To hear feedback on alternative approaches to updating the tree protection ordinance. This will inform future discussions with the City Council.
STRATEGY PRIORITIES

SUMMARY OF EXISTING ORDINANCE

AMENDMENT OPTIONS

NEXT STEPS/DISCUSSION
STRATEGY PRIORITIES

SUMMARY OF EXISTING ORDINANCE

AMENDMENT OPTIONS

NEXT STEPS/DISCUSSION
**POLICY**

- **56**
  - P1
  - P2
  - P3
  - P4
  - P5

**DESIGN**

- **38**
  - D3a
  - D3b
  - D3c
  - D3d

**PRACTICE**

- **12**
  - PR1
  - PR2
  - PR3

**OUTREACH & EDUCATION**

- **18**
  - O1
  - O2
  - O3
  - O4

**Key Strategies:***

- ENHANCE AND EXPAND TREE PROTECTION ORDINANCE
- LEVERAGE LAND USE REQUIREMENTS
- REDesign streets to create new planting opportunities
- SHARE RESPONSIBILITY FOR A HEALTHY FOREST
- INVEST IN THE PUBLIC REALM
FINDINGS
Private property represents 72% of the total loss since 2009 and 58% of the total 2018 canopy.

2018 CANOPY
- CITY AND STATE OWNED TREES
- PRIVATE TREES

AREA OF CAMBRIDGE CITY
- CANOPY(2018): 1043 acres
- -29.1%
- -23.7%
- -23.7%
- -2.2%
SHARED RESPONSIBILITY
Understand the importance of curbing loss to reaching 30% canopy cover

- **Curb Loss by 0%**
  - Plant 4000 trees per year

- **Curb Loss by 25%**
  - Plant 3250 trees per year

- **Curb Loss by 50%**
  - Plant 2750 trees per year
RESILIENCE
Shade the Public Realm

12,000 NEW RIGHT OF WAY TREES AT MATURITY INCREASE CANOPY COVER FROM 26% TO 27.5%* CITYWIDE

2018 CANOPY
R.O.W. CANOPY AT 25' DIAMETER, ALIGNS WITH 2050-2060 TIMEFRAME

*Idealized scheme of R.O.W. planting, does not consider conflicts with utilities, etc.
Source: CUFMP 2018 canopy analysis.
TREE PROTECTION ORDINANCE

Is well suited to...

— Establishing city policies for urban canopy management
— Establishing dedicated funds for tree mitigation and planting
— Establishing dedicated structures, permitting programs, and/or review process
— Collecting and distributing fees in exchange for tree removal
— Setting standards for tree removal, replacement plantings, pruning, etc.
— Setting standards for tree protection during construction
TREE PROTECTION ORDINANCE
Must be supported by allied efforts in ...

— Zoning Requirements to encourage planting
— Capital and Operating expenditures and infrastructure enhancement
— Urban Design Standard updates
— Education and outreach
— Partnerships with institutions and groups
1. What’s protected?
2. What’s the current process?
3. What’s the cost and who is paying?
4. What’s happened over the last year?
5. What sunsets and what remains?
EXISTING ORDINANCE
What is protected?

SPECIAL PERMITS PROJECTS
all significant trees (over 8” dbh) require mitigation

ALL OTHER PROPERTY TYPES
significant trees (over 8” dbh) require a permit
EXISTING ORDINANCE
What is the process?

SPECIAL PERMITS PROJECTS

1. I AM DOING A LARGE PROJECT
2. SUBMIT A SPECIAL PERMIT
3. EVALUATE AND VALUE THE TREES TO BE REMOVED (INDEPENDENT CERTIFIED ARBORIST)
4. SUBMIT TREE REMOVAL AND PLANTING PLANS WITH SPECIAL PERMIT
5. REVIEW BY DPW
6. RECEIVE PERMIT

ALL OTHER PROPERTY TYPES

1. I AM A HOMEOWNER LIVING IN MY HOUSE
2. FILE A PERMIT WITH THE CITY
3. ARBORIST REPORT ($150-$300 est.) (INDEPENDENT CERTIFIED ARBORIST)
4. VALUE TREES TO BE REMOVED
   - EXEMPTIONS
     - (10% RESIDENTIAL)
     - (100% FEDERAL ASSISTANCE)
5. PAY FEE
6. RECEIVE PERMIT

EXEMPTIONS
- (10% RESIDENTIAL)
- (100% FEDERAL ASSISTANCE)

DEAD, HAZARD OR OTHER EXEMPTION
EXISTING ORDINANCE
What is the cost for voluntary removals?

SPECIAL PERMITS PROJECTS

1. I AM DOING A LARGE PROJECT
2. SUBMIT A SPECIAL PERMIT
3. EVALUATE AND VALUE THE TREES TO BE REMOVED
4. SUBMIT TREE REMOVAL AND PLANTING PLANS WITH SPECIAL PERMIT
5. REVIEW BY DPW
6. RECEIVE PERMIT

(INDEPENDENT CERTIFIED ARBORIST)

TRUNK DIAMETER FORMULA

VALUE = TYP. REPLACEMENT FOR 2 IN TREE \times \frac{TOTAL CALIPER INCHES OF TREE}{2 IN (TYPICAL REPLACEMENT)}

- $1,700 (COST, PLANTING, & 3 YRS OF WATERING)
EXISTING ORDINANCE
What is the cost for voluntary removals?

ALL OTHER PROPERTY TYPES

I AM A HOMEOWNER LIVING IN MY HOUSE
FILE A PERMIT WITH THE CITY
ARBORIST REPORT ($150-$300 est.)
(INDEPENDENT CERTIFIED ARBORIST)
VALUE TREES TO BE REMOVED
EXCEPTIONS
(10% RESIDENTIAL)
(100% FEDERAL ASSISTANCE)
PAY FEE

ARBORIST REPORT
FOR ALL TREES (EVEN IF DEAD OR DYING)

$50 - $150:
site visit to determine whether the tree is significant and/or qualified for removal as hazard, etc.

$250 - $300:
site visit to evaluate the tree, on-line permitting

MITIGATION FEE BASED ON TRUNK DIAMETER FORMULA
(x 0.1 for homeowners)
(x 0 for those of Federal assistance)

\[
\text{VALUE} = \left( \frac{\text{TYPICAL REPLACEMENT FOR 2" CAL}}{1,700} \right) \times \frac{\text{TOTAL CALIPER INCHES OF TREE}}{2 \text{ IN (TYPICAL)}} \times 0.1
\]
**EXISTING ORDINANCE**

What happened over the last year?

<table>
<thead>
<tr>
<th>Permit Action</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permits Received</td>
<td>376</td>
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<tr>
<td>Permits Approved</td>
<td>347</td>
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<tr>
<td>Permits Declined</td>
<td>19</td>
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<tr>
<td>Permits Stopped</td>
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</table>

<table>
<thead>
<tr>
<th>Tree Type</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Norway Maple</td>
<td>57</td>
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<tr>
<td>Hemlock</td>
<td>41</td>
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<tr>
<td>Elm</td>
<td>23</td>
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<td>White Pine</td>
<td>21</td>
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<td>Ash Trees</td>
<td>20</td>
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<tr>
<td>Sugar Maple</td>
<td>17</td>
</tr>
<tr>
<td>Red Oak Trees</td>
<td>17</td>
</tr>
</tbody>
</table>
EXISTING ORDINANCE
What happened over the last year?

REASONS FOR REMOVAL

- 263 of approved permits were for dead or dangerous trees
- 36 permits, City Parks Project
- 22 permits, to provide a healthier tree canopy on the property
- 10 permits, tree poses a significant impact to an adjacent existing structure
- 9 permits, significant utility infrastructure project
- 7 permits, emergency circumstances
EXISTING ORDINANCE
What happened over the last year?

REASONS FOR DENIAL

11 permits: did not reapply- application incomplete
7 permits: did not reapply- did not meet category requirements
1 permit: incorrect category
EXISTING ORDINANCE

Moratorium

A moratorium on issuing permits, except in the case of hazard, began March 11, 2019 and will expire on February 25, 2020.

City Council is considering extending the moratorium until permanent changes to the Tree Protection Ordinance can be approved.
**PROPOSED ADDITIONS**
Enhance ordinance impact

**Fund**
Enable the Tree Fund to be used in more flexible ways

**Enforce**
Institute a performance bond system to ensure follow through
Intent
Enable the Tree Fund to be used in more flexible ways.

Action
Allow for funding of outreach and education programs.
Allow for funding that plant trees outside of city property.

Precedent
Atlanta: dedicates a specific portion of funds to educational outreach, administrative costs, salaries of city staff, and honoraria for tree commission members.

Portland: funds may be used to plant tree on public or private property, purchase conservation easements for the perpetual retention of trees and tree canopy and acquire land to permanently protect existing trees or groves.
**Intent**
To ensure that trees survive for at least a few years after planting.

**Action**
Require a two year bond be posted after final inspection of property prior to issuing CO with site inspection at 12 and 24 month periods and perhaps a longer timeframe.

**Precedent**
Savannah, GA: requires that a two-year bond be posted after the final inspection of the property prior to issuing the C.O. At the 12 and 24 month periods after the date of the bond, there is a site inspection to check conditions of trees. The administrator can require the property to address any items that may affect the future viability of the required trees at both inspection periods. The guidelines document recommends a period longer than two years.
VALUES
To be represented in the ordinance amendment

Trees are a shared resource

Trees provide benefits to the city

Not all trees are equal

Replanting in kind is preferred, but not all sites and project types are the same

The process should be simple and objective

The process should be equitable
COMPETING INTERESTS
To be balanced in the ordinance amendment

discourage removals

encourage planting
PRINCIPLES
To be represented in the ordinance amendment

Everyone should be subject to the ordinance
All property types are under the jurisdiction of the ordinance

Protect more trees
All trees over 6” dbh are covered by the ordinance (currently 8”)

Protect the largest trees
Increase mitigation for larger trees

Ensure equitable application of the ordinance
Exempt those on federal assistance from any fees

Encourage replanting on private property
Expand the uses of mitigation funds
## COMPARABLE REGULATIONS

### Requirements (removal or destruction)

<table>
<thead>
<tr>
<th>City/town</th>
<th>Trees on private property are within jurisdiction (outside of development process)</th>
<th>Exemptions other than dead/hazardous condition</th>
<th>Special/heightened requirements for Heritage/Exceptional trees or the equivalent</th>
<th>City/town has policies on planting or canopy loss</th>
<th>Zoning-esque landscape and design standards are included in tree protection ordinance</th>
<th>Requires compliance prior to inspection or C.O.</th>
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<tbody>
<tr>
<td>Atlanta, GA</td>
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<td></td>
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<tr>
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<tr>
<td>Cambridge, MA</td>
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</tr>
</tbody>
</table>

*Tree protection requirements were either recently revised, currently undergoing revision, or being considered for revision*
**PRECEDENT – REMOVALS**

From other cities

<table>
<thead>
<tr>
<th>City</th>
<th>Scope Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta, GA</td>
<td>No permits issued for removal or destruction of any living and non-hazardous tree (&gt;6” DBH or greater) with few exceptions.</td>
</tr>
<tr>
<td>Portland, OR</td>
<td>Permit required for removal of all city trees 3-inch DBH or greater and private trees 12-inch DBH or greater, with few exceptions.</td>
</tr>
<tr>
<td>Austin, TX</td>
<td>Removal of heritage tree only approved with a variance from land use commission unless it is an imminent hazard. Two permitting paths based on tree size and other criteria, allows removal of up to 4 healthy, non-nuisance trees per year.</td>
</tr>
<tr>
<td>New York, NY</td>
<td>No protection of trees on private property except during development. Requirements for trees removed during development are ruled by zoning.</td>
</tr>
</tbody>
</table>
REPLACEMENT TREES = TOTAL NUMBER OF TREES BEING REMOVED.

ATLANTA, GA

TREE REPLACEMENT IS EITHER INCH-FOR-INCH OR TREE-FOR-TREE, SOME EXCEPTIONS MADE FOR AFFORDABLE HOUSING DEVELOPMENTS

PORTLAND, OR

MITIGATION REQUIREMENT DETERMINED BY PLANNING REVIEW DEPARTMENT.

AUSTIN, TX

REPLACEMENT ONLY REQUIRED FOR CITY OR PARK TREES AND IS CALCULATED BASED ON TRUNK FORMULA METHOD.

NEW YORK, NY

PRECEDENT – MITIGATION
From other cities
## PRECEDENT

Mitigation fee comparison

<table>
<thead>
<tr>
<th>City/town</th>
<th>Tree fund or account maintained separate from general account</th>
<th>Mitigation or replanting requirements for trees removed during development</th>
<th>Mitigation or replanting requirements for individual property owners outside of development process</th>
<th>Requires performance guarantees/bonds/contracts for maintenance</th>
<th>Permit or notice required for pruning (private property)</th>
<th>Standards or guidance for pruning (private property)</th>
<th>Prohibits excessive pruning</th>
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</thead>
<tbody>
<tr>
<td>Atlanta, GA*</td>
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<td>✓</td>
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*Tree protection requirements were either recently revised, currently undergoing revision, or being considered for revision
**PRECEDENT**
City of Tampa — Complex Mitigation

— tree mitigation is based on tree species, shape and type for both removal and proposed

— tree replacement can occur on public or private property, on-site or off-site

— review criteria includes demonstration that tree at maturity will not interfere with utilities, structures, ADA compliance, site triangle visibility

— gives owners flexibility in moving structures/varying setbacks in order to save protected trees

— one-year maintenance agreement is required
PRECEDE NTS
Summary

- mitigation requirements range quite extensively, and can vary greatly in complexity

- tree ordinances focus on curbing loss, not incentivizing tree planting

- other vectors for incentivizing tree planting on private property include:
  - Cool Factor (under development by the Zoning Resiliency Task Force)
  - Zoning ordinance requirements
    - canopy cover requirements
The following concepts are not specific proposals but represent alternative strategies to be considered.

Each strategy has different impacts and potential consequences.
OPTIONS

Permit Only — for data gathering

One for One — encourage the long-term replacement of the forest

Some for One — size matters, more quickly replace the resource value of the forest

Trunk Area — trees have inherent and shared value — replace the value of the tree

Cool Factor — trees work for the city — link value to impact on cooling
IN ALL CASES
Always allow removal of dead or hazardous trees

1. Get Arborist evaluation
2. File permit
3. Receive approval / No mitigation required
4. Receive free replacement if desired
PERMIT ONLY
Pull a permit so the City can document canopy loss

1. File permit
2. Receive approval /
   No mitigation required
3. Receive free replacement
   if desired
VOLUNTARY REMOVAL STRATEGY 1
Replace trees One for One

1. File permit
2. Replant on site or
   Pay to support replanting elsewhere
3. Receive free replacement
   if on assistance

Notes:
— all trees are treated equally, though could consider special protections for large trees
**VOLUNTARY REMOVAL STRATEGY 2**

Replace trees based on size

1. File permit
2. Replant on site
3. Receive free replacement if on assistance

Notes:
- Larger trees require increased mitigation
- Health and location are not considered
VOLUNTARY REMOVAL STRATEGY 2
Replace trees based on size

1. File permit
2. Pay to support replanting elsewhere
3. Receive free replacement if on assistance

Notes:
— larger trees require increased mitigation
— health and location are not considered
VOLUNTARY REMOVAL STRATEGY 2
Replace trees based on size

1. File permit
2. Replant on site and
   Pay to support replanting elsewhere
3. Receive free replacement
   if on assistance

Notes:
— larger trees require increased mitigation
— health and location are not considered
VOLUNTARY REMOVAL STRATEGY 3
Value trees based on trunk area formula

Replacing trees by “caliper inch”

40” diameter = (8) 5” Trees

Replacing trees by “trunk area”

(64) 5” Trees
1. Get arborist assessment
2. File permit
3. Pay to support replanting elsewhere

Notes:
- Arborist evaluation is required
- Mitigation increases with size
- Species, health, location are modifying factors
- Homeowner exemption could be significant
- Those on federal assistance could be exempt from any fees
- Could only apply to Special Permit projects
**VOLUNTARY REMOVAL STRATEGY 3**

Value trees based on trunk area formula

\[
\text{REMOVAL COST} = \frac{\text{\$541}}{\text{TYPICAL REPLACEMENT \$/SQ IN}} \times \text{TRUNK AREA} \times \text{SPECIES RATING (\%)} \times \text{CONDITION RATING (\%)} \times \text{LOCATION RATING (\%)}
\]

- **EXCEPTIONAL TREES**
  - 15% OF TRUNK AREA
- **ALL OTHER TREES**
  - 10% OF TRUNK AREA

**MITIGATION FACTORS TO REDUCE COST**

- Residential Exemption

**DRAFT FOR DISCUSSION ONLY**
Cost of Tree Removals

Larger trees are valued more under the trunk area formula.

<table>
<thead>
<tr>
<th></th>
<th>Dead / Hazard</th>
<th>Assistance</th>
<th>Trunk Diameter (Existing)</th>
<th>Trunk Area Declining Health (X.5)</th>
<th>Trunk Area Good Health</th>
<th>Trunk Diameter (Existing)</th>
<th>Trunk Area Declining Health (X.5)</th>
<th>Trunk Area Good Health</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8&quot; Red Maple</strong></td>
<td>$0</td>
<td>$0</td>
<td>$680</td>
<td>$543</td>
<td>$1,222</td>
<td>$6,800</td>
<td>$5,432</td>
<td>$12,221</td>
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<tr>
<td><strong>12&quot; Ailanthus</strong></td>
<td>$0</td>
<td>$0</td>
<td>$1,020</td>
<td>$153</td>
<td>$344</td>
<td>$10,200</td>
<td>$1,529</td>
<td>$3,440</td>
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<td><strong>12&quot; Red Maple</strong></td>
<td>$0</td>
<td>$0</td>
<td>$1,020</td>
<td>$1,223</td>
<td>$2,752</td>
<td>$10,200</td>
<td>$12,231</td>
<td>$27,520</td>
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<tr>
<td><strong>24&quot; Red Oak</strong></td>
<td>$0</td>
<td>$0</td>
<td>$2,040</td>
<td>$5,504</td>
<td>$12,384</td>
<td>$20,400</td>
<td>$55,039</td>
<td>$123,838</td>
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<tr>
<td><strong>24” Norway Maple</strong></td>
<td>$0</td>
<td>$0</td>
<td>$2,040</td>
<td>$3,669</td>
<td>$8,256</td>
<td>$20,400</td>
<td>$36,693</td>
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<tr>
<td><strong>30” Plane Tree</strong></td>
<td>$0</td>
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<td><strong>30” Ailanthus</strong></td>
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<td>$25,500</td>
<td>$9,555</td>
<td>$21,500</td>
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</table>
ALTERNATE APPROACH – COOL FACTOR

A property owner selects and implements several strategies to reduce heat from a menu of options in order to meet a set score, the **cool factor**.
COOL FACTOR
Menu of options

- Shade Structures
- Paving with high SRI
- Lawn
- Low Planting Areas
- Planting Areas
- Extensive Green Roof
- Intensive Green Roof (less than 2' tall)
- Intensive Green Roof (greater than 2' tall)
- Small Trees
- Medium Trees
- Large Trees
- Preserved Trees

Public Realm Multiplier

Performance Value
**Cool Factor**

Cool factor encourages a range of strategies toward a goal.

- **0.15**
  - High SRI paving

- **0.28**
  - Turf
  - High SRI paving

- **0.57**
  - Medium tree
  - Planting
  - Turf
  - High SRI paving

- **1.02**
  - Medium and large tree
  - Planting
  - Turf
  - High SRI paving
**COOL FACTOR**

Removing a 24” Red Oak
Mitigation option of replacing the tree with landscape components that equal or exceed its Cool Factor score

- Large tree with lawn and asphalt: Cool Factor 0.44
- Plant two medium trees, create planting beds, replace portion of asphalt with lawn: Cool Factor 0.55
MITIGATION APPROACHES

Summary of Strategies

ONE FOR ONE

SOME FOR ONE

TRUNK AREA VALUE

COOL FACTOR

<table>
<thead>
<tr>
<th>SIMPLE</th>
<th>PROCESS</th>
<th>COMPLEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPLACEMENT COST</td>
<td>METRIC</td>
<td>INHERENT VALUE</td>
</tr>
<tr>
<td>ENCOURAGE PLANTING</td>
<td>IMPACT</td>
<td>DISCOURAGE REMOVAL</td>
</tr>
</tbody>
</table>
STRATEGY PRIORITIES

SUMMARY OF EXISTING ORDINANCE

AMENDMENT OPTIONS

NEXT STEPS/DISCUSSION
From this discussion, the consultants will refine tree removal options and ordinance recommendations for the DPW to review. DPW will then present a series of draft ordinance recommendations and alternatives for City Council’s consideration.
Should tree removal require a permit?
Should all property types and owners be covered by the process?

— If not, who should be covered?

— Should there be different approaches for different owners: residents, businesses, institutions, developers?
Should there be a cost associated with removal?

— Should costs be calibrated to size, species, condition, etc?

— Should the city’s largest trees have special protection?
Should invasive species be removed without penalty?
DISCUSSION

INVASIVE SPECIES MAKE UP 19% OF THE CITY’S TOTAL CANOPY COVER

- NORWAY MAPLE: 192.0 AC
- BLACK LOCUST: 4.2 AC
- BUCKTHORN: 2.4 AC
- TREE OF HEAVEN: 2.2 AC

TOTAL: 200.8 ACRES
Should the City mitigate costs (considering issues of equity)?

— permit / arborist review costs

— replanting costs
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