AGENDA
LACEY PLANNING COMMISSION MEETING
Tuesday, June 15, 2021 – 5:00 p.m.
MEETING WILL BE CONDUCTED REMOTELY, NOT IN-PERSON
Please click the link below to join the webinar:

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Webinar ID: 863 2440 6161

Call to Order: 5:00 p.m.

Approval of Agenda & Consent Items: 5:01 p.m.
A. Approval of Agenda
B. Approval of June 1 Meeting Minutes

Public Comments: 5:02 p.m.

Commission Members' Reports: 5:04 p.m.

Director's Report: 5:05 p.m.

New Business: 5:10 p.m.
Introduction to the Water Comprehensive Plan Update: Brandon McAllister, Utility Engineer. Staff will provide the Planning Commission on an introduction to the Water Comprehensive Plan. The purpose of the Plan is to evaluate the existing system and its ability to meet the anticipated requirements for water source, quality, transmission, storage, and distribution over a twenty-year planning period while also identifying planning level costs of capital improvement projects and a financial plan for funding the projects.

Old Business: 5:30 p.m.
Urban Forest Management Plan and Associated Regulations: Jessica Brandt, Associate Planner. The Planning Commission will conduct a follow-up work session on the proposed update to the City of Lacey's Urban Forest Management Plan and associated regulations contained in Lacey Municipal Code 14.32.

Communications and Announcements: 5:55 p.m.

Next Meeting: July 10, 2021.

Adjournment: 6:00 p.m.

CITY OF LACEY PLANNING COMMISSION
WORK SCHEDULE

Planning Commission Meeting **June 15, 2021** **Packets due: June 10, 2021**	1. **Work Session:** Water Comprehensive Plan 2. **Work Session:** Urban Forest Management Plan
Planning Commission Meeting **July 6, 2021** **Packets due: July 1, 2021**	**Meeting Cancelled**
Planning Commission Meeting **July 20, 2021** **Packets due: July 15, 2021**	1. **Work Session:** Parking Code Revision Introduction
Planning Commission Meeting **August 3, 2021** **Packets due: July 29, 2021**	1. **Public Hearing:** Water Comprehensive Plan

MINUTES
Lacey Planning Commission Meeting
Tuesday, June 1, 2021 – 5:00 p.m.
Conducted remotely via videoconference

Meeting was called to order at 5:00 p.m. by Dave Wasson.

Planning Commission members present: Dave Wasson, Gail Madden, Peg Evans-Brown, Daphne Retzlaff, Kyrian MacMichael, Eddie Bishop, and Robin Vasquez. Staff present: Rick Walk, Ryan Andrews, and Jessica Brandt.

Dave noted a quorum present.

Peg Evans-Brown made a motion, seconded by Kyrian MacMichael, to approve the amended agenda, excluding the New Business item, for tonight's meeting. All were in favor, the motion carried. Robin Vasquez made a motion, seconded by Eddie Bishop, to approve the May 18 meeting minutes. All were in favor, the motion carried.

1. **Public Comments:**
   - Dan Tufford expressed concerns regarding the proposed homeowners association exemption for open space tree removal in the Urban Forest Management Plan.
   - Nancy Winters urged the City to provide greater tree protection.
   - Dianna Moore asked Planning Commission to disallow the HOA exemption and keep UFM plan as is.
   - Lynn Fitz Hugh spoke in favor of leaving the plan as is or amending it to provide more protection for trees, older trees in particular.
   - Roy Treadway agreed with other public comments and urged Planning Commission to provide more protection for older trees.
   - Wayne Olsen agreed with previous speakers.
   - Carolyn Treadway urged the City to take immediate action to protect older trees.

2. **Commission Members Reports:** Robin reported that she participated in a conversation with Parks regarding outreach on a Parks plan and said that she has volunteered to assist.

3. **Director's Report:** None.

4. **Old Business:**
   Urban Forest Management Plan and Associated Regulations: Jessica Brandt, Associate Planner.
   - Jessica gave a presentation that included background information on growth management and planning, goals and policies, City of Lacey growth and developable land, tree review process, public comments, proposed amendments, task force work and process, and tree canopy inventory.
   - **Robin Vasquez made a motion, seconded by Peg Evans-Brown, to recommend to Council that the City hire an arborist and establish an urban forest advisory committee to support a more comprehensive urban forestry program. All were in favor, the motion carried.**
   - **Robin Vasquez made a motion, seconded by Eddie Bishop, to recommend establishing a target of maintaining 28% tree canopy across the city based on a regularly-updated urban tree canopy inventory. All were in favor, the motion carried.**
   - **Gail Madden made a motion, seconded by Eddie Bishop, to direct staff to remove the exception for homeowners associations to be able to remove healthy trees contained in the draft regulations. All were in favor, the motion carried.**
   - Ryan suggested that staff add Planning Commission recommendations into the plan and make suggested changes, and present an amended draft at the next meeting.
   - Daphne asked for more clarification on the tree removal stipulations. Robin asked that the plan be reviewed again in 2022.

5. **Communications and Announcements:** None.

6. **Next meeting:** June 15, 2021.

7. **Adjournment:** 7:15 p.m.

PLANNING COMMISSION STAFF REPORT
June 15, 2021

SUBJECT: **Water System Plan Update**

RECOMMENDATION: No action, this is an informational briefing only. The full copy of the updated Water System Plan will be provided at a future meeting.

TO: Lacey Planning Commission

STAFF CONTACTS: Rick Walk, Director of Community Development
Ryan Andrews, Planning Manager RA
Brandon McAllister, Utilities Engineer BM

ATTACHMENT(S): N/A

PRIOR COUNCIL/ COMMISSION/ COMMITTEE REVIEW: None. This is a State-required update that is part of the 2021 Planning Commission work program.

BACKGROUND:

Lacey staff and our consulting team have been preparing an update to the City's Water System Plan. Our current Plan was approved and adopted in 2013. These plans are required by the Washington Department of Health as Group 'A' public water systems operate under their regulatory authority. The Washington Administrative Code (WAC) chapter 246-290 outlines the required elements of these plans.

The purpose of this Plan is to develop a long-term planning strategy for the City's water service area. Now updated every 10 years, the Plan evaluates the existing system and its ability to meet the anticipated requirements for water source, quality, transmission, storage, and distribution over a 20-year planning period. Water system improvement projects have been developed to meet the changing demands of regulatory impacts, population growth, and necessary infrastructure repair and replacement. The Plan also identifies planning-level costs of the improvement projects and provides a financial plan to ensure the utility's continued viability.

The Water System Plan contains the following major elements:

- **Description of the Existing System-** This includes a general description of the utility's structure and management, the local area, environment, neighboring systems, and the history of Lacey's system. It also details the system's service area, the size and type of infrastructure components, and its general configuration.

- **Policies and Criteria-** Policies in this section pertain specifically to the water utility and cover topics including service extensions, system reliability, emergency planning, fire protection, design and construction criteria, water use efficiency, operations, and finance.

- **Demand Forecast-** Using historical consumption records and applying growth projections provided by Thurston Regional Planning Council, future water demands are estimated for the next 20 years.

- **Water Use Efficiency-** In this section of the plan the amount of water produced is compared to metered sales, this is used to look for any apparent losses that cannot be accounted for. Water conservation is also discussed with a formal setting of target goals and proposed conservation measures.

- **Source Analysis and Water Quality-** This is a critical component of the plan where the City's existing water sources and water rights are evaluated to determine our actual production capacity. That is then compared against the demand forecast to evaluate the need for additional supply. Water quality parameters, regulatory requirements, and treatment needs are also discussed in detail.

- **Wellhead Protection-** This portion of the plan focuses on identifying any potential risks that may compromise the use of a water source and provides recommendations that can help minimize the risk of contamination.

- **System Analysis-** Here the City's water distribution network is evaluated to ensure adequate flow and pressure are available to all areas of the system, under existing water demands and future projections. Storage needs are also analyzed to ensure the system can adequately handle fire and/or emergency conditions.

- **Capital Improvement Program-** The CIP includes a comprehensive listing of the projects proposed to address deficiencies identified throughout the plan. This includes a mix of projects needed to address increases in growth, regulatory requirements, repair/replacement, and general system improvements.

- **Operation and Maintenance-** The organizational structure, including roles and responsibilities are included here. This chapter also includes summaries of how the water system is operated, various maintenance programs, and a staffing analysis.

- **Financial-** The final component of the plan evaluates the utility's financial health to ensure regular operating expenses are covered and appropriate reserves are in place. This also includes a funding strategy for the Capital Improvement Program.

The City's consultant team is currently finalizing the draft plan. Once complete, staff will present the draft plan to the Planning Commission. At that time, staff will also begin the SEPA process, a public review period, and distribute copies to adjacent purveyors and neighboring jurisdictions. Near the end of that review period the Planning Commission will be asked to hold a public hearing and forward the plan to Council. At that stage, the plan is then submitted to the State Department of Health for final review and approval, the plan is then returned to Council for adoption. The entire approval process is expected to take several months and will likely extend though the rest of the year.

RECOMMENDATION:

No action as this is an informational briefing only. The full copy of the updated Water System Plan will be provided at a future meeting. The Planning Commission will also hold a public hearing and make a recommendation to the City Council on the Plan at a future date. This plan update would be part of the 2022 package of comprehensive plan amendments.

PLANNING COMMISSION STAFF REPORT
June 15, 2021

SUBJECT: **2020-2021 Urban Forest Management Plan Update**

RECOMMENDATION: The Planning Commission is requested to make a formal recommendation to the City Council on proposed updates to the Urban Forest Management Plan and revisions to the implementation regulations in LMC 14.32. Staff recommends approval of amendments.

TO: Lacey Planning Commission

STAFF CONTACTS: Rick Walk, Community and Economic Development Director
Ryan Andrews, Planning Manager
Jessica Brandt, Associate Planner

ATTACHMENT(S):
1. UFMP draft amendments
2. UFMP clean version
3. LMC 14.32 draft amendments

PRIOR COUNCIL/ COMMISSION/ COMMITTEE REVIEW:
06/01/21 Planning Commission
05/25/21 Land Use Committee
05/18/21 Planning Commission Public Hearing
05/04/21 Planning Commission
07/09/20 Planning Commission
06/23/20 Land Use Committee
02/14/20 Planning Commission
02/04/20 Planning Commission

BACKGROUND:

The Urban Forest Management Plan is the overarching policy document that guides the City's urban forestry vision and efforts. The City developed this Plan in 2006 and updated it in 2013 with the assistance of the City of Lacey's contract forester Galen Wright, who has decades of experience and perspective into Lacey's urban forestry efforts.

In keeping with the Plan's goal of updating the document every five years, it now due again for review, along with the implementation regulations in LMC 14.32. In addition, homeowner associations and citizens have raised questions and concerns over tree removal and permitting process to the Council further supporting the need to conduct an assessment of forestry plan

and regulations. The review process examines challenges, issues, and experiences related to the implementation of the Plan since its last update.

To assist the Planning Commission in developing recommendations for changes to the Urban Forest Management Plan and tree regulations, a tree task force was established. The tree task force contained a broad representation of interests including homeowners associations, commercial property owners, residential development, environmental protection, residential property owners, and a representative from the Planning Commission. The task force is supported by a staff group representing Parks Facilities, Transportation Maintenance, Development Review, City Foresters and Community and Economic Development. The task force met five times in total and has provided staff and City foresters input on policy and regulation issues and challenges.

Early in the task force's discussions, these high-level issues were identified:

- Enforcement of Tree Regulations
- Street Tree Program
- Private Property Trees and Consistent Application of Regulations
- Retention of Existing Trees Through Development Process
- Tree Education and Outreach
- Potential Establishment of Tree Board

The task force also discussed options to address issues brought forth by homeowners associations and commercial property owners who wish to remove and replace existing trees but are constrained under current regulations.

Following a survey of the staff and task force about their recommended priorities of the above issues, the task force collectively recommended that the City focus on outreach and education first, then enforcement of tree regulations.

The tree task force reviewed proposed amendments on April 22, 2021 and were in general agreement about most of the proposed amendments. The Planning Commission reviewed the proposed amendments May 4, 2021. Both the task force and Planning Commission did not have full consensus on the issue of healthy tree removals in HOA open spaces. Additional technical amendments, such as recommended tree lists, will likely be made after further review by our tree protection specialists before consideration for formal adoption.

The Planning Commission held a public hearing on amendments to the Urban Forest Management Plan and associated regulations contained in Lacey Municipal Code 14.32. The Planning Commission requested a follow up worksession to discuss the public comments received. A few key themes from the public comments were related to tree removal in Northeast Lacey for new development, tree canopy analysis and changes over time, sequestration and climate mitigation needs, and stronger tree protection through stricter regulations.

Planning Commission Direction

Staff provided a presentation that addressed the above issues at the June 1st worksession. Following the presentation and discussion, the Planning Commission provided direction to staff to update the UFMP and regulations with the following:

- Set a tree canopy goal of maintaining the existing 28% coverage identified in the tree canopy analysis; evaluate the canopy analysis on a regular basis; and reevaluate the Plan and regulations if canopy coverage drops below 28%. (Goal 4)
- Remove the language allowing HOA's an exemption to remove healthy trees in open spaces, as in previous draft amendments. (LMC 14.32.050)
- Maintain tree density minimums using the tree density minimum table and remove language in exemptions on individual lots regarding "5 trees in 36 months" to address equity issues on larger lots, provided that removal of five trees requires tree protection professional site visit. (LMC 14.32.050)

The Planning Commission provided recommendations for the City Council to consider in addition to amendments to UFMP and in regulations:

- A full-time in-house arborist (tree protection professional) to manage a comprehensive tree program. (Goal 11)
- Establish a tree board as provided in the existing UFMP. (Goal 12)

The Planning Commission has the responsibility and authority to recommend action to the Lacey City Council on the proposed amendments. Based upon public comments, staff analysis, review of the Comprehensive Plan, and other applicable information, the Commission is requested to make a formal recommendation on the amendments to the City Council.

CITY OF LACEY

URBAN FOREST MANAGEMENT PLAN

August 2021

Shaping our community together

CITY OF LACEY

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Steve Hyer
Corinne Holland
Barbara Sovde
Marianne Tompkins

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Appendix 6 Street Tree Inventory Report

Streetscape in Horizon Pointe, Lacey

Executive Summary

Background:

The City of Lacey has been regulating the protection of trees and vegetation since the mid-1970's. Policy development regarding the City's role in protecting trees, vegetation and landscape were first reviewed and adopted a few years later with the adoption of the 1985 "City of Lacey Urban Beautification Project" which was co-sponsored by the United States Department of Agriculture and Washington State Department of Natural Resources. That plan was fairly specific about recommendations for "street" corridors, parks and public space furnishings and City maintenance recommendations. It did not consider landscape concepts or tree and vegetation preservation or protection for residential and commercial development on private properties. Official City guidelines regarding tree and vegetation protection was not formulated or developed by public policy other than adoption of regulations.

The next iteration of policy development occurred with the development and adoption of the Environmental Protection and Resource Conservation Plan developed under the Growth Management Act in 1992. This Plan was prepared as an element of the Growth Management Act (GMA) Comprehensive Land Use Plan for the City of Lacey and its urban growth area which was later adopted in 1994. Trees and vegetation were a specific focus of the environmental element's Urban Forest Resources section and policies

discussed the value of preserving some of the natural characteristics of the area and emphasized the importance the urban landscape with the increased intensity of urban style development. In 2002 - 2004 the City of Lacey adopted a major update of the 1994 plan, but did not change anything in the environmental element's Urban Forest Resources section that would affect the preservation and protection of trees and vegetation. The Environmental Element and implementing habitat and wetland protection ordinances did however update and strengthen the policies that address "urban" habitats.

Following the adoption of the updated land use plans, implementation regulations were approved by the City of Lacey that continued and re-enforced earlier strategies put in motion to promote the urban style development projected in the Comprehensive Land Use Plan. Most of the implementation was not changed dramatically from what was required prior to the GMA plans update. However, beginning in 2000, the first influx of development using the new urban development provisions started to be reviewed and in 2003 and 2004 a much accelerated rate of private property development came on line as the inventory of lots from pre-GMA development was almost totally absorbed. Much of the private property being proposed for development was in areas with second growth forest species on site and appeared heavily forested.

Since the intensity of urban development was causing nearly all the trees to be removed from development sites, the Lacey City Council started receiving more complaints from Citizens about removal of trees. Council in general shared those concerns. In 2001, the Council decided we needed to update our tree and vegetation protection and preservation regulations. In order to facilitate the update or create new standards it was determined that we should have strong policies to support any updates of the regulations. It was also determined that policies should be consistent with the vision Council had for balancing intense urban development and what the City should look like regarding the forested character the City currently possesses. With the assistance of the City of Lacey urban forester to look at the technical realities of the forested nature of the City, this plan defines Lacey's vision of urban forest and directs how we will maintain the look and feel of the Pacific Northwest Woodland character of the area.

In early February of 2005, the Council began the process of updating the forestry section of the environmental element and started a series of work-sessions including the Planning Commission. The work-sessions were designed to outline and refine the Council's vision for the city urban forestry program through development of an entirely new Urban Forestry Plan. The Urban Forestry Plan was adopted by the Lacey City Council on July 27, 2006.

In keeping with the goals of the Urban Forestry Plan to be updated every five years, the Urban Forestry Plan was updated in 2013 with a revision to technical data as well as addressing design and administration issues associated with implementation of the plan since 2006 including:

- Adding regulations for administering Class IV Forest Practices
- Applications Establishing a fee-in-lieu program for tree tracts in certain location
- Clarification of regulations contained in LMC 14.32 pertaining to tree replacement on individual lots
- Clarification of definitions contained in LMC 14.32
- Improve inspection procedures for trees in right—of-way

~~• Clarification of regulations contained in LMC 14.32 pertaining to tree replacement on individual lots~~
~~Clarification of definitions contained in LMC 14.32 Improve inspection procedures for trees in the right-of-way~~

The 2013 update was preceded by a total inventory of all street trees on city arterials and collectors as well as all city-maintained street trees. The data from that inventory ~~has~~ was ~~also been~~ included as an update to the plan.

In 2020 the City began the process of updating this plan again. The Planning Commission and staff created an ad hoc citizen task force, "Tree Task Force", to help with reviewing the policies, goals, and regulations. The Task Force, city foresters, and city staff identified preliminary issues and then engagement to the community helped guide priority areas for updates. The task force generally agreed on the importance of outreach and education about trees to residents, businesses, and landscaping companies.

The Task Force also recognized the shift in perspective of our community that once focused on trees as an aesthetic benefit to a now more holistic view of their benefits and values. Trees are part of our urban infrastructure and are closely aligned with our goals for maintaining air quality, reducing stormwater runoff, and providing shade in the hot summer months. The UFMP has always recognized the many benefits of trees, but trees as public infrastructure denotes asset management planning, maintenance, repair, and life cycle analysis, which will take time to fully implement.

The Task Force also recognized Lacey is a growing community where buildable lots are becoming scarce. The City is already in a transition to a more urban community where growth and development is focused on going vertical instead of horizontal. Developing up instead of out creates its own challenges with preserving tree canopy in the urban core. Urban tree canopy can be maintained and expanded with replanting, street trees, parking lot landscaping, open spaces, and simply giving young trees a little time to grow.

A tree canopy assessment, using remote sensing, was completed in August 2020. (See Appendix 1 Section C). The assessment showed 28.3% coverage in the City Limits and 31.3% coverage within the Urban Growth Area. Earlier canopy assessments used a different methodology but are assumed to be as accurate.

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Tree canopy coverage has decreased since the last assessment in 2004 where tree canopy coverage was 43%. The Northeast Area of Lacey has grown substantially since 2004, which may explain the change in canopy coverage. Trees planted as a requirements of new developments will mature and canopy coverage will increase over time.

The City recently updated its Climate Mitigation Plan, with regional partners, and trees are a key issue for the City to consider as it moves forward with implementing that plan. The focus on that plan is to reduce carbon emissions from buildings, energy, transportation, land use, water and waste. The other side of the equation in reducing emissions is to capture carbon. Trees capture and store carbon, so just as we reduce emissions we also will need to capture carbon emissions to meet our climate goals and targets as a community. That does not equate to stopping all development and tree removals, it means doing a full review of where it would be appropriate to replant, plant more, and protect existing stands of trees in Lacey. That review will be done at the local and regional level.

Another important issue is the growing challenges attributed to climate change. Our urban trees are facing more stress and mortality due to drought and heat. There is a need to begin long term forestry planning for our parks, forests, and non-irrigated areas of the city. As we choose tree species for landscaping and planting we will need to consider our changing climate.

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The Task Force raised a number of issues related to enforcement of regulations, and have been addressed in the Goals and Policies. Just as any aspect of the implementation of this plan and tree protection regulations, an issue of resources is always a challenge.

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Wonderwood Park, Lacey

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Methodology for Evaluating Lacey's Urban Forest:

The first step in management of any resource is an inventory to determine the

extent, condition, and needs of, in this case, the urban forest. Since all life is rooted in the soil, geologic and soil survey information was examined to determine the physical characteristics of the soils in Lacey. The information pertinent to management of trees includes: general fertility levels, drainage, depth to root restrictions, organic matter contents, plant available water capacity, and windthrow potential. The suitability for wildlife, construction and engineering properties was also examined. This information was then considered when recommendations were made with regard to tree protection areas, tree species selection, and planting designs.

The evaluation of Lacey's urban forest was undertaken through the following activities:

- Collection of maps, aerial photos, Landsat images, the transportation plan, and materials relating to the City of Lacey and its urban growth area.
- Interview of City Council members regarding their perceptions about the Lacey urban forest.
- Discussion of Lacey's urban forestry and landscape ordinances with staff in Community Development, Public Works, and Parks Maintenance.
- Obtain current contract language from Public works for tree planting contracts.
- Street tree inventory and location data.
- Inventory all private trees that function as street trees on the major and minor arterials, and collectors. Determine species, size and
- condition of trees.
- Evaluate the condition of the City maintained street trees.
  Conduct an inventory and evaluation of the general forest canopy conditions in the City of Lacey and its urban growth area. The inventory utilized aerial photos with ground truthing of a sample of stands (city property).
- Review of the past and current street tree profiles and how well trees fit and grow in these growing conditions.
- An assessment of the city was made to determine appropriate tree species for use in the rights-of-ways for comprehensive street tree planning.
- Continue hazard tree evaluation in all Lacey Parks.
- General review of other tree conditions that exist in the City of Lacey.
- Review of ordinances that relate to tree protection and planting.

Urban Forester's Technical Review and Recommendations:

Using the methodology discussed above over the last several years, the City Urban Forester has completed a technical review of the woodland character and current wooded areas of the City of Lacey and the City's history of the being

forested. At the time of incorporation, 1966, the area of the City and its urban growth area was a combination of open prairie and forest lands. Urban Forests are cyclical and our Urban Forester's findings appear to reinforce those characteristics. The following is his summary:

This study found that in 2006, 43% of Lacey and its urban growth area is covered with 1) native forests, 2) trees retained in parks, critical areas, and developed residential, commercial, and 3) residential areas, and ornamental trees planted along streets, parks, and developed areas. The remaining 57% of the land area is developed, logged and not replanted, pastures, lawn, or other areas without trees.

Tree cover in 1966, before Lacey was incorporated was only slightly higher, with 48% of the city and the urban growth area covered by trees. The remainder (52%) was cutover forest land, pastures, lawns, and development.

What appears to be a very small forested cover loss is due to significant tree retention in our older developments, replanting of streets, landscaping of parking lots, and continued retention in new developments. However, as areas such as the Hawks Prairie industrial area (Meridian Campus) continues to develop, the canopy loss will likely accelerate.

An inventory of the arterials and collectors completed in 2012, found 3,208 (an increase of 363 trees since an inventory completed in 2001) privately maintained street trees in addition to the 2,973 (an increase of 1,699 since 2001) street trees that the Parks Maintenance staff already maintains. These are in addition to all of the trees in the city parks that staff cares for.

The study found few open planting spaces within the city maintained street tree areas, indicating that staff is doing an excellent job of replacing mortality or damaged trees. The quality of maintenance of the street trees is very good, though some additional corrective pruning is needed in certain areas.

The quality of maintenance is quite variable for the private street trees. Most have received little corrective pruning to remove storm damage and extra branches. In the worst cases, required landscape trees that also serve as street trees are being severely topped or removed for perceived view improvement of business signage.

Based on the City Forester's evaluation of the urban forest in Lacey, the ordinances, visits with staff and citizens, and maintenance procedures - the following priority is recommended to improve protection and management of the Lacey urban forest:

- Continue annual maintenance activity on the existing street trees for sign clearance, corrective pruning, and clearance pruning, and complete annual hazard tree evaluations.

- Budget adequate annual funding to complete basic maintenance tasks for city street trees and some replanting.

- Continue to review all commercial and industrial projects with one or more trees. This is important in cases when, as an example, only a few Oregon white oaks occur on the site. Tree retention may have an even higher impact in areas nearly devoid of trees. Also, continue to require a minimum percentage area for tree tracts in all types of developments as well as establishing a fee-in-lieu of tree tract program in certain instances. Language regarding tree removal on private property needs to be clarified.

- Implement education programs to prevent improper pruning of required landscape trees and implement procedures for better inspection of required landscaping in the right-of-way.

- Continue to require that all trees and shrubs planted on projects within the City of Lacey meet the current ANSI Z60.1 American Standard for Nursery Stock.

- Consider appointing a tree advisory board.

- Create a 'Lacey Friend of Trees' award to be given to citizens, developers, or companies that have taken special care to protect, plant, or maintain significant trees or stands of trees in Lacey.

- Conduct a 'Big Trees in Lacey' contest to find and recognize large or specimen trees in the city.

- All new street tree plantings should be taken from the prescribed species list and matched to the growing space of the planting site. All landscape tree plantings in required landscaping on projects should be taken from the general tree list for Lacey. Other trees can be incorporated in the design upon approval of the site plan review committee.

- Solicit grant funding, corporate donations, and other funds to expand tree planting and maintenance.

- Revise the urban forest management plan every 5 years.

Goals:

The goal of managing city trees is to improve canopy cover and the aesthetic and physical benefits of trees to a community, while protecting the infrastructure from tree damage. This can have positive environmental and economic benefits to the community. In short, the urban trees should be compatible and functional, while minimizing maintenance costs. This management plan provides a detailed Goal and Policy section and technical appendixes that will assess the current urban tree conditions and make recommendations for preservation, protection, restoration, species selection, design, planting, and citizen involvement.

St. Martins University Campus, Lacey, WA

City of Lacey

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URBAN FOREST MANAGEMENT PLAN

Introduction

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Today, more than ever, we are a population of city dwellers. Over 75% of our citizens live within 50 miles of our shorelines in increasingly large and dense cities. Implementation of the Growth Management Act has pressed on our remaining undeveloped green spaces within growth areas, and shrunk

lot sizes to the point that tree planting, not individual tree protection, is often the order of business. Areas outside the adopted urban growth areas are seeing less pressure to convert from resource and agricultural lands. While this may preserve more net "green" spaces in the long run, other islands of green such as parks, wetlands and undeveloped green spaces within the urban growth areas are becoming more precious.

Cities have embraced a combination of tree protection and tree planting to ensure that the hard concrete lines of development are softened by tree lined boulevards, curved and planted walkways, shady parks, and natural areas. These planted and protected areas are enhanced by the natural instincts of humans to plant trees around their dwellings.

Urban trees provide both visual and emotional solace in our world of stressful jobs, family commitments, smart phones, and tablet computers.

As we continue to press on the edges of our native forests with our increasingly dense urban and suburban structure, the need to design for trees, implement sound tree protection practices, and create long-term planting plans becomes more and more critical.

A significant element of maintaining a livable city is to instill pride in its character. By working to make our cities more comfortable and pleasant we instill pride in our citizens. Proud citizens will get more involved and work even harder to preserve, protect, and enhance our cities.

The City of Lacey has recognized the need to protect and manage its valuable urban forest. This Urban Forest Management Plan is one of many steps the City of Lacey has undertaken to improve the benefits that its urban forest provides to the community.

Recognized Benefits of the Urban Forest:

The urban forest provides numerous environmental, psychological and economic benefits. It is critical in providing a healthy environment for people, fish and wildlife. It affects our health and sense of well being. It provides economic benefits by reducing the need for power, and water treatment. Most benefits can be measured, some cannot, and all are significant.

Environmental Benefits:

Water Quality - Clean water is vital to the health of our environment. In every area of the city, the urban forest helps to provide clean water. The urban forest intercepts rain, reducing runoff before it can occur. It absorbs and stores water which reduces the impacts of stormwater pulses, especially in developed areas, along streets and highways and in parking lots. It helps remove pollution from water and reduces excess sedimentation. Riparian vegetation shades and cools the water surface and the air in riparian areas, providing better habitat for fish and wildlife.

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Erosion Control - The hard surfaces common to urban areas are impervious to water infiltration, thereby increasing stormwater runoff volume and flow. The rapidly moving water erodes soil, increases siltation in urban waterways and creates water pollution problems. Trees and other plants play a role in stabilizing soils and preventing erosion. The roots slow runoff by holding soil in place and absorbing water. Leaves diminish the impact of raindrops on bare land and mitigate stormwater volume (McPherson et al 2002).

Energy Efficiency and Temperature Control - The role of vegetation in temperature control in the Pacific Northwest is becoming more important with rising energy costs and conservation concerns. Well placed vegetation can significantly reduce energy needs and increase energy efficiency by reducing heat loss in winter and increasing cooling in summer.

In winter, evergreen vegetation can reduce wind velocity that pulls heat out of buildings and provide an insulating effect by trapping air close to buildings. Deciduous vegetation around buildings allows for solar gain in winter months, reducing heating costs. In summer, well placed trees can intercept up to 90% of the solar energy, reducing the need for air conditioning (The National Arbor Day Foundation).

Trees reduce the temperatures of heat islands that form in urban centers by shading pavement and structures. Considering this cooling effect, the larger the size of trees and the bigger the size of the green spaces, the greater the effect of the trees on climate.

Plants can be used to manipulate air movement by strategically placing them to block undesirable prevailing winds and to provide effective barriers. Walls of vegetation can be used to direct air to sites where cooling is wanted.

Improved Air Quality - Many plants of the urban forest can reduce the effects of air pollution by removing pollution, both particulates and gases, from the air. This occurs because plants reduce winds, causing particulates to settle out of the atmosphere onto plants and the ground where precipitation washes the particulates into the soil. Certain gases such as nitrogen oxides, carbon monoxide, chorine and fluorine halogens, ammonia, and ozone are removed by absorption and stored in leaves and needles of some woody vegetation. Trees also sequester and reduce atmospheric carbon dioxide (National Arbor Day Foundation) (McPherson et al. 2002). Trees improve air quality as they release oxygen through photosynthesis and they reduce ozone levels by reducing urban temperatures.

Sound Control - The leaves, twigs and branches on vegetation absorb sound energy, as do grasses and other low growing plants, especially sounds in the higher frequencies which are the most bothersome to people. Plants dissipate sound energy by refraction that occurs when sound passes through vegetation barriers and bends around plant structures. Barriers of trees and vegetation in

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conjunction with walls and landforms can reduce traffic and highway noise (McPherson et al. 2002). Such barriers can be used as part of a noise mitigation strategy for new development.

Vegetation also masks unwanted sound by providing sounds of nature, rustling leaves and singing birds, to cover unwanted noise. People can focus on those natural sounds that are more pleasing than the noise of the city.

Fish and Wildlife Habitat - The urban forest provides habitat for many species of birds, mammals, fish, insects and amphibians that enrich urban life and offer opportunities for study. The larger the area, the greater the possibility for diversity of habitat and wildlife. While forested natural areas with native understory offer more biological diversity than other parts of the urban forest, all provide some habitat. Squirrels and chipmunks live in and around trees; numerous species of birds abound in vegetation; bats dwell in secret places; and fish inhabit the creeks, streams, and rivers. Wetlands, riparian areas, connected natural areas, and urban landscapes provide important biodiversity.

Psychological Benefits:

Mental and Emotional Benefits - People generally feel that the urban forest increases the enjoyment of everyday life and provides a meaningful connection with the natural environment. Research now provides the scientific basis to support those feelings. Urban forests have a clear role to play in reducing stress-related impacts on health such as lowering blood pressure.

Studies show that exposure to nature and urban forest reduces stress and provides significant restorative benefits. Various studies using slides of different subjects show that natural scenes and urban nature settings hold the viewer's attention more effectively than urban scenes without nature. Even slides of unspectacular natural scenes produce more positive emotional states than urban scenes without trees (Hull and Ulrich, 1991).

Significance and Symbolism - Trees have deep significance to people, especially in the urban setting that may offer little of the natural world. Trees and forests provide beauty and serenity that we can experience in the sensory realm. The constantly changing sights, sounds and smells of plants fascinate and delight us.

Trees may have symbolic meaning. Many cultures associate trees with strength and wisdom, and we often remember loved ones with memorial tree plantings (Dwyer 1994). Planting trees shows a commitment to the future and a desire to improve places where we live.

Aesthetics - Positive emotional states are also associated with being in or looking at things that are pleasing. Trees and vegetation provide much of the color, variety, texture, shape and sound that are pleasing in all seasons of the year. Visual preference surveys have shown that small parks and open spaces are uniformly desirable in all settings of a city. Such surveys show that people

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prefer scenes that have well maintained trees and vegetation. Research substantiates what people have known intuitively, that trees and natural areas bring pleasure and provide benefits beyond their economic values (Dwyer 1994).

Economic Benefits:

A healthy urban forest can improve water quality, prevent erosion, reduce heating and cooling costs, convert carbon dioxide into oxygen and has positive effects on our health and wellbeing.

Trees generally provide benefits in their immediate location and to the surrounding community. From the individual property owner who has a more comfortable environment and increased resale value, to community members who have better water and air quality, to the fish and wildlife who have better habitat - all benefit from healthy trees and vegetation.

Increased Resale Values - Studies show that landscaping with trees is associated with an increase in the value of residential properties. Generally larger trees have greater effect on the resale values than smaller trees. Properties with trees show better and sell faster. Increased property values increase a community's tax base (McPherson et al. 2002).

Stormwater Benefits - In addition to increased resale value, trees and vegetation mitigate stormwater runoff from new construction, reducing or eliminating the need for more costly systems.

Economic Stimulus - Trees make the city more attractive to both residents and businesses. The National Arbor Day Foundation explains that "trees can be a stimulus to economic development, attracting new businesses and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent." (Coolcommunities.org).

In a study conducted by the University of Washington, consumers indicated they would be willing to pay 12% more for goods purchased in a well landscaped district. The study also indicated 15% higher interaction between consumers and merchants, and tree-lined sidewalks were rated 80% higher for amenities and comfort (Wolf, 1999).

Recreational Value - Lacey's urban forest includes wonderful recreation areas such as Wanscher's Community Park and Wonderwood Park. While it is important to provide ample open space for active recreation, it is equally important to provide places for passive recreation. Lacey's urban forest includes many areas where wetlands and associated wooded buffers have been preserved. These areas provide places to observe wildlife, commune with nature and escape the pressures of daily life.

Traffic Management - Trees function as "traffic calming" devices effectively

slowing speeding drivers while also adding to the aesthetics of the urban landscape. Vertical elements, including trees, reduce the "optical width" of the narrow street, thereby discouraging speeding (Project for Public Spaces "Traffic Calming" http://www.pps.org). Trees and other plants may be used to direct not only vehicular traffic, but pedestrian traffic as well (Grey and Deneke 1992).

Challenges:

Since the 2006 adoption of the Urban Forest Management Plan, there have been several issues, challenges, and experiences with the implementation of the plan that are important to examine.

The first item is the challenge with application of tree tract standards in cases of infill or redevelopment where tracts previously did not exist. In Lacey's core area, specifically the Woodland District and Central Business District 5, many of the properties developed in the 1960's and 70's and predated even the earliest landscaping requirements, let alone, tree tract requirements. As properties redevelop under current policy, they would be required to set aside a 5% tree tract. If no trees exist, then they would be required to replant this area with trees to meet a certain coverage requirement in 15 years. This standard also runs somewhat contrary to Lacey's goals of establishing the core area as the urban center. Very few urban centers (if any) have set aside 5% tree tracts on all developable parcels. It may be prudent for the City to require a fee-in-lieu that may be used to either further urban forestry goals in other areas of the City or be used even in the same Planning Area to provide additional tree canopy to balance the City's urban forestry goals with its goals to urbanize. The priority areas for installation of any additional trees should be public (City-owned) properties.

Second, there have been challenges with maintenance responsibilities for street trees between the City and adjacent property owners. The City's policy has been to maintain street trees on City arterials, commercial areas, and City transportation projects and adjacent property owners or owners associations maintain the remainder. However, this has not been evenly applied across the board and there is a large amount of confusion between adjacent property owners and the City as to who has the maintenance responsibilities. The street tree inventory completed in 2012 will address some of the issues as it will provide a map of all City-maintained trees in Lacey and will therefore provide better information delivery to the public. The City ~~currently lacks an ordinance~~adopted an ordinance in 2015 related to street tree maintenance ~~and may benefit from developing one in the future. Such an~~The ordinance ~~would~~ provide~~s~~ additional clarity and consistency when it comes to maintenance responsibilities.

Another benefit of ~~having the~~a street tree ordinance ~~would be to~~is that it clarifi~~es~~y notice and abatement procedures for trees on private property that may impact city right-of-way. This ordinance ~~would~~ help~~s~~ the City better define procedures where a tree on private property is hazardous or potentially hazardous that may fall and damage city property (right-of-way) or other situations where liability

could be a concern.

Finally, there are financial challenges related to residential homeowners and homeowners associations in Lacey's neighborhoods when it comes time to replace trees. The need to replace trees can be for various reasons including being hit by a car, hazard tree, etc, but many need to be replaced due to damage or replacement due to an inappropriate species being initially installed. Many Lacey neighborhoods were developed using a street tree that, due to aggressive root structures or being a species susceptible to damage, needs to be replaced. However, many of our homeowners and homeowner's associations do not have the financial means to be able to replace the trees. The City should consider establishing a grant program or other means, including potential fee-in-lieu funds, to be able to assist our neighborhoods in these efforts.

Conclusion:

Washingtonians have chosen to protect farm and forest land by limiting expansion of urban growth boundaries under the Growth Management Act. While this results in more efficient use of urban land for development, it reduces the space available in the city for trees and vegetation. As cities become denser, there is a greater need to maintain, protect, and manage our urban forest.

While many people think of street trees when they think of the urban forest it is much more than that. The urban forest is a complex system of trees and smaller plants, wildlife, associated organisms, soil, water, and air in and around our city. It is the trees along the streets, the landscaping around our homes and institutions, the vegetation in commercial and industrial areas, the multilayered forests in our natural areas and the plants and landscaping in our parks.

The urban forest provides water and air quality benefits, improves the local climate by providing cooling and shading and improves the ecological health of the urban environment. Managing the urban forest for these benefits is sometimes difficult. Housing, commerce, transportation, public safety, and recreation must be accommodated. Successful urban forest management accommodates these uses, provides environmental benefits and improves the quality of life for our residents.

Our urban forest is managed by the city for many reasons, healthy watersheds, prime wildlife habitat, excellent outdoor recreation and exceptional trees. A healthy urban forest is essential to our quality of life and increasingly important to the city's efforts to improve the quality of the environment of our city. A healthy urban forest is an asset that increases in value over time, one that provides service as well as beauty to Lacey residents.

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~~*Creative use of trees – Lacey, WA*~~

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Goals and Policies
Of the Urban Forest Management Plan

Horizon Point, Lacey WA

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1. GOAL - Achieve and maintain a vibrant, healthy and diverse urban forest in Lacey and Lacey's urban growth area consisting of both native and non-native landscape components.

Policies:

A. Base decisions for preservation of trees and re-vegetation on privately owned lands upon the requirements of individual development sites considering criteria necessary for maintaining healthy, safe tree stands. Ensure trees planned for preservation or replanting can be integrated with expected uses given the zoning classification and anticipated urban development characteristics.

B. Base landscaping plans and landscaping decisions, concerning species selection, upon requirements of individual development sites, desired function, and anticipated urban development characteristics.

C. Create and maintain a street tree program that takes advantage of indigenous trees, provides a coordinated and deliberative approach on selection of preferred deciduous street tree species, and provides diversity of species, interest, and aesthetic quality

D. Develop landscaping themes as part of the city design review program promoting the desired wooded look and feel for specific traffic corridors and selected areas. In designated areas, where the width is sufficient to accommodate mature conifers, design landscape plans which include coniferous evergreens and native under-story vegetation in planter strips, medians and traffic islands.

~~D.~~E. Enforce tree protection regulations as part of the city's code enforcement program and respond quickly to complaints about illegal tree removals.

2. GOAL - Preserve and maintain native forest components in areas conductive to the lifecycle of native plants such as critical areas (wetland and habitat areas and buffers), conservation parks, large tracts of open space and other areas that can be naturalized while maintaining compatibility with the anticipated land use of the surrounding area.

Policies:

A. Utilize the Open Space Institutional (OSI) zone for preserving and maintaining natural indigenous vegetation and habitat.

B. Preserve natural vegetation in all designated privately owned wetland and habitat sensitive lands and buffers. Emphasize the preservation and use of natural vegetation on lands zoned OSI where the urban use is expected to be institutional.

C. Preserve natural vegetation or use indigenous, or landscaping resembling indigenous, vegetation in all large buffer areas preserved or created for the separation of one land use category from another. Provided the existing vegetation is sufficient to accommodate the desired function of separation of uses and mitigation of identified impacts.

D. Create and maintain programs that identify potential conservation areas and strategy to protect them through public acquisition.

3. GOAL - Preserve natural forest components recognizing and considering the nature of the urban zoning classifications and limitations particular zones and uses have on the preservation of indigenous trees.

Policies:

A. Replant and maintain non-native landscape components in areas of urban density and intensity where the natural life cycle of existing vegetation conflict with the built environment envisioned by the Comprehensive Land Use Plan.

B. When replanting is required give priority to the use of vegetative species that resemble native species in areas of the built environment not conducive to the native plant life cycle.

C. When making decisions for tree preservation or re-vegetation consider land use zoning designations and urban land use characteristics and expectations for development.

D. Develop specific urban forestry landscape expectations and standards for each land use zone. Standards should consider urban requirements and limitations pertaining to urban forestry.

E. Small lot areas should have reduced emphasis on preserving indigenous

vegetation because of physical development constraints and more intensive density. These areas should be planned for intensive re-vegetation with an appropriate combination of indigenous and non-native tree species.

F. Large lot areas can have more emphasis on preserving indigenous trees as lot sizes permit. However, efforts for preservation, particularly evergreen trees, should also recognize individual preference for residential landscaping options and the benefits of replacement of indigenous evergreens with deciduous tree species sensitive to residential home limitations and functions. Deciduous trees may be preferred given advantages for solar access, climate control and gardening.

G. Commercial areas anticipating intense development and little opportunity for saving trees because of significant grading, utility provisions, parking lot areas and access should emphasize preserving select tree stands with dedicated tree tracts and significant re- planting of preferred tree species throughout the site.

H. Trees in parking lots should emphasize deciduous trees that are preferred in parking areas given advantages of solar access and climate control. Pedestrian areas, particularly walkways required in design criteria for pedestrian access across parking lots should be edged with trees providing a canopy over walkways.

I. Buffers should emphasize preservation where practical, considering tree health and longevity and should emphasize re-planting native vegetation and evergreens where re- vegetation is necessary.

J. In both residential and commercial developments emphasis for preservation should be focused on selected sites or groves of healthy trees. Design of the site should protect these groves as part of the open space or as part of the overall landscape theme and requirement.

4. GOAL - Recognize the benefits of tree cover in consideration of drainage and watershed planning, habitat management, passive recreation opportunities, urban aesthetics and pedestrian benefits for street design, and maintain and improve Lacey's overall tree canopy for these benefits and purposes.

Policies:

A. ~~Develop a no~~Achieve no net loss ~~standard f~~or maintenance of Lacey's tree canopy. A 2020 tree canopy analysis showed 28% canopy cover in the City. Every three years conduct a tree canopy analysis and if canopy coverage drops below baseline, staff is directed to review tree protection regulations. Consider a tree density requirement for each land use zone based upon the zones capability for supporting tree cover.

B. Strive to achieve no net loss of forest canopy through preservation of conservation tracts, sensitive areas, community planting programs, and

replanting of properties developed under the vision of the Comprehensive Land Use Plan.

C. Apply a tree canopy requirement, or tree density requirement considering canopy, to individual development projects and require each project to comply with the standard by preservation of existing trees during construction, providing or replacing trees through intensive landscaping of development sites after construction, and/or designation and preservation of tree tracts.

D. Base plans for tree preservation or replacement upon expectations for the specific zoning designation the project is located in.

E. Craft development regulations to emphasize and promote saving existing trees with size and age by providing more credit towards established trees.

5. GOAL - Provide significant habitat value in Lacey's urban forest. Policies:

A. As is appropriate to the location and function, trees should be considered for wildlife habitat value. Trees well adapted to our area that provides food value and cover to wildlife is preferred in development of landscaping plans.

B. Consideration needs to be given to sighting of certain trees to avoid dropped fruit on sidewalks, patios and parking areas, or enticing animals into dangerous areas of roads that will result in road kill, but where landscaping opportunities allow for placement of trees in appropriate areas trees with food value for wildlife should be given special emphasis.

6. GOAL - Integrate urban forestry concepts and preferences with development design.

Policies:

A. Designation of tree tracts, preserving and planting trees in common areas, and landscaping of individual lots with tree cover shall be strategies used to meet a tree density/canopy requirement. This shall be required in the zoning and subdivision ordinances to support Lacey's urban forestry program. The tree density/canopy standards shall be applied during review and conditioning of the land division, prior to final approval of the land division. These standards shall also be applied to individual lots over the long term as building permits are approved. This can provide an expectation for a certain percentage of tree cover over the long term. It can also promote preservation or establishment of preferred species and tree stands.

B. Consider establishing a fee-in-lieu of program as an option to meet tree

tract requirements for redevelopment and infill projects in the City's ~~Woodland District~~Midtown District and Central Business District 5 in situations where no stands of trees currently exist. Fees collected should be used to plant new trees or expand the urban forest canopy on public property.

C. Tree protection, preservation and/or replacement plans shall be considered early during land division planning, prior to preliminary approval, to promote integration of urban forestry concepts with the overall land division design.

D. Create a balanced look in landscaping plans between natural and manicured landscape. Consider the urban context, site use, location, and zoning designation in designing the landscaping plans.

E. Promote creative landscape designs that avoid a cookie cutter design but still provide interest, visual relief, and break up expanses of hard surface and walls.

F. Allow flexibility in landscaping development sites to preserve areas of native vegetation where appropriate or create areas of native vegetation design by providing credit towards traditional prescriptive landscape methods and requirements.

G. Consider crown-raising on street and landscape trees to improve visibility into commercial properties consistent with sub-area or district-wide planning efforts.

7. **GOAL - Maintain tree canopy in developed areas**.

Policies:

~~H.~~A. Developed residential lots will be required to maintain a certain minimum canopy/tree density over the long term to promote the overall urban forestry program. This expectation or minimum standard should be based upon what is reasonable to expect based upon the size and design of the individual lot and the zoning designation it is located in, and the longevity of the trees planted.

~~I.~~B. A certain amount of flexibility will be provided for individual lot owners once lots are purchased to allow for individual tastes and landscaping preferences and needs. However, the goal of maintaining Lacey's tree canopy/density should be maintained. Unless physical constraints make it impractical, each lot should support its prorated share of the tree canopy/density.

C. Develop a program to monitor trees required in landscaping plans that are the responsibility of the land owner, lot owners association, or home owners association. Provide assistance in educating responsible parties regarding strategies and techniques of tree maintenance, and enforce landscaping requirements for trees.

~~J.~~D. Better utilize the city's tree protection specialists to conduct site visits of properties that received an exemption permit requiring replanting.

~~7.~~8. GOAL - Develop a street tree program as an essential component of Lacey's Urban Forestry Plan.

Policies:

A. Provide for a street tree program with specific emphasis on designing streets for pedestrian comfort and security and promote species that provide the desired street canopy, are disease resistant, low maintenance, have root systems that do not create street and sidewalk buckling, and have attractive features adding interest to the urban street environment.

B. Provide for a street tree program that has both naturalized and non-indigenous species components.

C. Develop a street tree program that is integrated with landscaping plans and design for specific street corridors.

D. Develop an ongoing tree planting program to replace mortality, damaged trees, and to increase canopy cover.

E. Develop a program to monitor street trees and follow up on enforcement where street trees are part of a required landscape plan and the maintenance is the responsibility of the land owner.

F. Explore establishment of a dedicated street tree maintenance fund, utility fund, or other similar program that would fund street tree replacement in neighborhoods.

~~8.~~9. GOAL - Create a heritage and specimen tree program that recognizes special trees worthy of extra attention, notoriety and protection.

Policies:

A. Develop definitions of heritage and specimen trees that emphasize the special distinctions that lead to such characterization, in context with Lacey's history.

B. Hold contests annually on Arbor Day for identification and qualification of these special trees.

C. Develop standards for protection of such trees and methodology for registering trees so that new land owners are notified of what they are purchasing and expectations associated with the distinction, including the tree's health and expected life cycle

~~9.~~10. GOAL - Develop an Urban Forestry Plan that promotes safety and healthy trees.

Policies:

A. Develop a program that incorporates decisions for preservation of trees that are related to development projects that consider safety issues associated with the potential built environment.

B. Assure that safety issues are considered by a qualified tree professional when developing plans for tree protection, preservation or landscaping design.

C. Develop a program that assures that tree species are considered for adaptation to our area, localized environmental conditions, resistance to disease, and compatibility with the planned urban use of the site.

D. Develop a program for regular inspection and maintenance of street trees that is ongoing to promote healthy well formed and functional street tree resources.

E. Provide for a tree removal process for removal and replacement of dead, dying or diseased trees.

F. Maintain the program for the tree professional(s) to be available to the public for tree inspections, and considerations of tree issues on individual lots, at cost for review.

~~10.~~11. GOAL - Create an Urban Forestry Program that is publicized, easily understood, has brood support, promotes pride in our Tree City USA distinction and is enforced.

Policies:

A. Develop a public education program that promotes Lacey's distinction as a Tree City USA and provides support to individual citizens and home owner associations concerning tree issues.

B. Develop a program for meetings with home owner associations to help associations manage privately owned tree resources.

C. Develop and implement a program of informing new residents of expectations for tree emphasis and tree regulations.

D. Develop and implement an enforcement method that is fair, based upon professional evaluation, and promotes the vision of the Urban Forestry Plan.

E. Develop an enforcement program that includes education of the benefits of

trees and maintenance of trees, and involves fines for non-compliance. Fines shall be based upon a fair value of the trees lost and replacement of trees. Fines may be used to support the city urban forestry program through maintenance and planting of street and park trees.

F. Work with private and public entities to create partnerships for developing education and community action programs promoting the value of maintaining and conserving natural vegetation and habitats.

G. Develop interpretive trails and view sheds within conservation areas and natural parks to provide recreation opportunities and education to the citizens of Lacey.

~~11.~~12.**GOAL - Create a citizen advisory board for urban forestry issues**.

Policies:

A. Develop an Urban Forestry Board that is made up of tree specialists and citizens representative of the scope of urban forestry issues in our city.

B. Develop a set of operation criteria for the Urban Forestry Board that has it develop and consider urban forest plan amendments, work on special urban forestry projects and advise the council on urban forest issues.

~~12.~~13.**GOAL - Develop a method to process Class IV Forest Practice Applications pursuant to requirements of RCW 76.09.240**.

Policies:

A. Develop a process to include in the city tree and vegetation protection ordinance for review and action on Class IV Forest Practice Applications.

B. Require all Class IV Forest Practice Applications to satisfy the intent and vision of the Urban Forestry Management Plan.

APPENDIX 1
Background and Baseline Information

A
Council's First Visioning Work-session for the Development of the Urban Forestry Plan

In early February of 2005, the Council held a work session to determine what each individual member thought was important in regards to maintaining trees and vegetation. Without priority, the following results are individual thoughts of Council members from that visioning effort

1. Observation: "don't like – for site planning and tree retention; need to know where building footprint is in relation to trees – keep tree clusters if possible."
2. Retain the "NW Woodland Character" – we are losing this. NW look and feel which is not just "ornamental" or "street trees" look.
3. Don't need cookie cutter designs: be more innovative in our designs. Develop designs to look more natural than the street trees on 35' centers. (Retail vs. Commercial).
4. No net loss of trees; need to preserve rather than replant.
5. Not real interested in large firs in residential, one ice storm will cause problems. Need to breakup walls with plantings.
6. Like mixing oil & water – have natural look at entry points or "open spaces", buffers native doesn't mix with density we are trying to keep or develop.
7. Replace trees with trees that meet our vision (rather than replacing like for like)
8. Find appropriate trees for a given area which retains the look and feel of the NW Woodlands. Not the typical street/landscape sculptured look.
9. Heritage/specimen trees need a definition – look at location and health. Be sure evaluation looks at long term.
10. Protection of the natural habitat – trees are a key component of this.
11. Look at when and where we plant trees. Don't waste the resource (mindless construction projects)
12. Heritage or specimen trees on private property. Owners need to understand what they are buying. Our vision can't take away personal property rights by imposing "our vision" on them.
13. Look and feel should apply to housing development and commercial. Hard on very small lots. Set aside tree tracts instead of how we do it now, trees in parking lot landscaping.
14. Need balance between natural and "landscaped look".
15. Adjoining development and differing standards and look/feel. Like, orchard style

– urban environment looks urban. Entry ways – public spaces (parks, open spaces and planters)

16. With innovative thought from our engineers, landscape architects, etc. we can have more natural looking parking lots.
17. Like: "the green of Lacey"
18. Trees that grow where you plant them. Species selected need to be the right choice for the location.
19. Education of public Home Owners Associations (HOA's). HOA's need to be aware of our tree preservation ordinances and the importance of trees. Use public events to promote healthier urban forest.
20. Exercise more judgment to all the NW look and feel – change landscaping ordinances to accommodate trees. (meander sidewalks)

It was also mentioned that there should be some public education about what does "Tree City USA" mean and what an urban forest is.

As with our citizens, opinions of individual council members vary greatly in regards to tree and vegetation preservation. But, when working together, as was done during the vision exercise, you can see that similar interests are reflected in their statements. It is the intent of this plan to take advantage of the common themes which have developed to create a plan that is widely supported by the Citizen's of Lacey.

B
Soils and Site Information

The City of Lacey occurs entirely within the Puget Sound Trough which extends the entire length of Washington from the Canadian border to Oregon. The soils were formed during the most recent Vashon glaciation epoch. The terminal moraine of the Vashon glaciation is found in southwest Thurston County.

The topography of Lacey is undulating to rolling on uplands. The soils are predominantly formed in glacial drift deposited by the most recent of several continent-sized glacial ice sheets. The soils generally consist of compact basal till covered by a thin, discontinuous layer of ablation till. The predominant gravelly soil types formed from this material include the Alderwood gravelly sandy loam, Everett very gravelly sandy loam, and the Spanaway gravely sandy loam. Also commonly found are the Indianola loamy sand, Nisqually loamy fine sand, Skipopa silt loam, and Yelm fine sandy loam. These sandy soil types are formed from outwash material and are found along the major stream courses and broad flats.

Photo A. Typical glacial till derived soils found in Lacey.

The windthrow potential for all of the soil types found in Lacey is slight (except the Alderwood which is moderate); meaning that blowdown of healthy trees is less likely during normal winter storm events. The moderate windthrow risk indicates a higher windthrow potential, especially during periods of wet weather and high winds. Perched water tables above the Alderwood hardpan contribute to this increased hazard. Inclusions of poorly drained soils such as the McKenna gravelly loam (small areas that generally occur within wetlands) also have a moderate to high potential for windthrow.

The productivity of these upland soils is moderate to high, and competition for new seedlings is moderate to high. Weed control is usually necessary during the first 3 years after planting seedlings in forested areas or gaps in the canopy.

The soils found on the outwash materials are slightly drier, but have no barriers to root penetration and a slight windthrow potential.

C
Forested Cover

The forest cover in the City of Lacey is within what is classified in forestry as the *Tsuga heterophylla* Zone, the most extensive vegetation zone in western Washington. It is famous for its subclimax Douglas-fir and climax western hemlock-western red cedar formations. The seral stands that occur today are dominated by second-growth Douglas- fir. Though they are climax associations, even old-growth stands (400 to 600 years old)

still have significant components of Douglas-fir in addition to the climax western hemlock, western red cedar, and grand fir species.

Photo B. View of remnant second-growth Douglas-fir along Golf Club Road SE in Lacey.

In east Lacey, an oak woodland type occurs that is often intermixed with Douglas-fir. The Oregon white oak (*Quercus garryana*) colonized former prairies and is now being overtopped by invading Douglas-fir. The Oregon white oak occurs predominantly on the excessively drained Spanaway gravelly sandy loam soil type, but scattered trees and groves of trees are found on other types (Photo C). Common snowberry and Oregongrape are the predominant shrub species under the oak stands.

Douglas-fir is the most common native tree found in Lacey. Western red cedar, western hemlock, bigleaf maple, black cottonwood, red alder, cherry, and Scouler willow are also found depending on the location with the topography and level of disturbance. The understory is dominated by salal, Oregongrape, bracken fern, swordfern, red mountain huckleberry, common snowberry, and *Rubus* species. This combination of conifer overstory and diverse understory, with the productive soils produces good to excellent wildlife habitat potential.

Photo C. View of a majestic Oregon white oak protected during development of the Senior Center in Lacey, WA.

The forest canopy is becoming more fragmented as development has spread into the urban growth areas, particularly in the Hawks Prairie Area. The industrial development on Marvin Road and Willamette Drive NE areas, along with Britton Parkway and the large commercial project development are impacting the forest canopy significantly.

On the other hand, some areas are growing trees that were non-forested in 1966. Undeveloped prairie areas are reforesting on their own, the city is planting trees on rights- of-ways, and residents are planting trees in yards and open space areas. This has combined to increase the forest cover in the original core of Lacey, and slow the overall forest loss since 1966. Figures 1 and 2 are based on examination of aerial photos from 1966 and 2001 (plus known changes in 2002-04).

Figure 1. % Forest Cover in Lacey - 2004

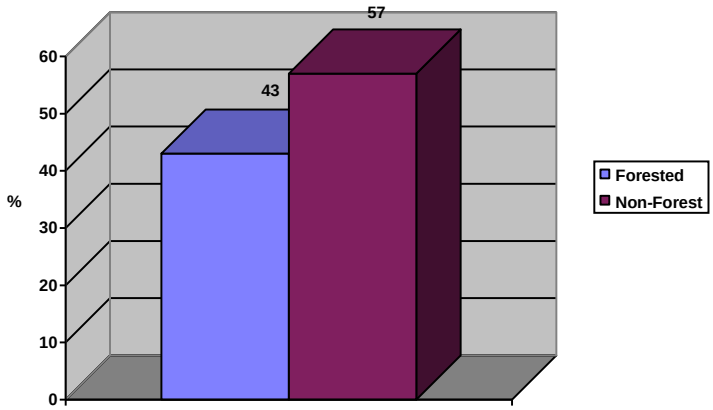
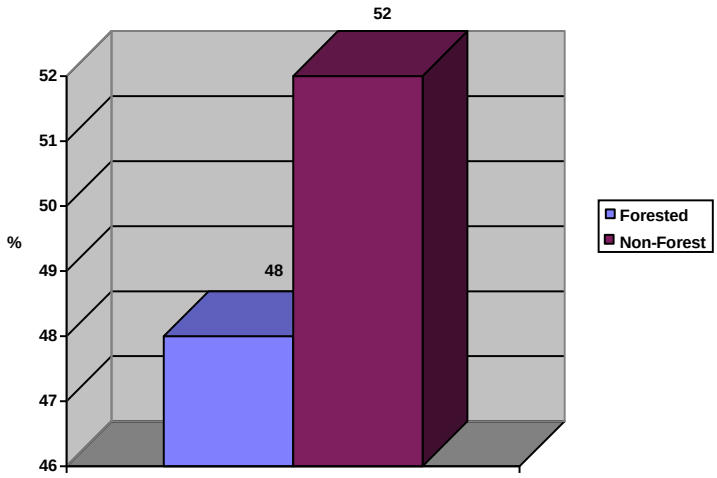


Figure 2. % Forest Cover in Lacey - 1966



Figures 1 and 2 illustrate the changes in forest cover between 1966, several years before Lacey became a City, and 2004. The 2001 photos were updated to 2004 by removal of acreage for projects constructed since 2001 to determine an approximate acreage.

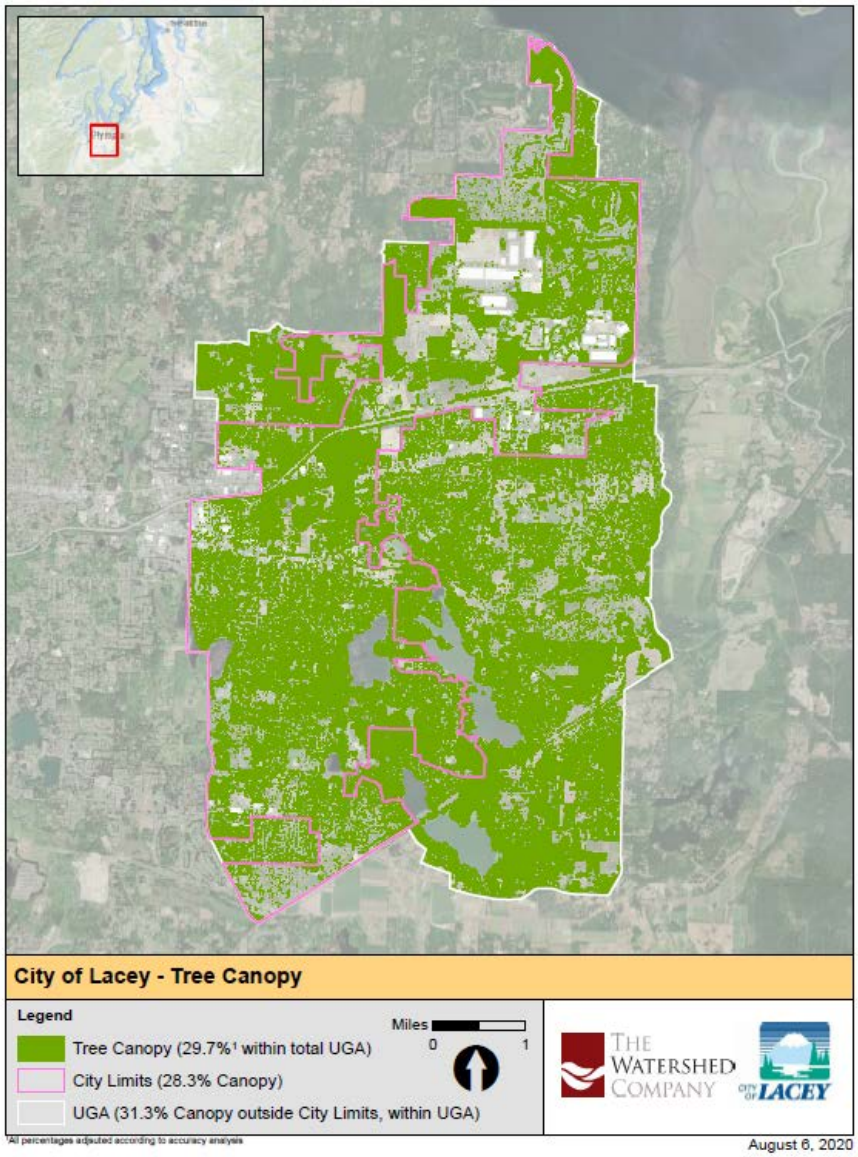


Figure 3 illustrates tree canopy in the City and UGA as of August 2020.

D
Street Trees and Maintenance Evaluation

Private Street Trees

A 100% inventory of all 'private street trees' was completed for all major and minor arterials and collectors in Lacey. A 'private street tree' is one that is maintained by the adjacent property owner and is situated in the curb lawn zone or behind the sidewalk, and serves as the street tree for that location. These are areas where there are no city maintained street trees.

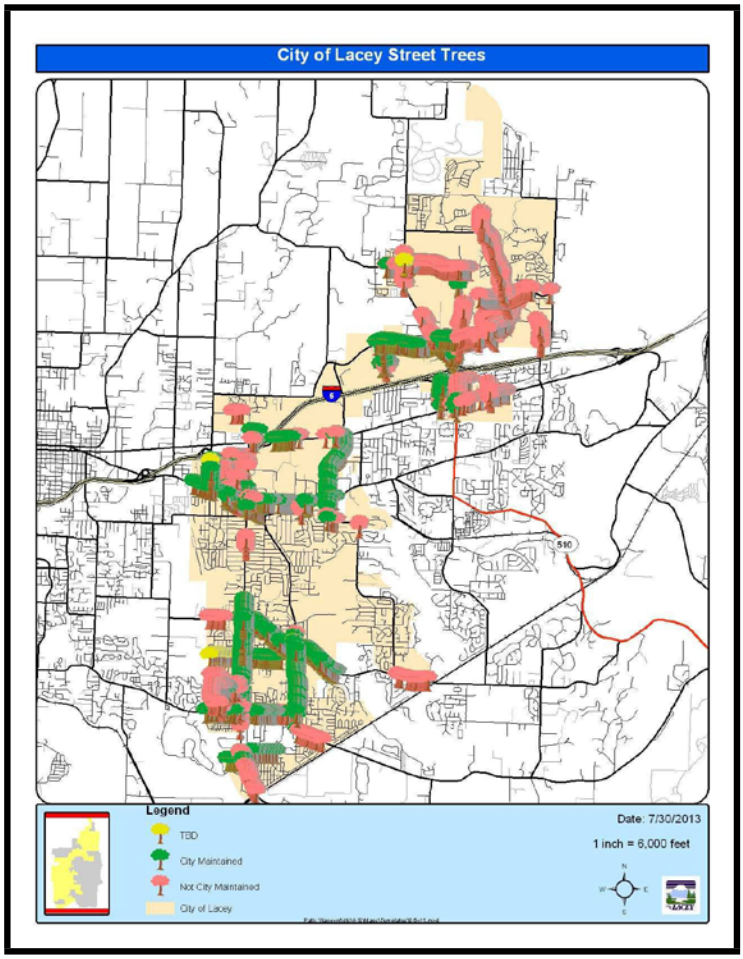


Figure ~~3~~4. 2012 Street Tree Inventory

Table 1. Summary list of street trees on all arterials and collectors.

Species	Diameter Range	# Trees	% Composition
Ash – Green/White	1-26	1,102	19.08
Sweetgum	1-19	839	14.53
Ash – Patmore	1-22	692	11.98
Pear - Callery	1-12	547	9.47
Oak – Red	2-17	349	6.04
Maple – Red	2-26	217	3.76
Crabapple	1-8	197	3.41
Cherry – Kwanzan	3-19	161	2.79
Maple – Norway	2-10	153	2.65
Ash – Autumn Purple	2-10	142	2.46
Maple - Vine	1-6	114	1.97
Dogwood – Flowering	1-6	100	1.73
Cherry - Flowering	1-9	91	1.58
Zelkova – Japanese	4-10	80	1.39
Maple – Norway	2-7	79	1.37
Plum - Flowering	1-16	75	1.30
Various Other Species		837	14.49
		5,775	**100.00**

Sweetgum and ash (green and white ash cultivars) dominate the streets of Lacey and its urban growth area. This is due to a Merritt and Pardini study of 1985 that recommended ash and sweetgum as the main trees for Lacey's central business district, plus the availability at nurseries and general popularity of the species among landscape architects for years. Red maple, flowering plum, and flowering cherry were the next most populous species found along streets that were under private maintenance. The private street trees – were, for the most part, in good condition.

The two major exceptions were:

1. Sweetgum trees that were heavily damaged by the 1996 and 2012 ice storms and other heavy wet snowstorms, and
2. Trees that have been topped or otherwise mal-pruned by the landowners.

Photo E. View of recent topping of private street trees in 'Old Lacey' area.

Few of the trees were receiving maintenance such as corrective pruning, including crown raising or crown cleaning to remove dead, dying, diseased, defective, crossing, or extra

branches. These trees will continue to be more susceptible to storm damage, will be more costly to maintain as they get large, and their useful lifespan will be shorter.

The majority of these private trees are located in the required landscaping of commercial properties. In some cases the form and severity of pruning has destroyed the trees natural shape, and shortened its projected lifespan. In some cases, it does not appear that the trees meet the intent of the requirements in the landscaping ordinance.

City-Maintained Street Trees

A 100% inventory of city-maintained right-of-way trees was conducted by Washington Forestry Consultants, Inc. in 2012. Individual trees were evaluated and data on species, size, location, and condition was collected.

Tree Diversity and Planting Spot Data

The inventory found 2,973 street trees. Trees were identified and recorded by common name. Specific cultivars were determined in the field. The average diameter measured at
4.5 feet above the ground line was 8 inches. This is a reflection of how young the street tree population is in the City of Lacey, however this has increased from an average of 4- inch diameter since the last inventory was completed in 2001. The majority of the trees are planted in curb lawn zones, though some are in tree grates within the sidewalks.

Diversity is key in any urban forest. This helps insure that entire urban canopies are not wiped out by common maladies such as the Dutch elm disease did to many elms across the U.S., the chestnut blight on American chestnut, and ash decline on several species of ash.

As a rule of thumb, no more than 10% of the urban tree population should be of the same species, no more than 20% of any genus, and no more than 30% of any family. Some tree species such as red maples, green ash, London plane, and sweetgum tend to be over planted in the Pacific Northwest urban areas. In Lacey, the green ash cultivars, cherry and flowering plum, and sweetgums are over planted. The focus for future street tree plantings should shift away from ash, cherry, flowering plum and sweetgum to other quality species and cultivars.

Selection of cultivars resistant to known insect or disease problems help to insure that mortality will be limited if outbreaks occur. Ice and snow storms, wind storms, or extended droughts also may impact some tree species differently. Diversity is the key to minimizing damage from abiotic and biotic

influences.

There is adequate space in many locations for larger scale street trees. Many of the best and longest-lived street trees are the larger tree varieties. Many of the small flowering

ttree species are plagued by leaf diseases, twig blights, cankers, and other problems. Even some resistant varieties will still have problems.

It is recommended that the species selection for street trees be diversified to improve the quality of the urban forest.

City Street Tree Maintenance Evaluation

The 4,554 street trees maintained by the City of Lacey are generally described as being young, and in fair to good condition. Staff has routinely raised crowns on young trees to provide sidewalk and street clearances, performed some corrective pruning, and day lighted trees from overtopping competition by adjacent forest trees. The quality of this work is excellent when evaluated against the current standard for proper pruning[1].

Photo F. Street trees planted in the urban growth area. Design is the City of Lacey's standard which is working very well.

Normally, in cities with more and larger trees, all work is prioritized based on the urgency of the work. Future evaluations will require prioritization. The following is the recommended prioritization for the trees.

[1] ANSI A300 (Part 1) – 2001 --Pruning for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, American National Standards Institute, New York, NY.

- *Priority 1 Tree Removal*: Trees designated for removal have structural defects that cannot be cost-effectively or practically treated. The majority of the trees in this category have a large number of dead branches which present a safety hazard. Removal of these branches would leave a severely deformed tree, the live crown would be reduced to the point that mortality was sure, or that the tree is already in irreversible decline. Removal of trees before they are dead and in severe decline helps to prevent property damage or injury, and the tree removal is safer and theoretically less costly for a tree service to remove.

- *Priority 2 Tree Removal*: Trees on public property that are recommended for priority removal should be removed after priority one removals are completed. These trees may be in irreversible decline, but still be structurally sound.

- *Priority 1 Large Tree Pruning*: Trees are recommended for priority one pruning if there is a need to remove hazardous deadwood, hangers, cracked or broken branches. If conditions cannot be determined from the ground, then a lift truck or climber may need to be employed to do a closer inspection of the above ground parts.

- *Priority 2 Small Tree Pruning*: These trees require routine corrective pruning to establish scaffold branches and to raise crown for sidewalk or street clearances. Corrective pruning should be minimal after planting, and should remove crossing, damaged, and extra branches. Pruning for street clearances and sidewalk clearances depends on the length of the crown and growth rate of the tree.

- *Priority 3 Monitor*: Tree has structural defect that cannot be repaired, or is showing minor symptoms of decline. Tree should be monitored in spring after leaf-out and fall before leaf drop and a prescription for care developed.

- *Planting Spot*: This category indicates a vacant planting spot or a stump where a previous street tree had died.

The causes for tree decline and mortality are many and varied. Planting shock or lack of irrigation are the most common causes of mortality for newly planted trees. The next most common cause of mortality is man-caused injury. Weed eater damage, lawnmowers, bicycles tied to trees, trees vandalized, root disturbance, or run over by cars are the most common reasons newly planted trees failed. Insect or disease problems usually are a problem in later years, unless a tree was infected with disease or infested with insects in the nursery.

It is important to remove and replace dying trees quickly to eliminate inoculum from disease or insect infestations, to maintain aesthetic quality, and

to get a new tree established and growing to maintain some uniformity of the planting.

Maintenance needs by priority is described below. Work should be accomplished by priority. This may require specialized tree contractor to deal with some of the larger hazard trees. Most of the small tree work can be accomplished with city staff.

All small street trees should be inspected on a 3-year cycle. This helps to assure that pruning is accomplished on a timely basis, that damage, decline, mortality, or other problems are addressed quickly. Decline and other insect or disease problems can be identified and control methods implemented before the tree is a total loss.

Individuals that maintain weeds near the bases of trees, mow curb-lawn zones, and do tree maintenance should be trained to recognize tree problems before they result in mortality.

All pruning should conform to the ANSI A300, Standard Practices for Trees, shrubs and Other Woody Plant Maintenance (2001). This is the recognized standard for all tree care. All pruning should be completed by an International Society of Arboriculture Certified Arborist, or be supervised by one. It is recommended that the City of Lacey retain at least one member of the parks maintenance staff that is certified.

Condition of the Urban Forest

A condition rating was assigned to each street tree to help assess the health of the street trees. The ratings are adapted from the *Plant Appraisal Guide* (2000), published by the International Society of Arboriculture. The condition of the foliage (if present), twigs, scaffold branches, stem, and roots is assessed, along with any hardware (stakes, cable and bracing) present in the tree. After the tree is evaluated it is rated as: Good, fair, poor, or dead.

Trees that are rated as dead or poor are usually recommended for immediate removal and replacement. Large trees rated as very poor usually are in irreversible decline due to root disturbance or some other factor. Small trees rated as very poor usually did not establish, or have been severely damaged since planting. Quick replacement of these trees simply gains a year of establishment and growth.

Trees rated as fair and good may need minor cultural care and are expected to be long- term trees. Trees rated as excellent are expected to be long-term trees and require no care at this time.

Approximately 94% of Lacey's trees were rated as fair to good. Based on this data more corrective pruning is needed to develop the crowns on the newly planted trees.

Priority Pruning

Pruning of the safety hazards identified in the inventory should be completed first, followed by routine maintenance pruning. The routine maintenance pruning should be completed in the dormant season between October 1st and February 15th.

All pruning should conform to the ANSI A300 (Part 1)—2008. This is the standard for proper tree care. All pruning should be done by an International Society of Arboriculture Certified Arborist.

When contracting with a professional tree service, it should be specified in the contract that they observe the safety guidelines for tree care operations: ANSI Z133.1 - 2001 -- Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush -- Safety Requirements. American National Standards Institute, Washington, D.C.

Clearance Requirements

The types of situations where trees can interfere with visibility include: signs, sidewalks, buildings, street lights, stop lights, or sight distances for pedestrians and motorists. In all cases trees can be pruned to provide adequate clearances.

Trees and other vegetation should be *monitored annually* to identify these types of safety hazards. The annual inspection of all rights-of-way is recommended to occur about June
1 when the first flush of deciduous tree growth begins to slow. Trees and other vegetation that are close to these signs will begin to obscure site distances and visibility. A second inspection is also recommended for early September, after vegetation growth is complete, but before leaf drop.

The tree that requires clearance pruning should be inspected and trimmed for clearance immediately. This should include native vegetation encroaching onto the streets and sidewalks as well as planted street trees.

Sidewalk overhead clearances should be a minimum of 8', but 10' is recommended. Pruning on smaller trees may need to be done over a 3-4 year period to achieve these clearances and avoid stress on the trees. Trees with thorns are especially a hazard. Generally, trees with thorns should not be planted as street trees. Where pruning for sidewalk clearance dramatically changes the look or shape of the tree, notification of the tree owner is recommended. As an option, they could be notified to prune their own trees to provide clearance with a time-frame before the City completes the work.

Street clearances must be maintained to prevent damage to vehicles and to the trees, and to maintain sight distances.

Trained city staff will recognize these clearance problems and correct them during routine maintenance. As a rule of thumb, branches should be pruned before they reach a diameter of 2 inches at the branch bark collar. This minimizes the wound size and allows a tree to quickly callus over the wound, protecting tree health.

Where branches of private trees encroach into the city rights-of-way, the city can only prune to the rights-of-way edge. In some cases this will leave stubs or unsightly branches that will die back. To maintain tree health and appearance it is recommended that all pruning cuts be made to the nearest lateral branch. Where pruning beyond the rights-of- way edge should occur to protect tree health, then landowner permission is recommended.

Overhead Utilities

The presence of overhead utility wires was noted for many trees and planting spots. Trees with a mature height of 20 feet or less should be planted under utility lines to avoid costly pruning and deformation of the appearance of trees.

Photo G. Tall growing green ash on Ruddell Road just south of Pacific Ave. SE. Trees require repeated pruning to prevent utility conflicts.

Overhead electrical wires were located over a portion of the existing street trees. Many of the street trees are inappropriate for these locations and will require extensive and repeated pruning to maintain reliability and safety for the public. If these trees are replaced due to mortality or other problems in the future, 'Utility Friendly' trees should be planted in those planting spots. A list of 'Utility Friendly' trees is provided in the section on street tree selections.

Curb Lawn Zone Widths

It is recommended that the designs for all new city streets include a curb lawn zone, the area between the sidewalk and the street, with a minimum width of 5 feet. Six to 8 feet is the optimum width. Currently the average curb lawn zone width is 5.5 feet.

In many cases, especially where large, canopy forming trees are desired; planting the street trees behind the sidewalk is the best location. This moves trees away from the street edge, reducing car damage, pruning for clearances, and will reduce sidewalk damage. Overhead utilities are less of a problem with these planting locations. Private easements for street trees can be obtained.

Maintaining the Safety of the Urban Forest

During the street tree inventory and evaluation, certain maintenance needs were identified for a small number of trees that are required for public safety. These needs include sign clearance, hazard tree removal, pruning, and sidewalk clearance pruning. As this work is completed, *systematic pruning programs* and *tree planting programs* can be considered.

Photo H. View of large stem failure on a bigleaf maple at the community center.

Annual evaluation of larger trees on and adjacent to rights-of-ways is necessary to identify developing hazard trees, and to identify clearance pruning

needs.

Removals

The hazard tree evaluation program in parks has already identified a number of removals that are necessary. Parks and City owned property (utility sites, greenbelts, easements, vacant property) are evaluated by an independent every 3 years for hazard trees. City maintained street trees are pruned for hazards and clearance every 5 years. ~~These trees should be removed or pruned as recommended immediately to protect public safety. Staff has done a good job in the past of completing hazard tree mitigation in a timely fashion.~~

The small street trees, and dead trees recommended for removal are less of a hazard, but should be scheduled for replacement.

The average lifespan of an urban street tree varies from 7 to 18 years. Mortality will be ongoing, and replacement should be completed during the next planting season.

Trees that require removal can be removed by city crews or on a lump-sum bid contract with private tree services. It is recommended that all large tree work and other difficult removals be handled by skilled contract tree professionals. Small tree pruning can effectively be handled by city staff.

When crews begin to remove hazard trees, public notices should be posted to avoid concerns by citizens. Much anxiety and public concern can be avoided if citizens understand that only hazard trees are being removed.

Sidewalk Damage

Street trees in Lacey are causing sidewalk heaving ~~is not a major problem~~ and ~~. However,~~ there will need to be ~~some~~ annual repair activity anytime trees grow near sidewalks or curbs.

Potential problems with new plantings can be minimized by use of root barriers along curbs and sidewalks to deflect or direct roots deeper. This will defer heaving, and with proper tree selection, can eliminate heaving problems.

Where roots of large native trees or ornamental trees adjacent to sidewalks begin to cause heaving, care must be used to avoid severe damage to the tree. Cutting of large lateral anchor roots can cause stability problems, may cause decay, and will reduce the lifespan of the tree.

Minor heaving can be temporarily repaired with an asphalt bridge between the lifted section of concrete, or the lifted edge can be ground flush. As the deflection of the section continues to rise, replacement of the section will be required. A decision to cut the root or bridge the root must be made at this time.

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If at all possible it is recommended that root cutting be avoided. Curving the sidewalk, leaving a cutout for the root, or raising the grade of the sidewalk to go over the top of the root is recommended. These ~~se~~

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decisions must be made on a case by case basis. Trees in poor condition, or that would be made hazardous by the activity should be considered for removal.

The City's Public Works Transportation Division has a mini excavator and a vacuum tool called a sidewalk sucker to lift sidewalk panels without breaking them. Once lifted, the crews can prune the roots heaving the sidewalks and then re-grade the subsurface and replace the panel.

Stump Removal

Stump removal is necessary if a new tree will be planted in the same location. If the new tree can be moved to avoid costly stump grinding tree planting costs will be reduced. ~~Stumps do need to be cut low to avoid safety problems with pedestrians and cars. In many cases grinding to a level 6 inches below the surface is recommended since safety concerns are eliminated and lawn can be established. Small stumps may be cut at the groundline and left in many cases.~~ In cases of disease caused mortality, excavation of the stump is recommended to reduce the inoculum from the pathogen.

The following specifications are to be used to identify an open

- planting spot: A minimum of 4 feet is needed for a plantable area.
- The minimum distance to the adjacent planted trees is 25 feet.
- All planting spots are at least 25 feet away from intersections.
- All planting sites are at least 10 feet away from fire hydrants, driveway, utility poles and street lights.
- All planting sites are at least 10 feet away from any visible or identifiable underground electrical vaults.
- Planting spots with overhead (electrical conductors) or side restrictions for growing space are identified.
- Planting behind the sidewalk is preferable to narrow (4 feet) planting spots in many cases. This may require private easements to establish medium to large street trees.

Knowing the numbers of open spots, coupled with a street tree plan with recommended species easily allows preparation of grant proposals for additional tree planting funds. Having good, demonstrable data on the urban forest will improve success in acquiring grants. These projects are also excellent to get citizen involvement.

Size Class Distribution

All tree diameters were measured 4.5 feet above the groundline (called diameter at breast height or DBH).

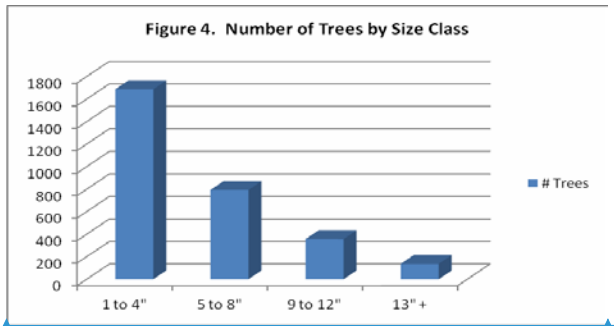

Figure 4 illustrates the young age of the Lacey city maintained street tree population.

The urban forest should have a diversity of size classes as well as species. This helps assure that the entire urban forest does not mature at the same time causing excessive maintenance costs, replanting costs, and major changes in the cities appearance.

The smaller trees grow vigorously and after establishment and early corrective pruning require low maintenance inputs. Ideally the urban forest would have a regular distribution of size classes from small to large trees, as well as a diverse species composition. Immediate replacement of dying trees or newly opened planting spots is recommended. The management practices help to spread and smooth annual maintenance costs over time.

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APPENDIX 2
Tree Protection Objectives, Issues and Forester Recommendations for Ordinance Adjustments

Objectives /Activities of an Urban Forestry Program

The following are the basic activities recommended for Lacey's urban forestry program:

- Maintaining the safety of the urban forest under management by the City of Lacey.

Removing dead and dying trees, pruning trees for traffic and pedestrian clearances,

mitigating other hazardous conditions that accomplish this goal.

- Maintaining the Health of the Urban Forest will reduce maintenance and replanting cost associated with the trees. Corrective pruning of young trees will eliminate costly pruning in later years, and will protect tree health by eliminating large diameter wounds from delayed corrective pruning. A healthy, properly pruned tree requires protection but very little maintenance.

- Perpetuating the Urban Forest through replacement tree planting, planting open planting spots, and filling gaps in forested stands must be done to perpetuate the forest. Trees and stands of trees are dynamic, living things. They live and die, and they respond to management and protection.

- Management of the Urban Forest, like other city services is a benefit to the citizens. Public relations are fostered as the city works with adjacent landowners to manage trees on the rights-of-way.

- Create public education programs that will assist the Citizens in perpetuating the goals of this plan.

- Continue to support the "Tree City USA" designation of the City of Lacey.

Protection Vs Re-planting

Protection of existing trees should be given precedence over replanting in new developments. Native trees should be protected in clusters or in tree tracts as opposed to retaining individuals or a few trees. Projects should be evaluated by a qualified professional forester who has academic and field experience in urban forestry to identify trees for potential retention in new development.

Healthy, long-term trees that are identified to be protected must be fenced during construction to avoid damage to the root protection zone (RPZ). This protection

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is illustrated and described in III page 73.

Urban Forestry Advisory Board

It is recommended that the city consider the formation of a tree advisory board. The purpose of the board is to review city ordinances, practices, and policies with regard to trees and make recommendations back to council and staff.

The board can help find and recognize historic, rare, or specimen trees and to recognize the individuals who have cared for them. A 'Friend of Lacey Trees' awards can be given to citizens who have done an exceptional job of tree protection, tree planting, or other tree related community service. The tree board generally helps coordinate Arbor Day and other tree related activity. As with any city appointed board, staff time will be required to support the board along with a small budget to purchase plaques, educational materials, tree seedlings, and other items for activities the tree board generates.

Another concept is to appoint Tree Stewards. Tree Stewards promote tree protection, tree planting, tree care, and environmental stewardship in the community. Tree Stewards are provided annual training in different areas of urban forestry and asked to assist with Arbor Day, inventory projects in parts of the City, and for input on ordinance related tree issues. The idea is that the knowledge gained by Tree Stewards is spread through their contacts in the community. They are also a source of ideas, information, and enthusiasm for protection and planting of trees in the community.

Summary

This study found that 43% of Lacey is covered with native forests and planted or ornamental trees, with the remainder being developed.

We found 2,973 planted city maintained street trees and 3,208 private street trees. Few open planting spots occur within city maintained areas. Many open planting spots occur in privately maintained areas.

Street tree maintenance is good, but requires additional corrective pruning on the planted street trees. Species selections for planting, and matching species to site need to be modified. We need to diversify the species mix on Lacey's streets. Ongoing training is recommended and the staff should include at least one International Society of Arboriculture Certified Arborist®.

Based on our evaluation of the urban forest in Lacey, the ordinances, visits with staff and citizens, and maintenance procedures - the following priority is recommended to improve protection and management of the Lacey urban forest:

- Continue annual maintenance activity on the existing street trees for sign clearance, corrective and clearance pruning, and complete annual hazard tree evaluations.
- Budget adequate annual funding to complete basic maintenance tasks for city street trees and some replanting.
- Continue to require review of all commercial and industrial projects with one or more trees. This is important in cases when only a few Oregon white oaks occur on the site. Tree retention may have an even higher impact in areas devoid of trees. Also consider a minimum percentage area for tree tracts in al types of developments. Language regarding tree removal on private property needs to be clarified.
- Continue to educate the public to prevent improper pruning of required landscape trees. A procedure for inspection of required landscaping for compliance 3 plus years after the bond has been released needs to be established.
- Continue to involve the Lacey contract urban forester in the site plan review process on new projects, require the urban forester attend pre-construction conferences when trees are to be protected on site, and utilize the urban forester more in inspection of required landscaping on completed projects.
- Consider appointing a tree advisory board.
- Create a 'Lacey Friend of Trees' award to be given to citizens, developers, or companies that have taken special care to protect, plant, or maintain significant trees or stands of trees in Lacey.
- Conduct a 'Big Trees in Lacey' contest to find and recognize large or specimen trees in the city.
- All new street tree plantings should be taken from the prescribed species list and matched to the growing space of the planting site. All landscape tree plantings in required landscaping on projects should be taken from the general tree list for Lacey. Other trees can be incorporated in the design upon approval of the site plan review committee.
- Solicit grant funding, corporate donations, and other funds to expand tree planting and maintenance.
- Revise the urban forest management plan every 5 years.

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APPENDIX 3

Tree Planting Specifications for Lacey Street Tree Planting Projects

Tree Planting Specifications

I. Description of Work

These specifications include standards necessary for and incidental to execution and completion of planting street trees.

A. Specifications for the planting hole design, tree planting, mulching and watering are included.

B. Protection of existing features. During construction, protect all existing trees, shrubs, and other specified vegetation, site features and improvements, structures, and utilities specified herein and/or on submitted drawings. Removal or destruction of existing plantings is prohibited unless specifically authorized by the owner.

II. Applicable Specifications and Standards

A. *Principles and Practice of Planting Trees and Shrubs*. 1997. International Society of Arboriculture, P.O. Box GG, Savoy, IL 61874

B. *American Standard for Nursery Stock*. 2004. American Association of Nurserymen, Inc. 1250 I Street NC Suite 500, Washington, D.C. 20005

C. *Standardized Plant Names*. 1942. American Joint Committee on Horticulture Nomenclature, Horace McFarland Company, Harrisburg, Pennsylvania. (Second edition).

III. Planting Season

A. Planting shall be done within the following dates:
Balled and Burlaped (B&B) trees and shrubs: October 15 to May 1st Containerized trees and other: October 1st to May 1st.
Bare rooted trees and shrubs: February 15th to April 15th.

B. Variance: If special conditions exist that warrant a variance in the above planting dates, a written request shall be submitted to the project owner stating the special conditions and the proposed variance. Permission for the variance will be given if warranted in the opinion of project owner.

IV. Planting Locations

A. The landscape contractor (hereafter referred to as Contractor) shall plant at locations to be determined and marked by the owner or other person representing the owner (hereafter referred to as the Owner's Representative).

B. Locations for individual trees will be supplied by the Owner's Representative. In some cases, the location may be inferred from reference to some identifiable field object or from some line that can be constructed in the field.

C. No tree that grows over 25 feet at maturity shall be planted under electrical utility wires.

D. No tree or shrub shall be planted within 10 feet of fire hydrants, driveways, streetlights, or intersections, or as specified by local ordinance.

V. Underground Utility Location

A. The Contractor shall contact the local utility companies for verification of the location of all underground utility lines in the area of the work. The Contractor shall be responsible for all damage resulting from neglect or failure to comply with the requirement.

B. Trees shall not be planted closer than 10 feet from water service connections, sewer laterals, or gas lines, unless so directed by the Owner's Representative. The Contractor shall be responsible for moving trees if planted closer than the specified distance.

VI. Materials

A. Topsoil provided shall be declared by the Contractor to be free from subsoil, roots, stones over 1 inch (2.5 cm) in diameter, herbicides, contaminates, and other extraneous materials. The Contractor shall dispose of materials removed. Topsoil shall be silt loam or loamy sand with 4 to 6 percent organic matter (by weight). Topsoil shall not be used in a frozen or muddy condition. The Contractor shall remove all surplus materials.

B. Plants shall be true to species and variety specified and nursery-grown in accordance with good horticultural practices under climatic conditions similar to

those in the locality of the project for at least 2 years. They shall have been freshly dug (during the most recent favorable harvest season).

Unless specifically noted, all plants shall be of specimen quality, exceptionally heavy, symmetrical, so trained to favored in development and appearance as to be unquestionably and outstandingly superior in form, compactness, and symmetry. They shall be sound, healthy, vigorous, well-branched and densely foliated when in leaf; free of disease and insects, eggs, or larvae' and shall have healthy well- developed root systems. They shall be free from physical damage or other conditions that would prevent vigorous growth.

Trees with multiple leaders, unless specified, will be rejected. Trees with a damaged or crooked leaders, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over ¾ in (2 cm) in diameter that are not completely closed will be rejected.

Plants shall conform to the measurements specified, except that plants larger than those specified may be used if approved by the Owner's Representative. Use of larger plants shall not increase the contract price. If larger plants are approved, the root ball shall be increased in proportion to the size of the plant.

Caliper measurements shall be taken on the trunk 6 inches (15 cm) above the natural ground line for trees up to and including 4 inches (10 cm) in caliper, and 12 inches (30 cm) above the natural ground line for trees over 4 inches (10 cm) in caliper. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to branch tip. Plants shall be measured when branches are in their normal position. If a range of size is given, no plant shall be less than the minimum size, and no less than 50 percent of the plants shall be as large as the maximum size specified. Measurements specified are minimum size acceptable after pruning, where pruning is required. Plants that meet measurements but do not possess a standard relationship between height and spread, according to the American Standards for Nursery Stock, shall be rejected.

Substitutions of plant materials will not be permitted unless authorized in writing by the Owner's Representative. If proof is submitted in writing that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety with a corresponding adjustment of the contract price.

C. The plant list at the end of this section is for the Contractor's information only, and no guarantee is expressed or implied that quantities therein are correct or that the list is complete. The Contractor shall satisfy himself that all plant materials shown on the drawings are included in his bid.

D. All plants shall be labeled by plant name and size. Labels shall be attached securely to all plants, bundles, and containers of plant materials when delivered.

Plant labels shall be durable and legible, with information given in weather- resistant ink or embossed process lettering.

E. Certificates of Plant Inspections: Certificates of inspection shall accompany invoices for each shipment of plants as may be required by law for transportation. Certificates are to be filed with the Owner's Representative prior to acceptance of the material. Passing inspection by federal or state governments at place of growth does not preclude rejection of plants at the work site.

VII. Selection and Tagging

A. Plants shall be subject to inspection for conformity to specification requirements and approval by the Owner's Representative at their place of growth and upon delivery. Such approval shall not impair the right of inspection and rejection during progress of the work. Inspection outside the state of Washington and Oregon shall be made at the expense of the Contractor. A Contractor's representative shall be present at all inspections.

B. A written request for the inspection of plant material at their place of growth shall be submitted to the Owner's Representative at least 10 calendar days prior to digging. This request shall state the place of growth and the quantity of plants to be inspected. The Owner's Representative may refuse inspection at this time if, in his/her judgment, sufficient quantities of plants are not available for inspection.

C. All plants shall be selected and tagged by the owner at their place of growth. For distant materials, photographs may be submitted for pre-inspection review.

VIII. Digging and Handling Plant Materials

A. Trees designated B&B shall be properly dug with firm natural balls of soil retaining as many fibrous roots as possible in sizes and shapes as specified in the most recent edition of the *American Standard for Nursery Stock*. Balls shall be firmly wrapped with nonsynthetic, rottable burlap and secured with nails and heavy nonsynthetic, rottable twine. Root collar will be apparent at surface of ball. No trees with loose, broken, or manufactured balls will be planted, **except with special written approval before planting.**

B. Plants grown in containers shall be of appropriate size for the container as specified in the most recent edition of the *American Standard for Nursery Stock,* and be free of circling roots on the exterior and interior of the root ball.

C. All other types of nursery stock shall also conform to the *American Standard for Nursery Stock.*

IX. Transportation and Storage of Plant Material

A. Fresh dug material is given preference over plant material held in storage. Plant material held in storage will be rejected if excessive growth or dieback of branches has occurred in storage.

B. Branches shall be tied with rope or twine only, and in such a manner that no damage will occur to the bark or branches.

C. During transportation of plant material, the Contractor shall exercise care to prevent injury and drying out of the trees. Should the roots be dried out, large branches broken, balls of earth broken or loosened, or areas of bark torn, the Owner's Representative may reject the injured tree(s) and order them replaced at no additional cost to the owner.

D. Plants must be protected at all times from sun or drying winds. Those that cannot be planted immediately on delivery shall be kept in the shade, well protected with soil covered with wet wood chips or other acceptable material, and kept well watered. Plants shall not remain unplanted any longer than 3 days after delivery. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be lifted and handled with suitable support of the soil ball to avoid damaging it.

X. Mechanized Tree Spade Requirements

Trees may be moved and planted with an approved mechanical tree spade. The tree spade shall move trees limited to the maximum size allowed for the similar B&B root ball diameter according to the *American Standard for Nursery Stock,* or the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller. The machine shall be approved by the Owner's Representative prior to use. Trees shall be *planted* at the designated locations in the manner shown in the plans and in accordance with applicable sections of the specifications.

XI. Excavation of Planted Areas

A. Locations for plants and outlines of areas to be planted are to be staked out at the site. Approval of the Owner's Representative is required before excavation begins. A minimum of 30 percent total planting must be staked out before inspection.

B. Shrub beds are to be excavated to a depth of 1 foot (30 cm) unless otherwise indicated. Ground cover beds are to be excavated to at depth of 6 inches (15 cm), unless otherwise indicated. Tree pits shall be excavated three times wider than the diameter of the ball, unless otherwise specified by the Owner's Representative,

and only as deep as the root ball to be placed in the hole. If initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped. The sides of all plant holes shall be sloped and the bottoms horizontal. On slopes, the depth of the excavation shall be measured at the center of the hole. Poor quality subgrade soils shall be separated from the topsoil, removed from the area, and not used as backfill or otherwise spread around in the landscape area. Pits shall not be left uncovered or unprotected overnight.

C. Detrimental soil conditions: The Owner's Representative is to be notified, in writing, of soil conditions that the Contractor considers detrimental to the growth of plant material. These conditions are to be described as well as suggestions for correcting them. Proper water drainage must be assured.

D. Obstructions: If rock, underground construction work, tree roots, or obstructions are encountered in the excavation of plant pits, alternate locations may be selected by the Owner's Representative. Where locations cannot be changes as determined by the Owner's Representative, and where digging is permitted, submit cost required to remove the obstruction to the depth of not less than 6 inches (15 cm) below the required hole depth. Proceed with work after approval of the Owner's Representative.

XII. Planting Operations

A. Plants shall be set at the same relationship to finish grade as they were to the ground from which they were dug. Plants must be set plumb and braced in position until prepared topsoil has been places around the ball and roots. Plants shall be set so that they will be the same depth 1 year later. The trunk of the tree is not to be used as a lever in positioning or moving the tree in the planting hole.

B. Ropes, strings, and wrapping from the ~~top half of~~ the root ball are to be removed after the plant has been set. All waterproof or water repellant wrappings shall be removed from the ball. Remove at least the top half of the wire basket before backfilling.

C. The roots of bare root trees shall be pruned at the time of planting to remove damage or undesirable roots (those likely to become a detriment to future growth of the root system). Bare root trees shall have the roots spread to approximate the natural position of the roots and shall be centered in the planting pit. The planting soil backfill shall be worked firmly into and around the roots, with care taken to fill in completely with no air pockets.

D. When specified by the Owner's Representative, amend the backfill soil

by adding 4-6 percent (by weight, 20-35 percent by volume, depending on materials) composted organic matter.

E. Basins are to be formed around tree and shrub root ball with a raised ring of soil as indicated on drawing.

F. Planting areas are to be finish graded to conform to grades on drawing after full settlement has occurred.

G. Plants are to be thoroughly watered immediately after planting.

H. Any excess soil, debris, or trimmings shall be removed from the planting site immediately upon completion of each planting operation.

XIII. Guying, Staking, Wrapping, Pruning and Mulching

A. Stake all deciduous trees over 1.5 inch caliper and all conifer trees over 5 feet tall.

B. Staking and guying shall be completed immediately after planting. Trees up to
2.5 inches caliper are to be staked with two stakes and separate flexible ties as shown on drawings. For larger trees, use 3 guy wires and ground anchors. Ground anchors are to be driven at approximately a 45-degree angle to ground plane and distributed at 120 degree intervals around the trunk. Guying cables, turnbuckles, and hose are to be attached securely until the tree is well supported.

C. Guying and staking materials: Ground anchors shall be arrowhead shaped earth anchors of malleable iron castings, aluminum castings, or stamped steel. Staking wire shall be pliable 12-gauge galvanized, twisted two strands. Guying cable shall be 5 strand, 3/16 in (5 mm) diameter steel cable. Vertical supporting stakes shall be sound hardwood or pine. They shall be a minimum of 2 x 2 in. (5 x 8 cm) in diameter, 6-8 feet (2.4 m) long, and pointed at one end. Rubber chain- link ties are to be used to secure the tree to the stakes.

D. Plants are to be pruned at the time of planting and according to best horticulture practices. Pruning of all trees will include the removal of injured branches, double leaders, watersprouts, suckers, and interfering limbs. Healthy lower branches and small twigs close to the center should not be removed, except as necessary to clear sidewalks or streets. All pruning cuts shall be clean and smooth, with the bark intact and uninjured at the edges. In no case shall more than 25% of the branching structure be removed, **leaving the normal shape of the plant intact.**

E. All trees, shrubs, and other planting beds will be mulched with a mixture of composted wood chips or bark previously approved by the owner. The composted mulch will be free of materials injurious to plant

growth, branches, leaves, roots, and other extraneous matter. The mulch will be 2 to 3 inches deep on trees and

shrubs. The depth of mulch on the planting beds will be 2-3 inches. Mulch must not be placed within 3 inches (8 cm) of the trunks of trees or shrubs.

F. Antitranspirant, if required, shall be an emulsion that provides a protective film over plant surfaces and is nontoxic to all plants used. It shall be delivered in containers of the manufacturer and mixed according to the manufacturer's directions.

XIV. Maintenance of Trees, Shrubs and Vines

A. Maintenance shall begin immediately after each plant is planted and continue until the Owner's Representative has confirmed its acceptance.

B. Maintenance shall consist of pruning, watering, cultivating, weeding, mulching, tightening and repairing guy and stakes, resetting plants to proper grades and to an upright position, restoration of the planting saucer, and furnishing and applying such sprays or other materials as are necessary to keep planting free of insects and diseases and in vigorous condition.

C. Planting areas and plants shall be protected at all times against trespassing and damage of all kinds for the duration of the maintenance period. If a plant becomes damaged or injured, it shall be treated or replaced as directed by the Owner's Representative at no additional cost.

D. Watering: Contractor shall irrigate, as required, to maintain vigorous and healthy tree growth. Over-watering or flooding shall not be allowed. Contractor shall use existing irrigation facilities and furnish any additional material, equipment, or water to ensure adequate irrigation. During periods of restricted water usage, all governmental regulations (permanent and temporary) shall be followed. Should modifications of existing irrigation systems and/or schedules facilitate adherence to these regulations, the Contractor shall notify the owner of the suggested modifications. The Contractor may have to transport water from other sources when irrigation systems are unavailable.

XV. Acceptance

A. The Owner's Representative shall inspect all work for acceptance upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date of inspection.

B. Acceptance of plant material by the Owner's Representative shall be for general conformance to specified size, character, and quality and shall not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.

C. Upon completion and reinspection of all repairs or renewals necessary in the judgment of the Owner's Representative, the Owner's Representative shall certify in writing that the work has been accepted.

XVI. Acceptance in Part

A. Work may be accepted in parts when the Owner's Representative and Contractor deem that practice to be in their mutual interest. Approval must be given in writing by the Owner's Representative to the Contractor verifying that the work is to be completed in parts. Acceptance of work in parts shall not waive any other provisions of this contract.

XVII. Guarantee Period and Replacements

A. The guarantee period for trees and shrubs shall begin at the date of acceptance.

B. The Contractor shall guarantee all plant material to be in a healthy and flourishing condition for a period of 1 year from the date of acceptance.

C. When work is accepted in parts, the guarantee periods extend from each of the partial acceptances to the terminal date of the guarantee of the last acceptance. Thus, all guarantee periods terminate at one time.

D. The Contractor shall replace, without cost, as soon as weather conditions permit, and within a specified planting period, all plants determined by the Owner's Representative to be dead or in an unacceptable condition during and at the end of the guarantee period. To be considered acceptable, plants shall be free of dead or dying branches and branch tips and shall bear foliage of normal density, size, and color. Replacements shall closely match adjacent specimen of the same species. Replacements shall be subject to all requirements stated in the specifications.

E. The guarantee of all replacement plants shall extend for an additional period of 1 year from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended guarantee period, the Owner's Representative may elect subsequent replacement or credit for that item.

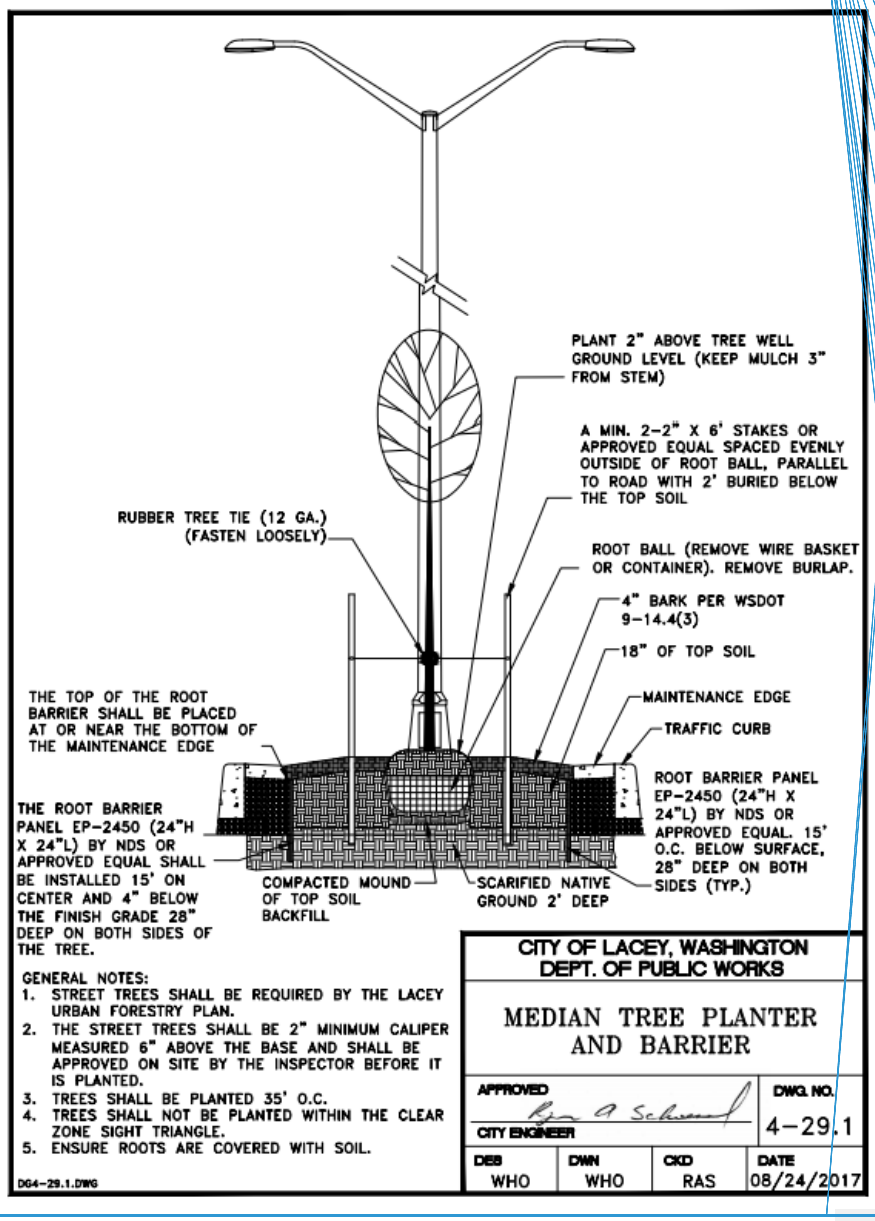
F. The Contractor shall make periodic inspections, at no extra cost, during the guarantee period to determine what changes, if any, should be made in the maintenance program. If changes are recommended, they shall be submitted in writing to the Owner's Representative.

XVIII. Final Inspection and Final Acceptance

A. At the end of the guarantee period and upon written request of the Contractor, the Owner's Representative will inspect all guaranteed work for final acceptance. The request shall be received at least 10 calendar days before the anticipated date for final inspection. Upon completion and reinspection of all repairs or renewals necessary in the judgment of the Owner's Representative at that time, the Owner's Representative shall certify, in writing, that the project has received final acceptance.

XIX. Planting Diagram ~~S~~STREET TREE PLANTING DETAIL

The City of Lacey Development Guidelines and Public Works Standards dictate street tree planting requirements. Drawing Numbers 4-29 and 4-30 in Chapter 4 Transportation are referenced below.



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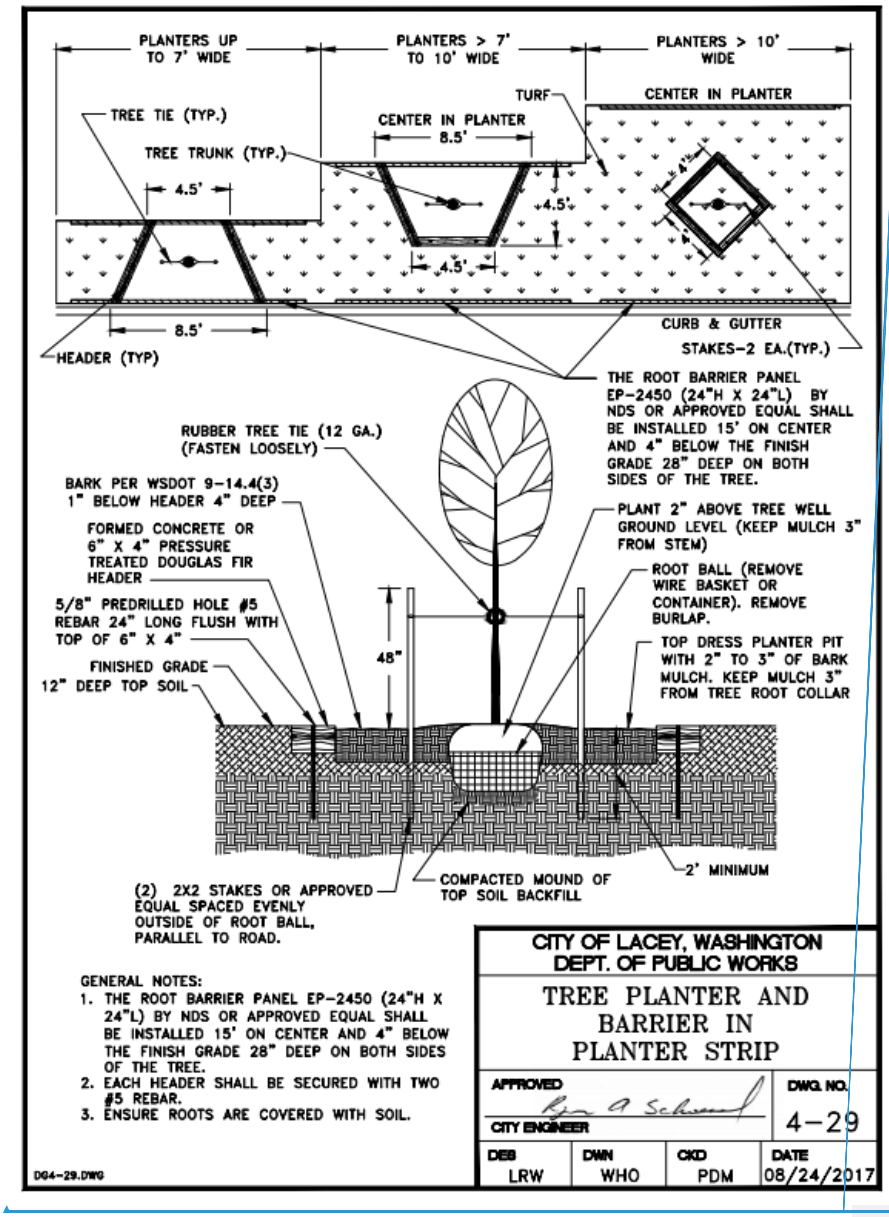

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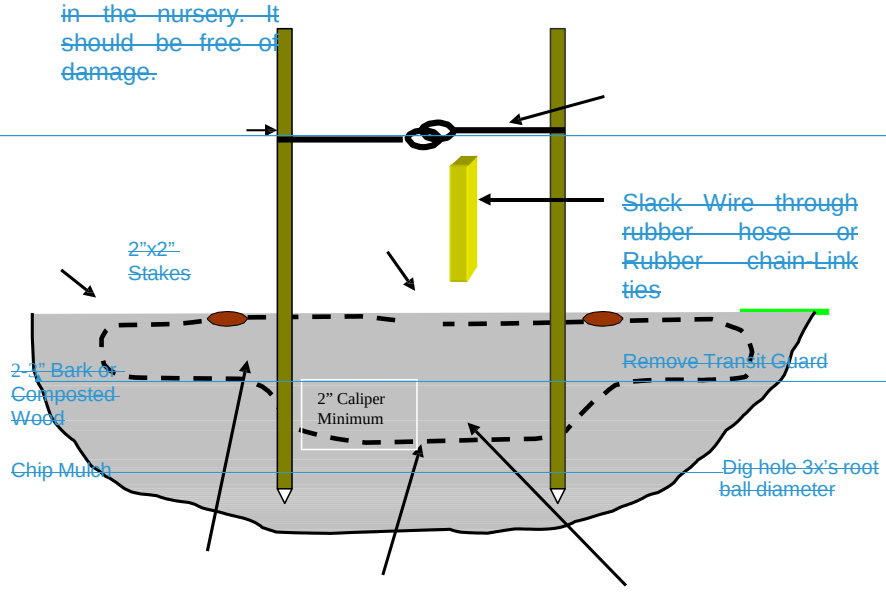
~~Prune damaged (minor) or crossing branches.~~

~~Tree should have central leader and show evidence of corrective pruning in the nursery. It should be free of damage.~~



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~~Soil Mix: Blend 1:1 silt loam with native soil. Add 5 gallons of~~

decomposed organics. Top dress with 1 cup 20-10-10 granular fertilizer. Water thoroughly.

Place root ball on undisturbed soil. Top of rootball should be placed just above finished grade.

Remove 2/3's of burlap and fold down wire basket.

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APPENDIX 4

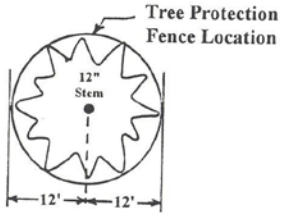
Tree Protection Guidelines

Pacific Northwest Native Trees

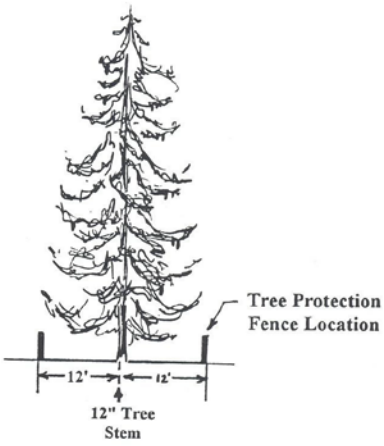
TREE ROOT PROTECTION ZONES

The root protection zone (RPZ) for Pacific Northwest native trees extends a distance of one (1) foot for every inch of tree diameter, measured 4.5' above the ground line. For example, the RPZ for a 12" diameter tree has a radius of 12' measured from the center of the tree stem. Ornamental or other high value or large trees should have the RPZ determined on a case by case basis.

TOP VIEW



SIDE VIEW



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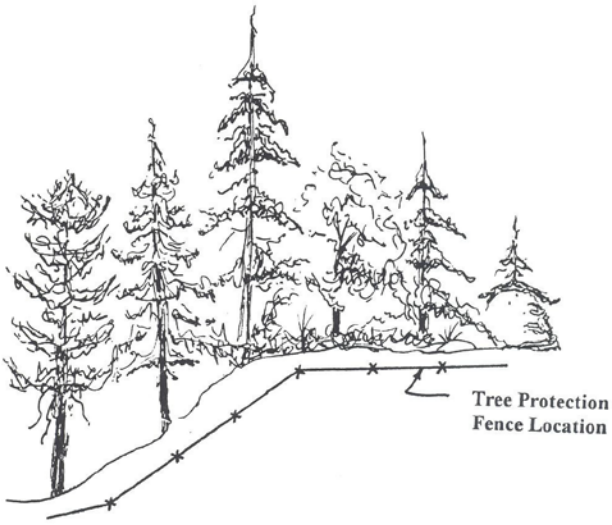
The RPZ for the edge of a forested area is determined using the diameters of the dominant edge trees, meandering the tree protection fence to correspond with the required RPZ distances.



The tree protection fence must be a minimum of 4' tall and be made of orange mesh plastic or chain link depending on recommendations in the tree plan. Posts must be T-top metal fence posts or a minimum 5/8" diameter rebar driven well into the soil. Posts should be spaced a maximum of 10' apart.

The fence should be maintained throughout the construction and grading, and not be removed until final landscaping is in progress. At no time should equipment enter into the RPZ and all brush clean-up should be completed by hand to prevent disturbance to native groundcovers. No cuts or fills, utility trenching, modifications to drainage, or concrete rinse water should impact the RPZ. No wires, cables, or other devices should be attached to protected trees during construction.

If impacts must occur within the RPZ, contact Washington Forestry Consultants prior to the operations to determine the proper procedure to protect the tree's health.

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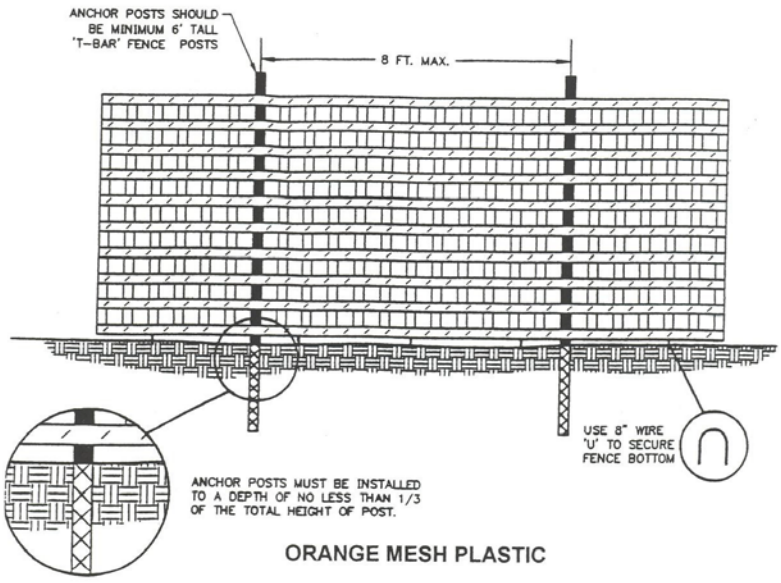

ORANGE MESH PLASTIC

THE TREE PROTECTION FENCE SHOULD BE MAINTAINED THROUGHOUT THE CONSTRUCTION AND GRADING, AND NOT TO BE REMOVED UNTIL FINAL LANDSCAPING IS IN PROGRESS. AT NO TIME SHALL EQUIPMENT ENTER INTO THE ROOT PROTECTION ZONE (RPZ). ALL BRUSH CLEANUP WITHIN THE RPZ SHOULD BE COMPLETED BY HAND TO PREVENT DISTURBANCE OF NATIVE GROUND COVERS NO CUTS OR FILLS, UTILITY TRENCHING, MODIFICATIONS TO DRAINAGE, OR CONCRETE RISE WATER SHOULD IMPACT THE RPZ. NO WIRES, CABLES, OR OTHER DEVICES SHOULD BE ATTACHED TO PROTECTED TREES DURING CONSTRUCTION.

IF IMPACTS MUST OCCUR WITHIN THE RPZ, CONTACT WFCI PRIOR TO THE OPERATIONS TO DETERMINE THE PROPER PROCEDURE TO PROTECT THE TREE'S HEALTH.

TREE PROTECTION FENCE DETAIL

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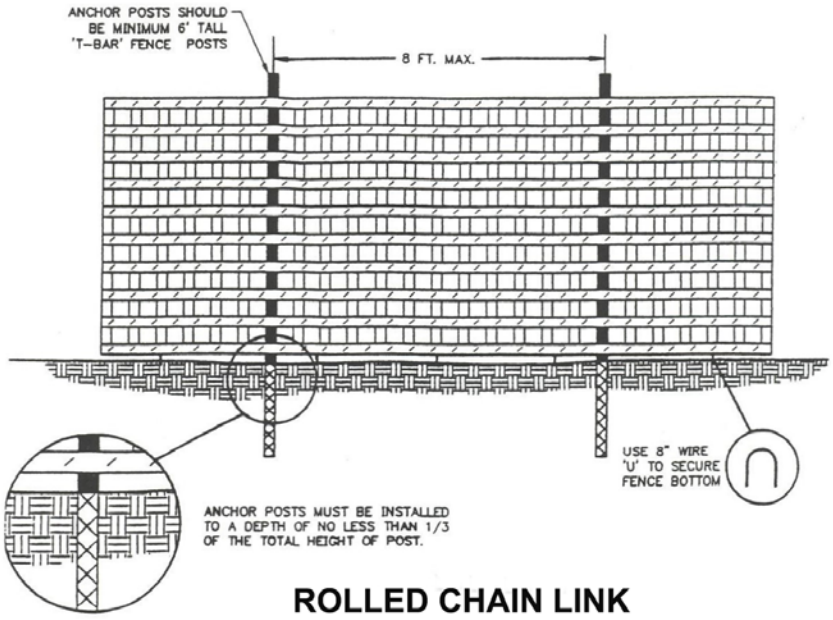

ROLLED CHAIN LINK

THE TREE PROTECTION FENCE SHOULD BE MAINTAINED THROUGHOUT THE CONSTRUCTION AND GRADING, AND NOT TO BE REMOVED UNTIL FINAL LANDSCAPING IS IN PROGRESS. AT NO TIME SHALL EQUIPMENT ENTER INTO THE ROOT PROTECTION ZONE (RPZ). ALL BRUSH CLEANUP WITHIN THE RPZ SHOULD BE COMPLETED BY HAND TO PREVENT DISTURBANCE OF NATIVE GROUND COVERS NO CUTS OR FILLS, UTILITY TRENCHING, MODIFICATIONS TO DRAINAGE, OR CONCRETE RISE WATER SHOULD IMPACT THE RPZ. NO WIRES, CABLES, OR OTHER DEVICES SHOULD BE ATTACHED TO PROTECTED TREES DURING CONSTRUCTION.

IF IMPACTS MUST OCCUR WITHIN THE RPZ, CONTACT WFCI PRIOR TO THE OPERATIONS TO DETERMINE THE PROPER PROCEDURE TO PROTECT THE TREE'S HEALTH.

TREE PROTECTION FENCE DETAIL

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City of Lacey

APPENDIX 5
COMPREHENSIVE STREET TREE PLAN

Introduction

The City of Lacey's "physical and aesthetic character" will be preserved and enhanced with a long-term plan providing street tree 'themes' and space for trees. This street tree plan, coupled with creative landscape plantings and preservation of native trees in new developments, parks, critical areas, open spaces, and residential lots will insure that the environmental health, economic, and aesthetic benefits of trees to a community grow with time

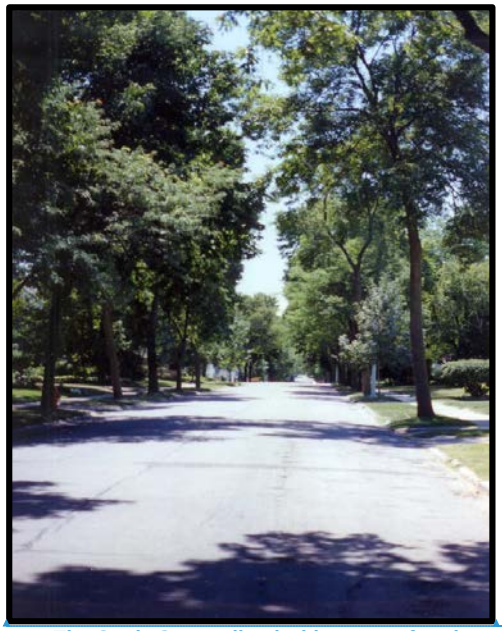
Trees are one of the most useful design elements on individual projects, but must be planned on a community wide basis so that diverse elements of the entire city are linked. This linkage cannot possibly be achieved if urban forestry planning proceeds on a project by project basis. Space for trees must be created to achieve the long-term benefits that trees provide for the entire community.

Goals of the Comprehensive Street Tree Planning Process

The following are the goals of the street tree planning process:

1. Modify street standards to provide space for trees.

2. Modify street tree design and planting guidelines to provide for long-term development and health of the trees.
3. Update the tree selection list to provide durable, long-term street trees.
4. Require street trees to be planted on all public and private streets, and in all new industrial, commercial, and residential development.
5. Provide the budget necessary to maintain street trees.
6. Aggressively solicit funding to bring existing major and minor arterials up to this long-term plan.



~~The Goal: Streets lined with canopy forming trees (City of Milwaukee, WI).~~

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The Street Tree Planning Process

The process of street tree planning encompasses all aspects of street design, soils and tree biology, planting, maintenance, and ordinances that affect street trees.

Planting Design Patterns (Themes)

There are four general designs for planting trees in the community. The type of design depends upon space available, both above and below ground, presence of other native tree stands, the character of the area, and effect desired. This approach was used by WFCI to develop the Hawks Prairie Annexation Area Beautification Plan in 1992.

1. **Formal Design:** This approach is strongly advocated to provide spatial definition to street corridors, and continuity between different types of areas within the city. This type of planting scheme works well in grid type street designs and long, linear corridors that lack space for groupings of trees. Trees are normally planted in rows. Species diversity is usually limited, but not so limited that monocultures are created.
2. **Informal Design:** This approach utilizes clustering, planting a variety of species, with irregular spacing intervals by design, or because of space limitations. This design is more often applicable in suburban areas or newly developing areas where space can be created on and off of rights-of-ways for tree plantings. It can however, be used in virtually every zone of the city achieving more species diversity. Informal plantings are most common in parks, and along park corridors.
3. **Combined Design:** In some cases, informal plantings can be used to break-up the more formal rows of trees, where space is provided. This is especially useful in commercial and industrial areas to help break up the moonscape of asphalt and buildings. Plant size, shape, color, seasonal flowering, fall coloration and growth rates are the most critical factors to consider when combining planting designs.
4. **Wildlife Design:** This concept utilizes clusters, layers of vegetation, and a variety of species of trees and shrubs to attract songbirds and small mammals. This design is best utilized near critical areas or other open spaces, and in parks. Safety and security must be considered when creating these types of dense plantings. Most trees with higher value for wildlife trees are not suitable for the street environment due to size, form, or fruit production.

Mature Tree Size

Street tree plantings are limited by space. Large trees require wide planter strips or areas for the tree roots to explore to avoid damage to curbs, sidewalks, and underground utilities. Power lines, adjacent buildings, overhanging awnings, and vehicle clearances are the most common above ground restrictions to growing space. Planting a tree with space to achieve its mature size will greatly increase the aesthetics and useful life of the street tree, while dramatically reducing the maintenance costs.

Longevity of the Species

Communities must fight the urge to plant fast growing tree species such as soft maples, poplar, and birch. Generally the fast growing tree species have shorter life-spans, are more easily damaged by storms, and cause more damage to curbs and sidewalks. This results in higher maintenance costs, requires replacement of trees years sooner, and upsets the visual and spatial continuity of the planting. Species such as Norway and sugar maple, linden, northern red and other oaks, and ash species tend to be more durable long- term trees.

Tree Character

The color of summer and fall foliage, presence of flowers, shape of the crown, color of bark, type of foliage and habit of branches (weeping, upright) give trees their color, texture, and form. These characteristics, along with size, longevity and growing space should be considered when selecting trees for all projects.

These tree characteristics should complement building architecture, define streets and sidewalks, accent adjacent landscaping, and add diversity along Lacey streets.

Trees are defined as having form that is:

1. Columnar
2. Round- full crowned, or spreading (upright, oval, globose)
3. Pyramidal (conical)
4. Vase shaped
5. Weeping
6. Irregular
7. Multi-stemmed
8. Fountain

Multi-stemmed trees are less desirable for street trees due to line-of-sight obstruction and sidewalk clearances. In most cases, tall growing trees are best since it is easy to raise crowns for ground and vehicle clearances. Signs for adjacent businesses can be exposed by crown raising. Monument-style signs work well with trees.

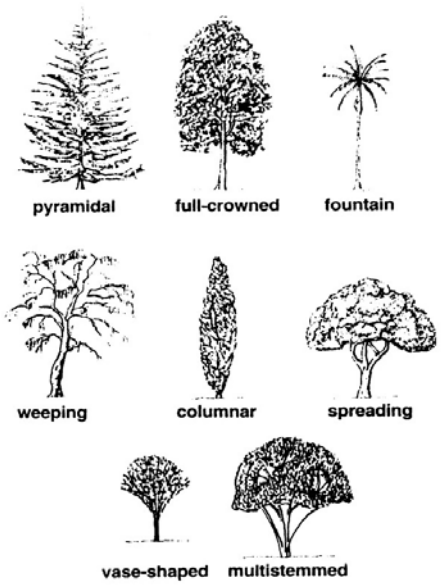

Figure 10. Illustration of Tree Shapes.

The form is critical in selecting trees to fit the growing space, and providing amenities such as screening of incompatible land uses or unsightly buildings, protecting views of vistas or signs, or lining streets in formal designs.

The summer color of a tree generally includes hues of green or shades of red or maroon. Reddish color summer foliage is used to break up the monotony of a formal, linear street tree planting, or accenting an informal design. Long rows of reddish foliage are considered more monotonous than facades created by tall, green canopies.

Fall color is more often considered when selecting seasonal color. Contrasting yellow fall coloration with occasional red or orange colored trees (or vice versa) catches the eye and stirs the 'ooh and aah' emotion common to the finale of a fireworks display.

The texture of a tree is not just apparent between conifers and deciduous trees. It varies greatly between deciduous tree species with simple leaves of differing shapes such as oaks and maples, to compound, bi- and tri-pinnately compound leaves on ashes, locusts, and mimosa. Subtle color differences accentuate the differences between leaf shapes.

Conifers also vary greatly in texture. Needle color, length, density, shape, and presence of cones create startling contrasts between tree species. Consider the

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differences between western red cedar, western hemlock, Douglas-fir, noble fir, and western white pine. All

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are strikingly different and can create attractive clusters in informal, combined, or wildlife plantings. When combined with deciduous accent trees, year-round beauty is created.

Hardiness to the Pacific Northwest

The temperate climate of Lacey (hardiness zones 7-8-USDA Hardiness Zone Map) allows many tree species to thrive, though some insect and disease populations also are well suited to the climate. Most of our common and most valued street tree species are native to the Midwestern and eastern United States.

Genetic selection is constantly improving the trees available from nurseries, as is the knowledge of growing them. Some cultivars of Pacific Rim species further improve the disease resistance of small trees available for use on Lacey streets.

Diversity of Street Trees

It is very important to avoid over planting a single species. We learned from Dutch elm disease and Chestnut blight to populate our cities with a diversity of tree species. Threats from ash decline, an actinomycete that threatens red maple, sudden oak death, oak wilt, gypsy moths, and other maladies will require that urban foresters be vigilant.

Current Tree Conditions

Lacey is currently stocked with remnant second-growth conifer stands of the *Tsuga heterophylla* forest type. Douglas-fir, western red cedar, western hemlock, and grand fir are the dominant conifers. The deciduous associates include bigleaf maple, red alder, cherry, and black cottonwood.

Planted ornamental and native trees occur in residential and commercial properties, and a scattering of public street trees occur on major and minor arterials. Most of the older neighborhoods do not have street trees. In many cases, street designs did not provide space for them.

In commercial areas, sidewalks usually abutted the street on both sides, with occasional medians, planter strips, or other variations in design. If trees were planted, they were planted on private property behind the sidewalk. In many cases, this did not occur or plantings have failed or been removed over time.

Where trees were planted on commercial projects, the most common species encountered were flowering cherries and red maple. In virtually all cases these trees had been topped relegating them to the status of an overgrown shrub.

In short, the long-term outlook for Lacey's inventory of older street trees is

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poor. The species monoculture of flowering plum and the lack of continuity in plantings will not form the linkages and tree-lined streets until additional plantings occur.

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Recent Plantings

Recently, the newer subdivisions have been stocked with more durable, long-term tree species. Ash and Norway maple varieties, northern red oak, littleleaf linden, callary pear, and red maple, all better street tree species, appear to dominant the streetscape in these areas. Planter strips are being provided in many cases; however there are still many open planting spots.

The same is true for the major and minor arterials. Past losses of planted trees have created open planting spots, species were varied within short distances, street designs changed with no space for trees, stands of native trees encroaching on street rights-of- ways, and/or buildings abutting the street have prevented the visual and spatial unity created by rows of street trees.

Soils in Lacey

Most soils in Lacey tend to be moderately well- or somewhat excessively drained. Pockets of poorly drained soils occur in some drainages or wetlands. These soil types allow a wide variety of trees to be grown as street trees, often with only the addition of organic matter, water, and nutrients to provide an excellent growing media.

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In the cases where trees will be planted in amended fill or disturbed or compacted soils, soil tests should be taken prior to planting of street trees to insure that the nutrient content, pH, water holding capacity, organic matter content, and bulk density will support healthy tree growth. Where hardpans occur, the pan should be fractured under the tree planting spot to allow drainage and added rooting zone. In all cases, supplemental irrigation will be required for at least 3 years after planting to re-establish the roots lost during transplanting.

~~Trees species planted into tree grates in the sidewalk will need to be more tolerant of elevated soil and ambient temperatures due to reflected and absorbed heat. Trees tolerant of drought tend to be more resistant to the harsh conditions when planted into a sidewalk or parking lot. Special consideration will need to be given for tree species selection for trees planted in grates.~~

Microclimatic Considerations

Street trees planted adjacent to native forest stands may need to be more shade tolerant than trees planted in open areas. Littleleaf linden and Norway maple are examples of more shade tolerant species.

Low points in the topography may be more susceptible to frost (frost pockets) than slopes or flats. Damage may occur to southern varieties of street trees in these areas. Other microclimatic features that may negatively impact trees include cold air drainages, areas

where wind tunnel effects develop, poorly drained soils, or areas downwind of industry. Other types of pollution or air flow patterns may cause localized tree damage.

Tree Selection

The following selection of trees in Table 1 is suitable for planting as street and landscape trees within the city of Lacey. This list includes large, medium, and small size trees for planting in all types of growing spaces. Species of flowering trees are selected based upon their colors and resistance to insect and disease problems, and low amounts of plant debris.

Species include red, orange, maroon, and yellow fall coloration. There is however, a great variation as to the timing and interval of fall leaf drop. For example, green ash cultivars turn yellow and drop their leaves within a week, while cultivars of white ash will have maroon leaf color, and may persist for 2-3 weeks. Unfortunately, leaf drop is not something that can be controlled if diversity is desired in street tree populations.

Trees that hold and drop leaves all winter long (such as pin oak and sweetgum) are to be avoided. Severe damage has occurred to sweetgums from early snowfalls and ice storms. Most sweetgum varieties will hold their leaves until the end of December (occasional exceptions). While their fall coloration is exceptional, planting more than a few accent trees should be avoided until cultivars with earlier leaf drop are available.
The following is a general list of tree species that should be considered Lacey's Street Tree List. All commercial, industrial, and residential projects should utilize this list. Selections should be in concert with the continuity provided by existing trees planted on adjacent portions of the street. Where existing street trees are of an undesirable, unhealthy, or inappropriate species, consideration should be given to re-treeing the entire area.

In short, trees can be chosen on a project basis, but must fit the overall plan for what has already been planted, or will be planted as part of the overall comprehensive street tree plan. More specific street tree themes will be provided for all major and minor arterials, and collectors in Table 2.

Table 2. General list of trees for Lacey.

~~**COMMON NAME**~~	~~**BOTANICAL NAME**~~	~~**CULTIVAR**~~	~~**MATURE HEIGHT**~~	~~**CROWN SPREAD**~~	~~**SPACING**~~
~~***Large >50' Tall***~~					~~40-50'~~
~~Northern Red Oak~~	~~*Quercus rubra*~~		~~70'~~	~~45'~~	
~~Tuliptree~~	~~*Liriodendron tulipfera*~~		~~70'~~	~~35'~~	
~~Autumn Purple Ash~~	~~*Fraxinus americana*~~	~~Autumn Purple~~	~~50'~~	~~35'~~	
~~Sugar Maple~~	~~*Acer saccharum*~~	~~Commemorat ion/~~	~~60'~~	~~35'~~	
~~European Beech~~	~~*Fagus sylvatica*~~		~~50'~~	~~35'~~	
~~Scarlet Oak~~	~~*Quercus coccinea*~~		~~60'~~	~~40'~~	
~~***Medium-Narrow Crowns 40-50'***~~					~~25-35'~~
~~Columnar Tuliptree~~	~~*Liriodendron tulipfera*~~	~~Fastigiatum~~	~~50'~~	~~15'~~	
~~Armstrong Red Maple~~	~~*Acer rubrum*~~	~~Armstrong~~	~~45'~~	~~15'~~	
~~Bowhall Red Maple~~	~~*Acer rubrum*~~	~~Bowhall~~	~~40'~~	~~15'~~	
~~Parkway Maple~~	~~*Acer platanoides*~~	~~Columnar - broad~~	~~40'~~	~~25'~~	
~~Skyrocket Oak~~	~~*Quercus robur*~~	~~Fastigiata~~	~~45'~~	~~15'~~	
~~***Medium – Wider Crowns 40-50'***~~					~~35-40'~~
~~Littleleaf Linden~~	~~*Tilia cordata*~~	~~Greenspire~~	~~40'~~	~~30'~~	
~~Summit Ash~~	~~*Fraxinus*~~	~~Summit~~	~~45'~~	~~25'~~	
~~Patmore Ash~~	~~*Fraxinus*~~	~~Patmore~~	~~45'~~	~~35'~~	
~~Norway Maple~~	~~*Acer platanoides*~~	~~Emerald~~	~~45'~~	~~40'~~	
~~Red Sunset Maple~~	~~*Acer rubrum*~~	~~Red Sunset~~	~~45'~~	~~35'~~	
~~October Glory Red Maple~~	~~*Acer rubrum*~~	~~October Glory~~	~~45'~~	~~35'~~	
~~Honeylocust~~	~~*Gleditsia triacanthos*~~	~~Shademaster~~	~~45'~~	~~35'~~	
~~Katsura Tree~~	~~*Cercidiphyllum japonicum*~~		~~40'~~	~~40'~~	
~~Red Horsechestnut~~	~~*Aesculus x carnea*~~	~~Briotti~~	~~30'~~	~~35'~~	
~~Autumn Gold Ginkgo~~	~~*Ginkgo biloba*~~	~~Autumn Gold~~	~~35'~~	~~30'~~	

COMMON NAME	**BOTANICAL NAME**	**CULTIVAR**	**MATURE HEIGHT**	**CROWN SPREAD**	**SPACING**
Large >50' Tall					40-50'
Sugar Maple	*Acer saccharum*	Commemoration or Bonfire	60'	35'	
European Beech	*Fagus sylvatica*		50'	35'	
Rivers Purple Beech	*Fagus sylvatica*	Riversii	50'	40'	
Autumn Purple Ash	*Fraxinus americana*	Autumn Purple	50'	35'	
Tuliptree	*Liriodendron tulipfera*		70'	35'	
Scarlet Oak	*Quercus coccinea*		60'	40'	
Northern Red Oak	*Quercus rubra*		70'	45'	
Oregon White Oak	*Quercus garryana*		120'	100'	

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Medium-Narrow Crowns 40-50' Tall					25-35'
Parkway Maple	*Acer platanoides*	Columnar-broad	40'	25'	
Armstrong Red Maple	*Acer rubrum*	Armstrong	45'	15'	
Bowhall Red Maple	*Acer rubrum*	Bowhall	40'	15'	
Columnar Tuliptree	*Liriodendron tulipfera*	Fastigiatum	50'	15'	
Fastigiate Beech	*Fagus sylvatica*	Fastigiata	45	15'	
Skyrocket Oak	*Quercus robur*	Fastigiata	45'	15'	
Medium – Wider Crowns 40-50' Tall					35-40'
Norway Maple	*Acer platanoides*	Emerald Queen	45'	40'	
Red Maple	*Acer rubrum*	October Glory	45'	35'	
Red Horsechestnut	*Aesculus x carnea*	Briotti	40'	35'	
Katsura Tree	*Cercidiphyllum japonicum*		40'	40'	
Summit Ash	*Fraxinus pennsylvanica*	Summit	45'	25'	
Patmore Ash	*Fraxinus pennsylvanica*	Patmore	45'	35'	
Autumn Gold Ginkgo	*Ginkgo biloba*	Autumn Gold	40'	30'	
Honeylocust	*Gleditsia triacanthos*	Shademaster	45'	35'	
Littleleaf Linden	*Tilia cordata*	Greenspire	40'	30'	
Small Trees <35' Tall					30-40'
Trident Maple	*Acer buergeranum*		20'	20'	
David's maple	*Acer davidii*		30'	25'	
Flame Maple	*Acer ginnala*	Flame	20'	20'	
Paperbark Maple	*Acer griseum*		25'	20'	
Tatarian Maple	*Acer tatarian*		25'	20'	
Norwegian Sunset Maple	*Acer truncatum x A. platanoides*	Keithsform	35'	25'	
Pacific Sunset Maple	*Acer truncatum x A. platanoides*	Warrenred	30'	25'	
Pyramidal European Hornbeam	*Carpinus betulus*	Fastigiate	35'	25'	
American Hornbeam	*Carpinus caroliniana*		25'	20'	
Eastern Redbud	*Cercis Canadensis*	Forest Pansy	20'	25'	
Pink Flowering Dogwood	*Cornus florida*	Rubra	20'	20'	
Chinese Kousa Dogwood	*Cornus kousa*	Chinensis	20'	20'	
Tricolor Beech	*Fagus sylvatica*	Roseomarginata	30'	20'	

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Goldenrain Tree	*Koelreuteria paniculata*		30’	30’	
Rustica Rubra Saucer Magnolia	*Magnolia soulangiana*	Rustica Rubra	20’	20’	
Flowering Crabapple	*Malus spp.*	Snowdrift, Red Baron, Prairiefire	20’	20’	
Black Tupelo	*Nyssa sylvatica*		30’	20’	
Flowering Plum	*Prunus cerasifera*	Thunder-cloud	20’	20’	
Sargent Cherry	*Prunus sargentii*		30’	30’	
Snowgoose Cherry	*Prunus spp.*	Snowgoose	20’	20’	
Callery Pear (not for street tree use)	*Pyrus calleryana*	Redspire or Cleveland Select	35’	25’	
Japanese Stewartia	*Stewartia pseudocamellia*		30’	20’	
Japanese Snowbell	*Styrax japonicus*		25’	25’	
Redmond Linden	*Tilia americana*	Redmond	35’	25’	
Small Trees – Narrow <35’ Tall					25-30’
Rocky Mt. Maple	*Acer grandidentatum*	Schmidt	25’	15’	
Crimson Sentry Maple	*Acer platanoides*	Crimson Sentry	25’	15’	
Golden Desert Ash	*Fraxinus oxycarpa*	Aureafolia	20’	18’	
Galaxy Magnolia	*Magnolia ‘Galaxy’*	Galaxy	30’	15’	
Spire Cherry	*Prunus x hillieri*	Spire	30’	10’	
Red Cascade Mt. Ash	*Sorbus americana*	Dwarfcrown	18’	8’	
Tree Lilac	*Syringa meyeri*	Palibin	7’	5’	

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COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Small Trees <35' Tall					25-40'
Norwegian Sunset Maple	*Acer truncatum x A. platanoides*	Keithsform	35'	25'	
Pacific Sunset Maple	*Acer truncatum x A. platanoides*	Warrenred	30'	25'	
Crimson Sentry Maple	*Acer platanoides*	Crimson	25'	15'	30-40'
Japanese Stewartia	*Stewartia pseudocamelli*		30'	20'	
Snowgoose Cherry	*Prunus spp.*	Snowgoose	20'	20'	
Spire Cherry	*Prunus x hillieri*	Spire	30'	10'	
Flowering Crabapple	*Malus spp.*	Snowdrift, Red Baron,	20'	20'	
Japanese Snowbell	*Styrax japonicus*		25'	25'	
Black Tupelo	*Nyssa sylvatica*		35'	20'	
Goldenrain Tree	*Koelreuteria paniculata*		30'	30'	
Rocky Mt. Maple	*Acer grandidentatum*	Schmidt	25'	15'	
Galaxy Magnolia	*Magnolia spp.*	Galaxy	30'	15'	
Rustica Rubra Saucer Magnolia	*Magnolia soulangiana*	Rustica Rubra	20'	20'	
Golden Desert Ash	*Fraxinus oxycarpa*	Aureafolia	20'	18'	
Chinese Kousa	*Cornus kousa*	Chinensis	20'	20'	
Pink Flowering	*Cornus florida*	Rubra	20'	20'	
Flowering Plum	*Prunus cerasifera*	Thunder - cloud	20'	20'	
Paperbark Maple	*Acer griseum*		25'	20'	
Tatarian Maple	*Acer tatarian*		25'	20'	
Trident Maple	*Acer buergeranum*		20'	20'	
David's maple	*Acer davidii*		30'	25'	
Flame Maple	*Acer ginnala*	Flame	20'	20'	
Sargent Cherry	*Prunus sargentii*		30'	30'	
Amur Maple	*Acer ginnala*	Flame	20'	20'	
Black Tupelo	*Nyssa sylvatica*		30'	20'	
Small Trees – Narrow <35'					25-30'
Redmond Linden	*Tilia americana*	Redmond	35'	25'	
Pyramidal European	*Carpinus betulus*	Fastigiate	35'	25'	
Hedge Maple	*Acer campestre*	Evelyn	35'	30'	
Callery Pear	*Pyrus calleryana*	Redspire or Cleveland	35'	25'	
Red Cascade Mt.	*Sorbus americana*	Dwarfcrown	18'	8'	
Tree Lilac	*Syringa meyeri*	Palibin	7'	5'	

**Other species or cultivars may be appropriate but must be approved by the City of Lacey.*

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If conifers are used in informal plantings, then the following species are appropriate for use in Lacey:

~~Western red cedar (*Thuja plicata*)~~
~~Mt. Hemlock (*Tsuga mertensiana*)~~
~~Douglas-fir (*Pseudotsuga menziesii*)~~ ~~Canada Hemlock (*Tsuga canadensis*)~~
~~Western Hemlock (*Tsuga heterophylla*)~~ ~~Giant sequoia (*Sequoia gigantea*)~~
~~Alaska Yellow Cedar (*Chamaecyparis nootkatensis* and 'Pendula')~~ ~~Austrian pine (*Pinus nigra*)~~
~~Deodar Cedar (*Cedrus deodara*)~~
~~Incense Cedar (*Calocedrus decurrens*)~~ ~~Serbian Spruce (*Picea omorika*)~~ ~~Noble Fir (*Abies procera*)~~
~~Shore Pine (*Pinus contorta* var. contorta)~~
~~Western white pine (*Pinus monticola* blister rust resistant cultivars)~~

Western red cedar (*Thuja plicata*)
Mt. Hemlock (*Tsuga mertensiana*)
Douglas-fir (*Pseudotsuga menziesii*)
Canada Hemlock (*Tsuga canadensis*)
Western Hemlock (*Tsuga heterophylla*)
Giant sequoia (*Sequoia gigantea*)
Alaska Yellow Cedar (*Chamaecyparis nootkatensis* and 'Pendula')
Austrian pine (*Pinus nigra*)
Deodar Cedar (*Cedrus deodara*)
Noble Fir (*Abies procera*)
Shore Pine (*Pinus contorta* var. contorta)
Western white pine (*Pinus monticola*-blister rust resistant cultivars)
Blue Atlas Cedar (*Cedrus atlantica* 'Glauca')
Serbian Spruce (*Picea omorika*)
Dawn Redwood (*Metasequoia glyptostroboides*)

Tree species specifically **prohibited** for planting in the City of Lacey:

Silver Maple (*Acer saccharinum*)
Boxelder (*Acer negundo*)
American Sycamore (*Platanus occidentalis*)
London Planetree (*Platanus* x *acerifolia*)
Red Sunset Maple (*Acer rubrum* 'Red Sunset')
Sycamore Maple (*Acer pseudoplatanus*)
Lombardy Poplar (*Populus nigra* 'Italica')
Silver Poplar (*Populus alba*)
Black Locust (*Robinia pseudoacacia*)
Tree of Heaven (*Ailanthus altissima*)

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Scotch pine (*Pinus sylvestris*)

Tree species discouraged:

Elms (*Ulmus* spp.)
European White Birch (*Betula pendula*)
Willows (*Salix* spp.)
Sweetgum (*Liquidambar styraciflua*)
Leyland Cypress (*Cupressus x leylandii*)
Colorado Blue Spruce (*Picea pungens*)
Callery pear (*Pyrus* spp.) as street trees

All trees planted as street trees and other landscape trees in Lacey should meet the standards defined as the American Standard for Nursery Stock (ANSI Z60-1-2004). This standard specifies height, caliper, and rootball diameter standards for nursery stock. It also provides standards for container stock and shrubs.

In addition to specifying that stock meet the ANSI standard, the stock should have 1) strong central leaders for all but small, spreading trees, 2) show evidence of cultural pruning by the nursery, including corrective pruning and crown raising, 3) be free of damage from nursery lifting and shipping to site, 4) be free of insects, diseases, and other pests, and 5) the rootball should be intact, not broken from rough handling.

The trees should not be picked up from the nursery until time to plant the trees. Most project sites are not set up to protect trees from freezing temperatures, drying, vandalism, theft, and other maladies. If they are brought in early, all balled and burlap material should have rootballs covered with sawdust or clean woodchips, and irrigation must provided daily in absence of rains (except during the dormant season). During the dormant season the woodchips or sawdust must just be kept moist. Container stock must be irrigated daily during the growing season. The trees must be monitored closely. Holdover time should be minimal (less than 1 week if possible).

Trees must be handled carefully when they arrive from the nursery to avoid stem and branch damage, and to avoid breaking the rootball. Plan the operation to minimize handling of the trees. If the rootball is broken, then consider that the tree is now a bare root tree, and the potential for survival and rapid establishment has been greatly reduced. Do not accept broken root balls from the nursery.

If trees are included as part of a contract, provide detailed specifications to prevent planting of inferior or damaged trees. Do not be afraid to reject trees due to poor quality. A detailed tree specification for use on projects is provided in Appendix III.
To help insure that proper size of high quality trees of the desired species are procured for street projects, it is recommended that the City of Lacey procure their own trees and bid only the installation of the trees on projects. For large future projects, it is recommended that a reputable nursery be contracted to provide the species, quality, and numbers of trees needed for the project. Tree quality will be greatly improved and the street tree design plan will continue to move in the planned direction.

Street Tree Themes

The following street tree themes are recommended to provide tree-lined corridors, canopies over the streets, and linkages between differing zones in the city. Detailed descriptions are provided for what were determined to be the highest need, and highest profile areas. The remainder of the arterials and collectors are described in Table 3.

Martin Way – Desmond Drive to Marvin Road (Mostly Urban Growth Area)

This major arterial serves as a linkage between the Lacey Central Business District and Hawks Prairie area. It includes only a few mixed species of street trees maintained by the City of Lacey, a few private trees, and barren street sides the remainder of the way. The sidewalks and ditches were reconstructed by Thurston County; however no street trees were planted.

The street profile for almost the entire corridor is a four lane boulevard with sidewalks abutting a narrow grader ditch. There is space for trees, both on rights-of-way and on private property behind the sidewalk, depending on the location.

It is suggested that funding be sought to re-tree Martin Way to provide the linkage between the two commercial zones. It is recommended that canopy forming trees be planted in all possible locations. In many cases these trees would be planted on private property.

The design should establish trees on a wide spacing, incorporating several different canopy forming and flowering tree species along the way. There are additional obstacles to a uniform design, including distribution power lines along portions of the route.

Summary: Planting design – Formal

Primary street tree species – Autumn purple ash, Scarlet oak, and

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Shademaster Honeylocust
Secondary street tree species – Saucer magnolia, Norwegian sunset maple and scarlet oak
Accent tree species – Amur maple, black tupelo, and snowgoose cherry

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Utility Trees –Kousa dogwood, Japanese snowbell, and flowering plum

This planting scheme, coupled with replacement of some poor quality trees and creation of additional planting spots will change this segment of Martin Way into a tree-lined corridor. The green canopy of foliage and splendid fall coloration will warm the appearance of the street and traffic will slow. Residents will find this a friendly and comfortable street to walk, bike and jog along, most unlike the conditions today. The linkage between the Hawks Prairie and Martin Village areas will be complete.

The following is a listing of other high need sections of Lacey streets that would benefit from trees. Refer to Table 3 – Street Tree Themes for recommended tree species:

1. Lacey Blvd from Sleater-Kinney Road to Golf Club Road.
2. Pacific Ave. from Sleater-Kinney Road to Golf Club Road.
3. 3rd Ave. from I-5 off ramp to College St.
4. Rainier Road from Yelm Hwy. to the south city limits.
5. Kinwood Street – entire length.
6. Union Mills Road – entire length
7. Marvin Road from 3rd Ave. to Pacific Ave.

Only arterials and collectors in developed areas that are not likely to have projects are listed. Undeveloped areas will likely be planted as adjacent parcels develop.

The following table provides a summary of the proposed street tree themes for all major and minor arterials and collectors in Lacey.

Table 3. 'Street Tree Themes' for all major and minor arterials and collectors.

STREET	SEGMENT FROM	SEGMENT TO	PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
Sleater-Kinney Road	Martin Way	14th Ave.	Autumn Purple Ash	Northern Red Oak	Flowering plum	Snowdrift crabappl
Sleater-Kinney Road	14th Ave.	Chambers Lk. Rd.	Emerald Queen	Parkway Maple Redmond	Prairiefire crabapple	Prairiefir e
Golf Club Road	I-5	Chambers Lk. Rd.	Patmore Ash	Rustica Rubra Saucer	Japanese Snowbell	Prairiefir e
Judd St.	Ruddell Road	28th Ave.	Japanese Stewartia	Rustica Rubra Saucer	Kousa Dogwood	Trident Maple
Clearbrook Dr.	Lacey Blvd.	To End	London Plane	Emerald Queen	Rustica Rubra Saucer	Galaxy Magnolia
College St.	15th Ave.	Pacific Ave.	Northern Red Oak	Shademast er	Galaxy Magnolia	Trident Maple
College St.	Pacific Ave.	32nd Lane	Norwegian Sunset Maple	Shademast er	Prairiefire crabapple	Desert Ash
College St.	32nd Lane	Yelm Hwy.	Patmore Ash	Norwegian Sunset Maple	Snowdrift Fl. Crab	Pacific Sunset
Rainier Road	Yelm Hwy.	City Limits	Greenspire Linden	Emerald Queen	Rustica Rubra Saucer	Trident Maple
Ruddell Road	Martin Way	Yelm Hwy.	Summit Ash	Tuliptree	Japanese Snowbell	Pacific Sunset
Ruddell Rd. Extension	Israel Road	Dennis St.	Summit Ash	Tuliptree	Flowering Cherry	--
Carpenter Road	Hawks Pr. Road	Pacific Ave.	Tuliptree	Rustica Rubra Saucer	Japanese Snowbell	Pacific Sunset
Carpenter Road	Pacific Ave.	Mullen Road	Sugar Maple	Emerald Queen	Kousa Dogwood	Hedge Maple
Kinwood St.	Capitol Blvd.	City Limits	Shademast er	Patmore Ash	Flowering Plum	Pacific Sunset
Hensley, Ranger, School St.	14th Ave. NE	Pacific Ave.	Red Horsechestnut	Redmond Linden	Rustica Rubra Saucer	Amur Maple
Union Mills Rd.	Pacific Ave.	Marvin Rd.	Scarlet Oak	Shademast er	Amur Maple	Underground

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STREET	SEGMENT FROM	TO	PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
Kagy Rd.	Mullen Rd.	58th Ave.	Sugar Maple	Norwegian	Flowering Dogwood	Rocky Mt. Maple
Marvin Road	44th Ave. NE	Martin Way	Northern Red Oak	Sunset Maple Emerald Queen	Flowering Plum	Galaxy Magnolia
Marvin Road	Martin Way	Pacific Ave.	Scarlet Oak	Shademaster	Snowgoose Cherry	Red Cascade Mt. Ash
Marvin Road	Pacific Ave.	City Limits	Norwegian Sunset Maple	Red Maple	Rocky Mt. Maple	Rocky Mt. Maple
Hogum Bay Road	Willamette Pkwy.	Marvin Road	Summit Ash	Callary Pear	Kousa Dogwood	Amur Maple
Willamette Pkwy.	Marvin Road	Hogum Bay Rd.	Sweetgum	Patmore Ash	Kousa Dogwood	Rocky Mt. Maple
Hoh St.	Martin Way	Steilacoom Rd.	Scarlet Oak	Shademaster	Prairiefire Fl. Crab	Golden Desert Ash
Meridian Road	46th Ave. NE	Martin Way	Tuliptree	Patmore Ash	Black Tupelo	Rocky Mt. Maple
Meridian Road	Pacific Ave.	Yelm Hwy.	Katsura Tree	Pacific Sunset	Snowgoose Cherry	Flowering Dogwood
Dutterow/Deerbrush Dr.	Martin Way	Pacific Ave.	Katsura Tree	Norwegian Sunset Maple	Rocky Mt. Maple	Trident maple
Hawks Prairie Road	Carpenter Road	Hogum Bay Road	Norwegian	Tuliptree	Sargent Cherry	Flowering Plum
31st. Ave. NE	Marvin Road	Meridian Road	Sunset Maple Emerald Queen	Red Sunset Maple	Flowering Plum	Golden Desert Ash
Britton Parkway	Carpenter Rd.	Hogum Bay Rd.	Sugar Maple	Autumn Purple	Sargent Cherry	Japanese
Orion Drive	Willamette Pkwy.	Meridian Road	Northern Red Oak	Sugar Maple	Snowgoose Cherry	Amur Maple
Martin Way	College St.	Kinwood St.	Autumn Purple Ash	Rustica Rubra Saucer	Amur Maple	Kousa Dogwood
Martin Way	Kinwood St.	Ranger Dr.	Scarlet Oak	Norwegian Sunset Maple	Black Tupelo	Japanese Snowbell
Martin Way	Ranger Dr.	Marvin Road	Shademaster	Scarlet Oak	Snowgoose Cherry	Flowering Plum
Steilacoom Road	Pacific Ave.	City Limits	Katsura Tree	Pacific Sunset	Snowgoose Cherry	Flowering Dogwood
Pacific Ave.	West City Limits	Carpenter Road	Patmore Ash	Autumn Purple	Kousa Dogwood	Amur Maple
Pacific Ave.	Carpenter Road	Marvin Road	Tuliptree	Greenspire Linden	Black Tupelo	Japanese

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STREET	SEGMENT FROM	TO	PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
Pacific Ave.	Marvin Road	City Limits	Greenspire Linden	Tuliptree	Flowering Plum	Golden Desert Ash
14th Ave.	Carpenter Road	Union Mills	Norwegian	Parkway Maple	Red Cascade	Amur Maple
			Sunset Maple		Mt. Ash	
Lacey Blvd.	Sleater-	Pacific Ave.	Patmore Ash	Autumn Purple	Paperbark Maple	Golden Desert Ash
21st Ave.	Kinney Rd. Chambers Lk. Dr.	Golf Club Rd.	Red Maple	Ash Pacific	Photinia Tree	Galaxy Magnolia
22nd Ave.	Golf Club Rd.	Shady Lane	Redmond Linden	Sunset Scarlet Oak	Galaxy Magnolia	Japanese
Shady Lane	Lilac St.	Carpenter Road	Sargent Cherry	Flowering Plum	Paperbark Maple	Tree Lilac
25th Ave.	Ruddell Road	Lilac St.	Redmond Linden	Sargent Cherry	Goldenrain Tree	Kousa Dogwood
Mullen Road	West City Limits	Ruddell Road	Red Horsechestnut	Black Tupelo	Japanese Snowbell	Amur Maple
Mullen Road	Ruddell Road	Carpenter Road	Tuliptree	Black Tupelo	Snowgoose Cherry	Amur Maple
Mullen Road	Carpenter Road	Meridian Road	Sugar Maple	Northern Red Oak	Sargent Cherry	Japanese
54th Ave.	East of	To End	Redspire Callery	Scarlet Oak	Flowering Plum	Galaxy Magnolia
58th Ave.	Ruddell Rd. Kagy Road	Meridian Road	Pear Greenspire Linden	Black Tupelo	Rocky Mt. Maple	Trident Maple
Yelm Hwy.	West City Limits	Ruddell Road	Norwegian	Flowering Plum	David's Maple	Red Cascade
			Sunset Maple			Mt. Ash
Yelm Hwy.	Ruddell Road	Fair Oaks Road	Sugar Maple	Northern Red Oak	Tree Lilac	Trident Maple
Yelm Hwy.	Fair Oaks Road	Meridian Road	Autumn Purple Ash	Pacific	Paperbark Maple	Japanese
				Sunset		hornbeam
Compton Blvd. Ext.	Rainier Road	Yelm Hwy.	Greenspire Linden	European Beech	Tatarian Maple	Tree Lilac

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Figure 11. Map of Lacey Arterials and Collectors
Street Trees Designed for Mapped Streets

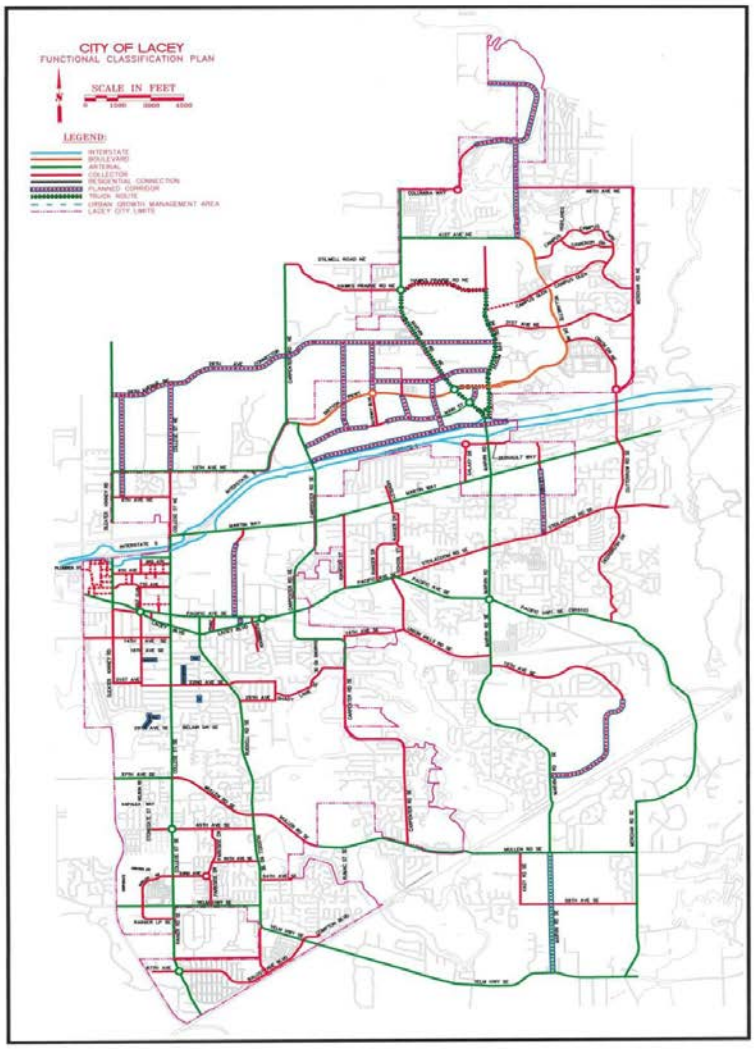

Figure 4
Functional Classification
of Roadways
Page 38

2030 Lacey Transportation Plan

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Street Profiles for Trees

The ideal street profile to create a tree-lined street with canopy forming trees would include 8' planter strips plus a 12-18' wide medians. Future designs of major and minor arterials should consider this type of design where rights-of-ways permit. This design provides adequate space above and below ground for trees, minimizing damage to curbs and sidewalks. The feel and look of driving, bike riding, jogging, and walking on these types of streets in 30 years will please residents of Lacey. To achieve this effect, we must plan for it and plant it today.

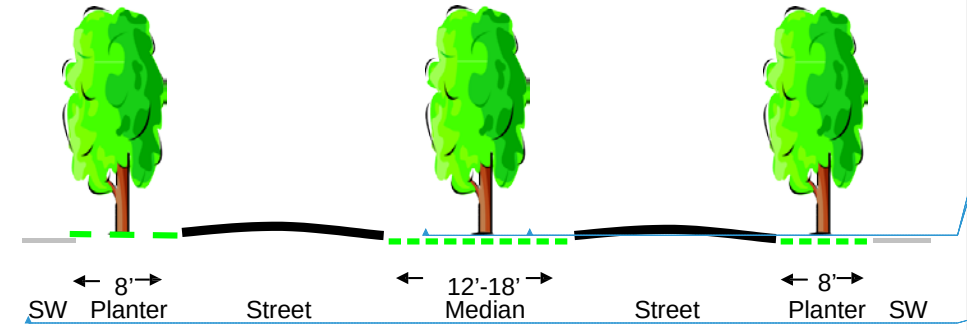

Figure 12. Ideal street design for development of maximum canopy, while providing separation between streets and sidewalks.

Figure 13. When space does not allow development of a full median, providing 8' planter strips will allow development of large, canopy forming trees. Planter strips should not be less than 6' wide. These narrow widths will only allow planting of small to medium sized trees that will not produce the canopy effect.

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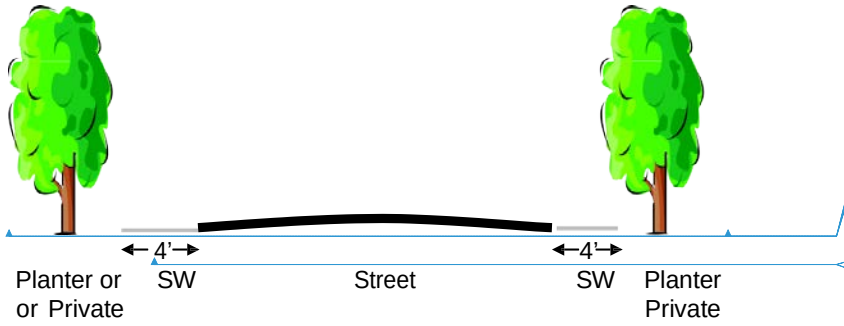

Figure 14. This is a commonly occurring street design in Lacey. Street trees, when they occur, are located on private property, or occasionally in planter strips.

Figure 15. This is a commonly occurring street design in older neighborhoods in Lacey. In some cases no sidewalks occur. Most street trees are privately planted, without uniformity of design or occurrence.

Planting Space Recommendations

When designing sidewalks for street tree plantings, an 8' wide planter strip is recommended to accommodate large, canopy-forming trees. Narrower strips increase the potential for heaving of the sidewalks and curbs. Placing trees between the vehicle and the pedestrian provides a feeling of safety for sidewalk users, though trees are more susceptible to vehicle damage in this location.

For trees, the most desirable location is behind the sidewalk where the tree can exploit the larger soil volumes of yards and open space. Development of a canopy over the street will take longer, and will be less effective. However, trees in this location will have greater longevity and cause less hardscape damage.

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Often driveways, water meters, signs, and other obstructions limit strict, uniform spacing for street trees. Compromises must then be made to achieve the visual and spatial effects provided by rows of street trees. Street tree spacing will be determined primarily by the mature size of the tree being planted. However, the purpose of the tree also is a factor.

If one is trying to screen objectionable views or less attractive structures, then tighter street tree spacing may be desirable. In an area where attractive architecture, signage, or views are to be preserved, then widen the tree spacing. Do not over plant. This will simply increase initial establishment costs, as well as future maintenance costs. Always consider the desired future visual and spatial effects – linkage, beauty, and shade.

The following are the recommended targets for street tree spacing, understanding that
variations may occur due to obstacles or the desired effect.

Tree Type/Size	Spacing Between
Trees Large Street Trees	40'-50'
Medium Street Trees	35'-40'
Columnar Trees	25'-35'
Small Trees	25'-35'

Informal planting designs utilizing conifers in cluster plantings should be 12'-15' on center, depending on the use of accent trees in the cluster. Each conifer must have two sides of its crown free to grow. These types of clusters of tall growing trees must be planted at least 25' from overhead utilities, and 15' from awnings, buildings, and signage. Screen plantings should be designed on a project by project basis and the plant spacing designed for the species used and the effect desired. Species other than listed in Table 1 may be used when dense screens are desired.

Compromises to this ideal design while still achieving some of the feel, would be 6' planter strips with a median. Any design that places the sidewalk against the curb with the trees behind the sidewalk will sacrifice the separation of pedestrians from traffic that the planter strip provides. Though planting trees behind the sidewalk where unlimited root zone occurs is good for the tree, the same feeling of security and visual beauty is not achieved.

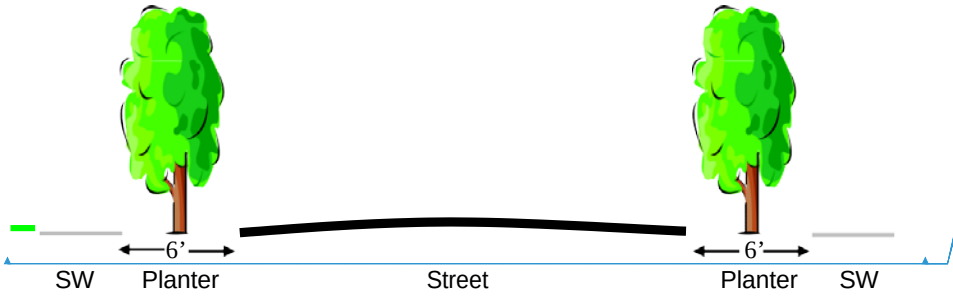

Figure 16. If space does not allow for 8' wide planter strips, then 6' can still be planted with medium to large street trees, however potential for root damage is higher.

Street Tree Planting and Maintenance

The responsibility and budget for the planting and maintenance of street trees should be with the Parks Maintenance division of the Public Works Department.

The selection and design of street tree plantings should be completed by a landscape architect or urban forester, and be reviewed by Community Development Department and the Parks Maintenance Division to insure that it furthers goals outlined in the comprehensive street tree plan, is compatible with the existing site conditions and the overall goals of the city.

Budget

As the street tree numbers grow, the maintenance, and thus the maintenance budget must grow. An adequate annual budget dedicated to street tree maintenance is required to provide adequate care for a street tree population. As the street tree population matures, these numbers will increase. The budget should be increased annually based on the new plantings, and with a modifier for inflation.

Stock Quality

All trees should meet the American National Standard for Nursery Stock (ANSI A60.1- 1996), have a strong, central leader and show evidence of cultural care in the nursery. The trees should not be damaged, and should be free of insect, insect eggs, disease, and other problems. The root balls should be well-wrapped with burlap and unbroken. Trees with broken root balls, damage, poor form, or other problems should be rejected. A detailed contractual specification is included in Appendix III for street projects.

It is strongly recommended that the City of Lacey remove the street tree

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procurement from the overall street project contract, and only contract for planting. The city should

contract for trees in advance with a reputable nursery to insure that the numbers, species, size, and quality of trees are available when a project is constructed. This will eliminate substitution, accepting less than high quality trees, and holding stock on site for extended periods of time (1 week is the target).

Preparing the Planting Hole

The planting hole within the planter strip or behind the sidewalk often contains structural soils used in the preparation of the sub grade for the street and sidewalks. If the planter strip will be planted with grass, the entire planter strip should be backfilled with topsoil that has a silt loam or loamy sand texture. The organic matter content should be 4-6%. It should be free from contaminants.

The area where the tree is to be planted should be excavated to the proper depth so the root ball sits on native soil, and the top of the root ball will be 1 inch above the final soil grade. The planting hole should be at least 3 times the diameter of the rootball of the street tree. The edges of the planting hole should be shaved off to eliminate the glazed or compacted hole edge.

If a hardpan or other compacted layer occurs that will cause perching of water in the planting hole, this layer should be fractured by over excavating the hole and backfilling the native material. The area under the rootball should be firmed to prevent settling of the tree. In cases where drainage cannot be improved by over excavating, installation of drain tile may be necessary to drain the planting hole and the surrounding root zone.

Orientation of the Tree

Plant the tree in the same orientation as it grew in the nursery. Most trees will be marked at the base to indicate the north side of the tree. This will reduce the potential for sunburn of the bark.

Tree Grates

The use of tree grates are not recommended by the City's tree protection specialists under any circumstance.

~~Every effort should be made to avoid planting trees in tree grates within a sidewalk. Planting behind the sidewalk and within planter strips will provide a microclimate much more conducive to tree growth and survival. Planting trees at the back of a sidewalk edge with half grates is a better alternative than full grates within a sidewalk.~~

~~If the only planting location is within the sidewalk and tree grates must be used, then the minimum size grate should be 5 ft. x 5 ft. If smaller grates must be used, then small street tree cultivars must be selected for these limited spaces. Preparation of the planting soils and space is similar to planting in planter strips.~~

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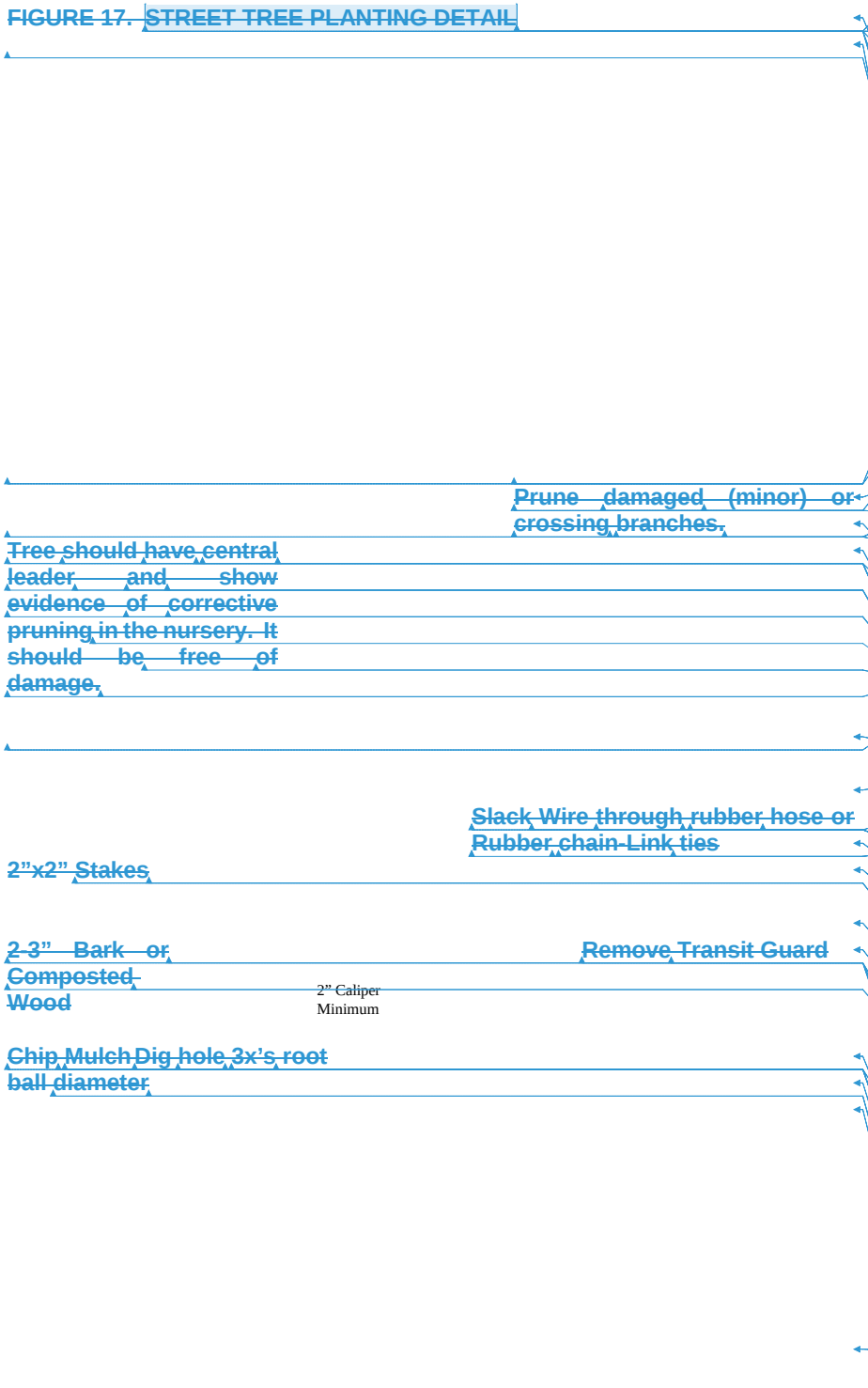
~~FIGURE 17. STREET TREE PLANTING DETAIL~~



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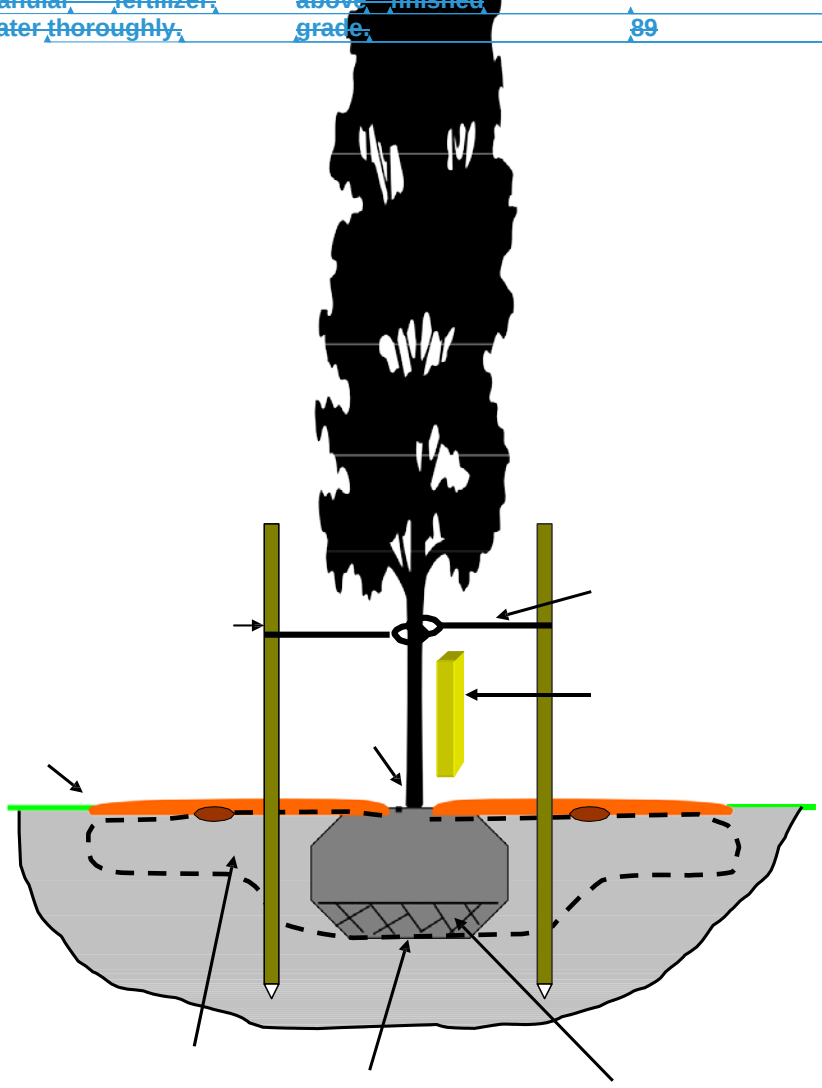
~~Soil Mix: Blend 1:1 silt loam with native soil. Add 5 gallons of decomposed organics. Top dress with 1 cup 20-10-10 granular fertilizer. Water thoroughly.~~	~~Place root ball on undisturbed soil. Top of rootball should be placed just above finished grade.~~	~~Remove 2/3's of the burlap and fold down wire basket.~~ ~~WFCI - 2005~~ ~~89~~



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Burlap and Wire Basket

Remove all twine ties from the root collar of the tree and ~~fold~~ remove the burlap~~. down into the hole exposing at least 2/3's of the root ball. If desired, cut out the extra burlap.~~ If the tree has a wire basket, leave it on until the tree is in the ground and stabilized. Prior to completing backfill, cut out the upper 2/3's of the wire basket and remove from the hole. If the tree has been in-ground fabric bag grown, remove all synthetic and plastic material materials prior to tree placement the planting hole.

Complete backfilling with the topsoil mix. In areas with gravely soils, blend the topsoil with native soils. In areas of Lacey with sandy loams, utilize the native material or imported topsoil with additional silt and organic matter. If native sandy loams are used, then incorporate organic matter as described on the planting diagram.

Fertilization

Trees should be fertilized with a granular formulation of 20-10-10 at a rate of 6 pounds per 1000 square feet of surface area. This amounts to approximately 2 ounces per tree. Do not incorporate the fertilizer into the planting hole or fill soils. Salt burn of the new roots may occur. Do not apply any other root stimulants. Good weed control must accompany fertilization treatments.

Watering

All trees should be thoroughly watered in to eliminate air pockets and settle the soil around the rootball. Create a small 4 inch high berm with soil to create a well for holding water from irrigation. This berm should be located 12 inches outside of the rootball.

The rule of thumb for water is to apply 2 inches of water per week, or follow the rates listed below:

Tree Caliper (in)	Gallons per
1	5
2	10
3	13
4	18
5	23

Monitor soil moisture contents in the root ball and the surrounding soil to determine the actual watering frequency and amounts.

Mulching

All trees should be mulched for a distance of at least 2 times the rootball diameter

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with 2- 3 inches of bark mulch or composted wood chips.

Staking

All deciduous trees 1.5 inch to 2.5 inches caliper and conifers taller than 5 feet should be staked with two stakes. Trees should be staked with 2 in. x 2 in. or round wooden stakes that are 6 feet long. The stake must be tall enough to provide support to the tree. The stakes should be driven firmly into the ground outside of the root ball. They should be placed straight up and down, and be equidistant from the tree. Trees should be oriented to support the tree against the prevailing winds.

The stake ties should be rubber chain-link, installed snug but not stretched. The tree needs to be able to move slightly to develop normal stem diameter and taper. Avoid wire and hose ties.

The stakes and ties should be inspected several times in the first year. Vandalism and accidental damage occurs frequently. Once the tree becomes established, usually one year, remove the stakes and ties. Ties left on trees long-term will often girdle the tree. Trees larger than 2.5 inches caliper will require 3 stakes. Trees larger than 4 inches caliper should be guyed with three cables and buried earth anchors.

Trunk Wraps

Trunk wraps are used to prevent sunburn on new trees. This is usually not a problem, however if trunk wraps are used, they should be made of paper and left on the tree for 1 year.

Transit guards should not be left on the tree as trunk wraps. They are designed to protect the stem of the tree during transport only. Molds, insects, and other fungi may be attracted to the moist, shady confines of the transit guard.

Root Collar Protectors

Plastic sleeves should be installed on all newly planted trees to protect the root collars from lawn mowers and weed eaters. These protectors should be left on the trees until trees are 6" caliper, or the protector becomes snug.

Grass and weeds should not be allowed to grow in the tree well, removing the temptation to mow or weed eat near the stems. Root collar damage from weed eaters is a major cause of tree mortality, and/or reduced vigor.

Pruning

Newly planted trees that were well cultured in the nursery should need only minor pruning to remove crossing branches, or branches damaged during

transport and planting.

Pruning in successive years to provide sidewalk and street clearance, improve the branch structure of the tree, and maintain central leaders should conform to the American National Standard ANSI A300 (2001), Tree, Shrub, and Other Woody Plant Maintenance
– Standard Practices (Pruning).

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This small tree pruning is critical to provide a strong tree and branch structure for the future, minimizing storm damage, and the need for additional pruning. Pruning should be completed by an arborist certified by the International Society of Arboriculture, or supervised by a certified arborist. No more than 20% of the live branches should be pruned in any one year.

Inspections

The newly planted trees should be inspected several times in the first year to adjust stakes and note other cultural concerns. Prior to release of the 1 year bond or end of the 1 year guarantee for trees planted as part of a street project, the trees should be inspected by a certified arborist. Trees that were unhealthy or poorly handled often 'hang on' for some time after planting. Specialized expertise is needed to identify the trees that are in decline, but still alive. This inspection must take place when trees are foliated.

Timing of Tree Planting

Tree planting should not occur between May and October. Trees planted during this time will be stressed and survival and establishment will be reduced. The following is a general window for planting the different types of trees.

Stock Type	Timing of Planting
Balled and Burlap	October 15th through May 1st
Containerized	October 15th through May 1st
Bare-Root Stock	February 15th through April
15th In-ground Fabric Bag	October 15th through May 1st

Fall planting of B&B and containerized stock is preferred, since tree roots will grow for part of the winter. This will improve establishment and early growth.

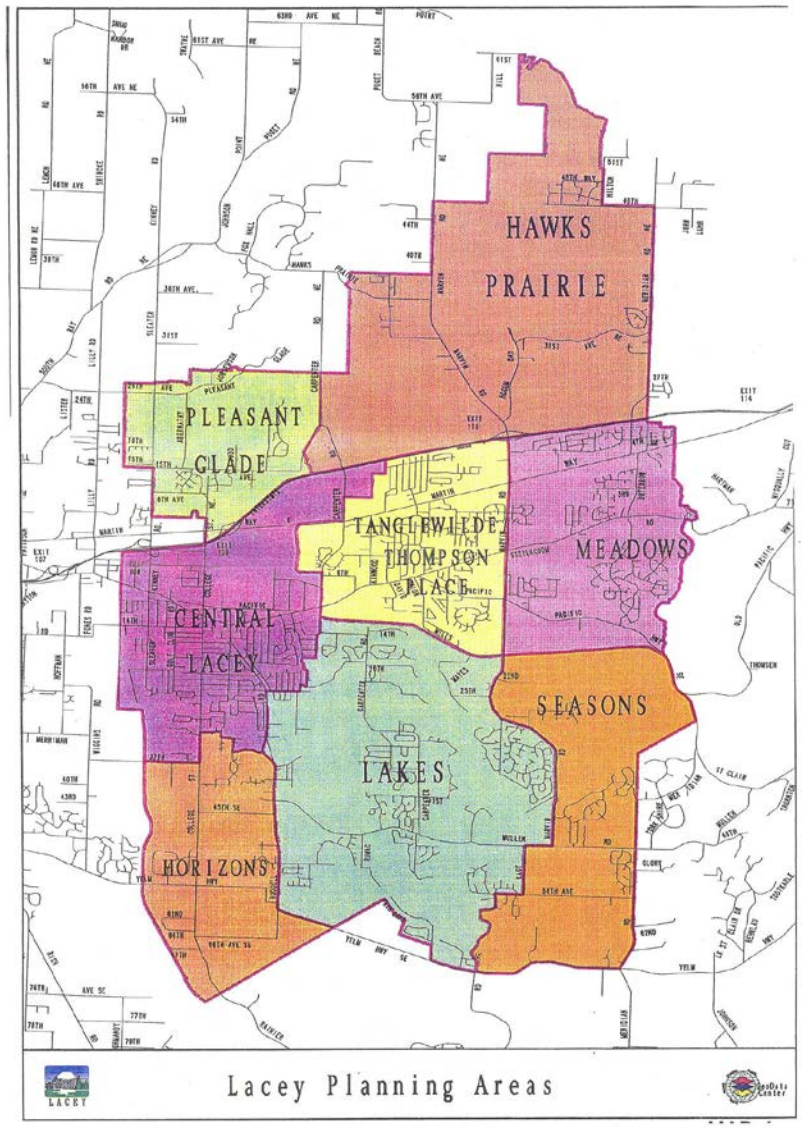
Maintenance Recordkeeping

As trees are planted in the city of Lacey, maintenance records need to be updated on the street tree inventory system. This will help with tracking of stake removal, weed control, pruning needs, and hazard assessment. This system is up and running, and simply needs to be maintained and refined as needed.

Street Tree Management Units. – The only soils based separation in Lacey street tree populations are soils that are 1) excessively drained gravels, 2) sandy soils, and 3) poorly drained soils.

Geographically, it is recommended that the management units be based on the Lacey planning areas.

Figure ~~18~~17. Proposed street tree management units. Lacey Planning Areas



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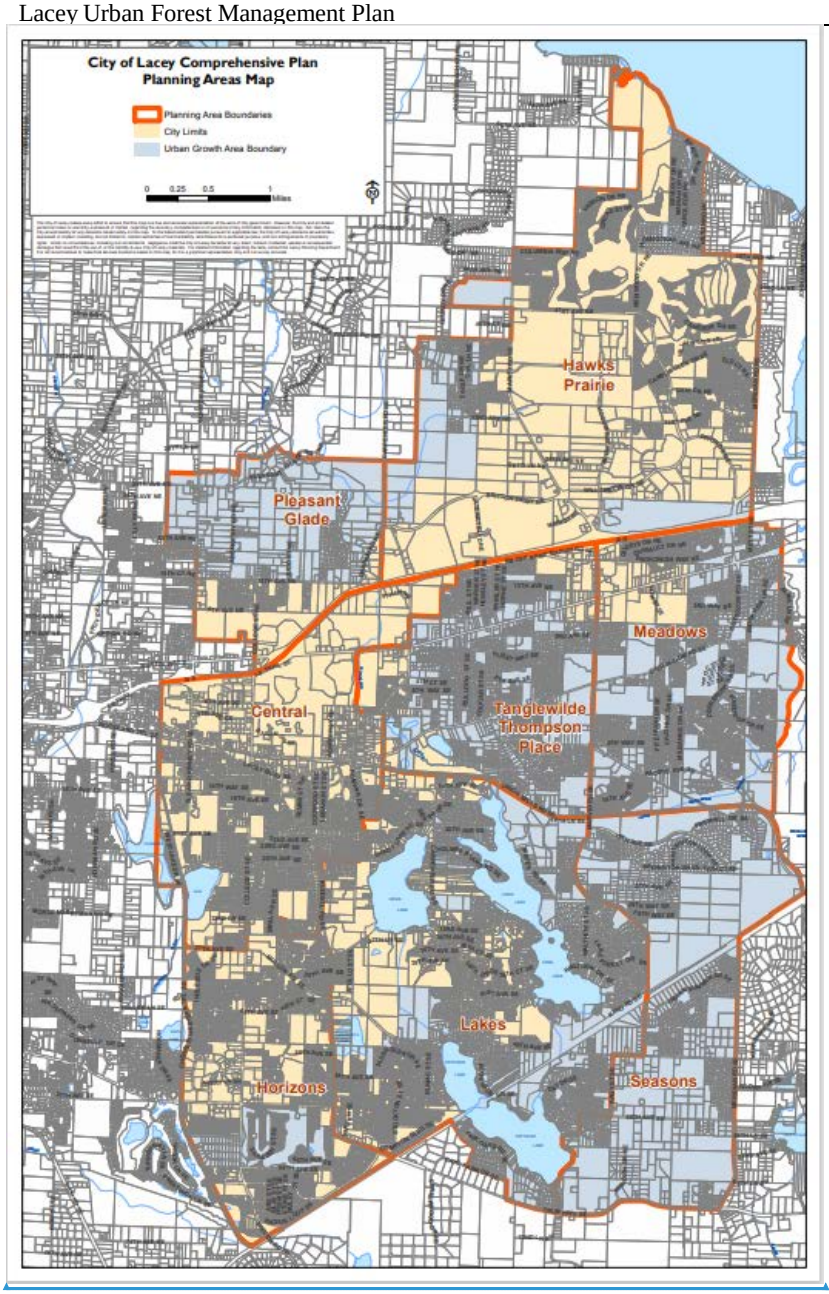

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Figure 18~~e 19.~~ Calendar for tree planting and maintenance activity.

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Tree Planting:										◄	─	►
Balled & Burlap and Containerized	◄	─	─	►								
Bare-Root Stock		◄	─	►								
Fertilization: Surface Applied			◄	►		◄	►				◄	►
Watering					◄	─	─	─	►			
Weed Control			◄	─	─	─	─	─	►			
Integrated Pest Management – Scouting		◄	─	─	─	─	─	─	─	─	►	
Pruning:												
Spring Flowering Trees					◄	►						
Summer Flowering Trees	◄	─	►							◄	─	►
All Other Shade Trees and Conifers	◄	─	►							◄	─	►
Storm Damage Assessment-As Needed	◄	─	─	─	─	─	─	─	─	─	─	►

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Trees and Planting Specifications

The following summarizes the tree and planting specifications:

All trees and shrubs should conform to the American Standard for Nursery Stock ANSI Z60.1-2004, for size, root ball diameter, and quality, and be planted according to industry standards, including mulching. All street trees should have a well-defined central stem and show evidence of corrective cultural pruning in the nursery.

Tree planting should occur in the spring between March 1 and June 1, or preferably in the fall between October 1 and December 1. Irrigation should be provided to the trees and shrubs at least weekly during the summer, in the absence of adequate rainfall.

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APPENDIX
6

WASHINGTON FORESTRY CONSULTANTS, INC.
FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS
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FAX 360/943-4128
1919 Yelm Hwy SE, Suite C
Olympia, WA 98501

-Street Tree Inventory-

CITY OF LACEY STREET TREES

Lacey, WA

Prepared for: Ryan Anderson
Community Development

Department Prepared by: Washington Forestry

Consultants, Inc. Date: October 22, 2012

Introduction and Purpose

We have completed an evaluation and inventory of the city maintained street trees in the City of Lacey. In addition, we did the street trees in the Lacey Corporate Center.

The purpose was to map the street trees, and provide an inventory and assessment of trees. This will be a brief summary report in lieu of a formal report as requested.

Methodology

Washington Forestry Consultants, Inc. (WFCI) was provided with an aerial photo layer of the city along with shapefiles for the arterials and collectors and parcel layers in the City of Lacey. We designed a data collection template for ArcPad 10.0 for ease of collection of the inventory information on the street trees. The following is a list of all of the major data collection parameters for the inventory:

- Species
- Diameter
- Condition
- Tree problems
- Work needed
- Work priority
- Field notes

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The work was completed by a ground inventory using a Trimble Nomad GPS handheld data collector. All trees within what appeared to be the city rights-of-way were inventoried. The rights-of-way edge was not always clearly defined in the field.

Native trees and planted trees on the rights-of-way were inventoried. Smaller, quality native tree species (e.g. a free-to-grow 3 inch caliper Douglas-fir) were also inventoried.

Observations

Tree Species

We found 5,557 trees of over 60 species of trees on the City of Lacey rights-of-ways that are maintained by the city. They ranged from 1 to 49 inches DBH.

Table 1. Species Summary of City of Lacey Street Trees.

Species	Diameter Range	# Trees	% Composition
Ash - Autumn Purple	2-10	142	2.46%
Ash - Golden Desert	2-4	19	0.33%
Ash - Green/White	1-26	1,102	19.08%
Ash - Mountain	2-3	4	0.07%
Ash - Patmore	1-22	692	11.98%
Ash - Raywood	1-9	53	0.92%
Ash - Summit	2-6	22	0.38%
Basswood - American	6-9	17	0.29%
Birch - Jacquemontii	2-7	53	0.92%
Birch - Paper	4-14	14	0.24%
Cascara	3	1	0.02%
Cedar - Deodar	1-2	4	0.07%
Cedar - Incense	1-12	37	0.64%
Cedar - Port Orford	6	1	0.02%
Cedar - Weeping Alaska	1-16	69	1.19%
Cedar - Western red	2-6	10	0.17%
Cherry - Flowering	1-9	91	1.58%
Cherry - Kwanzan	3-19	161	2.79%
Cherry - Other	6	1	0.02%
Crabapple	1-8	197	3.41%
Cypress - Other	2-6	30	0.52%
Dogwood - Flowering	1-6	100	1.73%
Fir - Douglas	1-49	29	0.50%
Fir - Grand	19-26	2	0.03%
Giant Sequoia	18-20	2	0.03%
Hawthorne	2-9	16	0.28%

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Hemlock - all	1-4	25	0.43%

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Species	Diameter Range	# Trees	% Composition
Hornbeam - American	2-9	69	1.19%
Hornbeam - European	3-7	18	0.31%
Katsura tree	2-14	61	1.06%
Lilac - Jap. Tree	2-3	13	0.23%
Linden	3-6	46	0.80%
Magnolia	3	8	0.14%
Maple - Nor. Sunset	2-7	79	1.37%
Maple - Norway	2-10	153	2.65%
Maple - Other	2-5	18	0.31%
Maple - Pacific Sunset	4-6	4	0.07%
Maple - Paperbark	2-3	8	0.14%
Maple - Parkway	3-6	24	0.42%
Maple - Red	2-26	217	3.76%
Maple - Sugar	6-12	5	0.09%
Maple - Tatarian	2-3	10	0.17%
Maple - Vine	1-6	114	1.97%
Oak - OR White	1-22	23	0.40%
Oak - Other	2-8	15	0.26%
Oak - Red	2-17	349	6.04%
Oak - Scarlet	2-4	3	0.05%
Other - Deciduous	2-10	16	0.28%
Pear - Callery	1-12	547	9.47%
Persian Perrotia	1-2	4	0.07%
Pine - Austrian	3-14	26	0.45%
Pine - Other	4-6	4	0.07%
Pine - Shore	2	1	0.02%
Plum - Flowering	1-16	75	1.30%
Redwood - Coast	2	3	0.05%
Spruce- other	2-3	14	0.24%
Sweetgum	1-19	839	14.53%
Sycamore	21-32	6	0.10%
Tuliptree	3-13	29	0.50%
Zelkova - Japanese	4-10	80	1.39%
Summary		**5,775**	**100.00%**

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A rule of thumb when managing a cities street trees is to avoid having more than 10% or so of a single genus of tree species to avoid major tree loss if an insect or disease outbreak occurs that affects a particular genus of trees. The following table shows that the City of Lacey is heavy to trees in the Fraxinus genus, but fairly well balanced overall.

Table 2. Breakdown of individual genera as a % of the street tree population.

Genera-Species	% of Total
Fraxinus-Ash species	35.2%
Liriodendron -Sweetgum	14.5%
Acer - Maple species	10.9%
Callery Pear	9.5%
Prunus - cherry cultivars	4.4%
Malus - crabapple cultivars	3.4%
Summary of Major Species	**77.9%**

The surprising number is that maple only makes up 10.9% of the street tree population. Over time the Sweetgum population will go down since it is no longer being planted as a street tree due to structural concerns in storms.

Tree Condition

The condition of each tree was recorded as good, fair, poor, dead, or hazardous. We found over 56% of the street trees to be in Good condition and 30 trees that were dead or hazardous.

Table 3. Summary of Tree Conditions of City of Lacey Street Trees.

Condition	# of Trees	%
Good	3,212	56%
Fair	2,263	39%
Poor	270	5%
Dead	18	<1%
Hazard	12	<1%
Summary	**5,775**	

Tree Maintenance

Hazard pruning was prescribed for trees damaged by the recent 2012 ice storm. Necessary pruning included broken and hanging branches or where pruning was necessary to stabilize or balance the crown of a tree.

More often, structural pruning was prescribed to raise and thin crowns on the smaller street trees that needed cultural pruning to develop long-term scaffold branches or required lifting of the crown to provide future sidewalk and road

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clearances.

Sidewalk, road clearance, and corner pruning were prescribed when branches were already encroaching into these zones. Generally, the parameters were 8 ft. over sidewalks, 15 ft. over roads, and anything impacting stop sign or corner visibility. Many trees were prescribed to receive sidewalk and road clearance pruning. A small number of trees required corner or sign visibility pruning.

Table 4. Summary of Tree Work Needed for City of Lacey Street Trees.

Work Needed	# of Trees	%
None	4,792	83%
Prune	566	10%
Remove	255	4%
Other	162	3%
Summary	**5,775**	

Tree work categorized as 'Other' includes work to remove tree stakes, ~~adjusting tree grates~~ and removing nails from trees.

Most of the trees require only routine maintenance. However there are 14 trees that require immediate action to mitigate potential threats posed by the tree.

Table 5. Summary of Work Priority for City of Lacey Street Trees.

Work Priority	# of Trees	%
Routine	5,761	99.8%
Immediate	14	<1%
Summary	**5,775**	

The effort of the City of Lacey to encourage and plant new street trees is evident by thousands of new street trees in the city. However, many opportunities still exist to plant new street trees where there are no planted or native trees today. These opportunities occur in planter strips that are empty or are being used as parking strips, and in front yards along streets with no sidewalks.

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Lacey Corporate Center

In addition to the City of Lacey trees we inventoried one area of private trees. This area was the Lacey Corporate Center Drive, and the Roxanna Drive and Loop. These trees were summarized separately from the city owned trees. The following tables include those areas.

Table 6. Species Summary of Lacey Corporate Center street trees.

Species	Diameter Range	# Trees	%
Ash - Green/White	2-18	198	49%
Birch - Paper	8-14	5	1%
Hawthorne	6-9	5	1%
Maple - Red	2-12	157	39%
Oak - Red	3-5	22	5%
Pear - Callery	2-6	11	3%
Plum - Flowering	2-5	6	1%
Sweetgum	2	2	<1%
Summary	**2-18**	**406**	

Table 7. Summary of Tree Conditions of Lacey Corporate Center.

Condition	# of	%
Good	225	55%
Fair	161	40%
Poor	16	4%
Dead	1	<1%
Hazard	3	<1%
Summary	**406**	

Table 8. Summary of Tree Work Needed for Lacey Corporate Center.

Work	# of	%
None	349	86%
Prune	37	9%
Remove	18	4%
Other	2	<1%
Summary	**406**	

Table 9. Summary of Work Priority for Lacey Corporate Center.

Work Priority	# of	%
Routine	398	98%
Immediate	8	2%
Summary	**406**	

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Summary

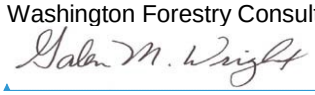
In summary, we inventoried 5,775 City of Lacey street trees that are maintained by the city. Four hundred six private trees were also inventoried and assessed for a total of 6,181 trees.

The City of Lacey Public Works staff is doing an excellent job of maintaining the trees with over 95% being classified as being in Fair or Good condition and only 17% requiring some type of maintenance work at this time.

Please give me a call if you have further

questions. Respectfully submitted,

Washington Forestry Consultants, Inc.



Galen Wright, ACF, ASCA
ISA Board Certified Master Arborist PN-0129
Certified Forester No. 44

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CITY OF LACEY

URBAN FOREST MANAGEMENT PLAN

August 2021

Shaping
our community
together

CITY OF LACEY

LACEY CITY COUNCIL

Andy Ryder, Mayor
Cynthia Pratt, Deputy Mayor
Lenny Greenstein
Michael Steadman
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Ed Kunkel
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LACEY PLANNING COMMISSION

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LACEY CITY MANAGER

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Ryan Andrews, Planning Manager
Jessica Brandt, Associate Planner
Sarah Schelling, AICP, Senior Planner
Samra Seymour, AICP, Senior Planner
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Appendix 6 Street Tree Inventory Report

Streetscape in Horizon Pointe, Lacey

Executive Summary

Background:

The City of Lacey has been regulating the protection of trees and vegetation since the mid-1970's. Policy development regarding the City's role in protecting trees, vegetation and landscape were first reviewed and adopted a few years later with the adoption of the 1985 "City of Lacey Urban Beautification Project" which was co-sponsored by the United States Department of Agriculture and Washington State Department of Natural Resources. That plan was fairly specific about recommendations for "street" corridors, parks and public space furnishings and City maintenance recommendations. It did not consider landscape concepts or tree and vegetation preservation or protection for residential and commercial development on private properties. Official City guidelines regarding tree and vegetation protection was not formulated or developed by public policy other than adoption of regulations.

The next iteration of policy development occurred with the development and adoption of the Environmental Protection and Resource Conservation Plan developed under the Growth Management Act in 1992. This Plan was prepared as an element of the Growth Management Act (GMA) Comprehensive Land Use Plan for the City of Lacey and its urban growth area which was later adopted in 1994. Trees and vegetation were a specific focus of the environmental element's Urban Forest Resources section and policies discussed the value of preserving some of the natural characteristics of the area and emphasized the importance the urban landscape with the increased intensity of urban style development. In 2002 - 2004 the City of Lacey adopted a major update of the 1994 plan, but did not change anything in the environmental

element's Urban Forest Resources section that would affect the preservation and protection of trees and vegetation. The Environmental Element and implementing habitat and wetland protection ordinances did however update and strengthen the policies that address “urban” habitats.

Following the adoption of the updated land use plans, implementation regulations were approved by the City of Lacey that continued and re-enforced earlier strategies put in motion to promote the urban style development projected in the Comprehensive Land Use Plan. Most of the implementation was not changed dramatically from what was required prior to the GMA plans update. However, beginning in 2000, the first influx of development using the new urban development provisions started to be reviewed and in 2003 and 2004 a much accelerated rate of private property development came on line as the inventory of lots from pre-GMA development was almost totally absorbed. Much of the private property being proposed for development was in areas with second growth forest species on site and appeared heavily forested.

Since the intensity of urban development was causing nearly all the trees to be removed from development sites, the Lacey City Council started receiving more complaints from Citizens about removal of trees. Council in general shared those concerns. In 2001, the Council decided we needed to update our tree and vegetation protection and preservation regulations. In order to facilitate the update or create new standards it was determined that we should have strong policies to support any updates of the regulations. It was also determined that policies should be consistent with the vision Council had for balancing intense urban development and what the City should look like regarding the forested character the City currently possesses. With the assistance of the City of Lacey urban forester to look at the technical realities of the forested nature of the City, this plan defines Lacey’s vision of urban forest and directs how we will maintain the look and feel of the Pacific Northwest Woodland character of the area.

In early February of 2005, the Council began the process of updating the forestry section of the environmental element and started a series of work-sessions including the Planning Commission. The work-sessions were designed to outline and refine the Council's vision for the city urban forestry program through development of an entirely new Urban Forestry Plan. The Urban Forestry Plan was adopted by the Lacey City Council on July 27, 2006.

In keeping with the goals of the Urban Forestry Plan to be updated every five years, the Urban Forestry Plan was updated in 2013 with a revision to technical data as well as addressing design and administration issues associated with implementation of the plan since 2006 including:

- Adding regulations for administering Class IV Forest Practices
- Applications Establishing a fee-in-lieu program for tree tracts in certain location
- Clarification of regulations contained in LMC 14.32 pertaining to tree replacement on individual lots

- Clarification of definitions contained in LMC 14.32

Improve inspection procedures for trees in right—of-way

The 2013 update was preceded by a total inventory of all street trees on city arterials and collectors as well as all city-maintained street trees. The data from that inventory was included as an update to the plan.

In 2020 the City began the process of updating this plan again. The Planning Commission and staff created an ad hoc citizen task force, “Tree Task Force”, to help with reviewing the policies, goals, and regulations. The Task Force, city foresters, and city staff identified preliminary issues and then engagement to the community helped guide priority areas for updates. The task force generally agreed on the importance of outreach and education about trees to residents, businesses, and landscaping companies.

The Task Force also recognized the shift in perspective of our community that once focused on trees as an aesthetic benefit to a now more holistic view of their benefits and values. Trees are part of our urban infrastructure and are closely aligned with our goals for maintaining air quality, reducing stormwater runoff, and providing shade in the hot summer months. The UFMP has always recognized the many benefits of trees, but trees as public infrastructure denotes asset management planning, maintenance, repair, and life cycle analysis, which will take time to fully implement.

The Task Force also recognized Lacey is a growing community where buildable lots are becoming scarce. The City is already in a transition to a more urban community where growth and development is focused on going vertical instead of horizontal. Developing up instead of out creates its own challenges with preserving tree canopy in the urban core. Urban tree canopy can be maintained and expanded with replanting, street trees, parking lot landscaping, open spaces, and simply giving young trees a little time to grow.

A tree canopy assessment, using remote sensing, was completed in August 2020. (See Appendix 1 Section C). The assessment showed 28.3% coverage in the City Limits and 31.3% coverage within the Urban Growth Area. Earlier canopy assessments used a different methodology but are assumed to be as accurate. Tree canopy coverage has decreased since the last assessment in 2004 where tree canopy coverage was 43%. The Northeast Area of Lacey has grown substantially since 2004, which may explain the change in canopy coverage. Trees planted as a requirements of new developments will mature and canopy coverage will increase over time.

The City recently updated its Climate Mitigation Plan, with regional partners, and trees are a key issue for the City to consider as it moves forward with implementing that plan. The focus on that plan is to reduce carbon emissions from buildings, energy, transportation, land use, water and waste. The other side of the equation in reducing emissions is to capture carbon. Trees capture and store carbon, so just as

we reduce emissions we also will need to capture carbon emissions to meet our climate goals and targets as a community. That does not equate to stopping all development and tree removals, it means doing a full review of where it would be appropriate to replant, plant more, and protect existing stands of trees in Lacey. That review will be done at the local and regional level.

Another important issue is the growing challenges attributed to climate change. Our urban trees are facing more stress and mortality due to drought and heat. There is a need to begin long term forestry planning for our parks, forests, and non-irrigated areas of the city. As we choose tree species for landscaping and planting we will need to consider our changing climate.

The Task Force raised a number of issues related to enforcement of regulations, and have been addressed in the Goals and Policies. Just as any aspect of the implementation of this plan and tree protection regulations, an issue of resources is always a challenge.

Wonderwood Park, Lacey

Methodology for Evaluating Lacey's Urban Forest:

The first step in management of any resource is an inventory to determine the extent, condition, and needs of, in this case, the urban forest. Since all life is rooted in the soil, geologic and soil survey information was examined to determine the physical characteristics of the soils in Lacey. The information pertinent to management of trees includes: general fertility levels, drainage, depth to root restrictions, organic matter contents, plant available water capacity, and windthrow potential. The suitability for wildlife, construction and engineering properties was also examined. This information was then considered when recommendations were made with regard to tree protection areas, tree species selection, and planting designs.

The evaluation of Lacey's urban forest was undertaken through the following

activities:

- Collection of maps, aerial photos, Landsat images, the transportation plan, and materials relating to the City of Lacey and its urban growth area.
- Interview of City Council members regarding their perceptions about the Lacey urban forest.
- Discussion of Lacey's urban forestry and landscape ordinances with staff in Community Development, Public Works, and Parks Maintenance.
- Obtain current contract language from Public works for tree planting contracts.
- Street tree inventory and location data.
- Inventory all private trees that function as street trees on the major and minor arterials, and collectors. Determine species, size and
- condition of trees.
- Evaluate the condition of the City maintained street trees.
  Conduct an inventory and evaluation of the general forest canopy conditions in the City of Lacey and its urban growth area. The inventory utilized aerial photos with ground truthing of a sample of stands (city property).
- Review of the past and current street tree profiles and how well trees fit and grow in these growing conditions.
- An assessment of the city was made to determine appropriate tree species for use in the rights-of-ways for comprehensive street tree planning.
- Continue hazard tree evaluation in all Lacey Parks.

- General review of other tree conditions that exist in the City of Lacey.

- Review of ordinances that relate to tree protection and planting.

Urban Forester's Technical Review and Recommendations:

Using the methodology discussed above over the last several years, the City Urban Forester has completed a technical review of the woodland character and current wooded areas of the City of Lacey and the City's history of the being forested. At the time of incorporation, 1966, the area of the City and its urban growth area was a combination of open prairie and forest lands. Urban Forests are cyclical and our Urban Forester's findings appear to reinforce those characteristics. The following is his summary:

This study found that in 2006, 43% of Lacey and its urban growth area is covered with 1) native forests, 2) trees retained in parks, critical areas, and developed residential, commercial, and 3) residential areas, and ornamental trees planted along streets, parks, and developed areas. The remaining 57% of the land area is developed, logged and not replanted, pastures, lawn, or other areas without trees.

Tree cover in 1966, before Lacey was incorporated was only slightly higher, with 48% of the city and the urban growth area covered by trees. The remainder (52%) was cutover forest land, pastures, lawns, and development.

What appears to be a very small forested cover loss is due to significant tree retention in our older developments, replanting of streets, landscaping of parking lots, and continued retention in new developments. However, as areas such as the Hawks Prairie industrial area (Meridian Campus) continues to develop, the canopy loss will likely accelerate.

An inventory of the arterials and collectors completed in 2012, found 3,208 (an increase of 363 trees since an inventory completed in 2001) privately maintained street trees in addition to the 2,973 (an increase of 1,699 since 2001) street trees that the Parks Maintenance staff already maintains. These are in addition to all of the trees in the city parks that staff cares for.

The study found few open planting spaces within the city maintained street tree areas, indicating that staff is doing an excellent job of replacing mortality or damaged trees. The quality of maintenance of the street trees is very good, though some additional corrective pruning is needed in certain areas.

The quality of maintenance is quite variable for the private street trees. Most have received little corrective pruning to remove storm damage and extra branches. In the worst cases, required landscape trees that also serve as street trees are being severely topped or removed for perceived view improvement of business signage.

Based on the City Forester's evaluation of the urban forest in Lacey, the ordinances, visits with staff and citizens, and maintenance procedures - the following priority is recommended to improve protection and management of the Lacey urban forest

- Continue annual maintenance activity on the existing street trees for sign clearance, corrective pruning, and clearance pruning, and complete annual hazard tree evaluations.

- Budget adequate annual funding to complete basic maintenance tasks for city street trees and some replanting.

- Continue to review all commercial and industrial projects with one or more trees. This is important in cases when, as an example, only a few Oregon white oaks occur on the site. Tree retention may have an even higher impact in areas nearly devoid of trees. Also, continue to require a minimum percentage area for tree tracts in all types of developments as well as establishing a fee-in-lieu of tree tract program in certain instances. Language regarding tree removal on private property needs to be clarified.

- Implement education programs to prevent improper pruning of required landscape trees and implement procedures for better inspection of required

landscaping in the right-of-way.

- Continue to require that all trees and shrubs planted on projects within the City of Lacey meet the current ANSI Z60.1 American Standard for Nursery Stock.

- Consider appointing a tree advisory board.

- Create a 'Lacey Friend of Trees' award to be given to citizens, developers, or companies that have taken special care to protect, plant, or maintain significant trees or stands of trees in Lacey.

- Conduct a 'Big Trees in Lacey' contest to find and recognize large or specimen trees in the city.

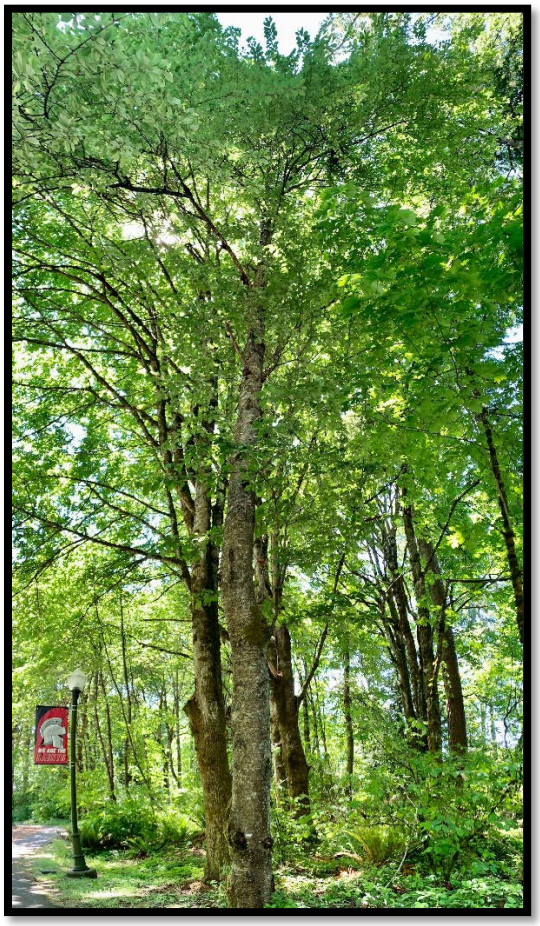
- All new street tree plantings should be taken from the prescribed species list and matched to the growing space of the planting site. All landscape tree plantings in required landscaping on projects should be taken from the general tree list for Lacey. Other trees can be incorporated in the design upon approval of the site plan review committee.

- Solicit grant funding, corporate donations, and other funds to expand tree planting and maintenance.

- Revise the urban forest management plan every 5 years.

Goals:

The goal of managing city trees is to improve canopy cover and the aesthetic and physical benefits of trees to a community, while protecting the infrastructure from tree damage. This can have positive environmental and economic benefits to the community. In short, the urban trees should be compatible and functional, while minimizing maintenance costs. This management plan provides a detailed Goal and Policy section and technical appendixes that will assess the current urban tree conditions and make recommendations for preservation, protection, restoration, species selection, design, planting, and citizen involvement.



St. Martins University Campus, Lacey, WA

City of Lacey

URBAN FOREST MANAGEMENT PLAN

Introduction

Today, more than ever, we are a population of city dwellers. Over 75% of our citizens live within 50 miles of our shorelines in increasingly large and dense cities. Implementation of the Growth Management Act has pressed on our remaining undeveloped green spaces within growth areas, and shrunk lot sizes to the point that tree planting, not individual tree protection, is often the order of business. Areas outside the adopted urban growth areas are seeing less pressure to convert from resource and agricultural lands. While this may preserve more net "green" spaces in the long run, other islands of green such as parks, wetlands and undeveloped green spaces within the urban growth areas are becoming more precious.

Cities have embraced a combination of tree protection and tree planting to ensure that the hard concrete lines of development are softened by tree lined boulevards, curved and planted walkways, shady parks, and natural

areas. These planted and protected areas are enhanced by the natural instincts of humans to plant trees around their dwellings.

Urban trees provide both visual and emotional solace in our world of stressful jobs, family commitments, smart phones, and tablet computers.

As we continue to press on the edges of our native forests with our increasingly dense urban and suburban structure, the need to design for trees, implement sound tree protection practices, and create long-term planting plans becomes more and more critical.

A significant element of maintaining a livable city is to instill pride in its character. By working to make our cities more comfortable and pleasant we instill pride in our citizens. Proud citizens will get more involved and work even harder to preserve, protect, and enhance our cities.

The City of Lacey has recognized the need to protect and manage its valuable urban forest. This Urban Forest Management Plan is one of many steps the City of Lacey has undertaken to improve the benefits that its urban forest provides to the community.

Recognized Benefits of the Urban Forest:

The urban forest provides numerous environmental, psychological and economic benefits. It is critical in providing a healthy environment for people, fish and wildlife. It affects our health and sense of well being. It provides economic benefits by reducing the need for power, and water treatment. Most benefits can be measured, some cannot, and all are significant.

Environmental Benefits:

Water Quality - Clean water is vital to the health of our environment. In every area of the city, the urban forest helps to provide clean water. The urban forest intercepts rain, reducing runoff before it can occur. It absorbs and stores water which reduces the impacts of stormwater pulses, especially in developed areas, along streets and highways and in parking lots. It helps remove pollution from water and reduces excess sedimentation. Riparian vegetation shades and cools the water surface and the air in riparian areas, providing better habitat for fish and wildlife.

Erosion Control - The hard surfaces common to urban areas are impervious to water infiltration, thereby increasing stormwater runoff volume and flow. The rapidly moving water erodes soil, increases siltation in urban waterways and creates water pollution problems. Trees and other plants play a role in stabilizing soils and preventing erosion. The roots slow runoff by holding soil in place and absorbing water. Leaves diminish the impact of raindrops on bare land and mitigate stormwater volume (McPherson et al 2002).

Energy Efficiency and Temperature Control - The role of vegetation in temperature control in the Pacific Northwest is becoming more important with rising energy costs and conservation concerns. Well placed vegetation can significantly reduce energy needs and increase energy efficiency by reducing heat loss in winter and increasing cooling in summer.

In winter, evergreen vegetation can reduce wind velocity that pulls heat out of buildings and provide an insulating effect by trapping air close to buildings. Deciduous vegetation around buildings allows for solar gain in winter months, reducing heating costs. In summer, well placed trees can intercept up to 90% of the solar energy, reducing the need for air conditioning (The National Arbor Day Foundation).

Trees reduce the temperatures of heat islands that form in urban centers by shading pavement and structures. Considering this cooling effect, the larger the size of trees and the bigger the size of the green spaces, the greater the effect of the trees on climate.

Plants can be used to manipulate air movement by strategically placing them to block undesirable prevailing winds and to provide effective barriers. Walls of vegetation can be used to direct air to sites where cooling is wanted.

Improved Air Quality - Many plants of the urban forest can reduce the effects of air pollution by removing pollution, both particulates and gases, from the air. This occurs because plants reduce winds, causing particulates to settle out of the atmosphere onto plants and the ground where precipitation washes the particulates into the soil. Certain gases such as nitrogen oxides, carbon monoxide, chorine and fluorine halogens, ammonia, and ozone are removed by absorption and stored in leaves and needles of some woody vegetation. Trees also sequester and reduce atmospheric carbon dioxide (National Arbor Day Foundation) (McPherson et al. 2002). Trees improve air quality as they release oxygen through photosynthesis and they reduce ozone levels by reducing urban temperatures.

Sound Control - The leaves, twigs and branches on vegetation absorb sound energy, as do grasses and other low growing plants, especially sounds in the higher frequencies which are the most bothersome to people. Plants dissipate sound energy by refraction that occurs when sound passes through vegetation barriers and bends around plant structures. Barriers of trees and vegetation in conjunction with walls and landforms can reduce traffic and highway noise (McPherson et al. 2002). Such barriers can be used as part of a noise mitigation strategy for new development.

Vegetation also masks unwanted sound by providing sounds of nature, rustling leaves and singing birds, to cover unwanted noise. People can focus on those natural sounds that are more pleasing than the noise of the city.

Fish and Wildlife Habitat - The urban forest provides habitat for many species of birds, mammals, fish, insects and amphibians that enrich urban life and offer

opportunities for study. The larger the area, the greater the possibility for diversity of habitat and wildlife. While forested natural areas with native understory offer more biological diversity than other parts of the urban forest, all provide some habitat. Squirrels and chipmunks live in and around trees; numerous species of birds abound in vegetation; bats dwell in secret places; and fish inhabit the creeks, streams, and rivers. Wetlands, riparian areas, connected natural areas, and urban landscapes provide important biodiversity.

Psychological Benefits:

Mental and Emotional Benefits - People generally feel that the urban forest increases the enjoyment of everyday life and provides a meaningful connection with the natural environment. Research now provides the scientific basis to support those feelings. Urban forests have a clear role to play in reducing stress-related impacts on health such as lowering blood pressure.

Studies show that exposure to nature and urban forest reduces stress and provides significant restorative benefits. Various studies using slides of different subjects show that natural scenes and urban nature settings hold the viewer's attention more effectively than urban scenes without nature. Even slides of unspectacular natural scenes produce more positive emotional states than urban scenes without trees (Hull and Ulrich, 1991).

Significance and Symbolism - Trees have deep significance to people, especially in the urban setting that may offer little of the natural world. Trees and forests provide beauty and serenity that we can experience in the sensory realm. The constantly changing sights, sounds and smells of plants fascinate and delight us.

Trees may have symbolic meaning. Many cultures associate trees with strength and wisdom, and we often remember loved ones with memorial tree plantings (Dwyer 1994). Planting trees shows a commitment to the future and a desire to improve places where we live.

Aesthetics - Positive emotional states are also associated with being in or looking at things that are pleasing. Trees and vegetation provide much of the color, variety, texture, shape and sound that are pleasing in all seasons of the year. Visual preference surveys have shown that small parks and open spaces are uniformly desirable in all settings of a city. Such surveys show that people prefer scenes that have well maintained trees and vegetation. Research substantiates what people have known intuitively, that trees and natural areas bring pleasure and provide benefits beyond their economic values (Dwyer 1994).

Economic Benefits:

A healthy urban forest can improve water quality, prevent erosion, reduce heating and cooling costs, convert carbon dioxide into oxygen and has positive effects on our health and wellbeing.

Trees generally provide benefits in their immediate location and to the surrounding community. From the individual property owner who has a more comfortable environment and increased resale value, to community members who have better water and air quality, to the fish and wildlife who have better habitat - all benefit from healthy trees and vegetation.

Increased Resale Values - Studies show that landscaping with trees is associated with an increase in the value of residential properties. Generally larger trees have greater effect on the resale values than smaller trees. Properties with trees show better and sell faster. Increased property values increase a community's tax base (McPherson et al. 2002).

Stormwater Benefits - In addition to increased resale value, trees and vegetation mitigate stormwater runoff from new construction, reducing or eliminating the need for more costly systems.

Economic Stimulus - Trees make the city more attractive to both residents and businesses. The National Arbor Day Foundation explains that "trees can be a stimulus to economic development, attracting new businesses and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent." (Coolcommunities.org).

In a study conducted by the University of Washington, consumers indicated they would be willing to pay 12% more for goods purchased in a well landscaped district. The study also indicated 15% higher interaction between consumers and merchants, and tree-lined sidewalks were rated 80% higher for amenities and comfort (Wolf, 1999).

Recreational Value - Lacey's urban forest includes wonderful recreation areas such as Wanscher's Community Park and Wonderwood Park. While it is important to provide ample open space for active recreation, it is equally important to provide places for passive recreation. Lacey's urban forest includes many areas where wetlands and associated wooded buffers have been preserved. These areas provide places to observe wildlife, commune with nature and escape the pressures of daily life.

Traffic Management - Trees function as "traffic calming" devices effectively slowing speeding drivers while also adding to the aesthetics of the urban landscape. Vertical elements, including trees, reduce the "optical width" of the narrow street, thereby discouraging speeding (Project for Public Spaces "Traffic Calming" http://www.pps.org). Trees and other plants may be used to direct not only vehicular traffic, but pedestrian traffic as well (Grey and Deneke 1992).

Challenges:

Since the 2006 adoption of the Urban Forest Management Plan, there have been several issues, challenges, and experiences with the implementation of the plan that are important to examine.

The first item is the challenge with application of tree tract standards in cases of infill or redevelopment where tracts previously did not exist. In Lacey's core area, specifically the Woodland District and Central Business District 5, many of the properties developed in the 1960's and 70's and predated even the earliest landscaping requirements, let alone, tree tract requirements. As properties redevelop under current policy, they would be required to set aside a 5% tree tract. If no trees exist, then they would be required to replant this area with trees to meet a certain coverage requirement in 15 years. This standard also runs somewhat contrary to Lacey's goals of establishing the core area as the urban center. Very few urban centers (if any) have set aside 5% tree tracts on all developable parcels. It may be prudent for the City to require a fee-in-lieu that may be used to either further urban forestry goals in other areas of the City or be used even in the same Planning Area to provide additional tree canopy to balance the City's urban forestry goals with its goals to urbanize. The priority areas for installation of any additional trees should be public (City-owned) properties.

Second, there have been challenges with maintenance responsibilities for street trees between the City and adjacent property owners. The City's policy has been to maintain street trees on City arterials, commercial areas, and City transportation projects and adjacent property owners or owners associations maintain the remainder. However, this has not been evenly applied across the board and there is a large amount of confusion between adjacent property owners and the City as to who has the maintenance responsibilities. The street tree inventory completed in 2012 will address some of the issues as it will provide a map of all City-maintained trees in Lacey and will therefore provide better information delivery to the public. The City adopted an ordinance in 2015 related to street tree maintenance The ordinance provides additional clarity and consistency when it comes to maintenance responsibilities.

Another benefit of the street tree ordinance is that it clarifies notice and abatement procedures for trees on private property that may impact city right-of-way. This ordinance helps the City better define procedures where a tree on private property is hazardous or potentially hazardous that may fall and damage city property (right-of-way) or other situations where liability could be a concern.

Finally, there are financial challenges related to residential homeowners and homeowners associations in Lacey's neighborhoods when it comes time to replace trees. The need to replace trees can be for various reasons including being hit by a car, hazard tree, etc, but many need to be replaced due to damage or replacement due to an inappropriate species being initially installed. Many Lacey neighborhoods were developed using a street tree that, due to aggressive root structures or being a species susceptible to damage, needs to be replaced. However, many of our homeowners and homeowner's associations do not have the financial means to be able to replace the trees. The City should consider establishing a grant program or other means, including potential fee-in-lieu funds, to be able to assist our neighborhoods in these efforts.

Conclusion:

Washingtonians have chosen to protect farm and forest land by limiting expansion of urban growth boundaries under the Growth Management Act. While this results in more efficient use of urban land for development, it reduces the space available in the city for trees and vegetation. As cities become denser, there is a greater need to maintain, protect, and manage our urban forest.

While many people think of street trees when they think of the urban forest it is much more than that. The urban forest is a complex system of trees and smaller plants, wildlife, associated organisms, soil, water, and air in and around our city. It is the trees along the streets, the landscaping around our homes and institutions, the vegetation in commercial and industrial areas, the multilayered forests in our natural areas and the plants and landscaping in our parks.

The urban forest provides water and air quality benefits, improves the local climate by providing cooling and shading and improves the ecological health of the urban environment. Managing the urban forest for these benefits is sometimes difficult. Housing, commerce, transportation, public safety, and recreation must be accommodated. Successful urban forest management accommodates these uses, provides environmental benefits and improves the quality of life for our residents.

Our urban forest is managed by the city for many reasons, healthy watersheds, prime wildlife habitat, excellent outdoor recreation and exceptional trees. A healthy urban forest is essential to our quality of life and increasingly important to the city's efforts to improve the quality of the environment of our city. A healthy urban forest is an asset that increases in value over time, one that provides service as well as beauty to Lacey residents.

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Goals and Policies
Of the Urban Forest Management Plan

Horizon Point, Lacey WA

1. GOAL - Achieve and maintain a vibrant, healthy and diverse urban forest in Lacey and Lacey's urban growth area consisting of both native and non-native landscape components.

Policies:

A. Base decisions for preservation of trees and re-vegetation on privately owned lands upon the requirements of individual development sites considering criteria necessary for maintaining healthy, safe tree stands. Ensure trees planned for preservation or replanting can be integrated with expected uses given the zoning classification and anticipated urban development characteristics.

B. Base landscaping plans and landscaping decisions, concerning species selection, upon requirements of individual development sites, desired function, and anticipated urban development characteristics.

C. Create and maintain a street tree program that takes advantage of indigenous trees, provides a coordinated and deliberative approach on selection of preferred deciduous street tree species, and provides diversity of species, interest, and aesthetic quality

D. Develop landscaping themes as part of the city design review program promoting the desired wooded look and feel for specific traffic corridors and selected areas. In designated areas, where the width is sufficient to accommodate mature conifers, design landscape plans which include coniferous evergreens and native under-story vegetation in planter strips, medians and traffic islands.

E. Enforce tree protection regulations as part of the city's code enforcement program and respond quickly to complaints about illegal tree removals.

2. GOAL - Preserve and maintain native forest components in areas conductive to the lifecycle of native plants such as critical areas (wetland and habitat areas and buffers), conservation parks, large tracts of open space and other areas that can be naturalized while maintaining compatibility with the anticipated land use of the surrounding area.

Policies:

A. Utilize the Open Space Institutional (OSI) zone for preserving and maintaining natural indigenous vegetation and habitat.

B. Preserve natural vegetation in all designated privately owned wetland and habitat sensitive lands and buffers. Emphasize the preservation and use of natural vegetation on lands zoned OSI where the urban use is expected to be institutional.

C. Preserve natural vegetation or use indigenous, or landscaping resembling indigenous, vegetation in all large buffer areas preserved or created for the separation of one land use category from another. Provided the existing vegetation is sufficient to accommodate the desired function of separation of uses and mitigation of identified impacts.

D. Create and maintain programs that identify potential conservation areas and strategy to protect them through public acquisition.

3. GOAL - Preserve natural forest components recognizing and considering the nature of the urban zoning classifications and limitations particular zones and uses have on the preservation of indigenous trees.

Policies:

A. Replant and maintain non-native landscape components in areas of urban density and intensity where the natural life cycle of existing vegetation conflict with the built environment envisioned by the Comprehensive Land Use Plan.

B. When replanting is required give priority to the use of vegetative species that resemble native species in areas of the built environment not conducive to the native plant life cycle.

C. When making decisions for tree preservation or re-vegetation consider land use zoning designations and urban land use characteristics and expectations for development.

D. Develop specific urban forestry landscape expectations and standards for each land use zone. Standards should consider urban requirements and limitations pertaining to urban forestry.

E. Small lot areas should have reduced emphasis on preserving indigenous vegetation because of physical development constraints and more intensive density. These areas should be planned for intensive re-vegetation with an appropriate combination of indigenous and non-native tree species.

F. Large lot areas can have more emphasis on preserving indigenous trees as lot sizes permit. However, efforts for preservation, particularly evergreen trees, should also recognize individual preference for residential landscaping options and the benefits of replacement of indigenous evergreens with deciduous tree species sensitive to residential home limitations and functions. Deciduous trees may be preferred given advantages for solar access, climate control and gardening.

G. Commercial areas anticipating intense development and little opportunity for saving trees because of significant grading, utility provisions, parking lot areas and access should emphasize preserving select tree stands with dedicated tree tracts and significant re- planting of preferred tree species throughout the site.

H. Trees in parking lots should emphasize deciduous trees that are preferred in parking areas given advantages of solar access and climate control. Pedestrian areas, particularly walkways required in design criteria for pedestrian access across parking lots should be edged with trees providing a canopy over walkways.

I. Buffers should emphasize preservation where practical, considering tree health and longevity and should emphasize re-planting native vegetation and evergreens where re- vegetation is necessary.

J. In both residential and commercial developments emphasis for preservation should be focused on selected sites or groves of healthy trees. Design of the site should protect these groves as part of the open space or as part of the overall landscape theme and requirement.

4. GOAL - Recognize the benefits of tree cover in consideration of drainage and watershed planning, habitat management, passive recreation opportunities, urban aesthetics and pedestrian benefits for street design, and maintain and improve Lacey's overall tree canopy for these benefits and purposes.

Policies:

A. Achieve no net loss or maintenance of Lacey's tree canopy. A 2020 tree canopy analysis showed 28% canopy cover in the City. Every three years conduct a tree canopy analysis and if canopy coverage drops below baseline, staff is directed to review tree protection regulations. Consider a tree density requirement for each land use zone based upon the zones capability for supporting tree cover.

B. Strive to achieve no net loss of forest canopy through preservation of

conservation tracts, sensitive areas, community planting programs, and replanting of properties developed under the vision of the Comprehensive Land Use Plan.

C. Apply a tree canopy requirement, or tree density requirement considering canopy, to individual development projects and require each project to comply with the standard by preservation of existing trees during construction, providing or replacing trees through intensive landscaping of development sites after construction, and/or designation and preservation of tree tracts.

D. Base plans for tree preservation or replacement upon expectations for the specific zoning designation the project is located in.

E. Craft development regulations to emphasize and promote saving existing trees with size and age by providing more credit towards established trees.

5. GOAL - Provide significant habitat value in Lacey's urban forest. Policies:

A. As is appropriate to the location and function, trees should be considered for wildlife habitat value. Trees well adapted to our area that provides food value and cover to wildlife is preferred in development of landscaping plans.

B. Consideration needs to be given to sighting of certain trees to avoid dropped fruit on sidewalks, patios and parking areas, or enticing animals into dangerous areas of roads that will result in road kill, but where landscaping opportunities allow for placement of trees in appropriate areas trees with food value for wildlife should be given special emphasis.

6. GOAL - Integrate urban forestry concepts and preferences with development design.

Policies:

A. Designation of tree tracts, preserving and planting trees in common areas, and landscaping of individual lots with tree cover shall be strategies used to meet a tree density/canopy requirement. This shall be required in the zoning and subdivision ordinances to support Lacey's urban forestry program. The tree density/canopy standards shall be applied during review and conditioning of the land division, prior to final approval of the land division. These standards shall also be applied to individual lots over the long term as building permits are approved. This can provide an expectation for a certain percentage of tree cover over the long term. It can also promote preservation or establishment of preferred species and tree stands.

B. Consider establishing a fee-in-lieu of program as an option to meet tree tract requirements for redevelopment and infill projects in the City's Midtown District and Central Business District 5 in situations where no stands of trees currently exist. Fees collected should be used to plant new trees or expand the urban forest canopy on public property.

C. Tree protection, preservation and/or replacement plans shall be considered early during land division planning, prior to preliminary approval, to promote integration of urban forestry concepts with the overall land division design.

D. Create a balanced look in landscaping plans between natural and manicured landscape. Consider the urban context, site use, location, and zoning designation in designing the landscaping plans.

E. Promote creative landscape designs that avoid a cookie cutter design but still provide interest, visual relief, and break up expanses of hard surface and walls.

F. Allow flexibility in landscaping development sites to preserve areas of native vegetation where appropriate or create areas of native vegetation design by providing credit towards traditional prescriptive landscape methods and requirements.

G. Consider crown-raising on street and landscape trees to improve visibility into commercial properties consistent with sub-area or district-wide planning efforts.

7. GOAL - Maintain tree canopy in developed areas.

Policies:

A. Developed residential lots will be required to maintain a certain minimum canopy/tree density over the long term to promote the overall urban forestry program. This expectation or minimum standard should be based upon what is reasonable to expect based upon the size and design of the individual lot and the zoning designation it is located in, and the longevity of the trees planted.

B. A certain amount of flexibility will be provided for individual lot owners once lots are purchased to allow for individual tastes and landscaping preferences and needs. However, the goal of maintaining Lacey's tree canopy/density should be maintained. Unless physical constraints make it impractical, each lot should support its prorated share of the tree canopy/density.

C. Develop a program to monitor trees required in landscaping plans that are the responsibility of the land owner, lot owners association, or home owners association. Provide assistance in educating responsible parties regarding strategies and techniques of tree maintenance, and enforce landscaping

requirements for trees.

D. Better utilize the city's tree protection specialists to conduct site visits of properties that received an exemption permit requiring replanting.

8. GOAL - Develop a street tree program as an essential component of Lacey's Urban Forestry Plan.

Policies:

A. Provide for a street tree program with specific emphasis on designing streets for pedestrian comfort and security and promote species that provide the desired street canopy, are disease resistant, low maintenance, have root systems that do not create street and sidewalk buckling, and have attractive features adding interest to the urban street environment.

B. Provide for a street tree program that has both naturalized and non-indigenous species components.

C. Develop a street tree program that is integrated with landscaping plans and design for specific street corridors.

D. Develop an ongoing tree planting program to replace mortality, damaged trees, and to increase canopy cover.

E. Develop a program to monitor street trees and follow up on enforcement where street trees are part of a required landscape plan and the maintenance is the responsibility of the land owner.

F. Explore establishment of a dedicated street tree maintenance fund, utility fund, or other similar program that would fund street tree replacement in neighborhoods.

9. GOAL - Create a heritage and specimen tree program that recognizes special trees worthy of extra attention, notoriety and protection.

Policies:

A. Develop definitions of heritage and specimen trees that emphasize the special distinctions that lead to such characterization, in context with Lacey's history.

B. Hold contests annually on Arbor Day for identification and qualification of these special trees.

C. Develop standards for protection of such trees and methodology for registering trees so that new land owners are notified of what they are purchasing and expectations associated with the distinction, including the tree's health and expected life cycle

10. GOAL - Develop an Urban Forestry Plan that promotes safety and healthy trees.

Policies:

A. Develop a program that incorporates decisions for preservation of trees that are related to development projects that consider safety issues associated with the potential built environment.

B. Assure that safety issues are considered by a qualified tree professional when developing plans for tree protection, preservation or landscaping design.

C. Develop a program that assures that tree species are considered for adaptation to our area, localized environmental conditions, resistance to disease, and compatibility with the planned urban use of the site.

D. Develop a program for regular inspection and maintenance of street trees that is ongoing to promote healthy well formed and functional street tree resources.

E. Provide for a tree removal process for removal and replacement of dead, dying or diseased trees.

F. Maintain the program for the tree professional(s) to be available to the public for tree inspections, and considerations of tree issues on individual lots, at cost for review.

11. GOAL - Create an Urban Forestry Program that is publicized, easily understood, has brood support, promotes pride in our Tree City USA distinction and is enforced.

Policies:

A. Develop a public education program that promotes Lacey's distinction as a Tree City USA and provides support to individual citizens and home owner associations concerning tree issues.

B. Develop a program for meetings with home owner associations to help associations manage privately owned tree resources.

C. Develop and implement a program of informing new residents of expectations for tree emphasis and tree regulations.

D. Develop and implement an enforcement method that is fair, based upon professional evaluation, and promotes the vision of the Urban Forestry Plan.

E. Develop an enforcement program that includes education of the benefits of trees and maintenance of trees, and involves fines for non-compliance. Fines shall be based upon a fair value of the trees lost and replacement of trees. Fines may be used to support the city urban forestry program through maintenance and planting of street and park trees.

F. Work with private and public entities to create partnerships for developing education and community action programs promoting the value of maintaining and conserving natural vegetation and habitats.

G. Develop interpretive trails and view sheds within conservation areas and natural parks to provide recreation opportunities and education to the citizens of Lacey.

12. GOAL - Create a citizen advisory board for urban forestry issues.

Policies:

A. Develop an Urban Forestry Board that is made up of tree specialists and citizens representative of the scope of urban forestry issues in our city.

B. Develop a set of operation criteria for the Urban Forestry Board that has it develop and consider urban forest plan amendments, work on special urban forestry projects and advise the council on urban forest issues.

13. GOAL - Develop a method to process Class IV Forest Practice Applications pursuant to requirements of RCW 76.09.240.

Policies:

A. Develop a process to include in the city tree and vegetation protection ordinance for review and action on Class IV Forest Practice Applications.

B. Require all Class IV Forest Practice Applications to satisfy the intent and vision of the Urban Forestry Management Plan.

APPENDIX 1
Background and Baseline Information

A
Council's First Visioning Work-session for the Development of the Urban Forestry Plan

In early February of 2005, the Council held a work session to determine what each individual member thought was important in regards to maintaining trees and vegetation. Without priority, the following results are individual thoughts of Council members from that visioning effort

1. Observation: "don't like – for site planning and tree retention; need to know where building footprint is in relation to trees – keep tree clusters if possible."
2. Retain the "NW Woodland Character" – we are losing this. NW look and feel which is not just "ornamental" or "street trees" look.
3. Don't need cookie cutter designs: be more innovative in our designs. Develop designs to look more natural than the street trees on 35' centers. (Retail vs. Commercial).
4. No net loss of trees; need to preserve rather than replant.
5. Not real interested in large firs in residential, one ice storm will cause problems. Need to breakup walls with plantings.
6. Like mixing oil & water – have natural look at entry points or "open spaces", buffers native doesn't mix with density we are trying to keep or develop.
7. Replace trees with trees that meet our vision (rather than replacing like for like)
8. Find appropriate trees for a given area which retains the look and feel of the NW Woodlands. Not the typical street/landscape sculptured look.
9. Heritage/specimen trees need a definition – look at location and health. Be sure evaluation looks at long term.
10. Protection of the natural habitat – trees are a key component of this.
11. Look at when and where we plant trees. Don't waste the resource (mindless construction projects)
12. Heritage or specimen trees on private property. Owners need to understand what they are buying. Our vision can't take away personal property rights by imposing "our vision" on them.
13. Look and feel should apply to housing development and commercial. Hard on very small lots. Set aside tree tracts instead of how we do it now, trees in parking lot landscaping.
14. Need balance between natural and "landscaped look".
15. Adjoining development and differing standards and look/feel. Like, orchard style

– urban environment looks urban. Entry ways – public spaces (parks, open spaces and planters)

16. With innovative thought from our engineers, landscape architects, etc. we can have more natural looking parking lots.
17. Like: "the green of Lacey"
18. Trees that grow where you plant them. Species selected need to be the right choice for the location.
19. Education of public Home Owners Associations (HOA's). HOA's need to be aware of our tree preservation ordinances and the importance of trees. Use public events to promote healthier urban forest.
20. Exercise more judgment to all the NW look and feel – change landscaping ordinances to accommodate trees. (meander sidewalks)

It was also mentioned that there should be some public education about what does "Tree City USA" mean and what an urban forest is.

As with our citizens, opinions of individual council members vary greatly in regards to tree and vegetation preservation. But, when working together, as was done during the vision exercise, you can see that similar interests are reflected in their statements. It is the intent of this plan to take advantage of the common themes which have developed to create a plan that is widely supported by the Citizen's of Lacey.

B
Soils and Site Information

The City of Lacey occurs entirely within the Puget Sound Trough which extends the entire length of Washington from the Canadian border to Oregon. The soils were formed during the most recent Vashon glaciation epoch. The terminal moraine of the Vashon glaciation is found in southwest Thurston County.

The topography of Lacey is undulating to rolling on uplands. The soils are predominantly formed in glacial drift deposited by the most recent of several continent-sized glacial ice sheets. The soils generally consist of compact basal till covered by a thin, discontinuous layer of ablation till. The predominant gravelly soil types formed from this material include the Alderwood gravelly sandy loam, Everett very gravelly sandy loam, and the Spanaway gravely sandy loam. Also commonly found are the Indianola loamy sand, Nisqually loamy fine sand, Skipopa silt loam, and Yelm fine sandy loam. These sandy soil types are formed from outwash material and are found along the major stream courses and broad flats.

Photo A. Typical glacial till derived soils found in Lacey.

The windthrow potential for all of the soil types found in Lacey is slight (except the Alderwood which is moderate); meaning that blowdown of healthy trees is less likely during normal winter storm events. The moderate windthrow risk indicates a higher windthrow potential, especially during periods of wet weather and high winds. Perched water tables above the Alderwood hardpan contribute to this increased hazard. Inclusions of poorly drained soils such as the McKenna gravelly loam (small areas that generally occur within wetlands) also have a moderate to high potential for windthrow.

The productivity of these upland soils is moderate to high, and competition for new seedlings is moderate to high. Weed control is usually necessary during the first 3 years after planting seedlings in forested areas or gaps in the canopy.

The soils found on the outwash materials are slightly drier, but have no barriers to root penetration and a slight windthrow potential.

C
Forested Cover

The forest cover in the City of Lacey is within what is classified in forestry as the *Tsuga heterophylla* Zone, the most extensive vegetation zone in western Washington. It is famous for its subclimax Douglas-fir and climax western hemlock-western red cedar formations. The seral stands that occur today are dominated by second-growth Douglas- fir. Though they are climax associations, even old-growth stands (400 to 600 years old)

still have significant components of Douglas-fir in addition to the climax western hemlock, western red cedar, and grand fir species.

Photo B. View of remnant second-growth Douglas-fir along Golf Club Road SE in Lacey.

In east Lacey, an oak woodland type occurs that is often intermixed with Douglas-fir. The Oregon white oak (*Quercus garryana*) colonized former prairies and is now being overtopped by invading Douglas-fir. The Oregon white oak occurs predominantly on the excessively drained Spanaway gravelly sandy loam soil type, but scattered trees and groves of trees are found on other types (Photo C). Common snowberry and Oregongrape are the predominant shrub species under the oak stands.

Douglas-fir is the most common native tree found in Lacey. Western red cedar, western hemlock, bigleaf maple, black cottonwood, red alder, cherry, and Scouler willow are also found depending on the location with the topography and level of disturbance. The understory is dominated by salal, Oregongrape, bracken fern, swordfern, red mountain huckleberry, common snowberry, and *Rubus* species. This combination of conifer overstory and diverse understory, with the productive soils produces good to excellent wildlife habitat potential.

Photo C. View of a majestic Oregon white oak protected during development of the Senior Center in Lacey, WA.

The forest canopy is becoming more fragmented as development has spread into the urban growth areas, particularly in the Hawks Prairie Area. The industrial development on Marvin Road and Willamette Drive NE areas, along with Britton Parkway and the large commercial project development are impacting the forest canopy significantly.

On the other hand, some areas are growing trees that were non-forested in 1966. Undeveloped prairie areas are reforesting on their own, the city is planting trees on rights- of-ways, and residents are planting trees in yards and open space areas. This has combined to increase the forest cover in the original core of Lacey, and slow the overall forest loss since 1966. Figures 1 and 2 are based on examination of aerial photos from 1966 and 2001 (plus known changes in 2002-04).

Figure 1. % Forest Cover in Lacey - 2004

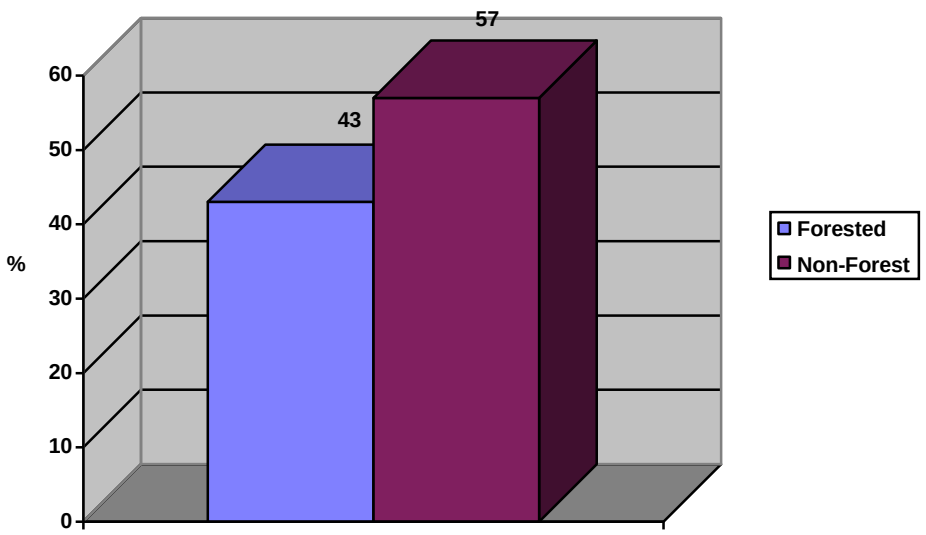
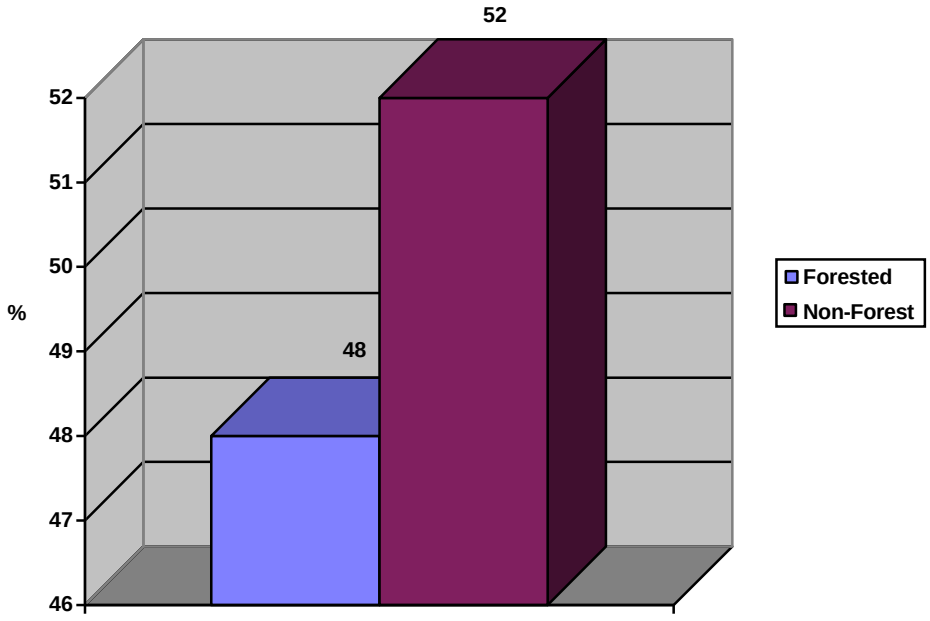


Figure 2. % Forest Cover in Lacey - 1966



Figures 1 and 2 illustrate the changes in forest cover between 1966, several years before Lacey became a City, and 2004. The 2001 photos were updated to 2004 by removal of acreage for projects constructed since 2001 to determine an approximate acreage.

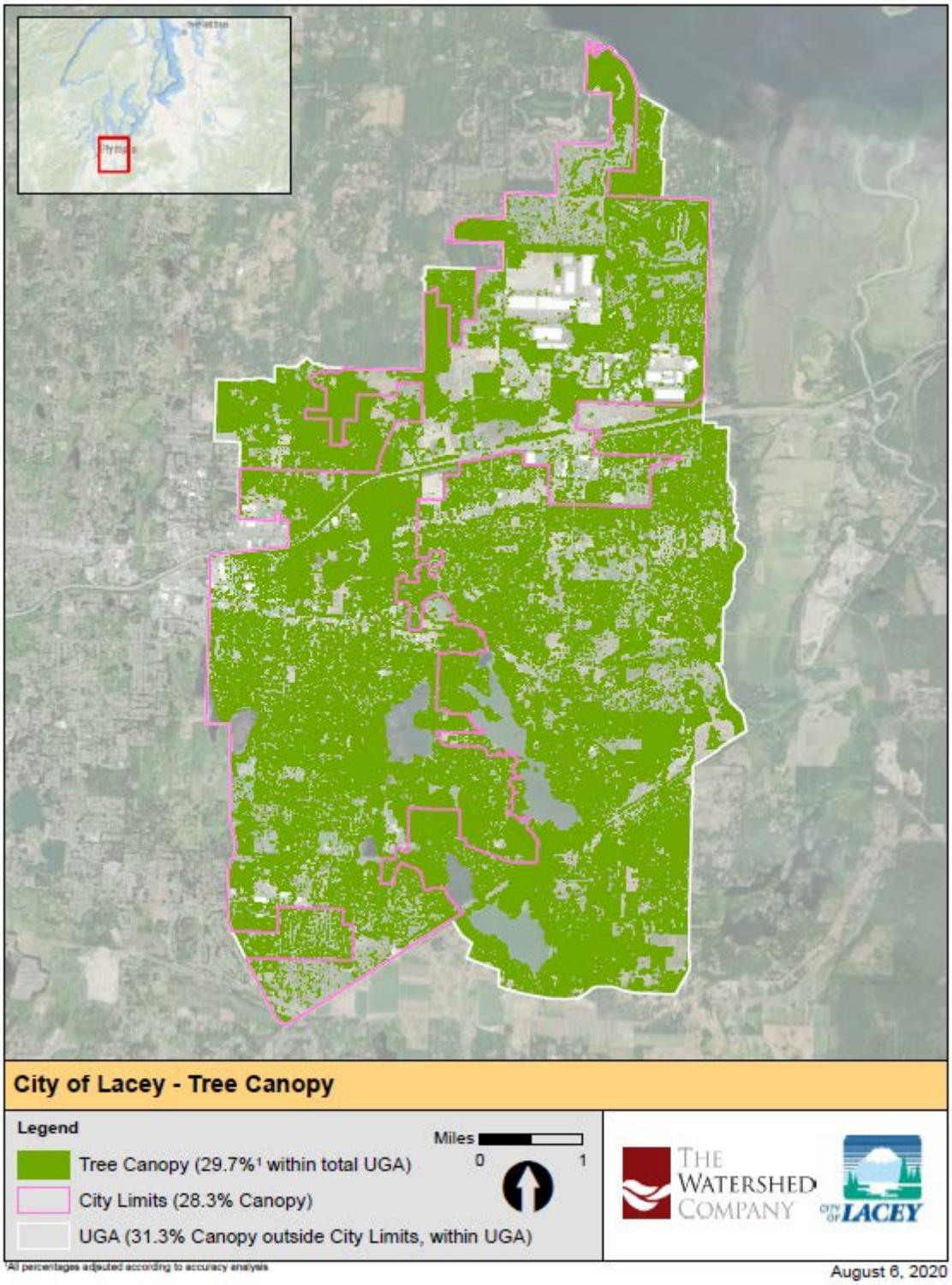


Figure 3 illustrates tree canopy in the City and UGA as of August 2020.

D
Street Trees and Maintenance Evaluation

Private Street Trees

A 100% inventory of all 'private street trees' was completed for all major and minor arterials and collectors in Lacey. A 'private street tree' is one that is maintained by the adjacent property owner and is situated in the curb lawn zone or behind the sidewalk, and serves as the street tree for that location. These are areas where there are no city maintained street trees.

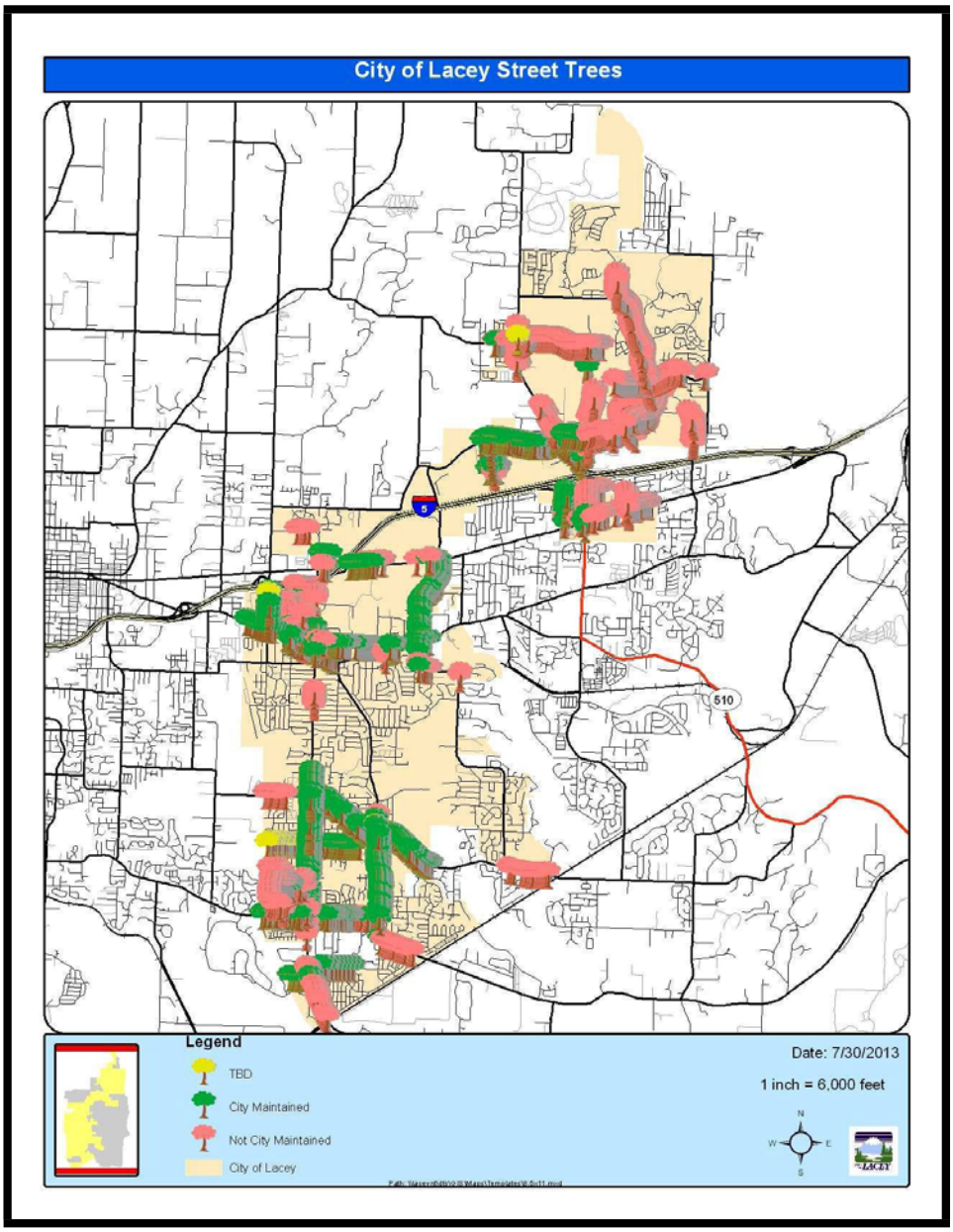


Figure 4. 2012 Street Tree Inventory

Table 1. Summary list of street trees on all arterials and collectors.

Species	Diameter Range	# Trees	% Composition
Ash – Green/White	1-26	1,102	19.08
Sweetgum	1-19	839	14.53
Ash – Patmore	1-22	692	11.98
Pear - Callery	1-12	547	9.47
Oak – Red	2-17	349	6.04
Maple – Red	2-26	217	3.76
Crabapple	1-8	197	3.41
Cherry – Kwanzan	3-19	161	2.79
Maple – Norway	2-10	153	2.65
Ash – Autumn Purple	2-10	142	2.46
Maple - Vine	1-6	114	1.97
Dogwood – Flowering	1-6	100	1.73
Cherry - Flowering	1-9	91	1.58
Zelkova – Japanese	4-10	80	1.39
Maple – Norway	2-7	79	1.37
Plum - Flowering	1-16	75	1.30
Various Other Species		837	14.49
		5,775	**100.00**

Sweetgum and ash (green and white ash cultivars) dominate the streets of Lacey and its urban growth area. This is due to a Merritt and Pardini study of 1985 that recommended ash and sweetgum as the main trees for Lacey's central business district, plus the availability at nurseries and general popularity of the species among landscape architects for years. Red maple, flowering plum, and flowering cherry were the next most populous species found along streets that were under private maintenance. The private street trees were, for the most part, in good condition.

The two major exceptions were:

1. Sweetgum trees that were heavily damaged by the 1996 and 2012 ice storms and other heavy wet snowstorms, and
2. Trees that have been topped or otherwise mal-pruned by the landowners.

Photo E. View of recent topping of private street trees in 'Old Lacey' area.

Few of the trees were receiving maintenance such as corrective pruning, including crown raising or crown cleaning to remove dead, dying, diseased, defective, crossing, or extra

branches. These trees will continue to be more susceptible to storm damage, will be more costly to maintain as they get large, and their useful lifespan will be shorter.

The majority of these private trees are located in the required landscaping of commercial properties. In some cases the form and severity of pruning has destroyed the trees natural shape, and shortened its projected lifespan. In some cases, it does not appear that the trees meet the intent of the requirements in the landscaping ordinance.

City-Maintained Street Trees

A 100% inventory of city-maintained right-of-way trees was conducted by Washington Forestry Consultants, Inc. in 2012. Individual trees were evaluated and data on species, size, location, and condition was collected.

Tree Diversity and Planting Spot Data

The inventory found 2,973 street trees. Trees were identified and recorded by common name. Specific cultivars were determined in the field. The average diameter measured at
4.5 feet above the ground line was 8 inches. This is a reflection of how young the street tree population is in the City of Lacey, however this has increased from an average of 4- inch diameter since the last inventory was completed in 2001. The majority of the trees are planted in curb lawn zones, though some are in tree grates within the sidewalks.

Diversity is key in any urban forest. This helps insure that entire urban canopies are not wiped out by common maladies such as the Dutch elm disease did to many elms across the U.S., the chestnut blight on American chestnut, and ash decline on several species of ash.

As a rule of thumb, no more than 10% of the urban tree population should be of the same species, no more than 20% of any genus, and no more than 30% of any family. Some tree species such as red maples, green ash, London plane, and sweetgum tend to be over planted in the Pacific Northwest urban areas. In Lacey, the green ash cultivars, cherry and flowering plum, and sweetgums are over planted. The focus for future street tree plantings should shift away from ash, cherry, flowering plum and sweetgum to other quality species and cultivars.

Selection of cultivars resistant to known insect or disease problems help to insure that mortality will be limited if outbreaks occur. Ice and snow storms, wind storms, or extended droughts also may impact some tree species differently. Diversity is the key to minimizing damage from abiotic and biotic

influences.

There is adequate space in many locations for larger scale street trees. Many of the best and longest-lived street trees are the larger tree varieties. Many of the small flowering tree species are plagued by leaf diseases, twig blights, cankers, and other problems. Even some resistant varieties will still have problems.

It is recommended that the species selection for street trees be diversified to improve the quality of the urban forest.

City Street Tree Maintenance Evaluation

The 4,554 street trees maintained by the City of Lacey are generally described as being young, and in fair to good condition. Staff has routinely raised crowns on young trees to provide sidewalk and street clearances, performed some corrective pruning, and day lighted trees from overtopping competition by adjacent forest trees. The quality of this work is excellent when evaluated against the current standard for proper pruning[1].

Photo F. Street trees planted in the urban growth area. Design is the City of Lacey's standard which is working very well.

Normally, in cities with more and larger trees, all work is prioritized based on the urgency of the work. Future evaluations will require prioritization. The following is the recommended prioritization for the trees.

[1] ANSI A300 (Part 1) – 2001 --Pruning for Tree Care Operations – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, American National Standards Institute, New York, NY.• *Priority 1 Tree Removal*: Trees designated for removal have structural defects that cannot be cost-effectively or practically treated. The majority of the trees in this category have a large number of dead branches which present a safety hazard. Removal of these branches would leave a severely deformed tree, the live crown would be reduced to the point that mortality was sure, or that the tree is already in irreversible decline. Removal of trees before they are dead and in severe decline helps to prevent property damage or injury, and the tree removal is safer and theoretically less costly for a tree service to remove.

- *Priority 2 Tree Removal*: Trees on public property that are recommended for priority removal should be removed after priority one removals are completed. These trees may be in irreversible decline, but still be structurally sound.

- *Priority 1 Large Tree Pruning*: Trees are recommended for priority one pruning if there is a need to remove hazardous deadwood, hangers, cracked or broken branches. If conditions cannot be determined from the ground, then a lift truck or climber may need to be employed to do a closer inspection of the above ground parts.

- *Priority 2 Small Tree Pruning*: These trees require routine corrective pruning to establish scaffold branches and to raise crown for sidewalk or street clearances. Corrective pruning should be minimal after planting, and should remove crossing, damaged, and extra branches. Pruning for street clearances and sidewalk clearances depends on the length of the crown and growth rate of the tree.

- *Priority 3 Monitor*: Tree has structural defect that cannot be repaired, or is showing minor symptoms of decline. Tree should be monitored in spring after leaf-out and fall before leaf drop and a prescription for care developed.

- *Planting Spot*: This category indicates a vacant planting spot or a stump where a previous street tree had died.

The causes for tree decline and mortality are many and varied. Planting shock or lack of irrigation are the most common causes of mortality for newly planted trees. The next most common cause of mortality is man-caused injury. Weed eater damage, lawnmowers, bicycles tied to trees, trees vandalized, root disturbance, or run over by cars are the most common reasons newly planted trees failed. Insect or disease problems usually are a problem in later years, unless a tree was infected with disease or infested with insects in the nursery.

It is important to remove and replace dying trees quickly to eliminate inoculum from disease or insect infestations, to maintain aesthetic quality, and

to get a new tree established and growing to maintain some uniformity of the planting.

Maintenance needs by priority is described below. Work should be accomplished by priority. This may require specialized tree contractor to deal with some of the larger hazard trees. Most of the small tree work can be accomplished with city staff.

All small street trees should be inspected on a 3-year cycle. This helps to assure that pruning is accomplished on a timely basis, that damage, decline, mortality, or other problems are addressed quickly. Decline and other insect or disease problems can be identified and control methods implemented before the tree is a total loss.

Individuals that maintain weeds near the bases of trees, mow curb-lawn zones, and do tree maintenance should be trained to recognize tree problems before they result in mortality.

All pruning should conform to the ANSI A300, Standard Practices for Trees, shrubs and Other Woody Plant Maintenance (2001). This is the recognized standard for all tree care. All pruning should be completed by an International Society of Arboriculture Certified Arborist, or be supervised by one. It is recommended that the City of Lacey retain at least one member of the parks maintenance staff that is certified.

Condition of the Urban Forest

A condition rating was assigned to each street tree to help assess the health of the street trees. The ratings are adapted from the *Plant Appraisal Guide* (2000), published by the International Society of Arboriculture. The condition of the foliage (if present), twigs, scaffold branches, stem, and roots is assessed, along with any hardware (stakes, cable and bracing) present in the tree. After the tree is evaluated it is rated as: Good, fair, poor, or dead.

Trees that are rated as dead or poor are usually recommended for immediate removal and replacement. Large trees rated as very poor usually are in irreversible decline due to root disturbance or some other factor. Small trees rated as very poor usually did not establish, or have been severely damaged since planting. Quick replacement of these trees simply gains a year of establishment and growth.

Trees rated as fair and good may need minor cultural care and are expected to be long- term trees. Trees rated as excellent are expected to be long-term trees and require no care at this time.

Approximately 94% of Lacey's trees were rated as fair to good. Based on this data more corrective pruning is needed to develop the crowns on the newly planted trees.

Priority Pruning

Pruning of the safety hazards identified in the inventory should be completed first, followed by routine maintenance pruning. The routine maintenance pruning should be completed in the dormant season between October 1st and February 15th.

All pruning should conform to the ANSI A300 (Part 1)—2008. This is the standard for proper tree care. All pruning should be done by an International Society of Arboriculture Certified Arborist.

When contracting with a professional tree service, it should be specified in the contract that they observe the safety guidelines for tree care operations: ANSI Z133.1 - 2001 -- Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and Cutting Brush -- Safety Requirements. American National Standards Institute, Washington, D.C.

Clearance Requirements

The types of situations where trees can interfere with visibility include: signs, sidewalks, buildings, street lights, stop lights, or sight distances for pedestrians and motorists. In all cases trees can be pruned to provide adequate clearances.

Trees and other vegetation should be *monitored annually* to identify these types of safety hazards. The annual inspection of all rights-of-way is recommended to occur about June
1 when the first flush of deciduous tree growth begins to slow. Trees and other vegetation that are close to these signs will begin to obscure site distances and visibility. A second inspection is also recommended for early September, after vegetation growth is complete, but before leaf drop.

The tree that requires clearance pruning should be inspected and trimmed for clearance immediately. This should include native vegetation encroaching onto the streets and sidewalks as well as planted street trees.

Sidewalk overhead clearances should be a minimum of 8', but 10' is recommended. Pruning on smaller trees may need to be done over a 3-4 year period to achieve these clearances and avoid stress on the trees. Trees with thorns are especially a hazard. Generally, trees with thorns should not be planted as street trees. Where pruning for sidewalk clearance dramatically changes the look or shape of the tree, notification of the tree owner is recommended. As an option, they could be notified to prune their own trees to provide clearance with a time-frame before the City completes the work.

Street clearances must be maintained to prevent damage to vehicles and to the trees, and to maintain sight distances.

Trained city staff will recognize these clearance problems and correct them during routine maintenance. As a rule of thumb, branches should be pruned before they reach a diameter of 2 inches at the branch bark collar. This minimizes the wound size and allows a tree to quickly callus over the wound, protecting tree health.

Where branches of private trees encroach into the city rights-of-way, the city can only prune to the rights-of-way edge. In some cases this will leave stubs or unsightly branches that will die back. To maintain tree health and appearance it is recommended that all pruning cuts be made to the nearest lateral branch. Where pruning beyond the rights-of- way edge should occur to protect tree health, then landowner permission is recommended.

Overhead Utilities

The presence of overhead utility wires was noted for many trees and planting spots. Trees with a mature height of 20 feet or less should be planted under utility lines to avoid costly pruning and deformation of the appearance of trees.

Photo G. Tall growing green ash on Ruddell Road just south of Pacific Ave. SE. Trees require repeated pruning to prevent utility conflicts.

Overhead electrical wires were located over a portion of the existing street trees. Many of the street trees are inappropriate for these locations and will require extensive and repeated pruning to maintain reliability and safety for the public. If these trees are replaced due to mortality or other problems in the future, 'Utility Friendly' trees should be planted in those planting spots. A list of 'Utility Friendly' trees is provided in the section on street tree selections.

Curb Lawn Zone Widths

It is recommended that the designs for all new city streets include a curb lawn zone, the area between the sidewalk and the street, with a minimum width of 5 feet. Six to 8 feet is the optimum width. Currently the average curb lawn zone width is 5.5 feet.

In many cases, especially where large, canopy forming trees are desired; planting the street trees behind the sidewalk is the best location. This moves trees away from the street edge, reducing car damage, pruning for clearances, and will reduce sidewalk damage. Overhead utilities are less of a problem with these planting locations. Private easements for street trees can be obtained.

Maintaining the Safety of the Urban Forest

During the street tree inventory and evaluation, certain maintenance needs were identified for a small number of trees that are required for public safety. These needs include sign clearance, hazard tree removal, pruning, and sidewalk clearance pruning. As this work is completed, *systematic pruning programs* and *tree planting programs* can be considered.

Photo H. View of large stem failure on a bigleaf maple at the community center.

Annual evaluation of larger trees on and adjacent to rights-of-ways is necessary to identify developing hazard trees, and to identify clearance pruning

needs.

Removals

The hazard tree evaluation program in parks has already identified a number of removals that are necessary. Parks and City owned property (utility sites, greenbelts, easements, vacant property) are evaluated by an independent every 3 years for hazard trees. City maintained street trees are pruned for hazards and clearance every 5 years.

The small street trees, and dead trees recommended for removal are less of a hazard, but should be scheduled for replacement.

The average lifespan of an urban street tree varies from 7 to 18 years. Mortality will be ongoing, and replacement should be completed during the next planting season.

Trees that require removal can be removed by city crews or on a lump-sum bid contract with private tree services. It is recommended that all large tree work and other difficult removals be handled by skilled contract tree professionals. Small tree pruning can effectively be handled by city staff.

When crews begin to remove hazard trees, public notices should be posted to avoid concerns by citizens. Much anxiety and public concern can be avoided if citizens understand that only hazard trees are being removed.

Sidewalk Damage

Street trees in Lacey are causing sidewalk heaving and there will need to be annual repair activity anytime trees grow near sidewalks or curbs.

Potential problems with new plantings can be minimized by use of root barriers along curbs and sidewalks to deflect or direct roots deeper. This will defer heaving, and with proper tree selection, can eliminate heaving problems.

Where roots of large native trees or ornamental trees adjacent to sidewalks begin to cause heaving, care must be used to avoid severe damage to the tree. Cutting of large lateral anchor roots can cause stability problems, may cause decay, and will reduce the lifespan of the tree.

Minor heaving can be temporarily repaired with an asphalt bridge between the lifted section of concrete, or the lifted edge can be ground flush. As the deflection of the section continues to rise, replacement of the section will be required. A decision to cut the root or bridge the root must be made at this time. If at all possible it is recommended that root cutting be avoided. Curving the sidewalk, leaving a cutout for the root, or raising the grade of the sidewalk to go over the top of the root is recommended. These decisions must be made on a

case by case basis. Trees in poor condition, or that would be made hazardous by the activity should be considered for removal.

The City's Public Works Transportation Division has a mini excavator and a vacuum tool called a sidewalk sucker to lift sidewalk panels without breaking them. Once lifted, the crews can prune the roots heaving the sidewalks and then re-grade the subsurface and replace the panel.

Stump Removal

Stump removal is necessary if a new tree will be planted in the same location. If the new tree can be moved to avoid costly stump grinding tree planting costs will be reduced. In cases of disease caused mortality, excavation of the stump is recommended to reduce the inoculum from the pathogen.

The following specifications are to be used to identify an open

- planting spot: A minimum of 4 feet is needed for a plantable area.
- The minimum distance to the adjacent planted trees is 25 feet.
- All planting spots are at least 25 feet away from intersections.
- All planting sites are at least 10 feet away from fire hydrants, driveway, utility poles and street lights.
- All planting sites are at least 10 feet away from any visible or identifiable underground electrical vaults.
- Planting spots with overhead (electrical conductors) or side restrictions for growing space are identified.
- Planting behind the sidewalk is preferable to narrow (4 feet) planting spots in many cases. This may require private easements to establish medium to large street trees.

Knowing the numbers of open spots, coupled with a street tree plan with recommended species easily allows preparation of grant proposals for additional tree planting funds. Having good, demonstrable data on the urban forest will improve success in acquiring grants. These projects are also excellent to get citizen involvement.

Size Class Distribution

All tree diameters were measured 4.5 feet above the groundline (called diameter at breast height or DBH).

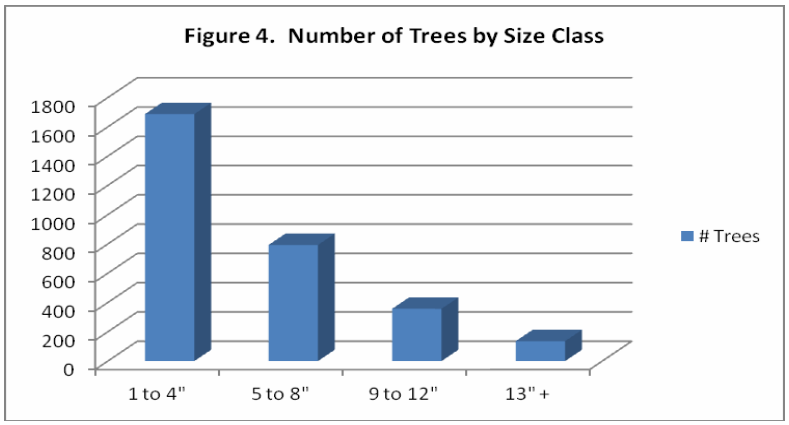


Figure 4 illustrates the young age of the Lacey city maintained street tree population.

The urban forest should have a diversity of size classes as well as species. This helps assure that the entire urban forest does not mature at the same time causing excessive maintenance costs, replanting costs, and major changes in the cities appearance.

The smaller trees grow vigorously and after establishment and early corrective pruning require low maintenance inputs. Ideally the urban forest would have a regular distribution of size classes from small to large trees, as well as a diverse species composition. Immediate replacement of dying trees or newly opened planting spots is recommended. The management practices help to spread and smooth annual maintenance costs over time.

APPENDIX 2
Tree Protection Objectives, Issues and Forester Recommendations for Ordinance Adjustments

Objectives /Activities of an Urban Forestry Program

The following are the basic activities recommended for Lacey's urban forestry program:

Maintaining the safety of the urban forest under management by the City of Lacey. Removing dead and dying trees, pruning trees for traffic and pedestrian clearances, mitigating other hazardous conditions that accomplish this goal.

Maintaining the Health of the Urban Forest will reduce maintenance and replanting cost associated with the trees. Corrective pruning of young trees will eliminate costly pruning in later years, and will protect tree health by eliminating large diameter wounds from delayed corrective pruning. A healthy, properly pruned tree requires protection but very little maintenance.

Perpetuating the Urban Forest through replacement tree planting, planting open planting spots, and filling gaps in forested stands must be done to perpetuate the forest. Trees and stands of trees are dynamic, living things. They live and die, and they respond to management and protection.

Management of the Urban Forest, like other city services is a benefit to the citizens. Public relations are fostered as the city works with adjacent landowners to manage trees on the rights-of-way.

Create public education programs that will assist the Citizens in perpetuating the goals of this plan.

Continue to support the "Tree City USA" designation of the City of Lacey.

Protection Vs Re-planting

Protection of existing trees should be given precedence over replanting in new developments. Native trees should be protected in clusters or in tree tracts as opposed to retaining individuals or a few trees. Projects should be evaluated by a qualified professional forester who has academic and field experience in urban forestry to identify trees for potential retention in new development.

Healthy, long-term trees that are identified to be protected must be fenced during construction to avoid damage to the root protection zone (RPZ). This protection is illustrated and described in III page 73.

Urban Forestry Advisory Board

It is recommended that the city consider the formation of a tree advisory board. The purpose of the board is to review city ordinances, practices, and policies with regard to trees and make recommendations back to council and staff.

The board can help find and recognize historic, rare, or specimen trees and to recognize the individuals who have cared for them. A 'Friend of Lacey Trees' awards can be given to citizens who have done an exceptional job of tree protection, tree planting, or other tree related community service. The tree board generally helps coordinate Arbor Day and other tree related activity. As with any city appointed board, staff time will be required to support the board along with a small budget to purchase plaques, educational materials, tree seedlings, and other items for activities the tree board generates.

Another concept is to appoint Tree Stewards. Tree Stewards promote tree protection, tree planting, tree care, and environmental stewardship in the community. Tree Stewards are provided annual training in different areas of urban forestry and asked to assist with Arbor Day, inventory projects in parts of the City, and for input on ordinance related tree issues. The idea is that the knowledge gained by Tree Stewards is spread through their contacts in the community. They are also a source of ideas, information, and enthusiasm for protection and planting of trees in the community.

Summary

This study found that 43% of Lacey is covered with native forests and planted or ornamental trees, with the remainder being developed.

We found 2,973 planted city maintained street trees and 3,208 private street trees. Few open planting spots occur within city maintained areas. Many open planting spots occur in privately maintained areas.

Street tree maintenance is good, but requires additional corrective pruning on the planted street trees. Species selections for planting, and matching species to site need to be modified. We need to diversify the species mix on Lacey's streets. Ongoing training is recommended and the staff should include at least one International Society of Arboriculture Certified Arborist®.

Based on our evaluation of the urban forest in Lacey, the ordinances, visits with staff and citizens, and maintenance procedures - the following priority is recommended to improve protection and management of the Lacey urban forest:

- Continue annual maintenance activity on the existing street trees for sign clearance, corrective and clearance pruning, and complete annual hazard tree evaluations.

- Budget adequate annual funding to complete basic maintenance tasks for city street trees and some replanting.

- Continue to require review of all commercial and industrial projects with one or more trees. This is important in cases when only a few Oregon white oaks occur on the site. Tree retention may have an even higher impact in areas devoid of trees. Also consider a minimum percentage area for tree tracts in al types of developments. Language regarding tree removal on private property needs to be clarified.

- Continue to educate the public to prevent improper pruning of required landscape trees. A procedure for inspection of required landscaping for compliance 3 plus years after the bond has been released needs to be established.

- Continue to involve the Lacey contract urban forester in the site plan review process on new projects, require the urban forester attend pre-construction conferences when trees are to be protected on site, and utilize the urban forester more in inspection of required landscaping on completed projects.

- Consider appointing a tree advisory board.

- Create a 'Lacey Friend of Trees' award to be given to citizens, developers, or companies that have taken special care to protect, plant, or maintain significant trees or stands of trees in Lacey.

- Conduct a 'Big Trees in Lacey' contest to find and recognize large or specimen trees in the city.

- All new street tree plantings should be taken from the prescribed species list and matched to the growing space of the planting site. All landscape tree plantings in required landscaping on projects should be taken from the general tree list for Lacey. Other trees can be incorporated in the design upon approval of the site plan review committee.

- Solicit grant funding, corporate donations, and other funds to expand tree planting and maintenance.

- Revise the urban forest management plan every 5 years.

APPENDIX 3

Tree Planting Specifications for Lacey Street Tree Planting Projects

Tree Planting Specifications

I. Description of Work

These specifications include standards necessary for and incidental to execution and completion of planting street trees.

A. Specifications for the planting hole design, tree planting, mulching and watering are included.

B. Protection of existing features. During construction, protect all existing trees, shrubs, and other specified vegetation, site features and improvements, structures, and utilities specified herein and/or on submitted drawings. Removal or destruction of existing plantings is prohibited unless specifically authorized by the owner.

II. Applicable Specifications and Standards

A. *Principles and Practice of Planting Trees and Shrubs*. 1997. International Society of Arboriculture, P.O. Box GG, Savoy, IL 61874

B. *American Standard for Nursery Stock*. 2004. American Association of Nurserymen, Inc. 1250 I Street NC Suite 500, Washington, D.C. 20005

C. *Standardized Plant Names*. 1942. American Joint Committee on Horticulture Nomenclature, Horace McFarland Company, Harrisburg, Pennsylvania. (Second edition).

III. Planting Season

A. Planting shall be done within the following dates:
Balled and Burlaped (B&B) trees and shrubs: October 15 to May 1st Containerized trees and other: October 1st to May 1st.
Bare rooted trees and shrubs: February 15th to April 15th.

B. Variance: If special conditions exist that warrant a variance in the above planting dates, a written request shall be submitted to the project owner stating the special conditions and the proposed variance. Permission for the variance will be given if warranted in the opinion of project owner.

IV. Planting Locations

A. The landscape contractor (hereafter referred to as Contractor) shall plant at locations to be determined and marked by the owner or other person representing the owner (hereafter referred to as the Owner's Representative).

B. Locations for individual trees will be supplied by the Owner's Representative. In some cases, the location may be inferred from reference to some identifiable field object or from some line that can be constructed in the field.

C. No tree that grows over 25 feet at maturity shall be planted under electrical utility wires.

D. No tree or shrub shall be planted within 10 feet of fire hydrants, driveways, streetlights, or intersections, or as specified by local ordinance.

V. Underground Utility Location

A. The Contractor shall contact the local utility companies for verification of the location of all underground utility lines in the area of the work. The Contractor shall be responsible for all damage resulting from neglect or failure to comply with the requirement.

B. Trees shall not be planted closer than 10 feet from water service connections, sewer laterals, or gas lines, unless so directed by the Owner's Representative. The Contractor shall be responsible for moving trees if planted closer than the specified distance.

VI. Materials

A. Topsoil provided shall be declared by the Contractor to be free from subsoil, roots, stones over 1 inch (2.5 cm) in diameter, herbicides, contaminates, and other extraneous materials. The Contractor shall dispose of materials removed. Topsoil shall be silt loam or loamy sand with 4 to 6 percent organic matter (by weight). Topsoil shall not be used in a frozen or muddy condition. The Contractor shall remove all surplus materials.

B. Plants shall be true to species and variety specified and nursery-grown in accordance with good horticultural practices under climatic conditions similar to

those in the locality of the project for at least 2 years. They shall have been freshly dug (during the most recent favorable harvest season).

Unless specifically noted, all plants shall be of specimen quality, exceptionally heavy, symmetrical, so trained to favored in development and appearance as to be unquestionably and outstandingly superior in form, compactness, and symmetry. They shall be sound, healthy, vigorous, well-branched and densely foliated when in leaf; free of disease and insects, eggs, or larvae' and shall have healthy well- developed root systems. They shall be free from physical damage or other conditions that would prevent vigorous growth.

Trees with multiple leaders, unless specified, will be rejected. Trees with a damaged or crooked leaders, bark abrasions, sunscald, disfiguring knots, insect damage, or cuts of limbs over ¾ in (2 cm) in diameter that are not completely closed will be rejected.

Plants shall conform to the measurements specified, except that plants larger than those specified may be used if approved by the Owner's Representative. Use of larger plants shall not increase the contract price. If larger plants are approved, the root ball shall be increased in proportion to the size of the plant.

Caliper measurements shall be taken on the trunk 6 inches (15 cm) above the natural ground line for trees up to and including 4 inches (10 cm) in caliper, and 12 inches (30 cm) above the natural ground line for trees over 4 inches (10 cm) in caliper. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to branch tip. Plants shall be measured when branches are in their normal position. If a range of size is given, no plant shall be less than the minimum size, and no less than 50 percent of the plants shall be as large as the maximum size specified. Measurements specified are minimum size acceptable after pruning, where pruning is required. Plants that meet measurements but do not possess a standard relationship between height and spread, according to the American Standards for Nursery Stock, shall be rejected.

Substitutions of plant materials will not be permitted unless authorized in writing by the Owner's Representative. If proof is submitted in writing that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety with a corresponding adjustment of the contract price.

C. The plant list at the end of this section is for the Contractor's information only, and no guarantee is expressed or implied that quantities

therein are correct or that the list is complete. The Contractor shall satisfy himself that all plant materials shown on the drawings are included in his bid.

D. All plants shall be labeled by plant name and size. Labels shall be attached securely to all plants, bundles, and containers of plant materials when delivered.

Plant labels shall be durable and legible, with information given in weather- resistant ink or embossed process lettering.

E. Certificates of Plant Inspections: Certificates of inspection shall accompany invoices for each shipment of plants as may be required by law for transportation. Certificates are to be filed with the Owner's Representative prior to acceptance of the material. Passing inspection by federal or state governments at place of growth does not preclude rejection of plants at the work site.

VII. Selection and Tagging

A. Plants shall be subject to inspection for conformity to specification requirements and approval by the Owner's Representative at their place of growth and upon delivery. Such approval shall not impair the right of inspection and rejection during progress of the work. Inspection outside the state of Washington and Oregon shall be made at the expense of the Contractor. A Contractor's representative shall be present at all inspections.

B. A written request for the inspection of plant material at their place of growth shall be submitted to the Owner's Representative at least 10 calendar days prior to digging. This request shall state the place of growth and the quantity of plants to be inspected. The Owner's Representative may refuse inspection at this time if, in his/her judgment, sufficient quantities of plants are not available for inspection.

C. All plants shall be selected and tagged by the owner at their place of growth. For distant materials, photographs may be submitted for pre-inspection review.

VIII. Digging and Handling Plant Materials

A. Trees designated B&B shall be properly dug with firm natural balls of soil retaining as many fibrous roots as possible in sizes and shapes as specified in the most recent edition of the *American Standard for Nursery Stock*. Balls shall be firmly wrapped with nonsynthetic, rottable burlap and secured with nails and heavy nonsynthetic, rottable twine. Root collar will be apparent at surface of ball. No trees with loose, broken, or manufactured balls will be planted, **except with special written**

approval before planting.

B. Plants grown in containers shall be of appropriate size for the container as specified in the most recent edition of the *American Standard for Nursery Stock,* and be free of circling roots on the exterior and interior of the root ball.

C. All other types of nursery stock shall also conform to the *American Standard for Nursery Stock.*

IX. Transportation and Storage of Plant Material

A. Fresh dug material is given preference over plant material held in storage. Plant material held in storage will be rejected if excessive growth or dieback of branches has occurred in storage.

B. Branches shall be tied with rope or twine only, and in such a manner that no damage will occur to the bark or branches.

C. During transportation of plant material, the Contractor shall exercise care to prevent injury and drying out of the trees. Should the roots be dried out, large branches broken, balls of earth broken or loosened, or areas of bark torn, the Owner's Representative may reject the injured tree(s) and order them replaced at no additional cost to the owner.

D. Plants must be protected at all times from sun or drying winds. Those that cannot be planted immediately on delivery shall be kept in the shade, well protected with soil covered with wet wood chips or other acceptable material, and kept well watered. Plants shall not remain unplanted any longer than 3 days after delivery. Plants shall not be bound with wire or rope at any time so as to damage the bark or break branches. Plants shall be lifted and handled with suitable support of the soil ball to avoid damaging it.

X. Mechanized Tree Spade Requirements

Trees may be moved and planted with an approved mechanical tree spade. The tree spade shall move trees limited to the maximum size allowed for the similar B&B root ball diameter according to the *American Standard for Nursery Stock,* or the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller. The machine shall be approved by the Owner's Representative prior to use. Trees shall be *planted* at the designated locations in the manner shown in the plans and in accordance with applicable sections of the specifications.

XI. Excavation of Planted Areas

A. Locations for plants and outlines of areas to be planted are to be

staked out at the site. Approval of the Owner's Representative is required before excavation begins. A minimum of 30 percent total planting must be staked out before inspection.

B. Shrub beds are to be excavated to a depth of 1 foot (30 cm) unless otherwise indicated. Ground cover beds are to be excavated to at depth of 6 inches (15 cm), unless otherwise indicated. Tree pits shall be excavated three times wider than the diameter of the ball, unless otherwise specified by the Owner's Representative,

and only as deep as the root ball to be placed in the hole. If initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped. The sides of all plant holes shall be sloped and the bottoms horizontal. On slopes, the depth of the excavation shall be measured at the center of the hole. Poor quality subgrade soils shall be separated from the topsoil, removed from the area, and not used as backfill or otherwise spread around in the landscape area. Pits shall not be left uncovered or unprotected overnight.

C. Detrimental soil conditions: The Owner's Representative is to be notified, in writing, of soil conditions that the Contractor considers detrimental to the growth of plant material. These conditions are to be described as well as suggestions for correcting them. Proper water drainage must be assured.

D. Obstructions: If rock, underground construction work, tree roots, or obstructions are encountered in the excavation of plant pits, alternate locations may be selected by the Owner's Representative. Where locations cannot be changes as determined by the Owner's Representative, and where digging is permitted, submit cost required to remove the obstruction to the depth of not less than 6 inches (15 cm) below the required hole depth. Proceed with work after approval of the Owner's Representative.

XII. Planting Operations

A. Plants shall be set at the same relationship to finish grade as they were to the ground from which they were dug. Plants must be set plumb and braced in position until prepared topsoil has been places around the ball and roots. Plants shall be set so that they will be the same depth 1 year later. The trunk of the tree is not to be used as a lever in positioning or moving the tree in the planting hole.

B. Ropes, strings, and wrapping from the the root ball are to be removed after the plant has been set. All waterproof or water repellant wrappings shall be removed from the ball. Remove at least the top half of the wire basket before backfilling.

C. The roots of bare root trees shall be pruned at the time of planting to remove damage or undesirable roots (those likely to become a detriment to future growth of the root system). Bare root trees shall have the roots spread to approximate the natural position of the roots and shall be centered in the planting pit. The planting soil backfill shall be worked firmly into and around the roots, with care taken to fill in completely with no air pockets.

D. When specified by the Owner's Representative, amend the backfill soil by adding 4-6 percent (by weight, 20-35 percent by volume, depending on materials) composted organic matter.

E. Basins are to be formed around tree and shrub root ball with a raised ring of soil as indicated on drawing.

F. Planting areas are to be finish graded to conform to grades on drawing after full settlement has occurred.

G. Plants are to be thoroughly watered immediately after planting.

H. Any excess soil, debris, or trimmings shall be removed from the planting site immediately upon completion of each planting operation.

XIII. Guying, Staking, Wrapping, Pruning and Mulching

A. Stake all deciduous trees over 1.5 inch caliper and all conifer trees over 5 feet tall.

B. Staking and guying shall be completed immediately after planting. Trees up to
2.5 inches caliper are to be staked with two stakes and separate flexible ties as shown on drawings. For larger trees, use 3 guy wires and ground anchors. Ground anchors are to be driven at approximately a 45-degree angle to ground plane and distributed at 120 degree intervals around the trunk. Guying cables, turnbuckles, and hose are to be attached securely until the tree is well supported.

C. Guying and staking materials: Ground anchors shall be arrowhead shaped earth anchors of malleable iron castings, aluminum castings, or stamped steel. Staking wire shall be pliable 12-gauge galvanized, twisted two strands. Guying cable shall be 5 strand, 3/16 in (5 mm) diameter steel cable. Vertical supporting stakes shall be sound hardwood or pine. They shall be a minimum of 2 x 2 in. (5 x 8 cm) in diameter, 6-8 feet (2.4 m) long, and pointed at one end. Rubber chain- link ties are to be used to secure the tree to the stakes.

D. Plants are to be pruned at the time of planting and according to best horticulture practices. Pruning of all trees will include the removal of

injured branches, double leaders, watersprouts, suckers, and interfering limbs. Healthy lower branches and small twigs close to the center should not be removed, except as necessary to clear sidewalks or streets. All pruning cuts shall be clean and smooth, with the bark intact and uninjured at the edges. In no case shall more than 25% of the branching structure be removed, **leaving the normal shape of the plant intact.**

E. All trees, shrubs, and other planting beds will be mulched with a mixture of composted wood chips or bark previously approved by the owner. The composted mulch will be free of materials injurious to plant growth, branches, leaves, roots, and other extraneous matter. The mulch will be 2 to 3 inches deep on trees and

shrubs. The depth of mulch on the planting beds will be 2-3 inches. Mulch must not be placed within 3 inches (8 cm) of the trunks of trees or shrubs.

F. Antitranspirant, if required, shall be an emulsion that provides a protective film over plant surfaces and is nontoxic to all plants used. It shall be delivered in containers of the manufacturer and mixed according to the manufacturer's directions.

XIV. Maintenance of Trees, Shrubs and Vines

A. Maintenance shall begin immediately after each plant is planted and continue until the Owner's Representative has confirmed its acceptance.

B. Maintenance shall consist of pruning, watering, cultivating, weeding, mulching, tightening and repairing guy and stakes, resetting plants to proper grades and to an upright position, restoration of the planting saucer, and furnishing and applying such sprays or other materials as are necessary to keep planting free of insects and diseases and in vigorous condition.

C. Planting areas and plants shall be protected at all times against trespassing and damage of all kinds for the duration of the maintenance period. If a plant becomes damaged or injured, it shall be treated or replaced as directed by the Owner's Representative at no additional cost.

D. Watering: Contractor shall irrigate, as required, to maintain vigorous and healthy tree growth. Over-watering or flooding shall not be allowed. Contractor shall use existing irrigation facilities and furnish any additional material, equipment, or water to ensure adequate irrigation. During periods of restricted water usage, all governmental regulations (permanent and temporary) shall be followed. Should modifications of existing irrigation systems and/or schedules facilitate adherence to these regulations, the Contractor shall notify the owner of the suggested modifications. The Contractor may have to transport water from other sources when irrigation systems are unavailable.

XV. Acceptance

A. The Owner's Representative shall inspect all work for acceptance upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date of inspection.

B. Acceptance of plant material by the Owner's Representative shall be for general conformance to specified size, character, and quality and shall not relieve the Contractor of responsibility for full conformance to the contract documents, including correct species.

C. Upon completion and reinspection of all repairs or renewals necessary in the judgment of the Owner's Representative, the Owner's Representative shall certify in writing that the work has been accepted.

XVI. Acceptance in Part

A. Work may be accepted in parts when the Owner's Representative and Contractor deem that practice to be in their mutual interest. Approval must be given in writing by the Owner's Representative to the Contractor verifying that the work is to be completed in parts. Acceptance of work in parts shall not waive any other provisions of this contract.

XVII. Guarantee Period and Replacements

A. The guarantee period for trees and shrubs shall begin at the date of acceptance.

B. The Contractor shall guarantee all plant material to be in a healthy and flourishing condition for a period of 1 year from the date of acceptance.

C. When work is accepted in parts, the guarantee periods extend from each of the partial acceptances to the terminal date of the guarantee of the last acceptance. Thus, all guarantee periods terminate at one time.

D. The Contractor shall replace, without cost, as soon as weather conditions permit, and within a specified planting period, all plants determined by the Owner's Representative to be dead or in an unacceptable condition during and at the end of the guarantee period. To be considered acceptable, plants shall be free of dead or dying branches and branch tips and shall bear foliage of normal density, size, and color. Replacements shall closely match adjacent specimen of the same species. Replacements shall be subject to all requirements stated in the specifications.

E. The guarantee of all replacement plants shall extend for an additional

period of 1 year from the date of their acceptance after replacement. In the event that a replacement plant is not acceptable during or at the end of the said extended guarantee period, the Owner's Representative may elect subsequent replacement or credit for that item.

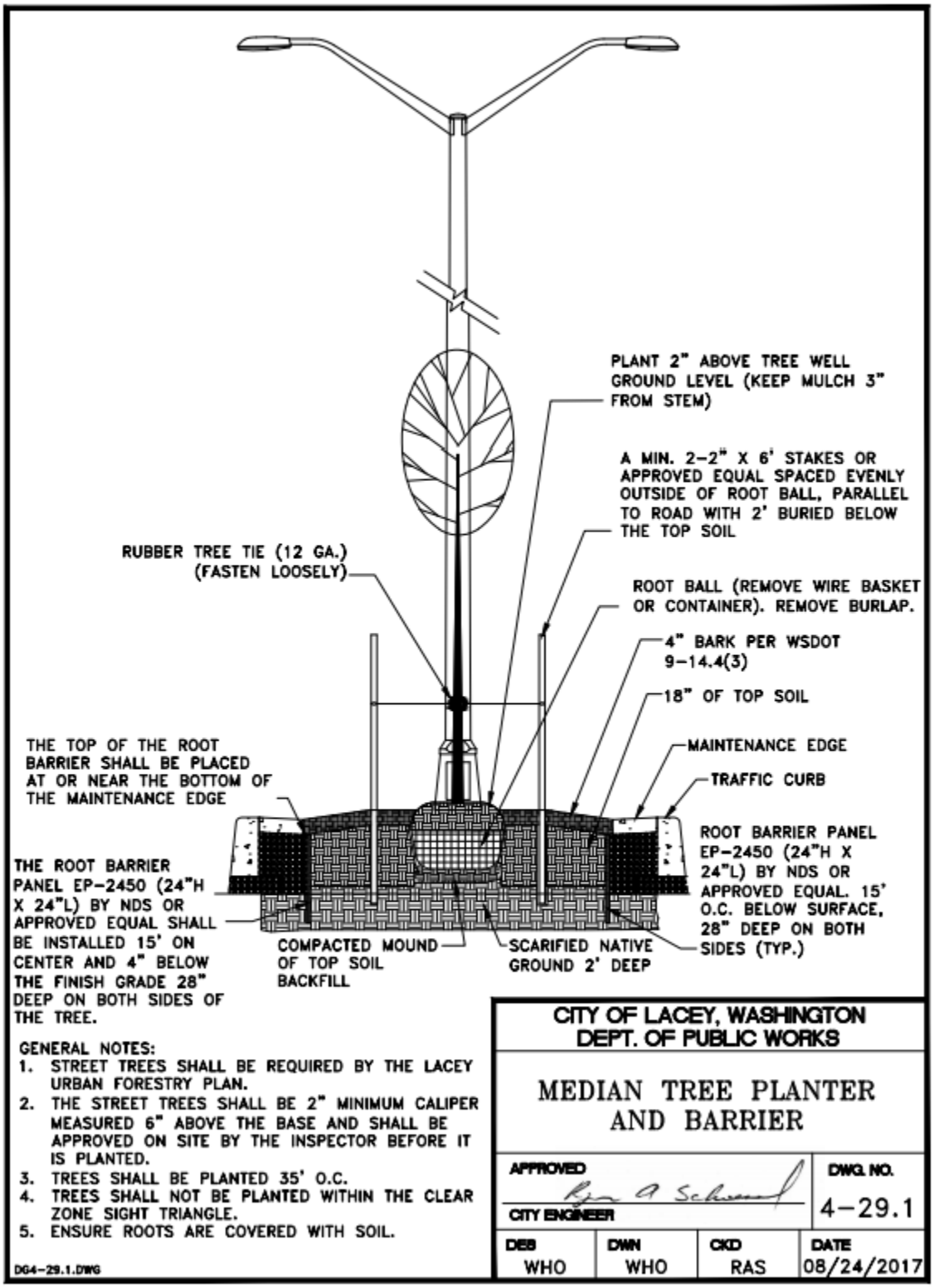
F. The Contractor shall make periodic inspections, at no extra cost, during the guarantee period to determine what changes, if any, should be made in the maintenance program. If changes are recommended, they shall be submitted in writing to the Owner's Representative.

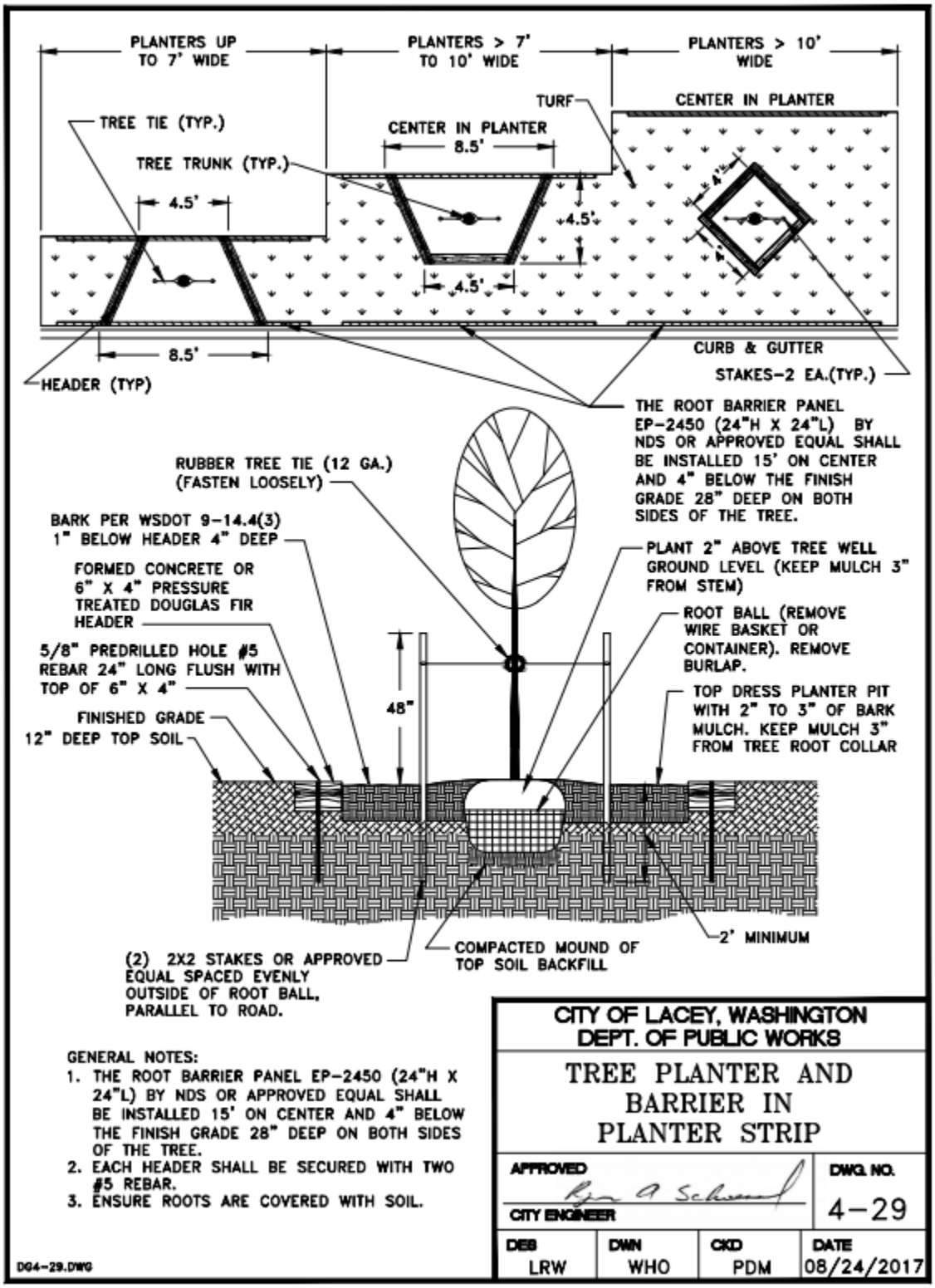
XVIII. Final Inspection and Final Acceptance

A. At the end of the guarantee period and upon written request of the Contractor, the Owner's Representative will inspect all guaranteed work for final acceptance. The request shall be received at least 10 calendar days before the anticipated date for final inspection. Upon completion and reinspection of all repairs or renewals necessary in the judgment of the Owner's Representative at that time, the Owner's Representative shall certify, in writing, that the project has received final acceptance.

XIX. Planting Diagram STREET TREE PLANTING DETAIL

The City of Lacey Development Guidelines and Public Works Standards dictate street tree planting requirements. Drawing Numbers 4-29 and 4-30 in Chapter 4 Transportation are referenced below.


PLANT 2" ABOVE TREE WELL GROUND LEVEL (KEEP MULCH 3" FROM STEM)
A MIN. 2-2" X 6' STAKES OR APPROVED EQUAL SPACED EVENLY OUTSIDE OF ROOT BALL, PARALLEL TO ROAD WITH 2' BURIED BELOW THE TOP SOIL
RUBBER TREE TIE (12 GA.) (FASTEN LOOSELY)
ROOT BALL (REMOVE WIRE BASKET OR CONTAINER). REMOVE BURLAP.
4" BARK PER WSDOT 9-14.4(3)
18" OF TOP SOIL
MAINTENANCE EDGE
TRAFFIC CURB
THE TOP OF THE ROOT BARRIER SHALL BE PLACED AT OR NEAR THE BOTTOM OF THE MAINTENANCE EDGE
ROOT BARRIER PANEL EP-2450 (24"H X 24"L) BY NDS OR APPROVED EQUAL. 15' O.C. BELOW SURFACE, 28" DEEP ON BOTH SIDES (TYP.)
THE ROOT BARRIER PANEL EP-2450 (24"H X 24"L) BY NDS OR APPROVED EQUAL SHALL BE INSTALLED 15' ON CENTER AND 4" BELOW THE FINISH GRADE 28" DEEP ON BOTH SIDES OF THE TREE.
COMPACTED MOUND OF TOP SOIL BACKFILL
SCARIFIED NATIVE GROUND 2' DEEP
GENERAL NOTES:
1. STREET TREES SHALL BE REQUIRED BY THE LACEY URBAN FORESTRY PLAN.
2. THE STREET TREES SHALL BE 2" MINIMUM CALIPER MEASURED 6" ABOVE THE BASE AND SHALL BE APPROVED ON SITE BY THE INSPECTOR BEFORE IT IS PLANTED.
3. TREES SHALL BE PLANTED 35' O.C.
4. TREES SHALL NOT BE PLANTED WITHIN THE CLEAR ZONE SIGHT TRIANGLE.
5. ENSURE ROOTS ARE COVERED WITH SOIL.
DG4-29.1.DWG
CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS
MEDIAN TREE PLANTER AND BARRIER
APPROVED
CITY ENGINEER
DWG. NO.
4-29.1
DES WHO
DWN WHO
CKD RAS
DATE 08/24/2017


PLANTERS UP TO 7' WIDE
PLANTERS > 7' TO 10' WIDE
PLANTERS > 10' WIDE
TREE TIE (TYP.)
TREE TRUNK (TYP.)
TURF
CENTER IN PLANTER
CENTER IN PLANTER
8.5'
4.5'
4.5'
4.5'
4.5'
4.5'
8.5'
HEADER (TYP)
CURB & GUTTER
STAKES-2 EA.(TYP.)
THE ROOT BARRIER PANEL EP-2450 (24"H X 24"L) BY NDS OR APPROVED EQUAL SHALL BE INSTALLED 15' ON CENTER AND 4" BELOW THE FINISH GRADE 28" DEEP ON BOTH SIDES OF THE TREE.
RUBBER TREE TIE (12 GA.) (FASTEN LOOSELY)
BARK PER WSDOT 9-14.4(3) 1" BELOW HEADER 4" DEEP
FORMED CONCRETE OR 6" X 4" PRESSURE TREATED DOUGLAS FIR HEADER
5/8" PREDRILLED HOLE #5 REBAR 24" LONG FLUSH WITH TOP OF 6" X 4"
FINISHED GRADE
12" DEEP TOP SOIL
PLANT 2" ABOVE TREE WELL GROUND LEVEL (KEEP MULCH 3" FROM STEM)
ROOT BALL (REMOVE WIRE BASKET OR CONTAINER). REMOVE BURLAP.
TOP DRESS PLANTER PIT WITH 2" TO 3" OF BARK MULCH. KEEP MULCH 3" FROM TREE ROOT COLLAR
48"
2' MINIMUM
COMPACTED MOUND OF TOP SOIL BACKFILL
(2) 2X2 STAKES OR APPROVED EQUAL SPACED EVENLY OUTSIDE OF ROOT BALL, PARALLEL TO ROAD.
GENERAL NOTES:
1. THE ROOT BARRIER PANEL EP-2450 (24"H X 24"L) BY NDS OR APPROVED EQUAL SHALL BE INSTALLED 15' ON CENTER AND 4" BELOW THE FINISH GRADE 28" DEEP ON BOTH SIDES OF THE TREE.
2. EACH HEADER SHALL BE SECURED WITH TWO #5 REBAR.
3. ENSURE ROOTS ARE COVERED WITH SOIL.
DG4-29.DWG
CITY OF LACEY, WASHINGTON
DEPT. OF PUBLIC WORKS
TREE PLANTER AND BARRIER IN PLANTER STRIP
APPROVED
CITY ENGINEER
DWG. NO.
4-29
DES LRW
DWN WHO
CKD PDM
DATE 08/24/2017

APPENDIX 4

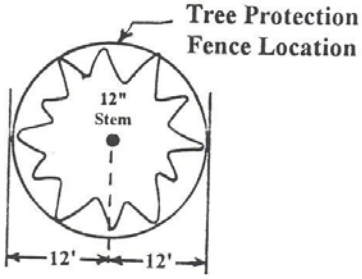
Tree Protection Guidelines

Pacific Northwest Native Trees

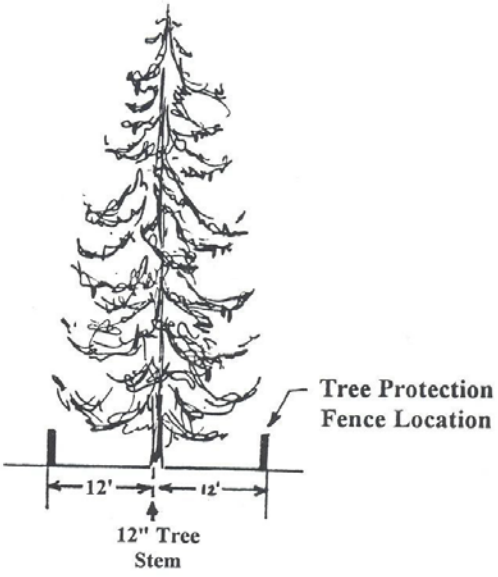
TREE ROOT PROTECTION ZONES

The root protection zone (RPZ) for Pacific Northwest native trees extends a distance of one (1) foot for every inch of tree diameter, measured 4.5' above the ground line. For example, the RPZ for a 12" diameter tree has a radius of 12' measured from the center of the tree stem. Ornamental or other high value or large trees should have the RPZ determined on a case by case basis.

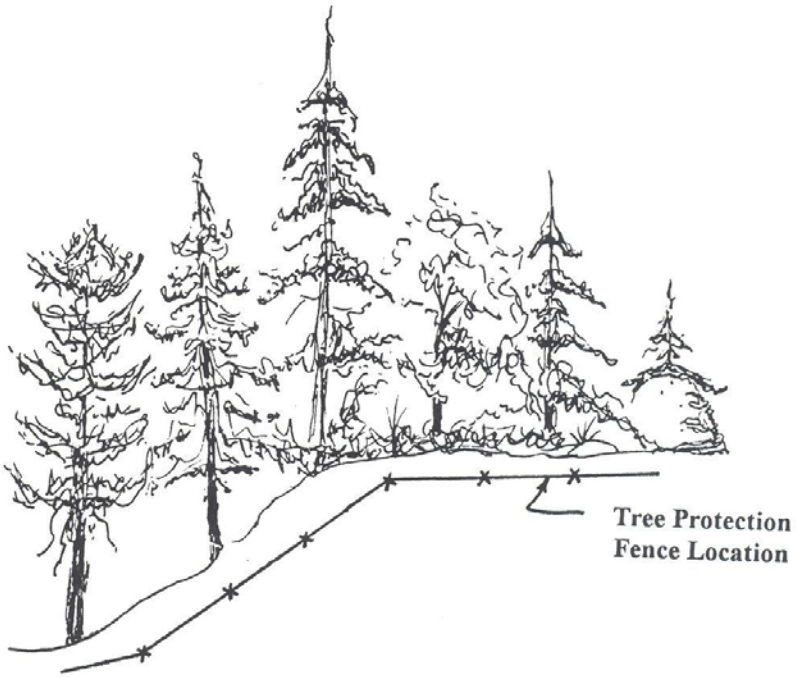
TOP VIEW



SIDE VIEW



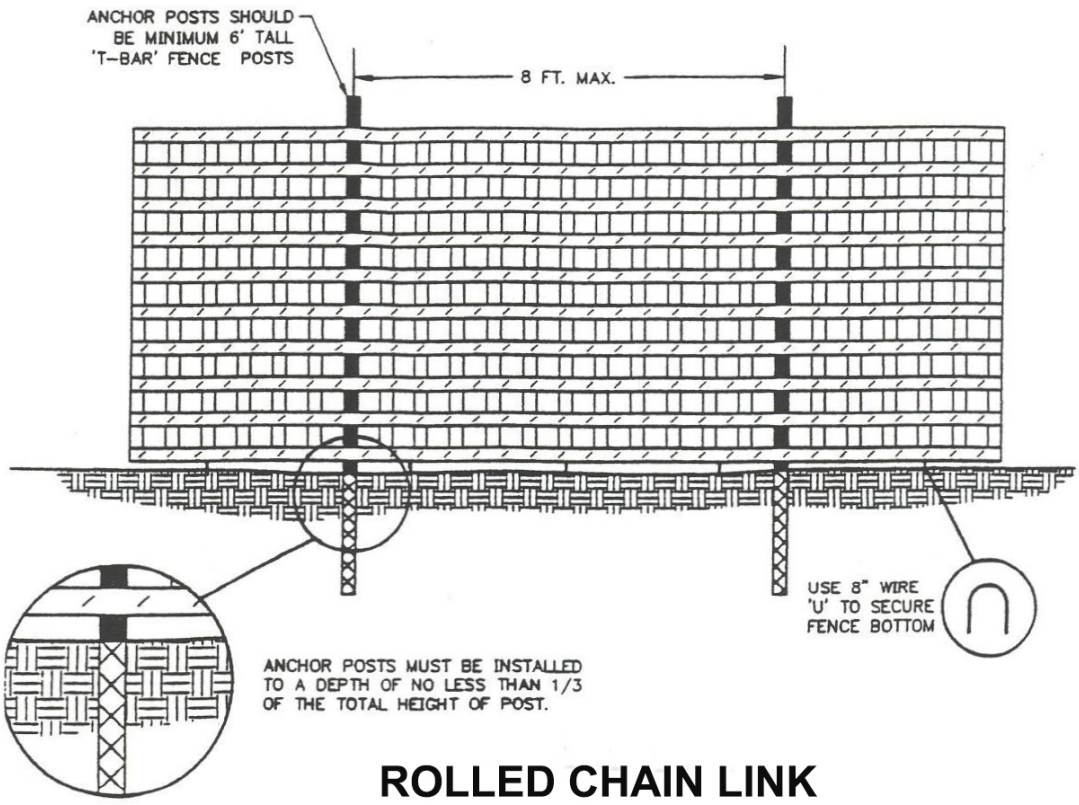
The RPZ for the edge of a forested area is determined using the diameters of the dominant edge trees, meandering the tree protection fence to correspond with the required RPZ distances.



The tree protection fence must be a minimum of 4' tall and be made of orange mesh plastic or chain link depending on recommendations in the tree plan. Posts must be T-top metal fence posts or a minimum 5/8" diameter rebar driven well into the soil. Posts should be spaced a maximum of 10' apart.

The fence should be maintained throughout the construction and grading, and not be removed until final landscaping is in progress. At no time should equipment enter into the RPZ and all brush clean-up should be completed by hand to prevent disturbance to native groundcovers. No cuts or fills, utility trenching, modifications to drainage, or concrete rinse water should impact the RPZ. No wires, cables, or other devices should be attached to protected trees during construction.

If impacts must occur within the RPZ, contact Washington Forestry Consultants prior to the operations to determine the proper procedure to protect the tree's health.



ROLLED CHAIN LINK

THE TREE PROTECTION FENCE SHOULD BE MAINTAINED THROUGHOUT THE CONSTRUCTION AND GRADING, AND NOT TO BE REMOVED UNTIL FINAL LANDSCAPING IS IN PROGRESS. AT NO TIME SHALL EQUIPMENT ENTER INTO THE ROOT PROTECTION ZONE (RPZ). ALL BRUSH CLEANUP WITHIN THE RPZ SHOULD BE COMPLETED BY HAND TO PREVENT DISTURBANCE OF NATIVE GROUND COVERS NO CUTS OR FILLS, UTILITY TRENCHING, MODIFICATIONS TO DRAINAGE, OR CONCRETE RISE WATER SHOULD IMPACT THE RPZ. NO WIRES, CABLES, OR OTHER DEVICES SHOULD BE ATTACHED TO PROTECTED TREES DURING CONSTRUCTION.

IF IMPACTS MUST OCCUR WITHIN THE RPZ, CONTACT WFCI PRIOR TO THE OPERATIONS TO DETERMINE THE PROPER PROCEDURE TO PROTECT THE TREE'S HEALTH.

TREE PROTECTION FENCE DETAIL

City of Lacey

APPENDIX 5
COMPREHENSIVE STREET TREE PLAN

Introduction

The City of Lacey's "physical and aesthetic character" will be preserved and enhanced with a long-term plan providing street tree 'themes' and space for trees. This street tree plan, coupled with creative landscape plantings and preservation of native trees in new developments, parks, critical areas, open spaces, and residential lots will insure that the environmental health, economic, and aesthetic benefits of trees to a community grow with time

Trees are one of the most useful design elements on individual projects, but must be planned on a community wide basis so that diverse elements of the entire city are linked. This linkage cannot possibly be achieved if urban forestry planning proceeds on a project by project basis. Space for trees must be created to achieve the long-term benefits that trees provide for the entire community.

Goals of the Comprehensive Street Tree Planning Process

The following are the goals of the street tree planning process:

1. Modify street standards to provide space for trees.

2. Modify street tree design and planting guidelines to provide for long-term development and health of the trees.
3. Update the tree selection list to provide durable, long-term street trees.
4. Require street trees to be planted on all public and private streets, and in all new industrial, commercial, and residential development.
5. Provide the budget necessary to maintain street trees.
6. Aggressively solicit funding to bring existing major and minor arterials up to this long-term plan.

The Street Tree Planning Process

The process of street tree planning encompasses all aspects of street design, soils and tree biology, planting, maintenance, and ordinances that affect street trees.

Planting Design Patterns (Themes)

There are four general designs for planting trees in the community. The type of design depends upon space available, both above and below ground, presence of other native tree stands, the character of the area, and effect desired. This approach was used by WFCI to develop the Hawks Prairie Annexation Area Beautification Plan in 1992.

1. **Formal Design:** This approach is strongly advocated to provide spatial definition to street corridors, and continuity between different types of areas within the city. This type of planting scheme works well in grid type street designs and long, linear corridors that lack space for groupings of trees. Trees are normally planted in rows. Species diversity is usually limited, but not so limited that monocultures are created.
2. **Informal Design:** This approach utilizes clustering, planting a variety of species, with irregular spacing intervals by design, or because of space limitations. This design is more often applicable in suburban areas or newly developing areas where space can be created on and off of rights-of-ways for tree plantings. It can however, be used in virtually every zone of the city achieving more species diversity. Informal plantings are most common in parks, and along park corridors.
3. **Combined Design:** In some cases, informal plantings can be used to break-up the more formal rows of trees, where space is provided. This is especially useful in commercial and industrial areas to help break up the moonscape of asphalt and buildings. Plant size, shape, color, seasonal flowering, fall coloration and growth rates are the most critical factors to consider when combining planting designs.
4. **Wildlife Design:** This concept utilizes clusters, layers of vegetation, and a variety of species of trees and shrubs to attract songbirds and small mammals. This design is best utilized near critical areas or other open spaces, and in parks. Safety and security must be considered when creating these types of dense plantings. Most trees with higher value for wildlife trees are not suitable for the street environment due to size, form, or fruit production.

Mature Tree Size

Street tree plantings are limited by space. Large trees require wide planter strips or areas for the tree roots to explore to avoid damage to curbs, sidewalks, and underground utilities. Power lines, adjacent buildings, overhanging awnings, and vehicle clearances are the most common above ground restrictions to growing space. Planting a tree with space to achieve its mature size will greatly increase the aesthetics and useful life of the street tree, while dramatically reducing the maintenance costs.

Longevity of the Species

Communities must fight the urge to plant fast growing tree species such as soft maples, poplar, and birch. Generally the fast growing tree species have shorter life-spans, are more easily damaged by storms, and cause more damage to curbs and sidewalks. This results in higher maintenance costs, requires replacement of trees years sooner, and upsets the visual and spatial continuity of the planting. Species such as Norway and sugar maple, linden, northern red and other oaks, and ash species tend to be more durable long- term trees.

Tree Character

The color of summer and fall foliage, presence of flowers, shape of the crown, color of bark, type of foliage and habit of branches (weeping, upright) give trees their color, texture, and form. These characteristics, along with size, longevity and growing space should be considered when selecting trees for all projects.

These tree characteristics should complement building architecture, define streets and sidewalks, accent adjacent landscaping, and add diversity along Lacey streets.

Trees are defined as having form that is:

1. Columnar
2. Round- full crowned, or spreading (upright, oval, globose)
3. Pyramidal (conical)
4. Vase shaped
5. Weeping
6. Irregular
7. Multi-stemmed
8. Fountain

Multi-stemmed trees are less desirable for street trees due to line-of-sight obstruction and sidewalk clearances. In most cases, tall growing trees are best since it is easy to raise crowns for ground and vehicle clearances. Signs for adjacent businesses can be exposed by crown raising. Monument-style signs work well with trees.

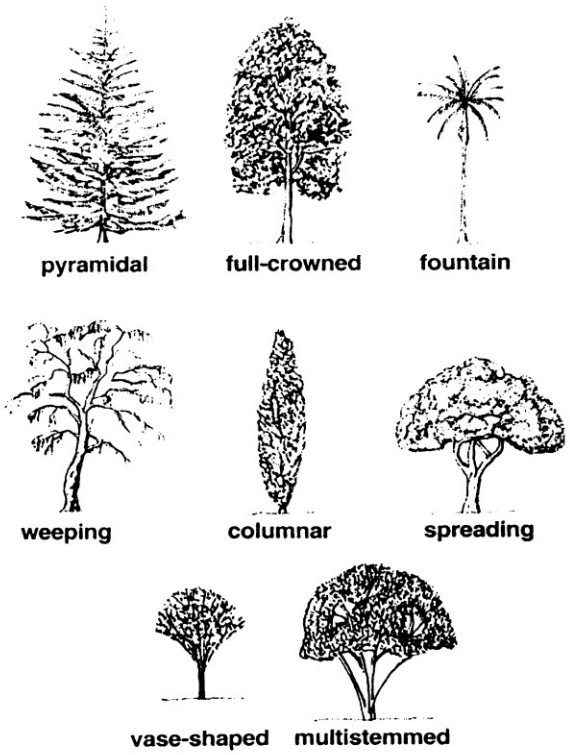


Figure 10. Illustration of Tree Shapes.

The form is critical in selecting trees to fit the growing space, and providing amenities such as screening of incompatible land uses or unsightly buildings, protecting views of vistas or signs, or lining streets in formal designs.

The summer color of a tree generally includes hues of green or shades of red or maroon. Reddish color summer foliage is used to break up the monotony of a formal, linear street tree planting, or accenting an informal design. Long rows of reddish foliage are considered more monotonous than facades created by tall, green canopies.

Fall color is more often considered when selecting seasonal color. Contrasting yellow fall coloration with occasional red or orange colored trees (or vice versa) catches the eye and stirs the 'ooh and aah' emotion common to the finale of a fireworks display.

The texture of a tree is not just apparent between conifers and deciduous trees. It varies greatly between deciduous tree species with simple leaves of differing shapes such as oaks and maples, to compound, bi- and tri-pinnately compound leaves on ashes, locusts, and mimosa. Subtle color differences accentuate the differences between leaf shapes.

Conifers also vary greatly in texture. Needle color, length, density, shape, and presence of cones create startling contrasts between tree species. Consider the

differences between western red cedar, western hemlock, Douglas-fir, noble fir, and western white pine. Allare strikingly different and can create attractive clusters in informal, combined, or wildlife plantings. When combined with deciduous accent trees, year-round beauty is created.

Hardiness to the Pacific Northwest

The temperate climate of Lacey (hardiness zones 7-8-USDA Hardiness Zone Map) allows many tree species to thrive, though some insect and disease populations also are well suited to the climate. Most of our common and most valued street tree species are native to the Midwestern and eastern United States.

Genetic selection is constantly improving the trees available from nurseries, as is the knowledge of growing them. Some cultivars of Pacific Rim species further improve the disease resistance of small trees available for use on Lacey streets.

Diversity of Street Trees

It is very important to avoid over planting a single species. We learned from Dutch elm disease and Chestnut blight to populate our cities with a diversity of tree species. Threats from ash decline, an actinomycete that threatens red maple, sudden oak death, oak wilt, gypsy moths, and other maladies will require that urban foresters be vigilant.

Current Tree Conditions

Lacey is currently stocked with remnant second-growth conifer stands of the *Tsuga heterophylla* forest type. Douglas-fir, western red cedar, western hemlock, and grand fir are the dominant conifers. The deciduous associates include bigleaf maple, red alder, cherry, and black cottonwood.

Planted ornamental and native trees occur in residential and commercial properties, and a scattering of public street trees occur on major and minor arterials. Most of the older neighborhoods do not have street trees. In many cases, street designs did not provide space for them.

In commercial areas, sidewalks usually abutted the street on both sides, with occasional medians, planter strips, or other variations in design. If trees were planted, they were planted on private property behind the sidewalk. In many cases, this did not occur or plantings have failed or been removed over time.

Where trees were planted on commercial projects, the most common species encountered were flowering cherries and red maple. In virtually all cases these trees had been topped relegating them to the status of an overgrown shrub.

In short, the long-term outlook for Lacey's inventory of older street trees is poor. The species monoculture of flowering plum and the lack of continuity in plantings

will not form the linkages and tree-lined streets until additional plantings occur.

Recent Plantings

Recently, the newer subdivisions have been stocked with more durable, long-term tree species. Ash and Norway maple varieties, northern red oak, littleleaf linden, callary pear, and red maple, all better street tree species, appear to dominant the streetscape in these areas. Planter strips are being provided in many cases; however there are still many open planting spots.

The same is true for the major and minor arterials. Past losses of planted trees have created open planting spots, species were varied within short distances, street designs changed with no space for trees, stands of native trees encroaching on street rights-of- ways, and/or buildings abutting the street have prevented the visual and spatial unity created by rows of street trees.

Soils in Lacey

Most soils in Lacey tend to be moderately well- or somewhat excessively drained. Pockets of poorly drained soils occur in some drainages or wetlands. These soil types allow a wide variety of trees to be grown as street trees, often with only the addition of organic matter, water, and nutrients to provide an excellent growing media.

In the cases where trees will be planted in amended fill or disturbed or compacted soils, soil tests should be taken prior to planting of street trees to insure that the nutrient content, pH, water holding capacity, organic matter content, and bulk density will support healthy tree growth. Where hardpans occur, the pan should be fractured under the tree planting spot to allow drainage and added rooting zone. In all cases, supplemental irrigation will be required for at least 3 years after planting to re-establish the roots lost during transplanting.

Microclimatic Considerations

Street trees planted adjacent to native forest stands may need to be more shade tolerant than trees planted in open areas. Littleleaf linden and Norway maple are examples of more shade tolerant species.

Low points in the topography may be more susceptible to frost (frost pockets) than slopes or flats. Damage may occur to southern varieties of street trees in these areas. Other microclimatic features that may negatively impact trees include cold air drainages, areas

where wind tunnel effects develop, poorly drained soils, or areas downwind of industry. Other types of pollution or air flow patterns may cause localized tree damage.

Tree Selection

The following selection of trees in Table 1 is suitable for planting as street and landscape trees within the city of Lacey. This list includes large, medium, and small size trees for planting in all types of growing spaces. Species of flowering trees are selected based upon their colors and resistance to insect and disease problems, and low amounts of plant debris.

Species include red, orange, maroon, and yellow fall coloration. There is however, a great variation as to the timing and interval of fall leaf drop. For example, green ash cultivars turn yellow and drop their leaves within a week, while cultivars of white ash will have maroon leaf color, and may persist for 2-3 weeks. Unfortunately, leaf drop is not something that can be controlled if diversity is desired in street tree populations.

Trees that hold and drop leaves all winter long (such as pin oak and sweetgum) are to be avoided. Severe damage has occurred to sweetgums from early snowfalls and ice storms. Most sweetgum varieties will hold their leaves until the end of December (occasional exceptions). While their fall coloration is exceptional, planting more than a few accent trees should be avoided until cultivars with earlier leaf drop are available.
The following is a general list of tree species that should be considered Lacey's Street Tree List. All commercial, industrial, and residential projects should utilize this list. Selections should be in concert with the continuity provided by existing trees planted on adjacent portions of the street. Where existing street trees are of an undesirable, unhealthy, or inappropriate species, consideration should be given to re-treeing the entire area.

In short, trees can be chosen on a project basis, but must fit the overall plan for what has already been planted, or will be planted as part of the overall comprehensive street tree plan. More specific street tree themes will be provided for all major and minor arterials, and collectors in Table 2.

Table 2. General list of trees for Lacey.

COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Large >50' Tall					40-50'
Sugar Maple	*Acer saccharum*	Commemoration or Bonfire	60'	35'	
European Beech	*Fagus sylvatica*		50'	35'	
Rivers Purple Beech	*Fagus sylvatica*	Riversii	50'	40'	
Autumn Purple Ash	*Fraxinus americana*	Autumn Purple	50'	35'	
Tuliptree	*Liriodendron tulipfera*		70'	35'	
Scarlet Oak	*Quercus coccinea*		60'	40'	
Northern Red Oak	*Quercus rubra*		70'	45'	
Oregon White Oak	*Quercus garryana*		120'	100'	
Medium-Narrow Crowns 40-50' Tall					25-35'
Parkway Maple	*Acer platanoides*	Columnar-broad	40'	25'	
Armstrong Red Maple	*Acer rubrum*	Armstrong	45'	15'	
Bowhall Red Maple	*Acer rubrum*	Bowhall	40'	15'	
Columnar Tuliptree	*Liriodendron tulipfera*	Fastigiatum	50'	15'	
Fastigiate Beech	*Fagus sylvatica*	Fastigiata	45	15'	
Skyrocket Oak	*Quercus robur*	Fastigiata	45'	15'	
Medium – Wider Crowns 40-50' Tall					35-40'
Norway Maple	*Acer platanoides*	Emerald Queen	45'	40'	
Red Maple	*Acer rubrum*	October Glory	45'	35'	
Red Horsechestnut	*Aesculus x carnea*	Briotti	40'	35'	
Katsura Tree	*Cercidiphyllum japonicum*		40'	40'	
Summit Ash	*Fraxinus pennsylvanica*	Summit	45'	25'	
Patmore Ash	*Fraxinus pennsylvanica*	Patmore	45'	35'	
Autumn Gold Ginkgo	*Ginkgo biloba*	Autumn Gold	40'	30'	
Honeylocust	*Gleditsia triacanthos*	Shademaster	45'	35'	
Littleleaf Linden	*Tilia cordata*	Greenspire	40'	30'	
Small Trees <35' Tall					30-40'
Trident Maple	*Acer buergeranum*		20'	20'	
David's maple	*Acer davidii*		30'	25'	
Flame Maple	*Acer ginnala*	Flame	20'	20'	

COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Paperbark Maple	*Acer griseum*		25’	20’	
Tatarian Maple	*Acer tatarian*		25’	20’	
Norwegian Sunset Maple	*Acer truncatum x A. platanoides*	Keithsform	35’	25’	
Pacific Sunset Maple	*Acer truncatum x A. platanoides*	Warrenred	30’	25’	
Pyramidal European Hornbeam	*Carpinus betulus*	Fastigiate	35’	25’	
American Hornbeam	*Carpinus caroliniana*		25’	20’	
Eastern Redbud	*Cercis Canadensis*	Forest Pansy	20’	25’	
Pink Flowering Dogwood	*Cornus florida*	Rubra	20’	20’	
Chinese Kousa Dogwood	*Cornus kousa*	Chinensis	20’	20’	
Tricolor Beech	*Fagus sylvatica*	Roseomarginata	30’	20’	
Goldenrain Tree	*Koelreuteria paniculata*		30’	30’	
Rustica Rubra Saucer Magnolia	*Magnolia soulangiana*	Rustica Rubra	20’	20’	
Flowering Crabapple	*Malus spp.*	Snowdrift, Red Baron, Prairiefire	20’	20’	
Black Tupelo	*Nyssa sylvatica*		30’	20’	
Flowering Plum	*Prunus cerasifera*	Thunder-cloud	20’	20’	
Sargent Cherry	*Prunus sargentii*		30’	30’	
Snowgoose Cherry	*Prunus spp.*	Snowgoose	20’	20’	
Callery Pear (not for street tree use)	*Pyrus calleryana*	Redspire or Cleveland Select	35’	25’	
Japanese Stewartia	*Stewartia pseudocamellia*		30’	20’	
Japanese Snowbell	*Styrax japonicus*		25’	25’	
Redmond Linden	*Tilia americana*	Redmond	35’	25’	
Small Trees – Narrow <35’ Tall					25-30’
Rocky Mt. Maple	*Acer grandidentatum*	Schmidt	25’	15’	
Crimson Sentry Maple	*Acer platanoides*	Crimson Sentry	25’	15’	
Golden Desert Ash	*Fraxinus oxycarpa*	Aureafolia	20’	18’	
Galaxy Magnolia	*Magnolia ‘Galaxy’*	Galaxy	30’	15’	
Spire Cherry	*Prunus x hillieri*	Spire	30’	10’	
Red Cascade Mt. Ash	*Sorbus americana*	Dwarfcrown	18’	8’	
Tree Lilac	*Syringa meyeri*	Palibin	7’	5’	

COMMON NAME	BOTANICAL NAME	CULTIVAR	MATURE HEIGHT	CROWN SPREAD	SPACING
Small Trees <35' Tall					25-40'
Norwegian Sunset Maple	*Acer truncatum x A. platanoides*	Keithsform	35'	25'	
Pacific Sunset Maple	*Acer truncatum x A. platanoides*	Warrenred	30'	25'	
Crimson Sentry Maple	*Acer platanoides*	Crimson	25'	15'	30-40'
Japanese Stewartia	*Stewartia pseudocamelli*		30'	20'	
Snowgoose Cherry	*Prunus spp.*	Snowgoose	20'	20'	
Spire Cherry	*Prunus x hillieri*	Spire	30'	10'	
Flowering Crabapple	*Malus spp.*	Snowdrift, Red Baron,	20'	20'	
Japanese Snowbell	*Styrax japonicus*		25'	25'	
Black Tupelo	*Nyssa sylvatica*		35'	20'	
Goldenrain Tree	*Koelreuteria paniculata*		30'	30'	
Rocky Mt. Maple	*Acer grandidentatum*	Schmidt	25'	15'	
Galaxy Magnolia	*Magnolia spp.*	Galaxy	30'	15'	
Rustica Rubra Saucer Magnolia	*Magnolia soulangiana*	Rustica Rubra	20'	20'	
Golden Desert Ash	*Fraxinus oxycarpa*	Aureafolia	20'	18'	
Chinese Kousa	*Cornus kousa*	Chinensis	20'	20'	
Pink Flowering	*Cornus florida*	Rubra	20'	20'	
Flowering Plum	*Prunus cerasifera*	Thunder - cloud	20'	20'	
Paperbark Maple	*Acer griseum*		25'	20'	
Tatarian Maple	*Acer tatarian*		25'	20'	
Trident Maple	*Acer buergeranum*		20'	20'	
David's maple	*Acer davidii*		30'	25'	
Flame Maple	*Acer ginnala*	Flame	20'	20'	
Sargent Cherry	*Prunus sargentii*		30'	30'	
Amur Maple	*Acer ginnala*	Flame	20'	20'	
Black Tupelo	*Nyssa sylvatica*		30'	20'	
Small Trees – Narrow <35'					25-30'
Redmond Linden	*Tilia americana*	Redmond	35'	25'	
Pyramidal European	*Carpinus betulus*	Fastigiate	35'	25'	
Hedge Maple	*Acer campestre*	Evelyn	35'	30'	
Callery Pear	*Pyrus calleryana*	Redspire or Cleveland	35'	25'	
Red Cascade Mt.	*Sorbus americana*	Dwarfcrown	18'	8'	
Tree Lilac	*Syringa meyeri*	Palibin	7'	5'	

**Other species or cultivars may be appropriate but must be approved by the City of Lacey.*

If conifers are used in informal plantings, then the following species are appropriate for use in Lacey:

Western red cedar (*Thuja plicata*)
Mt. Hemlock (*Tsuga mertensiana*)
Douglas-fir (*Pseudotsuga menziesii*)
Canada Hemlock (*Tsuga canadensis*)
Western Hemlock (*Tsuga heterophylla*)
Giant sequoia (*Sequoia gigantea*)
Alaska Yellow Cedar (*Chamaecyparis nootkatensis* and 'Pendula')
Austrian pine (*Pinus nigra*)
Deodar Cedar (*Cedrus deodara*)
Noble Fir (*Abies procera*)
Shore Pine (*Pinus contorta* var. contorta)
Western white pine (*Pinus monticola*-blister rust resistant cultivars)
Blue Atlas Cedar (*Cedrus atlantica* 'Glauca')
Serbian Spruce (*Picea omorika*)
Dawn Redwood (*Metasequoia glyptostroboides*)

Tree species specifically **prohibited** for planting in the City of Lacey:

Silver Maple (*Acer saccharinum*)
Boxelder (*Acer negundo*)
American Sycamore (*Platanus occidentalis*)
London Planetree (*Platanus* x *acerifolia*)
Red Sunset Maple (*Acer rubrum* 'Red Sunset')
Sycamore Maple (*Acer pseudoplatanus*)
Lombardy Poplar (*Populus nigra* 'Italica')
Silver Poplar (*Populus alba*)
Black Locust (*Robinia pseudoacacia*)
Tree of Heaven (*Ailanthus altissima*)
Scotch pine (*Pinus sylvestris*)

Tree species discouraged:

Elms (*Ulmus* spp.)
European White Birch (*Betula pendula*)
Willows (*Salix* spp.)
Sweetgum (*Liquidambar styraciflua*)
Leyland Cypress (*Cupressus x leylandii*)
Colorado Blue Spruce (*Picea pungens*)
Callery pear (*Pyrus* spp.) as street trees

All trees planted as street trees and other landscape trees in Lacey should meet the standards defined as the American Standard for Nursery Stock (ANSI

Z60-1-2004). This standard specifies height, caliper, and rootball diameter standards for nursery stock. It also provides standards for container stock and shrubs.

In addition to specifying that stock meet the ANSI standard, the stock should have 1) strong central leaders for all but small, spreading trees, 2) show evidence of cultural pruning by the nursery, including corrective pruning and crown raising, 3) be free of damage from nursery lifting and shipping to site, 4) be free of insects, diseases, and other pests, and 5) the rootball should be intact, not broken from rough handling.

The trees should not be picked up from the nursery until time to plant the trees. Most project sites are not set up to protect trees from freezing temperatures, drying, vandalism, theft, and other maladies. If they are brought in early, all balled and burlap material should have rootballs covered with sawdust or clean woodchips, and irrigation must provided daily in absence of rains (except during the dormant season). During the dormant season the woodchips or sawdust must just be kept moist. Container stock must be irrigated daily during the growing season. The trees must be monitored closely. Holdover time should be minimal (less than 1 week if possible).

Trees must be handled carefully when they arrive from the nursery to avoid stem and branch damage, and to avoid breaking the rootball. Plan the operation to minimize handling of the trees. If the rootball is broken, then consider that the tree is now a bare root tree, and the potential for survival and rapid establishment has been greatly reduced. Do not accept broken root balls from the nursery.

If trees are included as part of a contract, provide detailed specifications to prevent planting of inferior or damaged trees. Do not be afraid to reject trees due to poor quality. A detailed tree specification for use on projects is provided in Appendix III.
To help insure that proper size of high quality trees of the desired species are procured for street projects, it is recommended that the City of Lacey procure their own trees and bid only the installation of the trees on projects. For large future projects, it is recommended that a reputable nursery be contracted to provide the species, quality, and numbers of trees needed for the project. Tree quality will be greatly improved and the street tree design plan will continue to move in the planned direction.

Street Tree Themes

The following street tree themes are recommended to provide tree-lined corridors, canopies over the streets, and linkages between differing zones in the city. Detailed descriptions are provided for what were determined to be the highest need, and highest profile areas. The remainder of the arterials and collectors are described in Table 3.

Martin Way – Desmond Drive to Marvin Road (Mostly Urban Growth Area)

This major arterial serves as a linkage between the Lacey Central Business District and Hawks Prairie area. It includes only a few mixed species of street trees maintained by the City of Lacey, a few private trees, and barren street sides the remainder of the way. The sidewalks and ditches were reconstructed by Thurston County; however no street trees were planted.

The street profile for almost the entire corridor is a four lane boulevard with sidewalks abutting a narrow grader ditch. There is space for trees, both on rights-of-way and on private property behind the sidewalk, depending on the location.

It is suggested that funding be sought to re-tree Martin Way to provide the linkage between the two commercial zones. It is recommended that canopy forming trees be planted in all possible locations. In many cases these trees would be planted on private property.

The design should establish trees on a wide spacing, incorporating several different canopy forming and flowering tree species along the way. There are additional obstacles to a uniform design, including distribution power lines along portions of the route.

Summary: Planting design – Formal

Primary street tree species – Autumn purple ash, Scarlet oak, and

Shademaster Honeylocust

Secondary street tree species – Saucer magnolia, Norwegian sunset maple and scarlet oak

Accent tree species – Amur maple, black tupelo, and snowgoose cherry

Utility Trees –Kousa dogwood, Japanese snowbell, and flowering plum

This planting scheme, coupled with replacement of some poor quality trees and creation of additional planting spots will change this segment of Martin Way into a tree-lined corridor. The green canopy of foliage and splendid fall coloration will warm the appearance of the street and traffic will slow. Residents will find this a friendly and comfortable street to walk, bike and jog along, most unlike the conditions today. The linkage between the Hawks Prairie and Martin Village areas will be complete.

The following is a listing of other high need sections of Lacey streets that would benefit from trees. Refer to Table 3 – Street Tree Themes for recommended tree species:

1. Lacey Blvd from Sleater-Kinney Road to Golf Club Road.
2. Pacific Ave. from Sleater-Kinney Road to Golf Club Road.
3. 3rd Ave. from I-5 off ramp to College St.
4. Rainier Road from Yelm Hwy. to the south city limits.
5. Kinwood Street – entire length.
6. Union Mills Road – entire length
7. Marvin Road from 3rd Ave. to Pacific Ave.

Only arterials and collectors in developed areas that are not likely to have projects are listed. Undeveloped areas will likely be planted as adjacent parcels develop.

The following table provides a summary of the proposed street tree themes for all major and minor arterials and collectors in Lacey.

Table 3. 'Street Tree Themes' for all major and minor arterials and collectors.

STREET	SEGMENT FROM	SEGMENT TO	PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
Sleater-Kinney Road	Martin Way	14th Ave.	Autumn Purple Ash	Northern Red Oak	Flowering plum	Snowdrift crabappl
Sleater-Kinney Road	14th Ave.	Chambers Lk. Rd.	Emerald Queen	Parkway Maple Redmond	Prairiefire crabapple	Prairiefir e
Golf Club Road	I-5	Chambers Lk. Rd.	Patmore Ash	Rustica Rubra Saucer	Japanese Snowbell	Prairiefir e
Judd St.	Ruddell Road	28th Ave.	Japanese Stewartia	Rustica Rubra Saucer	Kousa Dogwood	Trident Maple
Clearbrook Dr.	Lacey Blvd.	To End	London Plane	Emerald Queen	Rustica Rubra Saucer	Galaxy Magnolia
College St.	15th Ave.	Pacific Ave.	Northern Red Oak	Shademast er	Galaxy Magnolia	Trident Maple
College St.	Pacific Ave.	32nd Lane	Norwegian Sunset Maple	Shademast er	Prairiefire crabapple	Desert Ash
College St.	32nd Lane	Yelm Hwy.	Patmore Ash	Norwegian Sunset Maple	Snowdrift Fl. Crab	Pacific Sunset
Rainier Road	Yelm Hwy.	City Limits	Greenspire Linden	Emerald Queen	Rustica Rubra Saucer	Trident Maple
Ruddell Road	Martin Way	Yelm Hwy.	Summit Ash	Tuliptree	Japanese Snowbell	Pacific Sunset
Ruddell Rd. Extension	Israel Road	Dennis St.	Summit Ash	Tuliptree	Flowering Cherry	--
Carpenter Road	Hawks Pr. Road	Pacific Ave.	Tuliptree	Rustica Rubra Saucer	Japanese Snowbell	Pacific Sunset
Carpenter Road	Pacific Ave.	Mullen Road	Sugar Maple	Emerald Queen	Kousa Dogwood	Hedge Maple
Kinwood St.	Capitol Blvd.	City Limits	Shademast er	Patmore Ash	Flowering Plum	Pacific Sunset
Hensley, Ranger, School St.	14th Ave. NE	Pacific Ave.	Red Horsechestnut	Redmond Linden	Rustica Rubra Saucer	Amur Maple
Union Mills Rd.	Pacific Ave.	Marvin Rd.	Scarlet Oak	Shademast er	Amur Maple	Underground

STREET	SEGMENT FROM	SEGMENT TO	PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
Kagy Rd. Marvin Road	Mullen Rd. 44th Ave. NE	58th Ave. Martin Way	Sugar Maple Northern Red Oak	Norwegian Sunset Maple Emerald Queen	Flowering Dogwood Flowering Plum	Rocky Mt. Maple Galaxy Magnolia
Marvin Road	Martin Way	Pacific Ave.	Scarlet Oak	Shademaster	Snowgoose Cherry	Red Cascade Mt. Ash
Marvin Road	Pacific Ave.	City Limits	Norwegian Sunset Maple	Red Maple	Rocky Mt. Maple	Rocky Mt. Maple
Hogum Bay Road	Willamette Pkwy.	Marvin Road	Summit Ash	Callary Pear	Kousa Dogwood	Amur Maple
Willamette Pkwy.	Marvin Road	Hogum Bay Rd.	Sweetgum	Patmore Ash	Kousa Dogwood	Rocky Mt. Maple
Hoh St. Meridian Road	Martin Way 46th Ave. NE	Steilacoom Rd. Martin Way	Scarlet Oak Tuliptree	Shademaster Patmore Ash	Prairiefire Fl. Crab Black Tupelo	Golden Desert Ash Rocky Mt. Maple
Meridian Road	Pacific Ave.	Yelm Hwy.	Katsura Tree	Pacific Sunset	Snowgoose Cherry	Flowering Dogwoo
Dutterow/Deerbrush Dr.	Martin Way	Pacific Ave.	Katsura Tree	Norwegian Sunset Maple	Rocky Mt. Maple	Trident maple
Hawks Prairie Road 31st. Ave. NE	Carpenter Road Marvin Road	Hogum Bay Road Meridian Road	Norwegian Sunset Maple Emerald Queen	Tuliptree Red Sunset Maple	Sargent Cherry Flowering Plum	Flowering Plum Golden Desert Ash
Britton Parkway	Carpenter Rd.	Hogum Bay Rd.	Sugar Maple	Autumn Purple	Sargent Cherry	Japanese
Orion Drive	Willamette Pkwy.	Meridian Road	Northern Red Oak	Sugar Maple	Snowgoose Cherry	Amur Maple
Martin Way	College St.	Kinwood St.	Autumn Purple Ash	Rustica Rubra Saucer	Amur Maple	Kousa Dogwood
Martin Way	Kinwood St.	Ranger Dr.	Scarlet Oak	Norwegian Sunset Maple	Black Tupelo	Japanese Snowbell
Martin Way	Ranger Dr.	Marvin Road	Shademaster	Scarlet Oak	Snowgoose Cherry	Flowering Plum
Steilacoom Road	Pacific Ave.	City Limits	Katsura Tree	Pacific Sunset	Snowgoose Cherry	Flowering Dogwoo
Pacific Ave.	West City Limits	Carpenter Road	Patmore Ash	Autumn Purple	Kousa Dogwood	Amur Maple
Pacific Ave.	Carpenter Road	Marvin Road	Tuliptree	Greenspire Linden	Black Tupelo	Japanese

STREET	SEGMENT FROM	SEGMENT TO	PRIMARY TREE	SECONDARY TREE	ACCENT TREE	UTILITY TREE
Pacific Ave. 14th Ave.	Marvin Road Carpenter Road	City Limits Union Mills	Greenspire Linden Norwegian Sunset Maple	Tuliptree Parkway Maple	Flowering Plum Red Cascade Mt. Ash	Golden Desert Ash Amur Maple
Lacey Blvd. 21st Ave. 22nd Ave.	Sleater-Kinney Rd. Chambers Lk. Dr. Golf Club Rd.	Pacific Ave. Golf Club Rd. Shady Lane	Patmore Ash Red Maple Redmond Linden	Autumn Purple Ash Pacific Sunset Scarlet Oak	Paperbark Maple Photinia Tree Galaxy Magnolia	Golden Desert Ash Galaxy Magnolia Japanese
Shady Lane 25th Ave.	Lilac St. Ruddell Road	Carpenter Road Lilac St.	Sargent Cherry Redmond Linden	Flowering Plum Sargent Cherry	Paperbark Maple Goldenrain Tree	Tree Lilac Kousa Dogwood
Mullen Road	West City Limits	Ruddell Road	Red Horsechestnut	Black Tupelo	Japanese Snowbell	Amur Maple
Mullen Road	Ruddell Road	Carpenter Road	Tuliptree	Black Tupelo	Snowgoose Cherry	Amur Maple
Mullen Road 54th Ave. 58th Ave.	Carpenter Road East of Ruddell Rd. Kagy Road	Meridian Road To End Meridian Road	Sugar Maple Redspire Callery Pear Greenspire Linden	Northern Red Oak Scarlet Oak Black Tupelo	Sargent Cherry Flowering Plum Rocky Mt. Maple	Japanese Galaxy Magnolia Trident Maple
Yelm Hwy.	West City Limits	Ruddell Road	Norwegian Sunset Maple	Flowering Plum	David's Maple	Red Cascade Mt. Ash
Yelm Hwy.	Ruddell Road	Fair Oaks Road	Sugar Maple	Northern Red Oak	Tree Lilac	Trident Maple
Yelm Hwy.	Fair Oaks Road	Meridian Road	Autumn Purple Ash	Pacific Sunset	Paperbark Maple	Japanese hornbeam
Compton Blvd. Ext.	Rainier Road	Yelm Hwy.	Greenspire Linden	European Beech	Tatarian Maple	Tree Lilac

Figure 11. Map of Lacey Arterials and Collectors
Street Trees Designed for Mapped Streets

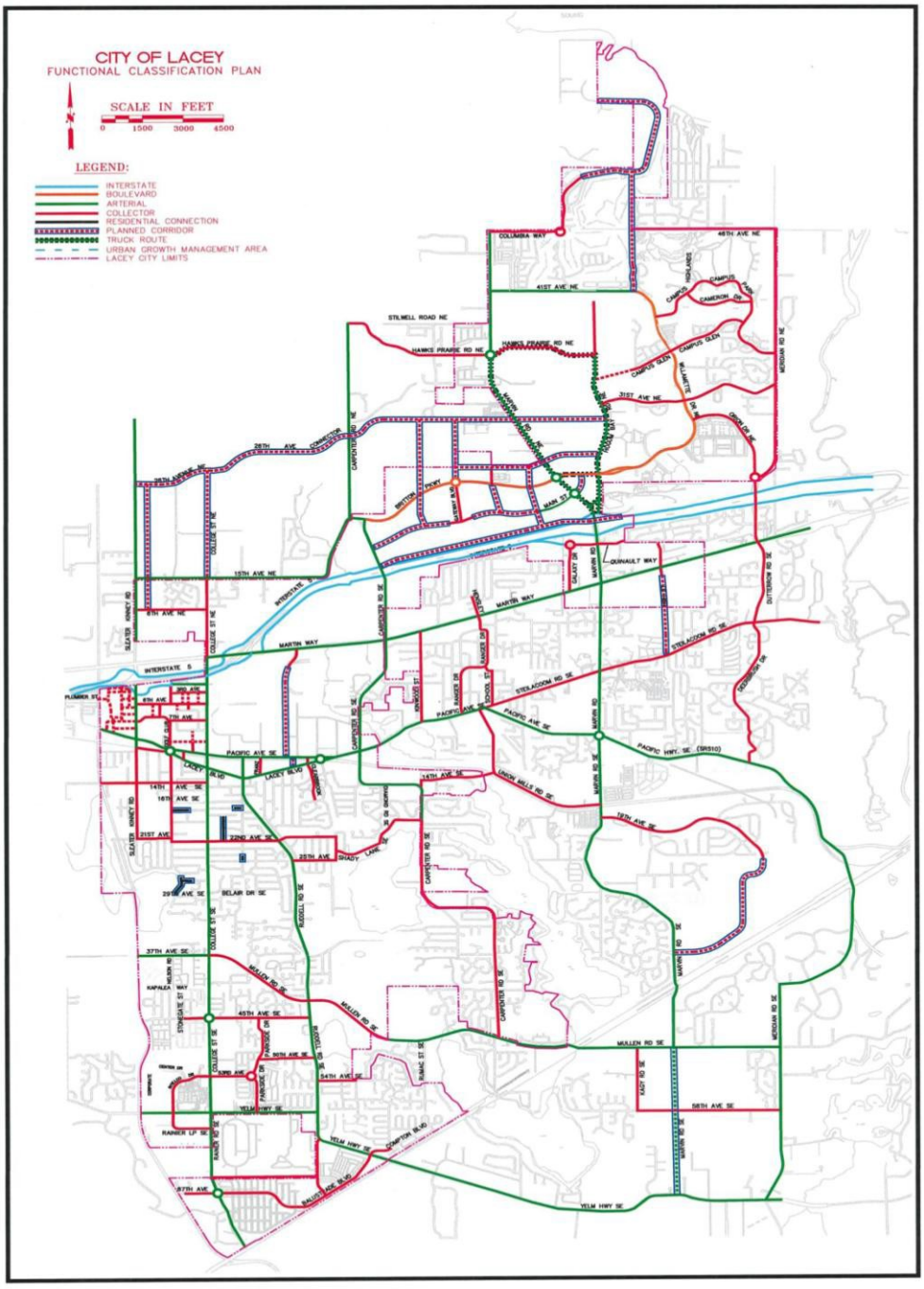


Figure 4
Functional Classification
of Roadways
Page 38

2030 Lacey Transportation Plan

Street Profiles for Trees

The ideal street profile to create a tree-lined street with canopy forming trees would include 8' planter strips plus a 12-18' wide medians. Future designs of major and minor arterials should consider this type of design where rights-of-ways permit. This design provides adequate space above and below ground for trees, minimizing damage to curbs and sidewalks. The feel and look of driving, bike riding, jogging, and walking on these types of streets in 30 years will please residents of Lacey. To achieve this effect, we must plan for it and plant it today.

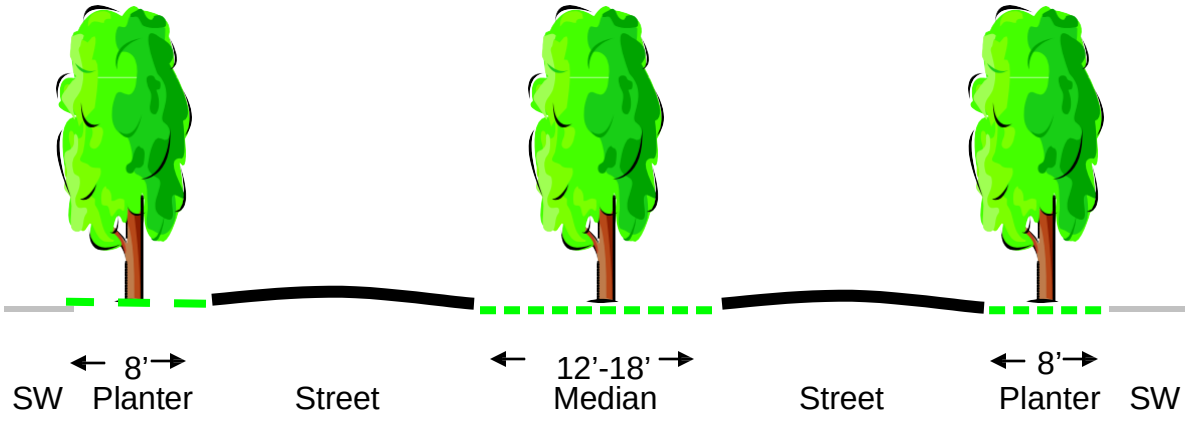


Figure 12. Ideal street design for development of maximum canopy, while providing separation between streets and sidewalks.

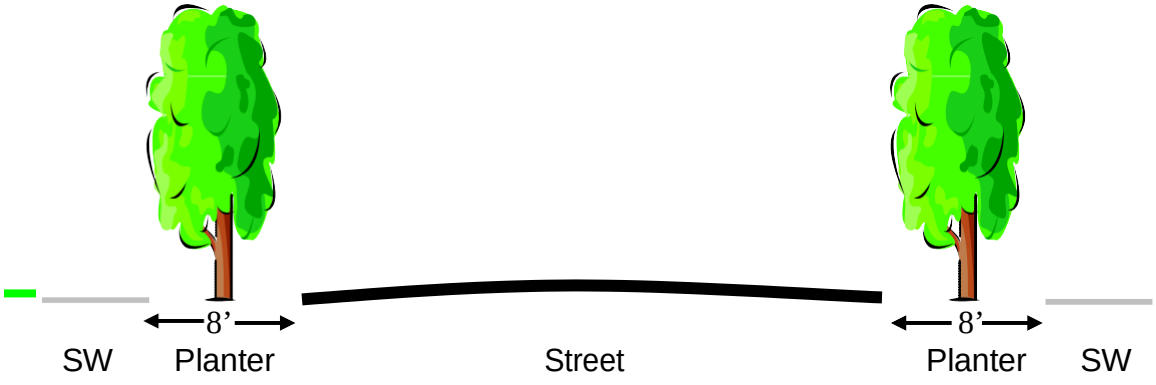


Figure 13. When space does not allow development of a full median, providing 8' planter strips will allow development of large, canopy forming trees. Planter strips should not be less than 6' wide. These narrow widths will only allow planting of small to medium sized trees that will not produce the canopy effect.

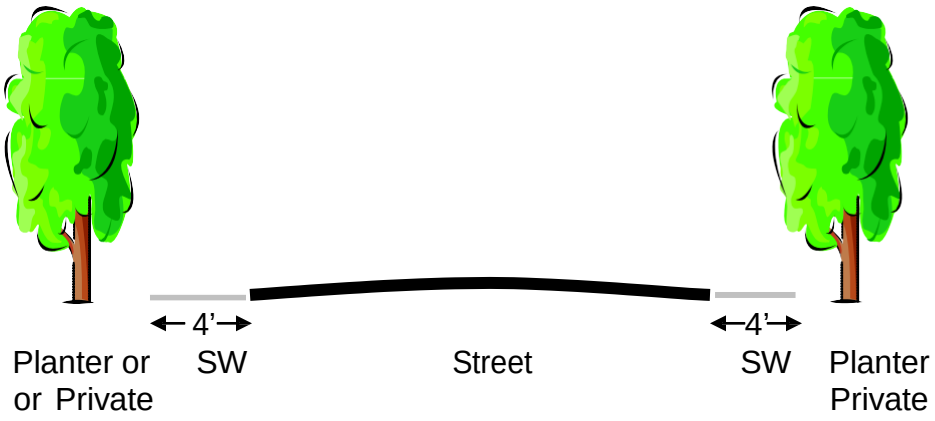


Figure 14. This is a commonly occurring street design in Lacey. Street trees, when they occur, are located on private property, or occasionally in planter strips.

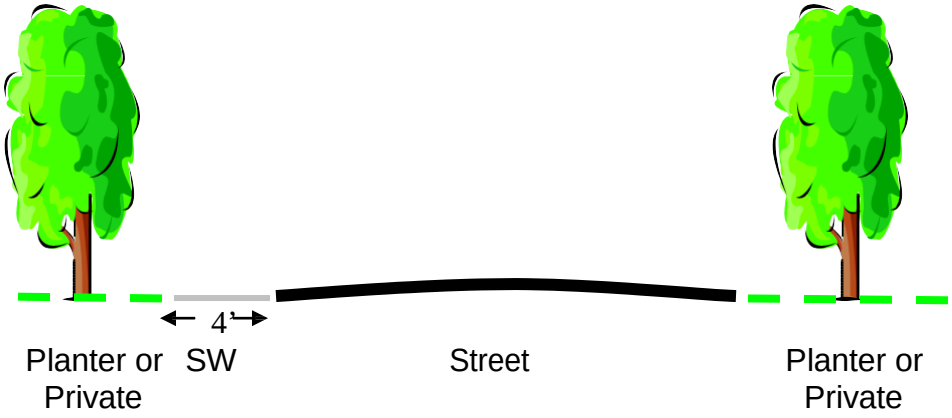


Figure 15. This is a commonly occurring street design in older neighborhoods in Lacey. In some cases no sidewalks occur. Most street trees are privately planted, without uniformity of design or occurrence.

Planting Space Recommendations

When designing sidewalks for street tree plantings, an 8' wide planter strip is recommended to accommodate large, canopy-forming trees. Narrower strips increase the potential for heaving of the sidewalks and curbs. Placing trees between the vehicle and the pedestrian provides a feeling of safety for sidewalk users, though trees are more susceptible to vehicle damage in this location.

For trees, the most desirable location is behind the sidewalk where the tree can exploit the larger soil volumes of yards and open space. Development of a canopy over the street will take longer, and will be less effective. However, trees in this location will have greater longevity and cause less hardscape damage.

Often driveways, water meters, signs, and other obstructions limit strict, uniform spacing for street trees. Compromises must then be made to achieve the visual and spatial effects provided by rows of street trees. Street tree spacing will be determined primarily by the mature size of the tree being planted. However, the purpose of the tree also is a factor.

If one is trying to screen objectionable views or less attractive structures, then tighter street tree spacing may be desirable. In an area where attractive architecture, signage, or views are to be preserved, then widen the tree spacing. Do not over plant. This will simply increase initial establishment costs, as well as future maintenance costs. Always consider the desired future visual and spatial effects – linkage, beauty, and shade.

The following are the recommended targets for street tree spacing, understanding that
variations may occur due to obstacles or the desired effect.

Tree Type/Size	Spacing Between
Trees Large Street Trees	40’-50’
Medium Street Trees	35’-40’
Columnar Trees	25’-35’
Small Trees	25’-35’

Informal planting designs utilizing conifers in cluster plantings should be 12’-15’ on center, depending on the use of accent trees in the cluster. Each conifer must have two sides of its crown free to grow. These types of clusters of tall growing trees must be planted at least 25’ from overhead utilities, and 15’ from awnings, buildings, and signage. Screen plantings should be designed on a project by project basis and the plant spacing designed for the species used and the effect desired. Species other than listed in Table 1 may be used when dense screens are desired.

Compromises to this ideal design while still achieving some of the feel, would be 6’ planter strips with a median. Any design that places the sidewalk against the curb with the trees behind the sidewalk will sacrifice the separation of pedestrians from traffic that the planter strip provides. Though planting trees behind the sidewalk where unlimited root zone occurs is good for the tree, the same feeling of security and visual beauty is not achieved.

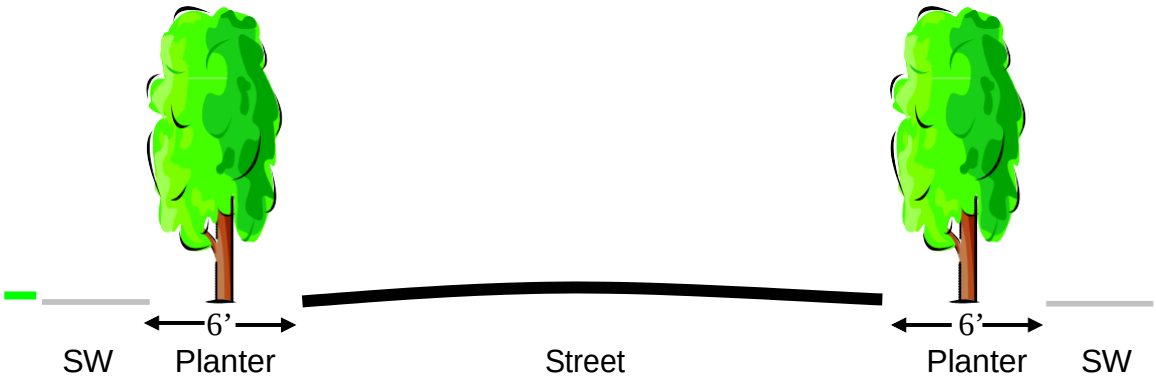


Figure 16. If space does not allow for 8' wide planter strips, then 6' can still be planted with medium to large street trees, however potential for root damage is higher.

Street Tree Planting and Maintenance

The responsibility and budget for the planting and maintenance of street trees should be with the Parks Maintenance division of the Public Works Department.

The selection and design of street tree plantings should be completed by a landscape architect or urban forester, and be reviewed by Community Development Department and the Parks Maintenance Division to insure that it furthers goals outlined in the comprehensive street tree plan, is compatible with the existing site conditions and the overall goals of the city.

Budget

As the street tree numbers grow, the maintenance, and thus the maintenance budget must grow. An adequate annual budget dedicated to street tree maintenance is required to provide adequate care for a street tree population. As the street tree population matures, these numbers will increase. The budget should be increased annually based on the new plantings, and with a modifier for inflation.

Stock Quality

All trees should meet the American National Standard for Nursery Stock (ANSI A60.1- 1996), have a strong, central leader and show evidence of cultural care in the nursery. The trees should not be damaged, and should be free of insect, insect eggs, disease, and other problems. The root balls should be well-wrapped with burlap and unbroken. Trees with broken root balls, damage, poor form, or other problems should be rejected. A detailed contractual specification is included in Appendix III for street projects.

It is strongly recommended that the City of Lacey remove the street tree

procurement from the overall street project contract, and only contract for planting. The city should

contract for trees in advance with a reputable nursery to insure that the numbers, species, size, and quality of trees are available when a project is constructed. This will eliminate substitution, accepting less than high quality trees, and holding stock on site for extended periods of time (1 week is the target).

Preparing the Planting Hole

The planting hole within the planter strip or behind the sidewalk often contains structural soils used in the preparation of the sub grade for the street and sidewalks. If the planter strip will be planted with grass, the entire planter strip should be backfilled with topsoil that has a silt loam or loamy sand texture. The organic matter content should be 4-6%. It should be free from contaminants.

The area where the tree is to be planted should be excavated to the proper depth so the root ball sits on native soil, and the top of the root ball will be 1 inch above the final soil grade. The planting hole should be at least 3 times the diameter of the rootball of the street tree. The edges of the planting hole should be shaved off to eliminate the glazed or compacted hole edge.

If a hardpan or other compacted layer occurs that will cause perching of water in the planting hole, this layer should be fractured by over excavating the hole and backfilling the native material. The area under the rootball should be firmed to prevent settling of the tree. In cases where drainage cannot be improved by over excavating, installation of drain tile may be necessary to drain the planting hole and the surrounding root zone.

Orientation of the Tree

Plant the tree in the same orientation as it grew in the nursery. Most trees will be marked at the base to indicate the north side of the tree. This will reduce the potential for sunburn of the bark.

Tree Grates

The use of tree grates are not recommended by the City's tree protection specialists under any circumstance.

Burlap and Wire Basket

Remove all twine ties from the root collar of the tree and remove the burlap.. If the tree has a wire basket, leave it on until the tree is in the ground and stabilized. Prior to completing backfill, cut out the upper 2/3's of the wire basket and remove from the hole. If the tree has been in-ground fabric bag grown, remove all synthetic and plastic material materials prior to tree placement the planting hole.

Complete backfilling with the topsoil mix. In areas with gravely soils, blend the topsoil with native soils. In areas of Lacey with sandy loams, utilize the native material or imported topsoil with additional silt and organic matter. If native sandy loams are used, then incorporate organic matter as described on the planting diagram.

Fertilization

Trees should be fertilized with a granular formulation of 20-10-10 at a rate of 6 pounds per 1000 square feet of surface area. This amounts to approximately 2 ounces per tree. Do not incorporate the fertilizer into the planting hole or fill soils. Salt burn of the new roots may occur. Do not apply any other root stimulants. Good weed control must accompany fertilization treatments.

Watering

All trees should be thoroughly watered in to eliminate air pockets and settle the soil around the rootball. Create a small 4 inch high berm with soil to create a well for holding water from irrigation. This berm should be located 12 inches outside of the rootball.

The rule of thumb for water is to apply 2 inches of water per week, or follow the rates listed below:

Tree Caliper (in)	Gallons per
1	5
2	10
3	13
4	18
5	23

Monitor soil moisture contents in the root ball and the surrounding soil to determine the actual watering frequency and amounts.

Mulching

All trees should be mulched for a distance of at least 2 times the rootball diameter with 2- 3 inches of bark mulch or composted wood chips.

Staking

All deciduous trees 1.5 inch to 2.5 inches caliper and conifers taller than 5 feet should be staked with two stakes. Trees should be staked with 2 in. x 2 in. or round wooden stakes that are 6 feet long. The stake must be tall enough to provide support to the tree. The stakes should be driven firmly into the ground outside of the root ball. They should be placed straight up and down, and be equidistant from the tree. Trees should be oriented to support the tree against the prevailing winds.

The stake ties should be rubber chain-link, installed snug but not stretched. The tree needs to be able to move slightly to develop normal stem diameter and taper. Avoid wire and hose ties.

The stakes and ties should be inspected several times in the first year. Vandalism and accidental damage occurs frequently. Once the tree becomes established, usually one year, remove the stakes and ties. Ties left on trees long-term will often girdle the tree. Trees larger than 2.5 inches caliper will require 3 stakes. Trees larger than 4 inches caliper should be guyed with three cables and buried earth anchors.

Trunk Wraps

Trunk wraps are used to prevent sunburn on new trees. This is usually not a problem, however if trunk wraps are used, they should be made of paper and left on the tree for 1 year.

Transit guards should not be left on the tree as trunk wraps. They are designed to protect the stem of the tree during transport only. Molds, insects, and other fungi may be attracted to the moist, shady confines of the transit guard.

Root Collar Protectors

Plastic sleeves should be installed on all newly planted trees to protect the root collars from lawn mowers and weed eaters. These protectors should be left on the trees until trees are 6” caliper, or the protector becomes snug.

Grass and weeds should not be allowed to grow in the tree well, removing the temptation to mow or weed eat near the stems. Root collar damage from weed eaters is a major cause of tree mortality, and/or reduced vigor.

Pruning

Newly planted trees that were well cultured in the nursery should need only minor pruning to remove crossing branches, or branches damaged during transport

and planting.

Pruning in successive years to provide sidewalk and street clearance, improve the branch structure of the tree, and maintain central leaders should conform to the American National Standard ANSI A300 (2001), Tree, Shrub, and Other Woody Plant Maintenance
– Standard Practices (Pruning).

This small tree pruning is critical to provide a strong tree and branch structure for the future, minimizing storm damage, and the need for additional pruning. Pruning should be completed by an arborist certified by the International Society of Arboriculture, or supervised by a certified arborist. No more than 20% of the live branches should be pruned in any one year.

Inspections

The newly planted trees should be inspected several times in the first year to adjust stakes and note other cultural concerns. Prior to release of the 1 year bond or end of the 1 year guarantee for trees planted as part of a street project, the trees should be inspected by a certified arborist. Trees that were unhealthy or poorly handled often 'hang on' for some time after planting. Specialized expertise is needed to identify the trees that are in decline, but still alive. This inspection must take place when trees are foliated.

Timing of Tree Planting

Tree planting should not occur between May and October. Trees planted during this time will be stressed and survival and establishment will be reduced. The following is a general window for planting the different types of trees.

Stock Type	Timing of Planting
Balled and Burlap	October 15th through May 1st
Containerized	October 15th through May 1st
Bare-Root Stock	February 15th through April
15th In-ground Fabric Bag	October 15th through May 1st

Fall planting of B&B and containerized stock is preferred, since tree roots will grow for part of the winter. This will improve establishment and early growth.

Maintenance Recordkeeping

As trees are planted in the city of Lacey, maintenance records need to be updated on the street tree inventory system. This will help with tracking of stake removal, weed control, pruning needs, and hazard assessment. This system is up and running, and simply needs to be maintained and refined as needed.

Street Tree Management Units. – The only soils based separation in Lacey street tree populations are soils that are 1) excessively drained gravels, 2) sandy soils, and 3) poorly drained soils.

Geographically, it is recommended that the management units be based on the Lacey planning areas.

Figure 17. Proposed street tree management units. Lacey Planning Areas

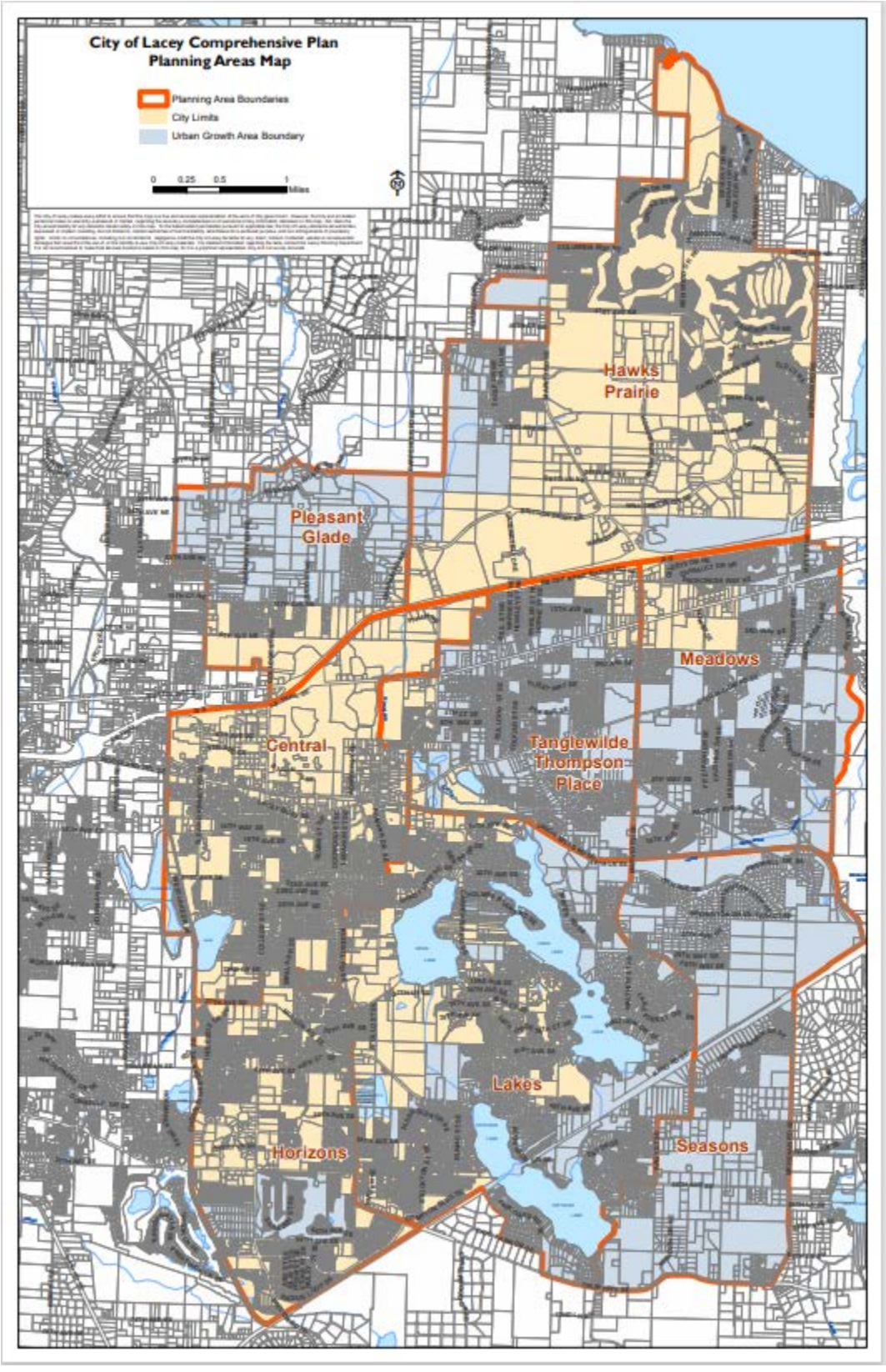


Figure 18 Calendar for tree planting and maintenance activity.

ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Tree Planting:										◄►	►	
Balled & Burlap and Containerized	◄►	►										
Bare-Root Stock		◄►	►									
Fertilization: Surface Applied			◄►		◄►					◄►		
Watering					◄►	►						
Weed Control			◄►	►								
Integrated Pest Management – Scouting		◄►	►								►	
Pruning:												
Spring Flowering Trees					◄►							
Summer Flowering Trees	◄►	►								◄►	►	
All Other Shade Trees and Conifers	◄►	►								◄►	►	
Storm Damage Assessment-As Needed	◄►	►										►

Trees and Planting Specifications

The following summarizes the tree and planting specifications:

All trees and shrubs should conform to the American Standard for Nursery Stock ANSI Z60.1-2004, for size, root ball diameter, and quality, and be planted according to industry standards, including mulching. All street trees should have a well-defined central stem and show evidence of corrective cultural pruning in the nursery.

Tree planting should occur in the spring between March 1 and June 1, or preferably in the fall between October 1 and December 1. Irrigation should be provided to the trees and shrubs at least weekly during the summer, in the absence of adequate rainfall.

APPENDIX
6

WASHINGTON FORESTRY CONSULTANTS, INC.
FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS
W F C I
360/943-1723
FAX 360/943-4128
1919 Yelm Hwy SE, Suite C
Olympia, WA 98501

-Street Tree Inventory-

CITY OF LACEY STREET TREES

Lacey, WA

Prepared for: Ryan Anderson
Community Development

Department Prepared by: Washington Forestry

Consultants, Inc. Date: October 22, 2012

Introduction and Purpose

We have completed an evaluation and inventory of the city maintained street trees in the City of Lacey. In addition, we did the street trees in the Lacey Corporate Center.

The purpose was to map the street trees, and provide an inventory and assessment of trees. This will be a brief summary report in lieu of a formal report as requested.

Methodology

Washington Forestry Consultants, Inc. (WFCI) was provided with an aerial photo layer of the city along with shapefiles for the arterials and collectors and parcel layers in the City of Lacey. We designed a data collection template for ArcPad 10.0 for ease of collection of the inventory information on the street trees. The following is a list of all of the major data collection parameters for the inventory:

- Species
- Diameter
- Condition
- Tree problems
- Work needed
- Work priority
- Field notes

The work was completed by a ground inventory using a Trimble Nomad GPS handheld data collector. All trees within what appeared to be the city rights-of-way were inventoried. The rights-of-way edge was not always clearly defined in the field.

Native trees and planted trees on the rights-of-way were inventoried. Smaller, quality native tree species (e.g. a free-to-grow 3 inch caliper Douglas-fir) were also inventoried.

Observations

Tree Species

We found 5,557 trees of over 60 species of trees on the City of Lacey rights-of-ways that are maintained by the city. They ranged from 1 to 49 inches DBH.

Table 1. Species Summary of City of Lacey Street Trees.

Species	Diameter Range	# Trees	% Composition
Ash - Autumn Purple	2-10	142	2.46%
Ash - Golden Desert	2-4	19	0.33%
Ash - Green/White	1-26	1,102	19.08%
Ash - Mountain	2-3	4	0.07%
Ash - Patmore	1-22	692	11.98%
Ash - Raywood	1-9	53	0.92%
Ash - Summit	2-6	22	0.38%
Basswood - American	6-9	17	0.29%
Birch - Jacquemontii	2-7	53	0.92%
Birch - Paper	4-14	14	0.24%
Cascara	3	1	0.02%
Cedar - Deodar	1-2	4	0.07%
Cedar - Incense	1-12	37	0.64%
Cedar - Port Orford	6	1	0.02%
Cedar - Weeping Alaska	1-16	69	1.19%
Cedar - Western red	2-6	10	0.17%
Cherry - Flowering	1-9	91	1.58%
Cherry - Kwanzan	3-19	161	2.79%
Cherry - Other	6	1	0.02%
Crabapple	1-8	197	3.41%
Cypress - Other	2-6	30	0.52%
Dogwood - Flowering	1-6	100	1.73%
Fir - Douglas	1-49	29	0.50%
Fir - Grand	19-26	2	0.03%
Giant Sequoia	18-20	2	0.03%
Hawthorne	2-9	16	0.28%

Hemlock - all	1-4	25	0.43%

Species	Diameter Range	# Trees	% Composition
Hornbeam - American	2-9	69	1.19%
Hornbeam - European	3-7	18	0.31%
Katsura tree	2-14	61	1.06%
Lilac - Jap. Tree	2-3	13	0.23%
Linden	3-6	46	0.80%
Magnolia	3	8	0.14%
Maple - Nor. Sunset	2-7	79	1.37%
Maple - Norway	2-10	153	2.65%
Maple - Other	2-5	18	0.31%
Maple - Pacific Sunset	4-6	4	0.07%
Maple - Paperbark	2-3	8	0.14%
Maple - Parkway	3-6	24	0.42%
Maple - Red	2-26	217	3.76%
Maple - Sugar	6-12	5	0.09%
Maple - Tatarian	2-3	10	0.17%
Maple - Vine	1-6	114	1.97%
Oak - OR White	1-22	23	0.40%
Oak - Other	2-8	15	0.26%
Oak - Red	2-17	349	6.04%
Oak - Scarlet	2-4	3	0.05%
Other - Deciduous	2-10	16	0.28%
Pear - Callery	1-12	547	9.47%
Persian Perrotia	1-2	4	0.07%
Pine - Austrian	3-14	26	0.45%
Pine - Other	4-6	4	0.07%
Pine - Shore	2	1	0.02%
Plum - Flowering	1-16	75	1.30%
Redwood - Coast	2	3	0.05%
Spruce- other	2-3	14	0.24%
Sweetgum	1-19	839	14.53%
Sycamore	21-32	6	0.10%
Tuliptree	3-13	29	0.50%
Zelkova - Japanese	4-10	80	1.39%
Summary		**5,775**	**100.00%**

A rule of thumb when managing a cities street trees is to avoid having more than 10% or so of a single genus of tree species to avoid major tree loss if an insect or disease outbreak occurs that affects a particular genus of trees. The following table shows that the City of Lacey is heavy to trees in the Fraxinus genus, but fairly well balanced overall.

Table 2. Breakdown of individual genera as a % of the street tree population.

Genera-Species	% of Total
Fraxinus-Ash species	35.2%
Liriodendron -Sweetgum	14.5%
Acer - Maple species	10.9%
Callery Pear	9.5%
Prunus - cherry cultivars	4.4%
Malus - crabapple cultivars	3.4%
Summary of Major Species	**77.9%**

The surprising number is that maple only makes up 10.9% of the street tree population. Over time the Sweetgum population will go down since it is no longer being planted as a street tree due to structural concerns in storms.

Tree Condition

The condition of each tree was recorded as good, fair, poor, dead, or hazardous. We found over 56% of the street trees to be in Good condition and 30 trees that were dead or hazardous.

Table 3. Summary of Tree Conditions of City of Lacey Street Trees.

Condition	# of Trees	%
Good	3,212	56%
Fair	2,263	39%
Poor	270	5%
Dead	18	<1%
Hazard	12	<1%
Summary	**5,775**	

Tree Maintenance

Hazard pruning was prescribed for trees damaged by the recent 2012 ice storm. Necessary pruning included broken and hanging branches or where pruning was necessary to stabilize or balance the crown of a tree.

More often, structural pruning was prescribed to raise and thin crowns on the smaller street trees that needed cultural pruning to develop long-term scaffold branches or required lifting of the crown to provide future sidewalk and road

clearances.

Sidewalk, road clearance, and corner pruning were prescribed when branches were already encroaching into these zones. Generally, the parameters were 8 ft. over sidewalks, 15 ft. over roads, and anything impacting stop sign or corner visibility. Many trees were prescribed to receive sidewalk and road clearance pruning. A small number of trees required corner or sign visibility pruning.

Table 4. Summary of Tree Work Needed for City of Lacey Street Trees.

Work Needed	# of Trees	%
None	4,792	83%
Prune	566	10%
Remove	255	4%
Other	162	3%
Summary	**5,775**	

Tree work categorized as 'Other' includes work to remove tree stakes, and removing nails from trees.

Most of the trees require only routine maintenance. However there are 14 trees that require immediate action to mitigate potential threats posed by the tree.

Table 5. Summary of Work Priority for City of Lacey Street Trees.

Work Priority	# of Trees	%
Routine	5,761	99.8%
Immediate	14	<1%
Summary	**5,775**	

The effort of the City of Lacey to encourage and plant new street trees is evident by thousands of new street trees in the city. However, many opportunities still exist to plant new street trees where there are no planted or native trees today. These opportunities occur in planter strips that are empty or are being used as parking strips, and in front yards along streets with no sidewalks.

Lacey Corporate Center

In addition to the City of Lacey trees we inventoried one area of private trees. This area was the Lacey Corporate Center Drive, and the Roxanna Drive and Loop. These trees were summarized separately from the city owned trees. The following tables include those areas.

Table 6. Species Summary of Lacey Corporate Center street trees.

Species	Diameter Range	# Trees	%
Ash - Green/White	2-18	198	49%
Birch - Paper	8-14	5	1%
Hawthorne	6-9	5	1%
Maple - Red	2-12	157	39%
Oak - Red	3-5	22	5%
Pear - Callery	2-6	11	3%
Plum - Flowering	2-5	6	1%
Sweetgum	2	2	<1%
Summary	**2-18**	**406**	

Table 7. Summary of Tree Conditions of Lacey Corporate Center.

Condition	# of	%
Good	225	55%
Fair	161	40%
Poor	16	4%
Dead	1	<1%
Hazard	3	<1%
Summary	**406**	

Table 8. Summary of Tree Work Needed for Lacey Corporate Center.

Work	# of	%
None	349	86%
Prune	37	9%
Remove	18	4%
Other	2	<1%
Summary	**406**	

Table 9. Summary of Work Priority for Lacey Corporate Center.

Work Priority	# of	%
Routine	398	98%
Immediate	8	2%
Summary	**406**	

Summary

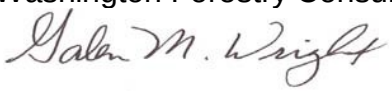
In summary, we inventoried 5,775 City of Lacey street trees that are maintained by the city. Four hundred six private trees were also inventoried and assessed for a total of 6,181 trees.

The City of Lacey Public Works staff is doing an excellent job of maintaining the trees with over 95% being classified as being in Fair or Good condition and only 17% requiring some type of maintenance work at this time.

Please give me a call if you have further

questions. Respectfully submitted,

Washington Forestry Consultants, Inc.



Galen Wright, ACF, ASCA
ISA Board Certified Master Arborist PN-0129
Certified Forester No. 44

Chapter 14.32
TREE AND VEGETATION PROTECTION AND PRESERVATION

Sections:

14.32.010 Short title.

This chapter shall be known and may be cited as the Tree and Vegetation Protection /Urban Forest Management regulations of the city of Lacey. (Ord. 1269 §3, 2006; Ord. 904, 1991; Ord. 399 §1 (part), 1975).

14.32.020 Purposes and permit criteria.

These regulations are adopted for the following purposes and these purposes are to be used as criteria for the issuance of land clearing permits under LMC 14.32.040:

A. To implement strategies for the management and protection of Lacey's urban forest resources pursuant to the goals and policies of the Lacey Urban Forest Management Plan;

B. To implement the purposes of the State Growth Management Act relating to conservation of natural resources, including Lacey's urban forest resources, pursuant to RCW 36.70A.050, 36.70A.060 and 36.70A.080;

C. To implement the purposes of the State Growth Management Act pursuant to RCW 36.70A.172, considering the many environmental benefits of the urban forest as described in Lacey's Urban Forest Management Plan;

D. To promote the public health, safety, and general welfare of the citizens of Lacey without preventing the reasonable development of land;

E. To preserve and enhance the city's physical and aesthetic character by preventing indiscriminate removal or destruction of trees and ground cover and to insure the protection of trees chosen to remain during construction;

F. To minimize surface water and ground water runoff and diversion and to prevent erosion and reduce the risk of slides;

G. To retain and utilize trees to assist in site planning, considering the abatement of noise, visual screening, protection from wind, and other site design issues;

H. To acknowledge that trees and ground cover have significant environmental and quality of life benefits as identified in Lacey's Urban Forest Management Plan, such as the production of pure oxygen from carbon dioxide, the reduction of air pollution, help in providing clean water, control of soil erosion, use in design for energy efficiency and temperature control, noise attenuation, and wildlife habitat;

I. To promote building and site planning practices that are consistent with the city's natural topography, soils, and vegetation features. At the same time certain factors may require the removal of certain trees and ground cover for things such as, but not limited to disease, danger of falling, proximity to existing and proposed structures and improvements, interference with utility services, protection of scenic views, protection of solar access and the realization of a reasonable enjoyment of property;

J. To insure prompt development, restoration, replanting, and effective erosion control of property after land clearing;

K. To reduce water pollution from siltation in the city's streams and lakes;

L. To implement the goals and objectives of the Washington State Environmental Policy Act;

M. To implement and further the City's Comprehensive Land Use Plan and its Environmental Protection and Resource Conservation Element;

N. To encourage protection of wildlife and/or wildlife habitat whenever possible. (Ord. 1269 §4, 2006; Ord. 904, 1991; Ord. 650 §1, 1982; Ord. 399 §1 (part), 1975).

14.32.030 Definitions.

A. "Brushing" means the practice of removing ground cover to create better visibility on a property for purposes such as marketing or surveying of said property.

B. "Caliper" is the standard for trunk measurement of nursery stock. Caliper of the trunk shall be the trunk diameter measured six inches above the ground for up to, and including, four-inch caliper size and twelve inches above the ground for larger sizes.

C. "City" means the city of Lacey, Washington.

D. "Class IV forest practice activity" is a timber harvest, thinning or other activity as established in the Washington State Department of Natural Resources Forest Practices Regulations, whereby a property owner is allowed to harvest a limited amount of timber from their property within the city of Lacey, while still maintaining their rights to convert their property to a use inconsistent with growing timber.

E. "DBH" is the diameter at breast height, measured four and one-half feet above the groundline on the high side of the tree.

F. "Director" means director of community and economic development or his/her designee.

G. "Drip line" of a tree is located by the vertical projection of a line at the tips of the outermost branches.

H. "Ground cover" means grass, forbs, shrubs, and trees less than four inches in diameter measured four and one-half feet above the ground level (DBH).

I. "Hazard tree" means any tree that is dead, dying, damaged, diseased, or structurally defective, recently exposed by adjacent clearing, or some other factor that will subject the tree to failure, and the tree could reasonably reach a target, as determined by the tree protection professional.

J. "Historical tree" is a tree or group of trees designated as such by the city because of its historical value to the residents of the city.

~~J~~K. "Land clearing" means the direct and indirect removal of trees and/or ground cover from any public or private undeveloped, partially developed, or developed lot, public lands or public right-of-way. This shall also

include any destructive or inappropriate activity applied to a tree that will result in its death or effectively destroy the tree's appearance and/or functionality, such as topping.

~~K. "Historical tree" is a tree or group of trees designated as such by the city because of its historical value to the residents of the city.~~

L. "Root protection zone" is an area around the tree to be saved equal to one foot of radius for each one inch of tree diameter measured four and one-half feet above the ground line (DBH), unless otherwise designated by the city's tree protection professional.

M. "Site disturbance" is any action that requires a city of Lacey building permit.

N. "Specimen tree" is a tree that is unique or rare because of its exceptional size or quality, species, or value in a particular location.

O. "Topping" is the indiscriminate placement of cuts to reduce a tree's size. Topping is not an acceptable pruning practice in the city of Lacey.

P. "Tree" means any living woody plant characterized by one main stem or trunk and many branches, and having a diameter of four inches or more measured at four and one-half feet above the ground level (DBH).

Q. "Tree protection professional" is a certified professional with academic and/or field experience that makes him or her a recognized expert in urban forestry and tree protection during development. A tree protection professional shall be a member of the Society of American Foresters (SAF), the Association of Consulting Foresters of America (ACF), the American Society of Consulting Arborists (ASCA), or the International Society of Arboriculture (ISA), and shall have specific experience with urban tree management in the state of Washington. Additionally the tree protection professional shall be an ISA Certified Arborist or an ASCA Registered Consulting Arborist with the necessary training and experience to use and apply the International Society of Arboriculture's Guide for Plant Appraisal and to professionally provide the necessary expertise relating to management of urban trees specified in this chapter.

R. "Tree tract" is a portion of land designated for the preservation and protection of existing trees or the planting of new trees to maintain tree canopy at a development site. The tree tract shall be a separate designated lot(s) shown on the plat map, binding site plan, or site plan review map, and shall be recorded with appropriate description of purposes and restrictions. Restrictions applied to the tree tract will not allow any use other than the growing of trees in the tract, and will reserve the tract for the protection and preservation of trees in perpetuity. Tree tracts can be used for other open space uses when the uses are compatible with trees and will not impact tree health. The tract will be dedicated to, and owned and maintained by, the homeowners' or lot owners' association, or comparable entity. The tract may be dedicated to the city of Lacey for maintenance if approved by the city. Creation of tree tracts to save the best trees on a site may require modifications to the street locations, lot designs and/or other features of the site plan. (Ord. 1539 §19, 2019; Ord. 1417 §7, 2013; Ord. 1269 §5, 2006).

14.32.035 The city's tree protection professional.

The city shall contract with one or more professionals that qualify as a tree protection professional under the definition of this chapter. Said professional or professionals shall be responsible for providing the information and services required of a tree protection professional described herein.

Individual applicants will be responsible for payment of the costs and fees of the designated tree protection professional for projects necessitating work to be performed by the tree protection professional in accordance with Table 14T-66. The city shall be responsible for billing and collecting costs and fees charged to the applicant and transferring said payment to the tree protection professional unless the city has opted for some other mechanism of providing for the costs and fees, such as inclusion of such costs and fees in the schedule of application fees. (Ord. 1417 §8, 2013; Ord. 1269 §6, 2006; Ord. 1219 §2, 2004; Ord. 904, 1991; Ord. 650 §2, 1982; Ord. 399 §1 (part), 1975).

14.32.040 Permits.

No person, corporation, or other legal entity shall engage in timber harvesting or cause land clearing in the city without having complied with one of the following:

A. Received a land clearing permit from the director;

B. Having obtained approval of the proposed work under the processes described in LMC 14.32.050(A);

C. Having received an exemption from the director under the provisions of LMC 14.32.050. In such cases an exemption notice shall be required for posting at the site. (Ord. 1269 §7, 2006; Ord. 904, 1991; Ord. 545 §1, 1979; Ord. 517 §1, 1979; Ord. 399 §1 (part), 1975).

14.32.045 Class IV forest practice applications.

A. **Urban growth area**. Properties within the urban growth area are anticipated to be available for development with urban uses within the next twenty-year period. Pursuant to RCW 76.09.070 lands within the urban growth area are not considered appropriate for long-term timber production and harvesting which takes a full forty-year cycle. Forest management activities shall be consistent with the city's Comprehensive Land Use Plan and implementing regulations for the urban growth area. Forest management activities shall promote the goals and policies of the Lacey Urban Forest Management Plan. Forest practice applications shall meet the requirements specified in subsections B, C, D and E of this section.

B. **Conversions and timing**. Because conversion of properties within the urban growth area can reasonably be expected, significant land clearing of such properties shall only take place at the time of a valid land use

application. Tree tracts, open spaces and buffers can then be properly coordinated with the actual development plans.

To further the purposes, goals, and policies of the Urban Forest Management Plan, timber harvesting and conversion of forested lands within the urban growth area shall not be permitted until such time as a valid land use application for development is made; provided, however, requests may be made for maintenance and thinning of existing timber stands to promote the overall health and growth of the stand until said stand is converted and harvested pursuant to plans provided within a valid land use permit.

C. **Maintenance and thinning**. Class IV forest practice applications and applications for maintenance and thinning shall be reviewed by the city's tree protection professional who shall make recommendations on the request to the ~~land clearing~~Site Plan Review committee. Recommendations shall ensure that action shall improve the health and growth of the stand and preserve long-term tree protection alternatives to meet the goals of this chapter.

D. **Selective thinning limited**. Thinning activities shall be strictly limited to less than thirty-five percent of the volume every ten years. High grading or top-down thinning shall not be permitted. The remaining stand of trees should be healthy, long-term trees from the dominant and co-dominant crown classes. The stand shall be marked prior to the selective thinning operation, indicating which trees will be removed and saved.

E. **Processing of applications**. Class IV forest practice applications shall be processed concurrently with, and using the same process as, the underlying land use application. Should there be no underlying land use application, the Class IV forest practice application shall be processed in accordance with the full administrative review procedures in Chapter 1 of the City of Lacey Development Guidelines and Public Works Standards. (Ord. 1417 §9, 2013; Ord. 1269 §8, 2006; Ord. 904, 1991).

14.32.050 Exemptions.

The following shall be exempt from land clearing permit requirements of this chapter but shall satisfy all standards and requirements of LMC 14.32.065 and other sections as noted below:

A. **Coordination with land use applications**. Projects requiring approval of the city of Lacey site plan review committee under Chapter 16.84 LMC, or projects requiring review by the hearings examiner or city council; provided, that land clearing on such projects shall take place only after approval and shall be in accordance with such approval and the standards of this chapter including the information requirements and standards of LMC 14.32.060.

B. **Hazard trees**. Removal of hazard trees in emergency situations involving immediate danger to life or property as determined by the city's tree protection professional.

C. **Unhealthy trees and groundcovers**. Removal of obviously dead or diseased trees or ground cover which may be a fire hazard as determined by the city's tree protection professional.

D. **Individual lot exemption**. Removal of trees on individual lots where tree density minimums are maintained per Table 14T-18. ~~of no more than five trees in any thirty-six consecutive months or ground cover for the purposes of solar access, general property and utility maintenance, landscaping or gardening, provided a minimum tree threshold is maintained pursuant to LMC 14.32.066, and provided further this exemption does not apply to historical trees or trees and ground cover in an area designated as environmentally sensitive.~~ For removal requests for more than five trees, review must be completed prior to permit issuance by the City's tree protection professional. An exemption must be issued by the city of Lacey prior to the removal of trees under this exemption provision.

E. **Building footprint**. Removal of trees and ground cover within a maximum of ten feet (when required for construction) of the perimeter of the building line and any area proposed to be cleared for driveway, septic, sewer and water purposes, of a single-family or duplex dwelling to be constructed as indicated on the plot plan submitted to the building official with an application for a building permit; provided, however, the director may require minor modifications in siting and placement of driveways, utilities and septic tank drain field systems and sewer and water lines where such modifications will promote the goals of the chapter and still satisfy the need and function of improvements.

F. **Clear vision**. Removal of obstructions required by the vision clearance at intersections regulations of Chapter Four of the Development Guidelines and Public Works Standards. (Ord. 1417 §10, 2013; Ord. 1269 §9, 2006; Ord. 904, 1991; Ord. 650 §4, 1982; Ord. 399 §1 (part), 1975).

G. City owned property. Tree assessment, removal and replacement of trees on city owned property.

14.32.060 Application for permits.

A. *Pre-Submission Conference*. Prior to application for land use permits and actions such as a land division, commercial site plan review (SPR), or a conditional use permit (CUP), a pre-submission conference shall be required consistent with the requirements of chapter one of the Development Guidelines and Public Works Standards. The pre-submission conference is designed to review the proposed action and identify permit requirements and issues an applicant may incur if the project is implemented. As part of this review it should be made clear that the city of Lacey has an Urban Forest Management Plan and tree protection regulations that require early consideration of tree protection options, and that urban forest concepts and strategies shall be part of the early design considerations for new projects. Location and design of major infrastructure, buildings, and planned uses must consider the tree protection opportunities to further the purposes of the Urban Forest Management Plan.

B. *Applicable Requirements.* An application for a land clearing permit or information required by this chapter shall be submitted at the same time as a valid land use application or building permit on a form provided by the

city and shall be accompanied by such of the following documents and information as are determined to be necessary by the director:

1. *Site Plan.* Copies of the site plan, pursuant to requirements of chapter one of the Development Guidelines and Public Works Standards, which shall include the following information:

a. Name, address, and telephone number of the applicant and owner of property;

b. Legal description of property;

c. Date, north arrow, and adequate scale, as determined by the director, on the map or plot plan;

d. Topography map showing contours at not greater than ten-foot intervals of proposed clearing projects within areas of steep slopes, creeks and shorelines;

e. Location of proposed improvements, including, but not limited to, structures, roads, driveways, utilities, and storm drainage facilities. Said improvement locations shall also be staked on site to enable the city's tree protection professional and other city staff to review improvement locations and their relationship to the site and existing vegetation;

f. Approximate and general location, type, size and condition of trees and ground cover and a general identification of trees and ground cover which are to be removed.

2. *Tree Protection Professional Report.* On forested property greater in size than one acre or commercial property with one or more trees, or other sites the city deems it necessary because of special circumstances or complexity, the city's tree protection professional shall review the site and provide a report analyzing the site for tree protection consistent with the requirements of this chapter. The report should provide information important to urban forest management and options for consideration when developing preliminary designs. The report should suggest options for design to best achieve the purposes of the Urban Forest Management Plan and this chapter. The report shall include but shall not be limited to:

a. Information required under subsections (B)(1) through (7) of this section;

b. An analysis of technical information requested by the review body related to trees and forest practices;

c. Analysis of what portion of the site is best for designation of the tree tract if required, considering the intent of this chapter, soil type, topography, tree species, health of trees and reasonable project design limitations;

d. Recommendations for saving of individual tree specimens based upon the intent of this chapter, soil type, topography, tree species, health of trees, and reasonable project design limitations;

e. A plan for protection of trees to be saved during construction including placement of construction fences, monitoring of construction activity and other measures necessary to ensure adequate tree protection;

f. Consideration of the location of roads, other infrastructure, and buildings and potential options for alternative locations, if applicable, to best satisfy the purposes of the Urban Forest Management Plan;

g. A timeline for tree protection activity;

h. The final tree protection plan should be prepared on the site grading plan. All tree protection fences, trees to be saved, and trees to be removed should also be shown on the site demolition plan. Necessary save-tree pruning and selective thinning within tree tracts shall be detailed and trees marked as such. The tree protection plan and demolition plan should be part of the submittal to the city of Lacey and shall be approved by the tree protection professional. The tree protection plan shall be part of the contractor bid package and a copy of the tree protection plan shall be available to the contractors on site at all times during logging, clearing, and construction.

3. *Schedule.* A proposed time schedule for land clearing, land restoration, implementation of erosion control and any excavation or construction of improvements.

4. *Strategy for control.* A statement indicating the method to be followed in erosion control and restoration of land during and immediately following land clearing.

5. *Landscape plan.* Proposed landscape plan or written or graphic description of proposed action.

6. *Areas of saved trees.* Location of tree tracts, proposed buffers, open space, and other areas of the site where stands of trees are to be saved.

7. *Revegetation.* If the option for revegetation of the site or a portion of the site is proposed under LMC 14.32.069, information requirements described under LMC 14.32.069 shall be required at the time of application.

C. *Review Body.* Review shall take place as part of the underlying permit review process. The review body (site plan review committee, hearing examiner, or city council) shall review the application and make a decision in accordance with review requirements of the underlying permit.

D. *Expiration.* Any permit granted hereunder shall run with the underlying permit or shall expire eighteen months from the date of issuance. Upon a showing of good cause, a permit may be extended by the director for one six-month period. The permit may be suspended or revoked by the director because of incorrect information supplied or any violation of the provisions of this chapter. Minor amendments of a permit may be granted by the director. Major amendments may be accomplished only by making a new application and proceeding through the requirements of this chapter and chapter one of the City of Lacey Development Guidelines and Public Works Standards. Major alterations are changes that alter the intent of the original

decision. What constitutes a minor or major amendment shall be left up to the discretion of the director who may consult the review body for guidance.

E. *Permit Notice Posted.* No work shall commence until a permit notice has been posted on the subject site in a conspicuous location. The notice shall remain posted until the project has been completed.

F. *Preconstruction Conference.* Prior to the start of logging and land clearing activity, a preconstruction conference shall be held with the city tree protection professional to insure the contractors understand the necessary tree protection measures prescribed in the tree protection plan and that all required tree protection fences and other required tree protection activity is completed prior to the start of site work. (Ord. 1539 §20, 2019; Ord. 1269 §10, 2006).

14.32.062 Repealed.

Repealed by Ord. 1192.

14.32.063 Conformance to standards.

All land clearing shall conform to the following standards and provisions unless otherwise recommended in a forest management plan, prepared by the city's tree protection professional and approved by the city, where the alternate procedures will be equal or superior in achieving the policies of this code. In addition, the following minimum standards and provisions shall be the governing criteria for the issuance or denial of land clearing permits under this chapter:

A. **Tree tract**. Land clearing shall meet requirements for tree tracts as specified in LMC 14.32.064.

B. **Soil stability**. The clearing will not create or contribute to landslides, accelerated soil creep, settlement and subsidence or hazards associated with strong ground motion and soil liquefaction.

C. **Preservation**. The proposal shall contain reasonable provisions for the preservation of natural topography, water features, vegetation, drainage and other existing natural features on the site.

D. **Runoff**. The clearing will not create or contribute to flooding, erosion or increased turbidity, siltation or other forms of pollution in a watercourse.

E. **Sensitive areas**. No ground cover or trees which are within the designated buffer area of creeks, streams, lakes and other shoreline or wetland areas shall be removed, nor shall any mechanical equipment operate in such areas; provided, that conditions deemed by the director to constitute a hazard may be removed; and provided, that a property owner shall not be prohibited from making landscaping improvements where such improvements are consistent with the aims of this chapter. The designated buffer area shall be in accordance with the city's wetland protection ordinance as hereafter amended. Buffer areas shall be consistent with best available science guidelines and recommendations from the Washington State Department of Ecology for classification, protection and designation of wetlands and wetland buffer areas.

F. **Aesthetic character**. The clearing will be undertaken in such a manner as to preserve and enhance the city's aesthetic character. Vegetative screens or buffer strips shall be maintained or be reestablished in a timely manner with approved plantings along public rights-of-way and adjoining property boundaries.

G. **Erosion control**. Clearing operations shall be conducted so as to expose the smallest practical area of soil to erosion for the least possible time, consistent with an anticipated build-out schedule.

H. **Conformance with laws**. Land clearing activities shall be performed in accordance with all applicable laws, rules and regulations pertaining to air and water pollution, the Washington Forest Practices Act, and the Shoreline Master Program.

I. **Protection of roots**. Except for the use of existing roads and constructed pathways, land clearing machinery shall be kept outside of the root protection zone of any trees designated for retention. Damaging of trees designated for retention by making cuts or fills, trenching, compacting of the soil, draining concrete rinsate, attaching wires or other devices to the trees, piling of materials, modification of drainage within the root protection zone, breaking of tree stems or branches, removal of desirable groundcovers from under tree, or otherwise damaging the roots or root zone of the tree shall be considered a violation of this chapter and shall require mitigation pursuant to the requirements of LMC 14.32.090(C). All requirements for protection of trees and vegetation detailed in plans prepared by the city's tree protection professional or in land clearing conditions required by staff such as fencing and other protection measures shall be satisfied.

J. **Clearing of individual lots with land division approvals prohibited**. Where a land division of property is concerned, only areas where streets and utilities are to be constructed can be cleared of trees and ground cover. No such rights-of-way clearing of trees or ground cover shall take place until preliminary short plat, preliminary plat or preliminary binding site plan approval has been granted and engineered plans for road construction have been approved by the city and said road areas have been surveyed and staked to enable city staff to confirm road locations. No tree removal or brushing shall take place on lots or in open space areas of a preliminary short plat or preliminary plat except through the provisions of LMC 14.32.069. Additionally, no tree removal or brushing shall take place on lots or in open space areas of a final land division except through the provisions of LMC 14.32.069, or on a lot by lot basis after individual building permit applications have been made and land clearing activities have been approved for said individual lots pursuant to the requirements of LMC 14.32.050 or 14.32.060.

K. **Intent**. Land clearing shall meet the intent and requirements of Lacey's Urban Forest Management Plan.
(Ord. 1496 §22, 2016; Ord. 1269 §11, 2006).

14.32.064 Tree tract requirements.

Every commercial project over one acre in size, and every land division over two acres in size shall be required to designate a tree tract(s) to further the goals of the Urban Forest Management Plan for maintenance and no net loss of tree canopy in the city of Lacey.

A. **Tree tract basic standard**. The tree tract or tracts shall generally cover five percent or more of the site and shall represent the primary strategy for maintaining the tree canopy. All developing properties shall create a tree tract equal to five percent of the gross site area.

B. **Tree tract credit for required open space area**. Land divisions and most binding site plans require provision of open space as a requirement of the approval process. Up to one hundred percent of the requirement for a tree tract(s) may be satisfied in combination with the open space requirement provided the following conditions apply:

1. The open space area can function for necessary recreation activities, is located in the most strategic location of the site to provide centralized recreation functions or combined with adjacent open space identified for a public park;

2. The open space satisfies open space needs as identified in the City Comprehensive Plan for outdoor recreation;

3. The location is the best site for the tree tract(s) based upon urban forestry principles and intent of the Urban Forest Management Plan.

4. If the open space and tree tract location requirements are not compatible, the requirement for open space may be reduced to provide for the full tree tract requirement provided the following conditions apply:

a. There shall be adequate area set aside for tot lot and subdivision park activities to satisfy the expected needs of the subdivision residents, as determined by the city parks and recreation department director;

b. In no case shall the combined amount of land in the open space and tree tract(s) be less than the original open space requirement for the development.

5. Cash or like value of land area and improvements may be donated to the city in lieu of a tree tract. Any cash donated to the city shall be deposited in the city tree account. The city shall then utilize those funds for planting trees in other areas of the city. Acceptance of such a donation will be at the discretion of the site plan review committee and consistent with city policies for the provisions of establishing tree tracts.

C. **Ownership**. Tree tracts shall be held in common ownership by the homeowner's or lot owner's association or a comparable entity. Tree tracts may be deeded to the city of Lacey if approved by the city.

D. **Priority of tree types**. Trees to be protected must be healthy, windfirm, and appropriate to the site at their mature size, as identified by a qualified professional forester. In designing a development project's tree tract, the applicant shall protect the following types of trees in designated tract(s) in the following order of priority, unless Endangered Species Act-listed species in accordance with LMC 14.33.117 are present:

1. **Historical trees**. Trees designated as historical trees under LMC 14.32.072.

2. **Specimen trees**. Unusual, rare, or high quality trees.

3. **Critical area buffer**. Trees located adjacent to critical area buffers.

4. **Significant wildlife habitat**. Trees located within or buffering significant wildlife habitat.

5. **Other high quality**. Individual trees or groves of trees. (Ord. 1496 §23, 2016; Ord. 1417 §11, 2013; Ord. 1269 §12, 2006).

14.32.065 Tree replacement in tree tracts.

Tree replacement is required where no trees exist in the tree tract, where tree canopy coverage in the tree tract is less than one hundred percent, where unhealthy, unsuitable, or hazardous trees occur within the tree tract, where gaps in the stand require replanting, or where underplanting is necessary for future stand replacement. The tree tract shall be replanted to achieve ninety percent canopy coverage within fifteen years. Replacement trees will be a minimum of 1.5 inch caliper for deciduous species and 6-7 foot tall for conifers unless otherwise recommended by the city tree protection professional. Conifers will be native to the Pacific Northwest. Deciduous tree species will be compatible with the other trees in the tract, and will provide wildlife, aesthetic, and other amenities to the tract. (Ord. 1269 §13, 2006).

14.32.066 Tree replacement and establishment of new trees on lots.

Tree planting is required on all newly developed single and multi-family residential, commercial, and industrial lots, and all properties on which a class IV forest practice occurs. A minimum tree threshold, according to the provisions of this section, is required on all developed lots where tree removal or other site disturbance is proposed.

When trees are planted on individual lots the species shall be appropriate for the size of the lot and the space planted pursuant to guidance provided in the Urban Forest Management Plan and, if applicable, as provided on approved revegetation or landscaping plans developed for the land division.

The following table provides a summary of the required minimum tree requirements and replacement for developed and developing properties. (See *Table* 14T-18).

TABLE 14T-18

Type of Development	Lot Size	Required New or Saved Trees	Tree Size **
Developing Single- and Multifamily Lots	Less than 3,500 ft^2	2	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
	3,500 ft^2 to 4,999 ft^2	3	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
	5,000 ft^2 to 6,499 ft^2	4	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
	6,500 ft^2 to 7,499 ft^2	5	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
	7, 500 ft^2 or over	4 trees per 5,000 ft^2	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
Developed Single-Family and Multifamily Lots	All***	4 trees per 5,000 ft^2*	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
Developing Commercial or Industrial	All	2 Trees per 10,000 ft^2*	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
Developed Commercial/Industrial/Multifamily Proposing an Addition, Tree Removal, or Other Site Disturbance	All	2 Trees per 10,000 ft^2	2.0" Caliper measured 6" above the base Deciduous 7' Tall Conifers
Class IV Forest Practice Activity	All	Replanting required when average stocking (basal area) falls below 80 ft^2 per acre – Tree spacing required is 10 ft on center	Seedlings or transplants 1+1, 2-0, 2-1, P+1, or 1-2

* In addition to all tree tract requirements and landscape ordinance requirements.

** Tree species will be selected from the general tree list in the Lacey Urban Forest Management Plan.

*** Developed single-family lots seven thousand five hundred square feet or larger proposing tree removal in accordance with LMC 14.32.050(D), that do not currently meet the required tree density of four trees per five thousand square feet, shall be required to replant the number of trees equal to the number removed.

A. **Replacement tree location**. The applicant's proposed location of transplanted or replacement trees shall be subject to city approval as part of the tree plan. Replacement trees should be planted according to the following priority:

1. **On-Site**.

2. **Off-site**. When space is unavailable for planting the required trees on-site, then they may be planted at another approved location within the city of Lacey or Lacey's growth area.

B. **City tree account**. When on-site and off-site locations are unavailable, the applicant shall pay an amount of money equal to the replacement cost of the replacement trees into the city's tree account. The replacement cost is the retail cost of the tree plus all cost of planting and maintenance for three years.

C. **Tree replacement**. Replacement trees shall meet the required quality and priority. On sites where there are currently inadequate numbers of existing trees, or where the trees are inappropriate for protection as determined by the tree protection professional, then replacement tree planting shall be required. In designing a development project and in meeting the required tree stocking the following trees shall be planted in the following order of priority:

1. **Buffers**. Trees in or adjacent to critical area and/or significant wildlife habitat.

2. **Tree tracts**. Trees to replace unhealthy or unsuitable trees for tree tracts with no trees or inadequate numbers of trees.

3. **Landscaping**. Trees required to be protected or planted as a requirement of this chapter are in addition to any required to be planted by the Landscaping Ordinance Chapter 16.80 LMC. Protected trees within any required landscaping area can be used to satisfy the required spacing in the landscaping requirements. For residential subdivisions this may include entrance landscaping, traffic islands, separate deeded tree tracts, and other common areas.

D. **Replacement tree quality**. Replacement trees shall meet the quality, caliper, and root-ball size standards delineated in the Urban Forestry Management Plan and the current edition of the American Standard for Nursery Stock (ANSI Z60.1). Trees shall be healthy and free of damage, insects, and disease, be well-branched and show evidence of cultural care in the nursery to create quality trees.

E. **Replacement tree planting standards**. Trees shall be planted pursuant to the industry planting standards delineated in the Urban Forestry Management Plan. (Ord. 1496 §111 (part), 2016; Ord. 1417 §13 (part), 2013; Ord. 1269 §14, 2006).

14.32.067 Street tree requirements.

Street trees are required on all public streets within all new developments. The species of tree shall be selected from the street tree list or the general tree list in the Lacey Urban Forest Management Plan. The required tree spacing depends on the expected tree size at age thirty. Landscape trees are required in all alleys. Street trees can be counted towards tree replacement requirements for individual lots. (Ord. 1269 §15, 2006).

14.32.068 Solar access considerations.

While trees have long been used to complement solar planning and site design such as providing deciduous trees in strategic locations to cool areas in summer and providing solar access in winter, providing of adequate solar access may sometimes conflict with protection of existing trees, particularly conifers. When established city goals designed for different purposes conflict, balancing of different community and individual needs must be accomplished. In implementing the goals of this chapter, the review body shall give due consideration to valid solar access needs together with any specific solar access policies that may hereafter be adopted. (Ord. 1496 §24, 2016; Ord. 1269 §16, 2006).

14.32.069 Revegetation option.

Based upon recommendations in a report by the city's tree protection professional, removal of areas of vegetation that might normally be saved may be permitted if extensive revegetation is accomplished and standards for tree tract(s) are satisfied pursuant to the requirements of LMC 14.32.064 and 14.32.065. Such alternatives may be desirable for sites with significant physical limitations such as topography, soil type or proposed small lot sizes (less than sixty-five hundred square feet). Additionally, limitations of existing trees such as unsuitable species or poor health of a particular tree stand may make such options desirable.

On a site with documented special circumstances, an alternative allowing removal of vegetation normally saved may be approved with a comprehensive revegetation plan developed by the city's tree protection professional. ~~At a minimum, the plan shall include:~~

~~A. **General information**. Information required under LMC 14.32.060.~~

~~B. **General standards**. Consideration of the standards provided in LMC 14.32.063.~~

~~C. **Justification**. An evaluation of what circumstances are present in specific areas of the site to make incorporation of topography and existing vegetation undesirable and recommendations on what areas if any can be designed to accommodate existing vegetation.~~

~~D. **Consideration of functions and values**. Consideration of overstory and understory vegetative species to provide wildlife habitat and meet specific purposes important to the neighborhood environment and project design such as buffers, green belts, open spaces, street trees, urban beautification, solar access, and other functions and purposes deemed desirable and appropriate to the anticipated use.~~

~~E. **Landscape plan map**. A comprehensive map showing location, number, species and size of planned vegetative improvements. The plan shall also consider the particular circumstances of the site and proposed project, and detail species selected based upon the anticipated use of the property consistent with the site's zoning designation, permitted uses, and lot size.~~

~~F. **Timing**. A time line for completion of improvements.~~

~~G. **Value of vegetation**. An appraisal of the value of vegetation being removed under this option. Said appraisal must be accomplished pursuant to the most recent guidelines established by the International Society of Arboriculture in its "Guide for Plant Appraisal" and be completed by the city tree protection professional.~~

~~H. **Commensurate value replaced**. Said plan shall provide for a commensurate value of vegetation to be installed as is to be taken out under this option. Said amount shall be above and beyond what is normally required for landscaping in the projects not utilizing this option. The calculated value of the revegetation shall include only appraised value of the trees and vegetation and shall not include the applicant's administrative or labor costs, or the costs of the city's tree protection professional.~~

~~I. **Maintenance**. A three year maintenance plan including provision for an irrigation system, weed control and a shrub and tree maintenance program.~~

~~J. **Protection strategy for vegetation to be saved**. If any existing vegetation is to be saved, a plan shall be provided for the protection of said vegetation during construction activity, including fencing and other protective measures deemed necessary by the city's tree protection professional.~~

~~K. **Land division elements considered**. If the project involves a land division, the landscaping plan should include a comprehensive treatment of tree tracts, open space areas, green belt areas, buffers, common areas, and street frontages (street trees and parkways). All common improvements shall be completed prior to the final land division, approval or financial security provided to the city in a form acceptable to the city in the amount of one hundred fifty percent of the estimated costs including two years maintenance and twenty percent replacement.~~

~~L. **Required consideration for clearing individual lots with land division approval**. If a developer desires to clear individual lots within the land division at the same time as road areas, this may be done if it is consistent with the approved plans and the following conditions are satisfied:~~

~~1. **Valuation of vegetation**. An average valuation of vegetation on individual lots shall be provided with a conceptual plan of typical yard landscaping of equal value. Such conceptual plan shall contain specific guidelines for revegetation of individual lots and said guidelines shall be incorporated into protective covenants and lot owner's association articles of incorporation;~~

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~~2. **Financial security**. Financial security is provided to the city in a form acceptable to the city at one hundred fifty percent of the estimated costs of improvements of individual lots based upon the conceptual typical yard landscaping plan.~~

~~3. **Meets requirements**. A detail of how the revegetation plan satisfies the requirements for tree tract(s) pursuant to this chapter. (Ord. 1269 §17, 2006; Ord. 1208 §56, 2003; Ord. 904, 1991).~~

14.32.070 Additional considerations for commercial developments.

Commercial projects generally have different demands than residential areas. Commercial sites have parking lots to serve the traveling public, they have larger buildings, and they may have need of significant utility infrastructure to service commercial uses. While Lacey has the same goals to maintain our tree canopy and to save significant stands of trees, urban forestry requirements for commercial areas need to be crafted to acknowledge and plan for differences in site design and construction requirements. In addition to other requirements of this ordinance, commercial sites shall have emphasis on the following considerations and requirements:

A. Early planning prior to project design shall consider the stands of trees on the site. For a land use application to be considered complete a tree inventory with consideration of urban forestry issues shall be required to be submitted with the land use application. The tree inventory and evaluation shall be utilized in the design layout of the site. Existing trees and protection opportunities shall play an important role in site design;

B. The major strategy for tree protection on commercial sites will be designation of a tree tract(s) pursuant to the requirements of LMC 14.32.068. Analysis and recommendations of the tree protection professional will determine if certain individual trees should have special emphasis based upon their health and significance, individual site conditions, and retention opportunities. A review of these recommendations shall be provided in the tree protection professional's report;

C. The selection of the location of the tree tract(s) and individual trees shall be chosen early on at the pre-submission stage, before design of the site, and it shall consider the best location of the site to address urban forestry issues. The design of the commercial site layout shall work within the framework of tree protection opportunities for designation of the tree tract and individual trees;

D. Deciduous trees are generally encouraged for parking areas because of advantages for solar access considerations (shading in summer and solar access in winter), temperature and climate control factors (reducing temperature in parking lots in summer), pollution control advantages (broad leaves absorption of gases and removal filtering of particulate matter), and options for providing tree canopy coverage over parking sites and drive lanes. Select deciduous trees can also be chosen for root character that will not damage asphalt and parking lot overlays. For these advantages, planting of select deciduous trees will generally be a good choice to provide canopy coverage in parking lots for commercial sites over the long term. It is also important to restore some native conifers to the project site. This can occur in larger planter islands or as a backdrop to

buildings or as foundation plantings to breakup concrete facades. The tree protection professional's report shall reflect these considerations, shall indicate the best areas for removal of trees to accommodate parking needs (based upon indigenous tree areas with the least protection value) and shall recommend replacement of trees;

E. In some cases commercial sites may require extensive grading because of the nature of the topography and other development requirements. For this reason, and the emphasis on provision of a designated tree tract to achieve canopy goals, some flexibility may be permitted for grading to provide for intensive infrastructure needs of the project design. Provided, the design takes advantage of tree protection opportunities to provide an attractive, functional and unique shopping experience. This flexibility is not intended to limit creative development with the site. Where possible, commercial developments should seek to use variations in terrain to create an interesting development scheme. (Ord. 1269 §18, 2006).

F. Trees planted in planter strips, medians, and tree wells with grates shall follow City of Lacey Development Guidelines and Public Works Standards in Chapter 4B.125, Landscape/Planter Areas for specific site preparation requirements and Drawings 4-17, 4-29, and 4-30.

14.32.072 Historical tree(s).

A. **Purpose**. The purpose of the historical tree designation is to protect trees with a historical significance and to establish a register of these trees. Historical trees require protection due to their special value in that they are irreplaceable. They may be associated with historic figures, events, or properties; or be rare or unusual species; or they may have aesthetic value worthy of protection for the health and general welfare of the residents of this city.

Therefore, the purpose of this section is:

1. **Protection and maintenance**. To provide for the protection and proper maintenance of historical trees, to minimize disturbance to the trees, and to prevent other environmental damage from erosion or destruction of wildlife habitat;

2. **Health, safety, welfare**. To protect the health, safety and general welfare of the public;

3. **Goals and objectives**. To implement the goals and objectives of the city's Urban Forest Management Plan.

B. **Historical Tree Registration**. The city shall prepare and thereafter maintain a list of historical trees within the city limits. The inventory may include a map identifying the location of the trees and a brief narrative description of each historical tree. The historical tree inventory shall be prepared and amended at any time following the procedures established below.

1. **Nomination**. A tree may be nominated for historical tree status by the property owner, a neighborhood organization, or any person by submitting a map, a photograph, and a narrative description including the location, species, approximate age, and the characteristics on which the nomination is based;

2. **Review**. The director, upon receipt of a nomination, shall review the nomination and confer with the city tree protection professional and other city staff as may be appropriate. Notice of the nomination shall be mailed to the property owner and shall be posted by the city on the subject site for a period of ten days. The director shall inspect the tree, consider public comments, and decide in each case whether or not the tree is to be designated a historical tree. The city shall place each designated historical tree on the historical tree register. In the event the owner of the tree does not approve of its designation as a historical tree, the nomination will be disapproved;

3. **Notification of the director's decision**. Notice of the director's decision shall be mailed to the property owner and shall be posted by the city on the subject site for a period of ten days;

4. **Appeal**. Any person may appeal the director's decision to the hearing examiner;

5. **Hearing examiner**. The hearing examiner shall hold a public meeting on the appeal pursuant to the procedures specified in section 1.C.050 (Quasi-Judicial Review of Applications) of the City of Lacey Development Guidelines and Public Works Standards. The hearing examiner will make a decision which will constitute a recommendation to the city council. All recommendations of the hearing examiner will be considered by the city council at the next available council meeting;

6. **Notification of registration**. Each property owner who has one or more registered historical trees shall be notified by first class mail of the designation within thirty days of designation;

7. **Recording of historical tree covenant**. Each property owner who has one or more registered historical trees shall execute a historical tree covenant in a form agreeable to the city. The historical tree covenant shall require that the tree be maintained in a manner which is consistent with the provisions of this chapter. The historical tree covenant shall be recorded by the county auditor. Recording fees shall be paid by the applicant;

8. **Duration of covenant**. The historical tree covenant shall be effective from the date of recording until such a time that a tree removal permit has been issued by the director pursuant to this section;

9. **Education benefits**. From time to time the city may prepare public information programs on historical trees and provide qualified professional tree care advice to owners of the historical trees;

C. **Limitation on removal**. Subject to the exceptions enumerated in subsection D of this section, no person shall remove, or cause to be removed, any historical tree.

D. **Removal Procedures**. Historical trees shall not be removed except through the procedures established in this section.

1. **Permit Required**. No Historical tree shall be removed without first applying for and receiving a land clearing permit. The applicant for the permit shall be the property owner or the city. An application for a tree removal permit shall be submitted on a form provided by the city. The applicant must state the justification for removal on the tree removal application;

2. **Review**. If justification for removal is based upon health of the tree, and a visual inspection by the director cannot establish that the tree is dead, diseased, or hazardous, the applicant shall pay for the city tree protection professional to make a determination. If it is determined by the tree protection professional that the tree is dead, diseased, or otherwise hazardous and cannot be saved, the director may approve the removal. If the tree is determined to be healthy, or with treatable infestation or infection, the director may deny the permit.

If justification is due to reasons other than health of the tree, the director shall confer with other city personnel as may be appropriate in evaluating the justification and make a decision pursuant to the procedures and requirements of section 1E.030 (Limited Administrative Review of Applications) of the Development Guidelines and Public Works Standards;

3. **Notification**. If the director decides that a permit is justified, notice of the director's decision shall be mailed to the applicant, all parties of record, and posted by the city on the subject site for a period of ten days, during which no work shall commence. No work shall commence during the notice periods or when appeals are pending disposition;

4. **Appeal**. The property owner or any person residing or owning property within three hundred feet of the tree may appeal the director's decision to the hearing examiner, whether that decision is positive or negative. Appeals must be submitted in writing within ten days of the posting of the director's decision;

5. **Hearing examiner**. The hearing examiner shall hold a public meeting on the appeal pursuant to the procedures specified in section 1K.050 (Quasi-Judicial Review of Applications) of the Development Guidelines and Public Works Standards. The hearing examiner will make a decision which will constitute a recommendation to the city council. All recommendations of the hearing examiner will be considered by the city council at the next available council meeting. The city council decision shall be final. No work shall commence during the notice periods or when appeals are pending disposition;

6. **Permit for tree removal timing**. Any tree removal permit granted under this chapter shall be valid for one year. In addition to the permit, the property owner will execute a revocation of covenant in a form agreeable to the city. The revocation of covenant shall be recorded by the county auditor. Recording fees shall be paid by the property owner. (Ord. 1269 §19, 2006).

14.32.073 Financial security.

The review body may require financial security in such form and amounts as may be deemed necessary to assure that the work shall be completed in accordance with the permit. Financial security, if required, shall be furnished by the property owner, or other person or agent in control of the property at one hundred fifty percent of the estimated tree and vegetation replacement costs or appraised value. (Ord. 1269 §20, 2006).

14.32.080 Appeals.

Any decision of the city of Lacey in the administration of this chapter may be appealed in accordance with Chapter 1D of the City of Lacey Development Guidelines and Public Works Standards. (Ord. 1192 §55, 2002; Ord. 904, 1991; Ord. 399 §1 (part), 1975).

14.32.090 Violations.

A. **Violation general**. Violation of the provisions of this chapter or failure to comply with any of the requirements shall constitute a misdemeanor and such violation shall be punished as provided by LMC Title 9 for the commission of a misdemeanor. Each day such violation continues shall be considered a separate, distinct offense. The city's code enforcement officer shall promptly investigate all complaints of illegal tree removals.

B. **Penalties**. Any person who commits, participates in, assists or maintains such violation may be found guilty of a separate offense and suffer the penalties as set forth in subsection A of this section.

C. **Mitigation required**. In addition to the penalties set forth in subsections A and B of this section, any violation of the provisions of this chapter shall be mitigated by comprehensive treatment of environmental impacts through revegetation of the affected site. In assessing environmental damage, the city's tree protection professional shall determine the extent and value of vegetation removed or damaged and other environmental damage inconsistent with the intent and requirements of this chapter. In assessing environmental damage, the tree protection professional shall consider what the outcome of the site should have been had the proposed project been designed around existing topography and vegetation and all appropriate vegetation saved. The tree protection professional shall use the methodology in the current edition of the International Society of Arboriculture's "Guide for Plant Appraisal" in determining the value of removed and damaged vegetation.

D. **Environmental damage reviewed**. If the violation is discovered after evidence has been removed, the city tree protection professional shall use whatever resources are immediately available to determine environmental damage which may include aerial photographs, other photographs, interviews with adjacent property owners, receipts of timber sales off the site, and any other records available that have a bearing on the quantity and quality of vegetation removed or environmental damage sustained. The tree protection

professional also may estimate the appraised value of removed vegetation at the site by analyzing the best case growing capability of the site given soil conditions, health of surrounding tree stands and type of species suspected of being removed. The determination of environmental damage made by the tree protection professional shall be given substantial weight in a court of law.

E. **Revegetation**. Once the value of the environmental damage is determined, a comprehensive plan for revegetation of the site shall be prepared by the tree protection professional considering the purposes of this chapter and the specific elements provided in LMC 14.32.069. The plan shall provide for a value of new vegetation commensurate with the determined value of environmental damage at the site. The violator shall be fully responsible for implementation of the plan, accomplishment of all improvements and maintenance of said improvements.

F. **City tree account**. If the cost of restoration of the site is less than the true value of environmental damage at the site, the balance shall be paid to the city tree account. The city shall then utilize those funds for planting trees in other areas of the city.

G. **Appeal**. The determination of the city tree protection professional regarding the environmental damage at the site may be appealed to the city hearings examiner pursuant to the requirements of LMC 14.32.080.

H. **Hearing examiner review**. In review of the tree protection professional's decision, the hearing examiner shall determine if the tree protection professional's decision accurately reflects the criteria set forth in LMC 14.32.020.

I. **Relevant facts**. Additionally, the city hearings examiner may consider any other facts the examiner determines are relevant to the specific situation.

J. **Reduction of monetary value**. In cases where the determined value of environmental damage far exceeds the site restoration requirements, and extenuating circumstances the examiner determines are relevant to the case are present, the hearing examiner may reduce the monetary value assigned to the environmental damage, provided the hearing examiner shall reduce the determined compensation only when all of the following criteria are demonstrated by the applicant:

1. **Professional forester or certified arborist**. A professional forester, certified arborist, or other professional who could have alerted the applicant of tree protection requirements was not involved in the action leading to the violation;

2. **Monetary gain**. The violation action was not associated with a tree harvesting operation for monetary gain;

3. **Previous record**. The applicant has no previous record of tree and vegetation protection and preservation ordinance violations.

K. **Monetary compensation**. If all of the above criteria are demonstrated, the hearing examiner may reduce the monetary compensation required. In determining the monetary compensation reduction, the hearing examiner shall consider the following factors:

1. **Person responded**. Whether the person responded to staff attempts to contact the person and cooperated with efforts to review the site and arrive at an agreement on site restoration;

2. **Due diligence**. Whether the person showed due diligence and/or substantial progress in site restoration;

3. **Code interpretation**. Whether a genuine code interpretation issue exists;

4. **Other factors**. Any other factors considered relevant to the situation by the hearings examiner.

L. **Limitation on reduction**. In fixing the amount of compensation, the hearings examiner shall not reduce the determined compensation by more than thirty percent of the true value of the environmental damage as determined by the tree protection professional; provided further, that no reduction shall be given in cases where the true value of environmental damage does not exceed the cost of restoration determined necessary by the city's tree protection professional; provided further the hearing examiner may double the monetary compensation if the violation is a repeat violation. In determining the amount of increased compensation, the examiner shall also consider the criteria of this section.

M. **Appeal of hearing examiner determination**. Appeals of violation determinations by the city hearing examiner shall be appealed to Superior Court. An appeal of the hearing examiner decision must be filed with Thurston County Superior Court within twenty calendar days from the date the hearing examiner decision was mailed to the person to whom the decision on monetary compensation was made. (Ord. 1269 §21, 2006; Ord. 935 §2 (part), 1992).

14.32.095 Requirements for foresters and contractors doing land clearing work in Lacey.

In order to assure compliance with the standards and requirements of this chapter, "Tree and Vegetation Protection/Urban Forest Management," foresters, arborists, and logging and land clearing contractors or others involved in land clearing operations in the city of Lacey shall be required to sign and submit a "Statement of Tree and Vegetation Protection Acknowledgment" to the city of Lacey. This statement shall attest such forester's or contractor's knowledge of the city of Lacey's tree and vegetation protection requirements. This statement shall be required in conjunction with normal city licensing requirements for persons performing work in the city of Lacey. The required statement shall be in substantially the following form:

"I, _____, a duly licensed professional contractor in the State of Washington, or professional forester, hereby attest that I have read and am knowledgeable of Chapter 14.32, "Tree and Vegetation Protection/Urban Forest Management", of the city of Lacey.

"I further attest that, as a professional doing land clearing work in the city of Lacey, I am accountable for following the city's tree and vegetation protection and conservation requirements, including obtaining a land clearing permit or exemption prior to performing land clearing work, as defined by Chapter 14.32.030(C) of the Lacey Municipal Code, as well as following all conditions and requirements of said permit or exemption.

"I attest that if I fail to follow tree protection requirements I will be held jointly responsible with the landowner for any restitution required as a result of environmental damage determined by the city tree protection professional to be the result of improper land clearing activities at the site. This may result in claims against my bond pursuant to Section 18.27.040 of the Revised Code of Washington and other monetary penalties as allowed by this chapter or State law."

Private professionals involved in land clearing operations who do not provide the above statement shall be prohibited from performing land clearing services in the city of Lacey. Said professionals who do not provide this statement and perform land clearing services in the city of Lacey shall be considered in violation of this chapter and may be prosecuted under this chapter, the city's civil penalties ordinance, or as otherwise provided by law. All foresters, arborists, loggers, or other land clearing contractors involved in land clearing operations shall be jointly responsible with the landowner for any land clearing violation and restitution required at a site as a result of improper land clearing activity. (Ord. 1269 §22, 2006; Ord. 935 §2 (part), 1992).

14.32.100 Severability.

If any section, paragraph, subsection, clause or phrase of this chapter is for any reason held to be unconstitutional or invalid such decision shall not affect the validity of the remaining portions of this chapter. (Ord. 904, 1991; Ord. 399 §1 (part), 1975).