

Urban Forest Management Plan

Prepared for

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Town Administrator

Town of Berwyn Heights

For Service at

Berwyn Heights, MD



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WHY DID SAVATREE DEVELOP AN URBAN FOREST MANAGEMENT PLAN FOR BERWYN HEIGHTS?

In December, 2015, the Town of Berwyn Heights issued a Request for Proposals for a Town Tree Inventory and Town-wide Urban Tree Canopy Assessment for the Town of Berwyn Heights, Maryland.

The Town of Berwyn Heights (Town) sought proposals from Consultants to perform: a comprehensive tree inventory, including tree location, species, size, condition and maintenance requirements; provide tree inventory software, which would become the property of the Town upon completion; and, perform an urban forestry management plan. Also included in the proposal was an urban tree canopy assessment for either 1) the entire Town (public and private properties) or 2) only public property. The project was to be completed by June 30, 2016.

On April 18, 2016, the Town executed a contract with SavATree to perform a reduced scope of work including:

- An urban tree canopy assessment;
- An inventory of public trees; and,
- An urban forest management plan.

The software component was deleted from the scope due to budget constraints.

As value-added services, we also provided:

- An analysis of existing and potential tree canopy by parcel;
- An urban heat island analysis of the Town; and,
- An ecosystem services assessment of Berwyn Heights' tree canopy.

HOW DID SAVATREE DEVELOP THE PLAN?

We performed the urban tree canopy assessment in collaboration with the University of Vermont Spatial Analysis Lab by fusing high-resolution satellite imagery and LiDAR data to produce a high-resolution 7-class land cover product. That land cover product was then assessed for the amount of existing and potential tree canopy in the Town by laying the Town boundary shapefile over the land cover and running metrics on land cover types. We assessed per-parcel tree canopy by laying the parcel map over the land cover and running metrics on the existing and potential tree canopy within each parcel. We used Landsat thermal imagery to assess surface temperature in the Town, created grids of equivalent size, and then quantified the tree canopy per grid cell. We then correlated the tree canopy, impervious surface cover, and surface temperature in each grid cell. A slide deck containing the results of the Urban Tree Canopy assessment is found in Appendix A.

We began field work for the tree inventory on April 20, 2016 and completed it on May 19, 2016. We used the ESRI ArcGIS Collector app on iPads to collect data on public trees, which included street trees and trees on town-owned parcels. We worked with you to identify parcels of land owned by the Town and included in the inventory. Data QA/QC was completed on June 15, 2015. The table of data variables collected is included the slide deck of inventory results found in Appendix B.

We reviewed the Town Urban Forest (Tree) ordinance, Ordinance 122.

We met with the Green Team on Thursday, June 16, 2016 to present our findings and get feedback on direction for the Urban Forest Management Plan.

WHAT DID SAVATREE FIND?

URBAN TREE CANOPY

The Urban Tree Canopy assessment was performed by us in collaboration with Jarlath O’Neil-Dunne, Director, University of Vermont Spatial Analysis Lab. The results are found in Appendix A. A summary is provided in Table 1 below.

Canopy Type	Amount
Existing Tree Canopy	58%
Possible Tree Canopy – Vegetation	15%
Possible Tree Canopy – Impervious	11%
Not Suitable	15%

Table 1 - Existing and potential tree canopy in Berwyn Heights

The tree canopy cover in Berwyn Heights is quite high. For comparison, see the graph below noting the relative urban tree canopy in various cities.

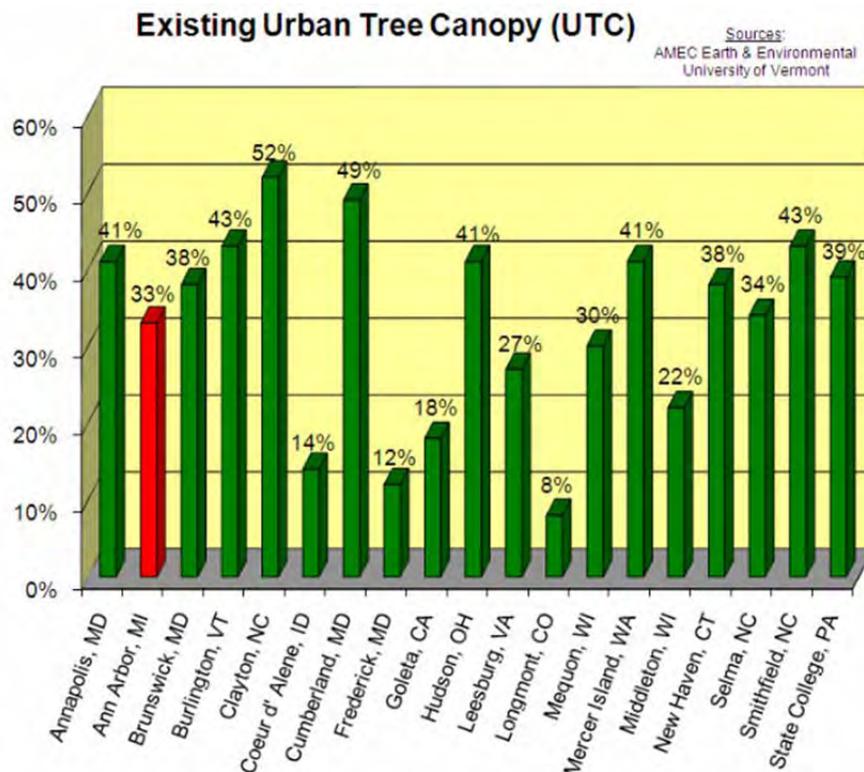


Figure 1 – Existing UTC in various cities; from the Ann Arbor Chronicle newspaper

I note that when we say “Possible” tree canopy cover, we mean biophysically possible. That is, you could plant a tree there and it could grow. However, there may be social constraints to planting trees in many

areas of possible tree canopy. They may be playgrounds, ball fields, septic fields, gas transmission lines, or any number of other types of areas where trees could grow but they may not be wanted. There are also likely resource (financial) limitations to planting trees in all of these places even if permission were available.

It is likely that Berwyn Heights' tree canopy cover is as high as is practically possible.

The parcel analysis shows that canopy cover, though different from one parcel to the next, is fairly well distributed through the Town. There are no major pockets of canopy deficit, with the exception of the Route 193 corridor. As many of the parcels in this corridor are non-residential (commercial), this is not unusual. Commercial and industrial lands normally have lower canopy cover than residential lands. It could present an opportunity for a commercial property tree planting initiative.

Surface temperatures in the Town are generally highest on the western and northern borders, associated with the transportation corridors for the Metro Green Line and Greenbelt Road, respectively. These are also the places where canopy cover is lowest.

The cooling effect of the greenway associated with Indian Creek, including Indian Creek Trail and Indian Creek Park, is evident in these images. The correlation between surface temperature and tree canopy is evident. Surface temperatures ranged from a low of 58F in areas of near total canopy cover to 72F in areas of little to no tree cover – a 14-degree difference over a very short distance.

TREE INVENTORY

The tree inventory field data collection was performed by Tree Risk Assessment Qualified Registered Consulting Arborist Matt Weibel.

The results of the tree inventory are found in Appendix B. We inventoried 861 public trees on streets and public lands in the Town. We note that Pepco was marking trees for removal during our inventory; some trees inventoried by us may have already been removed by Pepco by the time this report is issued.

Most of the street trees are planted at or near the property line, so in most cases the Town is a tenant-in-common, or co-owner, with the adjacent property owner regarding the tree.

TREES

SUSTAINABILITY

When we look at population resilience and vulnerability, two key metrics are species diversity and size distribution.

Berwyn Heights' tree population is very diverse, with 86 different species represented and the most dominant of them (red maple) making up 11% of the population.

We use size and a proxy for age when looking at the diameter distribution, realizing that this is inexact as some trees are small in stature and so may be mature and still quite small (ex: crepe myrtle). However, this approach gives us a good "big picture" idea of how resilient or vulnerable the population is. The Town's tree distribution generally shows a "reverse-J" shape, meaning the majority of trees are younger.

This is desirable as you want to have enough younger individuals growing up to assume the roles of the older ones as they decline and are removed.

The tree population is diverse in species and age and should prove very resilient to threats.

CONDITION

Despite a minimal maintenance program, 85% of trees inventoried were in Fair or better condition. Three percent of the trees were standing dead at the time of the inventory. Two percent were in critical condition.

PRIMARY MAINTENANCE NEED

Forty-eight percent of trees had no primary maintenance need. Fourteen percent are recommended for removal. Most of the rest need crown cleaning (removal of dead and defective limbs).

RISK

We used tree care industry standards (ANSI A300-Part 9, Level 2) and best practices (International Society of Arboriculture) performed by a Tree Risk Assessment Qualified arborist to derive qualitative tree risk ratings as noted below.

These ratings are based on the risk assessment formula:

$$\text{Probability} \times \text{Consequences} = \text{Risk}$$

Risk Rating	Number of Trees	Percent of Population
Extreme	0	0%
High	3	0%
Low	789	92%
Moderate	49	6%
NA	20	2%
Grand Total	861	

Table 2 - Risk ratings for the Town's trees

Because most of the trees were street trees, many had potential targets (people or property that could be impacted if the tree failed) and so Significant or Severe consequences in the event of failure,

No trees received the highest risk rating of Extreme. Only three were rated High risk. The majority were in the Moderate and Low risk categories.

TREE ENVIRONMENTS

HARDSCAPE

Only one percent of trees (10 trees) were found to cause hardscape damage of one inch or greater.

OVERHEAD UTILITIES

Almost two-thirds of trees (65%) have no overhead utilities. Conversely, over one-third (35%) do.

GROWING SPACE

Ninety-three percent of trees are growing in lawns or natural areas. This is in keeping with the fact that there are few sidewalks in Town and most front yards extend into the right-of-way to the curb.

TREE BENEFITS

The iTree Landscape tool provides outputs of ecosystem services based on tree canopy cover. These are modeled rather than measured benefits. The associated values are based on costs to mitigate the noted pollutants in the area studied.

CARBON

Berwyn Heights' tree canopy stores 4,732 tons of carbon at a value of \$658,886 and annually sequesters 198.8 tons of carbon at a value of \$27,675 per year.

AIR QUALITY

The tree canopy mitigates a number of constituents of soot and smog, with the majority of benefit by way of interception of particulate matter. Particulate matter has significant and documented adverse human health effects. The value of particulate mitigation is over \$32,000 per year, and the total value of air quality mitigation provided is \$42,246 per year.

WATER QUALITY

Trees improve water quality by transpiration, evaporation, interception, and avoided runoff. If not for Berwyn Heights' tree canopy, the Town would have to pay an additional \$20,960 annually to mitigate runoff.

The full iTree Landscape report is available here: <https://landscape.itreetools.org/report/a411086c-b791-4e2b-8e91-fdecb636655d/berwyn-heights/>

URBAN FOREST MANAGEMENT PLAN

The Town's Urban Forest Ordinance is in place to protect, preserve and promote the Urban Forest of Berwyn Heights as part of a larger ecosystem which contributes to air, noise and visual pollution control, moderates climate extremes, promotes energy conservation, and has aesthetic value affecting property values and the community quality of life.

This framing encouraged us to undertake the heat island and ecosystem services studies we contributed to this report.

The Ordinance also establishes a Shade Tree Board to be responsible for the tree program which regulates the planting and maintenance of trees in public places, and to advise, provide continuity, act as an advocate and coordinate contributions and interests in urban greenery.

SHADE TREE BOARD

At the time of this report, there is no active Shade Tree Board.

GREEN TEAM

In the absence of a Shade Tree Board, we met with the Green Team. The Green Team was created to help the Town earn a “Sustainable Maryland Certificate (SMC)” and to improve local living.

ORDINANCE 122 – URBAN FOREST (TREE)

According to the Urban Forest Ordinance, § 122-2, “There shall be created a Board to be known and designated as “Shade Tree Board” composed of five members appointed by the Mayor with the approval of the council. It shall be the responsibility of the Board to study, investigate, counsel, inventory and develop and/or update and administer a written plan for the care, preservation, pruning, planting, replanting, removal or disposition of trees and shrubs in parks, along streets and in other public areas. Such a plan will be presented to the Town Council and upon their acceptance and approval shall constitute the official comprehensive tree plan for the Town. The Board shall choose its own officers, make its own rules and regulations and keep records of its proceedings. A majority of the members shall be a quorum for the transaction of business.”

The Town has retained us to “...study, investigate, counsel, inventory and develop and/or update and administer a written plan for the care...” It would be the Shade Tree Board’s task to present it to Council for acceptance, to administer it, and to update it.

WHAT DOES SAVATREE RECOMMEND BASED ON WHAT WE OBSERVED?

Based on analysis of these data, we recommend the following:

URBAN FOREST MANAGEMENT PLAN

1. SHADE TREE BOARD (0-3 MONTHS)

The first task is to make a decision on the disposition of the Shade Tree Board. This could result in:

- The Board becoming a committee of the Green Team, with members appointed by the Mayor and approved by the Council;
- The Board being revived as a separate entity;
- The Green Team becoming the Shade Tree Board, with the concurrence of members, appointments by the Mayor, and approval of the Council; or,
- Modification or deletion of Urban Forest Ordinance, § 122-2 to suit current conditions and objectives.

The available volunteer resource may be inadequate to support both a Shade Tree Board as specified in the Ordinance and a Green Team.

The Town Administrator, the Green Team, the Mayor, and the Council should confer on this and decide on how the citizen advisory group for trees will be composed and how it will operate.

2. TREE MAPPING (3-6 MONTHS)

The tree mapping software was deleted from the project due to budget constraints. This map is critical to knowing where the tree management needs are. The Shade Tree Board (or its successor) should pursue a grant to fund the tree mapping software or engage a partner (M-NCPPC, University of Maryland student intern, etc.) with expertise to take the tree inventory data and provide it in a platform that the Town can use to manage tree resources.

3. TREE AND RISK MANAGEMENT (6 MONTHS – 5 YEARS)

Identify tree management priorities, including reducing or eliminating risk from the three trees with High risk ratings, the standing dead trees, and other priorities, and build a multi-year program. Creation of a management plan will allow Town and stakeholders to build a program and annual budget for tree and risk management.

4. TREE CANOPY GOAL (6 – 12 MONTHS)

Working with stakeholders, establish a Town tree canopy goal. Given the Town's very high present canopy coverage, this may be a loss threshold rather than an increase (i.e., the goal may be to not fall below 55% coverage rather than increase to 60% coverage).

Work with Prince George's County to see what contributions the Town's tree canopy may be able to make towards the County's requirements under the Chesapeake Bay TMDL.

If additional planting is deemed desirable, pursue grants through the Chesapeake Bay Trust and other entities for street tree plantings, tree giveaways, and other canopy enhancement programs.

5. MONITOR (5 – 10 YEARS)

Now there is baseline data for both the town-wide tree canopy and the public tree resource. In five to ten years, re-assess the tree canopy and re-inventory the street trees to detect and manage for changes.

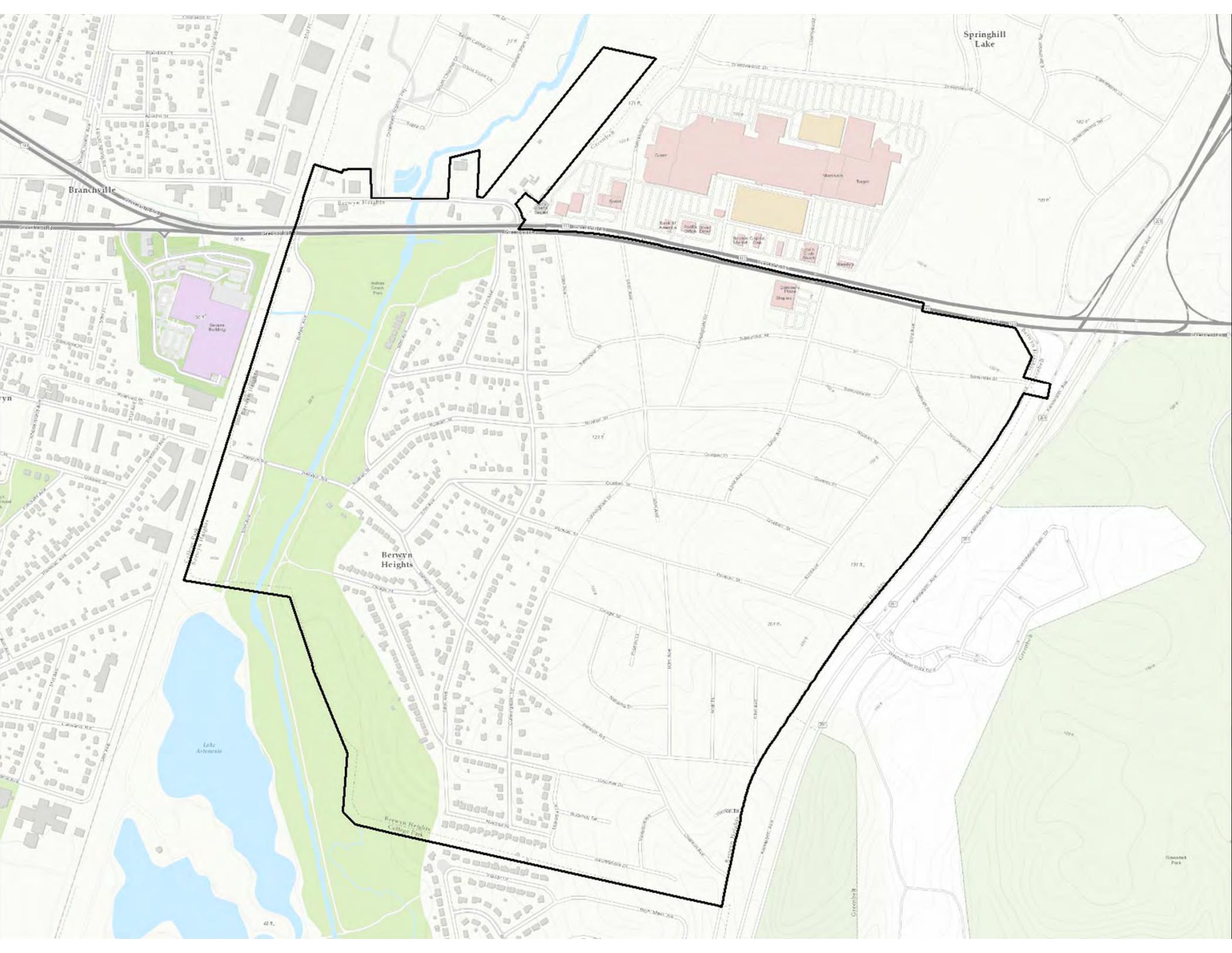
APPENDIX A – URBAN TREE CANOPY ASSESSMENT

Berwyn Heights Urban Tree Canopy Assessment

Mike Galvin & Jarlath O'Neil-Dunne



Study Area



Springhill
Lake

Branchville

Berwyn
Heights

Lake
Artemesia

Severn
Building

Berwyn Heights
College Park

Greenhill
Park

Land Cover Mapping

Data > Information



Buildings



Roads/Railroads



Other Paved



Tree Canopy



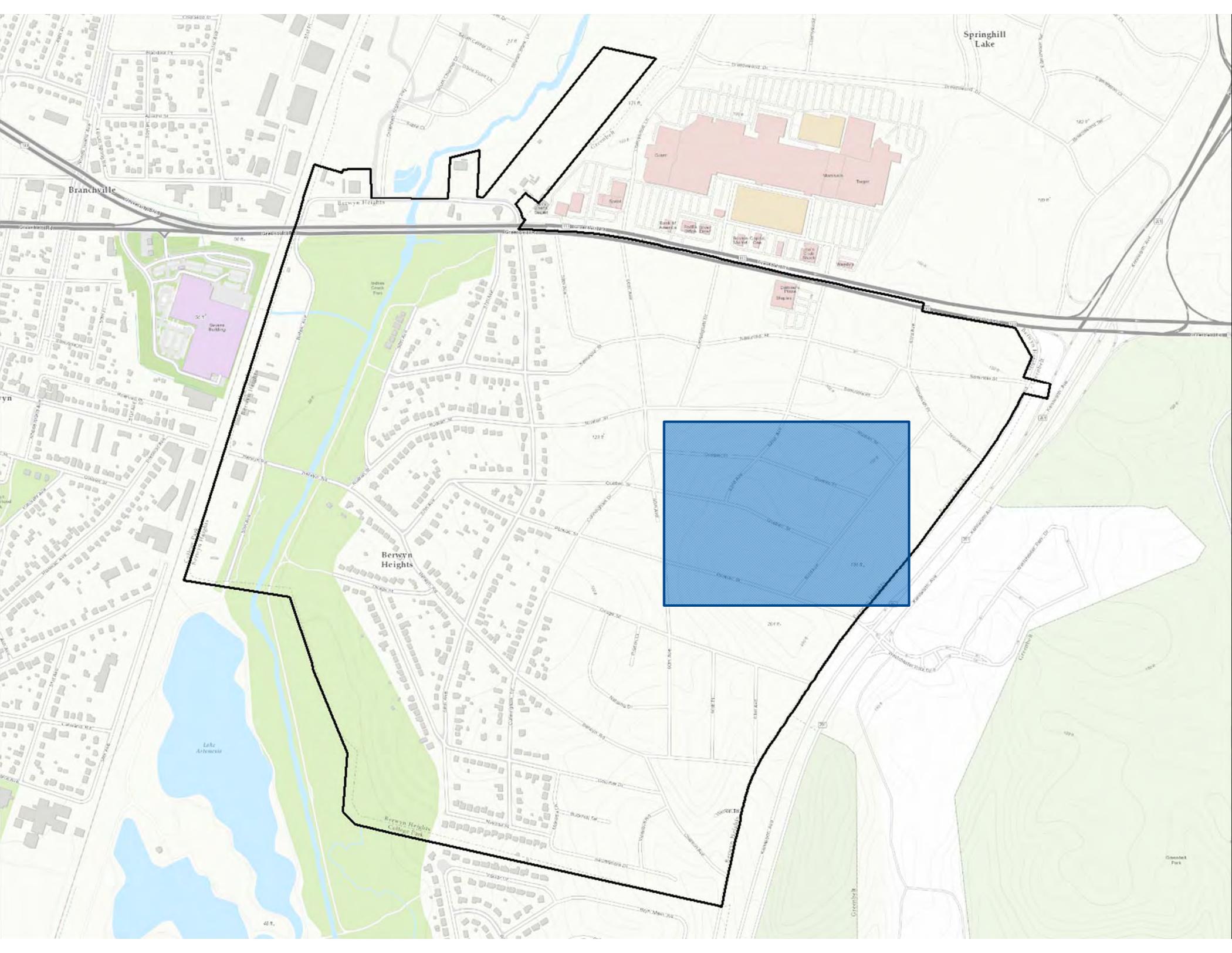
Grass/Shrub



Bare Soil



Water



Branchville

Springhill
Lake

Lake
Artemesia

Berwyn
Heights

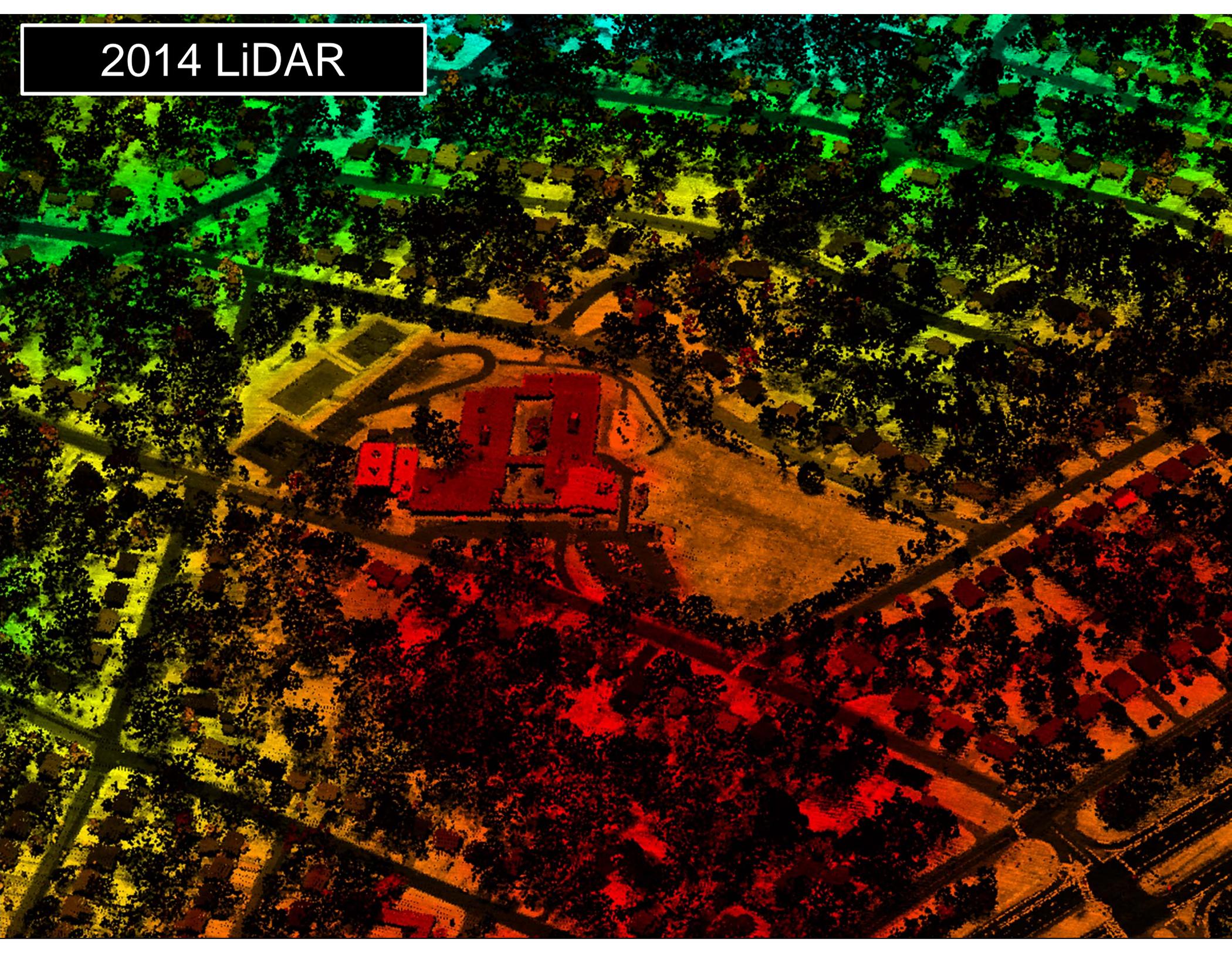


Greenhill
Park

2014 Imagery



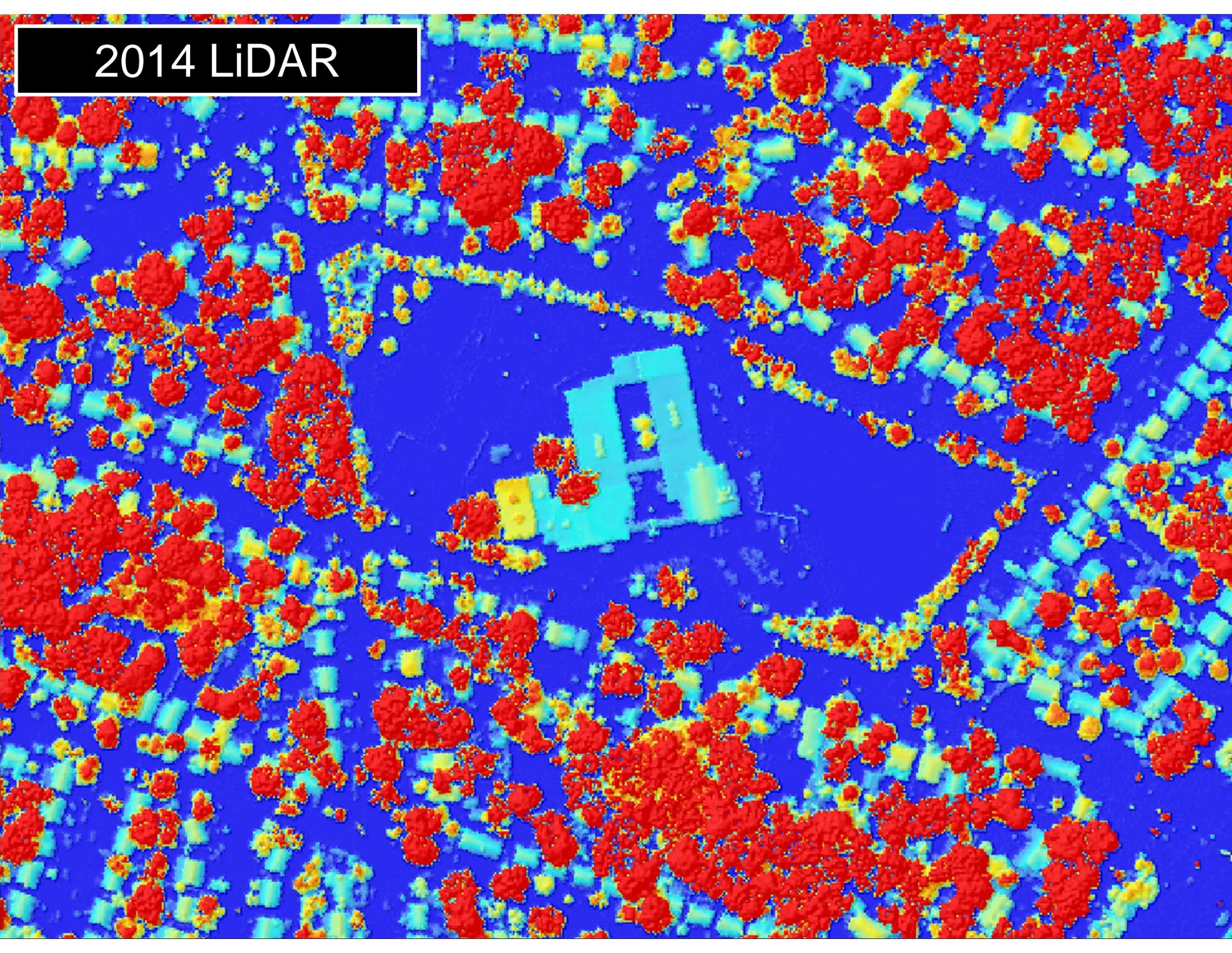
2014 LiDAR



Building Footprints



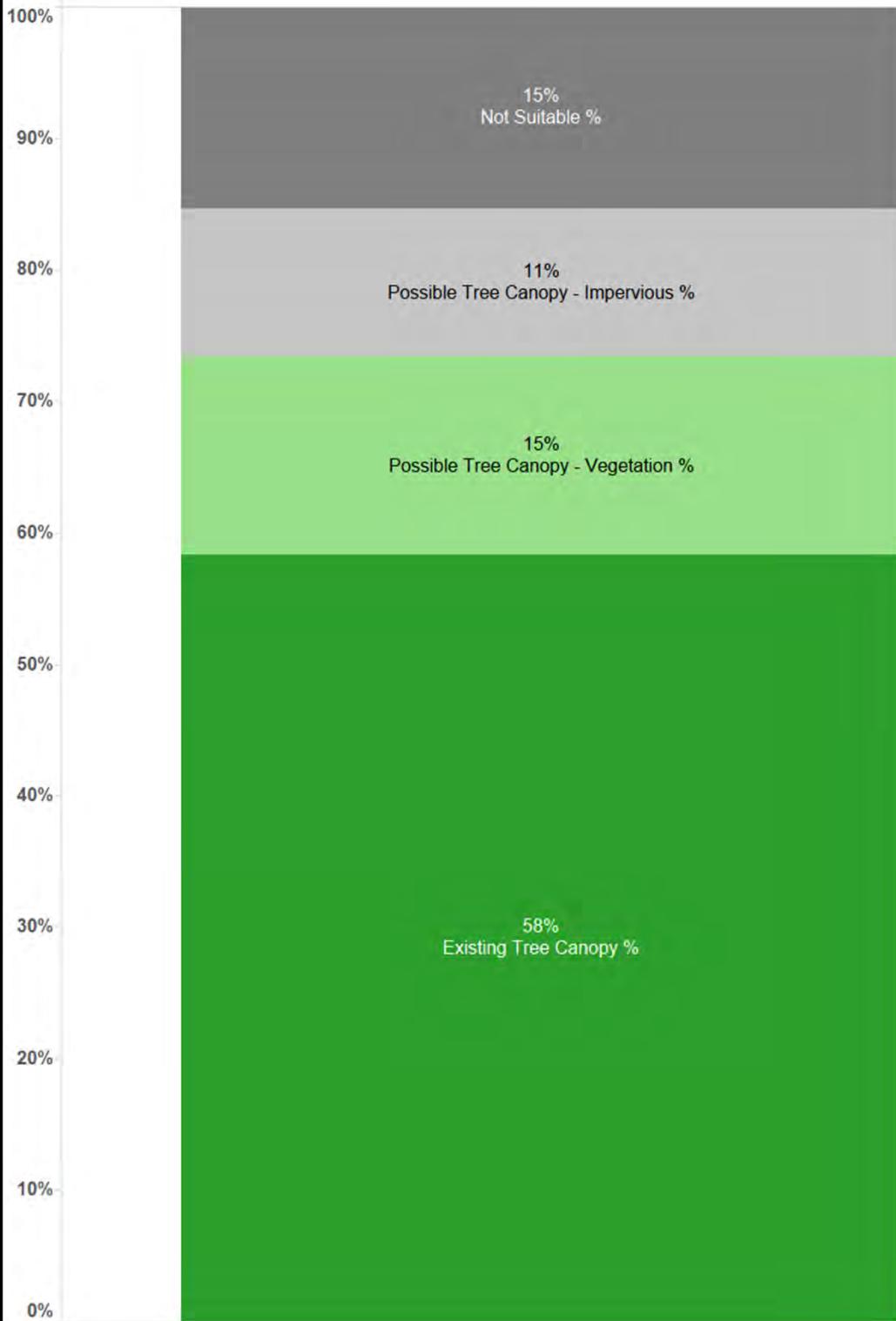
2014 LiDAR



2014 Land Cover

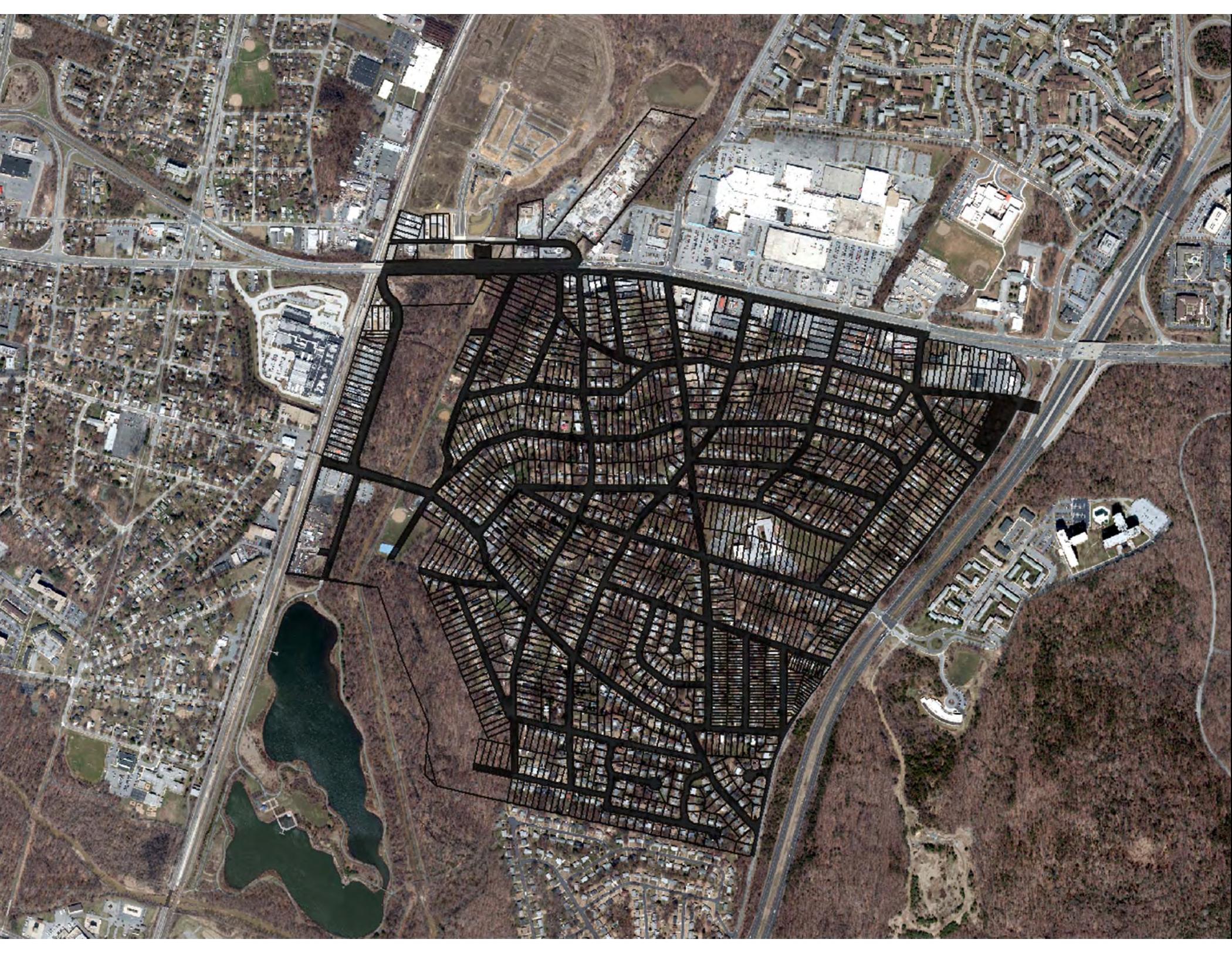


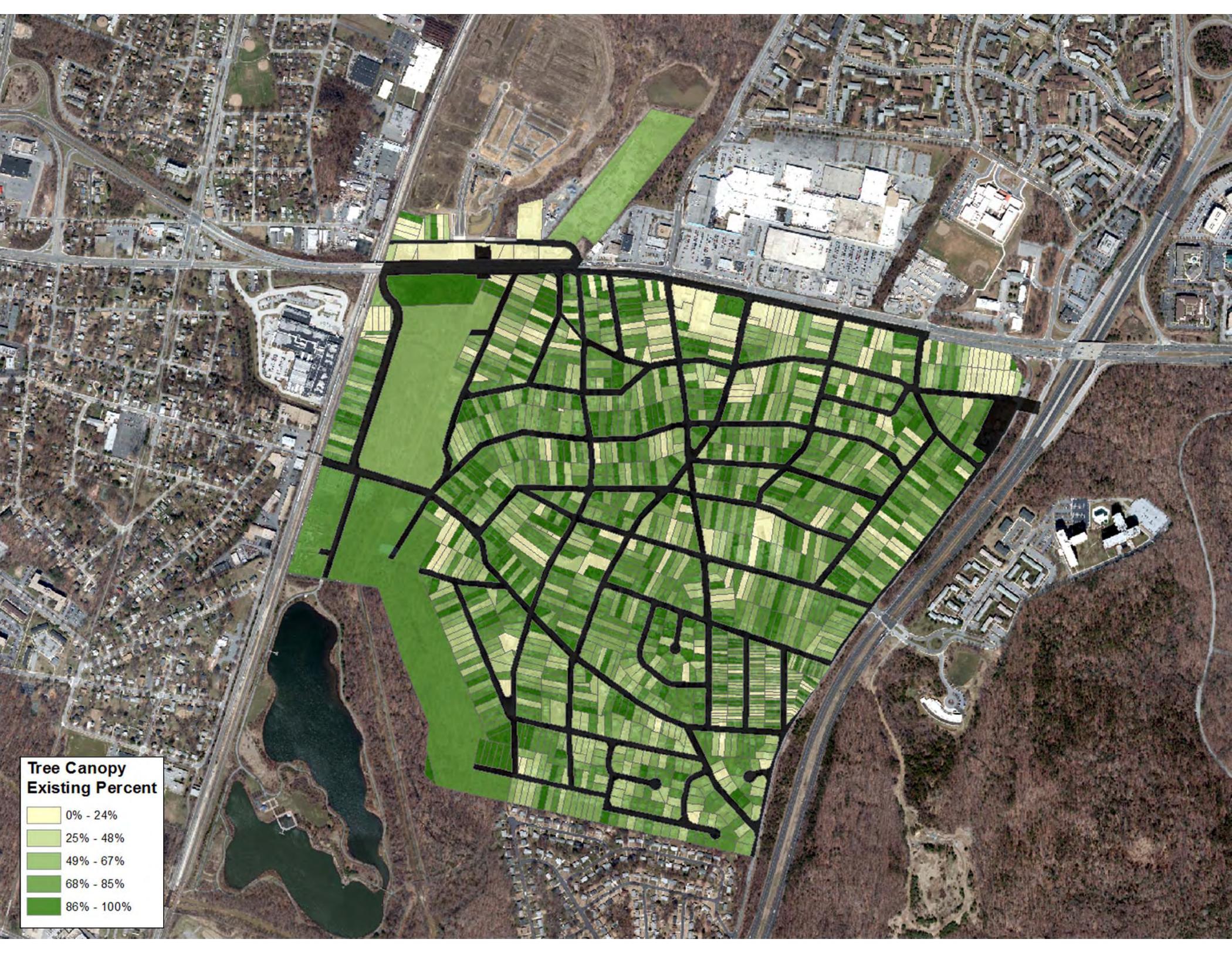
Tree Canopy Metrics



Parcels

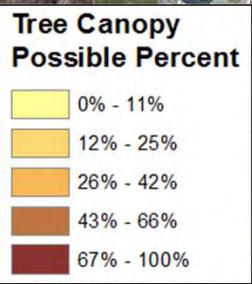
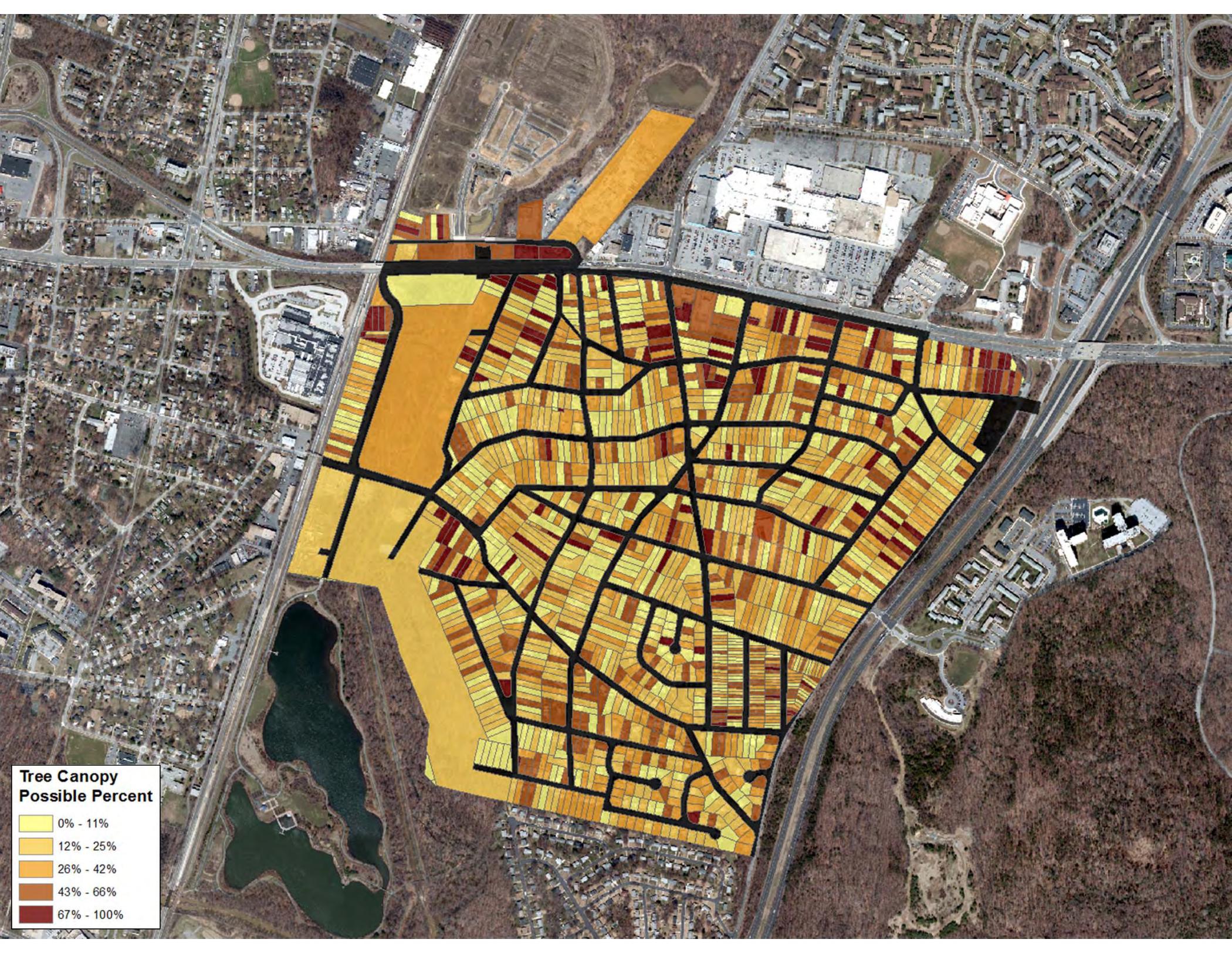
Tree Canopy Metrics





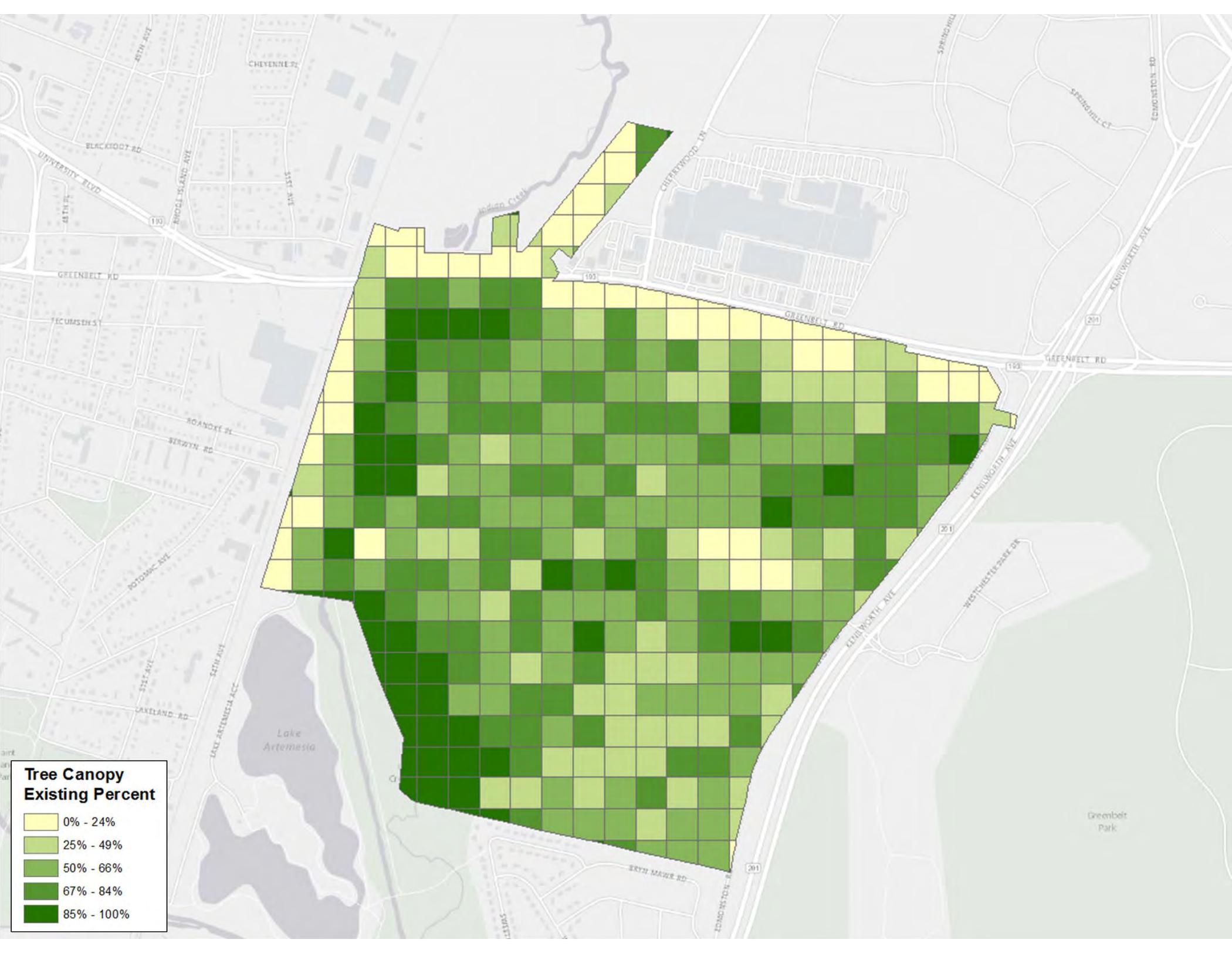
**Tree Canopy
Existing Percent**

- 0% - 24%
- 25% - 48%
- 49% - 67%
- 68% - 85%
- 86% - 100%



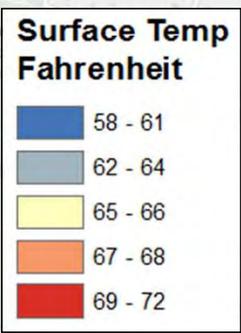
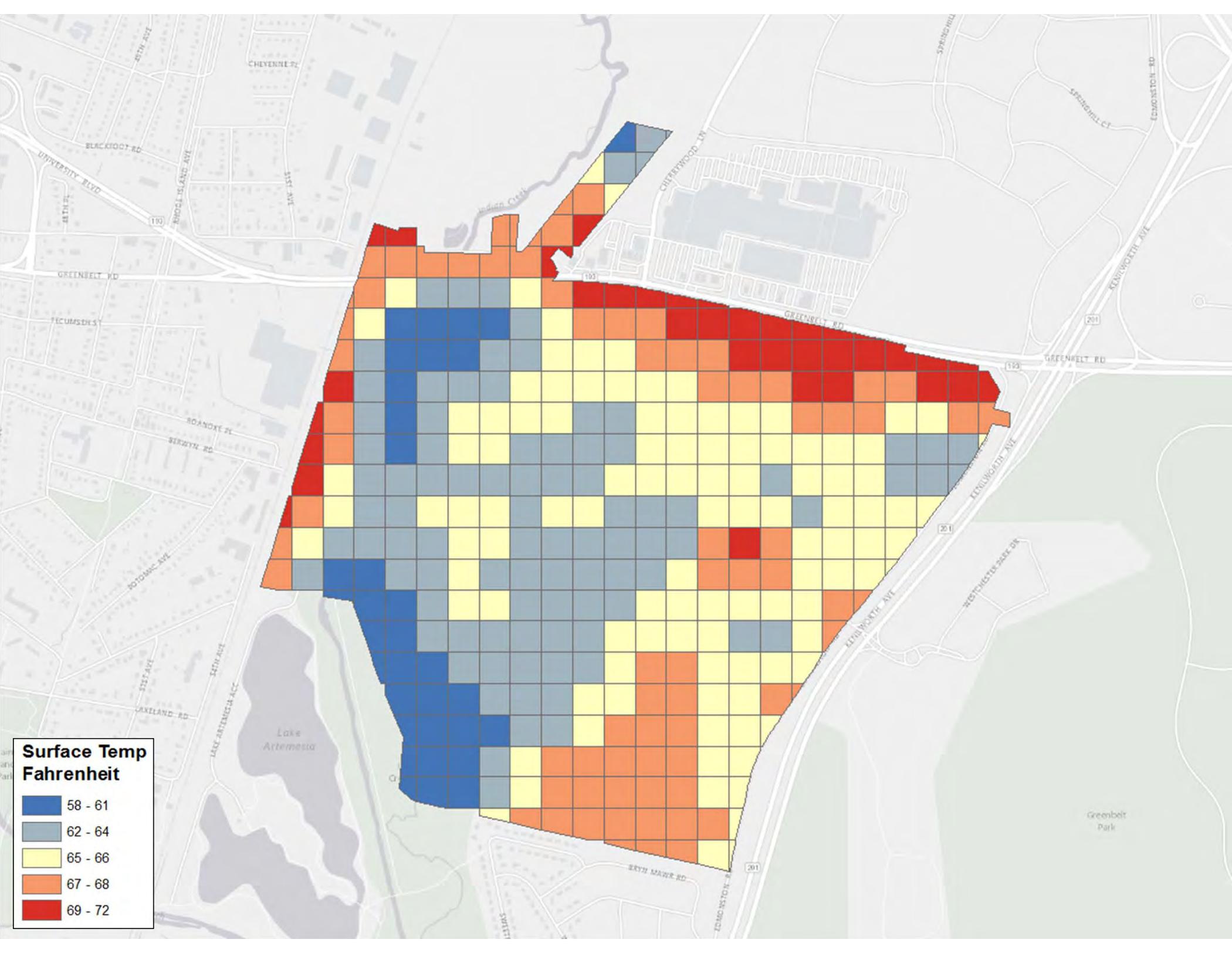
Surface Temperature

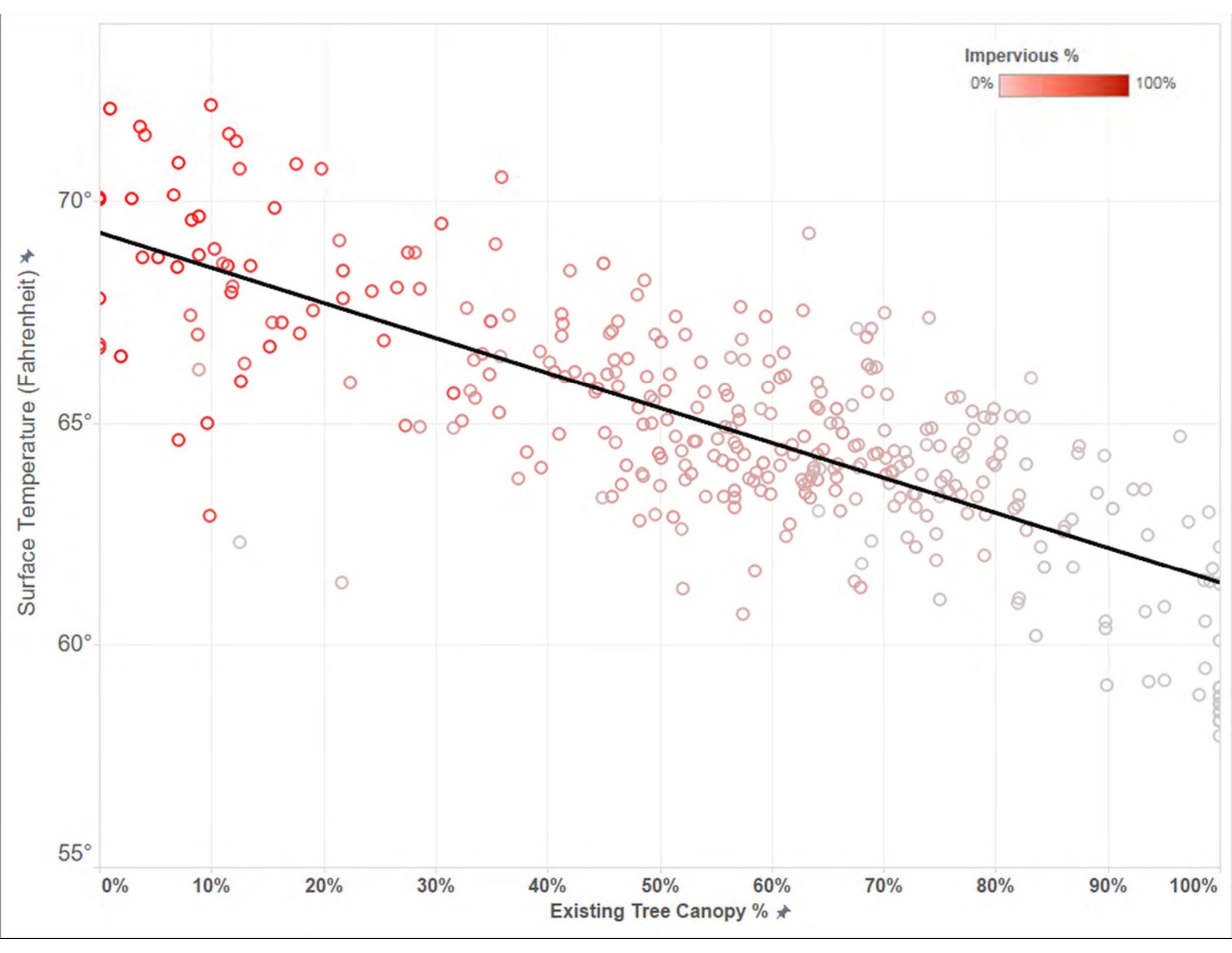
Tree Canopy Metrics



Tree Canopy Existing Percent

- 0% - 24%
- 25% - 49%
- 50% - 66%
- 67% - 84%
- 85% - 100%





Summary

- Present tree canopy very high

APPENDIX B – PUBLIC TREE INVENTORY

Berwyn Heights Tree Inventory

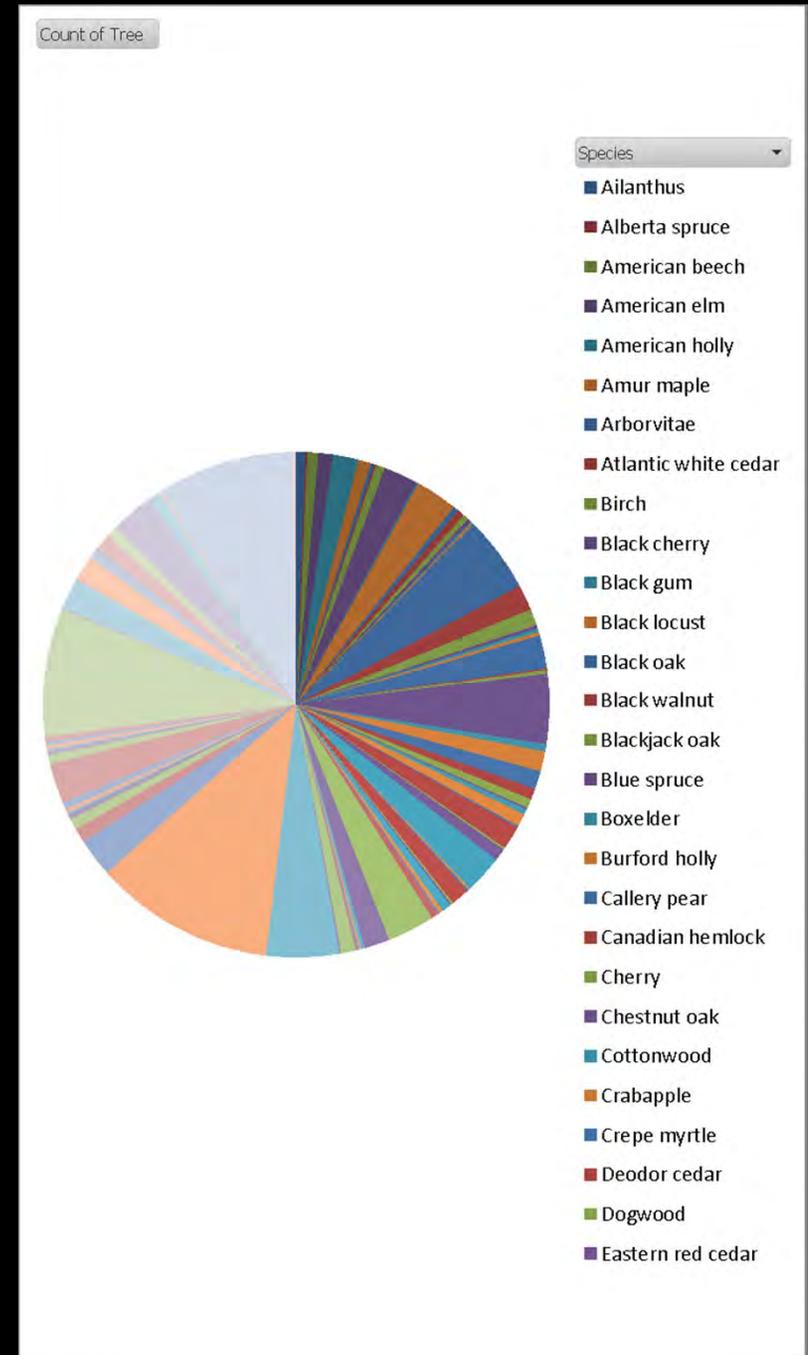
Results

Data variables

Tree # - Size – Species – Stems under 1 foot -
Condition – Primary maintenance -
Failure – Impact – Failure and Impact –
Consequences – Risk -
Observations – Further inspection -
Hardscape damage 1 inch or more -
Utilities – Growing space -
Other notes - Location

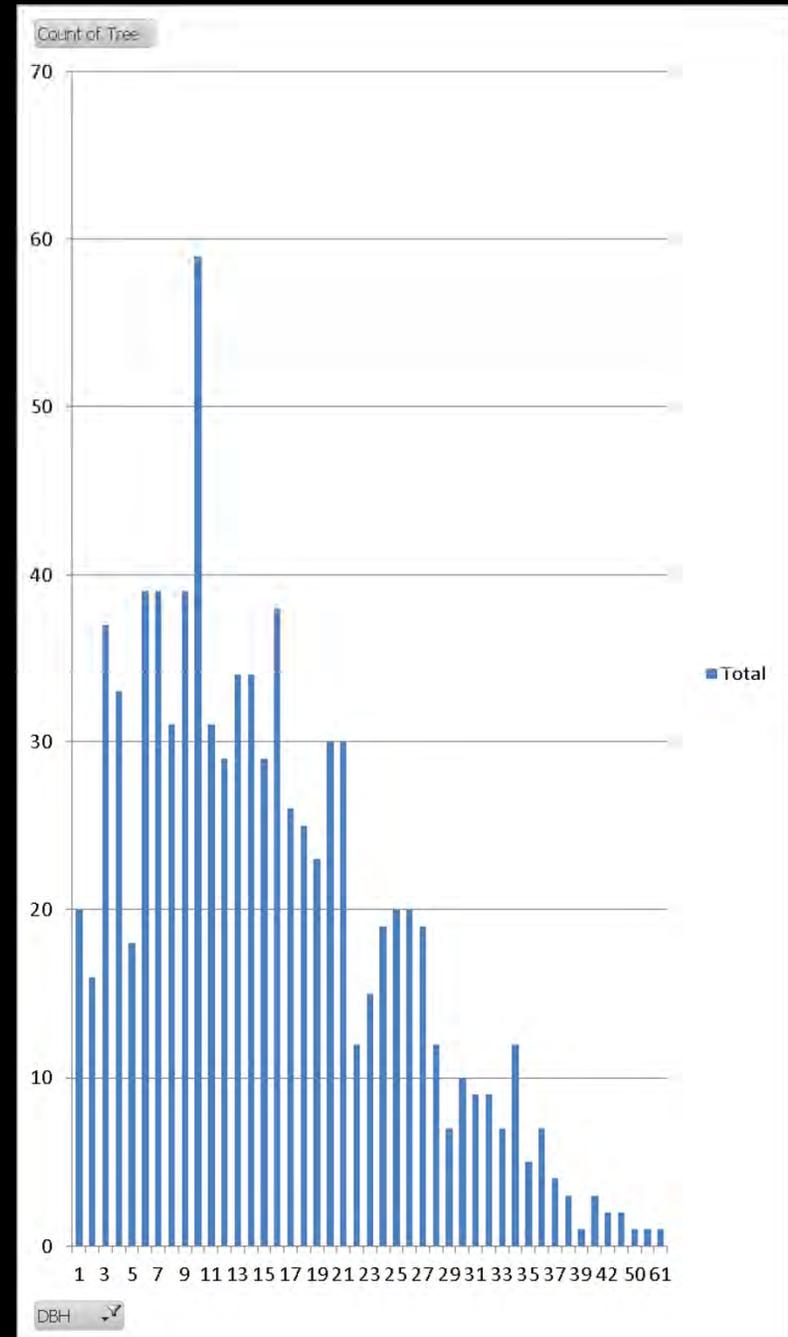
Sustainability - Diversity

- Population is extremely diverse
- Diversity = resilience
- Most common tree, red maple, makes up 11% of population



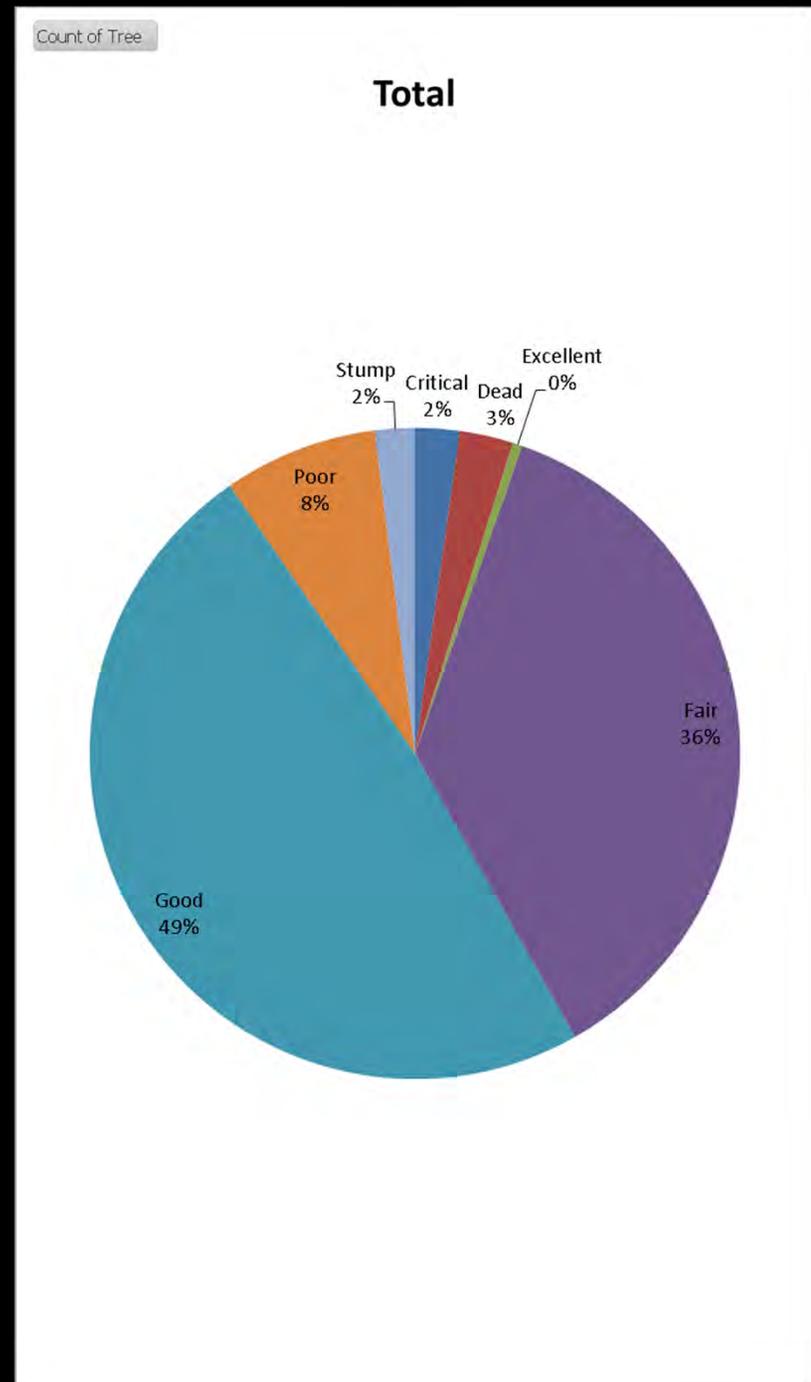
Sustainability- age

- Size used as proxy for age
- Ideal = “Reverse J”, with many younger trees and fewer older ones
- This population follows that well



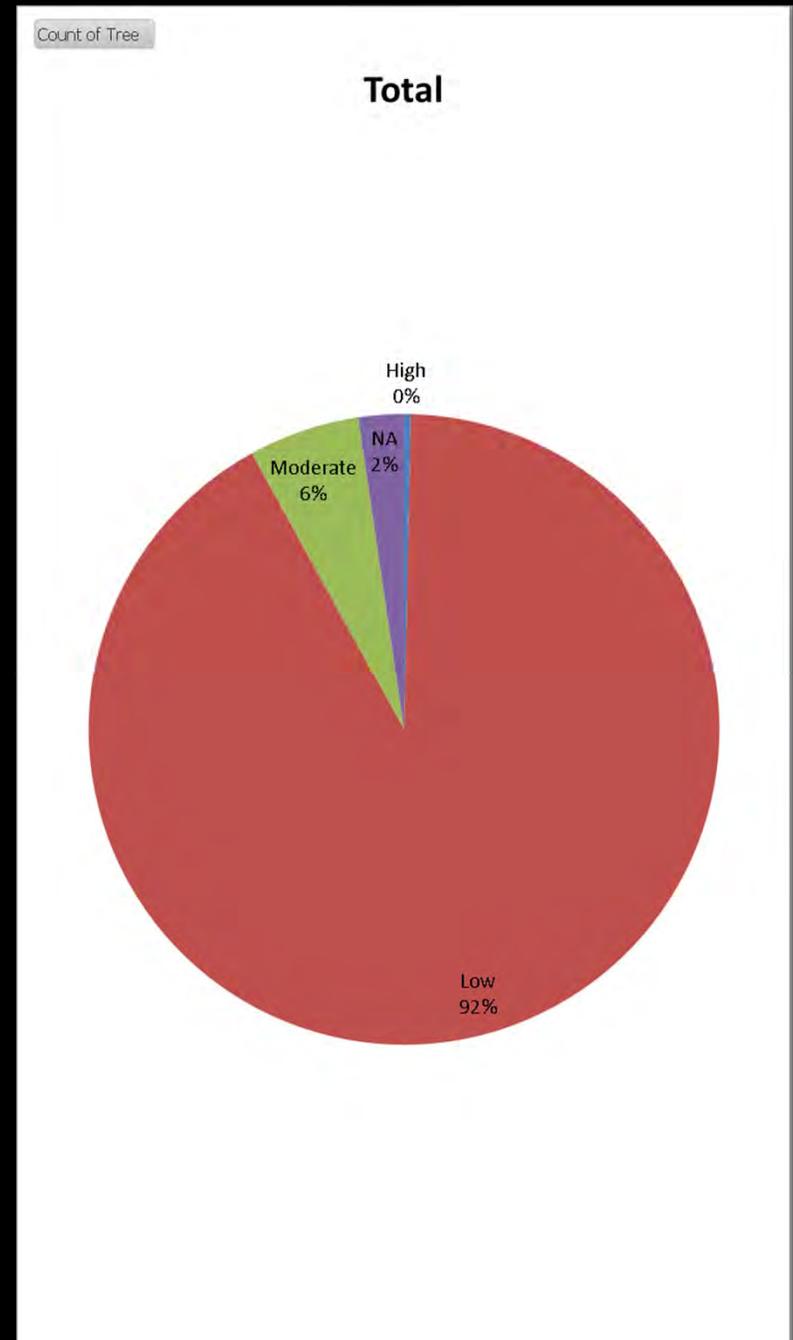
Condition

- 85% in Fair or better condition
- 5% Dead or Critical



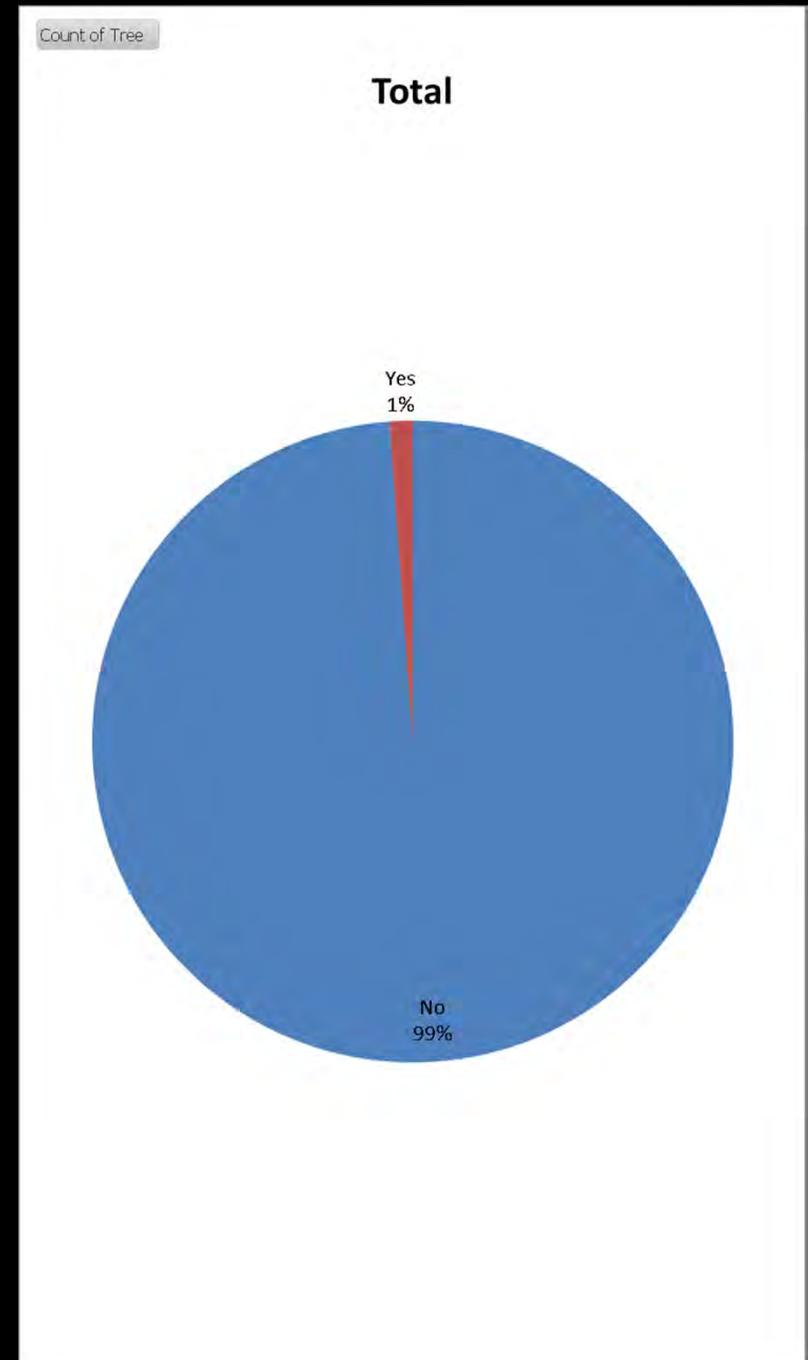
Risk

- High risk: 0% / 3 trees



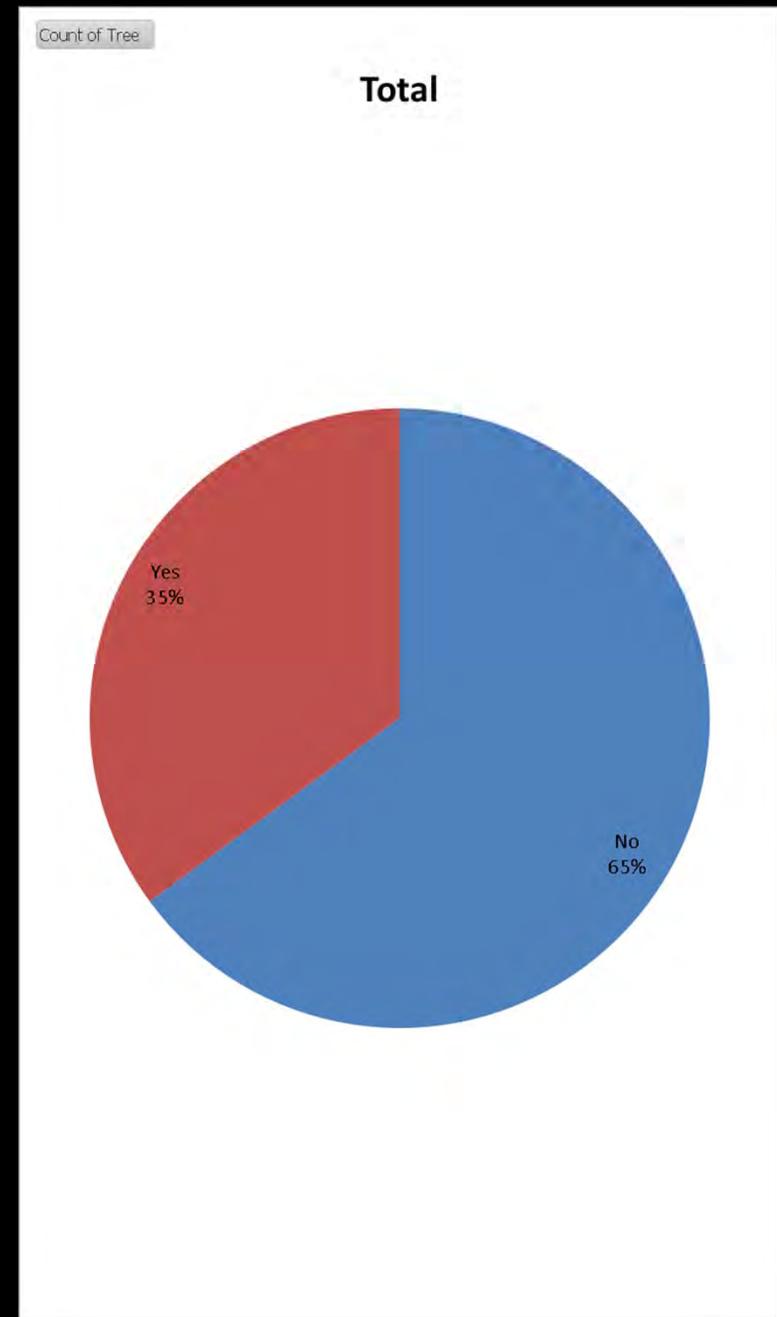
Hardscape damage

- Very low occurrence
 - 1% / 10 trees



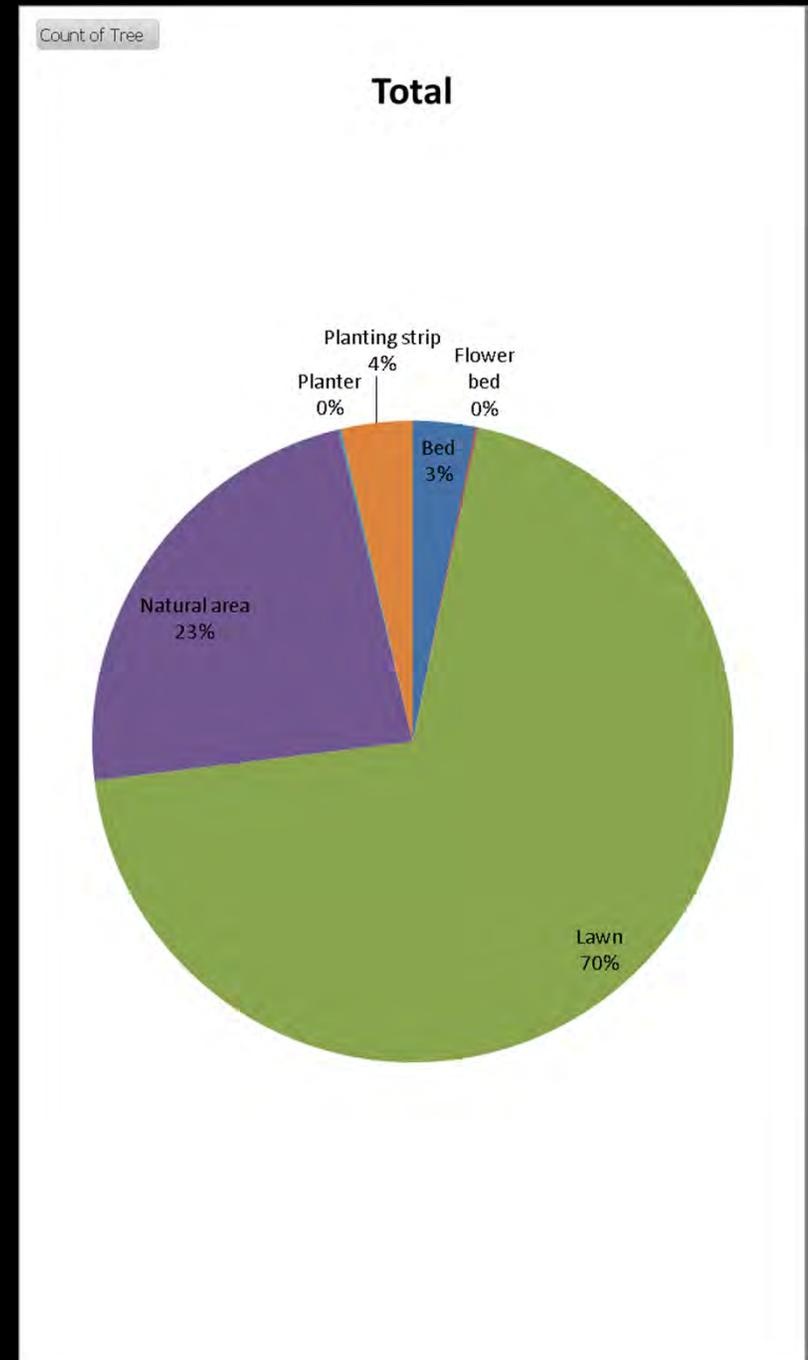
Overhead utilities

- The majority of public trees are not growing beneath overhead utility lines



Growing space

- Most in lawns and natural areas
- Reflects “tenants-in-common” status of most trees



Summary - trees

- 861 trees inventoried (street and public property)
- Population is resilient (age & diversity)
- Though the maintenance program is not extensive, most trees are in average condition and very few pose significant risk.
- However, 24% need crown cleaning and 14% are recommended for removal
- Overall = good!

Summary - infrastructure

- Public trees in Berwyn Heights cause almost no hardscape damage
- Most trees do not have OHW, though over a third do
- Most trees are in lawns and natural areas as most are on the property line rather than by the curb