2040 Long Range Transportation Plan - Needs Assessment: Congestion Management Costs and Benefits

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1.0 Introduction

The Tampa Bay region is the 19th largest metropolitan area in the United States and according to the Texas Transportation Institute's *Urban Mobility Report*, it stands alongside Atlanta, Dallas, Houston, and Chicago as one of the top 20 most congested metro areas in the U.S. Hillsborough County, at its geographic center, has the largest population and employment base in the region. The number of miles traveled each year in Hillsborough County is already twice any adjacent county.

To ensure the system is operating efficiently to move people and goods, the Hillsborough MPO developed a Congestion Management and Crash Mitigation Process (CM/CMP) which focuses on short and mid-term strategies that address congestion and crashes without going through the often lengthy and expensive process of widening roads. The CM/CMP and its evaluation is part of the Long Range Transportation Plan's (LRTP) project selection and prioritization process as advised in 23 CFR 450.322 which guides MPO's on the contents of their LRTPs.

The CM/CMP is based on three goals:

- Improve Reliability of Travel
- Shift Peak-Hour Trips to Modes of Travel Other than Single-Occupant Cars
- Reduced Peak-Hour Impacts

This memo describes the methodology used to estimate the congestion management performance measure of *reliability* based on three alternative investment plans in the 2040 Long Range Transportation Plan (LRTP) update. The methodology is based on work done for the Strategic Highway Research Program 2 (SHRP 2) under project C11, *Development of Improved Economic Impact Analysis Tools*.[1] In Project C11, several modules were developed to estimate the economic impact of transportation investments on factors not usually accounted for in transportation analyses: market access, connectivity, and travel time reliability. It is the reliability module that forms the basis for the current congestion management work.

A spreadsheet was developed in SHRP 2 Project C11 to estimate the reliability impacts of highway investments. This spreadsheet is not being used directly in the current work. Rather, its procedures are being built into a separate tool that post-processes the loaded network file from the Tampa Bay Regional Planning Model (TBRPM), henceforth known as the "C11 Post-Processor." At the request of the Hillsborough MPO, the ability to estimate safety impacts was added; projects that improve safety can have the added benefit of improving the levels of congestion that drivers experience. The results of the safety analysis are documented in the 2040 LRTP Crash Reduction Costs and Benefits Technical Memo.

This effort is being supported by the Florida Department of Transportation (FDOT) as part of its effort to implement products developed under the SHRP 2 program.

2.0 Technical Approach

2.1 Modeling Structure

The C11 Post-Processor is developed as a series of scripts written in the Statistical Analysis System (SAS) and is operated by Cambridge Systematics staff, with the potential to be refined into "user grade" software in the future.

[1] http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2350

For input, the scripts read the loaded network file as well as a list of safety improvements. The analysis is conducted at the corridor level, using the 192 corridors present in the TBRPM.

2.2 Performance Measures

Reliability

- Planning Time Index (95th percentile travel time/free flow travel time)
- Reliability Index (80th percentile travel time/free flow travel time)

Congestion

- Mean Travel Time Index (mean travel time/free flow travel time)

2.3 Methodology

Predicting Travel Time Reliability

The method in the original C11 tool was adapted as follows.

Assign Free Flow Speed (FFS)

- Freeways: 65 mph
- Arterials: 45 mph
- Collectors: 40 mph
- Ramps and local: 35 mph

Calculate Travel Time per Unit Distance (travel rate) for the Current and Forecast Years[2]

$$t = \{(1+(0.1225*(v/c)^{8}))\}/FFS, \text{ for } v/c <= 1.40$$

Where:

t = travel rate (hours per mile)
v = volume (from loaded network file)
c = capacity (from loaded network file)

This volume-delay function is different than the one used in the TBRPM. However, we have found it to produce more reasonable estimates of speeds.

Compute the Recurring Delay in Hours per Mile

$$RecurringDelayRate = t - (1/FFS)$$

Compute the Delay Due to Incidents (*IncidentDelayRate*) in Hours per Mile

[2] Source: Cambridge Systematics and JHK, *Multimodal Corridor and Capacity Analysis Manual,* NCHRP Report 399, Transportation Research Board, 1998.

The lookup tables from the IDAS User Manual[3] are used to calculate incident delay. This requires the v/c ratio, number of lanes, and length and type of the period being studied, which is set at 1-hour. (For rural two-lane highways, use number of lanes = 2.) This is the base incident delay.

If incident management programs have been added as a strategy or if a strategy lowers the incident rate (frequency of occurrence), then the "after" delay is calculated as follows:

$$D_a = D_u * (1-R_f) * (1-R_d)^2$$

Where:
D_a = Adjusted delay (hours of delay per mile).
D_u = Unadjusted (base)delay (hours of delay per mile, from the incident rate tables).
R_f = Reduction in incident frequency expressed as a fraction (where R_f = 0 means no reduction, and R_f = .30 means a 30 percent reduction in incident frequency).
R_d = Reduction in incident duration expressed as a fraction (where R_d = 0 means no reduction, and R_d = .30 means a 30-percent reduction in incident duration).

Changes in incident frequency are most commonly affected by strategies that decrease crash rates. However, crashes are only about 20 percent of total incidents. So, a 30 percent reduction in crash rates alone would reduce overall incident rates by .30 x .20 = .06.

Compute the Overall Mean Travel Time Index *(TTI_m)*. which includes the effects of recurring and incident delay:

$$TTI_m = 1 + FFS * (RecurringDelayRate + IncidentDelayRate)$$

Where: *IncidentDelayRate* is either D_u or D_a

Because the data on which the reliability metric predictive functions do not include extremely high values of TTI_m, it is recommended that TTI_m be capped at a value of 6.0, which roughly corresponds to an average speed of 10 mph. Even though the data included highway sections that were considered to be severely congested, an overall annual average speed of 10 mph for a peak period was never observed. At TTI_m = 6.0, the reliability prediction equations are still internally consistent.

Develop Custom Equations for Predicting Reliability Metrics

Instead of relying on the C11 tool's equations, developed from data from several cities, it was decided to recalibrate them using data from Tampa. Freeway detector data for the Tampa area for 2010-2012 were obtained and analyzed for this purpose. **Figure 1** shows the new equation to predict the 95th percentile travel time index (TTI).

[3] IDAS User's Manual, Appendix B, Tables B.2.14 – B.2.18, http://idas.camsys.com/documentation.htm

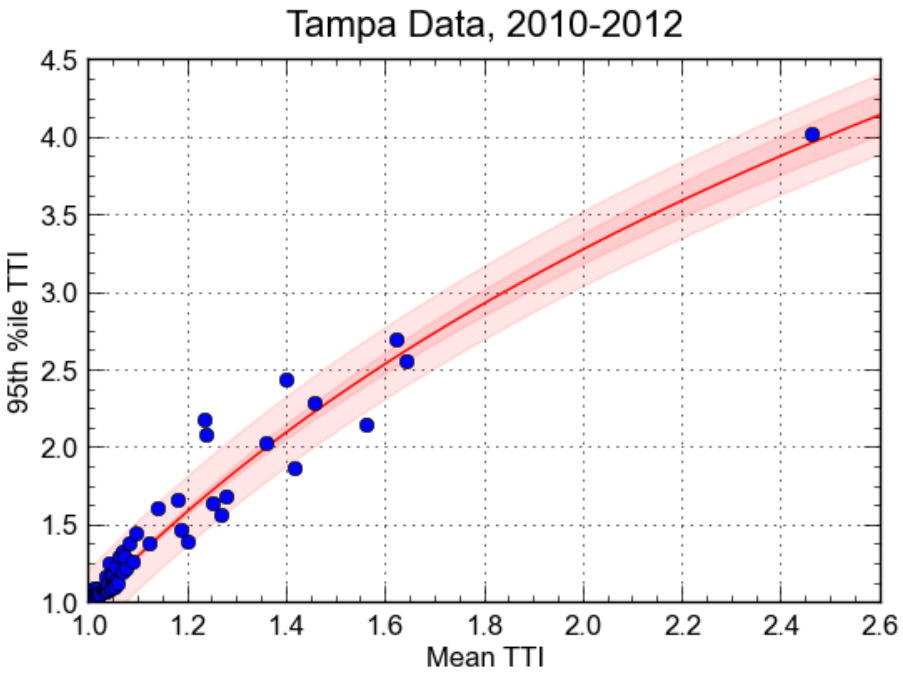


Figure 1. Relationship between the Mean and 95th Percentile Travel Time Indices

The equations for predicting reliability for Tampa roadways are:

$TTI_{95} = 1 + 3.3000 * ln(TTI_m)$

2.4 Reliability Results

Key parameters for conducting the Reliability analyses are listed in **Table 1**. These parameters were adapted from the Federal Highway Administration's (FHWA) Highway Economic Requirements System (HERS) model.[4] HERS is used to estimate the national future highway needs and the impacts of improvement strategies, including operations strategies.

The scenarios represent the intensity of treatments applied and the corresponding benefit seen in the measures of reliability. These are compared between base (today's measure) and in 2040 taking into account the increases in future traffic.

Low: Arterial improvements only (traffic responsive control).

Medium: Arterial improvements (traffic responsive control) plus freeway incident management.

High: Arterial improvements (traffic responsive control) plus freeway incident management, plus advanced freeway operations (lane control, ramp metering, variable speed limit)

[4] Federal Highway Administration, *2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*, http://www.fhwa.dot.gov/policy/2008cpr/appa.htm

Table 1: Congestion Management - Reliability Results

			Scenarios (Intensity of Improvements)		
Highway Type	**Mobility Measure**	**Year**	**Low**	**Medium**	**High**
Freeways	Average TTI	Base	1.580	1.580	1.580
		2040	1.580	1.418	1.308
	80th %ile TTI	Base	1.891	1.891	1.891
		2040	1.891	1.670	1.504
	Planning Time Index[5]	Base	2.206	2.206	2.206
		2040	2.206	1.944	1.744
	Centerline Miles Improved		0	120	120
Arterials	Average TTI	Base	1.717	1.717	1.717
		2040	1.602	1.487	1.487
	80th %ile TTI	Base	2.065	2.065	2.065
		2040	1.930	1.788	1.788
	Planning Time Index[1]	Base	2.431	2.431	2.431
		2040	2.254	2.074	2.074
	Centerline Miles Improved		425	425	425
	Intersections Improved		650	650	650

[5] The Planning Time Index is the 95th %ile Travel Time Index

Interpreting Reliability

The basic unit for the mobility metrics used is the Travel Time Index (TTI). This is the ratio of the actual travel time to the travel time under ideal conditions. Thus, a TTI of 1.2 means that a trip takes 20% longer than it otherwise would if no congestion was present.

The *2011 Congested Corridors Report* published by the Texas Transportation Institute expresses travel time reliability in the following way:

> A predictable transportation system is important to motorists and goods movers. Reliability describes the extra time you add to a trip to ensure you will be on time. Reliability is important if you have to be on time for work, to catch an airplane, to pick up a child at daycare, to ensure just-in-time deliveries are made—any trip when you simply can't be late. We all make important trips, and we add additional time over what a trip takes on a typical day so that we know we will make it on time. Reliability performance measures illustrate the variability in traffic congestion so that we can estimate the extra "buffer" time we need to add to be sure we are on time.

Reliability is based on the idea that travel times for a trip taken in the same time period vary from day-to-day. To describe this variability, we develop a distribution of travel times and use the Planning Time Index to explain how much variability exists. If travelers planned their trips according to their Planning Time Index, they would be late 5 percent of time, or 1 day per month for commuters.

For example, in the table we see that the baseline Planning Time Index for 2040 on freeways is 2.206. This means that travelers have to build in a large "buffer" when planning for their trips so as to be late only one day per month. In this case, freeways trips are expected to take up to twice as long, or even longer, than they would under uncongested conditions. With the deployment of advanced operations, the Planning Time Index is lowered to 1.774, a 20 percent decrease.

Types of Improvements

Roadway segments were identified for improvement if either the AM or PM peak period volume-to-capacity ratio was greater than or equal to 0.8. The AM peak period is 2.5 hours long and the PM peak period is three hours long in 2040. A complete list of segments is in **Appendix A**.

For arterials, two types of operational improvements are proposed: (1) traditional geometric treatments at intersections and (2) advanced coordinated signal control.

For freeways, incident management and advanced operations treatments are proposed. The advanced operations treatments include ramp metering, variable speed limits, and lane control. The "Description" column in **Table 2** shows how these treatments were assigned to the investment level scenarios.

If a roadway segment was identified for improvement, then either the capacity was increased, incident impacts were reduced, or both (depending on the investment scenario). Then, the reliability metrics were calculated for the "improved" case using the same equations as for the base condition. The reliability metrics were computed separately for the AM and PM peak periods, then combined as a VMT-weighted average.

3.0 Congestion Management Improvement Results

Table 2 summarizes the costs and benefits of each level of investment. The unit costs for the improvement types in Investment Levels 2 and 3 were compiled from FHWA's TOPS-BC tool[6,7]. FHWA for planners wishing to conduct benefit-cost analysis for deploying operations strategies.

For Investment Level 1, which represents current spending levels, funds allocated to congestion-related projects in the last two capital improvement plans were averaged due to the fluctuation of funds from year to year.

Investment Level 2 included Investment Level 1 plus arterial intersection geometric upgrades; as well as incident management for freeway operations.

Investment Level 3 included Investment Level 2, but also included more robust freeway operations: incident management, ramp metering, variable speed limits, and lane control.

The number of intersections needing improvement totaled 640 intersections (see **Appendix A**). With the Long Range Plan planning having a 20 year horizon, that would equate to approximately 32 intersection improvements per year. This investment level is consistent with the *Hillsborough County Intersection Program Master Plan White Paper of 2004,* which proposed a 6-year work program of 100-150 intersection projects, or 17-25 projects per year. Another 7-15 projects per year can be implemented in Tampa, Plant City and Temple Terrace combined.

Appendix A displays the list of corridors with volume to capacity greater than or equal to 0.80. The freeway projects listed first in the table are those corridors that would be improved using the freeway treatments identified in Table 2.

Appendix B shows a list of illustrative congestion-related projects that have been identified by local agencies or recommended in previous plans and studies. Theses illustrative projects are not intended to be an exhaustive list.

[6] http://www.ops.fhwa.dot.gov/publications/fhwahop13041/sec1.htm
[7] http://www.plan4operations.dot.gov/topsbctool/index.htm

Table 2: Congestion Management Costs and Benefits

Investment Level 1 CURRENT SPENDING TREND	**Responsible Agency**	**Description**	**FY13-17 CIP**	**FY14-18 CIP**
	FDOT	Road Ranger Patrol: I-275, 1-4/Selmon	$9,125,004	$9,125,004
	Hillsborough	Intersection Program, ATMS, TMC	$50,792,000	$67,900,000
	City of Tampa	Intersection Program, ATMS, signals	$10,440,000	
	City of Temple Terrace	ATMS	$270,000	
	Total 5-year spending		$70,627,004	$77,025,004
	Average of 5-year spending		$73,826,004	
	Current Spending Trend – Extended over 20 years $295,304,016		**Level 1 Total**	
Benefits	**- Arterial capacity is increased by 7% over no-build - Planning Time Index 2.2 on freeways, 2.3 on arterials, in 2040**			

Investment Level 2	**Description**	**Number**	**Unit Cost**	**Additional Cost**	**Total Cost**
	Level 1 Congestion Projects				$295,304,016
	Intersections: geometric improvements, ATMS, TMC	640 intersections	$770,000		$492,800,000
	TMC and ATMS Infrastructure and labor	one time cost		$9,400,000	$9,400,000
	Freeway operations: Incident Management	120 miles	$260,000		$31,200,000
	Freeway operations: Incident Management Infrastructure	One time cost		$3,000,000	$3,000,000
				Level 2 Total	**$831,704,016**
Benefits	**- Arterial capacity is increased by 17% - Incident frequency is reduced by 5% - Incident duration is reduced by 25% - Planning Time Index 1.9 on freeways, 2.1 on arterials, in 2040**				

	Description	Number/Year	Unit Cost	Annual Cost	Total Cost
Investment Level 3	Level 1 Congestion Projects				$295,304,016
	Intersections: geometric improvements, ATMS	640 intersections	$770,000		$492,800,000
	TMC and ATMS Infrastructure and labor	one time cost		$9,400,000	$9,400,000
	Freeway operations: Incident Management, ramp metering, variable speed limits, lane control	120 miles	$1,500,000		$4,600,000
	Freeway operations: Infrastructure & Labor	one time cost		$4,600,000	$180,000,000
				Level 3 Total	**$982,374,016**
Benefits	**- Arterial capacity is increased by 17%** **- Incident frequency is reduced by 7%** **- Incident duration is reduced by 25%** **- Freeway capacity is increased by 10%** **- Planning Time Index 1.7 on freeways, 2.1 on arterials, in 2040**				

Appendix A: Roadway Segments Needing Congestion Management Improvements

Freeways

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity
Brandon Parkway	I-75	Lumsden Rd	0.84	1.30
Courtney Campbell Causeway	Pinellas/Hillsborough Co Line	Eisenhower Blvd/Veterans Expwy	5.87	1.16
Crosstown/I-4 Connector	Leroy Selmon Crosstown Expwy	I-4	1.92	0.39
Eisenhower Blvd	Courtney Campbell Cswy	Hillsborough Ave	0.14	1.06
Gandy Blvd	Pinellas / Hillsborough Co Line	Dale Mabry Hwy	2.45	0.83
Hillsborough Ave	I-4 ramp	US 301	0.51	1.26
I-275	Pinellas/Hillsborough Co Line	I-4	8.26	1.45
I-275	I-4	Bearss	8.03	1.13
I-275	Bearss	I-75	6.15	0.91
I-4	I-275	I-75	8.40	1.33
I-4	I-75	Hillsborough / Polk County Line	16.48	1.44
I-75	Manatee/Hillsborough Co Line	Big Bend Rd	10.91	1.30
I-75	Big Bend Rd	Leroy Selmon Crosstown Expwy	8.75	1.58
I-75	Leroy Selmon Crosstown Expwy	I-4	3.76	1.19
I-75	I-4	I-275	7.44	1.18
Leroy Selmon Crosstown Expwy	Gandy Blvd	Willow Ave	2.01	0.96
Leroy Selmon Crosstown Expwy	Willow Ave	I-75	7.14	1.52
Leroy Selmon REL	I-75	Downtown	7.55	1.75
Memorial Hwy	Kennedy Blvd	Courtney Campbell Causeway	0.98	0.98

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity
Suncoast Expwy	Veterans Exwy	Lutz Lake Fern	2.94	1.33
Suncoast Expwy	Lutz Lake Fern	Hillsborough/Pasco Co Line	1.12	1.38
Veteran Expwy	Hillsborough Ave	Veterans Exwy Spur	6.05	1.17
Veterans Exwy Spur	Veterans Exwy Spur	Dale Mabry Hwy N	2.4	0.63
		Total Freeways	120.09	

Priority Arterials

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity	Intersections Needing Improvement
22nd St	Adamo Dr	Hillsborough Ave	1.06	1.42	2
40th St	Adamo Dr	Hillsborough Ave	2.16	0.91	3
40th St	Hillsborough Ave	Fowler Ave	3.53	0.78	5
50th St	Melbourne Blvd/US 41	Hillsborough Ave	1.47	1.03	2
50th St	Causeway Blvd	US 41	1.21	1.70	2
56th St	Hillsborough Ave	Fowler Ave	4.01	0.93	6
Armenia Ave	Swann Ave	Busch Blvd	4.11	1.66	6
Bearss Ave	Florida Ave	30th St	2.38	1.83	4
Boy Scout Blvd/Spruce St	Memorial Hwy	Dale Mabry Hwy	1.74	1.62	3
Branch Forbes Rd	Dr MLK Jr Blvd	Thonotosassa Rd	0.47	1.20	1
Brandon Parkway	I-75	Lumsden Rd	1.38	2.65	2
Bruce B Downs Blvd	Bearss Ave	Cross Creek Rd	6.37	1.44	10
Busch Blvd	Dale Mabry Hwy	Nebraska Ave	6.86	2.01	10
Causeway Blvd	Adamo Dr	US 301	7.82	1.00	12
Channelside Dr	Kennedy Blvd	Adamo Dr	0.33	1.58	1
CR 39	SR 674	SR 60	12.54	1.26	19

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity	Intersections Needing Improvement
Dale Mabry Hwy	Interbay Blvd	Kennedy Blvd	4.14	1.23	6
Dale Mabry Hwy	Kennedy Blvd	Hillsborough Ave	3.13	1.17	5
Dale Mabry Hwy	Hillsborough Ave	US 41	12.15	1.51	18
Fletcher Ave	Dale Mabry Hwy	Nebraska Ave	3.36	0.63	5
Fletcher Ave	Nebraska Ave	I-75	4.05	1.53	6
Florida Ave	Kennedy Blvd	Busch Blvd	2.89	1.12	4
Florida Ave	Busch Blvd	Nebraska Ave	5.19	1.44	8
Fowler Ave	I-275	I-75	6.69	2.04	10
Gandy Blvd	Pinellas/Hillsborough Co Line	Dale Mabry Hwy	1.34	1.70	2
Gibsonton Rd	US 41	I-75	0.24	1.00	1
Gunn Hwy	Dale Mabry Hwy	Veterans Exwy	4.49	1.56	7
Gunn Hwy	Veterans Exwy	Hillsborough/Pasco Co Line	7.89	1.71	12
Hillsborough Ave	Dale Mabry Hwy	US 301	7.48	1.55	11
Hillsborough Ave	US 301	Thonotosassa Rd	10.00	2.17	15
Hillsborough Ave	Pinellas/Hillsborough Co Line	Memorial Hwy	4.83	1.58	7
Hillsborough Ave	Memorial Hwy	Dale Mabry Hwy	4.67	1.64	7
Jackson St	Ashley St	Meridian Ave	0.03	0.91	1
James L Redman Pkwy	SR 60	Reynolds Rd	2.66	0.73	4
Kennedy Blvd	Memorial Hwy	Dale Mabry Hwy	1.3	1.73	2
Kennedy Blvd	Dale Mabry Hwy	Channelside Dr	2.80	1.26	4
Lithia Pinecrest Rd	Bloomingdale Ave	Brandon Blvd	3.81	1.58	6
Memorial Hwy	Kennedy Blvd	Courtney Campbell Causeway	0.24	1.96	1
MLK Jr Blvd	Dale Mabry Hwy	I-275	2.89	1.22	4
Nebraska Ave	Kennedy Blvd	Busch Blvd	4.54	1.16	7
Park Rd	US 92	I-4	0.52	1.83	1
Sheldon Rd	Hillsborough Ave	Ehrlich Rd	4.96	1.56	7

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity	Intersections Needing Improvement
SR 60/Adamo Dr	Channelside Dr	50th St	2.79	1.47	4
SR 60/Adamo Dr	50th St	US 301	2.95	1.75	4
SR 60/Adamo Dr	US 301	I-75	1.37	1.95	2
SR 60/Adamo Dr	I-75	Turkey Creek Rd	7.57	2.02	11
SR 674	US 41	Hillsborough/Polk Co Line	9.22	1.80	14
US 301	Manatee/Hillsborough Co Line	Big Bend Rd	4.31	1.58	7
US 301	Big Bend Rd	Leroy Selmon Crosstown Expwy	9.97	1.89	15
US 301	Leroy Selmon Crosstown Expwy	I-4	3.56	1.50	5
US 301	I-4	Fowler Ave	4.00	1.38	6
US 301	Fowler Ave	Hillsborough/Pasco Co Line	11.51	1.90	17
US 41	50th St	40th St	0.88	1.88	1
US 41	Manatee/Hillsborough Co Line	Big Bend Rd	11.2	2.08	17
US 41	Big Bend Rd	Leroy Selmon Crosstown Expwy	11.11	1.84	17
US 41	Busch Blvd	Bearss	3.79	1.19	6
US 41	Bearss	Hillsborough/Pasco Co Line	5.95	1.76	9
US 92	I-275	I-4	4.05	1.44	6
US 92	I-4	I-75	3.38	1.68	5
US 92	I-75	Alexander St	9.09	1.75	14
US 92	Alexander St	Hillsborough/Polk Co Line	1.54	0.97	2
Westshore Blvd	Gandy Blvd	Kennedy Blvd	3.50	1.59	5
Westshore Blvd	Kennedy Blvd	Spruce St	1.03	1.55	2
Wheeler Rd	Reynold Rd	Pasco/Hernando Co Line	8.2	1.12	12
		Total Tier 1 Arterials	287.8		430

Other Major Arterials

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity	Improved Intersections
20TH ST	MARITIME BLVD	HARPER ST	0.73	1.01	1
22ND ST	LEE ROY SELMON EXWY	21ST ST	0.35	1.29	1
30TH ST	LINEBAUGH AVE	BOUGAINVILLEA	1.33	0.89	2
30TH ST	PINE DR	131ST AVE	1.65	1.48	2
46TH ST	FLETCHER AVE	SKIPPER RD	0.82	1.03	1
78TH ST	TECO DRIVEWAY	LEE ROY SELMON EXWY	1.98	1.00	3
78TH ST	MADISON AVE	CAUSEWAY BLVD	0.53	1.06	1
ALEXANDER ST	VICTORIA ST	I-4 FRONTAGE RD	1.91	0.81	3
ANDERSON RD	WATERS AVE	VETERANS EXPY R	1.65	1.02	2
ANDERSON RD	SLIGH AVE	CRENSHAW ST	2.28	0.90	3
ARMENIA AVE	BUSCH BLVD	LINEBAUGH AVE	0.6	1.20	1
ASHLEY ST	ZACK ST	POLK ST	0.6	1.06	1
BAYSHORE BLVD	VERNE ST	PLATT ST	3.79	0.81	6
BEARSS AVE	ROME AVE	N BOULEVARD	2.73	0.97	4
BIG BEND RD	US HWY 41	OLD BIG BEND RD	3.18	1.20	5
BIG BEND RD	SUMMERFIELD BLVD	BALM RIVERVIEW	0.65	1.18	1
BIRD ST	I-275 S RAMP	I-275 N RAMP	0.03	0.94	1
BLOOMINGDALE AVE	US HWY 301	GORNTO LAKE RD	5.24	1.34	8
BOY SCOUT RD	RACE TRACK RD	CRAWLEY RD	0.36	1.01	1
BOYETTE RD	US HWY 301	BALM RIVERVIEW	3.78	1.41	6
BRUCE B DOWNS BL	WHARTON HIGH	COUNTY LINE RD	2.01	1.36	3
CAUSEWAY BLVD	MARITIME BLVD	50TH ST	1.62	1.23	2
COUNTY LINE RD	US HWY 92	I-4 FRONTAGE RD	3.82		6
CYPRESS ST	I-275	DALE MABRY HWY	0.53	0.96	1
CYPRESS ST	WESTSHORE BLVD	TRASK ST	0.66	0.90	1
CYPRESS ST	LOIS AVE	I-275	0.27	2.11	1

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity	Improved Intersections
DALE MABRY HWY	MACDILL AFB	INTERBAY BLVD	1.1	0.95	2
EHRLICH RD	VETERANS EXPWY	BELLAMY RD	3.8	1.34	6
FALKENBURG RD	US HWY 301	CRESCENT PARK DR	1.16	0.99	2
FALKENBURG RD	PROGRESS BLVD	EVERHART RD	1.59	1.61	2
FALKENBURG RD	WOODBERRY RD	WINDHORST RD	2.09	1.13	3
FISH HAWK BLVD	BELL SHOALS RD	LITHIA PINECRES	0.87	0.92	1
FLORIBRASKA AVE	TAMPA ST	FLORIDA AVE	0.37	0.73	1
GIBSONTON DR	I-75 S RAMP	I-75 N RAMP	1.39	0.96	2
INDEPENDENCE PKW	VETERANS FRONTAG	VETERANS EXPWY	0.8	1.39	1
KINGS AVE	RONELE DR	PROVIDENCE LAKE	3.13	1.23	5
LAKEWOOD DR	OAKFIELD DR	SR 60	0.6	1.01	2
LINEBAUGH AVE	WILSKY BLVD	VETERANS EXPWY	5.16	1.15	8
LINEBAUGH AVE	RACE TRACK RD	CITRUS PARK EXT	0.7	0.97	2
LINEBAUGH AVE	MONTAGUE ST	SHELDON RD	2.85	1.02	4
LINEBAUGH AVE	N BOULEVARD	FLORIDA AVE	1.85	1.41	3
LITHIA PINECREST	FISHHAWK	BOYETTE RD	2.32	0.80	3
LIVINGSTON AVE	VANDERVORT RD	COMMERCE PKWY	6.62	0.80	10
LOIS AVE	I-275 S RAMP	CYPRESS ST	0.47	1.04	1
LUMSDEN RD	DURANT RD	VALRICO RD	1.02	1.07	2
LUTZ LAKE FERN R	SUNCOAST PKWY	LAKE PATIENCE	5.28	1.41	8
LYNN TURNER	LAGUNA WOODS CT	ESSRIG ELEMENTA	1.59	1.21	2
MADISON AVE	US HWY 41	66TH ST	0.66	1.35	1
MEMORIAL HWY	WEBB RD	NORMANDY DR	1.97	0.89	3
MEMORIAL HWY	VETERANS FRONTAG	VETERANS EXPWY	0.67	0.99	1
MORRIS BRIDGE RD	I-75	CROSS CREEK BLV	0.73	0.80	1
MORRIS BRIDGE RD	I-75	CROSS CREEK BLV	8.39	0.92	13
N BOULEVARD	WEST ST	M L KING BLVD	1.06	1.62	2
N BOULEVARD	ROSS ST	COLUMBUS DR	1.5	1.05	2

Corridor Name	From	To	Length (Mi.)	2040 Peak Period volume/capacity	Improved Intersections
NORTH BOUNDARY	DALE MABRY HWY	BAYSHORE BLVD	0.62	1.30	1
PARK RD	JIM JOHNSON RD	ALBERTSONS DR	1.67	1.61	3
PARSONS AVE	OAKFIELD RD	SR 60	1.05	1.43	2
PARSONS AVE	WINDHORST RD	WHEELER RD	3.19	1.00	5
PROGRESS BLVD	I-75	US HWY 301	1.23	0.82	2
PROGRESS BLVD	I-75	US HWY 301	0.89	1.22	1
PROVIDENCE RD	WINDINGWOOD AVE	LUMSDEN RD	2.19	1.16	3
RACE TRACK RD	BOY SCOUT RD	GUNN HWY	0.76	1.40	1
RACE TRACK RD	S MOBLEY	PATTERSON RD	2.23	1.16	3
SKIPPER RD	BRUCE B DOWNS BLVD	46TH ST	0.64	0.94	1
SUNSET LANE	US HWY 41	HANNA RD	0.73	1.34	1
TARPON SPRINGS R	PINELLAS COUNTY	PATTERSON RD	2.39	1.76	4
TEMPLE TERRACE H	TEMPLE PARK DR	78TH ST	1.58	1.01	2
TEMPLE TERRACE H	DAVIS RD	MORRIS BRIDGE R	1.07	1.52	2
VAN DYKE RD	WHIRLEY RD	DALE MABRY HWY	4.68	1.17	7
WATERS AVE	WILSKY BLVD	HANLEY RD	1.86	1.65	3
WATERS AVE	WOODLAND CORPORA	MANHATTAN AVE	2.9	0.64	4
WATERS AVE	TWIN LAKES BLVD	HABANA AVE	1.33	0.82	2
WATERS AVE	ROME AVE	N BOULEVARD	1.83	1.22	3
		Total Other Major Arterials	139.16		210
		TOTAL ALL ARTERIALS	423.88		640

Appendix B: Illustrative Congestion Management Projects

Agency	Project	Further Description	Transportation for Economic Development*
City of Tampa	109th @ 22nd round-a-bout or lane improvements		
City of Tampa	12th @ Busch	New Pedestrian Signal	
City of Tampa	Armenia & Busch Intersection	north & westbound dual left turn lanes.	
City of Tampa	ATMS Citywide Deployment	replace, install, maintain traffic cameras, vehicle detection, poles, fiber optic network	YES
City of Tampa	Commerce Palms @ Compton	Intersection improvement; New Traffic Signal	YES
City of Tampa	County-line Road and Bearsley	Roadway Alignment	
City of Tampa	Cypress St at Lois Ave	Intersection Improvement	YES
City of Tampa	Dale Mabry Hwy at Henderson	Intersection Improvement	YES
City of Tampa	Dale Mabry Hwy at Interbay	Intersection Improvement	YES
City of Tampa	Dale Mabry Hwy at Kennedy Blvd	Intersection Improvement	YES
City of Tampa	Downtown Tampa ATMS	93 signalized intersections	YES
City of Tampa	Fowler at 50th Intersection	Additional left turn lanes north & southbound	
City of Tampa	Fowler from 30th to 50th	Insync Adaptive Control and signal upgrades,	
City of Tampa	Highwoods Preserve @ Highwoods Palm Way	Intersection improvement; New Traffic Signal	YES

Agency	Project	Further Description	Transportation for Economic Development*
City of Tampa	Highwoods Preserve Pkwy @ BBD	Intersection improvement; Dual Right	YES
City of Tampa	Interbay Blvd at Himes Ave	Intersection Improvement	YES
City of Tampa	Intersection Improvements	citywide for congestion & safety	
City of Tampa	Kennedy/Hyde Park ATMS	44 signalized intersections	
City of Tampa	Kinnan Street and Mansfield Blvd	Roadway Connection and Improvements	
City of Tampa	Linebaugh @ 22nd	round-a-bout or lane improvements	
City of Tampa	Maritime Blvd at 22nd St	Intersection improvement	YES
City of Tampa	Meadow Point and K-Bar development	Roadway Connection and improvements	
City of Tampa	MLK at Lois Intersection	replace signal, ped features, new right turn in both directions of MLK	
City of Tampa	Platt St at Aremenia Ave	intersection improvement	YES
City of Tampa	Pride Elementary, Basset Creek Dr. @ Kinnan	Access Improvements	
City of Tampa	S. Tampa/S. Dale Mabry	78 signalized intersections	
City of Tampa	South Downtown	Street network reconfiguration	YES
City of Tampa	Traffic Signals	replacing old with new	
City of Tampa	University Area / Busch Blvd	40 signalized intersections	
City of Tampa	USF/Busch Blvd ATMS	40 signalized intersections	

Agency	Project	Further Description	Transportation for Economic Development*
City of Tampa	Westshore & Gandy Intersection	widening all 4 approaches, addtl left turn, addtl thru lanes, sidewalk, signal adjust, bike lanes s. of Gandy	YES
City of Tampa	Westshore Blvd at Interbay	Intersection Improvement	YES
City of Tampa	Willow Ave to Cass St RR Bypass Development via CSX	Street network reconfiguration	YES
HART	MetroRapid - (Kennedy/TIA)	Bus Rapid Transit Infrastructure	
HART	MetroRapid – (Brandon)	Bus Rapid Transit Infrastructure	
HART	MetroRapid – (Dale Mabry)	Bus Rapid Transit Infrastructure	
HART	MetroRapid – (New Tampa)	Bus Rapid Transit Infrastructure	
HART	MetroRapid East/West (Temple Terrace/TIA)	Bus Rapid Transit Infrastructure	
Hillsborough County	109th & 22nd St	new pedestrian signal	
Hillsborough County	131st Ave (Nebraska to BBD/30thSt)	ATMS	YES
Hillsborough County	138th Ave/Azalea at Bruce B. Downs	Intersection Improvement	YES
Hillsborough County	50th Ave at Holly Dr	Intersection Improvement	YES
Hillsborough County	50th Ave at Palm River Rd	Intersection Improvement	YES
Hillsborough County	56th (East Lake Square Entr to Fletcher)	ATMS	YES
Hillsborough County	Anderson Rd at Gunn Hwy	Intersection Improvement	YES

Agency	Project	Further Description	Transportation for Economic Development*
Hillsborough County	Anderson Rd at Sligh Ave	Intersection Improvement	YES
Hillsborough County	Balm Riverview at Rhodine Rd	Intersection Improvement	YES
Hillsborough County	Balm Riverview at Symmes Rd	Intersection Improvement	YES
Hillsborough County	Bearss Ave at 22nd St	Intersection Improvement	YES
Hillsborough County	Bearss Ave at Florida Ave	Intersection Improvement	YES
Hillsborough County	Bearss Ave at Zambito Rd	Intersection Improvement	YES
Hillsborough County	Big Bend (US41 to Summerfield) US41 (Apollo to Big Bend)	ATMS	YES
Hillsborough County	Boyette (US301 to Bell Shoals)	ATMS	YES
Hillsborough County	Brandon Blvd at Kings Dr	Intersection Improvement	YES
Hillsborough County	Brandon Blvd at Lakewood Dr	Intersection Improvement	YES
Hillsborough County	Broadway Ave at 50th St	Intersection Improvement	YES
Hillsborough County	Broadway Ave at 66th St	Intersection Improvement	YES
Hillsborough County	Broadway Ave at Falkenburg Rd	Intersection Improvement	YES
Hillsborough County	Bruce B Downs at Fletcher	Intersection Improvement	YES
Hillsborough County	Busch Blvd at 40th St	Intersection Improvement	YES
Hillsborough County	Busch Blvd at Himes Ave	Intersection Improvement	YES
Hillsborough County	Busch Blvd at I-275	Intersection Improvement	
Hillsborough County	Busch Blvd at Nebraska	rail crossing improvement	
Hillsborough County	College Ave (US41 to US301)	ATMS	YES

Agency	Project	Further Description	Transportation for Economic Development*
Hillsborough County	CR 579 at Old Hillsborough Ave	Intersection Improvement	YES
Hillsborough County	Dale Mabry (Sligh Ave to Van Dyke)	ATMS	YES
Hillsborough County	Dale Mabry (Van Dyke to County Line)	ATMS	YES
Hillsborough County	Dale Mabry Hwy at Hamilton Ave	Intersection Improvement	YES
Hillsborough County	Dale Mabry Hwy at Stall Rd	Intersection Improvement	YES
Hillsborough County	Durant Rd at Miller Rd	Intersection Improvement	YES
Hillsborough County	Ehrlich Rd at Hutchenson Rd	Intersection Improvement	YES
Hillsborough County	Fish Hawk (Bell Shoals to Lithia Pinecrest)	ATMS	YES
Hillsborough County	Fletcher Ave at 15th St	Intersection Improvement	YES
Hillsborough County	Fowler (30th St to 50th St)	Insync Adaptive Control & signal upgrades	
Hillsborough County	Fowler (56th to US301)	ATMS	YES
Hillsborough County	Fowler at 50th St	Intersection Improvement	YES
Hillsborough County	George Rd at Memorial Hwy	Intersection Improvement	YES
Hillsborough County	Gibsonton (US41 to US301)	ATMS	YES
Hillsborough County	Gunn (S. Mobley to Lutz Lake Fern)	ATMS	YES
Hillsborough County	Gunn (Sheldon to Dale Mabry)	ATMS	YES
Hillsborough County	Gunn-Linebaugh Intersection	Remove westbound left & add westbound right turn lane, southbound right and eastbound right	YES

Agency	Project	Further Description	Transportation for Economic Development*
Hillsborough County	Habana-Waters Intersection	install north & southbound left turns, upgrade mast arms, sidewalk and ADA upgrades	
Hillsborough County	Hanley (Hillsborough to Waters)	ATMS	YES
Hillsborough County	Hanley Rd at Jackson Springs Rd	Intersection Improvement	YES
Hillsborough County	HART Transit Signals	Transit Signal Priority system. Extended green or shortened opposing red time	
Hillsborough County	Highwood Preserve at BBDowns	Dual right turn lanes	
Hillsborough County	Hillsborough (56th to Kingsway)	ATMS	YES
Hillsborough County	Hillsborough (Kingsway to Turkey Creek)	ATMS	YES
Hillsborough County	Hillsborough (Memorial to Hoover)	ATMS	YES
Hillsborough County	Hillsborough (Race Track to Sheldon)	ATMS	YES
Hillsborough County	Hillsborough Ave at Kelly Rd	Intersection Improvement	YES
Hillsborough County	Hillsborough Ave at Sawyer Rd	Intersection Improvement	YES
Hillsborough County	Hillsborough Ave at TNC Blvd	Intersection Improvement	YES
Hillsborough County	Himes & Lambright with Himes & Minnehaha	Intersection Improvement	

Agency	Project	Further Description	Transportation for Economic Development*
Hillsborough County	Himes Ave at Idlewild Ave	Intersection Improvement	YES
Hillsborough County	Himes Ave at Waters Ave	Intersection Improvement	YES
Hillsborough County	Hutchison (Ehrlich to Veterans)	ATMS	YES
Hillsborough County	I-275 at Fletcher Ave	interchange modification	
Hillsborough County	Intersection Improvement Program	Funding for a group of intersection projects around county as shown in ***Intersection Master Plan***	
Hillsborough County	John Moore/Parsons at Lumsden	Add eastbound right, southbound right, and westbound right	
Hillsborough County	Kingsway (Brandon Blvd to MLK)	ATMS	YES
Hillsborough County	Lithia Pinecrest (Brandon Blvd to Fish Hawk)	ATMS	YES
Hillsborough County	Lithia/Lumsden/Bell Shoals/Durant Intersections	additional or extension of turn lanes, thru lanes, concrete deparators, bike lanes, sidewalks, signals	
Hillsborough County	Lumsden Rd at Valrico Rd	Intersection Improvement	YES
Hillsborough County	Lutz Lake Fern Rd at Heritage Harbor Pkwy	Intersection Improvement	YES
Hillsborough County	Madison (US41 to US301)	ATMS	YES
Hillsborough County	Mango Rd at Old Hillsborough Ave	Intersection Improvement	YES
Hillsborough County	Memorial (Hillsborough to Eisenhower)	ATMS	YES

Agency	Project	Further Description	Transportation for Economic Development*
Hillsborough County	MLK Blvd (Corporex Park to Parsons)	ATMS	
Hillsborough County	MLK Blvd (Kingsway to 36th St)	ATMS	YES
Hillsborough County	MLK Blvd at 50th St	Intersection Improvement	YES
Hillsborough County	New & Improved Signalization	traffic signals upgrades to improve traffic movement	
Hillsborough County	New Traffic Signals	Countywide	
Hillsborough County	Northdale (Northdale to Dale Mabry)	ATMS	YES
Hillsborough County	Orient Road/Sligh Traffic Signal	Determine best alternative for intersection	
Hillsborough County	Parsons (Brandon Blvd to US92)	ATMS	YES
Hillsborough County	Parsons Ave at Windhorst Rd	Intersection Improvement	YES
Hillsborough County	Race Track (Hillsborough to S. Mobley)	ATMS	
Hillsborough County	S. Mobley (Race Track to Gunn)	ATMS	YES
Hillsborough County	S. Village (N. Village to Dale Mabry)	ATMS	YES
Hillsborough County	Sligh (56th to Orient)	ATMS	YES
Hillsborough County	Sligh (Benjamin to Habana)	ATMS	YES
Hillsborough County	SR 60 at Mt. Carmel Rd	Intersection Improvement	YES
Hillsborough County	SR 60 at Parsons Blvd	Intersection Improvement	YES
Hillsborough County	SR 60 at St. Cloud Ave	Intersection Improvement	YES
Hillsborough County	SR 60 at Valrico Rd	Intersection Improvement	YES

Agency	Project	Further Description	Transportation for Economic Development*
Hillsborough County	Sydney Rd at Valrico Rd	Intersection Improvement	YES
Hillsborough County	University Area/Busch Blvd	40 signalized intersections	
Hillsborough County	US 301 at Palm River Rd	Intersection Improvement	YES
Hillsborough County	US 301 at Riverview Dr	Intersection Improvement	YES
Hillsborough County	US 41 (Apollo Beach Blvd to Big Bend	ATMS	YES
Hillsborough County	US 41 at Crenshaw Lake Rd	Intersection Improvement	YES
Hillsborough County	US 41 at Sunset Blvd	Intersection Improvement	YES
Hillsborough County	US301 (Adamo Dr to Harney)	ATMS	YES
Hillsborough County	US301 (Bishop Rd to Boyette Rd)	ATMS	YES
Hillsborough County	US41 (19th Ave SE to Apollo Beach Blvd)	ATMS	YES
Hillsborough County	US41 (Big Bend to SR60)	ATMS	YES
Hillsborough County	US41 (Gulf City Rd to 19th Ave)	ATMS	YES
Hillsborough County	US41 (Symmes to Brandon Blvd)	ATMS	
Hillsborough County	USF Area/Busch Blvd	ATMS	
Hillsborough County	Van Dyke (Gunn to Dale Mabry)	ATMS	YES
Hillsborough County	Wheeler Street Re-Alignment	More traditional right angle	

Source Document	Project	Further Description	Transportation for Economic Development
2035 LRTP	Cash for Commuters	Hillsborough County Program	
2035 LRTP	Public Outreach & Education		
2035 LRTP	Telework Tampa Bay	Hillsborough County Program	
2035 LRTP	Vanpools - Current	80% to and from Hillsborough County	
2035 LRTP	Vanpools - Expansion	60% to and from Hillsborough County	
ITS Master Plan 2013	Active Traffic Management (ATM) Feasibility Study		
ITS Master Plan 2013	Arterial Real-Time Speed & Travel-Time System		
ITS Master Plan 2013	City of Tampa ATMS Upgrades		
ITS Master Plan 2013	City of Tampa ITS-Facility Management System		
ITS Master Plan 2013	Downtown Advanced Parking Management System Plan & Demo		
ITS Master Plan 2013	Dynamic Alternative Route System Study		
ITS Master Plan 2013	Emergency Alert System Enhancements		
ITS Master Plan 2013	Highway-Rail Crossing Traffic & Safety System Study & Pilot		
ITS Master Plan 2013	Hillsborough County Air Quality Monitoring System		
ITS Master Plan 2013	Hillsborough County ITS-Facility Management System		
ITS Master Plan 2013	Hillsborough County TMC Expansion & Upgrades		

Source Document	Project	Further Description	Transportation for Economic Development
ITS Master Plan 2013	Intelligent Portable Traffic Management Stations		
ITS Master Plan 2013	Intersection Safety Improvements Plan & Pilot		
ITS Master Plan 2013	Interstate DMS Replacement Project – Phase 1		
ITS Master Plan 2013	Low Visibility & Extreme Conditions Warning System		
ITS Master Plan 2013	Median Crossover Upgrade Study		
ITS Master Plan 2013	Plant City ATMS Expansion Phase 1		
ITS Master Plan 2013	Plant City ATMS Expansion Phase 2		
ITS Master Plan 2013	Plant City Emergency Vehicle Preemption Expansion		
ITS Master Plan 2013	Plant City Fire & Rescue AVL System		
ITS Master Plan 2013	Plant City ITS-Facility Management System		
ITS Master Plan 2013	Plant City Police AVL System		
ITS Master Plan 2013	Regional Communications Network Study		
ITS Master Plan 2013	Regional Operational Planning Improvements		
ITS Master Plan 2013	Tampa Police AVL System		
ITS Master Plan 2013	Tampa Video & Event Exchange Network		
ITS Master Plan 2013	Tampa-Bay Commercial Trucking Smart Route & Parking Study & Pilot		
ITS Master Plan 2013	Tampa-Bay Integrated Corridor (TBIC) Management Study		

Source Document	Project	Further Description	Transportation for Economic Development
MPO Lane Operations Study	Bloomingdale (US301 to Lithia Pinecrest)	Reversible Lanes	
MPO Lane Operations Study	Gunn Hwy (Casey to Linebaugh)	Reversible Lanes	
Plant City	Citywide ATMS		YES
Plant City	Frontage Rd at Park Rd	Reconfiguration	YES
Plant City	James Redman Pkwy	NB & SB Turn lanes at Alexander St	
SR60 Compatibility Study	Add traffic signal	SR60 at Pauls Dr. and Beverly Blvd.	
SR60 Compatibility Study	Dynamic Message Signs	Install DMS	
SR60 Compatibility Study	Extend parallel roads	Connectivity. Provide alternatives to SR60 for local trips	
SR60 Compatibility Study	Signal Timing	Modify coordinated signal timing and/or explore adaptive signal system	
Temple Terrace	Davis Rd at Harney Rd	intersection improvement	YES
Temple Terrace	Opticom (GPS System)	Traffic management	
Temple Terrace	Temple Terrace Hwy (56th to Harney)	ATMS	YES

*Transportation for Economic Development in Hillsborough County *Proposed Non-Transit Projects*, August 2014

Appendix C: Statewide Performance Measures

Following are excerpts of the 2014 Florida Multimodal Mobility Performance Measures Source Book that relate to the performance measures discussed in this technical memorandum.

System Performance

87% of rush hour traffic on state highways travels at acceptable operating conditions

2014 MAP-21 Performance Report

Overview: Florida has one of the most complete mobility highway system reporting systems in the nation. We have been reporting the quantity of travel, quality of travel and system utilization for over 10 years. This information helps ensure that the most needed system improvements are identified and implemented.

MAP-21 Provisions: Requires states to assess performance of the Interstate Highway System and non-Interstate segments of the National Highway System. It also requires the setting of performance targets, coordination with MPOs; and establishing a performance-based process.

Issues:

- The intended use of private data (e.g., freight carriers and shippers) vs. FDOT's data modeling techniques presents various challenges.
- The need for national consistency in setting performance measure thresholds such as travel time meeting generally acceptable operating conditions, delay, and travel time reliability
- Calculation methodologies will need to be valid and reliable
- Network coverage for each measure may not be possible in the short run
- Setting relevant and realistic targets
- Target Setting: To be determined.

For More Information: See the FDOT Source Book at:
http://www.dot.state.fl.us/planning/statistics/mobilitymeasures/

Results: for 2008-2012 for recommended performance measures

	2008	2009	2010	2011	2012
Vehicle miles traveled (millions)	309.7	300.4	301.5	298.2	284.1
% travel in generally acceptable operating conditions during the peak hour	84.5%	86.8%	87.1%	86.1%	87.1%
Delay (thousands of hours)	144.6	109.1	97.5	102.6	98.4
Travel time reliability	92.1%	94.2%	94.3%	94.0%	94.6%
% miles severely congested	2.9%	2.3%	2.3%	2.2%	2.2%

People -> Quality -> Auto/Truck ->

Travel Time Reliability

Methodology

Travel time reliability is defined as the percentage of freeway trips traveling at least at the posted speed limit.

Reporting Period

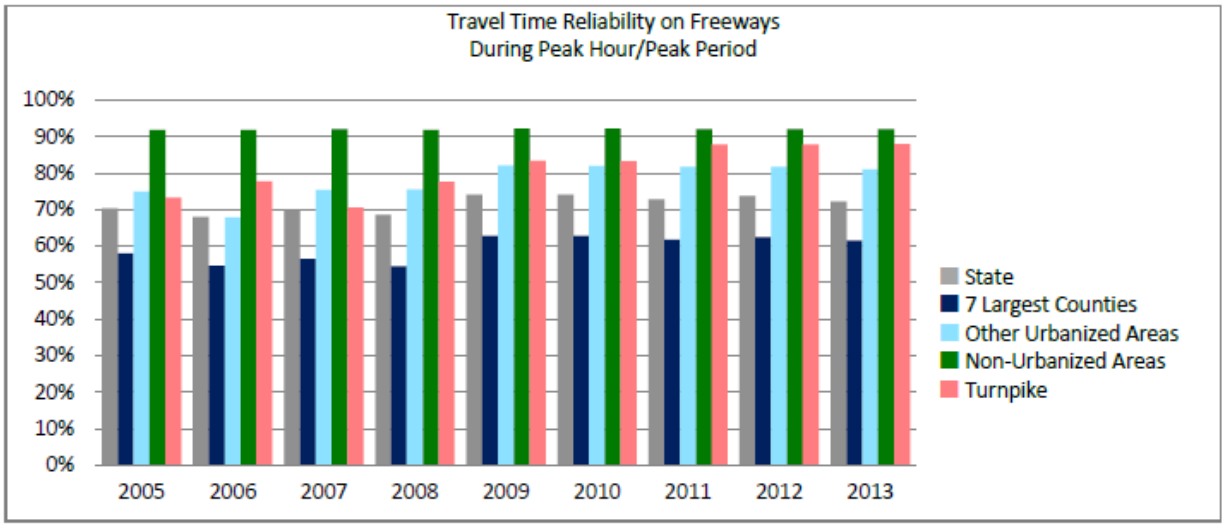
For 7 Largest Counties	For All Others
Peak period	Peak hour
Daily	Daily

Calculation

$$\frac{\sum (\text{VMT} \mid \text{Travel Speed} \geq \text{Posted Speed Limit})}{\sum (\text{VMT})} \times 100$$

Sources

- FDOT Traffic Characteristics Inventory
- FDOT Crash Analysis Reporting System (CARS)
- FDOT Travel Time Reliability Model



Travel Time Reliability

	Peak Hour/Peak Period					Daily				
Year	State	7 Largest Counties	Other Urbanized Areas	Non-Urbanized Areas	Turnpike	State	7 Largest Counties	Other Urbanized Areas	Non-Urbanized Areas	Turnpike
2005	70.4%	58.0%	74.9%	91.9%	73.3%	91.1%	88.3%	93.9%	95.6%	92.5%
2006	68.0%	54.6%	67.9%	91.9%	77.7%	90.9%	87.8%	94.2%	95.6%	93.4%
2007	69.8%	56.4%	75.4%	92.0%	70.5%	90.9%	87.9%	94.6%	95.6%	91.6%
2008	68.5%	54.5%	75.5%	91.8%	77.6%	90.4%	87.1%	94.7%	95.6%	93.8%
2009	74.1%	62.9%	82.1%	92.2%	83.4%	92.3%	90.1%	95.4%	95.7%	94.0%
2010	74.1%	62.9%	81.9%	92.2%	83.2%	92.3%	90.1%	95.5%	95.7%	94.0%
2011	72.8%	61.8%	81.8%	92.1%	87.8%	91.9%	89.5%	95.2%	95.7%	94.1%
2012	73.7%	62.4%	81.8%	92.0%	87.9%	92.2%	89.9%	95.4%	95.7%	94.1%
2013	72.2%	61.5%	81.1%	92.0%	88.0%	91.7%	89.2%	95.0%	95.6%	94.1%

People -> Quality -> Auto/Truck ->

Travel Time Variability

Methodology

Travel time variability is defined as 95th percentile travel time index (TTI_{95}).

Calculation

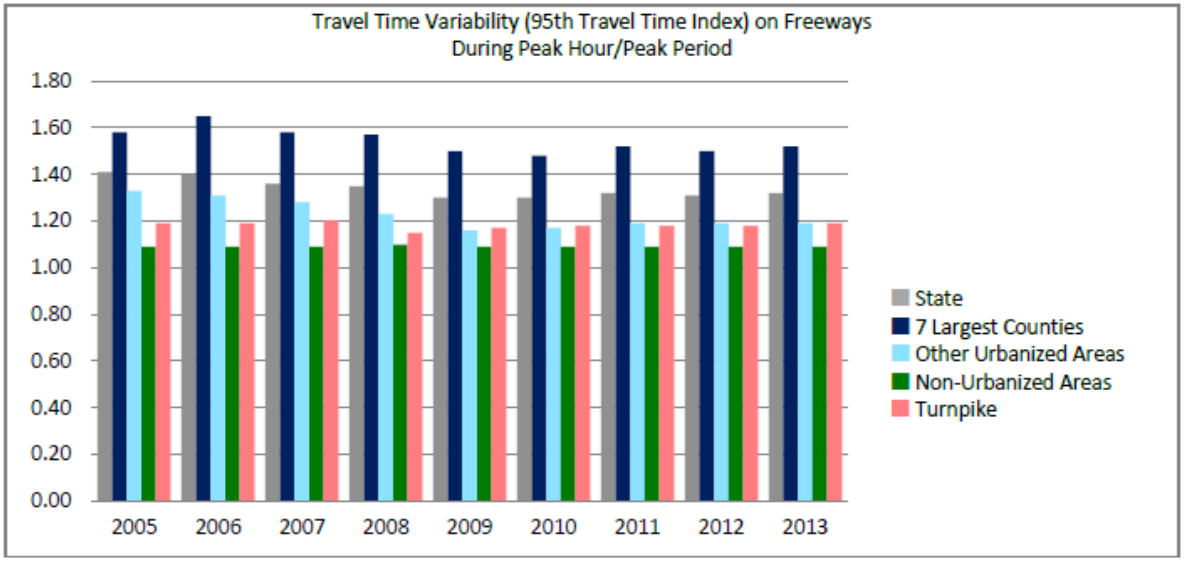
$$TTI_{95} = \frac{\text{Travel Time}_{95\text{th percentile}}}{\text{Travel Time}_{freeflow}}$$

Reporting Period

For 7 Largest Counties	For All Others
Peak period	Peak hour
Daily	Daily

Sources

- FDOT Traffic Characteristics Inventory
- FDOT Crash Analysis Reporting System (CARS)
- FDOT Travel Time Reliability Model



Travel Time Variability (95th Travel Time Index)

	Peak Hour/Peak Period					Daily				
Year	State	7 Largest Counties	Other Urbanized Areas	Non-Urbanized Areas	Turnpike	State	7 Largest Counties	Other Urbanized Areas	Non-Urbanized Areas	Turnpike
2005	1.41	1.58	1.33	1.09	1.19	1.17	1.25	1.11	1.05	1.09
2006	1.40	1.65	1.31	1.09	1.19	1.19	1.31	1.06	1.05	1.09
2007	1.36	1.58	1.28	1.09	1.20	1.18	1.28	1.08	1.05	1.11
2008	1.35	1.57	1.23	1.10	1.15	1.19	1.31	1.08	1.05	1.08
2009	1.30	1.50	1.16	1.09	1.17	1.14	1.22	1.05	1.05	1.09
2010	1.30	1.48	1.17	1.09	1.18	1.14	1.22	1.05	1.05	1.09
2011	1.32	1.52	1.19	1.09	1.18	1.15	1.22	1.07	1.05	1.09
2012	1.31	1.50	1.19	1.09	1.18	1.13	1.20	1.07	1.05	1.09
2013	1.32	1.52	1.19	1.09	1.19	1.15	1.23	1.07	1.05	1.09