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and Maintenance

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Key Initiatives

- **Transportation Pooled Fund Studies:**
 - **TPF-5(258): Traffic Signal Systems Operations and Management**
 - **TPF-5(1453): Enhanced Traffic Signal Performance Measures**
- **NCHRP 03-122: Performance-Based Management of Traffic Signals**
- **Every Day Counts 4 Initiative**

ITS Carolinas 2018 Annual Meeting

Session 1A – Signal System Arterial Operations and Corridor Management

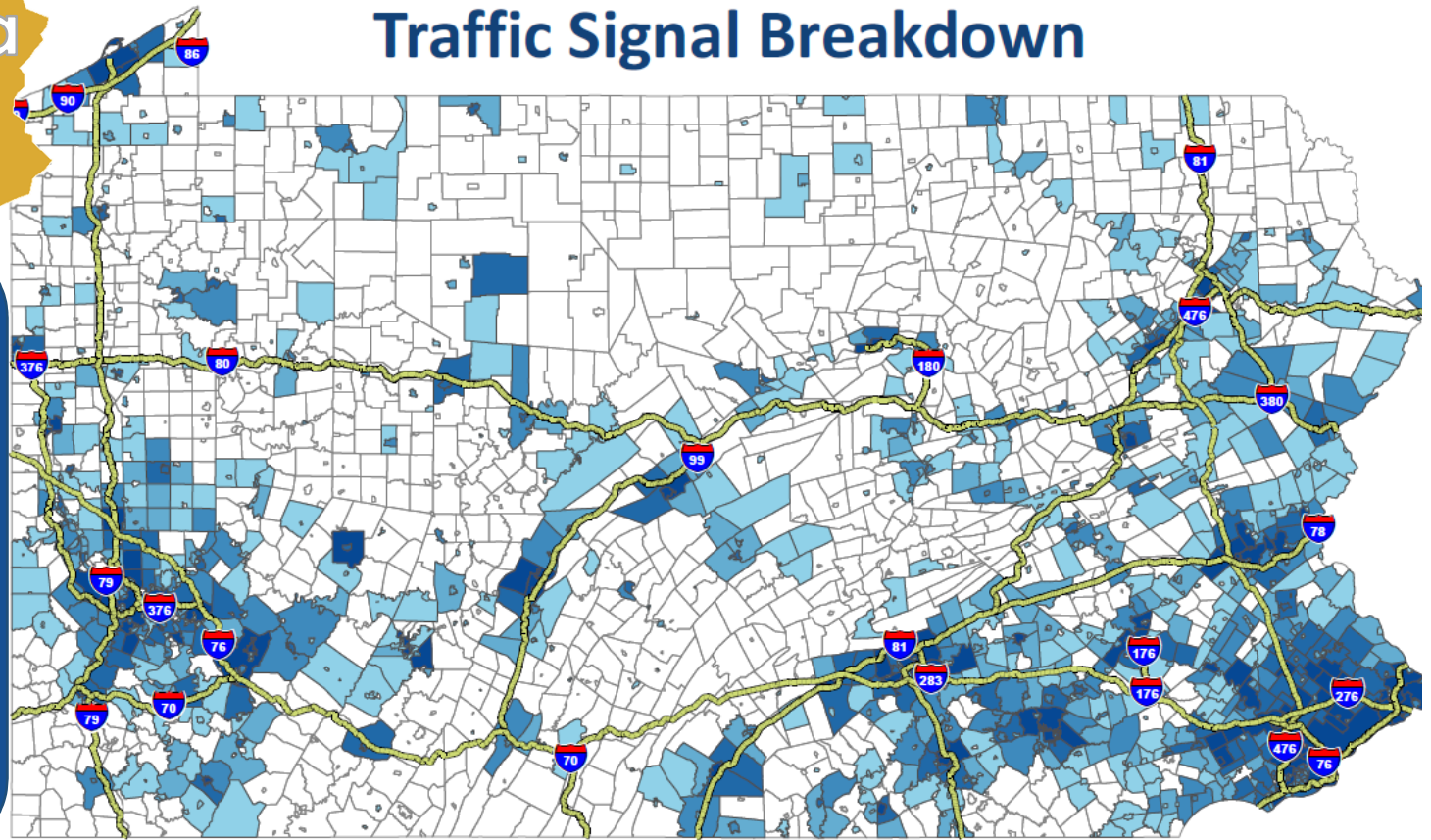
PennDOT's Outcome Assessment using Probe Vehicle Data to Justify Signal Investments to Decision Makers

February 13, 2018

Pennsylvania Facts

Traffic Signal Breakdown

- 1,200 municipal signal owners
- 14,000 signals in Pennsylvania
- 75% own less than 10 signals
- 80%+ maintained by contractors
- 10,500 (77%) on state highways



PENNSYLVANIA INFRASTRUCTURE



40K mi
of state-owned
roadway

5th largest
nationally

PENNSYLVANIA DEMOGRAPHIC



12.8M
people

6th largest
state

PENNSYLVANIA MOBILITY



102B
VMT
annually

Circle the
world more
than 4M times

PENNSYLVANIA TRAFFIC



264M+
annual hours
of delay

31.5 hours per
driver

PENNSYLVANIA ENVIRONMENTAL



133M+
gallons of
wasted fuel

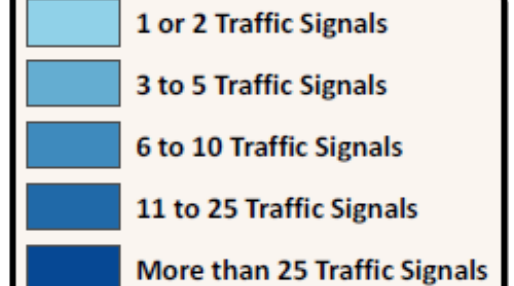
11.1 gallons
per vehicle

PENNSYLVANIA CONGESTION



\$6T
annual cost o
congestion

\$730 per
driver

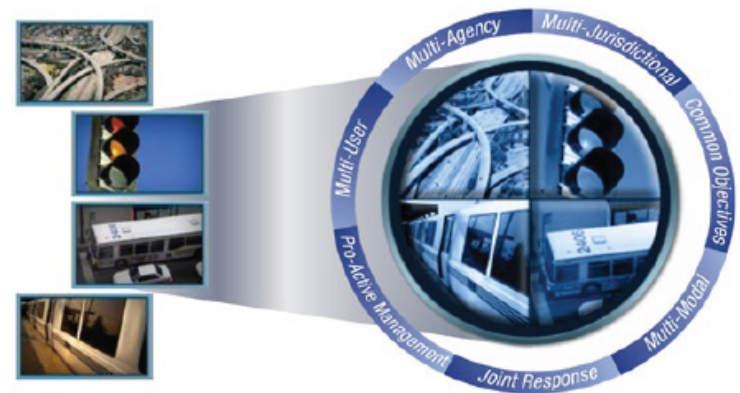


Traffic Signal Operations Approach

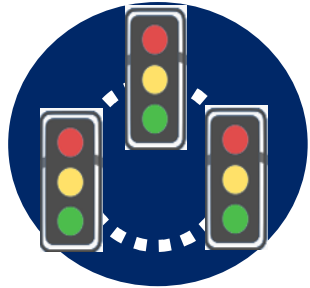
Goals:

- Reducing delay, emissions, and fuel consumption
- Reducing crashes and fatalities
- Focus impacts on the economy and job creation
- Standardizing traffic signal equipment
- Establishing regional and multi-jurisdictional collaboration

<u>Currently</u>		<u>Moving Towards</u>
Isolated	➔	Coordinated
Jurisdictional	➔	System
Project Focus	➔	Customer Focus
Local	➔	Regional
Reactive	➔	Proactive
Piecemeal	➔	Comprehensive
Historical information	➔	Real-Time Information
8/5 operations	➔	24/7 operations
Output oriented	➔	Performance-based



Traffic Signal Roadmap



Standardization

- Pub. 191 (1 Signal Publication)
- Product Approvals
- E-Permitting System
- Signal Permit Plans

TSAMS

Traffic Signal Asset Management System

Asset Management

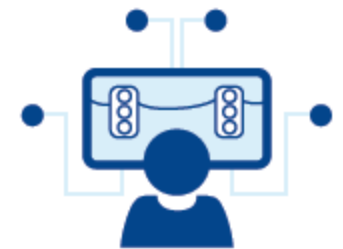
- Asset Inventory
- Maintenance Records
- Municipal Budgeting

ATSPM

Automated Traffic Signal Performance Measures
FHWA Every Day Counts (EDC-4) Initiative

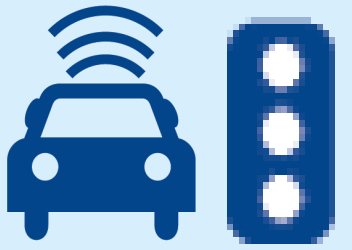
Performance Management

- EDC-4 High Resolution Data
- Arterial Probe Performance Metrics
- Pooled Fund Study (TPF-1453)



Maintenance and Operations

- Communications
- Command & Control
- Signal Mgmt. Plan
- Maintenance Strategies



Technology and Innovation

- Adaptive Signals
- Communication & DSRC Deployments
- CAV Applications



Sustainability and Funding

- Grants
- Ownership
- Systematic Statewide Improvements



Research and Training

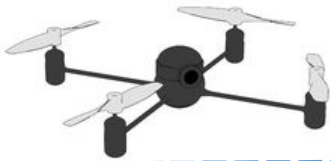
- HSTOD Training Committee
- Identify Needs/Gaps

Transportation Improvement Program (TIP)

Project Planning

- Life Cycle Evaluation
- Project Planning

Corridor Level Metrics



- Initial Deployment in Philadelphia Region (5 Counties)
- 138-Super-Critical Corridors
- 2,184 Traffic Signals
- 776 Arterial Miles of INRIX data
- Future Statewide Deployment



- Continue to Work to Identify Relationships and Use-Cases between Corridor and Intersection Metrics and the Variety of Data Sources
- Clarify when and where each of the Metrics should be used

Probe Data

Arterial Travel Time Comparison Tool

- Before/After Analysis and corridor reliability utilizing Cumulative Frequency Diagrams (CFDs)

Arterial Ranking

- Ranking by median travel time and interquartile range (IQR) identifying delay, reliability, and variability

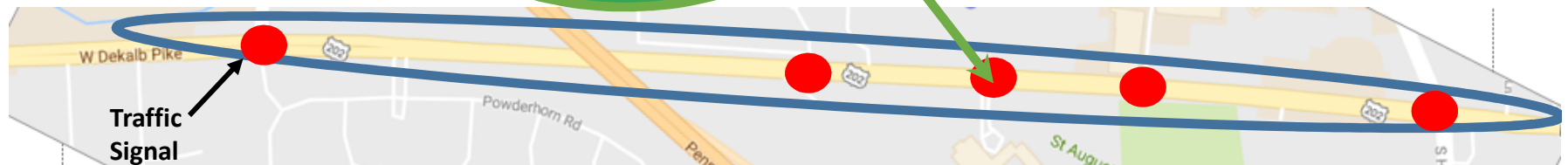
Arterial Congestion Ticker

- Speed profiles of arterial routes

Intersection Level Metrics (High Resolution Metrics)



- Statewide Approach
- Utilizing the Utah Open Source Code
- Establish as Updates Occur
- Implement where controller and communications are available
- Future statewide Command and Control Software Platform





Pennsylvania is an All-In State

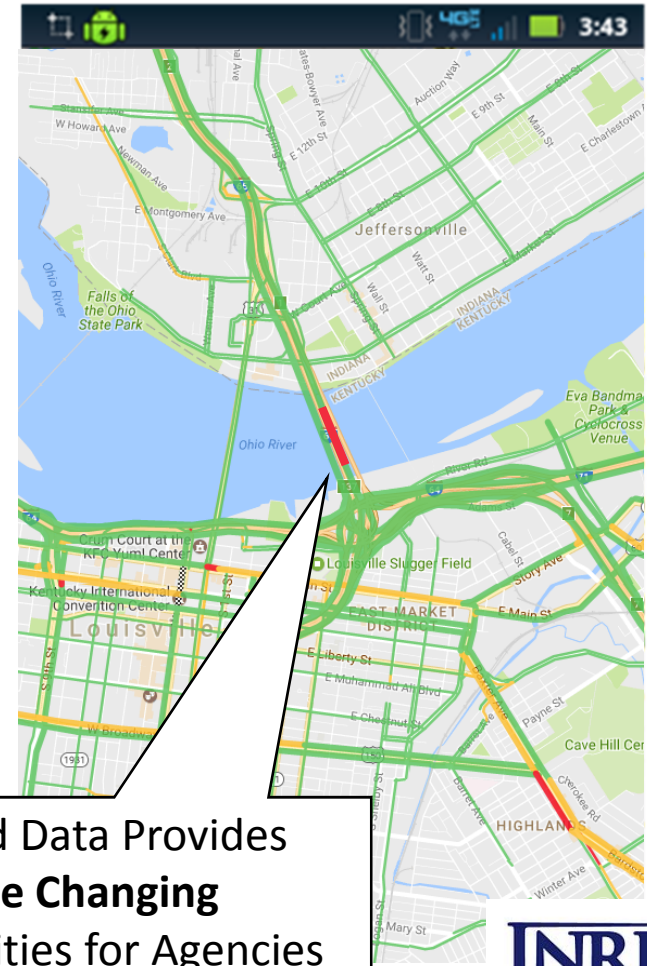
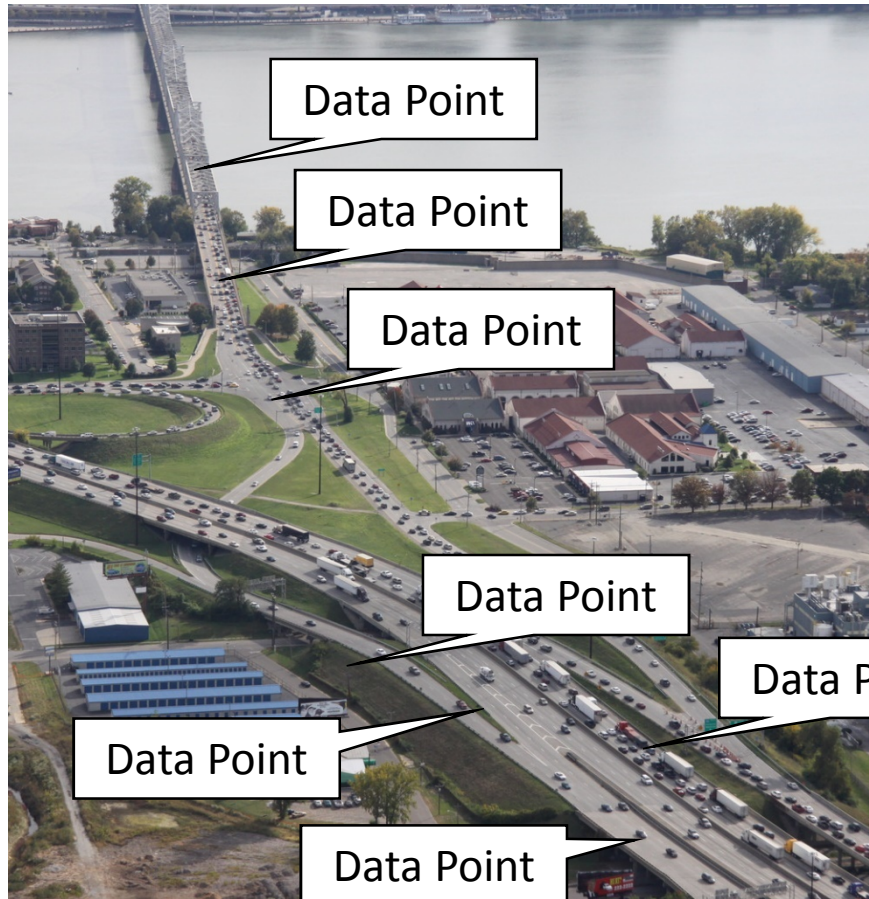
- INRIX is the Selected Data Vendor
- Real-Time Data and Achieved Data since 2011
- Data used in 511PA
- Statewide Travel Times when appropriate
- 7 validations completed in PA through I-95 VPP and have generally performed significantly better than contract (AASE < 5 mph, Speed Bias < 3 mph)

Coverage Area

- 25,000 TMC Segments; 16,600 Miles
- 112,000 XD Segments; 23,200 Miles (20,200 Arterials)

Corridor Type	Total # of Signals	INRIX XD Coverage		
		No Coverage	Has Coverage	% with XD
Supercritical	4314	66	4248	98.5%
Critical	4443	235	4208	94.7%
Designated	1752	318	1434	81.8%
Local	3051	1173	1878	61.6%
TOTAL	13560	1792	11768	86.8%

Probe Vehicle Data History

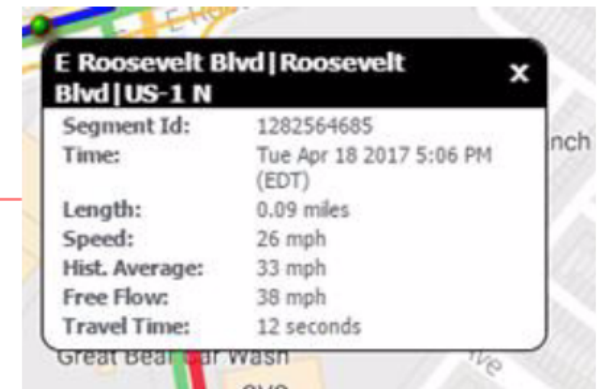
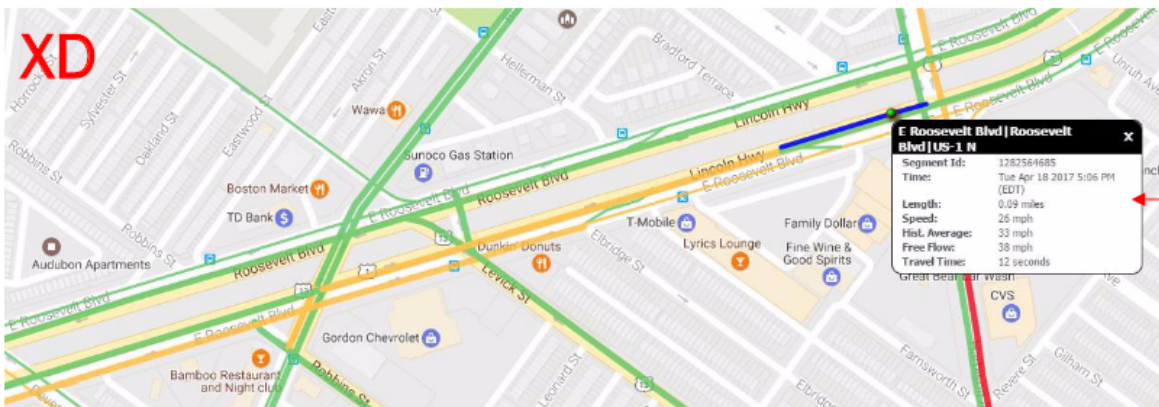
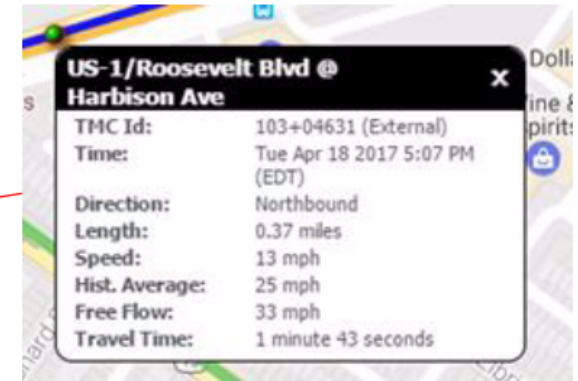
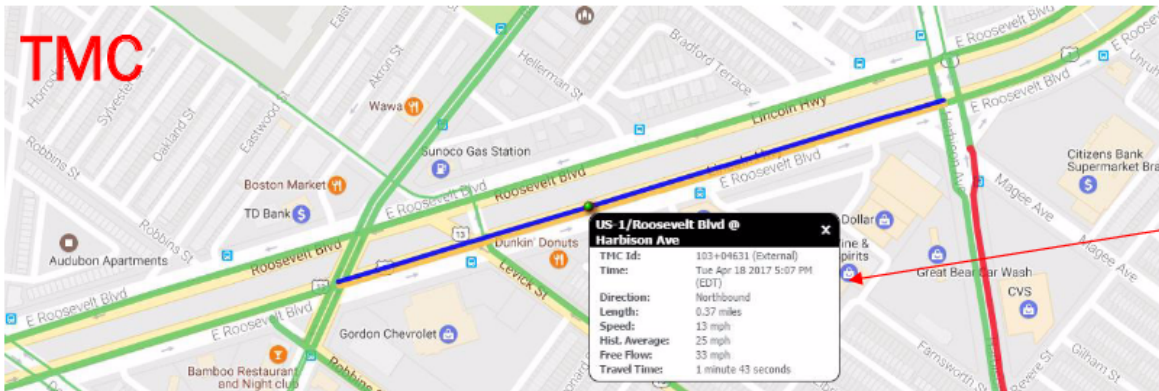


Archived Data Provides
Game Changing
Opportunities for Agencies



US-1 Corridor

Granularity and Coverage Comparison of TMC and XD Segments



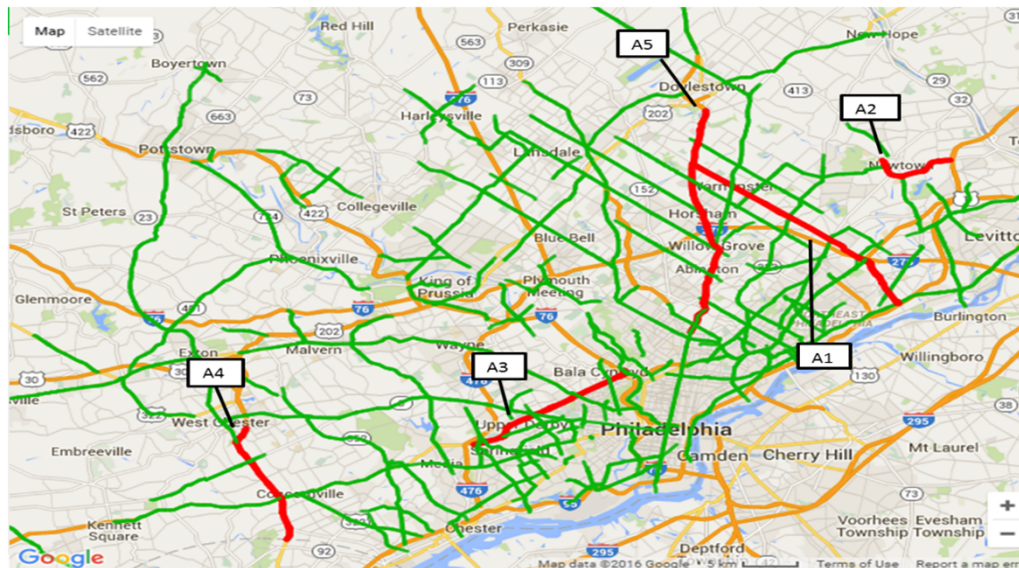
Figures provided by 

- Reflects current traffic conditions
- Reported every minute
- Generally 3-5 minutes behind actual road conditions

TRB Annual Meeting 2017 Paper Number 17-00314

<http://docs.trb.org/prp/17-00314.pdf>

Purpose: Develop, implement and evaluate commercial probe data licensed by Pennsylvania to produce arterial performance measures to evaluate user costs (signal retiming, maintenance, adaptive installation and benefit/cost activities), travel time reliability, variability, and corridor prioritization.



Focus Area:

- 138 “Super-Critical” corridors (AADT greater than 25,000)
- Five-county region of PennDOT District 6, including Bucks, Chester, Delaware, Montgomery, and Philadelphia counties
- Total: 2,184 Signals on 766 miles of arterials

Probe Data Performance Measures



Jump to: [Travel Time Comparison Tool](#) [Ranking Tool](#) [Congestion Ticker](#)

[Executive Summary](#)

[Guides](#)

[Webinars](#)

[Publications](#)

[Posters](#)

[Final Report](#)

In recent years, highway monitoring and performance measure requirements have been increasingly emphasized by transportation funding mandates such as MAP-21. The provisions in these mandates have led to an increased need for system performance at both state and local levels. It is highly likely that future bills will trend toward requiring performance measurement. Historically, this has been a challenge due to the data collection infrastructure required for wide-scale deployment efforts. To meet this data need, advances in connected and probe vehicle technologies have provided an unprecedented amount of data through third-party commercial vendors for agencies to procure and use. How this data has been transformed to adapt to the goals and objectives of the agency so to be well-suited for analyzing performance

In May 2016, the Pennsylvania Department of Transportation sponsored a 12-month research project at Purdue University to develop, implement and assess three web dashboards and a data system that make use of the commercial probe data provided by the Pennsylvania Department of Transportation to produce arterial performance measures for engineers and stakeholders to evaluate and monitor. Traffic speed data was downloaded in real-time as well as historic data from INRIX to populate roadway speeds at a high spatial resolution. The dashboards mapped the speeds to 138 "super-critical" corridors in the five-county region including Bucks, Chester, Delaware, Montgomery, and Philadelphia counties, and produced travel time and reliability corridor rankings, and a congestion monitoring tool on a web-enabled user platform. The three dashboards are:

- **Arterial Travel Time Comparison Tool.** This tool allows the user to perform a comparison of travel times for a specified corridor for specified "before" and "after" date ranges that can be filtered by day of week and time of day. The tool produces cumulative frequency diagrams (CFDs) of the travel times that illustrate the difference between the before and after periods. This tool is instrumental for assessing the effects of maintenance, operational changes, capital programs and other deployments.
- **Arterial Ranking Tool.** This tool enables the user to view performance of several corridors for a specified time period and rank the corridors according to their travel time characteristics, including both the median travel time and the interquartile range (IQR), a measure of the travel time variability. The tool produces sorted bar charts based on either the median travel time measure, or a scatter-plot using both criteria axes.
- **Arterial Congestion Ticker.** This tool produces a chart of speed distributions on selected arterial routes over time. The user can interact with the chart to focus-in on specific instances in time and display on a map the segments where the speeds were observed.

These web dashboards were accompanied by a research paper that assessed over \$30 million in user travel time and emissions benefits derived from a combination of signal retiming and adaptive system deployments. That paper was presented at the Transportation Research Board 96th Annual Meeting. Looking ahead, the groundwork laid by this project will aid the development of new business processes for assessing road network performance using emerging data sources to align with requirements of upcoming government mandates on performance measures.

1

Travel Time Comparison Tool

Compares travel time distributions on a single corridor over different time periods

2

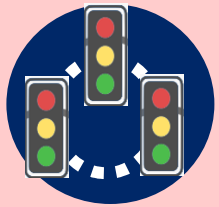
Arterial Ranking Tool

Ranks multiple corridors based on normalized median and interquartile travel times over the same time period

3

Congestion Ticker

Tracks speeds of corridors over time to identify time periods and locations of congestion



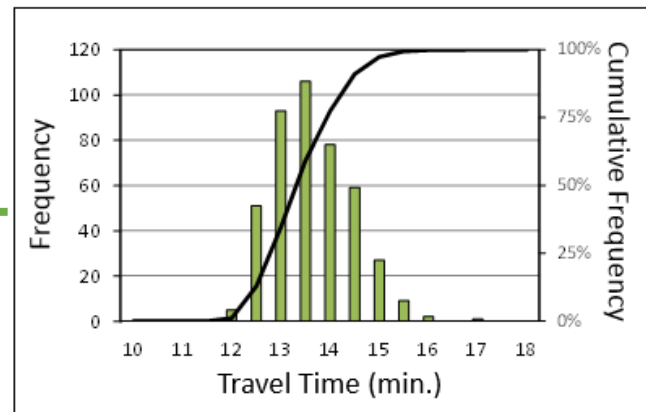
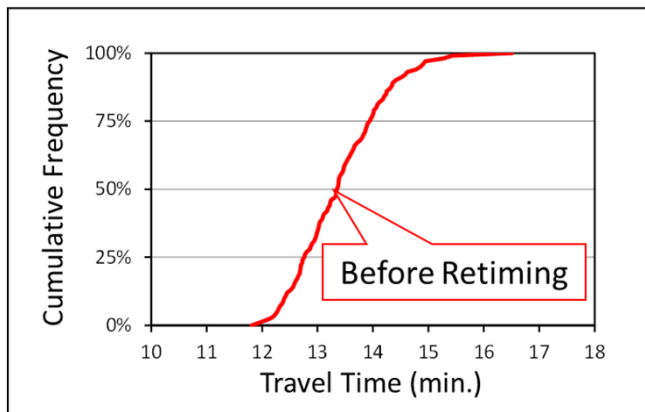
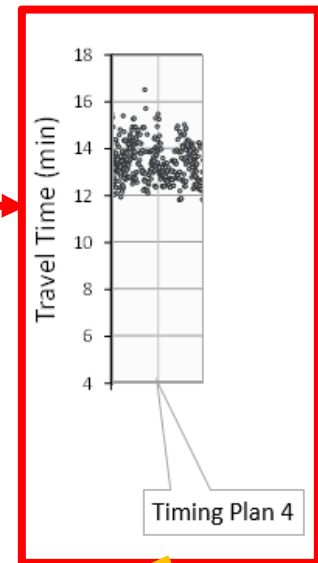
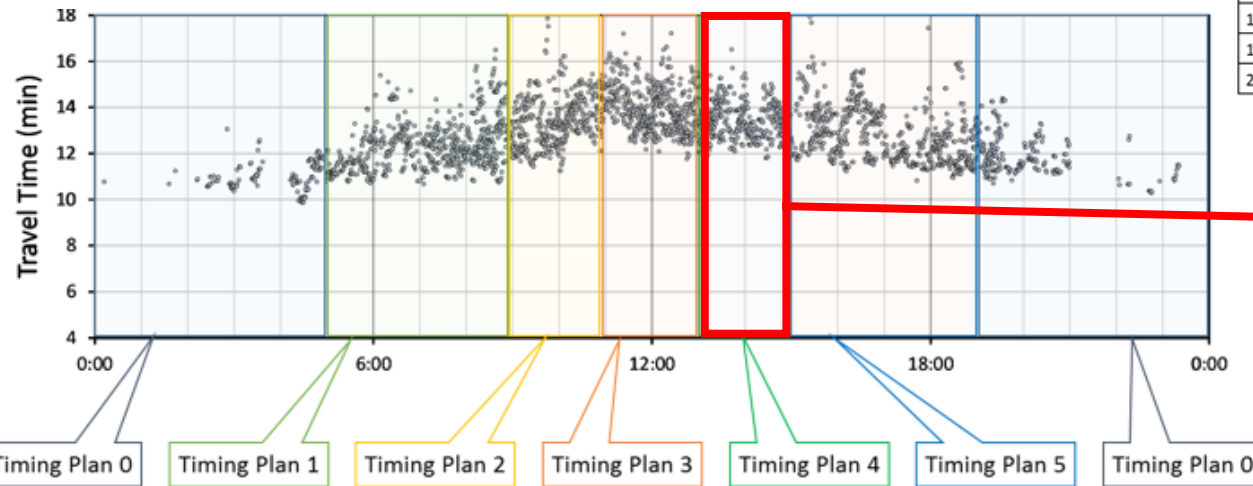
1

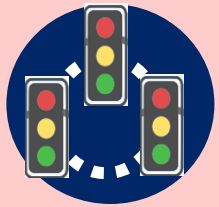
Travel Time Comparison Tool

Cumulative Frequency Diagram (CFD)

MARCH 2012						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Northbound US 31 in Kokomo





1 Travel Time Comparison Tool

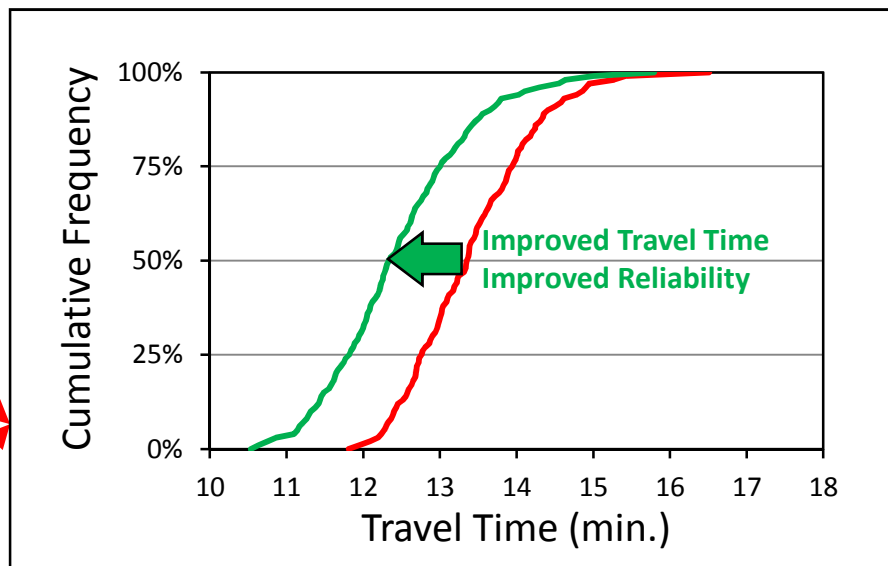
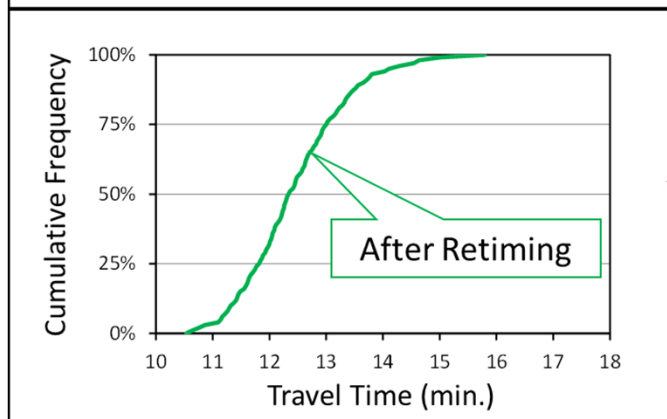
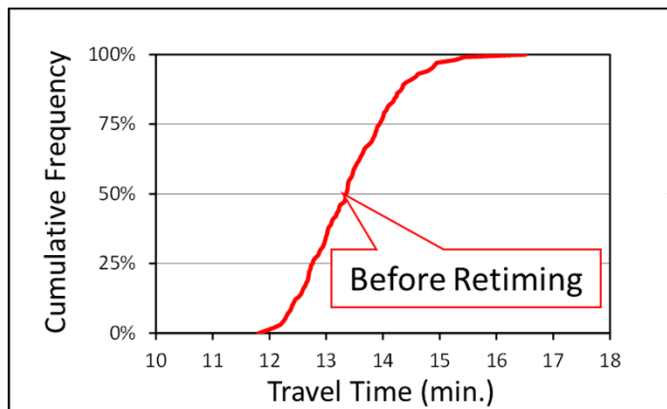
Cumulative Frequency Diagram (CFD)

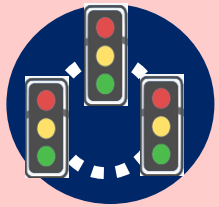
MARCH 2012							APRIL 2012						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3	1	2	3	4	5	6	7
4	5	6	7	8	9	10	8	9	10	11	12	13	14
11	12	13	14	15	16	17	15	16	17	18	19	20	21
18	19	20	21	22	23	24	22	23	24	25	26	27	28
25	26	27	28	29	30	31	29	30					

Retiming Week

BEFORE

AFTER





1

Travel Time Comparison Tool

Select a Corridor

Travel Time Comparison Tool

Corridor

- Rising Sun Ave
- Roberts Ave
- South Ave
- Springfield Rd
- State Rd
- Susquehanna Rd**
- Township Line Rd
- US 1/Baltimore Pk
- US 1/Roosevelt Blvd
- US 1/State Rd/Twp Line Rd/City Ave
- US 13 & US 30/Girard Ave
- US 13/Chester Pk
- US 13/Frankford Ave/Bristol Pk
- US 13/Macdade Blvd
- US 202 Parkway: Welsh Rd to PA 313
- US 202/Buckingham Rd & PA 179/Bridge St
- US 202/Dekalb Pk
- US 202/Dekalb Pk
- US 202/Wilmington Pk
- US 30/Lancaster Ave
- US 322/Conchester Hwy
- US 322/Downingtown Pk
- US 322/Horseshoe Pk
- Verree Rd
- Vine St
- Walton Rd
- Welsh Rd
- Woodbourne Rd
- Woodhaven Rd

Generate Graphs | Reset Options | Export Graphs | Export Quartiles | Export Raw

Susquehanna Rd

Before: 2017-04-03 to 2017-04-09

After: 2017-04-24 to 2017-04-30

Days of the week: Mon Tue Wed Thu Fri Sat Sun

X-axis min: auto

X-axis max: auto

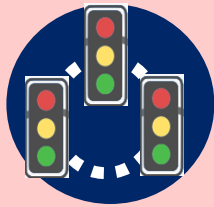
Reset | Update Axes

Susquehanna Rd

Signals: 16, County: Montgomery

Speed Limit: 30-45mph, AADT: 15808

10:01 PM
4/30/2017



1

Travel Time Comparison Tool

Select Before and After Evaluation Dates

Probe Data Arterial Perform. PennDOT Travel Time Cc +
pdrprvmap01.penndot.id/Apps/travel_time/index.html

Travel Time Comparison Tool

Susquehanna Rd
 Before: 2017-04-03 to 2017-04-09
 After: 2017-04-24 to 2017-04-30
 Days of the week: Mon Tue Wed Thu Fri Sat Sun
 X-axis min: auto
 X-axis max: auto
 Reset Update Axes

Corridor
 Generate Graphs Reset Options Export Graphs Export Quartiles Export Raw

Timing

Before dates: 2017-04-03 to 2017-04-09

Please select a date range

APRIL 2017							MAY 2017						
SU	MO	TU	WE	TH	FR	SA	SU	MO	TU	WE	TH	FR	SA
26	27	28	29	30	31	1	30	1	2	3	4	5	6
2	3	4	5	6	7	8	7	8	9	10	11	12	13
9	10	11	12	13	14	15	14	15	16	17	18	19	20
16	17	18	19	20	21	22	21	22	23	24	25	26	27
23	24	25	26	27	28	29	28	29	30	31	1	2	3
30	1	2	3	4	5	6							

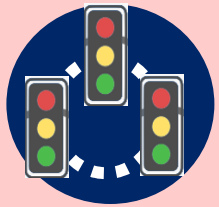
After dates: 2017-04-24 to 2017-04-30

Please select a date range

APRIL 2017							MAY 2017						
SU	MO	TU	WE	TH	FR	SA	SU	MO	TU	WE	TH	FR	SA
26	27	28	29	30	31	1	30	1	2	3	4	5	6
2	3	4	5	6	7	8	7	8	9	10	11	12	13
9	10	11	12	13	14	15	14	15	16	17	18	19	20
16	17	18	19	20	21	22	21	22	23	24	25	26	27
23							28	29	30	31	1	2	3
	1	2	3	4	5	6							

Susquehanna Rd
 Signals: 16, County: Montgomery
 Speed Limit: 30-45mph, AADT: 15808

Map Satellite
 Desktop 10:02 PM 4/30/2017



1

Travel Time Comparison Tool

Select the Days and Hours of Evaluation

Probe Data Arterial Perform. PennDOT Travel Time Cc

pdprvmap01.penndot.tl/Apps/travel_time/index.html

Travel Time Comparison Tool

Corridor: Susquehanna Rd

Generate Graphs | Reset Options | Export Graphs | Export Quartiles | Export Raw

Before: 2017-04-03 to 2017-04-09
After: 2017-04-24 to 2017-04-30
Days of the week: Mon Tue Wed Thu Fri Sat Sun

X-axis min: auto
X-axis max: auto
Reset | Update Axes

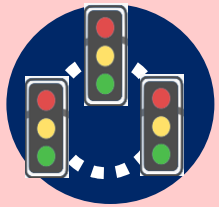
Signal Timing Plan: No corridor timing plan found

Timing: All Days Weekdays Weekends Custom

Hours to analyze: All day/ton Hourly Default Analysis Hours (6:00-9:00,9:00-15:00,15:00-17:00,17:00-22:00) TOD Period

Susquehanna Rd
Signals: 16; County: Montgomery
Speed Limit: 30-45mph, AADT: 15808

10:02 PM 4/30/2017



1

Travel Time Comparison Tool

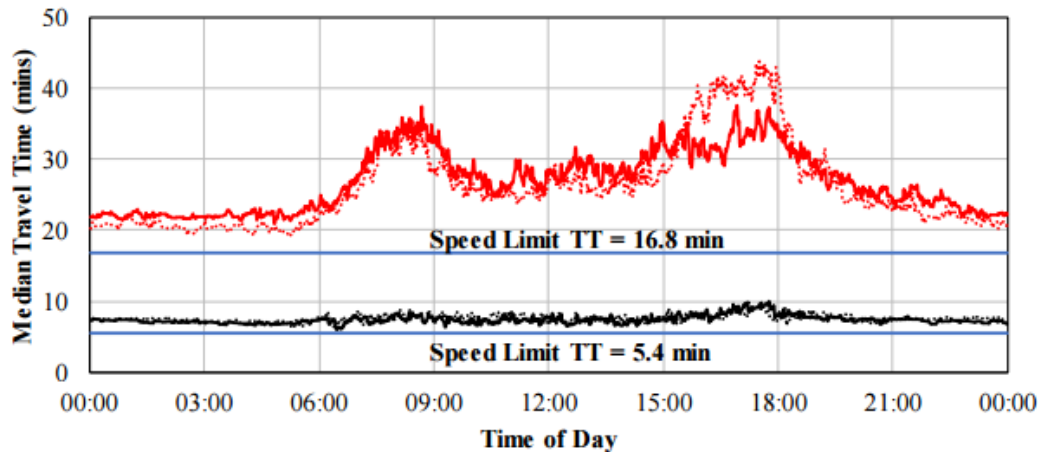




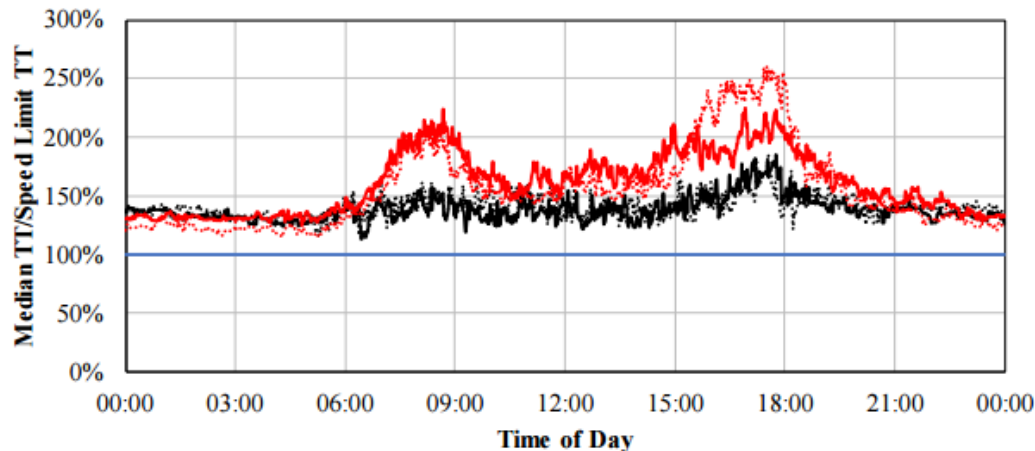
2 Arterial Ranking Tool

Travel Time Normalization

Median travel time and speed limit travel time on **Newtown Bypass** (shown in black) and **US-1** (shown in red) for the study period 12/5/2016 to 12/10/2016



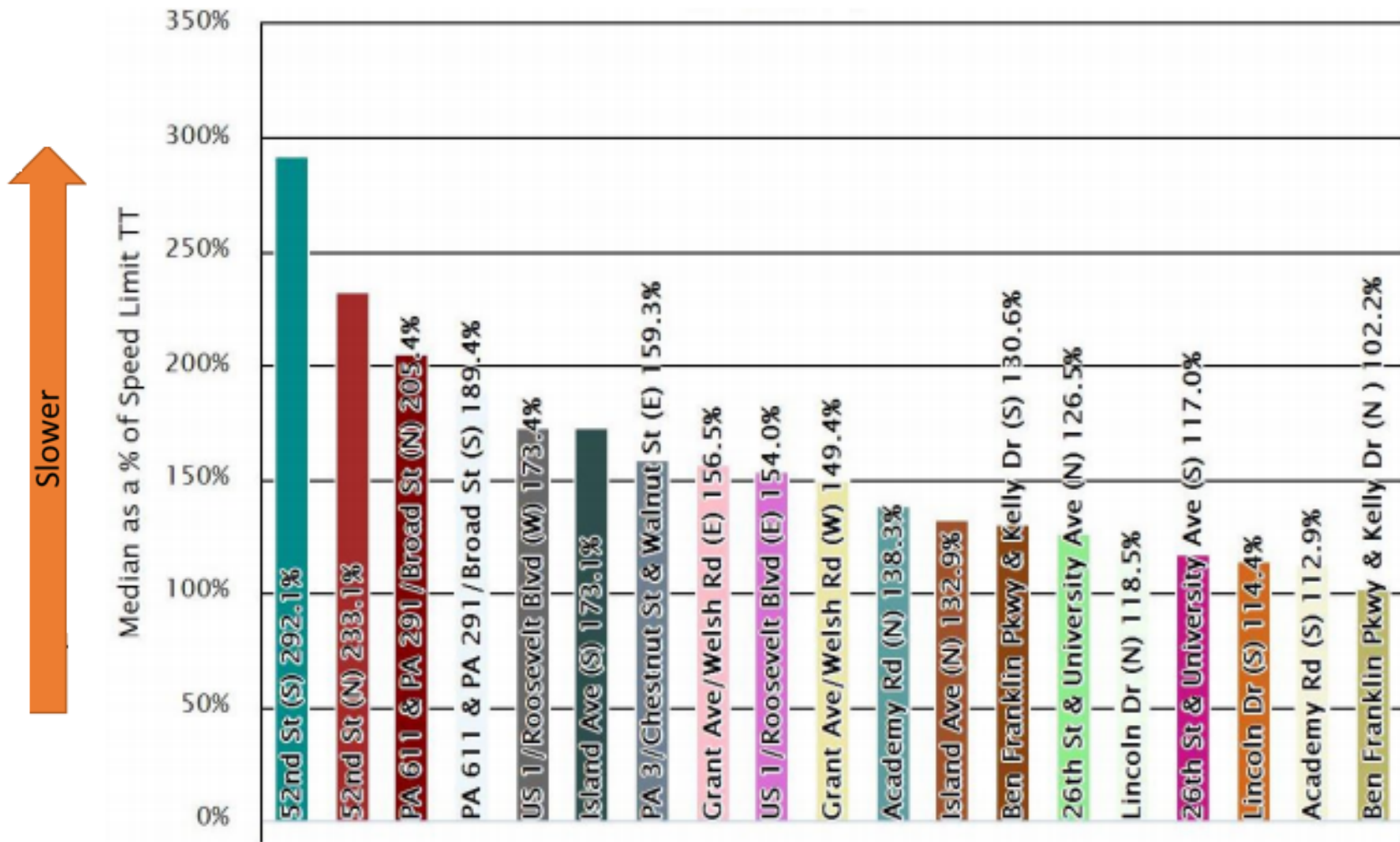
$$\text{Normalized TT} = \frac{\text{Median TT}}{\text{Speed limit TT}}$$





2 Arterial Ranking Tool

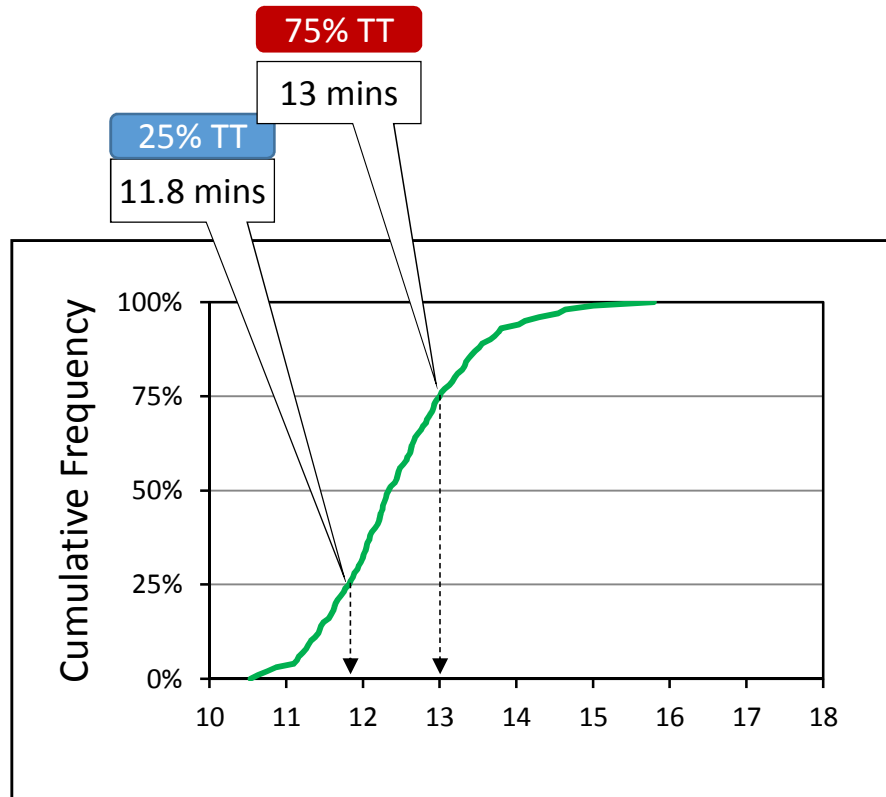
Travel Time Normalization Ranking





2 Arterial Ranking Tool

Interquartile-Range (IQR) Normalization



APRIL 2012						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

$$\text{Normalized IQR} = \frac{(75\text{th percentile TT} - 25\text{th percentile TT})}{\text{Speed limit TT}}$$

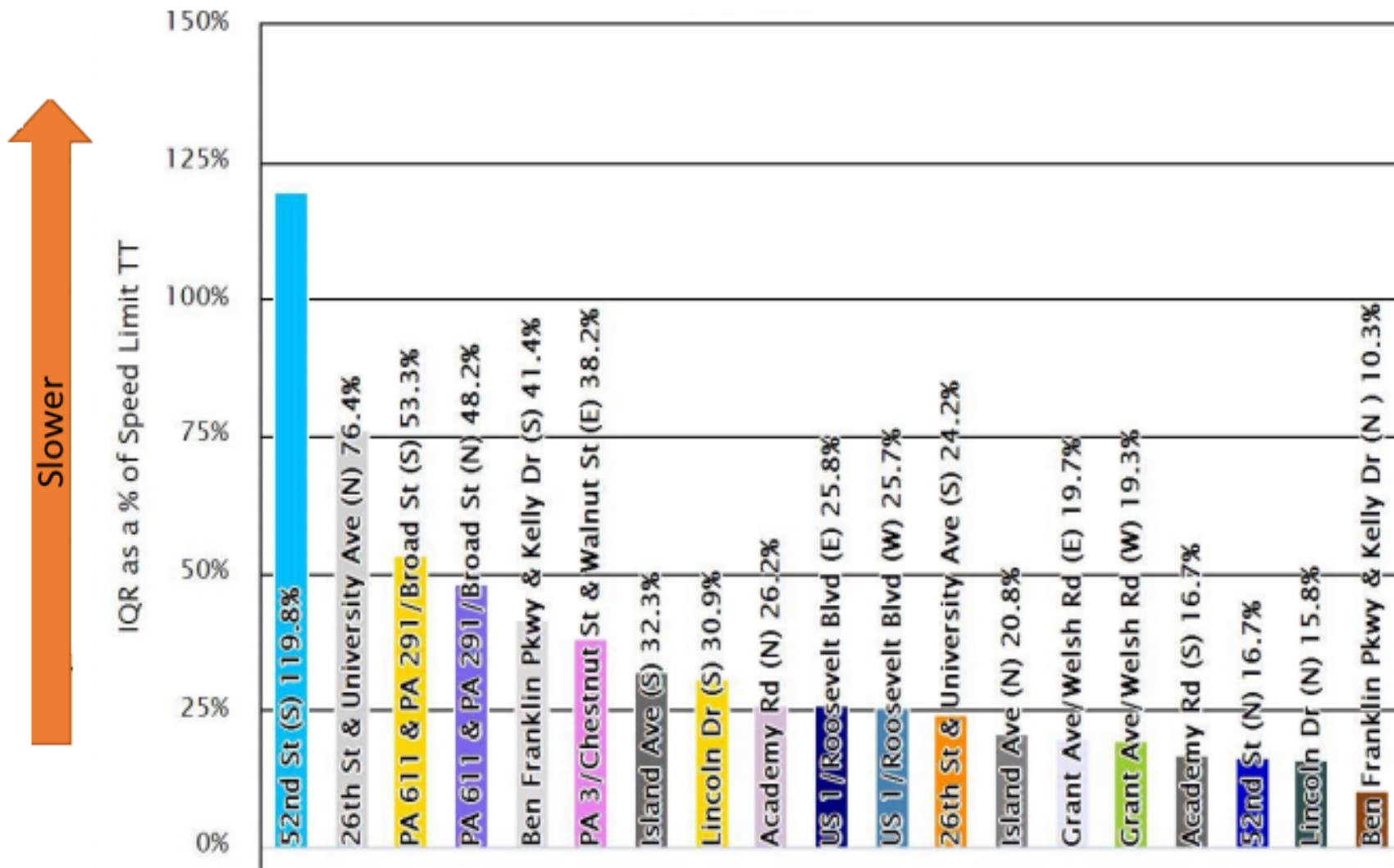
$$\frac{75^{\text{th}} \text{ TT} - 25^{\text{th}} \text{ TT}}{\text{Spd. Lim TT}} = \frac{13 \text{ min} - 11.8 \text{ min}}{9 \text{ min}} = 0.13 \text{ (13\%)}$$





2 Arterial Ranking Tool

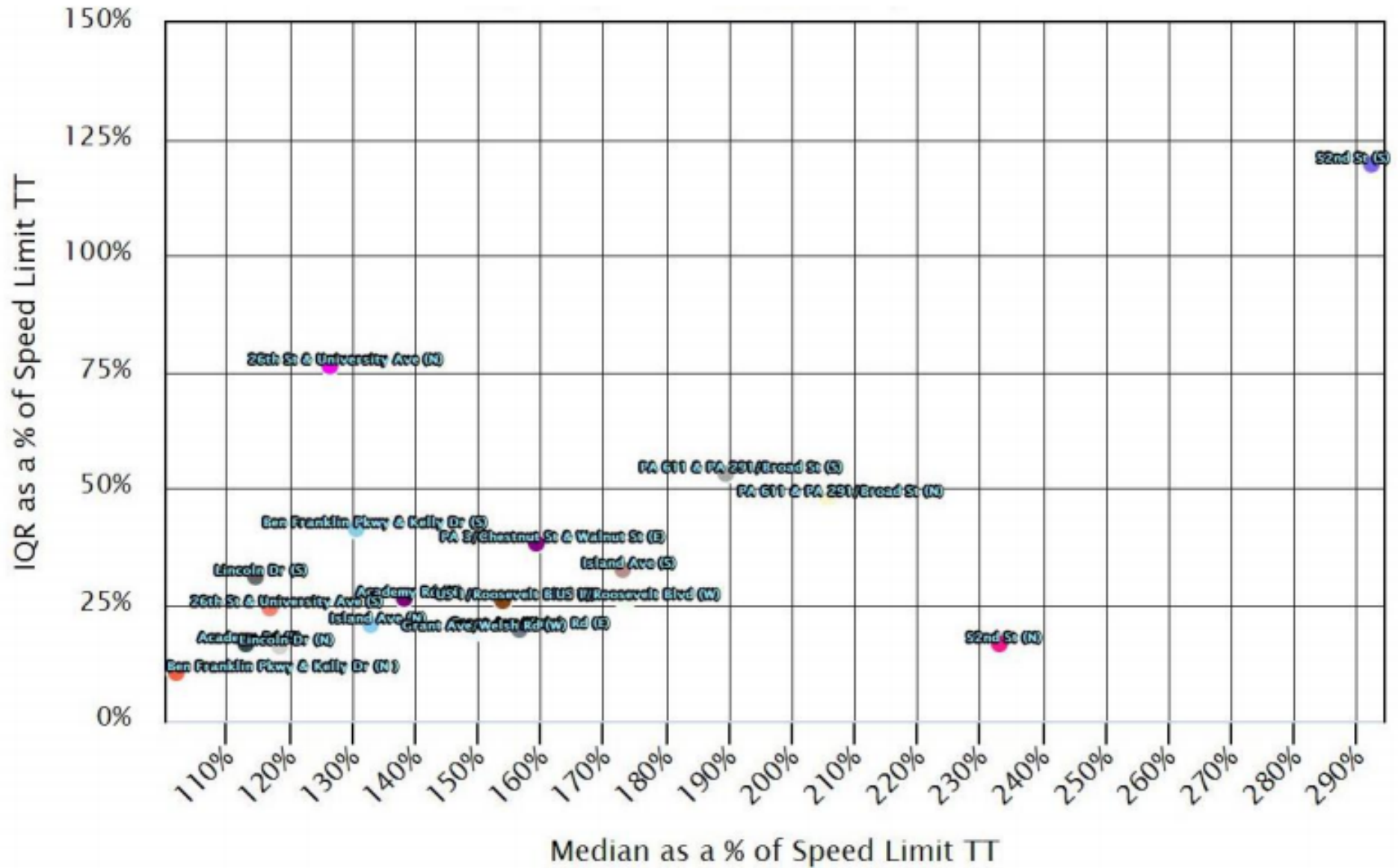
Interquartile-Range (IQR) Normalization Ranking





2 Arterial Ranking Tool

Reliability vs Central Tendency (Philadelphia County)





2 Arterial Ranking Tool

Select a County and Corridors

Probe Data Arterial Perform. PennDOT Arterial Ranker × +

pdprvmap01.pennidot.lcl/Apps/trends/index.html

Generate Graphs Export Raw Export Graph

Display Axes: Interquartile Range (IQR) Median Travel Time

Deselect All Corridors

- Bucks
- Chester
- Delaware
- Montgomery
- Philadelphia

Deselect All Select All Select Top 10 ADT US 1/Roosevelt Blvd

26th St & University Ave	Ben Franklin Pkwy & Kelly Dr	Academy Rd
Island Ave	52nd St	PA 3/Chestnut St & Walnut St
Grant Ave/Welsh Rd	PA 611 & PA 291/Broad St	Lincoln Dr
Cobbs Creek Pkwy/63rd St	Henry Ave & Ridge Ave	PA 291/Bartram Ave & Penrose Ave
Aramingo Ave/Harison Ave	PA 532/Bustleton Ave	Vine St
58th St	Cheltenham Ave/Crescentville Rd/Adams Ave	Delaware Ave (Columbus Blvd)
Bartram Ave &		IIS 13 & IIS

Arterial Ranking Tool

Desktop 10:10 PM 4/30/2017



2 Arterial Ranking Tool

Select a Time Frame, Days, and Hours of Evaluation

Probe Data Arterial Perform. PennDOT Arterial Ranker

pdprvmap01.penndot.lcl/Apps/trends/index.html

Generate Graphs Export Raw Export Graph

Display Axes: Interquartile Range (IQR) Median Travel Time

Corridors

Before Date Range: 2017-04-03 to 2017-04-09
After Date Range: 2017-04-24 to 2017-04-30

Compare Two Date Ranges

All Days Weekdays Weekends Custom

Su M T W Th F Sa

Select the hours of the day to analyze using the slider.
6:00 to 9:00

Arterial Ranking Tool

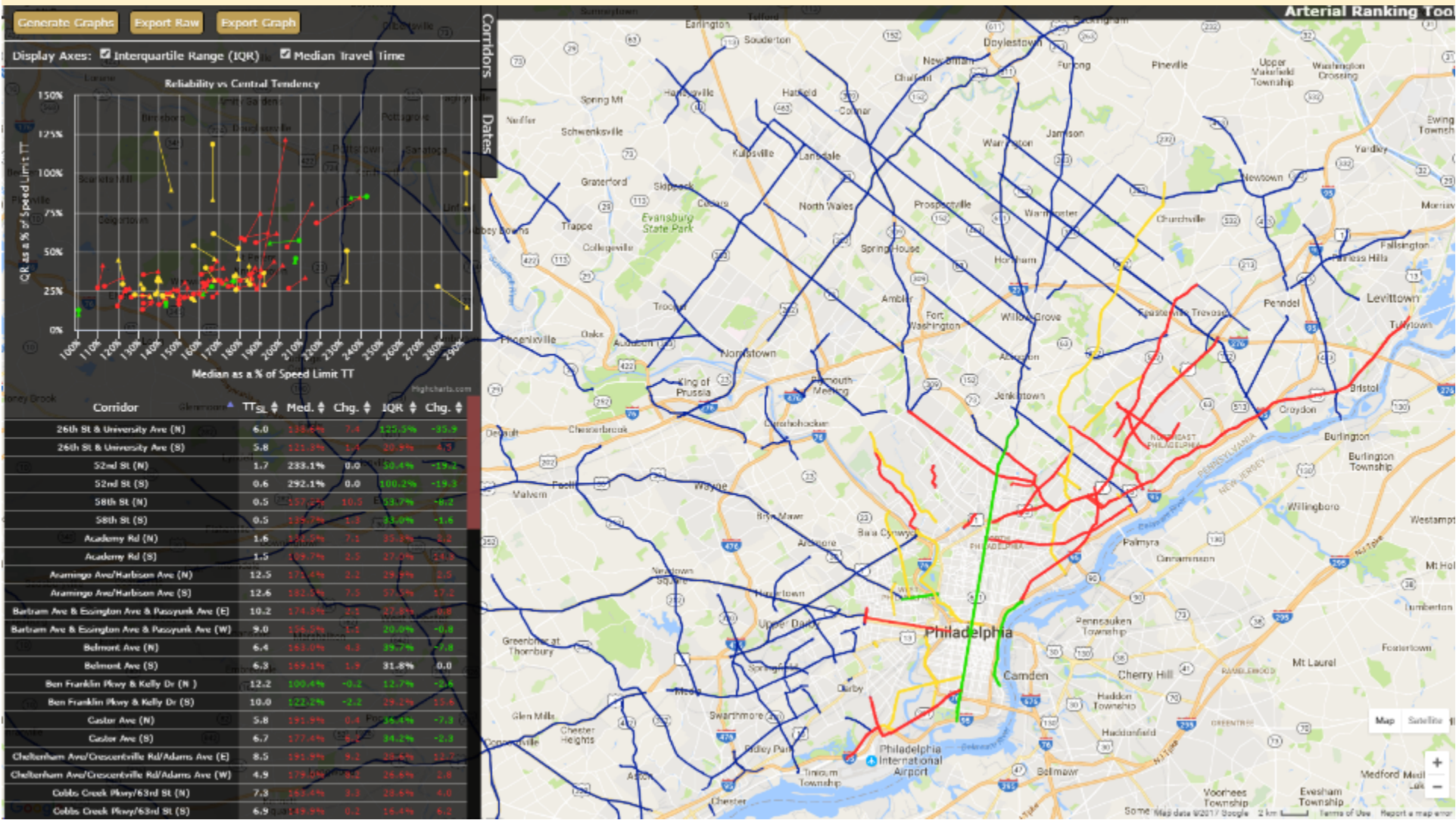
Map data ©2017 Google 2 km

10:10 PM 4/30/2017



2 Arterial Ranking Tool

Reliability vs Central Tendency





2 Arterial Ranking Tool

Interquartile-Range (IQR) Normalization Ranking

Probe Data Arterial Perform. PennDOT Arterial Ranker

pdprvmap01.penndot.lcl/Apps/trends/index.html

Generate Graphs Export Raw Export Graph

Display Axes: Interquartile Range (IQR) Median Travel Time

Reliability

Corridor	TTSL	Med.	Chg.	IQR	Chg.
26th St & University Ave (N)	6.0	141.0%	11.0	106.9%	8.7
26th St & University Ave (S)	5.8	118.6%	-7.3	49.1%	-3.3
52nd St (N)	1.7	249.8%	-16.7	35.9%	0.0
52nd St (S)	0.6	292.1%	58.4	80.9%	38.9
Academy Rd (N)	1.6	141.0%	-6.1	32.0%	-3.3
Academy Rd (S)	1.5	115.7%	-0.3	30.1%	5.6
Ben Franklin Pkwy & Kelly Dr (N)	12.2	100.7%	-0.3	12.6%	-0.1
Ben Franklin Pkwy & Kelly Dr (S)	10.0	121.2%	7.9	45.4%	-22.2
Grant Ave/Walsh Rd (E)	5.9	168.0%	-7.3	28.1%	3.6
Grant Ave/Walsh Rd (W)	6.1	154.1%	-9.7	19.9%	8.8
Island Ave (N)	4.0	136.8%	-0.8	23.8%	-3.8
Island Ave (S)	3.1	169.9%	4.9	27.7%	4.1
Lincoln Dr (N)	5.2	121.3%	0.2	20.8%	-3.3
Lincoln Dr (S)	6.9	118.1%	6.2	39.1%	26.9
PA 3/Chestnut St & Walnut St (E)	6.4	164.3%	-0.6	46.0%	0.1
PA 611 & PA 291/Broad St (N)	24.9	206.2%	7.8	42.4%	6.0
PA 611 & PA 291/Broad St (S)	26.3	189.9%	-6.0	50.2%	7.8
US 1/Roosevelt Blvd (E)	18.9	151.3%	2.7	16.9%	0.8
US 1/Roosevelt Blvd (W)	20.1	174.2%	1.4	34.7%	0.2

Corridors

Dates

Arterial Ranking Tool

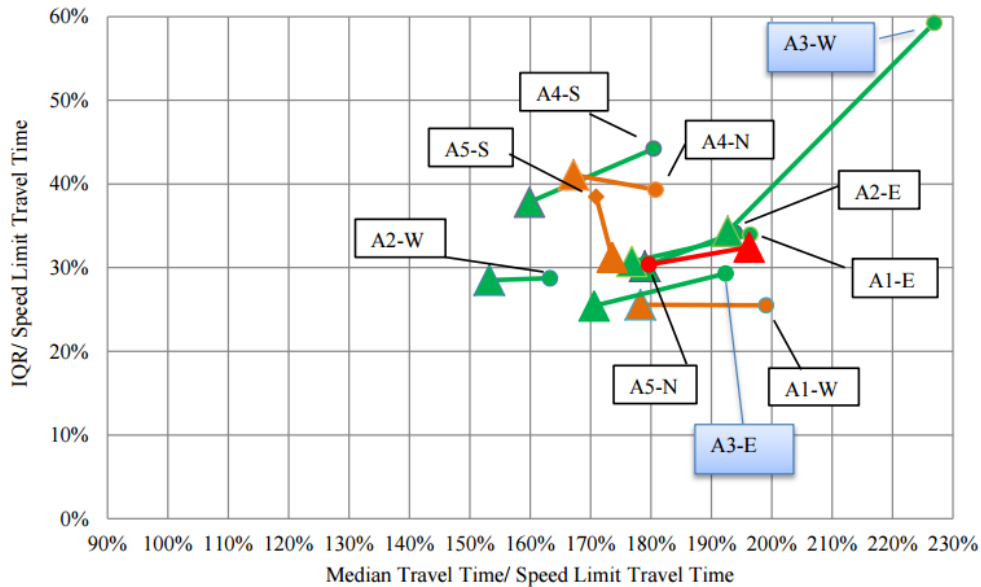
PA 611 & PA 291/Broad St
Signals: 119, County: Philadelphia
Speed Limit: 15-40mph, AADT: 29554

10:13 PM
4/30/2017

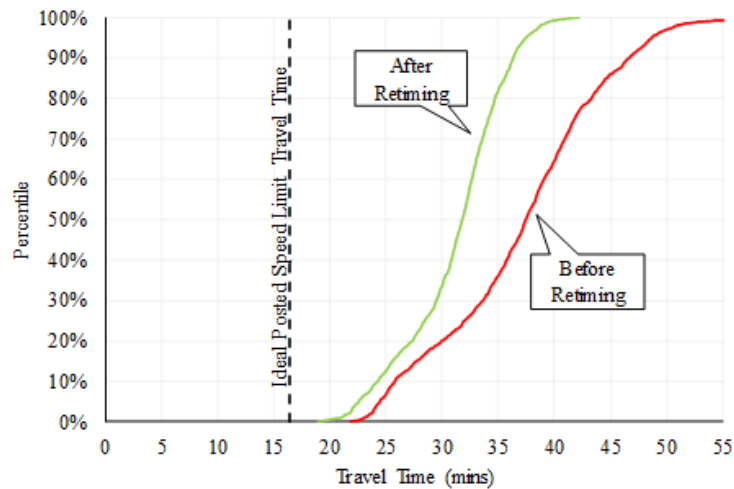


② Arterial Ranking Tool

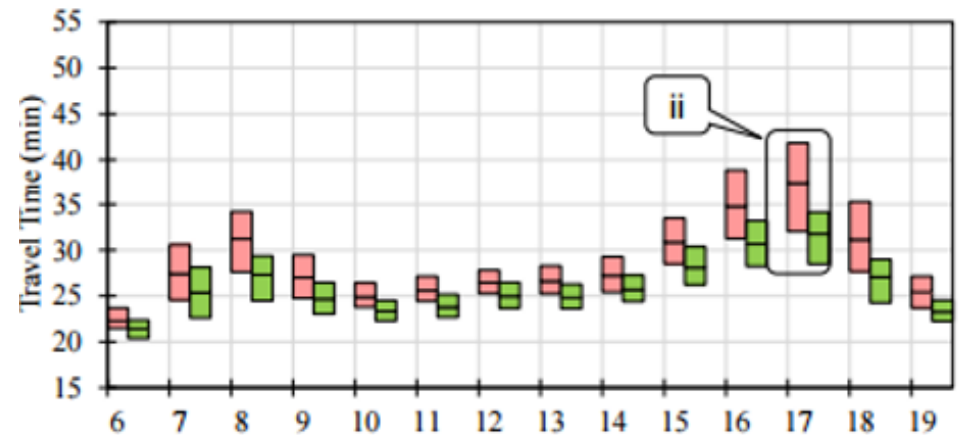
Case Study: US 1/State Rd/Township Line Rd/City Ave



Corridor ID	Corridor Name	AADT	Length (mi)	Average Speed Limit (mph)	Signal Count (Adaptive Signals)	Before Date Range	After Date Range
A1	PA 132 / Street Rd	33,965	15.2	45	50 (21)	10/12/2015–11/23/2015	1/4/2016–2/15/2016
A2	PA 332 (Newtown Bypass)	35,015	4.8	53	12 (12)	2/22/2016–4/4/2016	4/25/2016–6/6/2016
A3	US 1/State Rd/Township Line Rd/City Ave	35,268	10.0	36	40 (4)	10/12/2015–11/23/2015	3/7/2016–4/18/2016
A4	US 202/Wilmington Pkwy	46,553	8.6	45	16 (9)	9/4/2015–10/26/2015	1/4/2016–2/15/2016
A5	PA 611/Old York Rd/ Easton Rd	30,919	16.3	42	68 (15)	4/27/2015–6/8/2015	1/4/2016–2/15/2016



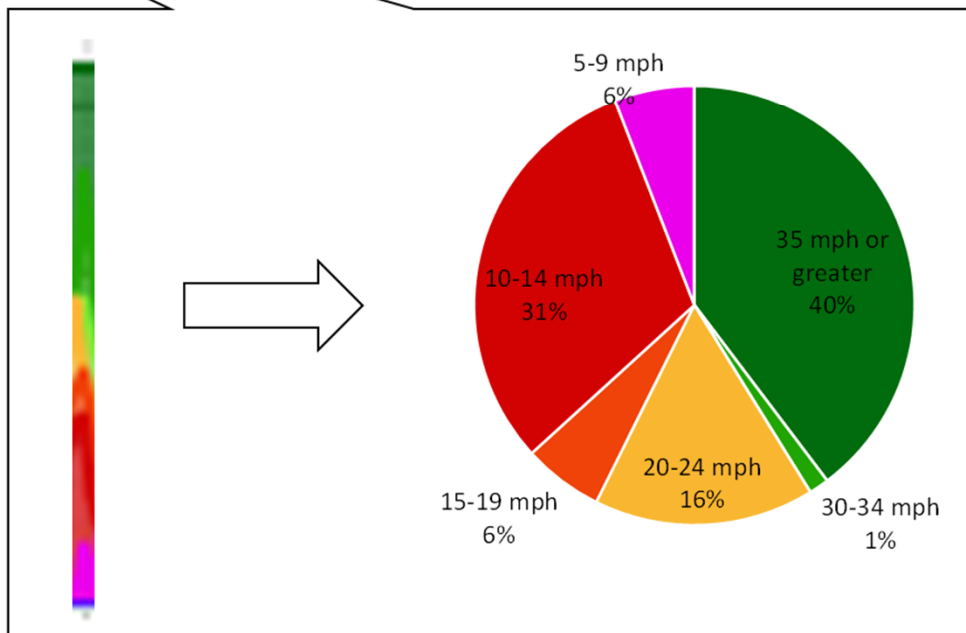
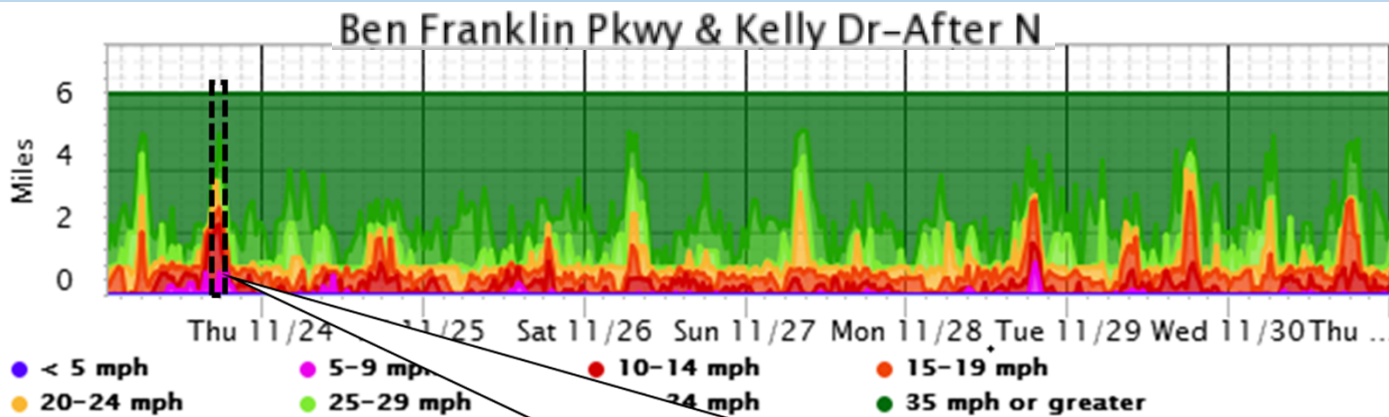
Westbound



f) Corridor A3, Westbound

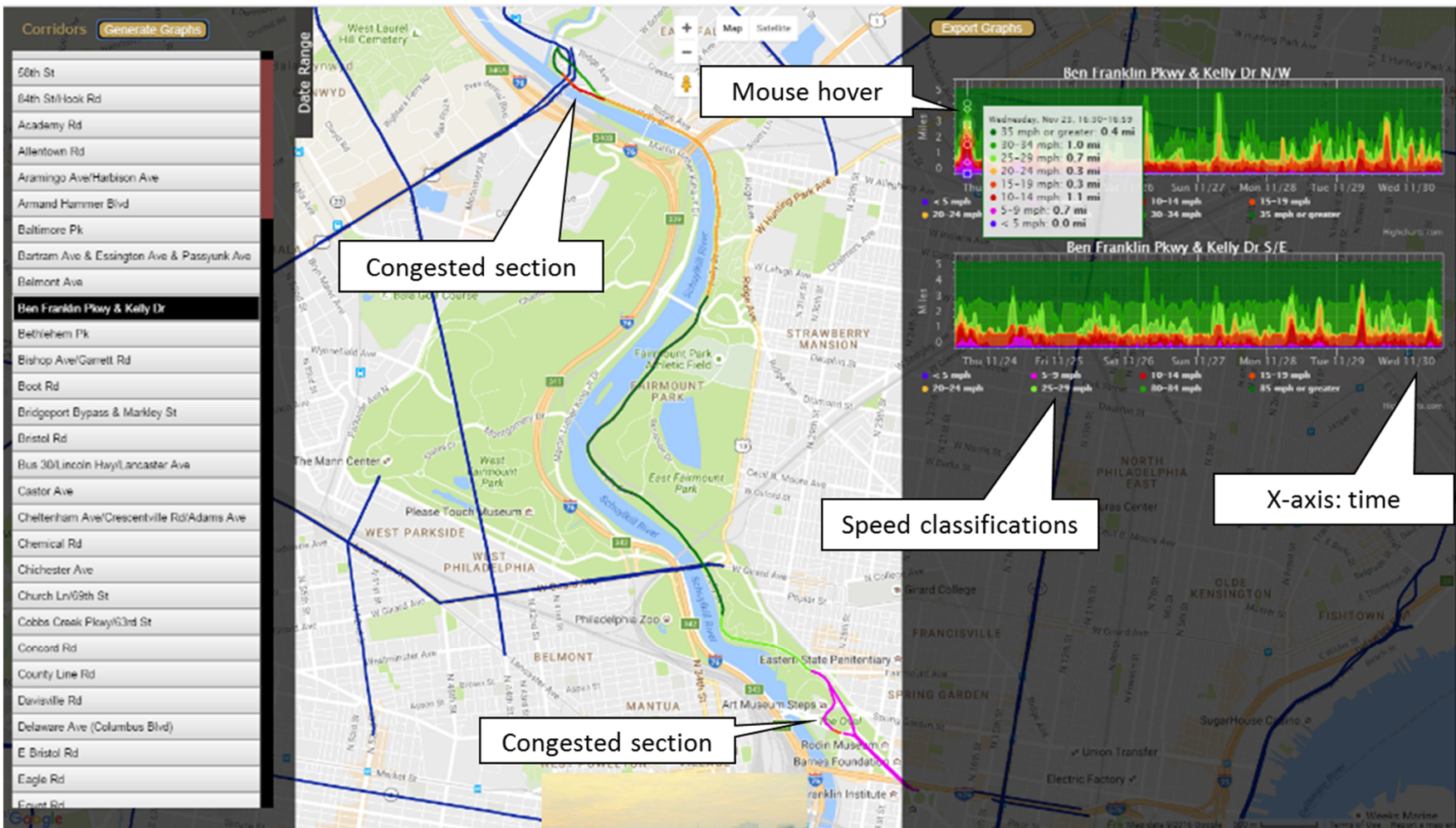


3 Congestion Ticker





3 Congestion Ticker





4 Benefit Evaluation

Case Study: US 1/State Rd/Township Line Rd/City Ave

Corridor ID	Corridor Name	AADT	Length (mi)	Average Speed Limit (mph)	Signal Count (Adaptive Signals)	Before Date Range	After Date Range
A1	PA 132 / Street Rd	33,965	15.2	45	50 (21)	10/12/2015–11/23/2015	1/4/2016–2/15/2016
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Volume
Change in median TT

$$vol_i = AADT * k_i * d$$

$$\Delta TT_i = TT_{before,i} - TT_{after,i}$$

$$user_{car,i} = vol_i * \Delta TT_i * \%C_i * PPV_c * VOT_c$$

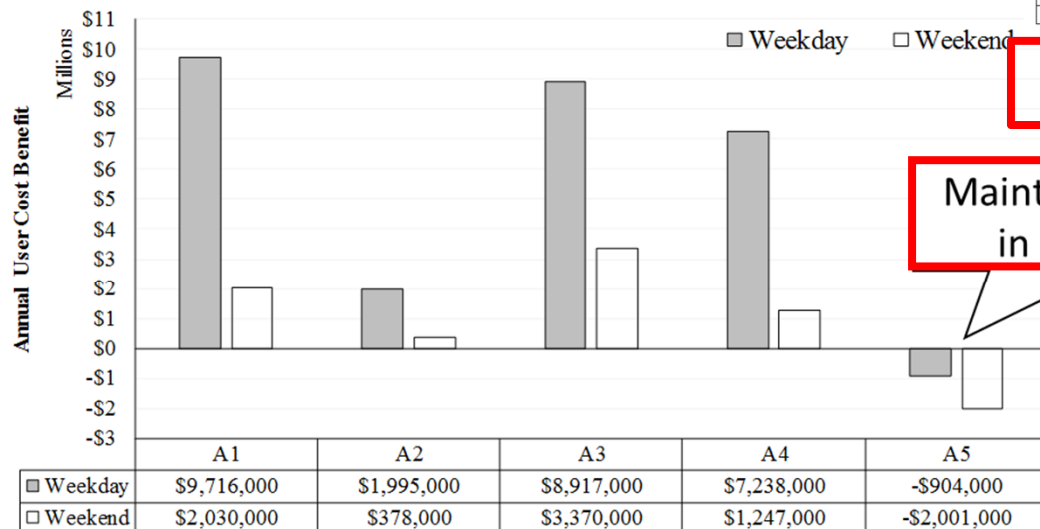
$$user_{truck,i} = vol_i * \Delta TT_i * \%T_i * PPV_t * VOT_t$$

User benefits (cars)

User benefits (trucks)

Summary of Annual CO₂ Emission Reductions for the Adaptive Signals

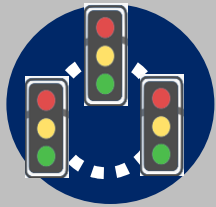
Corridor	Weekday CO ₂ Savings		Weekend CO ₂ Savings	
	Tons	Dollars	Tons	Dollars
A1	3120	\$112,000	650	\$23,000
A2	640	\$23,000	120	\$4,000
A3	2890	\$104,000	1080	\$39,000
A4	2320	\$84,000	400	\$14,000
A5	-310	-\$11,000	-650	-\$23,000
Total	8660	\$213,000	1610	\$58,000



10K tons of CO₂ savings

Maintenance activities in "after" period

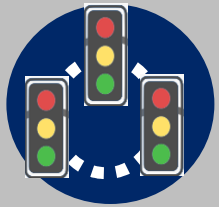
Over \$30M annualized user benefits



Real-World Evaluations

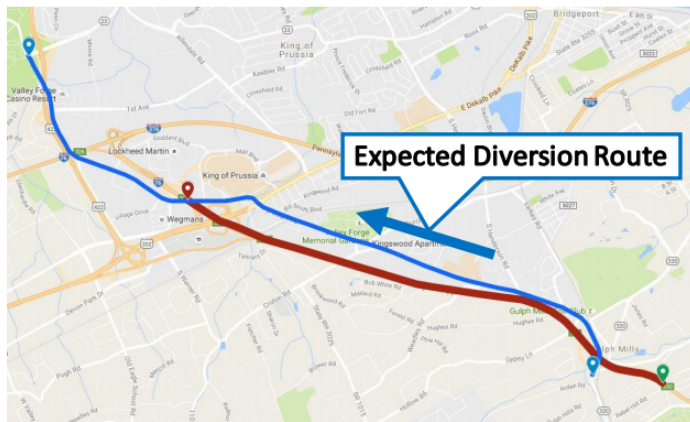
List of Use Applications

Type of Event	(1) Travel Time Comparison	(2) Arterial Ranking	(3) Congestion Ticker
Signal Timing Plan Degradation			
Signal Maintenance and Retiming			
Adaptive Installation			
Construction Activities			
Special Events			
Crashes			
Weather Events (Winter Storms)			
Land Use Changes			

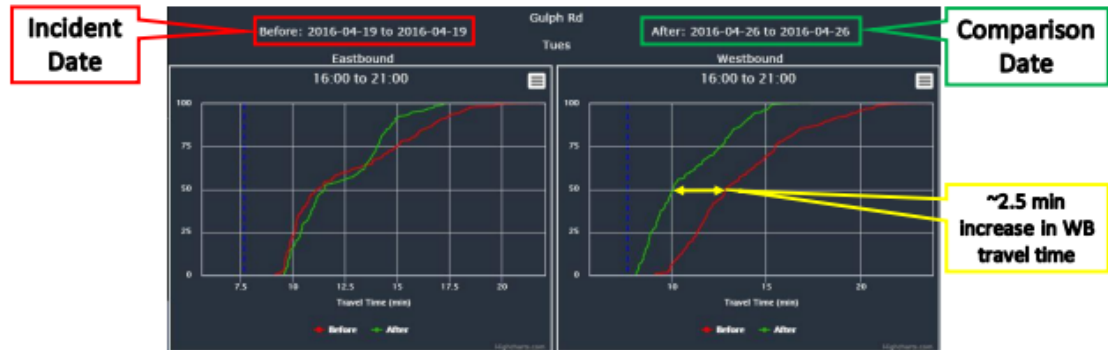


Real-World Evaluations

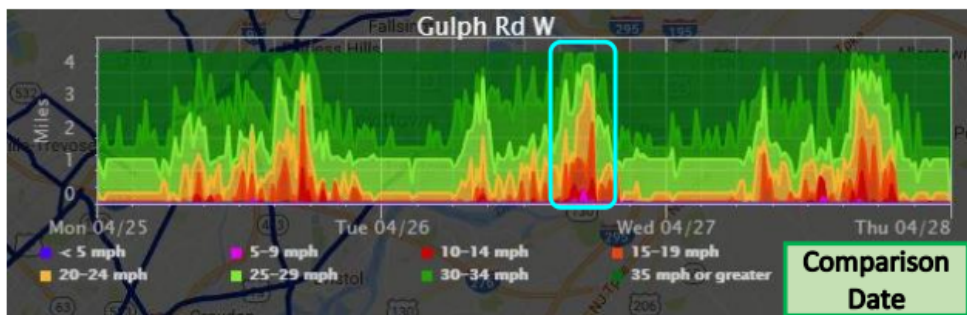
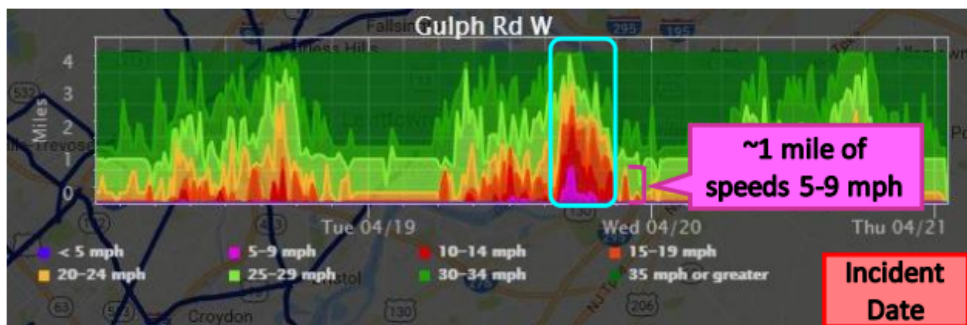
Incident Impacts



I-76 West accident impact (red) and expected Gulph Rd detour (blue)



Travel time impacts on Westbound Gulph Rd



Congestion heat map of Westbound Gulph Rd

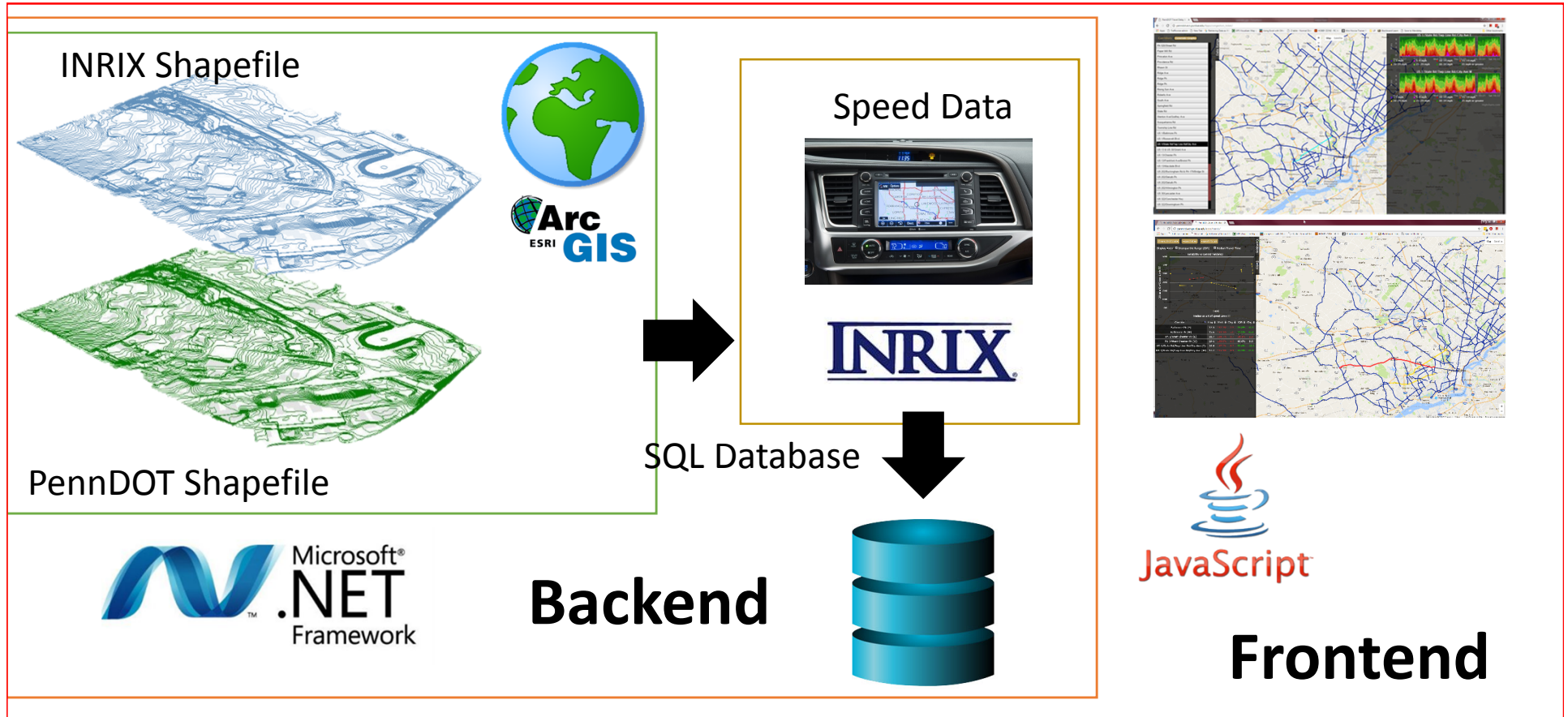


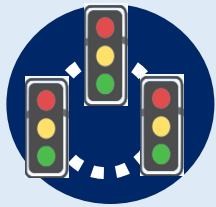


How it Works?

Overview

Developing the Dashboards





Next Steps

Phase 2 Research Efforts

- **Statewide Deployment (11 additional regions)**
- **Further refining of filters and corridor identifiers (i.e. by counties, municipality, identification #, etc...)**
- **Subdividing Corridors and possible user-defined corridor selection**
- **Integration with Real-Time Event Data (PennDOT's RCRS)**
- Executive dashboard and Automated Reports (performance at-a-glance)
- Export data directly into Benefits worksheet
- **Linear diagram showing relation of travel time to length and signal locations**
- Integration with high-resolution signal controller event data
- Further refine Real-Time metrics and Operator flags
- Additional Metrics as identified

Questions

www.dot.state.pa.us/signals

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(717) 783-0333

Traffic Signal Portal Menu ▾

Tuesday, September 5, 2017

2017 - Green Light-Go Program (Year 4) Program Updates and Application Period

PennDOT will be accepting applications for the 2017 Green Light-Go Funding Program (Year 3) from September 2 through November 9, 2017. The 2017 Green Light-Go Program has up to \$40 million for the competitive application and reimbursement grant program for existing traffic signal improvements such as: light-emitting diode technology and intelligent transportation applications, such as autonomous and connected vehicle-related technology, performing regional operations such as retiming, developing special event plans and monitoring traffic signals and for maintaining and operating traffic signals.

Municipalities are strongly encouraged to work with their PennDOT District Traffic Signal Unit representatives to define project scopes in a manner consistent with the program goals and requirements, which will allow PennDOT to assist applicants with refining the scope to ensure a successful project (e.g. equipment compatibility, appropriateness of project for location, etc.). A new project scoping form has been developed (see Appendix III of the [Program Guidelines](#)) to assist in this process, and the PennDOT contacts are identified in Appendix IV.

Please visit the PennDOT Traffic Signal Portal's Green Light-Go page for more information:
<http://www.dot.state.pa.us/Portal%20Information/Traffic%20Signal%20Portal/FUNDGLG.html>.

The 2017 program continues the following updates enacted in Act 101 of 2016 (Enhancing Pennsylvania's Green Light-Go Program):

- Reduction of the Municipal Match from 50% to 20%

Publications	Green Light-Go Program	Laws & Regulations
Strike-off Letters	ARLE Program	Flashing Yellow Arrow (FYA)
Traffic Engineering Forms	Approved Products Listing (eCAMMS)	Traffic Signal Training Courses
Analysis & Design (Excel Workbooks)	Manufacturer Structure Drawings	MUTCD (2009 Edition)

Traffic Signal Asset Management System (TSAMS)