Peace Bridge Neighborhood
Air Quality Study:
1st Data Review Meeting

January 27th 2015
Data Collection: Start Dates

Busti Avenue Site
• PM-2.5, Meteorological, Black Carbon (BC) started on August 11th
• Ultrafine Particle Data (UFP) valid data started September 24th.
• Volatile Organic Compounds (VOC) and Carbonyl sample collection started August 15th

PS 198
• BC started August 21st
• PM-2.5 started August 26th

Peace Bridge Traffic
• Vehicle transit and delay data available
Instrumentation: Ultrafine Particle Number

UFP range
(0.001-0.1 Microns)
API Model 651, TSI 3783
Water CPC
Lower size cut 7nm
(0.007 microns)
1 Micron Cyclone Inlet
2nd Unit is on Loan from the Manufacturer
Instrumentation: PM-2.5 and Data Logger

Thermo Environmental Inc. TEOM 1400B
• 1-Hour Data Average
• Near-Real Time data Availability
• 2.5 Micron Cyclone Inlet
• Sample Collection at 50°C

Envidas Data Logger
• Provides data polling, storage and communication with central database
Instrumentation: Aethalometer for Black Carbon

Magee Scientific Model AE22 and the newer Model AE33

- Measures light attenuation due to particle load on filter tape at 2 or 7 wavelengths
- Near-Real time data availability*
- Data must be post processed
- BC absorbs light 1000x other species
- UV – BC = DC (330 & 880nm)
- DC has been associated with combustion of biomass (indicator for wood smoke)
**Instrumentation: VOCs, Carbonyls**

Computer controlled Canister Sampler
- 24-Hr sample collected once every 6 days
- Collects pressurized whole air samples

Computer controlled Carbonyl Sampler
- 24-Hr sample collected once every 6 days
- Captures carbonyls in reaction products in a DNPH cartridge
PM-2.5 Data: 1-Hr Averages
Black Carbon Data: 1-Hr Averages

PS 198 started later and has had equipment and power issues
Black Carbon Data: 1-Hr Averages

Diurnal Profile of Hourly Averages
Data: August - November
UFP Data: 1-Hr Averages

October UFP 1-Hr Data
UFP Data: 1-Hr Averages

November UFP 1-Hr Data

Range of values from 0 to 50000

Dates from 1/1/2014 to 11/30/2014
UFP Data: Precision

The two instruments demonstrate excellent precision when both are operating properly.

Data 11/24 at 19:00 - 11/30 23:00

1-Min data is too variable to correlate with other pollutants.
Meteorological Data: Wind Speed and Wind Direction (8/11 – 12/31)

Data are available averaged over 1-Min or 1-Hr
Meteorological Data: Temperature (8/11 – 12/31/2014)

Data are available averaged over 1-Min or 1-Hr.
How do we Interpret Bridge Traffic Data?

Available Data:

- 1-Hr Average Eastbound and Westbound Car, Truck and Bus transit data
  (East bound Bus traffic included in East bound auto totals)
- 1-Min Average Car and Truck Delay Time East and Westbound

Data are reverse time stamp (for website presentation)
Data must be put in chronological order and then averaged to 1-Hr
How do we Interpret Bridge Traffic Data?

• Average Vehicle crossing time without delay (by class and direction)
• Vehicle Transit data and Delay data can be combined (Each Hour)
• Start with the number of vehicles/class/direction crossing the bridge
• Calculate the average delay for those vehicles for that hour
• Multiply number of vehicles x Delay (hrs) add the non delay transit time
• Result = number of idling/creeping vehicles by class, direction, hour
Peace Bridge Vehicle Transit Time without Delay

Normal Transit Times below are not included in delay times

- Canada bound cars = 4.37 minutes
- Canada bound NEXUS = 3.37 minutes
- Canada bound trucks = 5.12 minutes

- US bound cars = 4.88 minutes
- US bound NEXUS = 4.55 minutes
- US bound trucks = 6.05 minutes

The Focus is on US Bound Cars and Trucks
Traffic Data Analysis Example: August Eastbound Trucks

US Bound Trucks

Number of Trucks per Hour

Date

7/30/14 0:00 8/4/14 0:00 8/9/14 0:00 8/14/14 0:00 8/19/14 0:00 8/24/14 0:00 8/29/14 0:00 9/3/14 0:00
August Number of Trucks Eastbound with Weekends
August Eastbound Trucks Delay and Transit Time

US Bound Trucks Delay and Transit Time EDT

Delay and Transit Hours

7/30/14 0:00 8/4/14 0:00 8/9/14 0:00 8/14/14 0:00 8/19/14 0:00 8/24/14 0:00 8/29/14 0:00 9/3/14 0:00
August Eastbound Trucks Delay and Transit Time

Average transit time for each Eastbound truck in August was 0.316 Hrs or about 19 minutes.
August Eastbound Trucks: Total Idle Time on Bridge
Traffic Data Analysis Example: August Eastbound Autos
August Eastbound Autos Delay and Transit Time
**Traffic Analysis**

Peace Bridge traffic patterns are highly variable and different from normal commuting patterns (I-190)

Average traffic and average air pollutant concentrations are not likely to provide an adequate assessment of sources

- **Truck Idle-Hours Eastbound**
  - Average: 29  Max-Hr: 248  90\(^{th}\) Percentile: 79

- **Auto Idle-Hours Eastbound**
  - Average: 151  Max-Hr: 1413  90\(^{th}\) Percentile: 410

1-Hour vehicle data can be correlated with air pollutant concentrations and Wind Speed and Wind Direction data

1-Hour data allows for analysis of episodes (traffic & air quality)

- **High**: Holiday Weekend  
  - **Low**: Snow storm
Neighborhood Data Collection

(PTRAK): 10/23, 11/5, 11/9, 11/16, & 11/20
Thank You

• Dirk Felton
dar.web@dec.ny.gov
• Randi Walker
dar.web@dec.ny.gov

Connect with us:
Facebook: www.facebook.com/NYSDEC
Twitter: twitter.com/NYSDEC
Flickr: www.flickr.com/photos/nysdec