

The **APA Sustainable Communities Division** supports planners who are committed to planning for sustainable communities by **integrating all aspects of sustainability into our work** through the combined economic, social, and ecological factors that shape our communities.

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Webinar

Measuring the Benefits of Trees: The Green Streets Lawrence Health Impact Assessment

August 23, 2017

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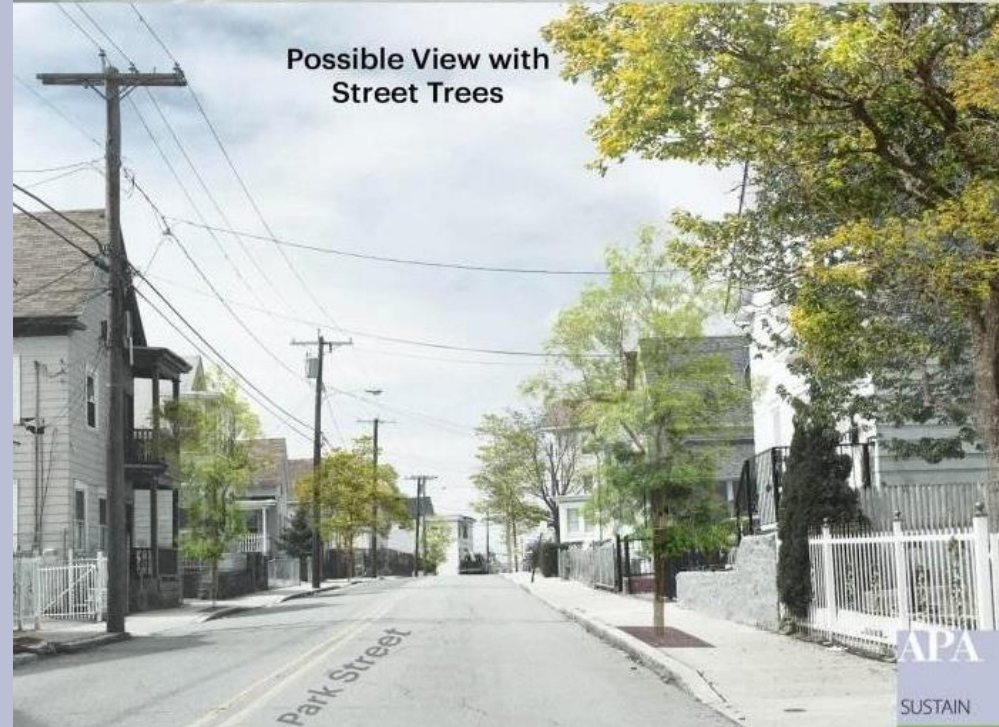


*Photo: HDR/City of Kansas City –
Kansas City Downtown Streetcar*

TODAY

Measuring the Benefits of Trees: The Green Streets Lawrence Health Impact Assessment

- **Angela J. Vincent, AICP**
Merrimack Valley Planning Commission
- **Lesly Melendez**
Groundwork Lawrence
- **Eddie Rosa**
Groundwork Lawrence
- **Neil Angus, AICP CEP, LEED AP BD+C & ND**
Devens Enterprise Commission



GREEN STREETS

LAWRENCE · MASSACHUSETTS

A Health Impact Assessment of the Lawrence Green Streets Program



GOOD FOR LAWRENCE, GREAT FOR YOU!



Green Streets & Equitable Redevelopment in Lawrence, Mass.

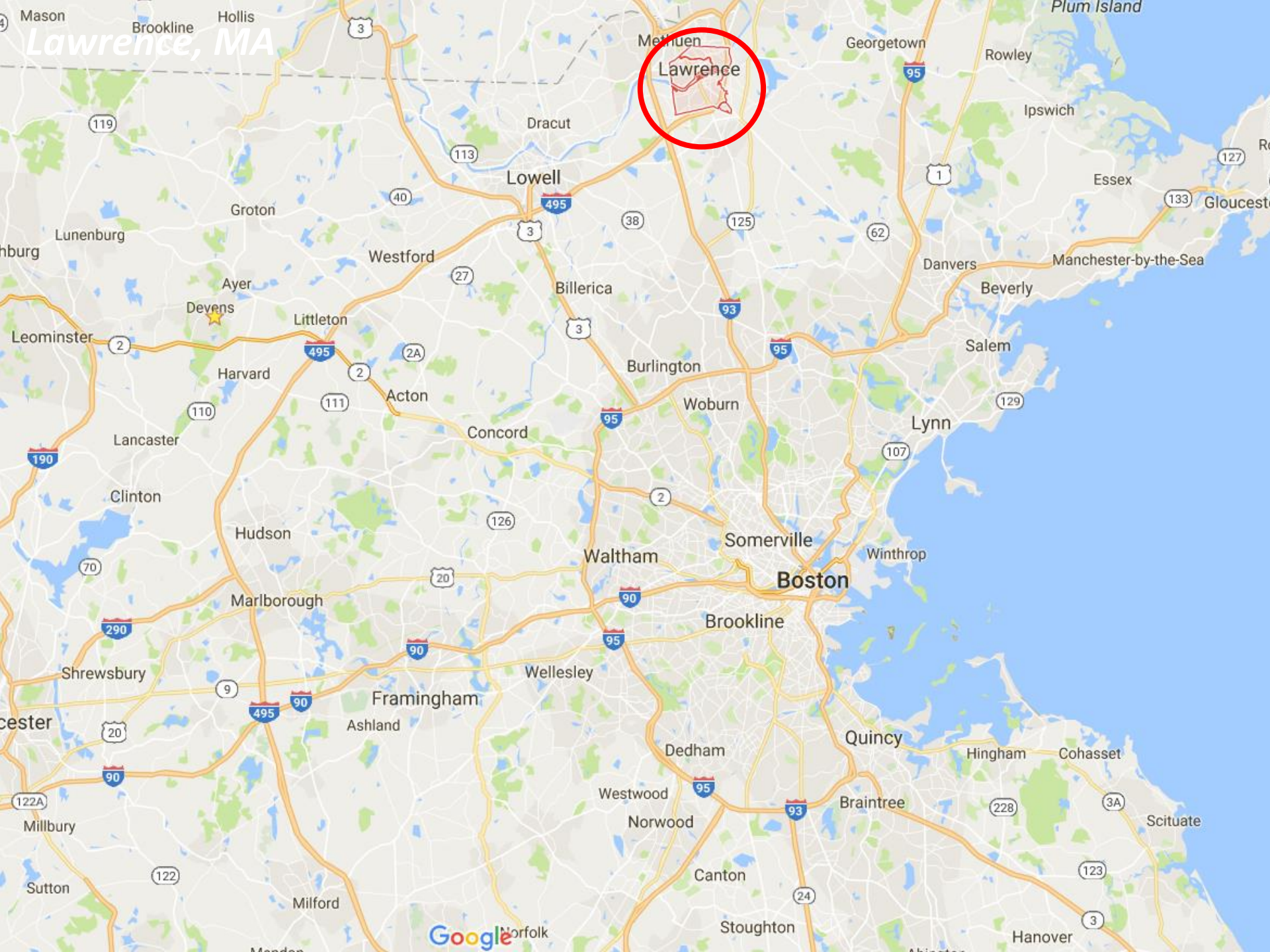
Lesly Melendez, Eddie Rosa || Groundwork Lawrence



About Lawrence / Massachusetts

- Population 80,209 (12th largest city)
- Hispanic or Latino 76.4% (9.6%)
- Foreign born 37.4% (15%)
- Individuals below poverty line 28.4% (11.4%)
- Median household income \$34,852 (\$66,866)
- Housing units in multi-unit structures 75.9% (41.7%)



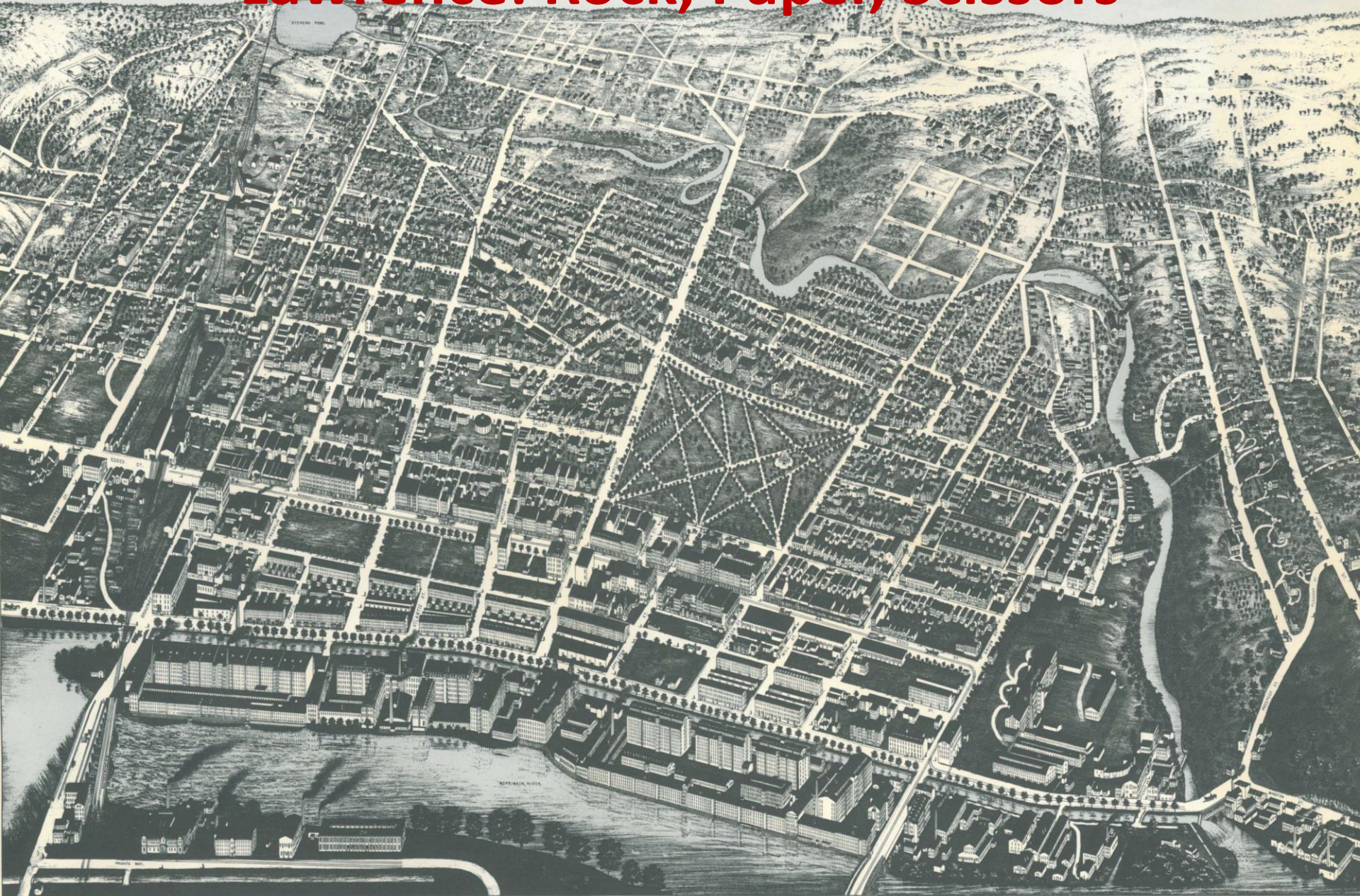


Lawrence, MA



Lawrence

Lawrence: Rock, Paper, Scissors



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Mission

To bring about the **sustained regeneration**, improvement and management of the physical environment **by developing**

community-based partnerships which empower people,

businesses and organizations to promote environmental, economic and social well-being.

Community Mandate



Community

- Family Events
- Community Cleanups
- Healthy Living Workshops
- Community Planning

Open Space Environment

- Parks & Playgrounds
- Rivers & Canals
- Tree Canopy
- Trails & Greenways
- Stewardship

Education & Job Training

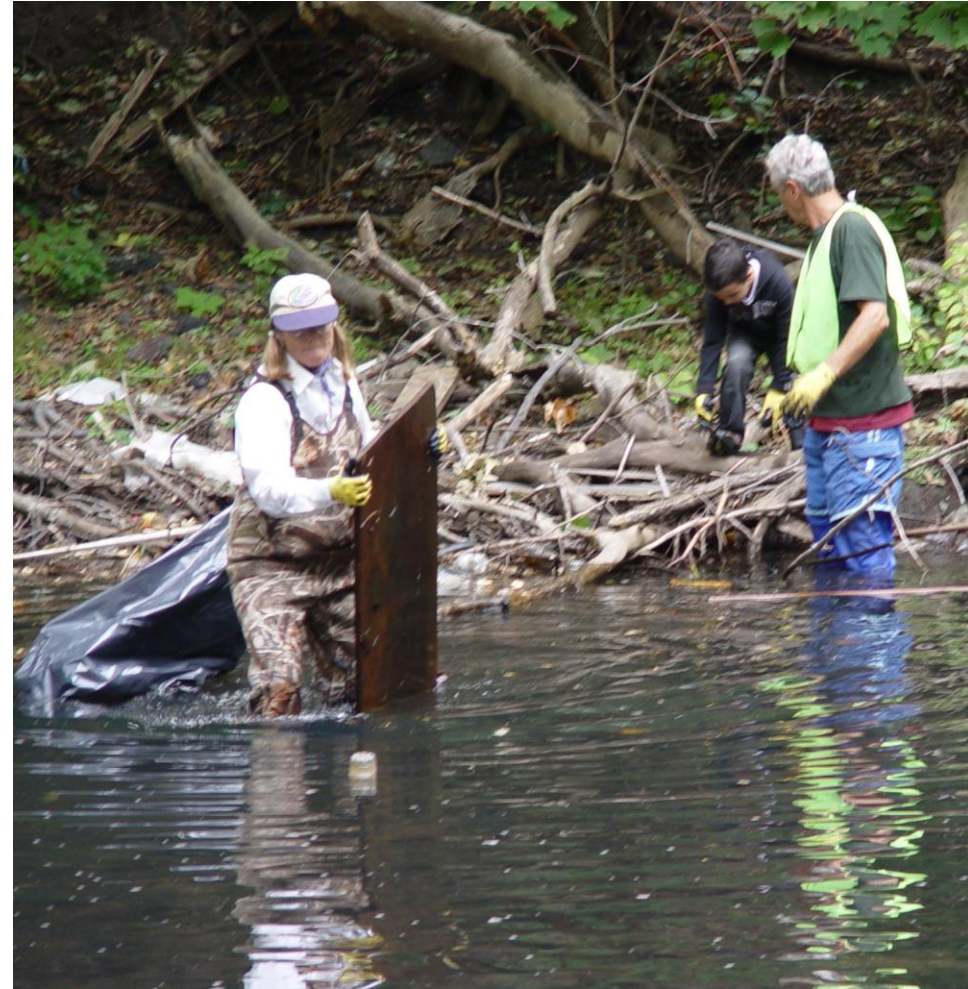
- Green Jobs
- Service Learning
- Youth Employment
- Schoolyard Gardens
- Environmental Educ.
- STEM Education

Fresh Food Healthy Living

- Active Spaces
- Community Gardens
- Urban Farming
- Farmers Markets
- Veggie Rx & Incentives

Community Engagement

The Spicket River Clean-up



Fresh Food / Healthy Living

Costello Urban Farm



Urban Ecology Education Spicket / Merrimack River Confluence



Environmental Improvements

Green infrastructure installation



Calles Verdes / Green Streets Program History



- Planted over 500 trees between 2007 and 2015
- Typically planted 50 to 60 set back trees per year
- Integrated tree planting into park improvements
- Program integrated into staff work plans

Urban Waters Calles Verdes / Green Streets



Calles Verdes / Green Streets Urban Tree Canopy Analysis



Alma/ Bromfield
Neighborhood

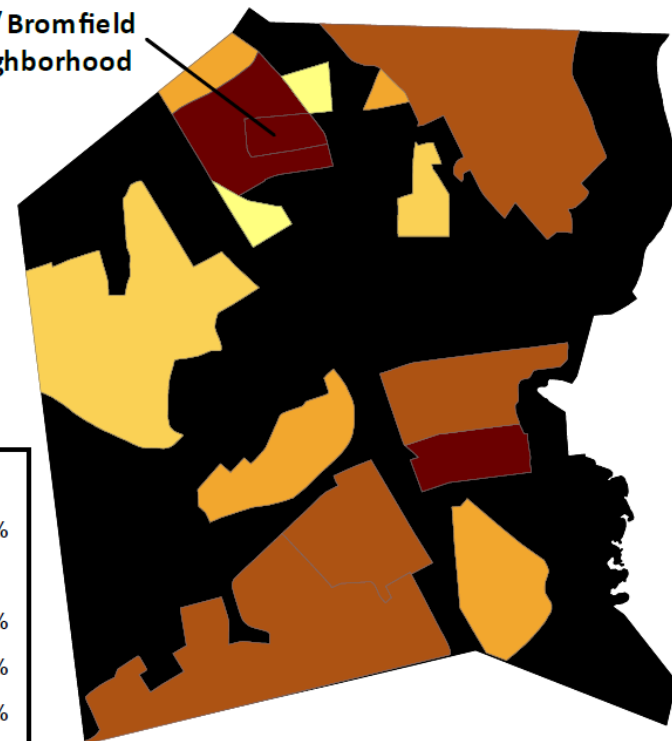
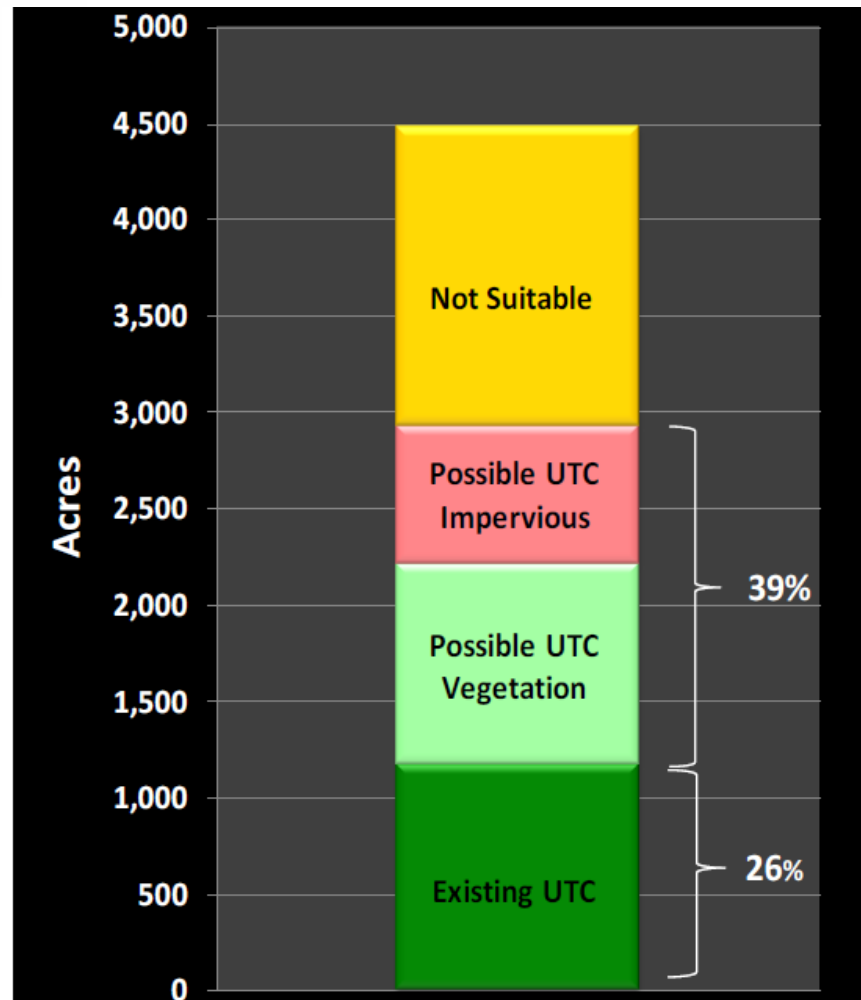


Figure 7. Existing and Possible UTC as a percentage of land area by neighborhood .

Calles Verdes / Green Streets Urban Tree Canopy Analysis



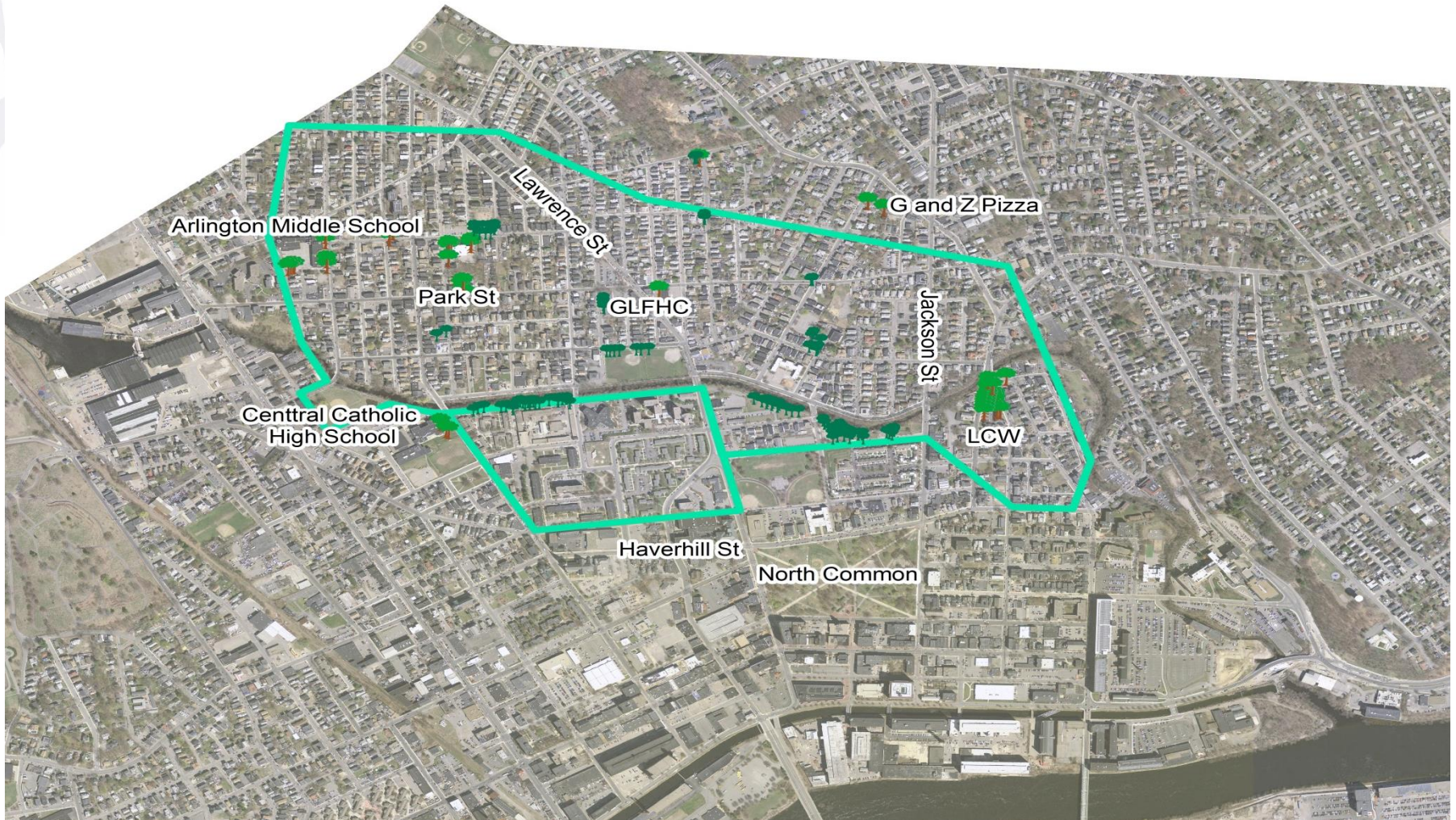
Calles Verdes / Green Streets

Greening the Gateway Cities

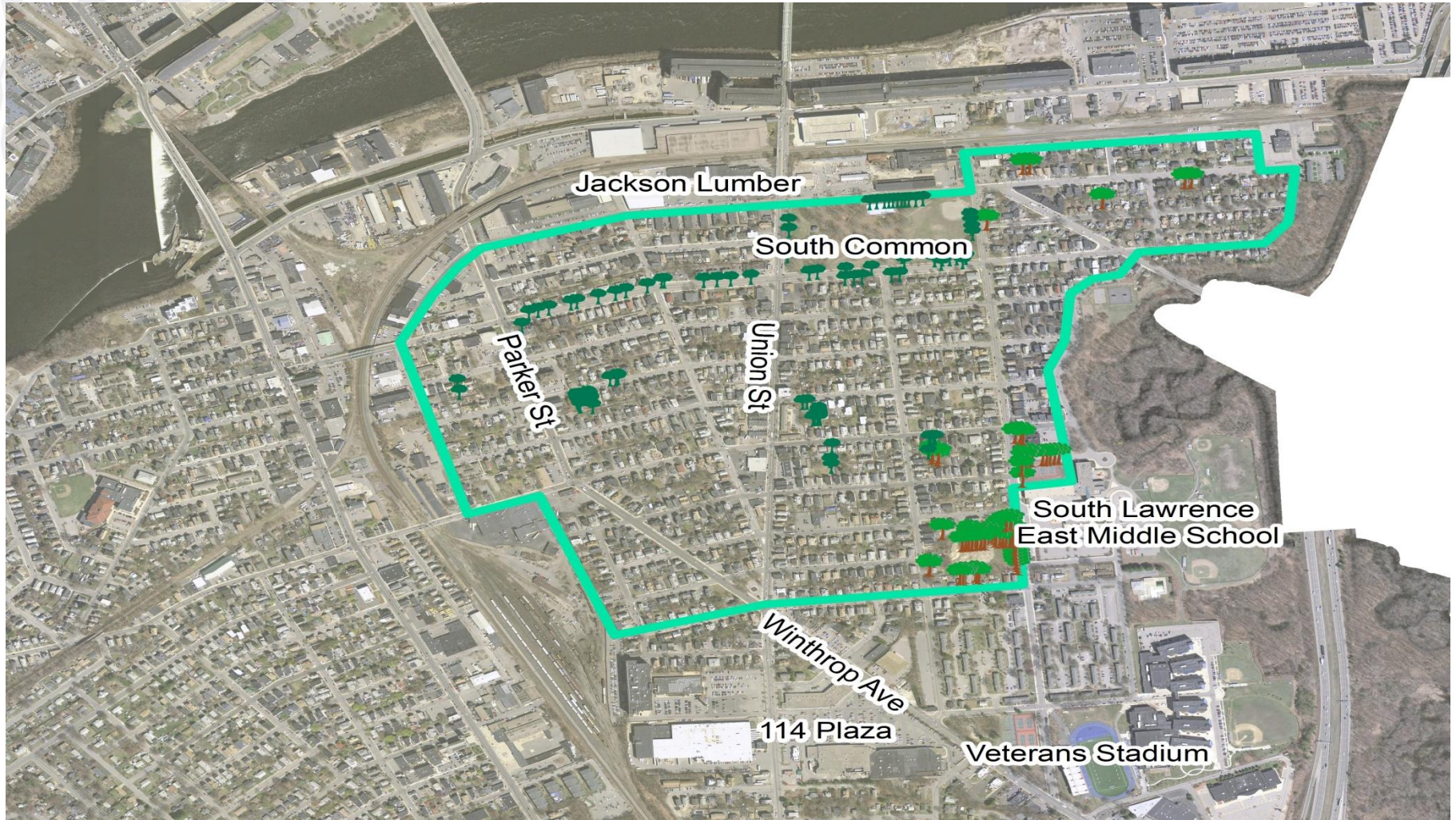


- Asian long horn beetle in Worcester
- State Urban Foresters advocates for energy efficiency money
- State launches program to focus on Gateway Cities
- Goal is to plant trees to achieve district level cooling
- State has monitoring program to evaluate program

Calles Verdes / Green Streets Greening the Gateway Cities

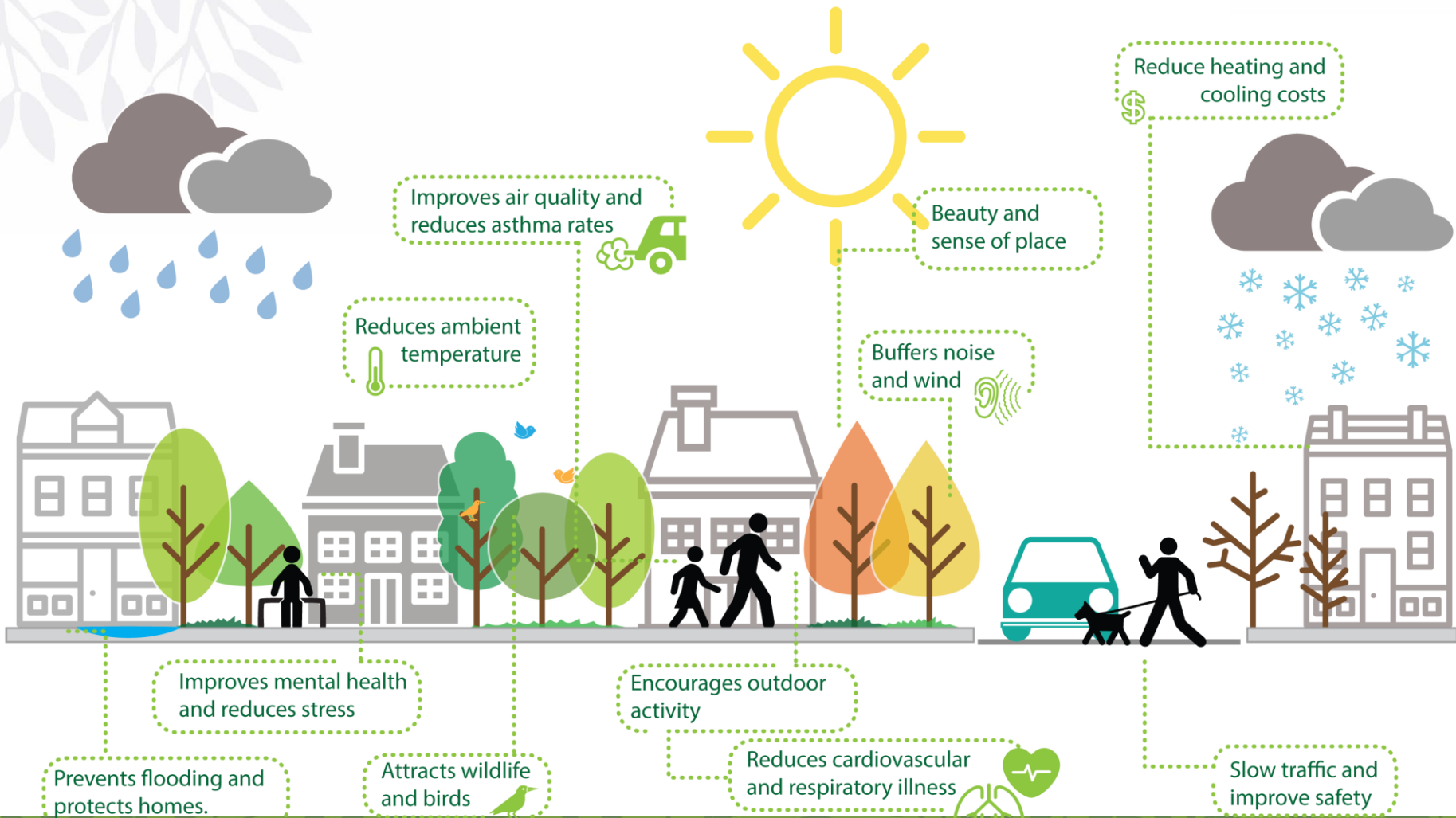


Calles Verdes / Green Streets Greening the Gateway Cities



Calles Verdes / Green Streets

Greening the Gateway Cities



Phillips Street

GREEN STREETS
LAWRENCE · MASSACHUSETTS
greenstreets@groundworklawrence.org

Phillips Street Looking North toward South Common



Like the difference?
Contact us today

What is an HIA?

- **Voluntary process to evaluate potential impacts of a plan, project, policy**
- **Comprehensive review through a “health lens”**
- **Assess built environment and its influence on public health**
- **More popular with current obesity epidemic, climate change and air quality**



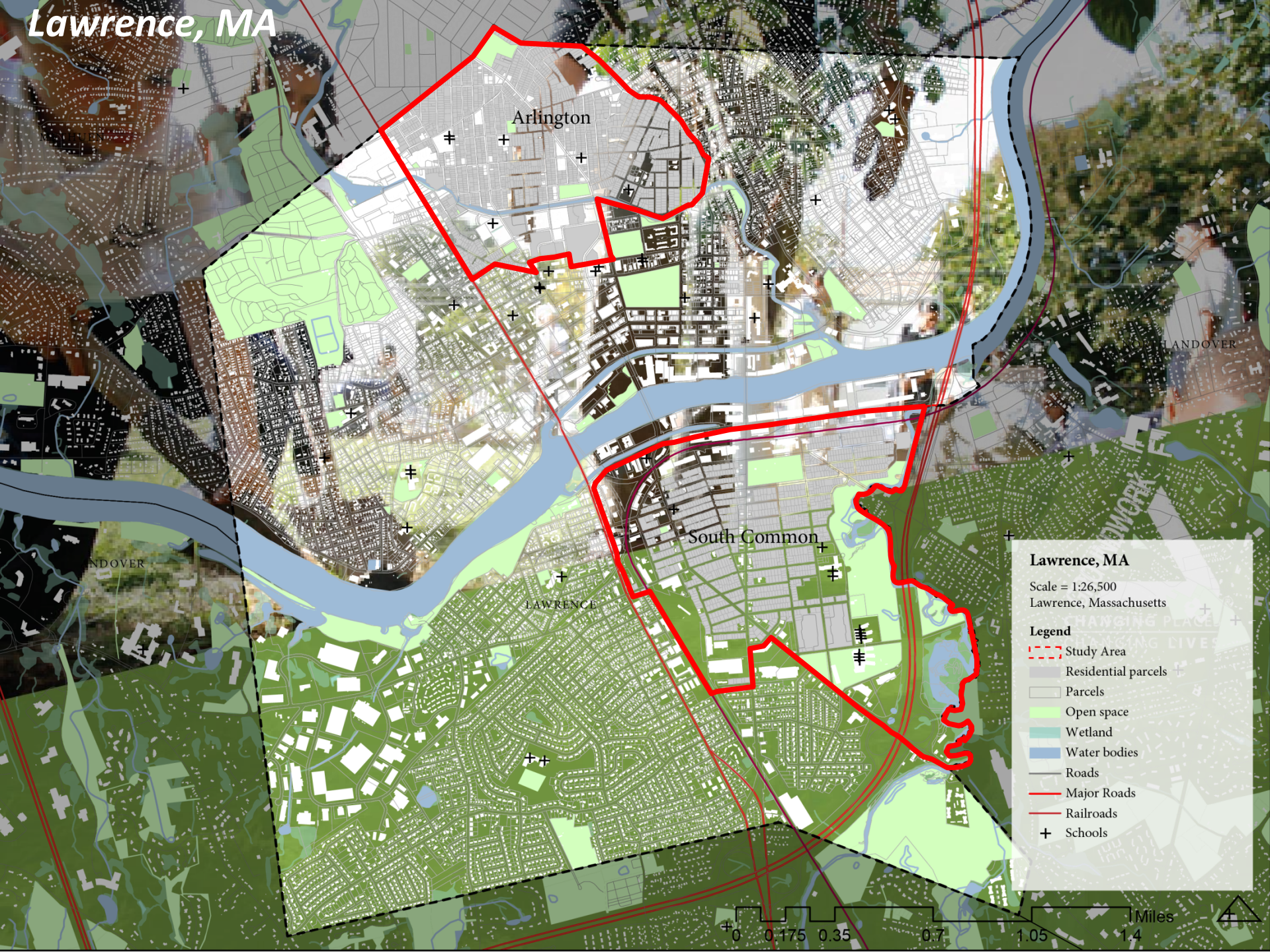
Screening: Lawrence Green Streets Program

- **Lawrence:** low tree canopy cover, old building stock, high wind speeds, large rental population, low-income
- **Program Details:**
 - **Goal:** reduce household energy use
 - 2,400 trees over 3 years
 - **Funding:** MA Greening the Gateway Cities Program
 - Need local buy-in from land-owners

Screening/Scoping: Partners and Population

- Launch of Groundwork Lawrence Green Streets Project
- Use HIA to assess health conditions and evaluate how trees might improve health conditions
- Build community buy-in/support
- Provide implementable tools and resources
- Arlington and South Common neighborhoods

Lawrence, MA



Lawrence, MA
Scale = 1:26,500
Lawrence, Massachusetts

Legend

- Study Area
- Residential parcels
- Parcels
- Open space
- Wetland
- Water bodies
- Roads
- Major Roads
- Railroads
- + Schools



Assessment:
GIS Analysis,
Census data,
health reports, site
visits



Assessment: Public Engagement

- Understand local health concerns
- Raise awareness of health benefits of trees



Existing View

Visual Preference Surveys



Possible View
with Street Trees



Findings: Four Priority Impact Areas

Environmental:

- Reduce flooding
- Improve air quality
- Provides wildlife habitat
- Climate change mitigation and adaptation strategy

Physical and Mental Health:

- Reduce obesity, diabetes, asthma and other respiratory diseases
- Improve mental health illnesses (depression and anxiety)
- Physical and mental rehabilitation

Findings: Four Priority Impact Areas, cont...

Social Cohesion:

- Correlation between the number of street trees and the amount of community interaction
- Aesthetically pleasing and inviting streetscapes
- Improved safety through traffic calming
- Reduced crime

Housing/Energy:

- Reduced energy demand for adjacent buildings
- Extended life of pavement and building materials from reduced sun exposure

Recommendations to Support Green Streets



1. *Promote benefits of trees related to local health issues*
2. *Use Baseline Conditions/Metrics to foster more support*
3. *Planting Guidelines*
4. *Create a Tree Stewardship Program*
5. *Marketing and Promotional Tools*
6. *Tree Preservation/Protection Ordinance*
7. *Street Tree Maintenance Ordinance/Program*
8. *Ongoing Monitoring and Reporting*

Multiple Benefits of Street Trees in Lawrence

Biomass-potential energy source

Visual screening for large expanses of pavement and utilities

Absorption of harmful pollutants (natural filters)

Reduction in storm water runoff and flooding

Define street edge and protect pedestrians

Reduced Urban Heat Island Effect

Extended pavement life from shading

Reduce solar glare for drivers

Provides context and aids drivers in better assessing their speed (traffic calming)

Habitat and nutrients for birds and other wildlife

Decreased Energy demands for adjacent buildings

Noise absorption/buffering

Increase in Property Values

Reduced UV exposure for pedestrians

Rehabilitation and stress relieving attributes

Root Structure and soils provide addition storm water management and subsurface habitat and nutrients for important bacteria and organisms.



Impacts of GWL Selected Trees



Table 4.0 – Proposed Street Tree Plantings and Estimated Benefits Per Tree

Street Tree Species	Estimated Benefits Per Tree											
	<i>2" caliper (at planting)/ 6" caliper (mid-term ~15yrs.)/ 12" caliper (long-term ~30yrs.)</i>											
	Stormwater (gal)			Energy (kWh)			CO ² Reduction (lbs.)			Ozone Reduction (\$)		
	2"	6"	12"	2"	6"	12"	2"	6"	12"	2"	6"	12"
Hackberry	107	549	1480	19	54	106	68	218	469	0.11	0.75	2.00
Yellowwood	87	571	1353	4	24	72	25	128	329	0.08	0.58	1.50
Ginkgo (fruitless)	34	245	786	3	19	61	13	88	273	0.05	0.43	1.30
Honeylocust	86	589	1546	6	39	105	32	189	470	0.14	0.92	2.30
Kentucky Coffeetree	107	549	1480	19	54	106	68	218	469	0.10	0.75	2.00
Sweetgum	45	323	1028	3	21	72	13	89	287	0.05	0.45	1.40

Street Tree Selector Tool



Table 5.0 – Selected Street Tree Species Benefits and Constraints

Botanical	Common Name	Tolerate Urban Conditions	Salt Spray	Soil Salt from Deicing	Drought	Native to MA	Storm water mgmt.*	Energy Efficiency*	Overall Air Quality*	Notes
<u><i>Celtis occidentalis</i></u>	Hackberry	Yes	Moderate	Good	Tolerant	Yes	Best	Best	Best	Requires wide tree lawn, produces galls
<u><i>Cladrastis kentukea</i></u>	Yellowwood	Yes	Moderate	Moderate	Moderate	Yes	Better	Good	Better	
<i>Ginkgo biloba</i>	Ginkgo (fruitless)	Yes	Moderate	Moderate	Tolerant	No	Good	Good	Good	Get fruitless variety
<u><i>Gleditsia 'Skyline'</i></u>	<u>Honeylocust</u>	Yes	Moderate	Good	Tolerant	No	Better	Better	Best	<u>Thornless</u> , nearly fruitless variety. High energy efficiency benefits as tree gets larger.
<u><i>Gymnocladus dioicus</i></u>	<u>Kentucky Coffeetree</u>	Yes	Tolerant	Tolerant	Tolerant	Yes	Best	Best	Best	
<u><i>Liquidambar styraciflua</i></u>	Sweetgum	Yes	Tolerant	Tolerant	Tolerant	Yes	Good	Good	Good	Prickly balls can be messy. <u>Rotundifolia</u> is fruitless – less mess.
<i>Nyssa sylvatica</i>	Tupelo	Yes	Moderate	Moderate	Moderate	Yes	Better	Good	Best	Wide tree lawns

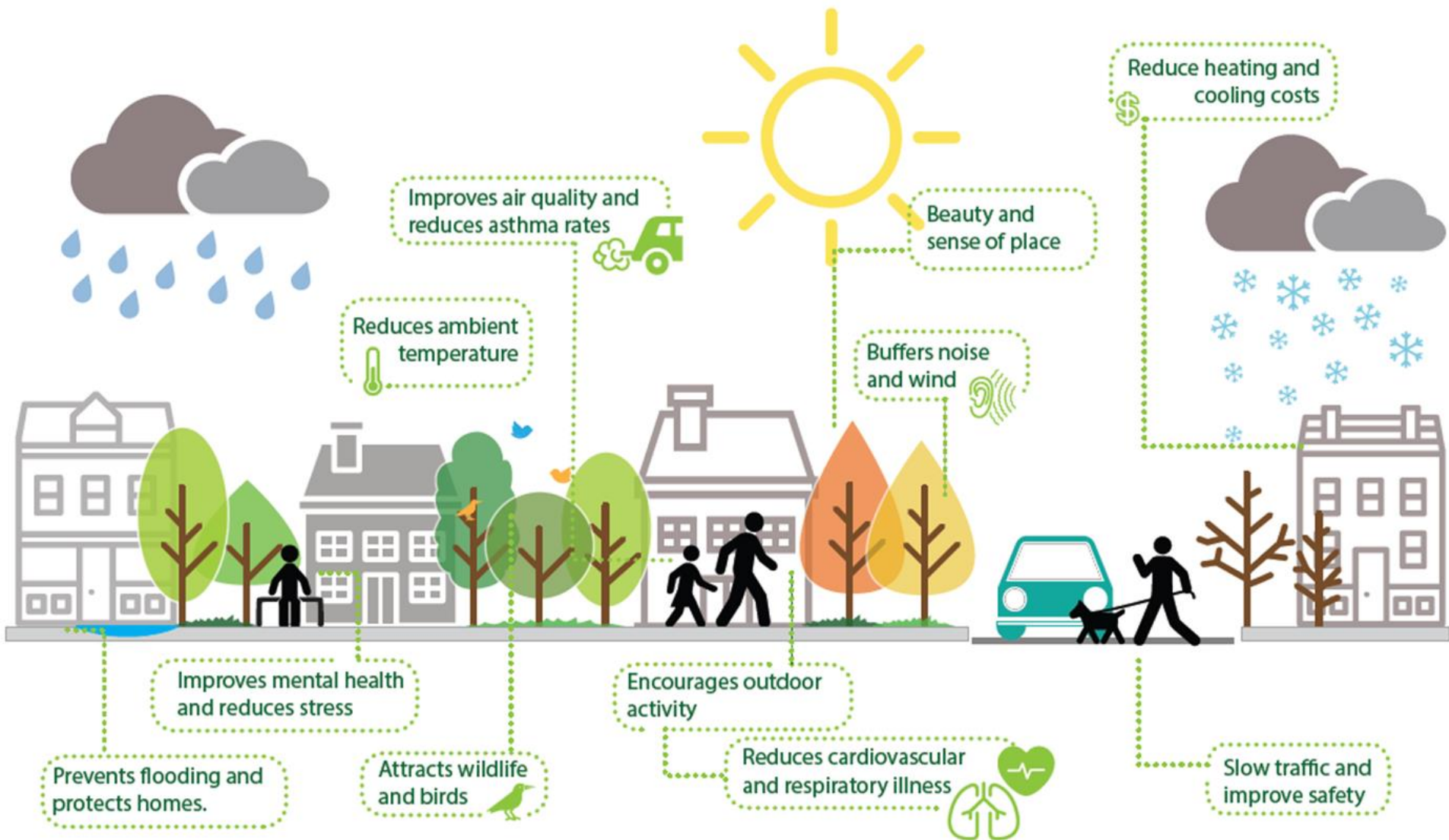


Good for Lawrence, Great for You!

¡Bueno para Lawrence, Mejor para Ti!

GREEN STREETS

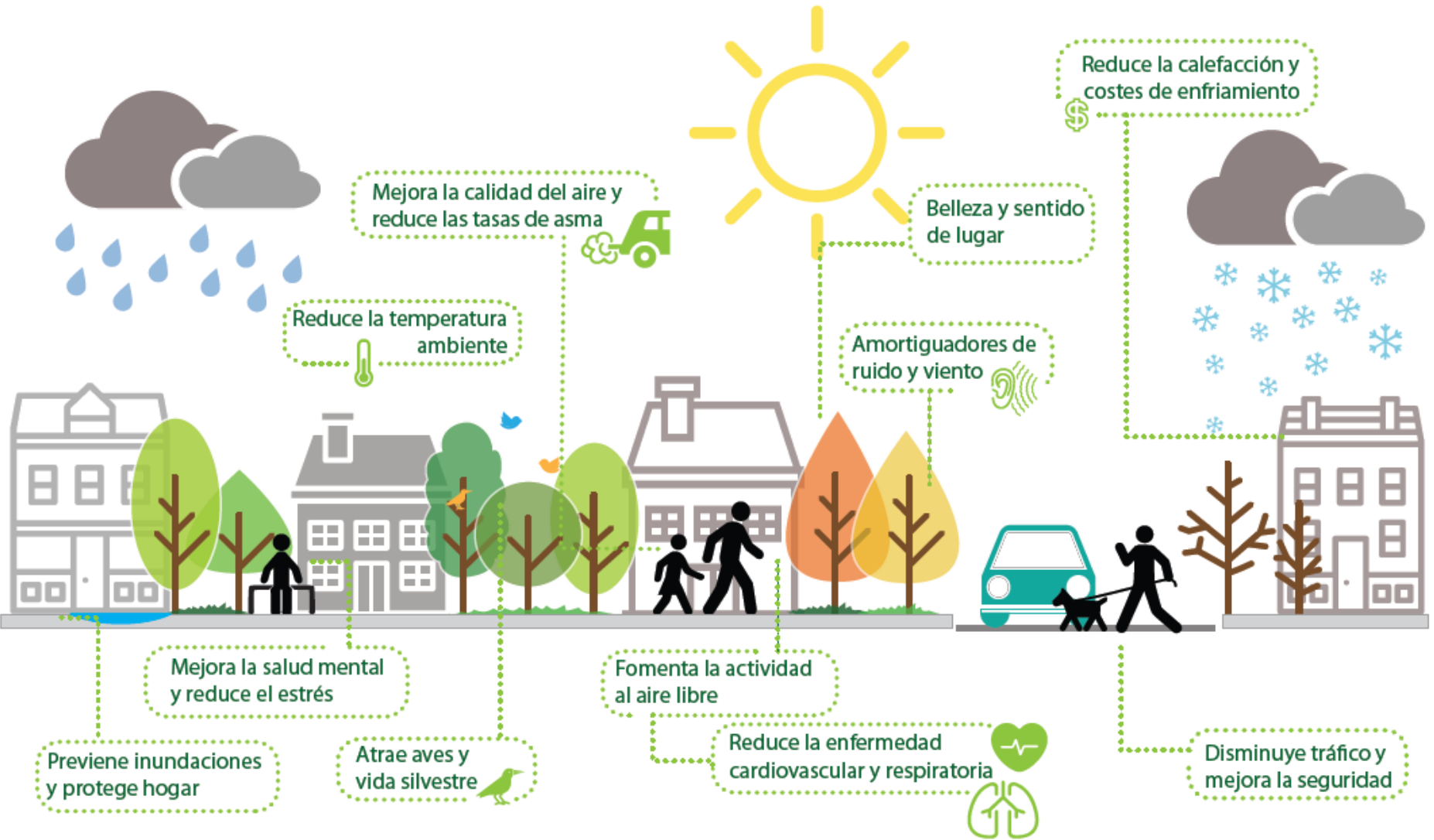
LAWRENCE · MASSACHUSETTS



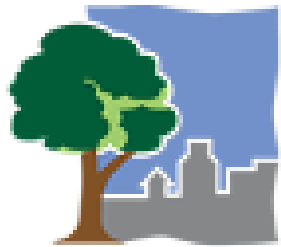
GOOD FOR LAWRENCE, GREAT FOR YOU!

CALLES VERDES

LAWRENCE · MASSACHUSETTS



¡BUENO PARA LAWRENCE, MEJOR PARA TI!



i-Tree

Tools for Assessing and Managing
Forests & Community Trees

MyTree Benefits



Serving size: 1 trees

Carbon Dioxide (CO₂)	\$0.65
CO ₂ absorbed each year	64.82 lbs
Storm Water	\$10.54
Rainfall intercepted each year	1317 gal.
Air Pollution removed each year	\$1.42
Ozone	10.56 oz
Nitrogen dioxide	0.48 oz
Sulfur dioxide	0.00 oz
Large particulate matter**	10.56 oz
Energy Usage each year*	\$1.58
Electricity savings (A/C)	61.10 kWh
Fuel savings (NG, Oil)	-4.83 therms
Avoided Emissions	
Carbon dioxide	-1.40 lbs
Nitrogen dioxide	0.00 oz
Sulfur dioxide	0.00 oz
Large particulate matter**	1.12 oz

Results

- **Increased awareness and community support for GWL Green Streets**
- **Understand impacts of trees in an urban environment**
- **Replicable process & techniques**
- **Street tree resources that can be tailored to other communities**
- **More green infrastructure**
- **More livable neighborhoods!**

Next Steps

- **Continue promoting to Planners**
- **New Service Project**
- **Podcasts**
- **Conference Presentations**
- **Nominate for APA/Chapter Awards**
- **Potential Documentary – *A Greener Place***





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FULL REPORT AVAILABLE ONLINE
<https://tinyurl.com/mkd9lll>