Multimodal Coordination for Bus Priority Hotspots

***Regional Public Transportation Subcommittee* (RPTS)**

November 24, 2015

FOURSQUARE INTEGRATED TRANSPORTATION PLANNING

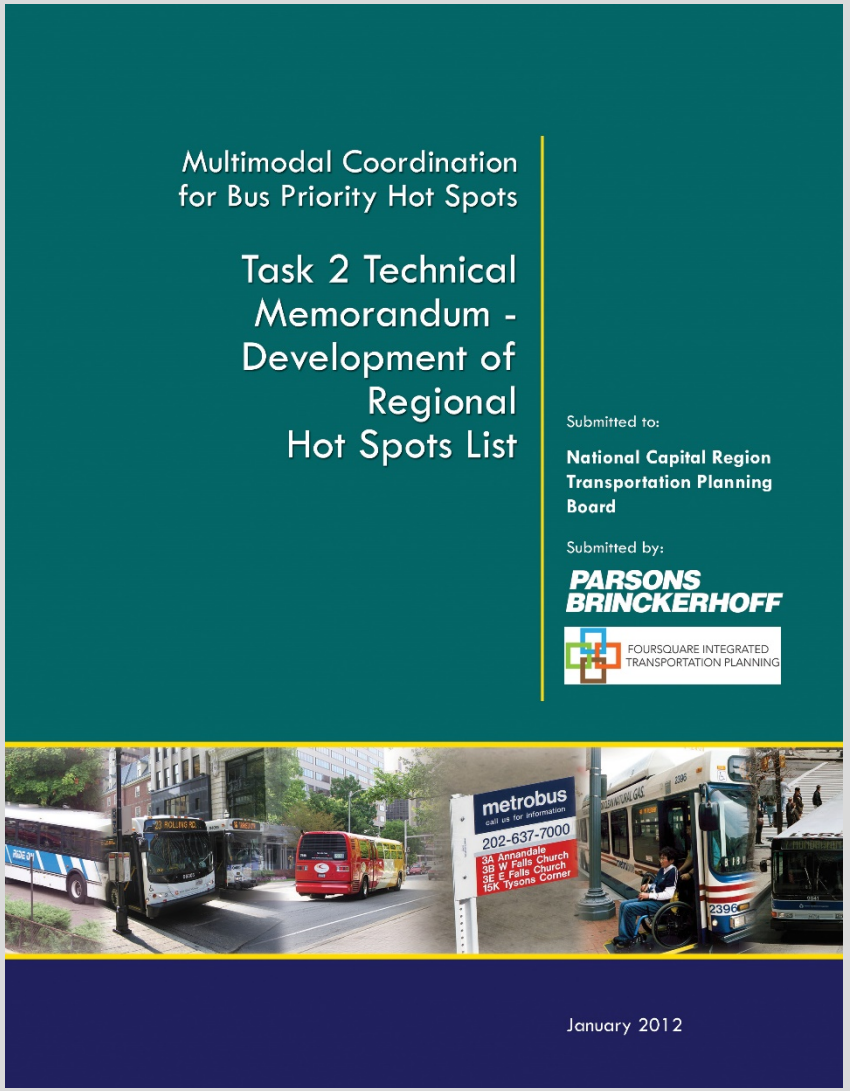
Team Organization

- Coordination - MWCOG
- Technical Advisor – WMATA Office of Long-Range Planning
- Data and Observations – Regional Transit Providers
- Direction & Feedback – Regional Stakeholders

- Data Analysis, Field Verification, Reports – Consultant Team

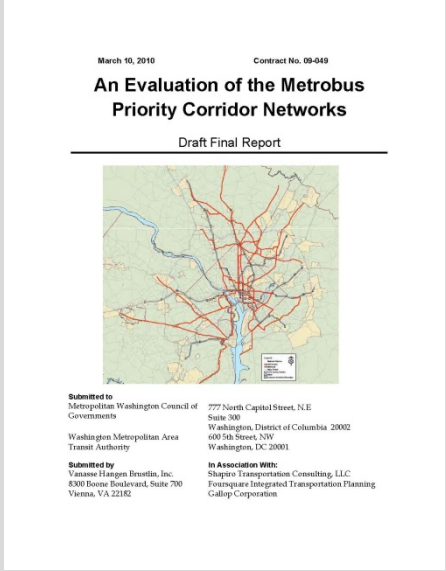
Consultant Team

- **Parsons Brinckerhoff** – Prime, Hot Spots Verification, Design Concepts
- **Foursquare ITP** – Database Development, Hot Spots List
- **Sabra, Wang & Associates** – Traffic Analysis



Background

- Priority Corridor Network (PCN) Running-Way Evaluation Study
  - 20-year Vision
  - Near-Term Implementation Horizon (“Hot Spots”)
- WMATA Hot Spots Study
  - Focus on Metrobus Network
  - Correlation of service frequencies and slow bus speeds to needs



March 10, 2010 Contract No. 09-049

An Evaluation of the Metrobus Priority Corridor Networks

Draft Final Report

Submitted to
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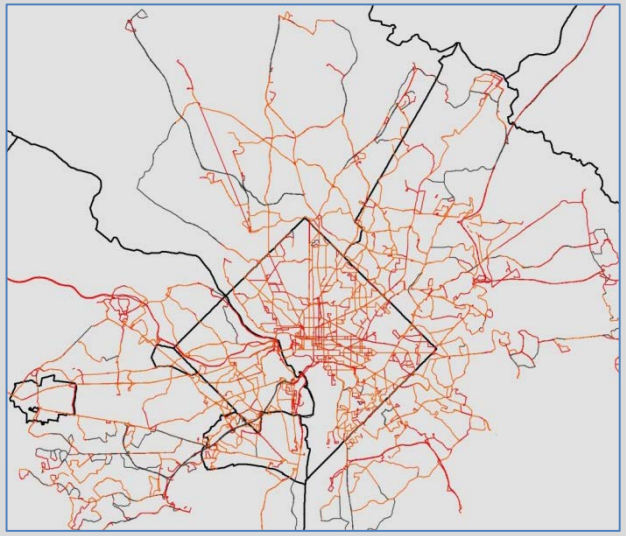
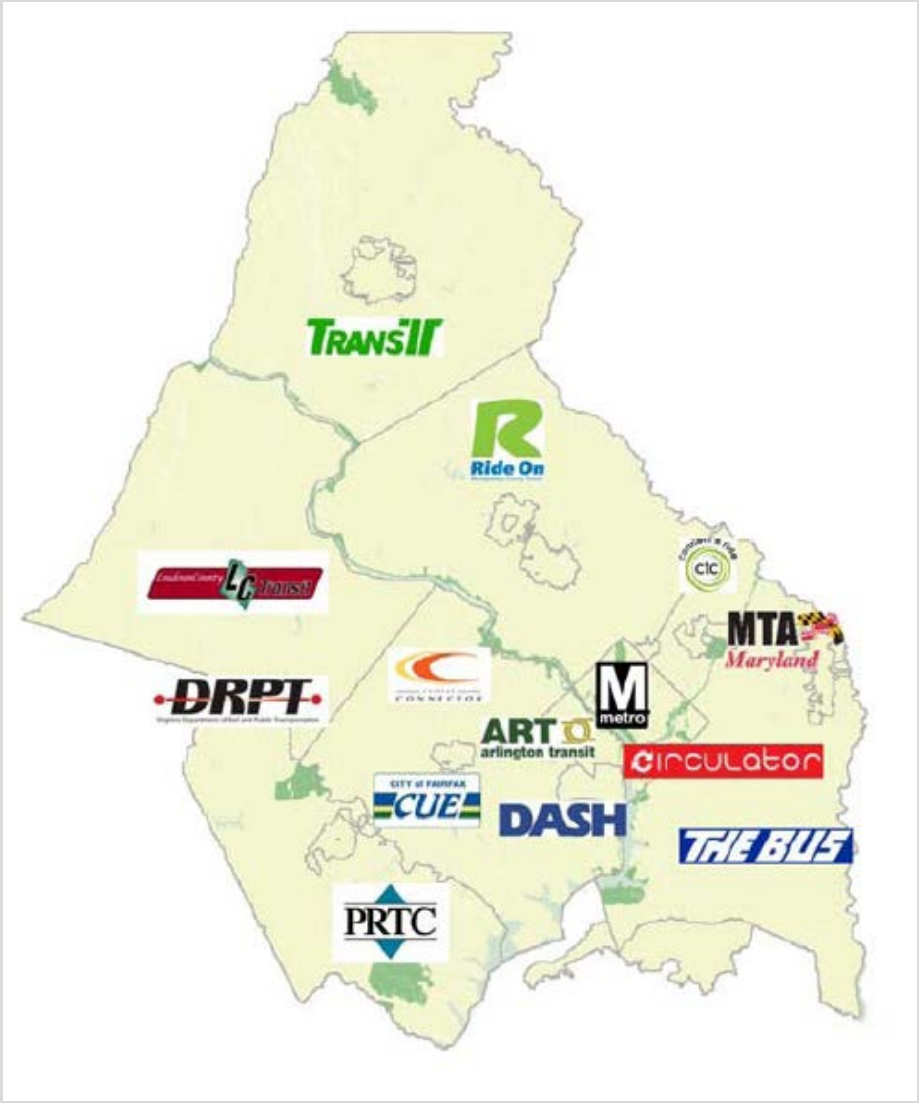


Scope of Work

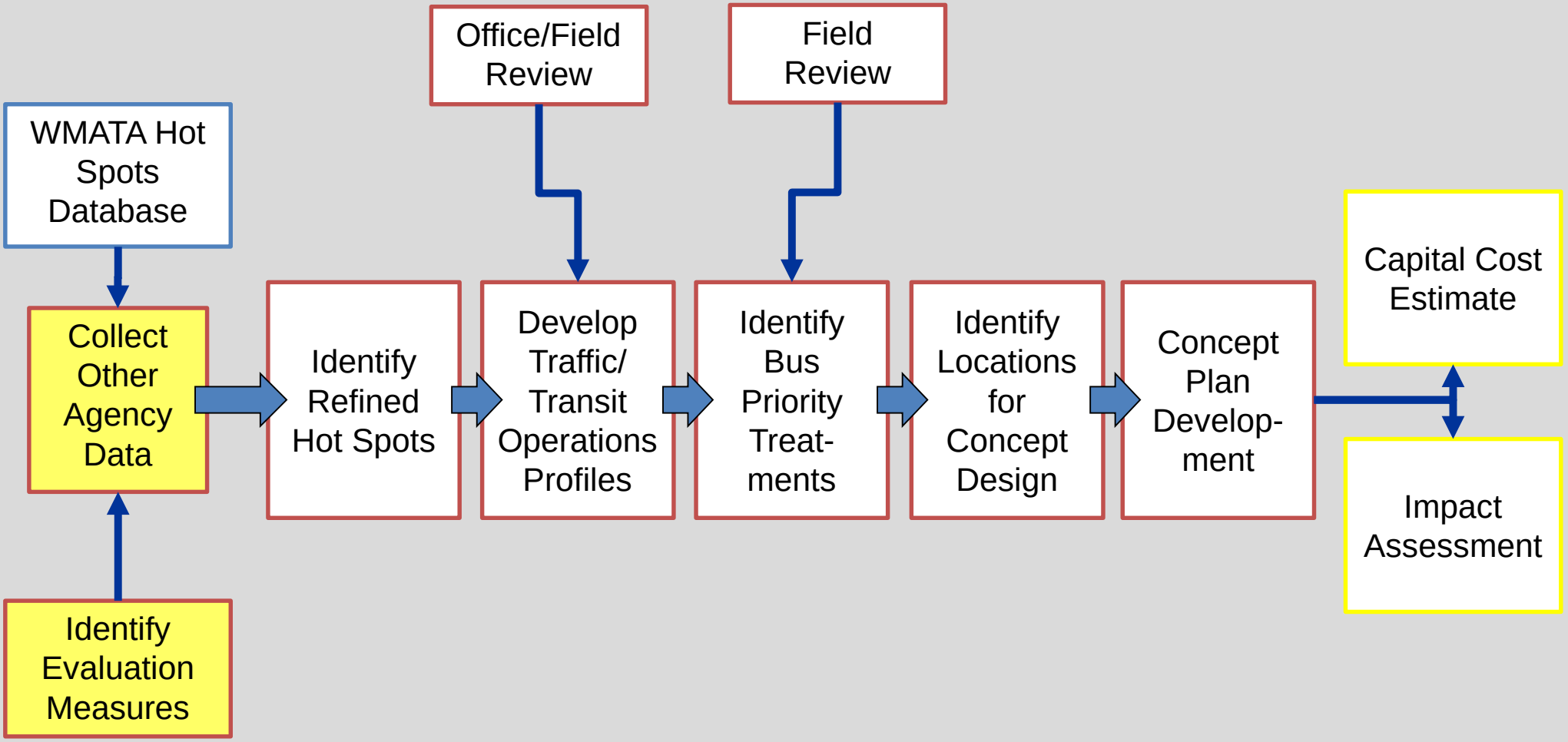
1. Develop hot spot list that reflects all bus transit agencies in the region.
2. Prioritize Top 10 Hot Spots lists for DC, MD, & VA.
3. Recommend and develop preliminary designs for bus priority treatments at the identified Hot Spot locations.
4. Quantify anticipated capital costs and operating cost savings.

Beyond Metrobus – Additional Systems to be Incorporated

- Core Agencies
  - Ride On
  - Fairfax Connector
  - DASH
  - DC Circulator
  - ART
  - CUE
  - The BUS
- Commuter Bus
  - MTA Commuter Bus
  - PRTC (Omni-Ride)
  - Loudoun County Transit
- Non Core Agencies
  - TransIT
  - Connect-a-Ride



Study Approach



Task 2 – Develop "Top 15" Lists / Initial Hotspot Database

- Top 15 sites initially identified in each jurisdiction: three lists
  - AM peak delay, PM peak delay, All-day delay

Process:

1. Utilized existing bus speed data from and other agencies for locations without WMATA data
   - Input into NavTeq data layers on a road segment basis
2. Used number of bus trips for all agencies to weight roadway segments
3. Developed Hot Spots list based on scores
   - Segment Score = (15mph – speed) x Number of Buses in time period

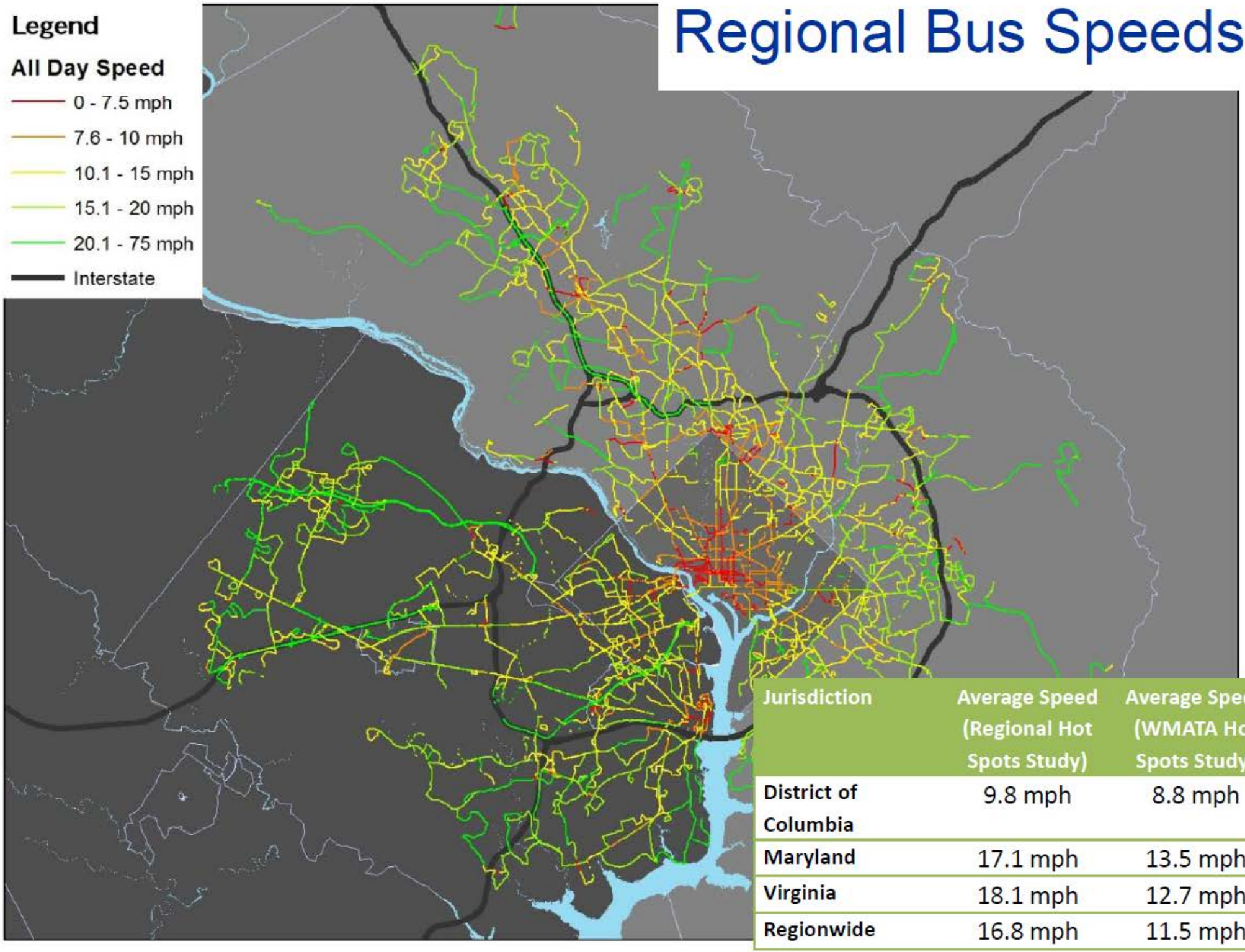
Task 2 – Develop "Top 15" Lists / Initial Hotspot Database

January , 2012

Table 7: District of Columbia Hot Spot Locations – All Day

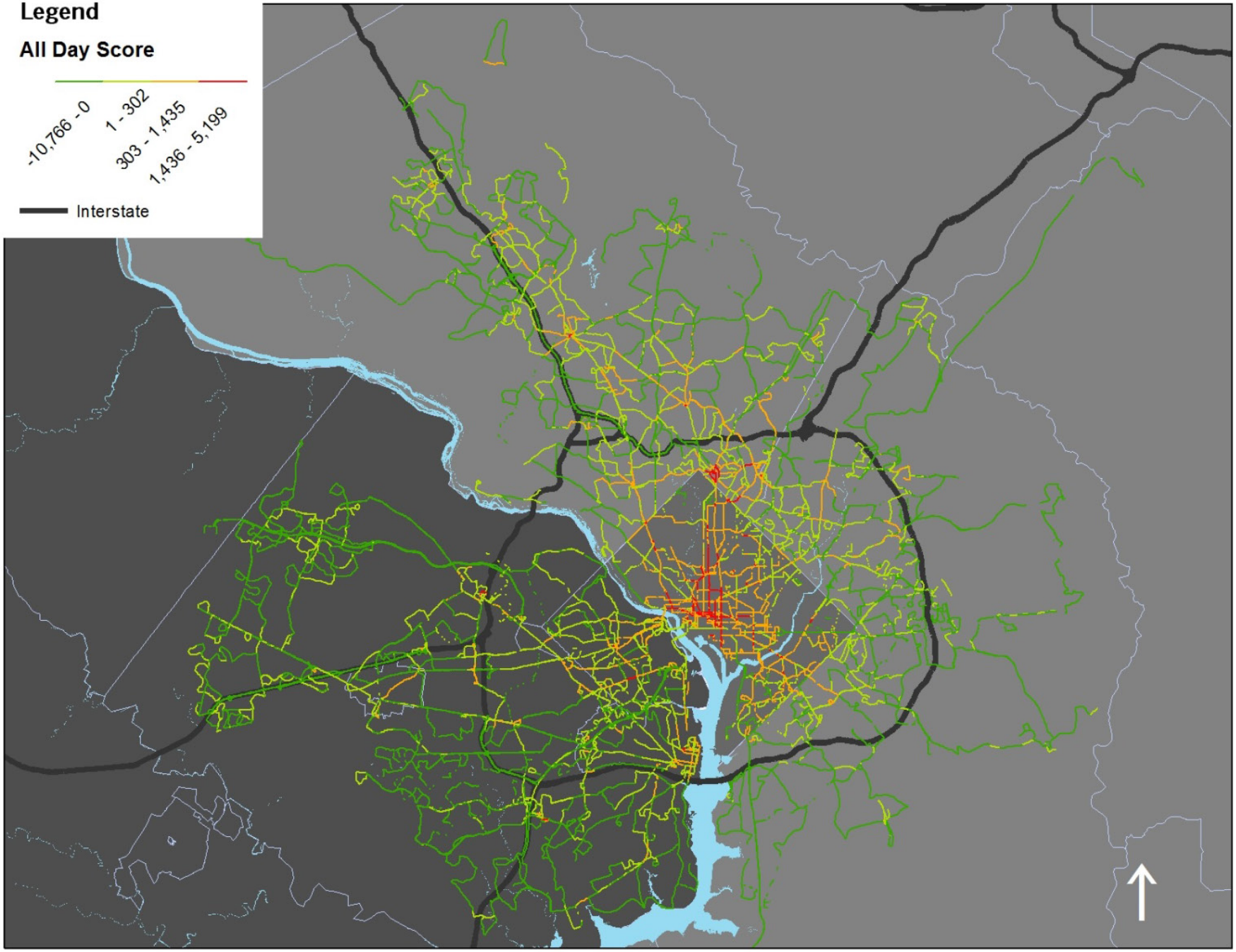
Rank	Direction	Location	Start	End	Avg. Score	Avg. Speed (mph)	Max Score	Max Link	Length	Buses per Time Period (Core Agencies)	Comments	Additional Trips (Non-Core Agencies)	Bus Routes and Avg. Daily Ridership
1	All	*Virginia Avenue NW*	*E Street*	*D Street*	4463	6.27	4463	18893075	0.05	510	-	54	(**WMATA:** S1, N3, 80, X1, 31, 39; **MTA:** 901, 909, 950) ***22,361***
2	All	I Street NW	18th Street	13th Street	4412	5.8	6369	732173176	0.65	493	-	-	(**WMATA:** 32, 11Y, S4, 36, P19, P17, S9, 43, S2, 39, 42, G8, X2, W13, 37) ***55,070***
3	All	McPherson Square (14th/K/I/13th)			4182	6.3	5484	727357000	0.12	514	-	144	(**WMATA:** 80, D3, D1, D4, S4, S9, D6, 34, 54, 52, 16Y, P19, P17, 42, G8, X2, W13, 63; **DCC:** EW, WAM; **MTA:** 901, 902, 904, 905, 909, 915, 950 **LT:** 4, 6, 7, 9, 15) ***113,696***
4	All	11th Street NW	I Street	F Street	4102	1.6	5199	18353306	0.27	302	-	38	(**WMATA:** 64, S4, P19, P17, 63, S2, 42, W13, P6; **MTA:** 904, **PRTC:**CO, X50) ***35,040***
5	All	*K Street*	*17th*	*Connecticut*	3637	8.9	3637	732173170	0.03	535	-	119	(**WMATA:** S1, 3Y, L2, 80, D3, N2, D1, D5, D6, 68, N6, 16Y, N4; **DCC**: EW; **MTA:** 901, 902, 904, 905, 909, 950; **LT:** 4, 6, 7, 15) ***34,626***
6	All	M Street - Pennsylvania Avenue	Wisconsin Avenue	Washington Circle	3420	6.0	4098	724215212	0.78	401	-	-	(**WMATA:** 32, 38B, 36, D5, 31, 36, D51; **DCC:** EW, DGR) ***29,599***

Regional Bus Speeds



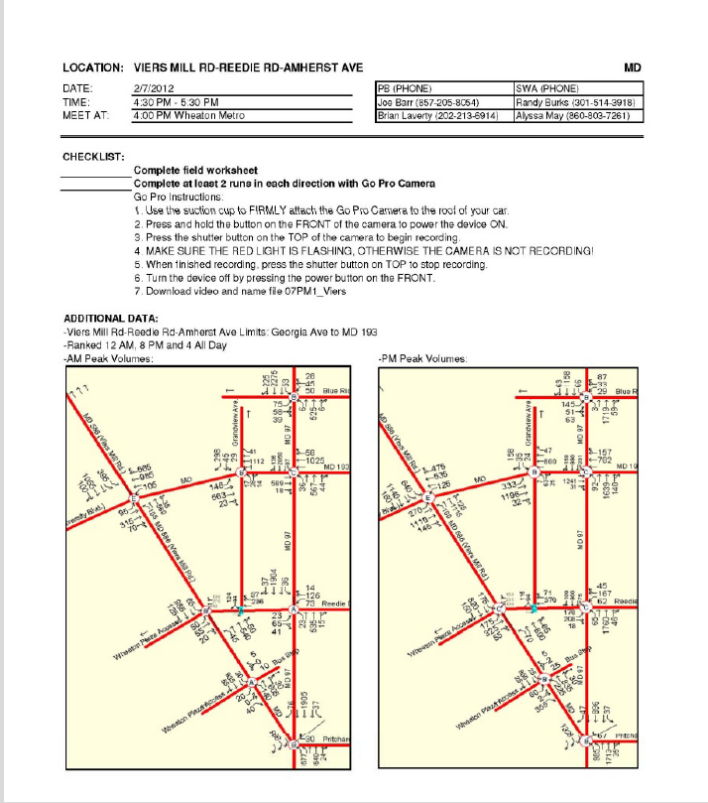
Jurisdiction	Average Speed (Regional Hot Spots Study)	Average Speed (WMATA Hot Spots Study)
District of Columbia	9.8 mph	8.8 mph
Maryland	17.1 mph	13.5 mph
Virginia	18.1 mph	12.7 mph
Regionwide	16.8 mph	11.5 mph

Figure 6: Regionwide Hot Spot Score – All Day



Task 3 – Field Verification Process

- Initial desktop inventory and traffic assessment
  - Turning movements
  - Intersection level of service
  - Lane configuration
  - Bus stop locations
  - Bus routings
- Data collection worksheet
  - Sidewalks, curb ramps, and crosswalks
  - Traffic and pedestrian signals
  - Bike lanes
  - Parking restrictions
  - Roadway width
  - Posted speed limits
- Identified critical peak period for hot spot site evaluation



LOCATION: VIERS MILL RD-REEDIE RD-AMHERST AVE — MD

		PB (PHONE)	SWA (PHONE)
DATE:	2/7/2012		
TIME:	4:30 PM - 5:30 PM	Joe Barr (857-205-8054)	Randy Burks (301-514-3918)
MEET AT:	4:00 PM Wheaton Metro	Brian Laverty (202-213-6914)	Alyssa May (860-803-7261)

CHECKLIST:

_____ **Complete field worksheet**
_____ **Complete at leaet 2 runs in each direction with Go Pro Camera**

Go Pro Instructions:
1. Use the suction cup to FIRMLY attach the Go Pro Camera to the roof of your car.
2. Press and hold the button on the FRONT of the camera to power the device ON.
3. Press the shutter button on the TOP of the camera to begin recording.
4. MAKE SURE THE RED LIGHT IS FLASHING, OTHERWISE THE CAMERA IS NOT RECORDING!
5. When finished recording, press the shutter button on TOP to stop recording.
6. Turn the device off by pressing the power button on the FRONT.
7. Download video and name file 07PM1_Viers

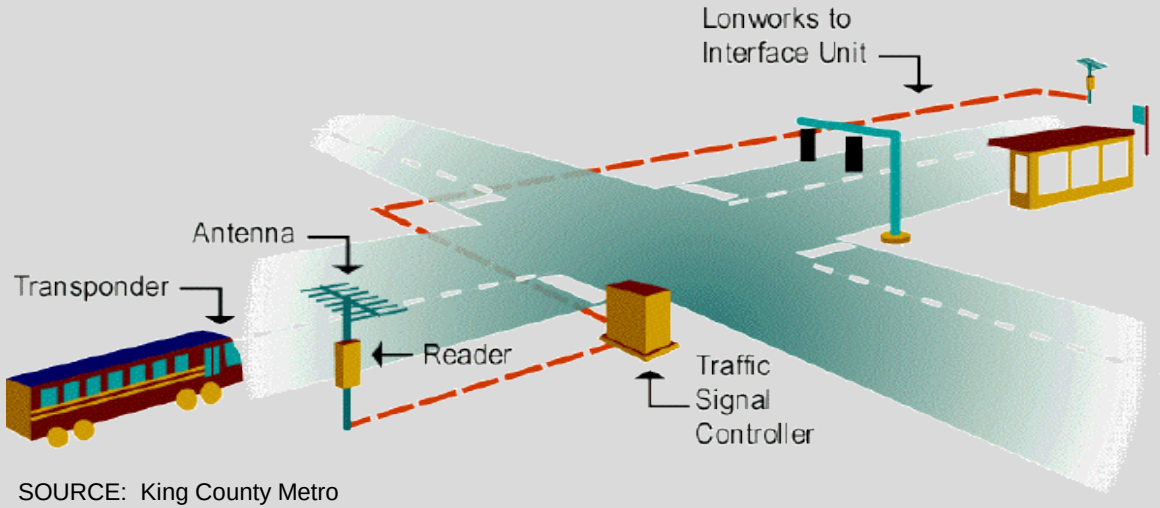
ADDITIONAL DATA:
-Viers Mill Rd-Reedie Rd-Amherst Ave Limits: Georgia Ave to MD 193
-Ranked 12 AM, 8 PM and 4 All Day
-AM Peak Volumes:

-PM Peak Volumes:

Identify Bus Priority Treatments

- Corridor/Segment-Level
  - Exclusive Lanes
  - Signal priority – system application (TSP)
  - Passive Signal Coordination
  - Stop Consolidation
- Intersection-Level
  - Isolated TSP
  - Queue-jump signal
  - Bypass Lane
  - Curb Extension
  - Stop Relocation

SOURCE: TCRP Report 118 (5)



SOURCE: King County Metro

Task 4 – Concept Plan Development

- Concept Layouts with infrastructure improvements
  - Six locations (two each: DC, MD, VA)
  - Minimal or no ROW impact
  - 15% level of design
  - Use of scaled aerial photography
- Capital Cost Estimates
  - Limited number of quantities
  - Prior approval of unit costs
  - Could translate to FTA SCC format

Task 4 – Impact Assessment

- Transit Operations
  - Unit travel time savings
  - On-time performance
  - Estimated bus operating cost savings – 5 & 20 years
  - MWCOG PCN Study and TCRP Synthesis 83
- Traffic Operations
  - Intersection LOS
  - Arterial Speeds
  - Queues
- Before and after impact summary

Further Application

- The findings of this study offer both:
  - For some locations, an independent assessment of potential improvements and the associated costs and impacts.
  - More broadly, the study provides a general process for assessing bus hot spots and their potential costs and impacts that can be used for future efforts.
- Task #2 developed a list of “Top 15” Hot Spots for DC, MD, and VA (AM, PM, and all-day)
  - Prioritized locations provide an opportunity for further analysis of potential bus priority treatments by jurisdictions.

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TIGER – Transit Signal Priority (TSP) on Bus Corridors

TSP Locations (228 total)

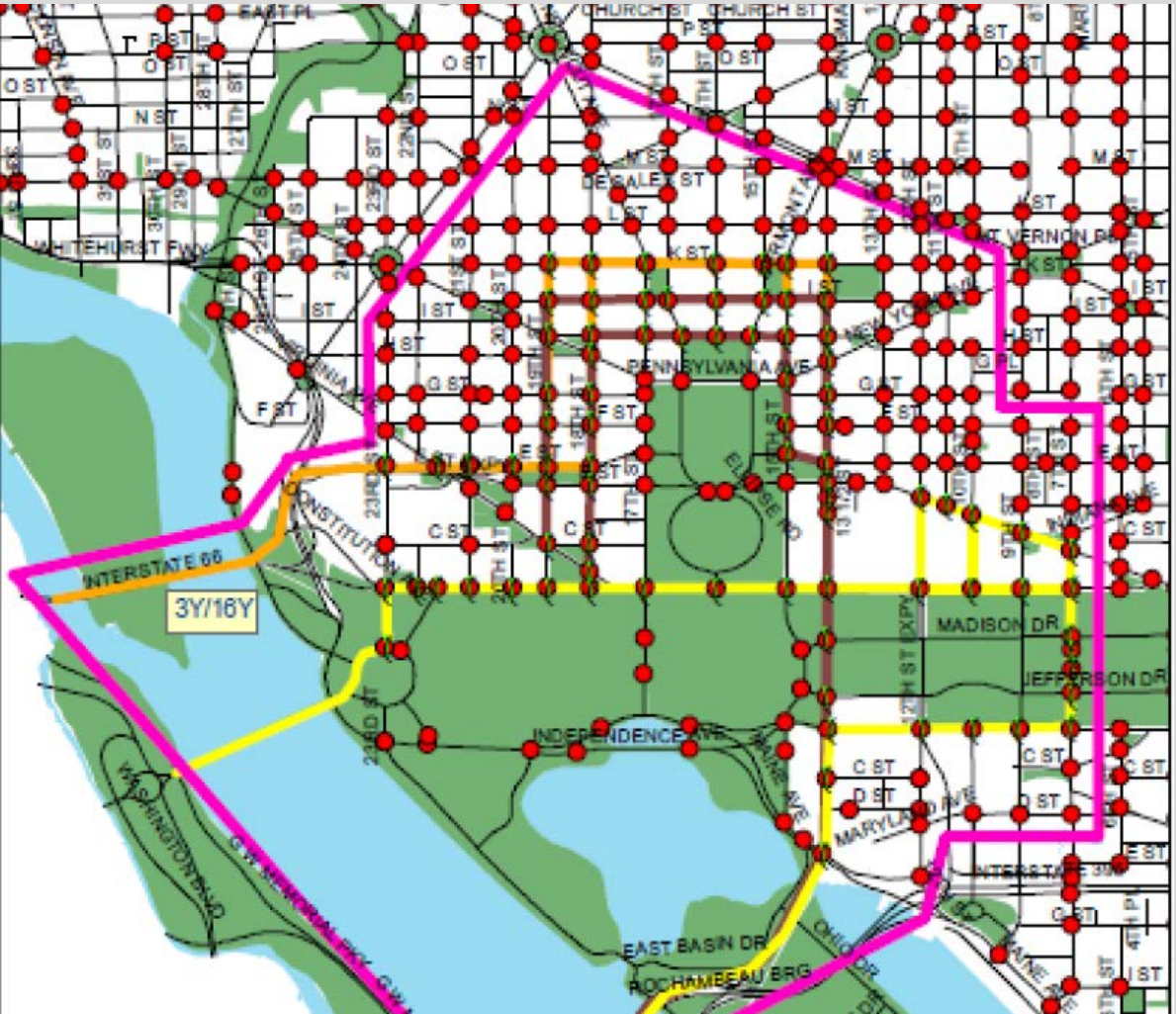
- 16th Street
- Georgia Avenue
- Wisconsin Avenue Van Dorn / Beauregard
- VA-7 / Leesburg Pike Install September 2015 – July 2016

Funding: $5.2M

*- Additional locations may be added in the District.

TIGER - Signal Optimization & Prioritization

TR Bridge and 14th Street Bridge to K Street



- **208 Traffic Signals in Downtown Core were improved**
- **68 signals to be both optimized and prioritized.**

April 2014 – June 2016

Funding: $3.2M

Applying Hot Spots to TIGER

- AVL data can be used to access the improvements associated with TIGER bus priority projects throughout the region
  - Before and After bus speeds
  - On-time performance by route or in a corridor
  - Illustrating the number of bus trips and passengers benefitting from priority treatments
    - Person hours of delay saved

Next Steps

- Improvements in data collection and reporting should make the process by which hot spots are identified easier
  - More fleets with AVL
  - Easier output and analysis of location and speed
- Combining bus speed with bus density provides a useful tool for identifying the locations with the highest need for bus priority
  - By agency or jurisdiction with regular updates
- Combining this data with vehicle loads based on stop-level ridership presents a powerful illustration of both person delay and the potential reduction in person delay with a given improvement
- Supports shift to using person-throughput as a performance metric for congested locations