

Work Zone Performance Monitoring Application

National Rural ITS Conference – Branson, MO

Session A1

August 25, 2014

UMD CATT Laboratory

Project Background

- Motivation: compliance with Final Rule on Work Zone Safety and Mobility
- Pilot project to develop a real-time performance monitoring tool for work zones using probe vehicle data and RITIS data
- Maryland SHA CHART program already shared work zone data with RITIS
- Determine adequacy of third party probe data to support WZPM

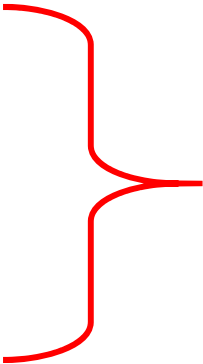


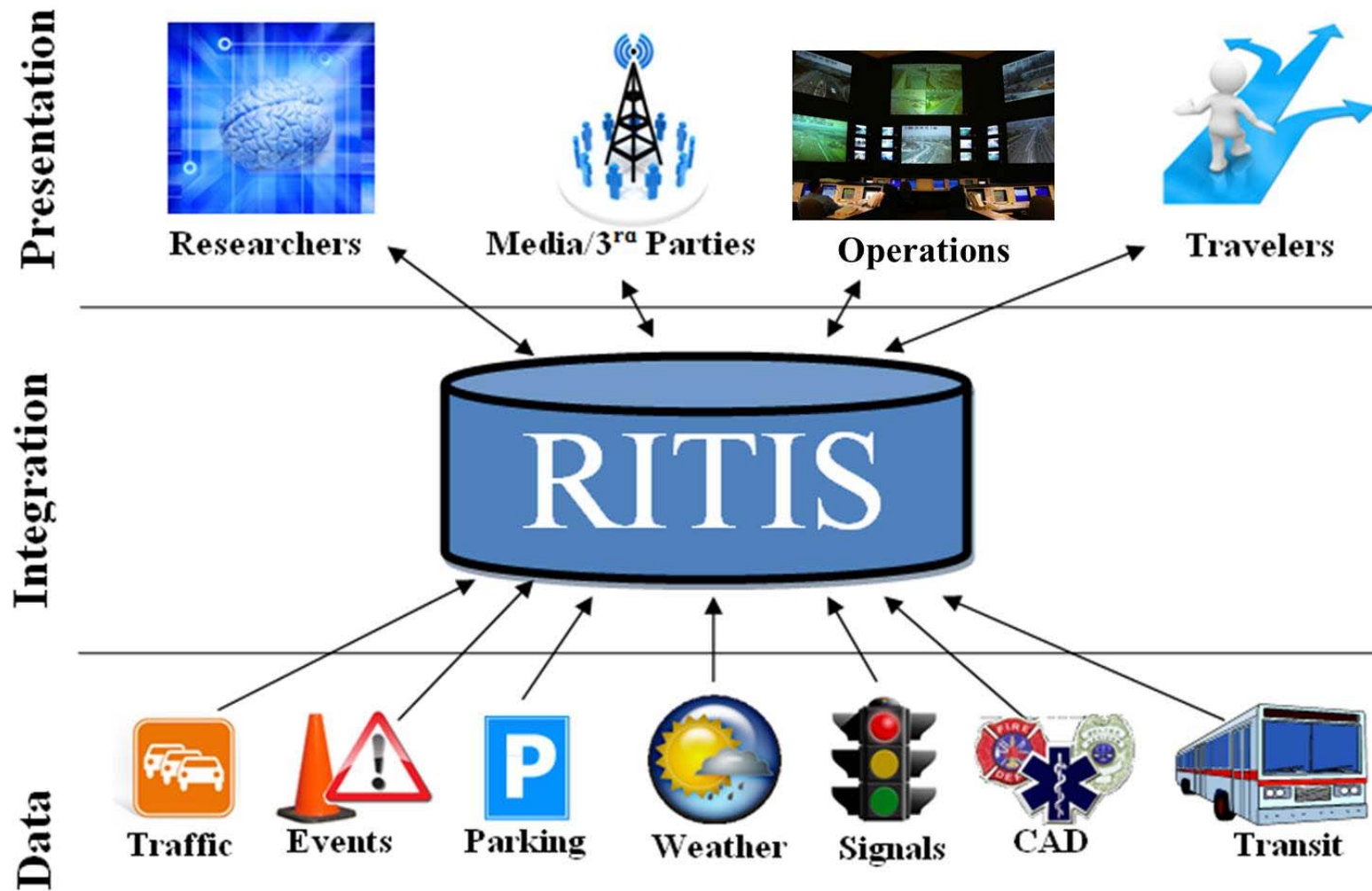
RITIS Background

- Many traffic management centers collecting large amounts of data:
 - Washington, D.C. TMC
 - Maryland CHART TMC
 - Northern Virginia TMC
 - Several Large County TMCs
 - Several Transit Agencies
 - Emergency Management Agencies
 - Computer Aided Dispatch
- **Coordination?!—does it exist?**
- **How is safety and performance measured/analyzed?**
- **How are investment decisions made?**
- **Why isn't there more innovation – private sector or otherwise?**

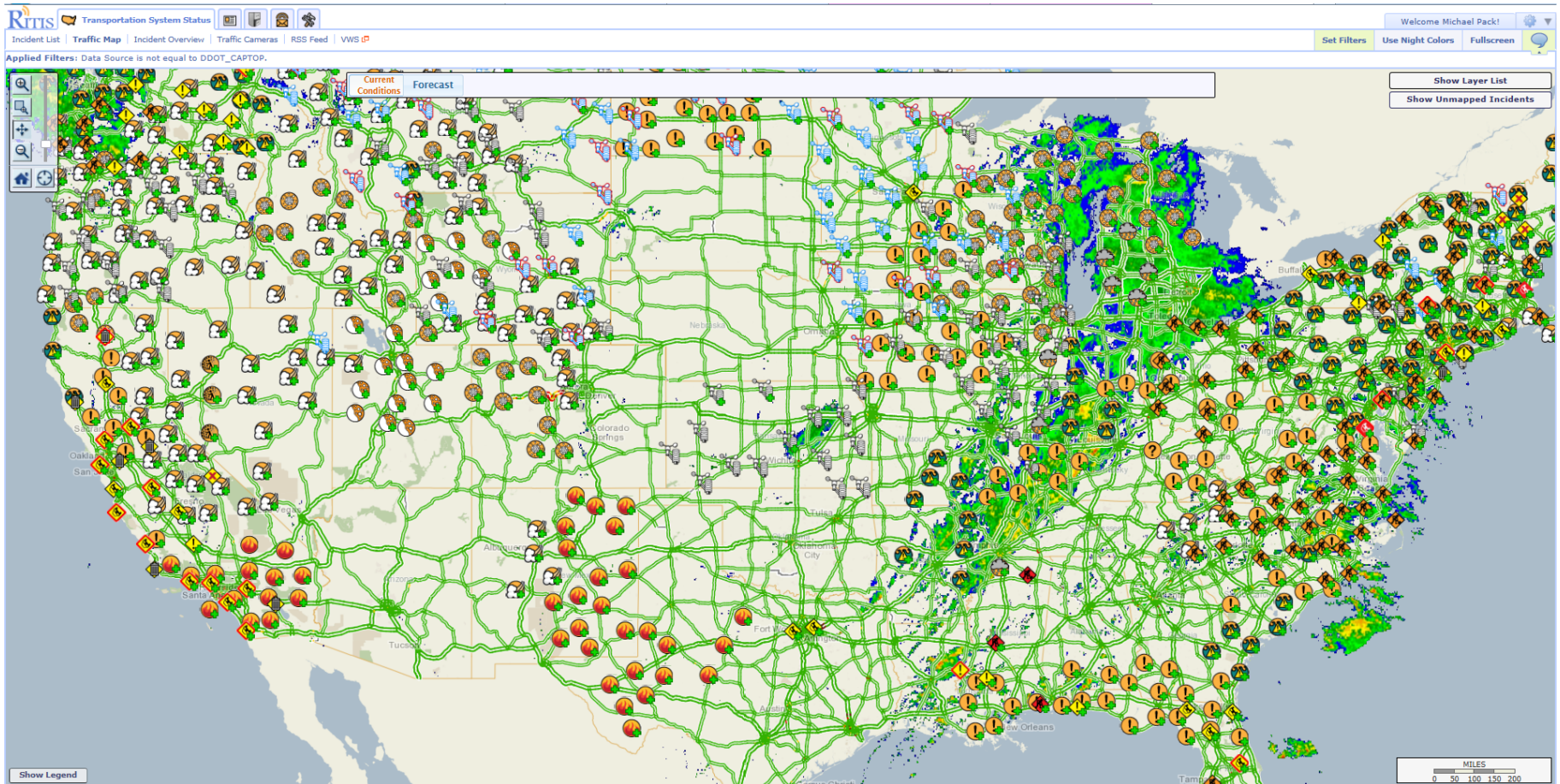


RITIS Mission

- 
- Improve accessibility to data
 - Improve data quality
 - Facilitate Operations Coordination
- Reduce Agency Operations Integration Costs
 - Reduce 3rd Party Developer Costs
 - Encourage and Facilitate Innovation by Others
 - Create an accessible transportation data archive for
 - Performance Reporting
 - Research
 - Operations
 - Planning
 - Decrease % of Wasted Research Dollars



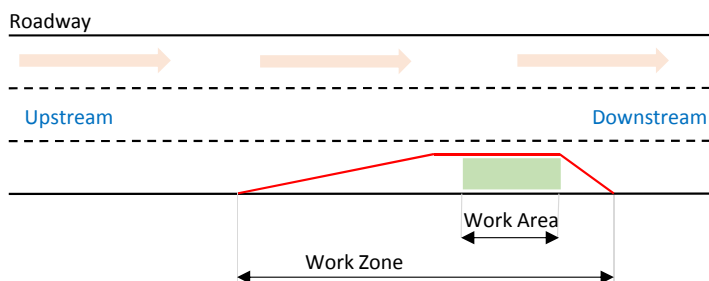
Progress thus far...



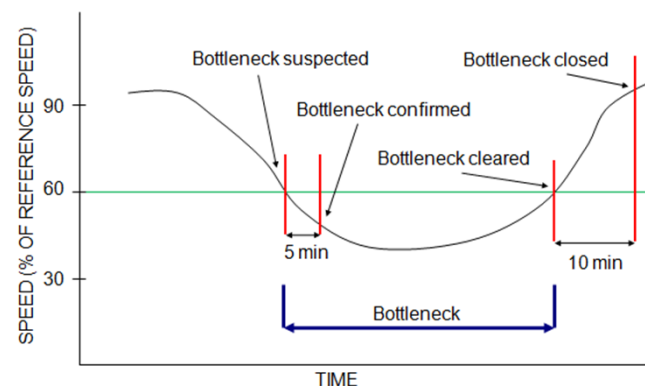
WZPM Data Sources and Key Definitions

- Active work zone information provided by Maryland SHA Coordinated Highway Action Response Team (CHART) system.
- Probe vehicle speed information from third party providers.

Work Zone



Queue/Bottleneck



User Delay Cost (UDC)

	12AM - 6AM	6AM - 9AM	9AM - 12PM	12PM - 4PM	4PM - 8PM	8PM - 12AM	Daily Totals
Tue 5/19/2014	\$3.00	\$108.81	\$7,128.14	\$27.44	\$45.40	\$18.84	\$7,352.21
Wed 5/20/2014	\$4.96	\$109.18	\$8,340.98	\$1,343.84	\$49.40	\$22.46	\$9,810.84
Thu 5/21/2014	\$14.88	\$28.33	\$3,990.93	\$3,622.06	\$110.97	\$88.99	\$7,444.80
Fri 5/22/2014	\$3.96	\$19.38	\$417.81	\$16.48	\$2,440.87	\$6.42	\$3,104.93
Sat 5/23/2014	\$4.07	\$0.49	\$0.00	\$36.27	\$12.90	\$54.81	\$108.54
Sun 5/24/2014	\$4.41	\$10.43	\$0.00	\$4,314.88	\$0.00	\$8.43	\$4,334.36
Mon 5/25/2014	\$2.58	\$201.15	\$8,183.06	\$3,144.98	\$349.59	\$27.90	\$11,908.47
Hourly Totals	\$37.72	\$474.78	\$27,840.92	\$12,528.99	\$3,049.83	\$217.61	Grand Total: \$46,165.95

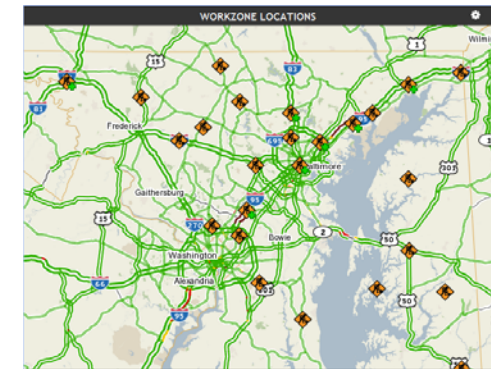
Calculated using:

- ADT (AADT with adjustment factor)
- Passenger/commercial vehicle percentages
- Speed reduction factor
- Delay

Performance Monitoring

Three disparate audiences and corresponding goals identified:

- **Audience:** Project Engineers and Managers
- **Goals:**
 - Real time performance
 - Alerts when thresholds exceeded
 - Potential actions based on identified performance
- **Audience:** Public Affairs
- **Goals:**
 - Real time and historical performance
 - Responding to complaints and inquiries
- **Audience:** Planners and Decision Makers
- **Goals:**
 - Closure costs
 - Review of previous performance



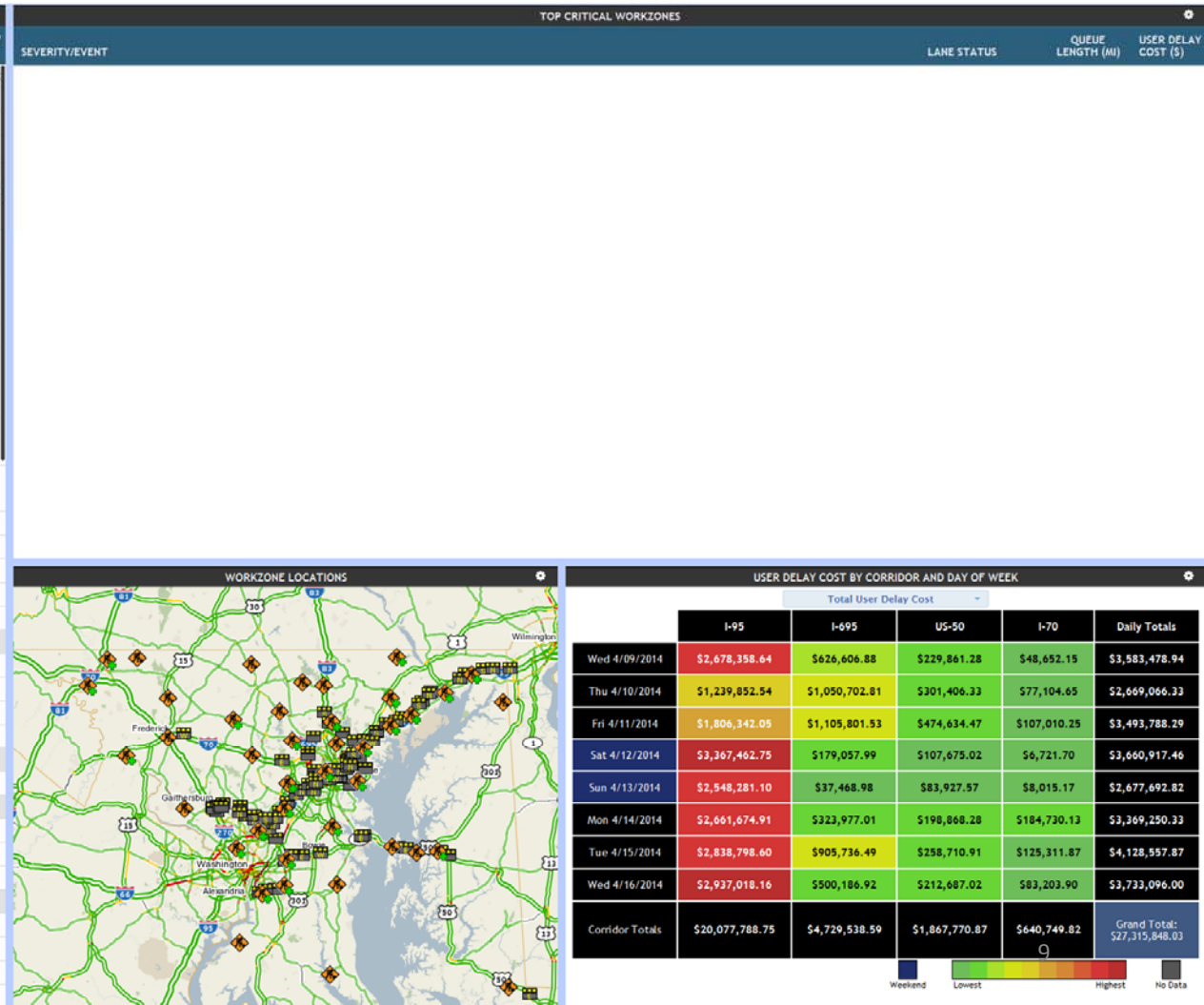
USER DELAY COST BY CORRIDOR AND DAY OF WEEK					
Total User Delay Cost					
	I-95	I-695	US-50	I-70	Daily Totals
Sun 5/04/2014	\$2,293,148.25	\$27,007.79	\$91,719.43	\$24,818.81	\$2,436,694.27
Mon 5/05/2014	\$2,690,597.77	\$790,679.54	\$245,083.44	\$176,684.45	\$3,903,045.21
Tue 5/06/2014	\$2,615,804.89	\$862,341.67	\$384,208.20	\$48,224.65	\$3,910,579.40
Wed 5/07/2014	\$2,845,013.60	\$884,413.37	\$380,984.89	\$115,593.89	\$4,226,005.75
Thu 5/08/2014	\$1,467,929.80	\$1,655,892.91	\$499,083.14	\$248,688.56	\$3,871,594.40
Fri 5/09/2014	\$1,892,924.58	\$1,144,372.86	\$315,555.14	\$107,486.88	\$3,460,339.47
Sat 5/10/2014	\$3,304,754.54	\$303,979.23	\$121,740.65	\$14,313.28	\$3,744,387.71
Sun 5/11/2014	\$2,435,040.40	\$48,424.94	\$268,858.10	\$6,513.70	\$2,758,837.15
Corridor Totals	\$19,545,213.84	\$5,716,712.31	\$2,307,833.00	\$742,324.22	Grand Total: \$28,312,083.35

Corridor performance

Work Zone Dashboard

Workzone Dashboard

CURRENT WORKZONES IN MARYLAND			
REGION/EVENT	# OF NEARBY INCIDENTS	QUEUE LENGTH (MI)	USER DELAY COST (\$)
Maryland (76)	2043	1.08	\$374,858.00
Allegany (3)	0	0	\$9,618.00
1-68 EAST AT PLEASANT VALLEY RD	0	0	\$1,196.00
US 220 SOUTH SOUTH OF MP 12.75	0	0	\$59.00
1-68 WEST FROM S JOHNSON ST TO PARK ST	0	0	\$8,163.00
Anne Arundel (2)	0	0	\$18,167.00
MD 198 EAST AT MD 295	0	0	\$8,374.00
MD 2 NORTH AT MD 255	0	0	\$9,793.00
Baltimore (15)	197	0.22	\$77,435.00
MD 26 EAST AT DEER PARK RD	0	0	\$9,738.00
I-95 NORTH PAST EXIT 641 695 BALTIMORE BELTWAY[MM.64.3-64.8]	0	0	\$431.00
MD 45 NORTH BETWEEN OLD PADONIA RD AND BEAVER RUN LA	0	0	\$5,942.00
I-895 NORTH PAST 295 ENTRANCE (MM 3.6-4.7) LONG TERM SHOULDER CLOSURE	83	0	\$9,748.00
I-895 SOUTH PRIOR TO EXIT 4 MD 295 BALTIMORE WASHINGTON PARKWAY (LONG-TERM & CONTINUOUS)	113	0	\$3,718.00
MD 45 SOUTH BETWEEN PADONIA RD AND TIMONIUM RD	0	0	\$880.00
I-83 NORTH AT EXIT 27 MD 137 MT CARMEL RD	0	0	\$8,648.00
US 1 NORTH BETWEEN FORGE RD AND PERRY HALL RD	0	0	\$9,028.00
I-70 EAST BETWEEN ROLLING RD AND COOKS LA	0	0	\$5,854.00
MD 25 NORTH BETWEEN JOPPA RD AND GREENSPRING VALLEY RD	0	0.22	\$58.00
I-695 OUTER LOOP FROM EXIT 18 MD 26 LIBERTY RD TO EXIT 17 MD 122 SECURITY BLVD	0	0	\$6,995.00
MD 25 SOUTH/NORTH FROM MT CARMEL RD TO BENSON MILL RD	0	0	\$939.00
MD 147 SOUTH BETWEEN KHOLL ACRES DR AND NORTH WIND RD	0	0	\$2,107.00
I-95 SOUTH SOUTH OF EXIT 49 I 695 BALTIMORE BELTWAY	1	0	\$4,168.00
MD 45 SOUTH FROM WINDWOOD RD TO DUNKIRK RD	0	0	\$9,181.00
Baltimore City (4)	178	0	\$26,997.00
I-95 NORTH PAST EXIT 50 US 1 CATCH AVE (LANE SHIFT/LONG-TERM)	17	0	\$9,485.00
I-895 NORTH AT POTEE ST ON POTEE ST	0	0	\$2,945.00
I-695 INNER LOOP PAST EXIT 1 MD 173 HAWKINS POINT RD	0	0	\$9,257.00
I-895 SOUTH AT EXIT 7 MD 2 POTEE ST (LONG TERM-CONTINUOUS 1/02/14-06/31/14)	161	0	\$5,310.00
Calvert (1)	0	0	\$324.00
MD 231 EAST BETWEEN SKIPJACK RD AND STAFFORD RD	0	0	\$324.00
Carroll (3)	1	0	\$18,550.00
MD 26 WEST AT MP 16.7	0	0	\$7,678.00
MD 97 SOUTH/NORTH AT OLD HANOVER RD	0	0	\$1,092.00
MD 26 EAST/WEST BETWEEN MD 27 AND BUFFALO RD	1	0	\$9,780.00
Cecil (4)	20	0	\$22,638.00
US 40 WEST AT Thomas Hatem Memorial Bridge	0	0	\$5,919.00
I-95 SOUTH PRIOR TO EXIT 100 MD 272 NORTHEAST RD (MM 99.54 -96.73)	19	0	\$8,071.00
I-95 SOUTH PAST EXIT 93 MD 222 BARNBRIDGE RD (MM92-89)	0	0	\$7,475.00
I-95 SOUTH PAST EXIT 100 MD 272 NORTHEAST RD(MM.100-98.5)	1	0	\$1,173.00

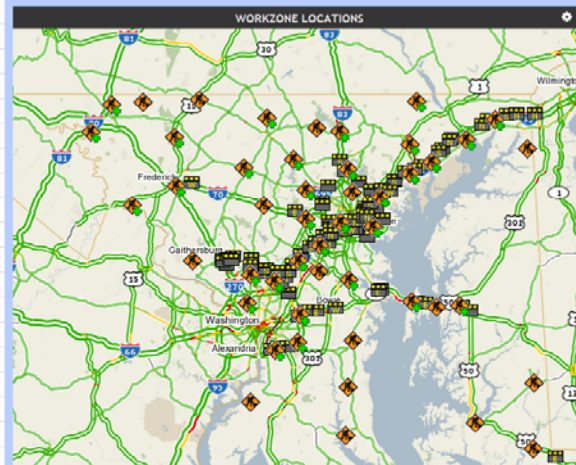


Critical Work Zones

Workzone Dashboard

CURRENT WORKZONES IN MARYLAND			
REGION/EVENT	# OF NEARBY INCIDENTS	QUEUE LENGTH (MI)	USER DELAY COST (\$)
▼ Maryland (115)	2048	7.24	\$590,385.00
▼ Allegany (4)	0	0.2	\$15,663.00
1-68 EAST AT PLEASANT VALLEY RD	0	0.2	\$4,606.00
US 220 SOUTH SOUTH OF MP 12.75	0	0	\$5,097.00
MD 144 EAST FROM I-68 TO BLACK VALLEY RD	0	0	\$4,133.00
I-68 WEST FROM S JOHNSON ST TO PARK ST	0	0	\$1,827.00
▼ Anne Arundel (7)	0	2.75	\$29,769.00
MD 176 EAST BETWEEN HARWANS RD AND MD 170	0	0	\$7,926.00
MD 2 SOUTH AT 5TH AVE	0	0	\$3,249.00
MD 198 EAST/WEST AT AIRFIELD RD	0	0	\$8,395.00
US 50 EAST AT MP 33 (BAY BRIDGE) LANE 4	0	2.75	\$2,541.00
MD 198 EAST AT MD 295	0	0	\$3,400.00
MD 2 NORTH AT MD 255	0	0	\$1,607.00
MD 100 EAST AT MD 295	0	0	\$2,651.00
▼ Baltimore (25)	197	3.48	\$129,026.00
MD 26 EAST AT DEER PARK RD	0	0	\$158.00
MD 695 SOUTH/NORTH FROM BELCLARE RD TO DUNHILL RD	0	0	\$8,823.00
I-83 SOUTH AT EXIT 27 MD 137 MT CARMEL RD	0	3.30	\$4,368.00
I-95 NORTH PAST EXIT 64 I 695 BALTIMORE BELTWAY[MM.64.3-64.8]	0	0	\$889.00
I-695 INNER LOOP BETWEEN I-895 AND I-95	0	0	\$8,577.00
MD 45 NORTH BETWEEN OLD PADONIA RD AND BEAVER RUN LA	0	0	\$8,211.00
US 40 WEST BETWEEN MOHR'S LA AND REAMES RD	0	0	\$9,311.00
I-895 NORTH PAST 295 ENTRANCE (MM 3.6-4.7) LONG TERM SHOULDER CLOSURE	83	0	\$842.00
I-895 SOUTH PRIOR TO EXIT 4 MD 295 BALTIMORE WASHINGTON PARKWAY (LONG-TERM & CONTINUOUS)	113	0	\$1,748.00
MD 372 WEST BETWEEN HILLTOP RD AND ROLLING RD	0	0	\$7,016.00
MD 43 EAST AT BELAIR RD	0	0	\$3,574.00
MD 145 EAST FROM OLD YORK RD TO FOX RUN CT	0	0	\$4,769.00
MD 45 SOUTH BETWEEN PADONIA RD AND TIMONIUM RD	0	0	\$5,636.00
I-83 NORTH AT EXIT 27 MD 137 MT CARMEL RD	0	0	\$4,199.00
US 1 NORTH BETWEEN FORGE RD AND PERRY HALL RD	0	0	\$8,262.00
I-70 EAST BETWEEN ROLLING RD AND COOKS LA	0	0	\$9,062.00
I-95 SOUTH PRIOR TO EXIT 67 MD 43 WHITE MARSH BLVD (MM69.8-69.0)	0	0	\$1,066.00
MD 25 NORTH BETWEEN JOPPA RD AND GREENSPRING VALLEY RD	0	0.05	\$6,514.00
I-695 OUTER LOOP FROM EXIT 18 MD 26 LIBERTY RD TO EXIT 17 MD 122 SECURITY BLVD	0	0	\$5,271.00
MD 25 SOUTH/NORTH FROM MT CARMEL RD TO BENSON MILL RD	0	0	\$1,662.00
I-695 INNER LOOP AT EXIT 32 US 1 BELAIR RD	0	0	\$1,663.00
MD 147 SOUTH BETWEEN KNOLL ACRES DR AND NORTH WIND RD	0	0	\$9,278.00
I-95 SOUTH SOUTH OF EXIT 49 I 695 BALTIMORE BELTWAY	1	0	\$9,565.00
MD 45 SOUTH FROM WINDWOOD RD TO DUNKIRK RD	0	0.07	\$192.00
I-695 INNER LOOP AT EXIT 13 MD 144 FREDERICK RD	0	0	\$8,370.00

TOP CRITICAL WORKZONES		
SEVERITY/EVENT	LANE STATUS	QUEUE LENGTH (MI) USER DELAY COST (\$)
▼ Critical (1)		3.38 \$2,621.00
1-83 SOUTH AT EXIT 27 MD 137 MT CARMEL RD		3.38 \$2,621.00
▼ Major (1)		2.75 \$4,199.00
US 50 EAST AT MP 33 (BAY BRIDGE) LANE 4		2.75 \$4,199.00

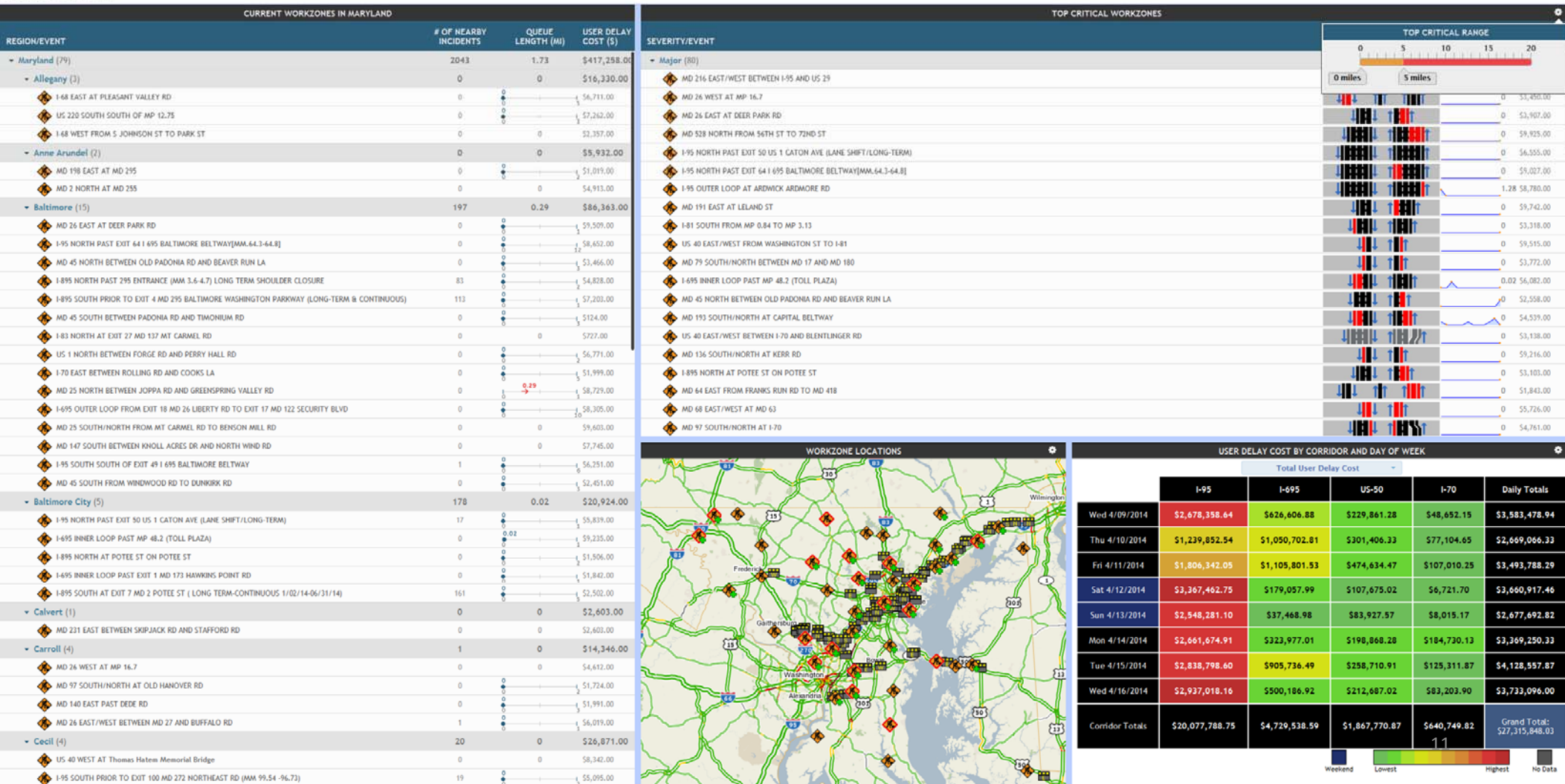


USER DELAY COST BY CORRIDOR AND DAY OF WEEK					
	Total User Delay Cost				
	I-95	I-695	US-50	I-70	Daily Totals
Wed 4/09/2014	\$2,678,358.64	\$626,606.88	\$229,861.28	\$48,652.15	\$3,583,478.94
Thu 4/10/2014	\$1,239,852.54	\$1,050,702.81	\$301,406.33	\$77,104.65	\$2,669,066.33
Fri 4/11/2014	\$1,806,342.05	\$1,105,801.53	\$474,634.47	\$107,010.25	\$3,493,788.29
Sat 4/12/2014	\$3,367,462.75	\$179,057.99	\$107,675.02	\$6,721.70	\$3,660,917.46
Sun 4/13/2014	\$2,548,281.10	\$37,468.98	\$83,927.57	\$8,015.17	\$2,677,692.82
Mon 4/14/2014	\$2,661,674.91	\$323,977.01	\$198,868.28	\$184,730.13	\$3,369,250.33
Tue 4/15/2014	\$2,838,798.60	\$905,736.49	\$258,710.91	\$125,311.87	\$4,128,557.87
Wed 4/16/2014	\$2,937,018.16	\$900,186.92	\$212,687.02	\$83,203.90	\$3,733,096.00
Corridor Totals	\$20,077,788.75	\$4,729,538.59	\$1,867,770.87	\$840,749.82	Grand Total: \$27,315,848.03

Weekend Lowest Highest No Data

Critical Work Zone Parameters

Workzone Dashboard

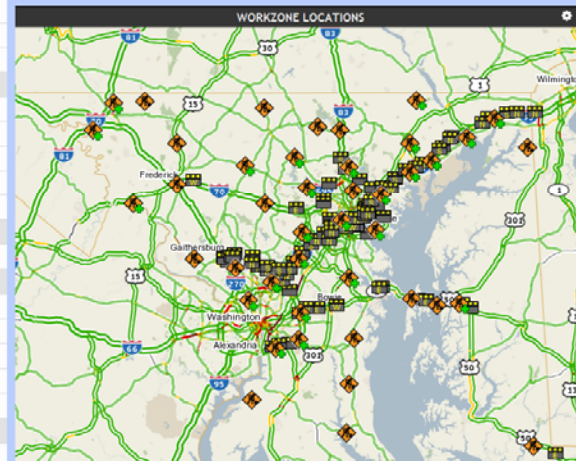


UDC Information

Workzone Dashboard

CURRENT WORKZONES IN MARYLAND			
REGION/EVENT	# OF NEARBY INCIDENTS	QUEUE LENGTH (MI)	USER DELAY COST (\$)
▼ Maryland (80)	2043	1.87	\$397,617.00
▼ Allegany (3)	0	0	\$9,455.00
I-68 EAST AT PLEASANT VALLEY RD	0	0	\$4,399.00
US 220 SOUTH SOUTH OF MP 12.75	0	0	\$2,976.00
I-68 WEST FROM S JOHNSON ST TO PARK ST	0	0	\$2,080.00
▼ Anne Arundel (2)	0	0	\$13,780.00
MD 198 EAST AT MD 295	0	0	\$5,041.00
MD 2 NORTH AT MD 255	0	0	\$8,739.00
▼ Baltimore (15)	197	0.31	\$63,495.00
MD 26 EAST AT DEER PARK RD	0	0	\$1,311.00
I-95 NORTH PAST EXIT 64 I 695 BALTIMORE BELTWAY[MM.64.3-64.8]	0	0	\$4,992.00
MD 45 NORTH BETWEEN OLD PADONIA RD AND BEAVER RUN LA	0	0	\$4,551.00
I-895 NORTH PAST 295 ENTRANCE (MM 3.6-4.7) LONG TERM SHOULDER CLOSURE	83	0	\$9,897.00
I-895 SOUTH PRIOR TO EXIT 4 MD 295 BALTIMORE WASHINGTON PARKWAY (LONG-TERM & CONTINUOUS)	113	0	\$3,087.00
MD 45 SOUTH BETWEEN PADONIA RD AND TIMONUM RD	0	0	\$9,205.00
I-83 NORTH AT EXIT 27 MD 137 MT CARMEL RD	0	0	\$7,528.00
US 1 NORTH BETWEEN FORGE RD AND PERRY HALL RD	0	0	\$6,892.00
I-70 EAST BETWEEN ROLLING RD AND COOKS LA	0	0	\$1,148.00
MD 25 NORTH BETWEEN JOPPA RD AND GREENSPRING VALLEY RD	0	0	\$5,985.00
I-695 OUTER LOOP FROM EXIT 18 MD 26 LIBERTY RD TO EXIT 17 MD 122 SECURITY BLVD	0	0	\$1,407.00
MD 25 SOUTH/NORTH FROM MT CARMEL RD TO BENSON MILL RD	0	0	\$689.00
MD 147 SOUTH BETWEEN KHOLL ACRES DR AND NORTH WIND RD	0	0	\$2,268.00
I-95 SOUTH SOUTH OF EXIT 49 I 695 BALTIMORE BELTWAY	1	0	\$774.00
MD 45 SOUTH FROM WINDWOOD RD TO DUNKIRK RD	0	0	\$3,761.00
▼ Baltimore City (5)	178	0.02	\$23,704.00
I-95 NORTH PAST EXIT 50 US 1 CATON AVE (LANE SHIFT/LONG-TERM)	17	0	\$9,872.00
I-695 INNER LOOP PAST MP 48.2 (TOLL PLAZA)	0	0	\$6,813.00
I-895 NORTH AT POTEET ST ON POTEET ST	0	0	\$2,675.00
I-695 INNER LOOP PAST EXIT 1 MD 173 HAWKINS POINT RD	0	0	\$2,545.00
I-895 SOUTH AT EXIT 7 MD 2 POTEET ST (LONG TERM-CONTINUOUS 1/02/14-06/31/14)	161	0	\$1,799.00
▼ Calvert (1)	0	0	\$8,668.00
MD 231 EAST BETWEEN SKIPJACK RD AND STAFFORD RD	0	0	\$8,668.00
▼ Carroll (5)	1	0	\$35,102.00
MD 26 WEST AT MP 16.7	0	0	\$6,858.00
MD 97 SOUTH/NORTH AT OLD HANOVER RD	0	0	\$8,380.00
MD 140 EAST PAST DEDE RD	0	0	\$3,528.00
MD 26 EAST/WEST BETWEEN MD 27 AND BUFFALO RD	1	0	\$7,660.00
MD 140 WEST PRIOR TO OLD WESTMINSTER PIKE	0	0	\$8,676.00
▼ Cecil (4)	20	0	\$16,022.00
US 40 WEST AT Thomas Hatem Memorial Bridge	0	0	\$1,670.00

TOP CRITICAL WORKZONES			
SEVERITY/EVENT	LANE STATUS	QUEUE LENGTH (MI)	USER DELAY COST (\$)
▼ Major (80)		2.1	\$378,117.00
MD 216 EAST/WEST BETWEEN I-95 AND US 29		0	\$8,105.00
MD 26 WEST AT MP 16.7		0	\$1,569.00
MD 26 EAST AT DEER PARK RD		0	\$878.00
MD 528 NORTH FROM 56TH ST TO 72ND ST		0	\$8,353.00
I-95 NORTH PAST EXIT 50 US 1 CATON AVE (LANE SHIFT/LONG-TERM)		0	\$3,225.00
I-95 NORTH PAST EXIT 64 I 695 BALTIMORE BELTWAY[MM.64.3-64.8]		0	\$4,445.00
I-95 OUTER LOOP AT ARDWICK ARDMORE RD		1.39	\$3,830.00
MD 191 EAST AT LELAND ST		0	\$9,752.00
I-81 SOUTH FROM MP 0.84 TO MP 3.13		0	\$1,319.00
US 40 EAST/WEST FROM WASHINGTON ST TO I-81		0	\$3,944.00
MD 79 SOUTH/NORTH BETWEEN MD 17 AND MD 180		0	\$4,691.00
I-695 INNER LOOP PAST MP 48.2 (TOLL PLAZA)		0.02	\$7,457.00
MD 45 NORTH BETWEEN OLD PADONIA RD AND BEAVER RUN LA		0	\$119.00
MD 193 SOUTH/NORTH AT CAPITAL BELTWAY		0	\$6,196.00
US 40 EAST/WEST BETWEEN I-70 AND BLENTLINGER RD		0	\$982.00
MD 136 SOUTH/NORTH AT KERR RD		0	\$9,531.00
I-895 NORTH AT POTEET ST ON POTEET ST		0	\$286.00
MD 64 EAST FROM FRANKS RUN RD TO MD 418		0	\$8,750.00
MD 68 EAST/WEST AT MD 63		0	\$6,968.00
MD 97 SOUTH/NORTH AT I-70		0	\$7,749.00



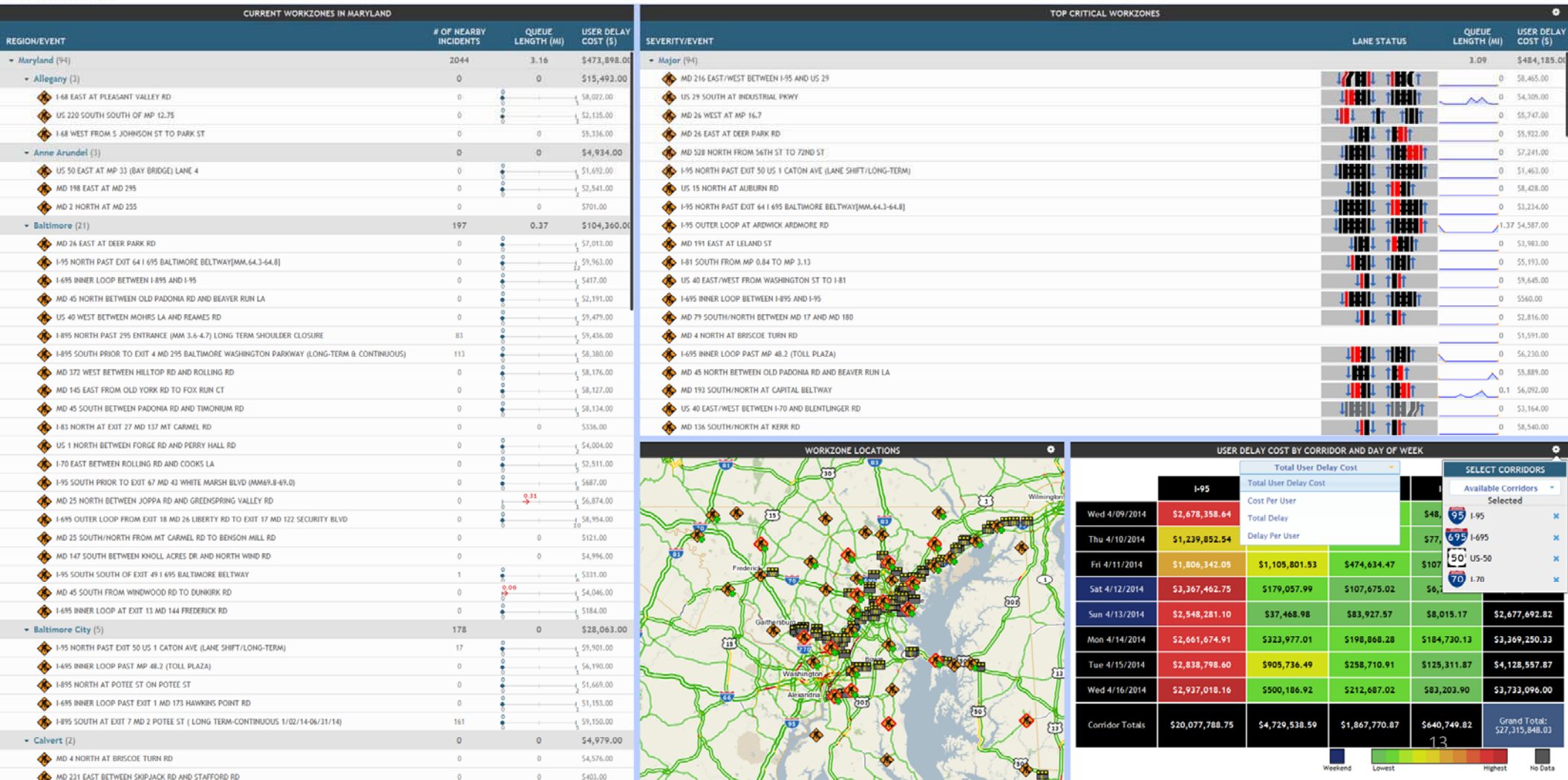
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Thu 4/10/2014	\$1,239,852.54	\$1,050,702.81	\$301,406.33	\$77,104.65	\$2,669,066.33
Fri 4/11/2014	\$1,806,342.05	\$1,105,801.53	\$474,634.47	\$107,010.25	\$3,493,788.29
Sat 4/12/2014	\$3,367,462.7	\$907,675.02	\$67,721.70		\$3,660,917.46
Sun 4/13/2014	\$2,548,281.1	\$83,927.97	\$8,015.17		\$2,677,692.82
Mon 4/14/2014	\$2,661,674.1	\$98,868.28	\$184,730.13		\$3,369,250.33
Tue 4/15/2014	\$2,838,798.60	\$905,736.49	\$258,710.91	\$125,311.87	\$4,128,557.87
Wed 4/16/2014	\$2,937,018.16	\$500,186.92	\$212,687.02	\$83,203.90	\$3,733,096.00
Corridor Totals	\$20,077,788.75	\$4,729,538.59	\$1,867,770.87	\$640,749.82	Grand Total: \$27,315,848.03

12

Weekend Lowest Highest No Data

UDC Options and Corridor Selection

Workzone Dashboard

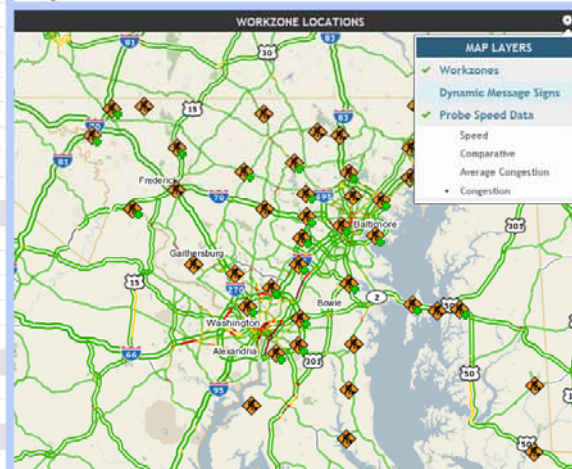


Map Layers and Options

Workzone Dashboard

CURRENT WORKZONES IN MARYLAND			
REGION/EVENT	# OF NEARBY INCIDENTS	QUEUE LENGTH (MI)	USER DELAY COST (\$)
▼ Maryland (91)	2044	3.02	\$462,013.00
▼ Allegany (3)	0	0	\$13,314.00
<div></div> <div>I-68 EAST AT PLEASANT VALLEY RD</div> <div>US 220 SOUTH SOUTH OF MP 12.75</div> <div>I-68 WEST FROM S JOHNSON ST TO PARK ST</div>	0	0	\$0,013.00 \$1,376.00 \$3,925.00
▼ Anne Arundel (2)	0	0	\$13,240.00
<div></div> <div>MD 198 EAST AT MD 295</div> <div>MD 2 NORTH AT MD 255</div>	0	0	\$4,726.00 \$0,514.00
▼ Baltimore (20)	197	0.37	\$101,808.00
<div></div> <div>MD 26 EAST AT DEER PARK RD</div> <div>I-95 NORTH PAST EXIT 64 I 695 BALTIMORE BELTWAY[MM.64.3-64.8]</div> <div>I-695 INNER LOOP BETWEEN I-895 AND I-95</div> <div>MD 45 NORTH BETWEEN OLD PADONIA RD AND BEAVER RUN LA</div> <div>US 40 WEST BETWEEN MOHRIS LA AND REAMES RD</div> <div>I-895 NORTH PAST 295 ENTRANCE (MM 3.6-4.7) LONG TERM SHOULDER CLOSURE</div> <div>I-895 SOUTH PRIOR TO EXIT 4 MD 295 BALTIMORE WASHINGTON PARKWAY (LONG-TERM & CONTINUOUS)</div> <div>MD 145 EAST FROM OLD YORK RD TO FOX RUN CT</div> <div>MD 45 SOUTH BETWEEN PADONIA RD AND TIMONIUM RD</div> <div>I-83 NORTH AT EXIT 27 MD 137 MT CARMEL RD</div> <div>US 1 NORTH BETWEEN FORGE RD AND PERRY HALL RD</div> <div>I-70 EAST BETWEEN ROLLING RD AND COOKS LA</div> <div>I-95 SOUTH PRIOR TO EXIT 67 MD 43 WHITE MARSH BLVD (MM.69.8-69.0)</div> <div>MD 25 NORTH BETWEEN JOPPA RD AND GREENSPRING VALLEY RD</div> <div>I-695 OUTER LOOP FROM EXIT 18 MD 26 LIBERTY RD TO EXIT 17 MD 122 SECURITY BLVD</div> <div>MD 25 SOUTH/NORTH FROM MT CARMEL RD TO BENSON MILL RD</div> <div>MD 147 SOUTH BETWEEN KHOLL ACRES DR AND NORTH WIND RD</div> <div>I-95 SOUTH SOUTH OF EXIT 49 I 695 BALTIMORE BELTWAY</div> <div>MD 45 SOUTH FROM WINDWOOD RD TO DUNKIRK RD</div> <div>I-695 INNER LOOP AT EXIT 13 MD 144 FREDERICK RD</div>	0	0	\$5,111.00 \$1,569.00 \$5,485.00 \$5,517.00 \$8,830.00 \$3,804.00 \$4,489.00 \$1,271.00 \$2,277.00 \$6,547.00 \$5,404.00 \$5,649.00 \$2,108.00 \$2,100.00 \$7,797.00 \$3,476.00 \$4,924.00 \$8,981.00 \$9,879.00 \$7,790.00
▼ Baltimore City (5)	178	0	\$27,750.00
<div></div> <div>I-95 NORTH PAST EXIT 50 US 1 CATON AVE (LANE SHIFT/LONG-TERM)</div> <div>I-695 INNER LOOP PAST MP 48.2 (TOLL PLAZA)</div> <div>I-895 NORTH AT POTEE ST ON POTEE ST</div> <div>I-695 INNER LOOP PAST EXIT 1 MD 173 HAWKINS POINT RD</div> <div>I-895 SOUTH AT EXIT 7 MD 2 POTEE ST (LONG TERM-CONTINUOUS 1/02/14-06/31/14)</div>	17	0	\$6,833.00 \$8,463.00 \$2,659.00 \$7,959.00 \$1,836.00
▼ Calvert (2)	0	0	\$10,262.00
<div></div> <div>MD 4 NORTH AT BRISCOE TURN RD</div> <div>MD 231 EAST BETWEEN SKIPJACK RD AND STAFFORD RD</div>	0	0	\$4,844.00 \$5,418.00
▼ Carroll (5)	1	0	\$29,218.00
<div></div> <div>MD 26 WEST AT MP 16.7</div>	1	0	\$1,174.00

TOP CRITICAL WORKZONES			
SEVERITY/EVENT	LANE STATUS	QUEUE LENGTH (MI)	USER DELAY COST (\$)
▼ Major (91)		2.96	\$416,082.00
<div></div> <div>MD 216 EAST/WEST BETWEEN I-95 AND US 29</div> <div>MD 26 WEST AT MP 16.7</div> <div>MD 26 EAST AT DEER PARK RD</div> <div>MD 528 NORTH FROM 56TH ST TO 72ND ST</div> <div>I-95 NORTH PAST EXIT 50 US 1 CATON AVE (LANE SHIFT/LONG-TERM)</div> <div>US 15 NORTH AT AUBURN RD</div> <div>I-95 NORTH PAST EXIT 64 I 695 BALTIMORE BELTWAY[MM.64.3-64.8]</div> <div>I-95 OUTER LOOP AT ARDICK ARDMORE RD</div> <div>MD 191 EAST AT LELAND ST</div> <div>I-81 SOUTH FROM MP 0.84 TO MP 3.13</div> <div>US 40 EAST/WEST FROM WASHINGTON ST TO I-81</div> <div>I-695 INNER LOOP BETWEEN I-895 AND I-95</div> <div>MD 79 SOUTH/NORTH BETWEEN MD 17 AND MD 180</div> <div>MD 4 NORTH AT BRISCOE TURN RD</div> <div>I-695 INNER LOOP PAST MP 48.2 (TOLL PLAZA)</div> <div>MD 45 NORTH BETWEEN OLD PADONIA RD AND BEAVER RUN LA</div> <div>MD 193 SOUTH/NORTH AT CAPITAL BELTWAY</div> <div>US 40 EAST/WEST BETWEEN I-70 AND BLENTLINGER RD</div> <div>MD 136 SOUTH/NORTH AT KERR RD</div> <div>I-895 NORTH AT POTEE ST ON POTEE ST</div>		0	\$4,967.00 \$3,376.00 \$2,342.00 \$4,008.00 \$9,976.00 \$5,332.00 \$1,835.00 \$9,969.00 \$5,525.00 \$9,672.00 \$1,246.00 \$9,064.00 \$8,418.00 \$8,220.00 \$7,187.00 \$469.00 \$0.09 56,685.00 \$9,315.00 \$1,671.00 \$6,166.00



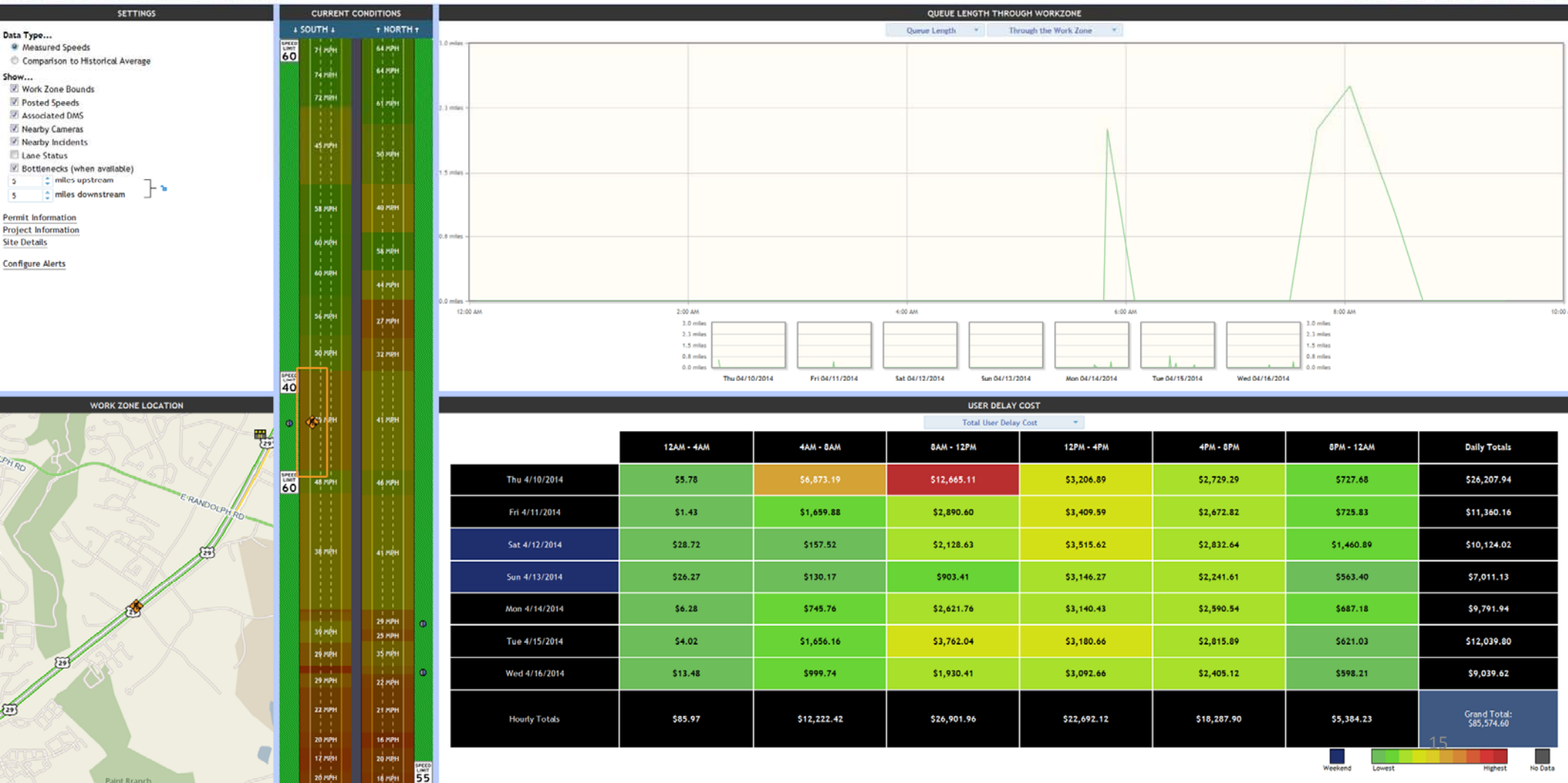
USER DELAY COST BY CORRIDOR AND DAY OF WEEK					
Total User Delay Cost					
	I-95	I-695	US-50	I-70	Daily Totals
Wed 4/09/2014	\$2,678,358.64	\$626,606.88	\$229,861.28	\$48,652.15	\$3,583,478.94
Thu 4/10/2014	\$1,239,852.54	\$1,050,702.81	\$301,406.33	\$77,104.65	\$2,669,066.33
Fri 4/11/2014	\$1,806,342.05	\$1,105,801.53	\$474,634.47	\$107,010.25	\$3,493,788.29
Sat 4/12/2014	\$3,367,462.75	\$179,057.99	\$107,675.02	\$6,721.70	\$3,660,917.46
Sun 4/13/2014	\$2,548,281.10	\$37,468.98	\$83,927.57	\$8,015.17	\$2,677,692.82
Mon 4/14/2014	\$2,661,674.91	\$323,977.01	\$198,868.28	\$184,730.13	\$3,369,250.33
Tue 4/15/2014	\$2,838,798.40	\$905,736.49	\$258,710.91	\$125,311.87	\$4,128,557.67
Wed 4/16/2014	\$2,937,018.16	\$900,186.92	\$212,687.02	\$83,203.90	\$3,733,096.00
Corridor Totals	\$20,077,788.75	\$4,729,538.59	\$1,867,770.87	\$640,749.82	Grand Total: \$27,315,848.03



Individual Work Zone

Planned Closure @ US 29 SOUTH AT INDUSTRIAL PKWY

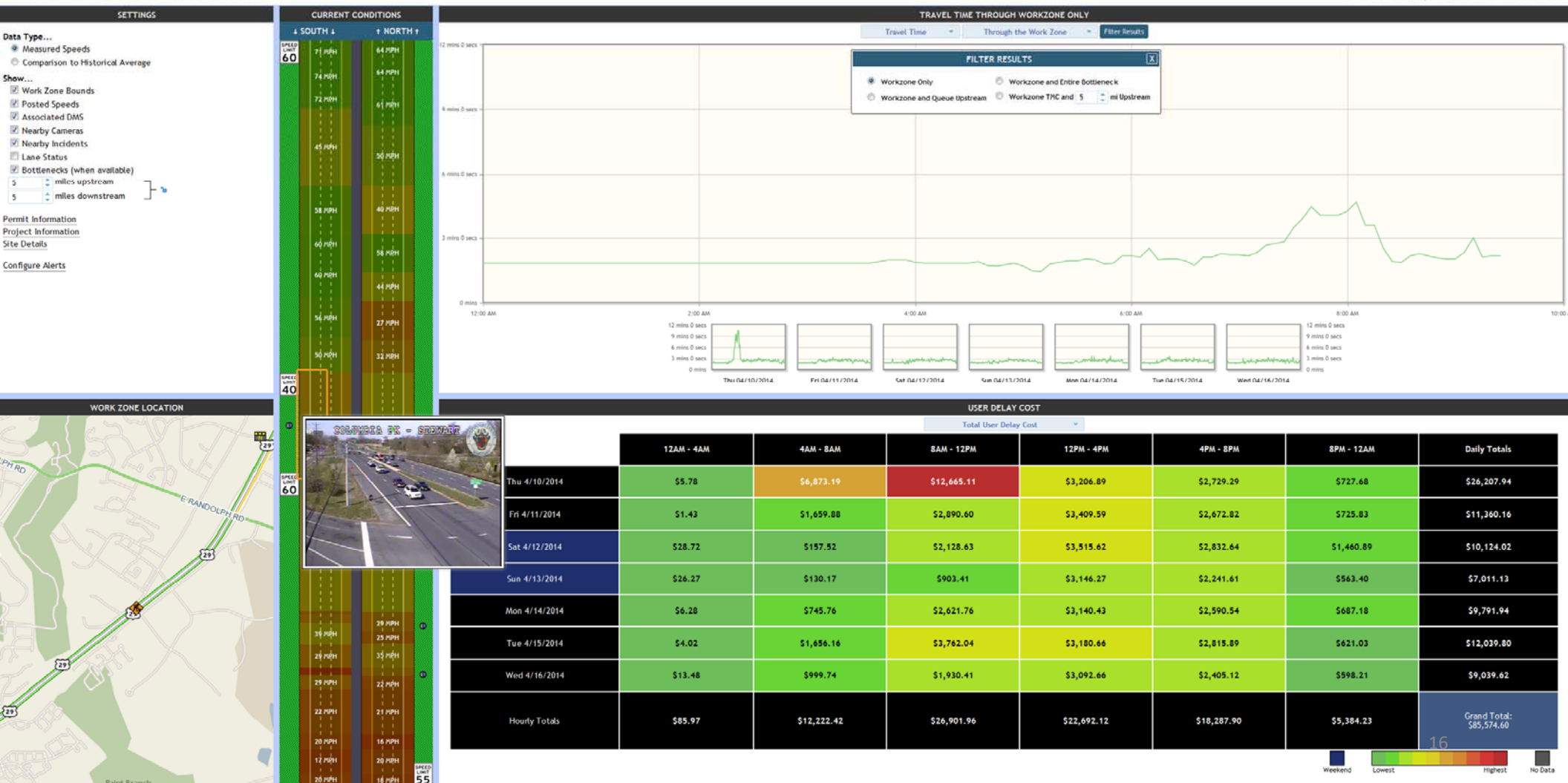
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Cameras and Graph Options

Planned Closure @ US 29 SOUTH AT INDUSTRIAL PKWY

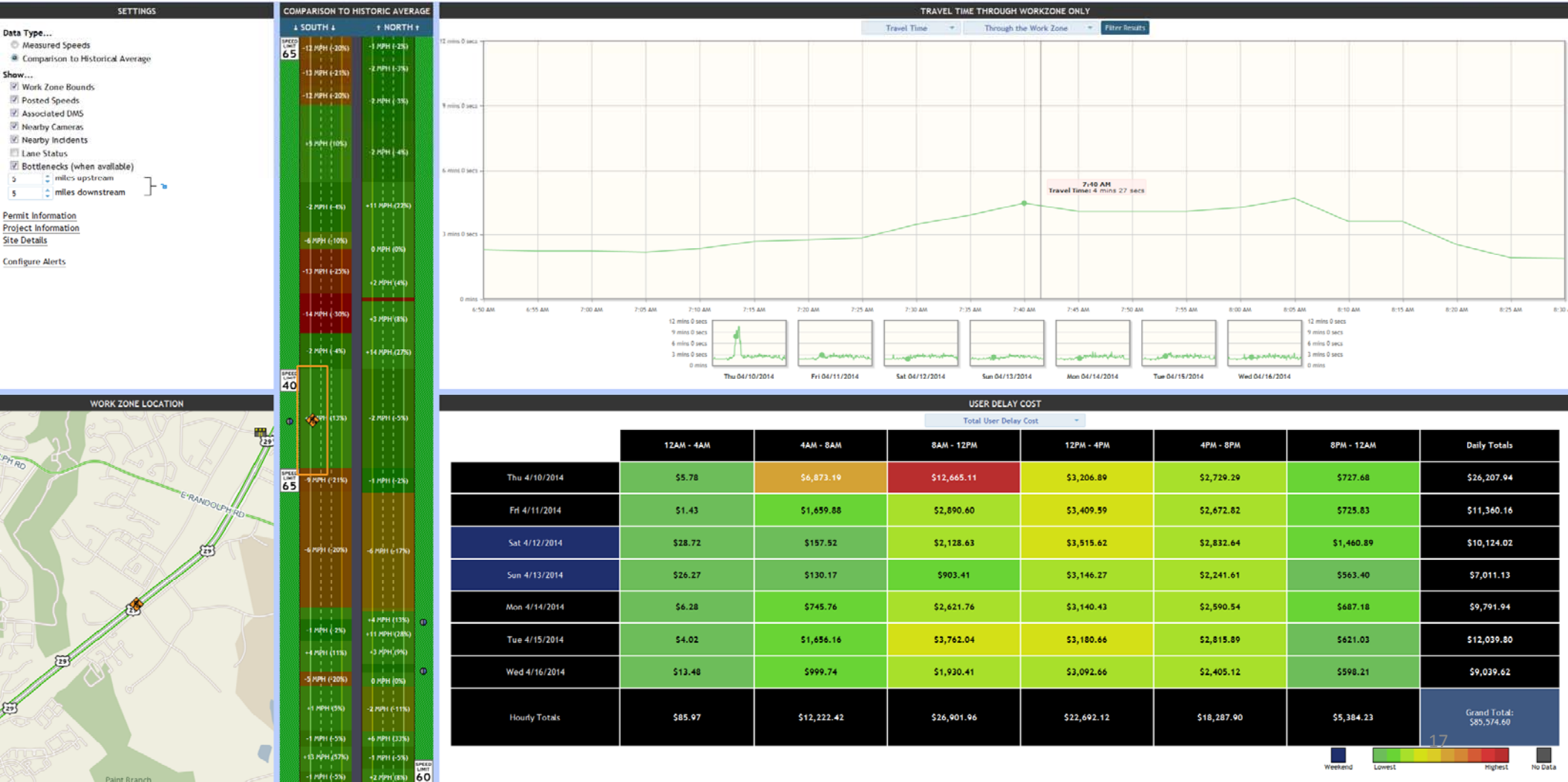
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Comparative Speed

Planned Closure @ US 29 SOUTH AT INDUSTRIAL PKWY

Started: Thu, Apr 17, 2014 at 09:16:31 AM



Nearby Incidents

Planned Closure @ I-83 SOUTH AT EXIT 27 MD 137 MT CARMEL RD

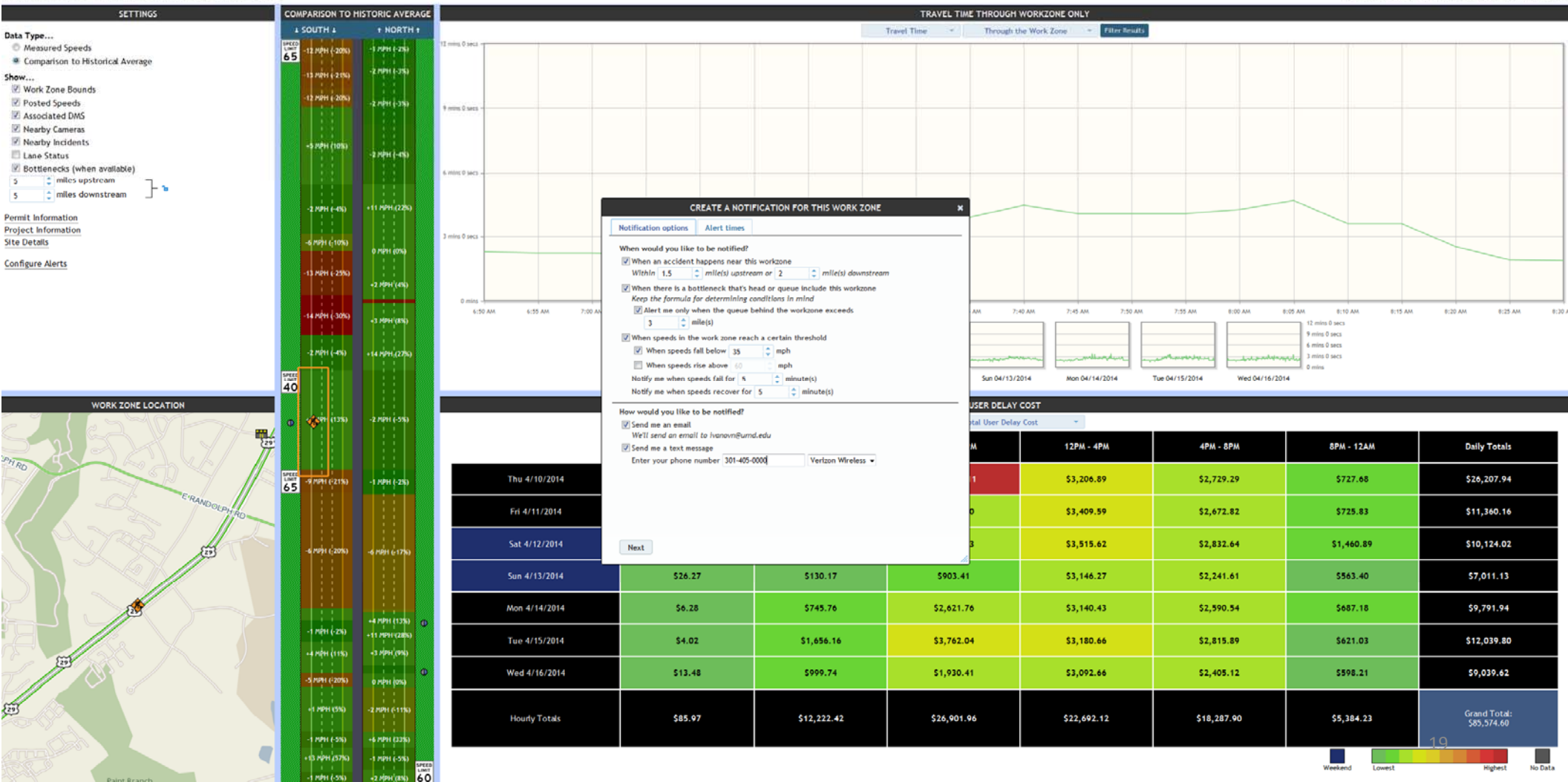
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Alert Interface

Planned Closure @ US 29 SOUTH AT INDUSTRIAL PKWY

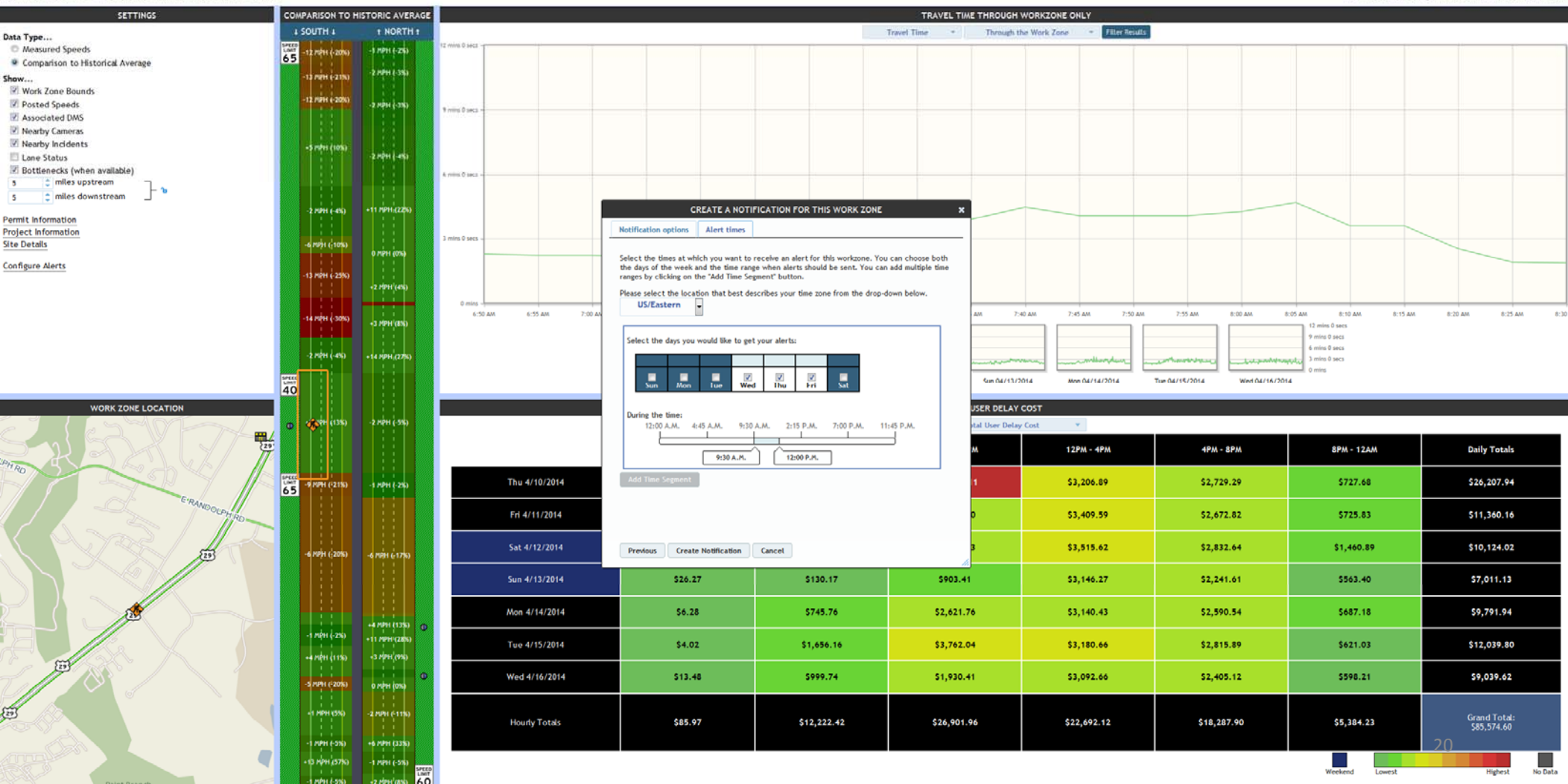
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Alert Times

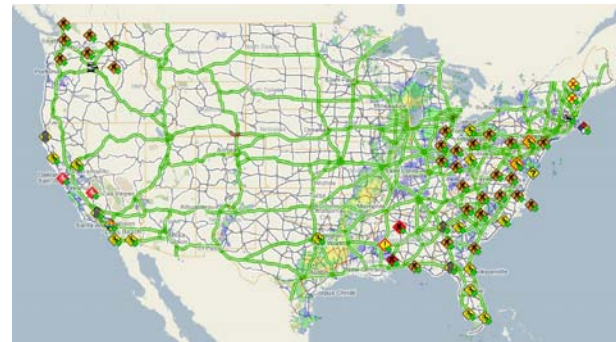
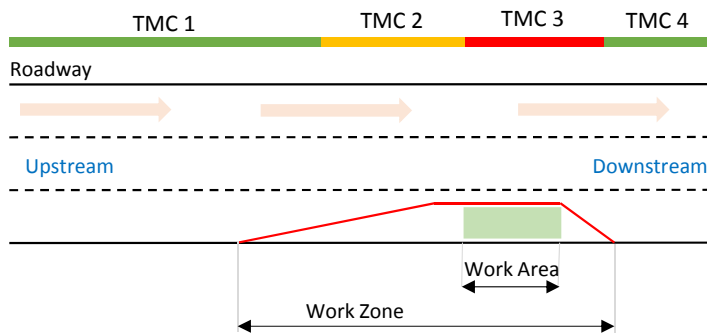
Planned Closure @ US 29 SOUTH AT INDUSTRIAL PKWY

Started: Thu, Apr 17, 2014 at 09:16:31 AM



Future Work

- Making the system available in other states
- Expanding the system to cover larger geographic areas – multiple states, I-95 Corridor Coalition, etc.
- Vehicle Probe Project loose coupling to enhance capabilities and coverage
- Permit system integration
- Improvement of underlying work zone and TMC link data



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