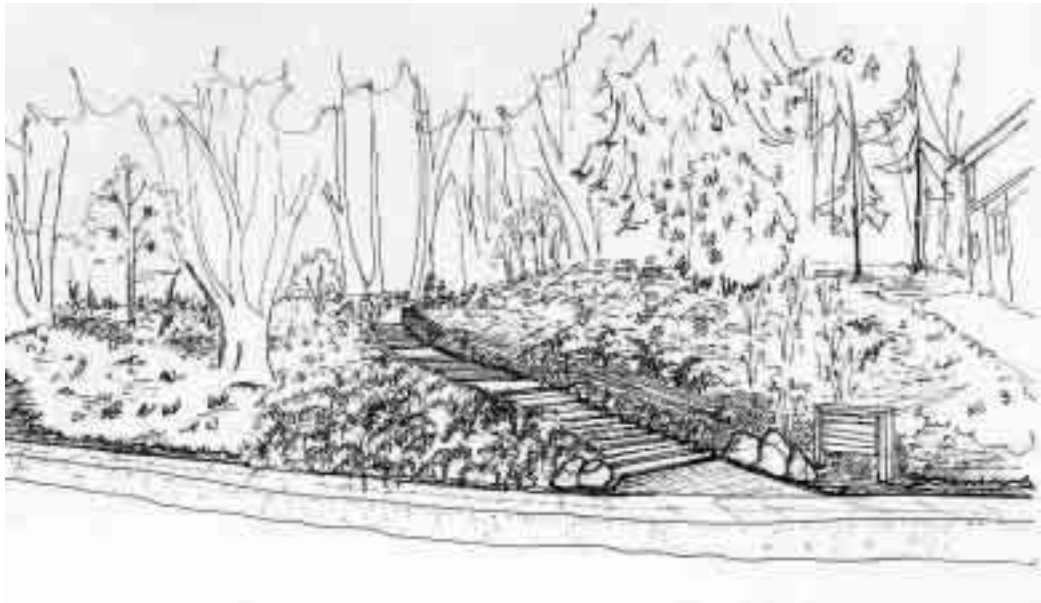

Hitt's Hill Park

Vegetation Management Plan



*Prepared for use by the Seattle Department of Parks and Recreation,
the Friends of Hitt's Hill Park and ongoing stewardship groups committed to
the restoration and continuing ecological health of Hitt's Hill Park.
for additional copies of this report see www.cityofseattle.net/parks/parkspaces/hittshill/VMP.htm*

Prepared by:
City of Seattle Department of Parks and Recreation June 2003

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Introduction to the Vegetation Management Plan

The purpose of the Vegetation Management Plan (VMP) is to provide a document that guides future vegetation restoration projects and vegetation maintenance activity at this limited development natural area in the Seattle Parks system. Existing site conditions have been well documented by previous reports that are included in the appendix. The VMP seeks to identify, integrate, and prioritize projects that will direct the long term vegetation composition, and contribute to the return and rejuvenation of this site to a healthy ecology. The VMP will identify vegetation management zones and recommend plant communities appropriate to this setting. The report will also provide relevant information on invasive plant removal, and provide a list of further helpful resources.

Hitt's Hill Park is a 3.15-acre site uniquely situated at the highest point in the Columbia City neighborhood of the Rainier Valley. Formerly the site of the Hitt's Fireworks Factory, Hitt's Hill has been vacant since 1976. When acquired in 2001 by the City of Seattle Department of Parks and Recreation (Parks), the site had grown into a difficult to access, densely vegetated area with early successional trees and a good dose of invasive plant species. Hitt's Hill Park is located in a residential neighborhood, a few blocks from an historic urban center. The park serves important functions as valuable breathing space for neighborhood residents, wildlife habitat for urban and migrating wildlife, and protection of sensitive areas.

The role of Hitt's Hill Park in the community is to provide open space – a place of unexpected urban respite, a place to breathe fresh air and enjoy a piece of nature. Hitt's Hill Park is intended to provide passive recreation activities such as walking, enjoying near and distant views, and observing plants and urban wildlife, especially birds. The overall site will be developed to allow access for these kinds of activities. The open and airy canopy of the mostly deciduous forest is unusual for the region, and will be highly valued by park users who enjoy the seasonal contrast it brings.

Vegetation Management Plan Goal

The goal of the Vegetative Management Plan is to enhance this natural area for passive recreation and to encourage the gradual development of a self-sustaining, invasive-free urban woodland for plant and wildlife habitat by the following actions:

1. Inventory and evaluate existing conditions on the site
2. Analyze where the existing resources are not achieving the intended purpose
3. Recommend strategies to correct problems or direct future vegetative patterns
4. Set priorities for implementation

General Site Background and History



Figure 1 - Vicinity Map and Aerial Photo

Hitt's Hill Park is located between Renton and Rainier Avenues South and between South Brandon Street and 39th Avenue South. From the top of the hill, it is possible to view Lake Washington, downtown Seattle and the Rainier Valley.

Natural History

Thousands of years of mountain upheaval, glacial scouring, wind and water have shaped the Puget Sound region. Located in the Rainier Valley and part of the Puget Sound lowlands, the Hitt's Hill Park site is the result of thousands of years of changing conditions. Hitt's Hill, a medium hill in a valley area, remains higher than the surrounding area, likely due to distinct subsoil conditions. The soil conditions allowed the hill to evolve differently than the surrounding landscape. The elevation of the property ranges from 175 to 235 feet above sea level.

“Soil borings in the area indicate sandstone (bedrock). Also, the surface geology map from 1960 maps the area as sandstone. These bedrock outcroppings are not that uncommon south of the I-90 corridor. This is roughly where the Seattle fault zone runs east to west. You'll notice when you are driving north on I-5 you can see exposed bedrock along the east edge of the highway prior to reaching I-90. However, north of I-90, the bedrock is thousands of feet deep. This is because the Seattle fault is a thrust fault that has created a large vertical offset of the bedrock. To the north the bedrock has been covered with thousands of years of soil deposits” (Fowler, personal communication 2/2003).

From the center of the site, the site slopes gently both east and west, with the highest point approximately mid-way between 37th Ave S and 39th Ave South. There are mapped steep

slopes areas both on the east and west sides of the site, with the northeast corner having the most significant change in elevation. The site does not appear to contain any surface water features or particularly damp areas, though there is an intermittent flow of groundwater emerging along the eastern edge and running out to the storm drainage systems along 39th Ave S. Soil borings indicate the site holds a silty sand soil, which generally allows suitable drainage, consistent with what has been observed on site.

Upland portions of the site are generally well covered by vegetation, with evidence of clearing for soil remediation work in 2001. The included reports on existing site vegetation, Scott D. Baker Consulting Arborists' "Vegetation Management Plan" (prepared Feb. 2003) and Leina Johannsen's "Hitt's Hill Plant Inventory" (prepared October 2001) both describe the site vegetation as generally consisting of immature forest canopy and a broad range of understory plants. Both native and invasive plant species are present.

Social History

While there are no recorded archeological sites close to Hitt's Hill Park, utilitarian, medicinal, and food plants including cedar, edible roots, nuts and berries would have been available to the forest gathering tribes that traveled throughout the Puget Sound area including the Duwamish and Muckleshoot people. Prior to modern development, this site would have supported a Douglas Fir-Hemlock forest typical of the region.

Columbia City Historic District, just to the north of the site, was placed on the National Register of Historic Places in 1980. Columbia City was settled in the 1850s and 1860s. Its pioneers cleared the forests and used the timber for house construction. Columbia City grew from a small mill settlement to a large commercial and residential area that was annexed by Seattle in 1907. Based on the forest canopy conditions, Hitt's Hill Park was most likely logged early in the settlement of the Columbia City.

English chemist Thomas Gabriel Hitt started an unusual Columbia City business in 1905. The Hitt Fireworks Company provided fireworks and flares for Fourth of July festivities, is credited with creating pyrotechnics for the movie "Gone With the Wind," and provided fireworks for shows at Green Lake and Ivar's Fourth of July celebrations until the 1970s. The company grew to include over 30 shop buildings as well as an ink and chemical company. Only the western half of the site was occupied by the company. Small buildings were spread throughout leaving space for some significant trees to remain. The factory closed in 1976 and final site demolition occurred in the 1980s. The eastern half of the site is not known to have been developed, and so appears to contain a higher density of mature trees and native plant understory. The only built reminder of the Hitt Fireworks Company is a north-south row of ornamental cement posts along 37th Avenue South.

Future Development

In 2000, voters approved the \$198.2 million Pro Parks Levy to fund more than 100 projects throughout the city over the subsequent eight years. Projects include improvements to athletic fields, playgrounds, trails and community centers and parks. The Pro Parks Levy also includes an Opportunity Fund for community-generated development

and acquisition projects. In 1999, neighbors around the Hitt's Hill open space began meeting to discuss how to preserve the open space as a natural area and turn it into a safe neighborhood park. The open space was purchased by the Seattle Parks Department in September 2001. The areas that contained materials left over from the old Hitt's Fireworks factory site were remediated in 2001-2002, shortly after the property was acquired by the Parks Department. The Friends of Hitt's Hill Park applied for funding from the Opportunity Fund on behalf of Hitt's Hill Open Space Development. In 2002 the Seattle City Council unanimously approved \$100,000 to develop Hitt's Hill open space. Hitt's Hill Park has a strong community support group. Community members who nominated Hitt's Hill for the Opportunity Fund have made and expect to make an ongoing commitment to the restoration of the site.

Parks worked with the community at a series of meetings to discuss ideas for the use and development of Hitt's Hill Park. The ideas that came out of these meetings include: passive recreation, walking, enjoying views, habitat preservation, observing nature, learning about plants, plant stewardship, sitting, safe access into and through the site. Other ideas include acknowledging the park's history, and providing opportunities for school children, youth groups, and stewardship groups to explore the natural world.

Because maintaining a "natural" area was clearly an important community goal in the development of this site, Parks staff felt it was important for the community to discuss their landscape preferences and what they would characterize as "natural." A strong desire for open winter territorial views was expressed and the general community consensus was to support a deciduous forest, with limited coniferous plantings. Parks supports this goal and has an overall goal of making Hitt's Hill Park natural, safe and accessible.



Existing Vegetation Inventory and Evaluation

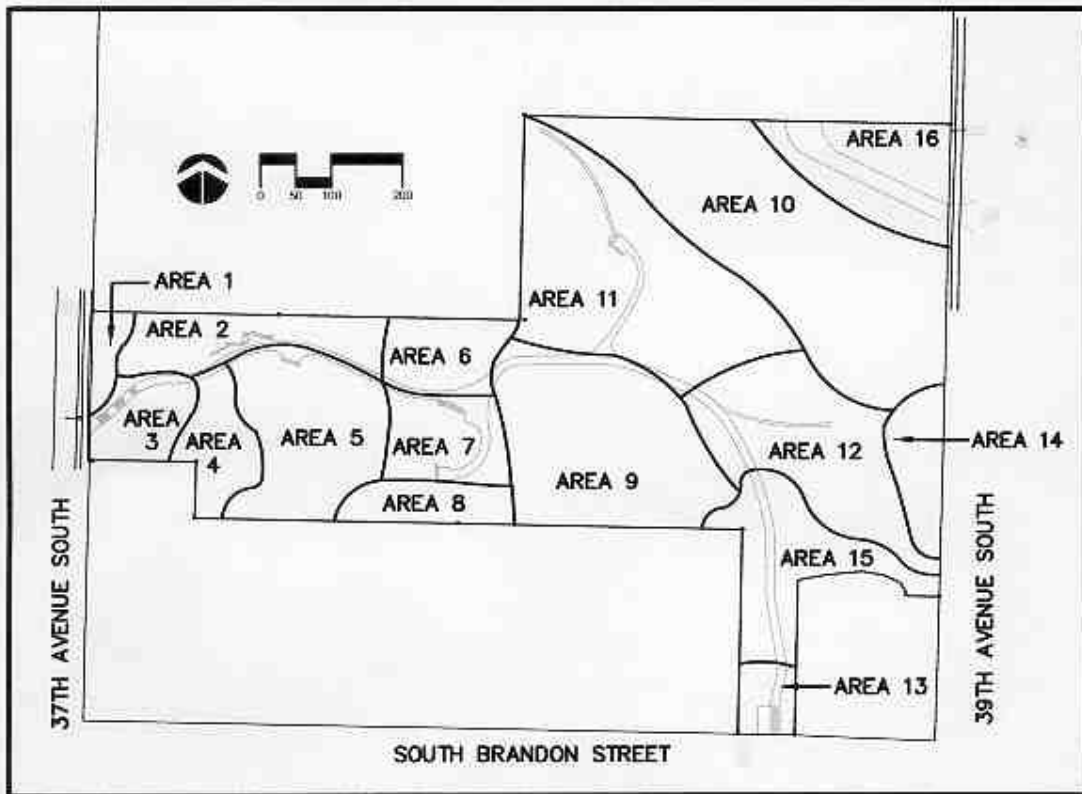


Figure 2 – Existing Vegetation Areas Plan

Figure 2 is a diagram of the site indicating 16 areas of existing vegetation. Each of these areas represents a unique vegetative “community.” The description of these areas is a culmination of site observations, including the reports in the Appendix. Specific observations regarding all mapped trees are found in the Arborist’s report. In some cases, the existing vegetation areas will be managed as found, with overall woodland or forest health as the primary goal. In others they will be modified to fit the goals of overall site development. Restoration and maintenance priorities are defined in more detail in this report’s final section entitled Recommended Projects for Implementation.

Table 1 –Area Descriptions

Area	General Description
1	West facing slope is adjacent to residential street. Steep soil slope, some native understory plants, heavily covered with English ivy. Fill on tree roots is adversely affecting health of trees. Unique English laurel at north boundary. High invasive coverage.
2	Gently southwest facing slope, mix of native understory covered with ivy and Himalayan blackberry, ivy and clematis are heavy on trees. Narrow area is adjacent to single residence to north. Moderate to high invasive coverage.
3	West facing, moderate to steeply sloped, sparse grass primary vegetation. One Western Red Cedar showing signs of stress, possible candidate for removal. One vigorous young Pacific Madrone. Area is adjacent to single residence to south. Minimal invasive coverage.
4	Open, west facing and gently sloped, vegetative understory mainly erosion control grasses; contains candidate trees for removal, including medium holly. Minimal invasive coverage. Borders residences on west and south.
5	Near the top of the hill, contains mainly gentle, west facing slope. High percentage of invasive species, ivy beginning to girdle trees, some examples of native understory. Good views north. Several trees in poor condition. Large area borders residences on south.
6	Relatively level area, with north aspect. High percentage of area covered by non-native blackberry. Young trees in good health. Prior site disturbance/grading area. Adjacent residence to north.
7	Just east of the highest point, gently sloping, east facing. Area comprised of many native plants, understory and one cedar and one Madrone. Low to moderate level of invasive species. Perimeter control of invasives important here.
8	Elevated area, recently cleared, young birch trees, knotweed and other invasive species with moderate coverage. Adjacent residences to south.
9	Relatively level area, northeast aspect. Mainly native understory plant species, very large poplar tree with large crack and decay in trunk. Minimal invasive coverage.
10	Northeast facing steep slope (contains >40% slope), ivy covered maple trees, one hemlock, sword ferns abound. High percentage of invasive coverage. Adjacent residences to north.
11	Northeast facing gentle slope. Area of “over-mature” trees, some snags, good wildlife and insect habitat. Several trees in decline. Moderate to high coverage invasive plant understory. Some clearings in canopy. Adjacent to residence to west.
12	Gradual slope east to 39 th , understory mix of native and non-native; tends toward more shrub understory (hazelnut, blackberry) than herbaceous. Ivy abounds as groundcover; also salal and Oregon grape. Trees generally in good condition. Low (eastern part) to moderate (western part) invasive coverage.
13	Fairly level, south facing terrace. Many ornamental shrubs and perennials. Very large walnut tree and younger sibling. Angled silver maple tree unique to site, but strong roots spread aggressively and may damage sidewalks.
14	East facing, steeply sloped area adjacent to 39 th Ave S sidewalk. Ilex (English holly) and ivy dominate. Ivy covers trees. Some native Indian plum, hazelnut, Sword ferns. Potential soil erosion on slope upon invasive removal.
15	Southeast facing, fairly level area. Lower density of trees than other areas, heavy in blackberry cover. Very high percentage of invasive cover. Candidate for wholesale clearing and restoration.
16	Flat area at toe of slope, access drive for north neighboring property. Relatively compacted soil from use, residual native and ornamental plantings at periphery. Site for future coordinated driveway easement and restoration planting project. No significant health issues with existing vegetation.

Summary of Goals for Hitt's Hill Park

Figure 3 is an Illustrative Site Plan indicating the minimal level of development intended for this site: basic access and enjoyment of nature and views. The remaining areas are intended to be managed to encourage a healthy ecosystem, as self-sustaining as possible given the surrounding urban setting, and to provide an oasis for urban wildlife and native plants.

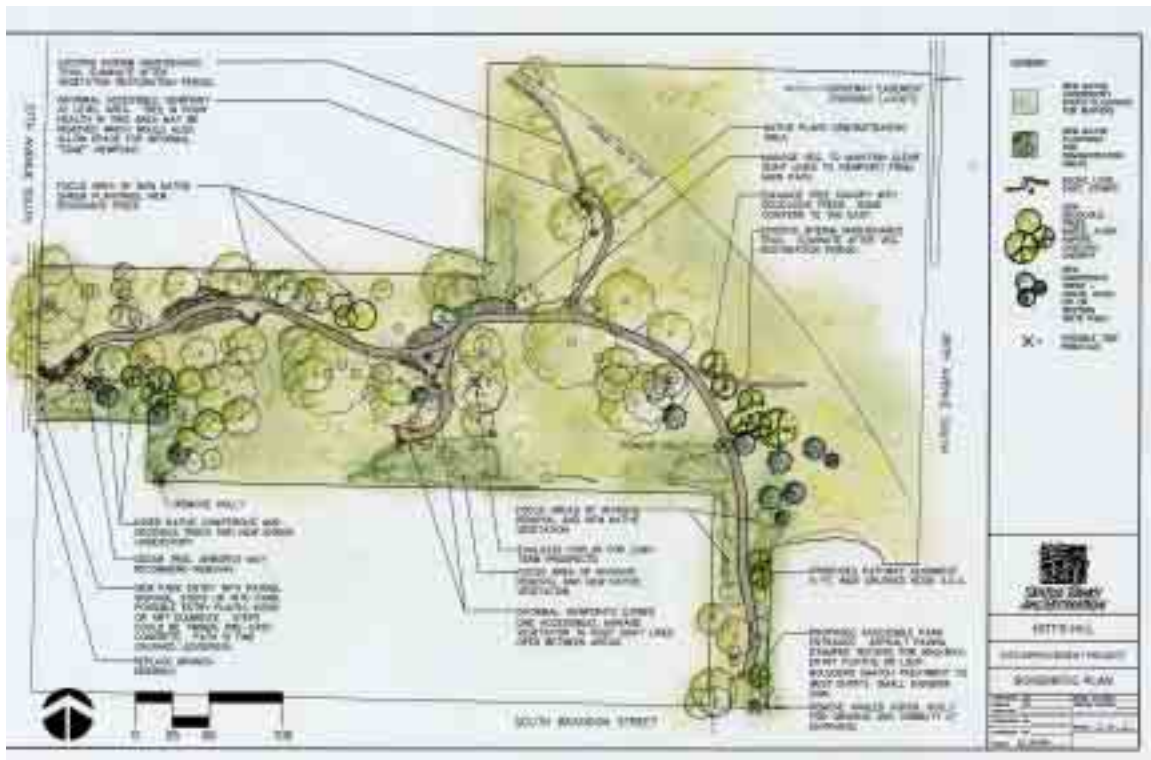


Figure 3 – Illustrative Site Plan

This plan proposes a central 6-foot wide crushed rock pathway, informal accessible viewpoint areas and entries at both South Brandon Street and 37th Avenue South. Steep slopes require stairs from the west entry. More level pedestrian access is from the south. The plan recommends that after existing maintenance trails are no longer needed, they should be restored to a vegetated condition.

It recommends inclusion of enhanced planting areas at park edges to provide physical buffer zones to adjoining residences. Selection of plants for these areas will combine the goals of providing visual access for safety, while establishing a thick plant barrier to discourage foot traffic close to adjoining residences. The plan also suggests inclusion of one or two native plant demonstration areas where visitors could easily identify native plants.

Proposed Vegetative Management Zones

The recommendations of the Vegetative Management Plan are for two distinct vegetative types to be supported at Hitt's Hill Park: a **coniferous Western Hemlock-Douglas fir forest** and a **deciduous early successional Bigleaf maple woodland**. These vegetative types are divided into subsets based on topography and solar exposure at the site.

The Vegetation Management Zone (VMZ) descriptions are followed by a table of recommended plant species that would be appropriate for each zone. These recommended species should be considered as a palette of plant material, representing trees, shrubs and groundcovers appropriate to the ongoing revitalization of each distinct zone.

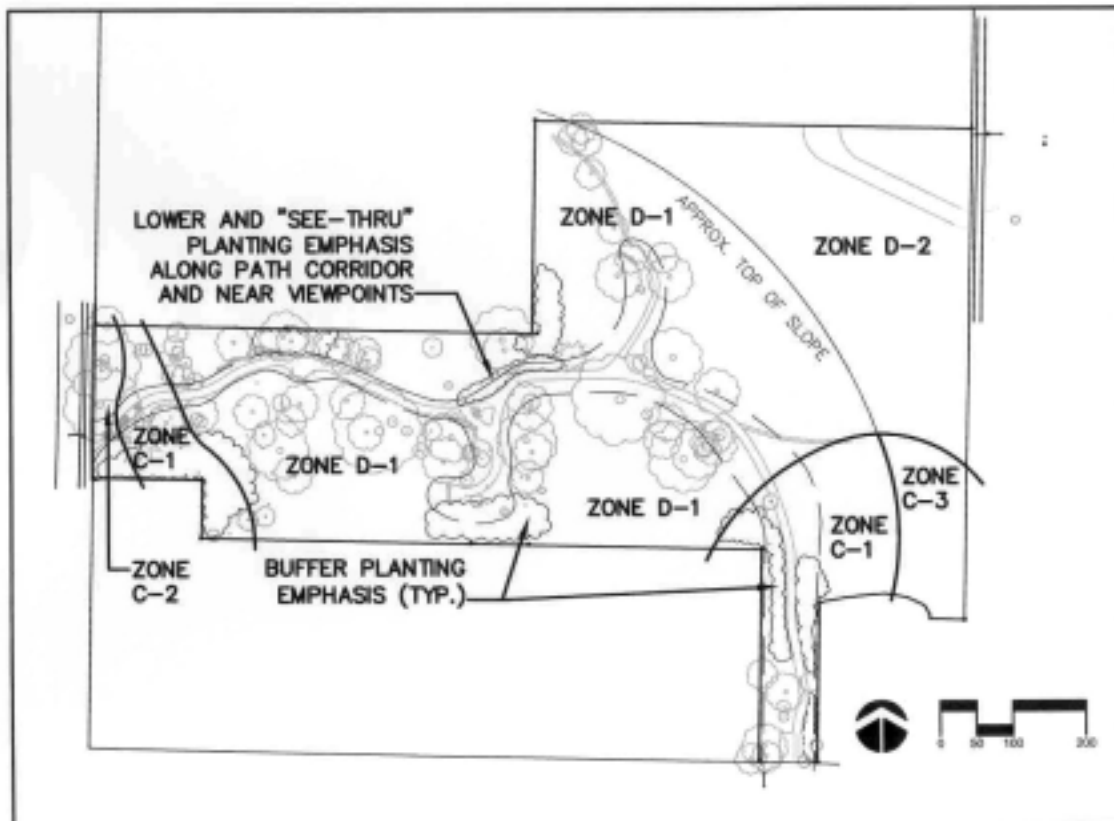


Figure 4

Figure 4 – Proposed Vegetation Management Zones Plan

These zones represent the long-term goals for plant community management areas. The dominant successional plant community that naturally occurs in this part of the Puget Sound region is the Western Hemlock forest. The VMZ are subsets of that plant community, further defined by site conditions, such as topography, water and solar exposure, and modified to support desired park use by people and urban wildlife.

Human control and management decisions.

The human community currently enjoys strong seasonal contrast offered by the deciduous woodland at Hitt's Hill Park and would like management to continue to support current vegetative patterns. Therefore, some of the plant recommendations for these VMZ are not consistent with the natural succession of a wooded area in the Puget Sound region. Some

areas may require additional management effort over the years to maintain the desired seasonal experience provided by deciduous trees and shrubs. For example, when conifer seedlings begin to seed in near a central viewpoint they may need to be weeded out or transplanted to other areas of the site.

Buffer planting and visual access

Included in these lists are plants that would be suitable to use as low buffer plantings as described in the Illustrative Concept Plan. These areas are generally focused where a pathway or informal viewpoint is within 30 feet of an adjoining residential property, where greater buffering is desirable. Plants that are generally lower growing or easily seen through are also noted. Low growing plants are desirable to focus along the pathways and near the viewpoints in order to protect and maintain good visibility throughout the area. Including low growing plants allows good surveillance of many areas by park visitors and neighbors, which is important for site security. Generally speaking, trees are not considered to block views as one can see under the canopy or around the trunk.

Zone transitions

The Vegetative Management Zones are guidelines on the general direction of desirable plant communities in each zone. Although lines are shown demarking each management zone, transition zones occur between each. “Hard and fast” lines between areas should not be encouraged. Implementation and support for the development of plant communities will require on-site guidance by knowledgeable staff or plant stewards who recognize valuable existing features and adjust plant spacing and locations accordingly.

Description of the Vegetation Management Zones

Coniferous Zone: Western Hemlock-Douglas Fir Forest

In the Puget Sound region, Western Hemlock forests are typically marked by a canopy of Western Hemlock, Douglas Fir with occasional Western Red Cedar in damp areas, and Incense Cedars in some dryer areas.

C-1: Interior forest

Two focus areas are ideally suited to be developed to take advantage of existing canopy gaps. New conifers could be introduced in these canopy gaps without compromising views, and enhance the experience of the interior woods by setting up a visual contrast from the entry from either west or south. Existing deciduous trees could be left until health dictated otherwise, then left as snags or set for insect habitat as decaying logs. New plantings should emphasize Western Hemlock forest species.

C-2: West facing slope

At the west entrance to Hitt’s Hill Park there is an existing unhealthy cedar, as well as a significant canopy opening. Any ivy covered steep slope (>40%) gets western sun and is

one of the potentially drier areas of the site. This area is suited to dry coniferous forest development.

C3: East facing slope

A good portion of this zone faces 39th Ave S, a steep slope with soils that appear to be moving under a slow creep. A northeast aspect and subsurface water flow emerging at the sidewalk create unique challenges to plant establishment. Forest species that tolerate both damp conditions and shade should be emphasized.

Deciduous Zone: Early Successional Bigleaf Maple Woodland

Recently disturbed areas in Puget Sound coniferous forests tend to be dominated by Red Alder, followed by Bigleaf Maple. This immature condition is what is found and will be managed for in the Hitt’s Hill Park Staid Successional Bigleaf Maple Woodland zone.

D1: Site interior and northeast corner

Big Leaf Maple woodland currently covers the majority of the site. The forest condition is described as “staid,” as Parks is recommending a halt to the natural succession into coniferous tree species. Some healthy conifers existing within this matrix should be left, and a small number of new ones added over time, but the majority of the canopy layer will be managed to remain deciduous. Existing Bigleaf maples and cherry should be left and maintained consistent with Parks natural area best management practices. Downed wood should be left when possible in “habitat” areas.

D2: East facing slope

The east facing slope of Hitt’s Hill Park has some particular challenges. The precipitous slope will be difficult to manage without proper training and equipment for working in steep slope areas. Further, removal of invasive plant understory will expose the slope to erosion. Measures must be taken to counteract erosion when invasive species are removed. Toward the south edge of the east facing slope, groundwater emerges, creating a damp environment. This area is not suitable for human activities and therefore makes a great candidate to manage almost entirely for vegetation and habitat value.

Table 2 - Plant Communities for Vegetation Management Zones

Some new forested areas can be created in existing gaps, but tree planting is recommended primarily to replace existing forest canopy when diseased or high maintenance trees need to be removed. The selection of shrubs and groundcover will require detailed consideration. Much more area must be covered with shrubs and groundcover. These lower growing plant materials must also be selected to play many roles: to halt erosion, buffer the site from adjacent properties and the street, allow visual access, provide habitat and food sources for urban wildlife, etc.

Table 2 describes a recommended palette of plant materials that can be selected to support Vegetation Management Zones. It includes the following plant attributes which relate to some of the special conditions found or imposed on the site. While many factors are

important in plant selection, these are primary factors related to design goals and plant requirements and should be considered when plants are located on the ground.

Buffer: These plants would be suitable for use in areas indicated on the plan for “buffer” plantings. In this park, buffers are intended to discourage physical trespass to adjacent properties with thick or prickly plant growth, while still allowing site surveillance by park neighbors. Thus, the buffer plantings included are generally lower growing or open branching which can be seen through, and prickly or thorny or very densely branched plants. Brush piles created during restoration efforts can also be used for buffering.

Erosion Protection: There are 2 very steep slope areas at this site: C-2, a west facing slope toward 37th Ave S, and a much larger area (C-3, D-2) facing east and northeast toward 39th Ave S. Steep slopes are subject to erosion by rainfall and gravity, and some plants are better able to survive in these conditions, and reduce surface erosion by creating a vegetative cover. Plants in this category have these qualities.

View Corridor: Views are an important feature of this site, and planting certain kinds of vegetation in direct line with a special view would take away from this feature. Therefore, plants that do not detract from views, either by being easily seen over or around (ie. single-trunked trees) or through.

Wet/Dry: Plants with these indications are generally more tolerant of extreme wet or dry conditions.

Table 2- Plant Communities for Vegetation Management Zones

Botanical Name	Common Name	For use in zones:	Special conditions				
			Consider these functions when locating plants on site:			Tolerant of these conditions:	
			Buffer	View	Erosion	Wet	Dry
Evergreen Trees							
Arbutus menziesii	Madrone	C-1,2,3; D-1					D
Pseudotsuga menziesii	Douglas fir	C-1,2,3					
Thuja plicata	Western red cedar	C-1,2,3				W	
Tsuga heterophylla (difficult to establish, susceptible to pests and disease)	Western hemlock	C-1,3					
Deciduous Trees							
Acer macrophyllum	Bigleaf maple	C-1,2,3; D-1					D
Alnus rubra	Red alder	D-1,2				W	
Betula papyrifera	Paper birch	D-1				W	

<i>Cornus nuttallii</i> (difficult to establish, susceptible to pests and disease)	Pacific dogwood	C-1; D-1					
<i>Fraxinus latifolia</i>	Oregon ash	C-1,2,3; D-1,2				W	
<i>Populus trichocarpa</i> (limbs break easily, avoid planting near paths)	Black cottonwood	D-1,2				W	
Shorter Deciduous Trees							
<i>Cornus florida</i> or C. 'Eddie's White Wonder'	Flowering dogwood	C-1; D-1					
<i>Crataegus douglasii</i>	Black hawthorn	D-1,2				W?	
<i>Prunus emarginata</i>	Bitter cherry	D-2					
<i>P. virginiana</i>	Choke cherry	D-1				W	
<i>Rhamnus purshiana</i>	Cascara	D-1,2					
Shrubs							
<i>Acer circinatum</i>	Vine maple	C-1,2,3					
<i>Amelanchier alnifolia</i>	Saskatoon	C-1,2					
<i>Ceanothus velutinus</i>	Wild lilac	C-1,2/sun					
<i>Cornus stolonifera</i>	Red osier dogwood	C-3; D-2			E	W	
<i>Corylus cornuta</i>	Beaked hazelnut	C-1,2,3					D
<i>Garrya elliptica</i>	Silk-tassel bush	C-1/edge; D-1					D
<i>Holodiscus discolor</i>	Oceanspray	C-1,2,3; D-2			E		D
<i>Lonicera involucrate</i>	Twinberry	C-1,2,3				W	
<i>Myrica Californica</i>	Pacific wax myrtle	C-1/edge, 2,3	B		E		D
<i>Oemleria cerasiformis</i>	Indian plum	C-1,2,3; D-1,2		V	E		
<i>Philadelphus lewisii</i>	Mock orange	D-1					D
<i>Physocarpus capitatus</i>	Ninebark	C-1,2,3				W	
<i>Rhododendron macrophyllum</i>	Pacific rhododendron	C-1,2					D
<i>Rosa rugosa</i>	Rugosa rose	C-1,2	B	V	E		D
<i>Salix scouleriana</i>	Scouler's willow	C-2; D-2			E	W	
<i>Sambucus racemosa</i>	Red elderberry	C-1,2,3		V		W	
Smaller Shrubs							
<i>Gaultheria shallon</i>	Salal	C-1,2, 3; D-1,2	B	V	E	W	D
<i>Leucothoe davisiae</i>	Leucothoe	C-1,3	B	V			
<i>Mahonia aquifolium</i>	Tall Oregon grape	C-1,2,3; D-1,2	B				D
<i>Mahonia nervosa</i>	Longleaf Mahonia	C-1,3; D-1,2	B				D
<i>Ribes sanguineum</i>	Red flowering currant	C-1,2, 3; D-1,2					D
<i>Rosa nutkana</i> or <i>Rosa gymnocarpa</i>	Nootka rose	C-1,2; D-1	B	V			D
<i>Rubus spectabilis</i>	Salmonberry	C-3; D-2	B	V		W	
<i>Spirea douglasii</i>	Spirea	C-1/edge	B				D
<i>Symphoricarpos alba</i>	Snowberry	C-1,2; D-1		V	E		

Groundcovers/Perennials							
Asarum caudatum	Wild ginger	C-1,3; D-1,2		V			
Blechnum spicant	Deer fern	C-1,3		V		W	
Cornus canadensis	Bunchberry	C-1,2,3; D-1,2		V			
Dicentra Formosa	Bleeding heart	C-1,3; D-1,2		V			D
Fragaria chiloensis	Sand Strawberry	C-1,2; D-1		V	E		
Juncus spp.	Juncus	C-3; D-2				W	
Mahonia repens	Low Oregon grape	C-1,2,3; D-1,2	B	V			
Polystichum munitum	Sword fern	C-1,2,3; D-1,2		V	E		
Tiarella trifoliata	Foam-flower	C-1,3; D-1,2		V			
Tolmiea menziesii	Youth-on-age, Piggyback plant	C-1,3; D-1,2		V			
Trillium ovatum	Trillium	C-1,3; D-1		V			
Vancouveria hexandra	Inside-out flower	C-1,2,3; D-1,2		V			

Sources:

1. Northwest Native Plants Identification and Propagation For Revegetation and Restoration Projects – King County Dept. of Public Works, Surface Water Management Division
2. Gardening with Native Plant of the Pacific Northwest – Arthur R. Krukeberg
3. A Plant List for Natural Access Control – Seattle Police CPTED Unit
4. Plants of the Pacific Northwest Coast – Pojar-Mackinnon

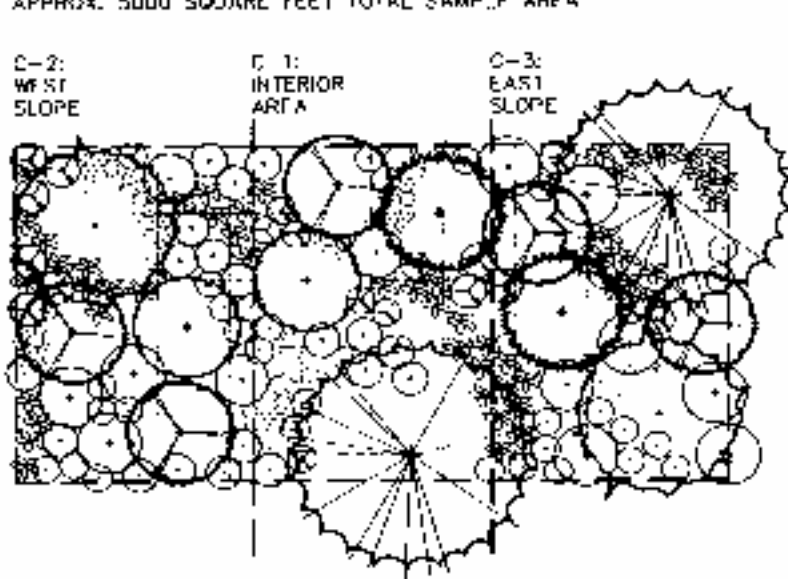
This list is not all inclusive. Additional plant species may be approved by Parks District Senior Gardener and Landscape Architect.

Plant Community Templates for Vegetation Management Zones

The following diagrams illustrate a planting template for use in a newly planted restoration area, intended to provide general guidance on approximate spacing, grouping and relative numbers of plant species for an approximately 5000 square foot area. Subzones are included in each diagram, to illustrate how to adjust the plant palette slightly to respond to site conditions (ie. focus on heavier Sword fern planting on the east facing slope), and how transitions occur across the zones. Quantities are given to aid in developing a “shopping list” when plant acquisition is made.

CONIFEROUS ZONE - WESTERN HEMLOCK-DOUGLAS FIR FOREST TEMPLATE

APPROX. 5000 SQUARE FEET TOTAL SAMPLE AREA



ONE SQUARE IS
10- FEET BY
10- FEET

NOTE: UNDERSTORY PLANTS LIKE COMPANY. WHEN PLANTING NEW UNDERSTORY SHRUBS, GROUP THEM IN NO LESS THAN 3 OF THE SAME TYPE. IN RESTORATION PROJECTS, APPROXIMATELY 20-25% OF NEW PLANTS ARE NOT EXPECTED TO SURVIVE. GROUPING INCREASES THE SURVIVAL RATE AND REDUCES THE IMPACT IF INDIVIDUAL PLANTS DO NOT SUCCEED.

PLANTS SHOWN ARE A SUGGESTED SELECTION FROM THE PLANT LIST AND A TYPICAL DISTRIBUTION. OTHER PLANTS MAY BE SUBSTITUTED IF SUITABLE FOR THE LOCATION. PLANT LAYOUT WILL REQUIRE FIELD MODIFICATION TO RESPOND TO UNIQUE SITE CONDITIONS.

KEY: PLANT SYMBOL, (FIRST AID QUANTITY PER 5000 SF), COMMON PLANT NAME

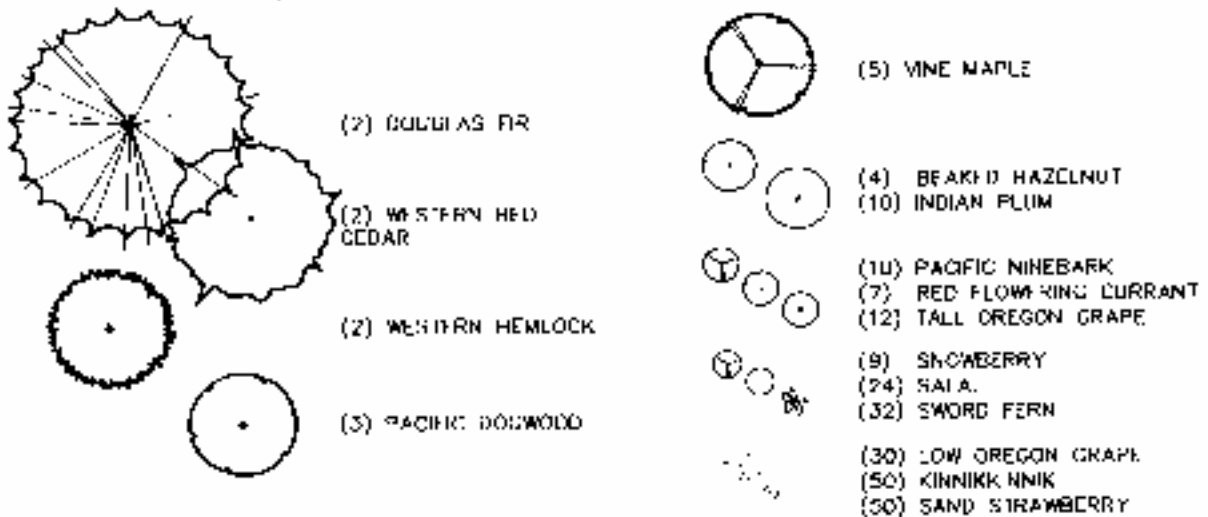


Figure 5a – Coniferous Zone Plant Template

DECIDUOUS ZONE - "STAID" SUCCESSIONAL BIGLEAF MAPLE WOODLAND TEMPLATE
 APPROX. 5000 SQUARE FEET TOTAL SAMPLE AREA.

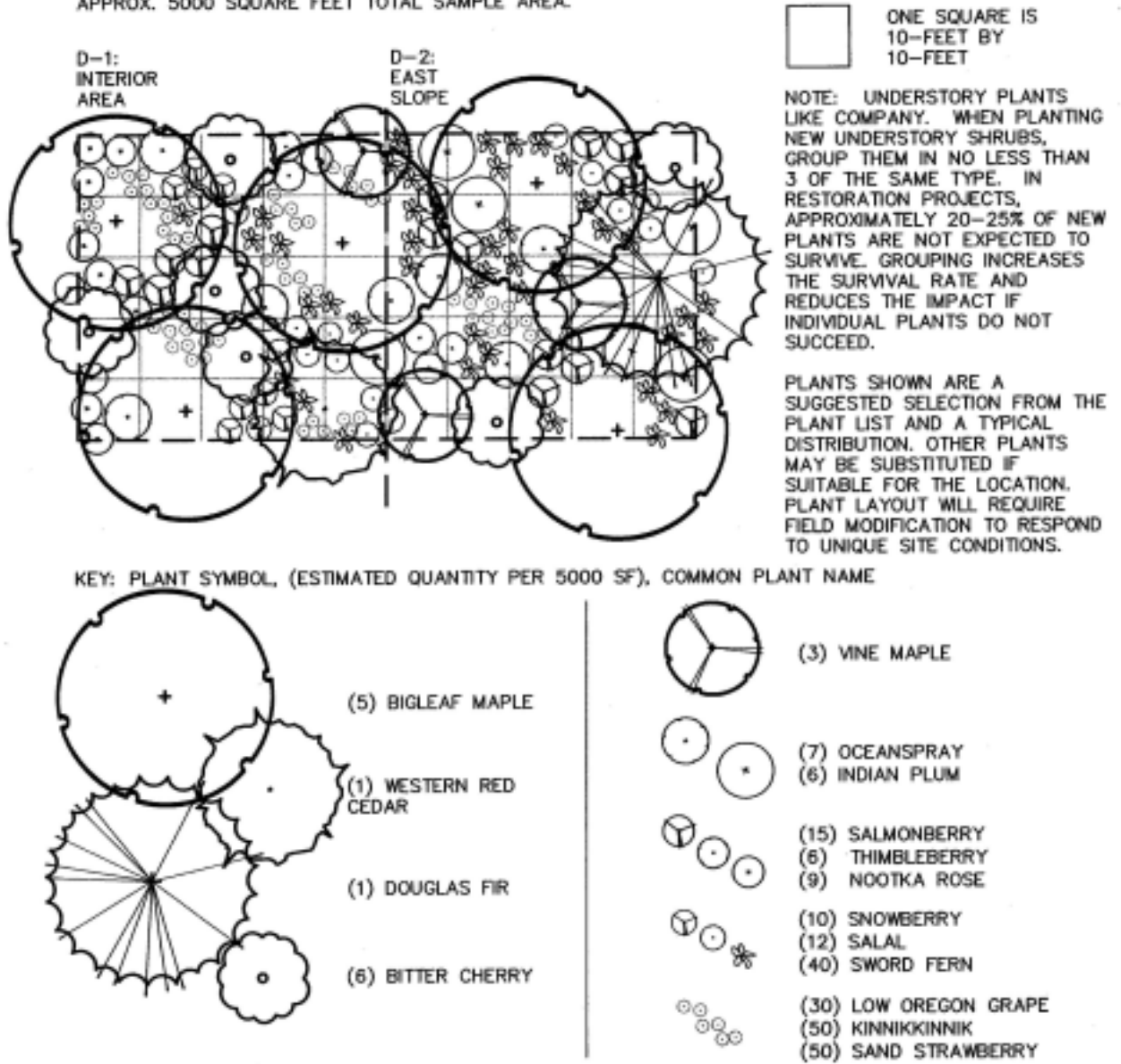


Figure 5b - Deciduous Zone Plant Template

Recommended Projects for Implementation

Note regarding site history and volunteer pre-cautionary measures: This site was previously used by a fireworks factory. A soil remediation project was completed and the site determined to be below state thresholds for soil contamination. As a very conservative precautionary measure, it is recommended that volunteers wear rubber work gloves and boots during planting projects. Soil on work gloves and boots should be rinsed off before leaving the site. If suspicious debris is found in the course of work, Seattle Parks Environmental Services Section should be contacted. Edible vegetation should not be consumed from this site.

The following recommended projects are based on a culmination of input from site observations, associated reports, input from the Parks Resource Management division, Volunteer Programs, Parks Urban Forestry and Trails programs, and community input. The projects are prioritized overall and within each area. Implementation is recommended by either Volunteers, Parks crews or a Contractor (including Certified Arborists). These distinctions are made based on the difficulty or level of expertise required to do the work. Volunteers will be trained by Parks staff or stewardship organizations in native plant restoration, or work directly under the guidance of Parks staff or organizations experienced with natural area restoration in urban settings.

Priority Ratings: 1-3-5

- 1: Short term goal** – high priority, should be accomplished within 1 year
- 3: Intermediate goal** – medium priority, not immediately important to long term goals, should be accomplished within 3 years
- 5: Long term goal** – ongoing monitoring, ultimately beneficial to natural area, should be accomplished in 5 or more years

Criteria for receiving high priority:

- Tree canopy health, including Arborist’s tree risk assessment
- Timing –urgency due to outside resources, ie. funding cycles
- High percentage of invasive coverage on ground or trees
- Proximity of area or high visibility from people-use areas of the park

Overall Recommended Actions

1. **Tree monitoring program:** Include Hitt’s Hill Park Natural Area in Parks ongoing natural area tree monitoring programs. As trees mature or decline in the future, additional removals may be required. Specific trees of interest are listed in the following table, and further described in the Scott D. Baker Consulting Arborists Vegetation Management Report in the Appendix.
2. **Tree canopy maintenance:** Implement recommendations in Baker’s report as funding allows. Prioritize tree removals or maintenance located near new trail and viewpoints. Trees that are “yellow-flagged” and within 50-feet of the pathway are highlighted in this list. Additional tree work should be scoped based on the arborist report in the appendix. Work may be done by Parks Urban Forestry crews or a Parks approved Certified Arborist.
3. **Remove invasive plant sources** throughout site and restore planted areas with native plants suitable to specific site conditions

Table 3 – Recommended Actions By Area

Existing Area	Vegetation Management Zone	Priority	Recommended Action	Who can do the work, other special conditions
1	C-2	1	<ul style="list-style-type: none"> ▪ Gently remove fill soil over tree roots. 	<ul style="list-style-type: none"> ▪ Parks/Contractor
		3	<ul style="list-style-type: none"> ▪ Prune trees as recommended by Arborist. 	<ul style="list-style-type: none"> ▪ Parks or Certified Arborist
		1	<ul style="list-style-type: none"> ▪ Remove tree Y33 (proximity to path) 	
		3	<ul style="list-style-type: none"> ▪ Remove ivy on steep slope and heavily mulch and, if needed, use jute matting or coils to reduce soil erosion, replant with slope-happy low shrubs and groundcovers. Retain native fern and salal. 	<ul style="list-style-type: none"> ▪ Steep slope requires special training – Parks Natural Area Crew and/or guided/trained volunteers.
		5	<ul style="list-style-type: none"> ▪ Retain specimen laurel until alternative buffer grows that is not an invasive seed source. 	
2	C-1	1	<ul style="list-style-type: none"> ▪ Remove diseased/damaged portions of trees Y30, 31 	<ul style="list-style-type: none"> ▪ Parks or Certified Arborist
		3	<ul style="list-style-type: none"> ▪ Remove H. blackberry and ivy. 	<ul style="list-style-type: none"> ▪ Volunteers
		3	<ul style="list-style-type: none"> ▪ Retain Mahonia and Nettles. 	
		3	<ul style="list-style-type: none"> ▪ Restore, include buffer plantings. 	
3	C-2	1	<ul style="list-style-type: none"> ▪ Protect young Madrone, mulch, minimize activity nearby. 	<ul style="list-style-type: none"> ▪ Volunteers
		1-5	<ul style="list-style-type: none"> ▪ Monitor cedar tree, mulch root area, “soil drench” with mycorrhizal inoculant for soil health and to stimulate fine root growth. 	<ul style="list-style-type: none"> ▪ Parks or Cert. Arborist
		3	<ul style="list-style-type: none"> ▪ Enhance understory vegetation on sloped area, include low buffer plantings with occasional taller shrubs. 	<ul style="list-style-type: none"> ▪ Volunteers
		5	<ul style="list-style-type: none"> ▪ Snag or remove cedar when failed 	<ul style="list-style-type: none"> ▪ Parks
4	C-1, C-2 on west portion; some D-1 on east boundary	1	<ul style="list-style-type: none"> ▪ Remove ivy from trees and understory 	<ul style="list-style-type: none"> ▪ Volunteers
		1	<ul style="list-style-type: none"> ▪ Remove holly 	<ul style="list-style-type: none"> ▪ Parks or Contractor
		1	<ul style="list-style-type: none"> ▪ Provide recommended high priority tree maintenance within 50 feet of path; remove dead or diseased portions of Y34, Y35, Y36. 	<ul style="list-style-type: none"> ▪ Parks or Cert. Arborist
		1	<ul style="list-style-type: none"> ▪ Plant D-1 trees at eastern edge 	
		3	<ul style="list-style-type: none"> ▪ Plant buffer understory plants at west 15-20 feet of west edge adjoining property ▪ Revegetate throughout with native understory shrubs and groundcover, heavily mulch or compost erosion control grass upon planting with new Plant C-1, C-2 “summit” tree species toward west and north edge. 	<ul style="list-style-type: none"> ▪ Volunteers
5	D-1	1	<ul style="list-style-type: none"> ▪ Remove ivy 	<ul style="list-style-type: none"> ▪ Volunteers
		1	<ul style="list-style-type: none"> ▪ Provide recommended tree maintenance work, particularly trees #Y21, Y22, Y28, Y29 	<ul style="list-style-type: none"> ▪ Parks or Cert. Arborist
		3	<ul style="list-style-type: none"> ▪ Selectively restore understory with appropriate shrubs and small trees 	<ul style="list-style-type: none"> ▪ Volunteers
6	D-1	1	<ul style="list-style-type: none"> ▪ Remove dead or diseased portions of Y32. 	<ul style="list-style-type: none"> ▪ Parks or Cert. Arborist
		3	<ul style="list-style-type: none"> ▪ Remove H. blackberry 	<ul style="list-style-type: none"> ▪ Volunteers

		3 3 3 3	<ul style="list-style-type: none"> ▪ Retain native annuals and perennials ▪ Plant low growing native buffer shrubs ▪ Potential area to begin demonstration plant labeling/interpretation ▪ Protect young maple #116 	
7	D-1	5 1-5	<ul style="list-style-type: none"> ▪ Remove invasives to limit spread ▪ Protect madrone, cedar, and other native trees 	<ul style="list-style-type: none"> ▪ Volunteers
8	D-1	1 1 1	<ul style="list-style-type: none"> ▪ Control invasive plants ▪ Plant buffer understory within 15-20 feet of south property line ▪ Retain birch trees 	<ul style="list-style-type: none"> ▪ Volunteers
9	D-1	1	<ul style="list-style-type: none"> ▪ Establish monitoring program for large poplar (#Y19) every year (or as recommended by Parks Urban Forester) 	<ul style="list-style-type: none"> ▪ Parks
		1	<ul style="list-style-type: none"> ▪ Remove invasives as encountered 	<ul style="list-style-type: none"> ▪ Volunteers
		1 5	<ul style="list-style-type: none"> ▪ Preserve native understory ▪ Snag poplar for wildlife when failed 	<ul style="list-style-type: none"> ▪ Parks or Cert. Arborist
10	D-2	1 3	<ul style="list-style-type: none"> ▪ Remove ivy from trees ▪ Remove ivy from steep slope, immediately mulch heavily to prevent erosion 	<ul style="list-style-type: none"> ▪ Parks Natural Area crew or specially trained/guided volunteers due to steep slope condition
		1-5 3	<ul style="list-style-type: none"> ▪ Preserve Sword fern on slope ▪ Plant native shrubs and groundcover, low trees 	
11	D-1	1	<ul style="list-style-type: none"> ▪ Remove dead or declining trees near path area (Y12), re-use woody debris on site for habitat for wildlife 	<ul style="list-style-type: none"> ▪ Parks or Certified Arborist
		3 3	<ul style="list-style-type: none"> ▪ Provide recommended tree maintenance ▪ Plant new trees in clearings for next tree generation 	<ul style="list-style-type: none"> ▪ Volunteers
		5	<ul style="list-style-type: none"> ▪ Plant new understory in areas of invasive removal 	
12	D-1; C-1	1	<ul style="list-style-type: none"> ▪ Remove invasive blackberry and ivy (higher percentage toward sloping east boundary) 	<ul style="list-style-type: none"> ▪ Volunteers
		1-3	<ul style="list-style-type: none"> ▪ Remove dead or diseased portions of Y4 	<ul style="list-style-type: none"> ▪ Parks or Certified Arborist
		3 3	<ul style="list-style-type: none"> ▪ Protect existing native understory: Beaked hazelnut, Sword fern, Mahonia, ▪ Plant new native understory shrubs ▪ Introduce mixed conifers 	<ul style="list-style-type: none"> ▪ Volunteers
13	C-1	1	<ul style="list-style-type: none"> ▪ Remove invasive species (ivy, holly) 	<ul style="list-style-type: none"> ▪ Volunteers
		1	<ul style="list-style-type: none"> ▪ Retain walnut tree 	
		1	<ul style="list-style-type: none"> ▪ Retain laurel hedge with unmanicured appearance until alternative buffer is planted that is not an invasive seed source. 	
		1	<ul style="list-style-type: none"> ▪ Retain native ferns and mahonia 	
		1	<ul style="list-style-type: none"> ▪ Plant native low understory shrubs and groundcovers, including buffer plants to east edge of narrow passageway 	
		1	<ul style="list-style-type: none"> ▪ Plant shorter deciduous trees at park entrance (powerlines) 	
14	C-2	1	<ul style="list-style-type: none"> ▪ Remove ivy, invasives from trees and slope 	<ul style="list-style-type: none"> ▪ Parks Natural Area crew or specialized
		3-5	<ul style="list-style-type: none"> ▪ Mulch heavily and/or use jute matting to 	

		1	prevent soil erosion on slope	trained/guided volunteers
		3	<ul style="list-style-type: none"> ▪ Remove holly at top of slope 	<ul style="list-style-type: none"> ▪ Volunteers
		3-5	<ul style="list-style-type: none"> ▪ Restore disturbed areas with native plantings, trees and shrubs 	<ul style="list-style-type: none"> ▪ Volunteers, slope trained
		3-5	<ul style="list-style-type: none"> ▪ Create some planting pockets with fallen logs 	<ul style="list-style-type: none"> ▪ Parks Natural Area crew or contractor
15	C-1, C-2	1	<ul style="list-style-type: none"> ▪ Remove blackberries, holly and mulch heavily 	<ul style="list-style-type: none"> ▪ Volunteers, Parks or contractor (extensive area)
		1	<ul style="list-style-type: none"> ▪ Retain Bitter cherry 	<ul style="list-style-type: none"> ▪ Volunteers
		1-3	<ul style="list-style-type: none"> ▪ Plant with native trees, shrubs 	
		3	<ul style="list-style-type: none"> ▪ Introduce groundcovers after invasives are eradicated 	
		1-5	<ul style="list-style-type: none"> ▪ Monitor annually for blackberry return 	<ul style="list-style-type: none"> ▪ Parks or Certified Arborist
		1	<ul style="list-style-type: none"> ▪ Remove dead tree Y1, use in habitat area 	
16	D-2	5	<ul style="list-style-type: none"> ▪ Coordinated restoration work with future driveway easement 	<ul style="list-style-type: none"> ▪ Parks or contractor due to necessary site prep
		5	<ul style="list-style-type: none"> ▪ Plant with tough buffer plantings allowing good visibility, considering vehicle traffic and adjacent residential use 	

References

- Archaeological and Environmental Assessment 01-01002, Eco Compliance Corporation 2001
- “Vegetation Management Plan” (note: Tree Health Assessment), Scott D. Baker Consulting Arborists, Feb. 2003
- “Hitt’s Hill Plant Inventory,” Leina Johannsen, October 2001
- “Planting Guidelines” and “Management Guidelines” excerpted from Leschi Natural Area Native Restoration and Management Plan, Charles Anderson Landscape Architecture, July 2000
- Northwest Native Plants Identification and Propagation For Revegetation and Restoration Projects – King County Dept. of Public Works, Surface Water Management Division
- Gardening with Native Plant of the Pacific Northwest – Arthur R. Krukeberg
- A Plant List for Natural Access Control – Seattle Police CPTED Unit
- Plants of the Pacific Northwest Coast – Pojar-Mackinnon
- (Fowler, personal communication 2/2003).

Helpful resource on native plants and invasive plant removal

“A City Among The Trees – An Urban Forestry Resource Guide”, City of Seattle Urban Forest Coalition, October 1998

Appendices

1. Vegetative Management Plan, Scott D. Baker Consulting Arborists 2/21/03
2. Hitt's Hill Plant Inventory, Leina Johansson 12/02
3. "Planting Guidelines" and "Management Guidelines" excerpt from Leschi Natural Area Native Restoration and Management Plan, Anderson & Ray, Inc., P.S., July 2000

Please note that the attached studies may include recommendations that may not always reflect the priorities and practices of the Parks Department. Please refer to the preceding document – the Hitt's Hill Park Vegetative Management Plan, April 2003 – for clarification of recommendations.

TO: **EarthCorps**

JOB SITE: Hitts Hill Park Project, 3843 S. Brandon St., Seattle WA 98118

FROM: **Scott D. Baker Consulting Arborists**

SUBJECT: Vegetation Management Plan

DATE: 1/24/2003

PREPARED BY: Sean Dugan, Certified Arborist – Scott D. Baker Consulting
Arborists

Contents

Summary
Assignment & Scope of Report
Observations
Analysis and Testing
Discussion and Conclusions
Vegetation Survey
Recommendations
Glossary
References
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Site Map
Table of Trees

(These attachments are available from Scott D. Baker Consulting Arborists and are not included in Seattle Parks and Recreation June 2003 Hitt's Hill Park Vegetative Management Plan)

Summary

Hitts Hill is a young forest stand typical for the Seattle region. Vegetation has been surveyed for health and percentage of invasive and naturally occurring species. Forest health will be dramatically increased with the removal of invasive species and the establishment of native species consistent with the community's desire. Hazard trees have been identified using a Visual Tree Assessment. Further investigation into the Black cottonwood will be necessary if the tree is to be retained.

Assignment & Scope of Report

This report outlines the site inspection by Scott D. Baker Consulting during October and November 2002. Included are observations, health assessments, and recommendations for trees and vegetation located at Hitts Hill open space.

The property owner, Seattle Parks and Recreation and their agent Earth Corps, requested these services for use in park planning and design.

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, 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.

Observations

Hitts Hill consists of 3.2 acres of wooded vacant land surrounded by a suburban development. The property was formerly the site of Hitts Fireworks factory. It has been vacant since the late 1970's.

Elevation changes significantly from the northern and eastern portions of the property. From a northern vantage point, S. Dawson St. can be viewed approximately 80' below. The view to the east is comprised of 39th Ave. S. and Rainer Ave S. Rear yards of local residents line the southern portion of this property. Concrete stairs rise up from S. Brandon St., allowing an access point along the southern boundary. The western portion of the property is gradually sloped, rising up from 37th Ave S. This is the location of the main entryway into the open-space.

Currently, work by volunteers and EarthCorps is underway to create access to the west and to remove the large number of invasive species that have overrun the site. Invasive removal has been established as the first priority. The goal of the project is to create a passive park highlighting native plant species of the Pacific Northwest in a neighborhood that is in need of preserved open space.

Trees with a 6" diameter at breast height (DBH) were counted and evaluated for health conditions. Hazard trees were identified with yellow flagging tape. Vegetation was evaluated for percentages of varying species, health, location, and recommendations for care or removal.

The forested site is composed primarily of native tree species with Big-leaf maple (*Acer macrophyllum*) dominating the canopy. Other native species on the site include Black cottonwood (*Populus trichocarpa*), Pacific madrone (*Arbutus menziesii*), Western Red cedar (*Thuja plicata*), and Pacific dogwood (*Cornus nuttallii*).

The under-story is dominated by Beaked hazelnut (*Corylus cornuta*), Bitter cherry (*Prunus emarginata*), English holly (*Ilex aquifolium*), and Laurel (*Prunus spp.*). Non-woody native vegetation in the forested area is dominated by Sword fern (*Polystichum munitum*), Salal (*Gaultheria shallon*), and Oregon Grape (*Mahonia nervosa*). However, there are several non-native invasive species present on the

site, which have re-shaped the landscape. Most important and problematic are English ivy (*Hedera helix*) and Himalayan blackberry (*Rubus discolor*).

Several non-native ornamental trees are present on the site. These trees are most likely remnants from the home that once existed at this location. Most notable is an English walnut (*Juglans regia*) growing along the edge of the southern access point.

Many of the existing maples show signs of damage in the basal area of the trunk. Decay problems exist, posing an unacceptable risk with increased use by Park visitors, and will necessitate removal. Other trees have large dead branches in the canopy, which also pose a threat to those below.

The distinctive large Black cottonwood presents an interesting management challenge. This tree is a local landmark, visible for a great distance due to its location at the “top” of Hitts Hill. The tree is massive and the canopy projects far above other trees on the site. This tree has sustained major damage in the past, and assessment from the ground reveals decay in the area of the upper trunk with large dead portions. The defect appears to have compromised the two large scaffold limbs that form the upper structure of the tree.

Typically, a naturally occurring forest of this type would slowly be colonized by shade-tolerant native conifers such as Western hemlock (*Tsuga heterophylla*) and Western red cedar (*Thuja plicata*). Through succession, these trees replace most of the deciduous forest trees found in this region. There are few young conifer seedlings or young trees growing at Hitts Hill. This phenomenon is common in Seattle’s urban forests due to competition by invasive species, lack of seed trees in the vicinity, and browsing of young seedlings by various animals.

Analysis and Testing

Evaluation of existing vegetation for health, condition and risk were determined utilizing a Visual Tree Assessment (VTA) format. Tree risk was based on three criteria to determine the level by which a tree should be categorized: 1.) the presence of a target; 2.) tree structure; 3.) size of the part in question. Assessment allows a value to be assigned to a tree in a Low, Medium or High category.

Risk assessment for Hitts Hill has been slightly adjusted in the presence of target category. To insure the safety of the people who will be utilizing the park, it was assumed that a target would be ever-present. Therefore, some trees were determined to be of an elevated risk status in locations that might not receive any use at all. The final design of pathway circulation will factor into the potential risk value.

Discussion and Conclusions

The collection of vegetation at Hitts Hill is typical to other forested areas throughout the Seattle metropolitan region. A number of high-risk trees have been identified and should be removed where they could affect park users. Caution should also be maintained where high-risk trees exist in low traffic areas.

If retaining the large Black cottonwood is a priority for the community, further investigation of the tree should be scheduled to determine whether all or part of the tree can be retained with reasonable risk. It is clear to us that this tree will not be a long-term feature of the proposed park and that if it failed the likelihood of extensive damage to several nearby trees is high.

A decision must be made about the long-term goal of forest type on the site. Many of the Bigleaf maples now growing on the site are young and have many years before becoming mature. I suggest identifying the best maples for long-term service in the park, and working to improve and preserve them. In the areas covered with deciduous forest there will be openings available for planting shade-tolerant native conifers. This would help to restore a natural succession process and give interest to a view dominated almost entirely by a single species of tree.

Plantings of other native trees may also be included along with native shrubs such as huckleberry, red elderberry, pacific dogwood, and cascara. Protective measures will be required to ensure the survival of young trees to a point where they are not vulnerable to animal damage.

Removal of invasive species is ongoing, and successful control will require yearly attention. Reforestation efforts will help to control invasive species by creating an environment that is not conducive to their establishment and spreading. An example would be to create a shade environment in areas where blackberry exists by planting native conifers such as Douglas fir or Western Red cedar. English ivy must be removed by hand, with follow-up control scheduled annually.

A monitoring program will need to be established for other trees with a potential for failure near the trail system. Trees should be inspected using a Visual Tree Assessment. The inspector should look for:

- Broken or hanging branches
- Heaving or mounding of soil at the base of the tree near paths or open-space, often associated with a change in the angle of the trunk.
- Cracks, especially below co-dominant stems

Monitoring should also be made after severe storm events and snow or ice storms.

Vegetation Survey

Area # 1 – Entry along 37th Ave. S.

This steeply sloped site includes both native and invasive plant species, **30:70** % respectively. Native fern and Salal are almost entirely covered with English ivy. Invasive plant removal should be followed by adding a thick layer of mulch and planting with native groundcovers. This will help to reduce soil erosion and to stabilize the slope over time. The trees along the slope ridge are showing signs of stress related to the re-grading that took place during trail clearing. Removing the fill and returning the site back to the original grade, along with mulching, would help reduce the negative impact to the trees, however, this should be done without the use of heavy machinery that could further compact soil and disturb roots. A mature laurel also existing here is considered a specimen plant due to its size and distinguishing characteristics. This plant is valuable for its screening attributes and should remain.

Area #2 – West of Area 1 & North of the main trail.

Native-to-invasive-species ratio decreases as you move further towards the east from an initial **50/50** to **20/80**. Mahonia and Nettles are visible beneath a thick layer of Blackberry and English ivy. Past excavation along the eastern border of this area has been completely enveloped by invasive species. Removing invasive species and incorporating a screening buffer from the neighbor's residence should take place in this location.

Area # 3 – Entry/ Screening

Screening for the neighbor's property should be the main focus here. The area is sloped and sparsely covered with non-native grasses and ground cover. This sight is dominated by a large Western Red cedar (*Thuja plicata*), which is showing signs of stress due to a compromised root system. It has been recommended to remove the tree before trying to establishing other plants in this area. If removal is not opted for, mulch should be applied over the area surrounding the tree, and a soil drench should be applied to increase micro biotic activity and increase the nutrient availability. A monitoring program will need to be established if the tree is to be retained.

Area # 4 – Open space behind resident.

Screening should be incorporated along the western edge of this area for the neighboring resident. A mix of hydro seed grasses has been added to reduce the effects of erosion. Trees along the eastern edge of the space have a high risk value, which will increase with use of this area. Tree removal or snagging, addition of a buffer strip, or changing the use characteristics of the space will reduce the associated risk. Recommendations include establishing native groundcovers and successional tree species, such as *Thuja plicata*.

Area # 5 – Priority Invasive Removal.

85% coverage here is invasive species, primarily English ivy. The ivy vines have compromised many of the large stems and are beginning to girdle

trunks along the root crown. The heavy impact has increased the possibility of failure in many of the trees. This location would benefit most from the removal of invasive species, particularly from the trees, and re-establishment of native species. Walking trails should be excluded from this area due to the high risk associated with the compromised stems. Otherwise, many of the trees here would need to be reduced or removed. Addition of native conifers to this location would be consistent with the community's desire for long term succession planning.

Area #6 – Excavation, now Blackberry.

Although some annuals and perennials exist along the fringe of this location, the primary component is small Blackberry bushes, up to **75%**. The grade has been disturbed in this location, dropping it down a few feet from the surrounding grade. This site abuts the neighboring property. Removal of blackberry from this site, along with area #2, would increase the need for a screening buffer from the neighbor's property but would also leave room for plantings of native species that could be viewed along the walk. The area is shaded for most of the day during mid spring to early fall. Tree # 116 is in good condition and young. It would benefit from the removal of invasive species.

Area # 7 – Increased Diversity

Area 7 contains a variety of native species, including a madrona, cedar, and other native trees. The ground is approximately 40-50% covered, **90%** of which are native-species. Control of invasive species in the surrounding areas is important so that they do not spread further into this site.

Area #8 – Elevated clearing and Neighbors' edge.

Area 8 is located along the boundary with the local neighboring properties. The vegetation here is limited to small trees and invasive species in small percentages. This location is elevated above most of the rest of the park and has been cleared in the past. This site might be well suited for a viewing area and the establishment of some screening with native plants. Appropriate plantings will also be needed to restrict the flow of people from entering the neighbor's property.

Area #9 – Cottonwood and native groundcover.

The large cottonwood in this location will require immediate addressing prior to the opening of the park. It is recommended to either remove this trunk entirely or to reduce it to a large snag for wildlife. Although it is a predominate feature in the space, the associated risks are considered to be too high to leave this tree unattended to. The understory in this location is primarily native ground cover. There is an increase in the percentage of non-native/invasive species as you move from west to east along this area, however, native species dominate.

Area #10 – Steep Slope

This site, which is on a heavy slope, contains numerous trees in a variety of conditions. There is 100% coverage, of which **80%** is invasive species with non-native species present. Sword fern is the primary native species in this location, and is most suitable for retaining the slope. Work on the slope should be limited to invasive species removal. After which, a layer of mulch is recommended to further prevent weed establishment and erosion.

Area #11 – North, along main trail.

60% invasive, **40%** native. This area contains many trees that are over-mature and have begun to dieback and decline. A number of potentially hazardous trees exist here. These trees are currently providing habitat for wildlife. Retaining these trees would increase the diversity of the site, but removal would be recommended if any paths were to be incorporated into this location.

Area #12 – Even distribution w/ understory trees.

This portion of the property gradually slopes to the East towards 39th Ave. S. The understory here is primarily Beaked hazelnut and groundcovers with an even distribution of 20% each. Starting along the upper part of the slope, invasive species consist of **20%** of the species and increase to **60%** along the lower portion of the slope. Species include Sword fern, Mahonia, Blackberry, and Ivy. Ivy begins to increase in percentage as you head down slope. Work done here should be to re-establish Sword fern, retaining the slope, and pushing out the ivy.

Area #13 – Entry along S. Brandon St.

There is evidence of the residence that once existed in this location. There are many species of non-natives occurring here, including an extensive laurel hedge providing screening to the neighboring property, a large Rhododendron that has been surviving well, and other small ground covers. A large walnut tree should be considered a specimen in this location and any new trails should respect its root zone. Invasive species (ivy, ilex) make up approximately **60%** of the groundcover with the other **40%** being native ferns and mahonia.

Area #14 – Slope & Street

The slope is covered by **80%** invasive species with **20%** native. Ilex is heavy in this location, especially along the top of the bank. Trees here are large and covered with ivy. Removal of this climbing weed is priority for this area. Trees are generally in good condition, with some areas of decay, and would not require extensive management since a lack of target exists. Removal of any vegetation here should be re-planted with other vegetation to help support the slope structure. Use of jute matting would be recommended along the steepest portions of the slope.

Area #15 – Blackberry Row.

Once through area #13, you encounter a great mass of blackberries to both sides of the main trail. It would be recommended to remove the Blackberries and to create a native shade forest planting here, including those species which you would find in a healthy stand undergoing a succession process. This includes Douglas fir and *Thuja plicata*. The orientation of this site also provides one of the few areas that receive sun for an extended portion of the day.

Recommendations

Determine if the large cottonwood can be retained on the site and for how long. Further inspection will be needed.

Finalize the park plan to include a planting plan that includes native conifers.

Design the trails to avoid high-risk trees that may be safely maintained off the trail.

Continue the invasive removal project and include budget for yearly work to ensure continued control.

Consider an educational component that identifies the native forest on the site for park users.

Glossary

basal area: the cross-sectional area of the trunk based upon measurement at 54 inches (4.5 ft) above grade (Matheny *et al.* 1998)

broad-leaved: trees whose foliage is flat and broad (Matheny *et al.* 1998)

canopy (or crown): the leaves and branches of a tree (Matheny *et al.* 1998)

central leader: the main stem, trunk, or bole (Matheny *et al.* 1998)

codominant stems: stems or branches of nearly equal diameter, often weakly attached (Matheny *et al.* 1998)

conifer: a cone-bearing tree or other plant that has its seeds in a structure called a cone (Lilly 2001)

crown (canopy): the leaves and branches of a tree (Matheny *et al.* 1998)

crown cleaning: removal of water sprouts and dead, dying, diseased, crossing, and hazardous branches from a tree (Lilly 2001)

DBH: diameter at breast height; the diameter of the trunk measured 54 inches (4.5 feet) above grade (Matheny *et al.* 1998)

decay: decomposition of woody tissues by fungi or bacteria (Lilly 2001)

deciduous: tree or other plant that loses its leaves sometime during the year and stays leafless generally during the cold season (Lilly 2001)

dieback: death of twigs and branches in the upper crown (Matheny *et al.* 1998)

failure: loss of branch or trunk due to structural defects (Matheny *et al.* 1998)

included bark: bark that becomes embedded in a crotch between branch and trunk or between co dominant stems and causes a weak structure (Lilly 2001)

risk assessment: process of determining the level of risk posed by a tree or group of trees on a property (Lilly 2001)

structural defects: flaws, decay, or other faults in the trunk, branches, or root collar of a tree, which may lead to failure (Lilly 2001)

target: person, object, or structure that could be injured or damaged in the event of tree or branch failure (Lilly 2001)

References

Harris, Richard W., James R. Clark, and Nelda P Matheny. Arboriculture: Integrated Management of Landscape Trees, Shrubs, and Vines, 3rd Ed. New Jersey: Prentice Hall, 1999

Lilly, S.J., Tree Climbers' 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.

Attachments

Site map

Table of Trees

(These attachments are available from Scott D. Baker Consulting Arborists and are not included in Seattle Parks and Recreation June 2003 Hitt's Hill Park Vegetative Management Plan)

Appendix #2 *Hitt's Hill Park Plant Inventory* Leina Johannson 12/02

Preliminary Notes: Existing Conditions and Ideas for Site Plan

Overall

- The majority of the site is wooded, but this is not a dense or mature forest. Most of the trees are probably less than 30 years old.
- Non-native invasives (especially English ivy, Himalayan blackberry, English holly, and laurel) dominate the area. In fact, in many areas it is difficult to find any native plants (other than the trees.)
- The changes in elevation of this hilly site make it among the more interesting public areas in the larger neighborhood. It presents opportunities for diverse plantings, beautiful vantage points—and potential risks. Dense plantings near the steepest slopes will probably be needed to discourage people from getting too close to the drop-offs and to prevent erosion.
- Property boundaries will need dense plantings or other ways to discourage site visitors from wandering onto private property
- A moderate amount of debris (including one abandoned car) has been dumped on the site; most of the debris is concentrated along the site's southern boundary.

Area #1

- Very sharp drop-off to sidewalk
- High visibility since this area has the Hitt's Hill Park sign and is along the street. Few native plants here, and most of them are nearly swallowed up by invasives
- This area has the site's only patches of salal, scotch broom, and one of the few of bracken fern

Area #2

- The widening along the dirt roadway in this area might be the most convenient spot in the western half of the site for dropping off mulch and piling invasives to be taken away. Might need gravel on the roadway, from sidewalk to the widening, so that vehicles don't get stuck. If so, might need a gate to discourage other vehicles from attempting to enter the site.
- Trees along the eastern portion of this area are heavily loaded with clematis and ivy.
- The roots of the trees next to the excavation here have been obviously compromised.
- The dirt roadway climbs uphill from 37th Ave S. to reach a peak near this area's excavation.

Area #3

- Two of the site's few evergreen trees are located in this area (a cedar and young madrone). Otherwise, the area is sparsely planted; straw has been scattered on the bare ground.
- This area slopes up from the dirt roadway and the neighboring house. The house and roadway could easily be screened from each other by planting the slope.

Area #4

- This area is fairly open, flat, and probably the best candidate in the west half of the site for the native plant demonstration garden that volunteers have discussed. There would have to be a clear demarcation (hedge?) of the property line between the demonstration garden and the house. (Currently, the small yard is completely open to the greenspace.)
- Grasses (rye?) have been planted here, probably to prevent erosion.
- Comfrey has established itself along the southern edges of Areas 4, 5 and 6.

Area #5

- This area is the site's highest point, has the most downed wood, and the trees here have some of the heaviest ivy infestation.
- This area has the site's only examples of baldhip rose and oceanspray.
- Looking north from the edge of this area is a great view of the neighborhood—a bench would be nice here. To improve the view, the neighboring property could be screened by planting a hedge (about 4-5 feet tall).

Area #6

- Most of the plants in this area are fairly small. The private property adjacent to it is mostly open, contributing to the sense that this is a clearing.

Area #7

- This area includes a large madrone and a cedar. Both are located fairly close to one of the excavations; an arborist will need to check if the roots of these trees have been compromised. A small amount of clematis has climbed into the madrone.
- Last spring, a patch of sweet cicely was identified along the edge of this area, but since that time the roadway has been widened and may have wiped out these plants.

Area #8

- This area has large patches of knotweed and poison hemlock along with the site's usual invasive plants.
- There are a few paper birches here. From their small size, they must have been planted within the past few years. They are adjacent to one of the excavations and some of the roots have been compromised.
- Looking north from this area, past the car and cedar tree located in Area #11, is a great view of the surrounding neighborhood and the lake.

Area #9

- This area includes a very large cottonwood. The tree is a prominent landmark from within the site and from the surrounding neighborhood.
- Large amounts of herb robert are located in this area.

Area #10

- This area is a very steep slope; sword ferns are the dominant plant here.
- There are great views from the footpath through this area, but due to the steep slope, this is probably not the best area from which to survey the view. Could add some benches well away from the drop-off, then plant very thickly along the edge to discourage people from getting too close to it.
- At the bottom of the slope, there is a small hemlock (probably recently planted) and one small patch of maidenhair fern.

Area #11

- A few snags are located here.
- One cedar tree is growing in this area.
- Areas #11 and 12 do not have many footpaths and therefore are (relatively) less disturbed. A lot of birds (robin, crow, bushtit, flicker, stellar jay, wren, chickadee) and their nests can be spotted in this area.

Area #12

- Himalayan blackberry (shoulder-high and very dense) dominates this area; there are few trees.
- Wisteria has escaped from a neighboring yard and appears to be successfully competing with the blackberry.
- This is the most open, sunniest area in the site. Because of this exposure, it could host a different mix of native plants than the remainder of the site.
- This area (or Area #13) are the best candidates for a native plant demonstration garden in the eastern half of the site.

Area #13

- Steps leading up from the sidewalk, and a concentration of ornamental plants (rhododendron, yucca, iris, vinca) are reminders of the house that once stood on this lot.

Area #14

- Very steep slope, mainly covered in Himalayan blackberry. This area is very prominent from the street.
- This area includes the site's only patch of horsetail and one of the few vine maples.

Existing Plant Inventory

Note: An inventory during the growing season may reveal more herbaceous plants. Letters in parenthesis after non-native plants indicate a species on the Washington State Noxious Weed List; for example, (C) is a Class C Weed.

Dominant

Non-native

English ivy	Hedera helix
Himalayan blackberry	Rubus discolor
English holly	Ilex aquifolium
Laurel	Prunus spp.

Native

Bigleaf maple	Acer macrophyllum
Bitter cherry	Prunus emarginata
Beaked hazelnut	Corylus cornuta var. californica

Frequent

Non-native

Clematis	Clematis vitalba (C)
Bindweed	Convolvulus arvensis (C)
European bittersweet	Solanum dulcamara
Knotweed	Polygonum spp. (B)
Money plant	Lunaria biennis
Forget-me-not	Myosotis sylvatica
Grasses	
Poison hemlock	Conium maculatum (C)
Comfrey	Symphytum officinale
Thistles	Various spp. (possible A-C)
Dock	Rumex spp.
Herb robert	Geranium robertianum (B)
Clover	Trifolium repens
Nipplewort	Lapsana communis
Buttercup	Ranunculus repens
Dandelion	Taraxacum officinale
Self-heal	Prunella vulgaris

Dovefoot geranium	Geranium molle
Wall lettuce	Lactuca muralis

Native

Osoberry	Oemleria cerasiformis
Red elderberry	Sambucus racemosa ssp. pubens
Low Oregon-grape	Mahonia nervosa
Sword fern	Polystichum munitum
Fringecup	Tellima grandiflora
Trailing blackberry	Rubus ursinus
Cleavers	Galium aparine

Infrequent (1 to 3 small patches or individual plants)

Non-native

Wisteria
European hawthorn
English walnut
Mountain ash
Scotch broom
Rose
Spurge laurel
Butterfly bush
Rhododendron
Variegated holly
Yucca
Iris
Vinca major
Calendula

Wisteria spp.
Crataegus douglasii
Juglans regia
Sorbus aucuparia
Cytisus scoparius (B)
Rosa spp.
Daphne laureola
Buddleia spp.
Rhododendron spp.
Ilex spp.
Yucca spp.
Iris spp.
Vinca major
Calendula spp.

Native

Western redcedar
Madrone
Western hemlock
Black cottonwood

Pacific dogwood
Vine maple
Red alder
Paper birch
Oceanspray
Snowberry
Baldhip rose
Salal
Bracken fern
Maidenhair fern
Pacific waterleaf
Horsetail
Mountain sweet-cicely
Stinging nettles
Large-leaved avens
Common rush

Thuja plicata
Arbutus menziesii
Tsuga heterophylla
Populus balsamifera ssp.
trichocarpa
Cornus nuttallii
Acer circinatum
Alnus rubra
Betula papyrifera
Holodiscus discolor
Symphoricarpos albus
Rosa gymnocarpa
Gaultheria shallon
Pteridium aquilinum
Adiantum pedatum
Hydrophyllum tenuipes
Equisetum arvense
Osmorhiza chilensis
Urtica dioica
Geum macrophyllum
Juncus effusus

RECOMMENDED SPECIES

Woodland

Canopy

Evergreen

Western hemlock

Western redcedar

Deciduous

Pacific dogwood

Understory

Evergreen

Evergreen huckleberry

Low Oregon-grape

Pacific rhododendron

Salal

Tall Oregon-grape

Western yew

Deciduous

Black gooseberry

Black twinberry

False azalea

Oceanspray

Red elderberry

Red huckleberry

Red-osier dogwood

Snowberry

Vine maple

Groundcovers

Evergreen

Bunchberry

Deer fern

Lady fern

Mosses

Oregon oxalis

Pacific waterleaf

Piggy-back plant

Sword fern

Twinflower

Vancouveria

Wild ginger

Deciduous

Angled bitter-cress

Bracken fern

False lily-of-the-valley

Licorice fern

Pacific bleeding-heart

Siberian miner's lettuce

Vanilla-leaf

Viola spp.

Western starflower

Western trillium

Vines

Deciduous

Western trumpet honeysuckle

Open Areas/Edges

Canopy

Evergreen

Douglas-fir

Grand fir

Madrone

Western redcedar

Western white pine

Deciduous

Black cottonwood

Black hawthorn

Cascara

Garry oak

Oregon ash

Pacific crabapple

Paper birch

Red alder

Understory

Evergreen

Chinquapin

Deciduous

Baldhip rose

Clustered wild rose

Highbush-cranberry

Mock-orange

Nootka rose

Oceanspray

Pacific ninebark

Red flowering currant

Salmonberry

Serviceberry

Scouler's willow

Thimbleberry

Vine maple

Groundcovers

Evergreen

Blue-eyed grass

Kinnikinnick

Large-leaved avens

Deciduous

Aster spp.

Large-leaved lupine

Camas

Chocolate lily

Cooley's hedge-nettle

Fawn lilies

Fireweed

Pearly everlasting

Red columbine

Stinging nettle

Tiger lily

Steep Slope

Understory

Evergreen

Evergreen huckleberry

Low Oregon-grape

Salal

Tall Oregon-grape

Deciduous

Black twinberry

False azalea

Nootka rose

Oceanspray

Osoberry

Pacific ninebark

Red elderberry

Red flowering currant

Red-osier dogwood

Salmonberry

Scouler's willow

Snowberry

Thimbleberry

Vine maple

Groundcovers

Evergreen

Deer fern

Fringecup

Kinnikinnick

Smooth alumroot

Sword fern

Deciduous

False lily-of-the-valley

Pacific waterleaf

Management Guidelines

Non-Native Weedy and Invasive Plants

Most of the weedy, invasive terrestrial plants in Western Washington are not native to this area having been introduced to our region through human activities. Due to their aggressive growth patterns and a lack of native competitors here, they spread rapidly into native plant communities. This reduces habitat diversity, food and shelter for many wildlife species, and the ability of the natural environment to perform a wide variety of important ecological functions. Weeding should be accomplished in midsummer, late summer, or fall. Spring weeding will introduce disturbance into habitat areas. The following guidelines should be followed for non-native weed and invasive plant removal.

1. Preparations and Planning

(a) Before trying to control invasive non-native plants, make sure you have correctly identified them. Your local conservator, district or weed control board can often help with this. In certain situations you may need to get permits (for example, to work in or next to a stream or lake, or to burn plant material); consult local land use departments for guidance. If you wish to remove the plants from public or vacant land, you will also need to get the property owner's permission.

(b) Plan for on-going maintenance to ensure your efforts are not wasted. In addition, plan on replacing invasive non-natives with native plants to prevent reinvasion by the same or another non-native.

2. Removing and Disposing of Invasive Non-native Plants:

Many control methods are available, including hand removal, herbicides, and biological controls. Care should be taken to choose a strategy that causes the least environmental harm while still being effective. Controlling invasive weeds without negatively impacting water quality or spreading the weed is sometimes difficult.

As much as possible avoid disturbing the soil, since disturbed soils are ideal sites for the seeds of invasive non-native plants to germinate. Often the best control methods to remove only part of the plant, such as seed heads or the above-ground portion. Avoid leaving any fragments which might re-sprout, and take particular precautions to not spread the seeds if the plant is in seed. Also be careful not to disturb wildlife if birds or other wildlife might be nesting, reschedule your removal efforts.

Dispose of invasive weed materials in a manner that will prevent further infestation. All species except Scott broom should be removed from the site or buried to prevent re-sprouting. Some counties may pay dump fees for invasive weed material- check with your local weed board or conservator district. Other weeds, such as invasive blackberries, may be shredded and composted.

3. Replanting with Native Plants
Replant disturbed areas with appropriate native plants to prevent re-growth of the invasive weeds

Dominant Non-Native Weedy and Invasive Plant Control

Ivy should eventually be completely excluded from the whole site. The best that should be done each year is to remove climbing vines from tree stems over the whole site. The stems should be cut near the base of the tree, and significant sections of trunk totally exposed to ensure that the vines have all been cut. It is not necessary to completely remove the vines, although this is desirable. Climbing vines should be cut and removed in mid-to-late summer, before any of the plants bear fruit. Individual small areas should be chosen each year for complete eradication of ivy. Ivy should be cut and as much of the roots removed as possible in cleared areas. If possible, the area should then be allowed to sit unplanted for a few weeks, and then sprayed with herbicide when plants begin to come up again. The following fall, the area should be densely replanted according to the above recommendations. Depending on site accessibility larger areas may be appropriate but it may be necessary to clear and plant in smaller areas or steep slopes. Areas should be cleared in mid-to-late summer, and planted the following autumn.

Areas that are cleared and planted in this way will have to be monitored and maintained for at least one year after planting. Ivy should be removed from all of the plants, and cleared from as much of the area as possible. Maintenance of this sort will be desirable each year, and may be useful for as many as ten years after planting.

Blackberry: Blackberry should also be excluded from the whole site. The first priority is to remove existing thickets of blackberry, and to destroy individual pioneering in other areas. Entire thickets should be targeted all at once. If an edge or portion of a thicket is removed, and the rest allowed to remain, the remaining plants will rapidly recolonize the cleared area. Blackberry should be destroyed before it sets seed each year, sometime in late summer (typically August and September). It is important that all parts of the plant are removed from the site entirely. Blackberry will sprout from seed, leftover roots, and pieces of stem left on the ground.

The two best recommended methods for removing blackberries are 1) completely remove the plant, including all roots, in the late spring while the ground is still moist, or 2) clip the plants back and coat the stems with herbicide in the early fall, when the plant is just beginning to go dormant. An area that is cleared in the summer can be sprayed with herbicide after seed or roots have sprouted, to reduce competition the following season. Areas that are cleared in the summer should be densely planted the following autumn.

Areas that are cleared and planted in this way will need to be closely monitored the first year. The spring following planting, the areas planted should be closely inspected at least three times for new blackberry plants, and the plants pulled out roots and all. That summer, the planting should be inspected at least twice, and any new plants removed. Subsequent years, the plantings should be examined at least once early each summer, and any new plants removed. If an area is so infested that it requires more frequent maintenance than this, it should be examined at least once in the spring and once in the summer.

Holly and Laurel: These small trees will completely exclude vegetation from an area, and should be removed from the site entirely. Anytime in the summer, cut the plant off at the base, and then grub as much of the root out as possible. If it is not possible to grub the roots completely, the plant should be cut off at the base and the stem painted with herbicide. Any suckers from the stem in the following year should be cut and the stems painted with herbicide.

Clematis and Bindweed: Both of these plants climb over and smother young conifers and in the case of the clematis will cover and kill very large trees. Control treatment is much the same as for ivy. However, both plants seed profusely and are easiest to control by removing or spraying seedlings while the soil is moist.

*Herbicides can only be applied on public land by a licensed herbicide applicator. It is illegal for unlicensed individuals to apply herbicides on public land. If herbicides are to be used, they must be used with the cooperation of the Department of Parks and Recreation, and only by a licensed herbicide applicator.

Monitoring

Upper Gardens: Individual plantings should be monitored closely for the health of the plants and to ensure that they do not become infested with weeds. Any weeds that do invade the parking should be removed promptly. It is important that the plants not be allowed to become water stressed their first season. They should be monitored closely throughout the summer drought, and hand-watered when they begin to show any signs of water-stress. Monitoring in the following seasons should focus on the degree of weed re-infestation.

Natural Areas: Plantings should be monitored for weed re-infestation and water stress. At least one session of plant watering should occur during the summer drought the first year. If possible, hoses could be strung down the hillside to reach the plantings, though it may be necessary to bucket-brigade water down. Monitoring the following seasons should focus on weed re-infestation.

Plant Sources

The King County Department of Natural Resources provides plants free of charge to non-profit groups and community groups. Volunteers must salvage plants or break down from sites within King County that are undergoing development. This department publishes a quarterly journal which lists the dates and contacts for upcoming events. Called Downstream News it is a free publication and can be received by contacting

King County Department of Natural Resources
Water and Land Resources Division
Attn: Fern; Desk/Reception
700 fifth Avenue, Suite 2200
Seattle, WA 98104
Ph: 206 296 8619

There are many vendors in the Puget Sound Area. We recommend that you either work with a plant broker or the Parks Department to procure plants. This will allow you to get plants for a lower price, and will also help you get plants in the most timely and convenient manner.

A good broker for non-profit groups like yours is Cascade Biomes. They have offices in the Madrona neighborhood and can be reached by contacting

Cascade Biomes
PO Box 22475
Seattle WA 98122
Ph: Fax: 206.322.0528

Planting Guidelines

By following the recommendations and guidelines in the Leschi Natural Area Native Forest Restoration and Management Plan a mix of successful plant communities once common to the Puget Sound are reintroduced and reestablished.

Both plant quantity and size are important in developing a successful native plant community. Large plants tend to be harder to establish than small ones. However, it is important to use some larger plants to create a skeletal structure to modify environmental conditions for the new plant community. Smaller plants should be spaced in less conspicuous places in the clump-gap mosaic where they may thrive when environmental conditions improve. Many native plants have the ability to remain almost completely dormant under inappropriate growing conditions.

Site preparation for planting requires a careful balance between non-native weedy and invasive plant removal and over-stating steep slopes and retaining native groundcover, shrubs, and trees. Take the time to carefully evaluate a planting area prior to site preparation. Inventory the native plants in the planting area, their location and distribution, slope conditions and aspect. Where possible, plant like species or native species associated with the particular community types identified in the clump-gap mosaic diagrams.

Native mosses, companion plants, and pioneer plants that provide a living mulch, are also very important for successfully native plant establishment. These plants buffer the impact of rain on the soil, hold water in a sponge-like fashion, slow-runoff, minimize erosion, shield soil plant roots, and small seedlings from the sun, and stabilize the plant community's microclimate, specifically moderating it at the air-soil interface. Use caution to not see preparation and avoid disturbing native mosses, companion plants, and pioneer plants.

When choosing plants for reforestation and slope stabilization there is a range of options available. Nursery grown plants thrive more readily than plants dug in the wild. Salvaged or dug plants experience extreme shock when moved. In a natural setting plants will develop large root systems and important interdependencies with other plants and organisms. When plants are salvaged, these relationships are severely impacted. Thus it is preferable to use nursery grown plants whenever possible. Long term plant survival is more likely when container-grown plants are used.

Other planting options include rhizome cuttings, layering, dividing plants, root cuttings, hardwood cuttings, live stakes, and gathering from designated sites with permission. These methods are discussed in greater detail elsewhere in this document.

Schedule of Planting

General. All development should be accomplished with the final design in mind. Plants that are planted in the area of the future trails will eventually have to be transplanted or removed, so it is important to leave leeway for these developments as plantings occur. In deciding how to plant in individual areas, pick one area that can be completely prepared and planted in one season, in most cases. It is better to start with a smaller space and then expand if there is extra time, labor, and/or materials.

All plantings should be done top-down. Always begin with the largest plants and then add smaller plants. Canopy trees and understory trees should be planted first, shrubs and ferns last. Remember that larger plants will be easier to find in the weeds, and thus will have a better chance of surviving.

Small plants, shrubs like Saal and groundcovers like Kurawinnik or Strawberry, should be planted only after the weeds in an area have been well controlled. They will have the best chance if they are planted in areas where the overstory and understory are already established. Areas that currently have dense stands of small native trees (Western Hazelnut, for example) could be underplanted with low shrubs and groundcovers (Sword Fern and Strawberry). Areas that are currently covered with Blackberry should be cleared and replanted with small trees and vigorous shrubs (Serviceberry, Indian Plum, and Snowberry, for example), and the smaller plants can be added later after the trees and shrubs have established themselves.

It is better to plant in the fall (October 15th through December 15th) than at any other time of year. Planting in the very early spring (February 15th through April 15th) is also acceptable, though less desirable. If absolutely vital, planting can be done later in the spring, although this will require significant additional maintenance.

Plant Materials

Upper Early Native Gardens. These areas have the highest visual impact within the individual plantings of any portion of the entire open space. It is also extremely important in establishing the natural character of the site in the public eye. In order to immediately create the highest visual and spatial quality in the upper area, more mature stock should be used. Balled and burlapped trees and large container stock will create the native gardens in this area much more quickly, and will provide a multi-canopy forest intermingled with the existing gardens in a relatively short time.

Natural Area. This area presents difficulties in planting and maintenance because of the steep slopes and the universal dominance of ivy. No plants larger than a two-gallon container should be used, because of the difficulty involved in transporting plants up and down slope. No plants smaller than a one gallon container should be used because they might disappear under the ivy too quickly. Plants of this size can be flagged for easier identification for maintenance and monitoring.

Smaller plants should be used only if there will be dedicated maintenance of a planting area, or after the larger plants have become well-established. Low shrubs and groundcovers will easily disappear in areas dominated by ivy. However, after the ivy has been successfully removed from an area, the addition of vigorous groundcover plants will help resist the reestablishment of the ivy.

Planting

Use the following guidelines when planting:

Container Stock. We recommend this type of stock over any other kind of stock. When received, container stock should be healthy and vigorous, with significant roots reaching the side of the pot. Shrubs and groundcovers should have multiple stems, evergreens should be fully leaved and of good color, and deciduous plants should have live ("springy") twigs, and healthy, full buds. Container stock should be planted to its own depth, so that its soil level when in the container equals the soil level when planted. The planting pit should be at least twice as wide as the container. The plants should be removed from the container and installed with its root structure intact. Any large roots which have circled around the inside of the pot should be pointed out, away from the plant.

Balled & Burlapped Stock (B&B) Large trees may be balled and burlapped, which means they are field grown and dug up for delivery. These should have dense, well-compacted root-balls, and healthy stems. They should have significant root systems that run throughout the root ball. Plants with extremely soft root balls, or with root balls that have been manufactured with potting soil or compost, are unacceptable. B&B stock should be planted to the same depth in the new site as in the original site.

Bare-Root Stock. Some salvage stock and some purchased stock may come bare-root. This means the plants have been field-grown or grown in the wild, and dug up without any native soil after they have gone dormant. This kind of stock can be easily transported, but requires special care. The roots should never be allowed to dry out or be exposed to sunlight. They should be kept covered in soil, compost, or chips until just before planting.

How To Plant

To create a landscape that looks natural, avoid planting in rows or spacing the plants evenly. Instead, plant randomly. If you are planting several species and have multiple plants of each, clump each species together in groups of two or three. Spacing between plants should take into account how large they are going to grow and what you want it to look like when the plants are mature. While spacing varies from species to species, generally trees should be at least 10-12 feet apart, and shrubs at least three feet apart. Be sure to locate each plant so that it gets enough sun or shade.

Plant in the early morning or late afternoon to avoid intense sunlight and heat, which can dry out the roots and kill the plant. Remember to keep the roots moist at all times!

1. Dig a hole twice as wide and at least as deep as the plant's roots. If the soil is very hard, loosen the soil at the bottom of the hole. If the soil is clay roughen the sides of the hole with the edge of your shovel or spade (this will eliminate slick sides, which act as barriers to water and roots).
2. If you wish to add "good soil" or other material to your soil, make sure you add less than one bucket of new material for every bucket of old soil - otherwise, the roots may refuse to spread beyond the hole. If you want to add fertilizer, use a slow-release fertilizer and add it only to the soil below the roots.
3. Fill enough soil back in the hole so that the plant will be buried just as deeply as it was before being disturbed.

4. Water the hole well (saturate the soil).



Dig a hole twice as wide and at least as deep as the plant's roots

5. Putting the plant in the hole:

a. If the roots are in a burlap ball or encased in soil- unroll the burlap and peel it back so the soil is exposed. Carefully lift the root ball out of the burlap. Place it in the hole, and arrange any exposed roots so they point outward.



b. If the plant is in a container- remove the plant from the container, and move the root ball around to break it up and roughen the sides (roots should stick out). Curving roots should be straightened out, and encircling roots should be cut off where they begin to curve. Otherwise they will encircle and eventually kill the plant. Then place the plant in the hole and arrange the roots so they point outward.



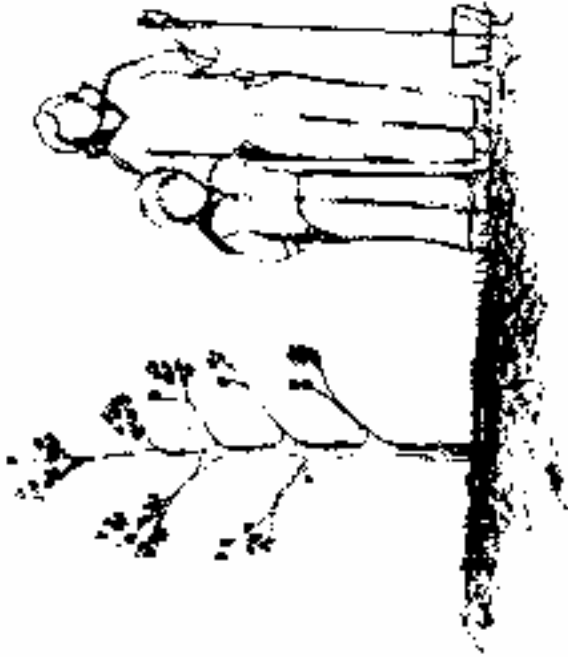
c. If the roots are bare, with no surrounding soil- add soil to make an upside-down cone in the middle of the hole. Hold the plant in the hole, over the cone and arrange the roots around the cone so that none of the roots are curled around or bent. If a root can't be uncurred or unbent, cut it off, as it will only harm the plant's development.



6. Fill the remainder of the hole with soil half-way and soak the soil (make mud)



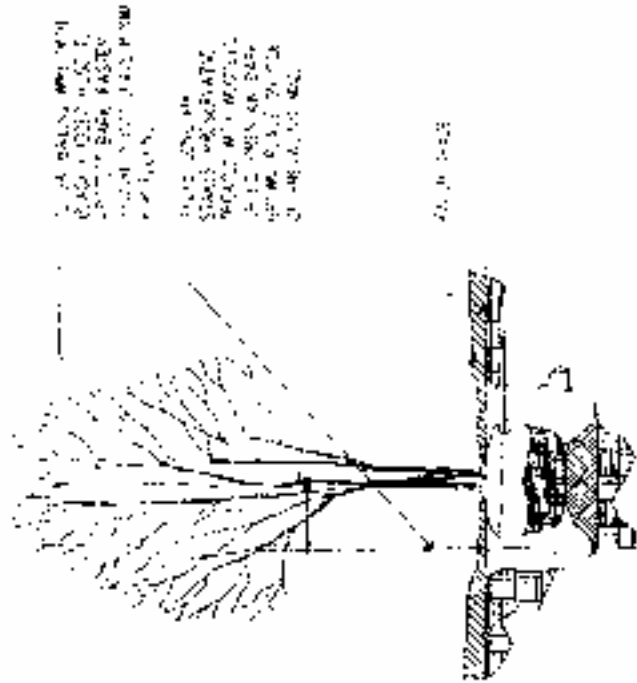
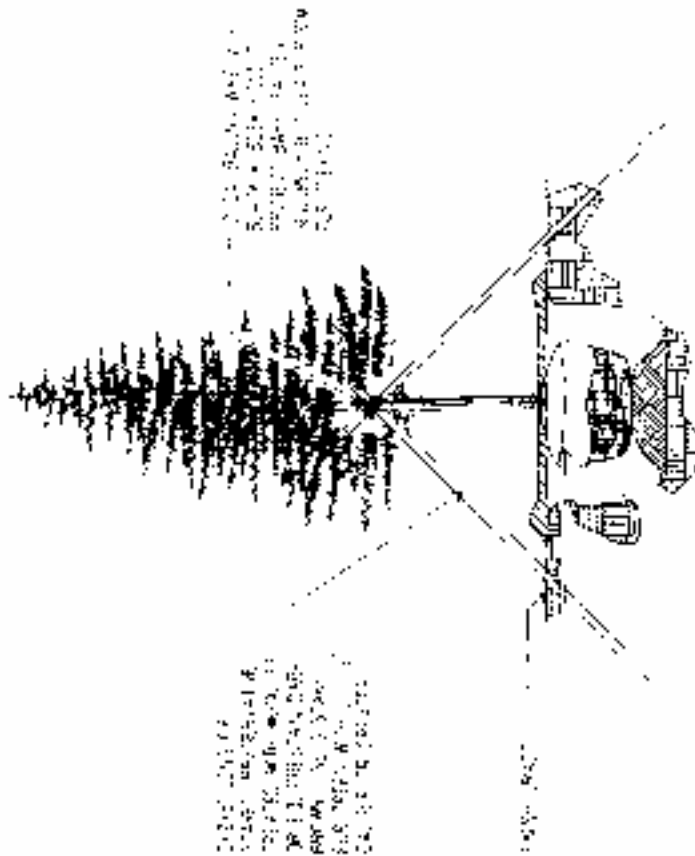
7. Finish filling the hole, then press the soil down firmly with your hands or feet (don't stomp), to close up any air holes. You usually do not need to water the top layer of soil. However, if you do so, don't allow puddles to form as this will cause smaller soil particles to float to the top and form a barrier to water in the future.



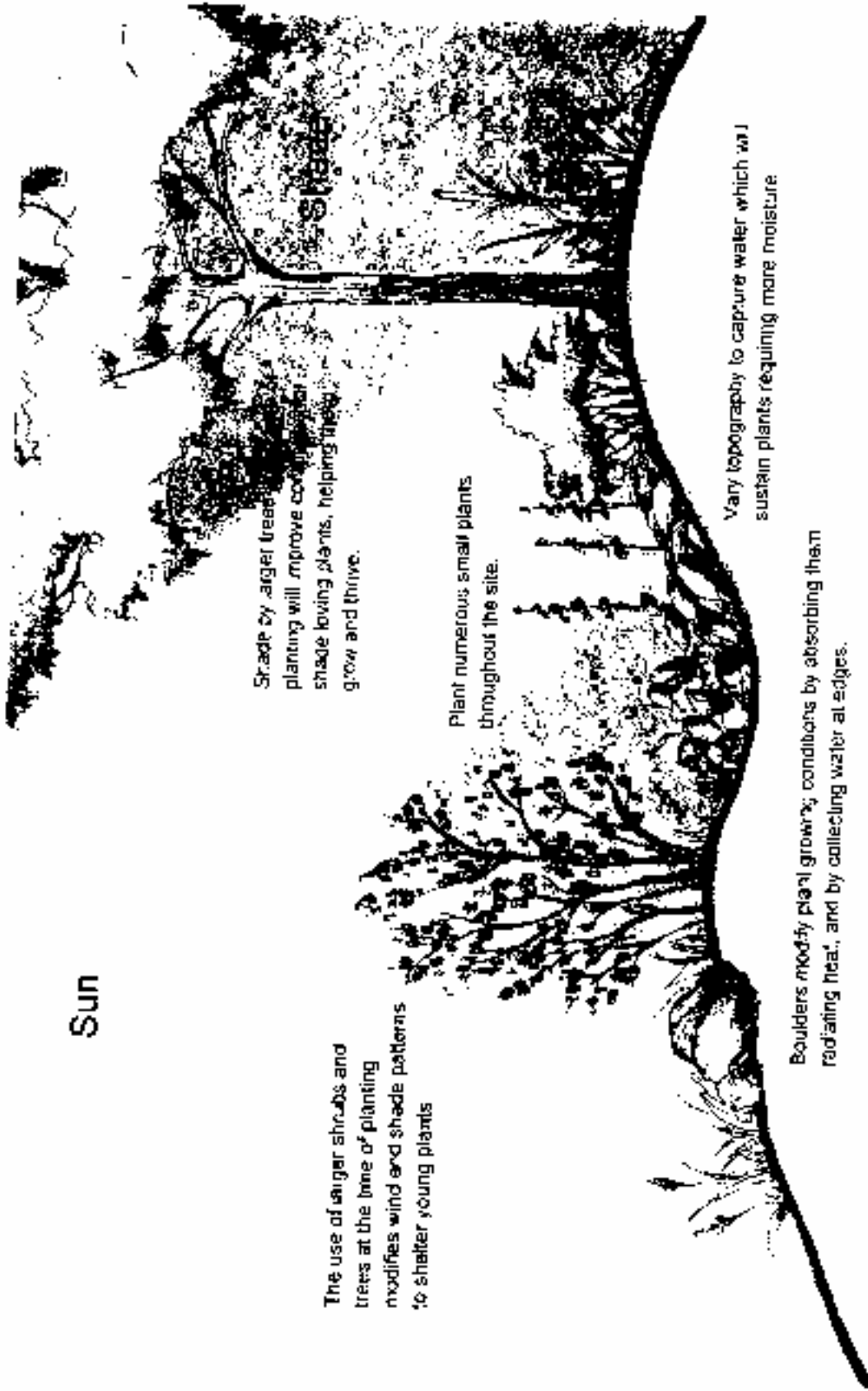
8. If you are concerned about the plant not getting enough moisture (for example, if it's on a steep slope, or watering will be infrequent), encircle the filled-in hole with a mound of soil to create a watering well.

9. Cover the bare ground around the plant with mulch. This will help retain moisture, reduce surface erosion, moderate the temperature around the roots, discourage weeds, and if an organic mulch is used, add nutrients. Composted leaves work best, but you can use any weed-free organic matter, or even rocks or (as a last resort) wood chips. Fine sawdust is not a good choice, as it tends to form a water-repellent mat. Do not use cedar, anything with weed seeds (e.g., hay), or sawdust from painted or treated wood. Do not pile mulch around the stem itself.

10. Stake the plant only if it is so big and the root ball so small that the wind might blow it over. The plant should still be loose enough for it to move a little ($\frac{1}{2}$ - 1 inch) in the wind, and should not remain staked for longer than one year



Sun



Concepts for Increasing Plant Diversity



Site at Time of Planning



Site After Three Growing Seasons