GREEN STREETS
LAWRENCE · MASSACHUSETTS

Selecting Trees to Improve Public Health in the City

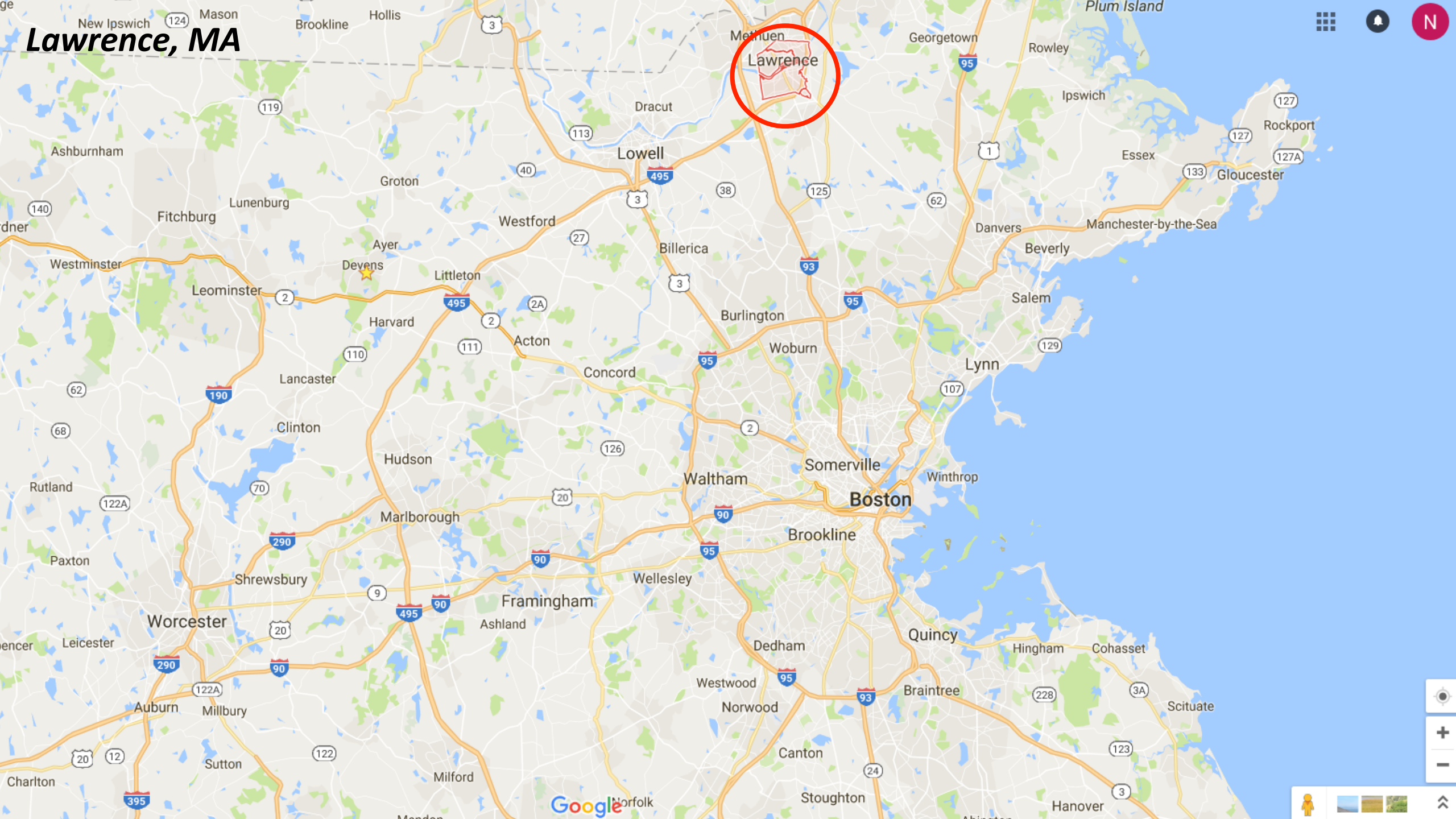
UMass Extension
Landscape, Nursery & Urban Forestry Program

40th Annual UMass Community Tree Conference: Species Selection in the Urban Landscape - Professional Perspectives

APA SUSTAIN
GROUNDWORK CHANGING PLACES CHANGING LIVES
Groundwork Lawrence

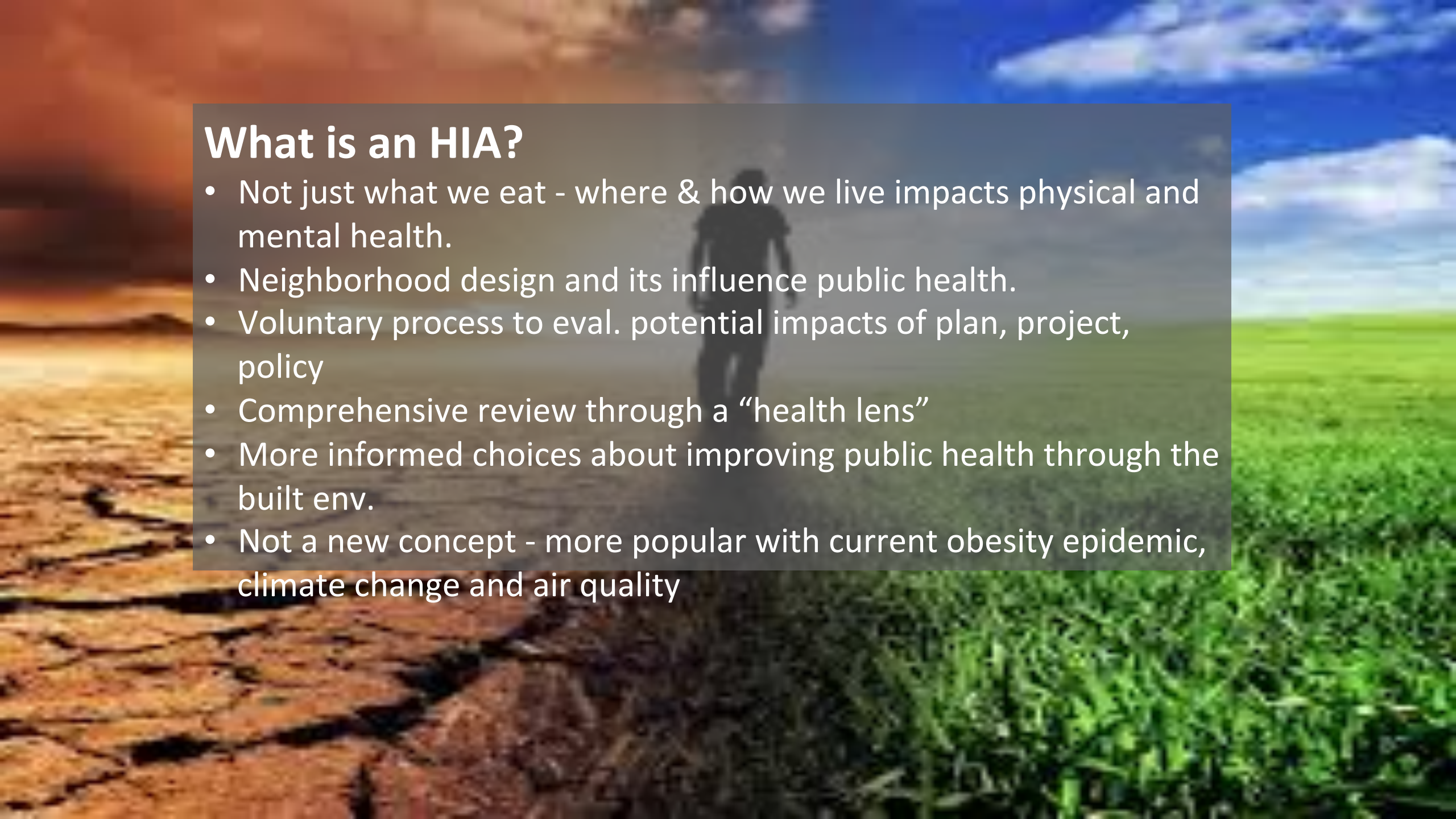
HIA-Benefits of Streets Trees in Built Environment

- **Lawrence:** low tree canopy cover, older building stock, higher wind speeds, large rental population.
- **GWL Green Streets:** plant 2,400 trees in Lawrence over 3 years;
- **Program goal:** reduce household heating and cooling energy use;
- **Funding:** MA Greening the Gateway Cities Program (GGCP) - partnership between EOEEA, DCR, DOER and DHCD;


Lawrence, MA
Lawrence
Methuen
Georgetown
Rowley
Plum Island
Ipswich
Rockport
Essex
Gloucester
Manchester-by-the-Sea
Danvers
Beverly
Salem
Lynn
Winthrop
Boston
Somerville
Brookline
Waltham
Woburn
Burlington
Billerica
Dracut
Lowell
Westford
Groton
Ashburnham
Fitchburg
Lunenburg
Ayer
Devens
Westminster
Leominster
Littleton
Harvard
Acton
Concord
Lancaster
Clinton
Hudson
Marlborough
Shrewsbury
Paxton
Rutland
Worcester
Leicester
Auburn
Millbury
Sutton
Charlton
Framingham
Ashland
Wellesley
Dedham
Westwood
Norwood
Canton
Stoughton
Quincy
Hingham
Cohasset
Scituate
Braintree
Hanover
Milford
Norfolk
Google

HIA-Benefits of Streets Trees in Built Environment

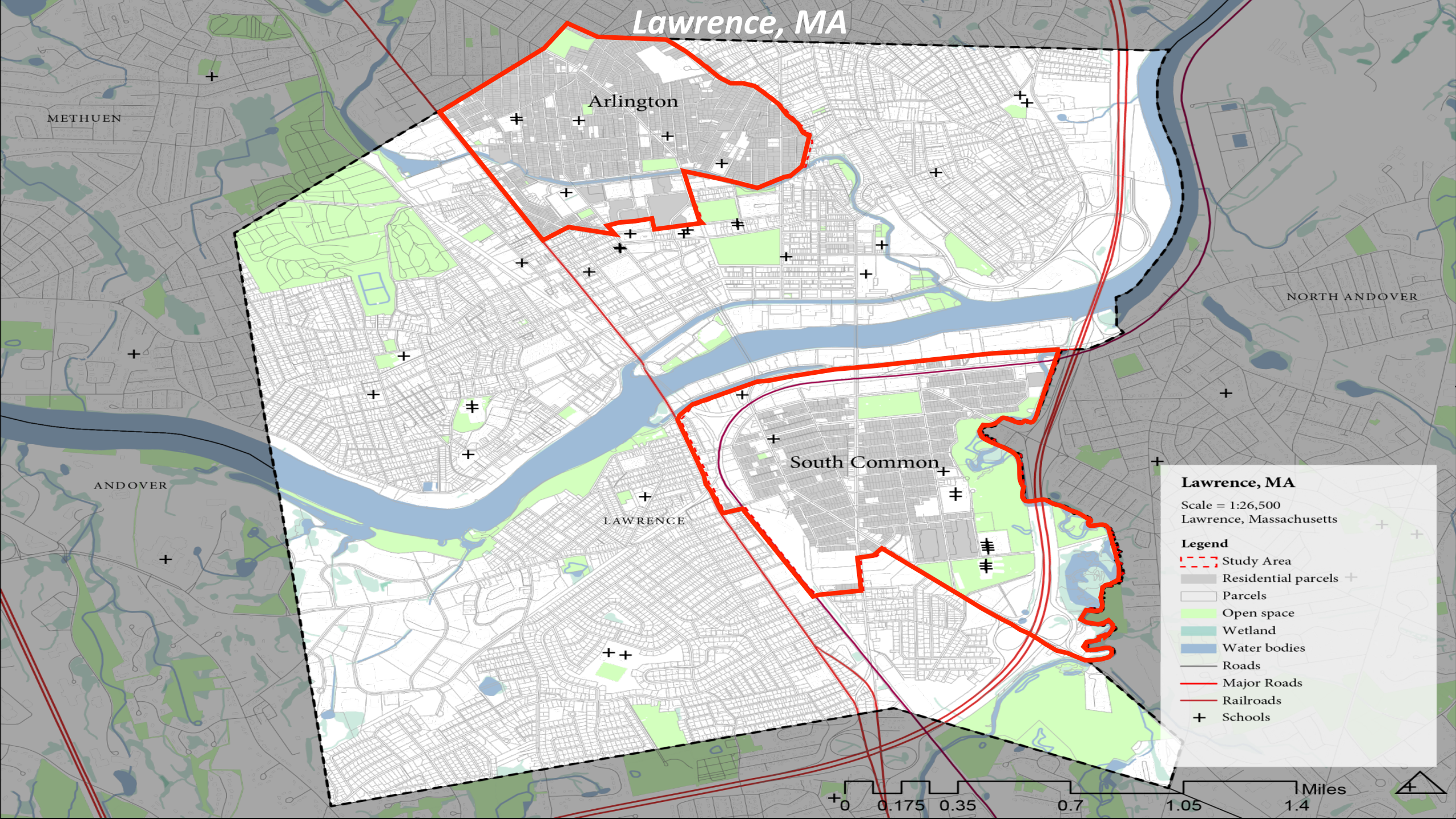
- GWL needed assistance promoting to businesses and residents.
- APA SCD & MA APA Planners – Volunteer Service Project.
- HIA as a tool to assess existing health conditions and evaluate how trees might improve health conditions as well as EE.
- Additional community buy-in/support



What is an HIA?

- Not just what we eat - where & how we live impacts physical and mental health.
- Neighborhood design and its influence public health.
- Voluntary process to eval. potential impacts of plan, project, policy
- Comprehensive review through a “health lens”
- More informed choices about improving public health through the built env.
- Not a new concept - more popular with current obesity epidemic, climate change and air quality


Screening
Is HIA needed?
Scoping
What health impacts should be considered and who should be involved in this HIA?
Assessment
What is the current status? What are the health effects of potential impacts?
Recommendations:
What actions can be taken to improve health or manage health effects?
Reporting
Sharing results and recommendations with decision makers.
Monitoring & Evaluation
What are the changes in health? What are the outcomes of an HIA?
Health Impact Assessment Process

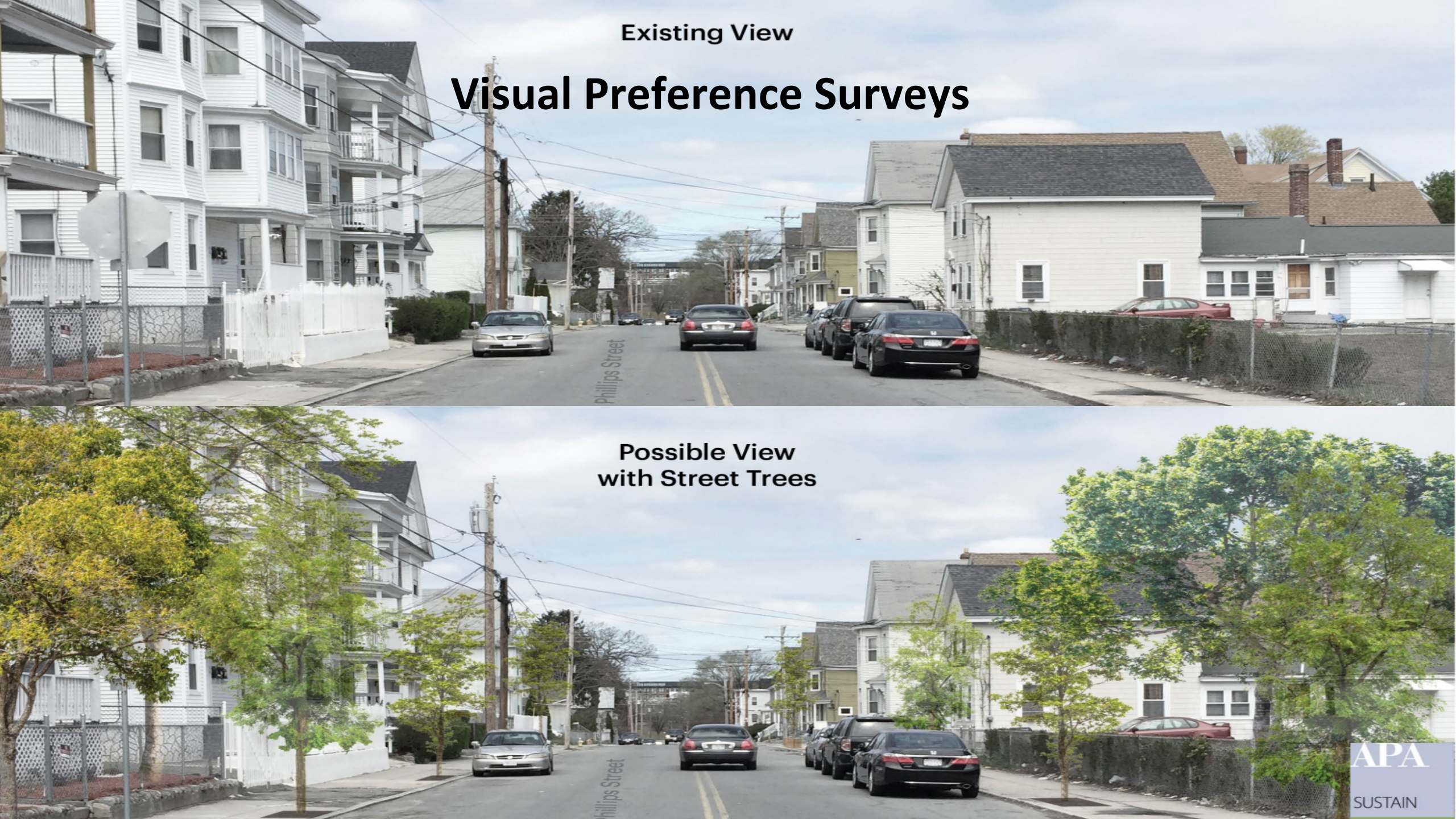

Lawrence, MA
Arlington
South Common
METHUEN
NORTH ANDOVER
ANDOVER
LAWRENCE
Lawrence, MA
Scale = 1:26,500
Lawrence, Massachusetts
Legend
Study Area
Residential parcels
Parcels
Open space
Wetland
Water bodies
Roads
Major Roads
Railroads
Schools
0
0.175
0.35
0.7
1.05
1.4
Miles

Baseline Assessment of existing street tree canopy cover and public health conditions (GIS analysis, census, existing health reports, site visits).

Existing Trees and Sidewalks in Arlington Neighborhood

Data Collection (Scoping & Assessment)

- Understand local health concerns
- Hosted Public Informational Sessions
- Raise awareness of TBL benefits of trees in urban env.


Existing View
Visual Preference Surveys
Phillips Street
Possible View
with Street Trees
Phillips Street
APA
SUSTAIN

Research Findings: Four Priority Impact Areas

Environmental:

- Low tree canopy cover, flooding, air quality
- ecosystem services (wildlife habitat, stormwater management, air filtration, regulation of micro-climate and carbon sequestration)
- Climate change mitigation and adaptation strategy.

***Physical and Mental Health*:**

- High % of obesity, diabetes, asthma and other respiratory diseases
- Mental health illnesses (depression and anxiety)
- Rehabilitating impacts street trees (physical and mental health).

Findings: Four Priority Impact Areas cont…

Social Cohesion:

- Correlation between the number of street trees and the amount of community interaction.
- More aesthetically pleasing and inviting streetscapes
- Safety – traffic calming
- Crime

Housing/Energy:

- Reduction in energy demand for adjacent buildings
- Extended life of pavement, building materials (reduced sun exposure)

Research Summary, Classification & Ranking:

Ranking Key:

0 : speculative. The impacts are supported by expert opinion but the direct correlation to street trees is weak.

+ : probable. The impacts relate to street trees and community stakeholder input and are supported by scientific studies.

++: definite. The impacts relate directly to street trees and community stakeholder input and are based on studies or scientific literature that supports causal relationships.

Priority Impact	Specific Element	Summary of Research	Source	Ranking	Notes
Environmental	Air Quality	Estimated total annual air pollution removal (of ozone, particulate matter, NO2, SO2, and carbon monoxide) by urban trees across 55 U.S. cities is 711,000 metric tons, representing $3.8 billion in public value.	http://depts.washington.edu/hhwb/Thm_Risk.html	++	
	Air Quality	Urban heat island effect: Parks can be up to 2°F cooler than the surrounding urban area in the day. Large numbers of trees and expansive green spaces across a city can reduce local air temperatures by up to 9°F.	http://depts.washington.edu/hhwb/Thm_Risk.html	+	
	Air Quality	City residents who live adjacent to green space have lower levels of illness and disease than other people of similar income levels. Physical environments that promote good health may reduce socioeconomic health inequalities.	http://depts.washington.edu/hhwb/Thm_Risk.html	0	
	Air Quality	"It's estimated an urban street with street trees has a 60% reduction in street level particulates (a type of air pollution from the burning of fuel) compared to an urban street with little or no street trees, (Johnson, 2009)	http://ac.els-cdn.com/S1877042812004004/1-s2.0-S1877042812004004-main.pdf?_tid=a68226cc-7fe5-11e6-929c-00000aab0f02&acdnat=1474453680_784fbf001acd9ee49b093b268b4e89f7 Towards a Better Tomorrow: Street Trees and Their Values in Urban Areas, Kadir and Othman.	++	
	General	General - According to the US Forest Service, a large tree with a trunk diameter 10 times larger than a small tree (76.2 cm vs. 7.62 cm, i.e., 30 inch vs. 3 inch diameter at breast height) produces 60-70 times the ecological services (McPherson et al, 1994); approaching 2 orders of magnitude increase!	http://www.ingentaconnect.com/content/wef/wefproc/2012/00002012/00000005/art00054 The Urban Forest is Broken: Rethinking Street Trees as Urban Infrastructure Peter MacDonagh, The Kestrel Design Group, Inc. and University of Minnesota Thomas Smiley, Bartlett Lab and Clemson University David Bloniarz,	++	

Research Summary, Classification & Ranking:

Priority Impact	Specific Element	Summary of Research	Source	Ranking	Notes
Mental Health cont...	Well-being	Green infrastructure and its effects on health and psychological well-being.	http://static1.squarespace.com/static/56e9367020c64742fe062659/t/56fd16022fe131ba2aaed188/1459426836832/Implications+for+-+CRN+Study.pdf	+	
	Mental Distress	How Trees Calm Us Down	http://www.newyorker.com/tech/elements/what-is-a-tree-worth	++	
	Depression	How Walking in Nature Prevents Depression	http://www.theatlantic.com/health/archive/2015/06/how-walking-in-nature-prevents-depression/397172/	+	
	Mood	The Relaxing Effect of trees	NC State University Co-op Ex - https://www.ncsu.edu/project/treesofstrength/benefits.htm	+	
	Mood	Trees and Landowner Pride	NC State University Co-op Ex - https://www.ncsu.edu/project/treesofstrength/benefits.htm	+	
	Health	Slower heartbeats, lower blood pressure and more relaxed brain wave patterns when exposed to green.	NC State University Co-op Ex - https://www.ncsu.edu/project/treesofstrength/benefits.htm	+	
	Sound	Sound waves are absorbed by tree leaves and branches. A belt of trees 100 feet wide and 45 feet high can reduce highway noise by 50 percent. Prolonged exposure to noise can cause hypertension, higher cholesterol levels, irritability and aggressive behavior.	NC State University Co-op Ex - https://www.ncsu.edu/project/treesofstrength/benefits.htm	+	
	Concentration	A Systematic Review of Evidence for the added benefits to health from from Exposure to Natural Environments	BMC Public Health, 2010 - http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2924288/pdf/1471-2458-10-456.pdf	0	Greater levels of attention
	Disease	Obesity, physical activity, and the urban environment: public health research needs	BioMed Central - Environmental Health, 2006 - http://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-5-25	0	
	Disease	How and why do individuals make food and physical activity choices?	Nutrition Reviews, 2001 - http://nutritionreviews.oxfordjournals.org/content/59/3/S11	0	
	Stress	Mental stress can lead to unhealthy habits, immune system suppression and cardiovascular disease, cancer, stroke, depression, asthma, and other severe health problems. Tree canopy in communities can significantly aid stress recovery.	A Dose-Response Curve Describing the Relationship Between Urban Tree Cover Density and Self-Reported Stress Recovery. Environment & Behavior Journal, 2014 - https://www.dropbox.com/s/8vycat9f5la2tiz/JiangLiLarsenSullivan2015.pdf?dl=0	++	
	Physical Health	Reducing obesity, encouraging active lifestyles	Green Cities Good Health; University of Washington, Urban Forestry/Urban Greening Research, 2010 - https://depts.washington.edu/hhwb/Thm_ActiveLiving.html	+	
	Mood	Mental Health & Function	Green Cities Good Health; University of Washington, Urban Forestry/Urban Greening Research, 2015 - https://depts.washington.edu/hhwb/Thm_Mental.html	+	

Findings: Estimated Impacts of Selected Individual Trees

- Quantify env. services that trees to be planed will provide.[1]

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

Street Tree Species	Estimated Benefits Per Tree											
	2" caliper (at planting)/ 6" caliper (mid-term ~15yrs.)/ 12" caliper (long-term ~30yrs.)											
	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
Tupelo	87	571	1353	4	24	72	25	128	329	0.08	0.58	1.50
Sourwood (small deciduous)	74	271	579	6	20	43	28	120	305	0.14	0.50	0.95
Sargent Cherry	74	271	579	6	20	43	28	120	305	0.14	0.50	0.95
Higan Cherry	74	271	579	6	20	43	28	120	305	0.14	0.50	0.95
Pagoda (medium deciduous)	87	571	1353	4	24	72	25	128	329	0.08	0.58	1.50
Japanese Tree Lilac	74	271	579	6	20	43	28	120	305	0.14	0.50	0.95
Littleleaf Linden	51	353	937	2	19	63	20	124	327	0.05	0.41	1.30
Japanese Zelkova	107	549	1480	19	54	106	68	218	469	0.11	0.75	2.00

Source: Data compiled from the National Tree Benefit Calculator http://treebenefits.com (based on multi-family residential as the closest use)

[1] http://www.itreetools.org

Findings: Estimated Impacts of Selected Individual Trees

- Quantify env. services that trees to be planed will provide.[1]

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

Street Tree Species	Estimated Benefits Per Tree *2" caliper (at planting)/ 6" caliper (mid-term ~15yrs.)/ 12" caliper (long-term ~30yrs.)*											
	Nitrogen Dioxide ($)			*Sulfur Dioxide ($)*			*Particulate Matter[10]($)*			*Overall Benefits ($)*		
	2"	*6"*	*12"*	*2"*	*6"*	*12"*	*2"*	*6"*	*12"*	*2"*	*6"*	*12"*
Hackberry	0.95	2.60	4.80	0.30	0.80	1.60	0.18	0.90	2.10	54	101	162
Yellowwood	0.19	1.35	3.40	0.06	0.43	1.25	0.09	0.61	1.70	41	63	104
Ginkgo (fruitless)	0.13	0.97	2.80	0.05	0.32	1.00	0.06	0.47	1.30	8	32	80
Honeylocust	0.32	2.01	4.90	0.11	0.69	1.70	0.15	0.88	2.40	39	81	147
Kentucky Coffeetree	0.95	2.60	4.80	0.30	0.80	1.60	0.18	0.90	2.10	54	101	162
Sweetgum	0.12	0.95	3.30	0.04	0.36	1.20	0.05	0.47	1.50	15	44	100
Tupelo	0.19	1.35	3.40	0.06	0.43	1.25	0.09	0.61	1.70	41	63	104
Sourwood (small deciduous)	0.31	1.12	2.15	0.09	0.36	0.60	0.14	0.54	1.10	13	30	54
Sargent Cherry	0.31	1.12	2.15	0.09	0.36	0.60	0.14	0.54	1.10	13	30	54
Higan Cherry	0.31	1.12	2.15	0.09	0.36	0.60	0.14	0.54	1.10	13	30	54
Pagoda (medium deciduous)	0.19	1.35	3.40	0.06	0.43	1.25	0.09	0.61	1.70	41	63	104
Japanese Tree Lilac	0.31	1.12	2.15	0.09	0.36	0.60	0.14	0.54	1.10	13	30	54
Littleleaf Linden	0.11	0.94	2.90	0.04	0.33	1.10	0.05	0.44	1.35	31	49	84
Japanese Zelkova	0.95	2.60	4.80	0.30	0.80	1.60	0.18	0.90	2.10	54	101	162

Source: Data compiled from the National Tree Benefit Calculator http://treebenefits.com (based on multi-family residential as the closest use).

[1] http://www.itreetools.org

Recommendations to Support Green Streets

1. *Promote documented TBL benefits of specific trees species to be planted (related to local health issues)*
2. *Build off of baseline conditions - projections (metrics to foster more support)*
3. *Planting Guidelines to help ensure success*
4. *Tree Stewardship Program.*
5. *Podcast and Videos to Promote the Green Streets Program.*
6. *Tree Preservation/Protection Ordinance.*
7. *Street Tree Maintenance By-law/Ordinance/Program.*
8. *Ongoing monitoring: Feedback from Residents*

Steps Beyond a Traditional HIA:

- Assessment of Existing Conditions (public health & tree canopy cover)
- Trees Impact on TBL (with a health lens)
- GWL Green Streets program
- Impacts to TBL health
- Recommendations

H I A

- **Education and awareness**
- **Tree selection tools**
- **Marketing/promotional tools**

+

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
Celtis occidentalis	Hackberry	Yes	Moderate	Good	Tolerant	Yes	Best	Best	Best	Requires wide tree lawn, produces galls
Cladrastis kentukea	Yellowwood	Yes	Moderate	Moderate	Moderate	Yes	Better	Good	Better	
Ginkgo biloba	Ginkgo (fruitless)	Yes	Moderate	Moderate	Tolerant	No	Good	Good	Good	Get fruitless variety
Gleditsia 'Skyline'	Honeylocust	Yes	Moderate	Good	Tolerant	No	Better	Better	Best	Thornless, nearly fruitless variety. High energy efficiency benefits as tree gets larger.
Gymnocladus dioicus	Kentucky Coffeetree	Yes	Tolerant	Tolerant	Tolerant	Yes	Best	Best	Best	
Liquidambar styraciflua	Sweetgum	Yes	Tolerant	Tolerant	Tolerant	Yes	Good	Good	Good	Prickly balls can be messy. Rotundifolia is fruitless – less mess.
Nyssa sylvatica	Tupelo	Yes	Moderate	Moderate	Moderate	Yes	Better	Good	Best	Wide tree lawns
Oxydendrum arboretum	Sourwood	Yes	Moderate	Unknown	Moderate	Yes	Good	Good	Good	Small. Lower Ozone reduction. Good under power lines
Prunus sargentii	Sargent Cherry	Yes	Moderate	Tolerant	Intolerant	No	Good	Good	Good	Small. Lower Ozone reduction. Good under power lines.
Prunus subhirtella 'autumnalis'	Higan Cherry	Yes	Tolerant	Tolerant	Tolerant	No	Good	Good	Good	Small. Lower Ozone reduction. Prone to suckering.
Styphnolobium japonicum	Pagoda Tree	No	Moderate	Tolerant	Tolerant	No	Better	Good	Better	
Syringa reticulate	Japanese Tree Lilac	Yes	Tolerant	Tolerant	Intolerant	No	Good	Good	Good	Small. Lower ozone reduction. Good under power lines.
Tilia cordata 'Greenspire'	Littleleaf Linden	Yes	Intolerant	Moderate	Tolerant	No	Good	Good	Good	Not ideal close to road.
Zelkova serrata	Japanese Zelkova	Yes	Moderate	Tolerant	Tolerant	No	Best	Best	Best	
Zelkova serrata 'City Sprite'	Japanese Zelkova 'City Sprite'	Yes	Tolerant	Tolerant	Tolerant	No	Best	Best	Best	Small. Good under power lines.

Green: recommended street trees; any red highlights are caveats for their use. Note that "small" indicates a smaller tree that could be useful for streets with overhead wires or narrow neighborhood streets. They would be much less successful on broader streets where a large tree is needed to create a sense of volume under the tree canopy.

Red: caveats for the use of the recommended street trees.

Grey: reasons for the tree not being recommended for street tree planting. No evergreens are recommended.

** - Rankings based on data compiled based on Table 4.0 and is from http://treebenefits.com*

i-Tree

Tools for Assessing and Managing

Forests & Community Trees

MyTree Benefits

Serving size: 1 trees

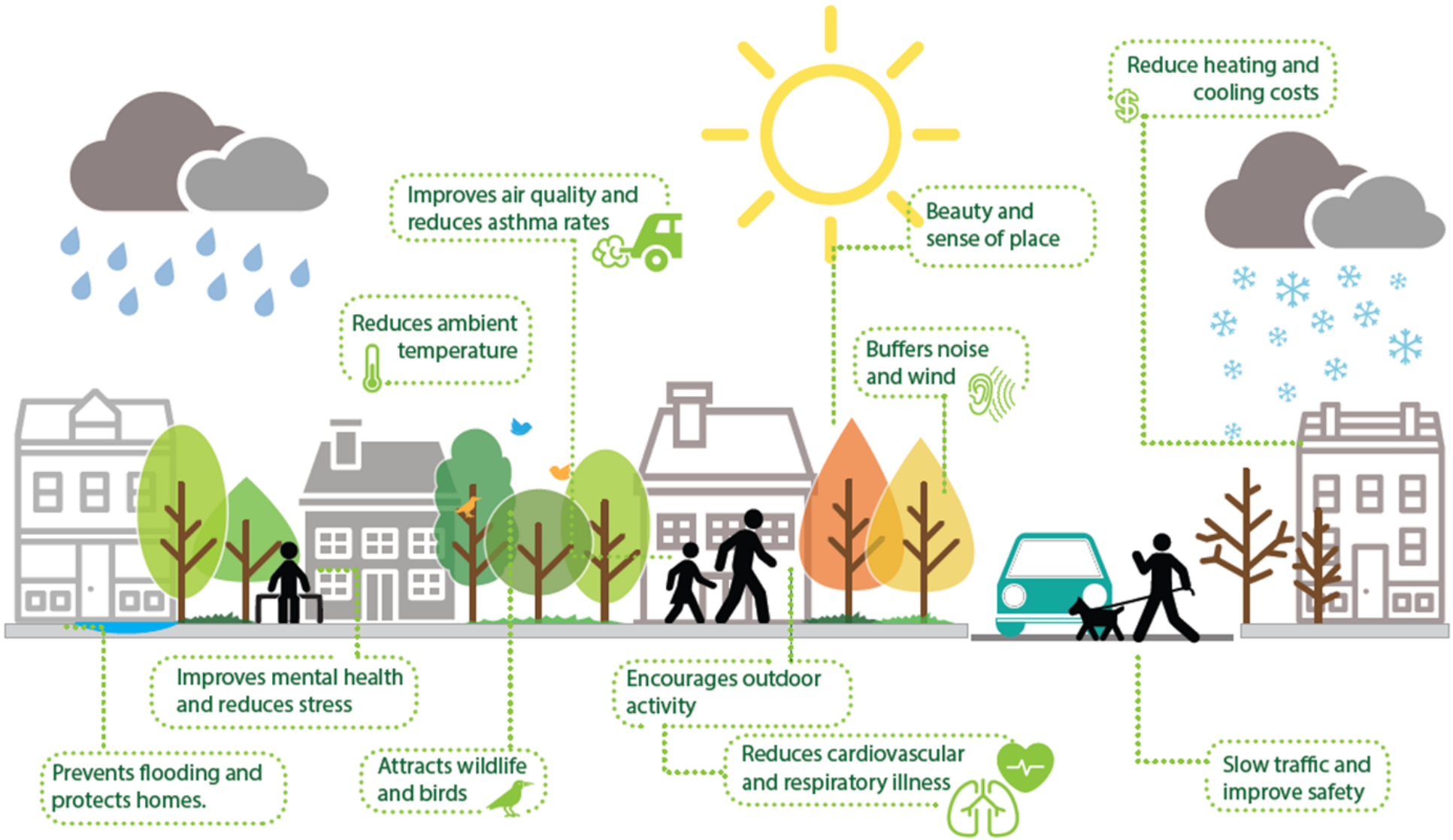
Carbon Dioxide (CO_2)	$0.65
CO_2 absorbed each year	64.82 lbs
Storm Water	$10.54
Rainfall intercepted each year	1317 gal.
Air Pollution removed each year	$1.42
Ozone	10.56 oz
Nitrogen dioxide	0.48 oz
Sulfur dioxide	0.00 oz
Large particulate matter**	10.56 oz
Energy Usage each year*	$1.58
Electricity 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

Good for Lawrence, Great for You!

¡Bueno para Lawrence, Mejor para Ti!

GREEN STREETS

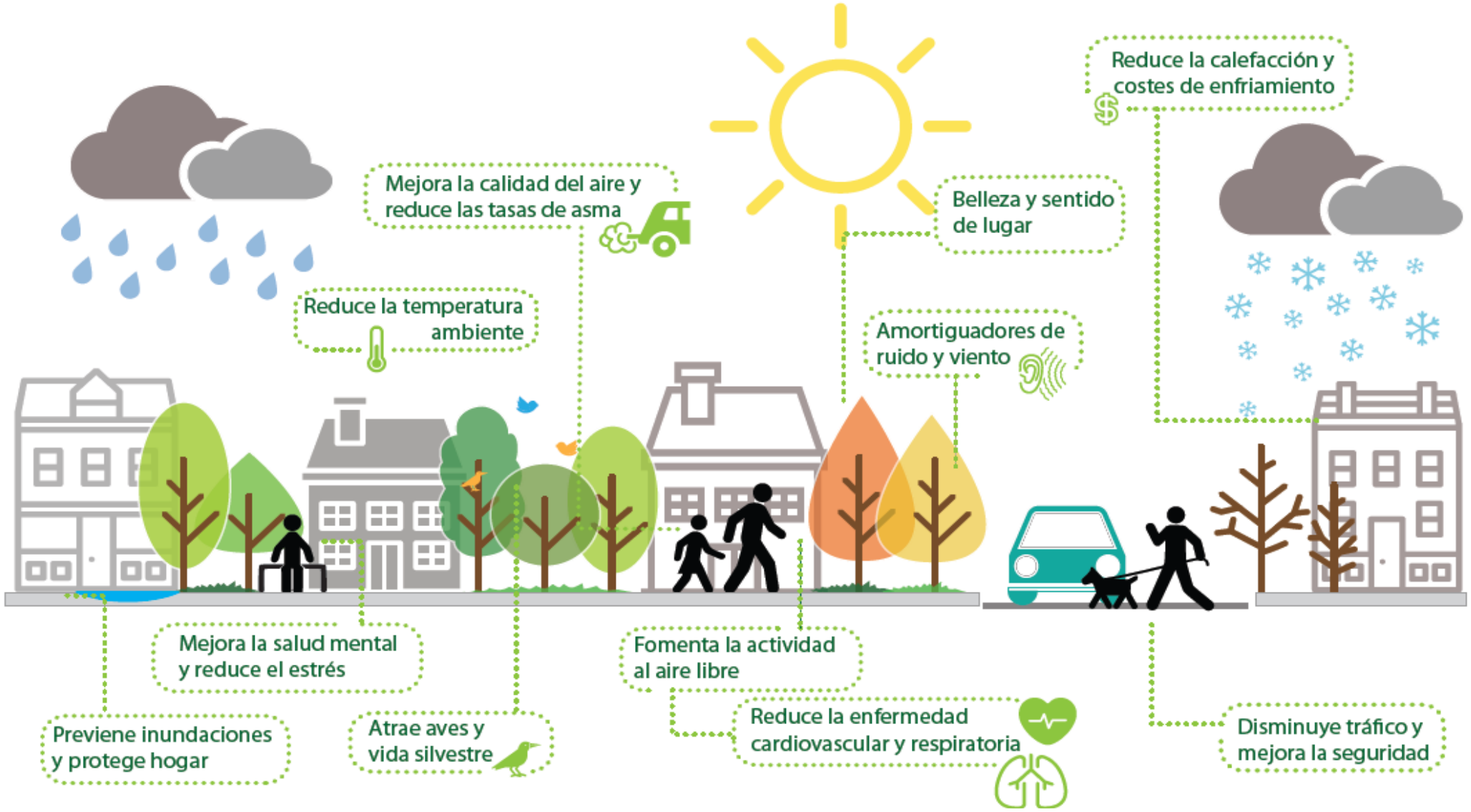
LAWRENCE · MASSACHUSETTS



GOOD FOR LAWRENCE, GREAT FOR YOU!

CALLES VERDES

LAWRENCE · MASSACHUSETTS



¡BUENO PARA LAWRENCE, MEJOR PARA TI!

Multiple Benefits of Street Trees in Lawrence

1. ECONOMIC:

Increased property value: realtor estimates of tree-lined streets vs. comparable non tree-lined streets have shown anywhere between 5-18% increase in home/business value. People prefer tree-lined streets!

Reduced Energy Costs: streets and parking lots can increase local temperatures which can significantly impact energy costs to homeowners and consumers. The shade provided from street trees can reduce energy bills for a household by as much as 10%.

Return on Investment: for a planting cost of $250-600, a single street tree returns over $90,000 of direct benefits in the lifetime of the tree.

Extended pavement life: the shade of street trees reduces daily heating and cooling of asphalt and can extend the life of pavement up to 60% longer. This translates into a significant cost reduction for maintaining street systems.

Energy: Biomass from trees is a potential source of renewable energy for Municipalities.

2. ENVIRONMENTAL:

Grey Infrastructure to Green Infrastructure: The leaves, branches and trunks of street trees (green infrastructure) can capture up to 30% of a typical rainfall event through absorption and evaporation. Tree root systems can absorb up to another 30%, resulting in reduced stormwater runoff and potential flooding. This also results in less man-made drainage infrastructure (catch basins, piping, detention ponds).

Climate Change Mitigation: leaves absorb harmful pollutants like carbon dioxide (CO_2), carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), and particulate matter (PM) such as dirt, dust and soot. Street trees absorb nine times more pollutants than more distant trees, converting those harmful gasses back into oxygen and other useful and natural gasses.

Air Quality: shading provided by trees can reduce local temperatures by up to 15°F, which helps reduce the creation of ground-level ozone – a major contributor to smog & respiratory problems in kids &adults.

Habitat: street trees provide a canopy, root structure and setting for important insect &bacterial life below the surface. Above the surface, they provide biomass, nutrients and habitat for birds &other wildlife.

3. SOCIAL:

Public Safety: street trees help reduce solar glare and define the roadside edge and their canopy cover provides shading and separation from the road that can help protect pedestrians, guide motorists movements and help them better assess their speed. These attributes lead many motorists to exercise greater caution, resulting in reduced speeds (by as much as 15mph) as well as fewer accidents on streets lined with trees.

Public Health: trees reduce UV exposure for pedestrians and have a natural calming effect which can help reduce "road rage", local crime and vandalism, further improving the safety of streets and neighborhoods. Visual access to trees has also been shown to have a rehabilitating impact on our recovery from illness.

Noise Reduction: slower vehicle speeds as a result of street trees can reduce engine and tire noise. Their leafy vegetation can also absorb a great deal of noise in neighborhoods.

Aesthetics: trees provide a general softening of the urban environment and also provide a screen for utility poles, light poles, on-street and off-street parking and other features that create visual pollution. The aesthetics of tree lined streets and green spaces have been shown to have positive psychological benefits including lower rates of stress, blood pressure and mental illness.

Facts and Figures from the USDA Forest Service: http://www.fs.fed.us/ucf/

Facts and Figures:

- "There are about 60– to 200-million spaces along our city streets where trees could be planted. This translates to the potential to absorb 33 million more tons of CO^2 every year, and saving $4 billion in energy costs." —*National Wildlife Federation*
- "The net cooling effect of a young, healthy tree is equivalent to ten room-size air conditioners operating 20 hours a day. Trees properly placed around buildings can reduce air conditioning needs by 30 percent and can save 20–50 percent in energy used for heating." —*USDA Forest Service*
- "Healthy, mature trees add an average of 10 percent to a property's value." —*USDA Forest Service*
- "One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people." —*U.S. Department of Agriculture*
- "Trees can be a stimulus to economic development, attracting new business and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent." —*The Arbor Day Foundation*
- "In laboratory research, visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension." —*Dr. Roger S. Ulrich Texas A&M University*

Have questions, comments or want more information? Visit the Green Streets Blog: https://higreenstreets.wordpress.com/

APA SUSTAIN

GROUNDWORK CHANGING PLACES CHANGING LIVES

Groundwork LAWRENCE

Targeted Messaging to Community Health Issues and Concerns:

Table 6.0 – Suggested Messaging for Green Streets Program

Element	Specific Health Concern	Suggested Messaging
Air Quality	Asthma/Allergies	Did you know?? A large contributor to asthma is caused by pollutants in the air from industry, cars, and buildings. Street trees can lower the amount of these pollutants by up to 60%. OR Lawrence has one of the highest rates of asthma in the state. This is caused by air pollution from industry, cars, and buildings. Street trees can lower the amount of this pollution by up to 60%, and improve the quality of life in Lawrence.
Walking	Obesity/Asthma/ Mental Health	Street trees have been shown to increase physical activity, reducing the risk of obesity; improve air quality, reducing asthma and other respiratory illnesses, and reduce stress for those that are surrounded by them. Have you spent time with your street tree today?
Quality of Life	Social interaction	Street trees create a more inviting environment which can bring people together through relaxing outdoor activities. A community that knows each other and engages with each other regularly is safer and healthier.
Refreshing	Shade/heat stroke	During the hot summer days, appropriately placed street trees can be a refreshing change that will keep you cool while walking home or waiting for the bus.
Safety	Physical/Mental Health	Street trees create the appearance of a smaller space, which has been shown to reduce vehicle speed on the street and create a safer route for pedestrians.
Beauty	Natural Environment	Street trees attract birds and other wildlife. Improve biodiversity of urban environments.
Safety	Crime/Violence	Street trees beautify the neighborhood and help get more people outside and active which can promote more social interaction and help to reduce stress levels which can lead to fewer incidents of crime and violence. More street trees can also signal that the neighborhood is cared for and being watched carefully (more “eyes on the street”).

End Results:

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

Resources:
https://www.vibrantcitieslab.com/

Greening the Gateway Cities Program:
https://bit.ly/2tIIRjR

Full Report:
https://tinyurl.com/GWLGreenStreets

Groundwork Lawrence:
https://www.groundworklawrence.org/

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UMass Extension
Landscape, Nursery & Urban Forestry Program

40th Annual UMass Community Tree Conference: Species Selection in the Urban Landscape - Professional Perspectives