REGIONAL TRANSPORTATION TECHNICAL ADVISORY COMMITTEE
MODELING SUBCOMMITTEE MEETING AGENDA
Tuesday, October 14, 2008 – 1:30 to 4:30 PM
FDOT District 4 Offices, Fort Lauderdale
D4-DO3, Executive Conference Room

I. Call to Order and Introductions (Wilson Fernandez)

II. Approval of August 4th Meeting Minutes (Wilson Fernandez)

III. Subsequent Socioeconomic Assumptions/Revisions (Srin Varanasi)

III.1.1. Trip Production and Attraction Data

III.1.2. Special Generators

III.1.3. External Trips

IV. Existing-plus-Committed Network Coding (Srin Varanasi)

IV.1.1. Coding Assumptions

IV.1.2. Highway Network

IV.1.3. Transit Network

V. Review and Discussion on SERPM 2035 Model Results (Rob Schiffer)

VI. ITS Toolbox (Mohammed Hadi)

VII. Performance Evaluation (Rob Schiffer/Jessica Josselyn)

VII.1.1. Draft evaluation criteria

VII.1.2. Display of volume-over-capacity

VIII. Upcoming Schedule Milestones (Wilson Fernandez/Shi-Chiang Li)

VIII.1.1. Address comments and revisions

VIII.1.2. Return model files to MPO Consultants

IX. Next Steps

X. Other Discussion Items

XI. Adjournment

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
110 E Broward Boulevard, Suite 2410, Fort Lauderdale, FL 33301 P 954.828.1730 F 954.828.1787

MEETING NOTES

RTTAC Modeling Subcommittee
August 4, 2008

Date: August 14, 2008 Project #: 9338.0

To: Wilson Fernandez, RTTAC Modeling Subcommittee Chair

From: Jessica Josselyn, Kittelson & Associates, Inc.
John Zegeer, PE, Kittelson & Associates, Inc.
Rob Schiffer, Cambridge Systematics

The following is a summary of the RTTAC Modeling Subcommittee meeting held on August 4, 2008. Meeting handouts may be found in Attachment A.

MEETING TIME AND LOCATION

Florida Department of Transportation, District IV
First Floor Administration Conference Room
Fort Lauderdale, Florida

MEETING ATTENDEES

1. Ashutosh Kumar, AECOM Consult, Ashutosh.kumar@aecom.com
2. David Schmitt, AECOM Consult, david.schmitt@aecom.com
3. Sung-Ryong Han, BCC Engineering, shan@bcceng.com
4. Ed Sirianni, Broward County MPO, esirianni@broward.org
5. Lina Kulikowski, Broward County MPO, lkulikowski@broward.org
6. Ossama Al Aschkar, Broward County MPO, oalaschkar@broward.org
7. Rob Schiffer, Cambridge Systematics, Inc., rschiffer@camsys.com
8. Dan Glickman, Citizen, danglick@hotmail.com
9. Yongqiang Wu, FDOT Central Office, Yongqiang.wu@dot.state.fl.us
10. Min-Tang Li, FDOT D4, min-tang.li@dot.state.fl.us
11. Shi-Chang Li, FDOT D4, shi-chiang.li@dot.state.fl.us
12. Phil Steinmiller, FDOT D6, phil.steinmiller@dot.state.fl.us
13. Franco Saraceno, Gannett Fleming, fsarasceno@gfnet.com
14. Myung Sung, Gannett Fleming, mhsung@gfnet.com
15. Kapil Arya, Gannett Fleming, karya@gfnet.com
16. Jessica Josselyn, Kittelson & Associates, Inc., jjosselyn@kittelson.com
17. John Zegeer, Kittelson & Associates, Inc., jzegeer@kittelson.com
18. Scot Leftwich, Leftwich, scot.leftwich@lce-fl.com
19. Arturo Perez, Leftwich, ajp@lce-fl.com
20. Carlos Roa, Miami-Dade MPO, RCF@miamidade.gov
21. Larry Foutz, Miami-Dade MPO, lfoutz@miamidade.gov
22. Wilson Fernandez, Miami-Dade MPO, Wilson@miamidade.gov

23. Nellie Fernandez, Palm Beach MPO, nfernand@pbcgov.com
24. Paul Larsen, Palm Beach MPO, plarsen@pbcgov.com
25. Vinod Sandanasamy, Palm Beach MPO, vsandana@pbcgov.com
26. Srin Varanasi, The Corradino Group, svaranasi@corradino.com
27. Sandeep Obulareddy, The Corradino Group, sobulareddy@corradino.com
28. Sunil Saha, The Corradino Group, ssaha@corradino.com

MEETING NOTES

Below is a summary of the key points discussed at the meeting. The comments have been organized by agenda topic.

I. Call to Order and Introductions

Wilson Fernandez introduced the first RTTAC modeling Subcommittee meeting.

II. Socio-Economic Data

Rob Schiffer presented a summary and comparison of socio-economic data received from the three counties. Palm Beach County is concerned with the school file data because the school board does not forecast school locations beyond the year 2015. Thus, the MPO had previously assumed the location of future schools (at 1500 students per school) based on population growth and the availability of vacant land. There could be a 60,000 school student shortfall in the 2035 model if a methodology is not selected for locating new schools. Unless the MPO is aware of plans for the construction of a private school, they do not assume the construction of additional schools. Paul Larsen plans to carry over the school location data that was used for the 2030 plan for the 2035 plan. The assumption used in Broward County considered the school children population by zone in identifying new school locations. **Paul Larsen will make some revisions to the Palm Beach County socioeconomic data (including schools) and submit these revisions to Rob Schiffer this week.**

It is anticipated that a large area around Belle Glade, South Bay, and Pahokee will be purchased by the state from US Sugar. This could result in the loss of 10,000 jobs in the western part of Palm Beach County, resulting in the need for a double set of socio-economic data for projecting growth. Shi-Chiang Li suggested that this second set of data be used for comparison purposes when alternative transportation improvements are being evaluated. Wilson Fernandez suggested that one baseline data set be established for regional coordination and that alternative data sets be used by the individual counties for their own analysis of alternative improvements. Ossama Al-Aschkar said that data that he has submitted for Broward County reflects the existing approved land use plan. Miami-Dade County was told by FHWA to use what the MPO knows today.

Miami-Dade County auto ownership rate data will be reviewed next week. Revisions will be made and submitted within two weeks.

III. 2035 External Trips

Min-Tang and Srin (Corradino Group) prepared 2035 external trip forecasts (E-I, I-E, and E-E trips) based on extrapolating count trends at external stations. These trips were developed using existing growth factors. Two corrections were made: First, the existing model has an error at the SR A1A station in Palm Beach County. The external trip forecasts at this location were revised. Second, at SR 710 (Beeline Highway), a PD&E study projected a 2030 volume that is different from the historic counts. The PD&E projection was used. Rob Schiffer described an independent assessment by Cambridge Systematics staff and found generally similar results overall.

Ossama Al-Aschkar is concerned about the external loading on I-75 west into Collier County. The growth rate appears to be high. In addition, the U.S. 1 increase from 23,000 to over 40,000 south of Miami-Dade County into Monroe County appears to be high and the percentage of E-E trips appears to be high as well. **The Corradino Group will recheck and adjust both of these projections.** Rob Schiffer looked at these two stations and found the suggested 2035 forecast was somewhat higher than the latest traffic count extrapolations from the FDOT CD as calculated by Cambridge Systematics staff. Shi-Chiang Li asked if there was a solution (an alternative methodology) for resolving these two discrepancies. Phil Steinmiller suggested a methodology based on revised count trend analyses (e.g., different number of years, different current year, different count station, etc.) to resolve the US 1 issue into Monroe County. Ossama Al-Aschkar suggested that one paragraph be prepared for each external count station to document the methodology that was used to project future external station traffic. **Srin, Min-Tang, and Rob Schiffer will take another look at the growth trends for each external station and report back to this group by August 11th.**

IV. E+C Project Review and Network Coding Specifications

Jessica thanked the three counties for submitting E+C project data. For Palm Beach County, there are no new transit projects proposed other than the east-west corridor project planned for the year 2013. (The years 2008 – 2013 represent committed projects for the E+C network.) Transit routes are being cut due to budget limitations.

In Broward County, the US 1 bypass inside Port Everglades is not in the TIP. It is not funded. Thus, this project will not be included in the E+C network. **More detail is needed for the I-595 committed projects. FDOT District 4 will provide this additional project description information.** These projects will include reversible lanes and ramp braiding. **Ossama Al-Aschkar will provide Broward County bus route information to KAI by the end of the week.**

In Miami-Dade County, there are some roadway grade-separations and transit BRT projects. For the grade-separations, Carlos Roa will provide a sheet that describes the geometric improvements as a back-up to the E+C network. The SR 826/SR 836 interchange configuration needs to be described for the E+C network.

For BRT routes that operate in mixed-flow conditions with traffic signal priority, the one-mile station spacing on the State Road 7 Breeze service has provided a reduction in travel time by about 25% as compared with local bus service. BRT service could be coded as "local bus" with improved headways or coded as a BRT mode with limited-stop service (with improved travel times). Transit service levels on the E+C network must be based on input from the transit agencies as to the cuts in service that are anticipated.

In late August, FDOT District 4 will begin coding the E+C network. **All E+C projects need to be specified by the counties and submitted to District 4 by August 18th**. Larry Foutz cannot guess what other Miami-Dade transit services will be eliminated beyond the service cuts that already have been implemented. By 2013, some of the existing transit service cuts may be restored. Paul Larsen suggested that if a transit agency has reduced service by resolution as of today, then that service should not be reflected in the E+C network. Phil Steinmiller agreed that existing agency cuts should be reflected in the E+C network. He anticipates that the decrease in transit ridership may not be as great as the reduction in service because the least-efficient routes are being reduced or eliminated. The group unanimously agreed that the transit service as it is currently will be used for the E+C network and should any changes occur the E+C network will be amended in 2009 when the updated TIP is adopted.

The 2005 (baseline conditions) model is completed. **The Corradino Group will provide E+C transit project coding (in the form of a set of tables) information to the three counties to confirm its accuracy**.

Shi-Chiang Li raised an issue regarding how to code a posted speed based on the number of lanes and the facility type for a roadway. The signal locations are also important in determining the proper speed to be coded. When a link volume is underreported in model output, this needs to be documented. When links have underreported volumes, the volumes might need to be adjusted "subjectively." All of the posted speeds for the E+C network need to be reviewed by the three counties. **It was agreed that by August 18th, The Corradino Group/D4/KAI will receive posted speed assumptions from each of the three counties for the E+C network**.

V. TOD model for Managed Lanes

Sunil presented a description of the HOT lanes concept. As demand increases, the toll rate increases. SERPM65 is a time-of-day (TOD) model that implements the HOT lanes. Vehicle occupancy (two persons per auto or 3+ persons per auto) is treated as a separate mode. The model uses separate facilities for the HOT lanes – distinguished from General Purpose lanes in the same corridor. It was suggested that the Corradino Group consider data from the State Route 91 Managed Lanes project in Orange County, California to validate the relationship between v/c ratios and speeds. Corradino did not review the Wilbur Smith I-95 revenue studies. The Wilbur Smith toll rates should be used for the SERPM model. The I-95 HOT lanes are not funded

north of the Golden Glades interchange. Thus the HOT lanes will not be considered as an E+C project north of the Golden Glades interchange.

Miami-Dade County sees a need for the LRTP process to use the TOD model rather than a 24-hoiur model so that any managed lanes project can be properly analyzed. Both the 24-hour model and the time-of-day model have been validated in SERPM. Ossama Al-Aschkar is concerned that the TOD model is based on percentages of 24-hour trip tables and does not accurately represent peak period volumes. Thus, the TOD model does not provide a higher level of accuracy than the 24-hour model. A 24-hour model run takes 12 hours. A TOD model run takes 16 hours. This TOD run-time can be reduced if the number of "feedback loops" is reduced. Miami-Dade County MPO staffs believe that a TOD model is necessary to evaluate HOT lane use since a comparison of the speed in the HOT lanes vs. the General Purpose lanes for different times of the day is needed. Phil Steinmiller says that we have committed to a regional model. It is his understanding that this group has already made a decision to go with a TOD model. Palm Beach County is not certain that the TOD model has been fully validated but will agree to go with a TOD model if that is the desire of this group. Broward County agreed to go with the group decision, albeit with previously stated concern. **Therefore, all subcommittee voting members unanimously agreed that the TOD model would be used.**

VI. Use of Auto ownership Model

Due to time constraints, the auto ownership discussion was postponed until the next face-to-face RTTAC Modeling Subcommittee Meeting.

VII. Capacity and V/C Reporting Issue

The SERPM 6.5 model uses the FDOT Generalized Tables (in the Quality/Level of Service Handbook) to determine volume-to-capacity ratios. The interrupted and uninterrupted facility types are considered. The capacities in the existing model are based on Level of Service E (not LOS D) threshold service volumes. In the model, the capacities have been reduced to reflect the peak hour factors. Eventually, this group will need to take action to decide whether or not the Level of Service D capacity (service volume) values will be used in determining the adequacy of roadways in the future conditions analysis. **The SERPM65 Model Validation documentation and Users Guide will be provided to the group by The Corradino Group by the end of August.** Rob Schiffer will respond with his thoughts on LOS reporting for consideration. This issue will be discussed in detail at the next meeting.

VIII. Key LRTP modeling Milestone Dates and Coordination

Travel Demand Model Milestone #1 (submittal of SE data and E+C project lists) has been completed. Milestone #2 (Regional SE data and coding the E+C network) will be completed by each of the three counties and turned over to FDOT District 4 in one month. (This is consistent with the schedule that was distributed to the meeting attendees.) There is a milestone date for travel demand modeling activities every

month for the next 14 months. LRTP Plan adoption is scheduled for October 2009 in Palm Beach and Miami-Dade Counties and in November 2009 for Broward County. The schedule that is shown for the Goals and Objectives activities will be updated. The Needs Plan activity start date will need to be moved back to October 2008 in the schedule.

IX. Subcommittee Meeting Coordination / Vice Chair

It was suggested that either a face-to-face meeting or a teleconference should be held at each major milestone during the travel demand modeling activities. **It was agreed that a teleconference would be held on Tuesday, September 9, 2008 (if needed). In addition, the group agreed to a face-to-face meeting on Tuesday, October 14, 2008 in the FDOT District 4 offices at 1:30 pm.**

Prior to adjournment, it was voted on that Ossama Al Aschkar from Broward County MPO will Vice-Chair the RTTAC Modeling Subcommittee Meeting.

ATTACHMENT A

Southeast Florida Regional LRTP
Regional Socioeconomic Data Profile

presented to
SERPM Model Application Coordination Meeting

presented by
Robert G. Schiffer, AICP
Cambridge Systematics, Inc.

August 4, 2008

Transportation leadership you can trust.

CAMBRIDGE SYSTEMATICS

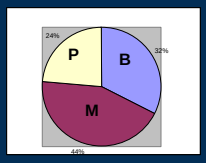
Regional Socioeconomic Profile
Presentation Overview

- Purpose & Process
- Broward County
- Miami-Dade County
- Palm Beach County
- Regional Comparisons
- Preliminary Enplanement Forecasts
- Open Discussion

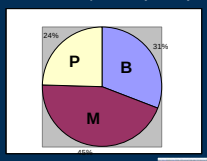
1

Regional Socioeconomic Profile
Purpose and Process

- Purpose – to ensure regional coordination
- Obtain SE forecasts from each MPO
- Generate Regional and MPO statistical comparisons
  - Dialogue on comparisons among counties
  - Holistic sum of the parts
- Identify missing pieces?



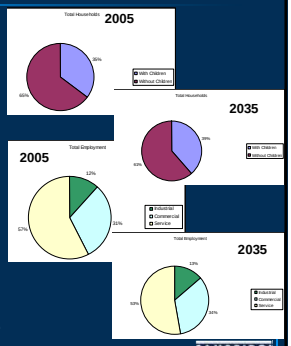
2005 & 2035 Population by County



2

Regional Socioeconomic Profile
Broward County

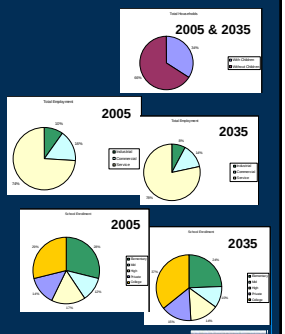
- Highest growth in HH size & employment/population ratio
- 2030 higher than 2035:
  - Avg HH size
  - Hotel-motel units
  - Population
  - Households
- 2035 School Enrollment not yet available
- 2005/2035 LT Woods & Poole



3

Regional Socioeconomic Profile
Miami-Dade County

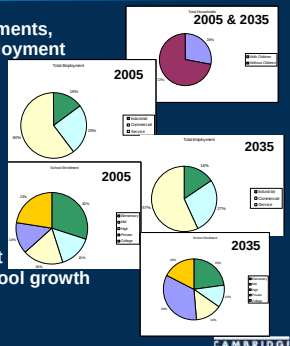
- Highest growth in autos, hotel-motel units, HHs
- 2030 higher than 2035:
  - Avg HH size
  - Hotel-motel units *(same for both years)*
- 2035 population GT BEBR
- 2035 employment GT Woods & Poole



4

Regional Socioeconomic Profile
Palm Beach County

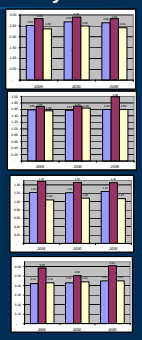
- Highest growth in enplanements, workers/HH, pop, and employment
- 2030 higher than 2035:
  - Avg HH size
  - Avg auto ownership
  - Hotel-motel units
  - Workers/HH
- 2035 school enrollment not complete; high private school growth
- 2035 LT Woods & Poole



5

Regional Socioeconomic Profile
Regional Comparisons: County-by-County Ratios

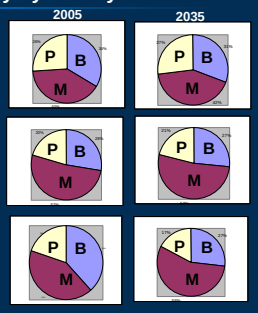
- 2005 vs. 2035 avg. HH size:
  - *BC – up; MD stable; PB – up*
- 2005 vs. 2035 auto ownership:
  - *Up in all three counties*
- 2005 vs. 2035 workers/HH:
  - *BC – up; MD – down; PB – up*
- 2005 vs. 2035 employment/pop:
  - *Up in all three counties*



6

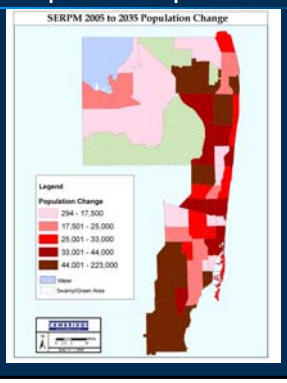
Regional Socioeconomic Profile
Regional Comparisons: County-by-County Shares

- Regional share of HHs decreases for Broward Co.
- Regional share of employment increases for PB Co.
- Regional share of hotel-motel units increases for M-D Co.



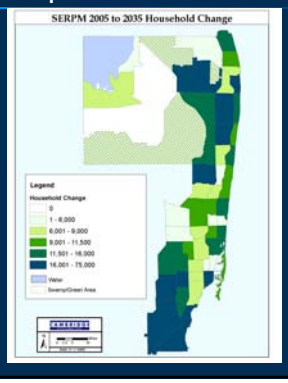
7

Regional Socioeconomic Profile
Regional Comparisons: Population Growth by District



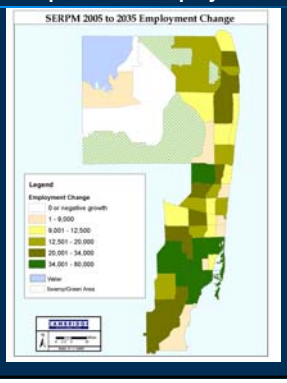
8

Regional Socioeconomic Profile
Regional Comparisons: Household Growth by District



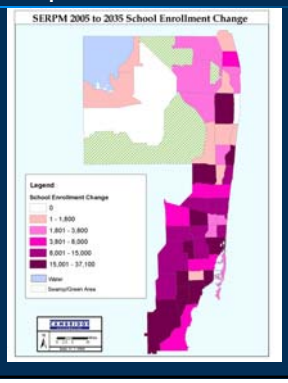
9

Regional Socioeconomic Profile
Regional Comparisons: Employment Growth by District



10

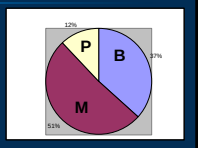
Regional Socioeconomic Profile
Regional Comparisons: Enrollment Growth by District



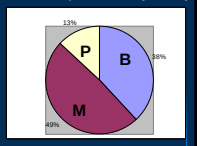
11

Regional Socioeconomic Profile
Preliminary Enplanement Forecasts

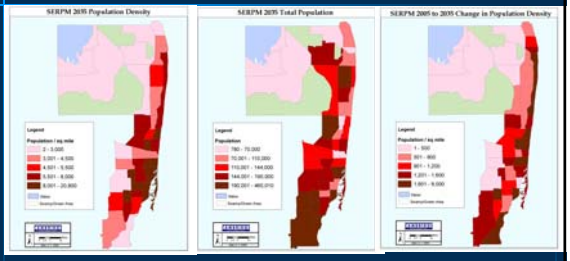
- Enplanement forecasts through 2025 downloaded from FAA web site
- BEBR growth rates for each county were used to extrapolate enplanements out to 2035
- 2005 and 2030 enplanements were obtained directly from SERPM
- Share of enplanements to increase at Fort Lauderdale and Palm Beach Int'l



2005 & 2035 Enplanements by County



Regional Socioeconomic Profile
Open Discussion



What's on your mind….?

SERPM65 Manage Lane Modeling Process

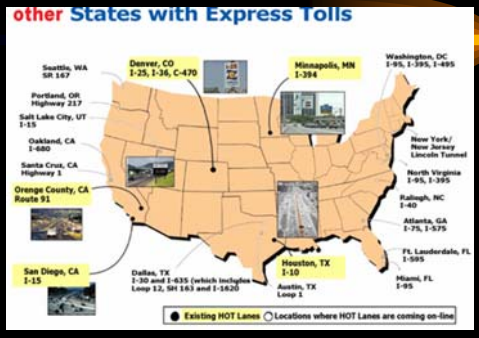
SERPM Model Application
Coordination Meeting
Ft. Lauderdale, FL

What are HOT lanes?

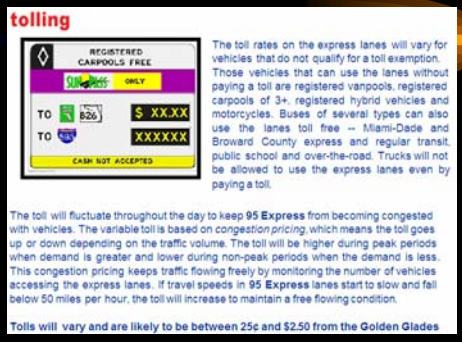
High-Occupancy Toll (HOT) lanes are a class of managed lanes.

- Designated lanes, usually on a freeway
- Separated from general purpose lanes
- Toll charged for low-occupancy vehicles
- No toll for high-occupancy vehicles
- Electronic toll collection

Managed Lane Locations



Variable Tolls



Ramp Metering

- Platoons desirable on arterials for signal progression
- Platoons undesirable for freeway merges
- Ramp meters smooth out flow by breaking up platoons

HOT Lane Example

HOT Modeling Background

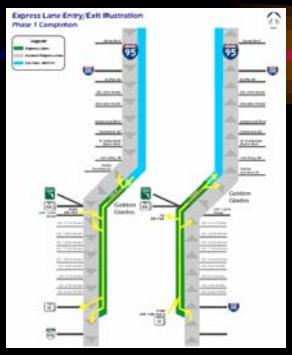
- Modified SERPM6 assignment steps to study I-95 express lane study
- Refinement to SERPM65 (TOD Version) for path, distribution, mode-choice and assignments

How do you model HOT lanes?

- Modeled in TOD version of the Southeast Regional Planning Model (SERPM)
- Model is a time-of-day model, with HOV, mode choice and transit components
- Cube Voyager software

Location

Access



HOT Lanes Model Features

- Treat auto occupancy as modes.
- Add 3+ mode and skims.
- Modify highway assignment model so that in HOT lanes:
  - 3+ HOVs are not assessed tolls
  - Other vehicles are assigned tolls
  - Determine toll as a function of V/C in the HOT lanes.
  - Convert toll to time.
  - Model allocates trips to lanes using capacity restraint.

SERPM6.5 – Multiple CTOLL Values & Implied Value-of-Time

Key	Key Value	Period	County	CTOLLs	1/x, $/Hr	60% of 1/x, $/Hr
1. CTOLL	0.079			0.0790	12.66	7.59
2. DevCtollPB	-0.014		Palm Beach	0.0650	15.38	9.23
3. DevCtollBO	-0.009		Broward	0.0700	14.29	8.57
4. DevCtollMD	0.012		Miami-Dade	0.0910	10.99	6.59
5. DevCtollPk	-0.007	Peak	Palm Beach	0.0580	17.24	10.34
		Peak	Broward	0.0630	15.87	9.52
		Peak	Miami-Dade	0.0840	11.90	7.14
6. DevCtollOp	0.006	Off-Peak	Palm Beach	0.0710	14.08	8.45
		Off-Peak	Broward	0.0760	13.16	7.89
		Off-Peak	Miami-Dade	0.0970	10.31	6.19
7. FacCtollShort	0.70	Peak	Miami-Dade	0.0588	17.01	10.20
		Off-Peak	Miami-Dade	0.0679	14.73	8.84
8. FacCtollLong	0.75	Peak	Broward	0.0473	21.16	12.70
		Off-Peak	Broward	0.0570	17.54	10.53

	($/Hr)	CTOLL	
SERPM Region	$ 9.64	0.0622	FDOT/URS - Toll Choice Survey Data
Palm Beach	$ 12.34	0.0486	
Broward	$ 10.54	0.0569	
Miami-Dade	$ 5.22	0.1149	

SERPM Enhancements for Managed Lanes Analysis

- Develop Network with special HOT lane codes
- Add High-Occupancy-Toll (HOT) lanes capability to the model code and the highway networks

SERPM HOT Lane & Facility Type Codes

FTC1:	FTC2:	MINOR Classification
80 (HOV)	81	2+ Persons HOV Segments
	82	3+ Persons HOV Segments
	83	AM and PM Peak Only Ramps
	84	AM Peak Only Ramps
	85	PM Peak Only Ramps
	86	All Day Ramp
	81(old)	*Freeway Segments (see revised definition)*
	82(old)	*Uninterrupted Segments (see revised definition)*

HOT:	Managed Lane Codes
0	Non-HOT Facility
1	HOT Lane Facility
2	"Dummy" HOV Slip Ramps (83-86)

Changes in PROFILE.MAS (&HOVUSE Parameter)

&HOVUSE	HOV Usage Flag
4	

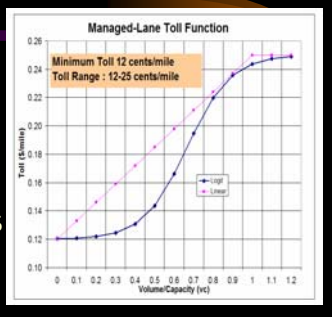
- Parameter value of "4" is used in **TOD model** so that 2 or 3+ carpools can use different HOV facilities and skims. The FTC2 of 81 facilities will have 2+ carpools, whereas FTC2 of 82 facilities will have only 3+ carpools.
- Parameter value of "2" is used in **24-Hour model** so that 2 or 3+ carpools can use same HOV facilities and skims. The FTC2 of 81 and/or 82 facilities will have 2+ carpools.
- Parameter values of 1 and 3 (not used in model) are for non-HOV assignment and HOV assignment for 3+ carpools only, respectively.

HOT Lanes Method

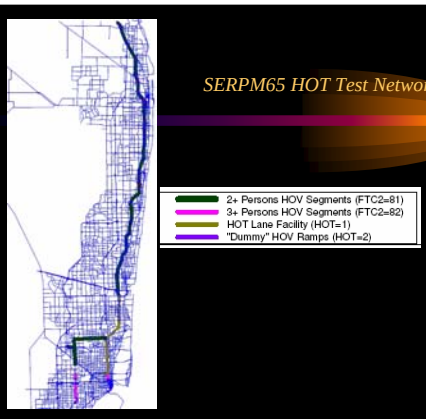
- Implemented with SERPM6.5 (TOD Version) Framework
- Model seeks equilibrium of impedance (time and time equivalent of the toll)
- Better flow of traffic in HOT lanes
- 3+ person carpools are not accessed tolls
- 2-person carpools and drive alone are assessed tolls
- Value of time was calibrated in the toll model

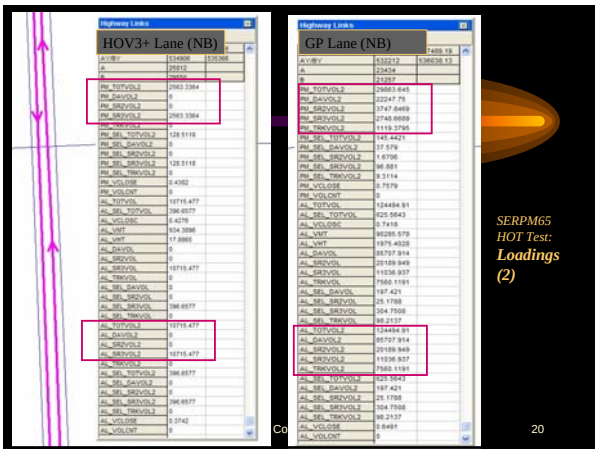
Toll Calculation

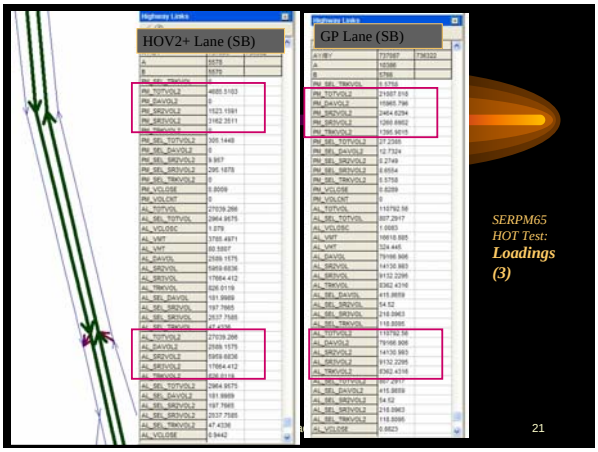
- Function of the V/C on the managed lanes
- Logit function
- Several toll ranges explored
- Final toll rate ranged between $.12 and $0.25 per mile



SERPM65 HOT Test Network







Few Notes

- SERPM65 Managed lane modeling process has consistency in model steps to treat toll related costs
- Other modeling technique is possible
- Corradino is developing a new HOT lane model for VDOT with toll diversion curves

QUESTIONS?

?

Review and Investigation of SERPM65 Capacities

SERPM Model Application Coordination Meeting
Ft. Lauderdale, FL

Discussion Items

- Review Model Capacities for Model Applications
- Summary results of current and "selected" previous models
- Investigation summary – University Drive Connection Study
- Corradino's Investigation Results
- Effects on Assignments and Distributions
- Viewer's Expectation & Actions - Fixes

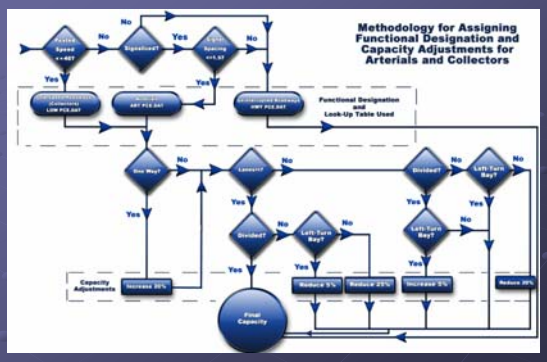
Model Capacities

- SERPM5 and 2000 MPO models – Use 2-digit speed capacity lookup table
- SERPM6 & SERPM6.5 – Use Capacity Calculator based on
  - FDOT LOS Manual
  - Earlier model for facilities not addressed directly in LOS manual

SERPM6.5 – FT & Capacity Calc Attributes

FTC1: MAJOR Classification	FTC2: MINOR Classification	Capacity Calculation Attributes						Capacity Adjustment Attributes		
		FREEWAY (FRWY)	UNINTERRUPTED (UNINTRPD)	HOV	TOLL	LOW/MED LOS STANDARD	SIGNAL SPACING (SIG_SPACE)	POSTED SPEED (POSTSPD)	TWOWAY	DIVIDED	LEFTTURN
10 FREEWAYS	11 Freeway Segments	1									
	12 Freeway Segments (I 595 - Broward)	1									
20 UNINTERRUPTED ROADWAYS	21 Uninterrupted Segments		1				> 1.5	>40	X	X	X
40 Higher Speed Interrupted Facility	41 Higher Speed Interrupted Facility						<= 1.5	>=35	X	X	X
50 CENTROID CONNECTORS	51 Internal										
	52 External										
60 Lower Speed Facility & Collector	61 Lower Speed Facility & Collector					1		< 35	X	X	X
70 RAMPS	71 On										
	72 Loop On										
	73 Off										
	74 Loop Off										
	75 Freeway-to-Freeway (included in FRWY)	1									
80 HOV	81 2+ Persons HOV Segments	1		1							
	82 3+ Persons HOV Segments	1		1							
	83 AM and PM Peak Only Ramps			1							
	84 AM Peak Only Ramps			1							
	85 PM Peak Only Ramps			1							
	86 All Day Ramp			1							
90 TOLL	91 Freeway Segments	1			1						
	92 Uninterrupted Segments	1			1						
	93 On				1						
	94 Off				1						
	95 Toll Plaza				1						

SERPM65 – Capacity Adjustment Logic



SERPM6.5 – LOS-E Capacity (Passenger-Car/Hour/Lane)

FUNCTIONAL TYPES (for Capacity Lookup purposes)	LANES per direction	Interchange Spacing >= 2 miles apart	Interchange Spacing < 2 miles apart
FREEWAYS (includes Parkways, Expressways, Toll and HOV freeway sections and, Freeway-to-Freeway ramps)	1	1,950	2,000
	2	2,040	2,100
	3	2,140	2,160
	4	2,190	2,120
	5	2,220	2,210
	6	2,230	2,220

UNINTERRUPTED ROADWAYS (includes arterials with signal spacing > 1.5 and posted speed > 40 for Signalized, OR posted speed > 40 for Unsignalized)	LANES per direction	All
	1	1,310
	2	1,850
	3	1,950

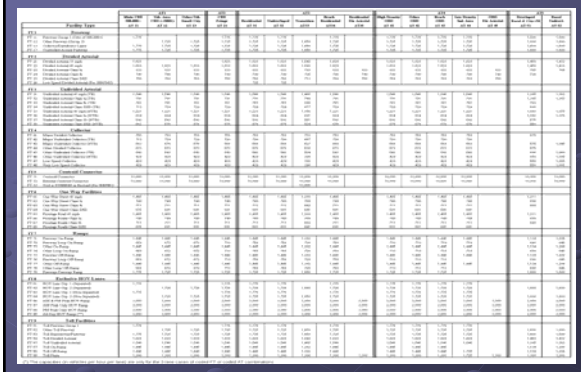
Higher Speed Interrupted Facility (arterials with posted speed >= 35)	LANES per direction	Signal Density >0.00 to 1.99 per mile	Signal Density 2.00 to 4.50 per mile	Signal Density > 4.50 per mile AND NOT within CBD (and Major City/County Roadways)	Signal Density > 4.50 per mile AND WITHIN CBD	Other Signalized Roadways
	1	900	860	820	790	660
	2	900	910	870	840	660
	3	900	910	870	840	660
	4	900	880	840	820	660

Lower Speed Facility & Collectors (posted speed < 35)	LANES per direction	CBD & Non-CBD High-Density	Non-CBD Low-Density	Non-CBD Medium-Density	Non-CBD Very Low-Density	
	1	630	750	630	760	
	2	660	750	660	760	
	3	660	750	660	760	
	4	660	750	660	760	

SERPM6.5 – LOS-E Capacity (Passenger-Car/Hour/Lane) (contd.)

FUNCTIONAL TYPES (for Capacity Lookup purposes)		LANES per direction	CBD	Non-CBD Low-Density	Non-CBD Medium-Density	Non-CBD High Density	Non-CBD Very Low-Density
RAMPS	ON	1	1,927	1,927	1,927	1,927	1,512
		2	1,927	1,927	1,927	1,927	1,512
	LOOP ON	1	774	835	835	892	892
		2	774	835	835	892	892
	OFF	1	1,927	1,927	1,927	1,927	1,512
		2	1,927	1,927	1,927	1,927	1,512
	LOOP OFF	1	892	892	835	892	892
		2	892	892	935	892	892
	TOLL ON	1	1,927	1,927	1,927	1,927	1,512
		2	1,927	1,927	1,927	1,927	1,512
	TOLL OFF	1	1,927	1,927	1,927	1,927	1,512
		2	1,927	1,927	1,927	1,927	1,512
	HOV PEAKS ONLY (slip ramps)	1	4,000	4,000	4,000	4,000	4,000
	HOV ALL DAY (slip ramps)	1	4,000	4,000	4,000	4,000	4,000
CENTROID CONNECTORS	INTERNAL CENTROID CONNECTORS	1	10,000	10,000	10,000	10,000	10,000
	EXTERNAL CENTROID CONNECTORS	1	10,000	10,000	10,000	10,000	10,000

SERPM5 Capacity Table Summary (Vehicle/Hour/Lane)



Palm Beach 2000 Based Model

Estimated Systemwide Capacity in Vehicle-Per-Lane-Per-Hour

Facility Type	Area Type: CBD (11-14)	Fringe (21)	Residential (31-35)	OBD (41-45)	Rural (51-52)	TOTAL
1. Freeway (11-17)			1,846	1,846	1,792	1,835
2. Divided Arterial (21-26)	886	853	945	834	1,228	934
3. Undivided Arterial (31-38)	850	853	820	874	1,035	855
4. Collector (41-48)	651	725	752	665	629	738
6. One-Way & Frontage (61-68)	879	936	940	930		910
7. Ramps (71-79, 97-98)			1,402	1,460	1,424	1,421
8. HOV (81-85)			1,930			1,930
9. Toll Facility (91-95)					1,664	1,664
TOTAL	800	854	966	891	1,473	1,009

Broward 2000 Based Model

Estimated Systemwide Capacity in Vehicle-Per-Lane-Per-Hour

Facility Type	Area Type: CBD (11-14)	Fringe (21)	Residential (31-35)	OBD (41-45)	Rural (51-52)	TOTAL
1. Freeway (11-17)			1,817	1,840		1,833
2. Divided Arterial (21-26)	914	937	857	925	918	893
3. Undivided Arterial (31-38)	856		916	1,033		963
4. Collector (41-48)	644	711	708	656		697
6. One-Way & Frontage (61-68)			1,011	972		991
7. Ramps (71-79, 97-98)	1,445		1,510	1,523		1,521
8. HOV (81-85)				1,926		1,926
9. Toll Facility (91-95)			1,779	1,960		1,910
TOTAL	818	851	910	1,247	918	1,064

SERPM65 – Estimated Capacity in Vehicle-Per-Lane-Per-Hour

24-Hour Model:

Facility Type	Area Type: 1. CBD	2. NonCBD HiDen	3. NonCBD MedDen	4. NonCBD LowDen	5. NonCBD VeryLowDen	TOTAL
1. Freeway (11,12)	2,108	2,101	2,089	2,083	1,997	2,086
2. Uninterrupted Roadway (21)	1,804	1,633	1,593	1,607	1,532	1,556
4. Higher Speed Interrupted Facility (41)	855	874	860	842	717	843
6. Lower Speed Facity & Collector (61)	645	601	569	617	573	596
7. Ramp (71-75, 93,94)	1,832	1,793	1,810	1,851	1,406	1,816
8. HOV (81-84)			1,844	1,851		1,848
9. Toll Facility (91-92)	2,005	1,975	2,047	1,990	2,010	1,999
TOTAL	834	1,022	973	1,046	1,182	1,035

TOD Model - AM Peak Period:

Facility Type	Area Type: 1. CBD	2. NonCBD HiDen	3. NonCBD MedDen	4. NonCBD LowDen	5. NonCBD VeryLowDen	TOTAL
1. Freeway (11,12)	2,102	2,102	2,085	2,083	2,018	2,085
2. Uninterrupted Roadway (21)	1,796	1,632	1,589	1,606	1,550	1,567
4. Higher Speed Interrupted Facility (41)	849	871	858	840	716	841
6. Lower Speed Facity & Collector (61)	642	599	568	616	573	594
7. Ramp (71-75, 93,94)	1,826	1,787	1,808	1,848	1,410	1,813
8. HOV (81-84)			1,938	1,948		1,944
9. Toll Facility (91-92)	1,982	1,994	2,060	2,006	2,032	2,015
TOTAL	830	1,021	972	1,046	1,192	1,036

SERPM65 – Estimated Capacity in Vehicle-Per-Lane-Per-Hour (contd.)

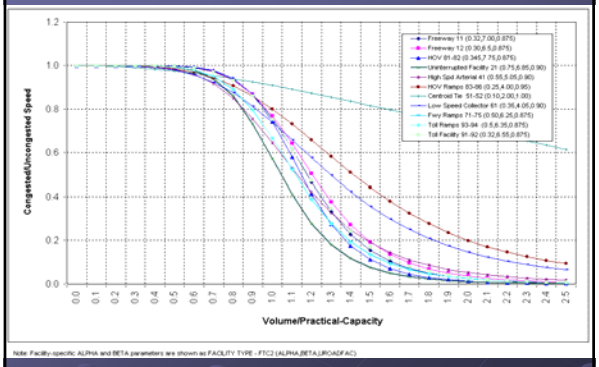
TOD Model - PM Peak Period:

Facility Type	Area Type: 1. CBD	2. NonCBD HiDen	3. NonCBD MedDen	4. NonCBD LowDen	5. NonCBD VeryLowDen	TOTAL
1. Freeway (11,12)	2,109	2,108	2,092	2,087	2,016	2,090
2. Uninterrupted Roadway (21)	1,802	1,635	1,593	1,612	1,552	1,570
4. Higher Speed Interrupted Facility (41)	854	874	861	842	720	844
6. Lower Speed Facity & Collector (61)	644	600	569	618	575	596
7. Ramp (71-75, 93,94)	1,832	1,795	1,816	1,853	1,424	1,820
8. HOV (81-84)			1,937	1,948		1,943
9. Toll Facility (91-92)	1,992	1,963	2,064	2,009	2,039	2,018
TOTAL	833	1,024	975	1,049	1,194	1,039

TOD Model - Off-Peak Period:

Facility Type	Area Type: 1. CBD	2. NonCBD HiDen	3. NonCBD MedDen	4. NonCBD LowDen	5. NonCBD VeryLowDen	TOTAL
1. Freeway (11,12)	2,105	2,096	2,081	2,073	1,986	2,078
2. Uninterrupted Roadway (21)	1,805	1,633	1,595	1,601	1,512	1,540
4. Higher Speed Interrupted Facility (41)	854	874	859	841	714	842
6. Lower Speed Facity & Collector (61)	645	601	569	617	574	595
7. Ramp (71-75, 93,94)	1,832	1,789	1,804	1,840	1,386	1,808
8. HOV (81-84)			1,825	1,834		1,830
9. Toll Facility (91-92)	2,008	1,970	2,030	1,979	1,999	1,987
TOTAL	834	1,021	970	1,043	1,170	1,032

SERPM65 Volume-Delay Functions



SERPM65: Few CONFAC & UROADFAC

FREEWAYS (includes Parkways, Expressways, Toll and HOV freeway sections and, Freeway-to-Freeway ramps)	ConfacAMP	0.33333
	ConfacPMP	0.33333
	ConfacOFP	0.09500
	Confac24H	0.06976
	Uroadfactor	0.87500
Uninterrrupted Roadways (includes arterials with signal spacing > 1.5 and poster speed >40 for Signalized, Or posted speed >40 for Unsignalized)	ConfacAMP	0.34333
	ConfacPMP	0.34333
	ConfacOFP	0.11500
	Confac24H	0.08534
	Uroadfactor	0.90000
Interrupted Roadways Arterials (arterails with posted speed>=35)	ConfacAMP	0.34333
	ConfacPMP	0.34333
	ConfacOFP	0.11500
	Confac24H	0.08392
	Uroadfactor	0.90000

Note: For comlete list, see MVFACTORS.YYA file

Univ. Drive Connection Study - Capacity Investigation Summary

- ✓Initial capacities (LOS E) – OK
- ✓Differences in LOS C Based Capacities – Model vs. FDOT LOS Manual
- ✓Has Implication on Number of Lanes
- ✓Differences in "implied" CONFAC and UROADFAC

Corradino's Investigation & Analysis

- ✓ SERPM vs. FDOT LOS E & C Capacities
- ✓ SERPM uses 24-hour and Period CONFAC values
- ✓ Compare Implied UROAD and Daily CONFAC
- ✓ Summary Tables
  - Freeways (No 1-5)
  - Uninterrupted Roadways (No 6-8)
  - Arterials – Class I (No 9-11)
  - Arterials – Class II (No 12-14)
  - Arterials – Class III (No 15-17)
  - Arterials – Class IV (No 18-20)
  - Other Signalized Roadways (No 21-23)

Freeways:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 1: Peak Hour Capacity Comparison : SERPM vs FDOT LOS Tables for Freeways (*)

Lanes Per Direction	SERPM - LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM - LOS E (PCE)	FDOT-LOS LOS E (Vol)
	Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart	
1	2,000		1,950	
2	2,100	1,990	2,040	1,955
3	2,160	2,050	2,140	2,050
4	2,120	2,080	2,190	2,095
5	2,210	2,096	2,220	2,124
6	2,220	2,108	2,230	2,142

SERPM/FDOT Ratio	
Interchange Spacing >= 2 miles apart	Interchange Spacing < 2 miles apart
1.06	1.04
1.05	1.04
1.02	1.05
1.05	1.05
1.05	1.04

Note: Model Lookup Table: FRWYPCE.DAT & Model's (PCE-Truck)=1.5

(*) FREEWAYS (includes Parkways, Expressways, Toll and HOV freeway sections and, Freeway-to-Freeway ramps)

Lanes Per Direction	SERPM - LOS C (PCE)	FDOT-LOS LOS C (Vol)	SERPM - LOS C (PCE)	FDOT-LOS LOS C (Vol)
	Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart	
1	1,750		1,706	
2	1,838	1,470	1,785	1,330
3	1,890	1,517	1,873	1,393
4	1,855	1,538	1,916	1,426
5	1,934	1,552	1,943	1,444
6	1,943	1,560	1,951	1,457

Implied UROADFactor (LOSC/LOSE)			
SERPM	FDOT-LOS	SERPM	FDOT-LOS
Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart	
0.875	**0.739**	0.875	**0.680**
0.875	**0.740**	0.875	**0.680**
0.875	**0.739**	0.875	**0.680**
0.875	**0.740**	0.875	**0.680**
0.875	**0.740**	0.875	**0.680**

Freeways (contd.):

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 2: Daily Capacity Comparison : SERPM-TOD vs FDOT-LOS Tables for Freeways

Lanes Per Direction	SERPM-TOD	FDOT-LOS	SERPM-TOD	FDOT-LOS
	LOS E			
	Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart	
1	33,053		32,226	
2	34,705	18,650	33,714	19,125
3	35,697	19,217	35,366	20,033
4	35,036	19,500	36,193	20,488
5	36,523	19,640	36,889	20,760
6	36,689	19,758	36,864	20,933

Lanes Per Direction	SERPM-TOD	FDOT-LOS	SERPM-TOD	FDOT-LOS
	LOS C			
	Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart	
1	28,921		28,198	
2	30,367	13,800	29,500	13,000
3	31,235	14,217	30,946	13,617
4	30,656	14,413	31,669	13,925
5	31,958	14,550	32,102	14,120
6	32,102	14,625	32,247	14,242

Table 3: Implied 24 Hour CONFAC (Peak/Daily) Ratio : SERPM-TOD vs FDOT-LOS Tables for Freeways

Lanes Per Direction	SERPM-TOD	FDOT-LOS	SERPM-TOD	FDOT-LOS
	Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart	
1	0.0605		0.0605	
2	0.0605	0.1067	0.0605	0.1022
3	0.0605	0.1067	0.0605	0.1023
4	0.0605	0.1067	0.0605	0.1023
5	0.0605	0.1067	0.0605	0.1023
6	0.0605	0.1067	0.0605	0.1023

Freeways (contd.):

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 4: Daily Capacity Comparison - SERPM 24H vs FDOT LOS Tables for Freeways

Lanes Per Direction	SERPM-24H LOS E: Interchange Spacing >= 2 miles apart	FDOT-LOS LOS E: Interchange Spacing >= 2 miles apart	SERPM LOS E: Interchange Spacing < 2 miles apart	FDOT-LOS LOS E: Interchange Spacing < 2 miles apart	SERPM LOS C: Interchange Spacing >= 2 miles apart	FDOT-LOS LOS C: Interchange Spacing >= 2 miles apart	SERPM LOS C: Interchange Spacing < 2 miles apart	FDOT-LOS LOS C: Interchange Spacing < 2 miles apart
1	28,670		27,963		25,086		24,459	
2	30,103	18,660	29,243	19,125	26,340	13,800	25,588	13,000
3	30,963	19,217	30,677	20,033	27,093	14,217	26,842	13,617
4	30,390	19,500	31,393	20,488	26,591	14,413	27,469	13,925
5	31,680	19,640	31,823	20,760	27,720	14,550	27,845	14,120
6	31,823	19,758	31,967	20,933	27,845	14,625	27,971	14,242

Table 5: Implied 24 Hour CONFAC (Peak/Daily) Ratio - SERPM 24H vs FDOT LOS Tables for Freeways

Lanes Per Direction	SERPM-24H: Interchange Spacing >= 2 miles apart	FDOT-LOS: Interchange Spacing >= 2 miles apart	SERPM-24H: Interchange Spacing < 2 miles apart	FDOT-LOS: Interchange Spacing < 2 miles apart
1	0.06976		0.06976	
2	0.06976	0.1067	0.06976	0.1022
3	0.06976	0.1067	0.06976	0.1023
4	0.06976	0.1067	0.06976	0.1023
5	0.06976	0.1067	0.06976	0.1023
6	0.06976	0.1067	0.06976	0.1023

Uninterrupted Roadways:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 6: Peak Hour Capacity Comparison: SERPM vs FDOT-LOS Tables for Uninterrupted Roadways (*)

Lanes Per Direction	SERPM LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM LOS C (PCE)	FDOT-LOS LOS C (VOL)	SERPM/FDOT Ratio @ LOSE	Implied UROADFactor (LOS C / LOS E): SERPM	Implied UROADFactor (LOS C / LOS E): FDOT-LOS
1	1,310	1,440	1,179	790	0.91	0.90	**0.55**
2	1,860	1,835	1,665	1,250	1.01	0.90	**0.68**
3	1,850	1,833	1,665	1,247	1.01	0.90	**0.68**

Note: Model Lookup Table: HWYPCE.DAT & Model's [PCE-Truck]=1.5

(*) Uninterrupted Roadways (includes arterials with signal spacing > 1.5 and posted speed >40 for Signalized, Or posted speed >40 for Unsignalized)

Table 7: Daily Capacity Comparison - SERPM-TOD vs FDOT-LOS Tables for Uninterrupted Roadways

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	19,022	13,550	17,120	7,500	0.0689	0.1063
2	26,864	17,550	24,177	11,950	0.0689	0.1046
3	26,864	17,567	24,177	11,933	0.0689	0.1043

Table 8: Daily Capacity Comparison - SERPM 24H vs FDOT-LOS Tables for Uninterrupted Roadways

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	15,350	13,550	13,815	7,500	0.08534	0.1063
2	21,678	17,550	19,510	11,950	0.08534	0.1046
3	21,678	17,567	19,510	11,933	0.08534	0.1043

Arterials – Class-I:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 9: Peak Hour Capacity Comparison - SERPM vs FDOT-LOS Tables for Interrupted Roadways - Class I (*)

Lanes Per Direction	SERPM LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM LOS C (PCE)	FDOT-LOS LOS C (VOL)	SERPM/FDOT Ratio @ LOSE	Implied UROADFactor: SERPM	Implied UROADFactor: FDOT-LOS
1	900	890	810	720	1.01	0.90	**0.81**
2 (Note 2)	900	930	810	905	0.97	0.90	**0.97**
3 (Note 2)	900	930	810	907	0.97	0.90	**0.98**
4 (Note 2)	900	885	810	865	1.02	0.90	**0.98**

(*) Interrupted Roadways Arterials (arterials with posted speed<=35) & Signal Density >0.00 to 1.99 signalized intersection per mile
Note: Model Lookup Table: ARTPCE.DAT & Model's [PCE-Truck]=1.5

Note 2: Not applicable for that level of service letter grade. For automobile/truck modes, volumes greater than LOS D become F because intersection capacities have been reached, Hence LOS D values have been reported

Table 10: Daily Capacity Comparison - SERPM-TOD vs FDOT-LOS Tables for Arterials - Class I

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	13,069	8,450	11,762	6,900	0.0689	0.1053
2	13,069	8,925	11,762	8,675	0.0689	0.1042
3	13,069	8,917	11,762	8,683	0.0689	0.1043
4	13,069	8,475	11,762	8,263	0.0689	0.1044

Table 11: Daily Capacity Comparison - SERPM-24H vs FDOT-LOS Tables for Arterials - Class I

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	10,724	8,450	9,652	6,900	0.08392	0.1053
2	10,724	8,925	9,652	8,675	0.08392	0.1042
3	10,724	8,917	9,652	8,683	0.08392	0.1043
4	10,724	8,475	9,652	8,263	0.08392	0.1044

Arterials – Class-II:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 12: Peak Hour Capacity Comparison - SERPM vs FDOT-LOS Tables for Interrupted Roadways - Class II (*)

Lanes Per Direction	SERPM LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM LOS C (PCE)	FDOT-LOS LOS C (VOL)	SERPM/FDOT Ratio @ LOSE	Implied UROADFactor: SERPM	Implied UROADFactor: FDOT-LOS
1	860	850	774	590	1.01	0.90	**0.69**
2	910	900	819	680	1.01	0.90	**0.76**
3	910	903	819	703	1.01	0.90	**0.78**
4	880	875	792	698	1.01	0.90	**0.80**

(*) Interrupted Roadways Arterials (arterials with posted speed<=35) & Signal Density 2.00 to 4.5 signalized intersection per mile
Note: Model Lookup Table: ARTPCE.DAT & Model's [PCE-Truck]=1.5

Table 13: Daily Capacity Comparison - SERPM-TOD vs FDOT-LOS Tables for Arterials - Class II

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	12,488	8,150	11,239	5,600	0.0689	0.1043
2	13,214	8,625	11,893	6,500	0.0689	0.1043
3	13,214	8,633	11,893	6,717	0.0689	0.1046
4	12,778	8,375	11,501	6,663	0.0689	0.1045

Table 14: Daily Capacity Comparison - SERPM-24H vs FDOT-LOS Tables for Arterials - Class II

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	10,248	8,450	9,223	6,900	0.08392	0.1006
2	10,844	8,925	9,759	8,675	0.08392	0.1008
3	10,844	8,917	9,759	8,683	0.08392	0.1013
4	10,486	8,475	9,438	8,263	0.08392	0.1032

Arterials – Class-III:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 15: Peak Hour Capacity Comparison - SERPM vs FDOT-LOS Tables for Interrupted Roadways - Class III (*)

Lanes Per Direction	SERPM LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM LOS C (PCE)	FDOT-LOS LOS C (VOL)	SERPM/FDOT Ratio @ LOSE	Implied UROADFactor: SERPM	Implied UROADFactor: FDOT-LOS
1	820	810	738	280	1.01	0.90	**0.35**
2	870	860	783	325	1.01	0.90	**0.38**
3	870	860	783	340	1.01	0.90	**0.40**
4	840	833	756	338	1.01	0.90	**0.41**

(*) Interrupted Roadways Arterials (arterials with posted speed<=35) & Signal Density >4.5 signalized intersection per mile and not within CBD
Note: Model Lookup Table: ARTPCE.DAT & Model's [PCE-Truck]=1.5

Table 16: Daily Capacity Comparison - SERPM-TOD vs FDOT-LOS Tables for Arterials - Class III

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	11,907	7,750	10,716	2,650	0.0689	0.1045
2	12,633	8,200	11,370	3,100	0.0689	0.1049
3	12,633	8,217	11,370	3,250	0.0689	0.1047
4	12,198	7,975	10,978	3,225	0.0689	0.1045

Table 17: Daily Capacity Comparison - SERPM-24H vs FDOT-LOS Tables for Arterials - Class III

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	9,771	7,750	8,794	2,650	0.08392	0.1045
2	10,367	8,200	9,330	3,100	0.08392	0.1049
3	10,367	8,217	9,330	3,250	0.08392	0.1047
4	10,010	7,975	9,009	3,225	0.08392	0.1045

Arterials – Class-IV:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 18: Peak Hour Capacity Comparison - SERPM vs FDOT-LOS Tables for Interrupted Roadways - Class IV (*)

Lanes Per Direction	SERPM LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM LOS C (PCE)	FDOT-LOS LOS C (VOL)	SERPM/FDOT Ratio @ LOSE	Implied UROADFactor: SERPM	Implied UROADFactor: FDOT-LOS
1	820	780	738	270	1.05	0.90	**0.35**
2	870	830	783	325	1.05	0.90	**0.39**
3	870	830	783	333	1.05	0.90	**0.40**
4	840	813	756	338	1.03	0.90	**0.42**

(*) Interrupted Roadways Arterials (arterials with posted speed<=35) & Signal Density >4.5 signalized intersection per mile and within CBD
Note: Model Lookup Table: ARTPCE.DAT & Model's [PCE-Truck]=1.5

Table 19: Daily Capacity Comparison - SERPM-TOD vs FDOT-LOS Tables for Arterials - Class IV

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	11,907	7,500	10,716	2,600	0.0689	0.1040
2	12,633	7,925	11,370	3,075	0.0689	0.1047
3	12,633	7,933	11,370	3,183	0.0689	0.1046
4	12,198	7,775	10,978	3,238	0.0689	0.1046

Table 20: Daily Capacity Comparison - SERPM-24H vs FDOT-LOS Tables for Arterials - Class IV

Lanes Per Direction	SERPM LOS E	FDOT-LOS LOS E	SERPM LOS C	FDOT-LOS LOS C	Implied 24 Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24 Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	9,771	7,500	8,794	2,600	0.08392	0.1040
2	10,367	7,925	9,330	3,075	0.08392	0.1047
3	10,367	7,933	9,330	3,183	0.08392	0.1046
4	10,010	7,775	9,009	3,238	0.08392	0.1046

Other Signalized Roadways:

Note: All capacities are per lane capacities, SERPM in cars & FDOT-LOS in vehicles

Table 21: Peak Hour Capacity Comparison - SERPM vs FDOT-LOS Tables for Other Signalized Roadways (*)

Lanes Per Direction	SERPM LOS E (PCE)	FDOT-LOS LOS E (Vol)	SERPM LOS C (PCE)	FDOT-LOS LOS C (VOL)	SERPM/FDOT Ratio @ LOSE	Implied UROADFactor: SERPM	Implied UROADFactor: FDOT-LOS
1	660	660	594	250	1.00	0.90	0.38
2	660	660	594	290	1.00	0.90	0.44
3	660		594			0.90	
4	660		594			0.90	

(*) Interrupted Roadways Arterials (arterails with posted speed=>35)
Note: Model Lookup Table: ARTPCE.DAT & Model's (PCE-Truck)=1.5

Table 22: Daily Capacity Comparison - SERPM TOD vs FDOT-LOS Tables for Other Signalized Roadways

Lanes Per Direction	SERPM (LOS E)	FDOT-LOS (LOS E)	SERPM (LOS C)	FDOT-LOS (LOS C)	Implied 24-Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24-Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	9.584	6.300	8.625	2.400	0.0689	0.1048
2	9.584	6.300	8.625	2.775	0.0689	0.1048
3	9.584		8.625		0.0689	
4	9.584		8.625		0.0689	

Table 23: Daily Capacity Comparison - SERPM 24H vs FDOT-LOS Tables for Other Signalized Roadways

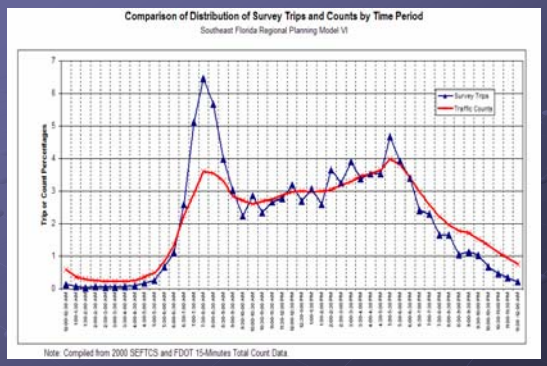
Lanes Per Direction	SERPM (LOS E)	FDOT-LOS (LOS E)	SERPM (LOS C)	FDOT-LOS (LOS C)	Implied 24-Hour CONFAC (peak/Daily) Ratio: SERPM	Implied 24-Hour CONFAC (peak/Daily) Ratio: FDOT-LOS
1	7.865	6.300	7.078	2.400	0.08392	0.1048
2	7.865	6.300	7.078	2.775	0.08392	0.1048
3	7.865		7.078		0.08392	
4	7.865		7.078		0.08392	

SERPM's CONFAC Derivation

Based on …

- Traffic Counts Analysis
- Diurnal distribution of HH Survey trip records

Survey Trips vs. Traffic Count Distribution



Traffic Distribution and Overall CONFAC

Period/Hour	Palm Beach Co	Broward Co	Miami-Dade Co	ALL Counties
TOD "Period" Traffic Distribution (in percent)				
AMPK Period (6:30-9:30AM)	18.28	18.87	18.03	18.47
MD Period (9:30AM-3:30PM)	35.76	34.60	34.50	35.08
PMPK Period (3:30-6:30PM)	21.89	22.59	20.06	21.82
NT Period (6:30PM-6:30 AM)	24.08	23.86	27.33	24.63
(AM & PM)-Peak Period (6:30-9:30AM,3:30-6:30PM)	40.16	41.46	38.09	40.29
Off-Peak Period (9:30AM-3:30PM,6:30PM-6:30AM)	59.84	58.54	61.91	59.71
TOD "Peak Hour" Traffic Distribution (in percent)				
AMPK Hour (7:30-8:30AM)	7.16	7.48	6.42	7.15
MD PKHR (2:30-3:30PM)	6.51	6.52	6.25	6.46
PMPK Hour (5:00-6:00PM)	7.83	8.19	6.83	7.78
NT PKHR (6:30-7:30PM)	5.21	5.80	5.61	5.54
TOD Model CONFAC Values				
AMPK Period (6:30-9:30AM)	0.3919	0.3965	0.3561	0.3870
MD Period (9:30AM-3:30PM)	0.1821	0.1880	0.1809	0.1843
PMPK Period (3:30-6:30PM)	0.3578	0.3624	0.3404	0.3566
NT Period (6:30PM-6:30 AM)	0.2184	0.2431	0.2052	0.2247
(AM & PM)-Peak Period (6:30-9:30AM,3:30-6:30PM)	0.1960	0.1975	0.1792	0.1931
Off-Peak Period (9:30AM-3:30PM,6:30PM-6:30AM)	0.1088	0.1113	0.1010	0.1083
All Periods - "24-Hour" Model	0.0783	0.0819	0.0663	0.07781

Note: Based on Analysis of 15-min Period Count Data (Year 2000).

Weighted Off-peak period Overall CONFAC

	Hours	SrvyTrp%	Cnts%	Cfacs_OffHrs	Cfacs_OffHrs*SrvyTrp%
1	11:30 PM-12:30 AM	0.33065	1.32715	0.022227	0.0073496
2	12:30-1:30 AM	0.16355	0.76300	0.013114	0.0021448
3	1:30-2:30 AM	0.09955	0.54566	0.009139	0.0009098
4	2:30-3:30 AM	0.07111	0.44914	0.007522	0.0005349
5	3:30-4:30 AM	0.14577	0.49424	0.008278	0.0012067
6	4:30-5:30 AM	0.40532	0.82545	0.013825	0.0056035
7	5:30-6:30 AM	1.75994	2.16112	0.036195	0.0637011
8	9:30 AM-10:30 AM	5.09493	5.31168	0.088962	0.4532529
9	10:30 AM -11:30 AM	5.00249	5.40818	0.090578	0.4531142
10	11:30-12:30 PM	5.96957	5.86268	0.098190	0.5861509
11	12:30-1:30 PM	5.74557	5.99108	0.100340	0.5765129
12	1:30-2:30 PM	6.23978	6.04058	0.101169	0.6312740
13	**2:30-3:30 PM**	**7.15352**	**6.46348**	**0.108252**	0.7743854
14	**6:30-7:30 PM**	**4.68606**	**5.53510**	**0.092703**	0.4344132
15	7:30-8:30 PM	3.29233	4.16120	0.069693	0.2294519
16	8:30-9:30 PM	2.15015	3.46669	0.058061	0.1253045
17	9:30-10:30 PM	1.67816	2.84423	0.047636	0.0799408
18	10:30-11:30 PM	0.79642	2.03694	0.034115	0.0271700
	Off-Peak Hours (6:30AM-3:30PM, 6:30PM-6:30AM) Sum =>	50.79286	59.70759		4.4524210
	WEIGHTED Off-Peak Confacs (Wt. By SrvyTrps):				**0.08766**
				Simple Ave:	**0.05556**

Long-Term Fix (!!!)

- Use LOS-E capacities directly in volume-delay functions (No UROADFAC)
- Update & Validate modified BPR parameters
- Test and use of other form of volume-delay functions
- Rationalize CONFAC values of 24-hour and TOD models
- Rationalize CONFAC values of model and FDOT-LOS manual

System-wide Truck Adjustment Factors

(To adjust PCE Based Capacity)

Facility Type / Area Type / County	Truck Count (Observed) Based Adjustment Factor				Truck Volume Based Adjustment Factor			
	Truck Count Percent	Percent Truck Count VMT	Capacity Adj Factor Count	Count-VMT	Truck Volume (%)	Truck VMT (%)	Capacity Adj Factor Volume	VMT
1. Freeway (11)	7.4%	7.2%	0.9643	0.9654	7.6%	7.7%	0.9634	0.9629
2. Uninterrupted Roadways (21)	9.5%	13.1%	0.9526	0.9383	7.1%	8.4%	0.9659	0.9597
4. High Speed Arterials (41)	4.5%	4.5%	0.9782	0.9781	5.2%	5.2%	0.9747	0.9748
6. Low Speed Collectors (61)	4.6%	4.6%	0.9775	0.9775	5.2%	5.3%	0.9747	0.9740
7. Ramps (71-75, 93,94)					7.5%	7.2%	0.9637	0.9653
8. HOV (81-84)	7.6%	7.7%	0.9634	0.9630	9.4%	9.3%	0.9550	0.9555
9. Toll Facility (91-92)	4.1%	3.8%	0.9799	0.9816	10.8%	11.0%	0.9486	0.9477
ALL Facility Types	**5.1%**	**5.6%**	0.9752	0.9728	**6.2%**	**6.6%**	0.9701	0.9680
1. CBD	4.6%	4.7%	0.9777	0.9773	6.7%	6.9%	0.9722	0.9715
2. High Density - NonCBD	4.6%	4.7%	0.9776	0.9769	5.4%	5.5%	0.9736	0.9732
3. Medium Density - NonCBD	4.8%	4.8%	0.9768	0.9767	5.9%	6.0%	0.9712	0.9708
4. Low Density - NonCBD	5.1%	5.5%	0.9754	0.9730	6.3%	6.7%	0.9696	0.9677
5. Very Low Density - NonCBD	12.8%	13.7%	0.9397	0.9359	11.0%	11.6%	0.9477	0.9456
ALL Area Types	**5.1%**	**5.6%**	0.9752	0.9728	**6.2%**	**6.6%**	0.9701	0.9680
1. Palm Beach County	4.8%	5.2%	0.9766	0.9746	5.9%	6.6%	0.9712	0.9680
2. Broward County	4.9%	5.6%	0.9760	0.9727	5.9%	6.2%	0.9714	0.9700
3. Miami-Dade County	5.7%	5.9%	0.9721	0.9712	6.5%	7.0%	0.9685	0.9664
ALL Counties	**5.1%**	**5.6%**	0.9752	0.9728	**6.2%**	**6.6%**	0.9701	0.9680

PCE = 1.5

FDOT LOS-D & LOS-E Capacities (Volume/Lane) & Their Ratios

(A) Freeways

Lanes Per Direction	FDOT-LOS LOS E (Vol)	FDOT-LOS LOS D (Vol)	FDOT-LOS LOS E (Vol)	FDOT-LOS LOS D (Vol)	FDOT - LOS-D/LOS-E Factor	
	Interchange Spacing >= 2 miles apart		Interchange Spacing < 2 miles apart		Interchange Spacing >= 2 miles apart	Interchange Spacing < 2 miles apart
1						
2	1,990	1,790	1,955	1,720	**0.899**	**0.880**
3	2,050	1,843	2,050	1,903	**0.899**	**0.880**
4	2,080	1,870	2,095	1,845	**0.899**	**0.881**
5	2,096	1,888	2,124	1,868	**0.901**	**0.879**
6	2,108	1,898	2,142	1,885	**0.901**	**0.880**

(B) Uninterrupted Roadways

Lanes Per Direction	FDOT-LOS LOS E (Vol)	FDOT-LOS LOS D (VOL)	LOS-D/LOS-E Factor
1	1,440	1,130	**0.78**
2	1,835	1,615	**0.88**
3	1,833	1,613	**0.88**

FDOT LOS-D & LOS-E Capacities (Volume/Lane) & Their Ratios (contd.)

(C) Interrupted Roadways

Lanes Per Direction	FDOT-LOS LOS E (Vol)	FDOT-LOS LOS D (VOL)	LOS-D/LOS-E Factor
CLASS I			
1	890	860	**0.97**
CLASS II			
1	850	810	**0.95**
2	900	855	**0.95**
3	903	857	**0.95**
4	875	833	**0.95**
CLASS III			
1	810	660	**0.81**
2	860	755	**0.88**
3	860	777	**0.90**
4	833	768	**0.92**
CLASS IV			
1	780	720	**0.92**
2	830	790	**0.95**
3	830	797	**0.96**
4	813	783	**0.96**

(D) Other Signalized Roadways

Lanes Per Direction	FDOT-LOS LOS E (Vol)	FDOT-LOS LOS D (VOL)	LOS-D/LOS-E Factor
1	660	530	**0.80**
2	660	570	**0.86**

(E) Non-State (Major City/County) Roads

Lanes Per Direction	FDOT-LOS LOS E (Vol)	FDOT-LOS LOS D (VOL)	LOS-D/LOS-E Factor
1	810	760	**0.94**
2	860	810	**0.94**
3	860	817	**0.95**

Short Term Fix & Discussion

- Incorporate truck factors to PCE based model LOS-E capacities for the loaded network Volume/Capacity ratios display
- Derive/Implement "adjustment" factors to develop other LOS (C & D) capacities
- Derive/Implement LOS C & D based volume/capacity ratios
- Question & Discussion