Making bicycles and pedestrians count:

Arlington County's bicycle and pedestrian counting project

ARLINGTON
VIRGINIA

Department of Environmental Services

March 15, 2011

The plan of this presentation

- Why?
  - What's at stake
- How?
  - Three-plus versions of how
- So what?
  - How to use what we learn

Contested space

A - TRAFFIC AGENT LANE. A personal walkway for those peripatetic squads of uniformed men and women sworn to wander the streets and catch the culprits who get the tickets that pay for the uniformed men and women.

B - SKATEBOARD/SCOOTER/SEGWAY LANE frees up sidewalk space for runaway taxicabs, double-parked U.P.S. and FedEx trucks, outdoor restaurant seating, etc.

C - BRIDLE LANE brings new hope to Manhattan's imperiled equestrian industry.

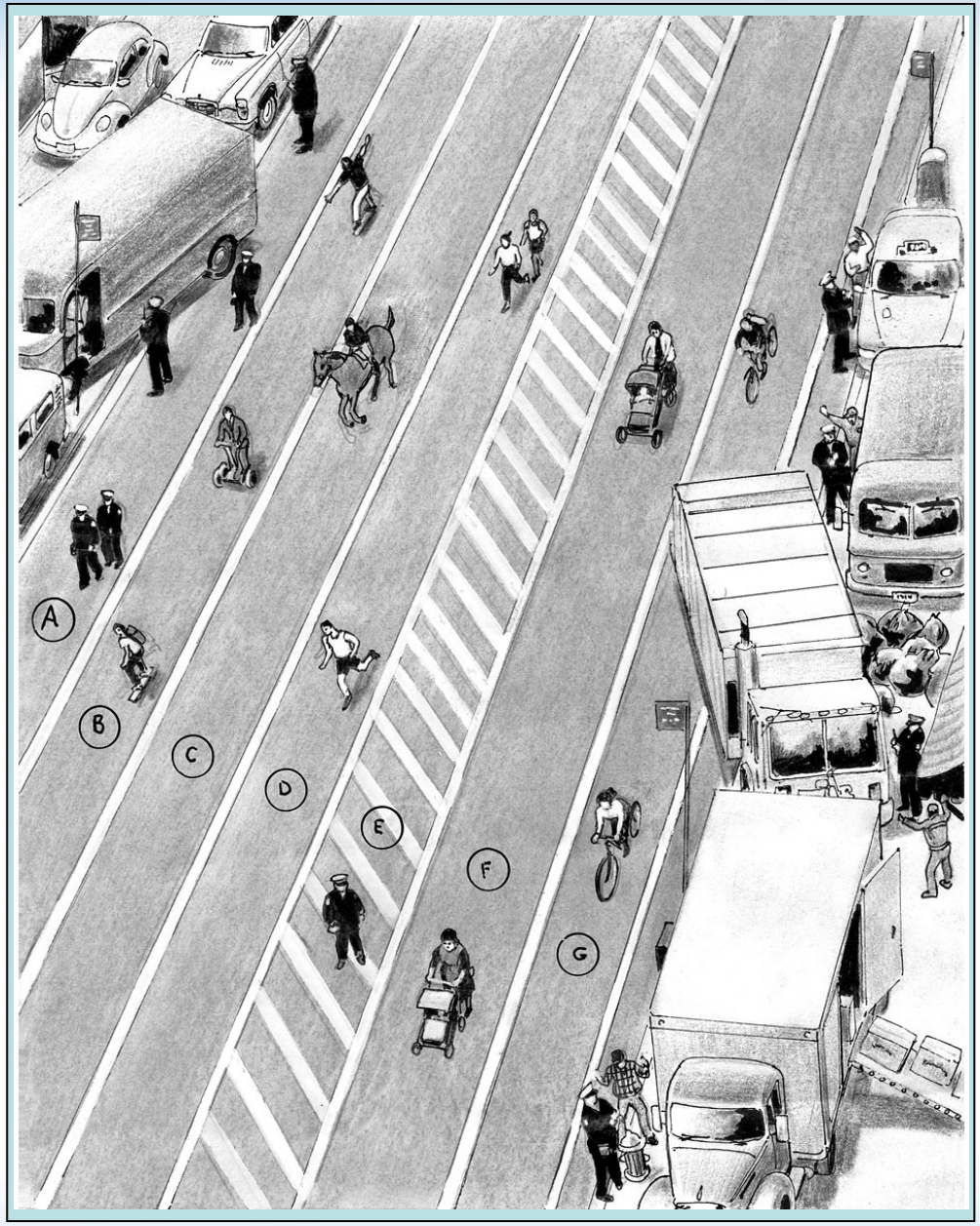
D - RUNNER/JOGGER LANE will ease foot-traffic congestion in Central Park, Riverside Park and other open spaces. ($65 fine for running/jogging in the wrong direction.)

E - PROHIBITED LANE. A revenue-bonanza no man's land with no purpose except to slap the unwary with a $95 fine.

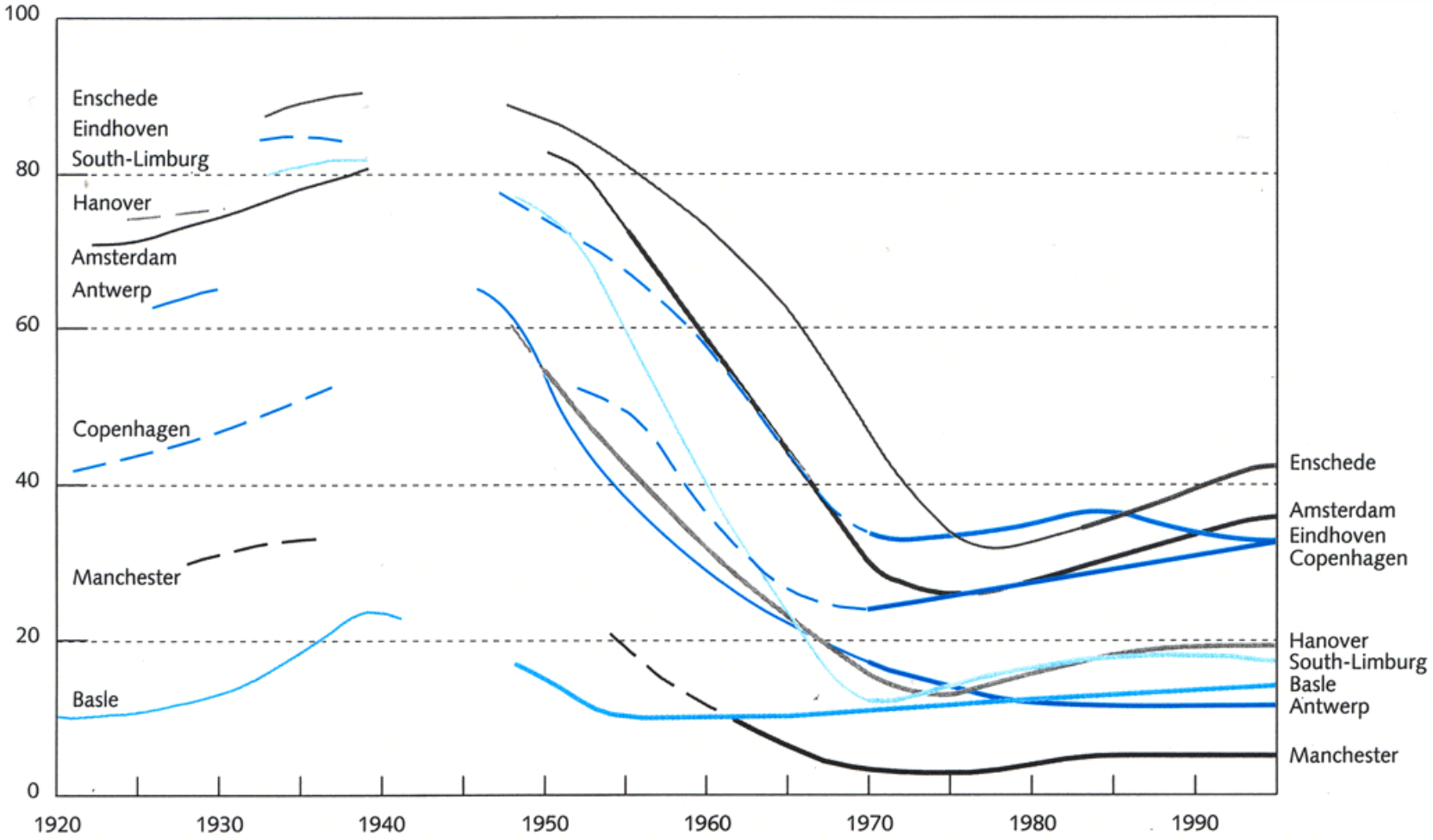
F - BABY STROLLER LANE. Those clusters of gabbing pram-pushers can at last roam free without blocking pedestrians. (Unoccupied strollers subject to $65 fine.)*

G - BICYCLE LANE. As many as ***seven cyclists per hour*** are expected to exploit this lane.

Apologies to Bruce McCall 12.18.2010 NYT



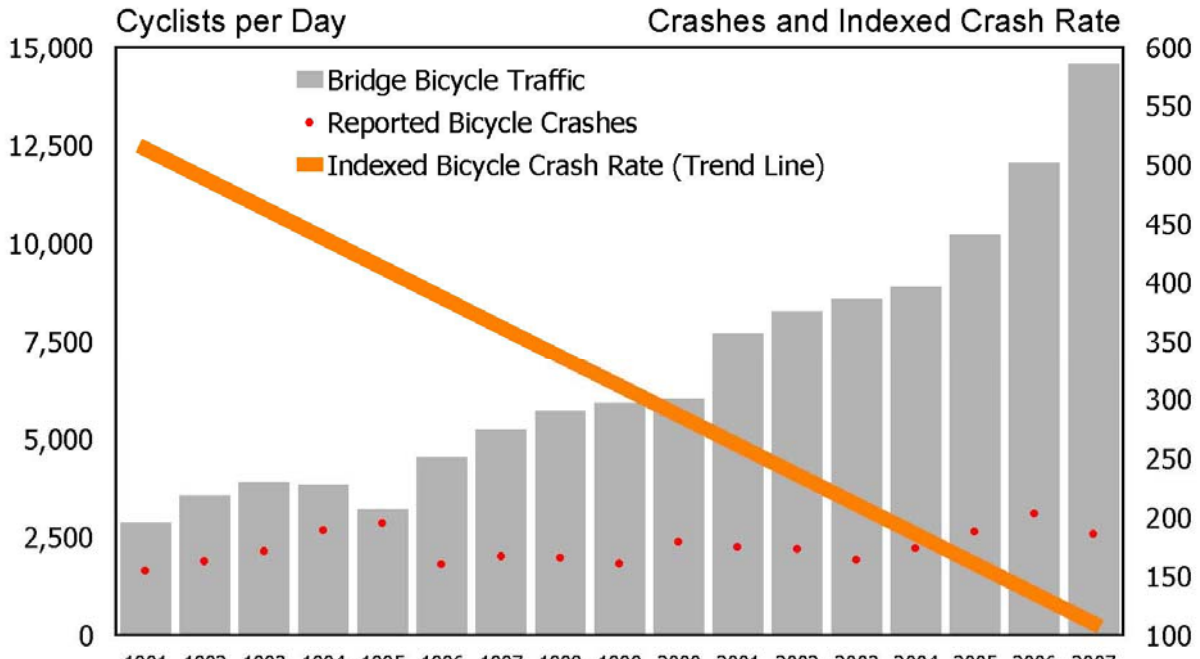
History



Reconstructed trend lines of the bicycle share in the total number of car, bicycle, motoped and public transportation trips in nine West European Cities, 1920-1995 (in%)(Source: A.A. Albert de la Bruheze and F.C.A Veraart, 1999: 34)

Because Portland does it ...

Combined Bicycle Traffic over Four Main Portland Bicycle Bridges Juxtaposed with Bicycle Crashes



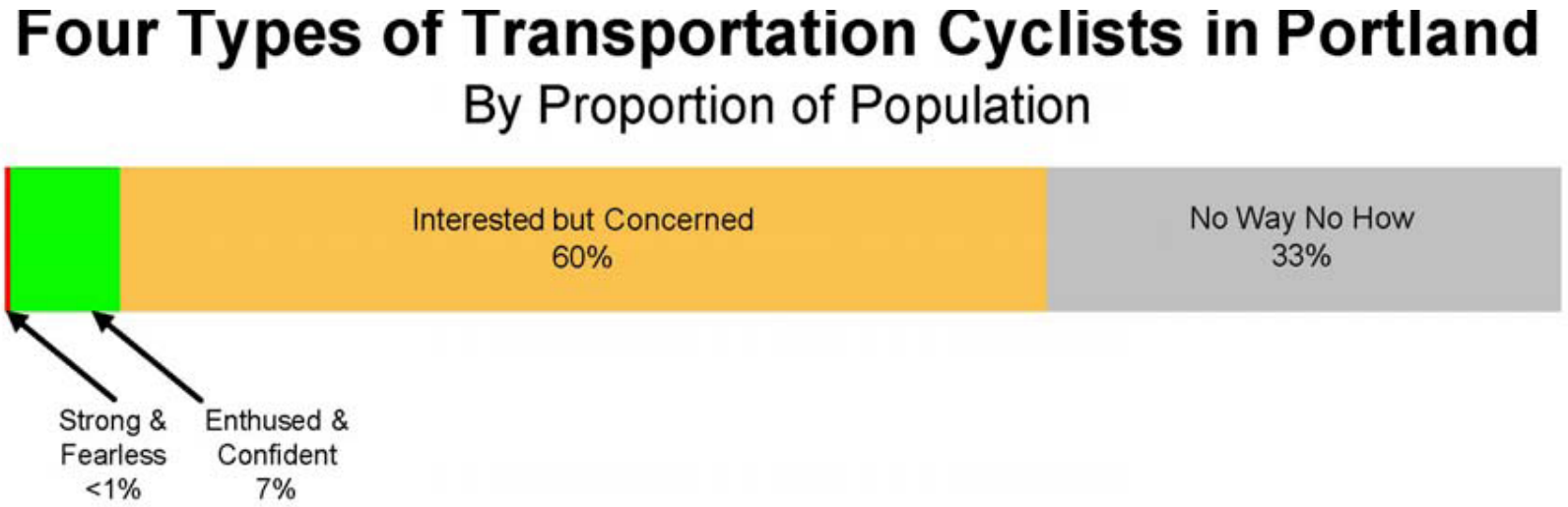
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bridge Bicycle Traffic	2,850	3,555	3,885	3,830	3,207	4,520	5,225	5,690	5,910	6,015	7,686	8,250	8,562	8,875	10,192	12,046	14,563
Reported Bicycle Crashes	155	163	171	189	195	160	167	166	161	179	175	173	164	174	188	203	186
Indexed Bicycle Crash Rate (Trend Line)	544	459	440	493	514	354	320	292	272	298	230	210	192	196	184	168	128
Bicycle Fatalities	2	0	4	3	2	1	5	3	0	0	5	0	4	1	4	0	6

Year

Extrapolated from peak period counts

"Crash Rate" represents an indexing of annual reported crashes to daily bicycle trips across the four main bicycle bridges.

Which helped identify …



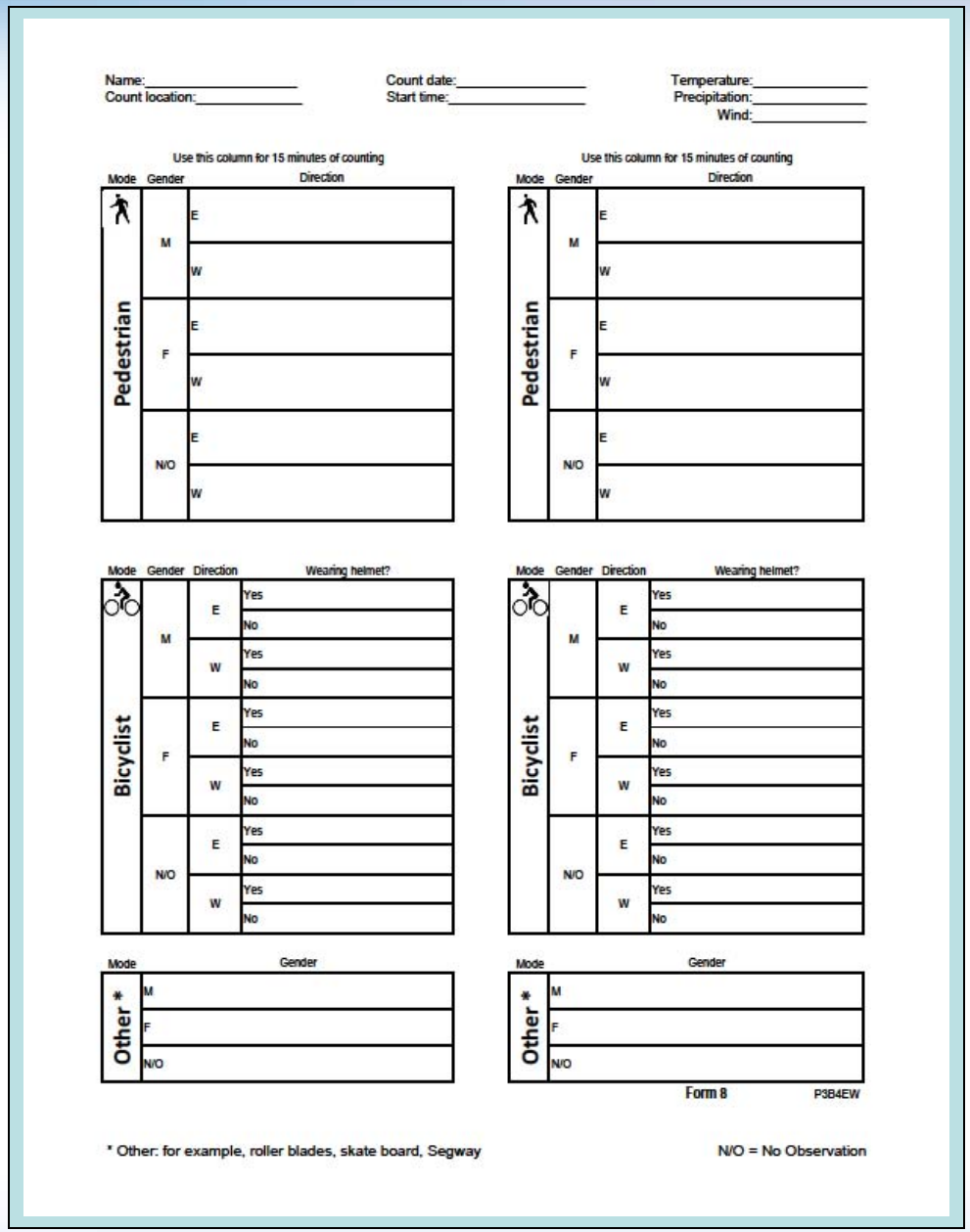
This typology was developed using professional knowledge and experience in a field where data is woefully inadequate. The analysis was initially vetted with many professionals in the field, representing hundreds of years of bicycle planning, policy, and operational experience. So far, this typology has been supported by all available data that has since been generated regarding either bicycle use or attitudes toward bicycling.

This categorization remains relevant and supported. It is fundamental to understanding both the market for increasing bicycle transportation and what needs to be undertaken to cater to them… – Roger Geller

How #1: Manual counts

- NBPD: joint ITE / Alta initiative
- Arlington supports this effort, with modifications
- We have so far carried out nine large seasonal volunteer counts (100+ vols)
- We are building a database to allow for rich analysis of the compiled data
- Adding questions to a resident survey (ACCS)

Manual count forms



Name:_____ Count date:_____ Temperature:_____
Count location:_____ Start time:_____ Precipitation:_____
Wind:_____

Use this column for 15 minutes of counting

Mode	Gender	Direction
Pedestrian	M	E
		W
	F	E
		W
	N/O	E
		W

Use this column for 15 minutes of counting

Mode	Gender	Direction
Pedestrian	M	E
		W
	F	E
		W
	N/O	E
		W

Mode	Gender	Direction	Wearing helmet?
Bicyclist	M	E	Yes
			No
		W	Yes
			No
	F	E	Yes
			No
		W	Yes
			No
	N/O	E	Yes
			No
		W	Yes
			No

Mode	Gender	Direction	Wearing helmet?
Bicyclist	M	E	Yes
			No
		W	Yes
			No
	F	E	Yes
			No
		W	Yes
			No
	N/O	E	Yes
			No
		W	Yes
			No

Mode	Gender
Other *	M
	F
	N/O

Mode	Gender
Other *	M
	F
	N/O

Form 8 P3B4EW

* Other: for example, roller blades, skate board, Segway

N/O = No Observation

Compiled first order results

Arlington Bike-Ped Count Results March, 2010	Location #	Multiple "legs"		Thursday, March 11th 7-9 AM		Thursday, March 11th 4-6 PM		Saturday, March 13th 12-2 PM		Notes:
										March 13 was very windy and wet
Shared Use Paths				Bicyclists	Pedestrians	Bicyclists	Pedestrians	Bicyclists	Pedestrians	
W&OD trail at East Falls Church (just W of Lee Hwy and Pfx Dr)	A1		FINAL RESULTS -- March 2010	95	55	139	118			counter did not show on Sat.
W&OD trail below Patrick Henry Dr. (three-way intersection at Custis split)	A2	*		150	87	209	212			
W&OD trail just N of Columbia Pike	A3			41	36	90	109	10	51	
Custis Trail split (three way intersection nr I-66, George Mason, and 10th St N)	A4	*		159	113	135	147	11	75	
Custis Trail at Lee Hwy. & Lynn St. (approach to Mt. Vernon Trail)	A5			183	79	170	132	13	65	
Shirlington bike/ped bridge over I-395	A6			8	34	8	67	2	38	
Four Mile Run Trail at S Eads St. (nr water treatment plant)	A7	*		84	30	127	80	13	31	
Four Mile Run Trail at rest area near 27th Road South	A8	(location moved)		68	41	86	67	17	24	*auto counter location
W&OD Trail at Shirlington Road	A9	(location moved)		25	19	40	49	5	21	
Custis Trail at 3.5 mile marker (near Troy and 20th Rd N)	A10	(new location)		189	68	156	83	8	71	*auto counter location
Urban sidewalks										
Wilson Blvd. at Ft. Myer Dr. (N side of Wilson nr Rosslyn Metro)	B1			18	1043	6	2058	1	529	Thurs. PM start at 4:07
Clarendon Blvd. at N Fillmore St. (S side sidewalk w bike lane nr Clarendon Commons)	B2			23	111	8	653	2	901	Thurs AM peds seem low
Fairfax Dr. between N Taylor St. and N Stuart St. (S side sidewalk w bike lane in Ballston)	B3			24	702	10	734	2	182	
Fairfax Dr. at N. Glebe Rd. (N side of Fairfax, E of Glebe)	B4					34	294			
N Glebe Rd. at Carlin Springs Rd. (entire "T" intersection in Ballston)	B5	*		10	529	20	772	5	394	
N Glebe Rd. at Lee Highway (N side of Lee, E of Glebe)	B6	*								counter did not show on Sat.
Columbia Pike at George Mason Dr. (N side of Col Pike, E of G Mason)	B7	*		9	116	19	247	14	146	Was 3/13 count done on 3/14?
S Eads St. at 23rd St. S (N side of 23rd, W of Eads)	B8	*		14	235					
Crystal Dr at 18th St. S (W side of Crystal, S of 18th, sidewalk w bike lane)	B9	*		62	1461			4	211	
S. Hayes St. at 12th St. S sidewalk w bike lane (E side of Hayes, S of 12th, @ Pentagon City Metro)	B10			1	531					
Bike lanes										
N Quincy St. at 14th St. N (nr. Wash-Lee HS)	C1			18				2		
Wilson / Clarendon Blvds. at Veitch St. N (count both directions from one spot)	C2	*		54		70		8		
Williamsburg Blvd. at Little Falls Rd. (entire three-way intersection)	C3	*		24		12		0		

Database structure

DRAFT Mode Description Table v2 Jan 14, 2010

BICYCLIST						Bicyclist	1	One-attribute codes are 1-3
	M					Bicyclist Male	4	Two-attribute codes are 4-12
	F					Bicyclist Female	5	"
	?					Bicyclist Indeterminate	6	"
	M	Northbound				Bicyclist Male Northbound	13	Three-attribute codes are 13-42
		Southbound				Bicyclist Male Southbound	14	"
		Eastbound				Bicyclist Male Eastbound	15	"
		Westbound				Bicyclist Male Westbound	16	"
	F	Northbound				Bicyclist Female Northbound	17	"
		Southbound				Bicyclist Female Southbound	18	"
		Eastbound				Bicyclist Female Eastbound	19	"
		Westbound				Bicyclist Female Westbound	20	"
	?	Northbound				Bicyclist Indeterminate Northbound	21	"
		Southbound				Bicyclist Indeterminate Southbound	22	"
		Eastbound				Bicyclist Indeterminate Eastbound	23	"
		Westbound				Bicyclist Indeterminate Westbound	24	"
	M	Helmet				Bicyclist Male with Helmet	25	"
		No Helmet				Bicyclist Male no Helmet	26	"
	F	Helmet				Bicyclist Female with Helmet	27	"
		No Helmet				Bicyclist Female no Helmet	28	"
	?	Helmet				Bicyclist Indeterminate with Helmet	29	"
		No Helmet				Bicyclist Indeterminate no Helmet	30	"
	M		N	Helmet		Bicyclist Male Northbound with Helmet	43	Four-attribute codes are 43-66
				No Helmet		Bicyclist Male Northbound no Helmet	44	"
			S	Helmet		Bicyclist Male Southbound with Helmet	45	"
				No Helmet		Bicyclist Male Southbound no Helmet	46	"
			E	Helmet		Bicyclist Male Eastbound with Helmet	47	"
				No Helmet		Bicyclist Male Eastbound no Helmet	48	"
			W	Helmet		Bicyclist Male Westbound with Helmet	49	"
				No Helmet		Bicyclist Male Westbound no Helmet	50	"
	F		N	Helmet		Bicyclist Female Northbound with Helmet	51	"
				No Helmet		Bicyclist Female Northbound no Helmet	52	"
			S	Helmet		Bicyclist Female Southbound with Helmet	53	"
				No Helmet		Bicyclist Female Southbound no Helmet	54	"
			E	Helmet		Bicyclist Female Eastbound with Helmet	55	"
				No Helmet		Bicyclist Female Eastbound no Helmet	56	"
			W	Helmet		Bicyclist Female Westbound with Helmet	57	"
				No Helmet		Bicyclist Female Westbound no Helmet	58	"
	?		N	Helmet		Bicyclist Indeterminate Northbound with Helmet	59	"
				No Helmet		Bicyclist Indeterminate Northbound no Helmet	60	"
			S	Helmet		Bicyclist Indeterminate Southbound with Helmet	61	"
				No Helmet		Bicyclist Indeterminate Southbound no Helmet	62	"
			E	Helmet		Bicyclist Indeterminate Eastbound with Helmet	63	"
				No Helmet		Bicyclist Indeterminate Eastbound no Helmet	64	"
			W	Helmet		Bicyclist Indeterminate Westbound with Helmet	65	"
				No Helmet		Bicyclist Indeterminate Westbound no Helmet	66	"
PEDESTRIAN						Pedestrian	2	One-attribute codes are 1-3
	M					Pedestrian Male	7	Two-attribute codes are 4-12
	F					Pedestrian Female	8	"
	?					Pedestrian Indeterminate	9	"
	M	N				Pedestrian Male Northbound	31	Three-attribute codes are 13-42
		S				Pedestrian Male Southbound	32	"
		E				Pedestrian Male Eastbound	33	"
		W				Pedestrian Male Westbound	34	"
	F	N				Pedestrian Female Northbound	35	"
		S				Pedestrian Female Southbound	36	"
		E				Pedestrian Female Eastbound	37	"
		W				Pedestrian Female Westbound	38	"
	?	N				Pedestrian Indeterminate Northbound	39	"
		S				Pedestrian Indeterminate Southbound	40	"
		E				Pedestrian Indeterminate Eastbound	41	"
		W				Pedestrian Indeterminate Westbound	42	"
OTHER						Other Mode	3	One-attribute codes are 1-3
	M					Other Mode Male	10	Two-attribute codes are 4-12
	F					Other Mode Female	11	"
	?					Other Mode Indeterminate	12	"

DRAFT Mode Description Pivot Table Feb 02, 2010

Mode code (key)	Number of attributes	Long description	Mode table attribute	Gender table attribute	Direction table attribute	Helmet table attribute
1	One-attribute codes	Bicyclist	B	null	null	null
2	"	Pedestrian	P	null	null	null
3	"	Other Mode	O	null	null	null
4	Two-attribute codes	Bicyclist Male	B	M	null	null
5	"	Bicyclist Female	B	F	null	null
6	"	Bicyclist Indeterminate	B	I	null	null
7	"	Pedestrian Male	P	M	null	null
8	"	Pedestrian Female	P	F	null	null
9	"	Pedestrian Indeterminate	P	I	null	null
10	"	Other Mode Male	O	M	null	null
11	"	Other Mode Female	O	F	null	null
12	"	Other Mode Indeterminate	O	I	null	null
13	Three-attribute codes	Bicyclist Male Northbound	B	M	N	null
14	"	Bicyclist Male Southbound	B	M	S	null
15	"	Bicyclist Male Eastbound	B	M	E	null
16	"	Bicyclist Male Westbound	B	M	W	null
17	"	Bicyclist Female Northbound	B	F	N	null
18	"	Bicyclist Female Southbound	B	F	S	null
19	"	Bicyclist Female Eastbound	B	F	E	null
20	"	Bicyclist Female Westbound	B	F	W	null
21	"	Bicyclist Indeterminate Northbound	B	I	N	null
22	"	Bicyclist Indeterminate Southbound	B	I	S	null
23	"	Bicyclist Indeterminate Eastbound	B	I	E	null
24	"	Bicyclist Indeterminate Westbound	B	I	W	null
25	"	Bicyclist Male with Helmet	B	M	null	Y
26	"	Bicyclist Male no Helmet	B	M	null	N
27	"	Bicyclist Female with Helmet	B	F	null	Y
28	"	Bicyclist Female no Helmet	B	F	null	N
29	"	Bicyclist Indeterminate with Helmet	B	I	null	Y
30	"	Bicyclist Indeterminate no Helmet	B	I	null	N
31	"	Pedestrian Male Northbound	P	M	N	null
32	"	Pedestrian Male Southbound	P	M	S	null
33	"	Pedestrian Male Eastbound	P	M	E	null
34	"	Pedestrian Male Westbound	P	M	W	null
35	"	Pedestrian Female Northbound	P	F	N	null
36	"	Pedestrian Female Southbound	P	F	S	null
37	"	Pedestrian Female Eastbound	P	F	E	null
38	"	Pedestrian Female Westbound	P	F	W	null
39	"	Pedestrian Indeterminate Northbound	P	I	N	null
40	"	Pedestrian Indeterminate Southbound	P	I	S	null
41	"	Pedestrian Indeterminate Eastbound	P	I	E	null
42	"	Pedestrian Indeterminate Westbound	P	I	W	null
43	Four-attribute codes	Bicyclist Male Northbound with Helmet	B	M	N	Y
44	"	Bicyclist Male Northbound no Helmet	B	M	N	N
45	"	Bicyclist Male Southbound with Helmet	B	M	S	Y
46	"	Bicyclist Male Southbound no Helmet	B	M	S	N
47	"	Bicyclist Male Eastbound with Helmet	B	M	E	Y
48	"	Bicyclist Male Eastbound no Helmet	B	M	E	N
49	"	Bicyclist Male Westbound with Helmet	B	M	W	Y
50	"	Bicyclist Male Westbound no Helmet	B	M	W	N
51	"	Bicyclist Female Northbound with Helmet	B	F	N	Y
52	"	Bicyclist Female Northbound no Helmet	B	F	N	N
53	"	Bicyclist Female Southbound with Helmet	B	F	S	Y
54	"	Bicyclist Female Southbound no Helmet	B	F	S	N
55	"	Bicyclist Female Eastbound with Helmet	B	F	E	Y
56	"	Bicyclist Female Eastbound no Helmet	B	F	E	N
57	"	Bicyclist Female Westbound with Helmet	B	F	W	Y
58	"	Bicyclist Female Westbound no Helmet	B	F	W	N
59	"	Bicyclist Indeterminate Northbound with Helmet	B	I	N	Y
60	"	Bicyclist Indeterminate Northbound no Helmet	B	I	N	N
61	"	Bicyclist Indeterminate Southbound with Helmet	B	I	S	Y
62	"	Bicyclist Indeterminate Southbound no Helmet	B	I	S	N
63	"	Bicyclist Indeterminate Eastbound with Helmet	B	I	E	Y
64	"	Bicyclist Indeterminate Eastbound no Helmet	B	I	E	N
65	"	Bicyclist Indeterminate Westbound with Helmet	B	I	W	Y
66	"	Bicyclist Indeterminate Westbound no Helmet	B	I	W	N

How #2: Automatic counting equipment

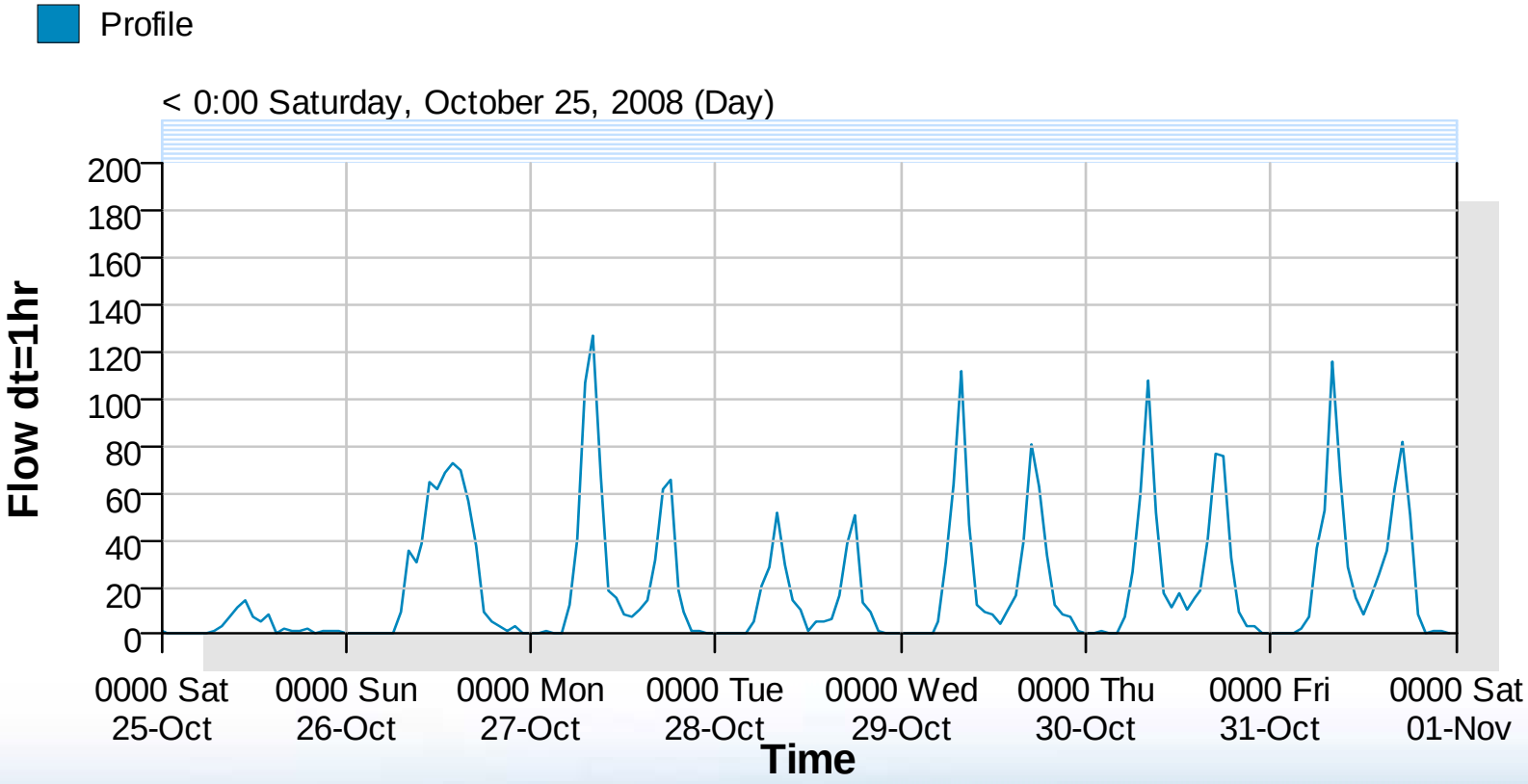
- Tube counters
- Inductive loops
- Passive infrared detection
- Piezo counters

Tubes …

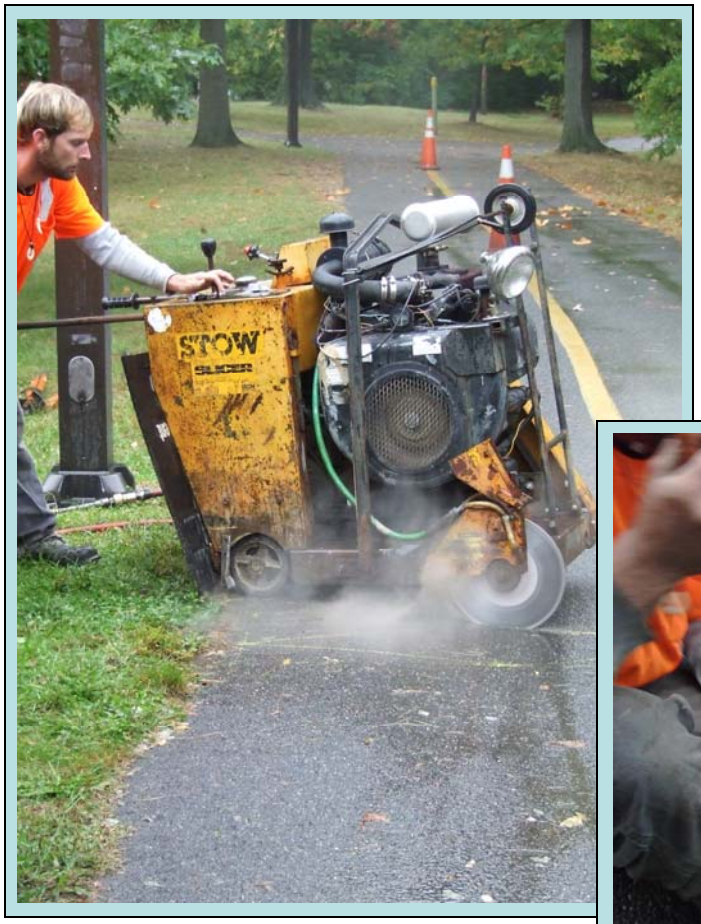
First tube counter results …

Vehicle Flow

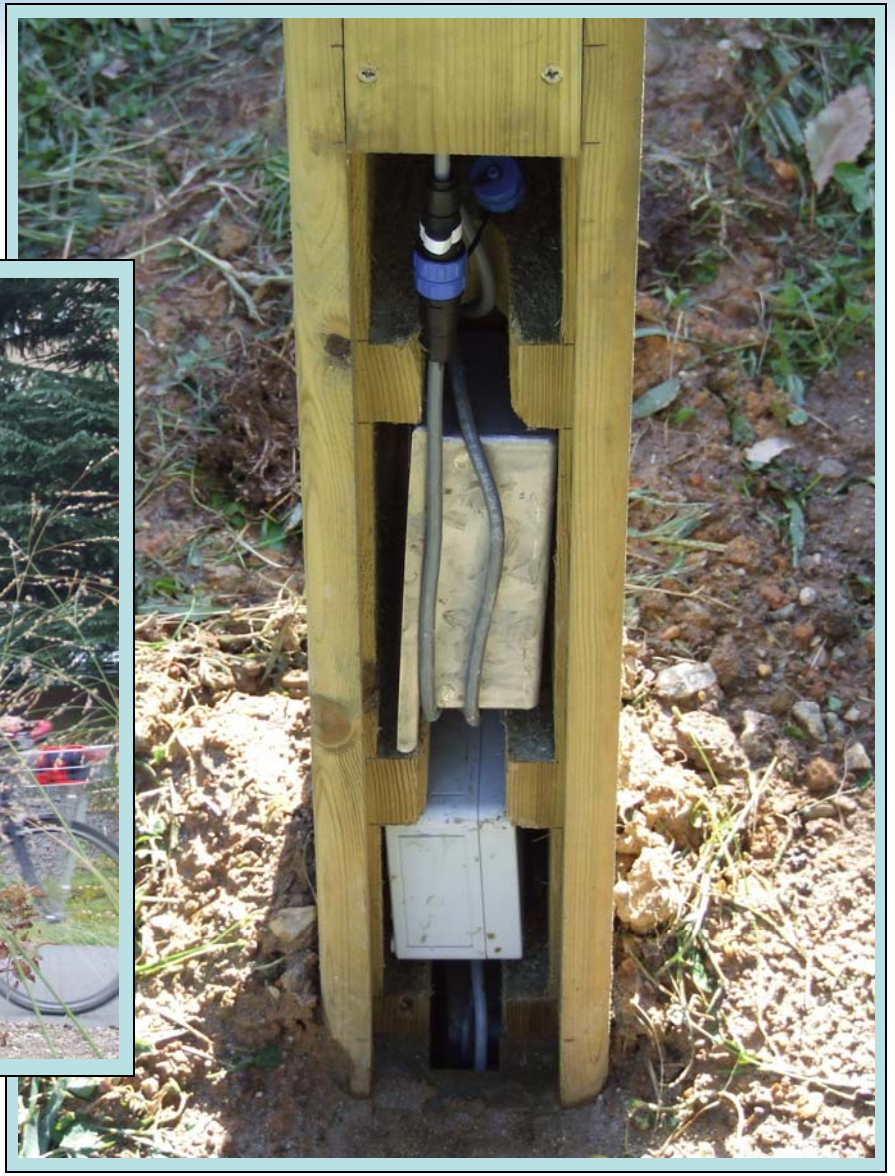
VehicleFlow-85 (Non metric) **Site:**Mile35 Custis Trail.0.0EW
Description: Bike count
Filter time: 0:00 Saturday, October 25, 2008 => 0:00 Saturday, November 01, 2008
Filter: Cls(1 2 3 4) Dir(NESW) Sp(1,100) Headway(>0)
Scheme: Vehicle classification (5720 Cycle)



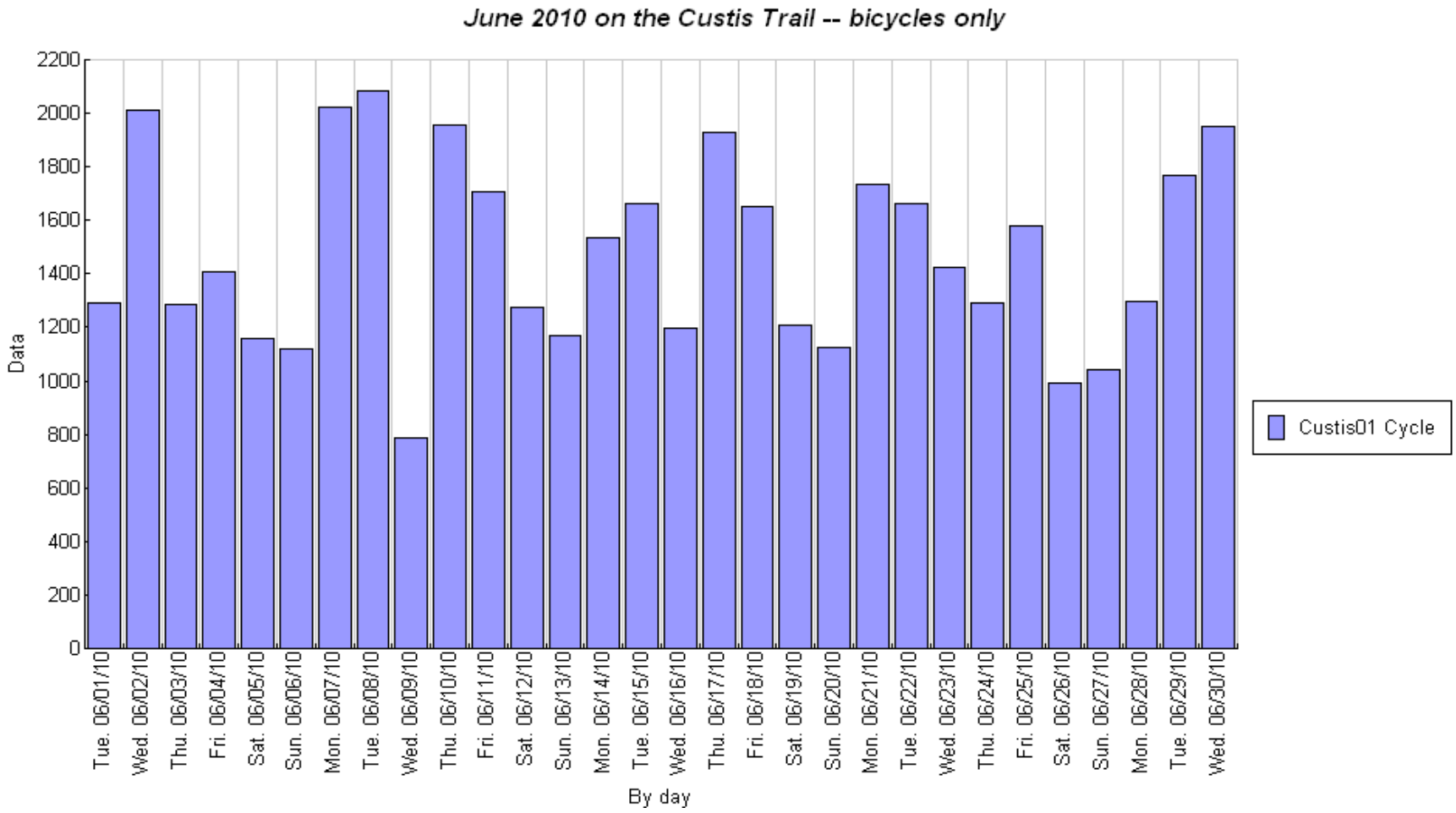
Inductive loops + passive infrared …



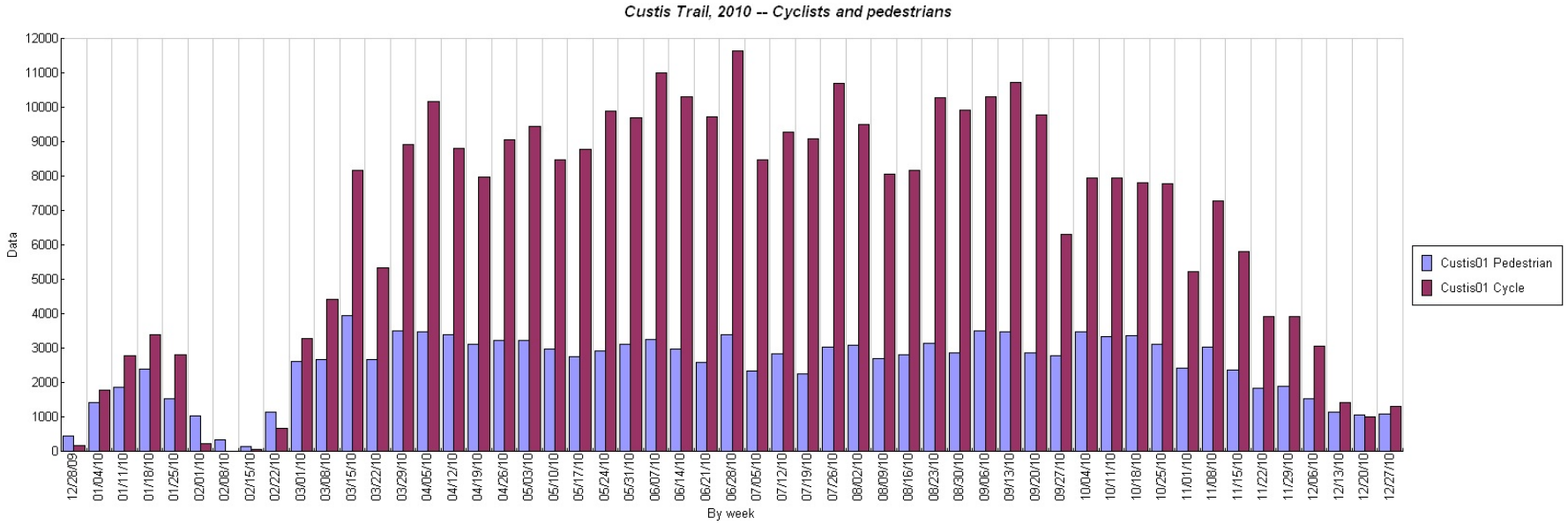
Installation details …



Sample data ...

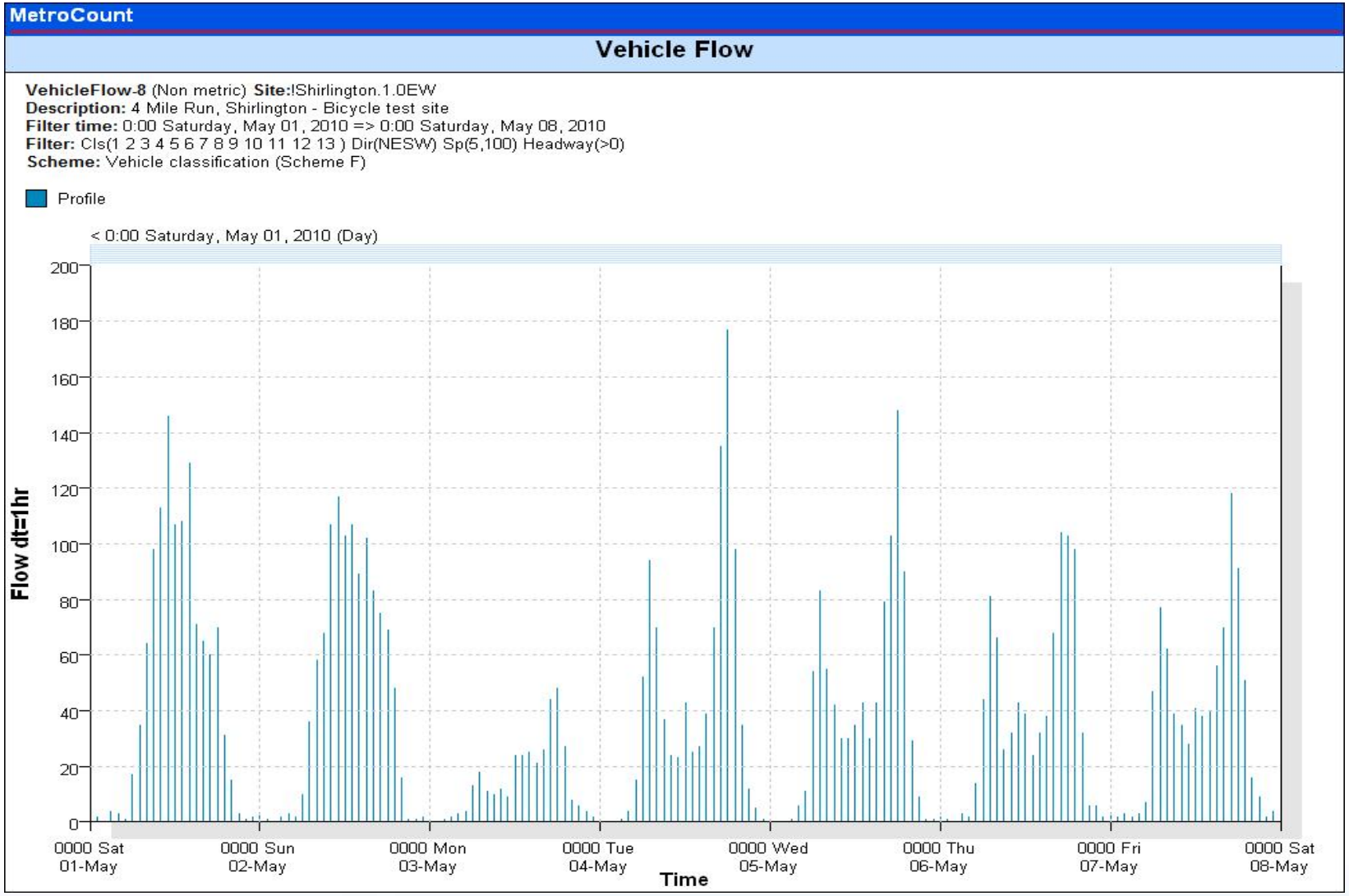

June 2010 on the Custis Trail -- bicycles only
Data
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Tue. 06/01/10
Wed. 06/02/10
Thu. 06/03/10
Fri. 06/04/10
Sat. 06/05/10
Sun. 06/06/10
Mon. 06/07/10
Tue. 06/08/10
Wed. 06/09/10
Thu. 06/10/10
Fri. 06/11/10
Sat. 06/12/10
Sun. 06/13/10
Mon. 06/14/10
Tue. 06/15/10
Wed. 06/16/10
Thu. 06/17/10
Fri. 06/18/10
Sat. 06/19/10
Sun. 06/20/10
Mon. 06/21/10
Tue. 06/22/10
Wed. 06/23/10
Thu. 06/24/10
Fri. 06/25/10
Sat. 06/26/10
Sun. 06/27/10
Mon. 06/28/10
Tue. 06/29/10
Wed. 06/30/10
By day
Custis01 Cycle

A year's worth of data – Custis Trail …

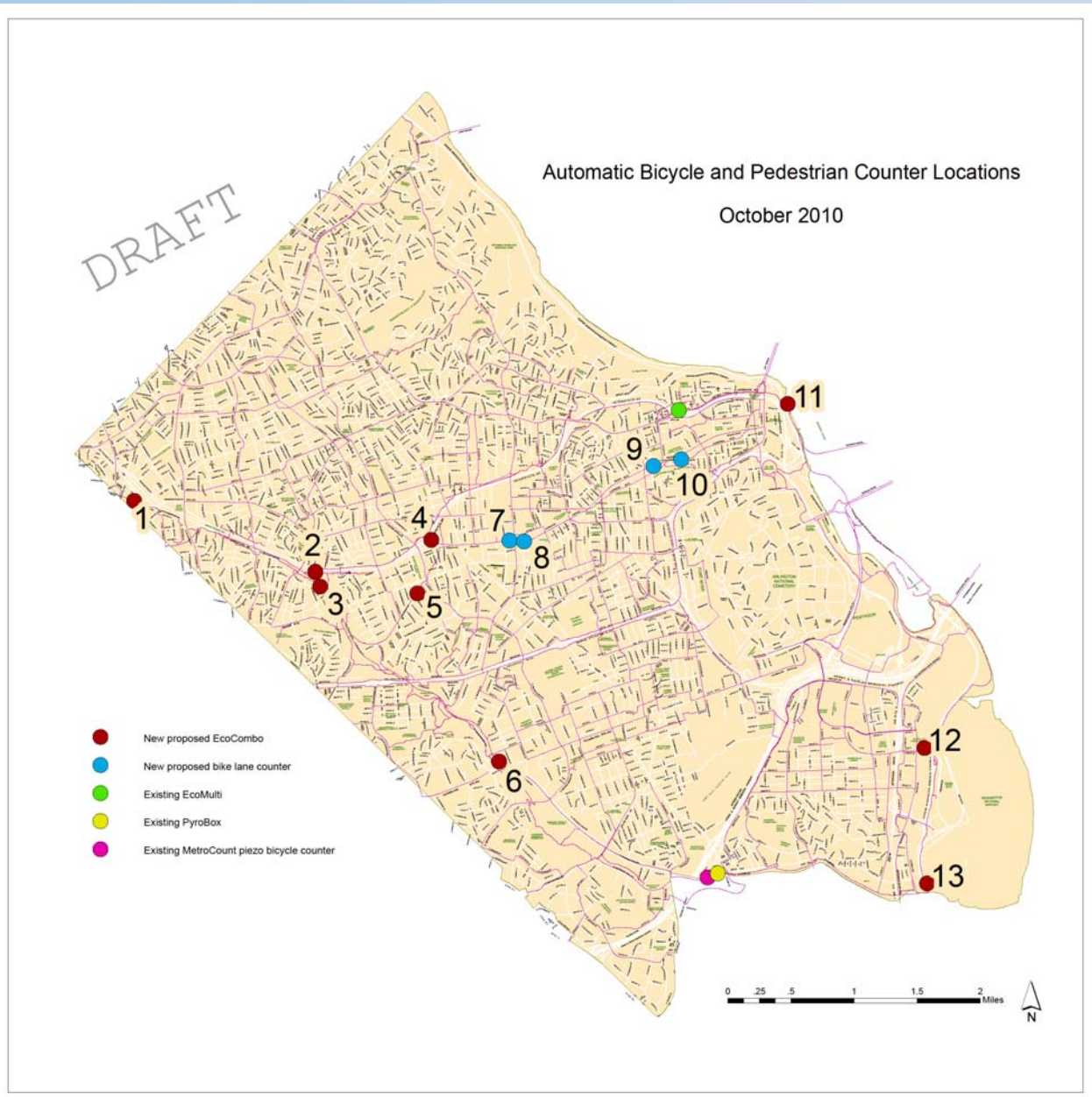


Piezo counting … bicycles only

Piezo data ...

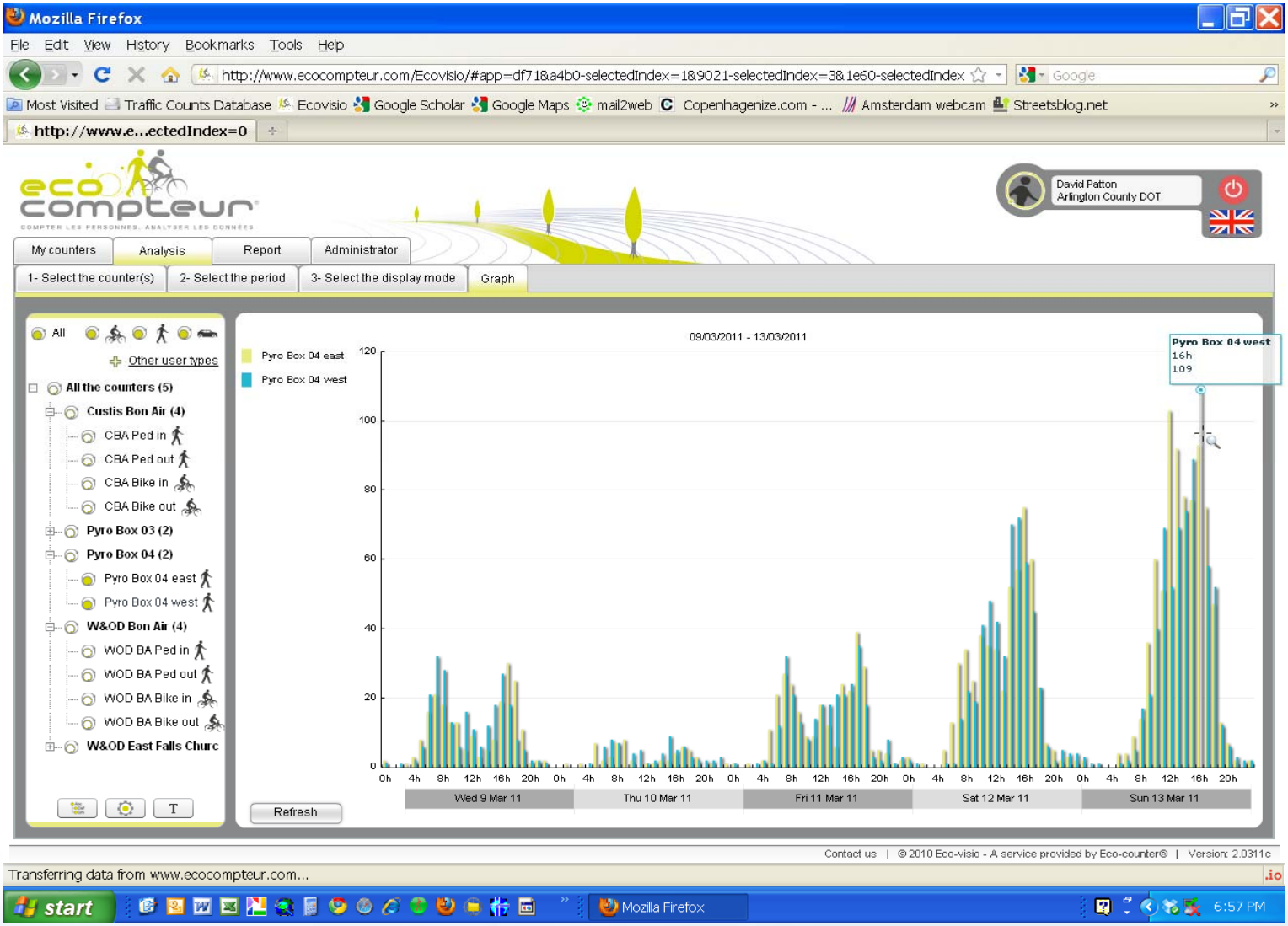

MetroCount
Vehicle Flow
VehicleFlow-8 (Non metric) Site:!Shirlington.1.0EW
Description: 4 Mile Run, Shirlington - Bicycle test site
Filter time: 0:00 Saturday, May 01, 2010 => 0:00 Saturday, May 08, 2010
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12 13) Dir(NESW) Sp(5,100) Headway(>0)
Scheme: Vehicle classification (Scheme F)
Profile
< 0:00 Saturday, May 01, 2010 (Day)
Flow dt=1hr
200
180
160
140
120
100
80
60
40
20
0
0000 Sat 01-May
0000 Sun 02-May
0000 Mon 03-May
0000 Tue 04-May
0000 Wed 05-May
0000 Thu 06-May
0000 Fri 07-May
0000 Sat 08-May
Time

More auto-counters …



A few glitches …

Live demo … screen shot for back-up



Snow what?

Cyclists and pedestrians make up more than 0% of commuters. They deserve more than 0% of the plowing resources.

Cold weather, lack of plowing affects bike commuting - Greater Greater Washington - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://greatergreaterwashington.org/post/8909/cold-weather-lack-of-plowing-affects-bike-commuting/

Most Visited | Traffic Counts Database | Ecovisio | Google Scholar | Google Maps | mail2web | Copenhagenize.com - ... | Amsterdam webcam | Streetsblog.net

Cold weather, lack of plowing...

Greater Greater Washington

The Washington, DC area is great. But it could be **greater**.

Search GGW

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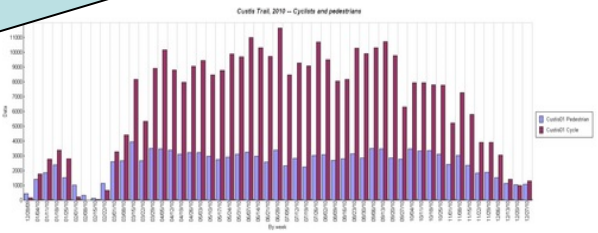
BICYCLING

Cold weather, lack of plowing affects bike commuting

by David C. • January 21, 2011 8:19 am

Automated trail counters ha… accurate count of… cycli… …nter located at the Custis …t the top of the hill, just west of Rosslyn:



There are three interesting things this chart shows.

The winter effect: Winter does cause a sizable drop off in cycling. It's around 70%, as I eyeball it. It's impossible to say if these are evenly dispersed among commuters and recreational cyclists or if the people left in the winter are dedicated commuters, but

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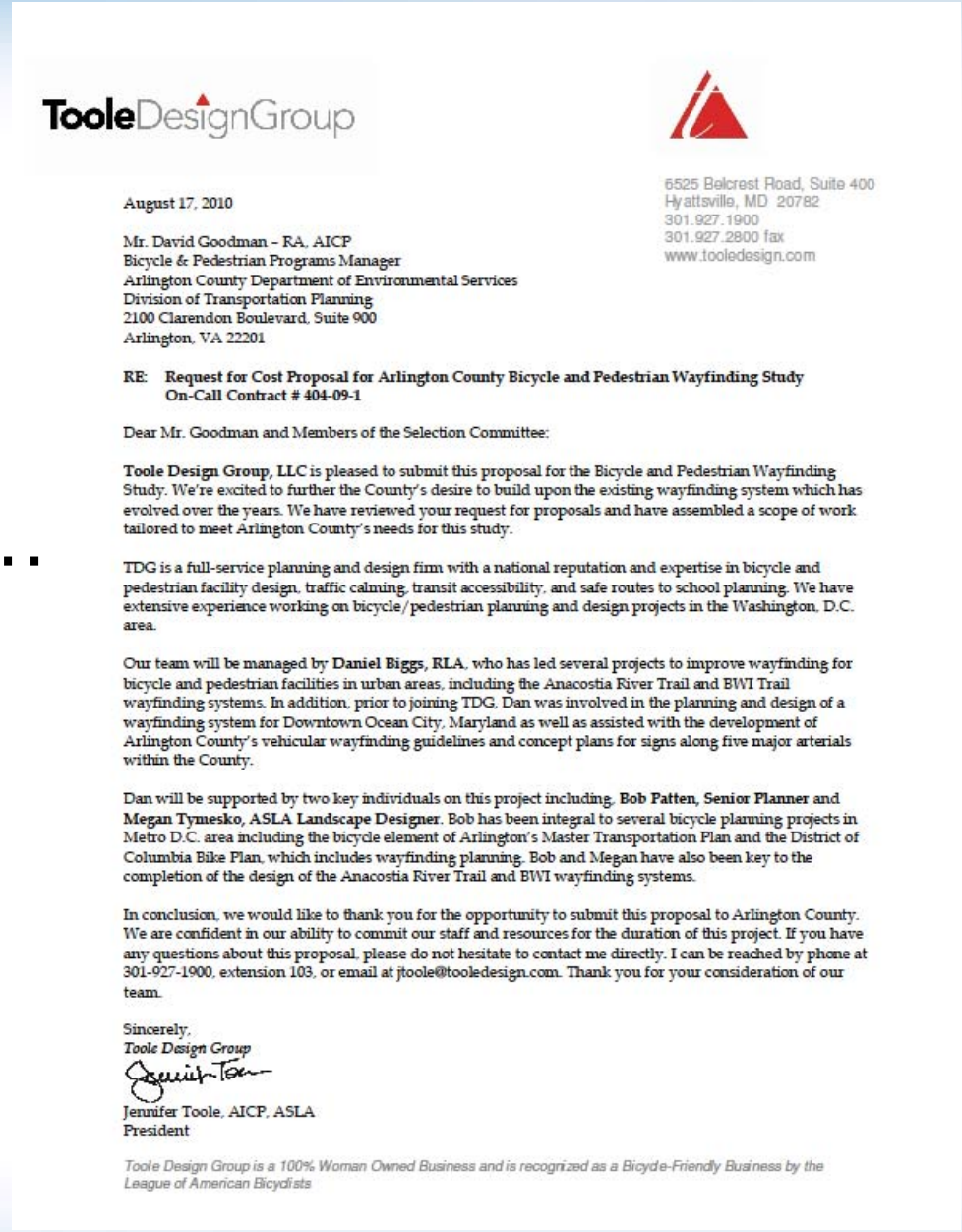
Done

start 9:41 PM

Where to?

Informs wayfinding …



ToolDesignGroup

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August 17, 2010

Mr. David Goodman – RA, AICP
Bicycle & Pedestrian Programs Manager
Arlington County Department of Environmental Services
Division of Transportation Planning
2100 Clarendon Boulevard, Suite 900
Arlington, VA 22201

RE: Request for Cost Proposal for Arlington County Bicycle and Pedestrian Wayfinding Study
On-Call Contract # 404-09-1

Dear Mr. Goodman and Members of the Selection Committee:

Toole Design Group, LLC is pleased to submit this proposal for the Bicycle and Pedestrian Wayfinding Study. We're excited to further the County's desire to build upon the existing wayfinding system which has evolved over the years. We have reviewed your request for proposals and have assembled a scope of work tailored to meet Arlington County's needs for this study.

TDG is a full-service planning and design firm with a national reputation and expertise in bicycle and pedestrian facility design, traffic calming, transit accessibility, and safe routes to school planning. We have extensive experience working on bicycle/pedestrian planning and design projects in the Washington, D.C. area.

Our team will be managed by **Daniel Biggs, RLA**, who has led several projects to improve wayfinding for bicycle and pedestrian facilities in urban areas, including the Anacostia River Trail and BWI Trail wayfinding systems. In addition, prior to joining TDG, Dan was involved in the planning and design of a wayfinding system for Downtown Ocean City, Maryland as well as assisted with the development of Arlington County's vehicular wayfinding guidelines and concept plans for signs along five major arterials within the County.

Dan will be supported by two key individuals on this project including, **Bob Patten, Senior Planner** and **Megan Tymesko, ASLA Landscape Designer**. Bob has been integral to several bicycle planning projects in Metro D.C. area including the bicycle element of Arlington's Master Transportation Plan and the District of Columbia Bike Plan, which includes wayfinding planning. Bob and Megan have also been key to the completion of the design of the Anacostia River Trail and BWI wayfinding systems.

In conclusion, we would like to thank you for the opportunity to submit this proposal to Arlington County. We are confident in our ability to commit our staff and resources for the duration of this project. If you have any questions about this proposal, please do not hesitate to contact me directly. I can be reached by phone at 301-927-1900, extension 103, or email at jtoole@tooledesign.com. Thank you for your consideration of our team.

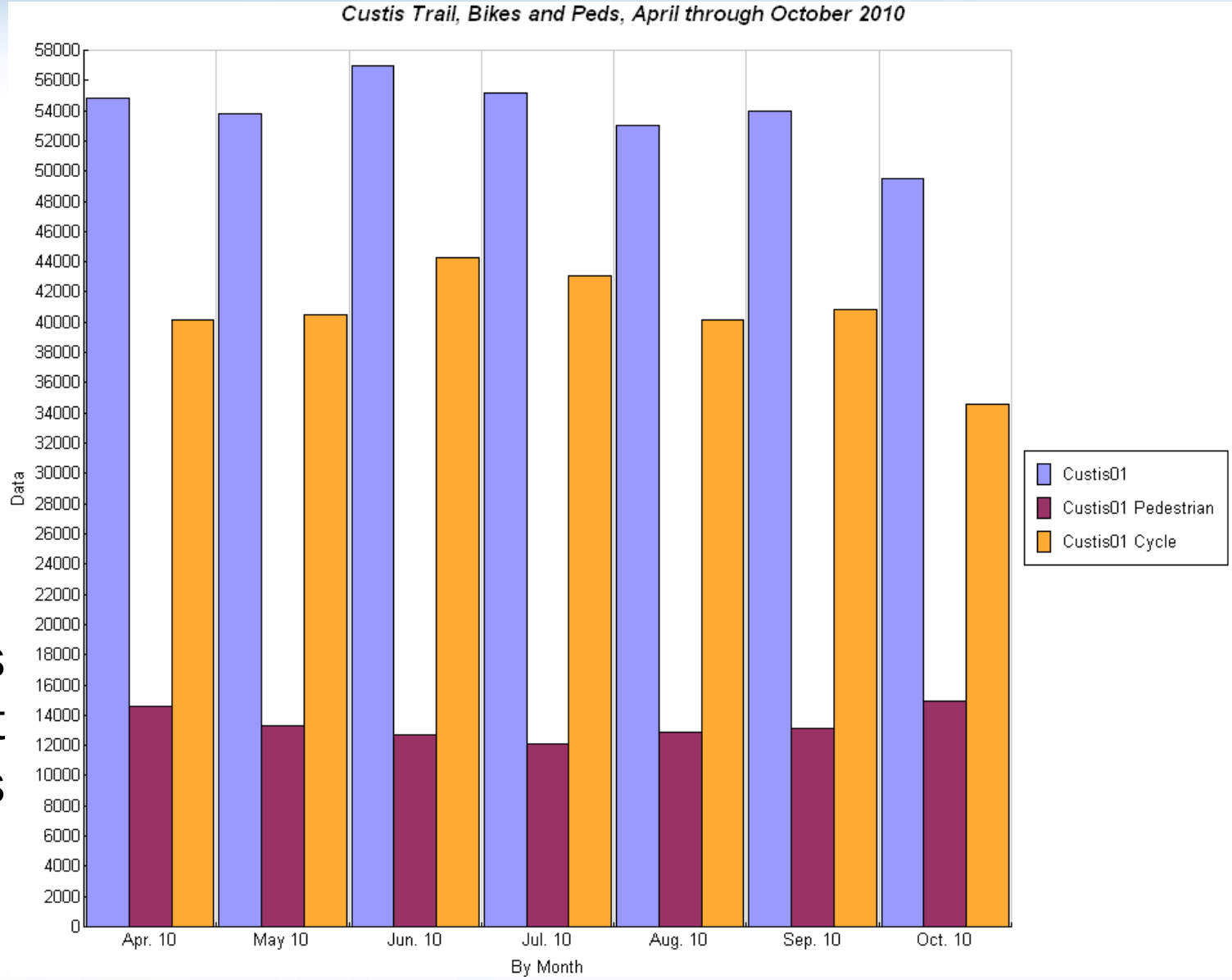
Sincerely,
Toole Design Group

Jennifer Toole, AICP, ASLA
President

Toole Design Group is a 100% Woman Owned Business and is recognized as a Bicycle-Friendly Business by the League of American Bicyclists

How many?

Supports grant requests



Questions?

David Patton

Bicycle and Pedestrian Planner

Arlington County Division of Transportation

dpatton@arlingtonva.us

703.228.3633