Cambridge Urban Forest Master Plan

Task Force Meeting #7

December 20, 2018

CAMBRIDGE DEPARTMENT OF PUBLIC THE WORKS

KLEINFELDER Bright People. Right Solutions.

clf conservation law foundation

BARTLETT TREE EXPERTS SCIENTIFIC TREE CARE SINCE 1907

APPLIED ECOLOGICAL SERVICES

F²

VJ ASSOCIATES

REED HILDERBRAND

There are two primary approaches to reversing the current trend of urban forest contraction —

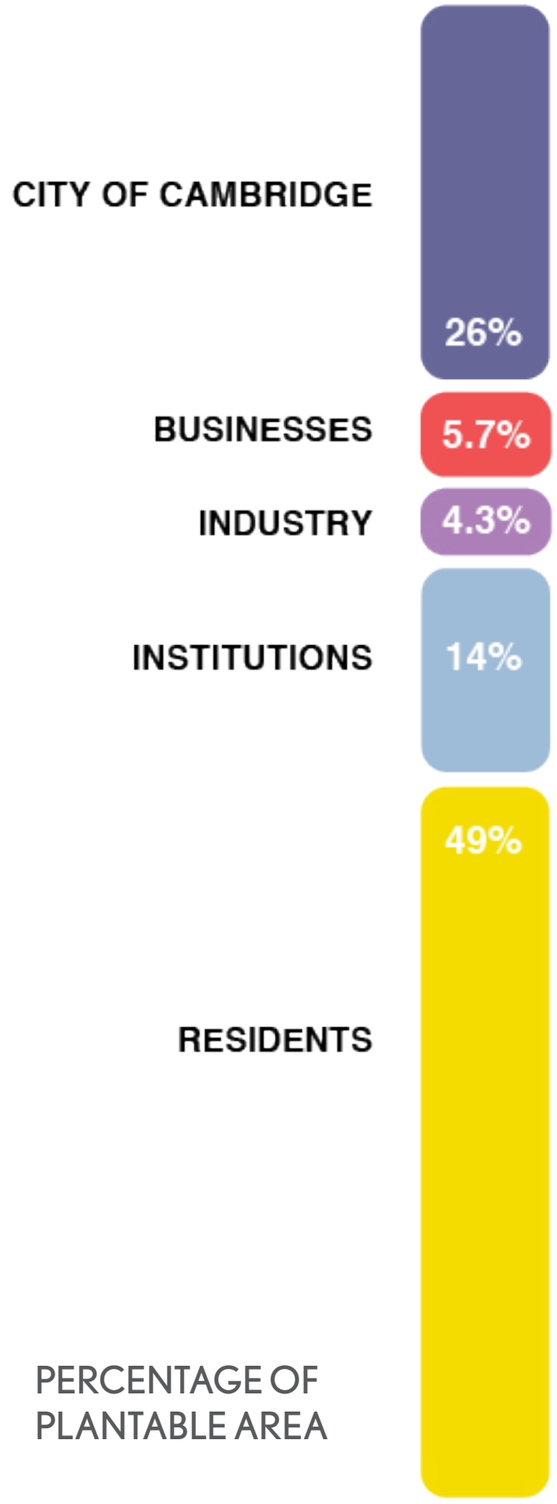
Stem the loss of existing trees

Grow Canopy by planting new trees

RESPONSE STRATEGIES

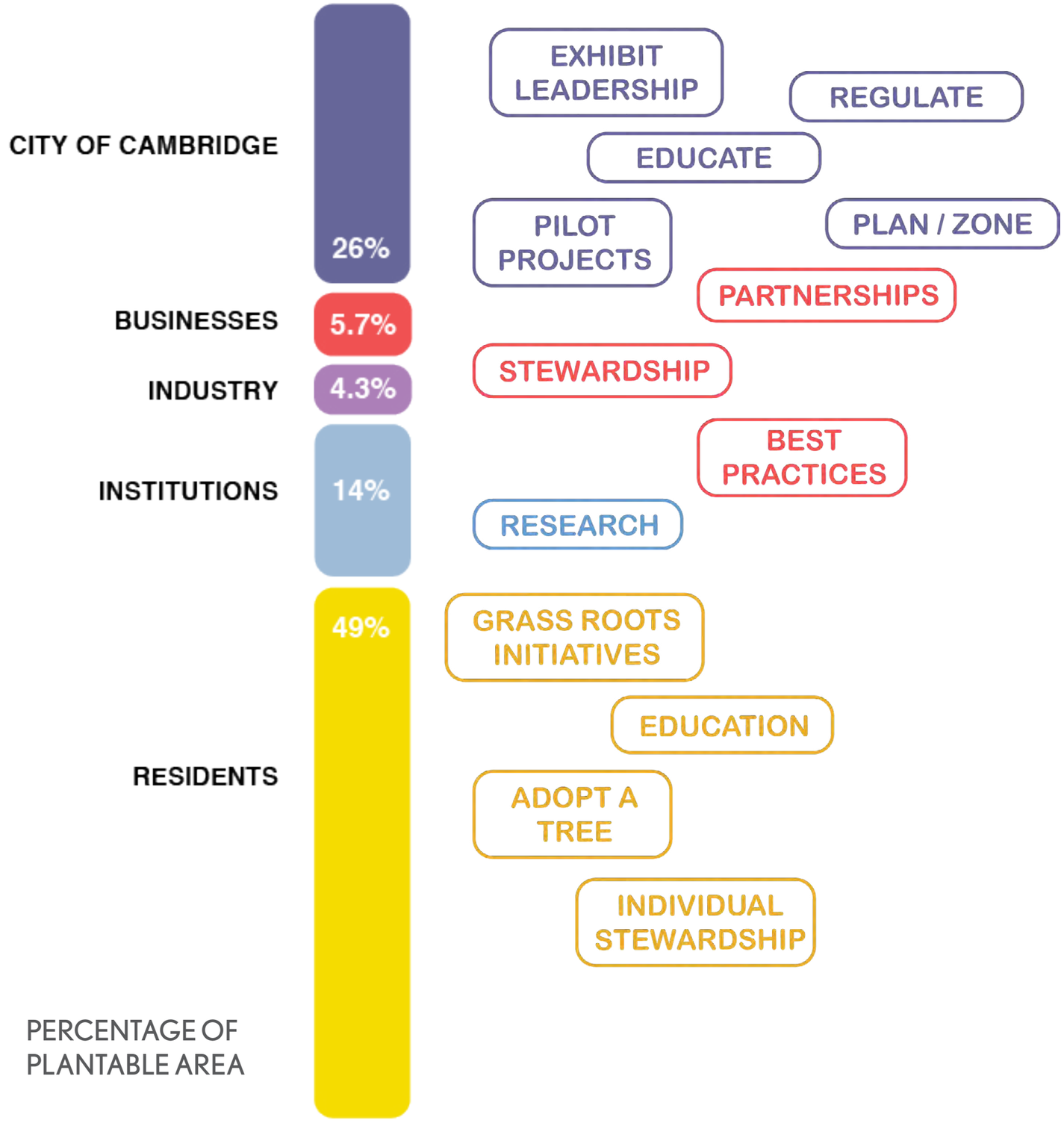
		STRATEGIES														
		Policy			Planning/Design					Practices				Outreach/Other		
		Enhance Current Tree Protection Ordinance	Formalize City Practices	Clarify Planning and Zoning	Leverage Envision Cambridge and CCPR planning studies	Restrict Street Tree Planting to Only Suitable Areas	Create New Typologies for Street Tree Planting	Implement City-Wide Planting Plan to Focus Efforts	Site New Parks/Open Spaces Strategically	Improve City Planting Practices	Improve City Maintenance and Care Practices	Implement Soils Management Program	Monitor Tree Canopy and Adapt	Invest in Educational Programs	Build Community Partnerships	Seek Alternative Green Strategies
ACTION	**in response to …**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Curb loss	Mature canopy decline	•													•	
	Land conversion	•		•	•							•			•	
	Residential removals	•		•										•	•	
	Poor tree condition	•	•	•		•				•	•	•		•	•	
	Narrow sidewalks			•		•										•
	Inadequate soil volume			•		•				•		•				
	Understanding the value of trees													•	•	
Grow canopy	Equity in distribution of canopy cover	•	•	•	•		•	•	•	•	•	•	•	•	•	
	Shading and cooling / pedestrian thermal comfort	•	•	•	•		•	•	•	•	•	•	•		•	
	Environmental quality / wellbeing and public health	•	•	•	•		•	•	•	•	•	•	•		•	•
	Ecological connectivity	•		•	•		•	•	•	•	•	•	•			•
	Diversity of forest composition						•	•		•			•			
	Disaster response preparedness				•			•		•			•	•	•	•

TAKE A MULTI-PRONGED APPROACH



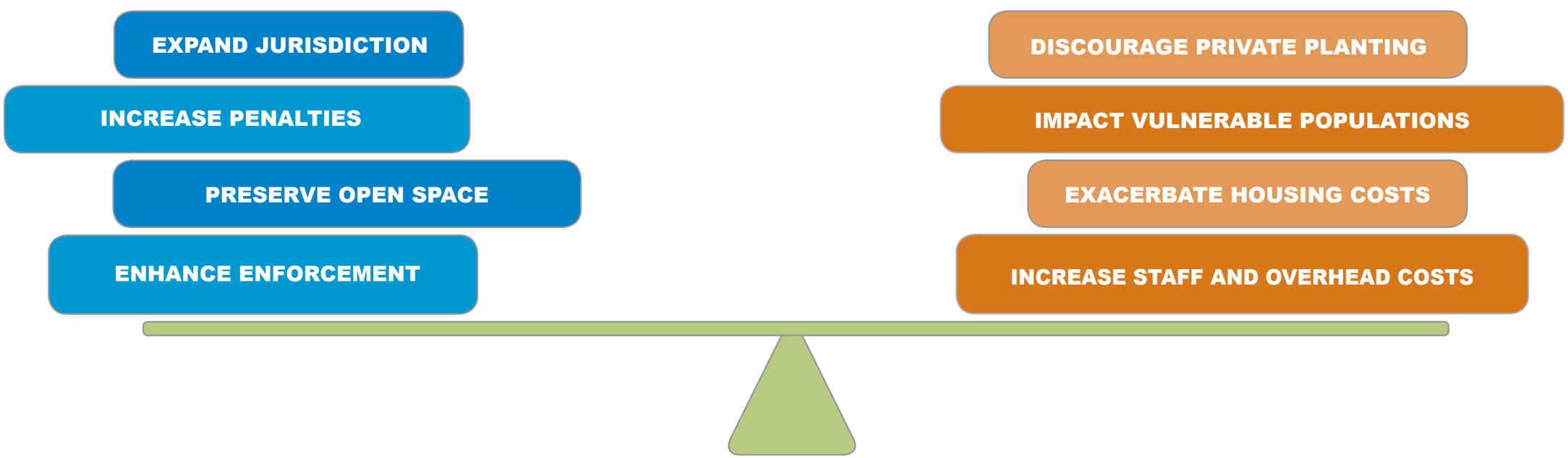
PERCENTAGE OF
PLANTABLE AREA

TAKE A MULTI-PRONGED APPROACH



PERCENTAGE OF PLANTABLE AREA

BALANCE COMPETING PRIORITIES

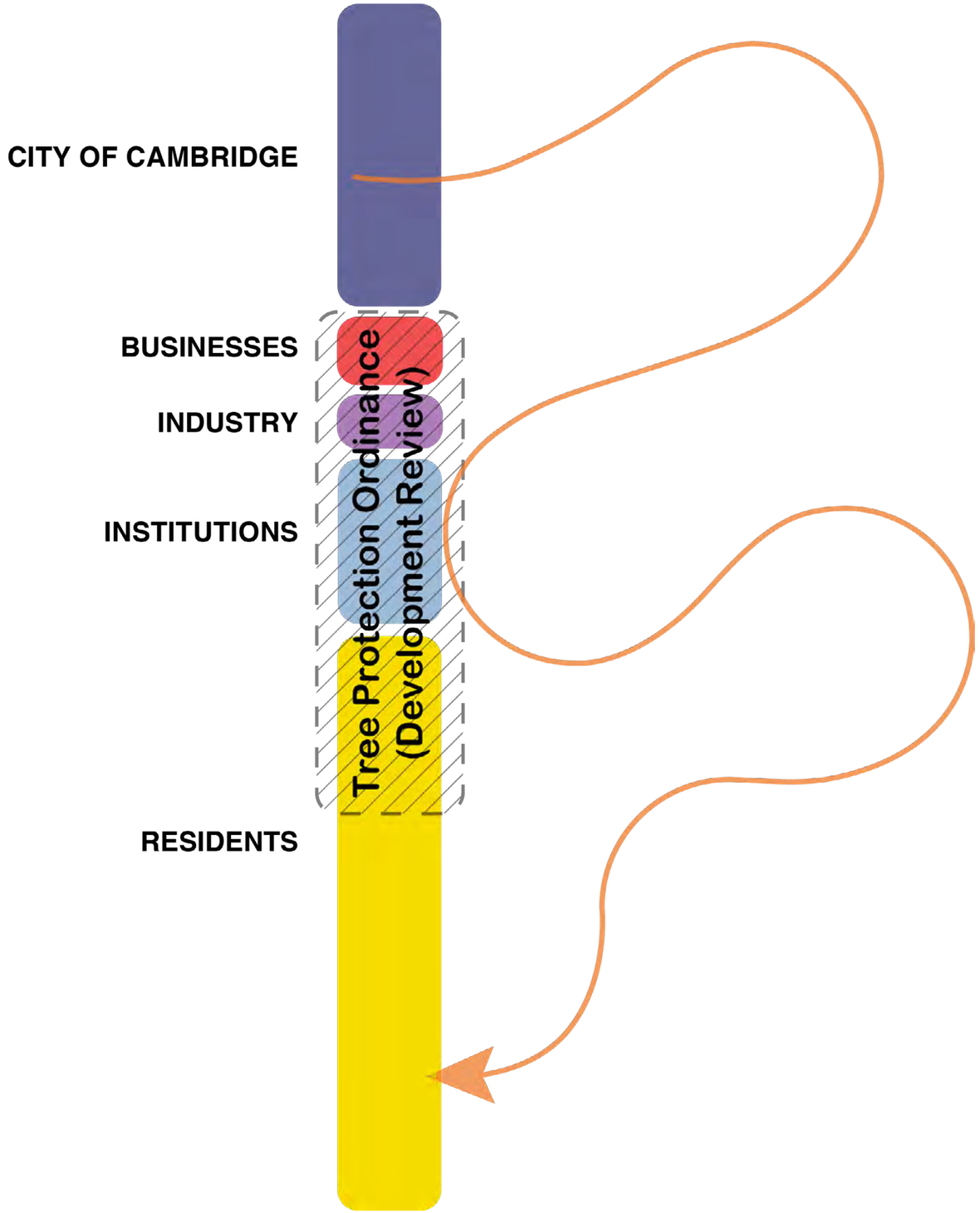


POLICY STRATEGIES

ACTION	in response to …	1 Enhance Current Tree Protection Ordinance	2 Formalize City Practices	3 Clarify Planning and Zoning	4 Leverage Envision Cambridge and CCPR planning studies	5 Restrict Street Tree Planting to Only Suitable Areas	6 Create New Typologies for Street Tree Planting	7 Implement City-Wide Planting Plan to Focus Efforts	8 Site New Parks/Open Spaces Strategically	9 Improve City Planting Practices	10 Improve City Maintenance and Care Practices	11 Implement Soils Management Program	12 Monitor Tree Canopy and Adapt	13 Invest in Educational Programs	14 Build Community Partnerships	15 Seek Alternative Green Strategies
		STRATEGIES														
		Policy			Planning/Design					Practices				Outreach/Other		
Curb loss	Mature canopy decline	●													●	
	Land conversion	●		●	●							●			●	
	Residential removals	●		●										●	●	
	Poor tree condition	●	●	●		●				●	●	●		●	●	
	Narrow sidewalks			●		●										●
	Inadequate soil volume			●		●				●		●				
	Understanding the value of trees													●	●	
	Equity in distribution of canopy cover	●	●	●	●		●	●	●	●	●	●	●	●	●	

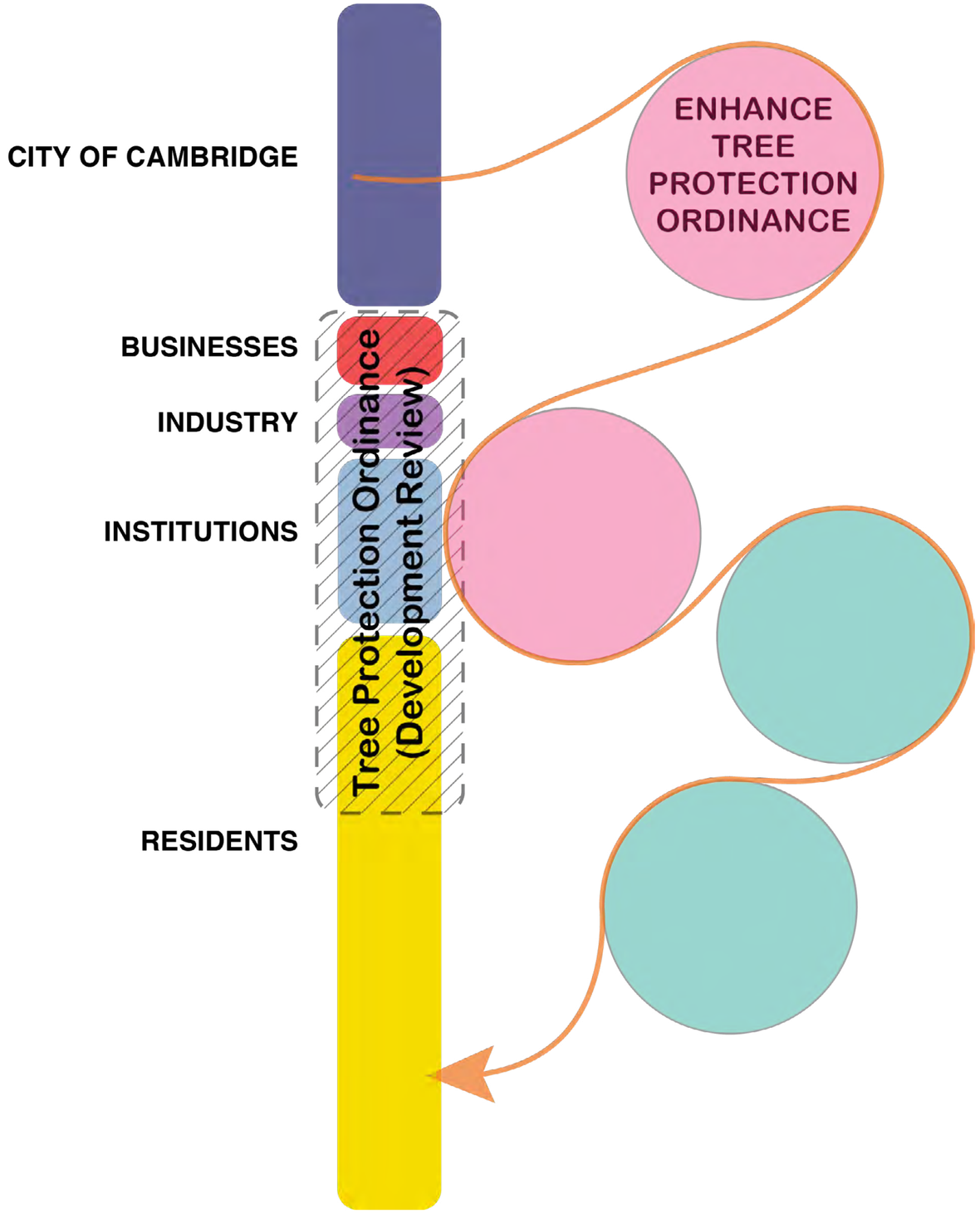
POLICY STRATEGIES – OBSERVATION

Strengthen current Tree Protection Ordinance



POLICY STRATEGIES – OBSERVATION

Strengthen current Tree Protection Ordinance



Trees have limited protection in Cambridge.

Only trees greater than 8” dbh require mitigation when part of new development projects.*

* applies to certain multifamily, townhouse and other projects requiring a special permit from the Planning Board or development projects of 25,000 square feet or more.

Three Approaches

— Expand jurisdiction

— Increase deterrence

— Enhance mitigation

Expand the **jurisdiction** of the Current Tree Protection Ordinance

Redefine "Significant Trees"

Add "Exceptional Tree" protections

Add triggers to expand the application of the Ordinance

Expand to all properties

POLICY STRATEGIES

If the city were to redefine **Significant Trees** to 6” dbh, it would expand the number of trees captured by the ordinance by approximately 49%.

8” DBH OR GREATER

6” DBH OR GREATER

For Example:
Atlanta; Seattle; Oakland, FL
Concord, Lexington, and Brookline (Massachusetts)

POLICY STRATEGIES

If the city were to add an **Exceptional Trees** category that received additional scrutiny, this could reduce removals of very large, old, or special trees.

HERITAGE TREES,
SEATTLE, WA

JACK LONDON OAK TREE, 100 YEARS OLD
OAKLAND, CA

Potential Criteria:
Size, Age, Species, Location, Historical Significance

Precedents:
Seattle, Atlanta, Washington DC

Potential Triggers

— Number of trees to be removed

— Area of new impervious surface

— Project size

Expand jurisdiction to all **private properties**

Data shows that the majority of canopy loss is not happening on development sites but on private residences. Many cities across the country, and some locally, have expanded their tree protection ordinances to apply to all properties including those that are not currently being developed/redeveloped.

Pros

- Expands city's jurisdiction for tree protection and mitigation
- Fee associated with a tree removal permit could offset city's enforcement costs

Cons

- Increase cost and resources for the city to enforce the ordinance
- Costs associated with a lawful removal of a tree on private property (tree removal permit) could be unaffordable for the average property owner
- Could discourage property owners from planting new trees

Expand the **jusidiction** of the current Tree Protection Ordinance

Redefine "Significant Trees"

Add "Exceptional Tree" protections

Add triggers to expand the application of the Ordinance

Expand to all properties

Strengthen **mitigation** requirements for removals

To remove a Significant Tree, a property developer must either replace the tree on site or pay into the Tree Fund.

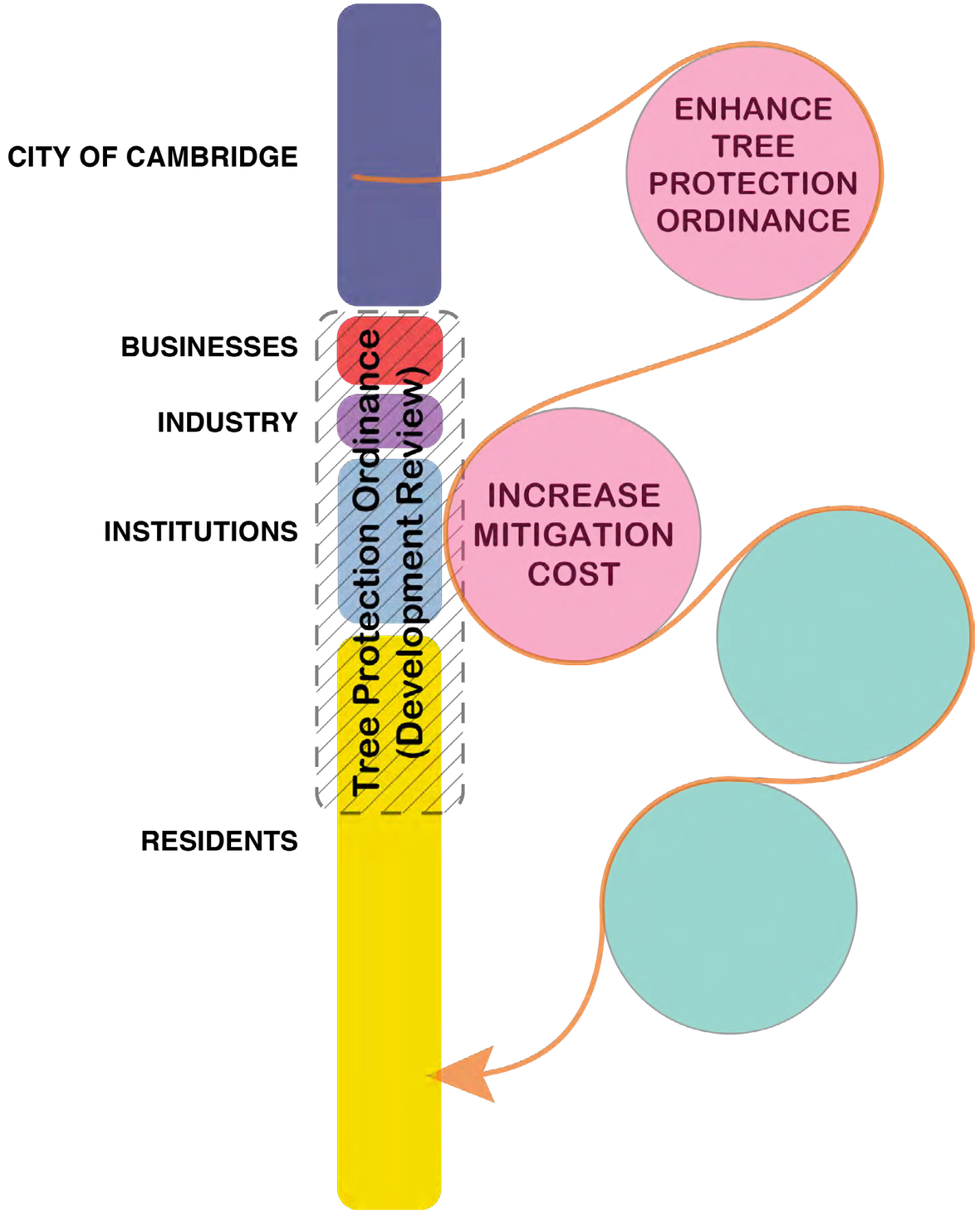
Strengthen **mitigation** requirements for removals

Current cost of mitigation is based on the cost of planting a number of 3” cal trees, approximately $1,500 per tree.

There is little incentive for a developer to minimize tree removal or to replant on site.

POLICY STRATEGIES – OBSERVATION

Strengthen **mitigation** requirements for removals



Increase deterrence — Strengthen **mitigation** requirements for removals

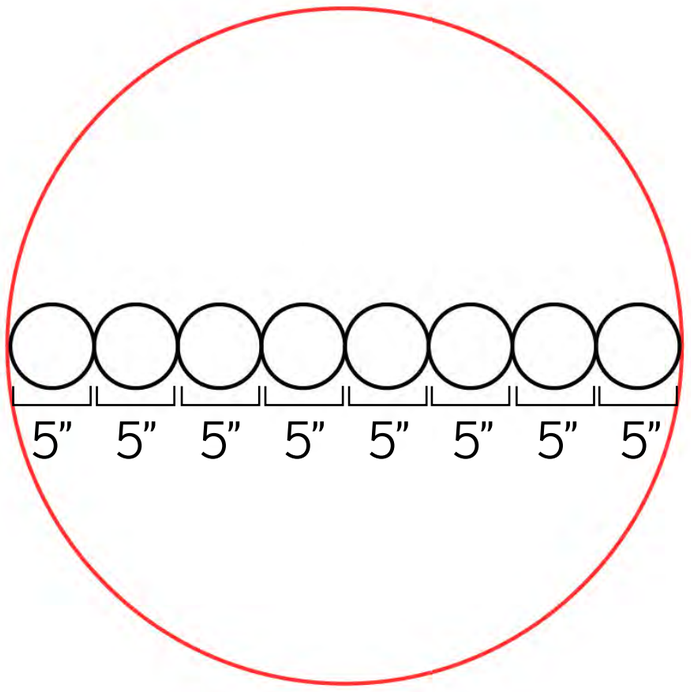
Develop more stringent requirements for replacing on site

Develop a more robust valuation process for off-site mitigation

POLICY STRATEGIES

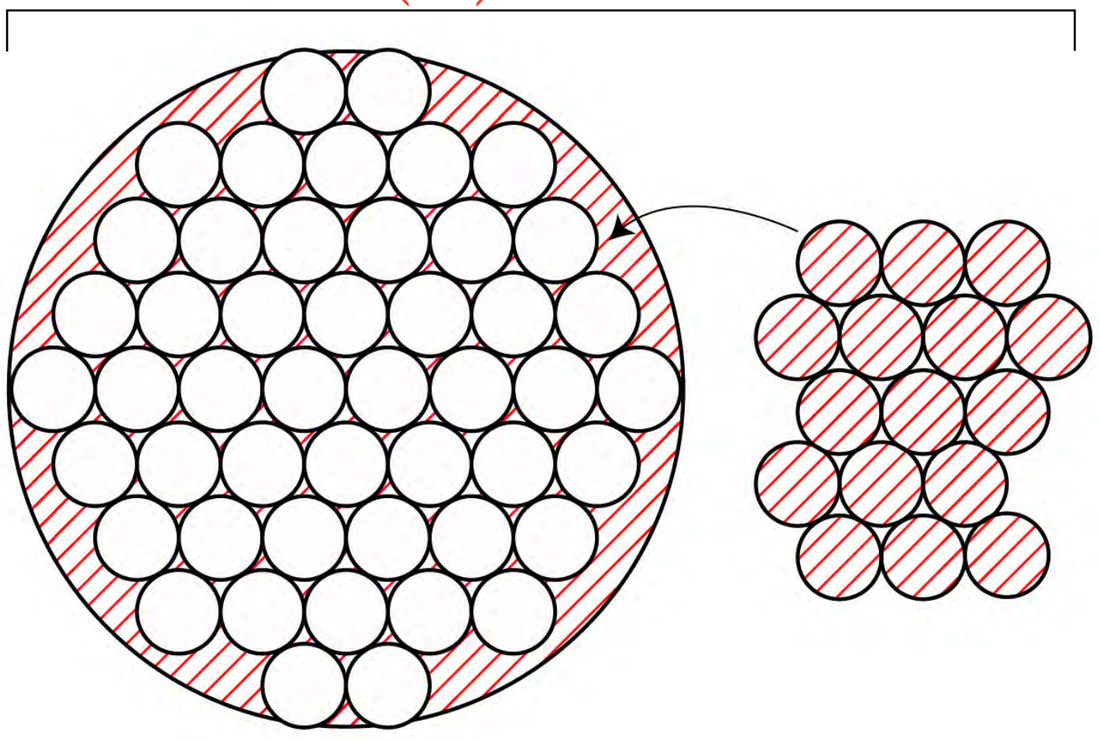
Calculate tree replacement by **trunk area** rather than by diameter

40” diameter = (8) 5” Trees



Replacing trees by
“caliper inch”

(64) 5” Trees



Replacing trees by
“trunk area”

POLICY STRATEGIES

Consider alternative **valuation** strategies

PURDUE EXTENSION

Forestry and Natural Resources FNR-473-W

Tree Appraisal

Author
Lindsey Purcell,
Urban Forestry Specialist, Purdue University Department of Forestry & Natural Resources

Trees provide many benefits and value to property owners in functional, aesthetic, social, environmental — and even economic — ways. Value may be defined as the present worth of future benefits. Many of these benefits can be quantified by a dollar figure, and it is the responsibility of an appraiser to assign monetary value. Appraising trees and living landscape components can be challenging, and requires training, expertise and experience.

The methods used to value trees are published in *The Guide for Plant Appraisal, 9th Edition*, authored by the Council of Tree and Landscape Appraisers (CTLA). The guide is endorsed by all the major arboriculture, horticulture and real estate industry organizations. When conducting an appraisal, be sure to use the current edition. The guide describes the various appraisal processes and gives examples of each. Although it is a good tool for the valuation of plants, it is only a guide and the procedures involved require care and experience.

The purpose of an appraisal is defined by the clients' needs. These needs may include tort claims, insurance claims, tax deductions, real estate assessment and proactive planning. An appraisal estimates the defined value of personal property, including plants. The tree appraisal process is used to develop a supported estimate of current value.

Unfortunately, most appraisals are done after trees have been removed or damaged. This situation requires additional investigation and might include determining pre-casualty value or sampling on a local basis. The best time to conduct an appraisal is prior to any incident or damage. This is rarely done, however. If available, previous site records, tree assessments, site reviews, images and even a witness can help determine the tree's pre-damage condition. With all the facts gathered, it is the duty of the appraiser to determine the appropriate method and provide an unbiased valuation. The appraiser should document all activities related to the process, from initial contact with the client — including establishing the background information on the tree — to inspecting the site and formulating values.

Regardless of the appraisal method used, there are some primary factors to consider. The four major elements involved in properly assessing the value of a tree are size, species, condition and location. A thorough understanding of each is imperative; otherwise, the appraisal will lack credibility and significance for the case.

www.fnr.purdue.edu

EXPERT REVIEWED

REPLACEMENT COST

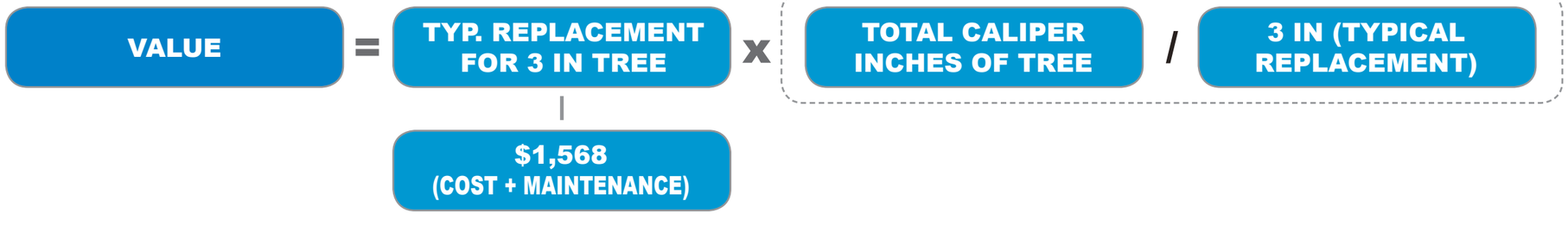
ECOSYSTEM SERVICES

CUSTOMIZED

POLICY STRATEGIES

Increase mitigation costs to reflect lost value

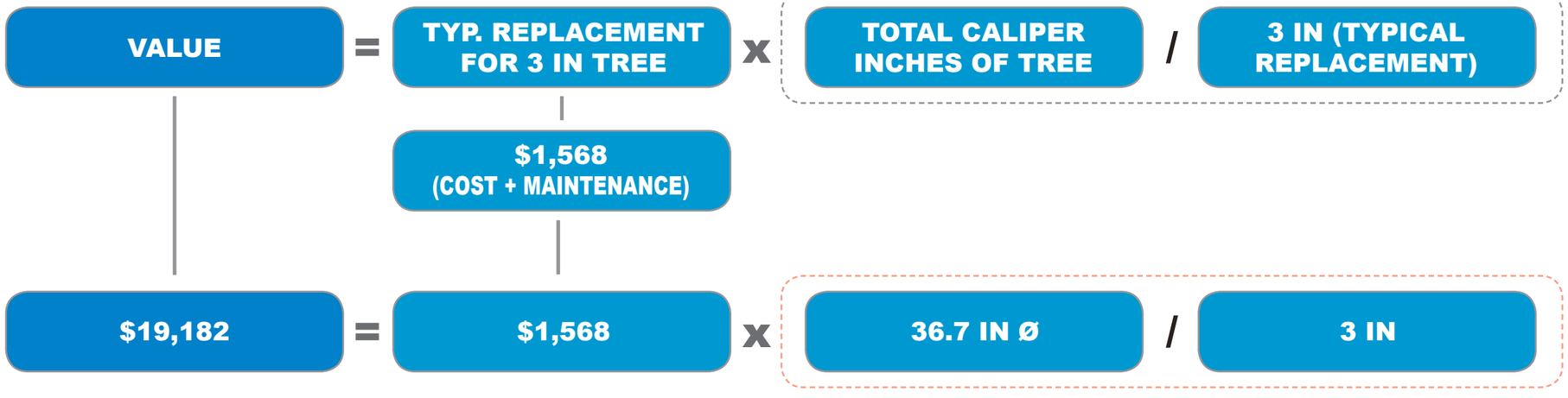
TYPICAL CALIPER REPLACEMENT VALUE



POLICY STRATEGIES

Increase mitigation costs to reflect lost value

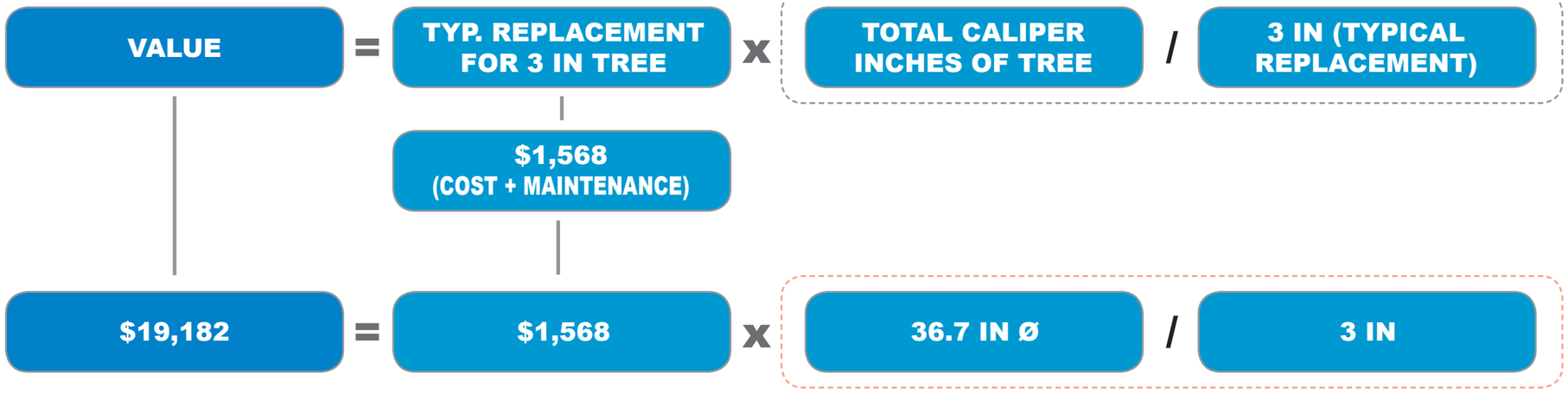
TYPICAL CALIPER REPLACEMENT VALUE



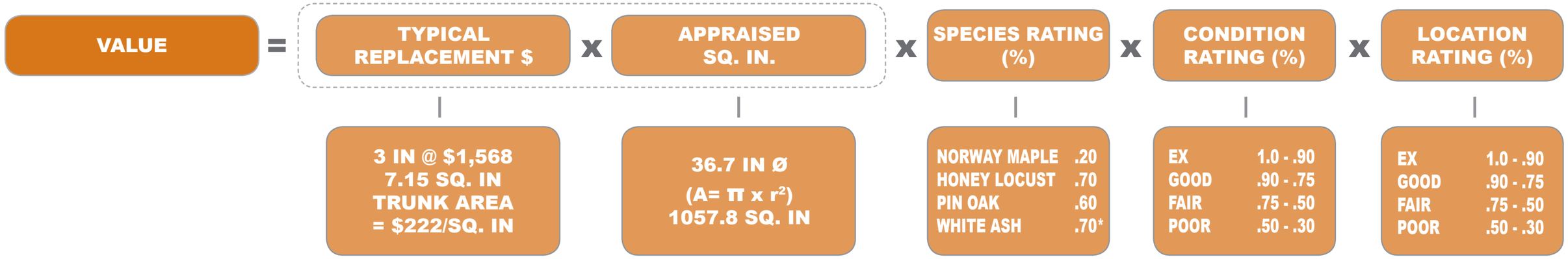
POLICY STRATEGIES

Increase mitigation costs to reflect lost value

TYPICAL CALIPER REPLACEMENT VALUE



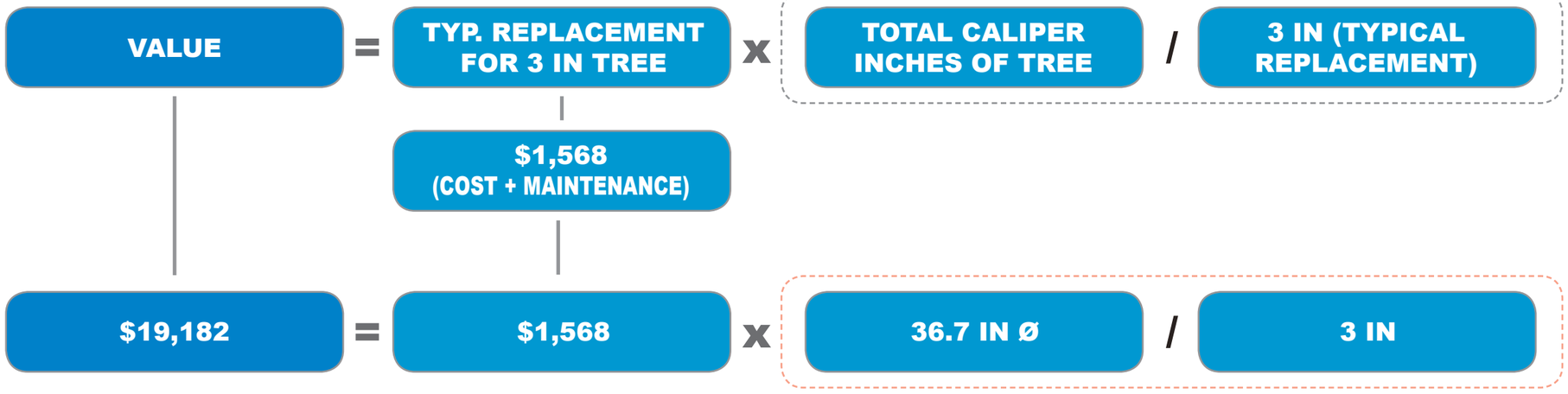
WEIGHTED TRUNK AREA REPLACEMENT VALUE



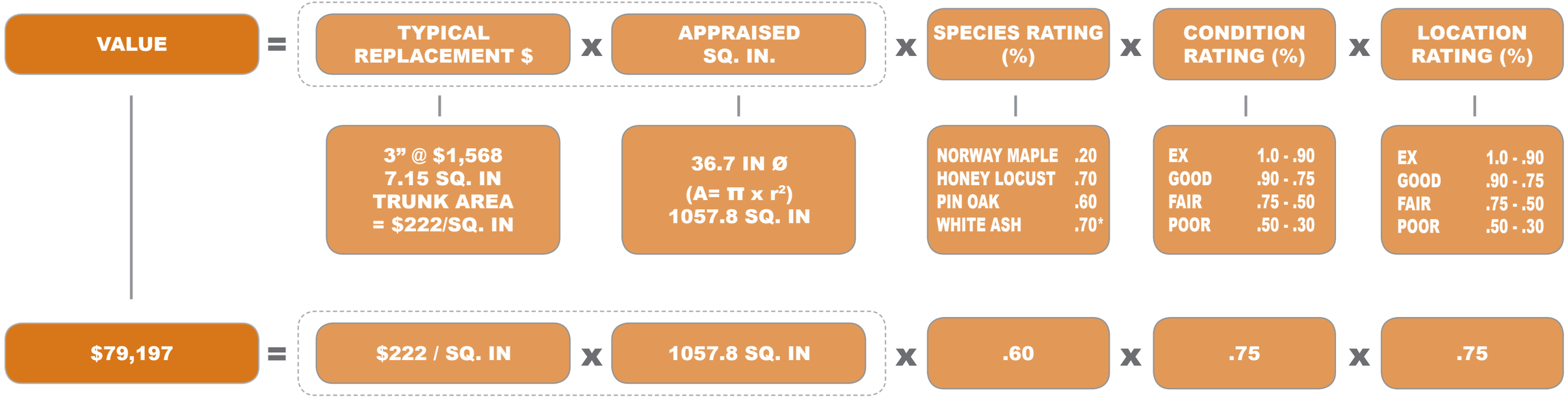
POLICY STRATEGIES

Increase mitigation costs to reflect lost value

TYPICAL CALIPER REPLACEMENT VALUE



WEIGHTED TRUNK AREA REPLACEMENT VALUE



Increase deterrence — Strengthen **mitigation** requirements for removals

Develop more stringent requirements for replacing on site

Develop a more robust valuation process for off-site mitigation

Increase **oversight** to ensure compliance

Currently, there is limited City oversight to ensure compliance.

The Tree Protection Ordinance does not currently define standards for tree protection during construction.

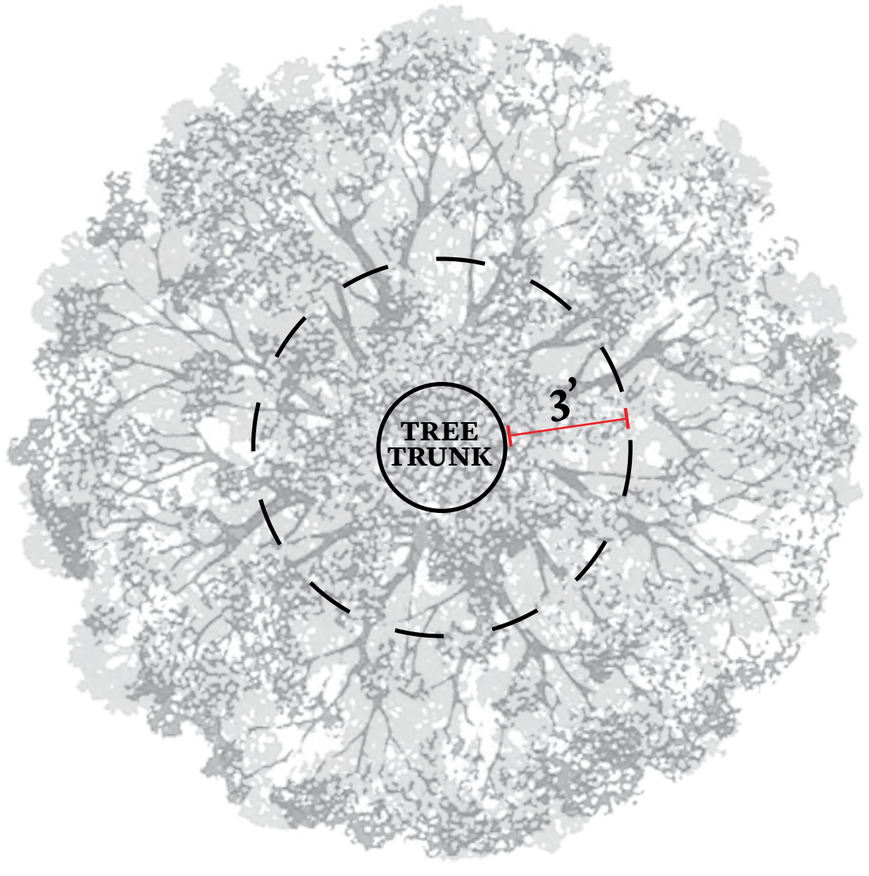
Increase **oversight** to ensure compliance

Require increased offset from tree dripline to protect tree roots

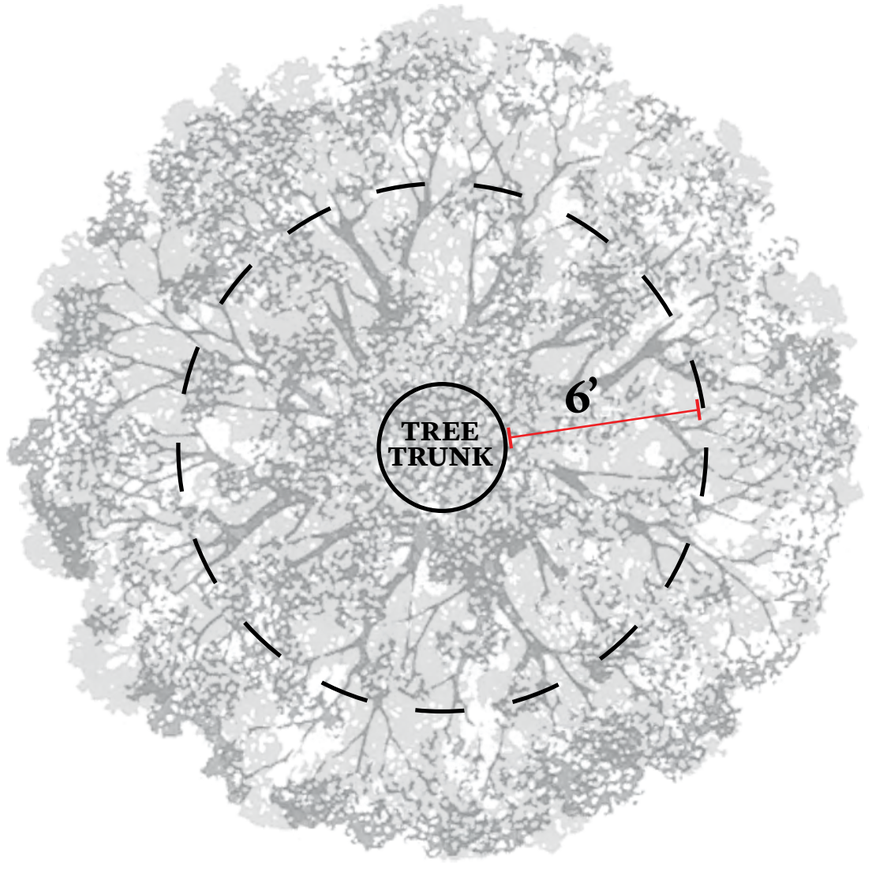
Require periodic review per an order of conditions to improve tree protection measures (fencing, watering) during construction

Require city arborist/city engineer inspection prior to obtaining Certificate of Occupancy

Expand Root Protection Zone



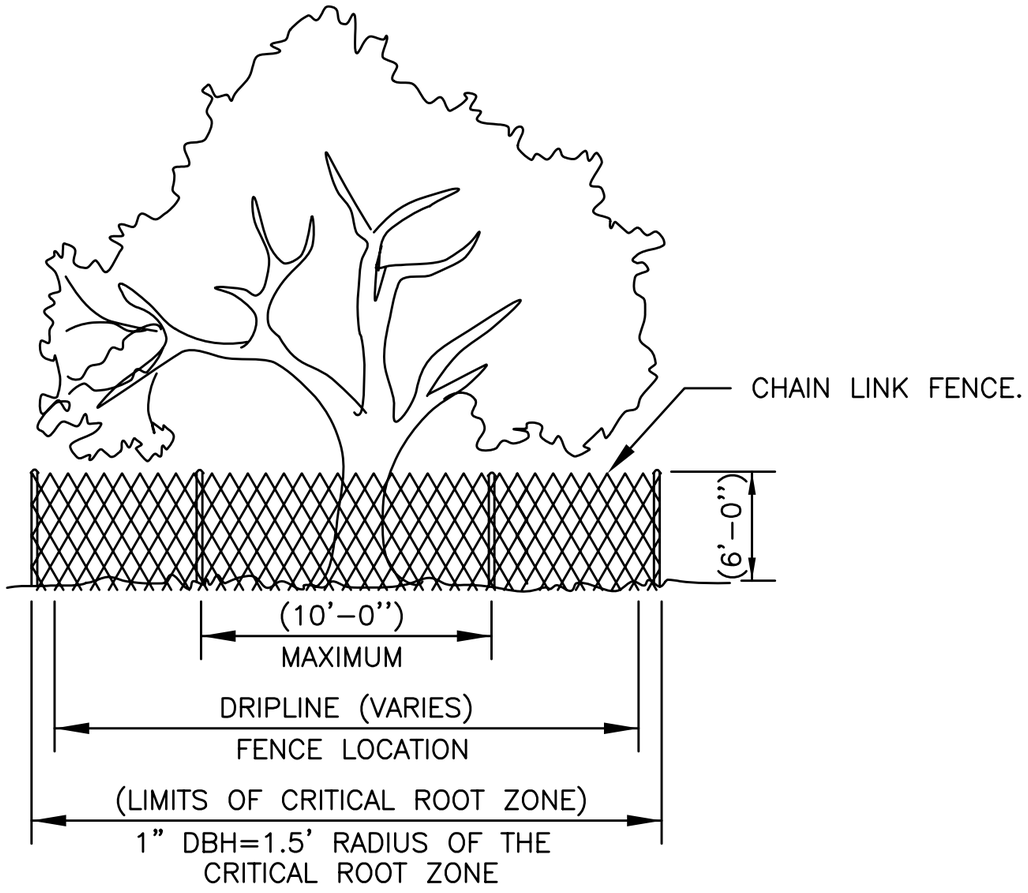
Current protection: 3’ from trunk



Proposed protection: 6’ from trunk

POLICY STRATEGIES

Trust but verify — Increase **inspections**



Increase oversight to ensure compliance

Require increased offset from tree dripline to protect tree roots

Require periodic review per an order of conditions to improve tree protection measures (fencing, watering) during construction

Require city arborist/city engineer inspection prior to obtaining Certificate of Occupancy

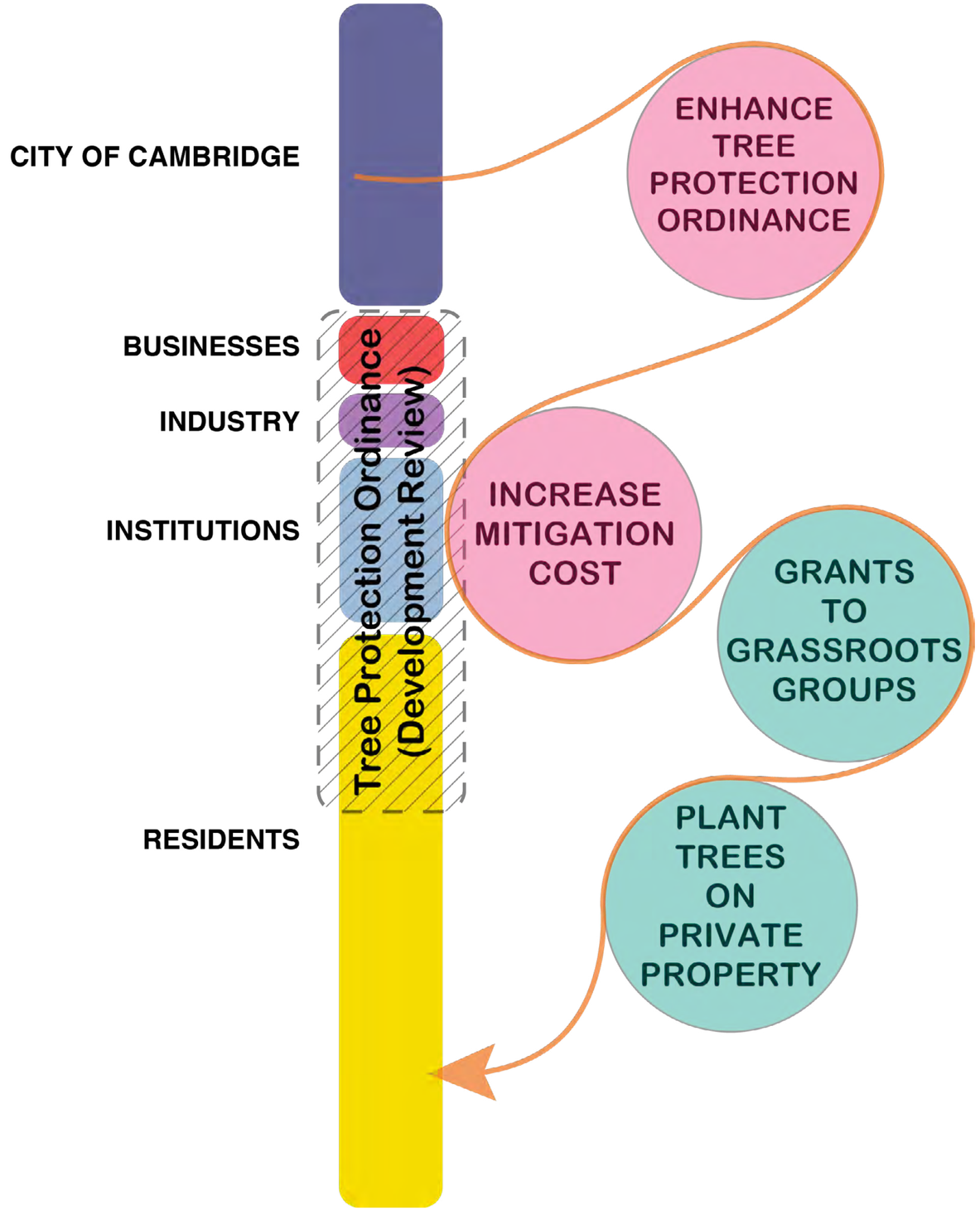
Engage with private property owners

While a significant proportion of canopy loss is taking place on private residential lots, the City does not have a way to directly **plant trees on private properties** outside of the Back of Sidewalk Program.

Under state law the city is only permitted to plant Public Shade Trees (with property owner consent) up to 20 feet from the public right-of-way. This limits the potential planting area for the Back of Sidewalk Program. In addition, the permanent protections afforded to Public Shade Trees may deter property owners from wanting to participate in the program.

POLICY STRATEGIES – OBSERVATION

Engage with private property owners



Engage with private property owners

Empower grass-roots community organizations and NGOs to plant trees on private property with grants from the Tree Fund.

Align grants with priority planting areas.

POLICY STRATEGIES – OBSERVATION

Leverage existing community organizations

Green Cambridge's Tree Task Force / Tree Group Advocates
Charles River Watershed Association
Charles River Conservancy
The Cambridge Community Gardens
A Better Cambridge
Cambridge Residents Alliance
Agassiz Baldwin Community
East Cambridge Planning Team
East End House
Neighborhood Association of East Cambridge
Mid-Cambridge Neighborhood Association
Cambridgeport Neighborhood Association
Cambridge Residents Alliance
Wellington-Harrington Neighborhood Association
Area Four Neighborhood Coalition
Essex Street Neighbors
Margaret Fuller House
Cambridge Community Center
Riverside Neighborhood Association
Mystic River Watershed Association
Taylor Square Neighborhood Association
Fresh Pond Residents Alliance
North Cambridge Stabilization Committee
Cambridge Highlands Neighborhood Association
Harvard Square Neighborhood Association
Inman Square Neighborhood Association
Porter Square Neighbors Association
Central Square Business Association

CITY PRACTICES

ACTION	in response to …	STRATEGIES: Policy 1 Enhance Current Tree Protection Ordinance	Policy 2 Formalize City Practices	Policy 3 Clarify Planning and Zoning	Planning/Design 4 Leverage Envision Cambridge and CCPR planning studies	Planning/Design 5 Restrict Street Tree Planting to Only Suitable Areas	Planning/Design 6 Create New Typologies for Street Tree Planting	Planning/Design 7 Implement City-Wide Planting Plan to Focus Efforts	Planning/Design 8 Site New Parks/Open Spaces Strategically	Practices 9 Improve City Planting Practices	Practices 10 Improve City Maintenance and Care Practices	Practices 11 Implement Soils Management Program	Practices 12 Monitor Tree Canopy and Adapt	Outreach/Other 13 Invest in Educational Programs	Outreach/Other 14 Build Community Partnerships	Outreach/Other 15 Seek Alternative Green Strategies
Curb loss	Mature canopy decline	•													•	
	Land conversion	•		•	•							•			•	
	Residential removals	•		•										•	•	
	Poor tree condition	•	•	•		•				•	•	•		•	•	
	Narrow sidewalks			•		•										•
	Inadequate soil volume			•		•				•		•				
	Understanding the value of trees													•	•	
	Equity in distribution of canopy cover	•	•	•	•		•	•	•	•	•	•	•	•	•	

The Committee on Public Planting is an existing city-sanctioned body that could build on the work of the Urban Forest Master Plan.

Provide the Public Planting Committee with resources to extend the discussion of subjects raised by the UFMP, including

— interpreting recommendations
— updating analysis based on current research
— reviewing pilot projects
— reviewing progress toward targets

Set up technical review panel to meet with the Public Planting Committee periodically to provide assistance and support, per the model of the Chicago Region Trees Initiative ...

Executive Advisory Council

CHICAGO PARK DISTRICT
Chicago Wilderness
Illinois Green Industry Association
Metropolitan Mayors Caucus
The Nature Conservancy
The Morton Arboretum
Chicago Metropolitan Agency for Planning
FOREST PRESERVES of Cook County
ILCA Illinois Landscape Contractors Association
Metropolitan Water Reclamation District of Greater Chicago
openlands
Forest Service US Department of Agriculture

Many concurrent planning efforts have overlapping but different priorities.

As the city determines top priorities, we should consider formalizing which efforts and initiatives take priority over others.

New City tree plantings occur by request and at the discretion of the City Arborist.

This may have the unintended consequence that some areas of the City have fewer new street trees than others.

Integrate equity and environmental justice criteria

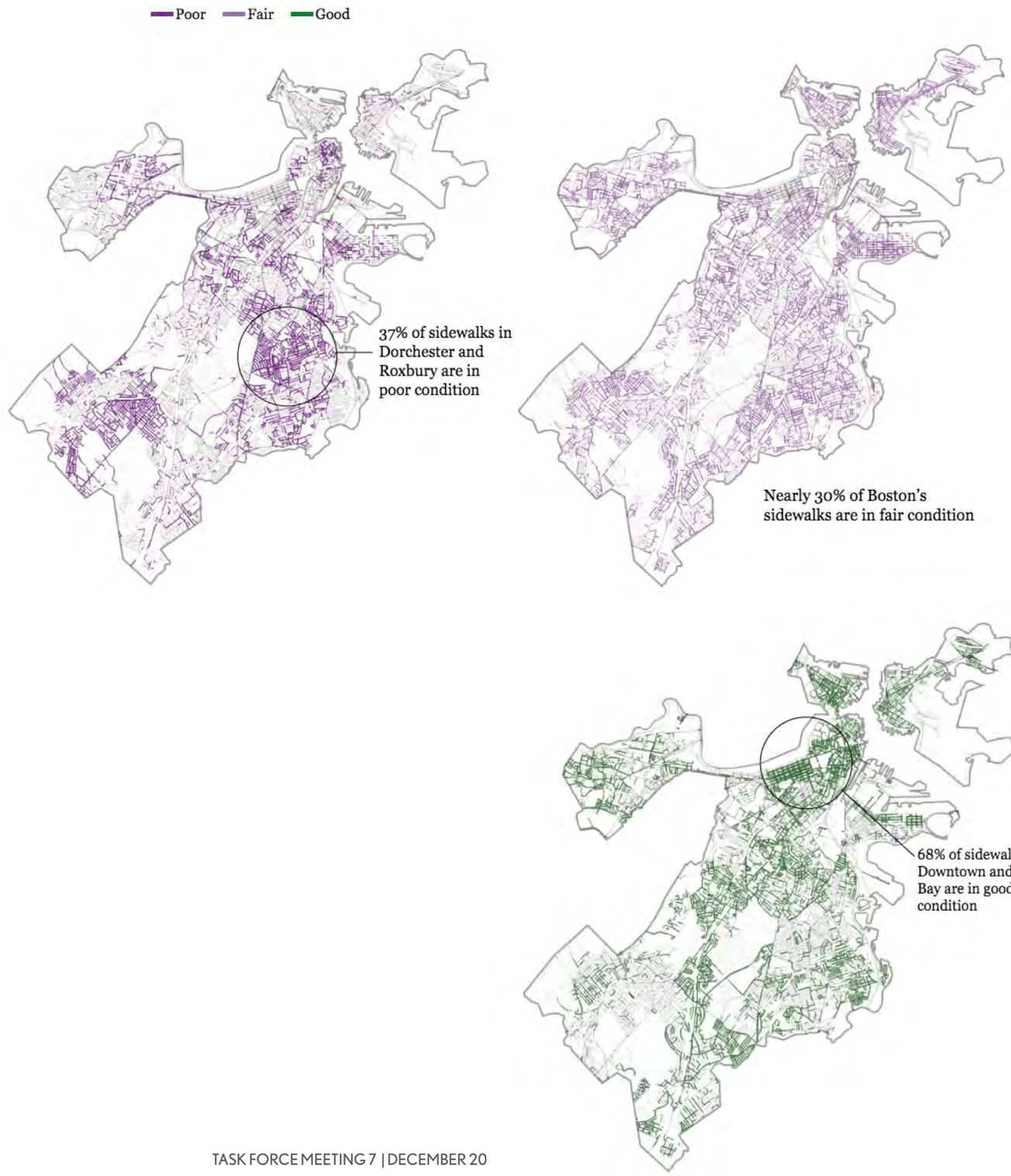
Boston's rich and poor neighborhoods show sidewalk repair disparity

JESSICA RINALDI/GLOBE STAFF

The sidewalk outside of the entrance to the playground behind the Trotter School in Dorchester is a spiderweb of cracks.

By Meghan E. Irons | GLOBE STAFF MARCH 04, 2018

The divide between the haves and have-nots in Boston has always been stark, often measured by the quality of schools and the safety of streets.

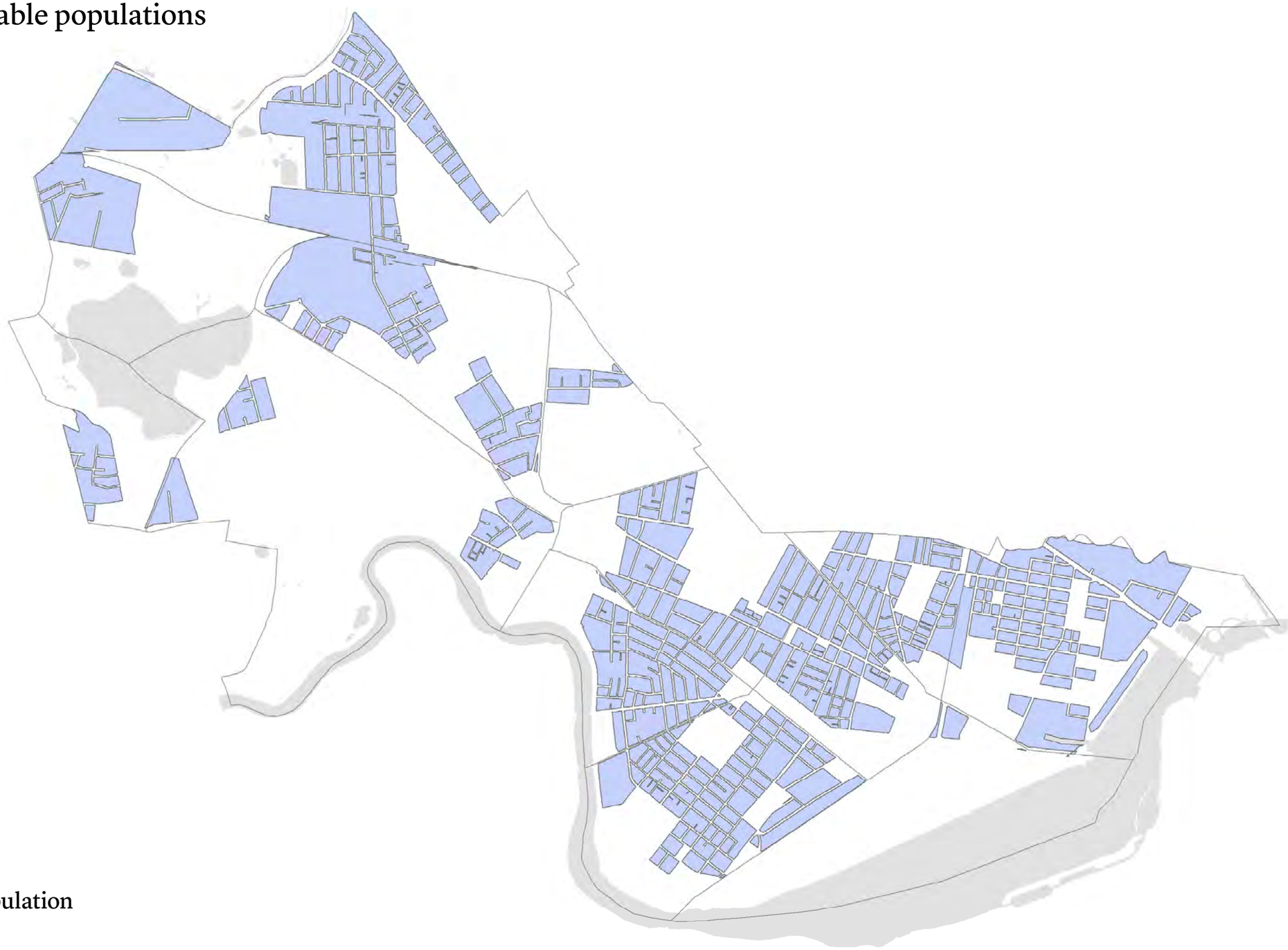


Source: The Boston Globe

Define priority areas and target outreach/city funded planting to align with equity and planning goals.

PLANTING PRIORITY AREAS

Environmentally vulnerable populations



CRITERIA 1

Minority population

Low income population

Non English speaking population

PLANTING PRIORITY AREAS

Heat island hotspots

CRITERIA 2

Greater than 92 degrees
on a 90 degree day
as modeled by KLF for 2030
ambient air temperature

PLANTING PRIORITY AREAS

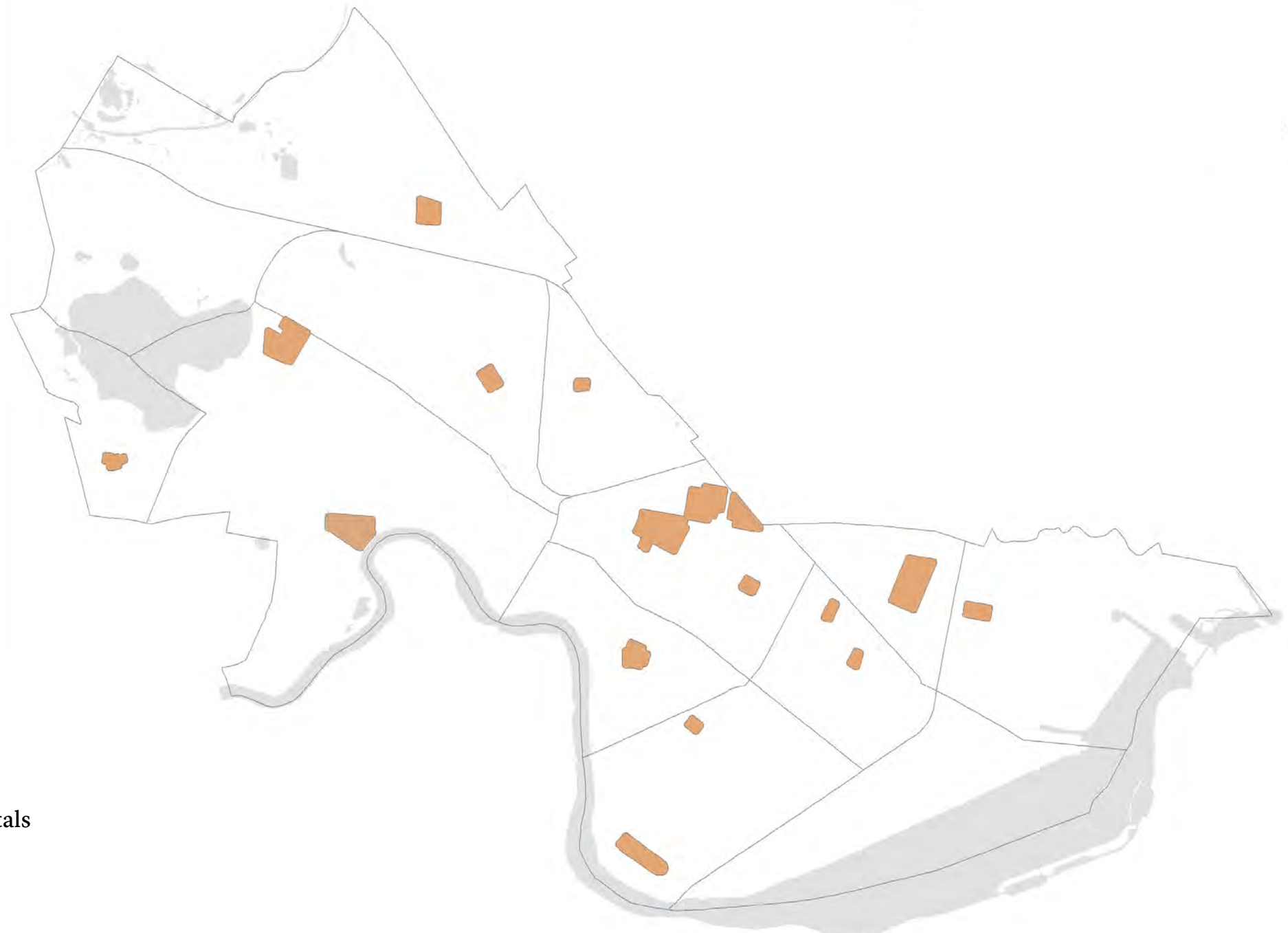
Transportation corridors

CRITERIA 3

Highest concentration of pedestrian and bike traffic and important corridors for connecting green spaces

PLANTING PRIORITY AREAS

Social infrastructure

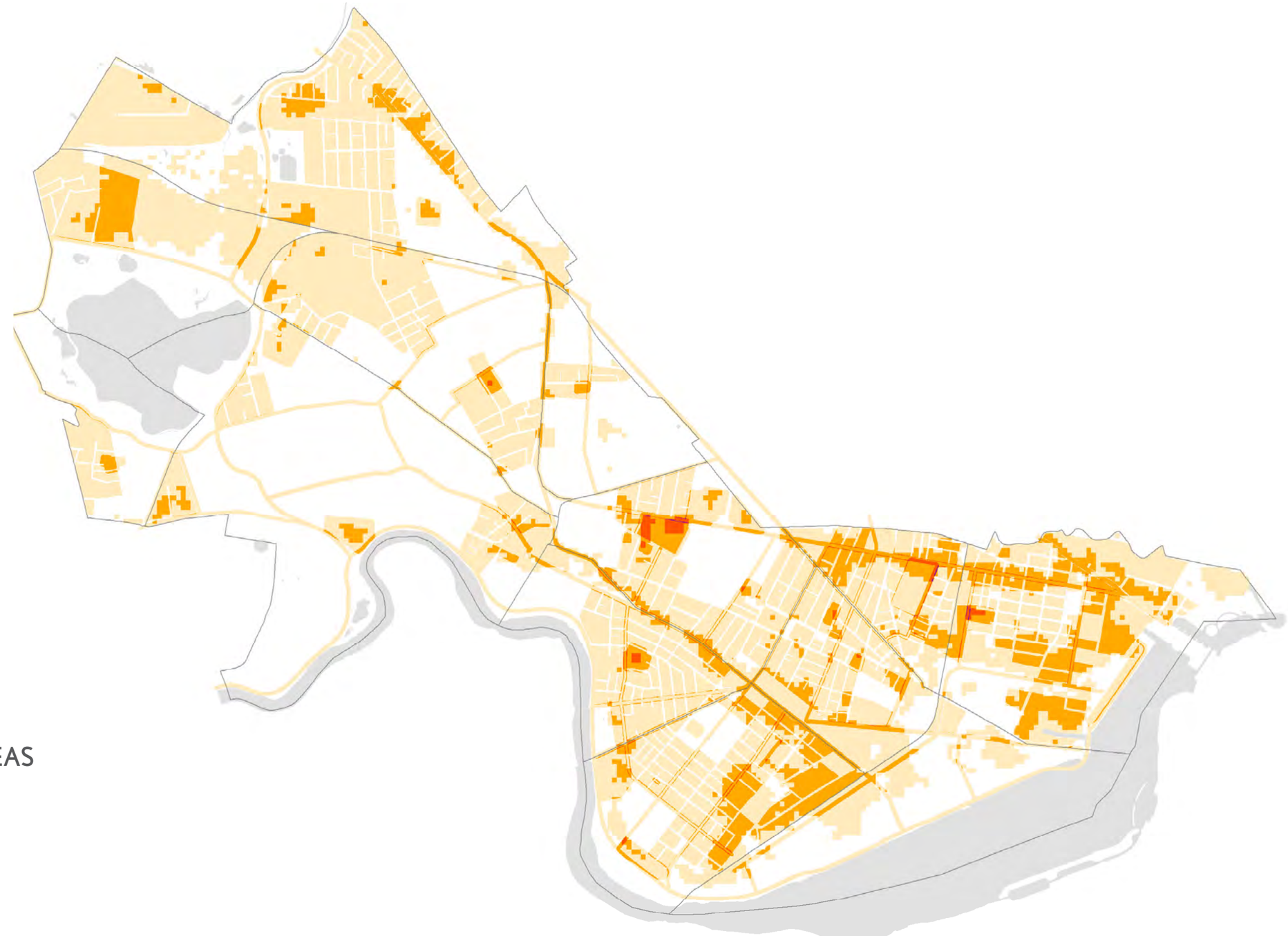


CRITERIA 4

Public Schools and Hospitals

PLANTING PRIORITY AREAS

Overlap of criterias

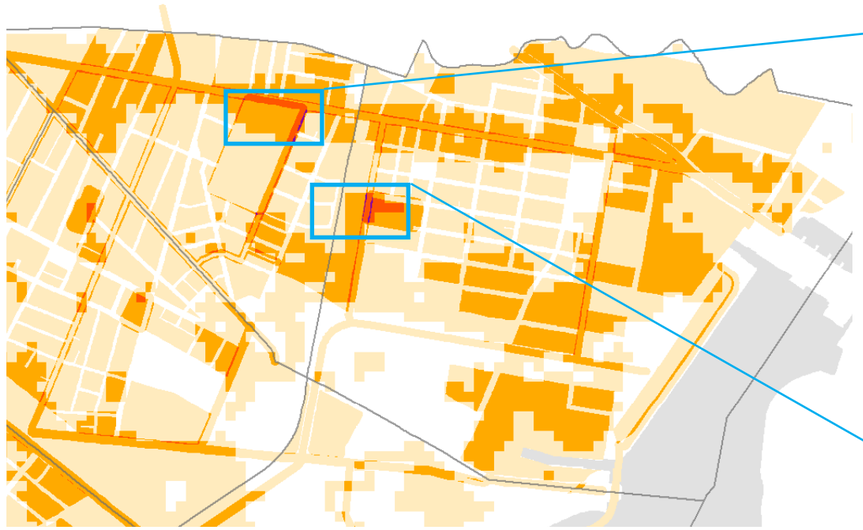


PLANTING PRIORITY AREAS

- Highest Priority
- High Priority
- Medium Priority

PLANTING PRIORITY AREAS

High priority area (example)



CAMBRIDGE STREET & COLUMBIA STREET

FULKERSON STREET

POLICY STRATEGIES 3

ACTION	in response to …	1 Enhance Current Tree Protection Ordinance	2 Formalize City Practices	3 Clarify Planning and Zoning	4 Leverage Envision Cambridge and CCPR planning studies	5 Restrict Street Tree Planting to Only Suitable Areas	6 Create New Typologies for Street Tree Planting	7 Implement City-Wide Planting Plan to Focus Efforts	8 Site New Parks/Open Spaces Strategically	9 Improve City Planting Practices	10 Improve City Maintenance and Care Practices	11 Implement Soils Management Program	12 Monitor Tree Canopy and Adapt	13 Invest in Educational Programs	14 Build Community Partnerships	15 Seek Alternative Green Strategies
		STRATEGIES														
		Policy			Planning/Design					Practices				Outreach/Other		
Curb loss	Mature canopy decline	•													•	
	Land conversion	•		•	•							•			•	
	Residential removals	•		•										•	•	
	Poor tree condition	•	•	•		•				•	•	•		•	•	
	Narrow sidewalks			•		•										•
	Inadequate soil volume			•		•				•		•				
	Understanding the value of trees													•	•	
	Equity in distribution of canopy cover	•	•	•	•		•	•	•	•	•	•	•	•	•	

Tree protections and new planting mandates are scattered throughout Cambridge's Zoning Ordinances.

Requirements are tied to specific site uses (such as construction of a parking garage) and districts (such as the Parkway Overlay District).

Consolidating requirements into a single tree-related zoning article could increase compliance and consistency.

Parking Lot Tree Planting — Article 6 (6.48.1)

The off street parking facility shall contain at least one tree, a minimum of 3” caliper at planting and shall be suitable for location in parking lots. Existing and new trees shall be protected by bollards, high curbs or other barriers sufficient to minimize damage.

Front Yards — Article 20 (20.66.4)

Front yards must contain at least one three-inch caliper tree for every twenty-five linear feet of street frontage. Each tree planted in a paved area shall have a minimum of fifty square feet of porous surface area surrounding the tree.

Setbacks and Open Space — Article 5

In a multifamily residential district, two of the yards on a lot shall consist entirely of green area, including permanently maintained trees and shrubs.

Article 5 also mandates a 20-foot setback requirement for business lots abutting a residential district. This setback is to consist exclusively of landscaped green area, including permanently maintained trees and shrubs.

Broaden and align Zoning Requirements

Consolidate and strengthen zoning ordinances relating to trees. Define performance characteristics for ...

— overlay districts

— canopy cover by land use

— setback/open space by land use

— parking space/tree ratios

— develop a Green Factor evaluation tool

Create a tree-based **overlay district**

Current zoning requires one tree for every 25 feet of frontage and at least fifty square feet of porous surface around the tree within the Parkway and Prospect Street Overlay Districts.

Create an “urban heat” or “urban forest” overlay district and have this standard apply across the city in high priority planting areas.

Salem, VA has an “urban forest” overlay district to increase the quantity of trees in new development along seven designated corridors. New development is required to have at least one tree per acre and at least one tree per 100 feet of frontage.

NYC requires one new tree for every 25 feet of frontage for all new buildings and enlargements exceeding 20 percent of floor space as a condition of occupancy.

Create canopy coverage requirements for lots by land use type and / or for open spaces

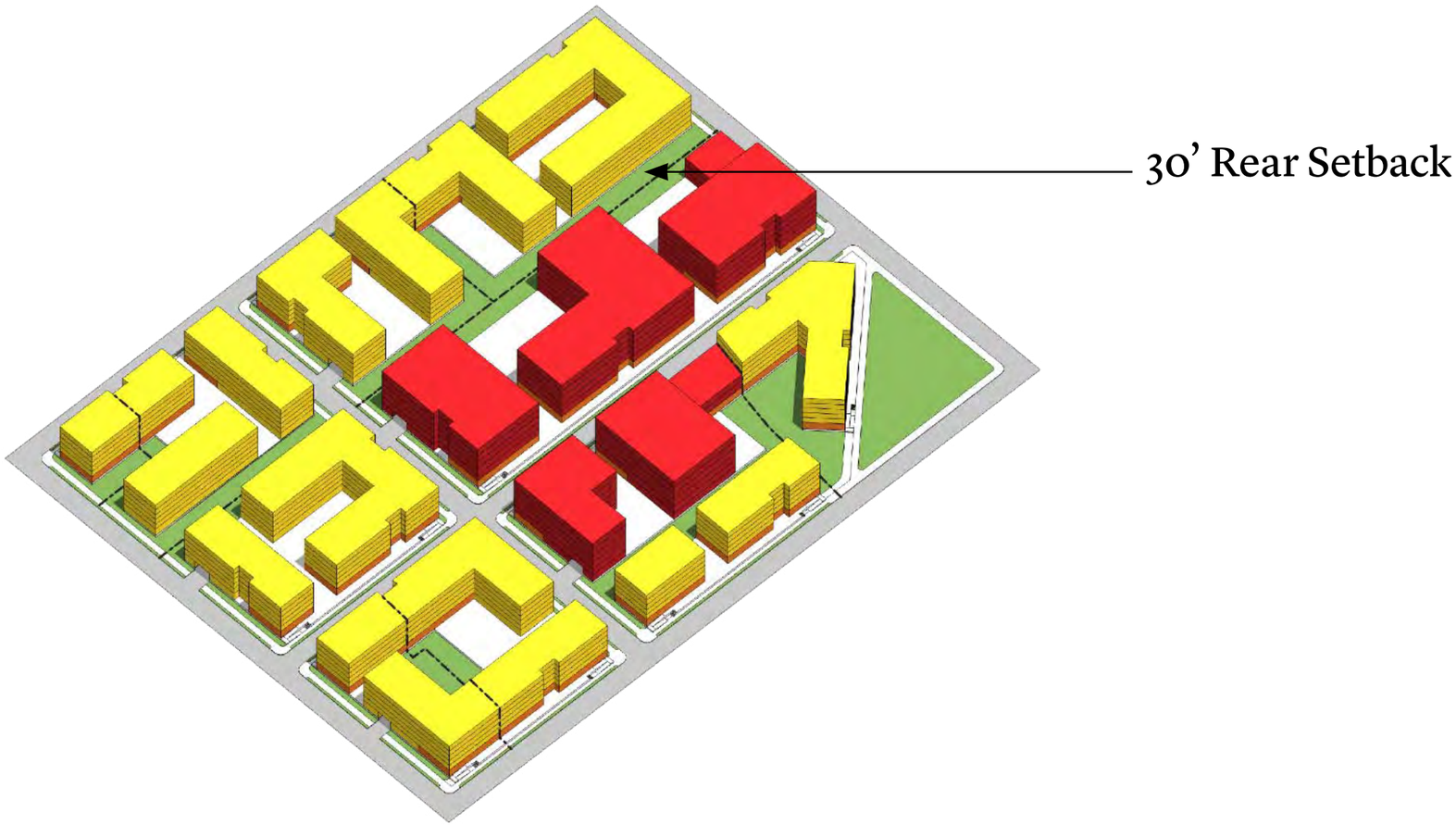
Zoning District	Providence, RI
Residential	30%
Open Space	30%
Downtown (Business)	15%
Institutional	30%
All Others	15%

Population: 180,393
Population Density: 9,803/square mile

Land Use	Chapel Hill, NC
Multi-Family Residential	30%
Commercial	30%
Mixed Use	40%
Institutional	40%

Population: 59,862
Population Density: 2,850/square mile

Increase setback and open space requirements in high priority areas to increase suitable planting areas



Source: Alewife District Plan - Envision Cambridge

Increase **parking lot** cover

PORTER SQUARE, CAMBRIDGE

PLANNING STRATEGIES – OPPORTUNITIES

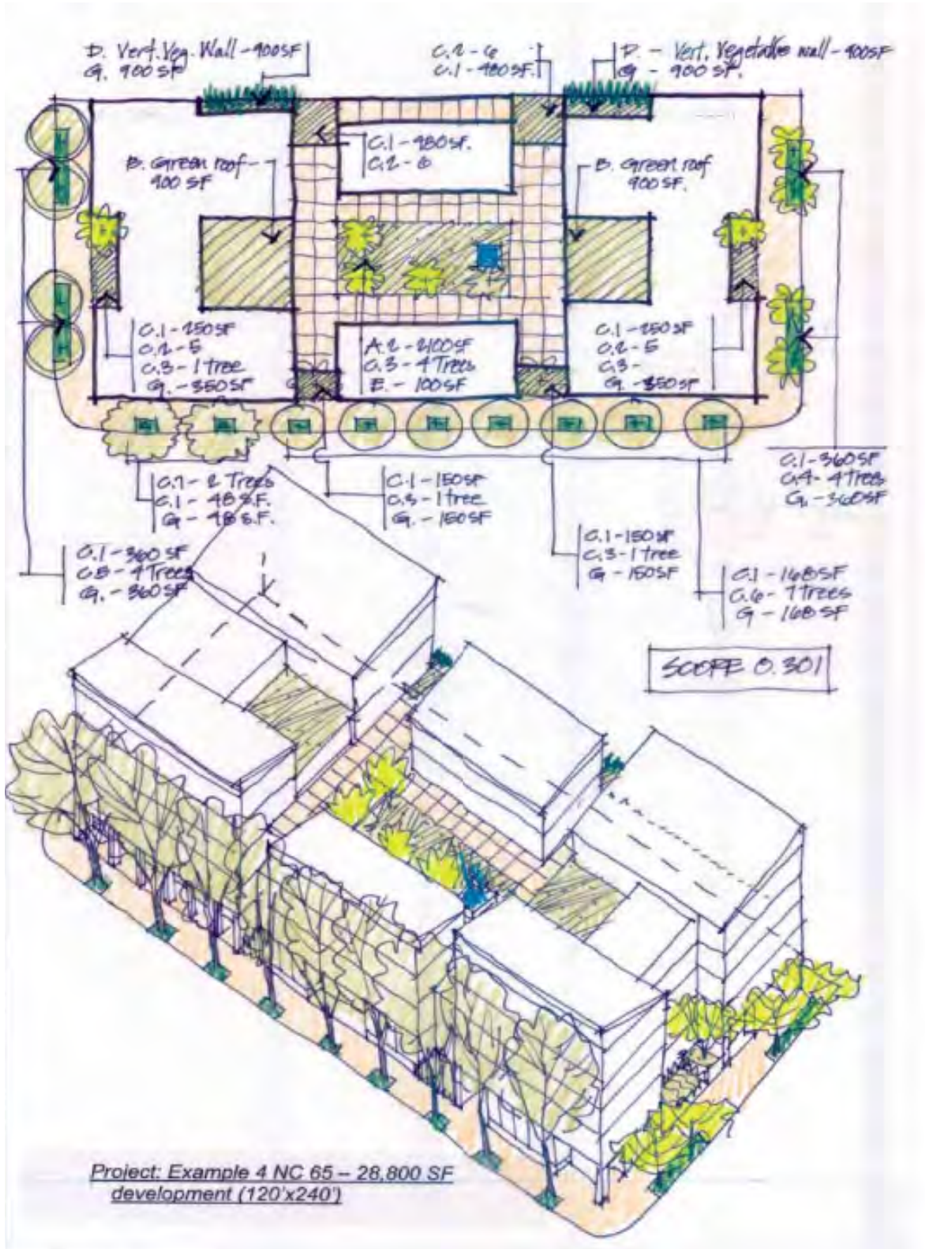
Develop a "**Green Factor**" rating system

AREA OF LANDSCAPE ELEMENT 1 **x** MULTIPLIER **+** AREA OF LANDSCAPE ELEMENT 2 **x** MULTIPLIER

+ AREA OF LANDSCAPE ELEMENT 3 **x** MULTIPLIER **+ . . .**

LOT AREA

Seattle Green Factor and Washington DC Green Area Ratio are alternative ways to promote new plantings while providing flexibility for sites where planting new trees (or many new trees) may not be feasible.



Broaden and align Zoning Requirements

Consolidate and strengthen zoning ordinances relating to trees. Define performance characteristics for ...

— overlay districts

— canopy cover by land use

— setback/open space by land use

— parking space/tree ratios

— develop a Green Factor evaluation tool

RESPONSE STRATEGIES

		STRATEGIES														
		Policy			Planning/Design					Practices				Outreach/Other		
		Enhance Current Tree Protection Ordinance	Formalize City Practices	Clarify Planning and Zoning	Leverage Envision Cambridge and CCPR planning studies	Restrict Street Tree Planting to Only Suitable Areas	Create New Typologies for Street Tree Planting	Implement City-Wide Planting Plan to Focus Efforts	Site New Parks/Open Spaces Strategically	Improve City Planting Practices	Improve City Maintenance and Care Practices	Implement Soils Management Program	Monitor Tree Canopy and Adapt	Invest in Educational Programs	Build Community Partnerships	Seek Alternative Green Strategies
ACTION	**in response to …**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Curb loss	Mature canopy decline	•													•	
	Land conversion	•		•	•							•			•	
	Residential removals	•		•										•	•	
	Poor tree condition	•	•	•		•				•	•	•		•	•	
	Narrow sidewalks			•		•										•
	Inadequate soil volume			•		•				•		•				
	Understanding the value of trees													•	•	
Grow canopy	Equity in distribution of canopy cover	•	•	•	•		•	•	•	•	•	•	•	•	•	
	Shading and cooling / pedestrian thermal comfort	•	•	•	•		•	•	•	•	•	•	•		•	
	Environmental quality / wellbeing and public health	•	•	•	•		•	•	•	•	•	•	•		•	•
	Ecological connectivity	•		•	•		•	•	•	•	•	•	•			•
	Diversity of forest composition						•	•		•			•			
	Disaster response preparedness				•			•		•			•	•	•	•

PUBLIC COMMENT

www.cambridgema.gov/ufmp

TASK FORCE MEETING SCHEDULE

JUNE 12	Introduction
JUNE 28	RESEARCH: Regulation and Management
JULY 26	RESEARCH: Goal Setting
AUGUST 30	RESEARCH: Ongoing Analysis + Climate Modeling
SEPTEMBER 27	RESEARCH: Summary of Findings
OCTOBER 25	Cancelled
NOVEMBER 29	TESTING: Baseline Change Model
DECEMBER 20	PROPOSAL DEVELOPMENT
JANUARY 31	PROPOSAL DEVELOPMENT
FEBRUARY 28	PROPOSAL DEVELOPMENT
MARCH 28	DRAFT DOCUMENTATION
APRIL 25	DRAFT DOCUMENTATION

www.cambridgema.gov/ufmp