City of Bellevue
Development Services Department
Land Use Staff Report

Proposal Name:	**Satomi Open Space Vegetation Management Plan**
Proposal Address:	**5411 Lakemont Blvd SE**
Proposal Description:	The applicant requests a Critical Areas Land Use Permit for a Vegetation Management Plan that includes removal and pruning of selected trees to encourage forest succession and promote forest health and native plant restoration in affected areas.
File Number:	**09-127514 XE**
Applicant:	**Erin Prendergast**
Decisions Included:	Critical Areas Land Use Permit (Process II. LUC 20.30P)
Planner:	**Kevin LeClair**, Planner
State Environmental Policy Act Threshold Determination:	**Determination of Non-Significance** Carol V. Helland, Environmental Coordinator Development Services Department
Director's Decision:	**Approval with Conditions** Carol V. Helland, Land Use Director Development Services Department

Application Date:	October 16, 2009
Notice of Application Publication Date:	October 29, 2009
Decision Publication Date:	March 4, 2010
Project/SEPA Appeal Deadline:	March 18, 2010

For information on how to appeal a proposal, visit Development Services Center at City Hall or call (425) 452-6800. Comments on State Environmental Policy Act (SEPA) Determinations can be made with or without appealing the proposal within the noted comment period for a SEPA Determination. Appeal of the Decision must be received in the City's Clerk's Office by 5 PM on the date noted for appeal of the decision.

DEVELOPMENT SERVICES DEPARTMENT
ENVIRONMENTAL COORDINATOR
450 100th Ave NE., P.O. BOX 90012
BELLEVUE, WA 98009-9012

DETERMINATION OF NON-SIGNIFICANCE

PROPONENT: Erin Prendergast, Parks & Community Services Department

LOCATION OF PROPOSAL: Satomi Park, 5411 Lakemont Boulevard

NAME & DESCRIPTION OF PROPOSAL:
The applicant requests a Critical Areas Land Use Permit for a Vegetation Management Plan that includes removal and pruning of selected trees to encourage forest succession and promote forest health and native plant restoration in affected areas.

FILE NUMBER: 09-127514 XE

The Environmental Coordinator of the City of Bellevue has determined that this proposal does not have a probable significant adverse impact upon the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(C). This decision was made after the Bellevue Environmental Coordinator reviewed the completed environmental checklist and information filed with the Land Use Division of the Development Services Department. This information is available to the public on request.

☐ There is no comment period for this DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision. A written appeal must be filed in the City Clerk's office by 5:00 p.m. on _____.

X This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS. There is a 14-day appeal period. Only persons who submitted written comments before the DNS was issued may appeal the decision. A written appeal must be filed in the City Clerk's Office by 5 p.m. on March 18, 2010.

☐ This DNS is issued under WAC 197-11-340(2) and is subject to a 14-day comment period from the date below. Comments must be submitted by 5 p.m. on _____. This DNS is also subject to appeal. A written appeal must be filed in the City Clerk's Office by 5 p.m. on _____.

This DNS may be withdrawn at any time if the proposal is modified so that it is likely to have significant adverse environmental impacts; if there is significant new information indicating, or on, a proposals probable significant adverse environmental impacts (unless a non-exempt license has been issued if the proposal is a private project): or if the DNS was procured by misrepresentation or lack of material disclosure.

Environmental Coordinator

March 4, 2010
Date

OTHERS TO RECEIVE THIS DOCUMENT:
State Department of Fish and Wildlife
State Department of Ecology,
Army Corps of Engineers
Attorney General
Muckleshoot Indian Tribe

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1. SEPA Environmental Checklist
2. Vegetation Management Plan

I. Proposal Description

The applicant is requesting a Critical Areas Land Use Permit for a Vegetation Management Plan that includes the removal and pruning of selected trees, native plant restoration, and forest succession and health treatments.

Vegetation management is an allowed use within critical areas and critical area buffers in accordance with Land Use Code (LUC) 20.25H.055.

II. Site Description, Zoning, Land Use and Critical Areas

A. Site Description

Satomi Park Open Space (Satomi) is located west of Lakemont Boulevard SE. It is bordered on the east and north by condominiums, and on the west by single family residential homes. The southern edge of Satomi is bordered by Bellevue Fire Station Eight. Satomi is 3.1 acres in size. There is a soft-surface, non-motorized trail running north-south. The trail connects other open spaces in the vicinity.

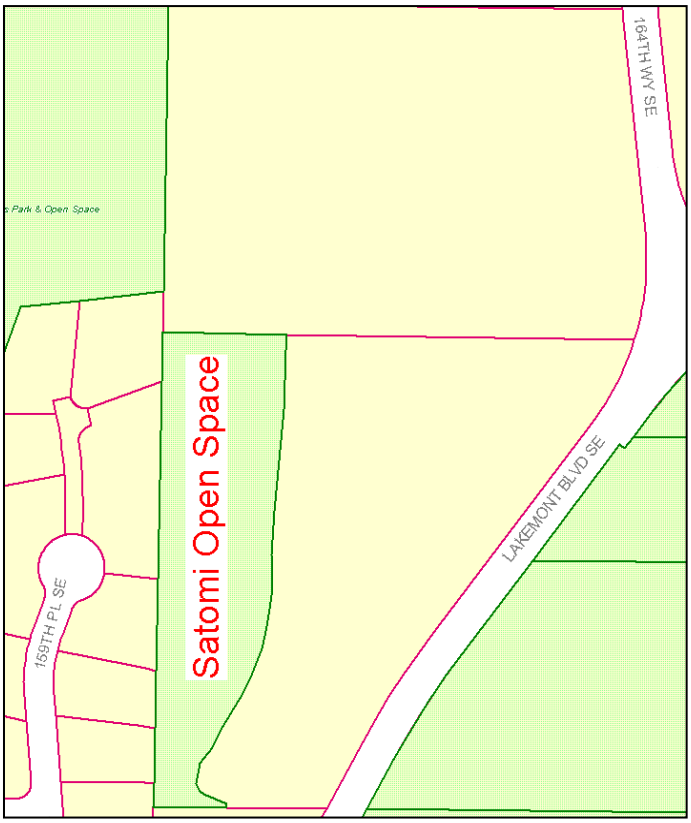

Figure 1: Vicinity Map

Satomi slopes down from the west to the east, with slopes ranging from 20% to over 40%, in some cases. Satomi is forested with vegetation in an early-successional stage dominated by red alder, black cottonwood and big-leaf maple with small areas of Douglas-fir and western red cedar. This forest composition is an indication that the site is moving towards the next successional stage. The canopy is closed, creating a shady environment for the understory plants which are diverse and typical of the understory natives found in the Puget Sound lowlands.

B. Zoning

The property is zoned R-7.5. The property is also within the Critical Areas Overlay District due to the presence of steep slope - geologic hazard critical areas.

C. Land Use Context

The property is currently a publicly-owned, forested open space. Its location between

a condominium complex on the east and a single-family residential subdivision on the west allows the property to serve as land use buffering between two areas of development. The property's elevation above the condominiums and Lakemont Blvd also allow it to serve as a green backdrop to the neighborhood.

D. Critical Areas Functions and Values

i. Geologic Hazard Areas

Geologic hazards pose a threat to the health and safety of citizens when commercial, residential, or industrial development is inappropriately sited in areas of significant hazard. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices. When technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided (WAC 365-190).

Steep slopes may serve several other functions and possess other values for the City and its residents. Several of Bellevue's remaining large blocks of forest are located in steep slope areas, providing habitat for a variety of wildlife species and important linkages between habitat areas in the City. These steep slope areas also act as conduits for groundwater, which drains from hillsides to provides a water source for the City's wetlands and stream systems. Vegetated steep slopes also provide a visual amenity in the City, providing a "green" backdrop for urbanized areas enhancing property values and buffering urban development.

ii. Habitat Associated with Species of Local Importance

Urban habitat is a vital component of wildlife conservation efforts. As human settlements increase in density and intensity there is a profound and lasting effect on the natural environment and wildlife habitat. Urbanization is a major cause of native species local extinctions and is likely to become the primary cause of extinctions in the coming century. Bellevue is situated on the shorelines of two large bodies of water with numerous streams and wetlands interspersed throughout the community. The associated floodplains and riparian systems make up a relatively small percentage of land cover in Bellevue, yet they provide habitat for rich wildlife communities, which in turn provide a source for urban habitat patches or reserves. Consequently, Bellevue still supports rich wildlife communities.

III. Consistency with Land Use Code Requirements:

A. Zoning District Dimensional Requirements:

The site is located in the R-7.5 zoning district. No structures are proposed for development, therefore the dimensional requirements for this land use zoning district do not apply.

B. Critical Areas Requirements LUC 20.25H:

i. Vegetation Management Performance Standards LUC 20.25H.055.C.3.i.v

Vegetation may be periodically removed from the critical area or critical area buffer as part of an ongoing routine maintenance plan for park projects allowed pursuant to a Vegetation Management Plan described below. In accordance with the requirements, the plan was prepared by the Parks & Community Services staff, professionals qualified to prepare and implement of such a plan by virtue of their training and experience as professional foresters and certified arborists.

Vegetation Management Plan includes the following items, in accordance with the performance standards:

a. The vegetation management plan describes the existing site conditions and discusses the critical area functions and values associated with the steep slope critical area and the habitat associated with species of location importance.

b. The plan discusses the history of the site, how it was developed, and the expected successional trajectory of the site.

c. The plan describes the Parks & Community Services Department's management objective for the site. They include: forest health, wildlife habitat, recreation, water/air quality, public safety, and neighborhood buffering.

d. While the applicant did not submit a topographic survey, the management plan does describe the site adequately to understand the scope and potential risk associated with the sensitive features on the site. The plan references previous geotechnical evaluations that have been conducted on the site in advance of the site development associated with the condominiums.

e. The management plan identifies the soils, existing vegetation, and habitat associated with species of local importance present on the site. The soils are Beausite gravelly sandy loam, 6 to 15 percent slopes (BeC), and Beausite gravelly sandy loam, 15 to 40 percent slopes (BeD). There is medium runoff and erosion potential for BeC, and rapid or very rapid runoff and erosion potential for BeD. The propose management of vegetation is tailored to these specific soil types to prevent unnecessary erosion and limit risk of soil movement.

Vegetation is the main focus of the plan. It discusses in detail the existing vegetation community and the expected successional pathway of the site in the absence of proactive forest management. The plan then proposes a series of management actions that will direct the site toward a desirable successional pathway that better meets the stated management objectives. In short, these actions include: removal and/or snag creation declining alders on the eastern property boundary, native plant restoration with site-appropriate conifer species

and mid and understory shrubs, and irregular shelterwood silvicultural operations.

Shelterwood in this context represents a technique that utilizes the existing overstory canopy to provide adequate shade to exclude shade intolerant tree species (such as bigleaf maple and red alder) from germinating, but favors shade tolerant tree species (such as Douglas-fir and Western Red Cedar) as they develop. The irregularity is introduced as a technique allowing for the forest manager to individually select openings at a measured rate as the planted trees establish and emerge from the understory layer into the mid-story.

The plan discusses the habitat characteristics of the site and provides specific guidance on the preservation of existing habitat features along with the augmentation of habitat through the application of the management actions.

f. The plan describes when specific work actions would be performed to meet the stated objectives. The plan covers a 5-year planning horizon.

g. Through the use of a geographic information system the applicant has clearly delineated of the area within which clearing and other vegetation management practices are allowed under the plan.

h. As stated above, the plan provides for management actions to be completed over the next five years, with maintenance and monitoring to be ongoing thereafter.

C. Consistency with Land Use Code Critical Areas Performance Standards:

i. Performance standards for landslide hazards and steep slopes LUC 20.25H.125

The only applicable performance standards is the LUC 20.25H.125.J, which states, “Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.” The applicant has proposed a vegetation management plan that provides for the management of the property’s vegetation to ensure the management objectives are realized.

ii. Performance Standards for Habitat associated with Species of Local Importance LUC 20.25H.160

If habitat associated with species of local importance will be impacted by a proposal, the proposal shall implement the wildlife management plan developed by the Department of Fish and Wildlife for such species. Based on the management objectives of the proposed vegetation management plan and

the accompanying management actions, it is not anticipated that the proposal will result in any impact to habitat associated with species of local importance. The proposal is anticipated to enhance habitat associated with species of local importance due to the focus on snag creation and native plant restoration and maintenance.

IV. Public Notice and Comment

Application Date:	October 16, 2009
Public Notice (500 feet):	October 29, 2009
Minimum Comment Period:	November 12, 2009

The Notice of Application for this project was published in the City of Bellevue weekly permit bulletin on October 29, 2009. It was mailed to property owners within 500 feet of the project site. No comments have been received from the public as of the writing of this staff report.

V. Summary of Technical Reviews

No other departments or divisions have performed a technical review of the proposal. The specific management actions will be reviewed further and in greater detail by the clearing and grading division under the subsequent clearing and grading permits applications.

VI. State Environmental Policy Act (SEPA)

The environmental review indicates no probability of significant adverse environmental impacts occurring as a result of the proposal. The Environmental Checklist submitted with the application adequately discloses expected environmental impacts associated with the project. The City codes and requirements, including the Clear and Grade Code, Utility Code, Land Use Code, Noise Ordinance, Building Code and other construction codes are expected to mitigate potential environmental impacts. Therefore, issuance of a Determination of Non-Significance (DNS) is the appropriate threshold determination under the State Environmental Policy Act (SEPA) requirements.

A. Earth and Water

The proposal indicates that erosion and sediment movement are potential issues if vegetation management actions are carried out during rain events or if too much vegetation is removed at one entry. These risks will be largely avoided by carefully timing the entries for management activities, along with the implementation of temporary erosion and sedimentation control best management practices. There is no

open water on the property, therefore there is little to no risk of siltation or contamination of water due to the implementation of the proposal. See Section X for a related condition of approval.

B. Animals

The project site is part of a larger natural area that contains quality habitat for birds and mammals. The proposed trail resurfacing follows the snake through existing mature vegetation. Although significant trees will be removed with this proposal, a certain number of larger diameter trees will be converted into wildlife snags to enhance this structural component of the forest. In addition, a dense mixture of native shrubs and trees will be planted along the property boundary. This vegetation will screen the interior of the property, making it more conducive to wildlife movement. No significant impacts are anticipated since wildlife snags will be created and native plants will be installed and maintained.

C. Plants

Mitigation for temporary disturbance will be approved pursuant to an approved restoration planting plans as part of the subsequent required clearing and grading permit. See Section X for related conditions of approval.

D. Noise

The site is adjacent to single-family residences whose residents are most sensitive to disturbance from noise during evening, late night and weekend hours when they are likely to be at home. Noise will be limited by the City's Noise Ordinance (Chapter 9.18 BCC) which regulates construction hours and noise levels. See Section X for a related condition of approval.

VII. Changes to proposal as a result of City review

As a result of review, the applicant provided additional information pertaining to the decision making method that will be used to determine the suitability of trees for snag creation, additional specifics related to the vegetation restoration, additional analysis of the significant cottonwood tree on the interior of the site and the monitoring of its suitability for retention, and additional specifics and rationale for the irregular shelterwood silviculture treatment in the northern third of the property.

VIII. Decision Criteria

A. Critical Areas Land Use Permit Decision Criteria 20.30P

The Director may approve or approve with modifications an application for a critical areas land use permit if:

1. The proposal obtains all other permits required by the Land Use Code;

Finding: The proposal is required to obtain a clearing and grading permit for review and approval prior to commencement of management activities.

2. The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer;

Finding: By thoroughly reviewing the attached vegetation management plan, the City has found that the applicant is utilizing the best management practices for natural area management. These include considerations for public safety, forest health, wildlife habitat, and critical area protection.

3. The proposal incorporates the performance standards of Part 20.25H to the maximum extent applicable, and;

Finding: The applicable performance standards have been incorporated and are discussed fully in Section III of this report.

4. The proposal will be served by adequate public facilities including street, fire protection, and utilities; and;

Finding: The property is currently served by adequate public facilities. The proposal will not increase the need for public facilities.

5. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC Section 20.25H.210; and

Finding: The proposed vegetation management plan includes plans for restoration of all temporary disturbance, along with subsequent maintenance and monitoring provisions that are consistent with LUC 20.25H.210.

6. The proposal complies with other applicable requirements of this code.

Finding: As discussed in Section IV & V of this report, the proposal complies with all other applicable requirements of the Land Use Code.

IX. Conclusion and Decision

After conducting the various administrative reviews associated with this proposal, including Land Use Code consistency, SEPA, City Code and Standard compliance reviews, the Director of Planning and Community Development does hereby **approve with conditions** the proposal for a Vegetation Management Plan within the Satomi Park Open Space steep slope critical area and critical area buffer.

Note- Expiration of Approval: In accordance with LUC 20.30P.150.B, this Critical

Areas Land Use Permit approval is for a 5-year time period beginning at the date of publication. This approval will automatically expire and be void if the applicant fails to apply for the required Clearing and Grading Permit within one year of the effective date of the approval.

X. Conditions of Approval

The applicant shall comply with all applicable Bellevue City Codes and Ordinances including but not limited to:

Applicable Ordinances	Contact Person
Clearing and Grading Code- BCC 23.76	Tom McFarlane, 425-452-5207
Land Use Code- BCC 20.25H	Kevin LeClair, 425-452-2928
Noise Control- BCC 9.18	Kevin LeClair, 425-452-2928

The following conditions are imposed under the Bellevue City Code or SEPA authority referenced:

1. Subsequent Development Permit Requirement: In accordance with the decision criteria for the critical areas land use permit, and to ensure compliance with the applicable clearing and grading codes and standards, a clearing and grading permit must be applied for and obtained prior to the implementation of the management actions described in the attached vegetation management plan.

In successive years, as the vegetation management plan is implemented, the applicant will conduct monitoring of the previous year management actions and report on the performance of the previous actions. The performance measures and monitoring plan will be finalized from the vegetation management plan and reflected in the clearing and grading permit.

Authority: Land Use Code 20.30P.140
Reviewer: Kevin LeClair, Land Use

2. Restoration for Areas of Temporary Disturbance: A restoration plan for all areas of temporary disturbance is required to be submitted for review and approval by the City of Bellevue prior to the issuance of the Clearing and Grading Permit.

The restoration planting plan shall include a palette native plant species consistent with those included in Appendix B of the applicant's vegetation management plan or species palette included in the *Critical Areas Handbook*.

Authority: Land Use Code 20.25H.220.H
Reviewer: Kevin LeClair, Land Use

3. Rainy Season restrictions: Due to the proximity to steep slope critical areas, no clearing and grading activity may occur during the rainy season, which is defined as November 1 through April 30 without written authorization of the Development Services Department. Should approval be granted for work during the rainy season, increased erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

Authority: Bellevue City Code 23.76.093.A,
Reviewer: Tom McFarlane, Clearing and Grading

4. Pesticides, Insecticides, and Fertilizers: The applicant must submit as part of the required Clearing and Grading Permit information regarding the use of pesticides, insecticides, and fertilizers in accordance with the City of Bellevue's "Environmental Best Management Practices".

Authority: Land Use Code 20.25H.220.H
Reviewer: Kevin LeClair, Land Use

5. Noise Control: Noise related to construction is exempt from the provisions of BCC 9.18 between the hours of 7 am to 6 pm Monday through Friday and 9 am to 6 pm on Saturdays, except for Federal holidays and as further defined by the Bellevue City Code. Noise emanating from construction is prohibited on Sundays or legal holidays unless expanded hours of operation are specifically authorized in advance. Requests for construction hour extension must be done in advance with submittal of a construction noise expanded exempt hours permit.

Authority: Bellevue City Code 9.18
Reviewer: Planner, Land Use

City of Bellevue Submittal Requirements | **27a**

ENVIRONMENTAL CHECKLIST

4/18/02

If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit or call the Permit Center (425-452-6864) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Our TTY number is 425-452-4636.

BACKGROUND INFORMATION

Property Owner: City of Bellevue

Proponent: City of Bellevue Parks + Community Services

Contact Person: ERIN Prendergast
(If different from the owner. All questions and correspondence will be directed to the individual listed.)

Address: 450 110th Ave NE

Phone: 425 766 0483

Processing as Critical Areas Land Use Permit
Bellevue File # 09-127514-XE

Proposal Title: Satom: Enhancement

Proposal Location: 5549 Lakemont Blvd SE / Sect 23 TN 24N Range 5E
(Street address and nearest cross street or intersection) Provide a legal description if available.

Please attach an 8 ½" x 11" vicinity map that accurately locates the proposal site.

Give an accurate, brief description of the proposal's scope and nature:

1. General description: remove alders, plant native vegetation, resurfact trail
2. Acreage of site: 3 acres
3. Number of dwelling units/buildings to be demolished: None
4. Number of dwelling units/buildings to be constructed: None
5. Square footage of buildings to be demolished: N/A
6. Square footage of buildings to be constructed: N/A
7. Quantity of earth movement (in cubic yards): N/A
8. Proposed land use: Parks + Openspace
9. Design features, including building height, number of stories and proposed exterior materials: N/A
10. Other

REVIEWED
By Kevin LeClair at 7:47 am, Oct 27, 2009

RECEIVED
OCT 15 2009
PERMIT PROCESSING

Estimated date of completion of the proposal or timing of phasing:

5 year plan 2014

Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. The work area is classified as a critical area + steep slopes have been mapped. A GeoTech report is also included.

Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. List dates applied for and file numbers, if known.

No.

List any government approvals or permits that will be needed for your proposal, if known. If permits have been applied for, list application date and file numbers, if known.

Land Use in Critical Areas Permit
Clear + Grade permit

Please provide one or more of the following exhibits, if applicable to your proposal.
(Please check appropriate box(es) for exhibits submitted with your proposal):

☐ Land Use Reclassification (rezone) Map of existing and proposed zoning

☐ Preliminary Plat or Planned Unit Development
Preliminary plat map

☒ Clearing & Grading Permit
Plan of existing and proposed grading
Development plans

☐ Building Permit (or Design Review)
Site plan
Clearing & grading plan

☐ Shoreline Management Permit
Site plan

A. ENVIRONMENTAL ELEMENTS

1. **Earth**

a. General description of the site: ☐ Flat ☐ Rolling ☐ Hilly ☒ Steep slopes ☐ Mountains ☐ Other

b. What is the steepest slope on the site (approximate percent slope)?

~46%.

c. What general types of soil are found on the site (for example, clay, sand, gravel, peat, and muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

BeC - gravelly sandy loam

REVIEWED
By Kevin LeClair at 7:48 am, Oct 27, 2009

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

N/A

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

yes, after clearing trees + invasives

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

None

Temporary Erosion and Sedimentation Controls will be in place per Bellevue City Code 23..76. Desirable native vegetation will be preserved per Bellevue Land Use Code 20.25H

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

plant with native vegetation right after removal, leave some coarse woody debris on the ground.

2. AIR

a. What types of emissions to the air would result from the proposal (i.e. dust, automobile odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Hand operated power tools would add to air pollution.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

c. Proposed measures to reduce or control emissions or other impacts to the air, if any:

only hand operated tools used, nothing larger. Much wood left on site.

3. WATER

a. Surface

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If

No.

REVIEWED
By Kevin LeClair at 7:49 am, Oct 27, 2009

appropriate, state what stream or river it flows into.

No.

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If Yes, please describe and attach available plans.

N/A

(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None.

(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground

(1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description.

No.

(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

N/A

REVIEWED
By Kevin LeClair at 7:50 am, Oct 27, 2009

c. Water Runoff (Including storm water)

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

N/A

(2) Could waste materials enter ground or surface waters? If so, generally describe.

N/A

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

N/A

4. Plants

a. Check or circle types of vegetation found on the site:

- [x] deciduous tree: alder, maple, aspen, other
- [x] evergreen tree: fir, cedar, pine, other
- [x] shrubs
- [ ] grass
- [ ] pasture
- [ ] crop or grain
- [ ] wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
- [ ] water plants: water lily, eelgrass, milfoil, other
- [x] other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Hazard trees will be removed along East edge, and 4 near trail. Northern forest will be thinned. Invasive in enhancement areas removed.

c. List threatened or endangered species known to be on or near the site.

None known

REVIEWED
By Kevin LeClair at 7:50 am, Oct 27, 2009

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Native plants will be planted on enhancement areas on East edge, conifers planted in Northern section.

5. ANIMALS

a. Check or circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

- [x] Birds: hawk, heron, eagle, songbirds, other:
- [x] Mammals: deer, bear, elk, beaver, other:
- [ ] Fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

None known

c. Is the site part of a migration route? If so, explain.

It may be used as a connector to the larger Lake Hills Open Space.

d. Proposed measures to preserve or enhance wildlife, if any:

Variety of native shrubs and ground covers will be installed in place of removed alder trees.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy need? Describe whether it will be used for heating, manufacturing, etc.

~~[illegible]~~ Solar

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of the proposal? List other proposed measures to reduce or control energy impacts, if any:

—

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Risk of injury as a result of improper tool use

(1) Describe special emergency services that might be required.

—

(2) Proposed measures to reduce or control environmental health hazards, if any.

Hire only trained professionals

REVIEWED
By Kevin LeClair at 7:51 am, Oct 27, 2009

b. Noise

(1) What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?

None.

(2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site. Noise from chain saws + other power tools. Hours of 8-4 acceptable

Work hours are constrained by Noise Control Code, Bellevue City Code 9.18

(3) Proposed measures to reduce or control noise impacts, if any:

—

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?
Open space. Adjacent site is condo complex

b. Has the site been used for agriculture? If so, describe.
No.

c. Describe any structures on the site.
A Retaining wall boarders the eastern side.

d. Will any structures be demolished? If so, what?
No.

e. What is the current zoning classification of the site?
R-7.5

f. What is the current comprehensive plan designation of the site?
SF-UR

g. If applicable, what is the current shoreline master program designation of the site?
N/A

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
Yes - there are critical areas throughout, based on slope %.

I. Approximately how many people would reside or work in the completed project?
None

j. Approximately how many people would the completed project displace?
None.

k. Proposed measures to avoid or reduce displacement impacts, if any:
N/A

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By Kevin LeClair at 7:51 am, Oct 27, 2009

i. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

None.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

N/A

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

N/A

c. Proposed measures to reduce or control housing impacts, if any:

N/A

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

N/A

b. What views in the immediate vicinity would be altered or obstructed?

N/A

c. Proposed measures to reduce or control aesthetic impacts, if any:

N/A

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None

b. Could light or glare from the finished project be a safety hazard or interfere with views?

no.

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c. What existing off-site sources of light or glare may affect your proposal?

NA

d. Proposed measures to reduce or control light or glare impacts, if any:

NA

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

walking / running trails

b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Trail will be resurfaced. Clearer to see, safer.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

NO.

b. Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.

None.

c. Proposed measures to reduce or control impacts, if any:

No.

14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any. Lakemont Blvd. NE. is the main access road. Some parking maybe within condo parking area.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No. Next stop is very far.

c. How many parking spaces would be completed project have? How many would the project eliminate?

None

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not Including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

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By Kevin LeClair at 7:51 am, Oct 27, 2009

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

g. Proposed measures to reduce or control transportation impacts, if any:

N/A

15. Public Services

a. Would the project result in an increased need for the public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No

b. Proposed measures to reduce or control direct impacts on public services, if any.

N/A

16. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

None.

Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature.....

Date Submitted 9.22.09

REVIEWED
By Kevin LeClair at 7:51 am, Oct 27, 2009

Management Plan
For
Satomi Open Space

PARKS & COMMUNITY SERVICES DEPARTMENT

January 1, 2010

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Satomi Park Open Space
Management Plan

Introduction

The following report outlines the Satomi Park Open Space management plan recommendations under the guidelines of the Bellevue Parks and Community Services Department. The purpose of this report is to describe current site conditions and the proposed long-term maintenance and restoration procedures in conjunction with the City of Bellevue's management goals for all open space areas as well as the Land Use Code section 20.25H.

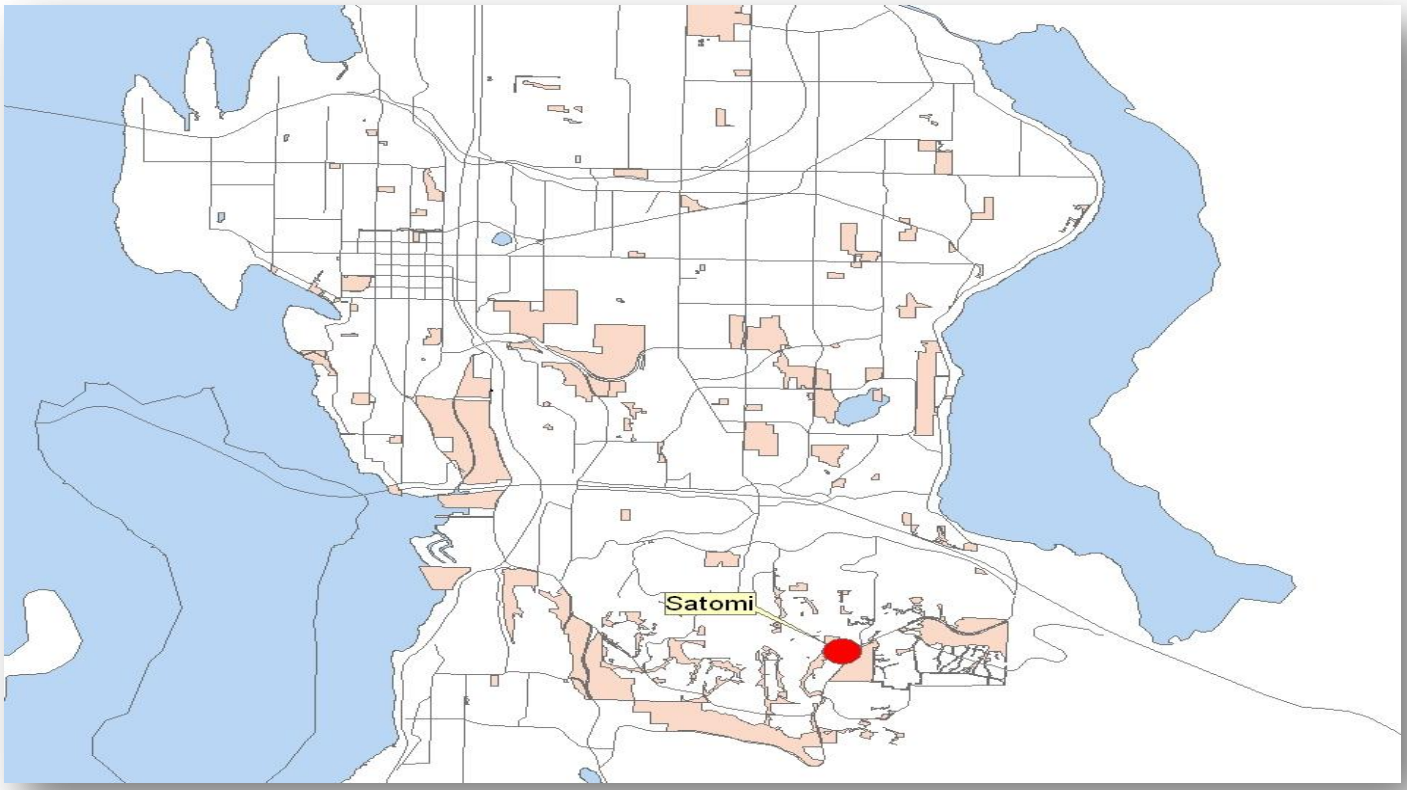
Included in the current site description is information on the Satomi Park Open Space location and history, soil type and sensitive areas, vegetation and forest health, wildlife, recreational benefits, and liabilities such as hazard trees. The forest management plan section of the report will describe the proposed procedures for the removal and planting of vegetation, maintenance of enhanced areas, and how the management goals for Bellevue's open spaces will be met for each action, as well as how each action follow the city's BMP's and Land Use codes. The City of Bellevue's management goals for the parks open spaces include:

1. Forest health
2. Wildlife habitat
3. Recreation
4. Water/Air quality
5. Public Safety
6. Neighborhood buffering

Current Site Description

Property Description / Site History

Satomi Park Open Space is located in the NE ¼ of Section 23, Township 24N, Range 5E. It is positioned east/west between Lakemont Boulevard SE and 159th Place SE. Satomi Park is bordered on the east and north by condominiums, and on the west by single family residential homes. The southern edge of Satomi open space is bordered by Bellevue Fire Station Eight. Satomi Park makes up 3.1 acres of open space. There is a trail running North to South that connects with the Lakemont Highlands trail on the North and the Lewis Creek trail on the South East if Lakemont Boulevard is crossed.


Satomi

Satomi
Lakemont Blvd

Soils/Topography/Tree Stability

A preliminary geotechnical investigation report was completed in 1996 by Kleinfelder Inc. prior to the construction of the Satomi condominiums, a storm water detention facility, interior roadways and other related facilities. A geotechnical reconnaissance of the site was completed on September 13, 1996 and included observations of soil types, surface drainage features, and indications of the stability of existing slopes. At the time of the investigation, there were few areas with a slope of 40% or greater. However, the construction of the complex included a retaining wall on the eastern boarder of the park which increased the slope by 30%-40%. Satomi Open Space is now considered a sensitive area due to the amount of slopes over 40% (See figure 2).

Satomi's soil composition is divided into two types: Beausite gravelly sandy loam, 6 to 15 percent slopes (BeC), and Beausite gravelly sandy loam, 15 to 40 percent slopes (BeD). Beausite's parent material consists of till over residuum of sandstone formed in glaciated areas. These soils are found at or very near sea level and up to about 1,500 feet and occur in mild cool marine climates characteristic of the Pacific Northwest. It is a well draining soil type with very low available water holding capacity, giving it a low incidence of flooding. However, runoff is medium to rapid depending on the percentage of slope for each area. The depth to reach lithic bedrock consisting of sandstone is 24 to 40 inches. Roots can penetrate through the loamy subsoil to the underlying sandstone and grow in fractures in the hardpan layer. The topography of Satomi is sloped with a minor depression running East/West through the center of the property. There is a slope running parallel to the properties on its East and West boarders, with the low end on the East. This is typical of Beusite soil characteristics.

General soil stability is an important concern when managing all open spaces. Soil erosion is a natural process aggravated by vegetation removal and modification, and some soil particles are more susceptible than others. Due to the steep slopes at Satomi, characteristics of the soil types, and the seasonally high levels of rainfall in the area, there is medium runoff and erosion potential for BeC, and rapid or very rapid runoff and erosion potential for BeD. Kleinfelder found glacial till from 1 to 9 ft. deep. Glacial till can be very limiting to deep root growth and is of some cause for concern regarding tree preservation. The potential of healthy tree blow down is moderate. Large, exposed trees may be particularly vulnerable. For edge trees, there is a greater risk of losing limbs or a co-dominant leader. Currently there are many mature red alders that boarder the housing complex on the eastern side of the park. These edge trees are large, and many are rooted in exposed soil where invasive removal has taken place in the past. It is our recommendation to remove or snag those trees that present a hazard and re-pant with native trees, shrubs and vegetation in order to provide a sustainable and long-term benefit to the open space site and adjacent private property and homes. (See tree assessment report: Appendix A)

Certain measures will be taken into consideration such as minimizing the removal of vegetation when possible. When removal is the recommended action, revegetation will be evaluated so as not to cause more damage or disturbance to soil layers and replanting with proper bioengineering techniques such as netting or hydro-mulching will be utilized. Slide-prone areas will be evaluated by a geotechnical expert before restoration begins, and appropriate drainage will be adequately functioning to prevent run-off from saturating or loading steep slopes.

Figure 2: Red areas indicate slopes greater than 40%

The primary function of Bellevue's protected Sensitive Areas is listed as follows:

- Provide a biological basis for maintaining good water quality
- Provide a habitat for terrestrial and aquatic wildlife
- Mange storm and surface water flows
- Contribute a valuable open space character to the landscape
- Provide visual diversity to the urban landscape and a sense of place to visitors and residents

Vegetation/Forest Health

The forest at Satomi is in the Tsuga heterophylla zone, one of the most extensive vegetation zones in western Washington. Though the climax vegetation type is characterized by western hemlock and western red cedar, the Satomi site is in a seral successional stage characterized largely by older deciduous trees that will eventually prepare the forest for conifers including Douglas-fir, western red cedar and western hemlock. Dominant trees on the site include red alder, black cottonwood and big-leaf maple. Small areas of the site are populated by Douglas-fir and western red cedar, an indication that the site is moving towards the next successional stage. With many of the red alders and other mature trees declining, the recommended actions would be thinning, removal and snag creation followed by the planting of Douglas-fir, western red cedar and native shrubs. The overstory canopy is closed, creating a shady environment for the understory plants which are diverse and typical of the understory natives found in the Puget Sound lowlands (See Figure 3).

Native species identified at the site include but are not limited to:

Common Name	Scientific Name
western red cedar	*Thuja plicata*
bigleaf maple	*Acer macrophyllum*
salal	*Gaultheria shallon*
elderberry	*Sambucus racemosa*
sword fern	*Polystichum munitum*
red alder	*Alnus rubra*
Douglas –fir	*Pseudotsuga menziesii*
indian plum	*Oemlaria cerasiformis*
creeping blackberry	*Rubus ursinus*
vine maple	*Acer circinatum*
Oregon grape	*Mahonia nervosa*
black cottonwood	*Populus trichocarpa*
salmonberry	*Rubus spectabilis*
ocean spray	*Holodiscus discolor*
wild rose	*Rosa gymnocarpa*
trailing blackberry	*Rubus ursinus*

Figure 3: A partial list of native species found at Satomi Open Space

There are areas within the park where invasive species are of great concern. Forest edges and open spaces that let in greater sunlight are highly susceptible to blackberry overgrowth. A habitat type inventory has been completed and shows isolated areas of invasive species present within the site (see figure 4). The highest density of invasive species is near the condominium development on the eastern border. Selective control as well as supplemental plantings to out-compete and shade the understory will be very important in the process of protecting the open space and maintaining its environmental benefits. It is our recommendation to implement the thinning, planting, and creation of snags in a phased approach so as not to create larger open areas where invasive species will flourish.

Exotic species include but are not limited to:

Common Name	Scientific Name	
Himalayan Blackberry	*Rubus discolor*	
English Holly	*Ilex aquifolium*	
yellow Archangel	*Lamium galeobdolon*	

Figure 4: A partial list of invasive species found at Satomi Open Space

Wildlife

Satomi Park Open Space is an important resource for wildlife. It is well connected to other larger open spaces, complex in forest structure, supports a diverse vegetative understory and has a varied terrain. The diversity of wildlife species directly reflects the health and stability of urban green spaces, and has the added benefit of offering wildlife viewing recreational activities. Currently, Satomi has a range of birds and mammals making use of its ecological benefits (See figure 5). It is important to note the presence to pileated woodpeckers at Satomi, which are candidates for state listing as threatened, endangered, or sensitive and considered vulnerable at its breeding areas.

A partial list of wildlife present on the site includes the following:

Birds	
song sparrow	Bewick's wren
American crow	house finch
Oregon junco	bushtit
spotted towhee	pine siskin
black cap chickadee	brown creeper
steller's jay	Anna's & Rufous hummingbird
Northern flicker	flycatchers
American robin	

Mammals
raccoon
deer
coyote
mountain beaver

Figure 5: A partial list of wildlife utilizing Satomi Open Space

It is important to carefully consider the affects of habitat alterations on the wildlife populations present on the site. Different successional stages throughout a forest's life will support varying types of wildlife communities. When managing an urban open space, the needs of native wildlife species will be promoted through all forest management actions. All wildlife species require food, water, shelter and space in an appropriate arrangement in order to survive and reproduce. Management practices prescribed on the site will seek to enhance these criteria, improving the habitat for native species. The following will be considered in order in order to ensure the promotion of wildlife requirements:

Connectivity: This parcel of Satomi Park is just north of Lewis Creek Park and joined through its trail system with Lakemont Highlands Park and Open Space on its north west. The large prevalence of wooded and open space areas in the surrounding vicinity puts this parcel in a situation of high connectivity. As such, improvements to wildlife habitat will be well utilized.

Water source: Nearby homes may provide some water in the form of bird baths.

Cover: Satomi Open Space has a closed canopy environment. Over time the canopy will be partially opened in some areas to create pockets for new tree growth. The understory is well covered with native species. However, there are some areas where invasive vegetation was removed in the past, which left isolated bare sections in the forest. These bare areas will be planted with native species suitable for the area given the slope and close proximity to the condo complex (see planting palette: Appendix B).

Snags/Coarse woody debris**:** The construction and maintenance of existing wildlife snags will be considered when managing hazard trees and open space. The amount of woody debris present in the site is minimal. Some woody debris will be left on the forest floor.

Specifically in Satomi Park, there is high potential to increase the habitat benefits of snags and downed woody debris which provide food and shelter for a myriad of small mammals, ground-feeding birds, reptiles, and amphibians. The abundance and diversity of hole-nesting birds, for example, are directly related to the dead and dying wood characteristics and general vegetation features of a forest. Generally, the snags used most by wildlife are large, long-lived native tree species. The conifers at Satomi including cedars, firs, and pines are an example of such trees. These rot slower and last longer than deciduous trees such as alder, aspen, cottonwood, and maple. Nevertheless, because deciduous trees rot quickly, you can create snag habitat sooner in a landscape with short-lived trees such as alder and maple, which are present in Satomi. Here are some ways wildlife use snags:

- Snags offer ideal hunting perches for hawks, eagles, and owls, resting perches for swallows, and "hawking" perches for flycatchers. For example, a flycatcher may perch on a branch, fly out to snatch an insect, and return to the same branch to watch (like a hawk) for more insects.
- Snags are commonly used as song or sentry posts by a wide variety of birds, such as bluebirds, hummingbirds, Townsend's solitaires, and flycatchers. These birds attract mates and proclaim nesting territory boundaries from these promontories.
- Bald eagles, osprey, hawks, band-tailed pigeons, and mourning doves commonly use snags as lookout/loafing perches.
- Snags also provide weather protection for birds mammals and butterflies, resting and sleeping areas, and food storage areas by mice, squirrels and birds.
- Snags and woody debris provide foraging substrates for wildlife.

For a snag to be suitable as a cavity site for wildlife, its diameter must be large enough to accommodate cavity users. Most hole nesting birds have been shown to prefer snags with a diameter greater than 15 inches and to select specific stages of decomposition for feeding and nesting. As a snag decomposes, texture and moisture content of wood fibers change, which in turn affects suitability of the snag as insect habitat. In urban and suburban areas, whenever possible, snags should be well distributed across the landscape. In very small lots, it is best to locate snags in quiet, partially shaded areas. (Appendix C)

Recreation

The Satomi Greenbelt provides many passive recreational opportunities to the community such as walking, jogging, and wildlife viewing. There are three main entrance points into the greenbelt. One on the southern part of the park begins off of Lakemont Blvd. Another in the center of the property connects to the middle of the Satomi housing development. And one entrance on the north side connects Satomi to Lakemont Highlands Open Space. From the northern trail, there is also another access point to Lakemont Blvd. In addition to these three entrances, there are a number of social trails created by the surrounding neighbors.

Trails are the most widely used recreational facility managed by Parks and Community Services. The Parks Open Space and Recreational element in the Comprehensive Plan states that it will be the goal of the City "to protect and preserve open spaces that are ecologically significant sensitive areas serve as buffers between uses and link open space; provide trails, wildlife corridors and greenways." The development of trails in open spaces is further supported in the Parks and Open Space Systems Plan and the Pedestrian and Bicycle Transportation Plan. As a result of such high usage, it is important to maintain high quality trail conditions and forest habitat in order to directly support the types of passive recreation occurring at the site. Improving trail quality will reduce the risk of injury to joggers and hikers, and a healthy forest habitat will increase the wildlife viewing potential.

Improving access to and through Satomi as well as the aesthetic value is an important goal of the City of Bellevue.

Liabilities

As stewards, we are responsible for the safety of people visiting our sites and in many instances the safety of immediate neighbors. Assuring the safety of visitors and preventing damage to private property are important stewardship tasks. Common liabilities are the accumulation of refuse and debris that may cause injury to children, steep eroding stream banks or cliffs, poorly maintained improvements like fences, trail bridges, or picnic tables, tree houses, and poorly placed and constructed trails. Other liabilities may include mine shafts, wells, septic tanks, drainage/erosion problems and tree houses. Negligence, poor management and maintenance, overuse, carelessness and inappropriate behavior can all lead to liability suits.

A well planned, implemented and documented stewardship plan not only prevents many liabilities from occurring but also can be an important mitigating factor in the event of a lawsuit. Government agencies should be particularly concerned about immediate correction of these problems because of the public access mandate and the high exposure to personal injury claims in the judicial system. Non-profit organizations should seek legal council before accepting the risk and liabilities associated with land ownership. Every organization must assess their risk tolerance and exposure and act accordingly. The removal of liabilities almost always improves the appearance and quality of the open space. In natural areas liabilities result from either deteriorated natural conditions or human activities. Correction of these problems will result in a safer and more natural environment.

In forested natural areas a common management concern is the assessment and removal of hazard trees. The trees in this site have been carefully monitored over time to prevent potential hazard trees from falling on a neighbor's property or in the way of recreational trails. However, within the past two years, there has been a need to remove and prune red alders that boarder the housing development on the eastern side of the park. Many of these alders are declining, and are currently posing a threat to homeowners. These trees need to be addressed. There are pockets of these hazard alders along the retaining wall. (See Soils/Topography/Tree Stability section above for additional information).

There is also a large co-dominant black cottonwood in the southwest region of the property that was of potential concern due to its age and size. On December 21st 2009, Tree Solutions assessed the tree for the City of Bellevue and recommended that the tree be monitored annually and eventually reduced to a wildlife snag. The tree at that time was a High level 1 risk. If the cottonwood failed it will most likely not reach the surrounding homes, but will damage surrounding trees that could then reach various targets (See Appendix D for Tree Solution's assessment).

The deciduous portion in the northern section of Satomi is composed of mature bigleaf maples. Some of these trees are in need of pruning to remove dead and hanging limbs, and others show signs of decay. It would be advantageous to clean up the limbs of the more healthy trees, and to create wildlife snags out of the decaying trees. Creating snags will also allow more light to reach the forest floor, increasing species diversity as well as the potential for the next phase of succession to take hold. If there is nesting potential for birds, bats and rodents in rotted out cavities in and of the decaying trees, the tree will be left standing. Evaluating the liability of such trees involves not only identifying the hazardous trees, but also evaluating the potential harm or damage that might occur. Where public safety or property is clearly at risk, removal is essential. However, dead trees may be left standing for wildlife habitat in remote sections of the greenbelt, provided no property or trail exists as a potential target. The tree can then safely act as a functional component of the forest ecosystem.

Another concern in forested open spaces is the safety of trails and stairways that are used by the public.

Routine maintenance will reduce the risks associated with utilizing these amenities. Particularly in Satomi, trail improvements are necessary. Currently, the trail is eroded down to rocks in certain sections that are particularly steep. There is also a portion of the trail that has become overgrown. The whole trail will be resurfaced with 2" of bark during year two of the 5 year forest management action plan

Forest Action Plan

In Satomi Open Space, there are two main areas that will be directly managed using modified silvicultural treatments, Area 1 and Area 2 (see page 15 for map). Managing for forest health and public safety requires many considerations. Traditionally practiced on larger plots of land and often for the benefit of timber production, silvicultural systems are adaptations of natural processes which hasten the development of healthy, desirable forest types. These systems can be modified and applied to Bellevue's urban open space management objectives which focus not on timber production but on providing the benefits of a healthy forest to the surrounding community. Although all silvicultural systems are based on the biological requirements of the trees themselves, how they are applied depends on the specific desires and goals of the landowner. The landowner may want to grow commercial timber, provide a habitat for wildlife, regulate and protect a water supply, maintain the forest for aesthetics, or combine several of these goals. Silviculture merely provides the most effective means to achieve that end. Satomi Park Open Space will be managed for the six management goals previously mentioned, with a focus on public safety, and on moving the forest into its next successional stage.

A forester tries to create conditions favorable for the regeneration process within the natural constrains on any given site. In an urban setting, regeneration is most successful when produced unnaturally through planting. Conditions of the land are considered such as topography, moisture, microclimate as well as vegetative characteristics when selecting which system to base management actions on. The prevalence of invasive species as well as ability of planted trees to thrive will affect success rates. Important too, in considering how best to regenerate a forest is the concept of uneven-aged and even-aged forests. In nature, an uneven-aged forest tends to contain many shade tolerant trees, which grow under the canopy of the mature trees. Uneven-aged forests are also structurally complex and support a wide range of wildlife species, and maintain diversity while changing over time. It is our recommendation that the Parks Open Spaces are managed to promote uneven-aged forests.

Area 1 is adjacent to the retaining wall and contains a stand of red alders that will be thinned (Appendix A). A selection system will be implemented here. The selection is a simple way to produce an uneven-aged forest. In the selection system, the forester selects trees individually or in small groups for cutting. The alder stand has been problematic to homeowners due to alder branches brushing up against the homes. Group selection, wherein small groups of adjacent trees are cut rather than just single trees is a favorable option in this case. Group selection will allow for larger openings, where lower growing vegetation will be planted (see plant palette: Appendix B). The type of vegetation planted will be more appropriate given the proximity to the Satomi condo complex. The selection system has the least visual impact, especially to the casual passerby; the forest always looks the same and only a close inspection reveals any changes. The group cuttings will occur over a 5 year period and be replanted subsequently.

Area 2, in the northern section of the forest, will be managed by a type of shelterwood system. In a shelterwood system, the new stand is established under the shelter of older trees. This method is used for species that generally do not compete well with other vegetation when growing in direct sunlight, especially in their early years. Two or more cuts are commonly made over several years. In a natural wild forest setting, the first cut stimulates seed production by the trees that are left. In the case of urban forests, it is more usual to plant saplings instead of relying on natural seeding, which can take much longer and has a low survival rate in urban areas. True to both the natural and urban forests is that enough of the older trees are left to shade all of the area for at least a portion of each day. Soon the younger trees establish themselves beneath the older trees. A second

and sometimes third cut removes and/or snags more of the remaining mature trees, completely releasing the young stand; an uneven-aged stand results. Aesthetically, the area nearly always looks like a “forest”, because by the time the last of the mature trees are removed, the young stand is fairly well along. The most appropriate type of shelterwood cutting in this case would be an irregular shelterwood system. The key characteristic of the irregular shelterwood is that, although prompt regeneration/planting is objective, residual trees are left for long periods beyond the regeneration phase and help to achieve non-timber stand objectives. Due to the protracted retention of leave-trees, the resulting stand is broadly aged and therefore intermediate between an even-aged and an uneven-aged stand. The reserved trees will be left after the younger planted trees have established themselves. Eventually as they decline, wildlife snags will be created, and woody debris will be left on site, thus increasing forest complexity and structure. The following is a breakdown of forest management actions over a 5 year period:

Year	Area 1 Action	Area 2 Action
1	Remove and/or create snags on red alders identified in Area 1 as per site map below. Removal and snag creation will be followed by the planting of western red cedar on 15' centers and a mixture of native shrubs and forbs as per planting palette.	Begin irregular shelterwood system in Area 2 by thinning red maples and snaging red alders to 15'. Plant 5 gallon conifers at 14X14 spacing to hasten succession. Planting to take place in areas where new openings have been made.
2	Manage for invasive plants in previously enhanced zones in Area 1 and remove/snag red alders within selected area as seen on site plan map. Newly cut areas to be planted with western red cedar on 15' centers and a mixture of native shrubs and forbs as per planting palette Resurface trail.	Resurface trail. No action in Area 2, seedling becoming established.
3	Monitor previsouly enhanced areas for invasives.	Phase 2 of the irregular shelterwood begins. Young conifers have now become established; second release will allow growing room. Red alders and red maples thinned/snagged to create room.
4	Monitor previously enhanced areas for invasives.	No action
5	Monitor for previously enhanced areas	Final thinning opens forest for proper conifer growth. The result is a healthy, uneven aged forest with multiple layers and wildlife snags.

* See Forest Action Plan maps on page 16

All activity will fulfill the Bellevue Parks and Community Services management goals for the forested open space properties. Activity will follow standards outlined in Land Use Code 20.25H as well as take into account and follow the City of Bellevue’s BMP’s.

Due to the steep slopes in Area 1 at the Satomi Open Space, temporary erosion and sediment control (TESC) practices will be supplemented by longer term best management practices (BMPs) including:

- Planting site preparation will include jute matting, planting and mulch for erosion and weed control
- TESCs will remain in place and monitored for removal
- Plant establishment will be maintained and monitored to ensure successful establishment
- Trees will be left on the forest floor as coarse woody debris which will help stabilize the slope and provide wildlife habitat

Trees in the northern section to be thinned will be evaluated by a certified arborist to verify the need for pruning or removal, and any tree that can be left as a wildlife snag will remain.

Implementation Recommendation

- Thinning, removal and snag creation will be performed with hand operated equipment
- Selectively leave large woody debris/logs on site for erosion control, habitat and decomposition with logs in ground contact. Lop and scatter, on site, limbs smaller than 3'' in diameter.
- Logs to be removed will be done by hand or methods approved by Parks and DSD. If too much coarse woody debris is on site, it adds to fire and fuel loading, is more difficult for the decaying process to take place, is difficult to site prep/re-plant and access for maintenance and establishment. In addition, different stages of decaying debris on the forest floor increases wildlife and insect diversity, and eventually improve soil quality.
- New scope of work to be sent separately every year to a list of qualified contractors detailing the actions for that particular year. Scope to include work hours, tools utilized, desired plant numbers from planting palette, and what action each specific tree will receive.

Maintenance and Monitoring

Yearly site visits will be made to ensure tree that survival rates are high, and invasive spread is low. During the site visits, encroachments and illegal cutting will also be monitored. The 5 year management plan laid out above is the best way to meet forest management goals while remaining in compliance with Land Use code 20.25H as well as the City of Bellevue's BMP's. Below is a summary of how each goal of the Forest Management Department will be met specifically regarding this project:

Forest health

- Move forest into next successional stage will promote diversity
- Improve lateral complexity
- Reduce invasive species by planting and maintaining bare open areas

Wildlife habitat

- Create wildlife snags
- Maintain connectivity, water sources and structural complexity/diversity of the forest

Recreation

- Resurface trail for safety
- Create a more well defined trail out of diminishing historic trails
- Maintain connectivity to other parks

Water/Air quality

- More conifers will be established. Conifers play an important role in intercepting and slowing down rain water.
- Conifers also remove particulates and pollution from the air year-round
- Maintaining good ground cover will reduce erosion

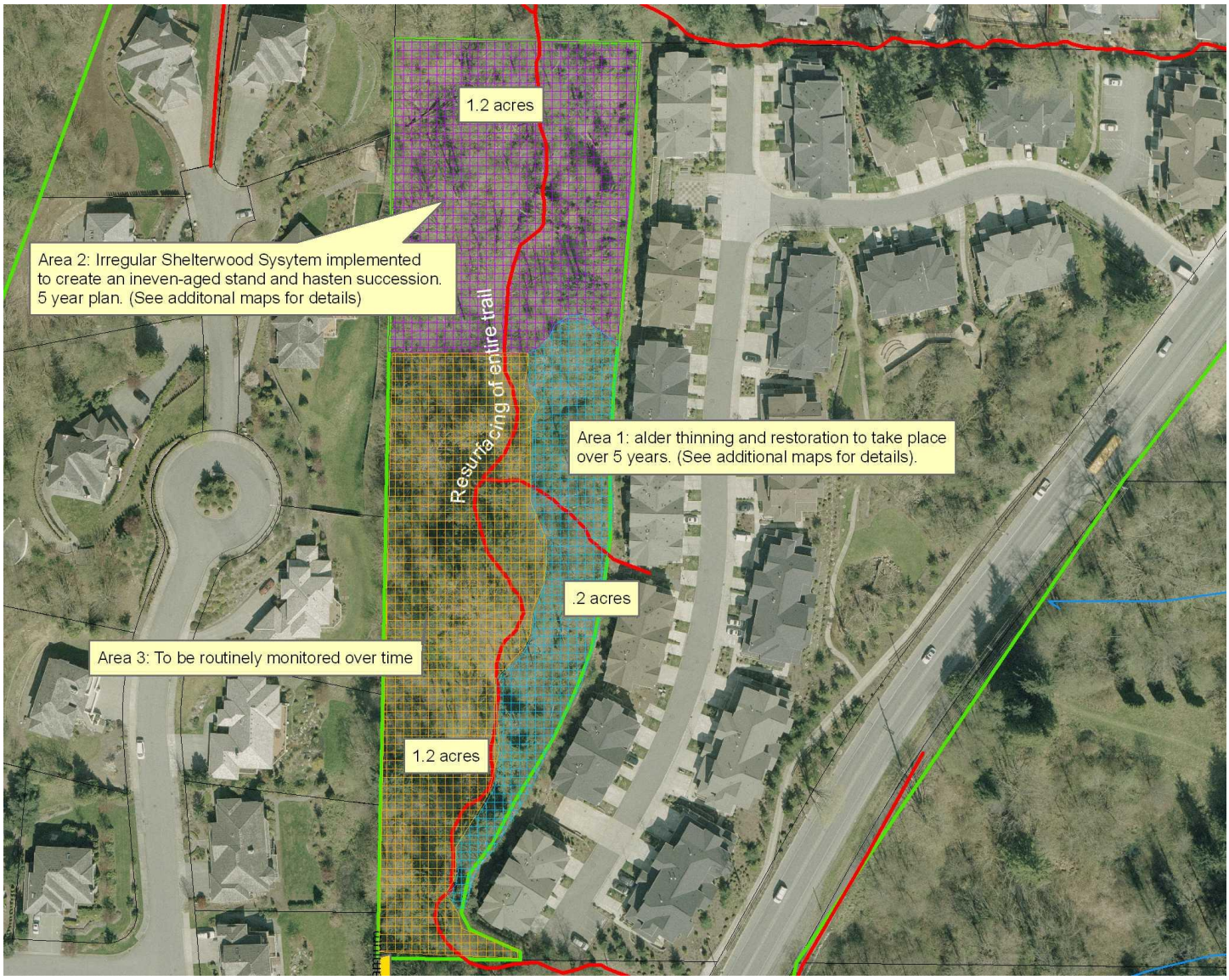
Public Safety

- Remove and monitor hazard trees
- Remove leaning red alders on eastern side
- Re surface trail

Neighborhood buffering

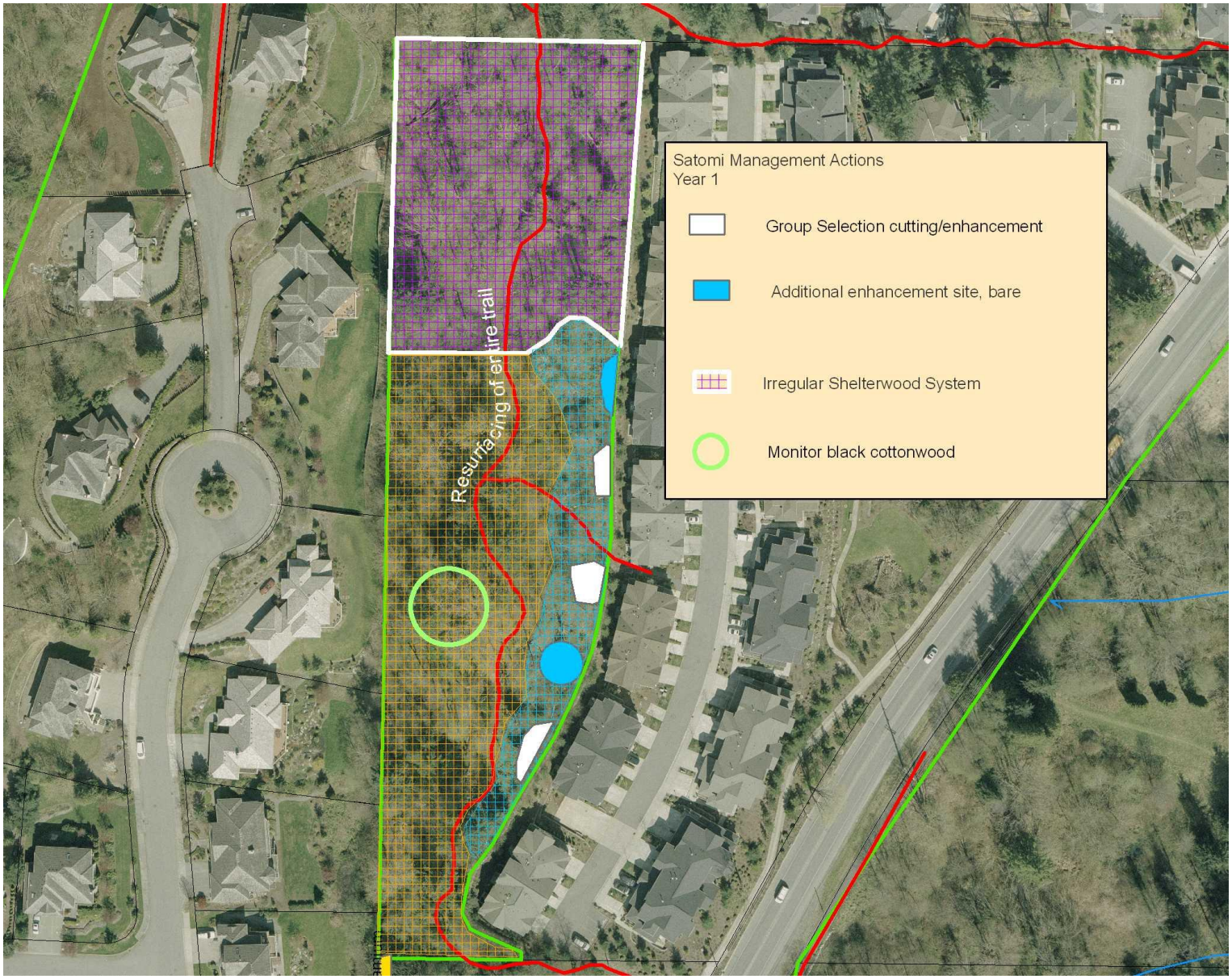
- Re-plant bare areas with native shrubs behind housing complex for privacy and aesthetics
- Retain tree canopy in forested areas by planting conifers as mature trees decline and area removed
- Actively manage forest to maintain tree health and vigor

General Zone Map



Management Actions/ 5 Year Plans

Year 1



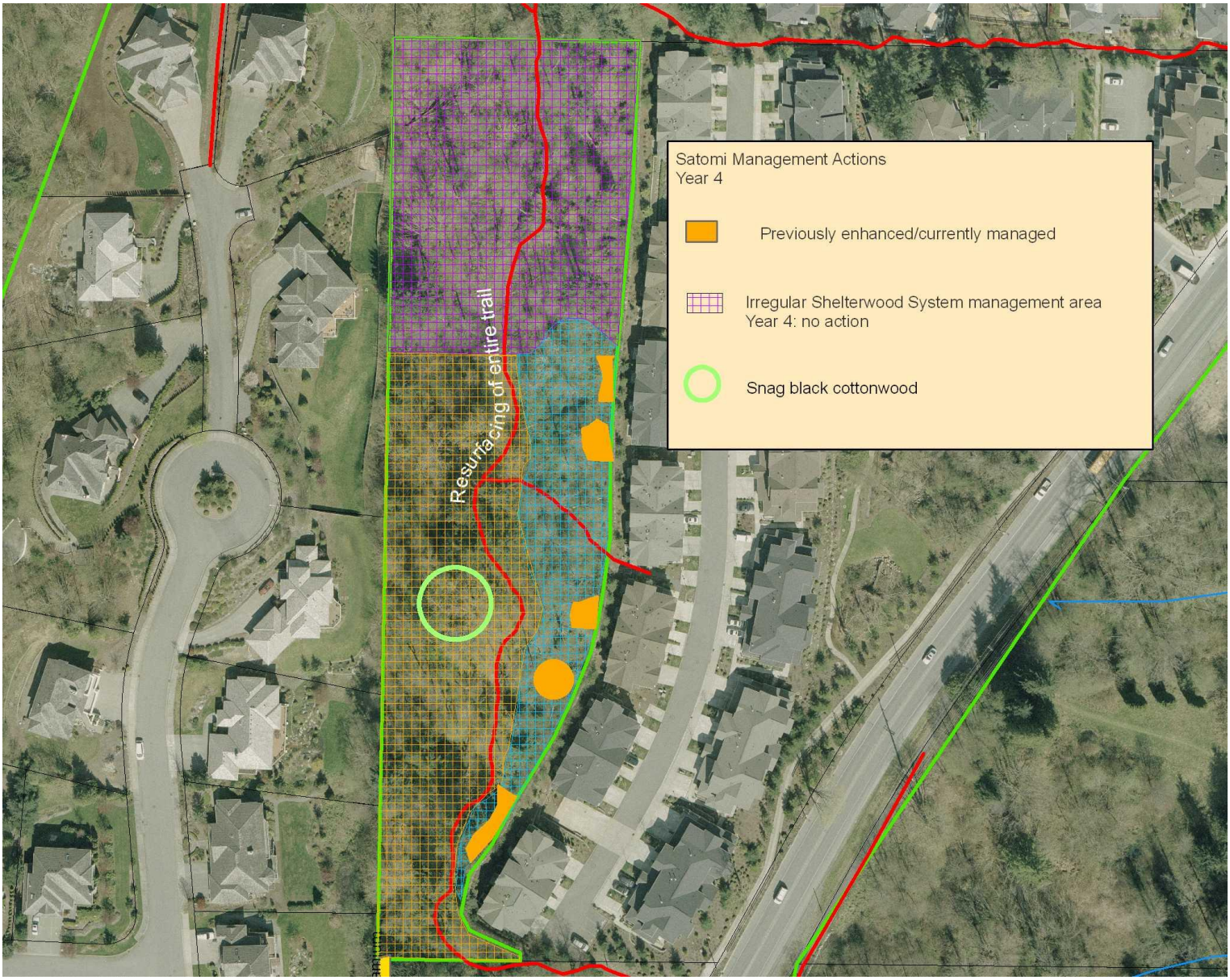
Year 2

Satomi Management Actions
Year 2
Group Selection cutting/enhancement
Previously enhanced/currently managed
Re-surface trail
Irregular Shelterwood System management area
Year 2: No action, seedlings establishing
Monitor black cottonwood
Resurfacing of entire trail

Year 3

Satomi Management Actions
Year 3
Previously enhanced/currently managed
Irregular Shelterwood System management area
Year 3: Additional thinning post seedling establishment, promote the growth of saplings
Monitor black cottonwood
Resurfacing of entire trail

Year 4


Satomi Management Actions
Year 4
Previously enhanced/currently managed
Irregular Shelterwood System management area
Year 4: no action
Snag black cottonwood
Resurfacing of entire trail

Year 5

Satomi Management Actions
Year 5
Previously enhanced/currently managed
Irregular Shelterwood System management area
Year 5: Final thinning opens space for established saplings/creates additional wildlife snags/results in an uneven-aged stand
Resurfacing of entire trail

Appendix A

Satomi red alder (Alnus rubra) stand risk assessment

Observations:

The alder stand at the Satomi Open Space is located on the Eastern edge of the forest. It is a long strip of dense single aged stems bordered on the West by the forested open space and on the east by the Satomi Condominiums. It is a forest edge stand measuring 775 feet in length and only approximately 15 feet in width. The area is approximately 11625 square feet or ¼ acre.
All of the trees in the stand are juvenile stems of even age. Stem diameters range from 1 ½ inches to 5 inches. Red alder has a rapid juvenile growth; of its associates, only black cottonwood grows as much or more during the juvenile phase. On favorable sites, trees may reach 9 inches DBH by age 5. At Satomi Open Space stand initiation likely began within the last 4 or 5 years. Stem exclusion would explain the varied range of DBH. Many smaller trees are already suppressed with some of the larger stems exhibiting dominate positions in the stand.
The stand is extremely dense. Stem density was determined to be approximately 6500 stems per acre. This is well above the red alder average maximum density of 650 TPA at 6 inches DBH that stands will approach as trees grow and mortality reduces their numbers. Though tree mortality is already being expressed within the stand and will increase dramatically in time, the Satomi alder stand is projected to exceed this average stocking density by the time it reaches the 6 year mark.

Tree height measurements throughout the stand average 20 to 30 feet. Height growth of juvenile red alder is exceptionally rapid. Maximum annual height growth of more than 9.8 feet a year can be achieved by 2 to 5 year old seedlings. The average live crown ratio of the trees within the stand is approximately 75%. Due to the phototropic response to light, the trees all display a lean toward the condominiums East of the stand and away from the higher canopy of the established forest to the West.

Discussion:

Assigning a probability of failure to each individual tree within the population of the stand is not within the scope of this report. It is not feasible to try to accomplish a risk analysis based on characteristics of each tree. Rather, this report outlines the threshold criteria for assigning risk probabilities to the stand as a whole as they relate to the safety of the condominium and the people that reside there. The criteria analyzed within this report will be the target area, defective part, and probability of failure as these relate to the stand as a whole.

<u>Target Area</u>

The entire stand is bordered on the West by the forested open space and on the East by the condominiums. This is a forest edge stand stretching 775 feet in length. The condominiums lay parallel to the stand at a distance of 10 to 15 feet from the stems. Over the last year there have

been numerous reports and complaints by residents of limb failure and fallen trees on the patios directly behind the condominiums and next to the stand. There have also been complaints of scaffold limbs leaning on and rubbing windows and gutters on the buildings.
Red alder is classified as intolerant of shade. As the stand ages, sub-dominant and suppressed trees will start to die off. Self-thinning and mortality will be rapid as the stand density decreases from 6500 TPA to a sustainable < 650 TPA. Young alder trees can withstand partial shade for only a few years. If not released, the suppressed trees will die and fall. The only trees that will survive are those that maintain dominant or co- dominate positions. Phototropic responses of the trees will create lean in the direction of the condominiums and direct failures towards the target. Red alder self prunes extremely well. As the stand matures, shaded lower branches will rapidly die and fall off. Live ratio crowns in crowded pure stands are very low. This contributes to a wind sailing effect and possible root or stem failure. The target areas are well within the influence of these risk factors. Risk mitigating activities will be essential as the stand matures over the next 5 years.

Defective Part

When assessing risk of failure of a tree or component part, the term defect means one or more observable forms of injury, abnormal growth pattern, or disease that may have altered the structural capabilities of stems, roots, or branches of trees, possibly predisposing them to fail sooner rather than later. A 4 foot high rock wall exists behind the condominiums. This wall serves as a retaining structure below the sensitive slope and a landscape barrier between the patio areas and the forest. The alder stand is located above and behind the wall. A healthy tree with unlimited growing space will form a uniform root system up to >2 times the diameter of the canopy. The tree will exert compressional forces uniformly down into the roots. The roots under tension then act as rods and braces holding the tree up. Because of the close proximity of the alder stand to the wall, the root systems of each tree within the stand are compromised. The growth of a healthy lateral root system is critical for the trees to anchor well into the soil, but the development of these roots will be limited to a narrow space between the wall and competition with the larger more established root systems of the larger forest trees. The ability of this defective root system to anchor the trees securely will be compromised even more by the wind sail effect of the low live ratio crowns. The abnormal lean of the trees toward the condominiums as a result to the phototropic response puts additional stress on the root systems. Because of this lean, the compressed load pattern will be applied to fewer roots. Eventually the remaining roots will be unable to support the loads applied and will fail prematurely.

Probability of Failure

Every tree can and will fail at some point in its life. Determining a probability of failure is both an objective and subjective analysis. The alder stand at Satomi is a result of human activities and the genetic characteristics of the species. Characteristics of this stand will include rapid growth, a high level of competition within the population, a high degree of self pruning, and tall single stem trees with minimal taper. Red alder's native range is within the coastal regions west of the Cascades from northern California to southern Alaska. Red alder forests have high biodiversity value, as the dense shrub layer commonly associated with these forests provides forage for many species of wildlife and alder has an important ecological role, as the decomposition of its leaf

litter and downed wood enriches forest soils and streams. But because of the close proximity of this stand to the condominiums, the abnormal growth patterns displayed, and the characteristics of the stand as a whole, the probability of failure is relatively high and management actions are required to mitigate any risk potential that may adversely affect the condominiums or the residents living there. The benefits of initiating risk preventative measures sooner rather than later include cost savings, eliminating risk exposure, providing quality public service, and reducing the inconvenience to the residence affected by the mitigation activities.

Jim Bennett
Community Services Supervisor
Natural Resource Division

Appendix B

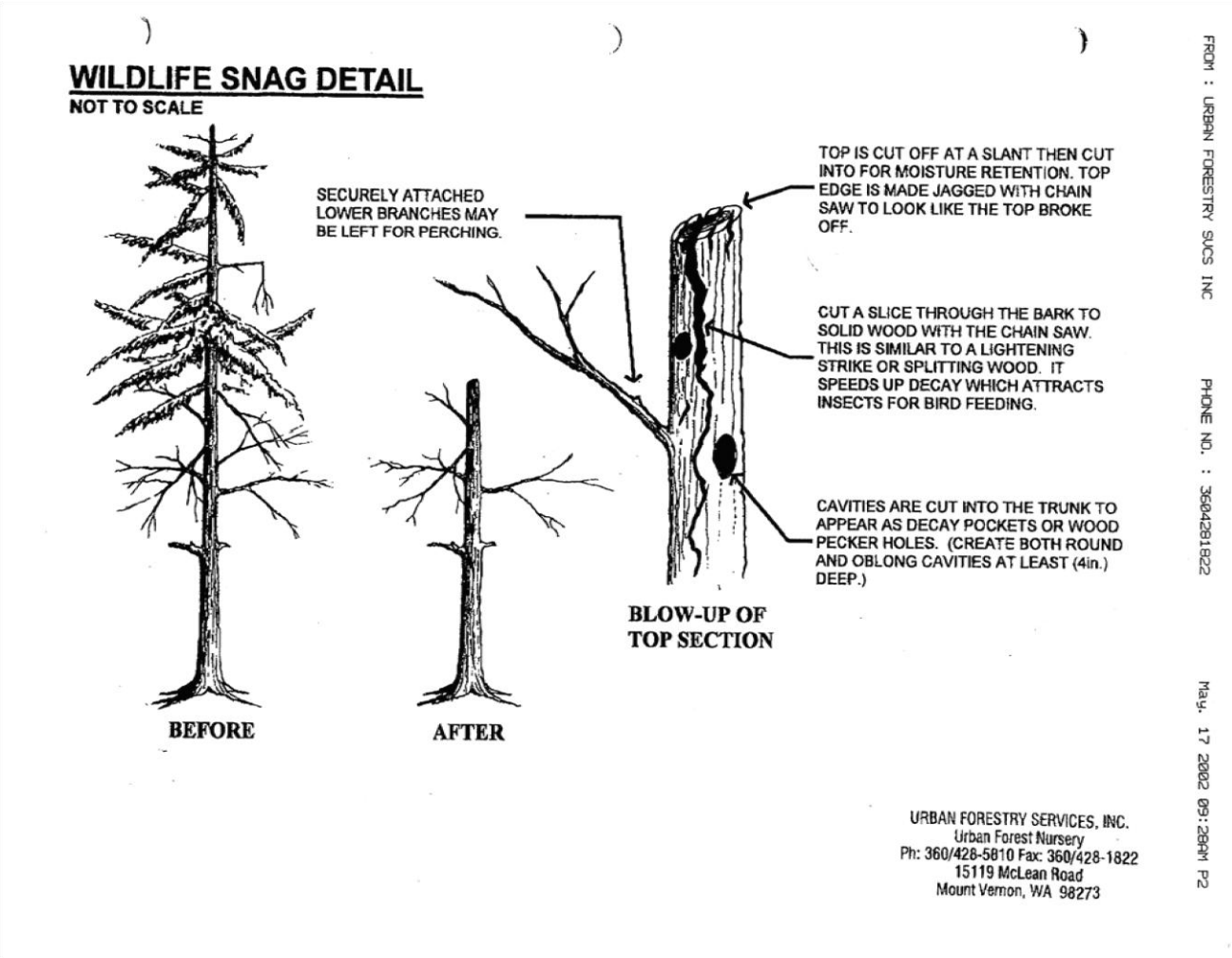
Planting Palette: Area 1 Satomi Open Space	
Common Name	Scientific Name
vine maple	Acer circinamtum
Indian plum	Oemleria cerasiformis
Oregon grape	Berberis nervosa
red-osier dogwood	Cornus stolonifera
salal	Gaultheria shallon
oceanspray	Holodiscus discolor
sword ferm	Polypodium glycyrrhiza
salmon berry	Rubus spectabilis
red elderberry	Sambucus racemosa
snowberry	Symphoricarpos albus

Planting Palette: Area 2 Satomi Open Space	
Common Name	Scientific Name
western red cedar	Thuja plicata
western hemlock	Tsuga heterophylla
Douglas fir	Pseudotsuga menziesii

* Area 2 will favor western red cedar. No shrubs will be
planted, as the openings created will only be large enough

for saplings. Understory growth will occur naturally.

Appendix C


WILDLIFE SNAG DETAIL
NOT TO SCALE
SECURELY ATTACHED LOWER BRANCHES MAY BE LEFT FOR PERCHING.
TOP IS CUT OFF AT A SLANT THEN CUT INTO FOR MOISTURE RETENTION. TOP EDGE IS MADE JAGGED WITH CHAIN SAW TO LOOK LIKE THE TOP BROKE OFF.
CUT A SLICE THROUGH THE BARK TO SOLID WOOD WITH THE CHAIN SAW. THIS IS SIMILAR TO A LIGHTENING STRIKE OR SPLITTING WOOD. IT SPEEDS UP DECAY WHICH ATTRACTS INSECTS FOR BIRD FEEDING.
CAVITIES ARE CUT INTO THE TRUNK TO APPEAR AS DECAY POCKETS OR WOOD PECKER HOLES. (CREATE BOTH ROUND AND OBLONG CAVITIES AT LEAST (4in.) DEEP.)
BLOW-UP OF TOP SECTION
BEFORE
AFTER
URBAN FORESTRY SERVICES, INC.
Urban Forest Nursery
Ph: 360/428-5810 Fax: 360/428-1822
15119 McLean Road
Mount Vernon, WA 98273
FROM : URBAN FORESTRY SVCS INC
PHONE NO. : 3604281822
May. 17 2002 09:28AM P2

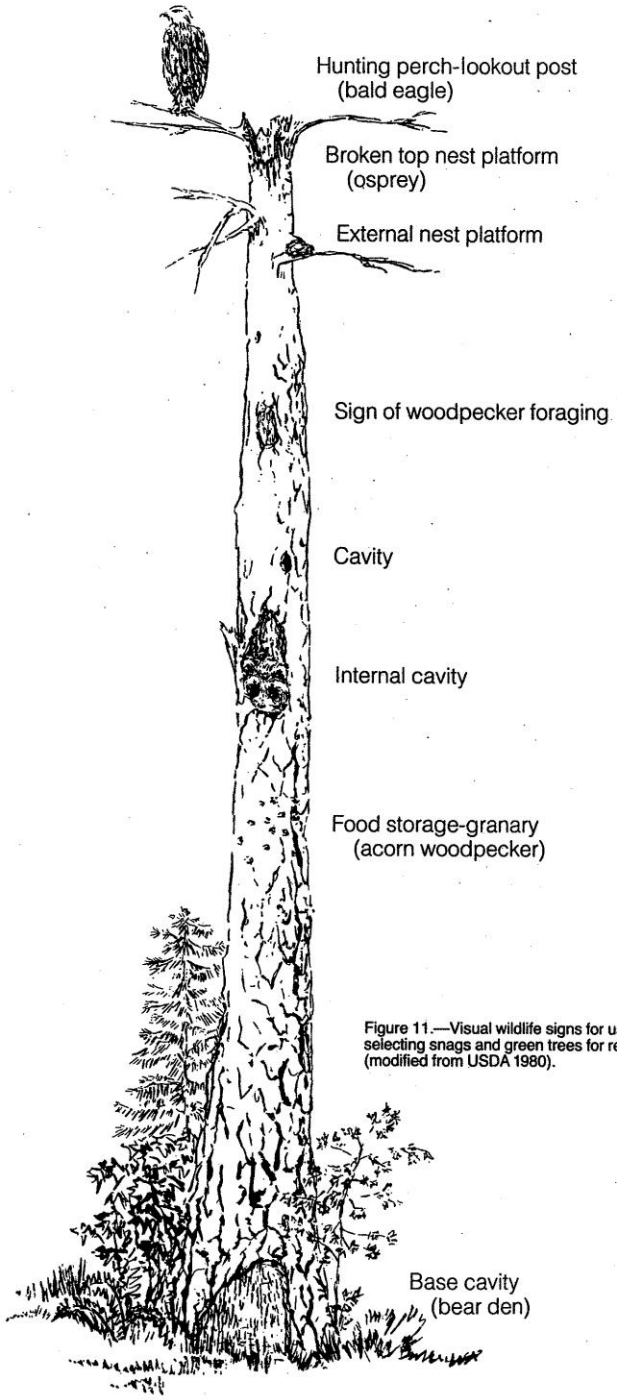


Figure 11.—Visual wildlife signs for use in selecting snags and green trees for retention (modified from USDA 1980).

Appendix D

Tree Solutions Inc

Consulting Arborists

Memo

TO:	Jim Bennett, City of Bellevue Parks
JOB SITE:	Satomi Park Open Space
FROM:	Sean Dugan, Registered Consulting Arborist #457, Certified Tree Risk Assessor # 149
DATE:	December 21, 2009
SUBJECT:	Satomi Park Open Space Black Cottonwood Tree Risk Assessment (PO #000-930903-OS)

Summary

Based on my findings, the tree presents a **High level 1** risk to the surrounding properties from whole trunk failure and associated failures of the surrounding forest stand. Trees receiving a High level 1 rating can be retained, but need to be monitored annually and regularly after severe wind, snow, and ice storm events. Adjacent property owners should be made aware of the issues and prepare that the tree will eventually require canopy work to reduce the risk potential.

To reduce the risk potential to the surrounding targets, the height of both trunks will need to be reduced to create a wildlife snag, or both trunks should be removed.

Assignment & Scope of Report

This report outlines the site inspection by Sean Dugan of Tree Solutions Inc. on December 9, 2009. I was asked to visit the job site and provide a risk assessment of a Black cottonwood (*Populus trichocarpa)* tree located in the Satomi Park Open Space near 164th Way SE and Lakemont Blvd. SE in the City of Bellevue. I was asked to provide a formal report outlining my findings, and providing discussion and recommendations. Jim Bennett, City of Bellevue Parks, requested these services.

Limits of Assignment

Unless stated otherwise: 1) information contained in this report covers only those trees that were examined and reflects the condition of those trees at the time of inspection; and 2) the inspection is limited to visual examination of the subject trees without dissection, excavation, probing, climbing, or coring unless explicitly specified. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future. Additional assumptions and limiting conditions can be found in Appendix A.

"Valuable Knowledge of Trees"

Tree Solutions Inc.
1058 North 39th St. Seattle, WA 98103

www.treesolutions.net
Phone 206.528.4670 Fax 206.547.5873

Small and moderate-diameter parts have failed from this tree in the past. The primary target of these failing parts is the Satomi Park Open Space. The residential structures are outside of the strike zone (1.5 times tree height) and the potential for them being hit is low. Even if these parts did hit the structure, it is unlikely that the structure would sustain severe damage. These parts are not the primary concern for the City and the surrounding property owners.

Similar to the branches, the likely target if the whole trunk were to fail is the Satomi Open Space. An associated issue is the high number of declining and dead trees in the surrounding Open Space. If any of these trees were contacted by the cottonwood tree during a failure, they are also likely to fail. The surrounding residential structures along the lower slope are within the strike zone of all of these trees, including the cottonwood. The structures would sustain significant damage if contacted. Based on the valuable buildings within striking range and extent of damage that would be sustained, I assigned a **Target** value of **3** out of a possible 4 points.

I assessed the tree for probability of failure. I inspected the long lateral scaffold branches and found no indicators, such as cracks, callus wood, or sap flow, that would indicate that failure is imminent. These branches are often shed by the tree in heavy rain, snow, or ice loading events. The probability of failure for these parts is moderate. Pruning to prevent future issues from developing is not needed at this time.

I assessed the whole trunk to determine its probability of failure. I found cracking and decay (see Appendix C – Photograph 5b) located where the tension and compression wood meet, along the shear plane. The shear failure is brought on by external forces, such as wind, snow, and ice loading events. In this case, it appears the external loading may be present from the larger adjacent trunk that is pushing and growing over the smaller trunk. As both trunks continue to grow, the smaller trunk appears to be giving way to the larger. This is easily visible in Appendix C – Photograph 3. This pressure from the adjacent growing structure may ultimately cause the smaller trunk to fail when a critical stress is reached.

Determining when a critical stress is reached is not something that can be predicted. The tree currently appears stable and failure is not imminent. However, based on its structure, it is unlikely that the tree will adapt and become more stable over time. This is compounded by the presence of a decay pathogen.

Cottonwood trees compartmentalize decay poorly. This will lead to an expanding area of decay internally along the shear plane. Decay reduces a tree's ability to optimize growth and place wood where it is needed for additional support. There is nothing that can be done to stop the spread of the decay once established in a tree. Based on these findings, I assigned a **Probability of Failure** value of **3** out of a possible 5.

The diameter size of the trunk, if it were to fail, is large. Many of the adjacent trees that are also likely to fail in the event of the cottonwood failure also have a large diameter size that could contact a structure. I assigned a **Size** value of **3** out of a possible 3.

Based on my findings, the tree received a risk potential value of **9** out of a possible 12, or **High Level 1**. Trees with a value rating of **High Level 1** have issues that have become clear and are not likely to fall part right away, but must now be monitored more regularly. At this stage, it is reasonable to inform the adjacent property owners of the issues facing this tree and to prepare them for the reality that large parts of the tree will need to be removed to reduce the risk.

Glossary

basal flare: The rapid increase of diameter that occurs at the junction of the trunk and root crown, associated with stem and root tissues. (Dunster 1996)
callus: a mass of undifferentiated tissue, or organized tissues, that proliferate on or at the edges of wounded or infected parts of a tree and gradually cover the affected area. (Dunster 1996)
canopy (crown): the leaves and branches of a tree (Matheny *et al.* 1998)
codominant trunks: trunks or branches of nearly equal diameter, often weakly attached (Matheny *et al.* 1998)
compartmentalize: physiological process that creates the chemical and physical boundaries that act to limit the spread of disease and decay organisms (ANSI A300)
scaffold branches: the major structural support branches that attach to the trunk (Matheny *et al.* 1998)
shearing/ shear failure: A pattern of wood failure in which the wood fiber breaks cleanly at ninety degrees to the main axis of the stem or branch (Dunster 1996)
structural defects: flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure (Lilly 2001)
wildlife snag: any standing dead, partially dead, or defective tree at least 10 feet tall that provides present or future habitat critical for the maintenance or enhancement of wildlife (*adapted from* Dunster 1996)

References

ANSI A300 (Part 1) – 2008 American National Standards Institute. American National Standard for Tree Care Operations: Tree, Shrub, and Other Woody Plant Maintenance: Standard Practices (Pruning). New York: Tree Care Industry Association, 2008.

Dunster, Julian & Katherine. Dictionary of Natural Resource Management. Vancouver: UBC Press, 1996

Dunster & Associates Environmental Consultants Ltd. Assessing Trees in Urban Areas and the Urban-Rural Interface, US Release 1.0. Silverton: Pacific Northwest Chapter ISA, 2006

Lilly, Sharon. Arborists' Certification Study Guide. Champaign, IL: The International Society of Arboriculture, 2001.

Matheny, Nelda and James R. Clark. Trees and Development: A Technical Guide to Preservation of Trees During Land Development. Champaign, IL: International Society of Arboriculture, 1998.

Mattheck, Claus and Helge Breloer, The Body Language of Trees.: A Handbook for Failure Analysis. London: HMSO, 1994.

Appendix B - Tree Risk Assessor Method

The Pacific Northwest International Society of Arboriculture (PNWISA) Tree Risk Assessment method is adapted from the United States Forest Service risk assessment approach and is considered the present Standard of Care. This method provides assessors a structured process, based on good science and arboriculture, to assign recommended thresholds for action for the purpose of informing risk managers. The PNWISA Tree Risk Assessment method requires assessor certification.

The method uses a 12 point system, divided into three categories, to rate the potential risk from a tree and its parts.

P **Probability of Failure** is rated at 1-5 points based on the judgment of the assessor.

1 point = Low risk – The defect is not likely to lead to imminent failure and no further action is required. In many cases these defects might not even be recorded.

2 points = Moderate risk – One or more defects that are well established but would typically not lead to failure for several years. Corrective action might be useful to prevent future problems but only if time and money are available. Not the highest priority for action, these are the "retain and monitor" situations that can be used to inform budget and work schedules for subsequent years.

3 points = Moderately High risk – One or more defects areas well established but not yet deemed to be a high priority issue. Additional testing may be required or, the assessor may feel the problems are not serious enough to warrant immediate action, but do warrant placing the tree on a list of trees to be inspected more regularly. These are Retain and Monitor trees.

4 points = High risk – The defect is serious and imminent failure is likely and corrective action is required immediately. These cases require treatment within the next few days or weeks.

5 points = Extreme - The tree or component part is already failing. An emergency situation where treatment is required today.

S **Size of the Defective Part(s)** is rated 1-3 with 1 point for branches or stems up to 10cm (4 inches) in diameter, 2 points for branches or stems between 10-50cm (4-20 inches) in diameter and, 3 points for branches or stems over 50cm (20 inches) in diameter.

T **Target Area** is rated 1-4 based on the following target descriptions.

1= Low – Sites rated at one point are very rarely used for any long period of time, and people passing through the area (regardless of how they travel) do not spend a lot of time within the striking range of the tree within any one day. There are no valuable buildings or other facilities within striking range.

2= Moderate – Valuable buildings are at the edge of striking distance, so they would not be seriously damaged even if the tree did fall down. The site has people within striking range occasionally, meaning less than 50% of the time span in any one day, week , or month, and do not stay within striking range for very long.

3= Moderately High – The site has valuable buildings within striking range. People are within striking range more than 50% of the time span in any one day, week, or month, and their exposure time can be more than just passing by.

4= High – The highest rated targets have a building within striking range frequently used by people, often for longer periods of time, or high volumes of people coming and going within striking range

5a

5b

Photographs 5a & 5b. View looking south along the north trunk. The red arrows point to cracks along the shear plane, indicated in yellow. The bottom photograph shows areas of decay associated with the crack.

Appendix C – Photographs

Photograph 1. View looking West, up slope, over a residence at the Black cottonwood tree as indicated with the red arrow. The yellow arrow points to a previous branch failure.

Photograph 2. View looking south from the cottonwood tree at the forest stand shows many of the hardwood trees are in decline or dead.