2012 MdQI Conference

Quality Transportation– A Hybrid Approach

An ACSLite Case Study
Riva Road – Annapolis

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MdQI Maryland Quality Initiative

Agenda

- Project Introduction and Overview
- CMAQ Funding
- ACSLite Basics
- Riva Road ACSLite Deployment
- Before & After Study
- Lessons Learned
- Questions

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Project Introduction

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Project Introduction and Overview

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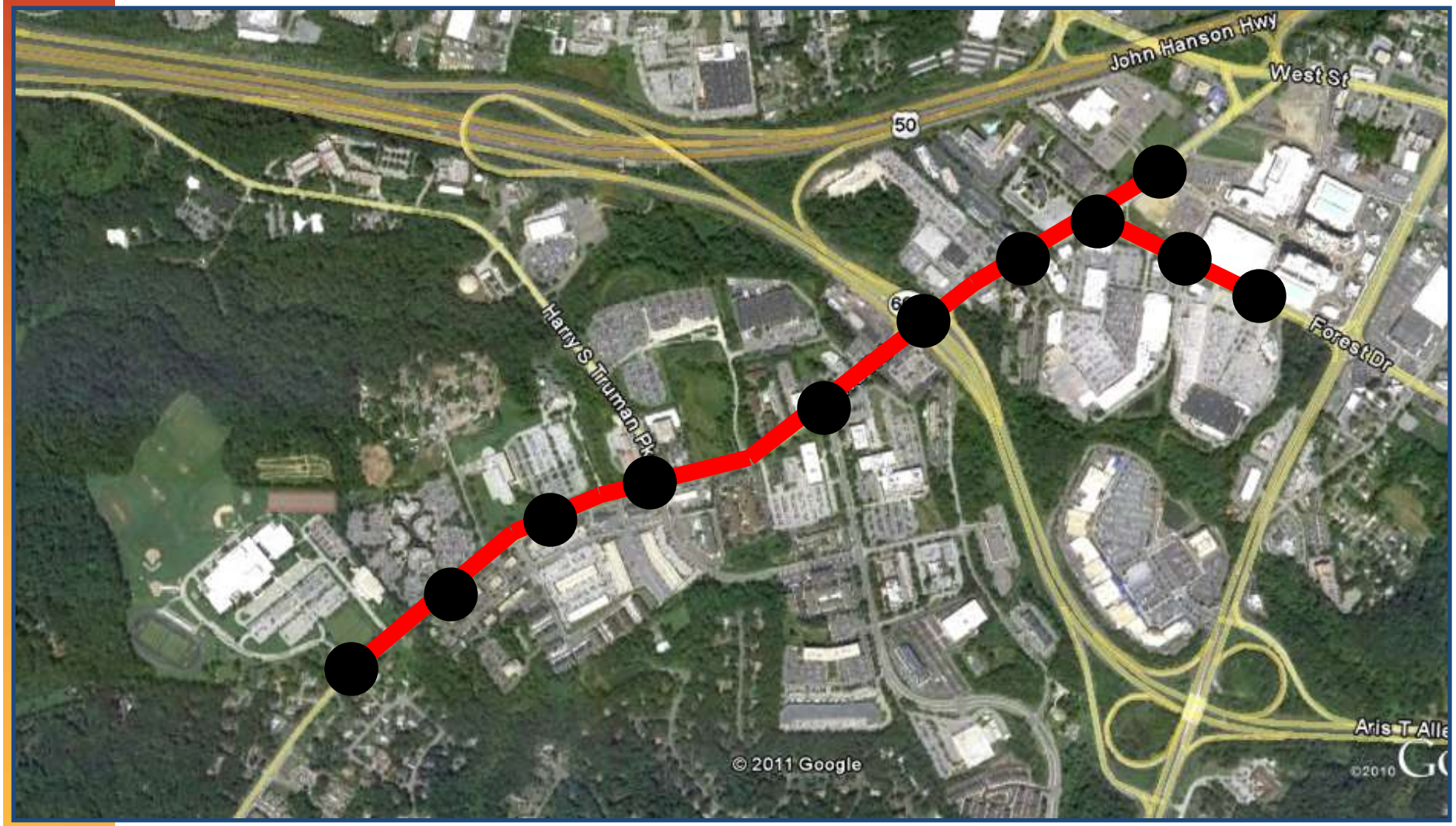
Maryland Quality Initiative

Project Introduction and Overview



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CMAQ Funding

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CMAQ Funding

- Congestion Management and Air Quality Grant
- 80% Federal contribution - 20% County match
- County fronts money and is reimbursed
- Documentation requirements
- Initiated Grant process - Fall 2008
- Received Approval - July 2009
- Completed Before Studies - March 2010
- ACSLite System On-line - November 2010
- Completed After Studies - March 2011

CMAQ Funding

- Project Costs
  - Initial Estimate = $141,200
    (County share $28,240)
  - Network Equipment Requirements ≈ $40,000
  - Engineering Studies ≈ $27,000
  - Total Project Costs ≈ $218,000

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ACSLite Basics

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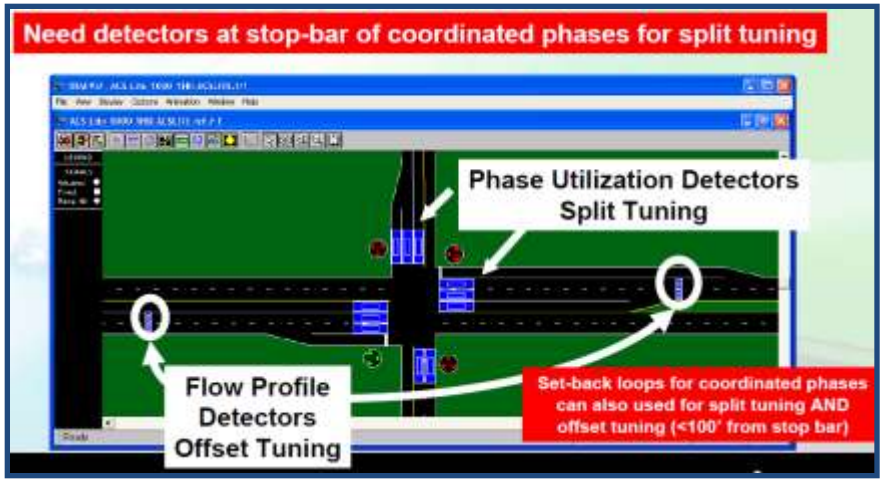
ACSLite Basics

- ACSLite – Adaptive Control System
- Developed by FHWA
  - Siemens
  - University of Arizona
  - Purdue University
- Test sites in US
  - CA, FL, OH, TX
  - CA, OH, TX, MD

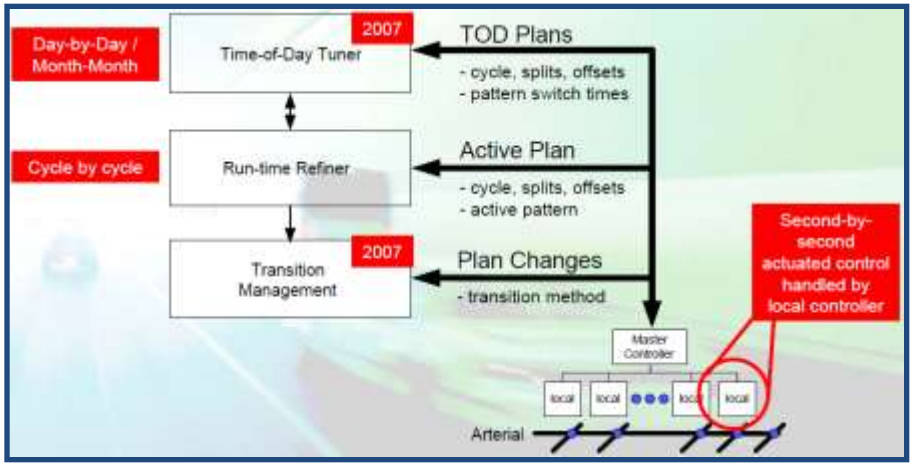


ACSLite Basics

- Closed loop signal system
- Recommend fiber connectivity
- System continuously monitors signals and traffic flow
- Adjusts Real Time
  - System Offset Times
  - Signal Split Times
- Signal Cycle Lengths are not adjusted

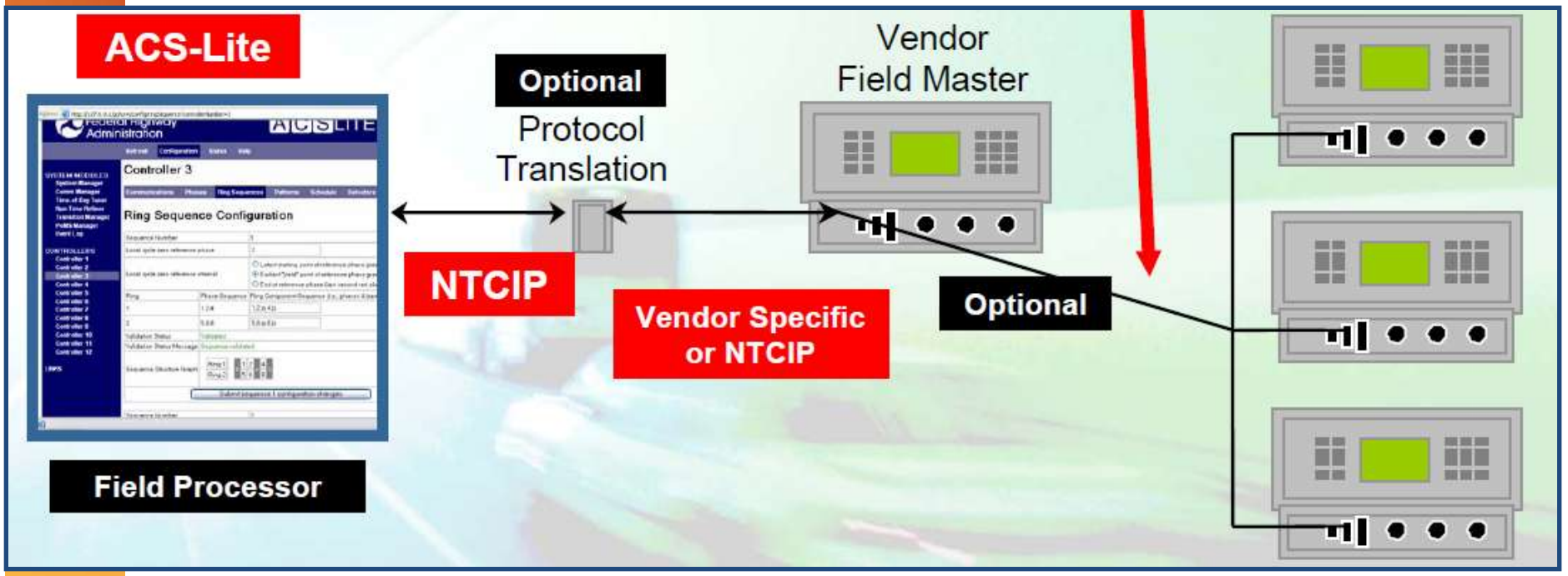
ACSLite Basics

- Evaluate & Monitor
- Provide Refinements
- 3 Levels of Optimization
  - Time of Day
  - Runtime Refiner
  - Transition Manager



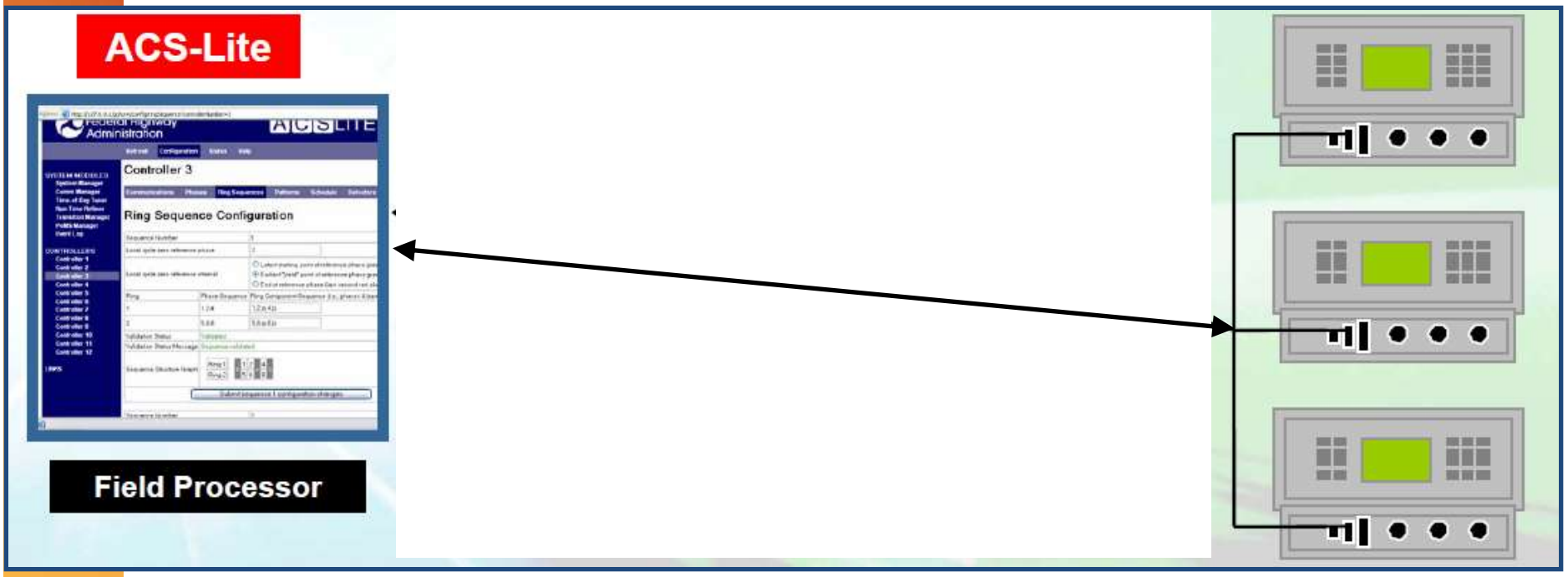
ACSLite Basics

- **Typical** ACSLite Field Application



ACSLite Basics

- **Riva Road** ACSLite Field Application



ACSLite Basics

- ACSLite Screen Shot – Detector Status

ACSLITE control

2011-03-30 10:08:08
Riva Road - Annapolis, MD

Refresh · Configuration · Status · Version
Phase Timing · Phase Utilization · Flow Profile · Pattern History · Detectors · Archive

SYSTEM MODULES
System Manager
Comm Manager
Adaptive
Traffic Responsive
Date/Time/Location
Schedule
Day Plans
Event Log
Security

CONTROLLERS
1: Riva Rd @ Town Centre Blvd
2: Riva Rd @ Forest Dr
3: Riva Rd @ Hearne Dr
4: Riva Rd @ SR 665
5: Riva Rd @ Admiral Cochrane Drive
6: Riva Rd @ Harry S Truman Pkwy
7: Riva Rd @ Board of Education
8: Riva Rd @ Heritage Complex
9: Riva Rd @ AHS-Spiecher
11: Forest Dr @ Tower Place
12: Forest Dr @ Harker Place

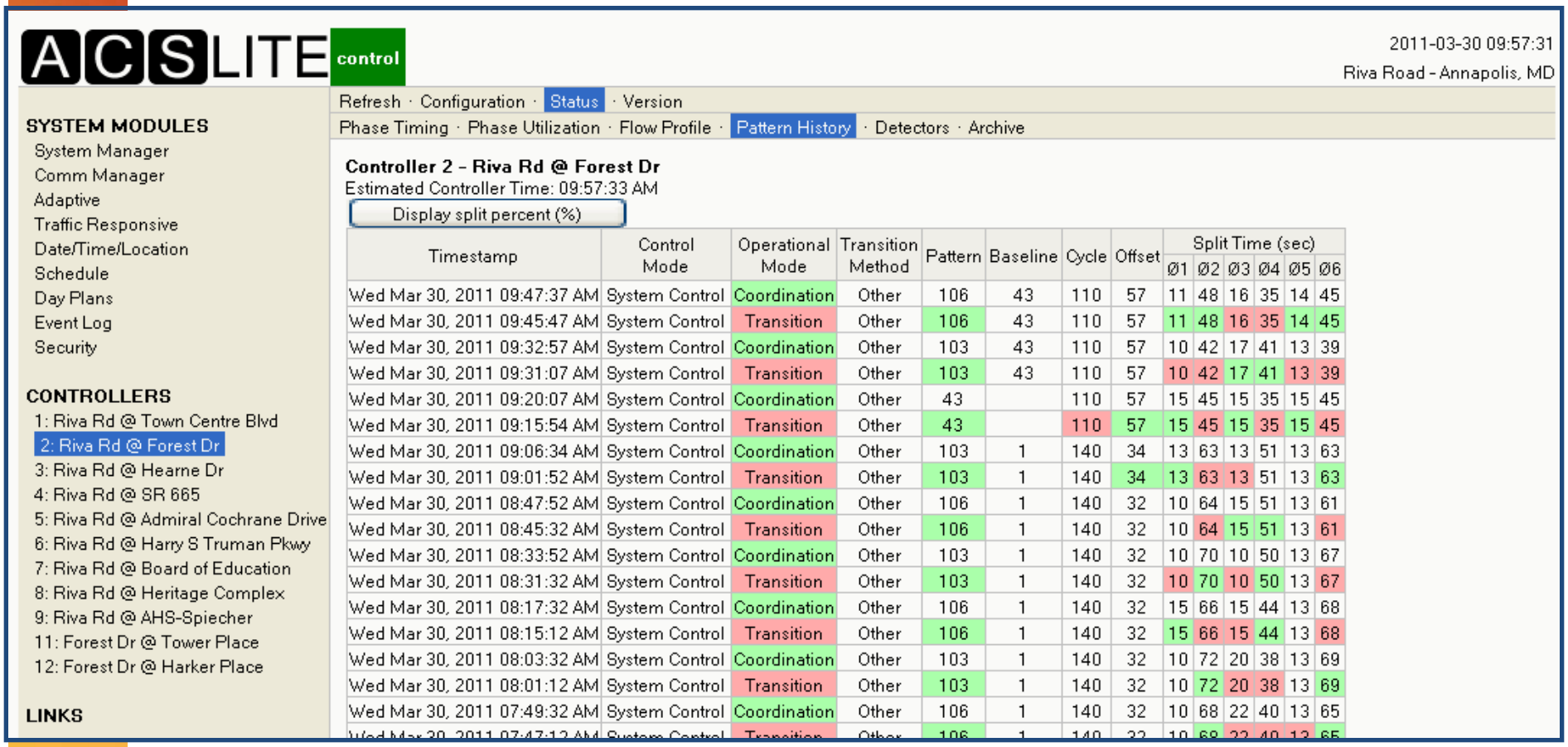
LINKS

Controller 2 - Riva Rd @ Forest Dr
Estimated Controller Time: 10:08:09 AM

Detector	Description	Call Phase	Link	Last Update	Last Change	Current Status	Minutes Data	Minutes No Faults	Volume (veh/hr)	Occupancy	Utilized Occupancy	Bursts (#/hr)
1	Forest - EB - L1 - Stopline	Ø3	0 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	20	18%	18%	0
2	Forest - EB - L2- Stopline	Ø3	0 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	24	41%	41%	0
3	Forest - WB - L3- Stopline	Ø4	11 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	120	17%	18%	0
4	Forest - WB - L2 - Stopline	Ø4	11 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	60	58%	59%	0
5	Forest - WB - L1 - Stopline	Ø4	11 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	72	62%	63%	0
6	SB Riva - LT - L2 - Stopline	Ø5	0 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	96	25%	25%	0
7	SB Riva - LT - L1 - Stopline	Ø5	0 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	32	11%	11%	0
8	SB Riva - SB - L2 - Thru - Avd	Ø2	1 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	192	11%	16%	0
9	SB Riva - SB - L1 - Thru - Avd	Ø2	1 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	296	18%	27%	0
10	NB Riva - LT - Stopline	Ø1	0 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	40	10%	10%	0
11	NB Riva - NB - L2 - Thru - Avd	Ø6	3 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	280	20%	28%	0
12	NB Riva - NB - L1 - Thru - Avd	Ø6	3 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	336	24%	34%	0
20	SB Riva - L2 - Stopline	Ø2	1 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	196	17%	24%	0
21	SB Riva - L1 - Stopline	Ø2	1 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	232	10%	19%	0
22	NB Riva - L3 - Stopline	Ø6	3 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	228	9%	15%	0
23	NB Riva - L2 - Stopline	Ø6	3 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	192	10%	17%	0
24	NB Riva - L1 - Stopline	Ø6	3 → 2	10:08:00 AM	03:02:00 AM	OK	15	15	344	11%	23%	0

ACSLite Basics

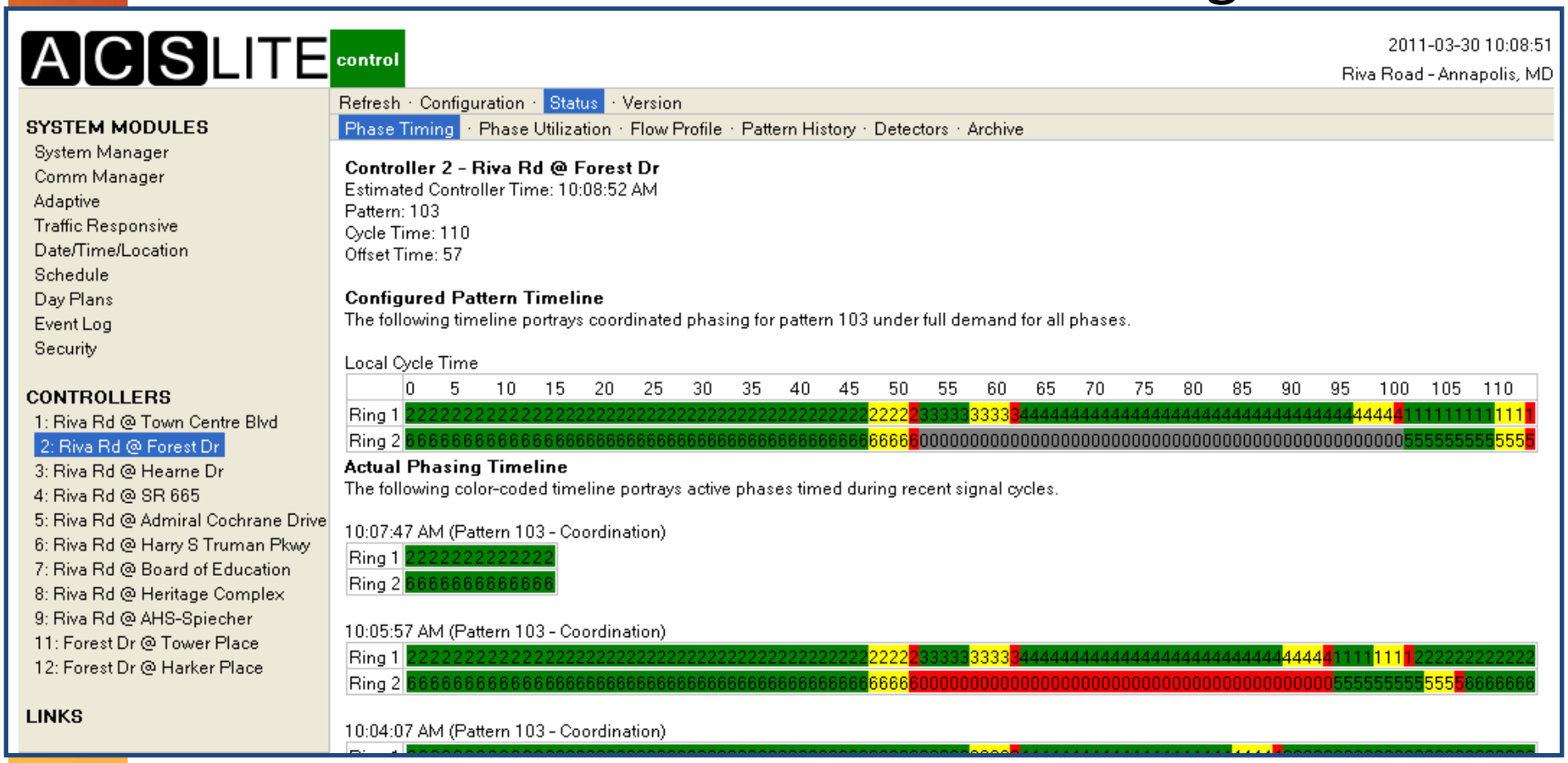
- ACSLite Screen Shot – Pattern Status



Timestamp	Control Mode	Operational Mode	Transition Method	Pattern	Baseline	Cycle	Offset	Split Time (sec)					
								Ø1	Ø2	Ø3	Ø4	Ø5	Ø6
Wed Mar 30, 2011 09:47:37 AM	System Control	Coordination	Other	106	43	110	57	11	48	16	35	14	45
Wed Mar 30, 2011 09:45:47 AM	System Control	Transition	Other	106	43	110	57	11	48	16	35	14	45
Wed Mar 30, 2011 09:32:57 AM	System Control	Coordination	Other	103	43	110	57	10	42	17	41	13	39
Wed Mar 30, 2011 09:31:07 AM	System Control	Transition	Other	103	43	110	57	10	42	17	41	13	39
Wed Mar 30, 2011 09:20:07 AM	System Control	Coordination	Other	43		110	57	15	45	15	35	15	45
Wed Mar 30, 2011 09:15:54 AM	System Control	Transition	Other	43		110	57	15	45	15	35	15	45
Wed Mar 30, 2011 09:06:34 AM	System Control	Coordination	Other	103	1	140	34	13	63	13	51	13	63
Wed Mar 30, 2011 09:01:52 AM	System Control	Transition	Other	103	1	140	34	13	63	13	51	13	63
Wed Mar 30, 2011 08:47:52 AM	System Control	Coordination	Other	106	1	140	32	10	64	15	51	13	61
Wed Mar 30, 2011 08:45:32 AM	System Control	Transition	Other	106	1	140	32	10	64	15	51	13	61
Wed Mar 30, 2011 08:33:52 AM	System Control	Coordination	Other	103	1	140	32	10	70	10	50	13	67
Wed Mar 30, 2011 08:31:32 AM	System Control	Transition	Other	103	1	140	32	10	70	10	50	13	67
Wed Mar 30, 2011 08:17:32 AM	System Control	Coordination	Other	106	1	140	32	15	66	15	44	13	68
Wed Mar 30, 2011 08:15:12 AM	System Control	Transition	Other	106	1	140	32	15	66	15	44	13	68
Wed Mar 30, 2011 08:03:32 AM	System Control	Coordination	Other	103	1	140	32	10	72	20	38	13	69
Wed Mar 30, 2011 08:01:12 AM	System Control	Transition	Other	103	1	140	32	10	72	20	38	13	69
Wed Mar 30, 2011 07:49:32 AM	System Control	Coordination	Other	106	1	140	32	10	68	22	40	13	65

ACSLite Basics

- ACSLite Screen Shot – Phase Timing Status



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Riva Road ACSLite Deployment

- Wait for the completion of Fiber installation
- Installed 20 new Video Detector Cameras
- Upgraded signal controllers to accept network connectivity (NTCIP)
- Installed dedicated ACSLite computer
- Assisted by
  - RGA, LLC / Siemens
  - County Signal Technicians
  - County Information Technology Technicians

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Before & After Study

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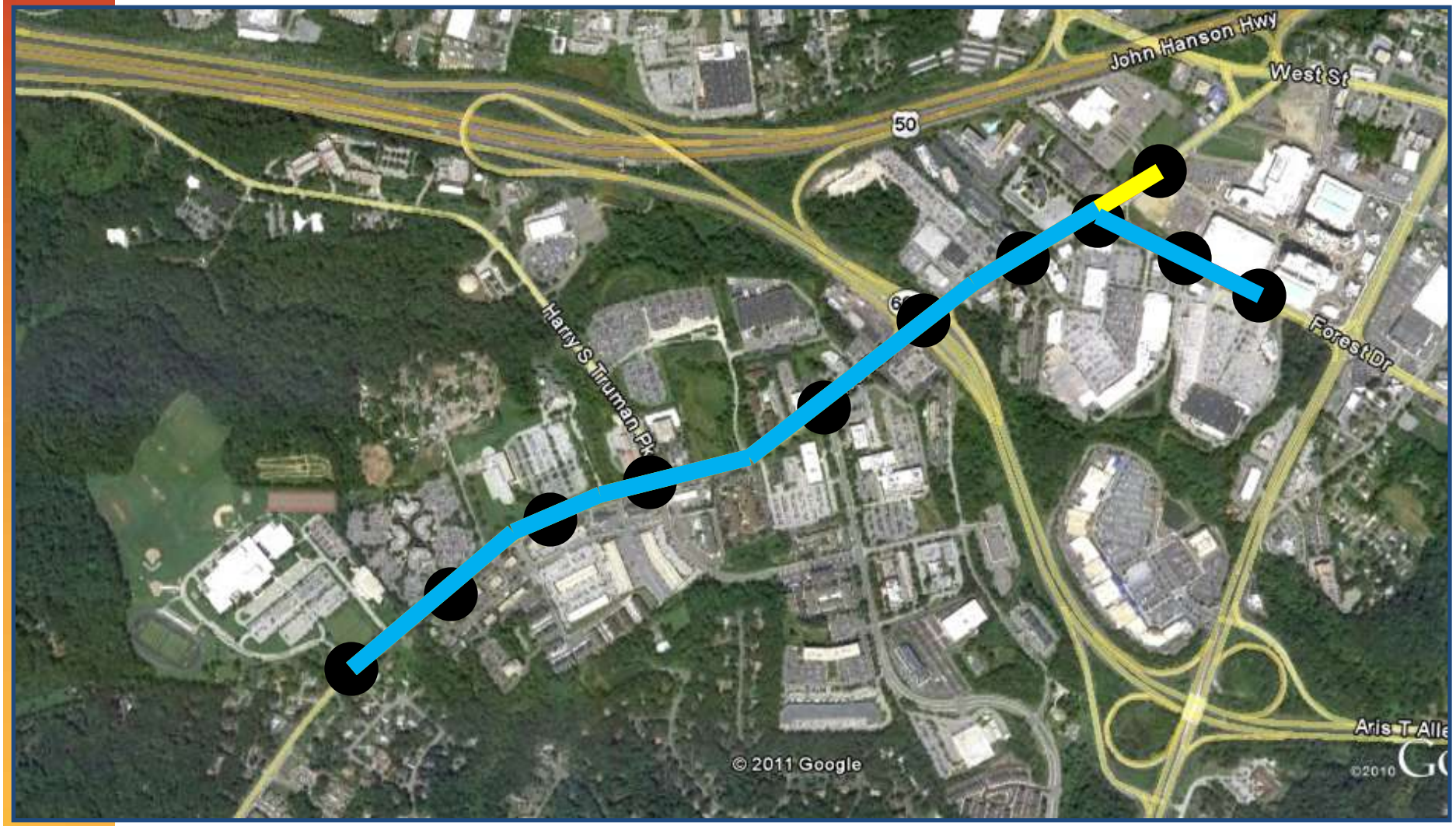
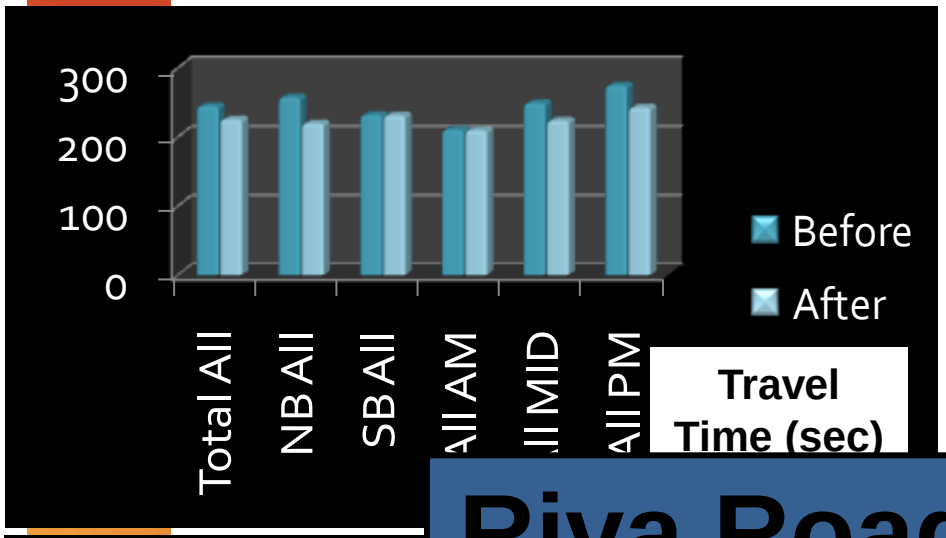
Before & After Study

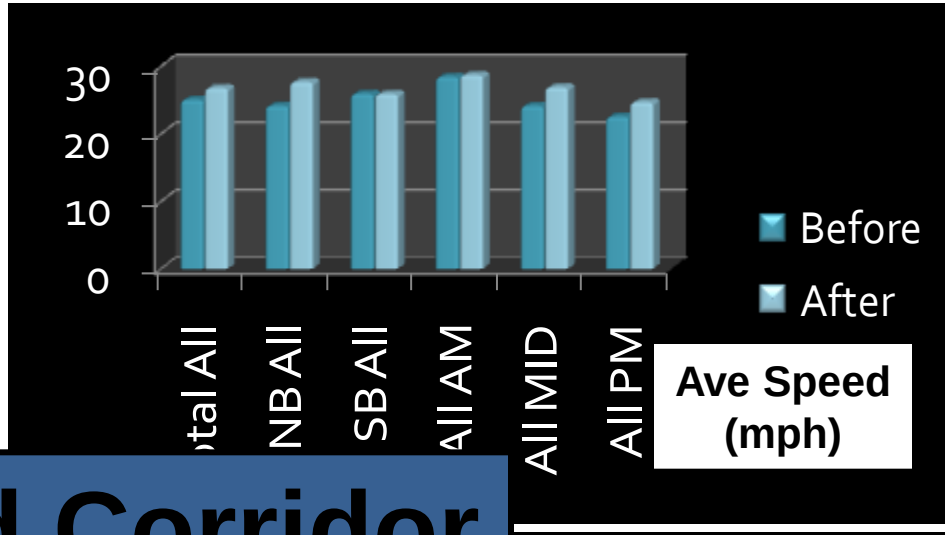
- CMAQ evaluation requirements
- Select Measures of Effectiveness (MOEs)
  - Travel Time and Delay
  - Vehicle Emissions
  - Minor Street Queues
- Analyzed two “Corridors”

Before & After Study

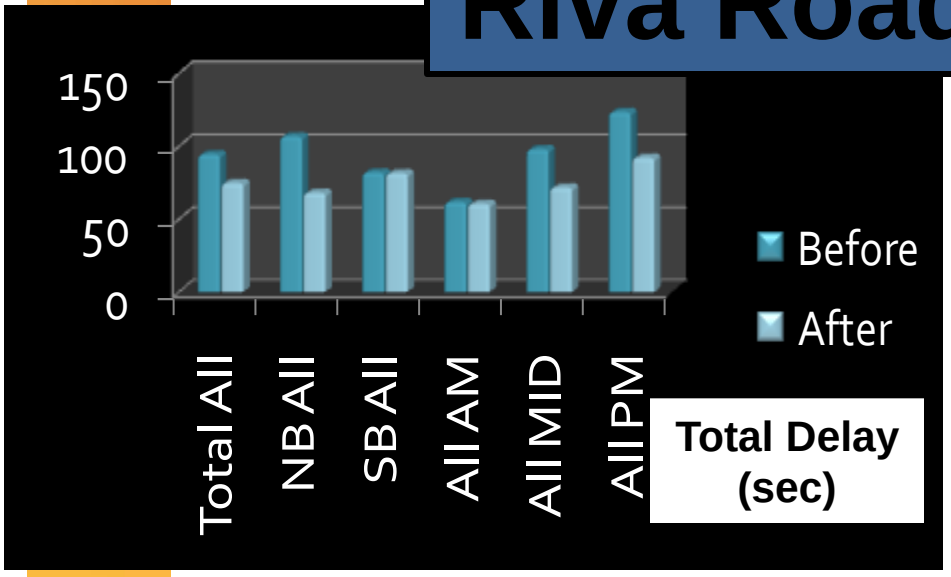


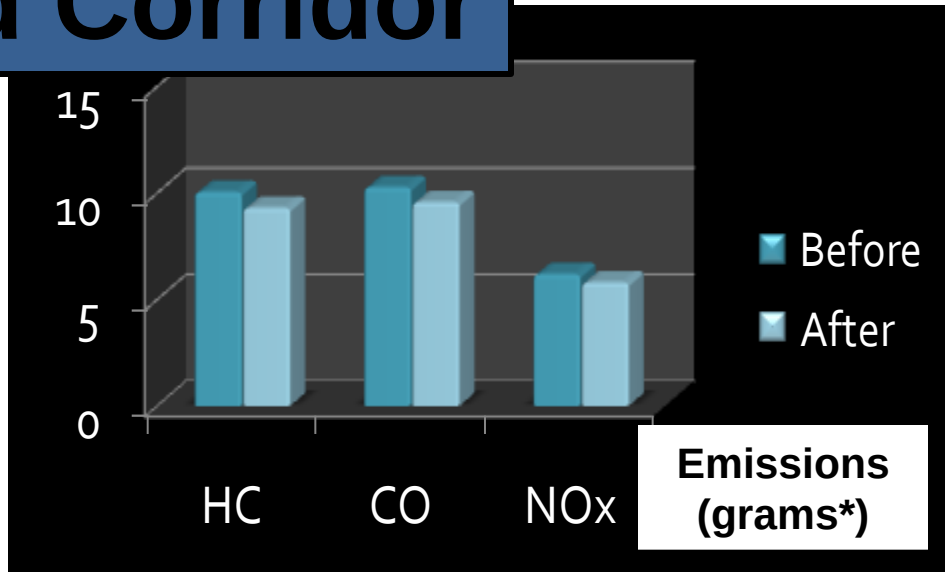
Before & After Study



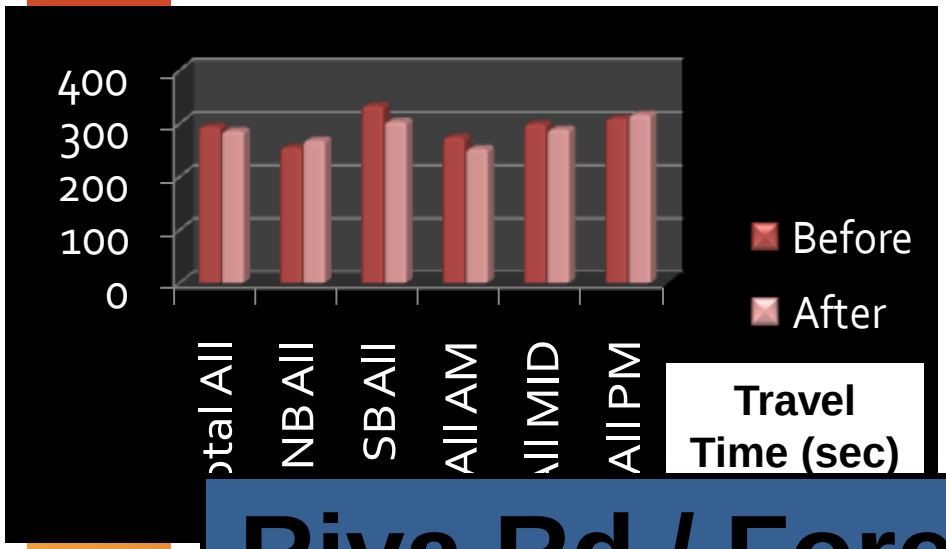


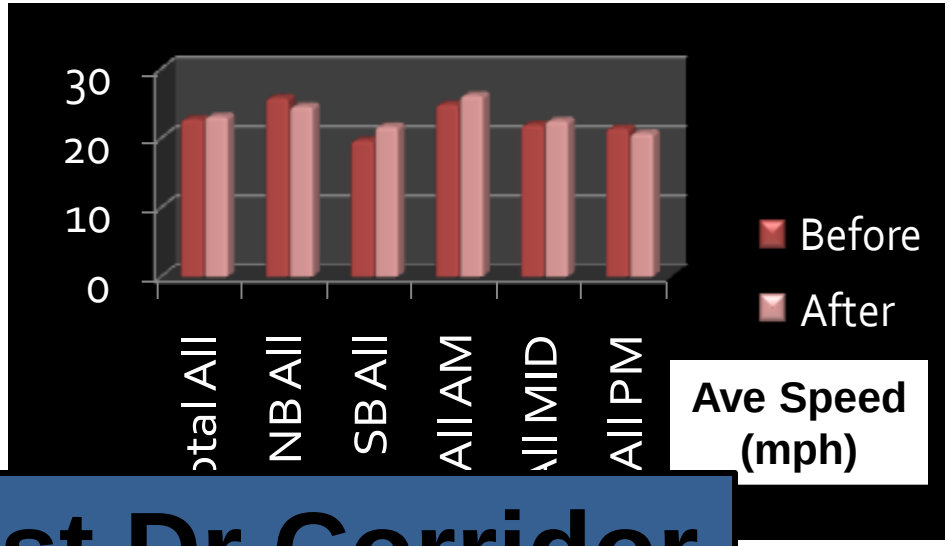
Riva Road Corridor



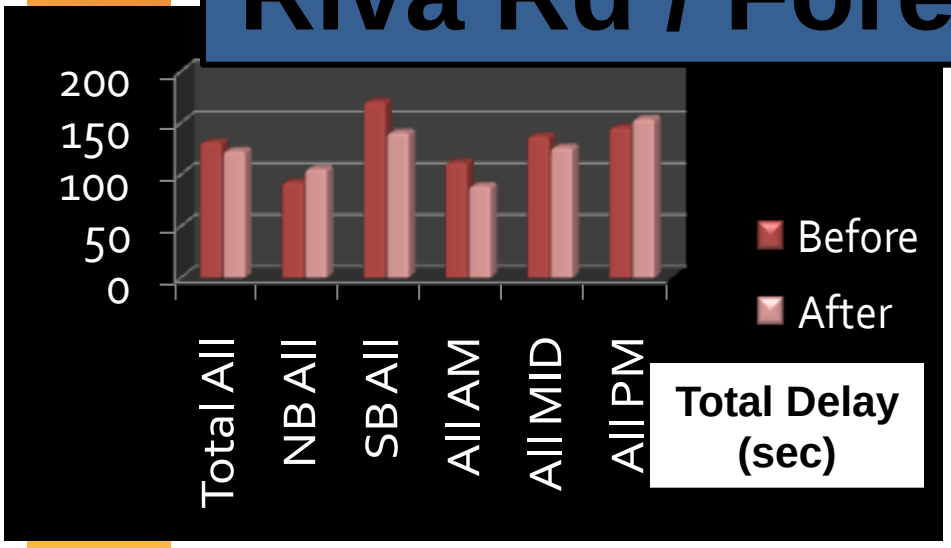


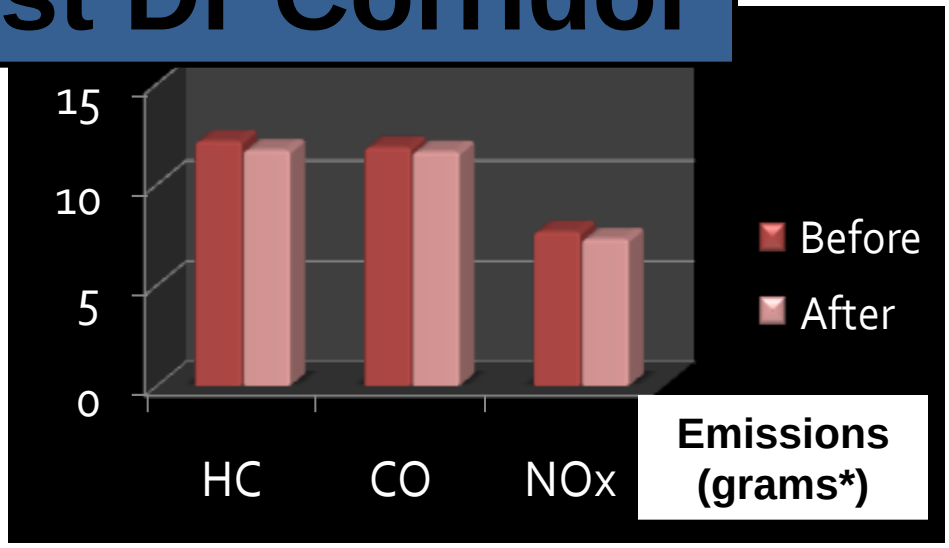
Before & After Study





Riva Rd / Forest Dr Corridor





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Lessons Learned

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Lessons Learned

- Accurate Baseline System
  - "Groundhog Day Effect"
- Detection, Detection, Detection
- Infrastructure/Communications Link
- Emissions Computations
- Use of Technology for Data Collection

Would we do it Again?

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Questions ??

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