CITY OF ALEXANDRIA
Urban Forestry Master Plan

Published and Printed By

The City of Alexandria
Department of Recreation, Parks & Cultural Activities
Kirk Kincannon, Director
Roger Blakeley, Deputy Director

Urban Forestry Steering Committee

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Marian Clarke
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Lindsey Swanson
Kaj Vetter
Amara Vogt

Photos By

Craig Alexander
Alexandria Library, Special Collections
Bethany Carton
Davey Resource Group
Mike Harris
John Noelle
Rod Simmons
John Walsh
Theodore Willger
Kevin Williams

Prepared By

Davey Resource Group
John Noelle
Bethany Carton

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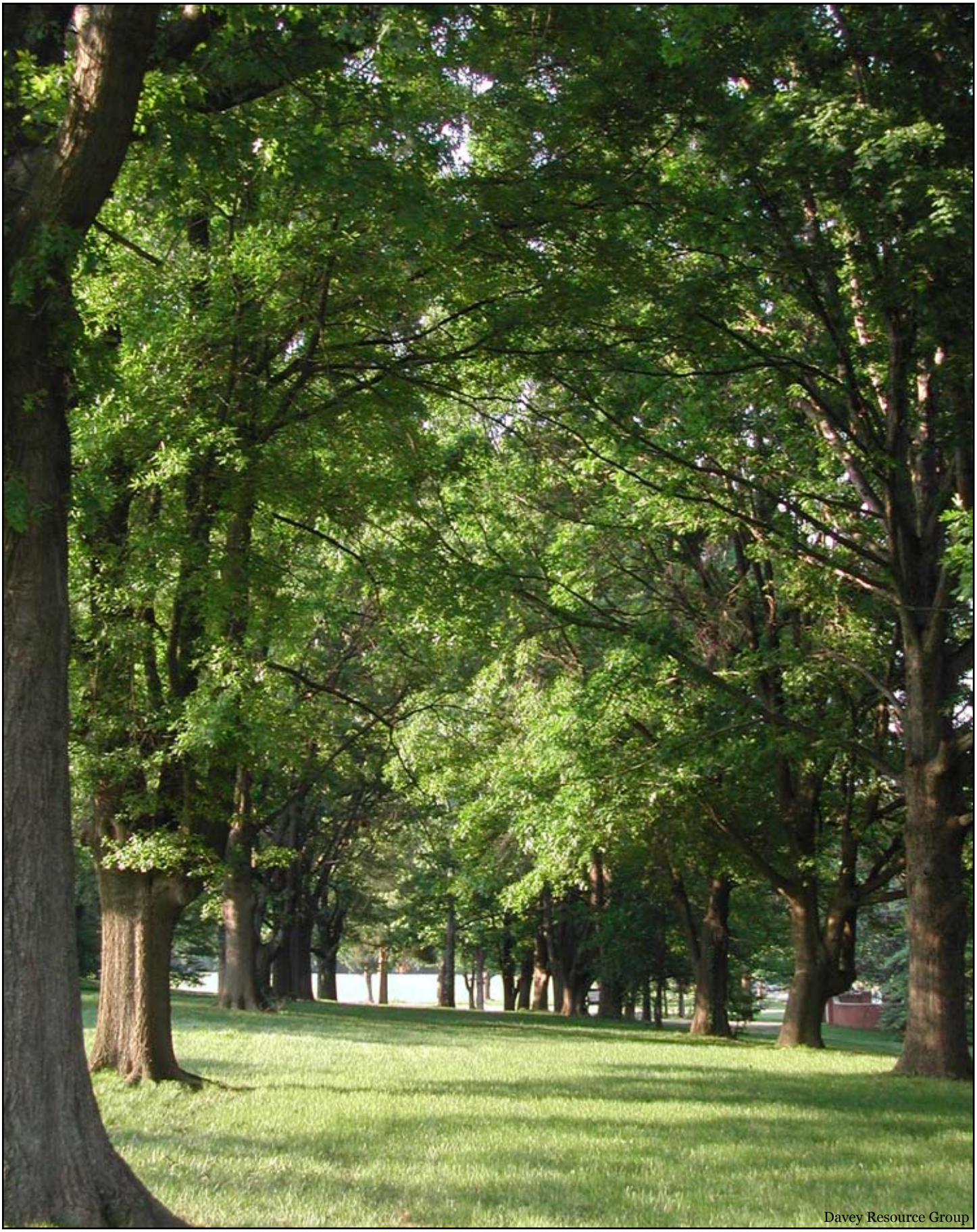

Davey Resource Group

Executive Summary

INTRODUCTION

The City of Alexandria has many lovely tree-lined streets and wooded areas, in both public and private ownership. Both the City government and citizens value the many environmental and economic benefits that trees provide. The government, strongly supported by its citizens, has consistently devoted significant resources to the planting and care of trees on public property.

Data Sources: 2007 City of Alexandria GIS Division Tree Canopy Extraction (Sept. 2007 Quickbird Multispectral Imagery) 85%-97.5% Accuracy; 2001 American Forests Land Cover Classification (Image Source Unknown) Accuracy Unquantified

Northridge Study Area

2007 Tree Canopy 2001 Canopy Loss

(*) The 2001 Canopy Extraction was performed by American Forests and delivered without "metadata" or other documentation. City of Alexandria GIS Staff contacted AF, but was unable to gather more details on the data source, extraction techniques, and other important information to help characterize the data quality. Therefore, the accuracy of the geographic referencing and the canopy extraction is unknown. Moreover, Alexandria GIS Staff observed a sizeable and irregular 15-30 ft. offset in the AF data set from the City's 1:100-scale GIS database. For the sample areas described in this document, a local adjustment was applied to reduce the relative shift, but the accuracy of that adjustment cannot be known.

(**) The 2007 Canopy Extraction was performed by City of Alexandria GIS Staff. The accuracy was measured at 85% (omission) - 97.5% (commission) and based on visual assessment of a random sample of 40 points distributed throughout the City. An adjustment was applied to correct for the underestimate created by the omission error.

Yet as a city with many densely developed areas, and with the pace of development intensifying in recent years, Alexandria faces a difficult challenge to maintain its existing tree cover and an even greater challenge to increase it. In fact, during the past few years, the extent of the tree canopy in the City appears to be getting smaller and its health declining. The overall state of the City's urban forest is fragile, as is true in many urban settings.

Alexandria's urban forest is at a critical juncture. The decisions made now will determine how much canopy cover will be gained or lost and how well or poorly Alexandria's current and future forest will function.

Recognizing the challenges and benefits of properly managing an urban forest, the City Manager appointed the Urban Forestry Steering Committee in 2004 to work with City Staff, a consultant, and citizens to prepare a comprehensive urban forestry management plan that would help guide future efforts. This report presents recommendations that will be taken under consideration in conjunction with the current fiscal environment.

KEY CHALLENGES

The City's tree canopy cover is decreasing. A study of the City's tree canopy using City Green, a program developed by the nonprofit group American Forests, indicated that, in 2001, tree canopy covered approximately 34% of the City. A more recent study conducted by the GIS Division of the Department of Planning and Zoning found that the City's tree canopy cover was 30% in 2007.

In 2001 the tree canopy coverage of the more suburban Northridge Community was estimated to be 63%. The 2007 study indicates that the canopy coverage of Northridge decreased to 57%. Similarly, the tree canopy cover over the Del Ray community east of Commonwealth Avenue was reduced from 31% in 2001 to 27% in 2007. Del Ray west of

Commonwealth Avenue changed from 45% to 39% tree canopy cover during the same period. Figure 1 on page 3 shows the results of the City's tree canopy cover analysis of designated test plots using 2001 and 2007 data.

Development and other pressures are negatively affecting the health and longevity of Alexandria's trees and limiting the areas in which trees can be planted. In addition to major development and redevelopment projects, the expansion of many single-family homes has resulted in the loss of trees and less space for planting new ones. Street trees must often be planted in inadequate spaces, and conflicts with above-ground and below-ground utilities are rampant. The lack of adequate planting strips makes it difficult to plant large shade trees, which provide the greatest environmental benefits.

Current resources and funding limit the ability of the City Arborist Office to provide for little more than the basic needs of the City's trees. Most of the staff time is spent responding to requests for service and reacting to problems. Only minimum amounts of time and resources are dedicated to proactive activities designed to enhance the urban forest.

Currently the City does not have a formal citywide management plan with goals, objectives, and performance measures, nor the tools and data needed to effectively manage Alexandria's urban forest. Except for a partially completed street tree inventory, there are no resources available to quantify or monitor the extent and the health of the City's tree cover.

In the planting and care of trees, staff focuses almost exclusively on street trees. Efforts in other parts of the urban forest—school grounds, parks, natural areas, stream corridors, and private and institutional property—are limited.

Although tree pruning efforts have increased in recent years, they are still below a level required to promote a healthy stand of trees. More resources need to be focused on the care of newly planted trees, especially in the first two-to-three years when watering in particular can be critical to tree survival and growth.

Public education—considered by many experts to be a key factor in preserving and enhancing the urban forest—is virtually nonexistent. Promotion of existing City-sponsored tree-oriented programs, such as the program to share the cost of planting street trees with residents and the Living Landscape Fund, is minimal. There is no tree-oriented section of the City website.

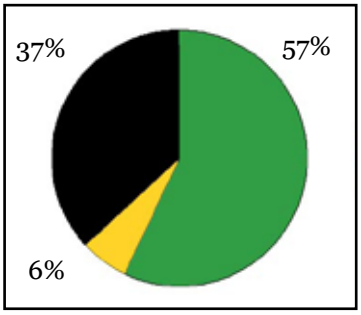

J. Noelle/Department of RPCA

Although there are many needs on public property, most of the City's urban forest is under private control, not subject to state or local regulations, and therefore vulnerable to inadequate management, injury, and tree removal. Homeowners often take great pride in the trees on their properties, but many lack basic knowledge about the benefits of trees, the appropriate trees to plant, and how to plant and care for them. In addition, trees are being lost on institutional properties where there are no requirements to preserve, protect or increase the tree canopy. Maintaining tree canopy on private and institutional property will be a major challenge in the years to come.

Figure 1.
City of Alexandria Canopy Coverage Study Areas

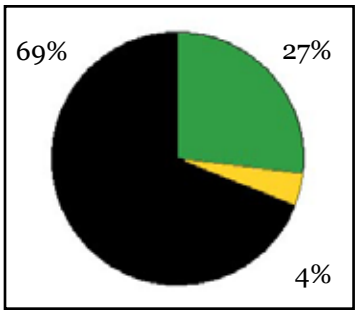
Northridge Study Area

- 2007 Tree Canopy
- Canopy Lost Since 2001
- Impervious Surface



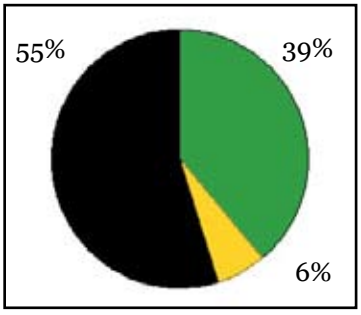
Del Ray East Study Area

- 2007 Tree Canopy
- Canopy Lost Since 2001
- Impervious Surface



Del Ray West Study Area

- 2007 Tree Canopy
- Canopy Lost Since 2001
- Impervious Surface



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MAJOR RECOMMENDATIONS

To meet these challenges, innovative approaches to managing the urban forest are required. Based on lessons learned from across the country, and from the feedback provided by Alexandria's citizens, a variety of suggestions have been made to improve the City's urban forest.

The overarching goal of the Alexandria Urban Forestry Master Plan is to increase the tree canopy throughout the City by better maintaining our existing trees and adding a significant number of new trees. The master plan includes specific recommendations for improving each part of the urban forest: public trees along streets, in parks, on school grounds and as part of other open spaces; private trees in residential areas and on institutional grounds; and trees within stream valleys and other natural areas. Summarized below are the major recommendations of the plan, defined in four strategic categories: tree planting, tree care, management, and public education and outreach.

Tree Planting

- Adopt American Forests' recommended tree canopy coverage goal of 40% and develop a citywide strategy to meet this goal. (Recommendation 1) *
- Plant 400 additional trees per year above what is being planted today and plant them on all types of public properties. School grounds provide an excellent opportunity for increased tree planting and should be a top priority. (Recommendation 4)
- Develop and implement master landscaping, planting, and maintenance plans for all public properties, including City rights-of-way, schools, libraries, stream corridors, and open spaces, and implement one-to-two of these plans each year. (Recommendation 13)
- Employ planting techniques that will promote the healthy growth of trees within an urban setting, such as alternative soil mixtures, extended tree wells, and systems to direct and manage root growth. (Recommendation 19)
- Establish a tree bank to plant trees on both public and private properties. The bank would be funded through various sources such as development-related activities, property damage reimbursements, and other sources. (Recommendation 6)


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- Create a grant program to permit the use of City funds to subsidize all or a portion of the cost of planting trees on private property. (Recommendation 7)
- Continue the City's spring and fall tree sales program (established in 2005 under the auspices of the Urban Forestry Steering Committee). (Recommendation 8)
- Provide and promote incentives to plant trees and implement projects to preserve and enhance the tree canopy on institutional and semi-public sites, such as INOVA Alexandria Hospital and Episcopal Seminary and High School. (Recommendation 31)
- Build on the Alexandria Open Space Plan's recommendation to seek innovative ways of creating more open space by developing and implementing pilot projects such as "green streets" (see Appendix F), which are aimed at redesigning streets to reduce impervious surface, thus freeing up land for tree planting and helping to meet other environmental goals, such as reducing the impact of storm water runoff. (Recommendation 24)

- Take steps to incorporate the use of more sustainable approaches to environmental design, such as rooftop gardens, to provide additional benefits for the City's overall canopy on private as well as public properties. (Recommendation 11)

- Increase and maximize the amount of tree canopy coverage required for Development Special Use Permits. (Recommendation 38)

Tree Care

- Fund and implement a five-year pruning cycle for all existing street trees and a three-year establishment program for new trees. (Recommendation 39)

- Work with the Departments of Transportation and Environmental Services, and Planning and Zoning to develop standards for, and require, innovative planting techniques and products to facilitate tree planting in restricted, high-use, difficult, and special needs areas. (Recommendation 18)

Management

- Change the name of the Arborist Office to the Urban Forestry Office and take steps necessary to transform it into a proactive operation with a systematic and strategic focus on the urban forest system as a whole. Develop a management plan and provide the resources needed to effectively manage the plan. (Recommendation 40)

- Create a new Urban Forest Specialist position that would be dedicated to activities aimed at preserving and enhancing the City's urban forest. (Recommendation 41)

- Establish benchmarks and report progress in an annual State of the Urban Forest Report to the City Manager and City Council. (Recommendation 43)

Public Education and Outreach

- Develop and implement an effective public outreach and education strategy and pursue it actively and consistently. Volunteers are a greatly untapped resource in this regard and should be a core part of this strategy. (Recommendation 44)

- Fund an additional extension agent at Virginia Cooperative Extension who would provide vital volunteer programming services for Alexandria's residents. This person would, among other tasks, work to expand Alexandria's role in the Tree Stewards of Arlington and Alexandria program, a group of volunteers trained by the extension service to educate and assist citizens on proper tree planting and care. (Recommendation 49)

- Rededicate Fort Ward as the City's arboretum and develop and adopt a master plan for the park. An arboretum could be an effective educational tool, providing increased public awareness about tree species appropriate to our City, planting conditions, and care. (Recommendation 25)

- Build an effective website www.alexandriava.gov/trees and provide links to other important sites with information about the benefits of tree programs and services that are available to the public. (Recommendation 50)

- Actively promote the existing Tree Stewards program and engage other citizens by creating opportuities to become program volunteers to assist in completing the vital maintenance tasks proposed in the Urban Forestry Master Plan that are currently not funded or inadequately funded for completion by City staff. These tasks might include: conducting tree inventories, small tree maintenance, tree planting, pruning teaching, grant writing, and marketing and public relations. (Recommendation 53)

*Recommendation numbers do not imply an order or priority, but refer to the overall number system used in Chapter 3, Analysis and Recommendations.

Fiscal Budget Impact of Proposed New and Expanded Programs

Action	Estimated Annual Cost	FY 2009 Budget	Added Cost
Increase Tree Canopy	$177,750	$105,000	$72,750
Five Year Pruning Cycle (as part of) On-Going Tree Maintenance Program	$976,945	$496,945	$480,000
Reorganize Arborist/Horticulture Section	$2,007,476	$1,596,476	$411,000
Educational Opportunities and Public Outreach	$95,000		$95,000
Total	**$3,257,171**	**$2,198,421**	**$1,058,750**

CONCLUSION

The recommendations in the master plan are ambitious, but realistically achievable. Some need immediate attention; whereas others can be phased in over time. Implementing some of these recommendations will require a significant increase in public funding. If funding is not available, alternative resouces such as grants, sponsorships and most importantly, volunteer efforts must be actively sought out and engaged to move closer to achieving the goals of this plan. Failure to make the investment, or garner the alternative resources, however, could have serious long-term consequences for the City's environmental quality of life.

In 1997, when the City of Alexandria held its first Environmental Summit, the City's urban forest was one of the critical issues identified for action. In the eleven ensuing years, this issue has only become more urgent. The Urban Forestry Master Plan responds to this urgency both by identifying and assessing current conditions, and by recommending actions to address these conditions. The problem is straightforward: every year, the City of Alexandria is losing tree canopy because of development, storms, aging, and urban pressures. If we are to enjoy the environmental, economic and aesthetic benefits of our urban forest, we must learn how to better manage it. By developing systematic and enhanced tree planting and maintenance programs, by having adequate funding, staffing, and public education resources available, and by undertaking innovative projects, Alexandria's future urban forest can be extensive, healthy, and highly valued, as envisioned by this plan.

J. Noelle/Department of RPCA

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
1. Adopt American Forest's recommended tree canopy coverage goal of 40% and develop a citywide strategy to meet this goal.	High	N/A	N/A	Short-term goal.
2. Perform tree canopy coverage analysis every five years using City Green or other comparable programs to determine changes in canopy cover and impervious surfaces.	High	$8,000	N/A	Mid-term goal. This analysis would be completed every five years. The cost of the program includes $3,000 for the required data and $5,000 for the analysis.
3. Sustain Alexandria's existing tree canopy through a comprehensive tree replacement and maintenance program for trees on public property and by developing new and promoting existing educational resources for the public.	High	N/A	N/A	Mid-term goal.
4. Plant 400 more trees per year above what is currently being planted annually on public properties, including City rights-of-way, schools, libraries, and other public facilities.	High	$90,000	N/A	Mid-term goal. The average unit cost for trees installed is approximately $225 depending upon the species and size of the specimen.
5. Actively seek ways to increase Alexandria's tree canopy on private property.	High	N/A	N/A	Short-term goal.
6. Establish a tree bank to plant trees on both public and private properties. The bank would be funded through various sources such as development-related activities, property damage reimbursements, and other sources.	Moderate	N/A	N/A	Mid-term goal.
7. Create a grant program to permit the use of City funds to subsidize all or a portion of the cost for planting trees on private property.	Moderate	N/A	N/A	Long-term goal.
8. Continue the City's spring and fall tree sales program (established in 2005 under the auspices of the Urban Forestry Steering Committee).	High	N/A	N/A	Short-term goal.
9. Achieve and maintain a species diversity where no single genus comprises 15% and no single species comprises 5% of the total population.	Moderate	N/A	N/A	Long-term goal. This may be accomplished by expanding the pallette of trees selected for planting and limiting the additional planting of Callery Pear species and Red Maples.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
10. Work with local civic and business groups to identify opportunities to plant additional trees on public and private lands.	Moderate	N/A	N/A	Long-term goal. Already conducted informally with small neigborhood groups.
11. Take steps to incorporate the use of more sustainable approaches to environmental design, such as rooftop gardens, to provide additional benefits for the City's overall canopy on private as well as public properties. Green roofs can provide some of the functions of forested areas including carbon fixation, shading, cooling, and watershed protection. Green roofs on underground parking structures can provide ground-level open space that is important to the continuous open space network.	Moderate	N/A	N/A	Long-term goal.
12. Conduct an inventory of all trees located in the public rights-of-way, in parks, on school properties, and at all other public properties and facilities. The inventory should be completed and reviewed on a continuous five-year schedule or as changes occur.	High	N/A	N/A	Short-term goal. To be completed on a five year schedule in concert with the recommnended street tree pruning rotation.
13. Develop and implement master landscaping, planting, and maintenance plans for all public properties including City rights-of-way, schools, libraries, stream corridors, and open spaces, and implement one to two of these plans each year. These plans should provide maintenance rotations and establish level-of-service standards for each land use type. Plans should also include strategies for regular inspections of trees, criteria for treatment, and practical methods to maintain current information on all trees subject to treatment. Coordinate with the Departments of Transportation and Environmental Services and Planning and Zoning to ensure plans are consistent with existing transportation and small area plans.	Moderate	N/A	N/A	Mid-term goal.
14. Develop quantitative methods to evaluate the overall health of Alexandria's street trees and trees on public properties.	High	N/A	N/A	Mid-term goal.
15. Plant and establish additional trees to achieve a 100% stocking level of available planting sites.	Moderate	N/A	N/A	Long-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
16. Actively seek opportunities to establish tree-lined medians along rights-of-way that are wide enough to create boulevards. Develop an urban forestry enhancement program specifically for Alexandria's unique boulevards and other significant transportation corridors.	Moderate	N/A	N/A	Long-term goal.
17. Establish criteria to identify sites that will permit the expansion of tree planting strips and tree wells to provide more suitable growing conditions for street trees, decrease conflicts between tree roots and urban infrastructure, and meet all Americans with Disabilities Act requirements for adequate clearance and passage.	High	N/A	N/A	Mid-term goal.
18. Work with the Departments of Transportation and Environmental Services, and Planning and Zoning to develop standards for, and require, innovative planting techniques and products to facilitate tree planting in restricted, high-use, difficult, and special needs areas.	High	N/A	N/A	Short-term goal.
19. Employ planting techniques that will promote the healthy growth of trees within an urban setting, such as alternative soil mixtures, extended tree wells, and systems to direct and manage root growth and limit conflicts between roots and urban infrastructure. Develop standards for planting in areas where space is too restricted or soil, aeration, drainage, or other conditions preclude providing adequate space and a satisfactory environment for trees to survive and thrive.	High	N/A	N/A	Mid-term goal.
20. Explore opportunities to protect existing trees by using alternative paving materials and methods to correct conflicts between tree roots and sidewalks, such as rubber sidewalks, stone dust, permeable paving, and alternative pavement profiles.	High	N/A	N/A	Mid-term goal.
21. Seek to relocate all overhead wires underground to avoid conflicts with trees and provide increased opportunities to plant large shade trees with an emphasis on major corridors.	Moderate	N/A	N/A	Long-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
22. Implement pilot programs to develop and adopt alternative street profiles and sections that provide larger tree planting areas, more open space, increased permeable surface area, and new opportunities for stormwater management, also referred to as shared street concepts.	Moderate	N/A	N/A	Long-term goal.
23. Establish and implement comprehensive planting and maintenance plans for trees located on parks, schools, and other public open space properties. These plans should be developed in conjunction with park landscape master/management plans which include both development and rotational maintenance costs.	High	N/A	N/A	Mid-term goal.
24. Build on the Alexandria Open Space Plan's recommendation to seek innovative ways of creating more open space by developing and implementing pilot projects such as Green Streets (see Appendix F), which are aimed at redesigning streets to reduce impervious surface, thus freeing up land for tree planting and helping to meet other environmental goals, such as reducing the impact of storm water runoff.	Moderate	N/A	N/A	Long-term goal.
25. Rededicate Fort Ward Park as the City's Arboretum and develop and adopt a master plan for the park. Create a collection of trees and other woody plants that will serve as an educational resource for City residents and visitors.	High	$25,000	N/A	Mid-term goal.
26. Promote the value of tree donations and other support programs, such as the Living Landscape Program, as a source of trees to be planted in parks and other public open spaces. Park master plans should be developed with tree locations that are ear-marked for living landscape trees.	High	N/A	N/A	Short-term goal.
27. Continue to celebrate Arbor Day and hold other special events and educational programs about urban forestry on parks and school grounds.	High	N/A	N/A	Short-term goal.
28. Encourage the establishment and healthy growth of native tree species through planting and maintenance.	Moderate	N/A	N/A	Mid-term goal.
29. Control invasive plant species.	High	N/A	N/A	Short-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
30. Improve maintenance of overgrown and currently inaccessible and under-used stream valleys and natural public open space.	Moderate	N/A	N/A	Long-term goal.
31. Provide and promote incentives to plant trees and implement projects to preserve and enhance the tree canopy on institutional and semi-public sites, such as INOVA Alexandria Hospital and Episcopal Seminary and High School.	High	N/A	N/A	Mid-term goal.
32. Encourage the establishment and dedication of open space tree canopy conservation, scenic and historic easements on institutional and private properties.	Moderate	N/A	N/A	Mid-term goal.
33. Develop guidelines for, and privately fund, a City grant program to support tree planting on private property. Grants should be made available to qualified homeowners, civic organizations, places of worship, religious institutions, and other not-for-profit organizations.	Moderate	N/A	N/A	Long-term goal.
34. Educate private property owners about the benefits of trees and proper planting and maintenance strategies.	High	N/A	N/A	Short-term goal.
35. Encourage homeowner and civic associations to create tree or beautification boards with which the City Arborist can communicate and provide information about tree planting and maintenance on this type of property.	High	N/A	N/A	Mid-term goal.
36. For commercial and industrial properties, enforce site plan and special use permit landscape requirements and conditions for new and existing development sites. Perform site inspections to ensure compliance.	High	N/A	N/A	Short-term goal.
37. Evaluate, update, and enforce the City's existing rules and regulations.	High	N/A	N/A	Short-term goal.
38. Increase and maximize the amount of tree canopy covreage required for Development Special Use Permits.	High	N/A	N/A	Short-term goal.
39. Plan, fund, and implement a five-year pruning cycle for all established trees and a three-year establishment program for new trees planted along City streets, in parks, and on school and other public properties.	High	$480,000	N/A	Mid-term goal. This would provide for the pruning of an additional 4,000 trees annually; to be accomplished through block to block pruning which will reduce the average unit cost of pruning a tree by an estimated 25%.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
40. Transform the City Arborist Office and Tree Maintenance Section into a proactive Urban Forestry Section with a systematic and strategic focus on the urban forest system as a whole. Develop a management plan and provide resources needed to effectively manage the plan. Optimize personnel allocations and create efficiencies by combining the City's urban forestry and horticulture programs under one Natural Resources Section.	High	N/A	N/A	Short-term. Convert five-year temporary Arborist position to permanent status.
41. Create a new Urban Forest Specialist position that would be dedicated to activities aimed at preserving and enhancing the City's urban forest.	Moderate	$110,000	N/A	Mid-term goal.
42. Fund requests for additional tree trimmers and horticulture staff necessary to successfully meet the goals of the Urban Forestry Master Plan.	High	$301,000	N/A	Mid-term goal. This would include the conversion of the vacant Assistant Superintendent position to a Tree Trimmer Position. Create two new Tree Trimmer Positions to create a third tree crew to accomplish the expanded soope of services recommended; $160,000. Create two new Horticultural Assistant positions to meet the demands to maintain the additional trees planted and implement a comprehensive watering and new tree maintenance program; $120,000. Purchase one chipper truck, one brush chipper, and one utility dump truck for the horticultural crews; $21,000 annual equipment replacement cost.
43. Establish benchmarks and report progress in an annual State of the Urban Forest Report to the City Manager and City Council.	High	N/A	N/A	Short-term goal.
44. Develop and implement an effective public outreach and education strategy and pursue it actively and consistently. Volunteers are a greatly untapped resource in this regard and should be a core part of this strategy.	High	N/A	N/A	Short-term goal.
45. Create a series of public service announcements on various urban forestry topics for radio, cable access television, and print news media outlets.	Moderate	N/A	N/A	Mid-term goal.
46. Develop and distribute information about the proper care for trees after they are planted.	High	N/A	N/A	Short-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
47. Promote the preservation and expansion of Alexandria's tree canopy with programs, such as seminars and neighborhood tree walks.	Moderate	N/A	N/A	Mid-term goal.
48. Increase support for and promote the expanded use of existing public resources such as the Cooperative Extension Service and the Tree Stewards and Master Gardeners of Arlington and Alexandria to provide assistance, advice, and educational opportunities and materials to the citizens of Alexandria.	High	N/A	N/A	Short-term goal.
49. Fund an additional extension agent at Virginia Cooperative Extension who would provide vital volunteer programming services for Alexandria's residents. This person would, among other tasks, work to expand Alexandria's role in the Tree Stewards of Arlington and Alexandria program, a group of volunteers trained by the extension service to educate and assist citizens on proper tree planting and care.	Moderate	$70,000	N/A	Mid-term goal.
50. Promote the availability and distribution of information to the public about the selection, planting, and care of trees through the development of an effective website www.alexandriava.gov/trees, and the publication of handbooks, fliers and other publications.	Moderate	N/A	N/A	Mid-term goal.
51. Encourage collaborative efforts with local schools of landscape architecture to study opportunities to improve streetscape, public open space, park, school, and facility designs.	High	N/A	N/A	Short-term goal.
52. Create partnerships with allied businesses and organizations to share in the distribution of timely urban forestry information; partnerships could include: local realtors, utility companies, nursery and landscape companies, and tree services contractors.	Moderate	N/A	N/A	Long-term goal.
53. Actively promote the existing Tree Stewards program and engage other citizens by creating opportunities to become program volunteers to assist in completing the vital maintenance tasks proposed in the Urban Forestry Master Plan that are currently not funded or inadequately funded for completion by City staff. These tasks might include: conducting tree inventories, small tree maintenance, tree planting, pruning, teaching, grant writing, and marketing and public relations.	High	N/A	N/A	Short-term goal.


R.H. Simmons/Department of RPCA

Chapter 1. Introduction

THE URBAN FOREST

The urban forest includes all parts of the city where trees provide canopy cover.

For Alexandria, the urban forest includes all areas that are publicly owned where trees are growing, such as public rights-of-way, parks, schools, and other public facilities, and those areas that are privately owned, including undeveloped open space and residential, commercial, industrial and institutional uses. Regardless of ownership or land use, all of the trees and other vegetation that make up Alexandria's urban forest are subject to the pressures of development and the demands of citizens for improved transportation, public facilities and services, as well as a cleaner environment and an aesthetically pleasing city.

B. Carton/Department of RPCA

The urban forest is the complex system of trees and smaller plants, wildlife, associated organisms, soil, water, air, and people in and around our city. The urban forest surrounds us and contributes to the quality of our daily lives. It provides environmental, psychological, and economic benefits ranging from improved air and water quality to savings from decreased heating and cooling costs to aesthetically pleasing neighborhoods and increased resale values.
- Portland Urban Forestry Management Plan, Oregon

The urban forest differs from a traditional forest in some significant ways because it is superimposed on a functioning city, but shares common traits with traditional forests. Most forest lands in the U.S. today are managed for multiple uses, primarily including recreation, timber or other resource production, watershed protection, and natural habitat. In the urban forest, the primary management function is to provide a natural backdrop for city life. Various parts of the urban forest have other more specific primary management objectives, but the natural characteristics of the urban forest mean that through management, the urban forest can serve the multiple functions of traditional forests more effectively while meeting urban needs.

THE URBAN FOREST AND ITS MANAGEMENT

Similar to traditional forestry, the goal of urban forestry is to optimize the value of the trees in a given urban area. The urban forest has many functions in the city that contribute to its value. Trees are a critical component of the character of Alexandria. Tree-lined streets and boulevards, natural areas, parks and schools, and tree-filled residential neighborhoods reveal a place that its people care about deeply. The urban forest also has important environmental roles, including providing shade to minimize the need for cooling interior spaces and to reduce the urban heat island effect, limiting erosion from rainfall, reducing peak runoff during storms, and cleaning pollutants from the air. The urban forest provides important habitat for migratory birds and insects, and provides habitat for resident species of plants and animals. Plants are also important in counteracting the adverse effects of burning carbon-based fuels on the worldwide cycle of atmospheric carbon dioxide. More detailed benefits of the urban forest are provided in Appendix A.

It is difficult to place a dollar value on some of the benefits of the urban forest, but it is clear that street trees, streets in parks and plazas and around public buildings, and trees on private property add substantially to the value of private residential and commercial property. Recent efforts to quantify the dollar value of the urban forest for its contribution to improving water and air quality, and carbon sequestration, conclude that a community's urban forest is an asset of significant dollar value that should be preserved.

Tree canopy coverage and tree planting programs in urban areas are now being considered an integral factor in improving air quality in urban areas that are not in compliance with the National Ambient Air Quality Standards.

Increasing the value of Alexandria's urban forest to better accomplish these many functions is the objective of urban forest management. Successful management of Alexandria's urban forest depends on citizens and staff who are aware of its many values and are committed to enhancing the urban forest as a fundamental part of a great community. Management of the urban forest requires consideration of the total urban forestry environment—biological, institutional/social, and legal.

Urban Forest Management is the art, science, and technology of managing trees, forests, and natural systems in and around urban areas for the health and well-being of communities.
-National Urban Forest Council


J. Noelle/Department of RPCA

Urban forest management can be best conducted under the direction of a plan identifying the vision and overall goals for each of the principal functions of the urban forest. Implementing the plan requires a strategy for meeting the needs identified, and budget and staffing to carry out the strategy in each of the City departments that have a significant role in the strategy. It may require the adoption of standards and guidelines where appropriate to guide public and private actions. It will require methods of measuring the characteristics of the urban forest over time to track its effectiveness.

Alexandria's Urban Forestry Master Plan

An urban forestry master plan is a strategic plan that establishes the overall vision, goals, objectives, and implementation tools for a community's comprehensive urban forestry program. Alexandria's Urban Forestry Master Plan is intended to provide the overall direction for a program

to protect, enhance, expand, and preserve the City's overall tree canopy for the benefit of the community. The plan will help coordinate and improve the City's existing tree management program and operations in ways that will support the sustained health of the urban forest.

The creation of the Urban Forestry Master Plan for Alexandria follows a trend in urban forestry to move from reactive management of individual trees—typically characterized by an emergency response approach to problems and complaints—to a proactive, systematic, and strategic focus on the urban forest system as a whole. While limited municipal funds for forestry programs often constrain proactive tree care, management and planning efforts can both establish the rationale for allocation of increased resources, and increase the efficiency of use of scarce resources, with a significant beneficial impact on the landscape.

Implementation of Alexandria's Urban Forestry Master Plan will fulfill many of the goals presented in the Alexandria Open Space Plan. Most specifically it supports Goal 12 to "expand the Citywide street tree program and protect existing trees and woodland areas."

With professional consultation from Davey Resource Group; the Alexandria's Urban Forestry Steering Committee, City staff, elected officials, and citizens worked together to develop the plan.

The planning program included the following tasks:

- Review and analyze City policies, operations, programs, and services that address the planting, maintenance, protection, preservation, and removal of trees on private property and of publicly owned trees along City streets, in parks, riparian corridors, and on other public properties. Recommend changes based on the review and analysis.
- Review and analyze the City's current urban forestry resources, planning policies, development regulations, construction standards, master plans, and other applicable documents and information.
- Perform on-site surveys of public trees on streets, in parks, and in other public areas.
- Obtain public input through interviews with City personnel, elected officials, various commission members, and other key stakeholders and through an internet-based public opinion survey and printed questionnaire.

The Urban Forestry Master Plan presented in this document reflects the input received throughout the Plan's development process. Recommendations made are based on the conclusions of the analysis and community input, in combination with urban forest best management practices and current arboricultural standards.


J. Noelle/Department of RPCA

Public Participation

The public was involved on multiple levels throughout the development of the Alexandria Urban Forestry Master Plan. Public meetings, interviews with public officials and department heads, and a questionnaire were used to gather the opinions and ideas of Alexandria's residents which are described below.

A public meeting was held on January 18, 2006. During this meeting, the public was introduced to the goals of the plan. Participants were provided an opportunity to discuss urban forestry visions for the City in small group formats.

Each group provided comments regarding three topics: public trees, private trees, and education. For each topic participants were asked to identify:

- Critical issues and challenges facing Alexandria's urban forest
- Next steps and solutions to improve and enhance Alexandria's urban forest community
- General goals for Alexandria's Urban Forestry Program and Plan

Thirty citizens, public officials, and members of Alexandria's Urban Forestry Steering Committee participated in the first public meeting. The following is a summary of the key comments received at the public meeting. More specific comments received at this meeting are included in Appendix B.

- Improve coordination and operations of City agencies and programs.
- Improve maintenance of public trees.
- Desire for more trees on public properties and rights-of-way.
- Perform a tree inventory of public trees.
- Protect large specimen trees.
- Encourage and explore ways to preserve trees on private property.
- Encourage planting new trees.
- Educate contractors and utility workers.
- Address invasive species problems in parks.
- Continue and expand programs such as the City-sponsored tree sales, tree steward program, master gardener programs, and Living Landscape Program.
- Expand the information available on the City's website for public education.

A questionnaire was developed and distributed at the public meeting and posted on the Internet using the website www.surveymonkey.com. A news release was prepared by the City after the public meeting to inform the public of the process for developing the Urban Forestry Master Plan and to provide them with the website information needed to complete the survey. In addition, a link to the survey was made available on the City's website. A total of 267 people responded to the survey. Specific results of the survey and other components of the public process are presented in Appendix B. The key results of the public survey are as listed here:

J. Noelle/Department of RPCA

- Trees make the City a better place to live and work.
- It is fair to require developers to preserve and/or plant trees on their projects.
- The City should plant more trees along City streets and on public property.
- There is a need to create a master tree plan and plant more trees along City streets and on public property.
- The City's urban forest and its future are very important.

VISION AND GOALS OF THE PLAN

With the implementation of the plan, Alexandria's vision for the urban forest of the year 2020 is:

Alexandria's urban forest in the year 2020 is extensive, healthy, and highly valued—a model for densely developed urban areas. It is the product of a sustained energetic partnership between City government and informed and educated private groups and individuals.

Vision

The vision for Alexandria's urban forest is captured and expressed by these terms:

- Extensive—Tree planting is maximized, to the extent practical, on public and private land.
- Healthy—All trees are properly planted and well-maintained.
- Highly Valued—Citizens recognize the environmental benefits of trees and their contribution to the City's livability, reflected in the taxpayer support for significant public funding.

Goals

As a result of the planning process, the following goals have been established for the Alexandria Urban Forestry Master Plan:

- Achieve the goals and carry out the implementation strategies of the Alexandria Open Space Plan, the Recreation, Parks, and Cultural Activities Strategic Plan, and the 1992 Master Plan related to landscape trees and urban forest ecosystems.
- Develop a master planting plan for all public properties responsive to the Alexandria Open Space Plan, adopted area plans, and park plans to provide direction for planting trees along streets, in parks, schools, and other public properties. The Plan should identify the conceptual design objectives and appropriate planting characteristics for each of the major features of the urban landscape, including major transportation corridors, boulevards and parkways, other City streets, parks, plazas, natural open spaces, and school properties.
- Ensure that the protection and management of the urban forest are citywide priorities.
- Develop an integrated, coordinated approach to the management of the urban forest that is supported by all concerned organizations, City departments, businesses, developers, community and civic groups, and citizens. Accomplish this through enhanced communication, volunteerism, and social equity.
- Secure sufficient funding and management resources to maintain and enhance the urban forest.
- Ensure that the urban forest is sustainable by maximizing and expanding the urban tree canopy through tree planting to produce a multi-aged and diverse tree community.
- Enact the plan's recommendations using education as the primary means of implementation, incentives as the next, and regulations as the last resort.
- Develop a plan that is adaptable and responsive to change, providing recommended benchmarks and schedules for implementation.

J. Noelle/Department of RPCA

Alexandria Library, Special Collections

Chapter 2. Alexandria's Urban Forest

HISTORY OF URBAN FORESTRY IN ALEXANDRIA

The social, economic, and political history of Alexandria began in 1654 with development on 700 acres in what is now Old Town. As trade and commerce expanded, so did the City, and by 1749, it was officially established and named after previous landowners and eventually chartered as a city in 1852.

B. Carton/Department of RPCA

The City was planned and developed following a grid pattern. This popular urban development scheme has its basis in the typical eighteenth century conviction that rational order could be imposed upon nature. The grid served the commercial life of Alexandria well, and since it was expandable, it was subsequently extended several times to accommodate the growth of the City.

Primarily a port, industrial center, and transportation hub, the prominence of Alexandria as a residential community did not develop until the 1930's with the annexation of the Town of Potomac (now Del Ray) northwest of Old Town, and the annexation of land west of Quaker Lane in 1952.

Compared to Alexandria's rich natural, political, and cultural history, the City's recognition and appreciation of its trees and urban forest are relatively recent. Early street tree planting efforts in Alexandria were sponsored by the Alexandria Chamber of Commerce and the Old Town Civic Association in the 1950's with the installation of trees at the Barrett Library and in Old Town.

The political will to protect trees and regulate the planting, maintenance, protection, control, and removal of trees, shrubs, plants and vegetation in the City of Alexandria was codified 1956 with the passage of Alexandria's first tree ordinances, limiting the removal, destruction or mutilation of trees planted on public property, including trees planted within the City's rights-of-way. Ordinance Number 902 called for the Director of Public Works to devise and place in force a master tree, shrub, plant, and vegetation plan for the City. In 1963, the general management of all trees, shrubs, plants, and vegetation covered by the previous ordinance were reassigned to the Director of the Department of Parks and Recreation.

The first City Arborist was hired in 1959 when City tree maintenance crews were established to plant and maintain trees in the public rights-of-way, parks, and on other public properties.

Measures to protect healthy mature trees on private property were first adopted in 1978 with the passage of Ordinance 2290, which established regulations prohibiting the removal of trees on private properties that are subject to site plan or subdivision regulations. This ordinance was the first to provide for the designation of specimen and historic trees on private property and prohibited their removal. In addition, the ordinance provided for the replacement of trees as a condition of permitting the removal of trees on private properties subject to subdivision and site plan regulations.

One measure of the success of Alexandria's existing urban forestry program has been the City's designation for 23 consecutive years as a Tree City, U.S.A. as recognized by the National Arbor Day Foundation. The City has also received two Growth Awards from the National Arbor Day Foundation for its continued efforts to improve and expand its tree maintenance program.

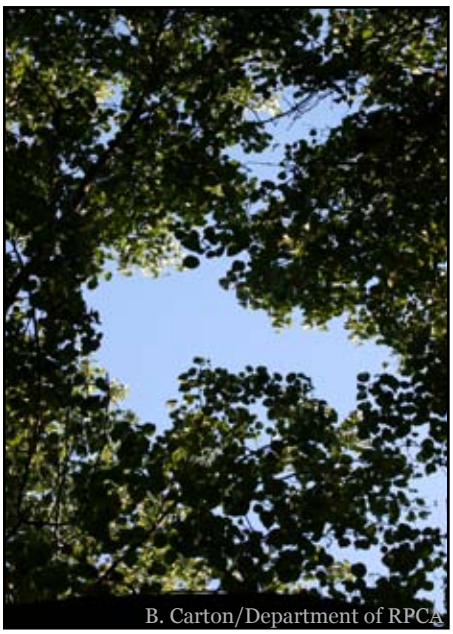
SUMMARY OF ALEXANDRIA'S EXISTING URBAN FOREST CONDITIONS

Overall Canopy Cover

The City's tree canopy cover is decreasing. A study of the City's tree canopy using City Green, a program developed by the nonprofit group American Forests, indicated that in 2001 tree canopy covered approximately 34% of the City. A more recent study conducted by the GIS Division of the Department of Planning and Zoning found that the City's tree canopy cover was 30% in 2007.

In 2001 the tree canopy coverage of the more suburban Northridge Community was estimated to be 63%. The 2007 study indicates that the canopy coverage of Northridge decreased to 57%. Similarly, the tree canopy cover of the Del Ray community east of Commonwealth Avenue was reduced from 31% in 2001 to 27% in 2007. Del Ray west of Commonwealth Avenue changed from 45% to 39% during the same period. Figure 1 on page 3 shows the results of the City's tree canopy cover analysis of designated test plots using 2001 and 2007 data.

Canopy loss throughout the City may be explained by development of properties and an increase in residential additions and redevelopment, decline and loss of mature trees as a result of environmental conditions including drought, storm damage, and disease, and the loss of trees during road improvements, particularly those associated with the Woodrow Wilson Bridge Project.


B. Carton/Department of RPCA

This loss of the tree canopy coverage clearly indicates that the City must be proactive and support programs to plant additional trees on public and private land, and increase its efforts to promote the health and longevity of its existing tree canopy. This is most urgent if the City is to achieve the suggested goal of 40% tree canopy coverage recommended by American Forests.

Ownership and Land Uses

The trees that make up Alexandria's urban forest can be divided into four categories based on the ownership and land uses in the areas in which they are growing. These land use categories are: public trees, institutional and semi-public trees, private trees, and trees growing along stream valleys and in natural areas. Public trees can be divided into subcategories of street trees, trees growing in parks, public open spaces, public facilities and properties, and trees located on school properties. All of the trees in each of the categories

contribute to Alexandria's urban forest; however, our ability to preserve existing trees, promote planting of additional trees, or influence their management and maintenance is directly affected by the ownership of the property, and the economic, environmental, and social pressures to which they are subject.

Overall Public Tree Population

Alexandria has a significant public tree population. It is estimated that there are 17,000 street trees, and possibly over 50,000 trees in parks, schools, public open space, and on other public properties.

Street Trees

There are approximately 220 street miles in Alexandria. Using the average for eastern U. S. cities of 100 trees per street mile, Alexandria has a potential street tree population of 22,000. It is estimated that Alexandria has 17,000 existing street trees, which is approximately a 77% stocking level for the street tree population. Of the existing street trees, nearly 7,500 have been mapped, assessed, and added to a computerized inventory. This inventory effort continues as time and resources allow.

The hierarchy of the City's streets, their profile, and construction standards each influence the species, number, and survival of trees planted in treelawns, medians, and tree wells along public rights-of-way. Arterial streets, parkways, boulevards, and residential streets present different opportunities and constraints for street tree sustainability.

Alexandria recognizes and respects the importance of street trees and actively plants and maintains them for the many benefits they provide. However, in the right-of-way setting, trees must share limited space and compete with underground and above ground utilities, sidewalks, curbs, and vehicle, pedestrian, and building clearance needs.

Major thoroughfares, such as King Street, Braddock Road, Henry Street, Patrick Street, and Duke Street, carry high volumes of traffic resulting in more paved surfaces and wider sidewalks, limiting open space for trees and requiring more stringent sight and vehicular clearances for public safety. Particularly in the historic parts of Alexandria, some of these roadways have been widened to accommodate traffic, or sidewalks widened for pedestrians in retail districts, without acquiring right-of-way to maintain adequate space for trees. De-icing chemicals, automobile exhaust, and other pollutants contribute to an inhospitable environment for tree growth and survivability.


B. Carton/Department of RPCA

Trees on secondary, yet highly developed streets, such as those in Old Town and sections of Mount Vernon and Commonwealth Avenues, also compete with public infrastructure, utilities, and buildings where space is at a premium.

Streets through residential areas such as Del Ray, Seminary Valley and others are better able to support the growth of street trees because there are wider treelawns, fewer building, infrastructure and utility conflicts, less hostile environmental pressures, and a degree of protection and voluntary maintenance provided by adjacent private property owners.

Unique transportation and urban forestry resources in Alexandria are found on the City's parkways and boulevards. Holmes Run, Fort Williams, Francis Hammond, George Washington Memorial, Timber Branch, Yoakum, and Taylor Run Parkways are historic public rights-of-way that traverse significant parks and greenways. Trees planted and properly maintained on these parkways can make a significant and long-lasting contribution to the overall forest canopy and will create more pleasing, successful, and vibrant routes between the greenways, residential areas, and their surrounding communities.

Monticello Boulevard, Old Dominion Boulevard, and large sections of Commonwealth Avenue are examples of wide, historic residential streets that support a significant and vital urban forest. Due to their design and the qualities of the abutting properties, rights-of-way like these can be enhanced for the preservation of the City's canopy cover and maximization of urban forest benefits and should be considered as linear parks.

Parks, Schools, and Open Space Trees

Park trees have not been inventoried, but appear to be relatively well-stocked and diverse in terms of age and species composition. Fort Ward Park is a highly popular park and heavily used. Its many visitors enjoy the historical site, museum, amphitheater, walking trails, and the City's official arboretum. Most of Alexandria's large canopy trees are found in the parks along with a variety of well-planned landscapes.

The urban forest components of other public open spaces have not been inventoried or assessed in detail. However, key issues, such as tree maintenance, tree preservation, reforestation, and exotic vegetation control, should be addressed. The Alexandria Open Space Plan provides an assessment of these areas and recommends that the natural resource areas, recreational sites, rivers and streams, and environmentally sensitive areas be protected and enhanced.

The public school system, a major property owner in Alexandria, has significant land and urban forest resources, but the condition and quality of the trees on school properties are in many cases poor. Public school properties are important community green spaces and should be managed for the benefit of the neighborhoods in which they are located. Many of Alexandria's largest open space areas connect directly with school properties.


B. Carton/Department of RPCA

Institutional and Semi-Public Tree Population

According to a 1990 land use analysis, nearly 868 acres, or 11%, of Alexandria's developed land, is in institutional use. This includes properties owned by private schools, religious facilities, cemeteries, and hospitals. Typically, these properties are large tracts with buildings, roads, parking lots, and open landscapes that support numerous trees.

There are significant tree populations on privately held institutional lands, such as the Episcopal Seminary and High School, St. Stephen's and St. Agnes Schools, Alexandria Country Day School, INOVA Alexandria Hospital, and numerous churches. The Open Space Plan identifies these tree areas as critical to preserve. Nevertheless, in the last several years, significant tree stands have been lost to both storms and development activities with no apparent replacement programs in place. This significant loss of urban forest has had a major impact on the City's canopy cover.

Private Tree Population

According to the Virginia Division of Forestry, private individuals own nearly 80% of the rural forests in Virginia. Mimicking this pattern, the vast majority (90%) of Alexandria's urban forest is located on private property or property not under direct control of the City. Based on land area and canopy coverage, and using U. S. Forest Service estimates, potentially 500,000 landscape and woodland trees are in private ownership in Alexandria.

Non-public trees comprise the bulk of the urban forest in every city. Yet trees on private property typically do not receive routine professional arboricultural maintenance, are not planted or managed for the long-term benefit of the community as a whole, and their removal is not regulated.

A significant portion of Alexandria's existing mature tree canopy is on private property, and more specifically on residential property since 50% of the land use in the City is classified as residential. The older, more established neighborhoods have historic and post-war smaller housing units that were built on relatively large lots. This situation allowed for landscape trees planted 40 to 80 years ago to flourish and become the dominant component of the forest canopy.

Today, the high quality of life in Alexandria, as well as the many other amenities and benefits of the City, have created a high demand for increased residential and commercial use of existing properties. Larger residential lots are being redeveloped, vacant land is being developed at an increasing rate, and the population continues to rise at a steady pace. These trends and activities place high pressure on the private tree populations, eliminating many trees and reducing the vitality and service lives of those that remain. Preventing a significant loss of tree canopy cover on private property will be a challenge for the future. Maintaining awareness of the extent of private canopy cover is an important reason to monitor the City's overall tree canopy cover using aerial imagery.

Stream and Natural Areas Tree Population

The Alexandria Open Space Plan identified rivers and streams and natural resource areas as important components in the City's open space network. The Alexandria Open Space Plan revealed that many of these sensitive areas are not connected to other open space amenities, have been degraded in the past, and are small in size and number. The tree resources along streams and in natural areas has been significantly reduced, entirely eliminated, or degraded with exotic species.


B. Carton/Department of RPCA

The Alexandria Open Space Plan recommended these solutions to protect and expand the streams and natural areas of the City:

- Expand stream valleys
- Maintain streams in a natural condition
- Increase vegetation
- Restore natural areas
- Perform significant reforestation

The reforestation, expansion, and appropriate management of stream and river corridors and of natural areas, will provide all the benefits indicated in the Alexandria Open Space Plan—improved water quality, stormwater and erosion control,

educational opportunities, and aesthetics. In addition to these benefits, the reforestation and proper management of these areas will also result in a significant increase in protected tree canopy. This riparian tree canopy not only benefits the immediate riparian area, but also collectively benefits the City and citizens in other ways, such as air pollution abatement, temperature moderation, and increased property values.

REGULATORY CONTEXT

The City's urban forestry program is governed and guided by a variety of City ordinances and strategic plans. Ordinances found in Title 6 Chapter 2, Trees, Shrubs, Plants, and Vegetation; Title 5 Chapter 11, Gypsy Moth Control; the Zoning Code; the Environmental Management Ordinance; and the recently revised Landscape Guidelines define the primary regulation of the trees on public and private properties.

Section 6 of the City Code gives the Director of Recreation and Parks the authority to prepare and implement a "master tree, shrub, plant, and vegetation plan for all or any portion of the public places within the City, except public school sites." The turf and tree maintenance of schools was added to the responsibilities of the Department of Recreation, Parks and Cultural Activities in 2007.

Strategic plans including the Recreation, Parks, and Cultural Activities Strategic Plan, the Alexandria Open Space Plan, and the 1992 Master Plan support and define objectives and goals for the program. The Department of Recreation, Parks, and Cultural Activities has the primary responsibility for implementing the Recreation, Parks, and Cultural Activities Strategic Master Plan and has major responsibility for implementing the Alexandria Open Space Plan. Both of these plans include clear goals and objectives that directly affect large portions of both the public and private urban forests.

The decisions, policies, and actions of the Park and Recreation Commission, the Beautification Commission, the Open Space Advisory Group, and the Waterfront Committee also have significant influences on the urban forest in the City.


J. Noffle, Department of RPCA

Detailed descriptions of these regulatory and planning documents are provided in Appendix C.

CURRENT PROGRAM MANAGEMENT AND OPERATIONS

Management and operations of Alexandria's urban forestry program are organized in the Department of Recreation, Parks, and Cultural Activities. Activities within this department include the maintenance or removal of trees located on public properties including those located along the public rights-of-way, trees in parks and on school and library properties, stream valleys and other public open spaces. While the department has primary responsibility for the care of trees, other City departments and entities also play significant roles in promoting the health and longevity of trees within the City on both public and private properties.

Department of Recreation, Parks, and Cultural Activities

Management

The Department of Recreation, Parks, and Cultural Activities has overall responsibility for management of all the City-owned parks and recreation facilities, recreation and cultural programs, and for management of the City's street trees located in the public right-of-way. The Department is responsible for development of plans, programs, and policies for open space, parks, recreation, and cultural activities for adoption by the City Council. The Department provides staff support to the Park and Recreation Commission, the Open Space Advisory Group, the Beautification Commission, and the Waterfront Committee. The Department is responsible for implementing the Open Space Plan, the Strategic Master Plan for Open Space, Parks, and Recreation, and the City's Landscape Guidelines. The Department participates in interdepartmental review of major development projects with emphasis on parks, recreation, open space and urban forestry issues. It develops plans for park improvements and works with the Department of General Services on design and construction of park and recreation facilities.

Long-range planning functions are performed by the Park Operations and Capital Development Division, which includes maintenance and operational sections as well as the Park Planning Section and Natural Resources Section.

Urban Forestry Management

Daily management of the public urban forest is the responsibility of the Natural Resources Section. The Arborist Office is staffed by the City Arborist and two Arborists. The City Arborist and staff include Certified Arborists, and Municipal Specialists, certified by the Society of Municipal Arborists and the International Society of Arboriculture.

The Arborist Office is responsible for completing a variety of tasks on a daily basis and administering all levels of the program. In addition, the Arborist Office conducts site plan and landscape plan reviews, as well as site inspections as needed to assist Park Planning staff, the Departments of Planning and Zoning, Transportation and Environmental Services, Office of Building and Fire Code Administration, Historic Alexandria, and others to determine the impact of proposed development on existing vegetation. Following completion of a development, the Arborist Office is required to conduct as-built plan reviews and comment on the completeness and condition of the installed landscape. Development and site plans go through multiple stages of review, often requiring multiple site visits and meetings with City staff, applicants, and the public to address concerns raised by all parties.


J. Walsh/Department of RPCA

The Arborist Office conducts an annual gypsy moth egg mass survey, and as needed, identifies treatment blocks and prepares required docket and program submittals to participate in federally funded and state-administered gypsy moth suppression programs. The Arborist Office is also charged with annually soliciting for the donation of a large evergreen tree that is to be used as the City's holiday tree installed yearly at Market Square.

Finally, the City Arborist and staff regularly meet with members of the public, attend public meetings, and make presentations to civic groups, City commissions, and to the City Council.

Tree Maintenance and Removal Operations

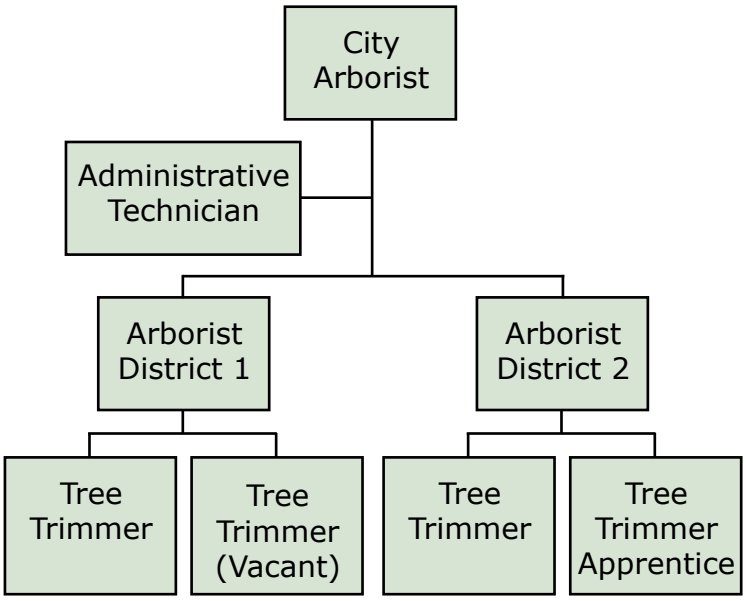
Tree maintenance and removal operations are carried out by City and by contracted tree crews. The City's tree crews are equipped to perform almost any tree maintenance task, however, they are usually assigned to complete high priority tasks, such as improving visibility at stop signs, removing low, hazardous or dead limbs over streets and sidewalks, and assisting other City departments when tree maintenance is required on projects such as street paving and alley clearance. City tree crews are the first to be called to respond to emergency calls involving trees from the police and fire departments at all times.

When fully staffed, the City's tree maintenance crews consist of three full-time tree trimmer positions and one tree trimmer apprentice position. These crews are equipped with two aerial lift trucks with chipper boxes and chippers, one stump grinder, two hydraulic sprayers, and required hand and power tools.

Contract tree crews are used to perform the bulk of the tree pruning and removals along City right-of-way and at City facilities. Work is completed for fixed unit prices based on the size of the tree and the task. These tasks include pruning, tree removal, and tree planting. Contractor crews may also be required to perform tasks on a time and materials basis as requested by the Arborist Office and based upon hourly unit prices for the required personnel and equipment.

In addition to regular tree maintenance and removal tasks, holiday lights and decorations are installed by the City and contract tree crews from the beginning of October to the end of November.

Figure 2.
City Arborist Office Organization Chart



Department of Transportation and Environmental Services

This Department has direct responsibility for public infrastructure, public right-of-way, and environmental services. Every division in the department directly or indirectly affects the urban forest through their specific missions and daily operations.

The Construction and Inspection Division manages capital improvement projects; administers contracts for curb, gutter, and sidewalk repairs; administers and coordinates utility work within public rights-of-way; issues excavation permits; inspects all bonded development work; and enforces the soil erosion control ordinance. Public trees can be positively or negatively affected by these actions.

The Engineering and Design Division reviews site plans to ensure that construction is in compliance with the City's engineering standards and policies, and the stormwater management detention and water quality requirements of the Chesapeake Bay Preservation Ordinance.

The Office of Environmental Quality (OEQ) is responsible for the environmental programs designed to protect the public's health, safety, and welfare. The division safeguards the City's environment by regulating air, water, soil, and noise pollution. OEQ administers the Environmental Management Ordinance (Article XIII) which protects and enhances buffer areas (forested and non-forested) along perennial and intermittent streams and requires the implementation of Best Management Practices in developing or redeveloping properties in order to fulfill the requirements of the Chesapeake Bay Protection Act.

The Chesapeake Bay Act is based on the premise that healthy state and local economies and a healthy Chesapeake Bay are integrally related; balanced economic development and water quality protection are not mutually exclusive. The goals of Alexandria's Urban Forest Management Plan will support the regional efforts to meet the Program's tree canopy goals as a way to improve and expand forested watershed functions in developed areas.

OEQ actively initiates outreach to make the public aware of the importance of their actions in reducing nutrient loading to the Bay and how they can be better stewards to the environment. The public urban forest contributes significantly to this division's mandates and responsibilities.

The Division of Solid Waste provides refuse and leaf collection services and recycles the leaves for mulch. The mulch is made available in the spring to residents.

The Maintenance Division provides maintenance and repairs for all City sewers, streets, sidewalks, and fire hydrants, maintains the carrying capacity of streams, function of the weirs, and provides floodway capacity while minimizing any adverse environmental impacts along the stream banks/beds, and enhances the ecology and environment in and around our aquatic resources wherever possible. It maintains stormwater pollution removal facilities and conducts snow removal and flood control operations. This division coordinates with other City agencies and other divisions within the Department of Transportation and Environmental Services to respond to weather-related emergencies, such as unusually heavy snowfall and rain, floods, high winds, and hurricanes, and assists in both emergency management and clean-up following these events. Clearly, public trees are involved in a majority of this Division's responsibilities.

Department of Planning and Zoning

The Department of Planning and Zoning develops and provides policy recommendations to the Planning Commission and the City Council for the orderly growth and development of the City as envisioned by the community through the Master Plan and Small Area Plan process. It implements this policy through recommendation of zoning and development regulations, and management of and participation in, the interdepartmental development review process for new development and redevelopment. It enforces the adopted

T. Willger/RHI

zoning and subdivision regulations and conducts inspections on construction sites, to ensure that developments conform to project conditions and City regulations and to ensure protection of public health, safety, and general welfare. These responsibilities affect both public and private trees that make up Alexandria's urban forest and, therefore, have a significant influence on the development and long-term preservation of the City's tree canopy cover.

The City's development regulations include requirements for open space in residential and mixed-use development, and require installation of street trees in large projects. Underground utilities and street tree plantings are required in most major projects. The department works with other City agencies to preserve resource protection areas established under the Chesapeake Bay Protection Act, to minimize the creation of new impervious surfaces in the City, and to require the planting of trees to maintain and increase canopy cover in the City.

Other City Departments

Other departments within the City that influence the planting and preservation of trees on both public and private property include the Office of Building and Fire Code Administration under the Alexandria Fire Department, the Department of General Services, Office of Historic Alexandria, and Alexandria City Public Schools.

The Office of Building and Fire Code Administration is responsible for managing the review and issuance of building permits and ensuring that there is a smooth transition for a development project from final site plan approval to building permit review, approval, and inspection.

The Department of General Services is responsible for all public buildings and facilities. Design for new building construction and the rehabilitation of existing facilities often affects existing trees and the installation of new trees.

Second only to the Department of Recreation, Parks, and Cultural Activities in area of open space managed, Alexandria City Public Schools controls all school grounds within the City, and therefore can play a significant role in the development of the City's urban forest.

Commissions, Committees, and Volunteer Programs

The City also supports other boards and commissions. The decisions, policies, and actions of the Planning Commission, Board of Architectural Review, Board of Zoning Appeals, Urban Design Advisory Committee, and neighborhood committees and plan task forces can all influence the development and preservation of Alexandria's urban forest.

Volunteer programs specifically oriented to trees and the urban landscape, such as the Beautification Commission, Tree Stewards of Arlington and Alexandria, and Virginia Tech Cooperative Extension's Master Gardener program, also exist to help and support the urban forest in the City, but are underutilized at this time.

Public Utilities

The installation and maintenance of public and private utilities, including communication, power, gas, water and sewer, can significantly affect the health and appearance of the City's street trees. Of these, overhead wires for electric, telephone, and cable television services present the most visible obstacle to planting and maintaining quality shade trees along City streets. Line clearance operations performed by utility companies are completed on a regular rotation in order to minimize service disruptions caused when tree branches grow and come into contact with energized wires. The severity of the pruning required is determined by the length of the rotation period and the anticipated growth of the trees. Repeated line clearance pruning often leads to a decline in the health of the trees and the destruction of their natural form and appearance. Lower growing and ornamental trees are now being planted under utility wires to minimize this conflict. However, these trees contribute less to the overall canopy coverage of the City, and often create new conflicts with vehicular and pedestrian traffic due to their lower branching habits.

Underground utilities, while less evident, may also conflict with the healthy development of City street trees because of the limited space available in the public right-of-way. New installations and repairs to underground services often result in significant damage to tree root systems, putting the health and stability of the trees in jeopardy. Excavation within their root zones causes damage to feeder roots as well as structural roots that support the trees. Service lines often occur in close proximity and even directly beneath street trees, making root disturbance during repairs unavoidable.

Efforts to place overhead utilities underground will eliminate many above-ground conflicts and develop a more natural habit with fuller crowns that are not subject to line clearance operations. It should be recognized that the process of installing overhead utilities underground will create other challenges to trees beneath the surface of the right-of-way.

The placement of trees within the City's right-of-way should be made with due consideration of the location of overhead and underground utilities; however, avoiding these conflicts completely is an unrealistic goal that would significantly reduce the valuable crown coverage, and associated environmental and aesthetic benefits provided by the City's street trees.

The public has the greatest influence on the development, maintenance, and preservation of Alexandria's urban forest. The public, including City residents, property and business owners, commuters, and visitors, influences the trees and canopy cover on both public and private land. Maintenance, removal, and planting of trees on public property are primarily driven by requests from the public.

Residential property owners influence the majority of the City's canopy cover through the decisions they make to care for, remove, or plant trees on their properties, particularly in areas of the City like Northridge where the tree canopy cover exceeds 50%. For many residential property owners, the desire to live among mature shade trees is challenged by the desire to improve their properties and upgrade their homes.

The public further influences the urban forest through its ability to participate in public processes regarding development. The public also has the ability to engage political influence in these and other matters that may affect the urban forest.

J. Noelle/Department of RPCA

J. Noelle/Department of RPCA

Chapter 3. Analysis and Recommendations

There is great potential for expansion and improvement of the City's urban forest. In order to evaluate the potential for improvement and develop recommendations to achieve it, the City conducted an analysis of its current plans, policies, and programs that affect the future of the urban forest. This section reports on the result of that analysis, identifies areas for potential improvement, and evaluates the improvement that is achievable through various actions.

J. Noelle/Department of RPCA

OVERALL CANOPY COVER

Issue

Potential loss of citywide canopy cover.

Analysis

As indicated by the City Green analysis, Alexandria's tree canopy covered approximately 35% of the City in 2001. Most of the tree canopy is provided by mature oaks and other native trees growing on private property in established single-family residential areas, such as Northridge and Del Ray. In recent years, many trees have succumbed to the natural pressures of age and the environmental stresses of drought, insects, and diseases. Many new and long-time residents who are attracted to these communities because of the trees now find that they require larger, more updated homes, which requires the removal of mature trees to accommodate new houses, building additions, and other improvements.

American Forests recommends an average of 40% tree canopy for communities in the Chesapeake Bay region, and most urban foresters and other eastern cities agree with this overall goal. This goal is based on tree benefit studies, technological advances in urban forest measurement, and an evolution of thinking about how and why we quantify the urban forest. This goal appears to be the point where environmental benefits of trees are maximized, such as community-wide goals for clean air and water, and a balance is established between development and the natural environment that contributes to a high quality of life in a city. Achieving the goal of an overall 40% canopy cover is not without its challenges in Alexandria. New development of both commercial and residential properties throughout the City may not provide enough open or planting space to expand or even sustain Alexandria's existing tree canopy. There are currently no efforts to monitor and track increases or decreases in the City's canopy cover.

An additional challenge to the sustainability of the overall forest canopy in Alexandria is the species diversity. Species diversity enables a tree community, as a collective whole, to survive natural epidemics due to environmental or biological

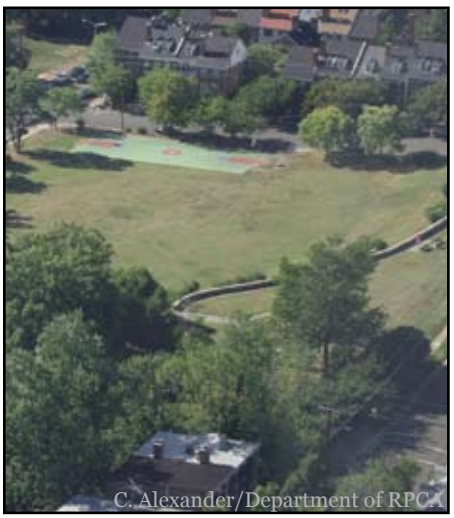
factors. Urban foresters know the value of planting and maintaining a wide range of species, including both native and non-native, urban-tolerant trees species. Planting a large number of trees of the same species creates a monoculture and can lead to catastrophic results. A good example of this situation was the dominance of American elm (*Ulmus americana*) in American cities in the early 1900s. When Dutch elm disease (*Ceratocystis ulmi*) arrived in the United States in the 1930s, the resulting tree losses were devastating. Similar scenarios are now foreseeable due to the effects of the Asian long-horned beetle, gypsy moth, and emerald ash borer.

Goal

Increase Alexandria's tree canopy.

Recommendations

1. Adopt American Forests' recommended tree canopy coverage goal of 40% and develop a citywide strategy to meet this goal.
2. Perform tree canopy coverage analysis every five years using City Green or other comparable programs to determine changes in canopy cover and impervious surfaces.
3. Sustain Alexandria's existing tree canopy through a comprehensive tree replacement and maintenance program for trees on public property and by developing new and promoting existing educational resources for the public.
4. Plant 400 more trees per year above what is currently being planted annually on public properties, including City rights-of-way, schools, libraries and other public facilities.
5. Actively seek ways to increase Alexandria's tree canopy on private property.
6. Establish a tree bank to plant trees on both public and private properties. The bank would be funded through various sources such as development-related activities, property damage reimbursements, and other sources.
7. Create a grant program to permit the use of City funds to subsidize all or a portion of the cost for planting trees on private property.
8. Continue the City's spring and fall tree sales program (established in 2005 under the auspices of the Urban Forestry Steering Committee).


C. Alexander/Department of RPCA

9. Achieve and maintain a species diversity where no single genus comprises 15% and no single species comprises 5% of the total population.
10. Work with local civic and business groups to identify opportunities to plant additional trees on public and private lands.
11. Take steps to incorporate the use of more sustainable approaches to environmental design, such as rooftop gardens, to provide additional benefits for the City's overall canopy on private as well as public properties. Green roofs can provide some of the functions of forested areas including carbon fixation, shading, cooling, and watershed protection. Green roofs on underground parking structures can provide ground-level open space that is important to the continuous open space network.

OVERALL PUBLIC TREE POPULATION

Issue

There is an incomplete strategy for management of all public trees.

Analysis

Alexandria's public trees include street trees, those in parks, those located on public school properties, and on other public lands. While there has been a continuing effort to quantify the number and condition of the City's street trees, no similar efforts have been made for trees in parks, schools, and other City facilities. Maintenance of the public trees focuses on street trees. Tree maintenance in other public areas is generally conducted as a result of weather-related damage or when a tree dies or presents a hazard to the public.

The cursory inspection of Alexandria's public trees indicates that they are in fair to good condition. The City has no procedures for evaluating the overall health of its public trees.

Goal

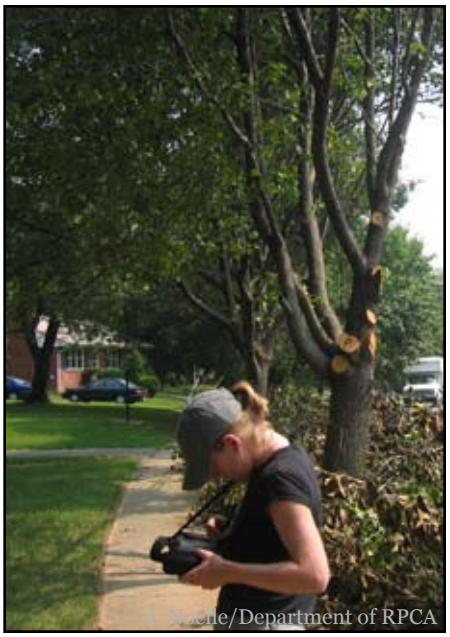
Develop comprehensive management plans for all trees on public lands including a street tree inventory and inventories of trees located in public parks, schools, and facilities.

Recommendations

12. Conduct an inventory of all trees located in the public rights-of-way, in parks, on school properties, and at all other public properties and facilities. The inventory should be completed and reviewed on a continuous five-year schedule or as changes occur.

13. Develop and implement master landscaping, planting, and maintenance plans for all public properties, including City rights-of-way, schools, libraries, stream corridors, and open spaces, and implement one to two of these plans each year. These plans should provide maintenance rotations and establish level-of-service standards for each land use type. Plans should also include strategies for regular inspections of trees, criteria for treatment, and practical methods to maintain current information on all trees subject to treatment. Coordinate with the Departments of Transportation and Environmental Services and Planning and Zoning to ensure plans are consistent with existing transportation and small area plans.

14. Develop quantitative methods to evaluate the overall health of Alexandria's street trees and trees on public properties.



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STREET TREES

Issue

There is a high public demand for a healthy public street tree population. However, many physical challenges to planting and maintaining a healthy population exist.

Analysis

Street trees in Alexandria face many environmental challenges and physical barriers due to the limited dimensions of the planting strips and tree wells. Narrow rights-of-way, sidewalks, curbs and gutters, and under- and above-ground utilities often limit the space required to permit the healthy and unobstructed development of street trees. Planting strips along residential streets are often less than three feet in width and conflicts between tree roots and surface infrastructure regularly occur and are not easily resolved.

Despite the deficiencies in their growing spaces, many of Alexandria's street trees seem to defy the accepted arboricultural conventions of what trees require for growth, and have become fundamental components in defining the character and ambience of its neighborhoods and commercial districts. A higher priority is placed on satisfying the community's desire to have street trees rather than following accepted tree planting standards and arboricultural best management practices regardless of the potential conflicts that may be created. If the demands of the community for more street trees are to be met, then policies and maintenance practices that accommodate the challenges of the planting conditions must be adopted and funded.

Current tree removal policies do not fully consider or address the potential and existing damage that the roots of street trees cause to sidewalks, curbs, and gutters, or how the repair of these hardscape elements affect the health and stability of the trees. Some street trees may be pruned one or more times as their health declines before they are considered for removal. As a result, additional funds are being spent on street and curb repair and the maintenance of trees that will continue to decline rather than on improving trees that are in good health and would benefit from an ongoing maintenance rotation. Earlier replacement of trees that are likely to become problems for infrastructure would reduce infrastructure maintenance costs and result in a healthier tree canopy.

J. Noelle/Department of RPCA

Street tree maintenance is performed predominately in response to citizen requests, public repair and improvement projects, and storms. This reactive approach to the care of the street trees results in higher costs and an uneven level of care provided to the trees in the stand. Recent increases in funding for tree maintenance have led to programmed maintenance rotations along major arterial streets and in some neighborhoods to a limited extent. There is currently no detailed plan for the maintenance of all street trees throughout the City.

The City's street tree planting program is primarily focused on the replacement of trees that have been removed. Tree replacement may not occur in circumstances where spacing between trees is deemed inadequate and where residents indicate that they do not want a tree planted adjacent to their properties. The City does not have a street tree planting plan; therefore, many opportunities to plant trees are overlooked.

Issue

The current street tree population is characterized by a lack of species and age diversity.

Analysis

Current species diversity of Alexandria's public street population is limited. Predominant street tree species include oaks, maples, and ornamental pears. Pears comprised nearly 30% of the inventoried trees. In addition, Alexandria's stand of street trees is comprised primarily of either very young trees or old trees and lacks individuals of ages in between.

Goal

Improve the health and diversity of street trees, reduce the potential safety risks of trees to the public, and maximize planting sites along major thoroughfares and all public rights-of-way.

Recommendations

15. Plant and establish additional trees to achieve a 100% stocking level of available planting sites.

16. Actively seek opportunities to establish tree-lined medians along rights-of-way that are wide enough to create boulevards. Develop an urban forestry enhancement program specifically for Alexandria's unique boulevards and other significant transportation corridors.

17. Establish criteria to identify sites that will permit the expansion of tree planting strips and tree wells to provide more suitable growing conditions for street trees, decrease conflicts between tree roots and urban infrastructure, and meet all Americans with Disabilities Act requirements for adequate clearance and passage.

18. Work with the Departments of Transportation and Environmental Services, and Planning and Zoning to develop standards for, and require, innovative planting techniques and products to facilitate tree planting in restricted, high-use, difficult, and special needs areas.

19. Employ planting techniques that will promote the healthy growth of trees within an urban setting, such as alternative soil mixtures, extended tree wells, and systems to direct and manage root growth and limit conflicts between roots and urban infrastructure. Develop standards for planting in areas where space is too restricted or soil, aeration, drainage, or other conditions preclude providing adequate space and a satisfactory environment for trees to survive and thrive.

20. Explore opportunities to protect existing trees by using alternative paving materials and methods to correct conflicts between tree roots and sidewalks, such as rubber sidewalks, stone dust, permeable paving, and alternative pavement profiles.

21. Seek to relocate all overhead wires underground to avoid conflicts with trees and provide increased opportunities to plant large shade trees with an emphasis on major corridors.

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22. Implement pilot programs to develop and adopt alternative street profiles and sections that provide larger tree planting areas, more open space, increased permeable surface area, and new opportunities for stormwater management, also referred to as shared street concepts.

PUBLIC PARK, SCHOOL AND OPEN SPACE TREES

Issue

Little is known about the nature and health of the tree population in the City's parks, schools, and open spaces.

Analysis

No inventories exist for the trees in the City's parks, schools, and open spaces; therefore, no information is known about the species diversity, age diversity, or health of these trees. Very little tree maintenance is completed in City parks, with the exception of Fort Ward Park, and new parks such as Ben Brenman Park. The majority of tree maintenance completed in City parks is tree removal. Tree work occurring in parks is generally focused on eliminating hazards to the public, and not on improving the overall health or coverage of the tree stand. There is no information of the quantity or quality of tree maintenance performed on school property or other public open spaces.

Issue

No comprehensive plans for tree maintenance have been considered, with the exception of new parks and those currently in the planning stages.

Analysis

Thousands of trees are expected to be planted as new parks are developed at Potomac Yard, and as part of the improvements to existing parks along the waterfront, Chinquapin Park, Four Mile Run, Jones Point Park, and others. The City's parks, recreational areas, and other public properties provide great opportunities to plant additional shade and ornamental trees that can fully develop and add to the City's tree canopy.

K. Williams/Department of RPCA

Alexandria City Public School properties are perhaps the City's greatest untapped public resource for planting trees and adding to the City's tree canopy cover. School properties have a significant amount of open space, offering excellent opportunities for tree planting, which could increase the City's overall canopy and provide environmental education opportunities for students. The maintenance, removal, and planting of trees located on City school properties are the responsibility of the Department of Recreation, Parks, and Cultural Activities (RPCA).

No detailed management plans exist to guide tree planting and maintenance in City parks, schools, or other developed open spaces.

Goal

Improve the health and diversity of public trees located in City parks, schools, and open spaces, reduce the potential safety risks of these trees to the public, and maximize canopy cover.

Recommendations

23. Establish and implement comprehensive planting and maintenance plans for trees located in public parks, on school and other public properties and open spaces. These plans should be developed in conjunction with park landscape master/management plans, which include both development and rotational maintenance costs.

24. Build on the Alexandria Open Space Plan's recommendation to seek innovative ways of creating more open space by developing and implementing pilot projects such as Green Streets (see Appendix F), which are aimed at redesigning streets to reduce impervious surface, thus freeing up land for tree planting and helping to meet other environmental goals, such as reducing the impact of storm water runoff.

25. Rededicate Fort Ward Park as the City's Arboretum and develop and adopt a master plan for the park. Create a collection of trees and other woody plants that will serve as an educational resource for City residents and visitors.

26. Promote the value of tree donations and other support programs, such as the Living Landscape Program, as a source of trees to be planted in parks and other public open spaces. Park master plans should be developed with tree locations that are ear-marked for living landscape trees.

27. Continue to celebrate Arbor Day and hold other special events and educational programs about urban forestry on parks and school grounds.

STREAM AND NATURAL AREAS TREE POPULATION

Issue

There is a lack of management and focus on stream valleys and forested ecosystems.

Analysis

Based on local information and field observations, the following general analysis of the tree population in riparian and other natural areas was developed.

The canopy cover, forest conditions, and species composition of the urban forest in stream and natural areas are unknown. Many environmentally sensitive areas and streams have been altered from their natural state by previous development, engineering projects, and ongoing floodway maintenance activities. If riparian and natural areas are not properly managed, native trees will be particularly prone to damage by invasive species.


J. Noelle/Department of RPCA

There are opportunities to plant more trees, especially large canopy trees, and native vegetation in these areas. Planting can often be accomplished economically with volunteers and smaller plant materials. Enhancement of these areas benefits the streams and environmentally sensitive areas directly and improves the quantity and quality of the overall urban forest canopy. Because streams provide the connected

natural areas that enhance habitat and open space benefits compared to small, disconnected areas, they are particularly important as open space corridors and connections. The Alexandria Open Space Plan places emphasis on development of continuous open space corridors and integrating currently unconnected open spaces.

Goal

Improve stream corridors and other natural areas through urban forest management.

Recommendations

28. Encourage the establishment and healthy growth of native tree species through planting and maintenance.

29. Control invasive plant species.

30. Improve the maintenance of overgrown and currently inaccessible and under-used stream valleys and natural public open space.

INSTITUTIONAL AND SEMI-PUBLIC TREE POPULATION

Issue

The urban forest is at risk on these properties due to high development pressure.

Analysis

The condition of existing trees and the level of maintenance on institutional and semi-public properties varies considerably. However, intensive uses of these properties contribute to the challenging growing conditions for the trees.

The quantity, species diversity, and condition of the trees growing on these properties are unknown. No efforts to quantify or evaluate the trees on these properties have been considered.

J. Noelle/Department of RPCA

No mechanism exists to enforce protection of existing trees on institutional and semi-public properties as development occurs. There are many opportunities to plant more trees and promote the creation of natural forest ecosystems on undeveloped portions of institutional and semi-public properties.

Goal

Establish a strategy for working collaboratively with institutions, such as hospitals, religious facilities, and private schools, to establish an appropriate approach to open space preservation and tree planting to benefit the public.

Recommendations

31. Provide and promote incentives to plant trees and implement projects to preserve and enhance the tree canopy on institutional and semi-public sites, such as INOVA Alexandria Hospital and Episcopal Seminary and High School.

32. Encourage the establishment and dedication of open space, tree canopy conservation, scenic, and historic easements on institutional and private properties.

PRIVATE TREE POPULATION

Issue

Trees are threatened by new development, redevelopment, and expansion due to the City's limited regulatory powers.

Analysis

The City's Tree Ordinance establishes conditions on the removal of trees on private property, but these conditions only apply at the time an application for a site plan or subdivision is made. Therefore, only a small portion of the residential properties, where most of the private trees are located, are impacted by this Ordinance. A provision providing for identification of historic and specimen trees covers only a small number of additional trees in the City.

Many cities that recognize the importance of trees to quality of life and the character of the community have adopted tree ordinances that are much more restrictive, typically requiring a City permit for removal or major reduction of the tree canopy of any tree above a certain size. Such ordinances typically permit such removal on submittal of a report from a Certified Arborist indicating that the tree cannot be saved or presents a danger to life or structures on the property. They may require compensatory planting elsewhere on the property or contribution to a fund for planting of trees on public lands or in another location identified for canopy cover mitigation.

While such ordinances may not ultimately prevent owners from removing existing trees, they require owners to consider alternatives and to carefully consider their options when they decide it would be desirable to remove a mature tree on their property.

Whether or not the City chooses to revise its tree ordinance to better protect mature trees on private property, the City has the ability to influence the behavior of some owners by providing public information on the benefits of trees and alternatives to tree removal and by providing incentives to plant trees and to retain existing trees on their property.

J. Noelle/Department of RPCA

Issue

As the private tree population reaches over-maturity, there is a lack of replacement planting when these over-mature trees are removed.

Analysis

The private tree population includes a high percentage of mature and over-mature trees, indicating that there is insufficient replacement stock to compensate for normal mortality and/or future loss to development and urban pressures. The overall condition of all trees is fair. Increasing disturbance of the growing area and urban environmental conditions can decrease this rating to poor or critical in a relatively short period of time.

Property owners may lack knowledge about proper tree care and planting. The level of maintenance private trees receive is unknown, but it is assumed that it is sporadic and on an as-needed basis. There may be opportunities to plant more trees, especially large canopy trees, on private properties, such as residential lots, open areas of industrial property, commercial parking lots, and other private properties.

Goal

As the largest property owner in the City, owners of industrial, commercial, and residential properties should preserve, plant, and maintain trees.

Recommendations

33. Develop guidelines for, and privately fund, a City grant program to support tree planting on private property. Grants should be made available to qualified homeowners, civic organizations, places of worship, religious institutions, and other not-for-profit organizations.

34. Educate private property owners about the benefits of trees and proper planting and maintenance strategies.

35. Encourage homeowners and civic associations to create tree or beautification boards with which the City Arborist can communicate and provide information about tree planting and maintenance on this type of property.

36. For commercial and industrial properties, enforce site plan and special use permit landscape requirements and conditions for new and existing development sites. Perform site inspections to ensure compliance.

J. Noelle/Department of RPCA

REGULATORY AND PLANNING CONTEXT

Issue

The City's existing regulations are outdated and the current City structure makes it difficult to enforce them.

Analysis

Alexandria directly and indirectly regulates the urban forest through a variety of legislation and planning documents. Most legislation and planning guidelines have been created and amended over time on the local level; however, Virginia's regulations and laws sometimes supersede and dictate Alexandria's ability to control and manage trees on public and private properties.

Goal

Strengthen Alexandria's ability to protect and increase its tree canopy as permitted by State and local regulation.

Recommendations

37. Evaluate, update, and enforce the City's existing rules and regulations.

38. Increase and maximize the amount of tree canopy coverage required for Development Special Use Permits.

MANAGEMENT AND OPERATIONS

Issue

The current urban forest management program is reactive.

Analysis

The City's urban forestry program has historically operated and still operates primarily in a reactive mode, responding to citizen requests for service with minimum proactive managed or pre-planned maintenance for the City's trees. The Arborist Office primarily responds to one tree at a time. Tree maintenance is almost exclusively confined to street trees, neglecting the needs of park trees and those at other City public facilities. There is no coordinated program that addresses the maintenance of all City trees or the establishment of new trees that are planted. Although there is an understanding of the entire urban forest, its maintenance is currently approached one tree at a time.

Issue

Current staffing, organizational structure, and funding levels are not adequate to meet the current needs of the program or the proposed goals of the Urban Forestry Master Plan.

Analysis

The current staffing of the City's tree crews does not provide enough full-time, permanent personnel to operate the equipment available or meet the many program demands. Three tree trimmers and one tree trimmer apprentice are assigned to operate two chipper trucks with aerial lifts and chippers, one stump grinder, and two hydraulic sprayers on trailers. Seasonal personnel and temporary full-time employees are trained to assist the tree trimmers and work with the specialized equipment, such as brush chippers and chain saws. Frequent turnover, mandatory furloughs, and limited seasonal budgets often interfere with the productive operation of the tree crews.

Department of RPCA Staff

The City tree crews provide a variety of services including tree pruning, tree removal, clearing of traffic signs, removal of low hanging limbs over streets and sidewalks, removal of limbs interfering with buildings, clearing alleys, brush pick up, stump grinding, and the care and watering of new trees. The Arborist Office staff and the tree crews are also required to respond at any time to emergency calls from the police and fire departments when public and private trees that are

blocking City streets or City trees have fallen onto private property. These calls are typically in response to severe weather events, but also include traffic accidents or other conditions that involve trees.

The City's tree crews are also responsible for installing the holiday lights in the street trees along King Street and holiday trees at four locations. During the months of October and November, one or both tree crews are committed to this task and cannot respond to citizen requests for service.

Tree pruning and removals are primarily completed by two contracted tree service companies. In 2007, approximately 1,300 trees were pruned and 300 trees were removed under unit price agreements. The volume of work completed by the contractors has increased over previous years as additional funds were made available. The majority of the work completed under contract is responding to requests for service from the public and high-priority items identified by City staff. Additional funding has also provided opportunities to begin the rotational maintenance of the trees along the City's major arterial and collector streets; those that are most visible to residents, visitors, and the commuting public. Contract crews are also called upon to assist in brush and debris pick up following severe storms.

Despite the assets, personnel, and contract services available, they are not adequate to meet the maintenance requirements of City's existing street trees, or those growing in parks and on school and other public properties. Proposals to expand the City's tree planting program will create increased demands for service which will not be met.

Goal

Improve the health, appearance, and longevity of all street trees and trees planted in parks, at schools, and on all public properties through regular maintenance.

Recommendations

39. Plan, fund, and implement a five-year pruning cycle for all established trees and a three-year establishment program for new trees planted along City streets, in parks, and on school and other public properties.

J. Noelle/Department of RPCA

Issue

The City's tree planting program fails provide adequate care for the survival, establishment, and development of healthy trees.

Analysis

Trees are planted along the City rights-of-way, in parks, and on school and other public properties by contractors under a unit price agreement. Once planted, the trees are not given adequate care, lacking water, mulching, and pruning during their establishment. While most of the trees planted in residential neighborhoods appear to survive, too many of those planted in commercial areas of the City, along arterial streets, in parks, and on school properties fail to survive or thrive because they are not watered and are often damaged by the careless operation of gas powered weed eaters and turf maintenance equipment.

The survival and improved growth of the trees could easily be accomplished by the commitment of staff to a watering program. However, the current level of staffing of the City tree crews and the demands for services to prune and maintain existing trees or clean-up response prevents the commitment of resources to a watering program.

Goal

Reorganize and support the urban forestry program to achieve the goals and implement the recommendations of the Urban Forestry Master Plan.

Recommendations

40. Transform the City Arborist Office and Tree Maintenance Section into a proactive Urban Forestry Section with a systematic and strategic focus on the urban forest system as a whole. Develop a management plan and provide resources needed to effectively manage the plan. Optimize personnel allocations and create efficiencies by combining the City's urban forestry and horticulture programs under one Natural Resources Section.

41. Create a new Urban Forest Specialist position that would be dedicated to activities aimed at preserving and enhancing the City's urban forest.

42. Fund requests for additional tree trimmers and horticulture staff necessary to successfully meet the goals of the Urban Forestry Master Plan.

43. Establish benchmarks and report progress in an annual State of the Urban Forest Report to the City Manager and City Council.

PUBLIC EDUCATION AND SUPPORT

Issue

Information about arboriculture and the Arborist Office is not easily accessible to the public.

Analysis

During the public participation processes carried out throughout this planning effort, the citizens of Alexandria enthusiastically supported trees. Alexandria's citizens need aggressive and consistent education on urban forestry issues and the City's urban forestry program's function and capabilities in order to focus citizen efforts to produce meaningful results. Citizen interest in trees can serve to provide resources for volunteer activities as well as opportunities for public education.

B. Carton/Department of RPCA

Volunteers have been used for insect monitoring, tree inventory tasks, and tree planting projects. Currently, however, the City's urban forestry program does not extensively use volunteers. These are an untapped resource. Activities well-suited for volunteers include: conducting educational programs, sustaining public relations initiatives, participating on various advisory/liaison groups, and performing limited tree planting and small tree maintenance tasks. Volunteers should not be used as a supplement to, or

replacement of, qualified staff to perform critical and core urban forest management services. The City should explore greater and better utilization of existing volunteers from the Tree Stewards and Master Gardeners, but must be prepared to support them with supervision and training.

Goal

Actively engage the citizens of Alexandria to be involved in the care, protection, and planting of the urban forest.

Recommendations

44. Develop and implement an effective public outreach and education strategy and pursue it actively and consistently. Volunteers are a greatly untapped resource in this regard and should be a core part of this strategy.

45. Create a series of Public Service Announcements on various urban forestry topics for radio, cable access television, and print news media outlets.

46. Develop and distribute information about the proper care for trees after they are planted.

47. Promote the preservation and expansion of Alexandria's tree canopy with programs, such as seminars and neighborhood tree walks.

Goal

Expand educational opportunities regarding the urban forest for the citizens for Alexandria.

Recommendations

48. Increase support for, and promote the expanded use of, existing public resources, such as the Cooperative Extension Service, the Tree Stewards, and Master Gardeners of Arlington and Alexandria, to provide assistance, advice, and educational opportunities and materials to the citizens of Alexandria.


R.H. Simmons/Department of RPCA

49. Fund an additional extension agent at Virginia Cooperative Extension who would provide vital volunteer programming services for Alexandria's residents. This person would, among other tasks, work to expand Alexandria's role in the Tree Stewards of Arlington and Alexandria program, a group of volunteers trained by the extension service to educate and assist citizens on proper tree planting and care.

50. Promote the availability and distribution of information to the public about the selection, planting and care of trees through the development of an effective website www.alexandriava.gov/trees, and the publication of handbooks, fliers and other publications.

51. Encourage collaborative efforts with local schools of landscape architecture to study opportunities to improve streetscape, public open space, park, school, and facility designs.

52. Create partnerships with allied businesses and organizations to share in the distribution of timely urban forestry information; partnerships could include: local realtors, utility companies, nursery and landscape companies, and tree services contractors.

53. Actively promote the existing Tree Stewards program and engage other citizens by creating opportuities to become program volunteers to assist in completing the vital maintenance tasks proposed in the Urban Forestry Master Plan that are currently not funded or inadequately funded for completion by City staff. These tasks might include: conducting tree inventories, small tree maintenance, tree planting, pruning teaching, grant writing, and marketing and public relations.

R.H. Simmons/Department of RPCA

B. Carton/Department of RPCA

Appendix A. Benefits of the Urban Forest

Trees are major capital assets in cities across the United States. Just as streets, sidewalks, public buildings, and recreational facilities are a part of a community's infrastructure and provide benefits, so are publicly-owned trees. Trees and the urban forest are important civic assets that require the same care and maintenance as other public properties to provide the services and benefits Alexandria's citizens expect and enjoy.

The following sections describe some of the general benefit types and values trees provide for the City.

ENVIRONMENTAL BENEFITS

Water Quality and Stormwater

- Trees reduce topsoil erosion, prevent harmful land pollutants contained in the soil from getting into our waterways, slow down water runoff, and ensure that our groundwater supplies are continually being replenished. For every 5% of tree cover added to a community, stormwater runoff is reduced by approximately 2%. (1)

- Research by the U. S. Forest Service shows that in a 1-inch rainstorm over 12 hours, the interception of rain by the canopy of an urban forest reduces surface runoff by about 11.3 million gallons, or 17%. These values would increase as the canopy increases. (2)

- Along with breaking the fall of rainwater, tree roots remove nutrients harmful to water ecology and quality. (2)

- Trees act as natural pollution filters. Their canopies, trunks, roots, and associated soil and other natural elements of the landscape filter polluted particulate matter out of the flow toward the storm sewers. Reducing the flow of stormwater reduces the amount of pollution that is washed into a drainage area. Trees use nutrients like nitrogen, phosphorus, and potassium—by-products of urban living—that can pollute streams.

Air Pollution

- Trees mitigate carbon emissions from vehicles. The larger the tree, the more carbon can be stored, or sequestered. A 3-inch caliper tree can store 2 pounds of carbon per year; a 10-inch tree stores 19 pounds per year; a 20-inch tree stores 43 pounds per year; and a 40-inch diameter tree stores over 90 pounds of carbon annually. Therefore, 1 acre of average tree cover in an urban environment can compensate for automobile fuel use and emissions equivalent to driving a car between 7,200 and 8,700 miles. (3)

- Trees remove gaseous and solid pollution from the air. Studies showed that pollution removal (i.e., ozone, particulate matter, sulfur dioxide, nitrogen dioxide, and carbon monoxide) by trees and shrubs in Chicago was estimated at 651 tons and in Brooklyn at 287 tons. Average individual tree pollution removal estimates can vary by diameter classes. For example, a 3-inch tree removes 0.07 pounds per year; a 10-inch tree removed 0.8 pounds per year; a 20-inch tree removes 2.2 pounds per year; and a 40-inch diameter tree removes over 5.3 pounds of pollutant per year. (3)

Energy Conservation

- Trees lower local air temperatures by transpiring water and shading surfaces. Because they lower air temperatures, shade buildings in the summer, and block winter winds, they can reduce building energy use and cooling costs. (4)

- Trees help to cool cities by reducing heat sinks. Trees shading sidewalks, often lacking in the City today, can make walking more pleasant on warm summer days and perhaps encourage more walking overall. Heat sinks are 6 to 19 degrees Fahrenheit warmer than their surroundings. A tree can be a natural air conditioner. The evaporation from a single large tree can produce the cooling effect of 10 room-size air conditioners operating 24 hours per day. (5)

- The annual effect of well-positioned trees on energy use in conventional houses is a savings of 20% to 25% when compared to a house in a wide-open area. (6)

ECONOMIC BENEFITS

The scope and condition of a community's urban forest is usually the first impression a community projects to its visitors. A community's urban forest is an extension of its pride and community spirit and has direct and indirect effects on economic development. Studies have shown that:

- Trees enhance community economic stability by attracting businesses and tourists.

- People linger and shop longer along tree-lined streets.

- Apartments and offices in wooded areas rent more quickly and have higher occupancy rates.

- Businesses leasing office spaces in developments with trees find their workers are more productive and absenteeism is reduced. (7)

- Property values increase 5% to 15% when compared to properties without trees, depending on species, maturity, quantity, and location.

- Cities spend fewer resources on street maintenance when street trees are present. The asphalt paving on streets contain stone aggregate in an oil binder. Without tree shade, the oil heats up and volatilizes, leaving the aggregate unprotected. Vehicles then loosen the aggregate and much like sandpaper, the loose aggregate grinds down the pavement. Streets should be overlaid or slurry sealed every 7 to 10 years over a 30- to 40-year period, after which reconstruction is required. A slurry seal costs approximately $0.27 per square foot or $50,000 per linear mile. Because the oil does not dry out as fast on a shaded street as it does on a street with no shade trees, this street maintenance can be deferred. The slurry seal can be deferred from every 10 years to every 20 to 25 years for older streets with extensive tree canopy cover. (8)

SOCIAL AND PUBLIC HEALTH AND SAFETY BENEFITS

- Trees have the potential to reduce social service budgets, decrease police calls for domestic violence, strengthen urban communities, and decrease the incidence of child abuse according to the study.

- Residents who live near trees have significantly better relations with and stronger ties to their neighbors.

- Researchers found fewer reports of physical violence in homes that had trees outside the buildings. (9)
- Studies have shown that hospital patients with a view of trees out their windows recover much faster and with fewer complications than similar patients without such views.
- A Texas A&M study indicates that trees help create relaxation and well-being.
- A U.S. Department of Energy study reports that trees reduce noise pollution by acting as a buffer and absorbing 50% of urban noise.
- Trees can enhance traffic calming measures, such as narrower streets, extended curbs, and roundabouts. Tall trees give the perception of making a street feel narrower and closely spaced trees give the perception of speed, slowing people down. A treeless street enhances the perception of a street being wide and free of hazard, thereby increasing speeds. Increased speed leads to more accidents.
- Trees can serve as a buffer between moving vehicles and pedestrians.
- Street trees also forewarn drivers of upcoming curves. If the driver sees tree trunks curving ahead before seeing the road curve, they will slow down and be more cautious when approaching curves. (10)

VALUE OF ALEXANDRIA'S URBAN FOREST

Alexandria's parks, forests, and open space systems provide many amenities for City residents, institutions, businesses and their employees, and visitors. Yet perceptions of public value by all these diverse beneficiaries may not incorporate all of the scientifically confirmed public goods and services of urban green space. Increasingly, theories and methods of economic valuation have been used to derive green space values. Alexandria's City Arborist and City leaders can and should use valuation data in strategic political management efforts on behalf of the urban forest and gree spaces to assure that adequate resources are allocated for planning and management of urban nature systems.

The USDA Forest Service's Urban Forestry Effects (UFORE) and Street Tree Resources Analysis Tool for Urban Forest Managers (STRATUM) are the most recent cost-benefit models available today to measure and calculate the many and diverse values of the urban forest. UFORE quantifies the quantity, structure, and benefits of the overall forest canopy, while STRATUM focuses specifically on the street tree resources. Both models are peer-reviewed, scientifically based, and regionally applicable models.

UFORE and STRATUM have not been applied to Alexandria's urban forest resources. However, using results from similar cities where these models have been used and based on previous research on urban forest benefits, Alexandria received the following estimated benefits from its urban forest and street trees:

Alexandria's collective urban forest canopy provides:

- An annual removal of 117,600 pounds of air pollutants at a value of $285,600.
- A stormwater retention equivalent of 7,560,000 cubic feet valued at $1,512,000. (11).

Alexandria's street trees provide:

- Annual carbon sequestration of approximately 2,642 tons valued at $39,610.
- Based on an average tree intercepting 2,460 gallons of stormwater annually, the street trees provide a service valued at $408,000.
- Electricity and natural gas usage saved from both shading and climate effects of street trees can be valued at $187,000 annually.
- Total annual benefits associated with aesthetics, property value increases, and other less tangible benefits is approximately $545,000 per year.
- The annual gross value of the combined benefits of Alexandria's street trees is over $1,175,000.

Once Alexandria applies the STRATUM and UFORE models to the City's urban forest resource, precise local data will be revealed about the costs and benefits of the public trees and the whole urban forest. Like other cities across the United States who have used the models, it is likely the results will show that there is a positive return on City funds invested in the planting and maintenance of public trees and for the education of private property owners in Alexandria.

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J. Noelle/Department of RPCA

Appendix B. Results of the Public Process

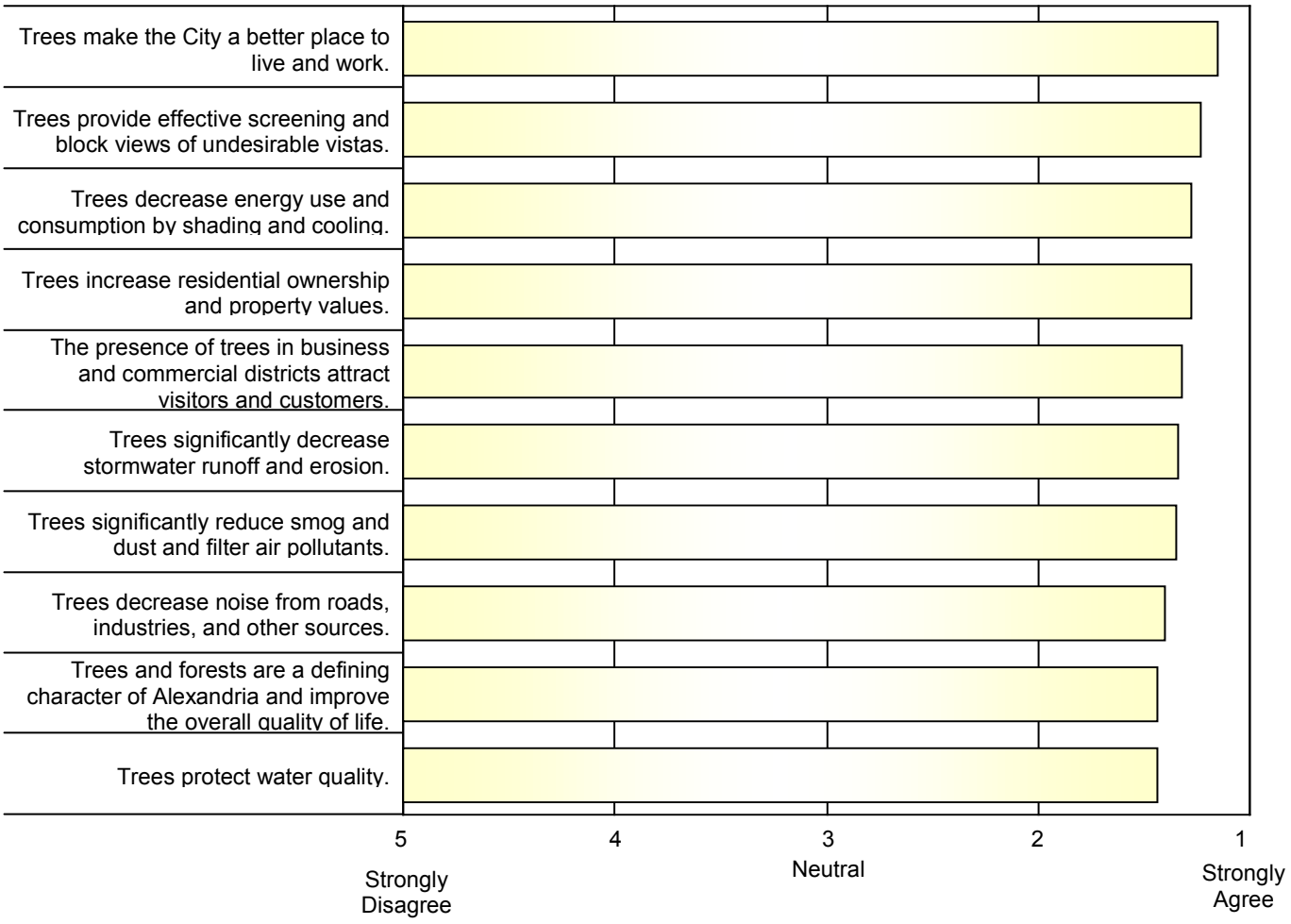
QUESTIONNAIRE

The questionnaire was comprised of ranking statements, rating general opinions, and replying to short answer questions. Responses to the ranking and rating portions of the questionnaire were averaged to develop the following figures.

The following discussion provides a summary of the results of the 267 questionnaire responses received from January 18 to April 30, 2006.

Participants were asked to rank statements regarding the benefits of trees based on their level of agreement with the statement (Figure 1). The average, top-ranked statement was that "Trees make the City a better place to live and work". Most respondents strongly agreed that all ten statements were valuable benefits of trees.

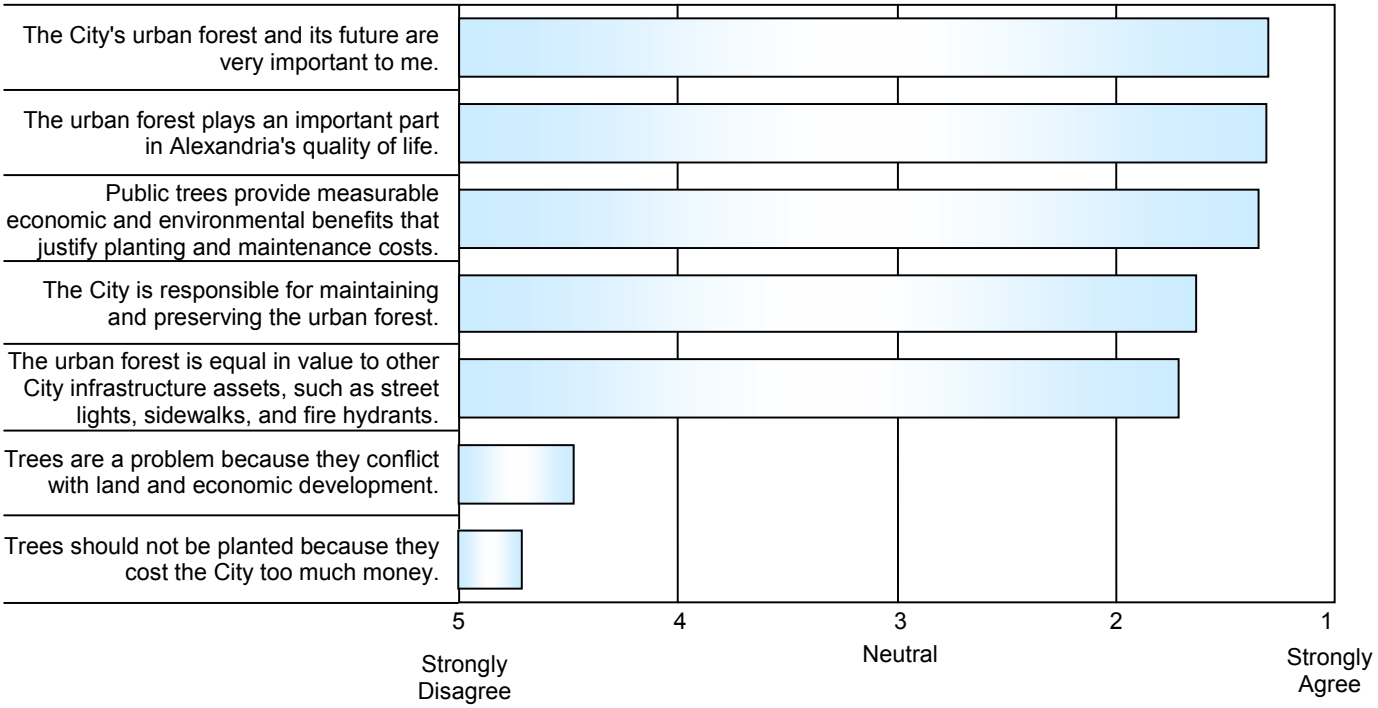
Figure 1. Tree Benefits



Prepared by Davey Resource Group

Participants were asked to rank statements regarding urban forestry values based on their level of agreement with the statement (Figure 2). The average, top-ranked statement was that the City's urban forest and its future are very important. Of the seven statements, the lowest ranking one was that trees should not be planted because they cost the City too much money.

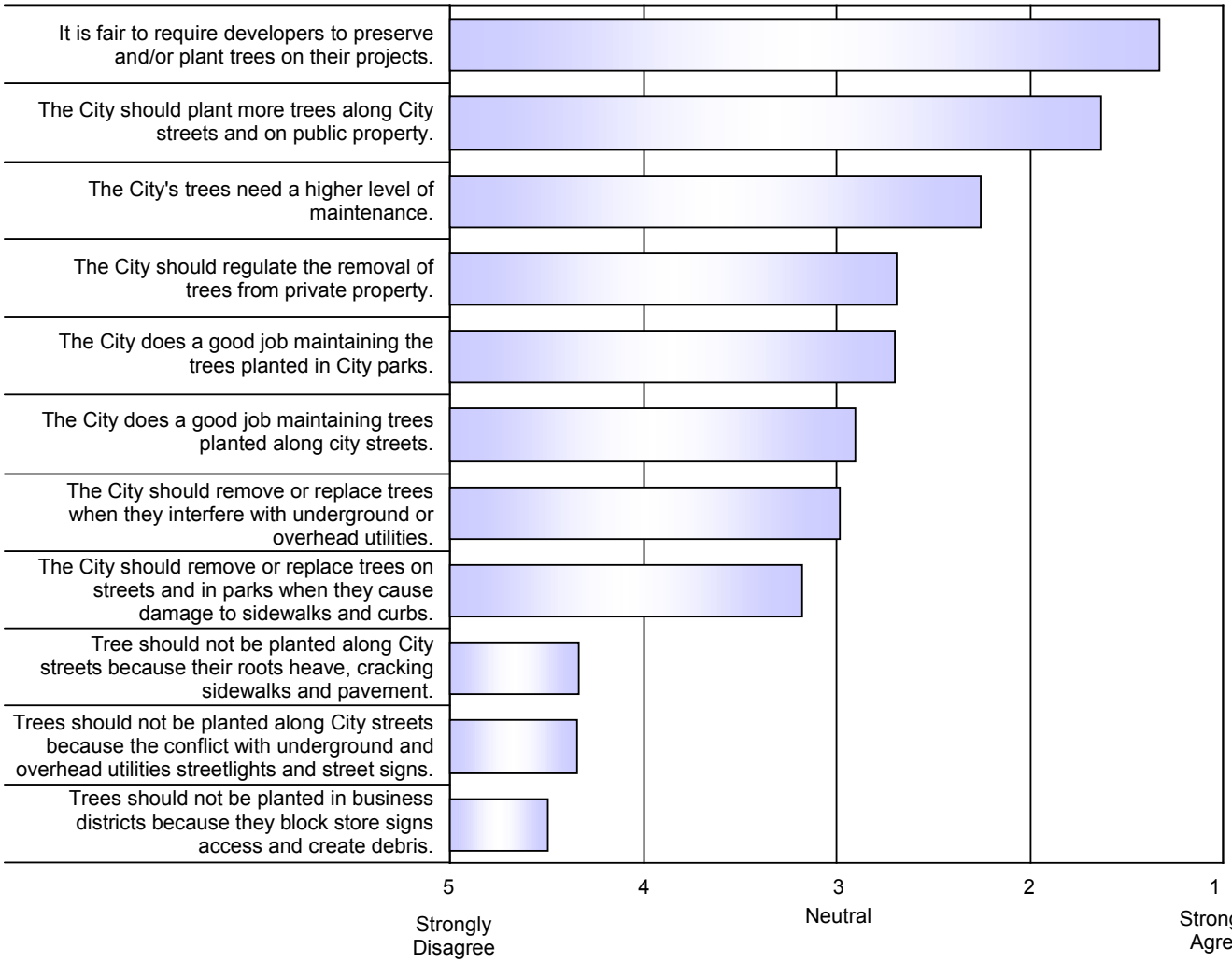
Figure 2. Urban Forestry Values



Prepared by Davey Resource Group

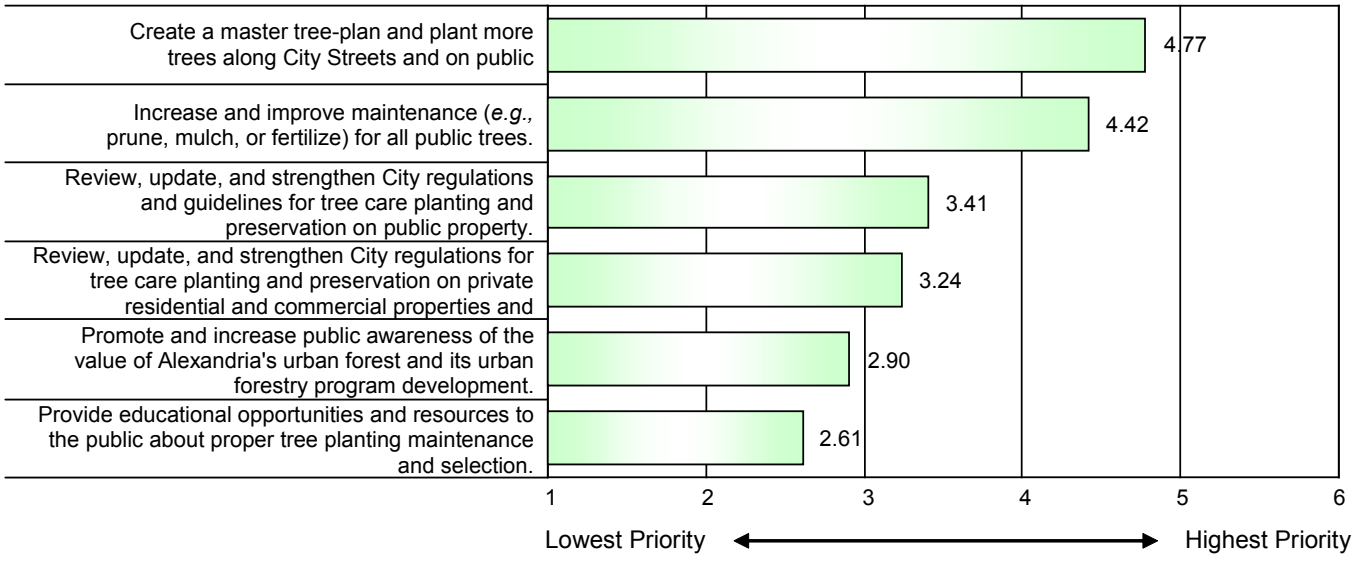
Participants were asked to rank statements regarding urban forestry management based on their level of agreement with the statement (Figure 3). Overall, respondents generally strongly agreed that it is fair to require developers to preserve and/or plant trees on their projects. The second, top-ranked statement was that the City should plant more trees along City streets and on public property. Of the 11 statements, the management statement that ranked the lowest was that trees should not be planted in business districts because they block store signs access and create debris.

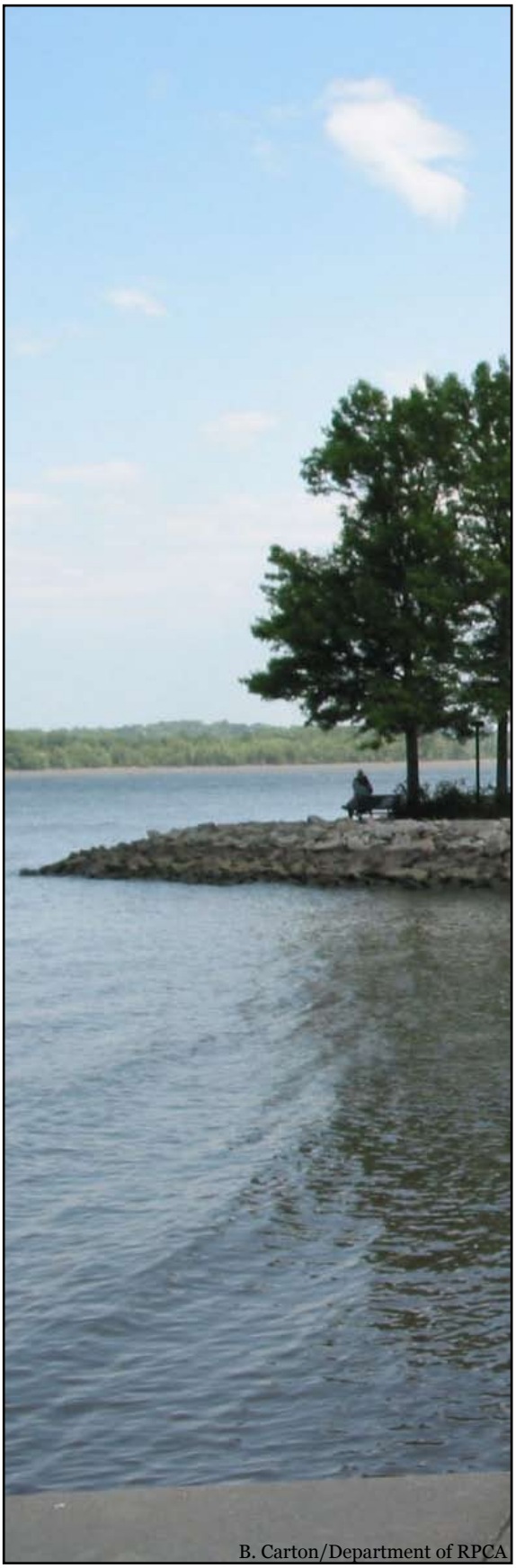
Figure 3. Urban Forestry Management



In the last part of the questionnaire, respondents were asked to prioritize a series of six action items. The average highest action priorities indicated a need to create a master tree plan and plant more trees along City streets and on public property. The lowest average action priority was to provide educational opportunities and resources to the public about proper tree planting, maintenance, and selection.

Figure 4. Action Priorities





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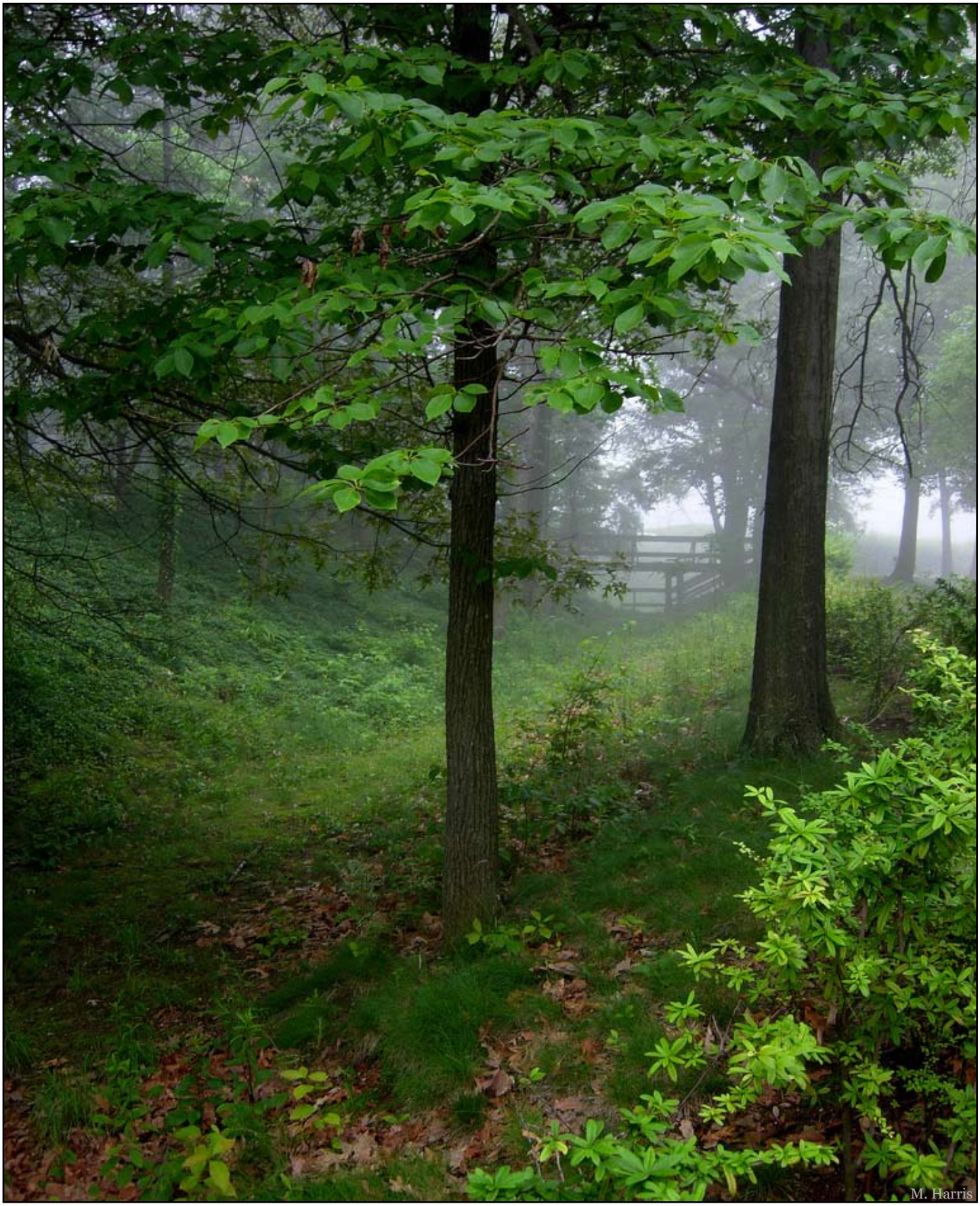

M. Harris

Appendix C. Detailed Analysis

TRENDS AND ISSUES

Based on the existing urban forest data, field observations, staff interviews, and public comments, the following trends, issues, and challenges currently support or challenge Alexandria's urban forestry program:

- The City's 35% overall forest canopy cover provides multiple and valuable benefits to the City and citizens in terms of environmental, economic, and social values.
- The street tree population is estimated to be 77% stocked.
- Alexandria can effectively be described as built-out; only 6%, or approximately 550 acres, is considered vacant. This implies that additional trees, open space, and new developments must compete for this small amount of available land. It also implies that forest canopy and development issues are dealt with on a micro-scale, lot-by-lot basis.
- Increased construction and development within the existing canopy cover is expected to continue based on population growth, housing needs, and commercial expansion in the next 10 years. Therefore, environmental, economic, and social benefits/services from trees will decrease due to the decline in the mature tree canopy cover lost to development and impervious surfaces.
- Urban forestry staff and leaders are challenged to manage public and private expectations and multiple goals in the development process. At issue is the difficult and complex task of balancing the built and natural environments for the maximum benefit of the citizens and the City.
- Since the vast majority of the existing overall forest canopy and the potential for the future forest are on private property and not in the City's control, the urban forestry program is challenged to effectively control and manage the effects of increased development on the remaining forest cover.
- Tree maintenance is performed on public trees, but typically is restricted to storm damage correction/clean-up, street and sidewalk construction or repair projects, building and right-of-way clearances, citizen requests, and other reactive tasks. Preventive and routine maintenance programs for mature trees and newly planted trees are not in place; citizens and staff highly desire such services.
- Tree planting is performed primarily on public streets by the urban forestry program or on private or public properties by developers in compliance with City requirements. Since 80% of the street tree planting is for replacement planting, little net gain in the street tree population is accomplished. In addition, a significant portion of City funding is directed to planting and caring for street trees; little money and attention is directed to other areas of the urban forest. Tree planting should be increased on public streets, parks, recreation areas, along streams and other environmentally sensitive areas, and on private property.

- Tree planting on many public and private properties is extremely restricted and inadequately designed to support vital, safe, long-lived trees. Due to competition for space, the locations and rooting areas for trees are limited by needs for pavement, buildings, and utilities leading to hardscape and infrastructure damage and trees in poor condition.

- The urban forestry program lacks basic urban forestry tools to efficiently and effectively accomplish its mission and responsibilities. Examples include tree inventories for various land use types, computer hardware and software programs, and operational management and master tree planting plans.

- The urban forestry program, staff, equipment, and funding are organized in the Department of Recreation, Parks, and Cultural Activities. Yet, the funding and mandates of the program are centered on right-of-way trees and planning and zoning projects on private property. Very little direct interaction or support for the urban forestry program comes from the Department of Recreation, Parks, and Cultural Activities, where much interaction, project coordination, conflicts, and opportunities occur with other City departments.

- The citizens of Alexandria consistently voice their extreme affection and concern for trees in their community and should also be considered a valuable urban forest resource. Citizens need and deserve to be educated and involved in urban forest management in the City.

REGULATORY AND PLANNING ANALYSIS

1992 Master Plan

Alexandria adopted its 1992 Master Plan. The Plan is made up of 15 small area plans (SAPs) which cover neighborhoods throughout the City, and contains chapters on topics of citywide interest, such as historic preservation, land use, urban design, and open space. Chapters of the 1992 Master Plan are updated on an ongoing basis as needed, either through Council-adopted amendments to the 1992 Master Plan or neighborhood studies initiated by Planning and Zoning's Neighborhood Planning and Community Development Division.

The 1992 Master Plan currently supports the concept of a comprehensive urban forestry program within the City's organizational structure, and acknowledges the importance of the urban forest in defining the character and livability of Alexandria. Clear emphasis is placed on the value of the City's trees, parks, and open spaces now and in the future.

In 2006, the City and citizens created the Vision for Alexandria 2015: "Alexandria is a vibrant, diverse, historic, and beautiful City with unique neighborhoods and multiple urban villages where we take pride in our great community." A healthy urban forest canopy sustained by a strong urban forest management program with an appropriate structure and sufficient funding can help make this vision a reality.

Urban Forestry Elements

Land Use Goal

To preserve and increase parkland and open space throughout the City.

Housing Policy

For new development, the City shall require suitable landscaping and well-defined open spaces.

Transportation Goal

The City shall develop and manage a safe, comprehensive transportation system with minimal environmental impact.

Community Facility Goals and Strategies

Public and private policy must lead the way to guarantee a healthy satisfying environment for this generation and all generations to come.

Woodlands throughout the City should be mapped and preserved; the City should plan and encourage tree planting.

A citywide forestation program, including street trees, should be maintained.

Property owners and developers should be encouraged or required to preserve existing trees.

Parks and Recreation Goals and Objectives

To integrate public open spaces into the fabric of the City in order to preserve natural resources and provide a healthy and attractive environment.

To expand landscaping of street medians and rights-of-way, to preserve and expand the number and variety of trees in the City, and to encourage sound forestry practices.

Alexandria Open Space Plan

In 2003, the Alexandria Open Space Plan was completed and adopted by the City as part of the City's 1992 Master Plan. This important study and implementation plan resulted in 15 goals that form the framework of the Plan. Nearly all 15 goals support increased and proactive urban forestry management in Alexandria, and conversely, the City's comprehensive urban forestry program can support the Alexandria Open Space Plan in almost every goal.

Goal 12 specifically focuses on the urban forestry needs of the City—expand citywide street tree programs and protect existing trees and woodland areas. Three major recommendations include: protect significant tree-lined rights-of way; identify and address potential tree cover protection areas; and address stream valley protection areas.

The implementation strategies are broad in nature, but do include important general tasks for the City's urban forestry program and will be recognized and incorporated in the Urban Forestry Master Plan.

To supplement the Alexandria Open Space Plan, the City prepared the Guide to Voluntary Land Conservation Options. The Guide provides descriptions of various methods to conserve environmentally significant lands, including land donation, conservation easements, establishing a living trust, and donation of property.

The Open Space Plan does not address the planting of additional trees to enhance tree canopy cover. However, the Open Space Plan's emphasis on increasing the amount and connectivity of the City's protected open spaces carries an implication that the tree cover in these areas should be expanded and enhanced.

The implementation strategies of the Open Space Plan are broad in nature, but do include important, general tasks for the City's urban forestry program and these are recognized and incorporated in the Urban Forestry Master Plan.

Recreation, Parks, and Cultural Activities Strategic Master Plan

In 2002, the City accepted and adopted the Recreation, Parks, and Cultural Activities Strategic Master Plan. Its purpose was to provide a broad policy and management framework to guide decision-making about future land use and recreational needs of the residents. The need for the plan was motivated by the existing population density, the expected rapid growth in the near

future, and potential loss of community character and livability so important to Alexandria. The major urban forest related components and recommendations of the plan included: protecting stream valleys and natural areas, preserving significant tree cover, acquiring additional park and open space land, enhancing greenways, creating an expanded trail system, protecting the Potomac River, enhancing existing parks, expanding recreation opportunities, and protecting historic sites.

A major, stated goal of the plan is to "Protect and enhance the urban forest and beautification of the City." However, while no direct analysis of the City's urban and suburban forest and natural resources was made in the plan, it is clear that many of the objectives and implementation strategies of the plan coincide directly with the Urban Forestry Master Plan goals. Specifically, these recommendations are listed in the Plan's Visioning Matrix.

Plan Visioning Matrix

Goal 1. Protect, restore, enhance, and connect open space and natural resources.
Strategy 1.1. Protect, restore, and enhance the urban forest and beautification of the City.
Tactics:

- Develop an urban forestry plan for the City.
- Seek City Council approval for funding the plan.
- Implement a work plan that is 70% planned work and 30% reactive work.
- Protect existing trees and woodlands.
- Expand citywide tree planting.

Strategy 1.6. Protect and enrich existing parks as well as new opportunities.
Tactics:

- Develop a master plan for each of the City's parks.
- Expand the City's volunteer programs, such as Adopt-A-Park and Tree Stewards.
- Develop a management and stewardship plan for each of the parks.

Strategy 1.9. Protect and expand stream valleys and other environmentally sensitive areas.
Tactics:

- Conduct a detailed survey of the City's streams and woodlands; the survey should also include specific recommendations for the protection of these resources.

Strategy 1.10. Maximize use of public school open space to satisfy local needs.

Strategy 1.11. Enhance streetscapes and gateways.

Clearly, the City administration, Council, and the Department of Recreation, Parks, and Cultural Activities support the management of forest resources as an integral part of the provision of recreational experiences to City residents. The plan's tactics for an urban forestry plan and funding have been accomplished.

New tree planting and mature tree care enhance the quality of existing and new parks, trails, gateways, public school properties, historic sites, and recreation areas. The protected status of parks, open spaces, stream corridors, and public schools make these areas prime opportunities for creating tree banks to recover overall canopy loss. Some of the revenue-generating mechanisms and suggestions made in the Recreation, Parks, and Cultural Activities Strategic Master Plan could be joint efforts to benefit both parks and urban forestry program goals.

Bicycle Transportation and Multi-Use Trail Master Plan

Completed in 1998 for the Department of Recreation, Parks, and Cultural Activities, the Bicycle Transportation and Multi-Use Trail Master Plan for Alexandria, Virginia details policies and

actions to implement the City's Transportation Master Plan and the Recreation, Parks, and Cultural Activities Strategic Master Plan goals relating to decreased vehicle use and increased pedestrian facilities. The plan calls for creating or designating 85 miles of on-street and off-street bikeways.

Whereas the plan does not directly address the value, use, or design of trees in the proposed bike trail system, except to dictate clearance requirements, the urban forest is a City resource that can enhance the plan's goals and encourage increased bicycle riding. Street trees provide welcome shade and aesthetics along bicycle routes for both commuters and recreational users. Bike trails through woodland settings are extremely popular and are often destinations in themselves. Additionally, by supporting and implementing both the Bicycle Transportation Plan and the Urban Forestry Plan, significant improvements in air quality can be realized.

Municipal Code

Title 6 Chapter 2, Trees, Shrubs, Plants, and Vegetation

Alexandria already has one of the most important tools needed for a comprehensive urban forestry program and to attain a healthy, vigorous, and well-managed community forest—a tree ordinance. Generally, a tree ordinance establishes standards and sets guidelines. It is the legal framework within which local tree management activities are conducted for the general welfare of the citizens.

A tree ordinance is not an end in itself and is not a solution for poor or inadequate management of community tree resources, but it is a valuable support mechanism for comprehensive community forest management and, therefore, should not be viewed as simply another regulation.

Alexandria's tree ordinance currently has four Articles that address these issues: regulation of trees on public property; regulation of trees on private properties that interfere with or endanger the public or public property; removal or damage of trees on private property; and appeals and penalties for violation of the ordinance. In almost all cases, public school properties are exempted.

The basic functional components and provisions of a good tree ordinance are currently in Alexandria's ordinance:

- Designation of Authority
- Permit Requirements
- Master Plan
- Public Tree Protection
- Private Tree Protection
- Appeals/Penalties

However, some current sections should be revised and other sections should be added to reflect new goals of the City's urban forestry program, current industry standards, and recommended professional practices.

These ordinances and guidelines provide direction that should result in gradual improvement of the condition of the City's public trees as streets are improved and trees are replaced as a result of development projects and street or streetscape improvements. However, these ordinances do not give direction for establishment of priorities or achievement of long-term streetscape objectives through annual operations or planting programs.

The City Code at Section 6-2-6 gives the Director of Recreation and Parks the authority to prepare and implement a "master tree, shrub, plant, and vegetation plan for all or any portion of the public places within the city, except public school sites." The Department has not developed such a master plan since this responsibility was transferred from the Public Works Department in 1963.

The absence of such a master plan means that there is no formal policy direction for the role of street trees on the various streets throughout the City except in the very limited cases in which a specific role and streetscape policy has been identified in a small area plan. There has been no citywide evaluation of whether the current planting and streetscape is appropriate for the long-term role of the street in the citywide landscape. There is no policy direction for which streets should have priority for conversion to underground utilities in order to provide for the achievement of the long-term streetscape objectives for the street and the neighborhood.

The lack of such policy direction means that development of planting plans for each street is likely to be based on maintaining or improving current conditions without reference to ultimate need for a change in direction. Each tree replacement or maintenance activity in such cases may be a missed opportunity to come closer to long-term goals for the image of the City and the development of the City's urban forest.

Because of the importance of the urban forest in the overall image of the City, this policy direction should be developed through an interdepartmental program involving the departments of Recreation, Parks and Cultural Activities, Planning and Zoning, and Transportation and Environmental Services.

Community support is critical to the effectiveness of Alexandria's tree ordinance, but community support cannot be legislated into an ordinance. Rather, the ordinance must be developed within the context of community values and priorities if it is to enlist public support. Even a technically correct tree ordinance is apt to be ineffective without public support. Therefore, any future changes to the existing ordinance should be subject to the public information and input process.

Alexandria's tree ordinance is an especially important regulatory and policy document. The tree ordinance, its use, and its enforcement demonstrate how the City and citizens manage and value the trees under their control. Tree ordinances can enhance the valuable natural resource of both the public and private urban forest and ensure that it is protected to provide public health and safety as well as many other important benefits.

Title 5 Chapter 2, Streets and Sidewalks

Across the country, trees are legitimately being considered and treated as publicly owned infrastructure on city rights-of-way. Therefore, it is appropriate to consider trees as green utilities and include them in other sections of the Municipal Code.

Despite the ultimate or future organizational location of the urban forestry program, public trees should be acknowledged, encouraged, and protected in this section of the Municipal Code.

Title 5 Chapter 11, Gypsy Moth Control

This chapter of the municipal code was created in October, 1987, when the threat of gypsy moths and the consequences of unmanaged control to the urban forest were extreme. Since that time, the efforts of the City, research entomologists, and time have significantly reduced the gypsy moth population and threat in Alexandria and the region.

Recently, however, there are new insects and diseases challenging the urban forest primarily due to the introduction of exotic threats from international sources. Some of these include the Asian long-horned beetle, Formosa termite, emerald ash borer, sudden oak death, and Armillaria root rots.

City governments are a logical entities to assist in the detection and control of these and any future insect and disease threats to the urban forest. The City should retain the power to monitor, suppress, and take other reasonable action to protect public and private trees.

Title 5 Chapter 4, Erosion and Sediment Control

Trees and associated shrubs, groundcovers, grasses, and other vegetation in urban forests have proven to provide very effective, natural erosion control. If significant forest resources exist on a site to be disturbed, then the owner or plan applicant should be encouraged to retain as much existing tree cover as possible as part of the total erosion and sediment control plan.

Title 5 Chapter 9, Weed Control

Weed control is a valid municipal responsibility to protect public health and safety and to enhance the aesthetics and livability of communities. Alexandria's Code instructs that abutting property owners shall be responsible for eliminating weeds on the public rights-of-way and in tree wells.

Title 5 Chapter 3, Underground Utilities

Within the City of Alexandria, all utilities are to be placed underground when possible. This creates a more aesthetic appearance for the City and does reduce conflicts between trees and aerial utilities. However, underground utilities and tree roots are not without their own set of conflicts.

Properly planned and constructed underground utilities and properly planned and planted public trees can usually co-exist in the public right-of-way. The primary urban forestry issue is the disturbance of established and mature trees when new utilities are constructed or when utilities and related facilities require routine or emergency repair. When trees and root systems are damaged by utility construction or repair projects, then the City not only faces the potential loss of the tree and its benefits, but also a safety risk may be created or exacerbated.

Therefore, it is important that the management of this issue and the role of the City Arborist be clearly defined in this Chapter. Section 5-3-4(A)(iii)(a) only indicates that aerial construction or expansion may occur if the City Arborist determines that underground construction would damage a mature tree.

Title 9 Chapter 3, Alexandria Cable Communications Code

Article 1 concerns the construction, operation, and maintenance of the cable system in the City. Section 9-3-122(o) specifically describes and regulates the pruning of public trees for cable wire and facilities clearances. These provisions are adequate if routinely followed and enforced. Section 9-3-123 generally describes the conditions for the use of public property for this activity and has provisions for the protection and repair of public structures and facilities.

City of Alexandria Zoning Ordinance

The City of Alexandria Zoning Ordinance was adopted June 24, 1992 and guides all land development and redevelopment in the City. The Department of Planning and Zoning is responsible for administration, review, inspection, and enforcement of its provisions. Chapter 9 of the City Charter, Planning, Zoning, and Subdivision Control, establishes the duties of the City Council, Plan Commission, and Board of Zoning Appeals and their roles in enforcing the Zoning Ordinance. In addition, Title 7 Chapter 1, Planning Commission, of the Municipal Code authorizes the City to participate in the Northern Virginia Regional Planning and Economic Development Commission.

The Zoning Ordinance recognizes the value of trees and takes several measures to account for and protect them:

- One of the purpose and intent statements is to "provide for the preservation of environmentally sensitive areas and urban forested lands."
- Development plans must show existing tree cover and proposed landscaping in detail.
- Tree preservation measures are required and canopy cover must be provided for a minimum of 25% of the site.
- Overlay zones are established to allow for development in parks and open spaces that is consistent with and respectful of these land uses.

Article IX provides site plan requirements and general landscaping guidelines. Trees, shrubs, and other natural areas, including streams and wetlands, must be shown on all site plans. Preserved natural areas and/or individual trees must be indicated on the plans along with the methods that will be used to protect them during development of the site. Canopy cover must be provided for 25% of the site once the development is completed. Of the 25% canopy cover, at last half must include preservation of existing canopy and plan commission may approve up to 50% be provided with new plantings. In some cases, up to 100% of the required 25% canopy cover can be provided with new plantings.

Section 11-410(CC)(2) in Article IX of the Zoning Ordinance also establishes alternatives to traditional tree planting sites, allowing for plantings on decks, plazas, and even roof-tops to count to the minimum canopy coverage on a development site. The flexibility in this area of the Zoning Ordinance provides the City with the unique opportunity to encourage developers to implement alternative designs such as green roofs. Green roofs can help increase the size of the urban forest, particularly in the City's densest areas, where opportunities for additional tree planting are limited.

Article VI of the Zoning Ordinance establishes several special and overlay zones, including the public open space and community recreation zone (POS) and the waterfront park and recreation zone (WPR). The intent of the POS zone is "to preserve and enhance Alexandria's publicly owned open space and recreational areas and to protect the natural and developed amenities they possess." The WPR zone is intended "to enhance the vitality of the Alexandria waterfront by providing for parks, open spaces, and recreational opportunities." These areas provide a focal point for preserving existing canopy cover and increasing efforts to plant trees to increase canopy cover in the City's existing parks and open spaces.

Landscape Guidelines

The 1997 Landscape Guidelines were an interdepartmental effort to create a document for the use of property owners, developers, and applicants for site plan or special use permit approval in the development process. These current guidelines establish minimum standards and requirements for the protection and preservation of existing trees and vegetation and new plantings within the City.

The purpose and intent of this document are broad and admirable. The street trees and tree well specifications and planting detail are accurate and current. However, some of the details and specifications found within certain sections could be improved and expanded to truly achieve the stated and implied goals of the Landscape Guidelines relative to protecting trees and forests.

The science of arboriculture and the practical use of technical information about tree physiology and tree preservation measures have grown rapidly in the last decade, and the body of knowledge and experience continues to expand. Alexandria should use these resources to revise and strengthen most of the sections in the Landscape Guidelines.

Virginia Codes

Alexandria may be hindered from enacting legislation and taking actions that other cities across the nation can do within their comprehensive urban forestry program because the municipalities in the Commonwealth of Virginia are subject to the Dillon Rule of local governance. However, several sections of the Virginia Code relate directly to urban forestry issues and recommendations of this Plan.

10.1-1127.1 Tree Conservation Ordinance

Virginia Code 10.1-1127.1 clearly gives the City the right to create and adopt a public tree ordinance as has already been established. This section of the Code directly states that the local governing body may adopt an ordinance "regulating the preservation and removal of…street trees. … Such ordinance…may include reasonable fees for the administration and enforcement of the ordinance and may provide for the appointment… of an administrator of the ordinance." The Code even allows for penalties for violations.

15.2-960 Planting of Trees Destroyed During Construction

This section allows the City to make reasonable rules, regulations, and schedules for planting trees in and along public areas that have been destroyed in the construction process. This might be interpreted to allow for tree banking on public properties, thereby providing a mechanism for maintaining canopy cover on a city-wide basis.

15.2-961 Replacement of Trees During Development

This unique section of the Code specifies that municipalities can require minimum canopy coverages within various land uses as a condition of site plan and subdivision approvals. The Codes states these minimum canopy coverages must be maintained or achieved in 20 years of the development:

- 10% canopy for land zoned business, commercial, or industrial
- 10% canopy for land zoned residential with 20 or more units per acre
- 15% canopy for land zoned residential with more than 10 but less than 20 units per acre
- 20% canopy for land zoned residential with less than 10 units per acre.

An interesting codicil of this section is that municipalities established before 1780 may make these minimum canopy coverages mandatory within only 10 years of a site's development.

15.2-4405 Creation of Districts of Local Significance

All localities have the authority to create special districts related to forest cover. Based on a minimum size of 20 acres, forest maps of a single or multiple districts may be created if the forests are significant, have scenic or historic qualities, and/or provide environmental benefits in the defined district.

MANAGEMENT AND OPERATIONS ANALYSIS

A comprehensive five-year tree maintenance plan would have to provide for the maintenance of approximately 4,500 street trees per year at full stocking levels, and an estimated 1,500 to 3,000 trees per year for those trees located in parks and on other public properties, such as the schools annually. Additional personnel and resources will be required to develop, implement, and supervise this inclusive plan.

The development of a comprehensive tree management and maintenance program for all public trees requires a complete picture of what is to be managed. This will require that an inventory be developed for all street trees, park trees, and trees located at public facilities including City schools.

An effort to inventory the City's street trees was started in 2004. The inventory data includes the location of the trees on a geographical information systems (GIS) database, information about tree species, size, condition, and the planting site. Approximately 7,000 trees have been inventoried along all major arterial and connector streets, and in Del Ray. It is estimated that there are between 17,000 and 19,000 street trees along the City's rights-of-way.

An inventory of street trees, park trees, and those on other public properties must be easily updated if it is to remain a useful management tool. Ideally, a tree inventory should tied to a work order system that records all maintenance activities associated with each tree from the date of inventory or planting to the date of its removal. The City Arborist Office has conducted a partial street tree inventory and a work order system that were developed in-house using available GIS and database programs. These systems do not work together and the tree inventory is not regularly updated. As a result, the street tree inventory cannot be used to make accurate management decisions.

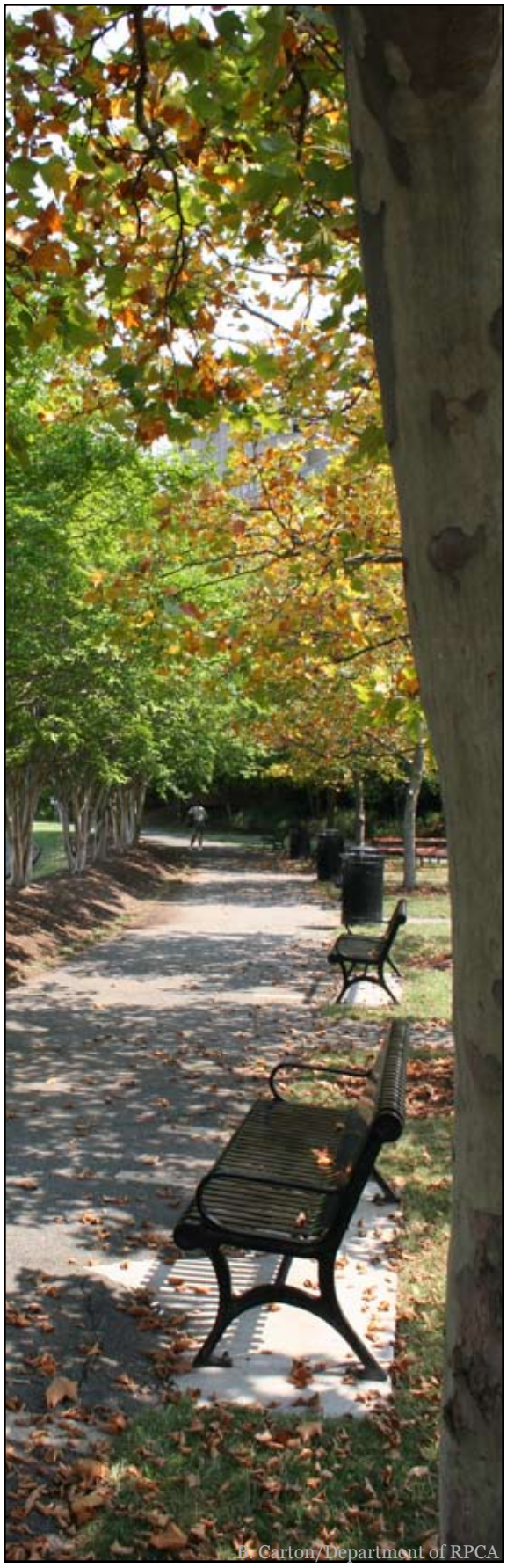
The Citizen Work Request and work order system now in use by the Arborist Office was developed in-house approximately 13 years ago. While the system works reasonably well, some inefficiency exists in the input requirements and output of the system; specifically the system is primarily paper-based, requiring data to be collected in the field and input at a later time back at the office. The result is a significant delay in completing inspection reports, and developing work orders that can be issued to the City's tree crews or contractors and further contributes to the lag time for completing the requested work. Computer hardware and software, and the technical knowledge to set up applications that would enable staff to input data in the field, print receipts or inspection reports to be left on site, and be downloaded into a main database are currently not available to the Department.

The City Arborist and/or Arborists regularly interact with other City departments that have responsibilities that directly and/or indirectly impact the development, maintenance, and preservation of Alexandria's urban forest. In some cases, the interaction of the Arborist Office with other City Departments is fairly well-defined; for instance, site plan review, Board of Zoning Appeals cases, building permit applications, and applications for waivers.

In other circumstances, the functions and responsibilities of other departments conflict with the best interests of City and/or private trees and the goals and function of the Arborist Office. These conflicts often involve the installation or repair of public and/or private infrastructure, such as curbs, sidewalks, street repairs, and storm and sanitary sewers. While many of these conflicts may be unavoidable, efforts should be made to encourage communication and cooperation among Departments. Standard procedures must be developed that allow for the careful and assessment of activities that occur around trees and identify and consistently apply criteria to be used to minimize damage or determine when tree removal is necessary to avoid the development of hazardous conditions.

In order to meet the challenge of transitioning from the current reactive management system to one that effectively addresses the needs of the entire urban forest, additional staff will be required. New program initiatives include street tree inventories, annual work plans for rotation pruning, the development of management and maintenance plans for trees in City parks, open spaces, stream valleys and on school properties. Work plans will include pruning all of the trees in designated sections of the City on a regular five to seven-year rotation. This shift in maintenance strategies requires an increased level of communication and cooperation with residents and civic organizations, and support from City administration and political leaders.

The City Arborist and Arborist spend a significant amount of time answering telephone calls, retrieving and responding to voice mail and e-mail requests, and inputting data for tree maintenance services. Most of these calls could be answered and request for service data directly input into the work order system by trained administrative staff, enabling the City Arborist and Arborist to concentrate on tree related matters in the field rather than clerical activities.



E. Carton/Department of RPCA


J. Noelle/Department of RPCA

Appendix D. Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
1. Adopt American Forest's recommended tree canopy coverage goal of 40% and develop a citywide strategy to meet this goal.	High	N/A	N/A	Short-term goal.
2. Perform tree canopy coverage analysis every five years using City Green or other comparable programs to determine changes in canopy cover and impervious surfaces.	High	$8,000	N/A	Mid-term goal. This analysis would be completed every five years. The cost of the program includes $3,000 for the required data and $5,000 for the analysis.
3. Sustain Alexandria's existing tree canopy through a comprehensive tree replacement and maintenance program for trees on public property and by developing new and promoting existing educational resources for the public.	High	N/A	N/A	Mid-term goal.
4. Plant 400 more trees per year above what is currently being planted annually on public properties, including City rights-of-way, schools, libraries, and other public facilities.	High	$90,000	N/A	Mid-term goal. The average unit cost for trees installed is approximately $225 depending upon the species and size of the specimen.
5. Actively seek ways to increase Alexandria's tree canopy on private property.	High	N/A	N/A	Short-term goal.
6. Establish a tree bank to plant trees on both public and private properties. The bank would be funded through various sources such as development-related activities, property damage reimbursements, and other sources.	Moderate	N/A	N/A	Mid-term goal.
7. Create a grant program to permit the use of City funds to subsidize all or a portion of the cost for planting trees on private property.	Moderate	N/A	N/A	Long-term goal.
8. Continue the City's spring and fall tree sales program (established in 2005 under the auspices of the Urban Forestry Steering Committee).	High	N/A	N/A	Short-term goal.
9. Achieve and maintain a species diversity where no single genus comprises 15% and no single species comprises 5% of the total population.	Moderate	N/A	N/A	Long-term goal. This may be accomplished by expanding the pallette of trees selected for planting and limiting the additional planting of Callery Pear species and Red Maples.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
10. Work with local civic and business groups to identify opportunities to plant additional trees on public and private lands.	Moderate	N/A	N/A	Long-term goal. Already conducted informally with small neigborhood groups.
11. Take steps to incorporate the use of more sustainable approaches to environmental design, such as rooftop gardens, to provide additional benefits for the City's overall canopy on private as well as public properties. Green roofs can provide some of the functions of forested areas including carbon fixation, shading, cooling, and watershed protection. Green roofs on underground parking structures can provide ground-level open space that is important to the continuous open space network.	Moderate	N/A	N/A	Long-term goal.
12. Conduct an inventory of all trees located in the public rights-of-way, in parks, on school properties, and at all other public properties and facilities. The inventory should be completed and reviewed on a continuous five-year schedule or as changes occur.	High	N/A	N/A	Short-term goal. To be completed on a five year schedule in concert with the recommnended street tree pruning rotation.
13. Develop and implement master landscaping, planting, and maintenance plans for all public properties including City rights-of-way, schools, libraries, stream corridors, and open spaces, and implement one to two of these plans each year. These plans should provide maintenance rotations and establish level-of-service standards for each land use type. Plans should also include strategies for regular inspections of trees, criteria for treatment, and practical methods to maintain current information on all trees subject to treatment. Coordinate with the Departments of Transportation and Environmental Services and Planning and Zoning to ensure plans are consistent with existing transportation and small area plans.	Moderate	N/A	N/A	Mid-term goal.
14. Develop quantitative methods to evaluate the overall health of Alexandria's street trees and trees on public properties.	High	N/A	N/A	Mid-term goal.
15. Plant and establish additional trees to achieve a 100% stocking level of available planting sites.	Moderate	N/A	N/A	Long-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
16. Actively seek opportunities to establish tree-lined medians along rights-of-way that are wide enough to create boulevards. Develop an urban forestry enhancement program specifically for Alexandria's unique boulevards and other significant transportation corridors.	Moderate	N/A	N/A	Long-term goal.
17. Establish criteria to identify sites that will permit the expansion of tree planting strips and tree wells to provide more suitable growing conditions for street trees, decrease conflicts between tree roots and urban infrastructure, and meet all Americans with Disabilities Act requirements for adequate clearance and passage.	High	N/A	N/A	Mid-term goal.
18. Work with the Departments of Transportation and Environmental Services, and Planning and Zoning to develop standards for, and require, innovative planting techniques and products to facilitate tree planting in restricted, high-use, difficult, and special needs areas.	High	N/A	N/A	Short-term goal.
19. Employ planting techniques that will promote the healthy growth of trees within an urban setting, such as alternative soil mixtures, extended tree wells, and systems to direct and manage root growth and limit conflicts between roots and urban infrastructure. Develop standards for planting in areas where space is too restricted or soil, aeration, drainage, or other conditions preclude providing adequate space and a satisfactory environment for trees to survive and thrive.	High	N/A	N/A	Mid-term goal.
20. Explore opportunities to protect existing trees by using alternative paving materials and methods to correct conflicts between tree roots and sidewalks, such as rubber sidewalks, stone dust, permeable paving, and alternative pavement profiles.	High	N/A	N/A	Mid-term goal.
21. Seek to relocate all overhead wires underground to avoid conflicts with trees and provide increased opportunities to plant large shade trees with an emphasis on major corridors.	Moderate	N/A	N/A	Long-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
22. Implement pilot programs to develop and adopt alternative street profiles and sections that provide larger tree planting areas, more open space, increased permeable surface area, and new opportunities for stormwater management, also referred to as shared street concepts.	Moderate	N/A	N/A	Long-term goal.
23. Establish and implement comprehensive planting and maintenance plans for trees located on parks, schools, and other public open space properties. These plans should be developed in conjunction with park landscape master/management plans which include both development and rotational maintenance costs.	High	N/A	N/A	Mid-term goal.
24. Build on the Alexandria Open Space Plan's recommendation to seek innovative ways of creating more open space by developing and implementing pilot projects such as Green Streets (see Appendix F), which are aimed at redesigning streets to reduce impervious surface, thus freeing up land for tree planting and helping to meet other environmental goals, such as reducing the impact of storm water runoff.	Moderate	N/A	N/A	Long-term goal.
25. Rededicate Fort Ward Park as the City's Arboretum and develop and adopt a master plan for the park. Create a collection of trees and other woody plants that will serve as an educational resource for City residents and visitors.	High	$25,000	N/A	Mid-term goal.
26. Promote the value of tree donations and other support programs, such as the Living Landscape Program, as a source of trees to be planted in parks and other public open spaces. Park master plans should be developed with tree locations that are ear-marked for living landscape trees.	High	N/A	N/A	Short-term goal.
27. Continue to celebrate Arbor Day and hold other special events and educational programs about urban forestry on parks and school grounds.	High	N/A	N/A	Short-term goal.
28. Encourage the establishment and healthy growth of native tree species through planting and maintenance.	Moderate	N/A	N/A	Mid-term goal.
29. Control invasive plant species.	High	N/A	N/A	Short-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
30. Improve maintenance of overgrown and currently inaccessible and under-used stream valleys and natural public open space.	Moderate	N/A	N/A	Long-term goal.
31. Provide and promote incentives to plant trees and implement projects to preserve and enhance the tree canopy on institutional and semi-public sites, such as INOVA Alexandria Hospital and Episcopal Seminary and High School.	High	N/A	N/A	Mid-term goal.
32. Encourage the establishment and dedication of open space tree canopy conservation, scenic and historic easements on institutional and private properties.	Moderate	N/A	N/A	Mid-term goal.
33. Develop guidelines for, and privately fund, a City grant program to support tree planting on private property. Grants should be made available to qualified homeowners, civic organizations, places of worship, religious institutions, and other not-for-profit organizations.	Moderate	N/A	N/A	Long-term goal.
34. Educate private property owners about the benefits of trees and proper planting and maintenance strategies.	High	N/A	N/A	Short-term goal.
35. Encourage homeowner and civic associations to create tree or beautification boards with which the City Arborist can communicate and provide information about tree planting and maintenance on this type of property.	High	N/A	N/A	Mid-term goal.
36. For commercial and industrial properties, enforce site plan and special use permit landscape requirements and conditions for new and existing development sites. Perform site inspections to ensure compliance.	High	N/A	N/A	Short-term goal.
37. Evaluate, update, and enforce the City's existing rules and regulations.	High	N/A	N/A	Short-term goal.
38. Increase and maximize the amount of tree canopy covreage required for Development Special Use Permits.	High	N/A	N/A	Short-term goal.
39. Plan, fund, and implement a five-year pruning cycle for all established trees and a three-year establishment program for new trees planted along City streets, in parks, and on school and other public properties.	High	$480,000	N/A	Mid-term goal. This would provide for the pruning of an additional 4,000 trees annually; to be accomplished through block to block pruning which will reduce the average unit cost of pruning a tree by an estimated 25%.

Recommendation Matrix

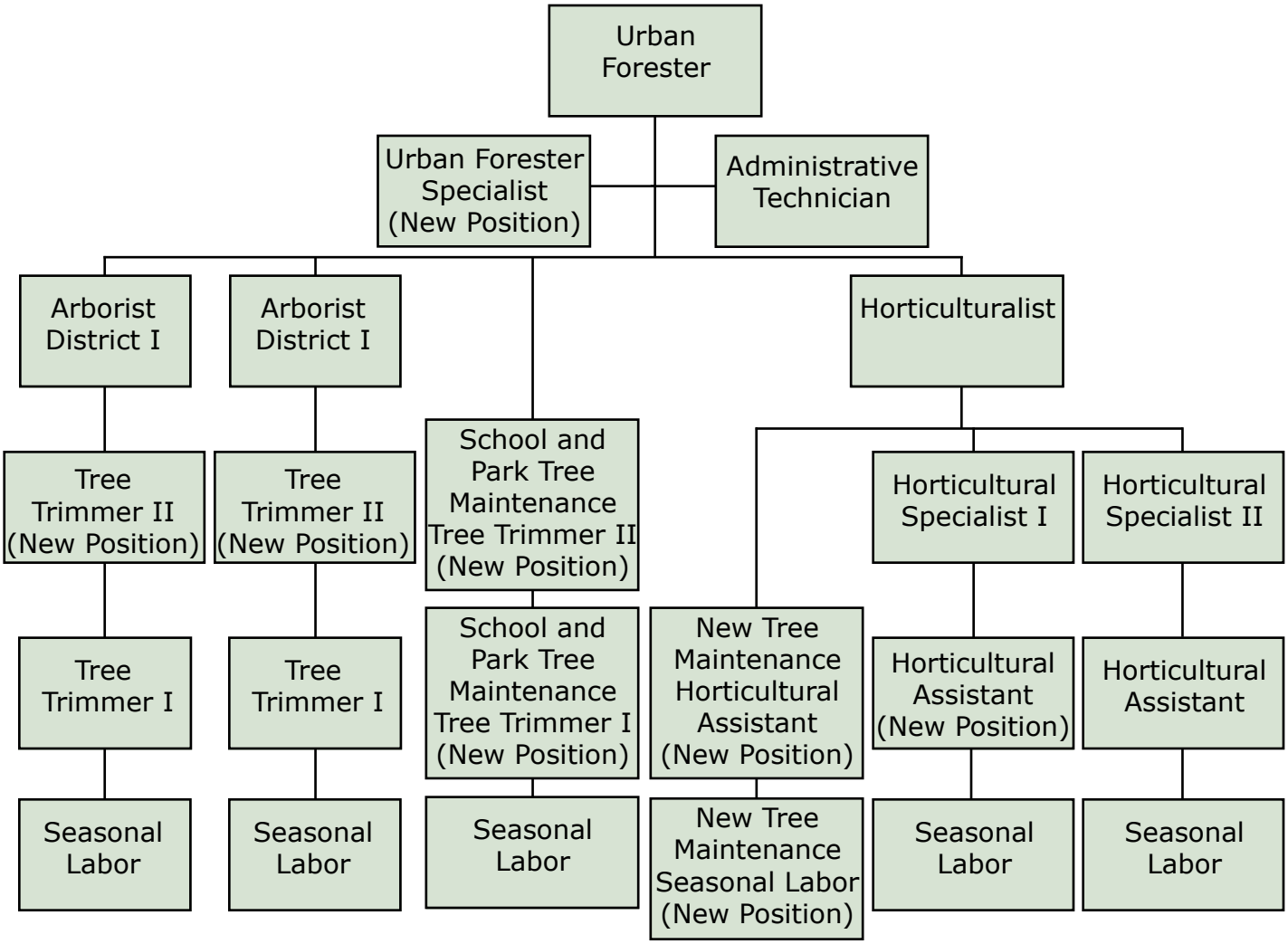
Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
40. Transform the City Arborist Office and Tree Maintenance Section into a proactive Urban Forestry Section with a systematic and strategic focus on the urban forest system as a whole. Develop a management plan and provide resources needed to effectively manage the plan. Optimize personnel allocations and create efficiencies by combining the City's urban forestry and horticulture programs under one Natural Resources Section.	High	N/A	N/A	Short-term. Convert five-year temporary Arborist position to permanent status.
41. Create a new Urban Forest Specialist position that would be dedicated to activities aimed at preserving and enhancing the City's urban forest.	Moderate	$110,000	N/A	Mid-term goal.
42. Fund requests for additional tree trimmers and horticulture staff necessary to successfully meet the goals of the Urban Forestry Master Plan.	High	$301,000	N/A	Mid-term goal. This would include the conversion of the vacant Assistant Superintendent position to a Tree Trimmer Position. Create two new Tree Trimmer Positions to create a third tree crew to accomplish the expanded soope of services recommended; $160,000. Create two new Horticultural Assistant positions to meet the demands to maintain the additional trees planted and implement a comprehensive watering and new tree maintenance program; $120,000. Purchase one chipper truck, one brush chipper, and one utility dump truck for the horticultural crews; $21,000 annual equipment replacement cost.
43. Establish benchmarks and report progress in an annual State of the Urban Forest Report to the City Manager and City Council.	High	N/A	N/A	Short-term goal.
44. Develop and implement an effective public outreach and education strategy and pursue it actively and consistently. Volunteers are a greatly untapped resource in this regard and should be a core part of this strategy.	High	N/A	N/A	Short-term goal.
45. Create a series of public service announcements on various urban forestry topics for radio, cable access television, and print news media outlets.	Moderate	N/A	N/A	Mid-term goal.
46. Develop and distribute information about the proper care for trees after they are planted.	High	N/A	N/A	Short-term goal.

Recommendation Matrix

Recommendation	Priority	Annual Cost Increase	Annual Cost Savings	Comments
47. Promote the preservation and expansion of Alexandria's tree canopy with programs, such as seminars and neighborhood tree walks.	Moderate	N/A	N/A	Mid-term goal.
48. Increase support for and promote the expanded use of existing public resources such as the Cooperative Extension Service and the Tree Stewards and Master Gardeners of Arlington and Alexandria to provide assistance, advice, and educational opportunities and materials to the citizens of Alexandria.	High	N/A	N/A	Short-term goal.
49. Fund an additional extension agent at Virginia Cooperative Extension who would provide vital volunteer programming services for Alexandria's residents. This person would, among other tasks, work to expand Alexandria's role in the Tree Stewards of Arlington and Alexandria program, a group of volunteers trained by the extension service to educate and assist citizens on proper tree planting and care.	Moderate	$70,000	N/A	Mid-term goal.
50. Promote the availability and distribution of information to the public about the selection, planting, and care of trees through the development of an effective website www.alexandriava.gov/trees, and the publication of handbooks, fliers and other publications.	Moderate	N/A	N/A	Mid-term goal.
51. Encourage collaborative efforts with local schools of landscape architecture to study opportunities to improve streetscape, public open space, park, school, and facility designs.	High	N/A	N/A	Short-term goal.
52. Create partnerships with allied businesses and organizations to share in the distribution of timely urban forestry information; partnerships could include: local realtors, utility companies, nursery and landscape companies, and tree services contractors.	Moderate	N/A	N/A	Long-term goal.
53. Actively promote the existing Tree Stewards program and engage other citizens by creating opportunities to become program volunteers to assist in completing the vital maintenance tasks proposed in the Urban Forestry Master Plan that are currently not funded or inadequately funded for completion by City staff. These tasks might include: conducting tree inventories, small tree maintenance, tree planting, pruning, teaching, grant writing, and marketing and public relations.	High	N/A	N/A	Short-term goal.

J. Noelle/Department of RPCA

Appendix E. Proposed Reorganization Chart




B. Carton/Department of RPCA

Appendix F. Proposed Pilot Projects

GREEN STREETS

In recent decades, urban planners, landscape architects, and others have been developing innovative ideas for increasing the amount of green, livable space in densely developed communities around the world. Recognizing that public streets often cover nearly one-third of urban landscapes with impermeable surface, these professionals have developed ways of retrofitting and redesigning streets to not only increase the amount of green space but also to accomplish a variety of environmental and other objectives. These designs have become known as green streets.

At their most basic, green street projects remove impermeable surface and allow more tree planting and other landscaping. But they can also be much more complex. In Portland, Oregon, for example, streets are being redesigned to mimic the natural hydrology of an area, in order to manage storm water, reduce flows, improve water quality, and enhance watershed health.

In some European and other countries, the entire concept of the street has been rethought. In the shared streets concept pioneered in Europe in the 1960s and 1970s, streets have been redesigned so that moving cars must share the street with pedestrians, including children at play and bicyclists. Vehicles, including emergency vehicles and wheelchairs, can still pass through, and residents still have areas to park their cars, but speed is restricted by careful placement of planting strips and other measures. Curbs, sidewalks, and grades changes are often eliminated to enhance a sense of continuous space. In essence, a kind of street park is created, which can be especially important in urban areas with little open space.

Although green streets were pioneered overseas, they have been increasingly embraced by U.S. cities such as Portland and Seattle. New York City recently announced a plan to construct 800 green streets. Green street ideas were incorporated into a project aimed at reinventing Commonwealth Avenue in Alexandria, which was conducted by Virginia Tech faculty and graduate students and sponsored by the Del Ray Citizens Association.

The Urban Forestry Master Plan proposes that the City adopt a pilot program to retrofit or redesign several streets or blocks in the city to allow more greening of the street, in the form of less impermeable surface and greater tree cover and other landscaping. The pilot program is designed in part to help overcome significant problems in planting street trees, especially inadequate planting areas and interference with overhead power lines. These obstacles often make it impossible to grow larger shade trees, which provide far more environmental and health benefits than do smaller trees (especially cleaner air and cooler temperatures during the summer). The pilot program is also designed to help implement goal 2 of the City's Open Space Plan, which is to "develop innovative opportunities for creating additional public open space."

For more details about green streets, see the following articles: "Green Streets: a better way to go" <http://www.djc.com/special/landscape00/5.html>; and "Green Streets: An Innovative design Approach" at <http://extension.ucdavis.edu/unit/green_building_and_sustainable_design/pdf/resources/green_streets.pdf>.

More detailed information about Portland, Oregon's program can be found at <http://www.portlandonline.com/shared/cfm/image.cfm?id=153974>. A virtual tour of Portland, Oregon's green streets can be taken at <http://www.portlandonline.com/shared/cfm/image.cfm?id=96962>.

For more information on shared streets, see "Streets for people too" at <http://www.architectureweek.com/2004/0505/building_1-1.html>.

REDEDICATION OF THE CITY OF ALEXANDRIA ARBORETUM AT FORT WARD PARK

Fort Ward Park was designated the City of Alexandria's Arboretum on Arbor Day 1983. Its purpose was to showcase a wide variety of plants, including trees and shrubs that are well adapted to Alexandria gardens. One the City's most popular destinations, Fort Ward attracts visitors to its Museum and historic site, picnic areas and playground, its amphitheater for summer concerts, and for many just a leisurely stroll along its shaded loop road.

The multiple uses of the park and the increasing pressures of recreational demands on the site have led to the decline of the park's tree population and a loss of focus on its function as a showcase for native and ornamental woody plant species. With the passing of the Arboretum's 25th anniversary gone unnoticed, it is time to rededicate this valuable resource to its important function as a collection of trees and shrubs that the public can come to observe study and enjoy throughout the year. This rededication should include a careful study and development of a plan that will integrate and celebrate the park's historic past as well as its future and importance as one of the City's premiere recreational sites. It should also include the reestablishment of the park's once enviable collections of azaleas and camellias and the thoughtful development of plant collections that will demonstrate a variety of plants that can be incorporated into local landscapes.

As a pilot program, the preliminary concepts of the plan could be developed with the help of schools of landscape architecture and land planning and landscape design programs of local universities.

The rededication of the City's Arboretum at Fort Ward Park should capture the imagination of gardeners and plant enthusiasts, gladden the hearts of present and future generations, and encourage all to plant trees and preserve our tree canopy.

COMMONWEALTH AVENUE: LOVE ME OR LEAVE ME NOT

In December of 2005, the Del Ray Citizens Association in Alexandria, Virginia approached Virginia Tech about plans and designs for creating a new kind of landscape for Commonwealth Avenue that is part street and part park. The Association voiced concerns about Commonwealth Avenue's declining infrastructure and its accessibility for walkers and cyclists while many members believe its tree-lined medians could serve as a catalyst to enhance its green assets. The goal of the community and student collaboration was to establish a green vision for Commonwealth Avenue.

The final report, Commonwealth Avenue: Love Me or Leave Me Not, presents the results of four student design and planning teams along with neighborhood input. It offers ideas and suggestions for the community and City officials to consider how Alexandria can adapt the designs and concepts presented to form a more cohesive open space/transportation plan for Commonwealth Avenue.

The conclusion of the report suggested several demonstration pilot projects that could be launched to test some of the design concepts presented and to promote public interest and support for the project and the long-term goals of the plan.

These pilot projects include:

- The design and development of a green promenade from Reed Avenue to the southern bank of Four Mile Run.
- The development of detailed designs and master plans for Commonwealth Avenue between Monroe and Mount Vernon Avenues with a particular focus on tree inventories, new and replacement tree plantings, new landscapes, possible pocket park designs, coordinated pedestrian scale street furniture, and traffic calming/pedestrian safety strategies.
- Experiment with the living streets concept presented by one of the design teams. Living streets are typically urban, pedestrian streets formed by placing trees, planters, parking areas, and other obstacles in the street to slow vehicles. Motorists are guests and must travel at walking speeds. A living street is more like a grand sidewalk than a street, where residents can navigate their cars between trees and people to get to their homes.

The full report can be viewed at <http://www.nvc.vt.edu/uap/research/commonwealth_avenue.html>.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