

# MEETING NOTES



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MEETING DATE  
Aug 30, 2018

LOCATION  
Cambridge Rindge and Latin School

CLIENT  
City of Cambridge

PROJECT NAME/NUMBER  
Urban Forest Master Plan  
2953

RE  
Task Force Meeting 4

ATTENDEES  
City of Cambridge  
City of Cambridge Task Force  
Reed Hilderbrand

## 1. Introduction

Opening remarks from Owen O’Riordan introducing Andrew Putnam as the new director of Urban Forestry, who will be working with David Lefcourt to help manage the population of trees.

## 2. Schedule

RH reviewed the project schedule and that the team is wrapping up the data gathering and research phase. The team is setting up parameters for the climate modeling. Tree inventory is completed and soil sampling is in the process of analyzing results.

## 3. Design Team Presentation

RH presented what the team has learned so far about the composition and health of the citywide tree canopy cover according to Bartlett's 5% inventory data and AES' classification data based on imagery and LiDAR. Climate modeling assumptions (KLF&RH) and the new Urban Forest Survey (CLF) are also overviewed.

Summary of the presentation and task force comments follows:

### *Draft Analysis of City-wide Classification Data (RH)*

Looking at the draft classification data, trees in the city are identified down to genus and species, classified through 2018 LIDAR data and aerial imagery. This gives us species breakdown of the City. Seven species make up roughly 60% of the urban forest. Norway maple and honey locust are the highest in number. We've been asked whether we would remove some Norway maples but we would not because of their large canopy that provide shade.

TF: What is "Other" on the chart?

Response: Other includes trees that are less than 1.63% of the forest and the unidentified trees that are growing under large canopy trees. We will have canopy loss and canopy cover by neighborhood and land use for the next meeting.

TF: Private vs public tree separation?

Response: This includes all the canopy cover in city both public and private.

We will be breaking it down according to the City's GIS land use layer.

TF: Is this new data?

Response: It is new data. It is still a draft but the numbers will not change drastically.

TF: Is this a representative canopy cover?

Response: This is not tree counts, it show the species as a percentage of the overall canopy.

TF: What do you mean by public?

Response: DCR land is also public but we don't have control over that, so it will be considered public-other. Private institutions will be considered separately. We have opportunities to form partnerships with universities.

TF: What is the canopy loss?

Response: There is a small loss. We will be looking at comparison of 2014 and 2018. Cities on a whole across the nation are losing canopy.

TF: There was a pixelated map that shows the canopy cover from the GIS (page 7 from previous Task Force presentation), can we get higher resolution images?

City response: It depends on the GIS, we can check.

KLF: Canopy maps are pixelated because they are raster images within the presentation itself. The LiDAR data has more precise information because the survey produces fine-grained data.

#### *Initial Analysis of Tree Inventory Data (RH)*

Survey summary:

Tree survey map shows all the trees that were surveyed (5% of all trees in the city) and are color-coded. Green means in good condition, yellow - fair, orange - poor, red - dead, with 95% confidence interval. The numbers of the trees are separated according to location, material etc. New plantings have a low sample rate but there is a good distribution of young, semi-mature and mature trees. 88% of trees are in good or fair condition.

TF: What does over mature mean?

Response: Trees have expected life spans, over mature means beyond its

peak age when the tree is expected to start declining.

Tree Condition Graphs:

City trees have lower percentage of trees in good condition, not unusual that this lags behind other categories.

TF: What are the ages of commercial trees? Is it possible that commercial trees are in good condition because they are younger?

Response: Yes, your question gets at the fact that there are many additional analyses to look into.

TF: What is a commercial property, as an example?

Response: Commercial buildings at Alewife, parking lots at Porter square.

Overmature trees are in good condition.

TF: What is "overmature"?

Response: A tree that is at the end of its expected lifespan and is assumed to be beginning to decline.

Trees by Material:

We have experienced in our practice over time that using tree grates is not the best practice. Even if it is low sample size, we are not surprised that they are not doing well.

Why is turf condition so low? We looked at the turf breakdown: 62% of the turf is lawn, including the Fresh Pond, where there is a high percentage of buckthorn. It is an invasive and isn't doing well, which skews the results.

TF: Competition for space with turf going up to the tree- is there a classification for mulch?

Response: That would be planting bed.

TF: Raised planters are deadly. Does that fall under planting bed?

Response: Might be planting bed but we need to check in with Bartlett.  
[Update: Raised planters built around trees in tree pits would have been counted as "Tree Pits."]

TF: Is the golf course included in the survey?

Response: We don't believe the sampling fell on the golf course.  
[Correction: four sample plots included portions of the golf course.]

TF: Why include the areas with buckthorn?

Response: We didn't know it was there. It's a random plot selection in order to create the 5% representative inventory.

The locations of the survey plots are intentionally random. Removing buckthorn is already in Fresh Pond's management strategy. As we get into this, we will get more precise in the questions we are asking of the data- so will evaluate whether it makes sense to remove buckthorn from the inventory data when we're creating these analysis graphs.

Conditions of Trees in all Age Classes:

A question of whether mature trees are declining: should we be worried? The data shows us the mature trees are fairing as well as the average. The arc of mature/young is in a good percentage. However in specific areas some trees skew the data in some way, such as buckthorn at Fresh Pond or London Plane trees on Memorial Drive.

Trees by Genus:

The chart shows the 20 or more occurrences of each genus. Interesting things to come out: Acer is at 61% of good condition, Norway is dragging the average down a bit (57% in good condition). We thought the maples were doing better in the city. We need to consider what trees are not planted any more, we have to understand that level.

Prunus (Cherries) and Malus (Crabapple) are lower in the graph, doing less well - also doing far down on the Earthwatch report. Common trees to plant underwires- so if both are not doing well, then we need to take a look at what is growing underwire.

TF: Both are also short-lived trees (where maybe doing well when first planted), maybe look at age class.

Response: Yes, this goes back to the question re: whether commercial trees are younger. Some of these graphs provoke further questions that need additional analyses.

Fraxinus (Ash trees) only 35% is in good condition. This is before EAB comes in, so this tells us the ash is very susceptible to EAB.

## EAB:

11 suspected occurrences found in the survey. Ash trees make up 5% of the total canopy of the city from AES layer.

## David Lefcourt on EAB:

As a member of the Municipal Society of Arborists, the EAB has been a hot topic starting around 2002 especially because ash is a high percentage of the population. The initial thought was to cut down ash, but researchers realized it was cost effective to treat rather than remove. In 2012 EAB was identified in Dalton, MA, so shortly after he put together a plan to treat. He surveyed all 800 ash trees in Cambridge and 50 were in poor condition and were removed. Then broke it up that every year half the population is treated. It's difficult to use chemicals in urban environments so Cambridge is using an organic treatment. Each tree has 2 doses. 2 weeks ago they found a beetle in a trap in Raymond Park. Green traps at 14 locations in the City. Started monitoring 3 years ago, but now switching to tracking mode. As they see the population grow, will shift to treating ash every year. Somerville also identified around the same time. Boston found EAB 4 years ago. 20 years ago, there was a huge decline in ash population. No one knew what it really was. When they decline they become very brittle and falls apart. A lot of arborists don't like ash because they are very problematic.

EAB goes after all ash. Blue ash is the most resistant but we don't have any in Cambridge.

Public comment: Are homeowners aware? Is it useful to get the word out through contractors?

Response: City will pursue this option.

## Pests:

2% of trees had pests/diseases. Overall forest is healthy in terms of pests/diseases. We did not break out lethal vs. nuisance.

## *Climate Modeling*

We are in the first phase of the climate modeling. We aim to understand what is the current condition of the canopy in Cambridge and what will happen with climate change. First, we need to understand the composition of the forest and the mortality rate.

In the modeling diagram that shows the process, the inputs of the model are on the left, such as citywide tree layer and pest occurrences and the outputs are on the right. We looked at the literature to see how tree species will react to these events.

We'll use the model to establish the baseline for the effects of climate change on the forest assuming no preventative measures. Then we'll evaluate management options to find effective strategies to address challenges shown in model.

TF: Are these the only inputs? How about the wind?

Response: Wind will affect the selection of tree species.

TF: Establishing baseline, what does that mean?

Response: If we did nothing, how would the urban forest look like?

To determine the mortality rate, the trees in urban conditions have a problematic environment. According to Earthwatch study the survival rates are 96.7% for young trees and 90.8% for old trees.

TF: The mortality rate is low given the years a mature tree live. The annual survival rate is high, I am surprised.

Q: Is Earthwatch report about Cambridge?

Response: Yes.

We tried to find what criteria affects the mortality rate. Differentiating the age and tree condition and also street and residential trees.

In 2012 City of Cambridge started working on CCVA, and in 2014 on CCPR about how to mitigate extreme heat and flooding. In 2012-2013 Army Corps of Engineers studied urban forest in relation to flooding but the climate modeling was not yet complete for Cambridge.

Temperature Projections:

We want to be consistent with CCVA. Recap of the temperature projections from expert judgments, specifically designed for the city. Gradual increase, as the new normal. In our projections, more extreme events such as heat waves are expected. Temperature increases – mean annual temperature by

9°F by 2070. Heat wave defined as three consecutive days greater than 90 degrees. Calendar graphic: nighttime lows not being low enough, second day becomes worst.

The increase and severity of temperatures affect the pests. Bartlett's experts have assessed what is likely and when that would happen. In terms of temperature increase, we need to look at the hardiness zones for the species to evaluate whether species will decline. For example, Aspen have pretty low range.

There is a difference between trying to model pests and diseases than assessing the tree conditions. For these we are working with a probabilistic model rather than a spatial model.

Extreme event - Precipitation Flooding:

City will experience more frequent and heavier storms and more precipitation in the future. We want some spatial correlation where the highest flooding is. Design storms - used to evaluate what types of storm infrastructure should be used. 10 year storm has a 10% chance of occurring. From the CCVA work, we know where the flood-prone areas are and can evaluate the species in that area.

Addressed frequency in this way:

25 year storm of today will be the 10 year storm by 2070

100 yr storm of today is more like 25 yr storm of 2070

Owen: There are maps in CCVA that indicates some locations are more vulnerable to flooding.

TF: Length of time for trees- some can survive a certain length of time.

Problem with modeling 24 hr storm event?

Response: We will look at drawn down time for flooding.

TF: Any historical record of what trees were in the Great Swamp before that might potentially suggest species that would do well in the flood-prone Alewife areas?

Response: We're not aware of what species were there historically but will look to see if there were any surveys made.

TF: These graphics seem fatalistic- what can we do?

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Response: We need to look at worst case to see how we can prepare.

TF: What does the probabilistic model mean for us?

Response: It tells us what percent of a species is likely to be present in 2030, 2070.

Extreme event - Storm Surge Flooding:

Flooding in the east side of Cambridge is not overland but rather through pipes, through the infrastructure. The flooding in Alewife is coming from the projected overtopping of the Earhart dam. As this is a regional issue of concern, we may decide that it would be addressed by 2070. If we decide the flooding from dam will not be taken into account- will need to make decision.

Extreme event - Drought:

There are a lot of uncertainties of how drought can impact Northeast and impact on certain species. We're drawing from the best available resources.

What about other climate risks? In the case of an ice storm, there are some species that will be more susceptible. Trees on shallow groundwater are more susceptible to hurricanes. Species suggestion in terms of material strength.

TF: Thinking about seasonal events, such as ice storm after flowering or before the leaves drop in fall?

Response: There are some expected catastrophic events, so part of the plan should be emergency plans.

Owen: One of the interesting challenges is Alewife. Fresh Pond water table is artificially elevated to avoid contact with groundwater. Something to bear in mind, as the elevated water table means adjacent areas are at risk.

TF: In relationship to mortality, how do you correlate the lifespan when you think about these events? You need to think about gradual change, there will be a new world. That relationship of lifespan and canopy loss is complex.

TF: Adaptive management is necessary- what you recommend for 2030 might be different for 2070.



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Owen: CCPR – appendix B shows the ambient temperature on a street in 2070, speaks to existing street that has 15-20% canopy. 30% canopy has 3.6 degrees decrease.

TF: Mt Auburn has been doing phenology studies – more mature trees and microclimates.

We're looking to identify what are the big risk factors? Then from there we will develop planning strategies. These will also be evaluated according to their cost/benefit.

### *Urban Forest Survey*

Deanna from Conservation Law Foundation: We have been working on the survey with the city in recent months. We are finalizing it and we will post it next week on website, as well as asking help from organizations. We encourage the Task Force to help spread the word. It will be translated in 7 different languages. 5 to 10 minutes for people to fill out. Will be asking for people to send out the survey, it can be done on phone, iPad etc.

TF(Suggestions for the survey): Can be done at the Danehy Park Day  
Use E-line Cambridge newsletter  
Schools newsletters  
First in person survey – senior citizen center

TF: Is it limited to residents?

Response: No, but has to have an interest in Cambridge.

Public: Goal for the number of recipients?

Response: 1000 responses, anyone can take it

We will send an e-mail to the task force. Next Thursday (Sept 6<sup>th</sup>) it will be online.

TF: What is the purpose?

Response: Purpose of the survey is to know how the people are thinking about the urban forest to make recommendations. It is like market research. Survey will give us context to refine the set of national best practices.

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Public: The answers will be informed by the level of knowledge

Response: Yes, we will get a sense of whether people know about trees by asking them about the benefits of tree. We will be able to pick up attitudes on trees.

TF: Is it for a certain age?

Response: It is for everyone.

TF: Can they add input on the questions?

Response: Already vetted and ready to distribute.

Met with Community Learning Center with people not native speakers to help refine the language and questions.

TF: Installation at the library? Places where people gather.

TF: Some little flyer?

We are thinking to run the survey until the end of December.

TF: How to deal with the pixelated nature of Urban Heat Island map? One pixel can be a habitat, it is not very specific. Inherent limitations of urban heat island model- not very accurate (hard to predict ambient air)- based on land surface temperature (Landsat) – inherent limitation to resolution – 30'x30'. Scale differences between heat island and scale of tree (microclimate). Extreme vs. gradual.

Response: There are some limitations of UHI model, it isn't very accurate, based on landsat data, its resolution is 30'.

TF: Relationship between density and canopy- but also so much to do with air flow. Harder to understand in denser urban areas.

Urban microclimate and urban heat island have a huge difference. The denser neighborhoods tend to be hotter neighborhoods. It is also about how the air moves, the relationship about where you stand, where you move. You don't see the microclimate. But it does impact how cool or hot it feels. It is going to be hard to work with dense neighborhoods.

Response: We will consider the human scale in our proposals. The proposal phase will involve making recommendations at various scales, from city-wide planting strategy to street level.



**4. Public Comment Period:**

Speaker 1: Wants to have ability to not answer a question on the survey. Would like to include a question about concern on loss of tree. Character of development of commercial and residential development – should be included in the impact on mortality – maybe provide alternative approaches to zoning. It didn't seem like development and zoning is part of the climate. A: We are looking at development patterns- not part of the climate modeling. CCPR will be looking into zoning (not part of this effort).