2	55698.4	759989.8	6010.0	0	21.6	0	294.4	0	31.0	0	6357.0	1.0
Transfers:															
NONE						3331.3	0	78.5	0	162.6	0	5.0	0	1222.5	4799.9
ONE						3824.6	0	34.9	0	231.5	0	25.2	0	0	4116.2
TWO						587.8	0	3.0	0	69.8	0	3.2	0	0	663.8
THREE +						0	0	0	0	0	0	0	0	0	0

Average Auto Occupancy = 1.176

Mode Choice Summary

NERPM42 Mode Choice Results--HBNW

HBNW - OP MODE XCHOICE RESULTS

MARKET SEGMENT	Total Person	Drive Alone	One Pax	Two+ Pax	Total Auto	Walk Bus	Walk Project	PNR Bus	PNR Project	KNR Bus	KNR Project	CBDKNR Bus	CBDKNR Project	Total Transit	Fringe PNR
Zero Car HHs	154021.3	0	88061.6	62416.5	150478.1	3454.7	0	0	0	72.4	0	16.2	0	3543.2	0
One Car HHs	639700.5	238980.1	227102.5	172232.9	638315.5	1297.5	0	11.0	0	63.7	0	12.8	0	1385.0	0
Two+ Car HHs	1121190.2	423241.1	394662.5	302416.6	1120320.1	747.0	0	22.8	0	84.0	0	16.2	0	870.1	0
TOTAL	1914912.0	662221.2	709826.5	537066.0	1909113.7	5499.2	0	33.8	0	220.1	0	45.2	0	5798.3	0
Can Walk	377570.4	126405.1	149902.2	95679.9	371987.2	5499.2	0	4.7	0	49.2	0	30.0	0	5583.2	0
Must Drive	455658.0	158707.8	163479.4	133255.6	455442.8	0	0	29.1	0	170.9	0	15.2	0	215.1	0
No Access	1081683.6	377108.3	396444.8	308130.5	1081683.6	0	0	0	0	0	0	0	0	0	0
TOTAL	1914912.0	662221.2	709826.5	537066.0	1909113.7	5499.2	0	33.8	0	220.1	0	45.2	0	5798.3	0
Productions:															
CBD	26563.4	7508.0	10912.3	7895.2	26315.6	247.8	0	0	0	0	0	0	0	247.8	0
Exurban	76564.4	27381.4	28478.8	20570.7	76430.9	123.8	0	1.3	0	5.8	0	2.7	0	133.5	0
Other	1811784.2	627331.8	670435.3	508600.1	1806367.2	5127.7	0	32.5	0	214.3	0	42.5	0	5417.0	0
Attractions:															
CBD	76294.8	25400.9	27741.0	22097.7	75239.6	961.2	0	17.4	0	76.5	0	0.1	0	1055.2	0
Exurban	167386.9	58227.0	61972.4	46747.2	166946.6	422.2	0	1.7	0	16.4	0	2.8	0	440.2	0
Other	1671227.6	578593.3	620113.1	468221.1	1666927.5	4115.9	0	14.7	0	127.2	0	42.3	0	4300.1	0
Transfers:															
NONE						2284.8	0	21.0	0	71.8	0	3.5	0	0	2381.1
ONE						2710.6	0	11.6	0	104.7	0	36.3	0	0	2863.2
TWO						503.8	0	1.3	0	43.6	0	5.3	0	0	554.0
THREE +						0	0	0	0	0	0	0	0	0	0

Average Auto Occupancy = 1.630

Mode Choice Summary

NERPM42 Mode Choice Results--NHB

NHB - OP MODE XCHOICE RESULTS

MARKET SEGMENT	Total Person	Drive Alone	One Pax	Two+ Pax	Total Auto	Walk Bus	Walk Project	PNR Bus	PNR Project	KNR Bus	KNR Project	CBDKNR Bus	CBDKNR Project	Total Transit	Fringe PNR
Zero Car HHs	971961.3	463363.3	292006.9	213518.0	968888.2	2188.8	0	29.5	0	763.2	0	10.6	0	2992.1	81.0
One Car HHs	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Two+ Car HHs	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	971961.3	463363.3	292006.9	213518.0	968888.2	2188.8	0	29.5	0	763.2	0	10.6	0	2992.1	81.0
Can Walk	278500.0	139090.7	86612.4	50218.3	275921.4	2188.8	0	9.2	0	333.1	0	8.0	0	2539.0	39.6
Must Drive	175561.7	79633.0	51219.4	44214.8	175067.2	0	0	20.4	0	430.0	0	2.7	0	453.1	41.4
No Access	517899.6	244639.5	154175.2	119084.9	517899.6	0	0	0	0	0	0	0	0	0	0
TOTAL	971961.3	463363.3	292006.9	213518.0	968888.2	2188.8	0	29.5	0	763.2	0	10.6	0	2992.1	81.0
Productions:															
CBD	57063.5	27731.7	17248.9	11906.1	56886.7	176.7	0	0	0	0	0	0	0	176.7	0.1
Exurban	97908.9	47028.5	29648.0	20907.2	97583.7	260.6	0	2.9	0	51.7	0	0.8	0	315.8	9.3
Other	816989.0	388603.1	245110.0	180704.8	814417.8	1751.5	0	26.7	0	711.5	0	9.9	0	2499.6	71.6
Attractions:															
CBD	55934.7	24022.1	14960.2	16579.3	55561.6	203.4	0	12.8	0	75.9	0	0.0	0	292.1	80.9
Exurban	96139.5	46492.2	29314.5	20000.7	95807.4	234.0	0	1.9	0	96.2	0	0.6	0	332.1	0
Other	819886.5	392849.0	247732.2	176938.0	817519.2	1751.5	0	14.7	0	591.0	0	10.1	0	2367.3	0.1
Transfers:															
NONE						1324.4	0	23.0	0	363.2	0	2.9	0	81.0	1794.6
ONE						771.1	0	6.0	0	331.3	0	7.0	0	0	1115.4
TWO						93.2	0	0.5	0	68.6	0	0.8	0	0	163.1
THREE +						0	0	0	0	0	0	0	0	0	0

Average Auto Occupancy = 1.449

Assignment

Trip assignment designates trips based on mode, origin and destination to the different paths on the transportation network.

FSUTMS uses equilibrium highway assignment which means that no trip can be made by an alternate path without increasing the total travel time in the network.

Equilibrium accounts for congestion in traffic assignment. The process is iterative and requires adjustments.

Assignment Input and Output Files

Highway Assignment Input Files

- Highway unloaded network
- Vehicle trip tables
- Turn penalties/prohibitors
- Toll links
- BPR curves, CONFAC, UROAD (VFACTORS)

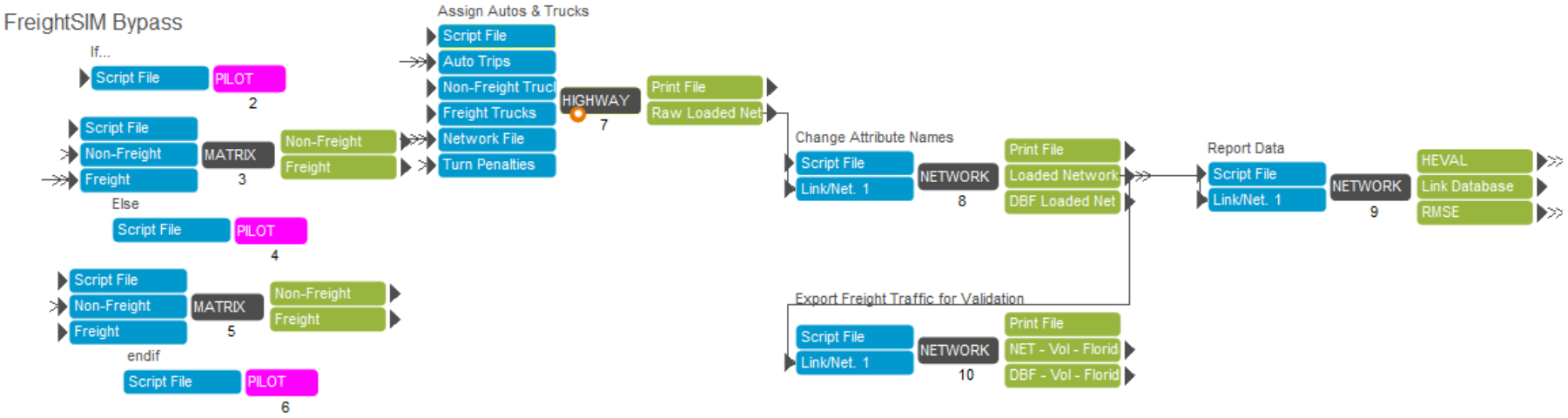
Highway Assignment Output Files

- Highway loaded network
- Turn volumes
- Highway Assignment Print File

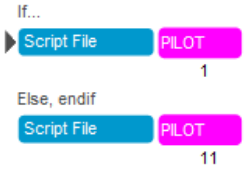
Highway Assignment Model

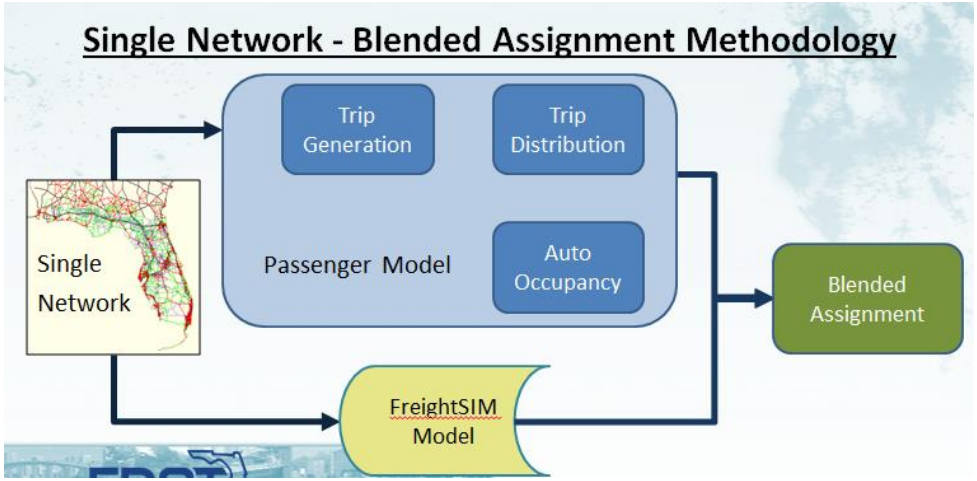
FLSWM

Statewide Passenger & Freight Joint Highway Assignment



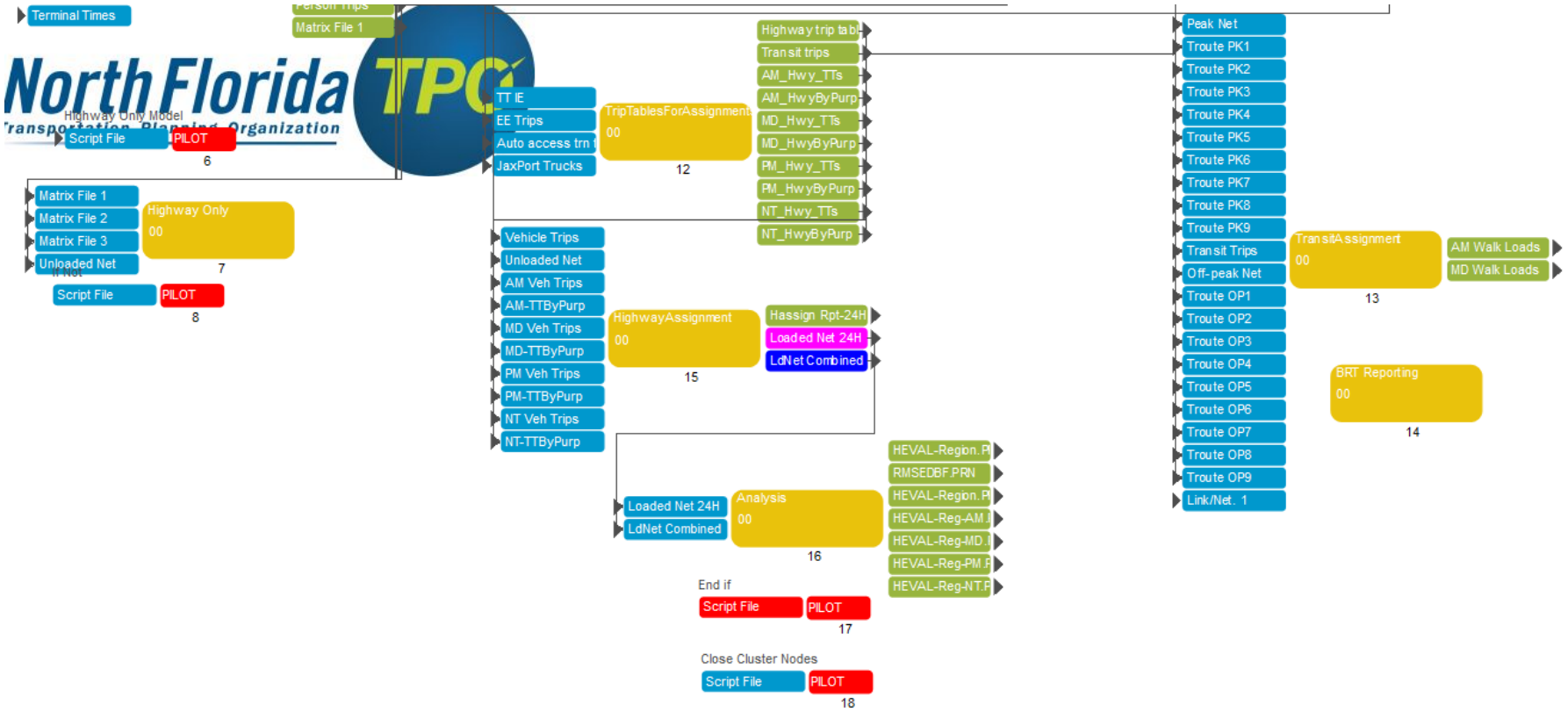
Conditional Switch to Run Assignment





Highway Assignment Model

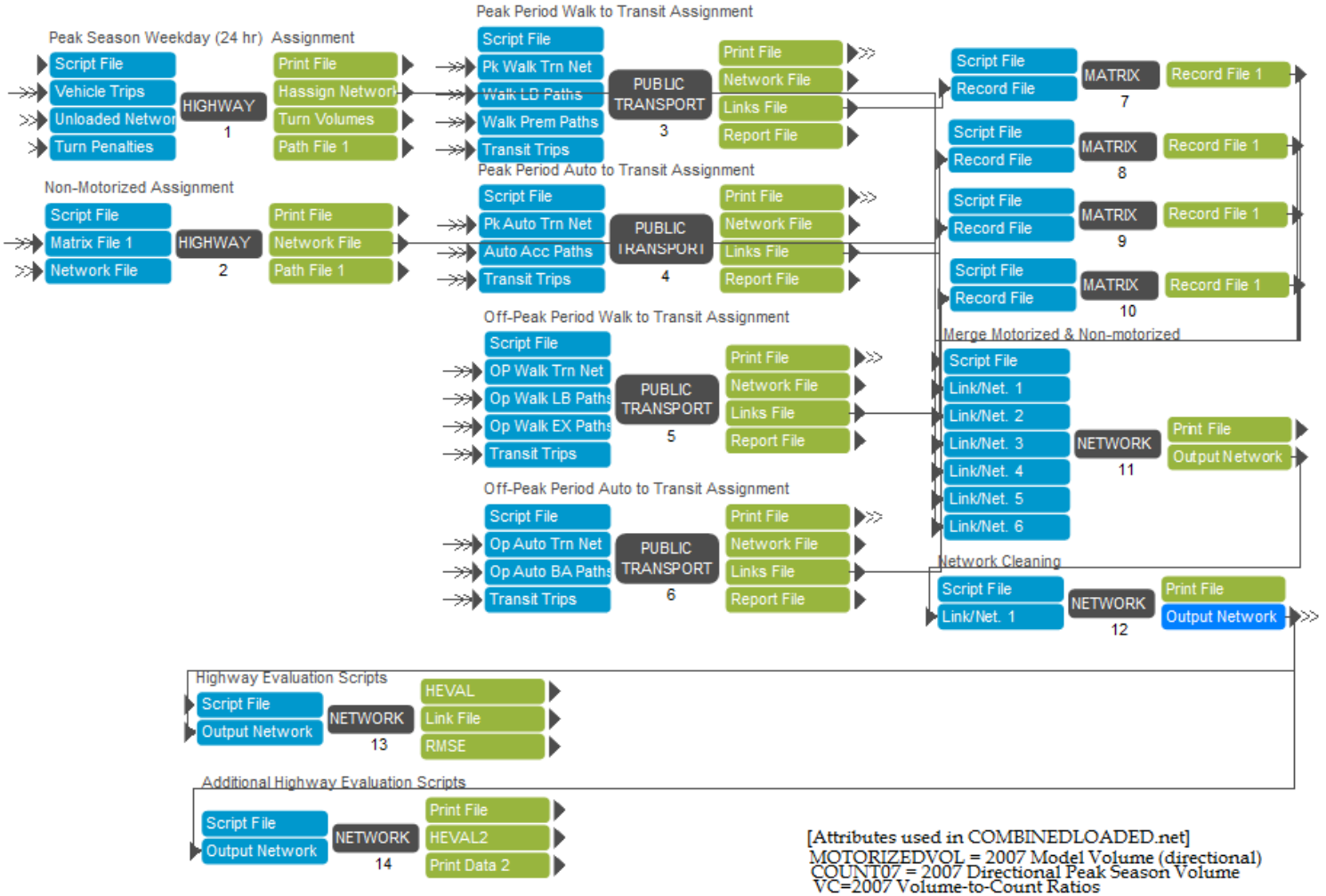
NERPM42



Highway Assignment Model

Alachua

HIGHWAY AND TRANSIT ASSIGNMENT



[Attributes used in COMBINEDLOADED.net]
MOTORIZEDVOL = 2007 Model Volume (directional)
COUNT07 = 2007 Directional Peak Season Volume
VC=2007 Volume-to-Count Ratios

Assignment Reporting

- Highway assignment uses HEVAL procedure to generate network summaries, vehicle-miles traveled (VMT), vehicle-hours traveled (VHT), comparison to counts.

- Root Mean Square Error (RMSE) is measure of dispersion, tends to describe model error better than areawide volume-over-count ratios which allow for high ratios to offset low ratios.

FLSWM HEVAL Example

Variable	Observations	Total	Average	Minimum	Maximum	RMS
TIME	229,190	384,884.22		0.01	1,559.41	8.93
TIME2	229,190	384,884.22		0.01	1,559.41	8.93
TOLL_ACC	321	321	1	1	1	1
TOLL_DEC	322	322	1	1	1	1
LANE	229,184	468,994	2.05	1	8	2.2
FTYPE	229,161	7,163,684	31.26	11	99	36.79
ATYPE	229,184	8,262,801	36.05	10	99	37.37
ECDIST	134,114	855,288	6.38	1	11	7.1
FFTIME	229,190	384,874.05		0	1,559.41	8.93
SHORT_URB_RUR	142,507	992,661,839.2	6,965.71	0	115,549.05	12,349.49
EI	126,957	19,690,091.25		0	26,221.56	742.89
EXCOUNT	79	244,548	3,095.54	175	28,253	6,264.58
LTE_TRUCKS	141,966	40,481,792.01		0	5,257.32	531.47
MED_TRUCKS	128,884	4,078,621.85		0.04	855.07	75.53
HVY_TRUCKS	162,612	56,115,151.45		0.04	14,614.33	926.08
AUTO_SHORT	142,507	992,661,839.2	6,965.71	0	115,549.05	12,349.49
AUTO_LONG	126,957	19,690,091.25		0	26,221.56	742.89
AUTO_VOL	142,850	1,012,351,930.28		0	116,102.64	12,549.02
TRUCK_VOL	190,500	100,675,565.37		0	15,077.33	1,102.56
TOTAL_VEH	191,188	1,113,027,495.68		0	124,040.18	11,557.84
FR_TOT	163,598	60,193,773.36		0.04	15,077.33	972.86
TRUCK_PCE	190,500	158,830,027.66		0	29,923.17	1,936.66
CGSPEED	229,190	10,955,737.34		0.03	2,493.9	52.03
CGTIME	229,190	391,247.73		0.01	1,559.41	8.94
VMT	191,188	530,352,114.9	2,773.98	0	684,061.94	9,895.9
VHT	191,188	13,130,985.83		0	27,248.58	275.84
VOLCNT	14,727	15,871.15		0	13.84	1.25
COR_COUNT	14,728	208,357,573	14,147.04	175	127,000	19,744.06
VTOCOR_CNT	14,728	15,871.17		0	13.84	1.25
DAILYCAPE	229,184	1,031,622,547,589	4,501,285.2	4,100	39,999,960	9,452,816.07
DAILYCAPC	229,184	959,016,825,391.75		3,075	29,999,970	8,863,451.13
VOL_CAPC	191,183	48,134.63		0	5.52	0.42
VOL_CAPE	191,183	36,101.78		0	4.14	0.32
TRUCK_F	190,500	56,532.41		0	1	0.51
SHORT_F	142,507	131,142.21		0	1	0.93
EI_F	126,957	3,513.38		0	1	0.1

Calibration and Validation Standards

Table 2.9 Volume-Over-Count Ratios and Percent Error

Statistic	Standards	
	Acceptable	Preferable
Freeway Volume-over-Count (FT1x, FT8x, FT9x)	+/- 7%	+/- 6%
Divided Arterial Volume-over-Count (FT2x)	+/- 15%	+/- 10%
Undivided Arterial Volume-over-Count (FT3x)	+/- 15%	+/- 10%
Collector Volume-over-Count (FT4x)	+/- 25%	+/- 20%
One way/Frontage Road Volume-over-Count (FT6x)	+/- 25%	+/- 20%
Freeway Peak Volume-over-Count	75% of links @ +/-20%; 50% of links @ +/-10%	
Major Arterial Peak Volume-over-Count	75% of links @ +/-30%; 50% of links @ +/-15%	
Assigned VMT-over-Count Areawide	+/-5%	+/-2%
Assigned VHT-over-Count Areawide	+/-5%	+/-2%
Assigned VMT-over-Count by FT/AT/NL	+/- 25%	+/- 15%
Assigned VHT-over-Count by FT/AT/NL	+/- 25%	+/- 15%

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Volume-Over-Count

FLSWM	Facility Type	Vol/Cnt
FT=11	Urban Freeway Class III	6%
FT=12	Other Freeway	-17%
FT=15	Collector Distributor Lanes/Facilities	-210%
FT=16	Controlled Access Freeways	10%
FT=21	Divided Arterial Urban LOS Unsignalized or Rural LOS	-5%
FT=22	Divided Arterial Urban LOS Unsignalized or Rural LOS	-49%
FT=23	Divided Arterial Urban LOS Class I or Rural Class I	-3%
FT=24	Divided Arterial Urban LOS Class II or Rural Class II	-2%
FT=25	Divided Arterial Urban LOS Class III or Rural Class IV	-25%
FT=30	Undivided Arterial	2%
FT=31	Undivided Arterial Bays Urban LOS Unsignalized or Bays Rural Uninterrupted	0%
FT=32	Undivided Arterial Bays Urban LOS Class I or Bays Rural Uninterrupted	-25%
FT=33	Undivided Arterial Bays Urban LOS Class II or Bays Rural LOS Class I	19%
FT=34	Undivided Arterial Bays Urban LOS Class III or IV or Bays Rural LOS Class III	15%
FT=35	Undivided Arterial No Bays Urban LOS Unsignalized or No Bays Rural	32%
FT=36	Undivided Arterial No Bays Urban LOS Class I or Bays Rural LOS	20%
FT=41	Collector Major Local Divided	14%
FT=42	Collector Major Local Undivided, Bays	37%

FLSWM	Facility Type	Vol/Cnt
FT=43	Collector Major Local Undivided, No Bays	21%
FT=44	Collector Other Local Divided	27%
FT=45	Collector Other Local Undivided, Bays	17%
FT=46	Collector Other Local Undivided, No Bays	12%
FT=47	Collector Low Speed Local/Rural	-164%
FT=60	One Way Facilities	-11%
FT=61	One Way Facilities Urban Unsignalized or Rural LOS	-507%
FT=62	One Way Facilities Urban LOS Class I or No Bays Rural LOS Class I	-74%
FT=63	One Way Facilities Urban LOS Class II or No Bays Rural LOS Class II	-114%
FT=64	One Way Facilities Urban LOS Class III or No Bays Rural LOS Class IV	-39%
FT=67	Frontage Road Urban LOS Class II/Rural Class II	28%
FT-81	Freeway Class III HOV Lanes Barrier Separated	-5%
FT=91	Urban Freeway Class III Toll Facility	-5%
FT=92	Other Freeway Toll Facility	14%
FT=93	Expressway/Parkway Toll Facility	-39%
FT=94	Divided Arterial Toll Facility	-23%
FT=95	Undivided Arterial Toll Facility	17%
FT=99	Toll Plaza	-14%

Alachua	Facility Type	% Error
FT= 1	Freeway	6%
FT= 2	Divided Arterial	-8%
FT= 3	Undivided Arterial	1%
FT= 4	Collector	11%
FT= 6	One Way Facilities	7%

Acceptable Standards
Freeway Volume-over-Count ±7%
Divided Arterial Volume-over-Count ±15%
Undivided Arterial Volume-over-Count ±15%
Collector Volume-over-Count ±25%
One way/Frontage Road Volume-over-Count ±25%

Calibration and Validation Standards

Table 2.11 Root Mean Square Error (RMSE)

Statistic	Standards	
	Acceptable	Preferable
RMSE: LT 5,000 VPD	100%	45%
RMSE: 5,000-9,999 VPD	45%	35%
RMSE: 10,000-14,999 VPD	35%	27%
RMSE: 15,000-19,999 VPD	30%	25%
RMSE: 20,000-29,999 VPD	27%	15%
RMSE: 30,000-49,999 VPD	25%	15%
RMSE: 50,000-59,999 VPD	20%	10%
RMSE: 60,000+ VPD	19%	10%
RMSE Areawide	45%	35%

FSUTMS-Cube Framework Phase II: Model Validation and Calibration Standards
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RMSE Example

Alachua Model RMSE

********** ALL COUNT ROOT MEAN SQUARE ERROR SUMMARY (exclude HOV)

Group	Volume Range	% RMSE	Target %	Obs
1	1- 5,000	46.0%	45 - 55	325
2	5,000- 10,000	30.7%	35 - 45	189
3	10,000- 20,000	25.4%	27 - 35	136
4	20,000- 30,000	21.4%	24 - 27	24
5	30,000- 40,000	8.3%	22 - 24	12
6	40,000- 50,000	18.6%	20 - 22	4
13	1-500,000	31.7%	32 - 39	690

High RMSE could mean issues with regional distribution of trips, erroneous traffic counts coded on screenline, cutline, or cordon line, or gaps in continuity of screenline, cutline, or cordon line.

Questions

Contact Information

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