





# Atmosphere

Exosphere

Thermosphere

Mesosphere

Stratosphere

Troposphere

# Can we see all air pollution?

## Air Pollutants

### Gases

### Particles

#### Common Gas Pollutants

#### Toxics

#### Solids

#### Liquid

Ozone (O<sub>3</sub>)

Carbon  
Monoxide  
(CO)

Sulfur  
Dioxide (SO<sub>2</sub>)

Nitrogen  
Dioxide  
(NO<sub>2</sub>)

Carbon  
Dioxide  
(CO<sub>2</sub>)

VOCs

187  
Compounds

PM<sub>2.5</sub>, PM<sub>10</sub>,  
Lead (Pb)  
Black Carbon

PM<sub>2.5</sub>, PM<sub>10</sub>

# Measuring Particulate Matter Pollution 2.5

Scale - Air Quality Index (AQI)	
0 - 50	<b>GOOD</b>
51 - 100	<b>MODERATE</b>
101 - 150	<b>UNHEALTHY</b> for sensitive groups
151 - 200	<b>UNHEALTHY</b>
201 - 300	<b>VERY UNHEALTHY</b>
301 - 500	<b>HAZARDOUS</b>

Code Green-> no to few pollutants in the air

Code Yellow

Code Orange

Code Red

Code Purple-> Highest level of pollutants in the air

Tablet with Air Casting App

AirBeam

## Campus Data Collection:

Particulate Matter PM 2.5  $\mu\text{g}/\text{m}^3$

Relative Humidity- RH% Temperature-  
°F

Noise Level- dB-

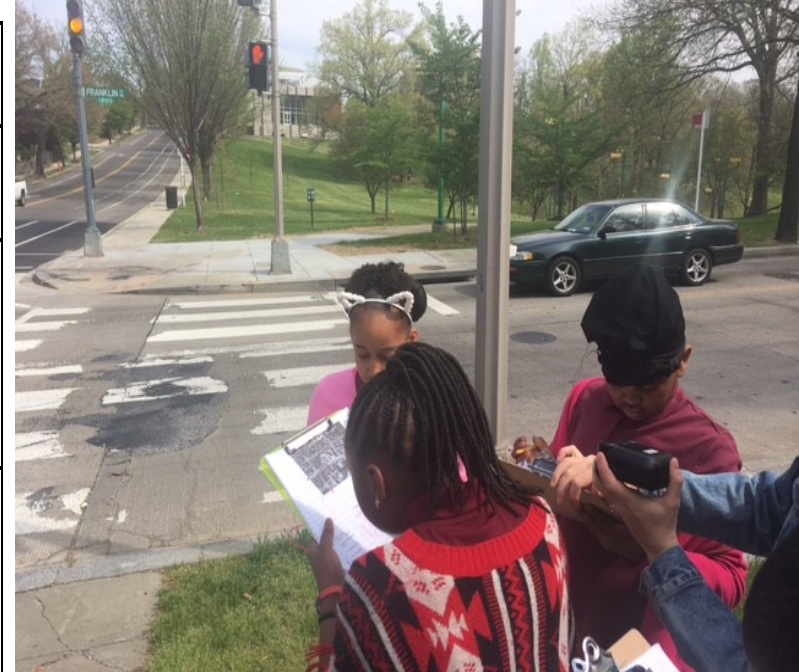
Peak PM

Mean/Average PM



# Campus Data Collection

	Classroom Test	Site 1	Site 2	Site 3
Particulate Matter 2.5 $\mu\text{g}/\text{m}^3$				
Relative Humidity RH%				
Temperature $^{\circ}\text{F}$ :				
Noise level dB:				



Franklin St

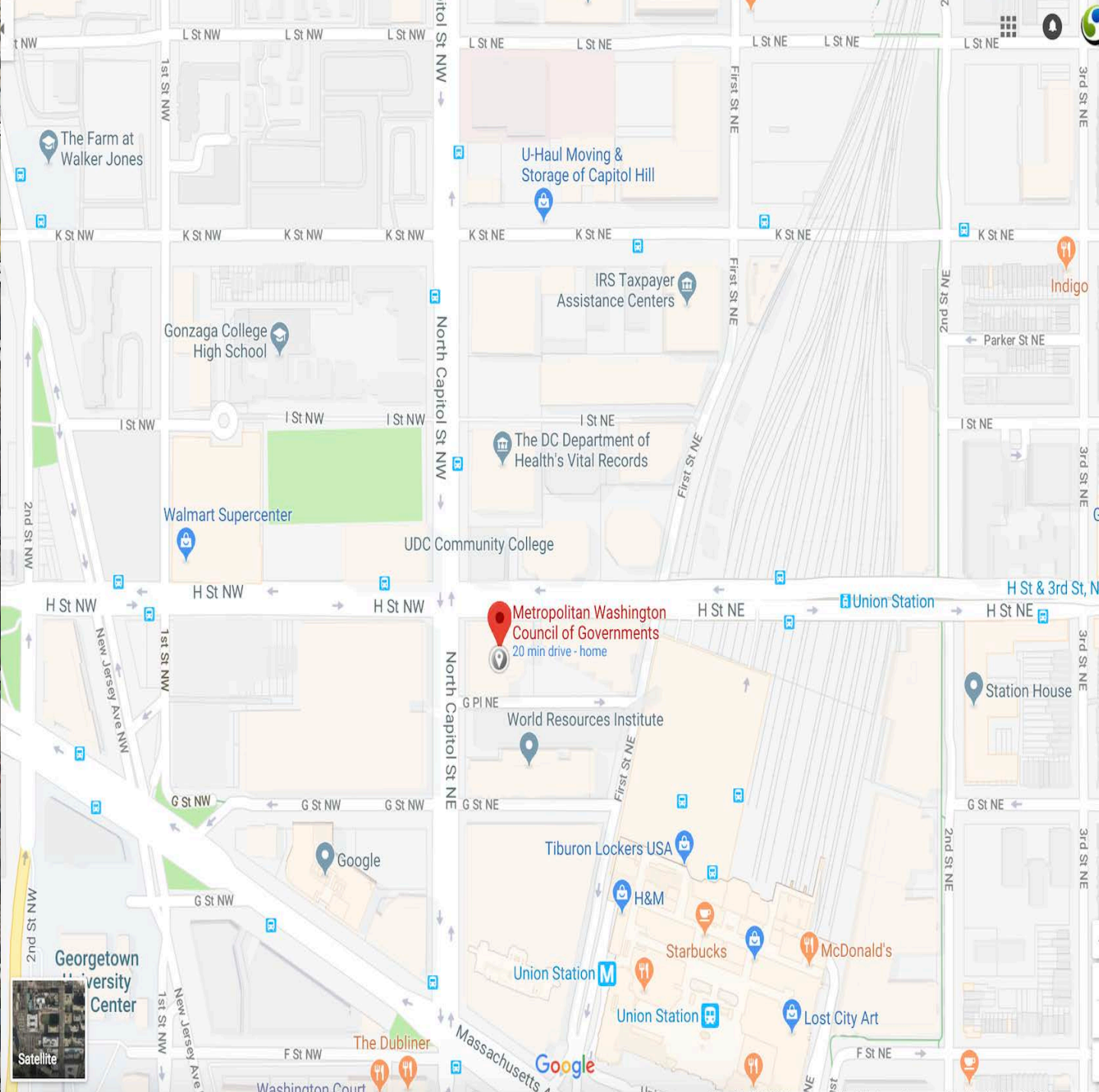
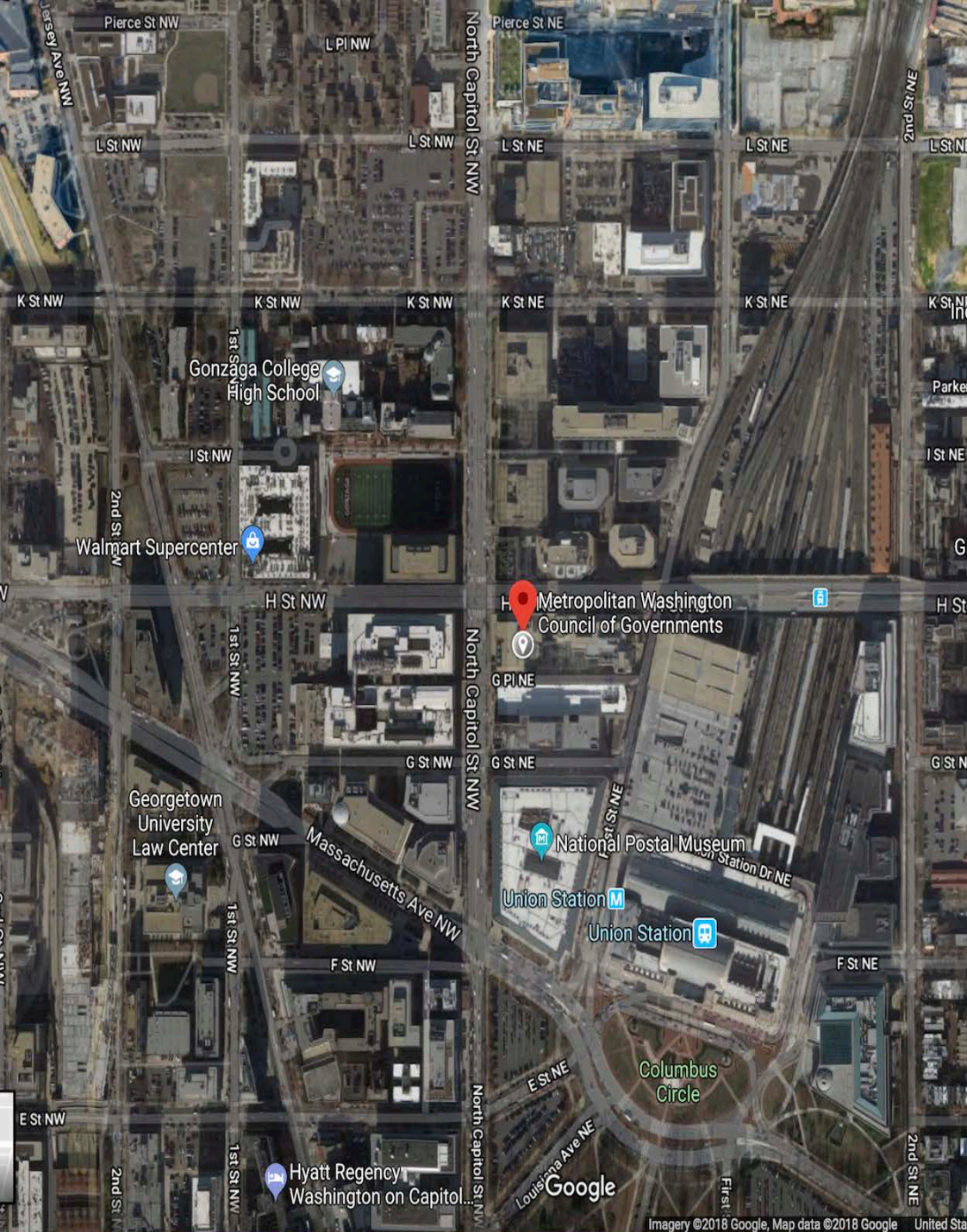
	Site 1	Site 2	Site 3	Site 4
Particulate Matter 2.5 $\mu\text{g}/\text{m}^3$	3	1	2	2
Relative Humidity RH%	40%	15%	18%	71%
Temperature $^{\circ}\text{F}$ :	82 $^{\circ}\text{F}$	82 $^{\circ}\text{F}$	80 $^{\circ}\text{F}$	78 $^{\circ}\text{F}$
Noise level dB:	86	75	90	85
Peak PM	5		2	
Average PM	5		2	

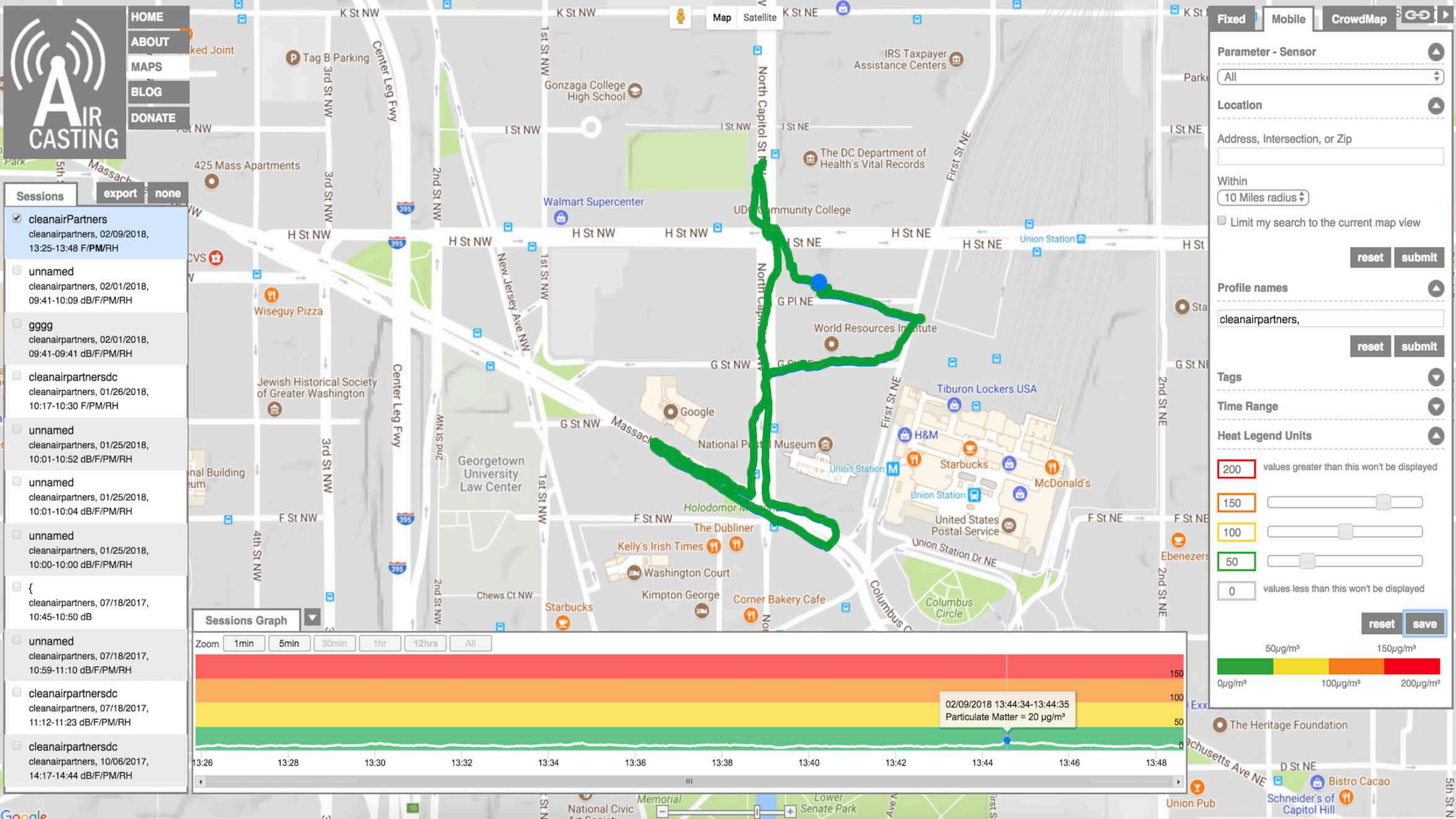
PM= Particulate Matter  $\mu$ =microns RH%= percent relative humidity  $^{\circ}\text{F}$  = degree Fahrenheit dB= Decibel

Peak PM \_\_\_\_\_

Average PM \_\_\_\_\_

PM= Particulate Matter  $\mu$ =microns RH%= percent relative humidity  $^{\circ}\text{F}$  = degree Fahrenheit dB= Decibel

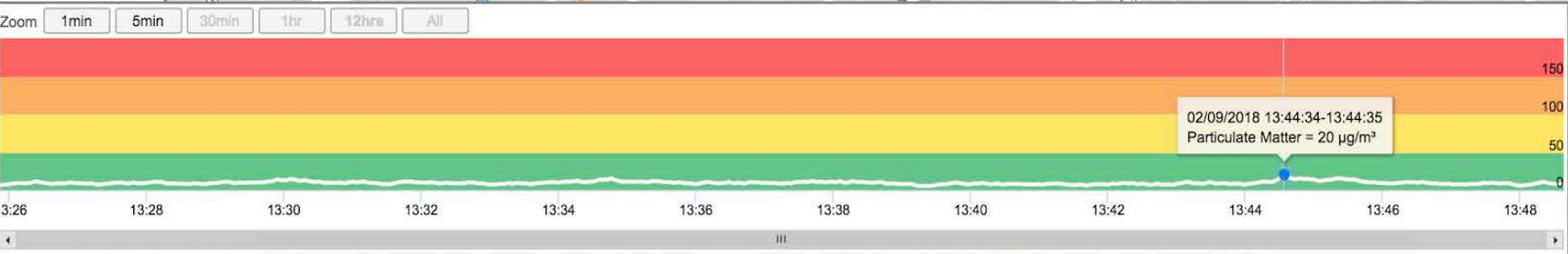




- HOME
- ABOUT
- MAPS
- BLOG
- DONATE

- Sessions
- cleanairPartners  
cleanairpartners, 02/09/2018,  
13:25-13:48 F/PM/RH
  - unnamed  
cleanairpartners, 02/01/2018,  
09:41-10:09 dB/F/PM/RH
  - gggg  
cleanairpartners, 02/01/2018,  
09:41-09:41 dB/F/PM/RH
  - cleanairpartnersdc  
cleanairpartners, 01/26/2018,  
10:17-10:30 F/PM/RH
  - unnamed  
cleanairpartners, 01/25/2018,  
10:01-10:52 dB/F/PM/RH
  - unnamed  
cleanairpartners, 01/25/2018,  
10:01-10:04 dB/F/PM/RH
  - unnamed  
cleanairpartners, 01/25/2018,  
10:00-10:00 dB/F/PM/RH
  - {  
cleanairpartners, 07/18/2017,  
10:45-10:50 dB
  - unnamed  
cleanairpartners, 07/18/2017,  
10:59-11:10 dB/F/PM/RH
  - cleanairpartnersdc  
cleanairpartners, 07/18/2017,  
11:12-11:23 dB/F/PM/RH
  - cleanairpartnersdc  
cleanairpartners, 10/06/2017,  
14:17-14:44 dB/F/PM/RH

Sessions Graph



Fixed Mobile CrowdMap

Parameter - Sensor

All

Location

Address, Intersection, or Zip

Within

10 Miles radius

Limit my search to the current map view

reset submit

Profile names

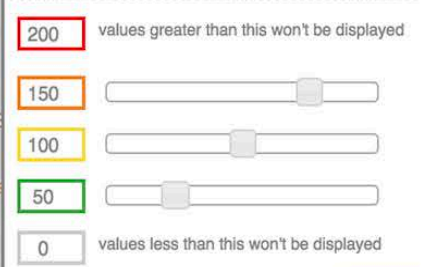
cleanairpartners,

reset submit

Tags

Time Range

Heat Legend Units


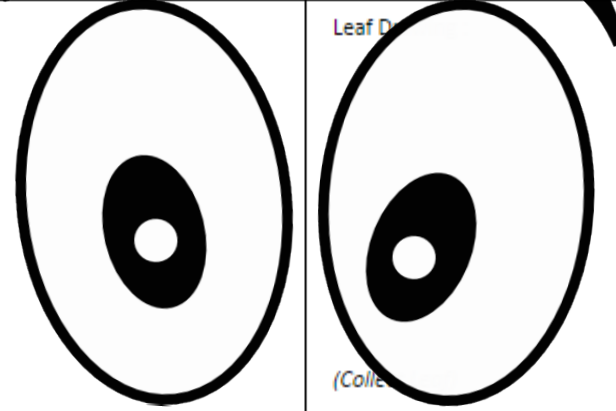


reset save





# Tree Observations

Tree #1	
Bark Observations	Feel: Sight: 
Leaf Observations	Feel: Shape: 
Fruit or flowers?	
How tall? (Feet)	
DBH/Circumference (Inches)	
Tree Condition	Circle: Excellent      Good      Fair      Poor      Dead/Dying
Tree Exposure to Sunlight	Circle: Full Sun      Partial Sun      Full Shade

Get started with these easy steps:


## 1. Draw Structures ?

## 2. Place Trees ?

### Describe your tree:

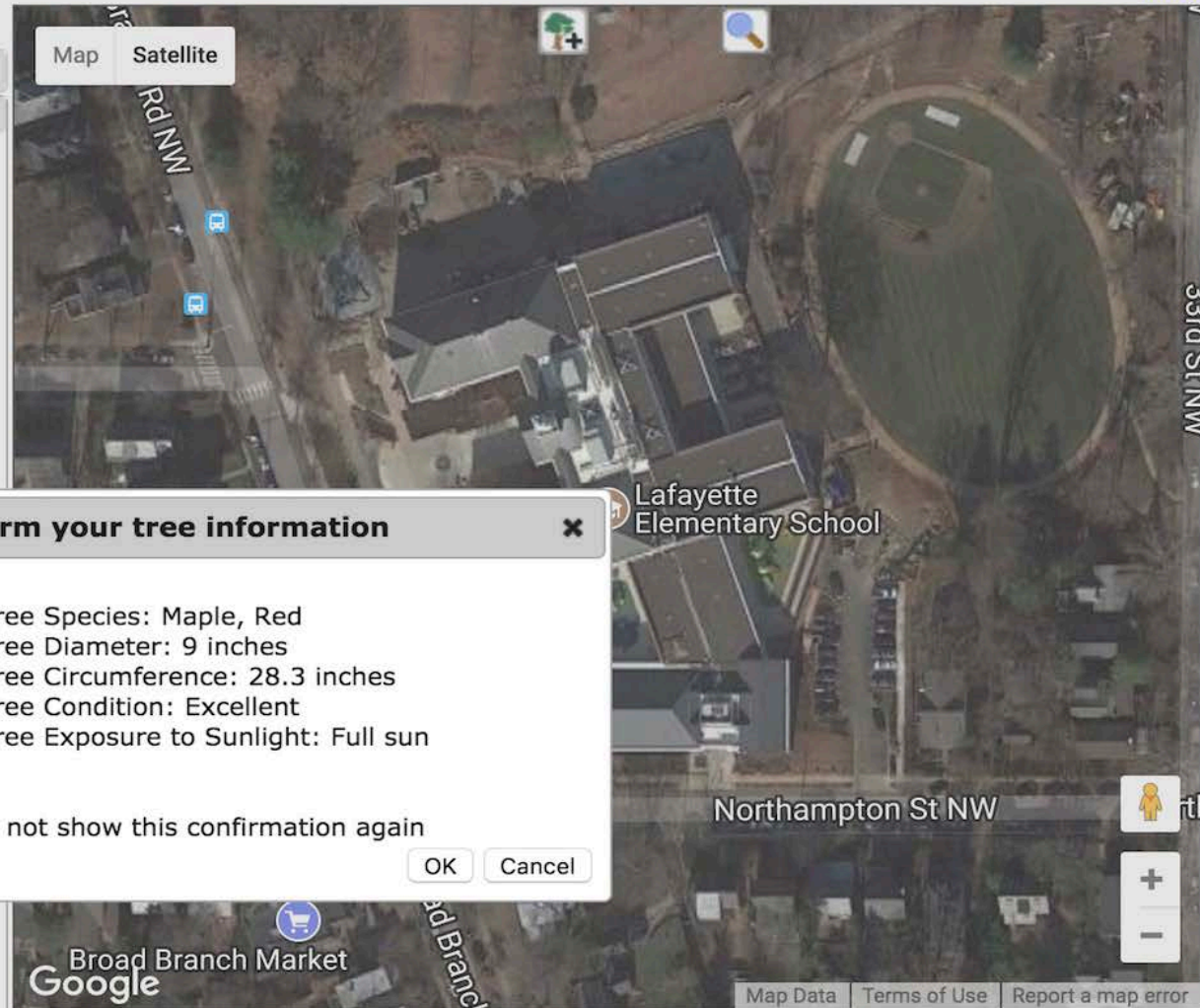
- Tree species: (South region)  
Maple, Red
- Tree diameter: 9 Inches  
or circumference: 28.3
- Tree condition: Excellent
- Tree exposure to sunlight: Full sun

### To place a tree:

- Drag this icon  to the location on the map where you would like to place your tree.
- Repeat to place additional trees.
- Hover over any tree you have placed on the map to display its benefits.

### Model the tree(s) future crown growth over time:

[Model Crown Growth](#)



### Confirm your tree information

Tree Species: Maple, Red  
Tree Diameter: 9 inches  
Tree Circumference: 28.3 inches  
Tree Condition: Excellent  
Tree Exposure to Sunlight: Full sun

Do not show this confirmation again

OK Cancel

Lat: 38.96705  
Lng: -77.06743

YOUR TREES

Overall Benefits

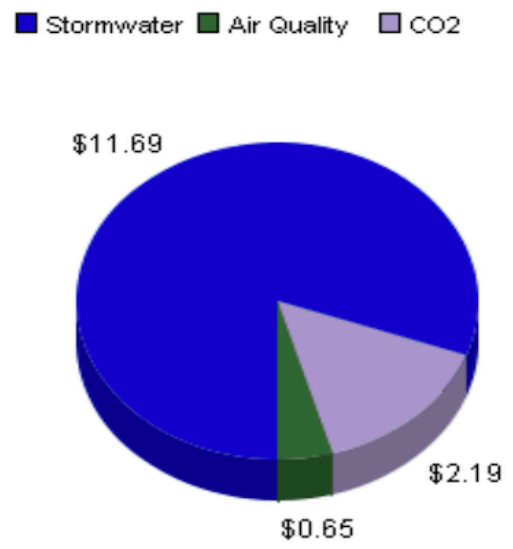
Stormwater

Energy

Air Quality

Carbon Dioxide

Current Year (2018)  
Future Year (2026)  
Total (2018-2026)  
Total to Date



**Breakdown of tree benefits**

Click on one of the tabs above for more detail

**This 9-inch diameter red maple will provide overall benefits of \$15 in the current year.**

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure are highly variable and make precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations to better understand the environmental and economic value associated with trees and their placement.

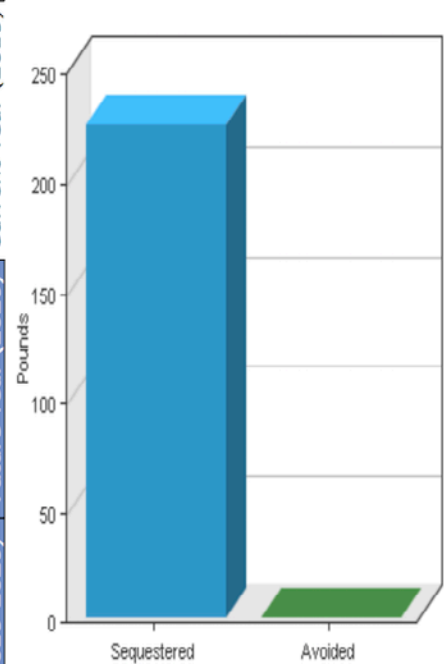
Benefits of trees do not account for the costs associated with trees' long-term care and maintenance.

**If this tree is cared for and grows, it will provide \$38 worth of annual benefit in 8 years. See 'Future Year (2026)' tab at left for details.**



Red maple  
Acer rubrum

Overall Benefits Stormwater Energy Air Quality **Carbon Dioxide**



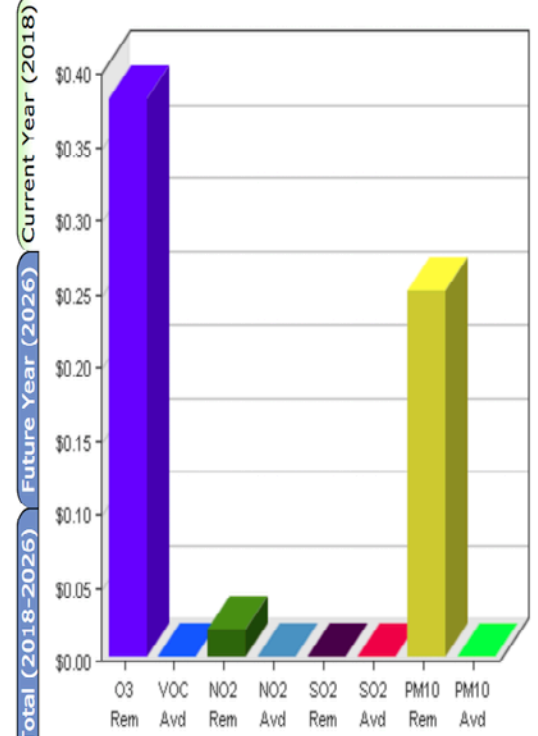
**This year your 9-inch diameter red maple will reduce atmospheric carbon dioxide (CO<sub>2</sub>) by 226 pounds.**

How significant is this number? Most car owners of an "average" car (mid-sized sedan) drive 12,000 miles (19,312 kilometers) generating about 11,000 pounds (4,990 kilograms) of carbon dioxide (CO<sub>2</sub>) every year. A flight from New York to Los Angeles adds 1,400 pounds (635 kilograms) of CO<sub>2</sub> per passenger. Trees can have an impact by reducing atmospheric carbon in two primary ways (see figure at left):

- They sequester ("lock up") CO<sub>2</sub> in their roots, trunks, stems, and leaves while they grow, and in wood products after they are harvested.
- Trees near buildings can reduce heating and air conditioning demands, thereby reducing emissions associated with power production. However, if a tree produces no energy benefits there will be no resulting avoided CO<sub>2</sub>.

Combating climate change will take a worldwide, multifaceted approach, but by planting a tree in a strategic location, driving fewer miles/kilometers, or replacing business trips with conference calls, it's easy to see how we can each reduce our individual carbon "footprints".

Overall Benefits Stormwater Energy Air Quality **Carbon Dioxide**



**Air quality benefits of your 9-inch diameter red maple are shown in the graph at left for the current year.**

Air pollution is a serious health threat that causes asthma, coughing, headaches, respiratory and heart disease, and cancer. Over 150 million people live in areas where ozone levels violate federal air quality standards; more than 100 million people are impacted when dust and other particulate levels are considered "unhealthy." We now know that the urban forest can mitigate the health effects of pollution by:

- Absorbing pollutants like ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>) through leaves
- Intercepting particulate matter less than 10 microns (PM<sub>10</sub>) like dust, ash, and smoke
- Releasing oxygen through photosynthesis
- Lowering air temperatures which reduces the production of ozone
- Reducing energy use and subsequent pollutant emissions from power plants (*If a tree produces no energy benefits there will be no resulting avoided pollutants.*)

It should be noted that trees themselves emit biogenic volatile organic compounds (VOCs) which can contribute to ground-level ozone production. This may negate the positive impact the tree has on ozone mitigation for some high emitting species (e.g., willow oak or sweetgum).

"Rem" stands for removal, which is your tree absorbing or intercepting pollutants. "Avd" stands for avoided, which is your tree lessening the need for creation of these pollutants in the first place by reducing energy production needs.

Current Year (2018)  
Future Year (2026)  
Total (2018-2026)  
Total to Date

Current Year (2018)  
Future Year (2026)  
Total (2018-2026)  
Total to Date