



Community Forestry Management Plan 2015-2019

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Mark Albiez, Chief of Staff
Vivian Brady-Phillips, Deputy Mayor
Marcos Vigil, Deputy Mayor
Rolando R. Lavarro, Jr., Council President

Joyce Watterman, Councilwoman at Large
Frank Gajewski, Ward A Councilman
Richard Boggiano, Ward C Councilman
Candice Osborne, Ward E Councilwoman

Daniel Rivera, Councilman at Large
Khemraj "Chico" Ramchal, Ward B Councilman
Michael Yun, Ward D Councilman
Diane Coleman, Ward F Councilwoman

Department of Public Works

Mark Redfield, Director

Division of Parks and Forestry

Cleveland Snow, Director

Tree Committee

Carolyn Katz-Mount, Chair

Environmental Commission

Gerald F. Nicholls, Chair
Sara K. Schultzer, Vice Chair

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Preparer Signature: *Les Alpaugh* Date: March 13, 2015

This plan was prepared in accordance with the New Jersey Shade Tree and Community Forestry Assistance Act, P.L. 1996, Chapter 135.

March 13, 2015

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City of Jersey City Community Forestry Management Plan

I. MUNICIPAL/COUNTY INFORMATION FORM

Municipality City of Jersey City

County Hudson County

Address 13-15 Linden Avenue East, 2nd Floor
Jersey City, NJ 07305

Contact Name and Title Cleveland Snow, Director – Division of Parks and Forestry

Phone # 201-547-4449

Fax # and E-mail No Fax Elizabeth Harley Elizabet@JCNJ.org
Cleveland Snow CSnow@jcnj.org

Organization Name City of Jersey City

Mayor/County
Freeholder's Signature _____

Date of Management
Plan Submission April 2015

Time Period Covered in
Management Plan 2015-2019

Community
Stewardship Incentive
Program (CSIP)
Practices Identified in
Management Plan

- CSIP #1 Training.
- CSIP #2 Community Forestry Ordinance Establishment.
- CSIP #3 Public Education and Awareness.
- CSIP #4 Arbor Day.
- CSIP #5 Tree Inventory.
- CSIP #6 Tree Hazard Assessment
- CSIP #7 Storm Damage Assessment
- CSIP #8 Tree Maintenance and Removals
- CSIP #9 Insect and Disease Management
- CSIP #10 Wildfire Protection
- CSIP #11 Tree Planting
- CSIP #12 Tree Recycling
- CSIP #13 Sidewalk Maintenance Program
- CSIP #14 Storm Water Management
- CSIP #15 Other

**Official Use Only
Certification**

The above named municipality/county has made formal application to the New Jersey Forest Service. I am pleased to advise you that after our review, the NJ Forest Service has concluded that this plan meets the standards set forth by the State and the NJ Community Forestry Council and is approved for the period covered.

Signed _____
State Forester Approved Date _____

**PLEASE
&**

II. INTRODUCTION

This is the 3rd, 5-year Community Forestry Management Plan prepared for the City of Jersey City in accordance with the New Jersey Shade Tree and Community Forestry Act P.L. 1996, Chapter 135. The long-range goal of these plans is to provide guidance to the City in its efforts to plant, maintain, sustain and manage a vigorous, healthy tree resource. The emphasis for Jersey City is to build upon the existing shade tree program by reporting on the extent of past work, refocusing goals and objectives and making adjustments to a proven program of success.

ForesTree Consultants met with City representatives from the Department of Public Works, Division of Parks and Forestry. Additional information was obtained through communications with personnel in the Office of the Director, Department of Public works. Further information was obtained from the City website and by reviewing the minutes of the Environmental Commission meetings held during 2014. This plan documents the City's existing program and organizes the information and thoughts into the context required by the New Jersey Shade Tree and Community Forestry Act (NJSTCFA). Approval of this plan by the State Forester, upon favorable recommendation by the Community Forestry Council, will provide continuing liability protection to the City under the NJSTCFA and will render the City eligible to apply for grant funds from the New Jersey Forest Service and other sources to assist in implementing this plan.

Mission Statement:

To ensure the health, safety, and sustainability of Jersey City's community forest and shade trees for the economic, environmental, and aesthetic benefits provided to City residents and visitors.

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Goals and Objectives:

Current goals and objectives, as well as a vision for the future, were discussed during the information gathering sessions, phone calls and emails with City representatives. The goals and objectives from previous plans have been adjusted to account for work(objectives) completed and to incorporate new objectives related to the emerging focus on work by the Division of Parks and Forestry to assess the condition of park trees. Objectives have also been added to include the initiative of the Jersey City Planning Department/Environmental Commission to assess the extent and condition of the City's tree canopy.

A Goal is defined as the result or achievement toward which effort is directed; aim; end. A Goal may not be reached and is expressed as desirable future condition or sustaining a favorable current state. Objectives are measurable acts undertaken to achieve and/or pursue a goal. This plan organizes Goals and Objectives into 3 categories:

1. Administrative and Organizational Capacity.
2. The Existing Condition of the Community Forest.
3. The Desired Future Condition of the Community Forest.

Category 1 - Administrative and Organizational Capacity

Goal #1a:

To meet State standards for "approved" status in accordance with the New Jersey Shade Tree and Community Forestry Act.

Objectives of Goal #1a:

- (1). Complete and gain approval of this 5-Year Community Forestry Management Plan.
- (2). Meet CORE training standards for at least two City representatives; one volunteer and one municipal employee (most desirable is the Director of Parks and Forestry and a volunteer working with the Tree Canopy Project).
- (3). Obtain at least 8 Continuing Education Units (CEU's) per year (most easily accomplished by attending the annual meeting of the New Jersey Shade Tree Federation.)
- (4). Provide an annual report of accomplishments relative to CFMP goals and objectives to the State Community Forestry Program administrator. See [http://www.nj.gov/dep/parksandforests/forest/community/Information for Municipalities.html](http://www.nj.gov/dep/parksandforests/forest/community/Information_for_Municipalities.html)

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Goal #1b:

To support and augment organizational capacity.

Objectives for Goal #1b:

- (1). Appoint a person and/or group to focus on implementation of this plan.
- (2). Consolidate on-going initiatives of the Department of Public Works, Division of Parks and Forestry and Jersey City Planning Department and Environmental Commission.
- (3). Fill and kick-start the Shade Tree Commission as established by City Ordinance 05-075, adopted June 22, 2005.
- (4). Review and recommend updates to City ordinances and development standards as ongoing work by the Shade Tree Commission.
- (5). Maintain membership in the New Jersey Shade Tree Federation.
- (6). Hold periodic, agenda driven meetings of the appointed tree group. Minimally 1 per quarter. The following persons/groups could be included:
 - a. Director of Parks and Forestry
 - b. Shade Tree Commission
 - c. Environmental Commission
 - d. Sustainable Jersey City Department
 - e. Parks Coalition
 - f. Green Infrastructure Center (GIC)
 - g. Rutgers Green Infrastructure Group
 - h. Grove of Remembrance Committee
 - i. New Jersey Tree Foundation

Goal #1c:

To sustain and improve public education, awareness and outreach.

Objectives for Goal #1c:

- (1). Meet the standards for and make annual application for Tree City, USA designation from the Arbor Day Foundation.
- (2). Continue to prepare the annual Arbor Day Proclamation for Mayor's signature and to plan for and participate in the annual Arbor Day Ceremony.
- (3). Publicize the Division of Parks and Forestry's Assessment of Parks and the Canopy Assessment by the Environmental Commission and Green Infrastructure Center.
- (4). Consider expanding existing Public Education, Awareness and Outreach in some combination of the following:
 - a. Participate in the NJFS "Third Grade Tree Team" program. See http://www.state.nj.us/dep/parksandforests/forest/nj_forest_nursery.htm
 - b. Develop information for distribution to private landowners to include a list of desirable trees for backyard planting (to help achieve increased tree canopy), tree pruning, mulching, etc.

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- c. Introduce and promote "Project Learning Tree" curriculum to school teachers. See <https://www.plt.org/>
- d. Start a Champion Tree Program.
- e. Expand the utilization of the City's website and social media to transfer information regarding ongoing tree programs, wood and leaf recycling, tree planting plans, etc.
- f. Provide information on Backyard Forest Habitats.
- g. Provide information on current and impending tree diseases and insect pests such as Emerald Ash Borer.
- h. Develop a program to engage City youth in tree planting.
- i. Encourage and support community partnerships and neighborhood actions towards making Jersey City or more sustainable place to live and work.

Goal #1d:

To provide funding for and to facilitate training of persons responsible for the creation and implementation of the City's Community Forestry Program.

Objectives of Goal #1d:

- (1). To meet the mandated training standards listed under Goal #1a.
- (2). To focus on attending training relative to "new" inventory and assessment tools such as i-Tree, i-Tree Canopy and Landuse Image Classification technology to map and measure the tree canopy and other emerging GIS based tools (especially JC GIS personnel). See "A Guide to Assessing Urban Forests" in Appendix #8. Include
- (3). To gain insight into existing and emerging insect and disease threats by attending 1 or more relevant programs per year. Contact the US Forest Service for possible aid.
- (4). Continue to provide training to Parks and Forestry tree crews to maintain tree climber certification, CRT line clearance certification, crew/personal safety, chainsaw safety and tree equipment maintenance as part of a planned and recorded employment requirement.

Category 2 - Determining Existing Condition

Goal #2a:

To determine the percent of tree canopy as an indicator/measure of the extent/value of the City's Community Forest.

Objectives of Goal #2a:

- (1). To finalize and accept the Jersey City Shade Tree/Green Infrastructure Inventory by Karen Firehock and Andrew Walker, Green Infrastructure Center Inc (GIC).
- (2). To determine % of tree cover by ward and/or other subdivision of land-use such as residential, industrial, commercial and open space including parks.

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Goal #2b:

To inventory and assess the location, condition, threats and needs of the City's trees and forests.

Objectives of Goal #2b

- (1). To continue the Parks and Forestry program to assess the species composition and condition of trees in City parks by a NJ Certified Tree Expert located on maps provided by the JC GIS Department.
- (2). To utilize i-Tree or other program, including the existing 2005 inventory, to identify the location of hazardous trees, planting spots, composition and other data (size classes, pruning needs, etc.) useful in developing action plans.
- (3). Prior to more complete information on forest resource condition, continue to catalog resident and tree crew observations of hazardous trees via 'windshield' surveys.
- (4). Follow-up with additional help from the NJ Certified Tree Experts, NJ Forest Service, US Forest Service and/or GIC.
- (5). Focus on insect and disease threats by forming a working group of City government units including but not limited to:
 - a. Parks and Forestry
 - b. Planning
 - c. Geographic Information Systems
 - d. Public Works

NOTE: During the last 5-year period the focus was on the Asian Long-horned Beetle as the most egregious insect threat. Now the **Emerald Ash Borer** has emerged as a very potent and widespread threat with the potential to "wipe-out" ash in New Jersey (according to the USFS). Now is the time to acknowledge the threat – stop planting ash, assess the ash component of the City's tree resources and begin making plans for the City's response to the EAB threat.

Category 3 – Desired Future Condition

Goal #3a:

To set goals and action plans to sustain and/or increase tree canopy.

Objectives of Goal #3a

- (1). Set goals for % of tree cover by wards, zoning and/or other categories of land-use.
- (2). Develop and implement action plans to increase or sustain % of canopy cover.
- (3). Complete a tree canopy assessment, based on aerial imagery, every five to ten years and compare with previous tree canopy assessments to monitor change.

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Goal #3b:

To reduce the number of hazardous trees and/or hazardous tree conditions in trees such as dead wood by utilizing tree inventory data.

Objectives of Goal #3b:

Parks:

- (1). Implement action plan to remove dead/dangerous trees based on NJCTE report and tree crew observation. Remove the most dangerous trees first.
- (2). Implement a systematic tree pruning schedule to focus on removing dead wood and improving structure of young/mid-aged trees.

City Streets:

- (1). Develop and implement an action plan to remove dead/dangerous trees based on visual observations from residents, public works employees and/or more systematic data collected via i-Tree and/or other method.
- (2). Implement a systematic tree pruning schedule to focus on removing dead wood and improving elevation and structure of young/mid-aged trees. Each ward should be scheduled for pruning at least once every 5-years.
- (3). Continue the existing program to fix heaved sidewalks by root pruning.

Goal #3c:

To continue and increase tree planting in City parks and along City streets.

Objectives of Goal #3c:

- (1). Develop planting plans using data from the on-going assessments of 66 parks and data from the tree canopy assessment.
- (2). Establish a goal to plant enough trees to meet the canopy goals suggested in the Tree Canopy Assessment Report.
- (3). Ensure that staff and contractors for the DPW follow recommendations in Design Standards. [**Amended 12-18-2013 by Ord. No. 13-138**] to ensure the right trees are planted in the most suitable locations.
- (4). Adopt planting standards for urban trees planted in city rights of way, city planting strips and in city parks

Goal #3d:

To encourage residents and businesses/corporations to care for and protect trees and to support tree planting on private property.

Objectives of Goal #3d:

- (1). Publish tree canopy goals with explanations of the benefits of increased tree canopy.
- (2). Distribute tree care information to homeowners as trees are planted.

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- (3). Distribute a preferred species list.
- (4). Provide information on planting methods, elevation, care and sources of planting stock for 'backyard' tree planting.
- (5). Adopt provisions to protect trees during construction.

Goal #3e:

To become knowledgeable and expectant of insect and disease threats.

Implementation Objectives:

- (1). Attend training/informational seminars on current insect and disease threats.
- (2). Assess risk(s) to the City's tree resources – for example [Emerald Ash Borer](#).
- (3). Develop and implement action plans based upon assessment of risk.

Liability Statement:

Trees in the City of Jersey City help to create a pleasing environment for living, work, and play. Although street trees are an asset to the community, it is inevitable that they mature and require care, maintenance and eventually replacement. Care and maintenance, in addition to planting "the right tree in the right place," can help ensure community trees not only contribute to the environmental and economic vitality of the area, but also reduce the potential hazards to public safety. The City of Jersey City must work within a reasonable budget that may not be able to meet each and every need of the community forest immediately. Therefore, it is the intent of this plan to focus available resources on the greatest need and outline a step by step action plan to achieve a healthy forest with commensurate reduced risks to public safety.

The City feels, by taking the logical steps outlined in the plan, it will garner public support for plan implementation and demonstrate long-term benefits to the environment and public safety. The City seeks to maintain and improve its program for management and care of the trees. Through hazard assessment, the Mayor and Council can enable corrective action by its employees, contracted professionals and/or the local utility prior to structural tree failure and other hazardous tree related conditions. It is acknowledged that not all hazardous conditions will be predicted, however, good maintenance and care will reduce the probability of tree failures. The City also wants to increase homeowner awareness, appreciation, and

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knowledge of trees to enable them to contribute well-informed and meaningful efforts towards the health and sustainability of Jersey City's trees.

Following this Community Forestry Management Plan will demonstrate that the City of Jersey City is devoting reasonable levels of resources in a planned manner to reduce the number of tree related accidents, and thereby, reduce its exposure to liabilities and increase public safety.

III. Community Overview

Jersey City used the 1st & 2nd 5-year Community Forestry Management Plans to document existing tree programs and to recommend additions to the on-going shade tree and park programs. The condition of the tree resource has not changed much over the past 5-years with removals still outpacing plantings along City streets. With increasing interest and support, many of the goals of the previous plans have been pursued and some of the objectives obtained. Good progress is being made on inventory and assessment in both the Parks and City wide. Benefits to Jersey City for maintaining "approved" status under the NJ Shade Tree and Community Forestry Act include:

1. Continuing a strong partnership with the State's Community Forestry Program.
2. Participating in training and informational seminars at the New Jersey Shade Tree Federation meetings.
3. Increased tree related liability protection.

During the past 5-years, Jersey City has made some very positive decisions and taken good actions affecting its tree resources. The City is bordered on two sides by bays and the Hudson River. In the aftermath of Hurricane Sandy, attention turned towards the mitigating effects of green infrastructure such as run-off reduction and improved water absorption in addition to the previously accepted values associated with aesthetics, air quality, 'birds and bees', educational opportunities and enhanced open space. The recognition of trees as a critical component of the City's infrastructure along with roads, utilities, etc is a giant step forward. Positive decisions and actions by the City include:

- (1). **Inventory and Assessment:** Renewed focus on inventory and assessment of the tree resources in the City's parks. Under the direction and supervision of the Division of Parks and Forestry the highlights include:
 - a. Contracting with a NJ Certified Tree Expert to survey 7 parks and inspect each tree to determine its species, condition and arboricultural needs such as pruning, structural improvement, branch elevation or possible removal. The CTE is being aided by Jersey City GIS personnel providing maps of each park and tree locations. This inventory and assessment work in providing valuable/essential data to help Parks and Forestry personnel develop work priorities.

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The Shade Tree Commission in Jersey City was established by City Ordinance 05-075, adopted June 22, 2005. No appointments to this commission have been made since the Ordinance was adopted. The Environmental Commission is on record in support of "reinvigorating the Shade Tree Commission."

- (9). **Natural Resource Inventory and Master Plan:** The City is in the process of working with Rutgers University to produce a Natural Resource Inventory. Connections between this plan and the Master Plan will improve as an oversight authority becomes established. The Environmental Commission is linked to the JC Planning Department and GIS Division which will facilitate transfer of tree canopy data in the GIC reports to conservation elements in future updates to the Master Plan.

For further historical perspective, readers of this plan are referred to this section of the previous CFMP which describes forgoing work by the US Forest Service, tree cover, carbon sequestration, links to the Master Plan, NJ Tree Foundation work and the previous 5-years of progress.

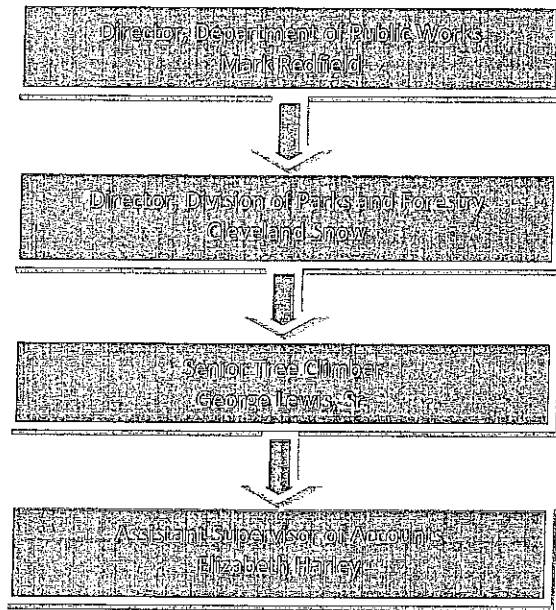
IV. Community Forestry Program Administration

The management of the tree resources in Jersey City is assigned by the Mayor and governing body to the Department of Public Works, Division of Parks and Forestry. Public requests for trees through the "Clean and Green Program" and maintenance inquiries are referred to the Division of Parks and Forestry. The Division of Parks and Forestry has approximately 60 employees. Ten workers are assigned to the forestry crew. The crew is trained and has two bucket trucks, chippers and associated equipment. The crew plants trees and completes pruning and maintenance. Most of the larger removals are contracted as well as plantings, fertilizer application and spraying in the parks.

During 2014, the JC Planning Department and the Environmental Commission have been working to determine the % of canopy cover and make recommendations for the next steps to increase not only the % of tree cover, but to also improve the City's green infrastructure. There are high expectations for the continued development of the amalgamation between the planning efforts of the Environmental Commission and the Division of Parks and Forestry responsible for on-the-ground work during the next 5-year period.

A testament to the interest and commitment of Jersey City employees and volunteers to improving the tree resources of the City is the fact that a total of 19 persons(11 employees and 8 volunteers) have attended CORE training since 1998. Current primary CORE trained persons are Marc Wesson(volunteer) and Elizabeth Harley(employee). CEU requirements of 8 per year were far surpassed in 2014 with a total of 24 units earned. A complete list of CORE trained persons and CEU's earned in 2014 is available by reviewing the 2014 Annual Report in Appendix #4.

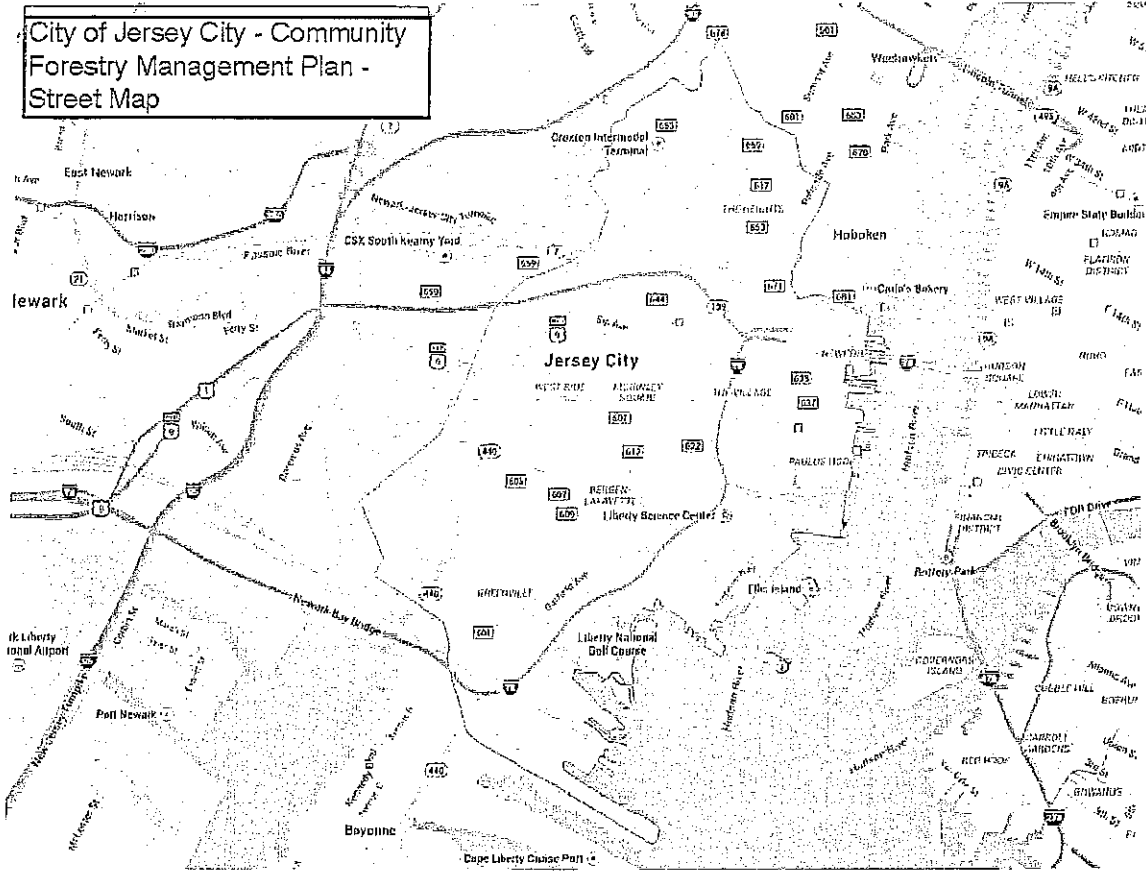
Administrative Flowchart:



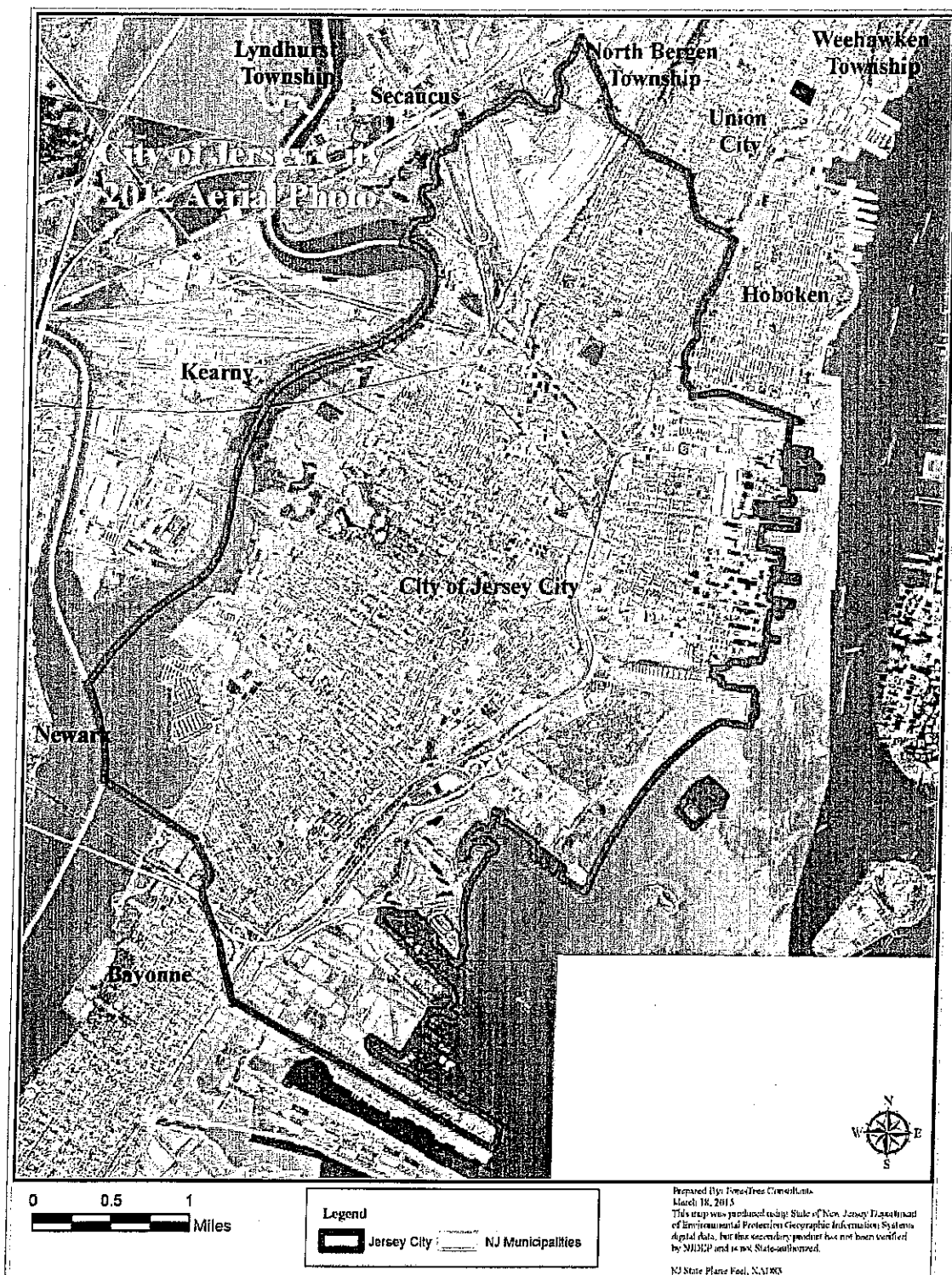
V. Community Maps

Jersey City, NJ - Google Maps

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VI. Training Plan

Some training is required by the State to retain "approved" status for the City of Jersey City under the Act and other training is elective based upon need and/or individual interests and assessment of need. Training is usually limited by available time, interest, funding and/or opportunities. Whatever the cost in time or money, the knowledge gained through training will improve program success. Representatives of the City of Jersey City attend the Federation meeting on an annual basis.

Required Training:

Core training is required by the Shade Tree and Community Forestry Assistance Act. The purpose of CORE training is to familiarize persons with the background of community forestry and shade tree commissions, the legal aspects of managing trees, and the recognition of hazardous tree conditions. It also enables individuals to help municipalities and counties gain approved status to be eligible for NJ Forest Service grant money and increased liability protection under the Act.

Currently, there are 19 CORE trained individuals within the Jersey City Department of Parks and Forestry. It is a requirement of the Shade Tree and Community Forestry Act to keep at least the minimum number of 2 persons CORE trained to maintain "approved" status. The two CORE trained persons must include at least 1 volunteer and 1 City employee. Currently, the primary CORE trained volunteer is Marc Wesson and the primary CORE trained employee is Elizabeth Harley. The remaining 17 CORE trained persons and their status are listed in the 2014 Annual Report as Appendix #4. In subsequent years it is required that the city obtain at least 8 Continuing Education Units (CEU's) annually. The City far surpasses this requirement most recently acquiring 24 CEU's in 2014. This training is available at the annual meeting of the New Jersey Shade Tree Federation and at other locations periodically announced by the New Jersey Forest Service. It is the intent of Jersey City to maintain at least the minimum number of persons CORE trained and to meet the annual Continuing Education Unit requirements for

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approved status under the Act. Notice of upcoming training opportunities can be found at the NJFS website: <http://www.nj.gov/dep/parksandforests/forest/community/act.html>.

Other Training:

The following training electives are arranged to outline the training needed by Goal stated in the Goals and Objectives section of this plan.

Training for Goal #1a:

This goal applies to meeting State standards for 'approved' status. No additional training is required.

Training for Goal #1b:

This goal focuses on building organizational capacity. Improving organizational capacity will require training Environmental Commission members, Shade Tree Commission members and Planning Department staff that have recently been engaged in Jersey City's community forestry. Training will include elements required in Goal #1a, history of past accomplishments and introduction to the New Jersey Shade Tree and Community Forestry Act/CFMP.

Training for Goal #1c:

This goal relates to Jersey City's public information, awareness and outreach (IAO) associated with community forestry. An increased awareness of the existence and content of several suggested additions to IAO programs (listed as objectives of Goal #1c) will be necessary to gain support and implementation. This increased awareness can be gained by searching the referenced websites and through training at the annual NJ Shade Tree Federation meeting.

Training for Goal #1d:

This goal relates to funding for implementation of this plan including training. There is a need to increase the awareness of and possible training in a broad suite of programs and software tools to measure the extent and condition of the community forest. The planning and commission members need to know the purpose and desired

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outcomes of each; GIS personnel must know how to operate the tools and to present the data for decision makers. Meeting an objective of this goal requires up-to-date training/awareness emerging insects and diseases. Training in these topics can be found at the NJ Shade Tree Federation meeting and through other courses offered by Rutgers University and should be directed at the decision makers in the Division of Parks and Forestry, Environmental Commission and Shade Tree Commission.

Training for Goal #2a:

This goal focuses on determining tree cover/canopy. No additional training is required to meet objectives.

Training for Goal #2b:

This goal addresses inventory and assessment. The training recommended for Goal #1d relates to this goal. Generally any training/improved awareness of those involved with implementing this plan on the many "new" tools for inventory and assessment will be beneficial to program effectiveness.

Training for Goal #3a:

This goal involves planning to increase tree canopy. No additional training is necessary to meet the objectives of this goal.

Training for Goal #3b:

This goal relates to reducing hazardous trees and/or conditions.

Parks:

Training of tree crew personnel on hazard tree identification and proper pruning techniques is an on-going necessity to effectively address this goal.

City Streets:

The ongoing program of fixing sidewalk upheavals caused by tree roots requires root pruning. The persons doing the root pruning must be kept aware of the current science, tools, materials and practice of root pruning/sidewalk repair via repeated

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exposure to training through courses at the NJ Shade Tree Federation meeting, videos on the web and published guides.

Training for Goal #3c:

The focus of this goal is increased tree planting. Training and new information needed to support this goal includes:

1. Information on tree species with an eye towards eliminating some species such as ash and continuing to search for and add to a diverse tree planting list. A good source of information is 'Trees for New Jersey Streets' by the New Jersey Shade Tree Federation.
2. Learning how to utilize the inventory and assessment data and how to incorporate the Tree Canopy Cover project and IA data into possible planting site maps and lists.

Training for Goal #3d:

This goal encourages homeowner/private property owner's participation in community forestry. No additional training is needed to meet this objective.

Training for Goal #3e:

This is the insect and disease control goal. Training to meet the objectives of this goal has been listed previously for other goals. Information on current threats can be found at the following:

1. Emerald Ash Borer (EAB) - <http://www.emeraldashborer.info/#sthash.VDsY45Ie.dpbs>
2. Asian Long-horned Beetle (ALB) - <http://asianlonghornedbeetle.com/>
3. Bacterial Leaf Scorch (BLS) - <http://extension.psu.edu/pests/plant-diseases/all-fact-sheets/bacterial-leaf-scorch>
4. Other insects and diseases of New Jersey's urban forests - http://www.state.nj.us/dep/parksandforests/forest/community/Pests_and_Diseases.htm

VII. Public Education, Awareness and Outreach(PEAO)

The Mayor, elected officials, Director of Parks and Forestry and planning personnel understand that public education, awareness and outreach form the underpinnings of continued support for the City's tree programs. In the past, the City has had help with PEAO from the New Jersey Tree Foundation; from the USDA during the ALB eradication; and BPU/Cool Cities Initiative (never fully funded).

The Jersey City Division of Parks and Forestry has a long standing record of partnerships with various neighborhood groups, historic restoration groups, volunteer park groups and many of Jersey City's schools. In the most recent annual report to the NJ Forest Service, Jersey City recorded participation in Earth Day and Arbor Day Programs and donations of plants, trees and shrubs to several park organizations and community garden groups.

The Jersey City Division of Parks and Forestry administers a 'Clean and Green' tree planting program whereby homeowners request a tree that is provided and planted in front of their home for the reduced cost of \$200 per tree. The City currently puts the cost of each tree planted under this program at ~\$500. 50-100 residents participate in this program annually.

One of the goals of the previous plans was to form a Shade Tree Commission. The statutory authority is in place establishing the Shade Tree Commission (see Appendix #1), but members have not been appointed. Having such a group to facilitate planning and expand community involvement will make all Jersey City Community Forestry efforts more effective. There are several other suggestions to expand public education, awareness and outreach listed under Goal #1c including:

Seedlings for School Children:

The City of Jersey City may participate in the New Jersey Forest Service's Third Grade Tree Team. These seedlings are available by contacting New Jersey Forest Service Tree Seedling

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Nursery @ 732-928-0029. Local schools will be informed of this program and provided contact information.

Project Learning Tree:

The Project Learning Tree program is an international environmental education program that is crafted to meet state and national education standards. PLT provides the tools educators need to bring the environment into their classrooms and their students into the environment. The PreK-8 activity guide contains 96 multi-disciplinary activities, each activity is carefully designed for specific grade levels and learning objectives. Recently, the PLT guide has been correlated to the NJ Core Curriculum Content Standards required by the New Jersey Department of Education. The City of Jersey City will encourage local schools to send some of their teachers to PLT workshops and to develop their own PLT Trunk which is loaded with many teaching aids, books, and videos. City schools are encouraged to take students to the NJ Forest Resource Education Center, in Jackson, New Jersey. For more information contact the Forest Resource Education Center at (732)-928-0029.

Champion Tree Program:

One way to raise the awareness of youth about trees is to involve them in some way. The City will work with the public schools to search for and produce a listing of Jersey City's Largest Trees. Results of the search will be announced at annual Arbor Day events. The students may also participate in the New Jersey Forest Service's Big Tree Program.

Jersey City Website:

Expand tree information on the City website to include:

- Tree planting plans for streets and public lands.
- Tree Canopy information including the results of the GIC Tree Canopy Assessment, a list of desirable trees, planting stock sources and planting methods.
- Information on creating backyard habitats.
- Opportunities for volunteers to 'sign-up' for committee work associated with plan implementation.
- Information on emerging diseases and pests such as Emerald Ash Borer.
- Opportunities to engage City youth in tree planting in parks.

VIII. Statement of Tree Budget

Jersey City has a population of about 250,000 with 66 parks totaling over 1554 acres. The largest Astroturf field in the eastern United States is located here and maintained by the City. Accessways to Liberty State Park/Ellis Island and viewpoints of the Statue of Liberty all are maintained by the City. The Division of Parks and Forestry has an annual budget of approximately \$3 million. Of this total approximately \$400,000 is budgeted for trees including trimming, pruning, removals and planting. Other Community Block Grants (CBGs) for sidewalk repair and No-Net Loss funds add to the City's budget for trees.

During 2014, the City Planning Department/Environmental Commission entered into a contract with a consultant(GIC) to determine the City's canopy cover. The canopy cover project is nearly complete and will lead to additional expenditures on tree planting in an effort to meet canopy cover goals. In 2014, the Division of Parks and Forestry highlights the fact the \$200,000 was dedicated to "tree planting city wide". The complete 2015 Budget for the Division of Parks and Forestry can be found below and is an example of budgetary levels of Jersey City.

City of Jersey City Community Forestry Management Plan

2015 Budget - Division of Parks and Forestry

CITY OF JERSEY CITY
 Combined Summary of Salary & Other Expense Line Items
 Department : 28-375 Description : PARKS MAINTENANCE

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Line Item (1)	Description (2)	2014 Budget Appropriation (3)	Transfers & Other Adjust. (4)	2014 Actual Spent (5)	2015 Dept. Request (6)	Mayor's Recomm. (7)	Council Request (8)	2015 Increase or Decrease Col. 8-3 (9)
100	TEMPORARY BUDGET-SAL.& WA	.00	.00	.00	.00	.00	.00	.00
101	SALARY & WAGES REGULAR	2,286,978.00	-271,000.00	2,088,883.20	2,355,844.00	2,315,844.00	2,315,844.00	28,866.00
102	SALARY & WAGES PART TIME	46,626.00	.00	17,848.12	25,000.00	25,000.00	25,000.00	-21,626.00
103	OVERTIME	111,600.00	136,000.00	248,584.93	150,000.00	150,000.00	150,000.00	38,500.00
104	UNIFORM ALLOWANCE	3,450.00	.00	3,425.00	.00	.00	.00	-3,450.00
105	ACTING POSITION COST	5,000.00	.00	4,005.00	5,000.00	5,000.00	5,000.00	.00
107	SEASONAL EMPLOYEES	109,000.00	.00	64,827.75	54,000.00	54,000.00	54,000.00	-55,000.00
108	RETIREMENT & LUMP SUM PAY	.00	.00	.00	.00	.00	.00	.00
200	TEMPORARY BUDGET-OTHER	.00	.00	.00	.00	.00	.00	.00
201	EX OFFICE SUPPLIES	2,000.00	6,500.00	8,500.00	2,000.00	2,000.00	2,000.00	.00
203	PHOTOGRAPHIC SUPPLIES	.00	.00	.00	.00	.00	.00	.00
204	DRAFTING AND PRINTING SUP	.00	.00	.00	.00	.00	.00	.00
206	CLEANING AND SANITARY SUP	60,000.00	-1,000.00	50,445.40	60,000.00	60,000.00	60,000.00	.00
208	PETROLEUM & LUBRICANTS	.00	.00	.00	.00	.00	.00	.00
209	AGRICULTURAL & BOTANICAL	115,000.00	-24,500.00	68,797.27	115,000.00	115,000.00	115,000.00	.00
210	TOOLS & MACH. MATERIALS P	95,000.00	39,000.00	132,836.65	120,000.00	120,000.00	120,000.00	25,000.00
211	CONSTR. REPR. MATERIALS S	.00	.00	.00	.00	.00	.00	.00
212	REC. EDUC MATERIALS & SUP	25,000.00	6,500.00	30,288.74	25,000.00	25,000.00	25,000.00	.00
213	SIGNAL & COMMUN. PARTS &	.00	.00	.00	.00	.00	.00	.00
214	CHEMICAL MEDICAL & LAB SU	1,000.00	600.00	1,439.00	1,000.00	1,000.00	1,000.00	.00
215	WEARING APPAREL	1,000.00	8,800.00	9,700.35	3,000.00	3,000.00	3,000.00	2,000.00
216	TIRES AND TUBES	.00	.00	.00	.00	.00	.00	.00
217	DATA PROCESSING	.00	.00	.00	.00	.00	.00	.00
301	CLEANING & LAUNDRY SERV	.00	.00	.00	.00	.00	.00	.00
304	RENTS	9,000.00	.00	7,356.00	9,000.00	9,000.00	9,000.00	.00
305	PRINTING & ADVERTISING	.00	.00	.00	.00	.00	.00	.00
306	DUES & SUBSCRIPTIONS	100.00	.00	.00	100.00	100.00	100.00	.00
307	TRAINING AND MEETING EXPE	20,000.00	-19,300.00	427.90	10,000.00	10,000.00	10,000.00	-10,000.00
308	MILEAGE ALLOWANCE	.00	.00	.00	.00	.00	.00	.00
309	FOOD AND MEAL EXPENSE	.00	.00	.00	.00	.00	.00	.00
310	MAINTENANCE REPAIR EQUIPM	60,000.00	33,000.00	121,981.00	80,000.00	90,000.00	90,000.00	.00
311	BLDG MAINT. & REPAIR	4,000.00	-3,800.00	.00	4,000.00	4,000.00	4,000.00	.00
312	PROF.,CONSUL.& SPEC.SERV.	230,000.00	40,000.00	238,555.23	140,000.00	140,000.00	140,000.00	-90,000.00
314	CONTRACTUAL SERVICES	350,000.00	-88,500.00	212,030.39	120,000.00	120,000.00	120,000.00	-230,000.00

City of Jersey City Community Forestry Management Plan

2015 Budget - Division of Parks and Forestry (cont.)

CITY OF JERSEY CITY
 Combined Summary of Salary & Other Expense Line Items
 Department : 29-375 Description : PARKS MAINTENANCE

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Line Item (1)	Description (2)	2014 Budget Appropriation (3)	Transfers & Other Adjust. (4)	2014 Actual Spent (5)	2015 Dept. Request (6)	Mayor's Recomm. (7)	Council Request (8)	2015 Increase or Decrease Col. 8-3 (9)
399	PETTY CASH	.00	.00	.00	.00	.00	.00	.00
401	FURNITURE & FURNISHINGS	.00	1,500.00	1,200.00	.00	.00	.00	.00
402	OFFICE EQUIPMENT	.00	1,000.00	775.00	.00	.00	.00	.00
403	MOTOR VEHICLES	.00	.00	.00	.00	.00	.00	.00
404	STREETS & PARKS EQUIPMENT	.00	.00	.00	.00	.00	.00	.00
405	REC. & EDUC.EQUIPMENT	15,000.00	2,000.00	15,980.00	15,000.00	15,000.00	15,000.00	.00
407	PHOTOGRAPHIC EQUIPMENT	.00	.00	.00	.00	.00	.00	.00
408	DRAFTING EQUIPMENT	.00	.00	.00	.00	.00	.00	.00
519	CENTREX & WATTS	.00	.00	.00	.00	.00	.00	.00
	Salary & Wage Totals:	2,562,554.00	-135,000.00	2,427,554.00	2,589,844.00	2,549,844.00	2,549,844.00	-12,710.00
	Other Expense Totals:	1,017,100.00	.00	890,292.93	714,100.00	714,100.00	714,100.00	-303,000.00
	Combined Totals:	3,579,654.00	-135,000.00	3,317,846.93	3,303,944.00	3,263,944.00	3,263,944.00	-315,710.00
	Salary & Wage Fund Totals:	2,562,554.00	-135,000.00	2,427,554.00	2,589,844.00	2,549,844.00	2,549,844.00	-12,710.00
	Other Expense Fund Totals:	1,017,100.00	.00	890,292.93	714,100.00	714,100.00	714,100.00	-303,000.00
	Combined Fund Totals:	3,579,654.00	-135,000.00	3,317,846.93	3,303,944.00	3,263,944.00	3,263,944.00	-315,710.00

IX. Statement of Plan Implementation

This is the third Community Forestry Management Plan (CFMP) prepared for the City of Jersey City. Implementation of training objectives and public education and outreach are discussed in separate sections (Sections VI and VII respectively) and will not be reiterated here.

This section will focus on the basic implementation steps regarding:

- Tree Inventory
- Tree Hazard Assessment
- Tree Maintenance and Removals
- Tree Planting

This section has been organized to include the implementation statements as written in the previous plan as 'Circa 2010-14' and the recommendations for this plan period as 'Continuing Recommendations'. The statements from the previous plan provide valuable information and serve as a "starting point" for the next steps of plan implementation.

Tree Inventory and Assessment:

Circa 2010-14:

This is one of the highest priority tasks identified by the Jersey City Director of Parks and Forestry. The last inventory was conducted in approximately 2005. The inventory was conducted with Global Positioning Systems (GPS) equipment and a base layer of tree locations was added to the City's Geographic Information System. The collection of the location of all the tree locations in the City was a monumental task and provides a base to work from when making further more detailed assessments of the City's trees. The tree layer currently only stores location data and has little or no information regarding species, health, size, maintenance needs or site conditions. There are also no planting sites stored in the current tree layer.

The Director of Parks and Forestry wants to continue inventory and assessment using the current tree layer as a base map. The City will be divided into manageable areas based upon the Director's perception of need and tree assessment data will be added to the tree layer on an annual basis. It is important that the end of use of the tree layer and data be clear prior to beginning collection of data. Collecting data on an estimated 75,000 trees is time consuming and results will be directly related to well thought out collected data. Basic items collected should include species, broad

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categories of tree size, an indicator of tree health, comments relating to tree safety, sidewalk conditions, planting site size and presence of overhead utilities. Any other data collected should be based upon the planned use of the layer and extraneous data collection should be avoided to save time and expense. Procedures to maintain the collected data and record work completed must also be developed to prevent premature aging of the data and loss of usefulness.

The final inventory will provide the City with a tool to support grant applications for planting, maintenance and removals. It will also allow Jersey City to focus limited resources on the greatest needs and greatest potential for return. The objective for the next 5-years is to revisit each tree in the GIS layer and add descriptive data as needed.

Continuing Recommendations:

In 2014, the Division of Parks and Forestry began the task of assessing the species composition and condition of trees in City parks. A New Jersey Certified Tree Expert (CTE) was hired and seven parks have been completed thus far. This goal (Goal #2b) will be pursued throughout this plan period.

Work associated with Goal #2a to determine the percentage of tree cover has been undertaken by the Planning Department and Environmental Commission under contract with the Green Infrastructure Center (GIC), Inc. The initial canopy cover calculations, assessment and report will be finalized in 2015. Associated maps and data will be useful for planning next steps to increase canopy cover. Results, maps and recommendations provide by GIC are included in Appendix #7.

There is potential to combine the existing 2005 tree inventory data with the data/maps from the 2015 GIC work. 2005 GIS data shows the location of trees but does not include data on species, condition or pruning needs. Collection of further assessment data such as hazardous conditions, species, size, condition, pruning needs and removals on these 75,000 trees by walking from tree to tree is a tremendous task, but must remain a goal. During the first year or so of this plan period, personnel from the Division of Parks and Forestry, Planning and GIS departments and Jersey City government will form a "working group" to assemble all the available inventory data and maps to assess gaps in the data and to reach consensus on next steps for inventory and assessment.

City of Jersey City Community Forestry Management Plan

The next steps include understanding and selection of a program to be used to collect, store, analyze and display data. There are several standalone programs in use as well as the possibility of creating a GIS layer for use in the City GIS. One of the best, cheapest (free) and most widely used is i-Tree from the US Forest Service. Next steps in choosing and/or designing a tree inventory system include:

Identification of End Use and Data Collection Needs:

The first and most crucial step in all tree inventory projects is the identification of the purpose and intended use of the inventory data. The City of Jersey City is interested in producing a comprehensive inventory of all planted street and park trees, available planting spots and hazardous trees. Initial focus will be on recently planted street trees and vacant planting spots. Data collected via a windshield survey for hazardous trees will also be included. Intended end use of the data may include:

- Identification and location of hazardous conditions, pruning needs, sidewalk conflicts and maintenance needs.
- Classification of trees by condition class.
- Classification of trees by species and size.
- Identification of planting sites and planting site conditions (ie: overhead wires, planting strip width, small or large species recommendations, ideal location on public or private property?)
- Production of various reports needed for grant applications, prioritizing work and demonstrating need to public officials and City residents.
- Production of a tree layer for the City's GIS system.
- Possible scheduling of the work flows and work order generation.

Selection of Inventory System and Method:

Selection of an appropriate data collection and storage system that meets the needs of the municipality currently and into the future is essential to a successful inventory project. There are several alternatives currently available for consideration. Selection of the best alternative will depend heavily upon the City GIS department's involvement and assistance if alternative #1 is used.

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Alternative #1, Utilize current City GIS/GPS capability:

The City of Jersey City has an impressive and well-equipped Geographic Information Systems (GIS) Program. GIS layers currently maintained by the City include such things as streets, parcels, fire hydrants, surface water, critical areas, City facilities, schools, parks, etc. The data collection methods and GPS equipment used to create the existing layers could be adapted for the creation of a "Tree and Planting Spot Layer" in the City GIS. This alternative will require significant assistance, training and input from the GIS department. Large scale tree inventory and assessment coupled with the GIS capacity of Jersey City makes this alternative the most preferred. The benefits of a "Tree and Planting Spot Layer" in the City GIS include:

- Integration with other infrastructure layers for layout and planning purposes.
- Graphic representation of data for visualization and presentation purposes.
- Data accessibility to multiple departments including planning, engineering and DPW.
- Support of funding requests to the City, State and Federal governments and in support of grant opportunities.
- Integration with the GIC Canopy Cover Assessment Project in support of increasing canopy cover and in pursuit of Sustainable NJ initiatives.

Alternative #2, Standalone Inventory- i-Tree:

This alternative could be used if the City wishes to create a standalone inventory that does not require or reside on the City GIS system. A free software suite, produced by the U.S. Forest Service, called *i-Tree* is available and recommended as the standalone platform of choice. The following is information directly from the *i-Tree* website at <http://www.itreetools.org/index.php> where additional information, training and software downloads are available.

"i-Tree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools. The i-Tree Tools help communities of all sizes to strengthen their urban forest management and advocacy efforts by quantifying the structure of community trees and the environmental services that trees provide. Developed by USDA Forest Service and numerous cooperators, i-Tree is in the public domain and available by request through the i-Tree website (www.itreetools.org). The Forest Service, Davey Tree Expert Company, National Arbor Day Foundation, Society of Municipal Arborists, International Society of Arboriculture, and Casey Trees have entered into a cooperative partnership to further develop, disseminate and provide technical support for the suite. The i-Tree suite includes the following urban forest analysis tools and utility programs.

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Analysis Tools

i-Tree Eco provides a broad picture of the entire urban forest. It is designed to use field data from complete inventories or randomly located plots throughout a community along with local hourly air pollution and meteorological data to quantify urban forest structure, environmental effects, and values to communities.

i-Tree Streets focuses on the benefits provided by a municipality's street trees. It makes use of a sample or complete inventory to quantify and put a dollar value on the street trees' annual environmental and aesthetic benefits. Streets also describes urban forest structure and management needs to help managers plan for the future.

i-Tree Hydro (beta) is an application designed to simulate the effects of changes in tree and impervious cover characteristics within a watershed on stream flow and water quality. The latest version of i-Tree Hydro offers users options for qualitative scenario modeling at the county or city scale.

i-Tree Vue allows you to make use of the freely available National Land Cover Database (NLCD) satellite-based imagery to assess your community's land cover, including tree canopy, and some of the ecosystem services provided by your current urban forest. The effects of planting scenarios on future benefits can also be modeled.

i-Tree Design is a simple online tool that provides a platform for assessments of individual or multiple trees at the parcel level. This tool links to Google Maps and allows you to see how tree selection, tree size, and placement around your home affects energy use and other benefits.

i-Tree Canopy offers a quick and easy way to produce a statistically valid estimate of land cover types (e.g., tree cover) using aerial images available in Google Maps. The latest version of Canopy also estimates values for air pollution reduction and capturing atmospheric carbon. Canopy can be used by urban forest managers to estimate tree canopy cover, set canopy goals and monitor canopy change over time. Canopy can also be used to estimate inputs for use in i-Tree Hydro and elsewhere where land cover data are needed.

Utility Programs

i-Tree Species is a free-standing utility designed to help urban foresters select the most appropriate tree species based on environmental function and geographic area.

i-Tree Pest Detection Module is a portable, accessible and standardized protocol for observing a tree for possible insect or disease problems. The i-Tree Pest Detection module is currently available within the i-Tree Streets and i-Tree Eco programs. Pest Detection can be adapted to other external tree inventory programs also.

i-Tree Storm provides a method for a community to assess widespread storm damage in a simple, credible, and efficient manner immediately after a severe storm. It is adaptable to various community types and sizes and provides information on the time and funds needed to mitigate storm damage."

Hazard Tree Identification and Management:

Circa 2010-2014:

Dangerous trees are now identified by the City's tree crews, by other DPW employees or are reported by residents. Dangerous conditions are not only created by dead and dying trees but also sidewalk heaving by tree roots. Sidewalk conflicts continue to be one of the most common concerns in many municipalities. Through training and awareness obtained at meetings such as the annual Shade Tree Federation

City of Jersey City Community Forestry Management Plan

meeting, assurance can be made that the most up-to-date science and techniques are being applied to limit dangerous conditions and the subsequent need for tree removal. Understanding of the science and biology of hazard tree identification and management can be continually enhanced through ongoing training as discussed previously. Given the opportunity, all City tree crew personnel would benefit from attending a "Tree Autopsy Workshop".

About 250 trees are removed annually in Jersey City. The updated tree inventory will quantify the overall need and bring focus to the highest priority needs, thus helping to insure the highest risk trees have priority. Completion of the GIS data layer with linkages to work orders, tracking and precise location will improve effectiveness and efficiency of the tree crew and supervising personnel. The inventory data and GPS location capability will also facilitate efficient and effective communications between Certified Tree Expert contractors and the City. Data will be used to focus contracted work on the most dangerous trees and to add a basis for cost estimates based on size (diameter and height). A complete 'Tree Layer' in the City's GIS will also prove invaluable in future insect or disease eradication efforts as the location of host species will be easily obtained and displayed.

A Community Block Grant (CBG) has been received to fix heaved sidewalks in underserved portions of the City.

Continuing Recommendations:

Ongoing efforts to collect more data on the species, condition and pruning needs of the City's trees; and associating the data with the existing tree locations will continue throughout the plan period as described in the previous "tree inventory and assessment" section following the goal and objectives found at Goal #2b, (1-5).

Tree Maintenance and Removals:

Circa 2010-2014:

The average life of an urban tree has been reported to be 7 years. This relatively low average life suggests that many trees planted don't survive. Site and species selection are critical to long-term survivability as well as early stage maintenance. This average can be significantly increased in several ways. One, to be discussed under tree planting, is to diversify species selection, adherence to nursery standards and proper planting. The other opportunities to increase average life span and utility involve tree maintenance and care. Beginning as newly planted trees they must be watered in times of drought through establishment. Trees must then be properly pruned to produce a single central stem. Of equal importance is to prune lower branches (elevate) to eliminate limbs encroaching on pedestrians and vehicles. Depending upon species and position in the landscape, the required elevation varies from 12-20'. During the first 20

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years of early establishment it is important to remove side branches before they exceed $\frac{1}{4}$ of the tree diameter and seldom more than 4" in diameter. Pruning during the first 20+/- years is critical because, if not done early, offending branches reach diameters larger than 4" and when pruned can create long-term defects which eventually lead to structural failure. During early developmental pruning it is important to retain as much foliage as possible and as a good general rule at least $\frac{2}{3}$ of the tree crown/bole should be left intact. Incremental pruning is preferred.

One of the four highest priority tasks of this plan as expressed by the Director of Parks and Forestry is to develop a strategy to implement a "10-year pruning cycle for Jersey City trees". In developing an implementation strategy to meet this objective, it will be important to recognize the need to prune/trim trees during the first 20 years after planting. The younger trees usually don't need much pruning but should be visited once every 3-4 years after planting. Once the tree crews have attained adequate training, developed an artistic eye and understand the basic biology and proper pruning techniques, the 10-year pruning cycle work can be efficiently completed. It is even possible to train volunteer crews to prune some of the smaller trees with some supervision. A quick glance at many of the vest-pocket parks confirms the need for early developmental pruning. As a beginning it is advisable to assign $\frac{1}{4}$ to $\frac{1}{3}$ of the time available for tree maintenance to early developmental pruning. The remainder of time can be spent on dead-wood removals and elevation of the larger trees. Large tree removals and remedial work on larger structurally damaged trees may be left to contracted New Jersey Certified Tree Experts.

Data obtained from the tree inventory will be invaluable in planning, organizing and managing a tree maintenance program to meet the Director's objective to have a "10-year pruning cycle for all city trees".

Continuing Recommendations:

Reports from the Division of Parks and Forestry show 4,052 trees pruned over the past 8 years. Over the same 8-year period, 1,485 trees were removed averaging 185 trees per year with no estimate of backlog. The annual average number of trees pruned is about 500. Given previous estimates of 75,000 trees in the City it will take 150 years to prune each tree once. A stated objective in the previous plan aimed at a 10-year pruning cycle – again a lofty task at 7,500 trees per year. Basing tree maintenance goals on the forgoing paths are not achievable. The task is to identify the trees exhibiting the greatest risk to public safety and to devote available resources accordingly.

In the future, the Division of Parks and Forestry could record the number of trees surveyed/examined in addition to the number pruned or removed. A measure of the

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trees surveyed for hazardous conditions will convey a more positive view of the overall health of the City's trees than is portrayed simply by removal and trimming totals. In order for the City to achieve a "10-year pruning cycle" it will be necessary to provide additional manpower and money to conduct hazard tree surveys on a systematic basis and to undertake the work to reduce hazardous conditions/extend the life of individual trees via tree pruning and removals.

Tree Planting:

Circa 2010-2014:

Re-plantings associated with the Asian Long-Horned Beetle eradication program are complete and consisted of 461 replacement trees. Through the City's "Clean and Green Program", described earlier in the Outreach Section, 100-200 trees are planted annually. Upon approval additional trees will be planted via the Cool Cities Program. The Cool Cities trees are targeted for under-served portions of the City and some thought should be given to potential locations for these trees once approvals have been obtained. The Cool Cities Program could provide a spike in tree planting activity for the period of time it remains in effect and should not be used to substitute for other on-going tree planting efforts.

How the current level of planting meets the overall planting needs of the City is not known quantitatively. It is apparent that the need is greatest in the under-served portions of the City. Planting 700-1000 trees per year would be an admirable and complimentary achievement. How this achievement contributes to meeting the goal to increase tree canopy over time cannot be adequately assessed until after the tree inventory is completed. Over time visual assessments of aerial photos can be used to compare tree canopy, but these are of limited value in setting quantitative planting targets.

Planting trees in urban environments is a challenging task. The City is fortunate to have an experienced landscape architect with a complete understanding of suitable species, Asian Long-Horned Beetle restrictions, nursery standards, species diversity, contract preparation and planting technique oversight.

One additional observation concerns preparation of the planting hole for new trees. As stated previously, planting trees in urban disturbed soils is somewhat of a gamble. Rubble, old stumps, underground utilities, poor soil structure, questionable fertility and adequate water supply all add to the challenge. While there is no easy or universal solution to site preparation, science and knowledge are being accumulated to address these problems. One exceptional reference, which leads to others, is a book, 'Trees in Urban Design' by Henry Arnold, published by Van Nostrand Reinhold, 1980. Any attempts to improve the growing conditions for new trees is a worthwhile investment and one to be seriously undertaken. Another good reference and other

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urban forestry topics is the 'Handbook of Urban and Community Forestry in the Northeast' by John E. Kuser, Kluwer Academic/Plenum Publishers, 2000.

Continuing Recommendations:

Tree planting reports by the Division of Parks and Forestry record 981 tree planted along the streets from 2007 until 2014 – averaging about 123 trees per year. Removals over the same period averaged 185 trees per year. No information is available on the survival of the planted trees, but from anecdotal reports and visual observations many have not survived. Planting in harsh city conditions requires the application of special standards and care during and after planting. The City has had its fair share of difficulty with planting contractors.

Work by the Green Infrastructure Center(GIC) has produced a series of maps and accompanying data on possible planting areas in relation to expanding tree canopy. "These can be used to perform additional analysis, or may even be used directly for tree project planning (in the initial stages)." – from GIC memo dated February 16, 2015, re: map review and next steps for shade tree inventory (see Appendix #7).

After all of the entities involved with planning for and planting trees in Jersey City have reviewed and assessed the current information, maps, statistics and canopy goals; it will become evident to all that the amount of tree planting(done properly with appropriate follow-up care) must be increased. The annual goal set in previous plans to plant 700-1,000 trees per year seems a good place to start.

Implementation Narrative by Year:

The implementation of any plan is dependent upon many factors. It is unlikely the exact path to success can be laid out for any 5-year period. Many tasks are ongoing as expressed in the Overview Section, plus sections VI and VII addressing training, education, awareness and outreach activities.

The following suggests actions to be followed over the next 5-year timeline.

City of Jersey City Community Forestry Management Plan

2015 -

This year begins with the assemblage of all those persons involved with and interested in Jersey City's trees as outlined at Goal #1b and #3a. Heretofore all responsibility for planning and the work involved with managing Jersey City's trees rested with the Division of Parks and Forestry. Last year (2014) the Planning Department and the Environmental Commission worked with a consulting group – The Green Infrastructure Center, Inc – to determine the percentage of tree canopy cover and produce maps and data to serve as a basis for future planning. The Division of Parks and Forestry has contracted with a NJ Certified Tree Expert to determine species composition, planting spots and condition of each tree in 8 parks. Two parks have been completed thus far. The purpose of this cooperative assemblage is to combine enough information and support to convince budgetary and elected officials to commit to making the necessary investments in Jersey City trees. Reports from the group will be finalized in spring/summer of 2015.

Attendance at the October meeting of the NJ Shade Tree Federation will take place as outlined in Goal #1a. Efforts will continue to have members appointed to the Jersey City Shade Tree Commission. Appointees will attend the Federation meeting and will help fill the volunteer requirement of the NJSTCFA.

The Division of Parks and Forestry will continue the public education, awareness and outreach objectives listed for Goal #1c. Additional outreach suggestions in the GIC report will be considered. Division of Parks and Forestry personnel will focus on gaining knowledge about Emerald Ash Borer, develop some response strategies as outlined in Goal #1d(3) and Goal #3e.

2016-

During this year, Jersey City will begin to take the next steps in inventory and assessment. In 2015, the "birds-eye view" of the green infrastructure was completed. This year it is time for "boots-on-the-ground" to determine hazardous trees, species (especially where and how many ash trees), condition/pruning needs and planting spots. See Objectives of Goal #2b.

The ongoing work, training and outreach by the Division of Parks and Forestry will continue.

City of Jersey City Community Forestry Management Plan

2017-

By this year, some combination of Division of Parks and Forestry, the Environmental Commission, Shade Tree Commission and Jersey City Planning Department will have formed an effective group to bring more resources (money, manpower, direction) to Jersey City trees and other green infrastructure. It may take this year to complete enough inventory and assessment work (Goal #2b) to start using the data to support more money and manpower, but there should be enough information to target some of the most dangerous trees (Goal #3b) and to “get serious” about planting trees as recommended in Goal #3c.

All ongoing training, reporting and work by the Division of Parks and Forestry will continue to maintain “approved” status with the New Jersey Forest Service.

2018-

By this year the Jersey City Planning Department, GIS personnel, Shade Tree Commission and Environmental Commission will have coalesced to assist the Department of Public Works in expanding its budget to increase tree maintenance and care. Businesses and residents will be informed about “what’s going on” and encouraged to plant trees (Goal #3d). Tree planting projects in pursuit of increased canopy cover will be underway.

All work, training and reporting necessary to maintain “approved” status under the NJSTCFA will be completed by the Division of Parks and Forestry.

2019-

This year is the final year of this plan and is a good time to review all the goals and objectives and to start thinking about the next plan for 2020-2024. By this year, the Division of Parks and Forestry and the tree planning group should be able to start “bragging” about the reduction of tree hazards in parks and along City streets, increased tree canopy via growth of well planted and maintained new trees, plus the increased environmental values due to increased commitment to improving the City’s green infrastructure/community forest. There are great challenges in Jersey City – but there are few other places in New Jersey where the simple act of planting a tree will have greater impact.

City of Jersey City Community Forestry Management Plan

X. Timeline of Activities

This timeline table outlines the previous descriptions of work by year. Cross-checking this table with the reference objectives defines the year's expectations.

City of Jersey City
CFMP Timeline 2015-2019 (cont.)

Goal/Objective:	2015	2016	2017	2018	2019
Category 1 - Administrative and Organizational Capacity					
Goal #1a					
Objective (1)					
(2)					
(3)					
(4)					
Goal #1b					
Objective (1)					
(2)					
(3)					
(4)					
(5)					
(6)					
Goal #1c					
Objective (1)					
(2)					
(3)					
(4)					
Goal #1d					
Objective (1)					
(2)					
(3)					
(4)					
Category 2- Determining Existing Condition					
Goal #2a					
Objective (1)					
(2)					
Goal #2b					
Objective (1)					
(2)					
(3)					
(4)					
(5)					

City of Jersey City Community Forestry Management Plan

City of Jersey City CFMP Timeline 2015-2019 (cont.)

Goal/Objective	2015	2016	2017	2018	2019
Category 3 - Desired Future Condition					
Goal #3a					
Objective (1)					
Objective (2)					
Objective (3)					
Goal #3b					
Parks Objective (1)					
Parks Objective (2)					
City Streets Objective (1)					
City Streets Objective (2)					
City Streets Objective (3)					
Goal #3c					
Objective (1)					
Objective (2)					
Objective (3)					
Goal #3d					
Objective (1)					
Objective (2)					
Objective (3)					
Objective (4)					
Goal #3e					
Objective (1)					
Objective (2)					
Objective (3)					

X. Community Stewardship Incentive Program Practices

Upon approval of this plan and completion of the core training requirements, the City of Jersey City will be qualified to apply for Community Stewardship Incentive Program (CSIP) grants to help offset the cost of implementing this plan. The following is an index of CSIP practices listed in this plan. Additional or revised grants may become apparent as plan implementation progresses.

Community Stewardship Incentive Program Practice Index:

1. CSIP #1 – Training
 - a. Goal #1a and #1d
 - i. Meet CORE and CEU training Requirements
 - ii. Attend additional training as outlined in #1d(1-4)
 - b. Section VI, Page 20-21
2. CSIP #2 – Ordinance Establishment
 - a. Goal #1b – Appoint group to focus on this plan, Shade Tree Commission
 - b. Goal #1b(4) – Review Chapter 321 Tree Ordinance and Zoning/Design Standards
 - c. Section IV, Page 13-14
3. CSIP #3 – Public Education and Awareness
 - a. Goal #1c – Tree City, USA; Arbor Day, Third Grade Tree Team, Champion Tree, etc
 - b. Section VII, Page 22-23
4. CSIP #4 – Arbor Day
 - a. Goal #1c(2) – Continue Arbor Day Ceremony and Proclamation
 - b. Section VII, Page 22
5. CSIP #5 – Tree Inventory
 - a. Goal #2a & #2b – Determine tree canopy %, windshield survey for hazards and design and implement tree inventory.
 - b. Section IX, Pages 27-31
6. CSIP #6 – Hazard Tree Assessment
 - a. Goal #2b, #3b, #3e – Hazard tree windshield survey, inventory and address hazardous tree conditions, monitor emerging insect and disease.

City of Jersey City Community Forestry Management Plan

- b. Section IX, Page 27-34
- 7. CSIP # 7 – Storm Damage Assessment – Readiness, Response & Restoration
 - a. The City of Jersey City includes trees in its Emergency Management Plan and thus will not be addressed further by this plan.
- 8. CSIP #8 – Tree Maintenance and Removals
 - a. Goal #3b & #3e – Establish pruning cycle for elevation and structure of young trees. Deadwood removal in larger trees. Pruning and removals in parks. Remove hazardous trees. Prepare for emerging insects and diseases.
 - b. Section IX, Page 32-34
- 9. CSIP #9 – Insect and Disease Management
 - a. Goal #3e – Training on incipient insect and disease problems. Preparation for Emerald Ash Borer arrival. Do not plant any more ash species.
 - b. Page 8
- 10. CSIP #10 – Wildfire Protection
 - a. Wildfire is not addressed by this plan.
- 11. CSIP #11 – Tree Planting
 - a. Goal #3a, #3c & #3d – Tree canopy and planting spot determination, increase tree planting in parks and along streets, businesses/corporations/residents to plant trees as “backyard” habitat
 - b. Section IX, Page 34-35
- 12. CSIP # 12 – Tree Recycling
 - a. The City of Jersey City recycles tree waste. Recycling is not addressed further by this plan.
- 13. CSIP #13 – Sidewalk Maintenance Program
 - a. Goal #3b - Tree damaged sidewalks will be noted during tree inventory. Sidewalk repairs via root pruning and barriers.
 - b. Section IX, page 31-32
- 14. CSIP #14 – Storm Water Management
 - a. The City of Jersey City has a Storm Water Management Plan. Aside from the Goal to increase tree canopy and tree planting, Storm Water Management will not be addressed further by this plan.
- 15. CSIP #15 – Other

XI. Appendix

1. Chapter 10 – Shade Tree Commission Ordinance
2. Chapter 321, Trees – Tree Ordinance
3. Zoning and Design Standards - Trees
4. 2014 Annual Accomplishment Report
5. Parks and Forestry Maintenance Report – 2007-2014
6. Jersey City Environmental Commission Canopy Project Meeting Minutes
7. Green Infrastructure Center, Inc (GIC) Canopy Project Memo and Maps
Produced and provided by the:
Green Infrastructure Center, Inc.
P.O. Box 317
Charlottesville, VA 22902
Phone: 434-244-0322
walker@gicinc.org
8. 'A Guide to Assessing Urban Forests' – US Forest Service

Use of Information:

The content of this Community Forestry Management Plan has been purchased by the subject municipality to guide a 5-year effort to manage its shade trees and publicly owned forests. The content, structure and organization remains the property of the authors, ForesTree Consultants, and may not be infringed upon by copying, adapting or sharing for use by another municipality or in future plans by the subject municipality without the expressed written consent of ForesTree Consultants.

Appendix #1:

Chapter 10 - Shade Tree Commission Ordinance

City of Jersey City Community Forestry Management Plan

Jersey City, NJ Code of Ordinances

Page 1 of 2

Chapter 10 - SHADE TREE COMMISSION

[HISTORY: Adopted by the Council of the City of Jersey City 6-22-2005, Ord. No. 05-075
Amendments noted where applicable.]

§ 10-1. - Establishment of an advisory shade tree commission; personnel; appointment.

There is hereby established an advisory body which will be known as the Shade Tree Commission of Jersey City. The Commission shall consist of five members appointed by the Mayor with the advice and consent of the Council, who shall be residents of the City of Jersey City and shall serve without compensation.

§ 10-2. - First commissioners; subsequent commissioners; terms.

The first commissioners shall be appointed within sixty (60) days after the effective date of the ordinance establishing the commission, and their terms of office shall commence upon the day of the appointment and be for the respective periods of one, two, three, four and five years beginning on January 1 of the year following appointment. The term of each appointee shall be designated in the appointment. All subsequent appointments, except to fill vacancies, shall be for the full term of five years, to take effect on January 1.

§ 10-3. - Organization of the advisory shade tree commission.

The commission shall organize within thirty (30) days after the appointment of its total membership for the remainder of the calendar year, and thereafter annually by the election of one of its members as chairman and another as secretary. At the request of the commission, the Mayor may designate a member of his staff to serve as secretary to the commission.

§ 10-4. - Functions of shade tree commission; Director of Public Works to cooperate

- A. The Advisory Shade Tree Commission organized under this chapter shall advise the Mayor and Council upon the following matters:
- (1) The planting and care of shade and ornamental trees and shrubbery planted in any public street, plaza or park, including the trimming spraying, care and protection of such trees and shrubbery;
 - (2) The use of the grounds surrounding such trees and shrubs so far as may be necessary for their proper growth, care and protection;
 - (3) The removal of any tree or shrub dangerous to public safety;
 - (4) The adoption of any ordinance or legislation necessary for the care and protection of trees, shrubs and park lands within the City;
 - (5) Consistent with applicable laws, the treatment or removal of any trees or shrubs on private property which may present a risk to trees and shrubbery under the care of the City or to public health in general.
- B.

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2/10/2015

City of Jersey City Community Forestry Management Plan

Jersey City, NJ Code of Ordinances

Page 2 of 2

The Director of Public Works shall delegate one of his or her staff to attend each meeting of the shade tree commission and shall provide the commission with informational copies of any work orders and any requests by residents for the planting, care, and removal of any shade trees. The Director shall also seek the advice of the shade tree commission prior to the planting of any shade trees and, except in emergencies, prior to the removal of any shade trees.

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2/10/2015

City of Jersey City Community Forestry Management Plan

Meeting Minutes

General Meeting: 16 September 2014 – 6:30 p.m.
Page 2 of 3

which is attached to these Meeting Minutes. Commissioners Verdibello and Holt indicated they would attend this conference.

Shade Tree Inventory

Solicitation 1405-002 Technical Assistance for Jersey City Shade Tree/Green Infrastructure Inventory was awarded to the Green Infrastructure Center (GIC) in early September. GIC has started data gathering and will attend the next Environmental Commission Meeting. Commissioners will be prepared to review materials in advance of the next meeting and engage GIC during the meeting.

Shade Tree Commission

A citizen's group is looking to restart the Shade Tree Commission in Jersey City. The Shade Tree Commission was established by City Ordinance 05-075, adopted on June 22, 2005. Per information provided by the City Clerk's Office, there are no appointments to this commission since the ordinance was adopted. The commission is not constituted. The Environmental Commission is in support of reinvigorating the Shade Tree Commission.

Environmental Resource Inventory

The Mayor's Office coordinated with Rutgers University to partner with Professor JeanMarie Hartman to create an Environmental Resource Inventory (ERI) as part of her Intermediate Landscape Architecture I. More detail is provided on this under General Public Participation.

Hudson County New Jersey Tree Foundation "Right-Tree, Right-Location" Workshop

Commissioner Verdibello brought up this work shop. He plans to attend and other commissioners were invited to attend.

CLOSING REMARKS AND OTHER BUSINESS BY COMMISSIONERS

Chair Nicholls encouraged commissioners to attend community meetings to voice the Environmental Commission purpose and objectives and looks for ways to collaborate. Chair Nicholls will attend the 10/9/2014 - Village Neighborhood Association Meeting.

GENERAL PUBLIC PARTICIPATION

Four members of the public attended the meeting. Two offered comments and posed questions. Ms. Ofrane commented on providing composting information to the Mayor's Office and her interest in the Environmental Commission. Ms. Calahan inquired on the Shade Tree Inventory.

Professor Hartman facilitated a discussion on the ERI and how she will integrate the ERI into her class Intermediate Landscape Architecture I. Secretary Marione-Stanton provided a course syllabus, which is attached to these Meeting Minutes. Professor Hartman showed an example of a similar work product a prior class produced. For the ERI to be successful, data layers will be needed from the City—the pending Shade Tree Inventory data layers should also be provided. Professor Hartman facilitated feedback from commissioners on what they consider



Appendix #2:

Chapter 321, Trees - Tree Ordinance

City of Jersey City Community Forestry Management Plan

Chapter 321

TREES

- | | |
|--|------------------------------------|
| § 321-1. Acts requiring a permit. | § 321-5. Guy wires and braces. |
| § 321-2. Permit application; fee. | § 321-6. Injury by animals. |
| § 321-3. Planting trees. | § 321-7. Chemical damage. |
| § 321-4. Protection from wires, cables and electrical current. | § 321-8. Violations and penalties. |

[HISTORY: Adopted by the Council of the City of Jersey City 9-8-1981 as Secs. 2-113 through 2-120 of Ord. No. Mc-14; amended in its entirety 1-24-1990 by Ord. No. McC-98. Subsequent amendments noted where applicable.]

GENERAL REFERENCES

Posting of advertising materials — See Ch. 81.

Fees and charges — See Ch. 160.

Trees in parks and recreation areas — See Ch. 239.

Property maintenance — See Ch. 254.

Streets and sidewalks — See Ch. 296.

§ 321-1. Acts requiring a permit.

A. No person shall do or cause to be done any of the following acts affecting the trees, plants, shrubbery or other ornamental flora planted or growing naturally within the highways of public places under the jurisdiction of the city, except with a written permit first obtained from the Division of Engineering and Facilities Maintenance:

- (1) Cut, saw or otherwise remove any living tree or shrub or climb with spikes any living tree or shrub.
- (2) Cut, trim, break or disturb the roots of or spray with chemicals and living tree or shrub or injure, misuse or remove any structure or device placed to support or protect any tree or shrub.
- (3) Fasten any rope, wire, electric attachments, sign or other device to a tree or shrub or to any guard about such tree or shrub.
- (4) Close or obstruct any open space provided about the base of a tree or shrub to permit the access of any water or fertilizer to the roots of such tree or shrub.
- (5) Pile any building material or make any mortar or cement within six (6) feet of a tree or shrub.
- (6) Change the grade of the soil within the limits of the lateral spread of the branches of any such tree.
- (7) Plant trees in accordance with § 321-3.

32101

City of Jersey City Community Forestry Management Plan

§ 321-1

JERSEY CITY CODE

§ 321-4

- B. Nothing in this section shall be construed to limit the power of the Division of Engineering and Facilities Maintenance to move or require the removal of any tree or part thereof dangerous to public safety.

§ 321-2. Permit application; fee.

- A. Application for permission to engage in any of the acts enumerated in § 321-1 shall be made in writing to the Division of Engineering and Facilities Maintenance, on forms to be supplied by the Division of Engineering and Facilities Maintenance, and each such application shall be accompanied by a fee as provided in Chapter 160, Fees and Charges, for each tree involved. If the application is denied, the fee shall be returned to the applicant.¹
- B. Standards for the issuance of such a permit will be promulgated and published by the Division of Engineering and Facilities Maintenance.

§ 321-3. Planting trees.

- A. An adjoining landowner may participate in planting or removing trees in areas of public easement abutting his or her property by submitting a written request to the Division of Engineering and Facilities Maintenance of a commercially competitive fee established by him or her upon condition that the adjoining landowner agrees to the following:
- (1) The adjoining landowner shall carry sufficient liability insurance in regard to any injury to property or person arising out of any condition created by the planting of such trees.
 - (2) The adjoining landowner shall maintain the sidewalk in a manner set forth by the Division of Engineering and Facilities Maintenance.
- B. While the services are offered by the city, it is by no means to be considered the solitary agent for such service, and the adjoining landowner may plant a tree or independently contract to plant a tree by first obtaining a permit provided for in § 321-2.
- C. The Division of Engineering and Facilities Maintenance shall replace, on a one-to-one basis, trees removed from all city-owned property for any reason. This replacement shall be done in a reasonable amount of time and be consistent with current planting conditions.

§ 321-4. Protection from wires, cables and electrical current.

Every person having control over any wire for the transmission of an electric current along a public highway shall at all times guard all trees through which or near which such wire passes against any injury from the wire or cable or from the electric current carried by it. The device or means used shall in every case be subject to approval by the Division of Engineering and Facilities Maintenance.

¹ Editor's Note: Amended at time of adoption of Code; see Ch. I, General Provisions, Art. I.

City of Jersey City Community Forestry Management Plan

§ 321-5

TREES

§ 321-8

§ 321-5. Guy wires and braces.

No person shall place any guy wire, brace or other device on any tree in a manner as to injure it.

§ 321-6. Injury by animals.

No person shall hitch or fasten any animal to any tree or shrub on a public highway or to any guard or support provided for the same or permit an animal to bite or otherwise injure any tree or shrub.

§ 321-7. Chemical damage.

No person shall permit any brine, gas or injurious chemical or liquid to come into contact with the stump or roots of any tree or shrub upon a public highway.

§ 321-8. Violations and penalties.²

The provisions of this chapter shall be administered and enforced by the Division of Engineering and Facilities Maintenance. If any person shall continue to violate any of the provisions of this chapter after being duly notified of such violation or shall neglect or refuse to comply with a second or each of any subsequent notifications or orders shall be construed as an additional violation of this chapter, and each additional offense shall subject the offending party, upon conviction, to the same penalty as provided for the first offense. Any person violating any of the provisions of this chapter shall, upon conviction thereof, be punishable as provided in Chapter 1, General Provisions, § 1-25. In addition to or in lieu of a fine or imprisonment, the court may impose a period of community service not exceeding ninety (90) days.

² Editor's Note: Amended at time of adoption of Code; see Ch. 1, General Provisions, Art. I.

Appendix #3:

Zoning and Design Standards - Trees

Amended 12-18-2013 by Ord. No. 13-138

- § 345-64. - Public or private common open space design standards.



A.

All open space shall incorporate several elements such as lawn, landscaping including shrubbery and trees, attractive paving materials, street furniture, decorative lighting, low walls, fountains and other architectural and artistic amenities so as to produce and provide a pleasant environment at all levels and to complement the surrounding buildings.

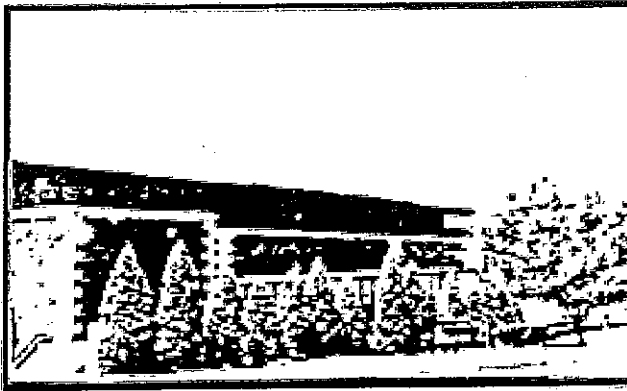
B.

Adequate lighting shall be provided to promote a sense of security in the open space.

C.

Open spaces shall be so located as to provide for maximum usability and to create a harmonious relationship between buildings.

- § 345-65. - Buffers.



A.

Zoning Standards. Buffer areas are required along lot lines where a non-residential use or district line abuts a residential property except that where a new residential use is proposed on a lot adjoining an existing non-residential use or district line, the proposed residential use shall provide the buffer.

B.

Design Standards.

1.

No activity, storage of materials or parking of vehicles shall be permitted in the buffer area except access driveways, directional signs, and permitted signs.

2.

All buffer areas shall include plantings except where spatial restrictions preclude its use.

3.

Any buffer area shall be planted and maintained with massed evergreens, deciduous trees and shrubs of such species and sizes which will produce within two growing seasons a living screen at least four feet in height and of such density so as to obscure throughout the full course of the year the glare of automobile headlights emanating from the premises. The screen plantings shall be placed so that at maturity they will not protrude across any street or property line and so that a clear sight triangle shall be maintained at off street intersections and at all points where private accessways intersect public streets.

4.

The parking, loading, outside equipment and storage areas shall be screened from view by buildings, decorative walls, or landscaped areas and the front of the building shall be landscaped.

• § 345-66. - Landscaping.





A.

Zoning Standards.

1.

All areas not occupied by buildings or structures shall be appropriately landscaped in addition to required street trees and buffer areas. (See maximum lot coverage requirement in each zone).

2.

a. At least sixty (60) percent of the area between the building line and street line on residential lots shall be landscaped, provided, however, that for new construction in the R-1 District, or for construction of three-family detached housing in the R-3 District, which includes either a front garage and driveway, or driveway access through the front yard to a side or rear yard parking area, or rear yard garage in lieu of a front yard garage access, the following front yard landscaping percentages shall apply

[Amended 8-16-2006 by Ord. No. 06-090]:

(1)

Lots less than twenty-five (25) feet wide - minimum of fifteen (15) percent.

(2)

Lots twenty-five (25) feet wide and greater - a minimum of thirty (30) percent.

b.

In the event of removal of front yard landscaping existing at the time of the adoption of this ordinance for rehabilitation, or required repair/replacement, or for any other purpose, restoration of the originally landscaped area is required in accordance with percentage requirements of subsection (A)(2)(a) of this section.

[Added 9-10-2003 by Ord. No. 03-113]

3.

In outdoor parking lots with six or more spaces not less than five percent of the parking area shall be suitably landscaped and maintained with shrubs at least three feet high and trees with branches no lower than six feet. The landscaping shall be disbursed throughout the parking area bounded by the limits of curbing or from the outside perimeter of the paved parking area.

4.

Street trees shall be required for all development in accordance with the schedule found under Section 345-66(B)(12) (Design Standards for street trees), except where it can be demonstrated to the administrative officer that it is not possible to plant trees due to underground constraints such as water or utility lines.

[Added 8-16-2006 by Ord. No. 06-090; Amended 11-8-2006 by Ord. No. 06-131]

B.

Design Standards. *[Amended 12-18-2013 by Ord. No. 13-138]*

1.

Landscaping for all uses shall define entrances to buildings and parking lots, define the edges of various land uses, provide transition between neighboring properties and provide screening for loading and equipment areas to the maximum extent feasible.

2.

In the Highway Commercial and Community Automotive zones, at least one-half of the required landscaping shall be located along the street right-of-way.

3.

Landscaping shall be in scale with adjacent structures and be of appropriate size at maturity to accomplish its intended purpose.

4.

Foundation plantings are recommended to soften the edge between the parking lot and the structure.

5.

The use of non-invasive vines and climbing plants on buildings and the perimeter of garden walls is encouraged.

6.

Plants in containers shall be used for enhancement of sidewalk shops, plazas and courtyards.

7.

Landscaping shall not obstruct visibility in the site triangle.

8.

All plantings shall be with species with proven resistance in an urban environment.

9.

Deciduous trees shall have at least a three inch caliper and evergreens shall be at least four feet tall at planting. All trees shall be balled and burlapped and be of specimen quality as established by the American Association of Nurserymen.

10.

Any parking lot that adjoins a street, open space or residential use shall have a landscaped strip along the adjoining lot line that includes trees, shrubs and ground cover.

11.

Parking lots for more than six vehicles and all loading areas shall provide a screen planting of dense native and drought tolerant evergreen mulched two (2) to four (4) inches during the spring and summer, not less than three (3) feet high at planting along all street lines and along all property lines, and will maintain a four-foot height along all property lines, except in those instances where a building intervenes and in sight triangles of driveways and sidewalk points. In lieu of screen plantings, a four-foot high decorative brick wall or any combination of plantings and walls or decorative fences may be provided.

12.

Street trees shall be required for all development and shall be in accordance with the following schedule:

a.

Small trees:

Cercis canadensis	Eastern Redbud		YES		Pruning	
Prunus sargentii	Sargent Cherry	YES	YES			
Syringa reticulata	Tree lilac	YES	YES		Pruning	
Latin Name	Common Name	Recommended on Narrow Streets	Recommended under Power Lines	Preferred Site	Maintenance Required	Notes

b.

Medium trees:

Amelanchier	Serviceberry	YES	YES	Dry		
Carpinus betulus	European Hornbeam		YES			

Carpinus caroliniana	Upright European Hornbeam		YES		Prune when young	
Cercis chinensis	Chinese Redbud	YES	YES		Pruning	
Cladrastis kenturkea	Yellowwood		YES			
Ginkgo biloba	Maidenhair Tree	YES	YES			
Gleditsia triacanthos	Honey Locust					
Gymnocladus dioicus	Kentucky Coffeetree					
Malus	Crabapple	YES	YES			
Ostrya virginiana	Hop Hornbeam	YES	YES			Prefers shade
Prunus serrulata	Kwanzan Cherry		YES		Pruning	
Prunus yedoensis	Yoshino Cherry	YES	YES			
Quercus acutissim	Sawtooth Oak	YES	YES			
Latin Name	Common Name	Recommended on Narrow Streets	Recommended under Power Lines	Preferred Site	Maintenance Required	Notes

c.

Large trees:

Celtis laevigata	Sugar Hackberry				
Celtis occidentalis	Hackberry				
Corylus columa	Turkish Filbert				
Eucornia ulmoides	Hardy Rubber Tree				
Ginkgo biloba	Maidenhair Tree				
Ilex opaca	American Holly	YE S	Wet/Dry		
Liquidambar styraciflua 'Cherokee,' 'Worplesdon'	Sweet Gum (Fruitless)		Wet/Dry		
Nyssa sylvatica	Black Gum		Wet	Wet sites	
Quercus bicolor	Swamp White Oak		Wet		
Quercus coccinea	Scarlet Oak	YE S	Dry		
Quercus imbricaria	Shingle Oak				

Quercus phellos	Willow Oak					
Quercus prinus	Chestnut Oak			Dry		
Quercus robur	English Oak					
Quercus robur 'Fastigiata'	Fastigiata Oak					
Quercus rubra	Northern Red Oak			Wet/Dry		
Quercus velutina	Black Oak			Wet/Dry		
Sophora japonica	Japanese Scholar					
Tilia Americana	American Linden	YES				
Tilia cordata	Little Leaf Linden					
Tilia euchtora	Crimean Linden					
Tilia tomentosa	Silver Linden					
Zelkova serrata	Zelkova					
Latin Name	Common Name	Recommended on Narrow Streets	Recommended under Power Lines	Preferred Site	Maintenance Required	Notes

13.

Recommended Tree Spacing. The distance between trunks shall be equivalent to the trees' spread at maturity.

14.

Street trees shall be planted so as if not to interfere with utilities, roadways, or sidewalks. Trees shall be nursery grown stock of not less than three to three and one-half inches in caliper measured one foot from the root system, with branches not less than eight feet above grade when planted and staked in an approved manner.

15.

Maintenance. The provisions of § 345-75 shall apply.

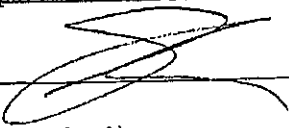
Appendix #4:
2014 Annual Accomplishment Report

City of Jersey City Community Forestry Management Plan

New Jersey Shade Tree and Community Forestry Assistance Act Annual Accomplishment Report

ANNUAL ACCOMPLISHMENT REPORT FORM

Municipality City of Jersey City
County Hudson County
Address 280 Grove Street, Jersey City, NJ 07305

Contact Name and Title Cleveland Snow, Director, Parks & Forestry
Phone # 201-547-4449
Fax # and E-mail Fax 201-547-5737 E-mail CSnow@jcnj.org
Organization Name Department of Public Works/ Parks & Forestry
Mayor/County Freeholder's Signature 
Date of Management Plan Approval Pending
Time Period Covered in Management Plan 2015 - 2019
Date of Annual Accomplishment Report Submission February 6, 2015
Accomplishment Report for Calendar Year January - December 2014

***PLEASE INCLUDE THIS FORM AS THE COVER
PAGE TO YOUR ANNUAL ACCOMPLISHMENT
REPORT**

To Submit Report:
Community Forestry Program
Attn: Alexander J. McCartney
Mail Code: 501-04
P.O. Box 420
Trenton, NJ 08625

City of Jersey City Community Forestry Management Plan



STEVEN M. FULOP
Mayor of Jersey City

CITY OF JERSEY CITY
DEPARTMENT OF PUBLIC WORKS
18-16 LINDEN AVENUE EAST, 2ND FLOOR | JERSEY CITY, NJ 07305
P: 201 647 4400 | F: 201 647 4603



MARK REDFIELD
Acting Director

Community Forestry Management Plan Annual Forestry Report January 2014 - December 2014

Community Forestry Program Administrators:

The City of Jersey City is responsible for any tree work done on the City streets. All tree work involving trimming, root shaving, and removals is performed by the Division of Parks & Forestry and their agents/contractors.

During 2014 Michael Razzoli, then Oren Dabney served as the Director of Public Works.

From July 1, 2013 Michael Razzoli had become Director of the Department of Public Works. From July 29th 2014, Oren K. Dabney became Director of the Department of Public Works.

Beginning July 15, 2013 Cleveland Snow assumed the duties as Director of the Division of Parks & Forestry. Cleveland Snow has over 25 years working in Forestry, and has learned from past Forestry Directors in the proper maintenance and care of street trees.

The Jersey City Tree Committee is run by Carolyn Katz-Mount. The Jersey City Tree Committee is manned by constituents whose key interests are to preserve trees within the City.

Public Education / Awareness / Outreach:

The City of Jersey City has partaken in Earth Day programs with the Jersey City Board of Education, and has provided literature to the schools. The City of Jersey City has also taken part in 2 Earth Day programs, in which literature was given out to constituents regarding proper care and maintenance of trees and plants

Statement of Tree Budget:

The City of Jersey City, Division of Parks & Forestry has dedicated funding in the amount of \$200,000.00 for Tree Planting City Wide, and has donated plants, trees, and shrubs to several park organizations and community garden groups.

City of Jersey City Community Forestry Management Plan

Plan Implementation:

In 2014 the City of Jersey City, Department of Public Works, Division of Parks and Forestry has been busy trying to keep "Jersey City Clean and Green". Programs implemented range from tree planting, sidewalk replacement programs with the express purpose of saving elder street trees, and educational programs such as Arbor & Earth Day festivities in conjunction with the Jersey City Board of Education.

Under the Directorship of Director Cleveland Snow, programs such as the Sidewalk Replacement Program that is designed to help constituents in low to moderate income areas replace sidewalks that have been torn up due to root expansion was implemented. A contractor was brought in to remove the damaged pavement, and the roots are shaved by the Division of Parks & Forestry, allowing the pavement to then be replaced. The cost of this is through a CDBG grant, which helps with quality of life issues and prevents injury to the public. Also this program helps to save sixty to eighty year old trees from being removed.

The Division of Parks & Forestry has also worked with the Public in maintaining the trees that are lining the numerous streets in Jersey City. Maintenance consists of tree trimming, root shaving, and removal of dangerous trees and/or dead trees. An ordinance that was passed prevents people from removing healthy trees along the street, and this has also helped to beautify the City and helped maintain a lush and vibrant city landscape.

The Division of Parks & Forestry in 2014 was to have held a Fall Tree Planting program that was to have planted approximately seventy-five street trees, including replacing trees that died from previous plantings. These plantings were to be done with assistance from property owners. The program required the property owners to pay the sum of two hundred dollars per tree that they requested, and the City of Jersey City, Division of Parks & Forestry assumed the bulk of the cost. Within the two hundred dollar price, the constituents were to have received one of nine species of tree, and they are:

1. *Bucconia Emerald Painte*, 2. *Gingko Princeton Sentry*, 3. *Amelanchier Spring Flurry*, 4. *Tilia Unizam Linden*, 5. *Ulmus Emerald Sunshine/Elm*, 6. *Syringa Ivory Silk/Lilac*, 7. *Cercidiphyllum Katsura*, 8. *Hornbeam Fastigiata*, 9. *Zelkova City Sprite*.

The placements were dependent upon the location and proximity to utility lines. The Division of Parks and Forestry had an inspector assess each location, and oversee the plantings by the contractor. Due to the Department of Public Works moving to a new location, the planting was pushed back to the Spring of 2015, with over 50 people expressing interest in applications.

In 2014 the Division of Parks & Forestry took part in a City-wide Earth Day programs, where the Division of Parks & Forestry helped the Jersey City Board of Education with tree planting programs at numerous schools throughout the City. These programs consisted of planting trees, shrubs, and plants at various schools, as well as supplying literature, and representation from Division of Forestry Personnel.

Plans have been made to renovate various parks within the City to add more green space for public use. Areas that are undeveloped have been added to the City Master Plan, and major renovations that will include the planting of various species of trees will add to the Green Acres

City of Jersey City Community Forestry Management Plan

Programs that have run within the City, along with renovations to parks that have been planned. There have been plantings in existing parks to add to the aesthetics of the Parks.

The City of Jersey City has already begun the process of applying for Grants for the upcoming year, and hopes to update the Community Forestry Management Plan, and with Public Involvement create programs that benefit both the constituents of today, and the citizens of tomorrow.

1. 2013 - 2014 CDBG Sidewalk Replacement Grant (To Save Street Trees and repair damage to Sidewalks uprooted by trees.) This program started in 2013 and ran through 2014.

The City of Jersey City sent several individuals to class to earn CEU credits that were required under State guidance. These CEU credits were very instrumental in helping the City of Jersey City apply for Grants and also helped in understanding the proper maintenance and care for the numerous street trees entrusted to the City's care.

In 2013 the following employees of the Division of Parks & Forestry took courses for CORE Training and CEU units.

George Lewis Sr. - Senior Tree Climber, Division of Parks & Forestry
Terrance Smith - Tree Climber, Division of Parks & Forestry

Hurricane / Super-storm Sandy October 29, 2012 (Aftermath)

On October 29th, 2012 Super-storm Sandy made landfall along the Eastern Coast causing tremendous damage to the City of Jersey City. Ninety mile an hour sustained winds devastated trees along the city landscape, resulting in the removal of over one hundred trees, due to damage from flooding weakening/washing out the root systems, branches and leaders being snapped causing the trees to become unstable, trees becoming uprooted and some toppling, and trees being damaged by power lines. The City of Jersey City, Department of Public Works in conjunction with the Office of Emergency Management, and the Jersey City Incinerator Authority worked tirelessly to handle the situation. The emergency implemented plan helped to alleviate a situation that could have become steadily worse.

Nor'easter 2012 (Aftermath)

Within a week following Super-storm Sandy, Jersey City was hit by the effects of a Nor'easter, that further devastated the City of Jersey City's streetscape by further decimating the already storm weakened trees. The various agencies within the City have worked long and hard to return the City back to a state of normalcy.

This resulted in The Division of Parks & Forestry working for the first few months in 2013 handling the aftermath of these great storms. Some of the effects were not evident immediately following the storm. One of the areas that was hard hit was the Park systems within the City of Jersey City, and due to limited manpower the Park system's were primarily neglected, until in 2014 Director Snow and various civilian Parks groups recommended having Park surveys committed to handling these neglected trees. This idea was first implemented by way of Director Razzoli, and then Director Dabney, in the hopes that these trees could be served proactively, preventing future damage. The New Director of Public Works, Mr. Mark Redfield is committed to completing the process started by his predecessors in the hopes of making the parks safe for the constituents.

City of Jersey City Community Forestry Management Plan

Jersey City

2014 Community Forestry Status Report (end-year)

Status is awarded by compliance with the four requirements of the New Jersey Shade Tree and Community Forestry Assistance Act (P.L. 1996, Chapter 135).

Approved Status:

PENDING

If this box says PENDING, submit a complete Annual Accomplishment Report by 2/15/2015
If the box says NO, please check the requirements below to see those that are missing.

To reach and maintain approved status, the community must stay up to date with these four requirements:

1. Community Forestry Management Plan
2. Core Trained Community Representatives
3. Continuing Education Credits
4. Annual Accomplishment Report

1. COMMUNITY FORESTRY MANAGEMENT PLAN

A current approved Community Forestry Management Plan is required for Approved Status

Initial Management Plan Status	Approved	Initial Management Plan Approved to start in	2005
Second 5-year Management Plan Status	Approved	Second Management Plan Approved to start in	2010
Third 5-year Management Plan Status	Due 2015	Third Management Plan Approved to start in	N/A
Fourth 5-year Management Plan Status	N/A	Fourth Management Plan Approved to start in	
Management Plan Contact Name	Cleaveland Snow	Most Recent Plan Expires on December 31st of	2014

2. CORE TRAINED COMMUNITY REPRESENTATIVES

The Act requires each municipality/county have at least two CORE Trained individuals, one municipal employee and one community volunteer who must be currently active in the program. An elected official will qualify as either a municipal employee or a community volunteer.

Primary CORE Volunteer: Marc Wesson Primary CORE Municipal Employee: Alphonso Lynch

*Additional CORE Trained Representatives are listed on Page #2 of this Status Report.

3. CONTINUING EDUCATION UNITS

At least two individuals representing your municipality/county must accrue a total of 8 Continuing Education Units (CEUs) annually to maintain Approved Status under the Act. Any individual can attain CEUs on behalf of your municipality/county, they do not have to be CORE trained. CORE Training does not count toward CEU credits.

2014 CEU Credits: 24 Number of Individuals Who Have Acquired CEU Credits to date in 2014: 4

*Details about CEU's are listed on Page #2 of this Status Report

4. ANNUAL ACCOMPLISHMENT REPORT

An Annual Accomplishment Report records Community Forestry Management Plan Implementation. A complete Annual Accomplishment Report detailing the years accomplishments under the plan, with Cover Sheet, must be submitted at the end of each calendar year by February 15th.

Annual Accomplishment Report for 2014: Due 2/15/2015



State Forestry Services | Department of Environmental Protection | State of NJ

Contact: Alec.McCartney@dep.nj.gov 609-292-2532

This Status Report is up to date as of: January 23, 2015

City of Jersey City Community Forestry Management Plan

If the tables are blank then there are no records on file.
Please contact Alec.McCartney@dep.nj.gov 609-292-2532 to update or correct this information.

CORE Trained Representatives

Name	Type of Representative	Primary Contact	Date of Training
Marc Wesson	Volunteer	YES	4/10/2010
Anthony Henderson	Municipal Employee	YES	10/26/2012
Isaiah Bryant	Municipal Employee	NO	2/28/2009
George Lewis	N/A	NO	10/1/2003
Jugmohan Bajnauth	Municipal Employee	NO	10/1/2003
Steven Sedlak	Municipal Employee	NO	10/1/2003
Alphonso Lynch	Municipal Employee	NO	10/1/2003
Michael Hinton	Municipal Employee	NO	10/1/2003
Isaiah Bryant	Municipal Employee	NO	10/1/2003
Nannette Jacobs	Volunteer	NO	3/18/1998
Anthony Henderson	N/A	NO	10/21/2005
Margo Hammond	Volunteer	NO	10/1/2003
Terrance Smith	Municipal Employee	NO	10/21/2005
Matthew Hogan	Volunteer	NO	2/28/2009
Charlene Burke	Volunteer	NO	3/18/1998
Silendra Bajnauth	Municipal Employee	NO	4/10/2010
Elizabeth Harley	Municipal Employee	NO	10/22/2010
George Lewis	Municipal Employee	NO	10/22/2010
Caroline Katzmunt	Volunteer	NO	10/26/2012
Cleveland Snow	Municipal Employee	NO	10/21/2005

2014 CEU's To Date

Course Participant	Course Title	Course Date	CEU Credits
Terrance Smith	NJSTF Day 2	10/25/2014	5
Anthony Henderson	NJSTF Day 2	10/25/2014	5
Terrance Smith	NJSTF Day 1	10/24/2014	5
Anthony Henderson	NJSTF Day 1	10/24/2014	5
Debra Italiano	RTRP Hudson	11/7/2014	2
George Lewis	RTRP Hudson	11/7/2014	2

City of Jersey City Community Forestry Management Plan



STEVEN M. FULOP
Mayor

CITY OF JERSEY CITY
DEPARTMENT OF PUBLIC WORKS
13-16 LINDEN AVENUE EAST, 2ND FLOOR | JERSEY CITY, NJ 07306
P: 201 547 4400 | F: 201 547 4803



MARK REDFIELD
Director

Parks & Forestry Maintenance Report January 2007 - December 2014

The Department of Public Works Division of Parks & Forestry has completed the pruning/trimming of trees throughout the following calendar years.

of trees trimmed by Month and Year.

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
2007	81	54	79	78	66	79	80	73	64	79	56	45	834
2008	39	44	49	64	34	65	46	43	56	61	51	46	598
2009	46	47	39	39	50	66	35	52	44	80	78	22	598
2010	37	36	27	24	18	46	32	49	28	31	32	20	380
2011	1	12	32	27	31	37	29	32	12	26	3	18	260
2012	38	30	41	37	28	31	35	49	38	42	1	19	389
2013	58	60	35	39	24	39	40	34	41	39	28	35	472
2014	50	06	27	21	25	45	74	31	36	67	65	74	521
TTL	350	289	329	329	276	408	371	363	319	425	314	279	4052
Avg	43.7	36.12	41.12	41.12	34.5	51	46.37	45.37	39.8	53.12	39.25	34.87	506.5
	5							7					

The above grid reflects the trees trimmed along City streets during those calendar years. These numbers are approximate based on calls received and checked. Also listed are the averages listed by month and the average of trees per annum.

of trees removed by Month and Year.

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
2007	25	11	13	9	11	13	8	21	12	17	12	9	161
2008	40	12	19	12	13	20	21	34	39	26	22	14	272
2009	3	10	16	15	18	17	20	35	45	35	15	23	252
2010	12	4	8	14	11	13	10	14	12	15	8	7	128
2011	0	4	18	9	9	12	7	21	7	16	0	10	113
2012	7	10	7	13	24	15	12	18	12	10	2	112	242
2013	17	17	5	15	14	12	13	29	10	11	8	20	171
2014	7	5	12	6	14	12	17	19	3	18	13	20	146
TTL	111	73	98	93	114	114	108	191	140	148	80	215	1485

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City of Jersey City Community Forestry Management Plan

Avg	14.8	9.12	12.2	11.6	14.2	14.2	13.5	23.8	17.5	18.5	10	26.8	185.6
			5	2	5	5		7				7	2

of trees planted by year.

Year	# of trees Planted
2007	178 trees planted along the streets
2008	204 trees planted along the streets
2009	224 trees planted along the streets
2010	120 trees planted along the streets
2011	95 trees planted along the streets
2012	75 trees planted along the streets
2013	11 Trees planted along the streets ***Due in part to the contractor backing out of the contract***
2014	74 Trees planted along the streets *** Remainder of trees that were to be planted from 2013***
TTL	981 trees planted along the streets from 2007 until 2014
Avg.	122.625 average trees planted per year between 2007 until 2014

*****Note***** This does not include trees that were planted, died, and were replanted. Some trees were planted inside parks after trees within the parks died from age, and or damage due to weather.

The Division of Parks & Forestry was responsible for the trimming and removal of street trees. These numbers reflect the work that was completed by this Division. The tree planting was accomplished by contractors working for the Division of Parks & Forestry.

The Division of Parks & Forestry works Monday through Friday 8:00am until 4:00pm, but on occasion Forestry is called in to handle emergency situations, such as large limbs down due to weather, and vehicle accidents, trees blown over and damaged by wind and rain. The Division of Parks & Forestry is always on standby.

The Division of Parks & Forestry is responsible for the daily maintenance of the 60 + City parks. This included the removal of trash, maintenance of the park apparatus (swings, slides etc.), along with the maintenance of the grass and trees.

The Division of Parks & Forestry is also responsible for the maintenance of the City ball fields. These include baseball, football, soccer, tennis, and bocce ball and sometimes cricket.

The Division of Parks & Forestry handles the maintenance of several Municipal Pools, located at Pershing Field, Pavonia West Side Pool, and the new pool at Lafayette Park Aquatic Center.

During the fall and winter months Parks & Forestry is responsible for the removal of leaves in the City parks, and the removal of snow around City parks and municipal buildings.

The Division of Parks & Forestry handles and maintains the park facilities after various events, and handles the placement of American and State flags throughout the City of Jersey City on Municipal buildings, and in the parks.

City of Jersey City Community Forestry Management Plan

*****Note***** During the months following October 2012 (Blizzards and Hurricane Sandy) numbers fell off due to Forestry and Parks cleaning up after Storm Damage.

*****Note***** In November the Division of Parks & Forestry was to plant by way of contractor (Andy Matt Inc.) 74 trees. After the initial 11 was planted, the contractor backed out of the contract, preventing the remainder of the trees to be planted in 2013. The trees will be planted during the early months of 2014.

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Appendix #5:

Parks and Forestry Maintenance Report - 2007-2014

City of Jersey City Community Forestry Management Plan



STEVEN M. FULOP
Mayor of Jersey City

CITY OF JERSEY CITY
DEPARTMENT OF PUBLIC WORKS
13-15 LINDEN AVENUE EAST, 2ND FLOOR | JERSEY CITY, NJ 07305
P: 201 647 4400 F: 201 647 2803



MARK REDFIELD
Acting Mayor

Parks & Forestry Maintenance Report January 2007 - December 2014

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The above grid reflects the trees trimmed along City streets during those calendar years. These numbers are approximate based on calls received and checked. Also listed are the averages listed by month and the average of trees per annum.

of trees removed by Month and Year.

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City of Jersey City Community Forestry Management Plan

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City of Jersey City Community Forestry Management Plan

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Appendix #6:

Jersey City Environmental Commission Canopy Project Meeting Minutes

City of Jersey City Community Forestry Management Plan



MEETING MINUTES

Jersey City Environmental Commission
City Hall - 280 Grove Street, Jersey City NJ 07302
Gerald F. Nicholls, Chair
Sara K. Schultzer, Vice Chair

Meeting: Special Meeting – Urban Tree Canopy Study

Date / Location: 18 November 2014 – 6:30 p.m.
Room 322, Law Department, City Hall, 280 Grove Street, Jersey City, NJ 07302

Attendees:

Commissioners/City Representatives	Public Participants
Tanya Marione-Stanton (JC Planning)	Amanda Khan (JCPC)
Naomi Hsu (JC Planning)	Andrew Walker (GIC)
Elizabeth Phillips-Lorenzo	Arvind Swarmy
Gerry Nicholls	Ashwani Vasishth (Ramapo)
Michelle Luebke (via phone)	Bill Montgomery (NJCU)
Sara Schultzer	Christ Davis Jackson (JC MUA)
Gabriel Ristorucci	Debra Italiano (SJC)
Mario Verdibello	Elizabeth Reynoso
	Karen Firehock (GIC)
	Marc Wesson (JCPC)

Prepared By: Karen Firehock and Gerry Nicholls

Date Prepared: 14 December 2014

ROLE CALL

Six of nine commissioners were present, which constituted quorum. Commissioners Latham and Holt were absent, Commissioner Luebke called in, and one commissioner position remains unfilled.

SUBCOMMITTEE REPORTS

Subcommittee reports were excused in light of the agenda to review and the draft Urban Tree Canopy Study data and results.

NEW BUSINESS

The following new business items were discussed:

Proposed Parking Ordinance

Commissioner Verdibello brought up the proposed idea to allow parking in the front yards of homes without driveways by making a 'cut out' in the front to allow a parking space next to a residential unit brought forward by Ward B Councilman Khenraj Ramchal. Commissioners discussed the role of the group in reviewing ordinances that may have an environmental impact. One commissioner stated her support for the ordinance since a lack of parking controls made it very difficult to find parking in her area. Others noted that taking up yards to provide parking

City of Jersey City Community Forestry Management Plan

Meeting Minutes

Special Meeting - Urban Tree Canopy Study: 18 November
2014 -- 6:30 p.m.
Page 2 of 6

would create more stormwater problems and harm trees (potentially) and result in a net loss in available public parking. The discussion was tabled until the end of the meeting.

Meeting Minutes

The 16 September 2014 and 14 October 2014 Meeting Minutes were accepted.

Jersey City Shade Tree/Green Infrastructure Inventory by Karen Firehock and Andrew Walker, Green Infrastructure Center Inc. (GIC)

Reminder of Project Scope and EC Requests from Last Meeting: Karen Firehock reminded the commission where we are in the process. Permission to begin the work was provided in August. This is the first draft of the tree canopy map. At the project kick-off meeting held in August, the GIC presented the approach to be taken, examples of other urban green asset mapping projects and also solicited input on other useful products desired by the commission, such as fact sheets about the benefits of urban canopy.

She noted that while the tree canopy is the major piece of data funded by this project, other data would also be included on the final maps such as watersheds, parks and community gardens. There will be different data layers used to analyze the city's green assets. This work will also relate to other studies, such as the Coastal Resiliency Study.

Tree Canopy Status -- Present Maps and Discussion

i: Where is canopy doing well, lacking?

Andrew Walker presented the canopy map to the commissioners and members of the public. He noted that the map is very accurate. To perform the image classification, the GIC used the new Land Image Analyst software and field visits to identify "training samples" in the imagery in order to train the decision tree classification algorithm to recognize certain types of land cover, most importantly tree canopy.

Mr. Walker reviewed the methodology used to map the trees. The Land Image Analyst software was used to classify land cover imagery to identify impervious surfaces such as roads, rooftops, driveways and parking lots, as well as vegetation including trees and non-tree vegetation including shrubs, turf, wetlands grasses or other smaller scale plants.

The source of the imagery used is the National Agriculture Imagery Program (NAIP) and NAIP's most current data are from August 2013. The only caveat is that it may not show newly planted trees because the imagery is from 12 months ago (the last time it was flown). It also may not show very small trees (e.g. 1 inch caliper trees, less than 6-8 feet tall). This is one area where additional field work may help to increase the accuracy. For example, students from NJCU might geo-locate new trees from known planting projects, such as trees recently added to Liberty Park.

The results from the analysis show that the canopy in Jersey City overall is 17 percent. Mr. Walker also provided the data showing tree coverage by neighborhood and by block. Commissioners also looked at the GIS data to zoom into particular areas they were familiar with



City of Jersey City Community Forestry Management Plan

Meeting Minutes

Special Meeting - Urban Tree Canopy Study; 18 November
2014 - 6:30 p.m.
Page 3 of 6

and compare those areas to the data results. Tree canopy is higher in some and lower in others, e.g. lower on the western side where there were more industrial sites and ports or higher in areas with large parks, such as Liberty State Park.

After some discussion, several commissioners asked if the data were what was expected. Ms. Firehock noted that a percent canopy recommended by the National Arbor Day Foundation for eastern U.S. cities is 40%. However, Jersey City is a very urban coastal city. She agreed with commissioners that it might be more useful to compare the city's number to similar sized eastern coastal cities. She will provide those comparisons at the next meeting.

ii. What are the opportunities to maintain/increase canopy?

One commissioner asked if the percentages included state owned and managed lands such as Liberty State Park. GIC staff replied that it did. Commissioners noted that the city could not control the state's tree management. Ms. Firehock noted that this is an example of a challenge that would be identified during the commission's strategic planning work. She reminded everyone that the tree canopy is key piece of environmental inventory data but much more work is needed to understand how to maintain, restore or improve canopy.

Ms. Firehock explained that there are many different types of programs that can be undertaken to enhance urban environmental assets such as tree canopy. For example, should we set goals by neighborhood? By zoning generally (e.g. residential, commercial)? Some areas can probably be greener than others, e.g. they have more opportunities to expand green space. Commissioners responded that it might be very helpful to provide canopy numbers by ward. GIC staff agreed to re-run the percentages by Ward once the city provides the mapped ward boundaries.

Another option could be to set goals by city master plans, e.g. an economic opportunity area or an area that will be redeveloping in the near term. City staff noted that there are so many master plans developed and in the works that this approach would likely prove too complex. One commissioner noted that they would like to see master plans include goals for tree canopy whenever possible.

Ms. Firehock explained that whatever we decide on will need to be tested before adopting a final goal to make sure it is realistic. (is there space, right zoning, right environmental conditions, public/private, funds?) She stated that some cities had adopted tree totals such as New York City's One Million Tree Goal. While this is impressive and ambitious, it may not be realistic. A good deal of reality testing will be needed to ensure that goals are realistic and doable.

Implementation could take many different forms. For example cities have different types of tree program for planting: citizen led, city led, local businesses initiatives and approaches that are incentive based or regulatory. A successful program will also need to address standards for tree care such as ensuring healthy trees, reducing maintenance costs or protecting investments by ensuring longevity. Poorly planted urban trees last an average of only eight years.

One member of the public noted that this will be difficult considering that the city does not even have an arborist. Ms. Firehock responded that the group needs to first understand the extent of



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the city's current canopy, what are the benefits it provides and then the challenges and related opportunities. Having an arborist is a likely recommendation for implementation, but we are still in the evaluation and analysis stage.

How will you make the case: Ms. Firehock recapped some of the ideas from the last meeting for how to make the case. Urban trees can help with revitalizing business districts, attracting and retaining residents, reducing heat island effects, allowing fun ways for the public to participate in re-greening their city, meeting state and federal mandates for stormwater reduction and many more ideas. Protecting against storm impacts was also identified (need to have a way to care for storm damaged trees, too).

What else? The group brainstormed the benefits that they would like to calculate/present. They are as follows:

- Stormwater abatement
- Reducing 'heat island' effects
- Reducing CO₂ levels
- Improving property values
- Reducing crime
- Improving public health
- Providing recreation opportunities
- Increasing biodiversity
- Green connections to enhance walkability and link to existing city infrastructure
- Energy savings and affordability that comes from lower energy bills
- Classify the types of open space available (how socially/equitably distributed is it)
- Aesthetics (especially city gateways)
- Creating jobs
- Types of future projects possible, e.g. remediation
- Protecting native vegetation (also helps with protection from storm surge)

iii. Establish a Draft Goal for Canopy in the City (by city, by sector)

Reflecting on the commission's request to report tree canopy by ward, she returned to the question of how the commissioners would like to set a goal for the city -- by the entire city, by ward or both. The commissioners agreed that once they see the numbers they might want to strive to increase each ward's percentage of trees by two to three percent and perhaps by a greater number for those for which that is possible. The commission will also look to canopies for similar cities in setting relatable and realistic goals. They also determined the need to identify areas most in need and set priorities for where to start, e.g. prioritize areas with the least canopy or those that are rapidly redeveloping and which present immediate opportunities to have an impact.

What are Opportunities to Establish/Maintain Canopy (public and private property, street trees, parks etc.)

The commission noted the challenges of implementation and that there would need to be different strategies for public and private lands. They also stated that they needed to find a way



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for better cooperation with state owned lands since areas, such as Liberty Park, are important contributors to city canopy.

The GIC emphasized the group's charge for this project is to develop strategies. The tree canopy data is a tool to help the commission understand existing conditions and to develop goals and related strategies. The GIC will help them evaluate if goals are realistic. For example, the commission may want to increase tree canopy by three percent, but it will take some work to determine where those trees can go (test the idea), evaluate current and future development (will current trees be removed, replaced?), and how are the city's trees cared for (will tree planting efforts be needed, can they be successful, funded?). In short, each goal will need to be reality tested.

One commissioner asked how existing street trees could be studied. Ms. Firehoek explained that a tree survey of individual trees was not funded and is outside the scope of the current project. However, some assumptions can be made by using the general age of neighborhoods and structures along with canopy size to determine general tree age ranges and hypothesize whether the canopy in some neighborhoods is at risk (e.g. all the trees were planted in 1890, few new ones have been planted and trees are reaching the end of their life cycles. This is an example of tree loss through attrition (non-replacement). There could also be some pilot inventories with local university students.

Next Steps for GIC and the Commission:

1. Further investigation of key options (based on data and site visits)
2. Research on programs, options, policies for tree canopy management (and related greening initiatives) and sharing research with commissioners to prepare them for the next strategy session.
3. Development of key messages and fact sheets (see brainstormed list above)
4. Other outcomes from this meeting? Coordinate with JC Park Coalition, Parks Department, PSEG, and related city organizations.

CLOSING REMARKS AND OTHER BUSINESS BY COMMISSIONERS

The commission voted 5-0 to prepare a memorandum to the JC Planning Department opposing the proposed parking ordinance. Commissioner Ristorucci will draft the memo for EC comment and the memo will be submitted to the Planning Department by 24 November 2014.

GENERAL PUBLIC PARTICIPATION

Attendees were encouraged to offer feedback during the Tree Canopy Study presentation.

Adjournment

The meeting was adjourned at 8:30 p.m.



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ACTION ITEMS

1. Commissioners to submit bios for website.
2. Commissioner Verdibello to coordinate a potential presentation to the Environmental Commission regarding the Genesis product that converts latent heat from light fixtures to supplemental light.
3. Commissioner Ristorucci to coordinate website updates and upgrades.
4. Tree Canopy Study data to be further reviewed and evaluated for subsequent meetings.
5. Submit memo opposing proposed parking ordinance.

NEXT MEETING

The next Environmental Commission is scheduled for 16 December 2014 at 6:30 p.m. in the Caucus Room, 2nd Floor, City Hall, 280 Grove Street.



Appendix #7:

Green Infrastructure Center, Inc (GIC) Canopy Project Memo and Maps

Produced and Provided by the:
Green Infrastructure Center, Inc.

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Charlottesville, VA 22902
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JERSEY CITY ENVIRONMENTAL COMMISSION PUBLIC NOTICE/LEGAL AD*

*Special Meeting for Rescheduled Item from February Meeting

Meeting Summary – Review Item

The following items were heard at a Special Meeting of the Jersey City Environmental Commission on Tuesday, March 3, 2015 at 6:30 pm in the Council Chambers Room, 2nd Floor, City Hall, 280 Grove Street, Jersey City, NJ 07302. This was a rescheduled meeting from Feb. 17th

1. Call to order
2. Sunshine announcement
3. Roll call
4. Jersey City Shade Tree/Green Infrastructure Strategy by Karen Firehock

a. Canopy Goals

- i. Modeling tree potential results: how much canopy might be achievable (range)
- ii. Charge to the Group: Adopt canopy goal (no net loss, increase by ___ percent)
Consider what is possible, desirable and whether/how it can be achieved.
- iii. Example results of benefits based on current canopy percentage and potential future benefits (e.g. stormwater retained, heat reductions etc.).

Presentation and Discussion:

The GIC presented the findings from modeling tree planting potentials. The canopy is currently at 17% citywide and is 16% if Liberty Park is deducted from this total coverage.

To help Jersey City set realistic canopy goals, the GIC conducted an analysis based on the newly created canopy/land cover data. The goal of the analysis is to determine how much land is potentially available for planting trees. To determine this "Possible Planting Area," GIS is used to come up with a "best guess" – that is, the analysis is not ground verified and is limited by the data available to refine it. In this case "Possible Planting Area" is defined as any area in which it is potentially feasible to plant a tree (grass, bare earth, impervious surfaces that aren't buildings or streets).

The *Possible Planting Area (PPA) Map 1* was created to show areas in which it is possible to plant a tree. Three types of land cover were included: non-tree vegetation, bare earth and non-building Impervious.

Note that this map does not represent areas of potential tree canopy, but rather estimates areas in which a tree could actually be planted (as tree canopy can overhang a street or building). See Figure 2 for a graphic illustration of the difference.

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Thus, the PPA estimates areas that are feasible to plant trees – it is not a suitability map. For example, a wide sidewalk may get identified as a feasible place to plant a tree, but it may not be very suitable if there are low power lines and an abundance of underground utilities. This would still need to be field checked and compared with other unseen barriers, such as underground utilities.

The *Possible Planting Area by Type Map 2* is very similar to Map 1, except it separates the PPA into two types for a more nuanced view. The first type is PPA that is currently grass or bare earth. The second type is PPA that is currently an impervious surface, such as a parking lot or sidewalk. While impervious PPA is typically more difficult to plant in, to abate stormwater, converting some impervious areas to pervious would be desirable, even though it may cost more to do.

The *Possible Planting Area by Size of Plantable Area Map 3* estimates the approximate size of tree that would be appropriate to plant in a given location in the PPA. For example, a large oak would not be appropriate to plant on a small sidewalk that is constrained by buildings.

As can be seen, over 90 percent of the PPA would have to be covered in tree canopy to achieve the 40 percent Arbor Day Foundation recommendations, which is probably not realistic. Based on this table, a city wide goal of 20 to 25 percent is probably most realistic (which equates to between 12 and 32 percent of the PP covered in tree canopy).

The GIC also calculated environmental benefits of the current tree canopy (see attached memo) and will calculate the benefits of the expanded canopy based on the goal recommended by the commission. Staff noted that the figures for stormwater management benefits were more conservative than for a normal tree's capture rate because the ground surface around most city trees is paved so GIC did not include uptake of surface water when calculating how much stormwater is absorbed. The GIC only included the amount intercepted by the canopy from rainwater capture.

Outcome: Draft canopy goals. The group reviewed the area of trees possible to plant and the number of trees various percentages would require. They determined that a goal of 20% canopy would be realistic. They discussed how fast this was achievable. The idea for 20% by 2020 was recommended as a catchy phrase but they also agreed that this should be reality tested and perhaps a longer timeframe will be needed.

The GIC will obtain the number of tree mortality (loss per year) from DPW removed from public lands and city right of way and attempt to guess how many other trees may be lost on private lands in order to derive an annual loss number. GIC will recommend a few different scenarios and the EC will then choose the appropriate timeframe to recommend to the city.

b. Programmatic Needs

- i. What is the capacity to carry out a program?
- ii. How will we maintain current or increase canopy?
- iii. Options to build a stepwise program (phasing) – what can we do at a minimum? Maximum? Timing? Who?

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Outcome: Program goals and homework to research options

Amanda Kahn, Supervising Administrative Analyst from the Department of Public Works (DPW) provided an overview of both the challenges and the opportunities for urban tree management. She explained that the DPW has hired a contractor to recommend a five year urban forest management plan for the city. This will position the city to better manage its trees and make it eligible for various new grants and funding sources. This report will coincide with the EC's work very well since it is due in April. She noted that she has asked the EC for its shade tree inventory data and she is very excited to be able to include this information in the city's management plan. She then discussed some of the city's challenges in maintaining or expanding its current tree inventory.

The city has a very limited budget for urban forest management. The DPW's cost to purchase and install a tree is \$500 per tree. They currently provide trees to residents who request them at a subsidized rate of \$200.

The city does not have funds for on-going tree care (watering, pruning etc.)

Inadequate tree sites is another problem. Many current tree planting cut outs are too small for mature, larger trees. The current system of adding pavers on top presents problems in the long term, as trees roots push up the blocks as the trees grow.

Some residents are resistant to having trees in front of their houses and the city needs them to agree to a tree before it can be planted there. An education campaign is needed on the benefits of trees.

The utility company PSE&G cuts out the trees to make room for overhead power lines -- this results in a V-shaped wedge cut out in trees all along a street which can be very detrimental to the trees' survival.

Each year the city plants 200 new trees on average. It is not known how many survive. One participant from the Jersey City Parks Coalition noted that the trees planted are not necessarily the species on the city's revised tree planting list that was adopted into the city's tree ordinance, so the wrong trees may be planted. One hypothesis offered was that half of the planted trees do not survive due to poor location, lack of care or wrong species selection for the site's conditions. The city will supply its known tree removals and GIC will compare that to try to develop a number for how new trees planted may be offset by tree mortality in order to derive a net tree number per annum. It is possible that net tree increase per year is negligible.

Any program to increase tree canopy will require a new budget and likely grant funding. Nonprofit groups can also help to fill the gap. The key will be to use the new shade tree inventory to direct where trees are most strategic to plant - where are they most lacking, most needed? Are there areas where trees are an important strategic investment such as areas undergoing planned economic revitalization?

While there are impressive programs in New York City with its one million tree planting goals, Jersey City has a long way to go to get to this level. However, many groups are ready to begin helping immediately. All agreed that it is important to target efforts using the maps and data that the EC has created for this project.

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The City has an ordinance prohibiting the removal of trees without a permit, however this is not enforced. The city lacks the staff to do the enforcement and it is thought that many people do not know about this regulation.

More education is needed to encourage people to plant and care for trees and to avoid removing them. Education should focus on tree benefits, the preferred tree list and the rules for tree planting or removal.

The Jersey City Parks Coalition provided some ideas based on the agenda for tonight's meeting (see meeting handout for more). BIG DIG 2016 Program: 2,016 trees in 2016 - (2015 is planning year...fundraising and strategic planning, align with all municipal departments and community groups for greatest success). Divide the City up by major neighborhoods with all Wards represented. Plant on both high ground and low ground. Target public spaces (must partner with DPW to make sure they can be watered, maintained and protected from: dog waste, salt, damage or contract this out). Host tree planting, watering and pruning workshops for residents and DPW staff.

c. Other Map Needs:

- i. Other green maps, e.g. city gardens, open space access etc.

Outcome: GIC to complete these maps and share on drop box before next meeting.

The group discussed the maps briefly such as community gardens, green features such as green rooftops. One new idea was to represent the tree canopy percentage for city parks so that park and non-park areas can be compared.

d. Next Meeting: Develop proposed strategy to meet canopy goals and determine how final report/materials will be packaged and shared. Discuss related commission work.

The GIC proposed that the final meeting GIC would facilitate could be structured more as an open house format to help engage more stakeholders and partners. An interim conference call would be needed to hear the results of the timing for achieving the potential 20% tree canopy and to plan this event. The group suggested an open format with maps and data for the public to become familiar, a possible presentation and then public input. The gazebo at Van Vorst Park was recommended as a good location. It was recommended the open house event be held on a Saturday morning to make it easier for the public to attend, in early April before the farmers market begins. GIC will send out a doodle poll to determine the best date.

Following the public meeting GIC will package the results and help the EC incorporate them into a final report for the city. This report will also include example funding ideas as well as programmatic recommendations.

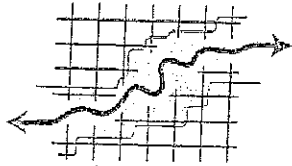
5. Closing remarks and other business by commissioners: none
6. General public participation (5 minutes per person): the public was invited to comment throughout the meeting.
7. Adjournment

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Attachments:

Maps 1, 2, 3 of Potential Planting Areas
Memo from the Jersey City Parks Coalition
Memo from GIC to JCPC on Next Steps for Shade Tree Inventory (dated Feb. 16, 2014)
Graphics 1 and 2 showing shade tree plantable area and overhang
Bubble diagram of parks relative sizes and tree densities

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Green Infrastructure Center

Memo

Date: February 16, 2014

To: Jersey City Environmental Commission

From: Karen Firehock and Andrew Walker, Green Infrastructure Center

Re: Map Review and Next Steps for Shade Tree Inventory

As it appears likely that we will not be able to meet with you in person on February 17, due to extreme weather and likely flight cancellations, we have drafted an explanation of the maps we were going to review tomorrow evening. The end of this memo includes links to download the maps. We still intend to come and meet in person to review and deliberate about how best to establish a canopy goal and city tree management needs.

a. Canopy Goals

Map Overview

To help Jersey City set realistic canopy goals, the GIC conducted an analysis based on the newly created canopy/land cover data. The goal of the analysis is to determine how much land is potentially available for planting trees. To determine this "Possible Planting Area," GIS is used to come up with a "best guess" - that is, the analysis is not ground verified and is limited by the data available to refine it. In this case "Possible Planting Area" is defined as any area in which it is potentially feasible to plant a tree (grass, bare earth, impervious surfaces that aren't buildings or streets).

Explanation of Maps

There are three primary maps, labeled 1 through 3.

Map 1: Possible Planting Area

The Possible Planting Area (PPA) was created to show areas in which it is possible to plant a tree. Three types of land cover were included: non-tree vegetation, bare earth and non-building impervious. A 1-meter land cover dataset was queried to map these land cover types. Then, a series of exclusionary factors were used to eliminate certain areas in order to develop a more realistic estimate of plantable area. See Figure 1 for a list of factors that excluded land from the PPA.

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Note that this map does not represent areas of potential tree canopy, but rather estimates areas in which a tree could actually be planted (as tree canopy can overhang a street or building). See Figure 2 for a graphic illustration of the difference.

Thus, the PPA estimates areas that are feasible to plant trees - it is not a suitability map. For example, a wide sidewalk may get identified as a feasible place to plant a tree, but it may not be very suitable if there are low power lines and an abundance of underground utilities. This would still need to be field checked and compared with other unseen barriers, such as underground utilities.

Map 2: Possible Planting Area (by Type)

This map is very similar to Map 1, except it separates the PPA into two types for a more nuanced view. The first type is PPA that is currently grass or bare earth. The second type is PPA that is currently an impervious surface, such as a parking lot or sidewalk. Obviously, impervious PPA is typically more difficult to plant in. However, in order to abate stormwater, converting some impervious areas to pervious would be desirable, even though it may cost more to do.

Map 3: Possible Planting Area by Size of Plantable Area

This map estimates the approximate size of tree that would be appropriate to plant in a given location in the PPA. For example, a large oak would not be appropriate to plant on a small sidewalk that is constrained by buildings. This map was created by using GIS to determine how "open" any given area of PPA was by looking at how much land around it was also PPA. For example, the narrow sidewalk from the previous example would have a low amount of PPA around it because it is proximate to streets and buildings. Conversely, the middle of a large lawn area will have a lot of PPA around it.

Three size categories of tree were used to perform the analysis: small (~25ft canopy spread), medium (~35ft canopy spread), and large (~50 ft. canopy spread). The sizes of these trees are based on the average canopy spreads of the trees on Jersey City's tree list.

Map 4: Possible Planting Area by Size of Plantable Area (Wards)

Map four is the same as Map 3, except it shows the ratio of small/medium/large tree PPA on a ward-by-ward basis (e.g. Ward C has less area to plant very large trees relative to other Wards).

Uses for these maps

The primary use of these maps is to help estimate how much area could potentially be planted with trees in Jersey City. Note that this is not an estimate of potential tree canopy, but it can be used as a rough proxy for how much tree canopy could be increased. Table 1 shows the implications of covering different percentages of the PPA in tree canopy. The first (left most) column shows percentages from one to one hundred, which represents the percentage of the PPA covered by tree canopy. The next column shows how many square feet this percentage equates to. The next column shows what the citywide tree canopy percentage would be if it increased by that amount of square feet. The next columns estimate how many trees that would equate to, using the size categories discussed above.

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The ratio of small/medium/large trees was derived from the data shown on Map 3 - of the total amount of PPA in the City, an estimated 21 percent is feasible for large tree, 42 percent for medium tree, and the rest (37 percent) for small trees.

As can be seen, over 90 percent of the PPA would have to be covered in tree canopy to achieve the 40 percent Arbor Day Foundation recommendations, which is probably not realistic. Based on this table, a city wide goal of 20 to 25 percent is probably most realistic (which equates to between 12 and 32 percent of the PP covered in tree canopy). Covering roughly 50 percent of the PPA in tree canopy would raise the city's tree canopy coverage to 30 percent, which represents a more aggressive goal.

A secondary use is to geographically locate which areas are feasible for planting trees. This can be used to perform additional analyses, or may even be used directly for tree planting project planning (in the initial stages).

These numbers exclude Liberty State Park.

Limitations of these maps

- These maps are not a recommendation of which areas should be planted.
- These maps do not represent *suitability* for tree planting, but are instead an estimation of feasibility/possibility. They are intended to help the JCEG estimate more realistic canopy goals.
- The maps are based on the best available GIS data, however these data are of varying levels of accuracy and currency.

Limitations of Table 1

- Does not account for tree mortality (would have to plant more trees than the estimate because some would not survive due to drought, disease or unanticipated development).
- Planting the percentages of the PPA shown on the table would likely result in a larger citywide tree canopy than is shown because tree canopy can overhang areas that were excluded from the PPA (tree canopy can overhang streets, but a tree can't be planted there).

Example benefits

The City's tree canopy is currently providing a number of benefits. By mapping out the City's tree canopy, these benefits can be more accurately estimated. The economic benefits of trees are among the most persuasive arguments for supporting investment in tree canopy. The estimated benefits of Jersey City's trees include:

- Between 95 million and 155 million gallons of rainwater intercepted annually. This is water that is prevented from entering the City's stormwater infrastructure during the initial rainfall (first 1 - 2 inches) during a storm. These are conservative numbers (Jersey City's trees are most likely more mature than the ages used for modeling) and this also does not account for water absorption by trees or evapotranspiration. Assuming the monetary benefit is \$0.008 per gallon, this equates to between \$760,000 to \$1.2 million in benefits.
- Carbon storage (estimated using iTree Vue software)
 - Carbon Storage: 59,311.1 tons; \$4,223,779.4 @ \$71.21 per ton annually
 - CO2 Equivalent Storage: 217,434.4 tons; \$4,223,779.4 @ \$19.43 per ton annually
- Air pollutant removal (estimated using iTree Vue software)

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- o Carbon monoxide (CO): 1.5 tons per year; \$2,111.6 @ \$1,450.46 per ton annually
- o Nitrogen dioxide (NO2): 13.6 tons per year; \$138,687.2 @ \$10,212.24 per ton annually
- o Ozone (O3): 24.6 tons per year; \$251,145.0 @ \$10,212.24 per ton annually
- o Sulfur dioxide (SO2): 4.6 tons per year; \$11,512.8 @ \$2,500.12 ton annually
- o Particulate matter (PM10): 21.3 tons per year; \$144,954.8 @ \$6,818.24 per ton annually

b. Programmatic Needs

Management/Expansion Capacity:

Currently the city can likely just keep up with management of its current trees. The city encourages tree planting through its annual tree giveaway each year run by DPW. However, this is not the same as having a strategic plan for where trees should be planted. And the survival rate of these free trees is not known.

Creating a goal for the city's tree canopy will require the city to find a way to expand its current tree management capacity. The maps can be used to target key areas of the city for new tree potentials. To be most effective, a rationale should be created for where to prioritize plantings. In addition, even if the goal becomes simply maintaining the current 17 percent canopy, a strategy will still be needed to do this since, as trees die, they must be replaced. A management strategy will be needed to ensure that replaced trees are planted in such a way as to ensure their longer term survival.

Over the next month, we will explore what is the organizational structure needed to carry forward a canopy goal for Jersey City. To do this we'll need to complete an assessment of the city's challenges and opportunities to determine what is the current capacity for urban canopy management, how does it need to be improved, how can we get there (likely a mix of government and private sector approaches and identified funding mechanisms). A phased approach will likely be needed. As we saw with the other programs we reviewed for Pittsburg, New York City etc., there are many components to a successful management program that need to be created and tailored for Jersey City.

c. Other Map Needs:

The GIC has drafted some sample maps (see the "Other Map Needs" attachment). They include:

- Access to Parks
- Community Gardens
- Tree Canopy + Historic Districts
- Tree Canopy + Public School Walksheds
- Tree Canopy by Drainage Area
- Tree Canopy Square Footage per Person
- Other statistics? We have calculated a number of stats including some analyses on park. [Here is a graphic that visualizes the tree canopy of Jersey City's parks, as well as their relative acreage \(size of the circles\).](#)

The GIC team would like to know, are these maps useful and what other things can/should we map/for what purposes?

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Recommended Next Steps:

- 1) GIC to complete assessment of current tree management capacity within city (through interviews with key DPW staff as well as other groups, such as the Parks Coalition).
- 2) Meet with JCEC and other stakeholders to develop a draft framework for how to maintain/expand canopy along with a canopy goal
- 3) Obtain buy in and agreement to proceed with creation of new tree canopy framework (strategy).
- 4) GIC to create other environmental maps (e.g. access to open space by ward etc.)
- 5) Create final recommendations in report format.

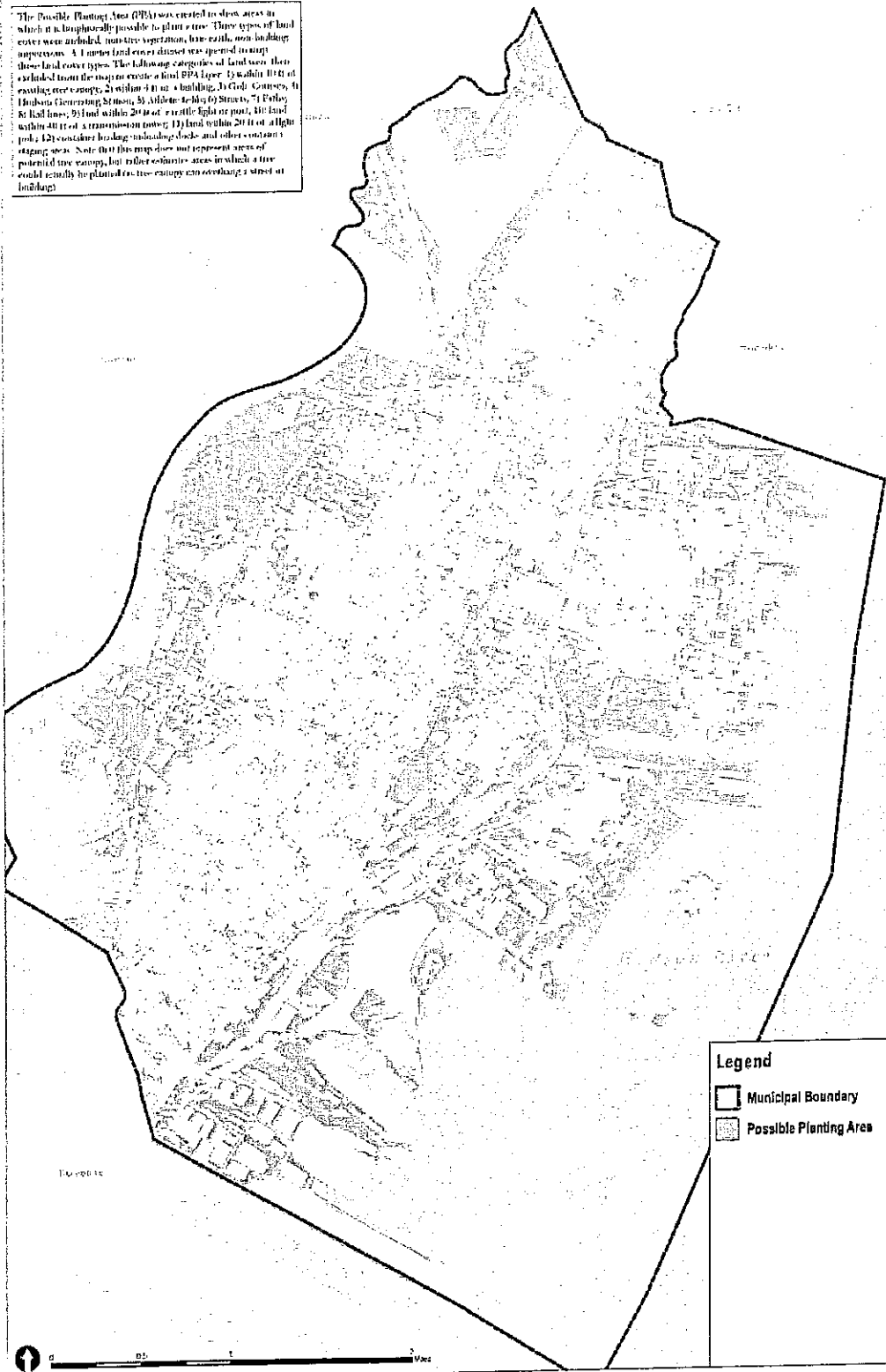
ATTACHMENTS

- PPA Map Series
 - [Large format of Map 3 with street names]
- Figure 1
- Figure 2
- Table 1
- Other Map Needs

City of Jersey City Community Forestry Management Plan

Map 1: Possible Planting Area

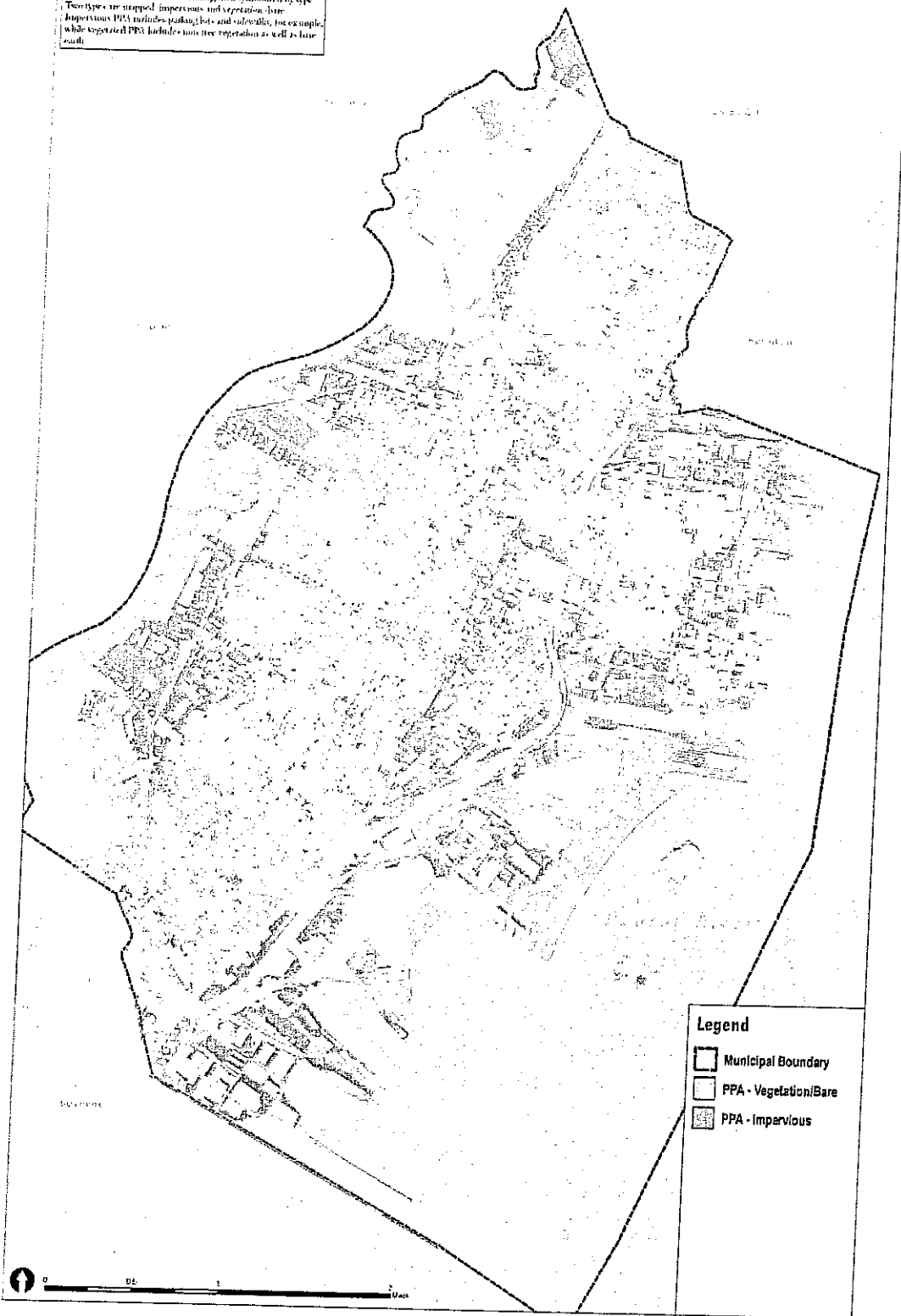
The Possible Planting Area (PPA) was created to show areas in which it is biophysically possible to plant a tree. Three types of land cover were included: non-tree vegetation, bare earth, and building impervious. A 1 meter land cover dataset was opened to map these land cover types. The following categories of land were then excluded from the map to create a final PPA layer: 1) within 10 ft of existing tree canopy, 2) within 2 ft of a building, 3) Grid Canyons, 4) Hudson Generating Station, 5) Atlantic City Street, 7) Foley St Rail line, 8) land within 20 ft of a traffic light or post, 9) land within 40 ft of a transmission tower, 10) land within 20 ft of a high pole, 11) contains building including docks and other contains staging areas. Note that this map does not represent areas of potential tree canopy, but rather identifies areas in which a tree could actually be planted (i.e. tree canopy can overhang a street or building).



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Map 2: Possible Planting Area (by Type)

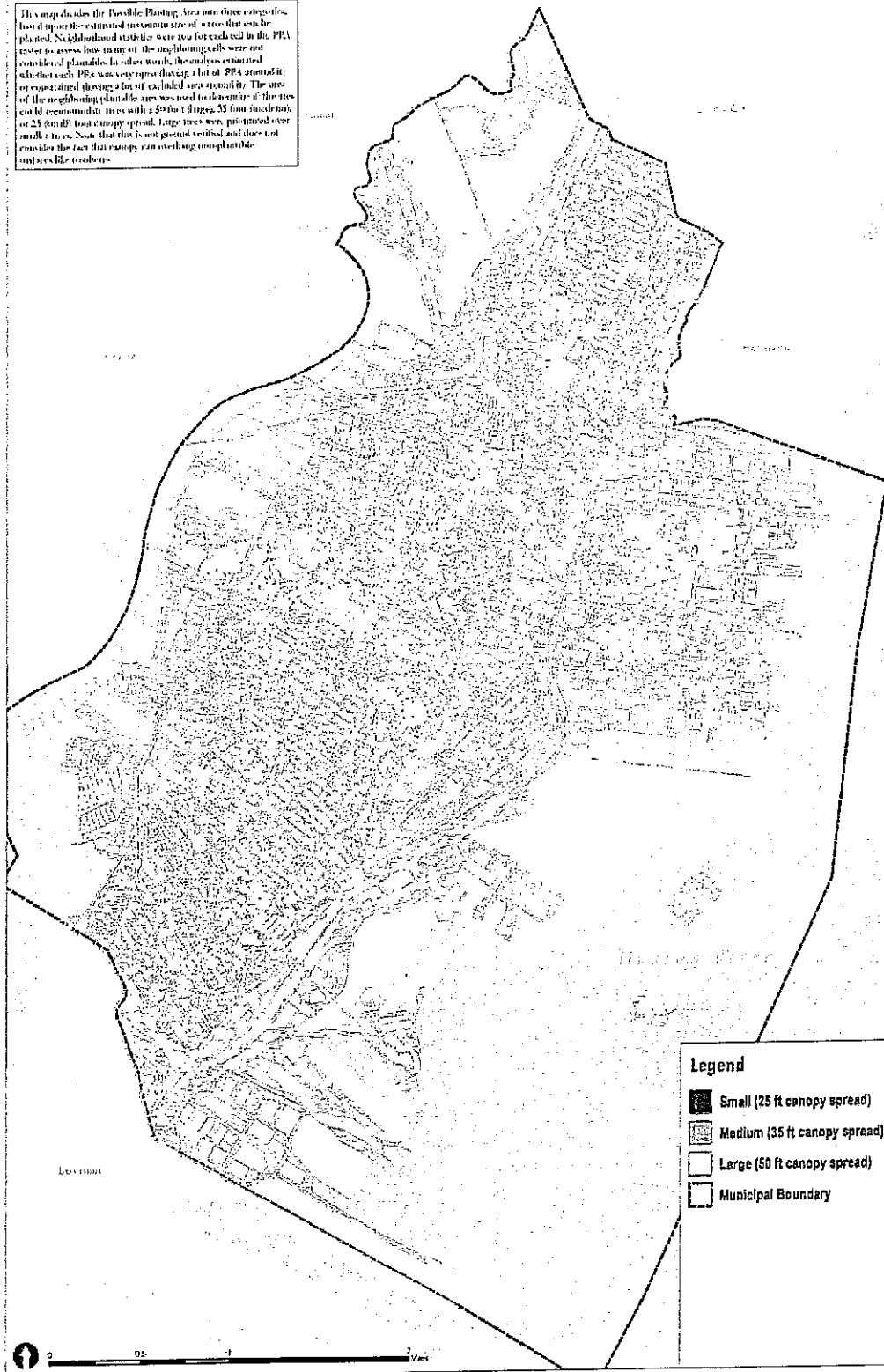
This map shows the Possible Planting Area (PPA) categorized by type. Two types are mapped: impervious and vegetation. Impervious PPA includes parking lots and sidewalks, for example, while vegetated PPA includes non-tree vegetation as well as bare soil.



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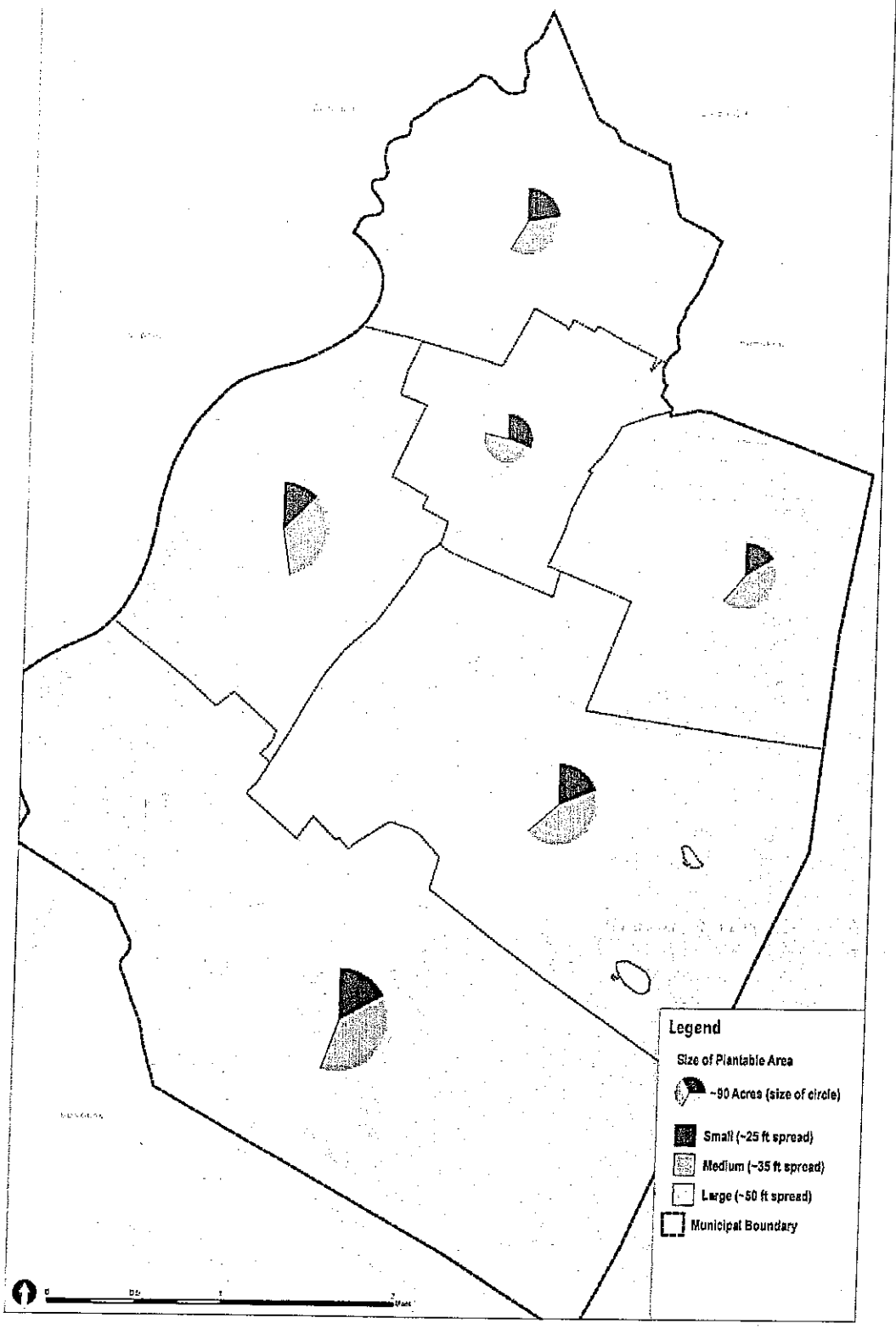
Map 3: Possible Planting Area by Size of Plantable Area

This map divides the Possible Planting Area into three categories, based upon the estimated maximum size of a tree that can be planted. Neighborhood statistics were run for each cell in the PPA raster to assess how many of the neighboring cells were not considered plantable. In other words, the analysis examined whether each PPA was very open (having a lot of PPA availability) or contained a lot of excluded area (unfit). The area of the neighboring plantable areas was used to determine if the tree could accommodate trees with a 50 foot diameter, 25 foot incidence, or 25 foot total canopy spread. Large trees were prioritized over smaller trees. Note that this is not ground vertical, and does not consider the fact that canopy can overlap non-plantable surfaces like roofs.



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Map 4: Possible Planting Area by Size of Plantable Area (Wards)



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Exclusion Factors for Possible Planting Area

Existing Tree Canopy + 10 ft buffer	To allow room for growth from existing trees
Buildings + 4 ft buffer	To allow room for tree growth
Golf Courses	Hand digitized
Hudson Generating Station	Selected using parcels layer
Athletic Fields	Athletic field needed for recreation excluded, but periphery included
Streets	All street polygons in JC database
Paths	All path polygons in JC database
Rail lines	Rail centerlines buffered by 10 ft to exclude ballast
Traffic Lights and Posts + 20 ft buffer	To preserve visibility of lights and signs
Transmission Towers + 40 ft buffer	To preserve ability to access towers unimpeded
Light Poles + 20 ft buffer	To allow tree growth and avoid conflicts with lighting
Container Loading/Unloading Docks	Hand digitized areas needed for loading/unloading containerized cargo, based on aerial imagery

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Table 1: Planting scenarios in Potential Planting Area

Percent of PPA Covered	New TC (Sq. Ft.)	New Citywide TC %	Small Trees	Medium Trees	Large Trees	Total Trees
1%	1,048,045	17.10%	789	457	112	1,358
2%	2,096,091	17.35%	1,579	915	224	2,718
3%	3,144,136	17.61%	2,369	1,372	336	4,077
4%	4,192,181	17.86%	3,159	1,830	448	5,437
5%	5,240,227	18.12%	3,949	2,287	560	6,796
6%	6,288,272	18.37%	4,739	2,745	672	8,156
7%	7,336,318	18.63%	5,529	3,202	784	9,515
8%	8,384,363	18.89%	6,319	3,660	896	10,875
9%	9,432,408	19.14%	7,109	4,117	1,008	12,234
10%	10,480,454	19.40%	7,899	4,575	1,120	13,594
11%	11,528,499	19.65%	8,689	5,032	1,232	14,953
12%	12,576,544	19.91%	9,479	5,490	1,345	16,314
13%	13,624,590	20.16%	10,269	5,947	1,457	17,673
14%	14,672,635	20.42%	11,059	6,405	1,569	19,033
15%	15,720,680	20.67%	11,849	6,862	1,681	20,392
16%	16,768,726	20.93%	12,639	7,320	1,793	21,752
17%	17,816,771	21.18%	13,429	7,777	1,905	23,111
18%	18,864,817	21.44%	14,219	8,235	2,017	24,471
19%	19,912,862	21.69%	15,009	8,692	2,129	25,830
20%	20,960,907	21.95%	15,799	9,150	2,241	27,190
21%	22,008,953	22.20%	16,589	9,607	2,353	28,549
22%	23,056,998	22.46%	17,379	10,065	2,465	29,909
23%	24,105,043	22.71%	18,169	10,522	2,578	31,269
24%	25,153,089	22.97%	18,959	10,980	2,690	32,629
25%	26,201,134	23.23%	19,749	11,437	2,802	33,988
26%	27,249,180	23.48%	20,539	11,895	2,914	35,348
27%	28,297,225	23.74%	21,329	12,352	3,026	36,707
28%	29,345,270	23.99%	22,119	12,810	3,138	38,067
29%	30,393,316	24.25%	22,909	13,267	3,250	39,426
30%	31,441,361	24.50%	23,699	13,725	3,362	40,786
31%	32,489,406	24.76%	24,489	14,182	3,474	42,145
32%	33,537,452	25.01%	25,279	14,640	3,586	43,505
33%	34,585,497	25.27%	26,069	15,097	3,698	44,864
34%	35,633,542	25.52%	26,859	15,555	3,811	46,225
35%	36,681,588	25.78%	27,649	16,012	3,923	47,584
36%	37,729,633	26.03%	28,439	16,470	4,035	48,944
37%	38,777,679	26.29%	29,228	16,927	4,147	50,302
38%	39,825,724	26.54%	30,018	17,385	4,259	51,662
39%	40,873,769	26.80%	30,808	17,843	4,371	53,022
40%	41,921,815	27.06%	31,598	18,300	4,483	54,381
41%	42,969,860	27.31%	32,388	18,758	4,595	55,741

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42%	44,017,905	27.57%	33,178	19,215	4,707	57,100
43%	45,065,951	27.82%	33,968	19,673	4,819	58,460
44%	46,113,996	28.08%	34,758	20,130	4,931	59,819
45%	47,162,041	28.33%	35,548	20,588	5,044	61,180
46%	48,210,087	28.59%	36,338	21,045	5,156	62,539
47%	49,258,132	28.84%	37,128	21,503	5,268	63,899
48%	50,306,178	29.10%	37,918	21,960	5,380	65,258
49%	51,354,223	29.35%	38,708	22,418	5,492	66,618
50%	52,402,268	29.61%	39,498	22,875	5,604	67,977
51%	53,450,314	29.86%	40,288	23,333	5,716	69,337
52%	54,498,359	30.12%	41,078	23,790	5,828	70,696
53%	55,546,404	30.37%	41,868	24,248	5,940	72,056
54%	56,594,450	30.63%	42,658	24,705	6,052	73,415
55%	57,642,495	30.88%	43,448	25,163	6,164	74,775
56%	58,690,540	31.14%	44,238	25,620	6,277	76,135
57%	59,738,586	31.40%	45,028	26,078	6,389	77,495
58%	60,786,631	31.65%	45,818	26,535	6,501	78,854
59%	61,834,677	31.91%	46,608	26,993	6,613	80,214
60%	62,882,722	32.16%	47,398	27,450	6,725	81,573
61%	63,930,767	32.42%	48,188	27,908	6,837	82,933
62%	64,978,813	32.67%	48,978	28,365	6,949	84,292
63%	66,026,858	32.93%	49,768	28,823	7,061	85,652
64%	67,074,903	33.18%	50,558	29,280	7,173	87,011
65%	68,122,949	33.44%	51,348	29,738	7,285	88,371
66%	69,170,994	33.69%	52,138	30,195	7,397	89,730
67%	70,219,040	33.95%	52,928	30,653	7,510	91,091
68%	71,267,085	34.20%	53,718	31,110	7,622	92,450
69%	72,315,130	34.46%	54,508	31,568	7,734	93,810
70%	73,363,176	34.71%	55,298	32,025	7,846	95,169
71%	74,411,221	34.97%	56,088	32,483	7,958	96,529
72%	75,459,266	35.22%	56,878	32,940	8,070	97,888
73%	76,507,312	35.48%	57,667	33,398	8,182	99,247
74%	77,555,357	35.74%	58,457	33,855	8,294	100,606
75%	78,603,402	35.99%	59,247	34,313	8,406	101,966
76%	79,651,448	36.25%	60,037	34,770	8,518	103,325
77%	80,699,493	36.50%	60,827	35,228	8,630	104,685
78%	81,747,539	36.76%	61,617	35,686	8,743	106,046
79%	82,795,584	37.01%	62,407	36,143	8,855	107,405
80%	83,843,629	37.27%	63,197	36,601	8,967	108,765
81%	84,891,675	37.52%	63,987	37,058	9,079	110,124
82%	85,939,720	37.78%	64,777	37,516	9,191	111,484
83%	86,987,765	38.03%	65,567	37,973	9,303	112,843
84%	88,035,811	38.29%	66,357	38,431	9,415	114,203
85%	89,083,856	38.54%	67,147	38,888	9,527	115,562
86%	90,131,901	38.80%	67,937	39,346	9,639	116,922
87%	91,179,947	39.05%	68,727	39,803	9,751	118,281

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88%	92,227,992	39.31%	69,517	40,261	9,863	119,641
89%	93,276,038	39.56%	70,307	40,718	9,976	121,001
90%	94,324,083	39.82%	71,097	41,176	10,088	122,361
91%	95,372,128	40.08%	71,887	41,633	10,200	123,720
92%	96,420,174	40.33%	72,677	42,091	10,312	125,080
93%	97,468,219	40.59%	73,467	42,548	10,424	126,439
94%	98,516,264	40.84%	74,257	43,006	10,536	127,799
95%	99,564,310	41.10%	75,047	43,463	10,648	129,158
96%	100,612,355	41.35%	75,837	43,921	10,760	130,518
97%	101,660,400	41.61%	76,627	44,378	10,872	131,877
98%	102,708,446	41.86%	77,417	44,836	10,984	133,237
99%	103,756,491	42.12%	78,207	45,293	11,096	134,596
100%	104,804,537	42.37%	78,997	45,751	11,209	135,957

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Figure 2



Hypothetical tree planting project



Potential Planting Area shown in yellow highlight



Potential tree canopy shown in orange highlight

Appendix #8:

'A Guide to Assessing Urban Forests' - US Forest Service

A Guide to Assessing Urban Forests

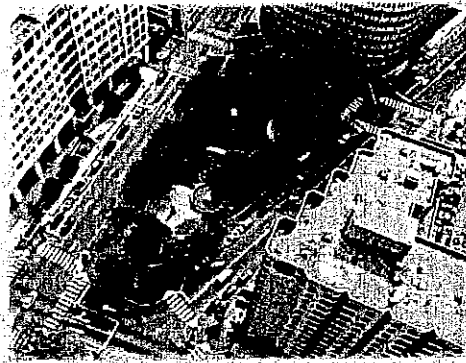
INTRODUCTION

Urban forests provide numerous ecosystem services. To quantify these services and guide management to sustain these services for future generations, the structure or composition of the forest must be assessed. There are two basic ways of assessing the structure or composition of the urban forest:

Bottom-up approach. Field-based assessments to measure the physical structure of the forest (e.g., species composition, number of trees)—typically used for strategic resource management or advocacy by connecting forest structure, functions and values with management costs, risks, and needs.

Top-down approach. Assessments of canopy cover using aerial or satellite images—used to determine amount and distribution of tree cover, potential planting space and other cover types.

These two approaches provide different types of urban forest information. The purpose of this guide is to outline the advantages, disadvantages and costs associated with various common assessment alternatives under these two approaches.



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2 *A Guide to Assessing Urban Forests*

THE BOTTOM-UP APPROACH: FIELD-BASED ASSESSMENTS

The bottom-up approach involves collecting field data on vegetation. It provides the most detailed information needed for urban forest management and to assess urban forest structure and its associated ecosystem services and values (Table 1). To aid in sampling or inventorying urban trees and forests, and for calculating their ecosystem services and values, the free i-Tree Eco and Streets models were developed (www.itreetools.org).



Advantages

- ✦ Provides good estimates of basic forest information needed for management (e.g., number of trees and locations, species composition, tree sizes, tree health, risks)
- ✦ Provides estimates of numerous ecosystem services and their values
- ✦ Can be used for monitoring changes in forest composition and values

Disadvantages:

- ✦ Must collect accurate field data using technical metrics
- ✦ Cost of data collection

Cost

Varies with size and scope of project. Volunteers, in-house crews and hired consultants have all been employed for collecting data. Hiring a consultant to carry out a typical i-Tree Eco sample of 200 plots could cost \$40,000 at a contracted rate of \$200 per plot. Costs would decrease with volunteers or student labor (e.g., \$20,000 with students; even less with volunteers). Sampling intensity is determined by the user based on accuracy desired and resources available.

Accuracy:

Varies with sample size and accuracy of data collection; 200 one-tenth acre plots typically produces a relative standard error less than 15 percent for the total population estimate.

THE TOP-DOWN APPROACH: URBAN TREE CANOPY COVER ASSESSMENTS

There are three common top-down approaches for assessing urban tree canopy cover and all three methods will produce estimates of tree and other cover types in an area, but with differing resolution, costs, and accuracy. The three methods are:

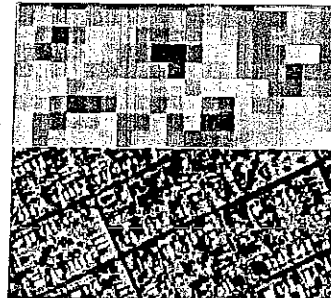
- ✦ NLCD analyses
- ✦ High-resolution image analyses
- ✦ Aerial photo interpretation

NLCD analyses

The National Land Cover Database (NLCD) has tree and impervious cover maps (30-m resolution) for the entire contiguous 48 states with percentage tree and percentage impervious cover estimated for each pixel. These maps and data are available for free and can be loaded into the free i-Tree Vue program to estimate tree cover and general ecosystem services.

Advantages

- ✦ Free
- ✦ Wall-to-wall coverage of lower 48 states
- ✦ Maps ecosystem services in addition to tree cover distribution



High resolution (below) vs. 30-m imagery.

Disadvantages

- ✦ Relatively coarse resolution (cannot see trees)
- ✦ Better suited for state or regional analyses rather than city scale or below
- ✦ Typically underestimates tree cover, on average, by about 10 percent. That is, if tree cover is 30 percent, NLCD tends to estimate 20 percent
- ✦ Data from circa 2001 (updated maps are being developed)

Cost

Free

Accuracy:

Varies with mapping zone, but tends to underestimate tree cover by about 10 percent on average; user can adjust canopy cover percentage in individual pixels in i-Tree Vue to improve accuracy.

High-resolution land cover

With this approach, land cover features are extracted from high-resolution aerial or satellite imagery using automated techniques. This process yields a detailed map of tree and other cover types for a given area. This approach is used for Urban Tree Canopy (UTC) Assessments. For more information go to: <http://www.nrs.fs.fed.us/urban/utc/>

Advantages

- ✦ Produces accurate, high-resolution cover map
- ✦ Complete census of tree canopy locations
- ✦ Integrates well with GIS

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A Guide to Assessing Urban Forest 3



Example of high-resolution land cover map.

- ✦ Allows the data to be summarized at a broad range of scales (e.g., parcel to watershed), enabling tree canopy to be related to a host of demographic, planning, and biophysical data
- ✦ Locates potentially available spaces to plant trees
- ✦ Can be used to monitor locations of cover change
- ✦ The source imagery needed for the mapping is available for the entire United States free of charge from the USDA

Disadvantages

- ✦ Can be costly if the data are low quality or incomplete
- ✦ Requires highly trained personnel along with specialized software
- ✦ Significant effort and time needed to produce quality maps
- ✦ Change analyses can locate false changes due to map inaccuracies
- Does not include ecosystem services reporting

Cost

Variable depending upon available data. Development of city cover maps are on the order of \$5,000 to 40,000+ depending upon size of city and availability of source data.

Accuracy:

Depends on the processor and available data, but is typically 90 percent accurate for tree cover. The incorporation of additional data, such as LIDAR, and/or the implementation of manual corrections can increase the accuracy to over 95 percent. Error matrix of map can detail actual accuracy of the map.

Photo-interpretation

Uses digital aerial images and a series of random points that are interpreted to determine the cover type at each point center. This process produces statistical estimates of cover with a known error of estimation. A free tool (i-Tree Canopy)

can be used to photo-interpret cover across the globe using Google Maps™. Photo interpretation has been used for accuracy assessments of the other top-down methods.

Advantages

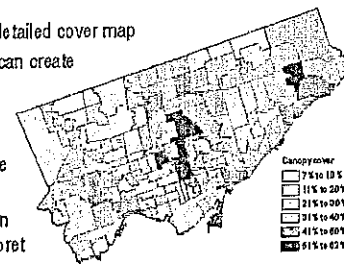
- ✦ Low cost – most images can be acquired freely (e.g., Google Earth or from cities or counties)
- ✦ Cover assessment can be done quickly (e.g., available planting space, tree, impervious)
- ✦ Accuracy can be increased by adding more points and can be calculated quickly
- ✦ Can produce sub-area analyses and maps (e.g., tree cover by neighborhood)
- ✦ Multi-date paired imagery can be used to assess change



Photo-interpretation involves classifying randomly located points within preselected cover classes (e.g., tree, impervious, water).

Disadvantages

- ✦ Does not produce detailed cover map
- ✦ Photo-interpreters can create errors though misclassifications (training and quality checking are recommended)
- ✦ Leaf-off imagery can be difficult to interpret
- ✦ i-Tree Canopy interpretation limited to high quality Google images
- ✦ Poor image quality in some areas
- ✦ Resulting data cannot be summarized at multiple, user-defined scales



Neighborhood tree cover in Toronto, Canada, determined through photo-interpretation.

Cost

At \$10 per hour, cost is about 10 cents per point (e.g., 1,000 points = \$100). Costs involve set up and interpretation time.

Accuracy:

A sample of 100 points will produce an estimate with a standard error of about 4.6 percent (assuming 30 percent canopy cover) and can be interpreted in about 1 hour. A sample of 1,000 points will produce an estimate with a standard error of about 1.4 percent (assuming 30 percent canopy cover).

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4 *A Guide to Assessing Urban Forests*

Table 1.—Summary of features of four types of urban forest analyses

Urban Forest Attribute	i-Tree Eco ^a	i-Tree Vue ^b	i-Tree Canopy ^c	Cover Map (UTC) ^d
Cover				
Amount or percent tree cover	✓	✓	✓✓	✓
Specific locations and distribution of tree cover		✓		✓✓
Amount or percent potential planting space	✓	✓	✓✓	✓
Specific locations and distribution of plantable space		✓		✓✓
Maps of tree cover and plantable space		✓	✓	✓✓
Urban Forest Composition and Management				
Total number of trees / tree density	✓✓			
Species composition	✓✓			
Diameter / size distribution	✓✓			
Species diversity	✓✓			
Species importance values	✓✓			
Leaf area and biomass	✓✓			
Tree health	✓✓			
Native vs. exotic composition	✓✓			
Invasive trees	✓✓			
Risk to insects and diseases	✓✓			
Ground cover attributes	✓✓		✓	✓
Ecosystem Services and Values				
Air pollution removal / human health	✓✓	✓	✓✓	✓✓
Carbon storage and annual sequestration	✓✓	✓	✓✓	✓✓
Effects on building energy use	✓✓			
Rainfall interception	✓✓			
Structural value	✓✓			
Mapping of ecosystem services		✓✓	✓✓	✓✓
Monitoring				
Change in tree cover	✓		✓✓	✓
Locations of tree cover change				✓✓
Change in species composition, services and values	✓✓			

✓ - procedure calculates attribute

✓✓ - recommended procedure based on resolution, accuracy, and cost

✓✓ - broad estimates of services could be calculated based on procedures in i-Tree Vue^b

^ai-Tree Eco - free program to assess ecosystem services and values from field data

^bi-Tree Vue - free program that uses NLCD cover data to map cover and estimate ecosystem services

^ci-Tree Canopy - tree photo-interpretation tool to assess canopy cover and monitor change

^dCover map - high-resolution cover maps generated as part of a UTC assessment

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