



Signal Optimization and Integration– Update

July 12, 2010

Nhan Vu

Northern Region Traffic Signal Operations

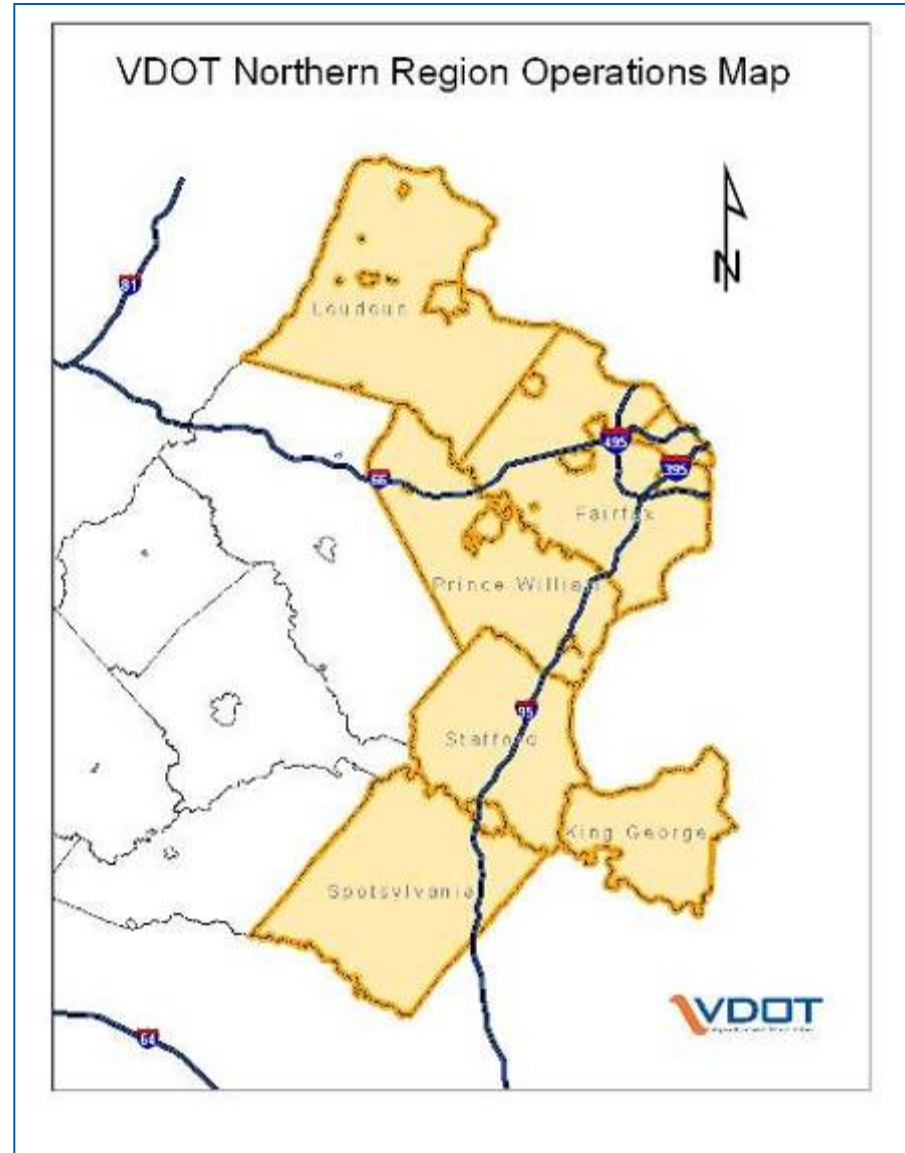
Presentation Topics

1. Signal Optimization

- Rte. 1 Spotsylvania
- Rte. 1 Stafford
- Rte. 3 Spotsylvania
- Rte. 17 Stafford

2. Central Signal System Integration

- Update



Networks

- **Stafford County**

- Rte. 610 Stafford Network – 22 intersections (March 2009)
- Rte. 1 Stafford Network – 18 intersections (January 2010)
- Rte. 17 Stafford Network – 17 intersections (July 2010)
- Rte. 630 Stafford Network – 7 intersections
- Rte. 218 Stafford Network – 12 intersections

- **Spotsylvania County**

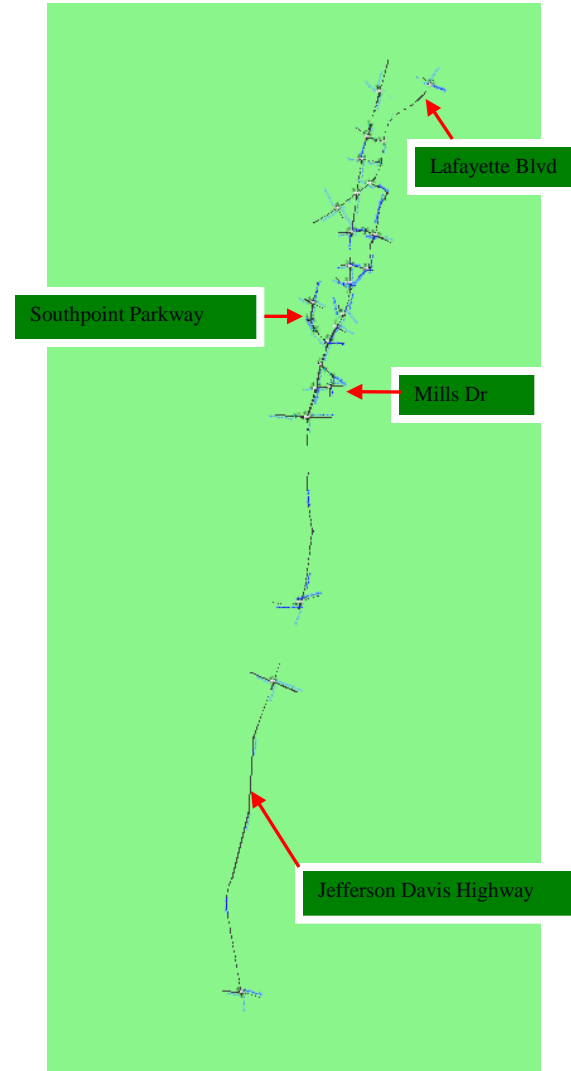
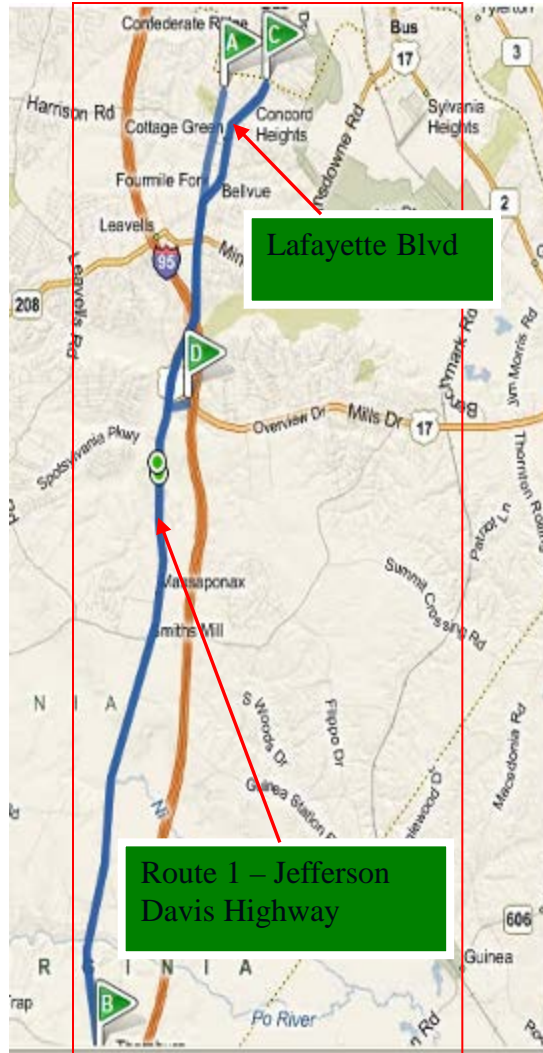
- Rte. 1 Spotsylvania Network – 24 intersections (December 2009)
- Rte. 3 Spotsylvania Network – 29 intersections (May 2010)
- Rte. 208 Spotsylvania Network – 16 intersections
- Rte. 2/17 Spotsylvania Network – 9 intersections

- **King George County**

- King George Network – 13 intersections

Rte. 1 Spotsylvania Network

24 intersections



Rte. 1 Spotsylvania Network cont.

- **Major Corridors:**

- Jefferson Davis Hwy: 16 signals
- Lafayette Blvd: 3 signals
- Mine Rd: 1 signal
- Market St: 1 signal
- Southpoint Pkwy: 1 signal
- Courthouse Rd: 1 signal
- Mills Dr: 1 signal

- **Implementation:**

- First round: December 2009

- **5 timing plans:**

- Weekday: AM, Midday, PM, Off-peak
- Weekend : Peak

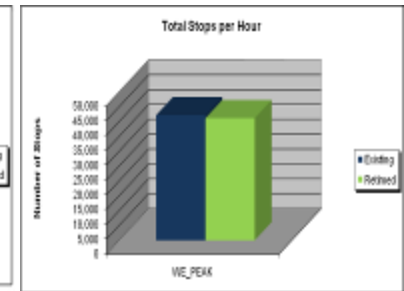
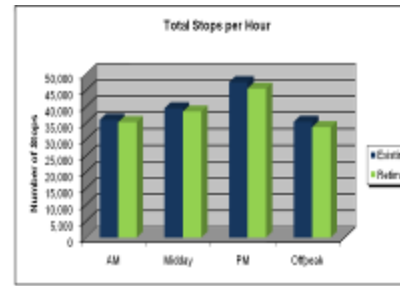
Rte. 1 Network - Spotsylvania County			
No.	Intersection ID	PRIMARY NAME	SECONDARY NAME
1	1405	Jefferson Davis Hwy	Hudgins Rd.
2	1410	Jefferson Davis Hwy	Harrison Rd.
3	1415	Jefferson Davis Hwy	Lassen Lane
4	1420	Jefferson Davis Hwy	Courthouse Rd./Lafayette
5	1425	Jefferson Davis Hwy	Mine Rd./Hood Dr.
6	1430	Jefferson Davis Hwy	Market St.
7	1435	Jefferson Davis Hwy	NB I-95 on ramp
8	1440	Jefferson Davis Hwy	SB I-95 off ramp
9	1445	Jefferson Davis Hwy	KFC private road
10	1450	Jefferson Davis Hwy	Southpoint Center
11	1455	Jefferson Davis Hwy	Mills Dr./Ramp
12	1460	Jefferson Davis Hwy	Cosner's Corner (Riteaid)
13	1465	Jefferson Davis Hwy	Spotsylvania Pkwy
14	1470	Jefferson Davis Hwy	Massaponax Church Rd.
15	1475	Jefferson Davis Hwy	Massaponax HS/River Run Pkwy
16	1480	Jefferson Davis Hwy	Morris Rd./Mudd Tavern Rd.
17	636105	Mine Rd.	Spotsylvania Ave./Falcon Dr.
18	1234005	Market St.	Spotsylvania Ave.
19	711005	Southpoint Pkwy	Walmart (Atlantic Dr./Pacific Dr.)
20	208005	Courthouse Rd.	4 Mile Fork Shopping Center
21	17225	Mills Dr.	Cosner's Corner (Target)
22	1485	Lafayette Blvd.	Olde Greenwich/Rhodes
23	1490	Lafayette Blvd.	Harrison Rd.
24	1495	Lafayette Blvd.	Falcon Dr.

Annual MOE Results

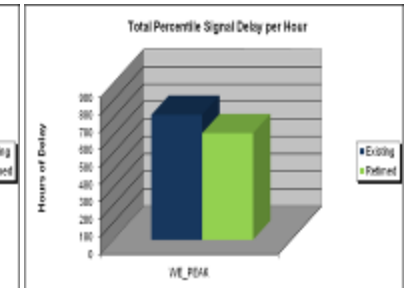
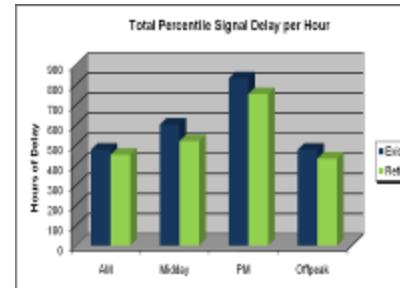
Rte. 1 Spotsylvania Network – 24 intersections

- **Stops**
 - 5,511,238 reduction
- **Delay**
 - 331,216 hrs reduction
- **Fuel Consumption**
 - 279,996 gal reduction
- **Emissions**
(CO, NOx, VOC)
 - 27,829 kg reduction

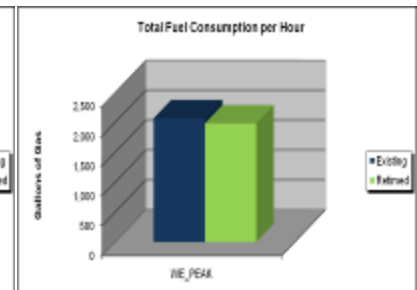
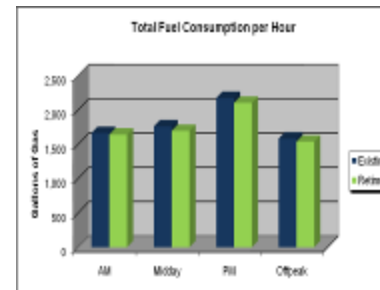
Total Stops per Hour



Total Percentile Signal Delay per Hour



Total Fuel Consumption per Hour



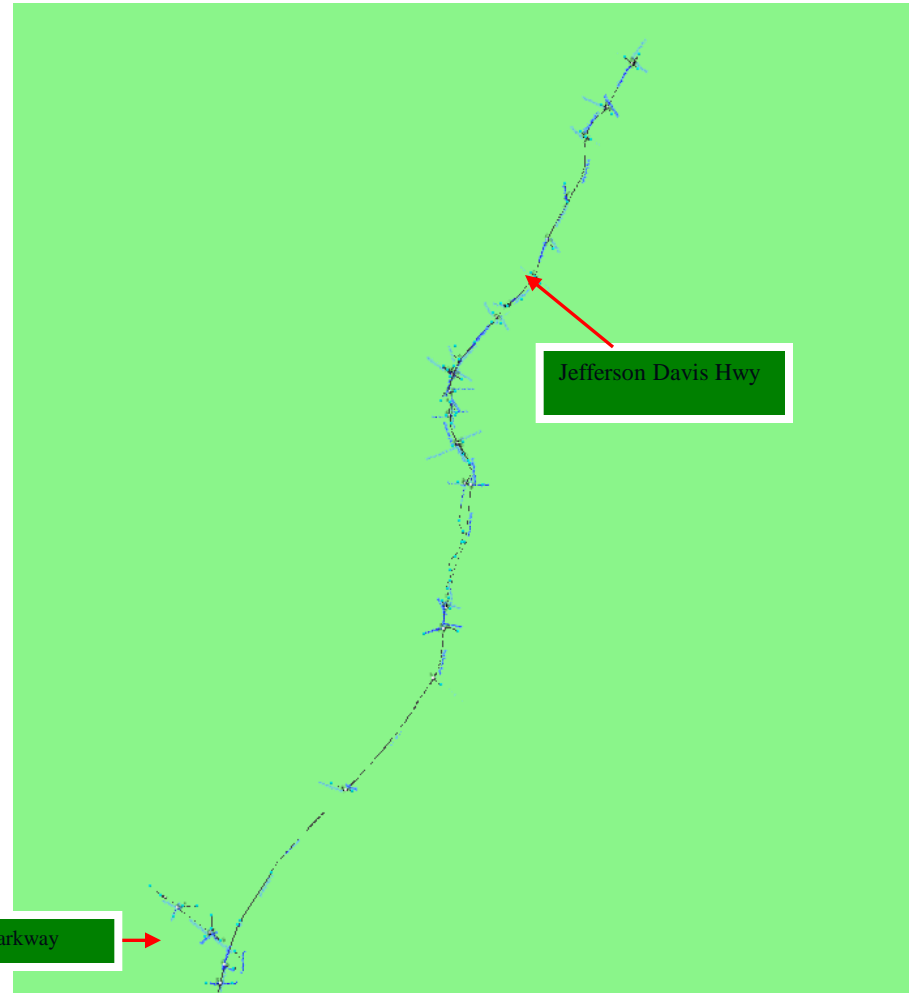
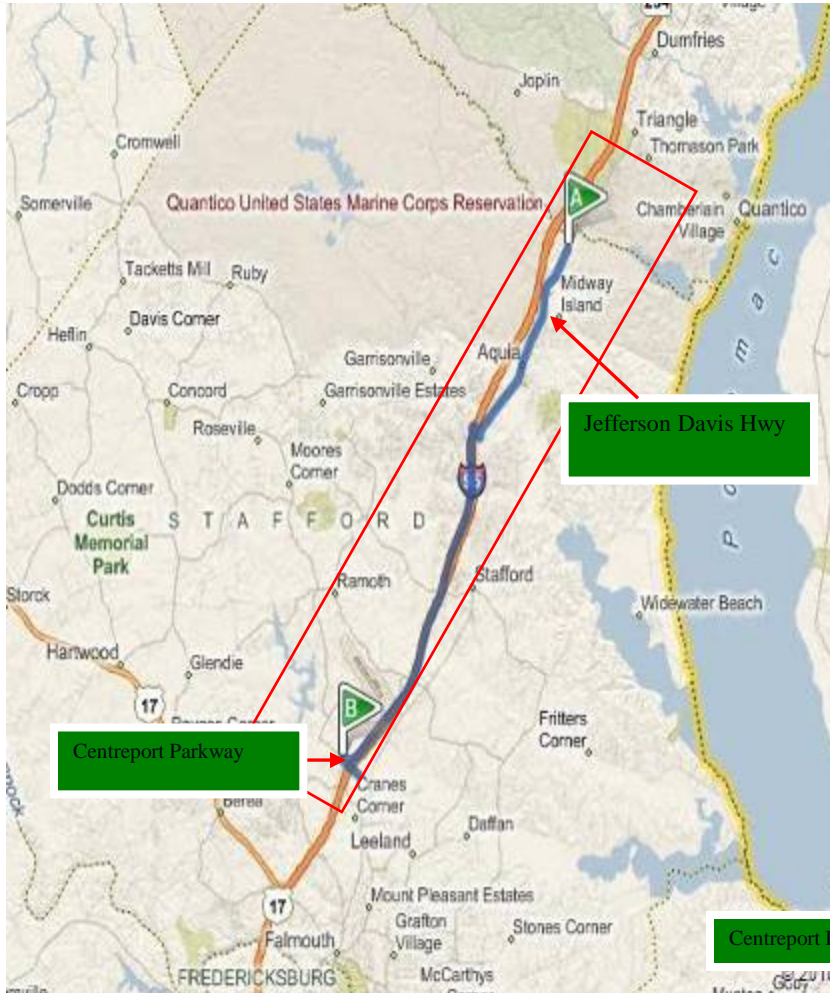
Annual Savings – Rte. 1 Spotsylvania Network

- Overall annual savings of \$5,886,754
- Benefit-to-cost ratio of 75.21

RTE 1 Spotsylvania Network Annual Savings			
Rte.1 Spotsylvania Network	Stops	Total Percentile Signal Delay (hr)	Fuel Consumption (gal)
Unit Values	\$0.014	\$15.47	\$2.45
Annual Weekday Savings*	\$63,949	\$3,589,040	\$488,469
Annual Weekend Savings**	\$13,209	\$1,534,872	\$197,215
Total Savings	\$77,158	\$5,123,912	\$685,684
Total Annual Savings			\$5,886,754
Project Cost***			\$78,270
Benefit / Cost Ratio			75.21

Rte. 1 Stafford Network

18 intersections



Rte. 1 Stafford Network cont.

- **Major Corridors:**

- Jefferson Davis Hwy: 16 signals
- Centreport Pkwy: 2 signals

- **Implementation:**

- First round: January 2010

- **5 timing plans:**

- Weekday: AM, Midday, PM, Off-peak
- Weekend : Peak

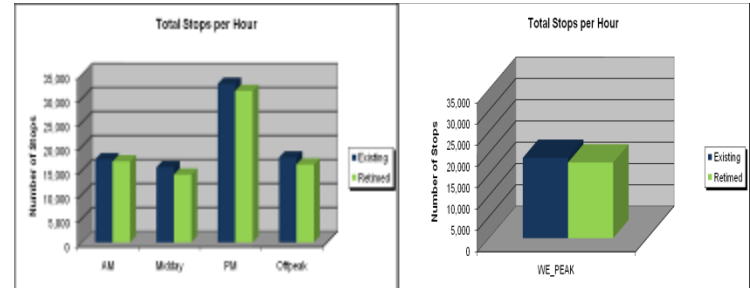
No.	Rte. 1 Stafford Network		
	Intersection ID	PRIMARY NAME	SECONDARY NAME
1	1303	Jeff Davis Hwy	Quantico Corp Center
2	1305	Jeff Davis Hwy	Telegraph Rd
3	1304	Jeff Davis Hwy	Acadia
4	1310	Jeff Davis Hwy	Port Aquia Dr.
5	1315	Jeff Davis Hwy	Garrisonville Rd./Washington Dr.
6	1320	Jeff Davis Hwy	I-95 ramp/Aquia Town Center
7	1325	Jeff Davis Hwy	Aquia Park Dr.
8	1330	Jeff Davis Hwy	Foreston Woods Dr./Va/Va
9	1335	Jeff Davis Hwy	Bells Hill Rd./Coal Landing Rd.
10	1340	Jeff Davis Hwy	Hope Rd./Bells Hill Rd.
11	1345	Jeff Davis Hwy	Courthouse Rd.
12	1327	Jeff Davis Hwy	Hospital Center Blvd.
13	1350	Jeff Davis Hwy	American Legion/Eskimo Hill
14	1355	Jeff Davis Hwy	Centreport Pkwy
15	1360	Jeff Davis Hwy	Enon Rd./Crane's Corner Rd.
16	1365	Jeff Davis Hwy	Morton Rd./Layhill Rd.
17	8900005	Centreport Pkwy	I-95 NB ramp
18	8900010	Centreport Pkwy	I-95 SB ramp

Annual MOE Results

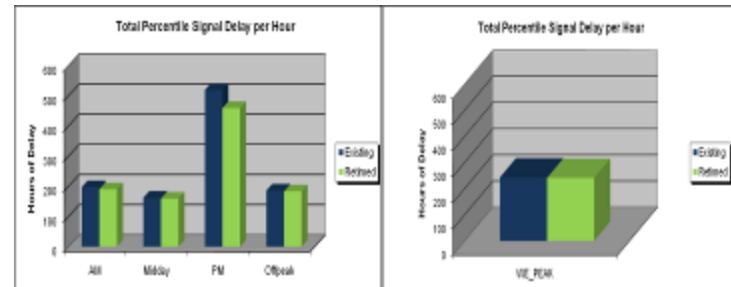
Rte. 1 Stafford Network

- **Stops**
 - 6,083,310 reduction
- **Delay**
 - 67,246 hrs reduction
- **Fuel Consumption**
 - 122,790 gal reduction
- **Emissions**
(CO, NOx, VOC)
 - 8,973 kg reduction

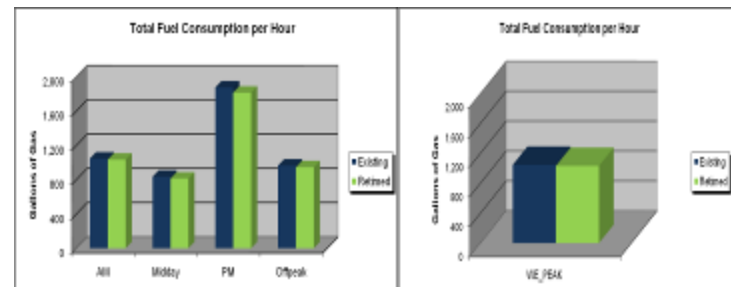
Total Stops per Hour



Total Percentile Signal Delay per Hour



Total Fuel Consumption per Hour



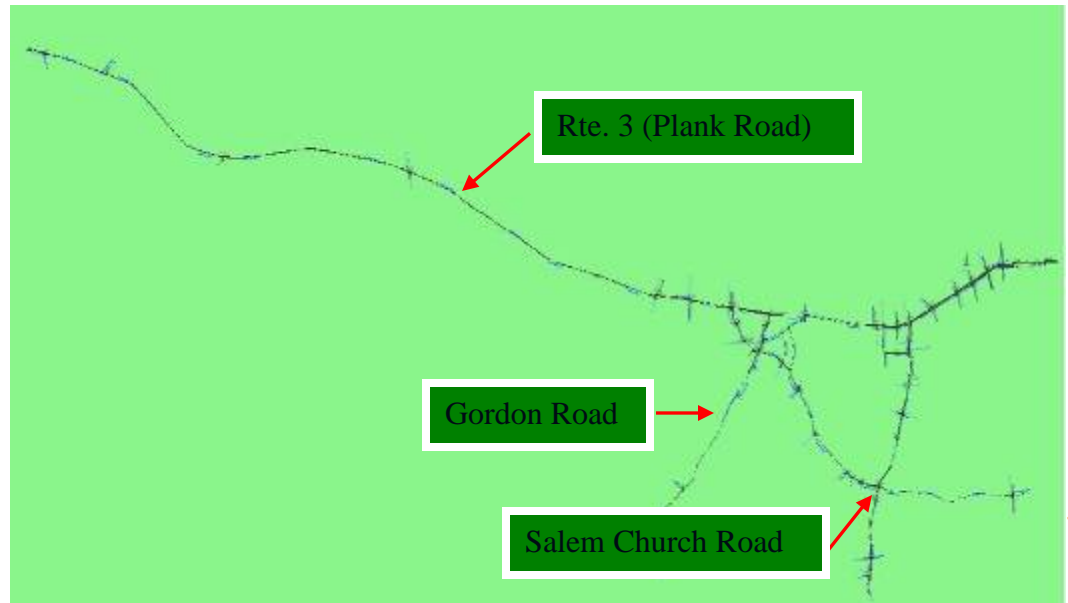
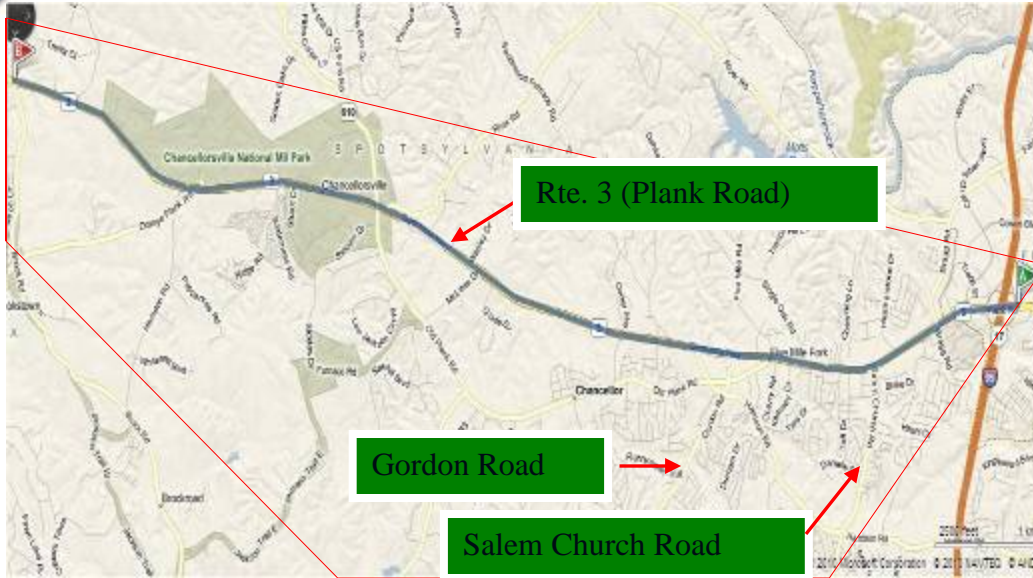
Annual Savings – Rte. 1 Stafford Network

- Overall annual savings of \$1,442,276
- Benefit-to-cost ratio of 24.40

RTE 1 Stafford Network Annual Savings			
Rte.1 Stafford Network	Stops	Total Percentile Signal Delay (hr)	Fuel Consumption (gal)
Unit Values	\$0.014	\$15.47	\$2.58
Annual Weekday Savings*	\$70,949	\$1,011,351	\$280,575
Annual Weekend Savings**	\$14,218	\$28,960	\$36,223
Total Savings	\$85,167	\$1,040,311	\$316,798
Total Annual Savings			\$1,442,276
Project Cost***			\$59,119
Benefit / Cost Ratio			24.40

Rte. 3 Spotsylvania Network

29 intersections



Rte. 3 Spotsylvania Network cont.

- **Major Corridors:**

- Plank Rd: 15 signals
- Salem Church Rd: 2 signals
- Leavells Rd: 3 signals
- Harrison Rd: 6 signals
- Gordon Rd: 3 signals

- **Implementation:**

- First round: May 2010

- **5 timing plans:**

- Weekday: AM, Midday, PM, Off-peak
- Weekend : Peak

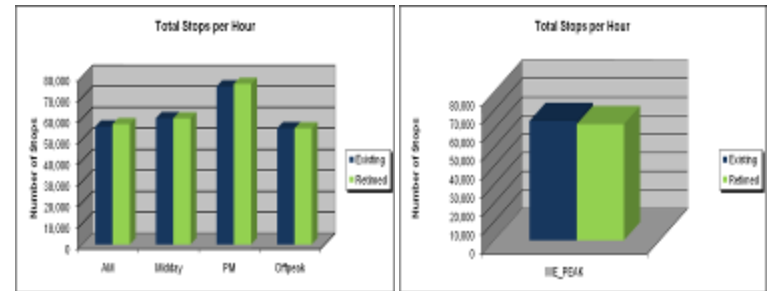
No.	Route 3 Spotsylvania Network		
	Intersection ID	PRIMARY NAME	SECONDARY NAME
1	3205	Plank Rd.	Brock Rd.
2	3210	Plank Rd.	Ely's Ford Rd.
3	3215	Plank Rd.	Andora Dr./Corter Ave.
4	3220	Plank Rd.	Spotswood Furnance/Big Ben Blvd.
5	3225	Plank Rd.	Harrison Rd.
6	3230	Plank Rd.	Gordon Rd.
7	3235	Plank Rd.	Old Plank Rd.
8	3240	Plank Rd.	Chewning Ln./Rutherford Dr.
9	3245	Plank Rd.	Chancellor Center/Ukrops
10	3250	Plank Rd.	Salem Church Rd.
11	3255	Plank Rd.	Heatherstone Dr.
12	3260	Plank Rd.	Taskforce Dr./Spotsy. Crossing
13	3265	Plank Rd.	Bragg Rd.
14	3270	Plank Rd.	Spotsy. Mall/Central Park Blvd.
15	3275	Plank Rd.	Carl Silver Parkway/Mall Court
16	639105	Salem Church Rd.	Gen. Semmes/Comm. Lot
17	639110	Salem Church Rd.	Kennedy Lanes/Salem Run
18	639115	Leavells Rd.	Harrison Rd./Salem Church Rd.
19	639120	Leavells Rd.	Salem Station Blvd.
20	639125	Leavells Rd.	Loriella Park
21	610620	Harrison Rd.	Old Plank Rd.
22	620305	Harrison Rd.	Gordon Rd.
23	620310	Harrison Rd.	Cherry Rd./Green Arbor Dr.
24	620315	Harrison Rd.	Chancellor Park Dr.
25	620320	Harrison Rd.	Piedmont Dr.
26	620370	Harrison Rd.	Kingswood/Beauclaire
27	627005	Gordon Rd.	Old Plank Rd.
28	627008	Gordon Rd.	Chancellor Rd.
29	627010	Gordon Rd.	Salem Fields Blvd.

Annual MOE Results

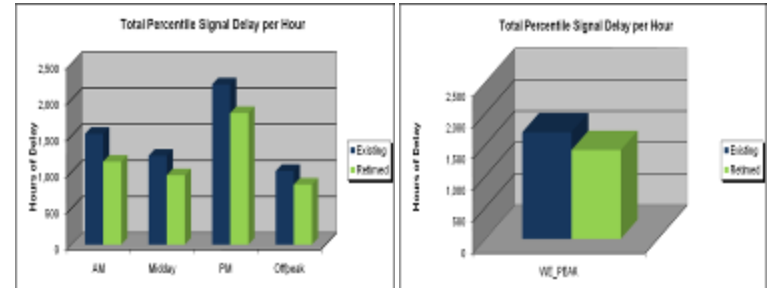
Rte. 3 Spotsylvania Network – 29 intersections

- **Stops**
 - 1,617,148 weekend reduction
 - 2,167,250 weekday increase
- **Delay**
 - 1,642,295 hrs reduction
- **Fuel Consumption**
 - 1,206,746 gal reduction
- **Emissions**
(CO, NOx, VOC)
 - 120,483 kg reduction

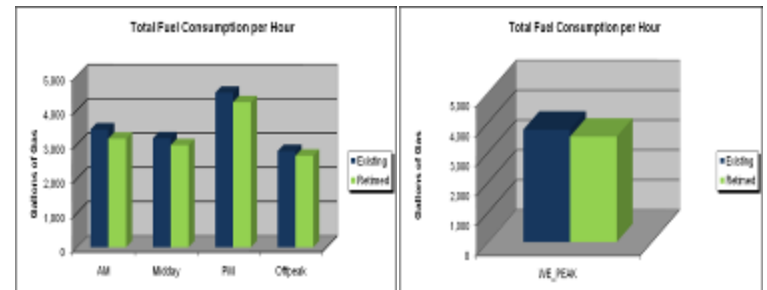
Total Stops per Hour



Total Percentile Signal Delay per Hour



Total Fuel Consumption per Hour



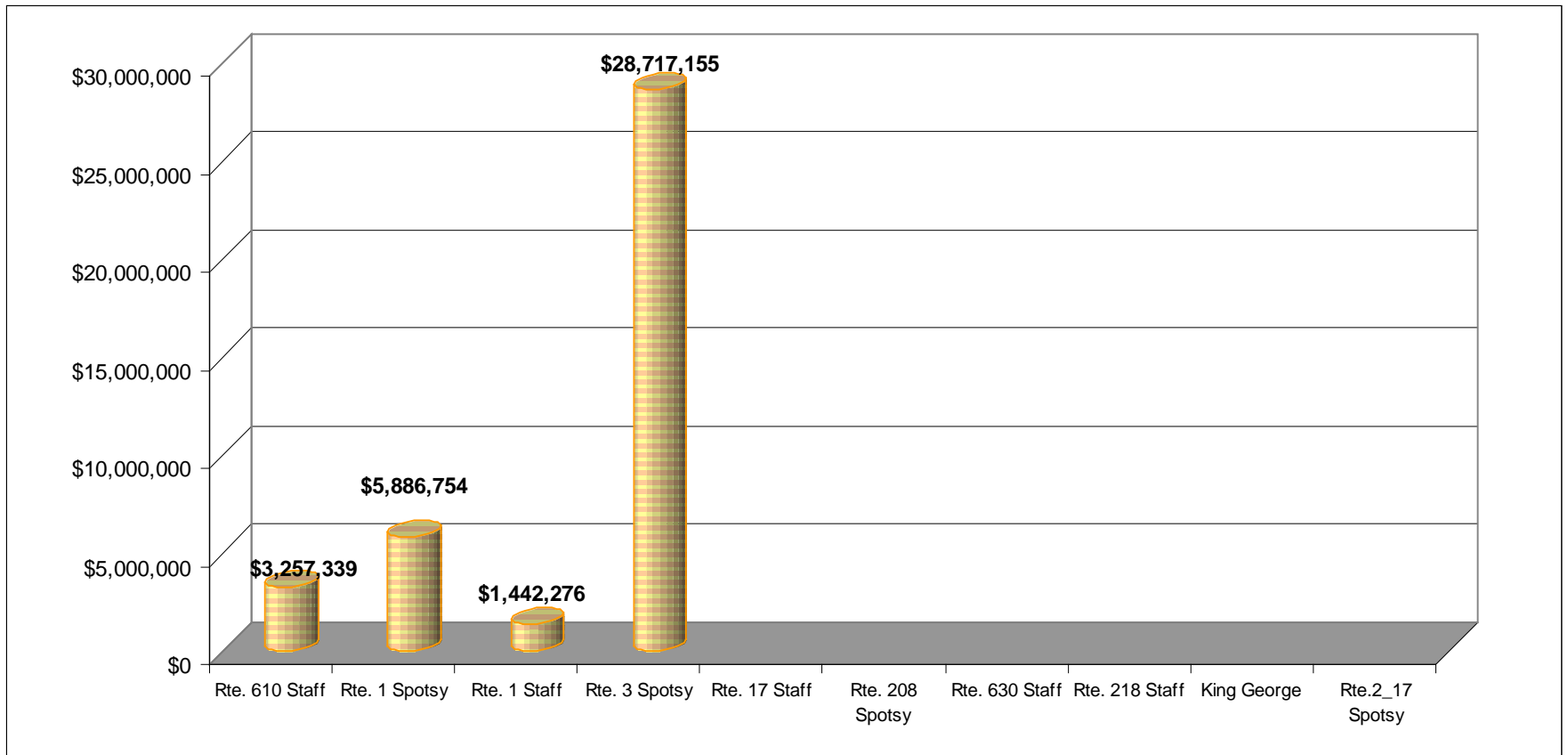
Annual Savings – Rte. 3 Spotsylvania Network

- Overall annual savings of \$28,717,155
- Benefit-to-cost ratio of 275.06

RTE 3 Spotsylvania Network Annual Savings			
Rte.3 Spotsylvania Network	Stops	Total Percentile Signal Delay (hr)	Fuel Consumption (gal)
Unit Values	\$0.014	\$15.47	\$2.75
Annual Weekday Savings*	-\$30,342	\$21,164,894	\$2,704,797
Annual Weekend Savings**	\$22,640	\$4,241,410	\$613,756
Total Savings	-\$7,702	\$25,406,304	\$3,318,553
Total Annual Savings			\$28,717,155
Project Cost***			\$104,404
Benefit / Cost Ratio			275.06

Annual Savings – First Round

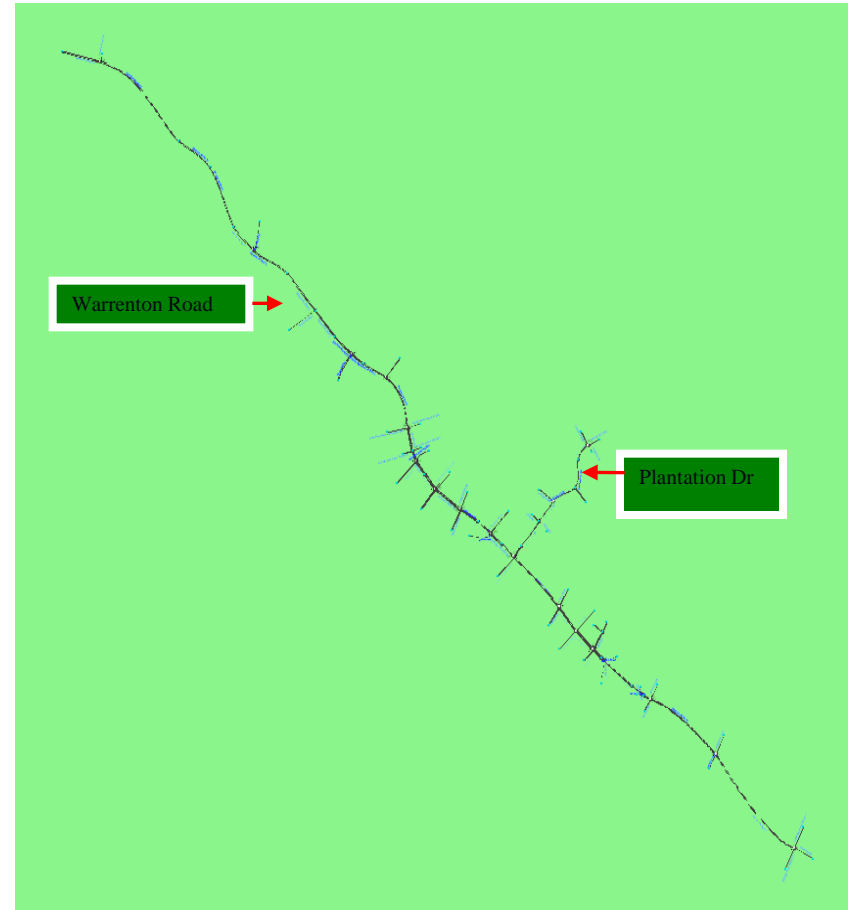
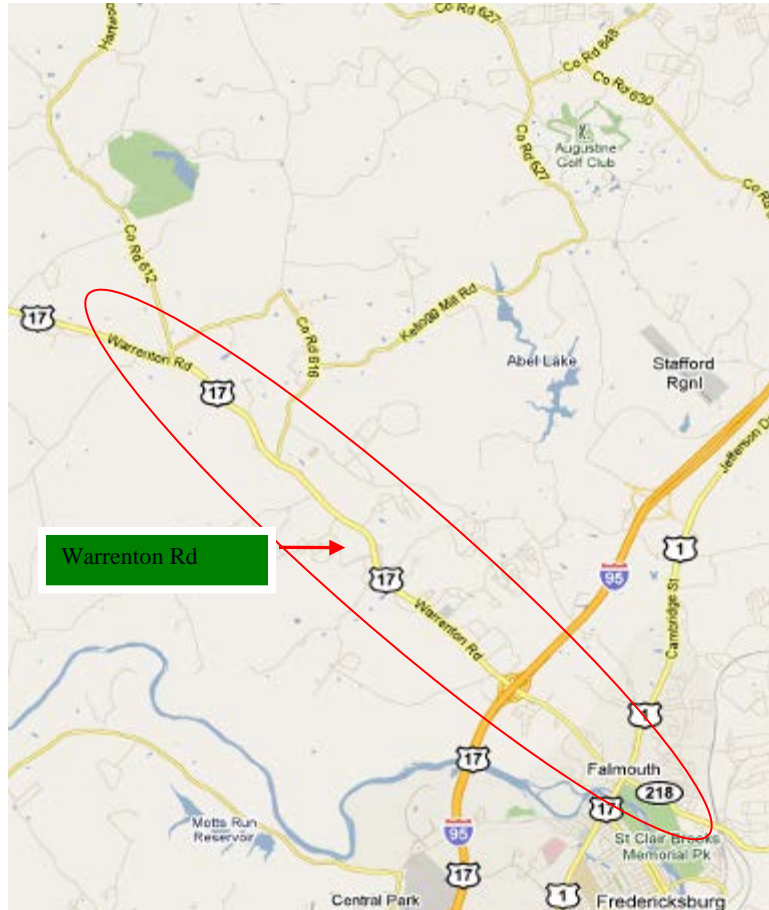
Total: \$39,303,524



Rte. 17 Stafford Network

In Progress

17 signals



Rte. 17 Stafford Network cont.

- **Major Corridors:**
 - Warrenton Rd: 15 signals
 - Jefferson Davis Hwy; 1 signal
- **Implementation:**
 - First round: end of July 2010
- **5 timing plans:**
 - Weekday: AM, Midday, PM, Off-peak
 - Weekend : Peak

Rte. 17 Network - Stafford County			
No.	Intersection ID	PRIMARY NAME	SECONDARY NAME
1	17105	Warrenton Rd.	Hartwood Rd.
2	17110	Warrenton Rd.	Poplar Rd.
3	17115	Warrenton Rd.	Village Pkwy.
4	17117	Warrenton Rd.	Cardinal Forest Dr.
5	17120	Warrenton Rd.	Stafford Lakes Pkwy.
6	17125	Warrenton Rd.	Greenbank Rd./Berea Church Rd.
7	17130	Warrenton Rd.	International Pkwy./McWhirt Loop
8	17132	Warrenton Rd.	Banks Ford Pkwy
9	17135	Warrenton Rd.	Lichfield Blvd/McWhirt Loop
10	17140	Warrenton Rd.	Plantation Dr./Commerce
11	17145	Warrenton Rd.	Falls Run Dr./Commuter Lot
12	17150	Warrenton Rd.	Victor Neilsen Dr./McClanes
13	17155	Warrenton Rd.	Sanford Dr./Stanstead Rd.
14	17160	Warrenton Rd.	Short St.
15	17165	Warrenton Rd.	Melchers Dr./Lendall Ln.
16	1370	Jeff Davis Hwy	Warrenton Rd./Butler Rd.
17	170602	Plantation Dr.	Lyons Blvd./Gladstone Dr.

Signal Optimization Schedule

Network	Number of Int.	Month																																					
		5/8	6/8	7/8	8/8	9/8	10/8	11/8	12/8	1/9	2/9	3/9	4/9	5/9	6/9	7/9	8/9	9/9	10/9	11/9	12/9	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	11/10	12/10	1/11	2/11	3/11	4/11		
Fredericksburg																																							
Rte. 2_17 Network	9																																						
Rte. 610 Network	22																																						
Rte. 1 Spotsylvania Network	24																																						
Rte. 1 Stafford Network	18																																						
Rte. 3 Network	29																																						
Rte. 17 Network	17																																						
Rte. 208 Network	16																																						
Rte. 630 Network	7																																						
Rte. 218 Network	12																																						
King George Network	13																																						
Holiday Special Event Plans 2010																																							
Total	167																																						

Signal Integration Update

- **Survey of intersections for loop detector and communications**
- **Testing NEMA controller firmware**
- **Replace NEMA to 170 (NOVA)**
- **Next generation of traffic controllers**

Q & A