Southeast Florida Model Users Group

FDOT D4

Developing an Alternate Approach to the use of Manual Post-Processing Techniques in Traffic Forecasting

- **A Case Study on Managed Lanes Forecasting on I-95 Corridor in Southeast Florida**

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Outline

- Design Traffic Forecasting Needs
- Traditional Approach
- Manual Post-Processing Issues
- Journey to an Alternate Approach
- Case-Study Example

Design Traffic Forecasting Needs

- AADT
- DDHV
- Traffic Factors, K and D

Traditional Approach

- Select a Travel Demand Model
- Perform Subarea Validation
- Develop Forecasts
- Apply Traffic Factors
- Ad hoc, NCHRP 255-style Post-Processing
- Develop Design Traffic

Manual Post-Processing Issues

- Manual Errors in Large-Scale projects
- Forecasting Consistency Issues
- Heavy Relying on Traffic Factors- K, D
- Issues with Managed Lanes Modeling Projects
  - Daily-to-Peak Correspondence is Different (K)

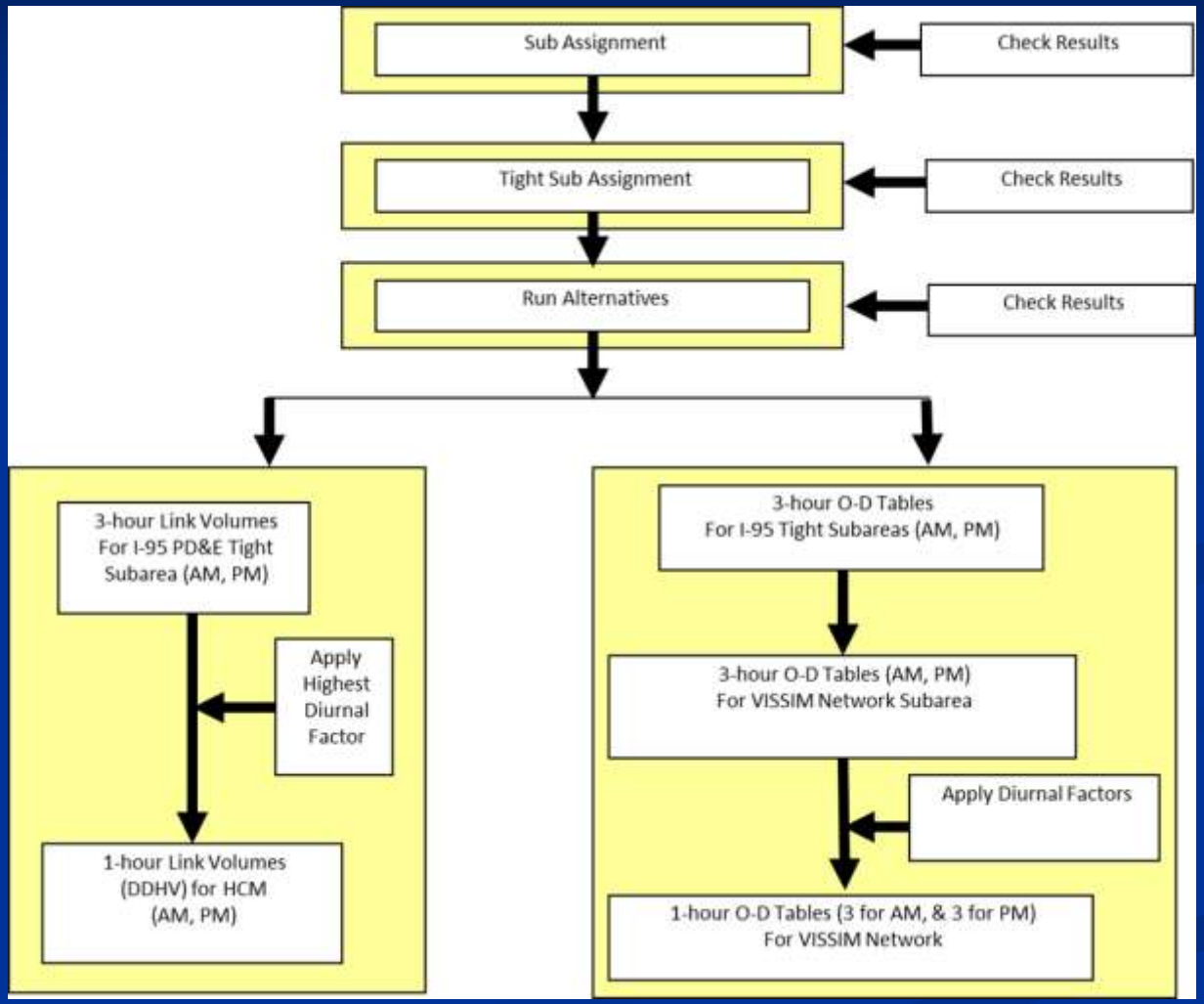
Journey to an Alternate Approach

- Use of Peak-Period Model Estimates
- Use of Diurnal Factors
- Use of CUBE Analyst Trip Table Estimation Process
- Increased Confidence in Turning Movement Forecasts

Case Study

I-95 PD&E Study in Southeast Florida

Study Modeling Approach

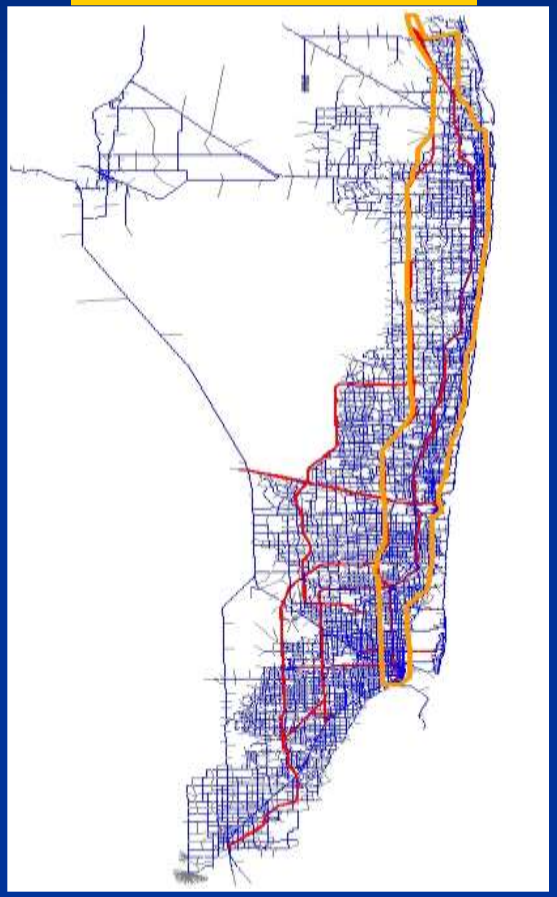


Study Goals

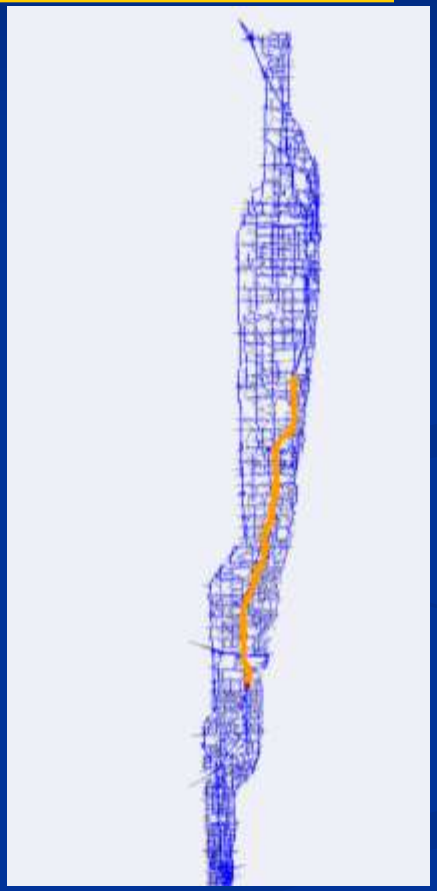
- Produce traffic estimates for morning and afternoon peaks.
- Multiple target years: 2010, 2020, 2030, 2040.
- Make systematic adjustments.
- Minimize “post-processing”.

Subarea Modeling Approach

Regional Model
2005 Base Year



Subarea Model
2005 Base Year



"Tight Subarea" Model
2010 Base Year

"Tight Subarea" Trip Table Adjustments

- Adjustments to Base Trip Tables Using CUBE Analyst
- Inputs:
  - Extracted Tight Subarea Trip Tables for the Study Corridor
  - Balanced AM and PM Traffic Counts for Freeways and Ramps
  - Trip ends
- Used Iterative Matrix Adjustment Process
- Trip ends Not Altered.
- Output: Adjusted Base Trip Table

"Tight Subarea" Forecasting Approach

- First, Compute Unadjusted Growth
  - Unadjusted Future-Base
- Estimate Future Adjusted Trip Table
  - Adjusted Base + Growth
- Difference Method Judged to be Better Performing than Factors

Results Discussion-Improved Validation Example

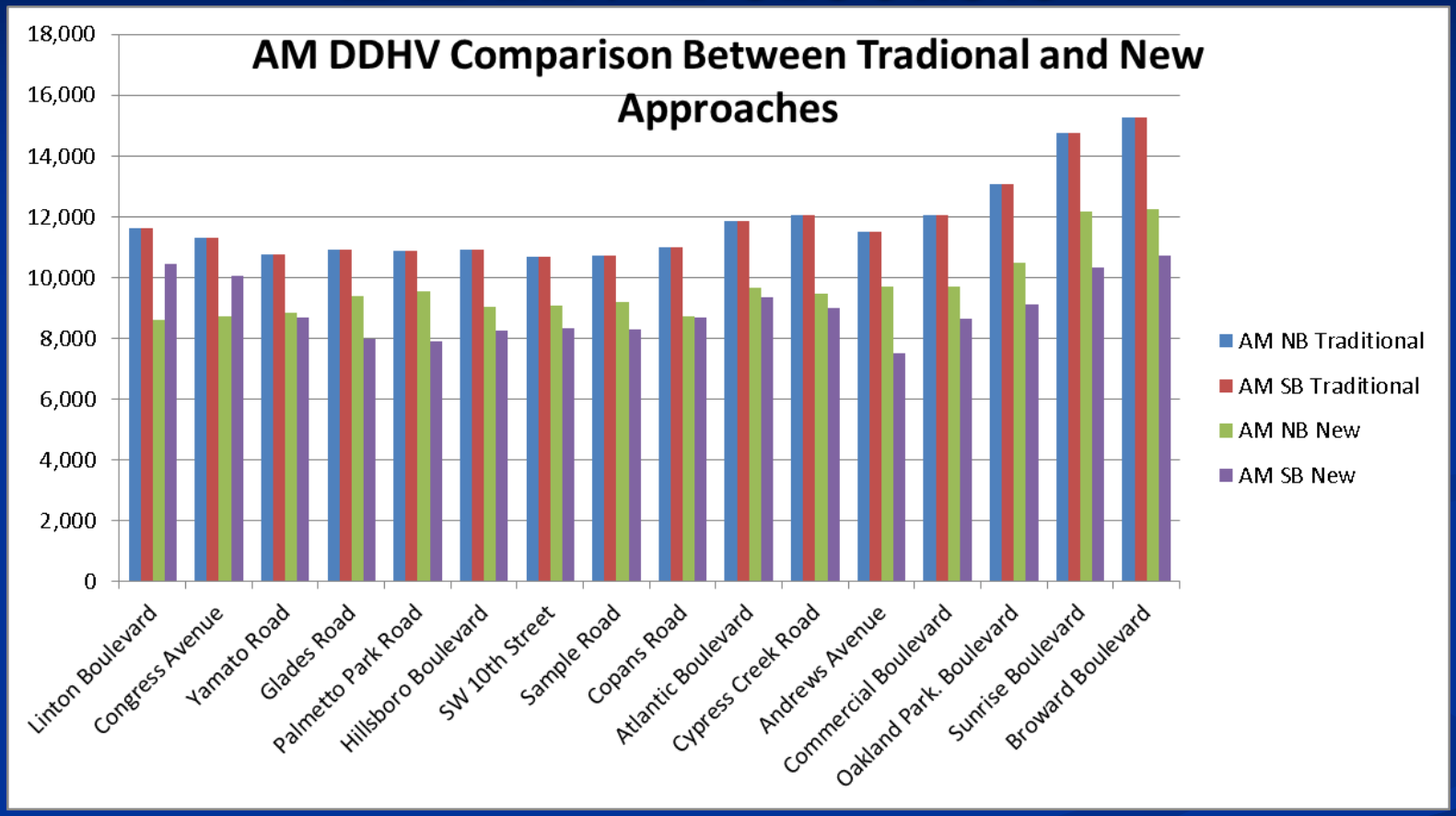
AM SUBAREA MODEL ASSIGNMENT RMSE for year 2010, using 2011 counts							
Vol Grp	Count Range	Model RMSE(%)	Allowable RMSE Range	Volume	Count	Volume/Count	Number of Links
1	1- 5,000	58%	45 - 55%	601,419	533,116	1.13	180
2	5,000- 10,000	38%	35 - 45%	303,209	325,637	0.93	53
3	10,000- 20,000	30%	27 - 35%	545,149	444,128	1.23	28
4	20,000- 30,000	20%	24 - 27%	222,931	197,001	1.13	9
ALL	**1-500,000**	**44%**	**32 - 39%**	**1,672,708**	**1,499,881**	**1.12**	**270**

AM TIGHT SUBAREA MODEL ASSIGNMENT RMSE for year 2010, using 2011 counts							
Vol Grp	Count Range	Model RMSE(%)	Allowable RMSE Range	Volume	Count	Volume/Count	Number of Links
1	1- 5,000	24%	45 - 55%	539,820	544,627	0.99	184
2	5,000- 10,000	8%	35 - 45%	294,332	303,792	0.97	50
3	10,000- 20,000	3%	27 - 35%	456,930	459,168	1	29
4	20,000- 30,000	3%	24 - 27%	194,235	196,449	0.99	9
ALL	**1-500,000**	**12%**	**32 - 39%**	**1,485,317**	**1,504,036**	**0.99**	**272**

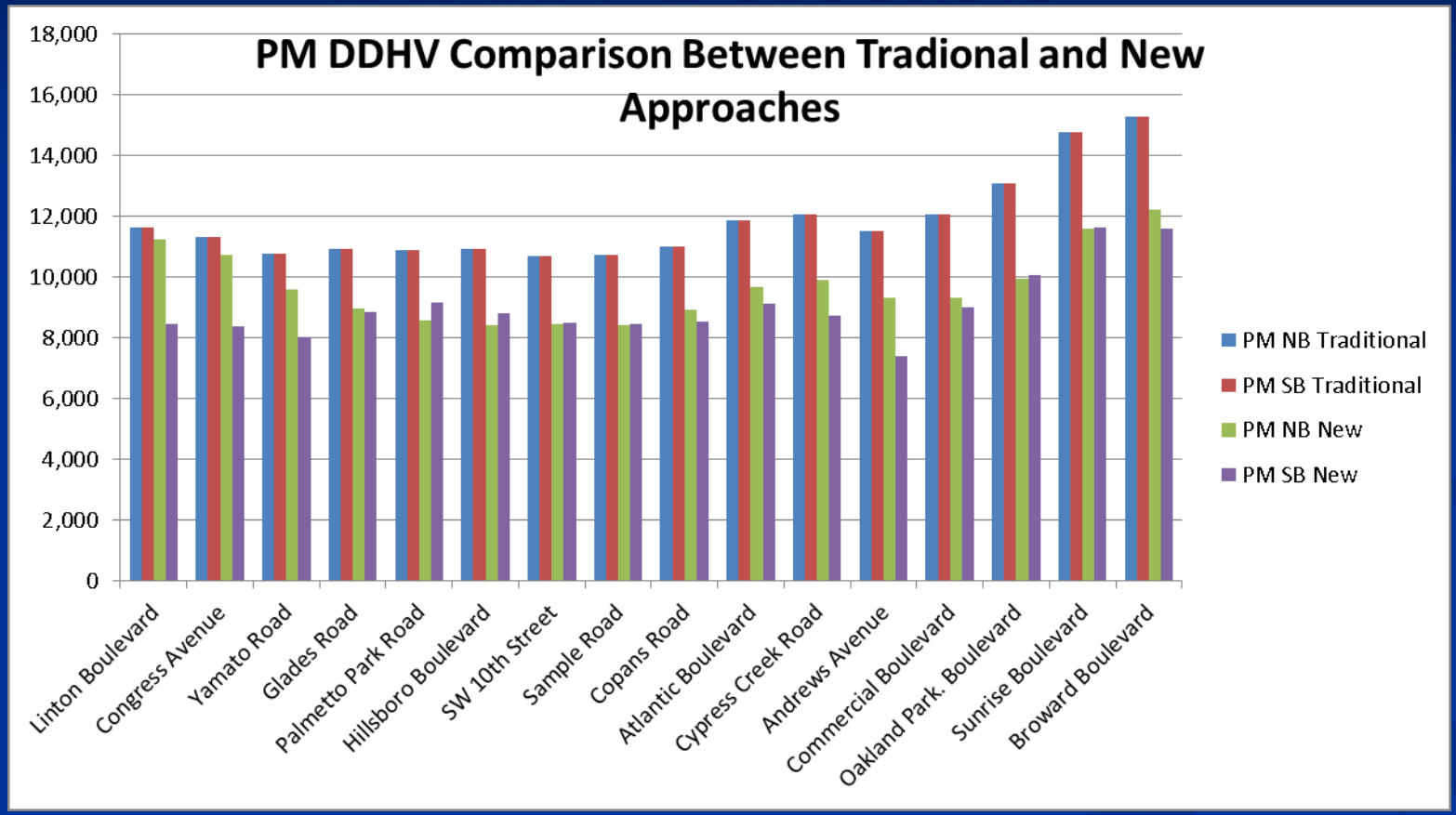
Results Discussion-Improved Trip Lengths

	AM	PM	OP
Tight Subarea	11.29	11.38	14.5
I-95 Survey (unfactored)	11.27	11.23	14.22
I-95 Survey Factored (Using different methods range)	10.57-10.95	10.38-11.23	9.7-10.8

Results Discussion- A look at the AM DDHV Forecasts



Results Discussion- A look at the PM DDHV Forecasts



Results Discussion- AADT Forecasts Comparison to Historic Counts Trends

I-95 Segment North of	2010 Count Station	I-95 PD&E 2040 NB AADT Projection	2040 Historic Trendline projections	%Difference
Linton Blvd.	932193	290400	272200	7%
Yamato Rd.	932192	269259	232000	16%
Glades Rd./SR 808	932191	272613	300500	-9%
Palmetto Park Rd.	932190	272000	218900	24%
SR 810/Hillsboro Blvd	862507	268509	215500	25%
SW 10th St. / SR 869	862506	262484	219300	20%
Sample Rd. / SR 834	860163	263992	220100	20%
Copans Rd.	862505	270250	245900	10%
Atlantic Blvd. / SR 814	862504	291684	269600	8%
Cypress Creek Rd.	862503	296733	311200	-5%
Commercial Blvd. / SR-870	862502	296751	290800	2%
Oakland Park. Blvd	862501	321798	284400	13%
Sunrise Blvd. / SR 838	862500	362942	360900	1%
Broward Blvd. / SR 842	862499	375070	304800	23%
Davie Blvd.	862498	240347	295400	-19%
I-595	862493	273854	297300	-8%
Griffin Rd.	862458	365468	318600	15%
Stirling Rd. / SR-848	862456	379864	301600	26%

Conclusions and Limitations

- Effective Method to relate DDHV and OD Matrices used in Operations Analysis
- Use of Standard K-Based Projections Seem to be Overestimated- "ignored" Peak Spreading??
- The Projections Match well with Historic Trends
- Matrix Estimation Software is Effective Tool if used with Care
- Post-Processing is not Completely Eliminated. Engineering Judgment Should be Exercised

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Thank You!

Questions/Discussion