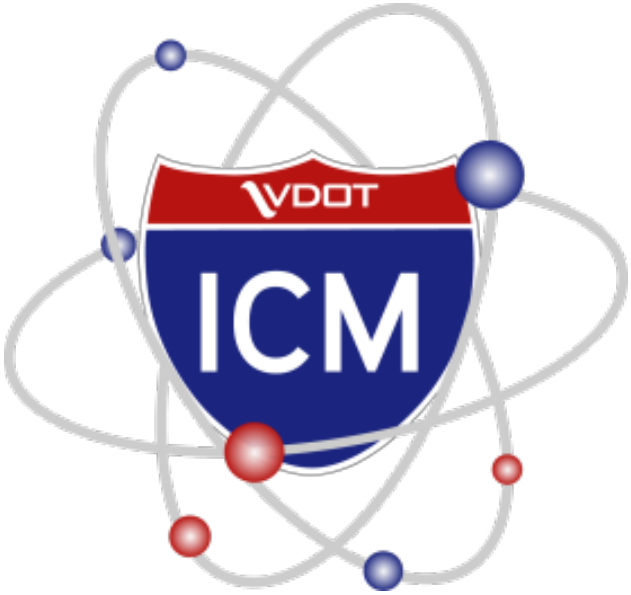
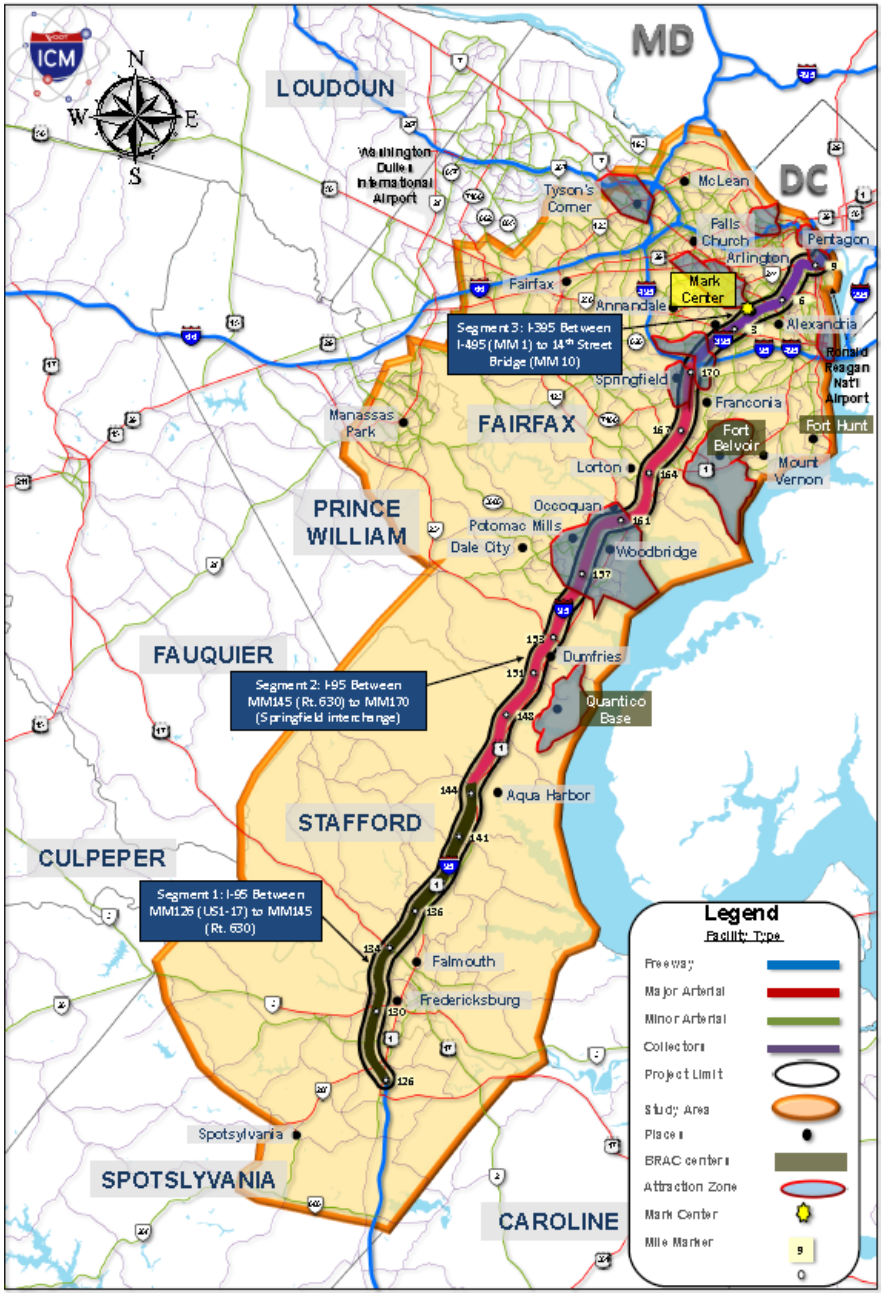


I-95 / I-395 Integrated Corridor Management

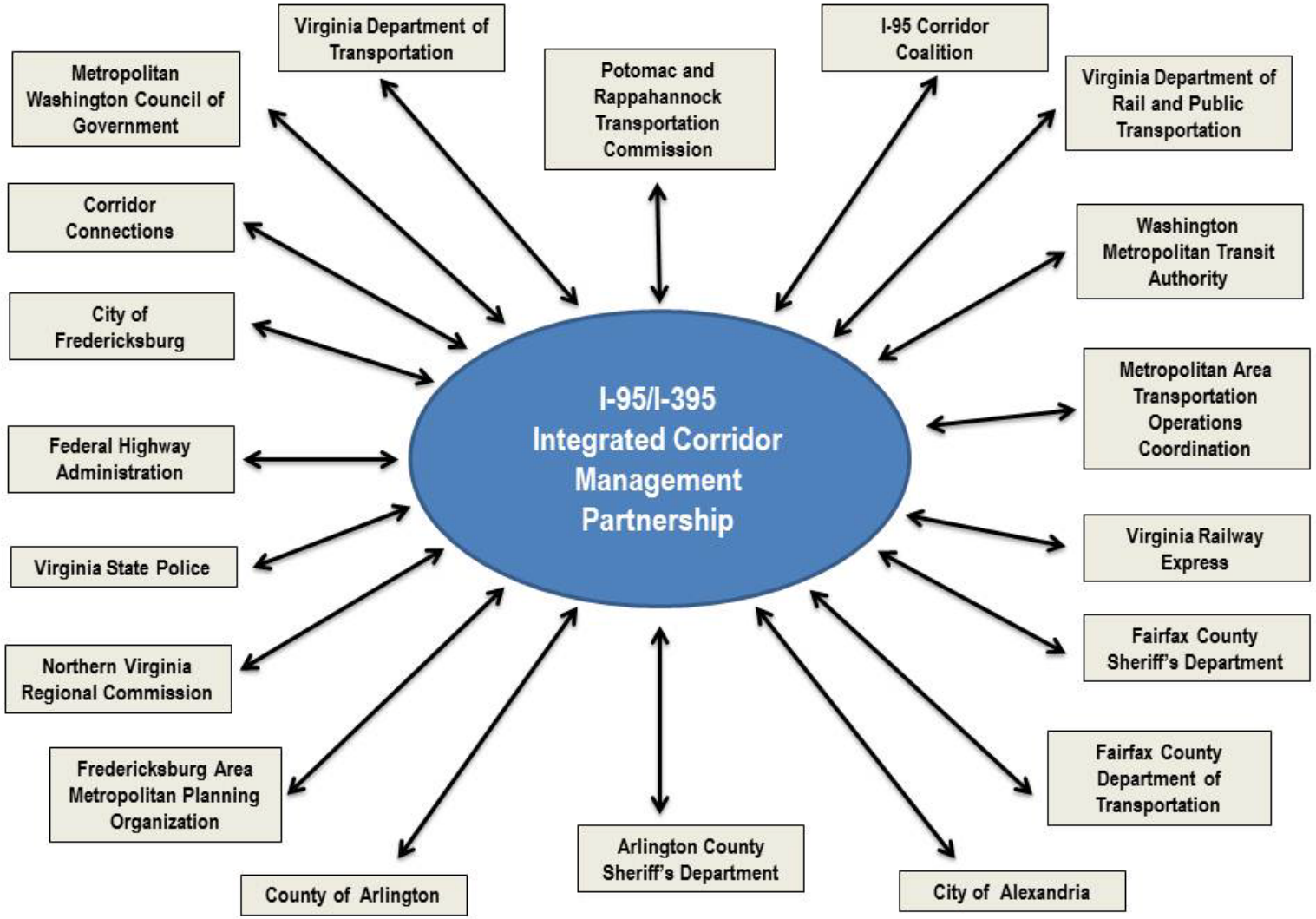
Presentation to MWCOG - MOITS
September 11, 2012

Status

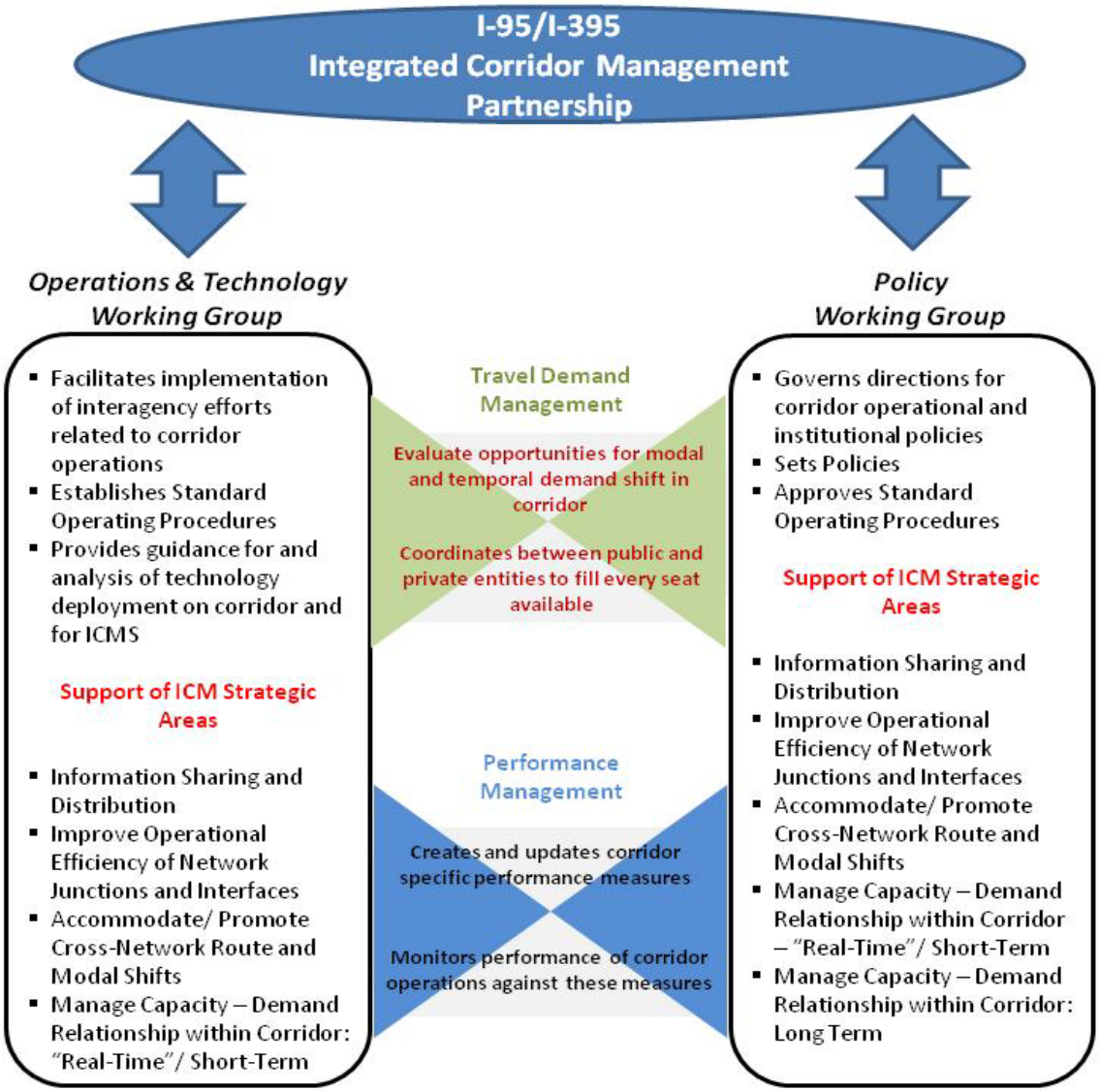
- I-95 / I-395 ICM ConOps & Project Development Task began October, 2011
- Extensive internal and external outreach resulted in definition of ICM strategies and Concept of Operations
- Work Packages defined based on corridor-wide and segment needs, addressing “low hanging fruit” and then more complex multi-modal applications.



Institutional View: The ICM Partnership

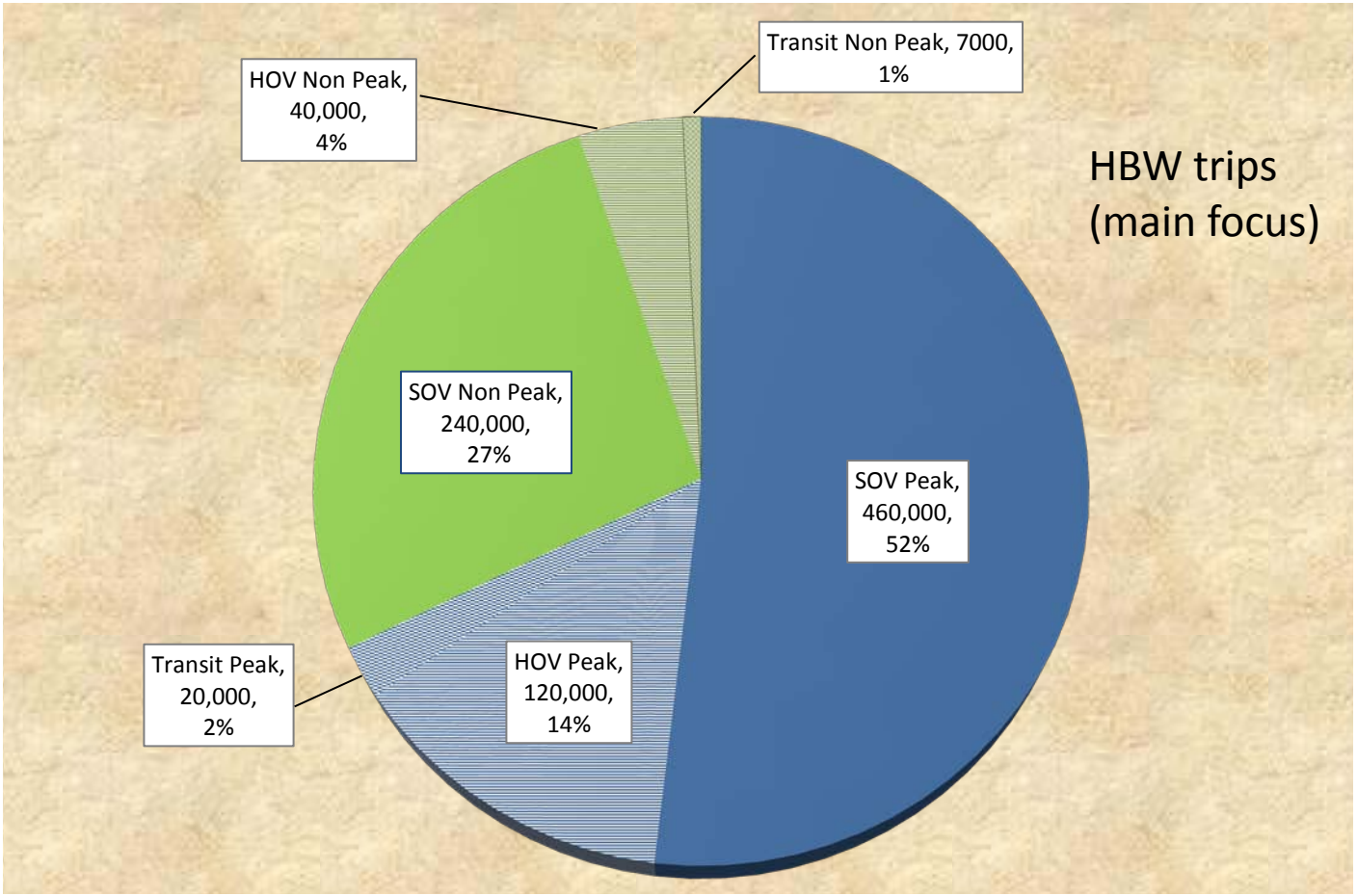


Working Group Structure



Trip View: Entire Corridor (I-95/395 and surrounding / connecting routes)

(885,000 home-based work trips daily)



Operational View: I-95/I-395 ICM Facts

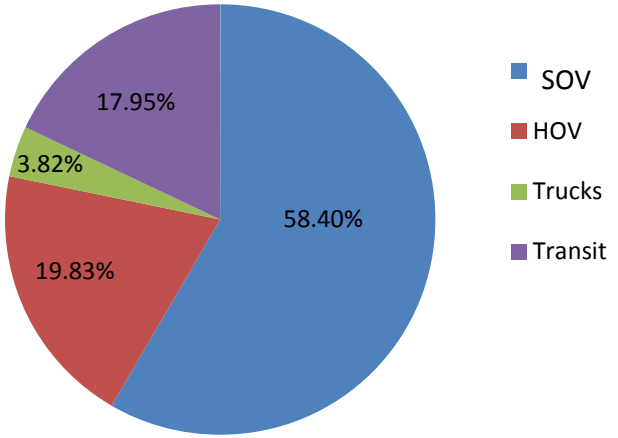
General Characteristics

- Study Area – 953 sq. miles
- Population – 0.6 million
- Employment – 813,856

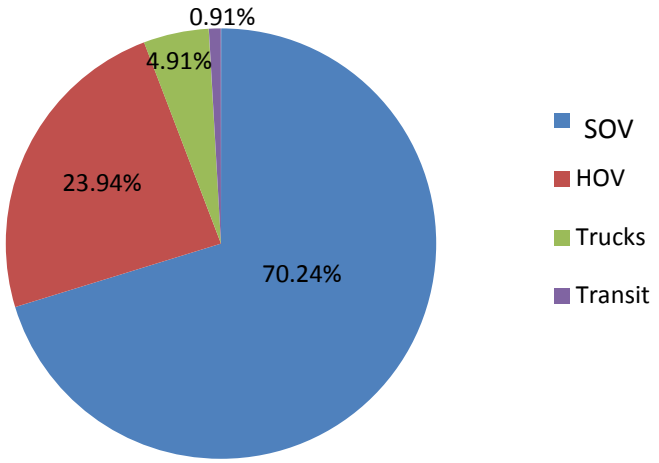
Subset of Trips generated from Occoquan and south (incl PW, Fredericksburg, Stafford)

- NB (35,741)
  - SOV = 20,873
  - HOV = 7,086
  - Trucks = 1,365
  - Transit = 6,417 (using 95/395)
- SB (35,544)
  - SOV = 20,752
  - HOV = 7,074
  - Trucks = 1,450
  - Transit = 6,268 (using 95/395)
- Two-way total = 71,285
  (50-60% of ADT along I-95 /395 and 75% of peak trips)

Trips by Mode share along I-95 NB



Trips by Mode share along I-95 SB

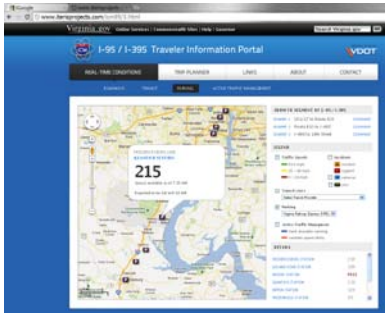


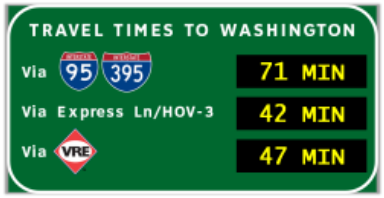
Home-Based Work Trips (2011) Using 95/395 SOV Lanes

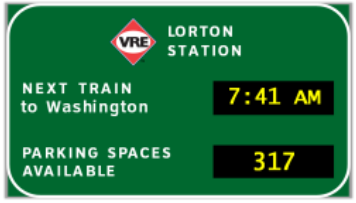
(2011) AM HBW Trips Likely to be made along I-95/I-395 SOV Lanes														
	Arlington, Crystal City	Tysons	Alexandria	Springfield	Potomac Mills, Occoquan	Fredericksburg City	Annandale	Fairfax City	Merrifield	Manassas	Fort Belvoir	Fort Belvoir North	Quantico	Total
Arlington, Crystal City	0	0	207	450	9	1	1,953	0	0	1	186	157	1	2,966
Tysons	0	0	0	0	0	0	0	0	0	0	9	9	0	18
Alexandria	470	0	0	0	8	1	0	0	0	1	310	212	2	1,002
Springfield	1,375	0	0	0	13	3	0	0	0	6	317	298	3	2,015
Potomac Mills, Occoquan	528	175	324	480	0	150	228	438	124	0	1,208	671	328	4,654
Fredericksburg City	10	7	11	11	64	0	4	6	1	16	51	25	148	353
Annandale	619	0	0	450	5	1	0	0	0	0	147	136	1	1,359
Fairfax City	0	0	0	118	5	0	120	0	0	0	42	44	1	331
Fair Oaks	207	486	36	81	7	0	0	0	0	0	50	42	1	910
Merrifield	252	386	31	64	1	0	0	0	0	0	18	20	0	772
Manassas	42	132	62	87	105	16	30	0	0	0	58	56	32	620
Fort Belvoir	834	236	325	99	46	5	260	87	79	0	0	0	10	1,980
Fort Belvoir North	1,335	440	484	734	110	13	457	351	195	0	0	0	21	4,141
Franconia	1,624	0	0	0	11	2	570	89	135	2	144	307	3	2,888
Quantico Base	0	0	0	0	2	2	1	1	0	1	3	1	0	12
Woodbridge	377	113	202	276	0	63	155	202	62	92	143	400	171	2257
Montclair, Riverridge	578	161	413	579	0	465	265	410	116	603	1,607	842	1,201	7239
Dumfries	62	16	46	66	215	99	29	43	11	73	108	95	0	863
Joplin, Quantico Reservation	29	8	21	29	97	42	14	19	6	48	79	40	98	529
Aquia Harbor	37	8	37	52	181	294	19	24	8	59	96	82	0	898
Garrisonville	87	34	50	61	351	781	28	16	10	85	253	114	772	2640
Stafford	16	7	12	15	81	854	7	8	1	25	67	27	193	1313
Leeland, Falmouth	32	11	36	51	199	0	16	24	7	56	105	83	341	962
Dunavant	6	3	5	6	48	0	2	3	1	10	31	11	79	205
South of Fredericksburg City	23	8	18	21	200	1376	8	8	5	40	78	45	221	2049
Total	8,543	2,231	2,320	3,730	1,760	4,168	4,165	1,728	761	1,118	5,109	3,717	3,625	42,976

Over 75% of AM peak trips are generated from Occoquan and south

ICM Concept Applications







- **Travel Time Information for All Travel Modes**
  - Pre-trip and en-route travel time information for multiple travel modes along the corridor (95/395. HOT, US1, bus, train)
  - Delays, congestion, restrictions at bases / work locations
  - Personal trip planning tool (end-to-end, compare/mix travel modes)
  - Address road and transit options and available parking should transit, carpool or slugging option be considered by the traveler
- **Real-time Parking Management and Guidance**
  - Park-and-ride space and guidance information (VDOT, VRE, WMATA parking facilities near I-95) for travelers entering the corridor via arterials, where they may have two or more options relative to parking and either carpooling, slugging or using transit.
  - Comparative travel time information for transit options (including next bus / train departure) would be presented along with parking space availability.

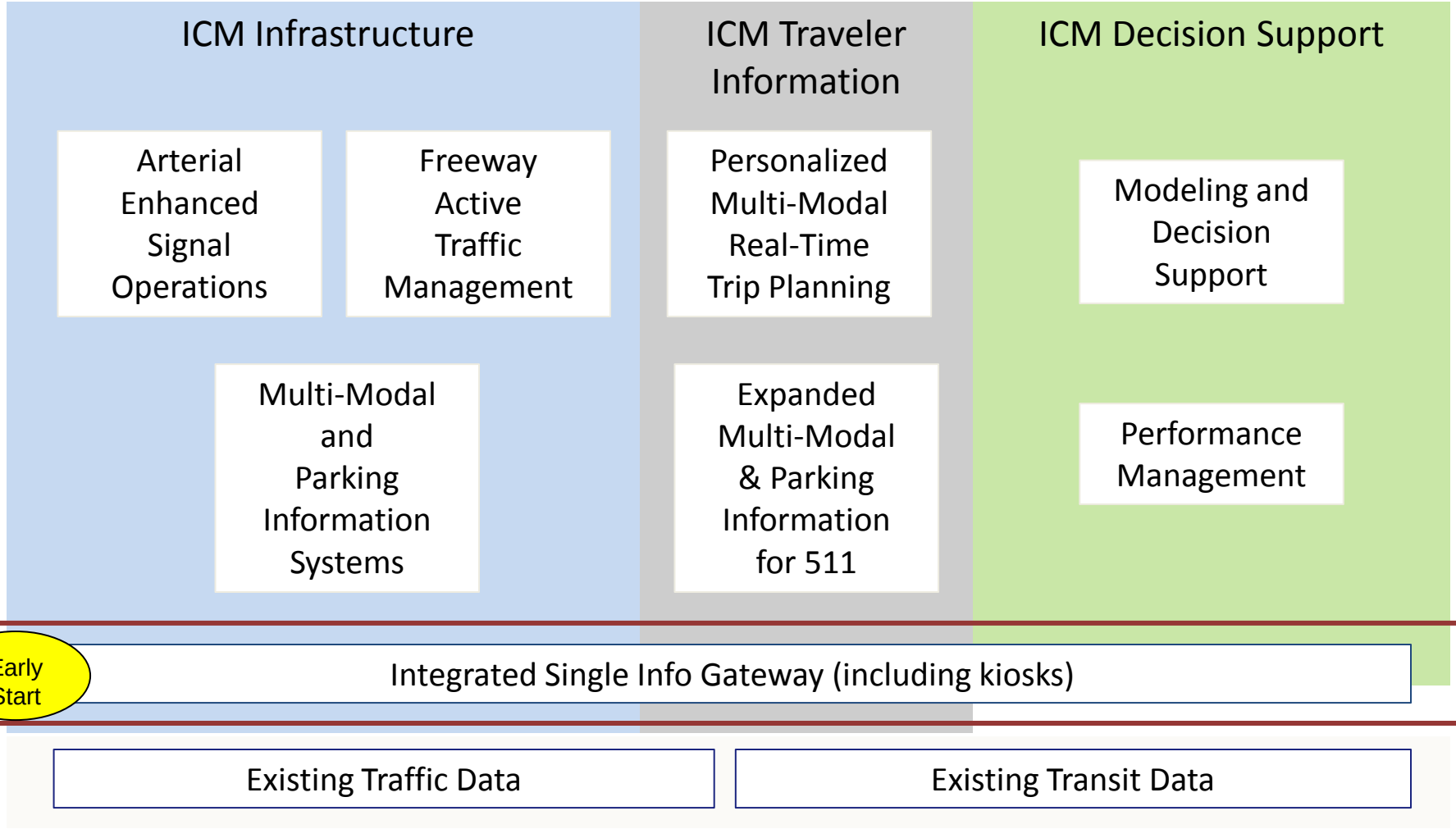
Potential Benefits in Corridor

Benefit	ICM Pilot Deployment (Corridor-wide)	Signal Upgrades / TSP (PW. Stafford, F-burg areas)	Hard Shoulder Running / ATM (I-95 between Rt 610 and Rt 630)	Ramp Metering (Rt 3 to I-495)
Delay Reduction	1	1	1	1
Travel Time Reduction	1	1	1	1
Reduction in Travel Time Variability	2	1	1	1
Crash Reduction		2	1	1
Reduced Fuel Consumption	2	1	1	1
Reduced Emissions	2	1	1	1
Reduced SOV Volumes	1			2
Reduced Travel Costs	1	2	2	2

Beneficiaries	ICM Pilot	Signal Upgrades/TSP	Hard Shoulder Running/ATM	Ramp Metering
Drivers / passengers (auto)	1	1	1	1
Transit users	1	1	2	2
Freight carriers	1	2	2	2

LEGEND: 1 Primary Benefit 2 Secondary Benefit

Deployment View:
Work Packages Derived from "Building Blocks"



Emphasis Areas

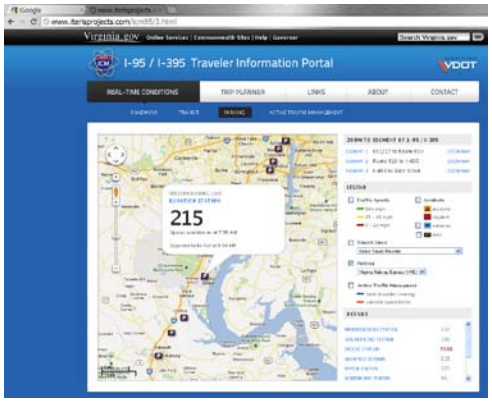
- **Traveler Information-Related Packages**
  - Corridor-wide
  - Build on 511 / current rideshare initiatives
  - Pre-trip orientation
  - Encourage mode shift, moves from SOV to HOV and transit
  - Entire investment could qualify as a TMP-related offset
- **Operations-Related Packages**
  - Segment-based (but includes central hardware/software)
  - Infrastructure-oriented
  - En-route orientation
  - Benefits to various modes
  - TMP-related offsets could be at least $3.96M of above
- Decision Support and Performance Management Systems are future elements

	Traveler Information-Related Packages			
TDM GOALS	Integrated Single Info Gateway	Kiosks	Expanded Multi-Modal and Parking Info	Personalized Multi-Modal Real-Time Trip Planning
Increase Carpooling	Provide links to carpool providers, improve awareness of corridor operational status	Improve awareness of corridor operational status	Real-time parking info promotes use of carpool / rideshare staging areas at new/different facilities	Provide trip planning capability with modal option for rideshare requests and responses (integrate with Commuter Connections, dynamic ridesharing systems). Providing parking status info between ICM and rideshare providers permits ability to arrange trips from specific park-and-ride locations, assuring availability of parking for rideshare users.
Increase Dynamic Rideshare	Provide links to carpool providers, improve awareness of corridor operational status	Improve awareness of corridor operational status	Real-time parking info promotes use of carpool/rideshare staging areas at new/different facilities	SEE ABOVE
Increase Transit Use	Increase awareness of transit options in the event that an incident on I-95 or 395 results in transit being more convenient.		Increase awareness of transit options in the event that an incident on I-95 or 395 results in transit being more convenient. Parking info can assist in facilitating mode shift where needed.	Provides flexible options for trip planning, including transit for part, most or all of a corridor trip, using real-time information for all modes.
Change Time of Travel	Better awareness of travel conditions prior to all times of travel	Potential encouragement to wait till later to travel home	Provide predictive information on when parking or transit is full on daily basis, encourage travel before heart of peak period.	Provide flexible options for travel based on time and mode, including ability to arrange rides, carpools or vanpools at whatever time the person is traveling

	Operations-Related Packages			
TDM GOALS	Multi-Modal and Parking Information Systems	Arterial Enhanced Signal Operations	Freeway Active Traffic Management	ICM Central Systems
Increase Carpooling	Real-time parking info promotes use of carpool/slugline staging areas at new/different facilities	Enhancing signal operations between park-and-ride and I-95 can reduce delays	Use of HOV restrictions for hard-shoulder running and HOV bypass lanes at new ramp meters may encourage carpool use as best means of reducing delay	Systems required for multi-modal/parking information systems deployment
Increase Dynamic Rideshare	Real-time parking info promotes use of carpool/slugline staging areas at new/different facilities		Use of HOV restrictions for hard-shoulder running and HOV bypass lanes at new ramp meters may encourage carpool use as best means of reducing delay	
Increase Transit Use	Increase awareness of transit options in the event that an incident on I-95 or 395 results in transit being more convenient. Parking info can assist in facilitating mode shift where needed.	Providing traffic signal priority may reduce travel time and enhance schedule adherence.	Use of HOV restrictions for hard-shoulder running and HOV bypass lanes at new ramp meters favors transit by allowing it to bypass meter queues while at the same time benefitting from the demand control strategies on the mainline that are provided through metering.	
Change Time of Travel		Reinforce better periods to travel through improved operating parameters / performance	Provide more favorable restrictions for earlier periods (e.g., no HOV restriction for hard-shoulder running lane in Stafford during first hour of peak, HOV-3 after)	

Information-Related Packages

- Integrated Single Information Gateway
- Expanded Multi-Modal and Parking Information for 511
- Personalized Multi-Modal Real-Time Trip Planning
- Kiosk Installations



Information-Related Packages

- Integrated Single Information Gateway
  - Create corridor-focused web and mobile access point within 511
  - Add transit data access to 511 interface
  - Corridor-based traffic, travel time, and transit status information
  - Basis for additional Transit / TDM activities
- Expanded Multi-Modal and Parking Information for 511
  - Create distinct tabs and interfaces for traffic, ATM-related info (speeds, shoulder status), each transit carrier, parking facilities)
  - Requires data from park-and-ride information projects (operations related)
  - Would greatly benefit and support dynamic ridesharing activities through sharing of parking information with rideshare systems / services

Information-Related Packages

- Personalized Multi-Modal Real-Time Trip Planning
  - Add access and interface to commuter connections and dynamic ridesharing services including sharing of parking and system status info with those services
  - Develop personal multi-modal trip planner interface allowing incorporation of road, transit, rideshare options and reservations
  - Would integrate transit and rideshare options and arrangements into trip planning mechanism
- Kiosk Installations
  - Corridor-based traffic, travel time, and transit status information
  - Locate at:
    - Pentagon, Mark Center, Ft Belvoir, MC Quantico, Pentagon City Mall, Landmark Mall, Franconia-Springfield Metro Station, Potomac Mills

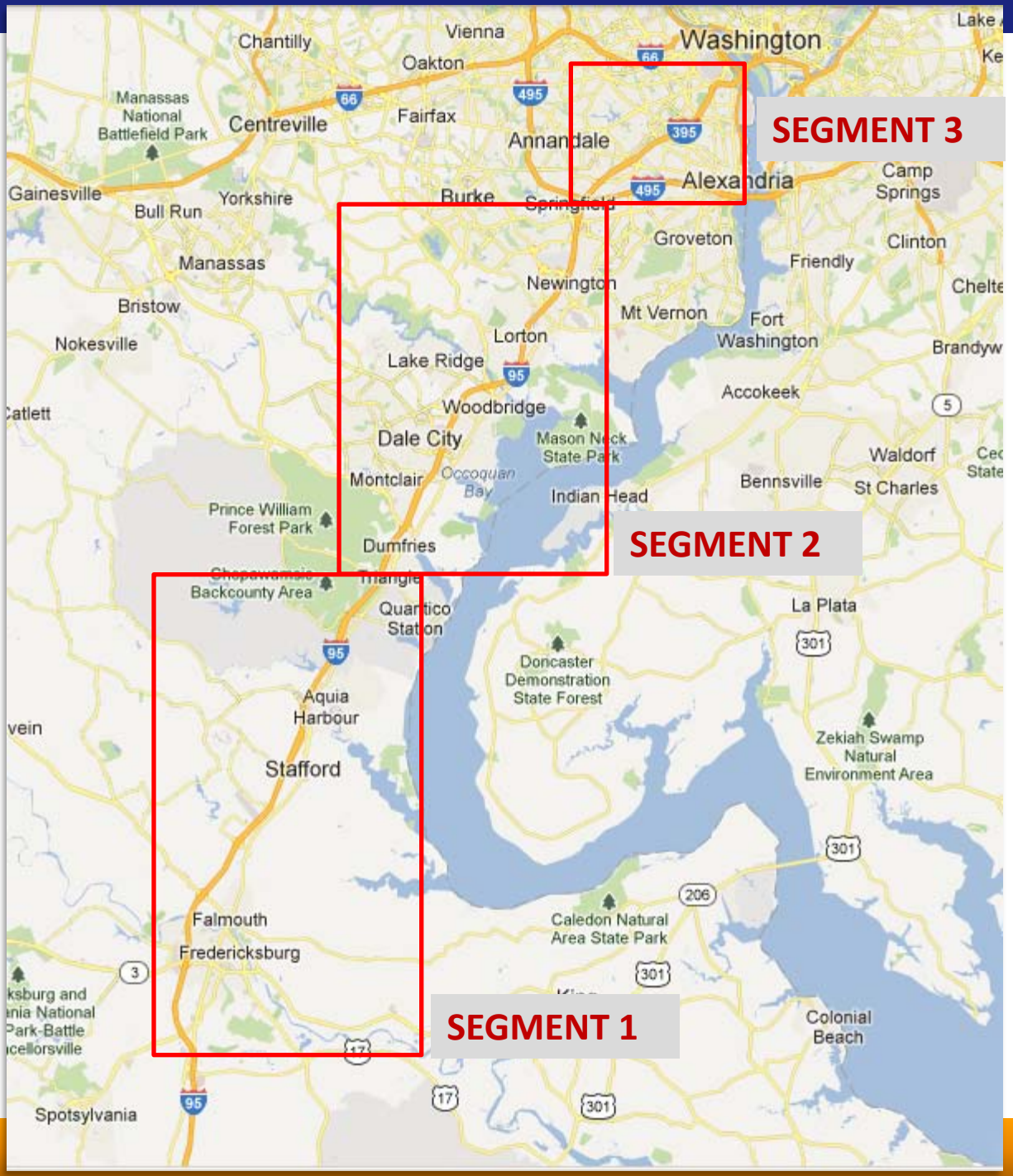
Operations-Related Packages

3 SEGMENTS

MM 126-145

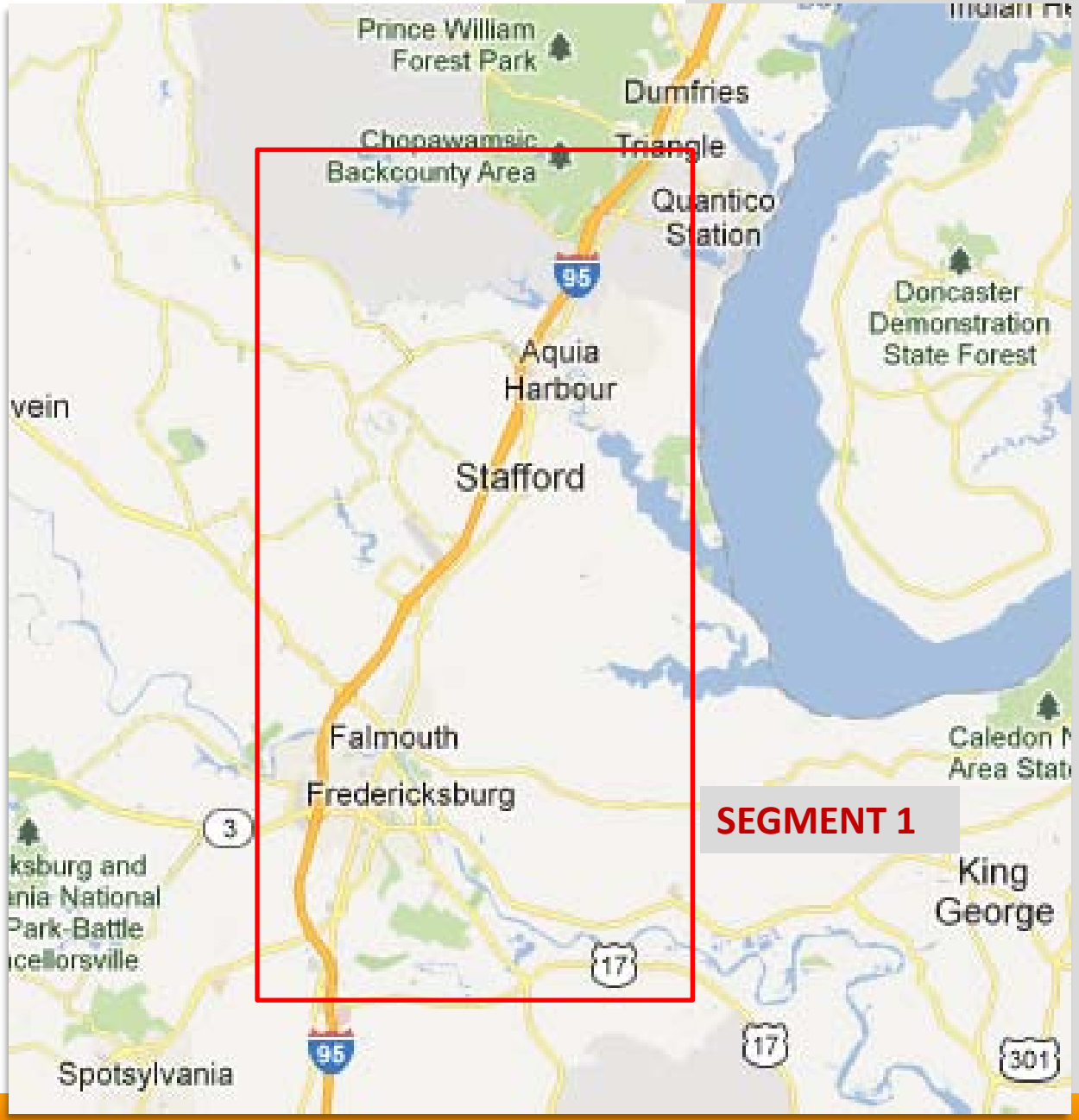
MM 145 – 170 (Springfield)

I-395 (MM 0 – 10)



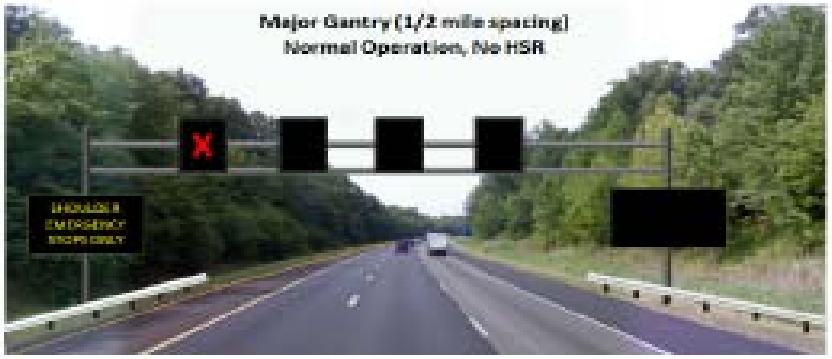
PROJECT SEGMENT 1

MM 126 – MM 145

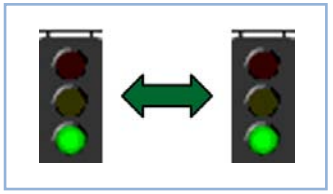


Project ID #	Project Element (Segment 1)	Location	TDM / Transit Support	Potential Trips Influenced (est.)
1a1	Active Traffic Management / Hard Shoulder Running	MM 138 - 145	HOV-2, transit only for peak period use	14,000
1b1	Enhanced Arterial Signals	US 1 MM 126 to US 17	Signal priority for express buses.	4400
1b2	Enhanced Arterial Signals	Route 3 I-95/ US1	Enhance access from park-and-ride, signal priority for express buses.	2200
1c1*	P&R Management and Guidance	MM 139-145	Encourage shifting of demand, increase dynamic rideshare options**.	3500
1c2	P&R Management and Guidance	MM 126-139	See #1c1 above	2200
1c3*	Comparative Travel Time System	MM 126-145	Compare mode and lane options	14,000
* Elements of these projects support TMP Mitigation of Express Lanes Project ** Required for providing parking information as part of Traveler Information enhancement activities				

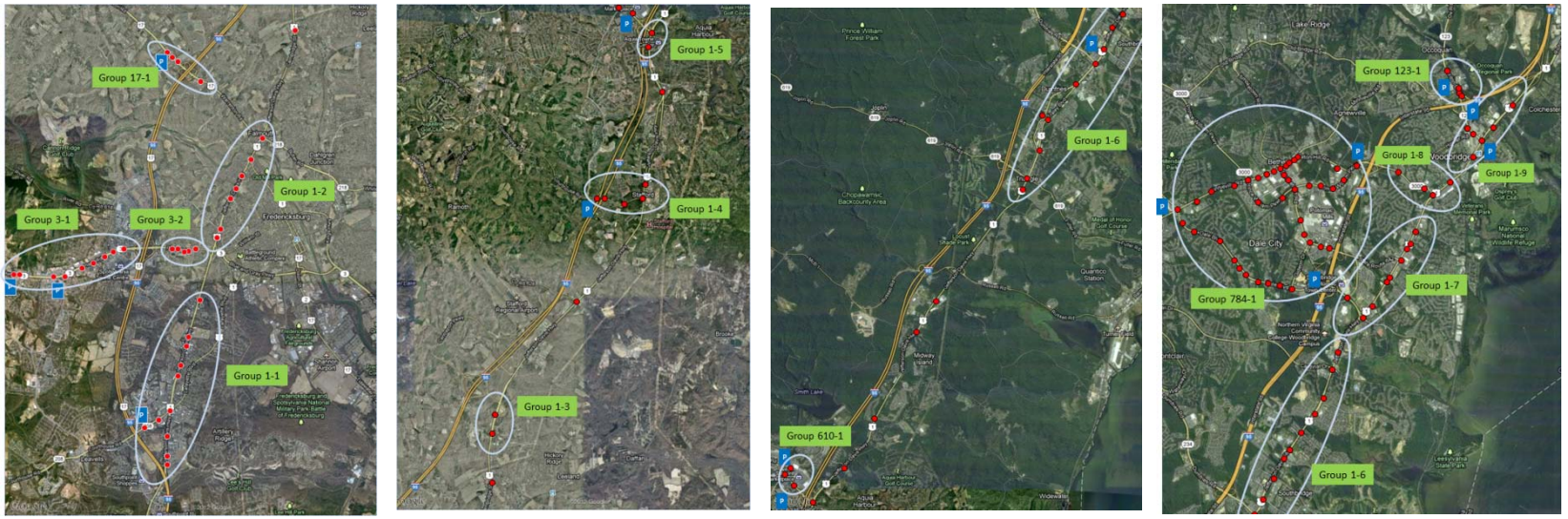
HSR / ATM Concept



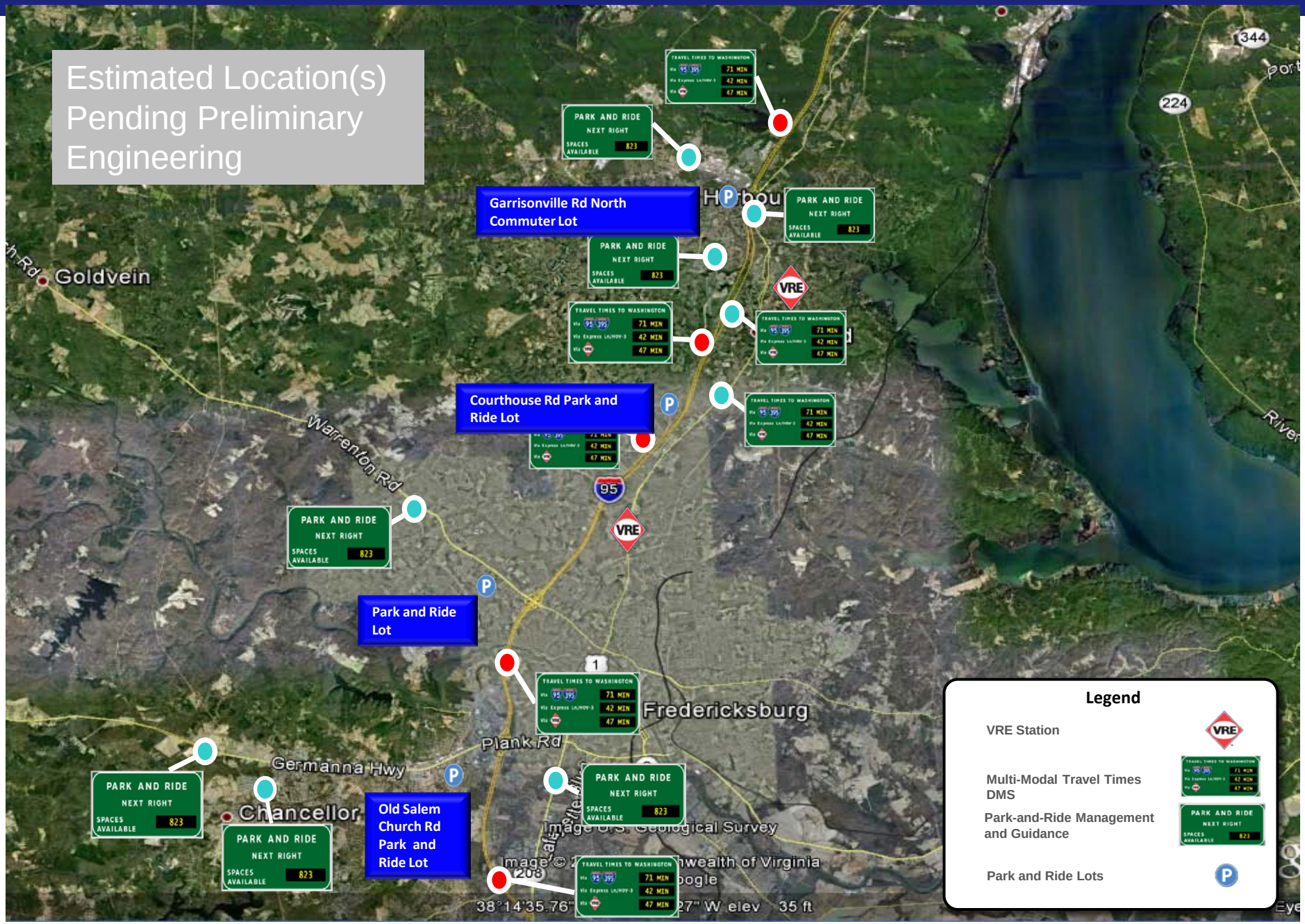
Future Activities: Arterials



CANDIDATE SIGNAL GROUPS



- Transit signal priority along express bus routes
- Adaptive control along:
  - Arterial alternate routes (incidents, congestion)
  - Key routes between park-and-ride and I-95



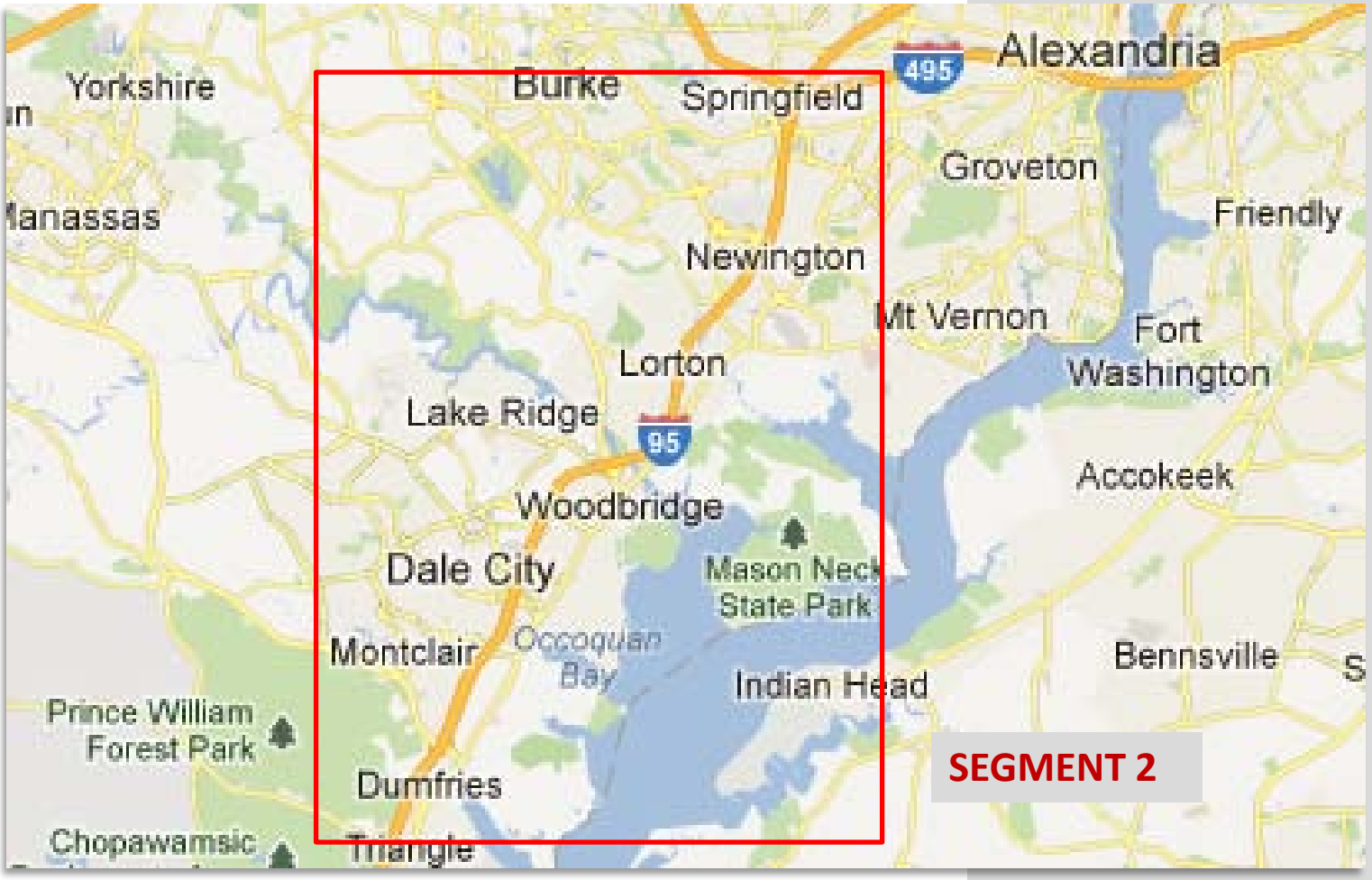
Park & Ride Management & Guidance Systems/ Comparative Travel Time signage (MM 126-145)

Fulfillment of TDM Goals Segment 1

Project ID #	Project Element (Segment 1)	Increase Carpooling	Increase Dynamic Rideshare	Increase Transit Use	Change Time of Travel
1a1	Active Traffic Management / Hard Shoulder Running (MM138-145)	Indirect		Indirect	
1b1	Enhanced Arterial Signals (US 1)			Direct (if TSP used)	
1b2	Enhanced Arterial Signals (Route 3)			Direct (if TSP used)	
1c1*	P&R Management and Guidance (Stafford)	Direct	Direct	Direct	Indirect
1c2	P&R Management and Guidance (Frederickburg)	Direct	Direct	Direct	Indirect
1c3*	Comparative Travel Time System			Indirect	

PROJECT SEGMENT 2

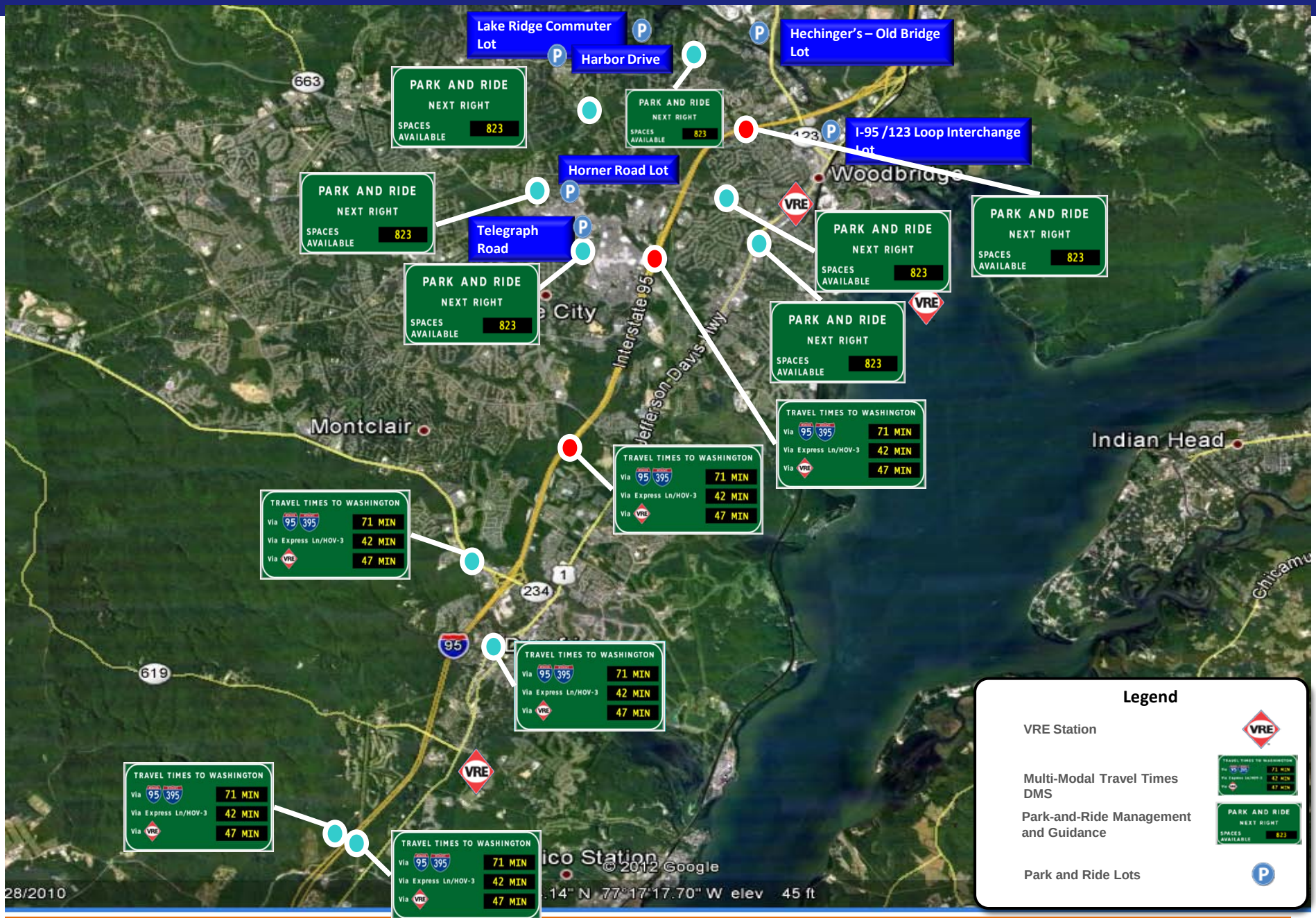
MM 145 – MM 170



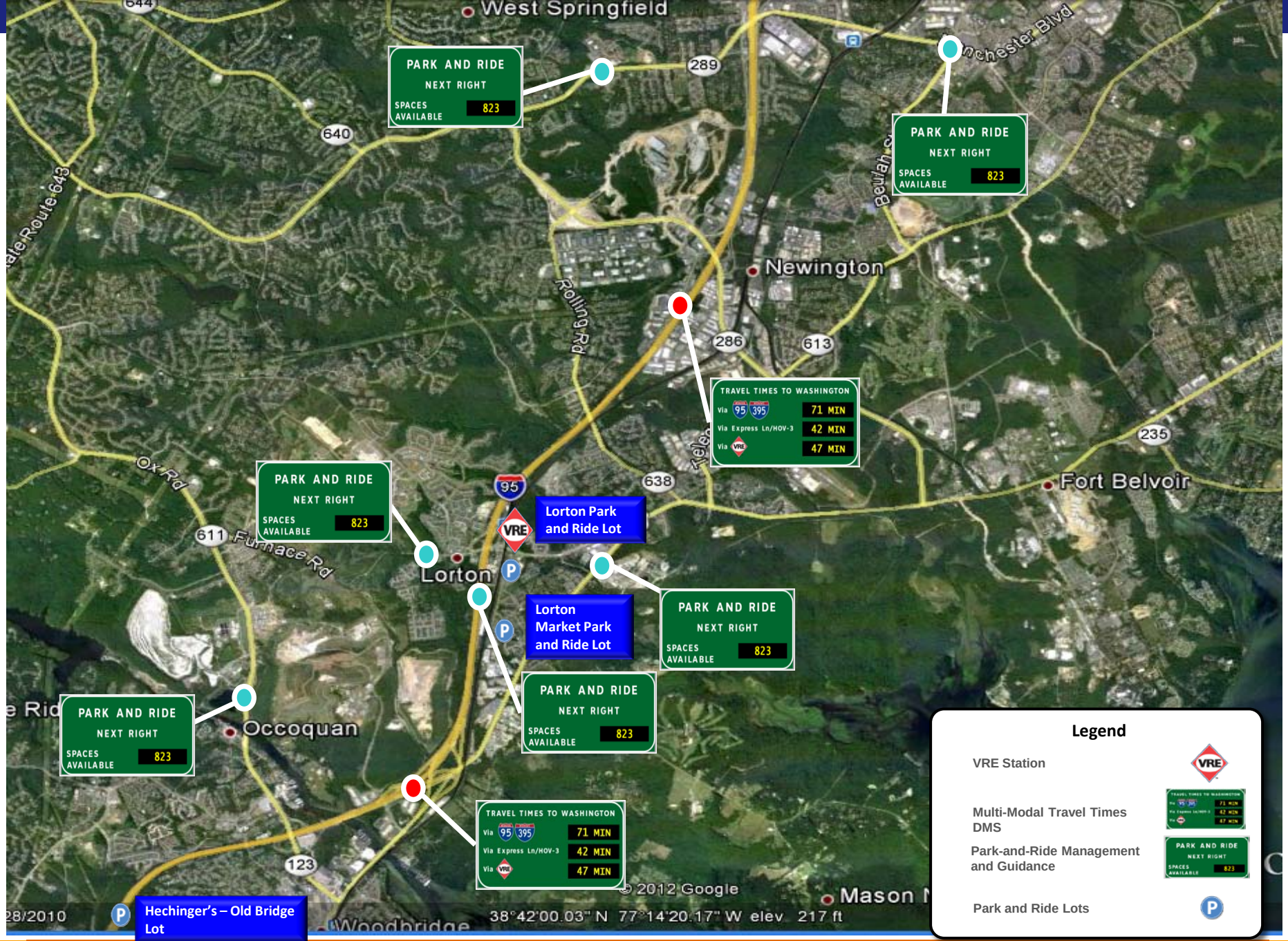
Project ID #	Project Element (Segment 2)	Location	TDM / Transit Elements	Potential Trips Influenced (est.)
2a1*	P&R Management and Guidance	Dale City/ Woodbridge	Encourage shifting of demand, increase dynamic rideshare options**	15,400
2a2*	P&R Management and Guidance	Lorton/ S. FFX County	See #2a1 above**	5,900
2a3*	Comparative Travel Time System	Dale City/ Woodbridge	Compare mode and lane options	15,400
2b1	Ramp Queue Warning - Quantico	Exit Ramps to Quantico	Improve safety, reduce access delay	8,400
2c1	Ramp Metering – PW & FFX Counties	PW/ Fairfax Counties	Include HOV meter bypass lane to favor HOV and transit at entrance ramps	21,300
2d1*	Enhanced Arterial Signals US1 in PW Co.	US 1 (PW County)	Express bus signal priority and overall flow enhancement	2,000
2e1*	Enhanced Arterial Signals US1 to I-495	Woodbridge to I-95/I-495	Express bus signal priority	3,000
2e2*	Enhanced Arterial Signals – Dale City	Dale City Area	Emphasis on express bus signal priority as well as overall accessibility from P+R	4,000

* Elements of these projects support TMP Mitigation of Express Lanes Project

** Required for providing parking information as part of Traveler Information enhancement activities



Park & Ride Management & Guidance Systems/ Comparative Travel Time signage (Dale City to Woodbridge)

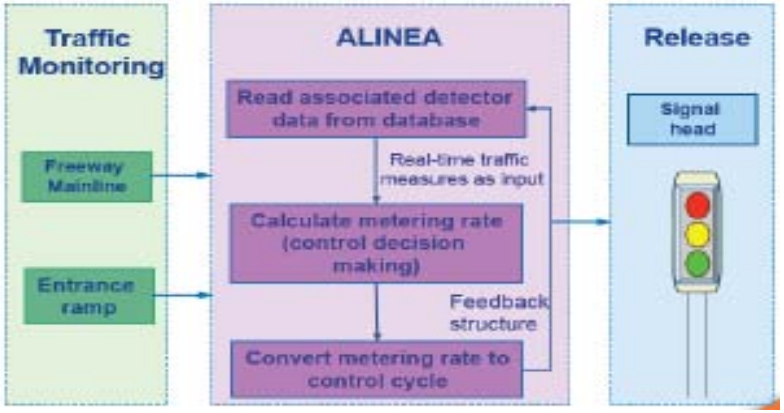


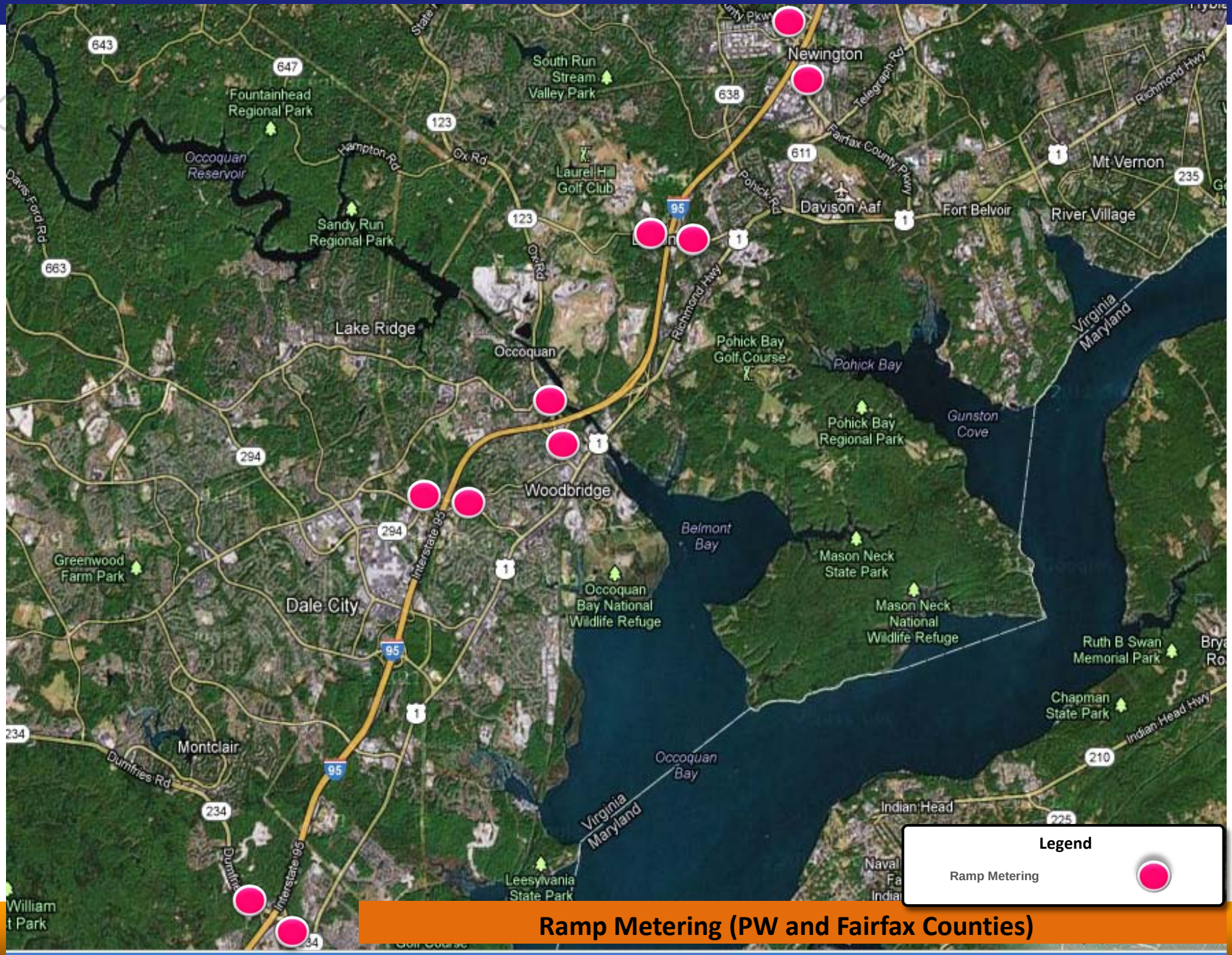
Park-and-Ride Management and Guidance System – Lorton / South Fairfax County area

Ramp Queue Warning Systems

Adaptive Ramp Metering with HOV Bypass

- Upgrade 18 metered ramps along I-395 to vary rates based on real-time mainline flows
- Implement new ramp meters (some with HOV bypass lane)
  - Consider widening at some entrance ramps





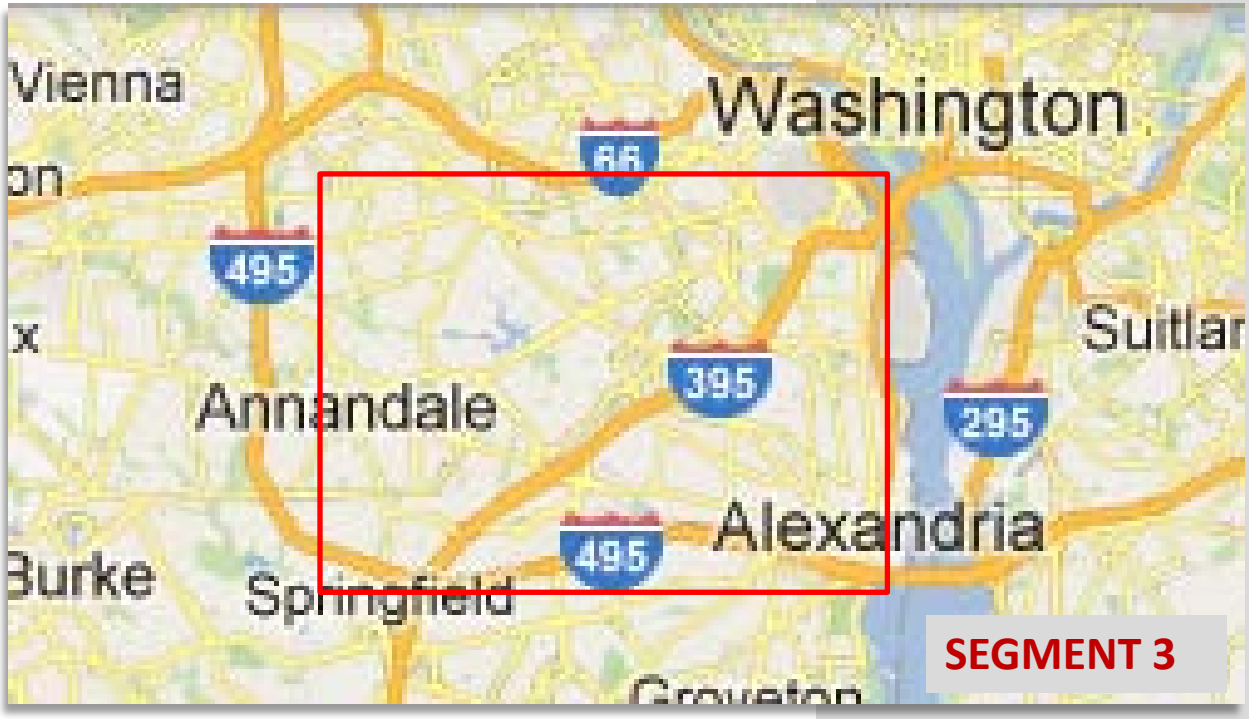
Ramp Metering (PW and Fairfax Counties)

Fulfillment of TDM Goals Segment 2

Project ID #	Project Element (Segment 2)	Increase Carpooling	Increase Dynamic Rideshare	Increase Transit Use	Change Time of Travel
2a1*	P&R Management and Guidance	Direct	Direct	Direct	Indirect
2a2*	P&R Management and Guidance	Direct	Direct	Direct	Indirect
2a3*	Comparative Travel Time System			Indirect	Indirect
2b1	Ramp Queue Warning - Quantico				Indirect
2c1	Ramp Metering – PW & FFX Counties	Indirect	Indirect	Indirect	Indirect
2d1*	Enhanced Arterial Signals US1 in PW Co.			Direct (if TSP used)	
2e1*	Enhanced Arterial Signals US1 to I-495			Direct (if TSP used)	
2e2*	Enhanced Arterial Signals – Dale City			Direct (if TSP used)	

PROJECT SEGMENT 3

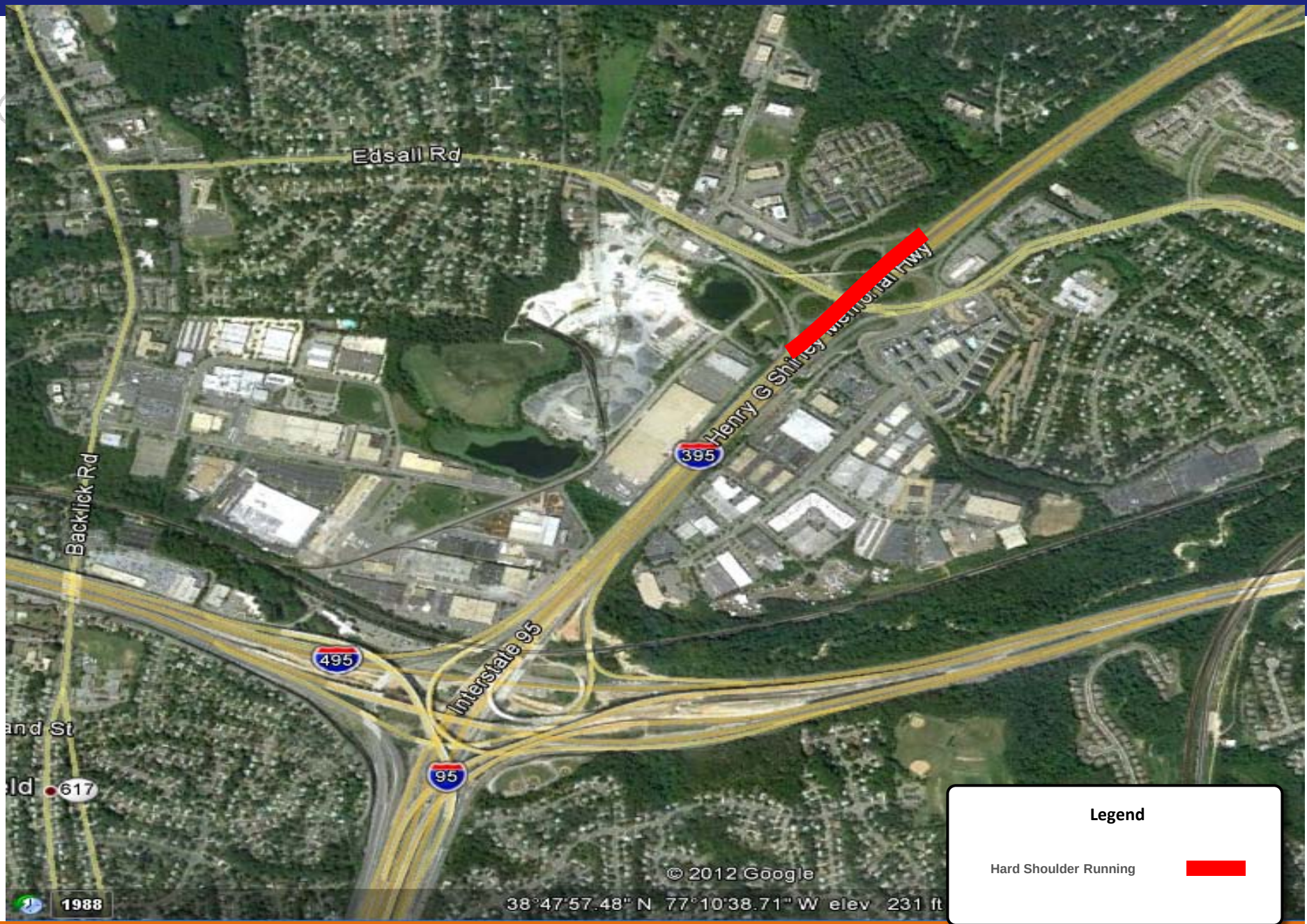
I-395 (MM 0-10)



Segment 3 Overview

Project ID #	Project Element (Segment 3)	Location	TDM / Transit Elements	Potential Trips Influenced (est.)
3a1	Enhanced Arterial Signals – Transit Signal Priority	Seminary Rd Mark Center to I-395	Express bus signal priority	2000 (assuming 30% transit use to Mark Center)
3b1	Hard Shoulder Running	I-395 at Edsall Rd	Reduce traffic bottlenecks	35,000

Advance Signal Operations : Seminary Road from Mark Center to I-395



Hard Shoulder Running I-95 (SB I-395@ Edsall Road)

Fulfillment of TDM Goals Segment 3

Project ID #	Project Element (Segment 3)	Increase Carpooling	Increase Dynamic Rideshare	Increase Transit Use	Change Time of Travel
3a1	Enhanced Arterial Signals – Transit Signal Priority (Mark Ctr / Seminary)			Direct	
3b1	Hard Shoulder Running (395/Edsall)				

FOR DISCUSSION…..

- Any further transit and TDM activities in corridor related to ICM activities we should address or know about?
- Coordination needs
- Other