

A CONFERENCE OF THE NATIONAL MAIN STREET CENTER

**SEATTLE, WA // MARCH 25-27, 2019** 



### Learning Objectives



- Think about Main Streets as a community's most significant open space/park and the benefits that result from thinking of a Main Street as an open space/park-like space.
- Identify the beneficial roles nature plays in a Main Street user's experience.
- Recognize the routine maintenance benefits that result from incorporating nature-based systems into a Main Street area.
- Identify some of the spatial requirements needed to successfully incorporate nature-based systems into a Main Street.

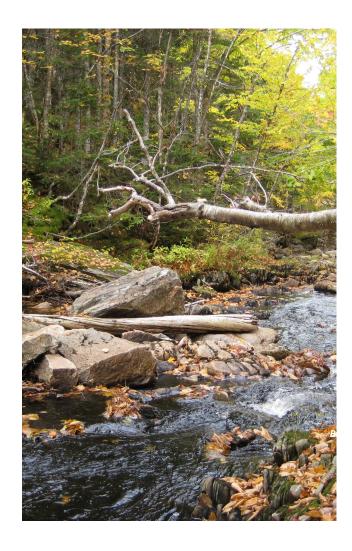
## What is Nature?





**WILDERNESS** 

**OUTSIDE** 



#### What is Nature?

- **1. Nature is consistent.** It follows a set of rules and principles that define the laws of physics, the characteristics of materials, and the behaviors of organisms;
- 2. Nature doesn't stop. Human beings are just one of millions of different types of organisms found on the planet. We will always be governed by nature first; regardless of how much or how little we might try to manage, order, or control other organisms or materials for our purposes.
- **3. Nature is a benefit and a detriment.** This is determined some by culture, and some by region/place, need, and desired outcome.
- 4. Nature does impact us.



# Benefits of Nature









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#### General Health



- Lower HDL Cholesterol
- Lower Cortisol Levels
- Faster Injury/Illness Recovery
- Lower Perception of Pain or Discomfort
- Higher Birth Weights
- Asthma/Allergy Relief
- Lower Blood Pressure
- Higher Physical Activity through Life



### Mental Health



- Attention Restoration Theory
- Stress Reduction Theory
- Concentration
- Lower Risk of Psychiatric Disorders
- Improved Cognition
- Improved Memory
- Improved Sense of Self
- Mood Regulation



### Performance



- Improved Memory
- Improved Concentration
- Better Writing
- Improved Testing
- Increased Job Satisfaction
- Improved Athletic Performance



#### Benefits of Nature





0.1% REDUCTION IN LOWER THAN NORMAL BIRTH RATES<sup>1,2</sup>

**OBESITY/OVERWEIGHT** AND TYPE 2 DIABETES<sup>4</sup>

ATURE SIGNIFICANTLY INCREASED

**TESTING SCORES<sup>6</sup>** 

CORTISOL LEVELS<sup>8, 9</sup>

12.4 % LOWER 7.4% REDUCTI BLOOD PRESSURE<sup>4</sup>

1.4 % SOCIAL COHESION<sup>4</sup>

HIGHER RISK FOR **PSYCHATRIC DISORDERS** WITHOUT ACCESS TO NATURE IN THE URBAN **ENVIRONMENT<sup>5</sup>** 

#### Social



- Lower Crime Rates
- Higher Levels of Communal-Trust
- Increased Willingness to Help Others
- Increased Generosity & Altruistic Behavior
- Promotes Social Interaction
- Increases Walkability
- Improves Neighborhoods
- Provides a *PUBLIC GOOD*



### Cleaning



- Reduces Air Pollution
  - Interception
  - Respiration
- Stormwater Control
  - Interception
  - Storage
- Water Quality Improvement
- Reduce Greenhouse Gases
- Decreased Erosion
- Minimized Downstream Pollution
- Graywater Treatment
- Carbon Sequestration



### Maintenance



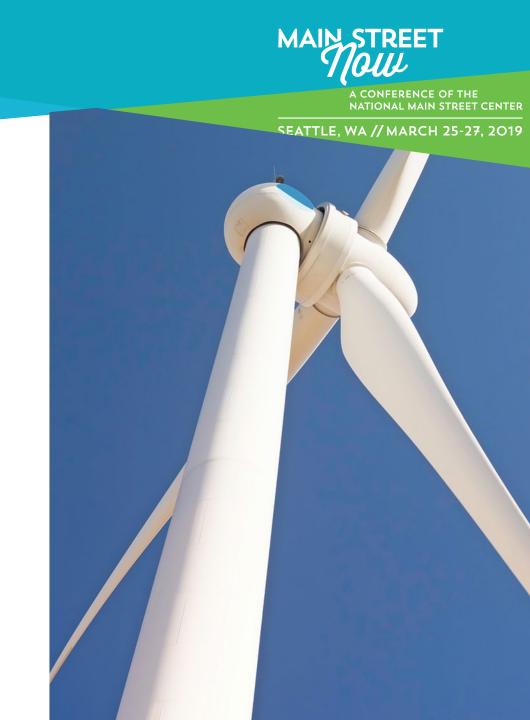
- Reduced MS4 Costs
- Longer Pavement Life
- Cooling
- Lower Street Maintenance
- Sound Buffer
- Visual Buffer



### Production



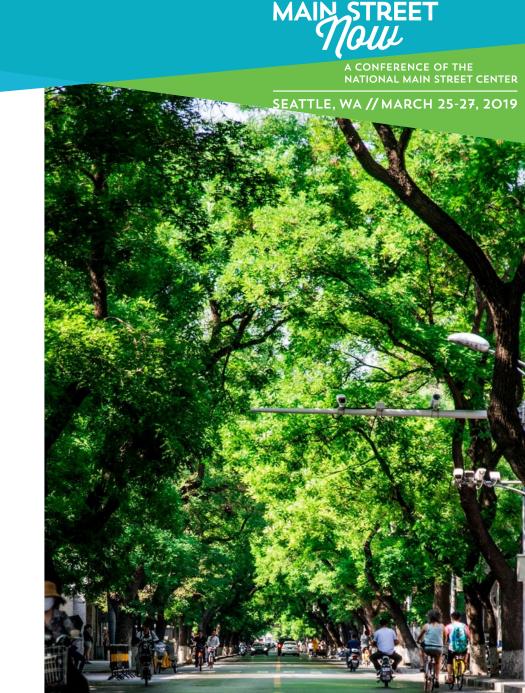
- Energy
  - Solar
  - Wind
  - Geothermal
  - Storm Interception
- Food
- Habitat
  - Humans
  - AND Everything Else
- Aesthetics
- Lower Heating/Cooling Costs
- Lower Urban Heat Island Effect



## Operational Savings



- Heating/Cooling Savings
- Decreases Hardscape Replacement
  - Particularly Asphalt
- Reduces Infrastructure Costs
  - Regulates runoff
  - Stores runoff
  - Reduces rainfall to the ground
  - Reduces in-pipe water



### Purchasing



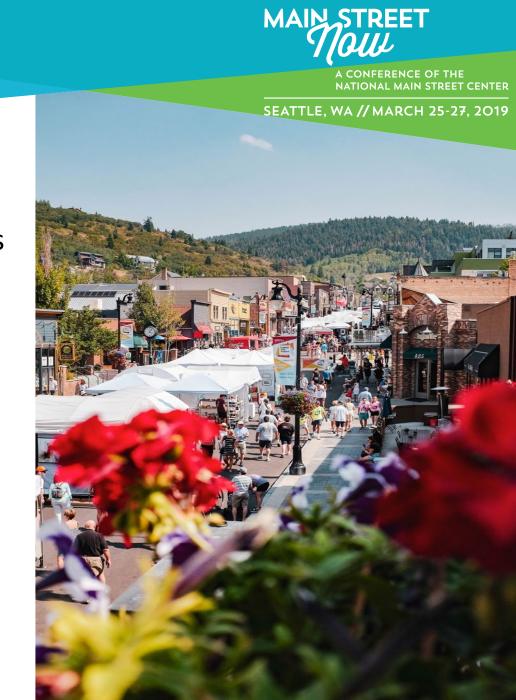
- Increased overall purchasing
- Increased spending on a per visit basis
- Increased willingness to pay for all goods or services sold
  - Convenience
  - Shopping
  - Specialty services/goods
- Increased willingness to pay for parking
- Attracts more 'out-of-market' customers



### Property



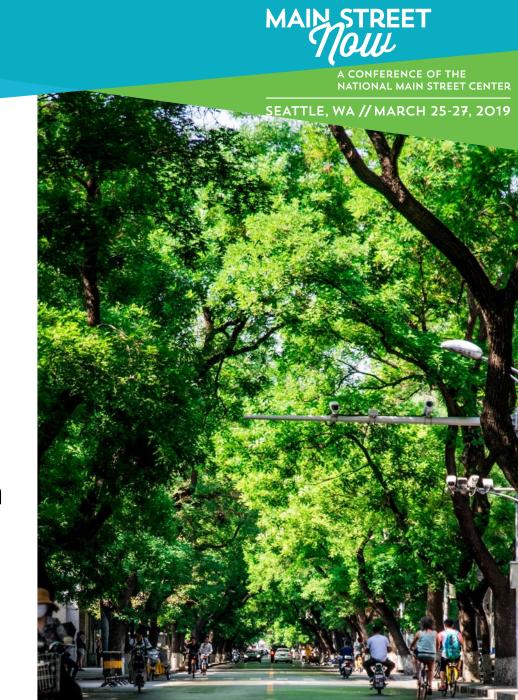
- Increased Property values
  - Retail and Residential Rental Values
  - Residential Home Values
  - Early studies show, can contribute to improved municipal tax value
- Increased Curb Appeal
- Economic Stability of a Neighborhood



### Experiences



- Customer Comfort
  - Physical Feels 3-5° cooler
  - Feelings of safety
- Quality of Goods and Services
   Sold
- Customers reported more positive commerce experiences
- Increases willingness to walk to a destination
- Improve customer perception of place



#### Benefits of Nature



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3-15% INCREASE

**HOME VALUES**<sup>10</sup>

7%

HIGHER COMMERCIAL RENTAL RATES<sup>12</sup>



**10**x

DISTANCE CONSUMERS ARE WILLING TO TRAVEL WHEN NATURE IS PRESENT<sup>11</sup>



ADDITONAL TIME
CONSUMERS SPENT IN
MARKET AREAS WITH
NATURE<sup>11</sup>

5-10% REDUCTION TOTAL ANNUAL HEATING & COOLING COSTS<sup>13</sup>

44%

GREATER PUBLIC PERCEPTION
OF NATURAL STREETSCAPES
VS. CLEAN STREETSCAPES
WITH NO VEGETATION<sup>11</sup>

# 5-10% REDUCTION 9-12% INCREASE

SHOPPER WILLINESS TO PAY FOR GOODS AND SERVICES<sup>11</sup>



GREATER TIME EQUALS MORE MONEY SPENT<sup>14</sup>

### Successful Downtowns Indicators



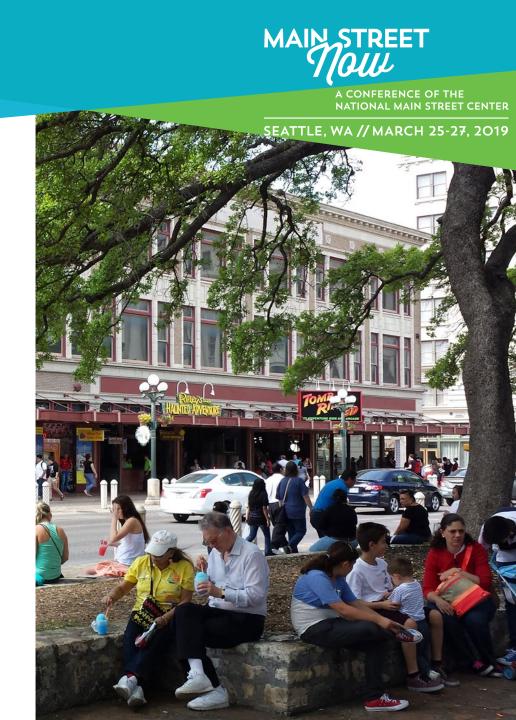
- Good First Impressions
- Gathering Spaces
- Pedestrian Activity
- Create Memories
- Urban Forest
- Capitalize on Nearby Natural Feature(s)
- Investment in Beautification



# Gathering Spaces



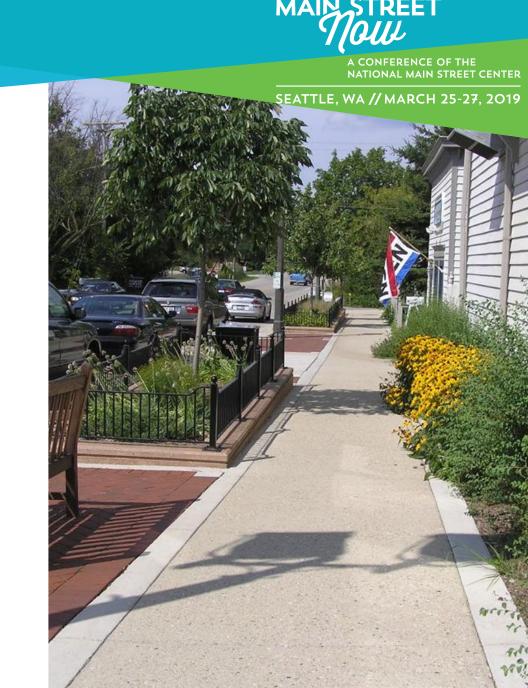
- Intimate Seating Areas
- Diverse Users



### Retail Beautification



- Extension of Interior Space onto Sidewalk
- Low plantings at Building Face
- Large Canopy Trees
- Perceived Order



# Design Standards

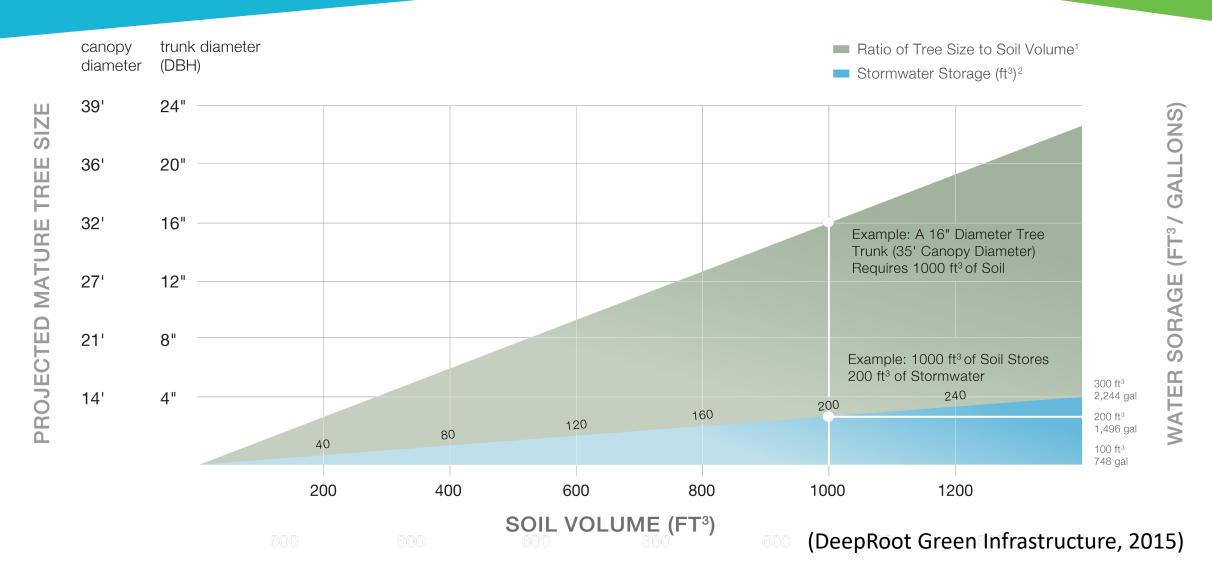


- Tree Spacing
- Space Requirements
- Spacing Related to Other Elements
- Plant Selection
- Protection
- Soil Requirements



#### Ratio of Tree Size to Soil Volume





### Soil





#### CLAY, SILT, & SAND

Mineral components of soil

Cubic feet of soil in a 5'x5' tree grate

Forest soils have a Proctor Density range of

600 to 1400 c.f.

Soil volume per street tree

64% - 84%

2' to 2.5' Ideal Soil Depth for Shrubs

**Living in the soil** are plant roots, bacteria, fungi, protozoa, algae, mites, nematodes, worms, ants, maggots, insects, grubs, & larger animals

Soil

is made of about 45% minerals 25% Water 25% Air 5% Organic Matter

Every 1% increase in organic matter results in as much as 25,000 gal of available soil water per acre

## Implementation



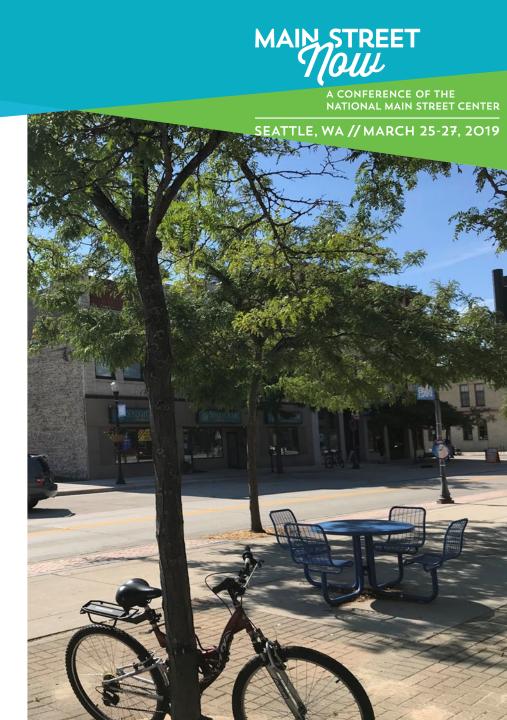
- Urban Forest Management Plan
  - Vision
  - Inventory & Assessment
  - Strategic Plan
  - Implementation Plan
  - Monitoring Plan
- Pilot Project



# Designing for Trees



- Design From the Root Up
- Respect the Base of the Tree
- Use the Right Tree



### Trees Health Influences

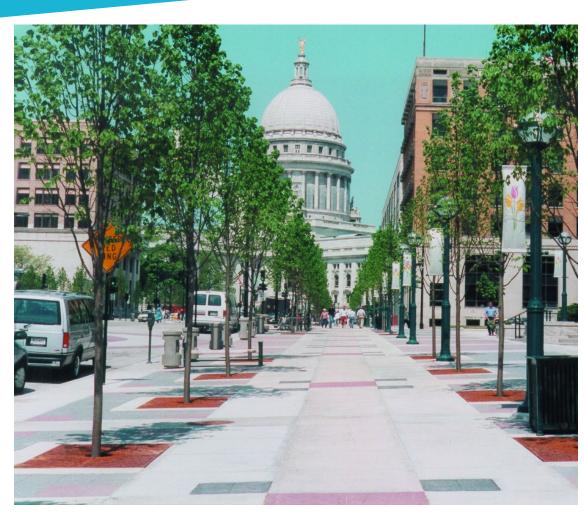


- Soil
  - Moisture
  - Volume
  - Porosity
  - Chemistry
- Canopy Irradiance
- Air Quality
- Water



# Adequate Soil Volumes

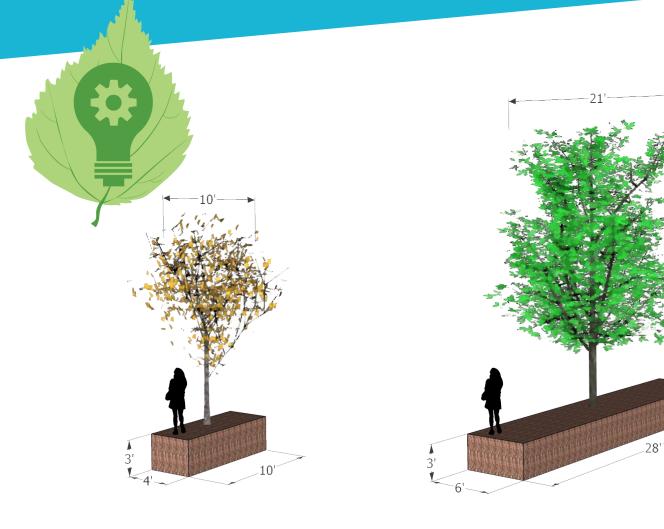






1999 2014

# Adequate Soil Volumes



Soil Volume =120 cubic feet

Soil Volume =500 cubic feet



Soil Volume =1000 cubic feet

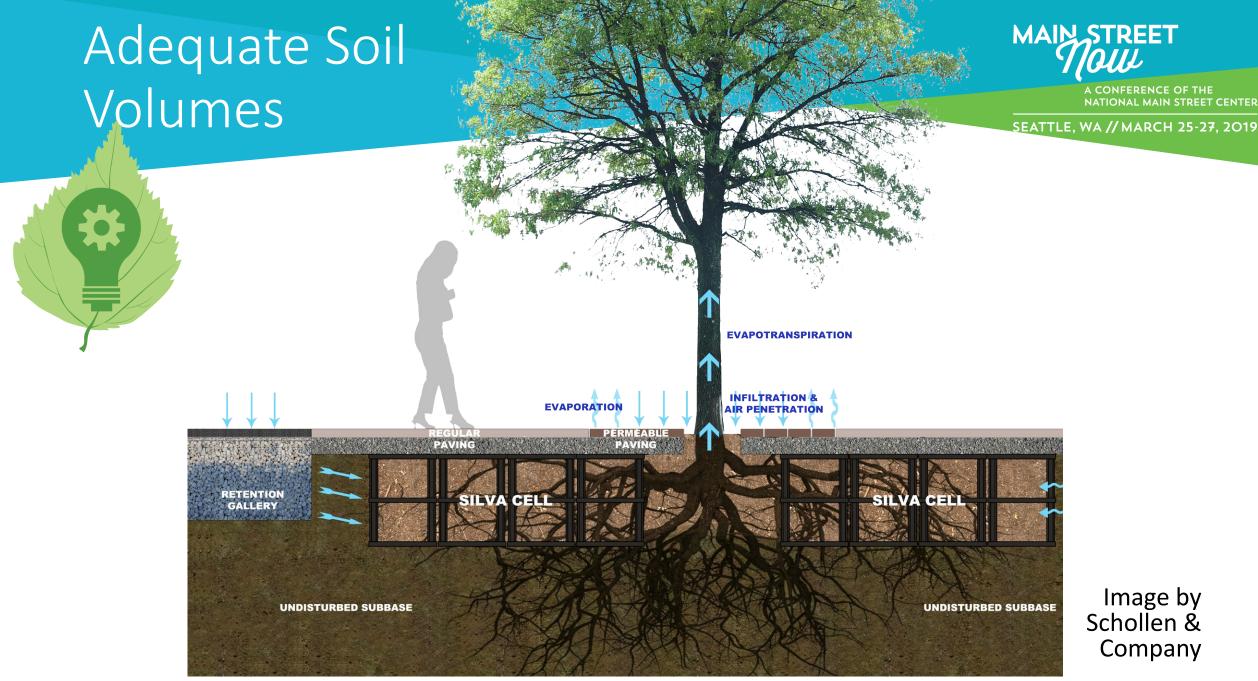


Image by Schollen & Company

#### Street Tree Return on Investment



#### Tree planted in 150 cf of soil

- 7 to 10 Years lifespan
- Installation \$5,000
- Maintenance Cost \$1,212
- Total Benefits \$2,718
- Net Lifecycle Cost \$3,293

#### Tree planted in 1,000 cf of soil

- 50 Years lifespan
- Installation \$14,000
- Maintenance Cost \$2,342
- Total Benefits \$41,769
- Net Lifecycle Cost <\$25,427>

#### Maintenance



- Protection
- Establishment
- Watering
- Trimming/Dead-heading
- Pest Control & Treatment
- Sidewalk Cleaning



### Trees Conflicts



- Pavement
- Person Injury
- Infrastructure
- Vehicles
- Views
- Messy



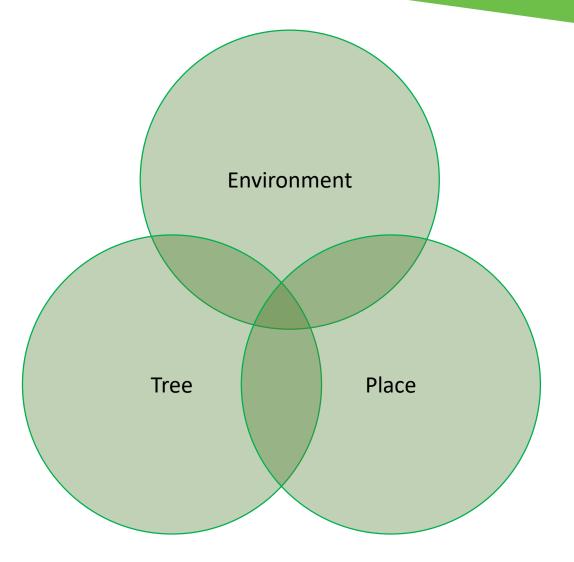
### Trees Conflicts





#### Preventative measures

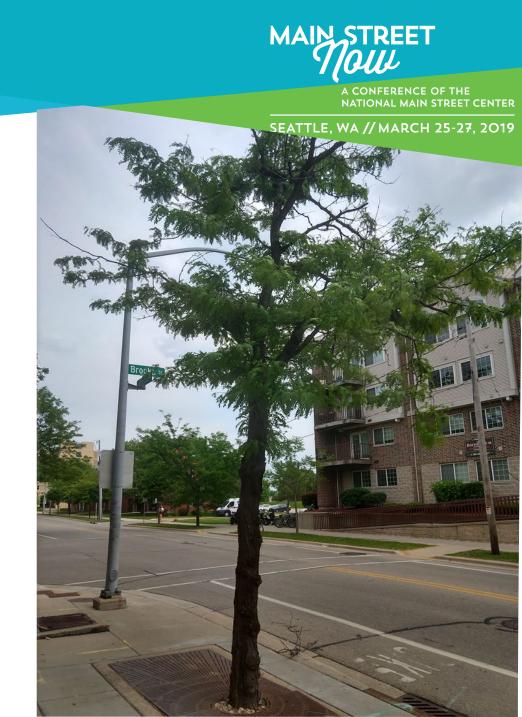
- Root Barriers
- Structural Soil/ Soil Cells
- Pervious Pavement
- Right Tree / Right Place
- Pruning
- Education



## Poor Tree Health



- Lack Of Room
- Vandalism
- Traffic Congestion
- Building Development
- De-icing Salts
- Air Pollution
- Plant Selection





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