Table of Contents

Figures

Details

Table of Contents cont'd

Tables

Appendices

Purpose and Need

This vegetation management plan (VMP) is being developed as a management guide for Licton Springs Park. The intended audience of this document will be the Seattle Department of Parks and Recreation (DOPR), Licton Springs Community Council (LSCC), and members of the public. The purpose of this document is to provide a management tool that outlines restoration projects to be completed in a strategic and phased manner. For several years, the interior area of Licton Springs has been dominated by invasive plants. As a result, native plant species diversity has decreased dramatically.

Goals of the Vegetation Management Plan

The following eight goals are those of the urban forestry program as well as those of the Licton Springs Vegetation Management Plan. Through the implementation of this plan we will be able to meet the objectives of each of these goals over the next several years.

- Promote natural processes
- Improve wetland functionality
- Conserve soil and water quality
- Insure public safety
- Promote native character
- Protect and Enhance Wildlife Populations
- Buffer land uses
- Provide recreation and environmental education

Other Projects related to the Vegetation Management Plan

Currently, Seattle Public Utilities (SPU) is completing a study of the Densmore Drainage Basin in which Licton Springs is located. Within the next ten years it is possible that SPU may complete hydrological work to alleviate high-flow problems within the neighborhood.

The bridge and path structures will be replaced in 2001-2002, while the comfort station is slated to be reconstructed in 2002-2003. At this point, there are no specific dates set for construction of these activities.

If these projects in any way effect revegetation efforts the appropriate departments and agencies will provide proper mitigation deemed necessary by the urban forester.

Park Setting
Licton Springs park is part of the Densmore drainage basin which is located in north Seattle (Figure 1). The legal description of the Licton Springs Park is Section: 36, Township:T26N, Range: R3E (See Regulatory Setting Appendix A). Licton Springs Park encompasses 9.1 acres which is broken down, approximately, by the forested wetland area (4.3 acres), the pond (0.3 acres) and the open area (including the playground, landscaped area and trails network (4.5 acres).

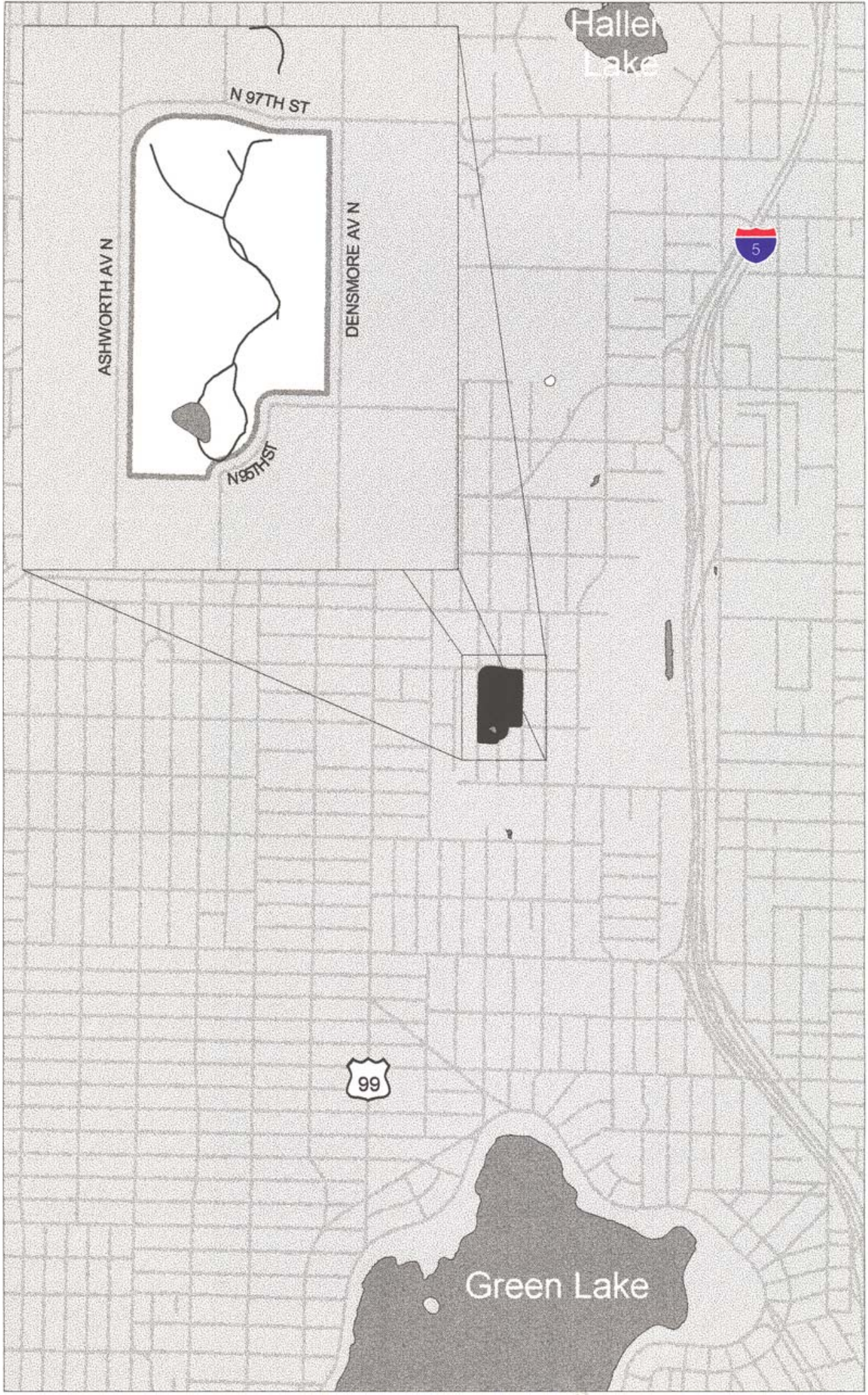
Native Americans
Prior to the settlement of Europeans in Seattle, Licton Springs was used extensively by Native Americans (LSCC, 2000). A group of mineral springs known as the "painted waters", because of the color given to them by their mineral content, were called "Licton" by the local Native Americans, which gave the neighborhood and later the park its name. The area was heavily utilized by Native Americans who camped regularly near the springs and used the water and mud as medicine.

European Settlement
Not only did Native Americans recognize the unique qualities of Licton Springs, but also white settlers (LSCC, 2000). David Denny, one of Seattle's original settlers, built a cabin close to Licton Springs in 1870. At that time, it was the first cabin north of Seattle proper. Arthur Denny, David's brother, bought the land in 1877, for a summer home and maintained the home for close to 30 years.

Over the years, settlers and city dwellers visited the springs to picnic, drink the mineral water and to ease the aching legs of draft animals by soaking them knee deep in the mineral mud (LSCC, 2000). In 1931, the City of Seattle diverted the spring's water to storm drains that fed into Green Lake.

In 1960, owner A.R. Patterson planned a large health sanatorium complex for the site but Seattle voters intervened with funding to purchase 4.5 acres for park development.

Park Projects
In 1964, the wetlands system that makes up Licton Springs park was diminished and degraded by filling that occurred on the site from the I-5 Freeway excavations. From 1960 until 1971, the land remained in a neglected state until an additional 2.3 acres on the eastern side of the property was added through funding from the Forward Thrust Bond. Jones and Jones Landscape Architects designed the original park development plan in 1974 followed by construction of many of the existing features and an extensive landscape planting plan. Another capital improvement project was initiated in 1986, focusing on restoration of the wetland plantings. Peggy Gaynor, a Landscape Architect, designed this project. In 1987, community members received a City of Seattle Department of Neighborhood grant to develop a playground. Further upgrades were made to the playground in 1998-99.



SEATTLE PARKS AND RECREATION

Location Map

Figure 1

Map date: July 18, 2001

LEGEND

Licton Springs
Streets

N
W E
S

1:18000

500 0 500 1000

Feet

Vegetation

Past Conditions

A 1965 contour map from the DOPR displays tree species present at Licton Springs. Red alder was the most abundant tree species present at the site in 1965. Other species present include, in order of abundance, willow (*Salix sp*.), cottonwood (*Poplar sp.),* cedar (*Thuja spp*.), cherry (*Laurel sp*.), maple (*Acer sp*.) and fir (*Pseudo sp*.). The cedar species was the most well adapted conifer at the site.

In 1974, the Jones and Jones planting plan changed the nature of the park through the introduction of non-native species including: lombardy poplar (*Populas nigra*), mountain ash (*Sorbus aucuparia*), pacific dogwood (*Cornus nuttallii*), quaking aspen (*Populus tremuloides*), silver maple (*Acer saccharinum),* silver poplar (*Populas alba*), weeping willow (*Salix babylonica*), and yellow poplar (*Liriodendron tulipifera*). Native coniferous species such as western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), and Douglas-fir (*Pseudotsuga menziesii*) were also planted, but were either thinned out over the years or have been out competed by red alder, a deciduous pioneer species.

Current Conditions

From historic and present vegetative data it is apparent that the wetland areas at Licton Springs are characterized as forested swamps (Franklin and Dyrness, 1973). These types of swamps, or wetlands as they are commonly called today, are typically found in the western hemlock (*Tsuga heterophylla*) zone, which is the designated vegetative zone for Puget Sound. A constant habitat characteristic of these zones includes a high water table, or standing water for all or the majority of the year. Soils pits have shown evidence that Licton Springs was a peat bog at one time. Typically, the dominant tree species on these sites is western red cedar (*Thuja plicata*) or red alder (*Alnus rubra*). From Franklin and Dyrness's research it is evident that red alder is the climax species, this appears to be the case at Licton Springs.

Forest succession in the Pacific Northwest is almost predictable in terms of species composition and timing. Site factors such as soil quality, slope and aspect, and prevailing precipitation contribute to the speed at which the forest proceeds through each stage and the composition of species within each stage. After a disturbance such as fire, or landslide, or in the case of Licton Springs, logging fast growing broadleaf "pioneer" plants and trees find root in recently disturbed sites.

Much of the original forest on the site, which was dominated by western red Cedar and western hemlock was logged off by A. A. Denny prior to 1900. Currently, the fast growing alder (*Alnus rubra*) is dominating at Licton Springs and it has successfully overtopped and shaded out slow growing conifers. The red alder canopy that dominates Licton Springs today is between 30-50 years old. A few western red cedars did colonize the site after disturbance and they provide some diversity among the red alders. Since Licton Springs is an isolated urban forested-wetland habitat there is not a seed source to provide for the

establishment of conifer species. As a result, the forested habitat remains in the secondary stage of forest succession and will likely remain that way for many decades unless the landscape is manipulated to mimic natural conditions. Eventually, the natural progression of forest succession in the Northwest could take place at Licton Springs replacing the deciduous dominated red alder landscape with western red cedar and western hemlock, but this can take hundreds and some times thousands of years depending upon several variables.

Another process affecting the forested wetland at Licton Springs is the exposure of forest edge. Licton Springs is an isolated park surrounded by residential properties and the developed park landscapes. The ratio of the interior of the park to the large open landscaped area is approximately 1:1. Forest edges have ambient conditions of higher light levels, higher wind speeds, and lower humidity. Edges contain a greater number of species overall, but fewer "interior" species. For example, many more bird species can be counted on forest edges, but birds that require interior forest habit may be absent. Exposed edges are also more vulnerable to the establishment of non-native plant species.

Non-native exotic plants from surrounding urban landscapes have colonized the forested wetland and surrounding areas at Licton. These species include: reed canarygrass (*Phalaris arundinacea*), climbing nightshade (*Solanum dolcamara*) bindweed (*Convolvus arvensis)* , Himalayan blackberry (*Rubus discolor*), Japanese knotweed (*Polygonyum cuspidatum*), and English ivy (*Hedera helix*),. These species outcompete the native vegetation found in the park. They ultimately reduce species diversity and may have an adverse effect on tree growth.

Vegetation Species found in Licton Springs

Trees (Native)
Bigleaf maple (*Acer macrophyllum*)
Bitter cherry (*Prunus emarginata*)
Douglas-fir (*Pseudotsuga menziesii*)
Mountain ash (*Sorbus scopulina*)
Lombardy poplar (*Populas nigra*)
Lodgepole pine (*Pinus contorta*)
Pacific dogwood (*Cornus nuttallii*)
Quaking aspen (*Populus tremuloides*)
Red alder (*Alnus rubra*)
Western hemlock (*Tsuga heterophylla*)
Western red cedar (*Thuja plicata*)
Yellow cedar (*Chamaecyparis nootkatenis*)

Trees (Non-Native)
Silver maple (Acer saccharinum)
Silver poplar (*Populas alba*)
Tuliptree *(Liriodendron tulipifera*)
Weeping willow (*Salix babylonica*)

Shrubs (Native)
Black swamp gooseberry (*Ribes viscosissimum*)
Black hawthorn (*Crataegus douglasii*)
Dogwood (*Cornus nutallii*)
Hardhack (*Spirea douglasii*)
Hazelnut (*Corylus cornuta*)
Indian plum (*Oemeleria cerasiformis*)
Nootka rose (*Rosa nutkana*)
Oregon grape (*Mahonia nervosa*)
Pacific willow (*Salix lucida*)
Red elderberry (*Sambucus racemosa*)
Salal (*Gaultheria shallon*)
Salmonberry (*Rubus spectabilis*)
Sitka willow (*Salix sitchensis*)
Scouler's willow (*Salix scouleriana*)
Snowberry (*Symphoricarpos albus*)
Thimbleberry (*Rubus parviflorus*)
Trailing blackberry (*Rubus ursinus*)
Vine maple (*Acer circinatum*)
Evergreen huckleberry (*Vaccinium ovatum*)
Red huckleberry (*Vaccinium parviflorum*)
Red osier dogwood (*Cornus sericea*)

Herbs (Native)
Arrowhead (*Sagittaria spp.)*
Common cattail (*Typha latifolia*)
Creeping buttercup (*Ranunculus repens*)
Dock (*Rumex spp.)*
Douglas spiraea (*Spiraea douglasii*)
Fringe cup (*Tellima grandiflora*)
Horsetail (*Equisetem arvense*)
Giant horsetail (*Equisetem telmatiea*)
Lady fern (*Athyrium filix-femina*)
Skunk cabbage (*Lysichitum americanum*)
Smartweed (*Polygonum sp.)*
Spiny wood fern (*Dryopteris expansa*)
Stinging nettle (*Urtica dioica*)
Sword fern (*Polystichum munitum*)

Grasses (Native)
Common duckweed (*Lemna minor*)
Hardstem bulrush (*Scirpus acutus*)
Sedge (*Carex spp.)*
Soft rush (*Juncus effusus*)
Spike rush (*Eleocharis spp.)*

Invasive Species
Bindweed (*Convolvus arvensis)*

Climbing nightshade (*Solanum dolcamara*)
Common laurel (*Prunus laurocerasus*)
English holly (*Ilex aquifolium*)
English ivy (*Hedra helix*)
Herb robert (*Geranium robertianum*)
Himalayan blackberry (*Rubus discolor*)
Japanese knotweed (*Polygonum cuspidatum*)
Purple loosestrife (*Lythrum salicaria*)
Reed canarygrass (*Phalaris arundinacea*)
Yellow flag (*Iris pseudoacorus*)

Forest Inventory Methods

The vegetation species at Licton Springs were surveyed by completing ten 1/10 acre plots (Figure 2). Recorded detail information included tree species, age, diameter, structure, and canopy cover, shrub and herbaceous species and their cover estimates, amount of downed logs and snags, special features (gully, slide, wetland, stream, seep, trail) soil type, water presence, and aspect. Data from the plot was then used to develop vegetation types based on the highest percentage of species sampled and public input (Table A). The ten plots sampled make up nine vegetative zones (Table A). The percentages in Table A and discussed throughout the Zone discussion are based on vegetation cover estimates taken from plot information for each zone. Table B displays the percent cover of each shrub and herbaceous sampled in the ten plots throughout Licton.

SEATTLE PARKS AND RECREATION

Vegetation Plot Locations

Figure 2

Orthophoto taken: July 1999
Map date: February 15, 2001

LEGEND

- Plot Locations
- Park Boundary

N
W E
S

1:1200

30 0 30 60 Feet

8

Table A. Species distribution by type and zone

Area	Vegetation Type	Species	% of Zone
Zone 1	Alnus rubra/Rubus discolor/Convolvus arvensis-Phalaris arundinacea	Alnus rubra	40%*
		Rubus discolor	2.5%
		Convolvus arvensis	45%
		Phalaris arundinacea	42.5%
Zone 2	Alnus rubra/Rubus discolor/ Phalaris arundinacea	Alnus rubra	20%*
		Rubus discolor	15.1%
		Phalaris arundinacea	72%
Zone 3	Alnus rubra/Phalaris arundinacea/Solanum dolcamara	Alnus rubra	20%*
		Phalaris arundinacea	96.3%
		Solanum dolcamara	45%
Zone 4	Alnus rubra/Rubus discolor/ Phalaris arundinacea	Alnus rubra	70%*
		Rubus discolor	35.3%
		Phalaris arundinacea	55%
Zone 5	Alnus rubra /Salix lucida-Salix sitchensis/Phalaris arundinacea	Alnus rubra	40%
		Salix lucida	32.5%
		Salix sitchensis	16.25%
		Phalaris arundinacea	70%
Zone 6	Alnus rubra/Rubus discolor/ Phalaris arundinacea	Alnus rubra	20%*
		Rubus discolor	33.8%
		Phalaris arundinacea	73%
Zone 7	Alnus rubra/ Salix lucida/ Phalaris arundinacea	Alnus rubra	20%
		Salix lucida	14%
		Phalaris arundinacea	8.8%
Zone 8	Alnus rubra/ Rubus discolor/Hedra helix	Alnus rubra	90%
		Rubus discolor	10%
		Hedra helix	21.3%
Zone 9	Alnus rubra/Rubus spectalis/Equisetem telmatiea	Alnus rubra	70%*
		Rubus spectalis	13%
		Equisetem telmatiea	46.3%
Zone 10	Landscaped Area with grasses	N/A**	N/A**
Zone 11	Alder Zone	N/A**	N/A**
Zone 12	Blackberry Zone	N/A**	N/A**

***** Indicates the canopy cover

**No vegetative information was collected.

Table B. Shrub and herbaceous layer distribution by zone

Table B											
Percent Cover of Shrub and Herbaceous by Zone											
Species	**Zone 1**	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**	**Zone 6**	**Zone 7**	**Zone 8**	**Zone 9**	**Grand Total**	**% of Total**
Hedera helix						0.7		21.3		**22.0**	**1.8%**
Ilex aquifolium				3.8		1.3			5.3	**10.3**	**0.9%**
Prunus laurocerasus	0.5			2.5					0.5	**3.5**	**0.3%**
Rubus discolor	2.5	15.1		35.3	4.5	33.8		10.0	1.3	**102.4**	**8.6%**
Convolvus arvensis	45.0	6.3		27.5	35.0	40.0	2.5	1.3	15.0	**172.5**	**14.5%**
Phalaris arundinacea	42.5	72.0	96.3	55.0	70.0	72.5	8.8		12.5	**429.6**	**36.1%**
Iris pseudoacorus						1.3	13.0		11.3	**25.6**	**2.1%**
Vinca minor								1.0		**1.0**	**0.1%**
Polygonum cuspidatum	38.8									**38.8**	**3.3%**
Solanum dolcamera	27.5	7.5	45.0		7.5	13.0	1.3	10.0	10.0	**121.8**	**10.2%**
Cornus nutalli						15.0				**15.0**	**1.3%**
Equisitem telmatiea	2.3	0.2		5.1			5.0		46.3	**58.9**	**4.9%**
Equistem hyemale					0.5	6.0	0.5	0.3		**7.3**	**0.6%**
Lysichitum americanum		1.0				0.3				**1.3**	**0.1%**
Rosa gymnocarpa								2.0		**2.0**	**0.2%**
Poa sp.		1.3						5.5	15.0	**21.8**	**1.8%**
Acer circinatum						2.0		5.5		**7.5**	**0.6%**
Tellima grandiflora								1.3		**1.3**	**0.1%**
Cornus sto onifera						0.3				**0.3**	**0.0%**
Polygonum species			25.5					0.3		**25.8**	**2.2%**
Rubus spectalis	0.1	0.1				12.5	1.3	1.3	13.0	**28.3**	**2.4%**
Pteridium aquilinum	0.3									**0.3**	**0.0%**
Symphoricarpos albus								0.5	0.3	**0.8**	**0.1%**
Salix lucida					32.5	7.5	14.0			**54.0**	**4.5%**
Salix sitchensis					16.3					**16.3**	**1.4%**
Carex sp.							0.2			**0.2**	**0.0%**
Dryopteris expansa						3.8				**3.8**	**0.3%**
Ribes viscosissimum	0.3									**0.3**	**0.0%**
Typha latifolia					0.5		0.5			**1.0**	**0.1%**
Ranunculus repens		2.5								**2.5**	**0.2%**
Corylus cornuta									1.3	**1.3**	**0.1%**
Polystichum munitum								0.3		**0.3**	**0.0%**
Urtica dioica	1.3						3.0	0.5	1.3	**6.1**	**0.5%**
Crataegus douglasii								0.5		**0.5**	**0.0%**
Athyrium filix-femina		6.8								**6.8**	**0.6%**
Rubus ursinus								1.0		**1.0**	**0.1%**
										1191	

The vegetation percentages described in Zones 1-9 are based on representative survey plots as depicted in Figure 3.

Zone 1

Alnus rubra/Rubus discolor/Convolvus arvensis-Phalaris arundinacea

Zone 1 is an area .5 acres in size and the vegetation overstory is dominated by red alder (40%) in the early mature and sapling seral stage (Figure 3). The approximate diameter at breast height (DBH) of the stand ranges from 1-8" (Figure 3). The red alder are mostly found along the outer limits of Zone 1. Other tree species present include western red cedar (*Thuja plicata*), quaking aspen (*Populus tremuloides*), false cypress (*Chamaecyparis obtusa*) and mountain ash (*Sorbus scopulina*), also in the early mature stage. These trees are found on the perimeter of Zone 1 and are also scattered throughout the Zone. The shrub layer is very sparse only containing Himalayan blackberry (*Rubus discolor*) (2.5%), common laurel (*Prunus laurocerasus*) (.5%), and salmonberry (*Rubus spectabilis*) (.1%) (Table B). The understory of this zone consists of bindweed (*Convolvus arvensis*) (45%), climbing nightshade (*Solanum dolcamara*) (27.5%), Japanese knotweed (*Polygonum cuspidatum*) (38.8%), and reed canarygrass (*Phalaris arundinacea*) (42.5%). Native plants such as giant horsetail (*Equisetem telmatiea*) (2.3%) and stinging nettle (*Urtica dioica*) (1.3%) are also present, but in small densities.

Zone 2

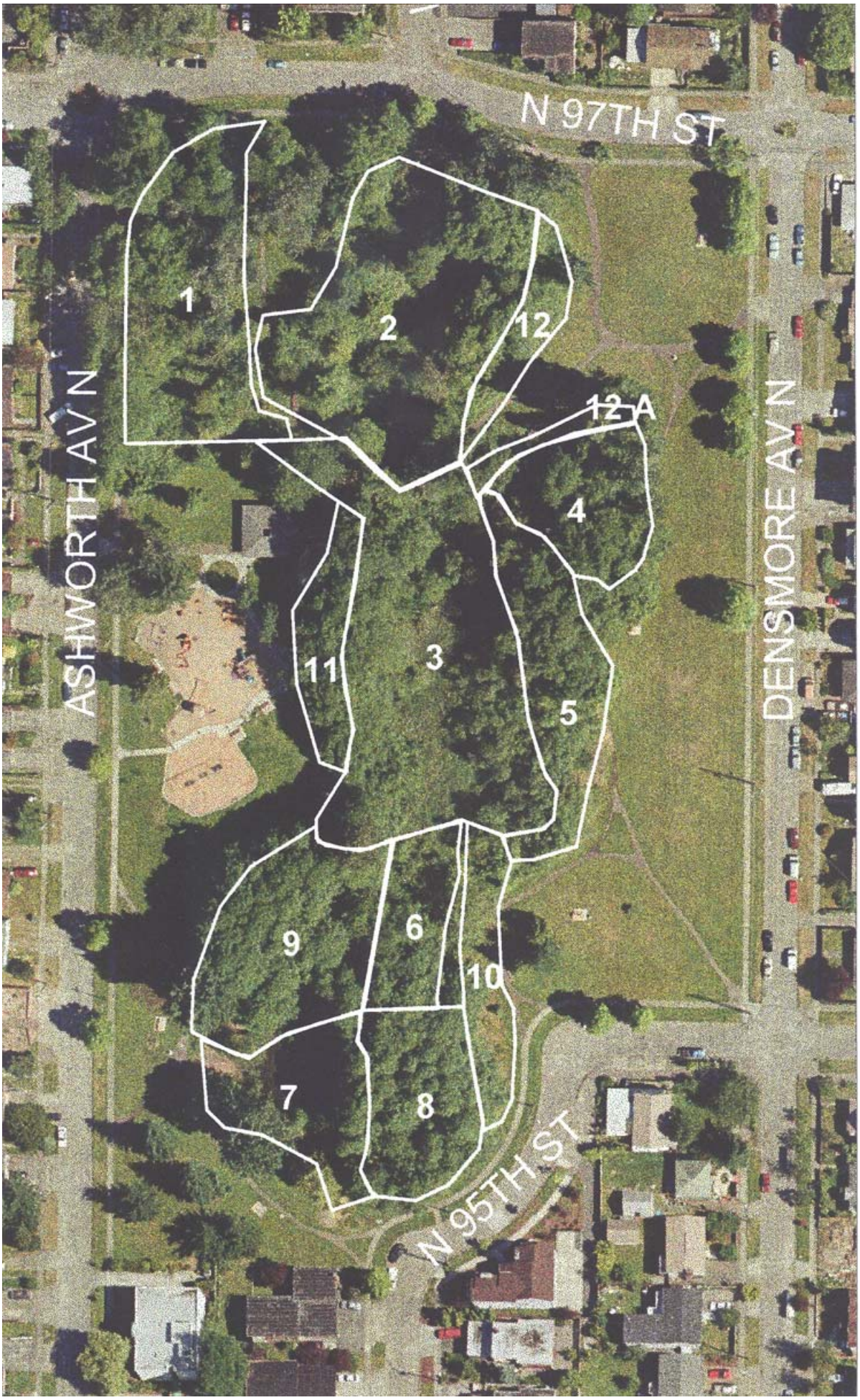
Alnus rubra/Rubus discolor/ Phalaris arundinacea

Zone 2 is .63 acres in size and consists of an overstory of early mature red alder (20% canopy cover) and silver poplar on the perimeter of the zone boundary while red alder and western red cedar are sparsely scattered in the interior of Zone 2 (Figure 3). The overstory is in the early mature seral stage. A few snags and downed logs are scattered throughout the zone. The shrub layer consists of Himalayan blackberry (15%) and salmonberry (.1%) mostly dominate on the western boundary of the zone boundary. The herbaceous layer of this zone consists of reed canarygrass (*Phalaris arundinacea*) (72%), bindweed (*Convolvus arvensis*) (6.3%), and climbing nightshade (*Solanum dolcamara*) (7.5%). Giant horsetail (*Equisetem telmatiea*) (.2%), lady fern (*Athyrium filix-femina*) (6.75%), and skunk cabbage (*Lysichitum americanum*) (1.0).

Zone 3

Alnus rubra/Phalaris arundinacea/Solanum dolcamara

Zone 3 is .84 acres in size and the overstory consists of approximately red alder (20% canopy cover) in the early mature seral stage (Figure 3). Three red alder snags are scattered throughout the zone. The shrub layer consists of sparse patches of blackberry and some willow patches on the edge of the zone boundary. As in Zone 2, the herbaceous layer dominates the zone consisting of reed canarygrass (*Phalaris arundinacea*) (96.3%), climbing nightshade (*Solanum dolcamara*) (45%), and a patch of smartweed (*Polygonum sp.*) (25.8%) in the southern portion of the zone (Table B).



SEATTLE PARKS AND RECREATION

Vegetation Zones

Figure 3

Orthophoto taken: July 1999
Map date: July 2001

LEGEND

Vegetation Zones

N
W E
S

1:1200

30 0 30 60 Feet

Zone 4

Alnus rubra/Rubus discolor/ Phalaris arundinacea

Zone 4 is .17 acres in size and dominated by red alder that has a closed canopy of 70% (Figure 3). The canopy also consisted of approximately five Douglas-firs along the eastern portion of the zone boundary. The overstory is in the early mature seral stage. A few downed logs are scattered throughout the zone. The shrub layer is dominated by Himalayan blackberry (Rubus discolor) (35.3%) and some English holly (*Ilex aquifolium*) (3.8%) (Table B). The understory consists of reed canarygrass (*Phalaris arundinacea*) (55%), bindweed (*Convolvus arvensis*) (27.5%), and a small percentage of giant horsetail (*Equisetem telmatiea*) (5.1%).

Zone 5

Alnus rubra/Salix lucida-Salix sitchensis/Phalaris arundinacea

Zone 5 is .2 acres in size and is dominated by red alder that has a closed canopy of 40% (Figure 3). A few red alder snags are scattered throughout the zone. The shrub layer consists of two types of willow species: *Salix lucida* (32.5%) and *Salix sitchensis* (16.3%) (Table B). Himalayan blackberry (4.5%) is also present in this zone, but in smaller densities than other zones. The herbaceous layer is dominated by reed canarygrass (*Phalaris arundinacea*) (70%), bindweed (*Convolvus arvensis*) (35%)%). Native species such as common cattail (*Typha latifolia*) (.5%) and horsetail (*Equisetem hyemale*) (.5%) are also present.

Zone 6

Alnus rubra/Rubus discolor/ Phalaris arundinacea

Zone 6 is .19 acres in size and dominated by red alder that has a mainly open canopy of 20% (Figure 3). The overstory is in the early mature seral stage. The shrub layer is dominated by Himalayan blackberry (*Rubus discolor*) (33.8%), dogwood *(Cornus nutalli*) (15%) salmonberry (*Rubus specatilis*) (12.5%), Pacific willow (*Salix lucida*) (7.5%), and red osier dogwood (*Cornus stolonifera*) (.3%). The herbaceous understory consists of reed canarygrass (*Phalaris arundinacea*) (72.5%), bindweed (*Convolvus arvensis*) (40%), climbing nightshade (*Solanum dolcamara*) (13%), horsetail (*Eqiusetem hyemale*) (6.0%), spiny wood fern (*Dryopteris expansa*) (3.8%) and skunk cabbage (*Lysichitum americanum*) (.3%)

Zone 7

Alnus rubra/ Salix lucida/ Phalaris arundinacea

Zone 7 is .21 acres in size and has a canopy of red alder covering 20% of the zone (Figure 3). The red alder is in the early mature seral stage. The shrub layer consists of Pacific willow (*Salix lucida*) (14%), and salmonberry (*Rubus spectalis*) (1.3%) (Table B). The herbaceous layer contains reed canarygrass (*Phalaris arundinacea*) (8.8%), Yellow Flag (*Iris pseudoacorus*) (13%), Giant horsetail (*Equisetem telmatiea*) (5%), bindweed (*Convolvus arvensis*) (2.5%), climbing nightshade (*Solanum dolcamara*) (1.3%), horsetail (*Eqiusetem hyemale*) (.5%), rush (Carex sp.) (.2%), and common cattail (*Typha latifolia*) (.5%).

Zone 8

Alnus rubra/ Rubus discolor/Hedra helix

Zone 8 is .29 acres in size and consists of an overstory of 80% red alder in the early mature seral stage (Figure 3). Other species in the canopy include: Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and western red cedar (*Thuja plicata*). The shrub layer consists of Himalayan blackberry (*Rubus discolor*) (10%), vine maple (*Acer circinatum*) (5.5%), bald hip rose (*Rosa gymnocarpa*) (2.0%), salmonberry (*Rubus spectalis*) (1.3%), trailing blackberry (*Rubus ursinus*) (1%), snowberry (*Symphoricarpos albus*) (.5%), and black hawthorn (*Crataegus douglasii*) (.5%). The herbaceous layer consists of English ivy (*Hedera helix*) (21.3%), climbing nightshade (*Solanum dolcamara*) (10%), grass species (*Poa sp*.) (5.5%), fringecup (*Tellima grandiflora*) (1.3%), bindweed (*Convolvus arvensis*) (1.3%), horsetail (*Eqiusetem hyemale*) (.5%), sword fern (*Polystichum munitum*) (.25%), and stinging nettle (*Urtica dioica*) (.5%).

Zone 9

Alnus rubra/Rubus spectalis/Equisetem telmatiea

Zone 9 is .44 acres in size and the overstory consists of red alder in the early mature seral stage covering 70% of the zone (Figure 3). A few bitter cherry (*Prunus emarginata*) are scattered throughout the zone. The shrub layer consists of salmonberry (*Rubus spectalis*) (13%), English Holly (*Ilex aquifolium*) (5.3%), hazelnut (*Corylus cornuta*) (1.25%), and snowberry (*Symphoricarpos albus*) (.25%) common laurel (*Prunus laurocerasus*) (.5%). The herbaceous layer consists of giant horsetail (*Equisetem telmatiea*) (46.3%), bindweed (*Convolvus arvensis*) (15%), grass (*Poa sp*) (15%), %), yellow flag iris (*Iris pseudoacorus*) (11.3%), and climbing nightshade (*Solanum dolcamara*) (10%).

Zone 10

Landscaped area

Zone 10 is .15 acres in size and is made up of grass species (*Poa sp*.) and three planted western red cedars (*Thuja plicata*) (Figure 3). Much of this zone is landscaped and is mowed regularly. No formal vegetation surveys have been completed in this area due to small size of the area, a 1/10 acre plot would have been to large to fit in, and due to the lack of vegetative diversity.

Zone 11

Alder Zone

Zone 11 is .13 acres in size and consists of red alders (*Alnus rubra*) in the early mature seral stage (Figure 3). This area is the upland zone for the wetland area in Zone 3. No formal vegetation surveys have been completed in this area due to small size of the area, a 1/10 acre plot would have been to large to fit in, and due to the lack of vegetative diversity.

Zone 12, 12A

Blackberry Zone

Zone 12 is .14 acres in size and consists of blackberry patches along the edges of Zones 2 and Zone 12A is .05 acres in size and consists of the blackberry

patches along Zone 4. No formal vegetation surveys have been completed in this area due to small size of the area, a 1/10 acre plot would have been to large to fit in, and due to the lack of vegetative diversity.

Perimeter Vegetation

Along the northwestern perimeter of the park are five Tuliptrees *(Liriodendron tulipifera*) approximately 30-40 years in age (Figure 4). On the northern perimeter of the park there are a mix of Lombardy poplars (*Populas nigra*), silver maples (Acer saccharinum), and alders (*Alnus rubra*) approximately 35-45 years of age (Figure 4). Along the northeastern perimeter, there are many red alders (*Alnus rubra*) aged 35-45 years of age as well as some western red cedars (*Thuja plicata*) ranging in age 30-40 years old (Figure 4). Along the southeastern perimeter, there are some newly planted western red cedars (*Thuja plicata*) ranging in age from 2-5 years old along with some red alders, 35-45 years of age. Along the southern tip of the vegetative perimeter, there are many red alders and some western red cedars ranging in age from 30-45 years of age. Along the southwestern perimeter, there are mostly red alders (*Alnus rubra*) ages ranging from 30-45 years of age and one Lombardy poplar (*Populas nigra*) approximately 35 years old. Near the playground are some silver maples (*Acer saccharinum*) as well as a yellow cedar (*Chamaecyparis nootkatenis*) approximately 35-45 years of age.

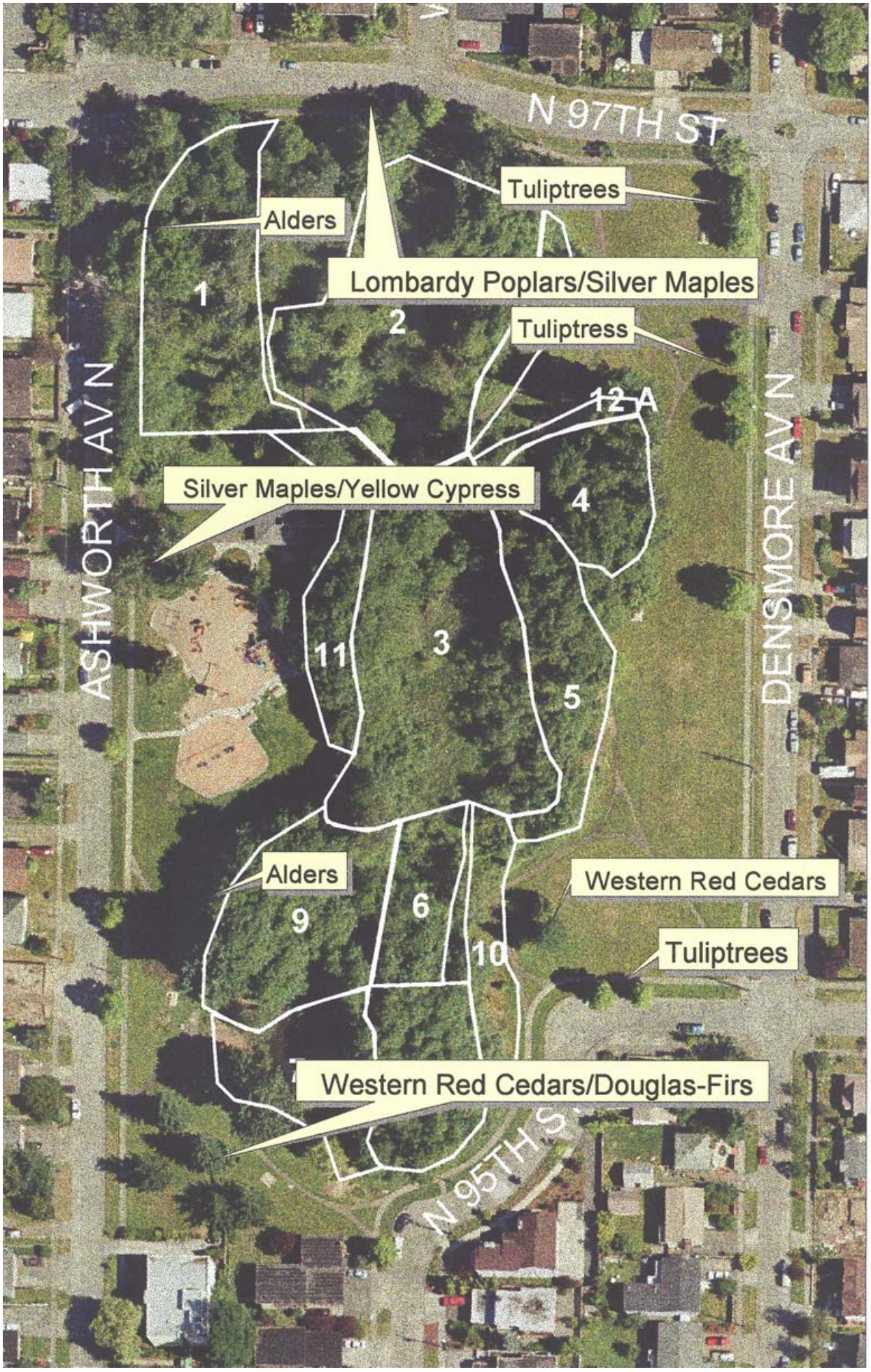
Landscaped vegetation

South of the pond area there are three douglas-firs and one western red cedar approximately 35-40 years of age (Figure 4). Near the playground are some silver maples (*Acer saccharinum*) as well as a yellow cedar (*Chamaecyparis nootkatenis*) approximately 35-45 years of age. Along the eastern boundary, bordering Densmore Ave, there are seven Tuliptrees *(Liriodendron tulipifera*) while along the southern boundary there are two Tuliptrees all in the age range of 35-45 years of age.

Vegetation Zone Discussion

Licton Springs park was broken down into twelve management zones based on each zone's site conditions and need for restoration. Of all the herbaceous and shrub layer sampled, 78% were invasives (Table B). Based on vegetation surveys, reed canarygrass (*Phalaris arundinacea*) is the most prevalent invasive species in the park. It was found in seven of the nine zones sampled in coverages ranging in from 12.5%-96.3% (Table B). Generally, it seems to be the densest in areas where there is little canopy cover (40% or less), the water levels fluctuate throughout the year, and the presence of iron springs. This is most evident in Zones 1, 2, 3, 5 and 6 (Figure 3).

However, reed canarygrass is found in moderate density in Zone 4 (55%), even though the canopy closure is high (70%)-this is likely due to the presence of a



SEATTLE PARKS AND RECREATION

Landscaped Vegetation

Figure 4

Orthophoto taken: July 1999
Map date: July 2001

N
W E
S

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30 0 30 Feet

spring and water level flucuation. Conversely, Zone 7 has a small presence of reed canarygrass (2.5%) with little canopy closure (20%). The majority of Zone 7 is inundated with water year-round. Which is not represented in the vegetative data.

The pervasiveness of reed canarygrass has lowered the vegetative diversity in all the zones that have a high concentration which negatively affects wildlife by providing less desirable habitat. Thus, if greater vegetative diversity is present at Licton then the diversity of wildlife would be increase as well. Greater vegetative diversity would provide better food sources for wildlife as well as nesting habitat through diversified vegetative structures.

The most species found in a plot was in Zone 8, which has eleven native species. However, this is not significant because the majority of these species were planted—although it should be noted that they are surviving. Zone 6 contains seven native plants. Zone 7 contains six native species while Zones 1 and 2 contain five native plants respectively. Four native species were sampled in Zone 9 while Zone 5 had three native species. Zones 3 and 4 had one native species present in their respective areas.

Hydrology

Green Lake Project

In the 1920's an ambitious project was undertaken to capture as much water as possible from Licton Springs to pipe into Green Lake as its main source of water. An extensive system of drain tile lines were installed throughout the wetland to drain and transport the water to Green Lake. At this time Licton Springs was the largest of a network of spring fed wetlands. Licton Springs contributed 300,000 gallons of water to Green Lake daily prior to major development, filling and other destructive practices that occurred throughout the 1960's and 70's. The fate of this system is not well documented yet, according to SPU, who manages the surface water throughout the City, this source flowed into Green Lake until a few years ago when the discharge was reworked. Presently water is discharged into Green Lake only at high flows (above elevation 159.26) to prevent localized flooding. An overflow channel runs along the southeastern edge of the wetland that functions in the event of high water. Water quality concerns for Green Lake was the main reason this practice was modified.

The primary sources of water are two large drain lines that discharge water from Haller Lake and Bitter Lake. A 1971 survey showed 20 feet of gradient throughout the length of the watercourse. The eastern drain line, which is 18" in diameter, appears to carry more water than the 30" western drain line (Figure 7). It is not known at this time the exact source for each of these lines. Further to the west is a small drain line that discharges small volumes of apparent spring water into a distinct stream channel. These drain lines form Stream B on Figure 7. Stream B has variable flow throughout the year, however it is severely incised

SEATTLE PARKS AND RECREATION

Stream Courses

Figure 5

Orthophoto taken: July 1999
Map date: July 2001

LEGEND

- Park Boundary
- Streams
- eastern drainline
- western drainline
- northern spring
- southern spring

N
W E
S

1:1440

50 0 50
Feet

and downcut from high periods of flow. Stream C flows from the confluence of Streams A and B throughout the wetland.

Springs

There are two springs in this system that gave Licton Springs its name. The northern most spring, which is commonly called the iron spring, was studied by University of Washington microbiologists in 1971 (Figure 7). Their recommendation due to the "tremendous diversity of iron bacteria" found in the samples was to create a unique educational center called a Microbioterium to educate the public about the Third Kingdom of organisms, the microbes. However, this did not happen but it does indicate an opportunity for interpretive signage. The spring still bubbles through a concrete collar that was installed to protect the springhead, spreading a colorful mat of iron deposits and associated microbes down a small side channel. This is a very minor source of water but remains constant year around.

The second southern spring with its content of at least 20 minerals including high magnesium content was the source for the mineral baths and spas and was used by Native Americans for medicinal purposes for centuries (Figure 7). For many years this spring was preserved in a whitish colored pool before it was encased in a concrete cistern.

Wetlands

Licton Springs can be classified into three different wetland classifications: a palustrine forested wetland, which covers approximately 3.5 acres, a palustrine scrub-shrub wetland, which comprises 1.5 acres, and two separate palustrine emergent wetland class areas encompassing 13,500 square feet (Figure 8). The wetland system is fed by several sources of water.

Pond

A 2500 sq. ft. pond was created during the 1974 development of the park. All of the water flowing through the site flows into a pond at the south end of the wetland. A rock weir controls the level of this pond and forms the outlet of the pond. The water flows through a short channel before disappearing down a large storm drain. The surface size and depth of the pond has decreased significantly due to sedimentation and biomass accumulation from vegetation. There has been limited maintenance over the years to restore the pond to its original condition.

Flow

No historic or current flow data exists since SPU does not gauge the water flowing into the site. It would be possible to generate potential flow data by calibration of a hydraulic model or for designed storms such as a 25-year event. SPU will be developing this information over the next 2-5 years.

SEATTLE PARKS AND RECREATION

Figure 6

Wetlands

Orthophoto taken: July 1999
Map date: July 2001

LEGEND

Palustrine forested wetland

N
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1:1200

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Feet

Recommendations

Specific Recommendations for each zone are outlined in the following discussion. Funding availability is also disclosed. Seven plant palettes have been designed based on habitat types including wetlands, buffer (area between wetland and upland zone) and riparian (adjacent to stream corridor). Appendix B also contains more detailed information on these plants as well as others that would be well-suited at Licton Springs. The Groups listed below can and should be monitored and modified if there is high mortality after a planting.

Plant Palette

Group A (Wetland Trees)
Western red cedar (*Thuja plicata*)
Sitka spruce (*Picea sitchensis*)
Oregon ash (*Fraxinus latifolia*)

Group B (Wetland Shrubs)
Salmonberry (*Rubus spectabilis*)
Red osier dogwood (*Cornus stolonifera*)
Clustered wild rose (*Rosa pisocarpa*)
Scouler's willow (*Salix scouleriana*)
Pacific willow (*Salix lucida*)
Cascara (*Rhamnus purshiana*)
Sitka willow (*Salix sitchensis*)
Black swamp gooseberry (*Ribes lacustre*)
Indian plum (*Oemelaria cerasiformis*)

Group C (Wetland Herbaceous, Emergent)
Lady fern (*Athyrium filix-femina*)
Slough sedge (*Carex obnupta*)
Giant horsetail (*Equisetem telmatiea*)
Skunk cabbage (*Lysichiton americanum*)
Hardstem bulrush (*Scripus acutus*)

Group D (Buffer Trees)
Western hemlock (*Tsuga heterophylla*)
Douglas-fir (*Pseudotsuga menziessii*)

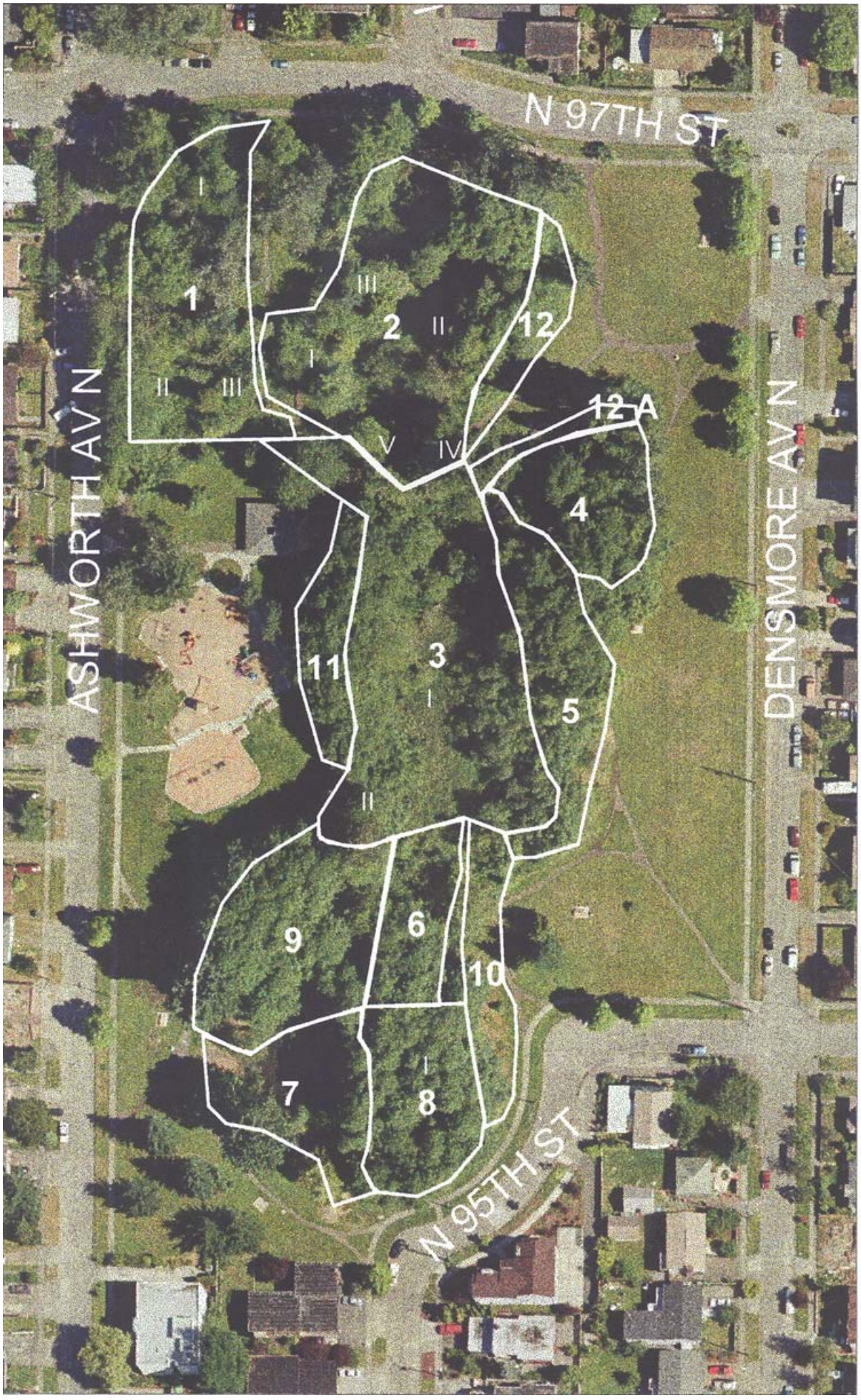
Group E (Buffer Shrubs)
Vine maple (*Acer circinatum*)
Indian plum (*Oemeleria cerasiformis*)
Thimbleberry (*Rubus parviflorus*)
Hazelnut (*Corylus cornuta*)
Snowberry (Symphoricarpos albus)
Oregon grape (*Berberis nervosa*)
Red elderberry (*Sambucus racemosa*)

Salal (*Gaultheria shallon*)

Group F (Buffer herbaceous)
Sword fern (*Polystichum munitum*)
Spiny wood fern (*Dryopteris expansa*)
Fringe cup (*Tellima grandiflora*)

Group G (Riparian corridor)
Tapertip rush (*Juncus acuminatus*)
Merten's rush (*Juncus mertensianus*)
Water sedge (*Carex sitchensis*)
Skunk cabbage (*Lysichitum americanum*)
Spiny wood fern (*Dryopteris expansa*)
Sword fern (*Polystichum munitum*)
Devil's club (*Opopanax horridus*)
Common marestail (*Hippuris vulgaris*)
Small bedstraw (*Galium trifidium*)
Northern clustered sedge (*Carex arcta*)
Cow-parsnip (*Heracleum lanatum*)
Water plantain (*Alisma plantago-aquatica*)
Foam flower (*Tiarella trifoliata*)
Palmate coltsfoot (*Petasites palmatus*)
Foam flower (*Tiarella trifoliata*)

Zone 1
In the fall of 2000, volunteer workparties removed the stems and roots of Japanese knotweed and the majority of the blackberry, reed canarygrass, climbing nightshade, and bindweed in the northern most section of Area I in Zone 1 (Figure 5). Subsequently, landscape fabric was laid down to cover the areas



SEATTLE PARKS AND RECREATION

Vegetation Zones and Areas Figure 7

Orthophoto taken: July 1999
Map date: July 2001

LEGEND

- Vegetation Zones
- I Area
- Park Boundary

N
W E
S

1:1200

30 0 30 60 Feet

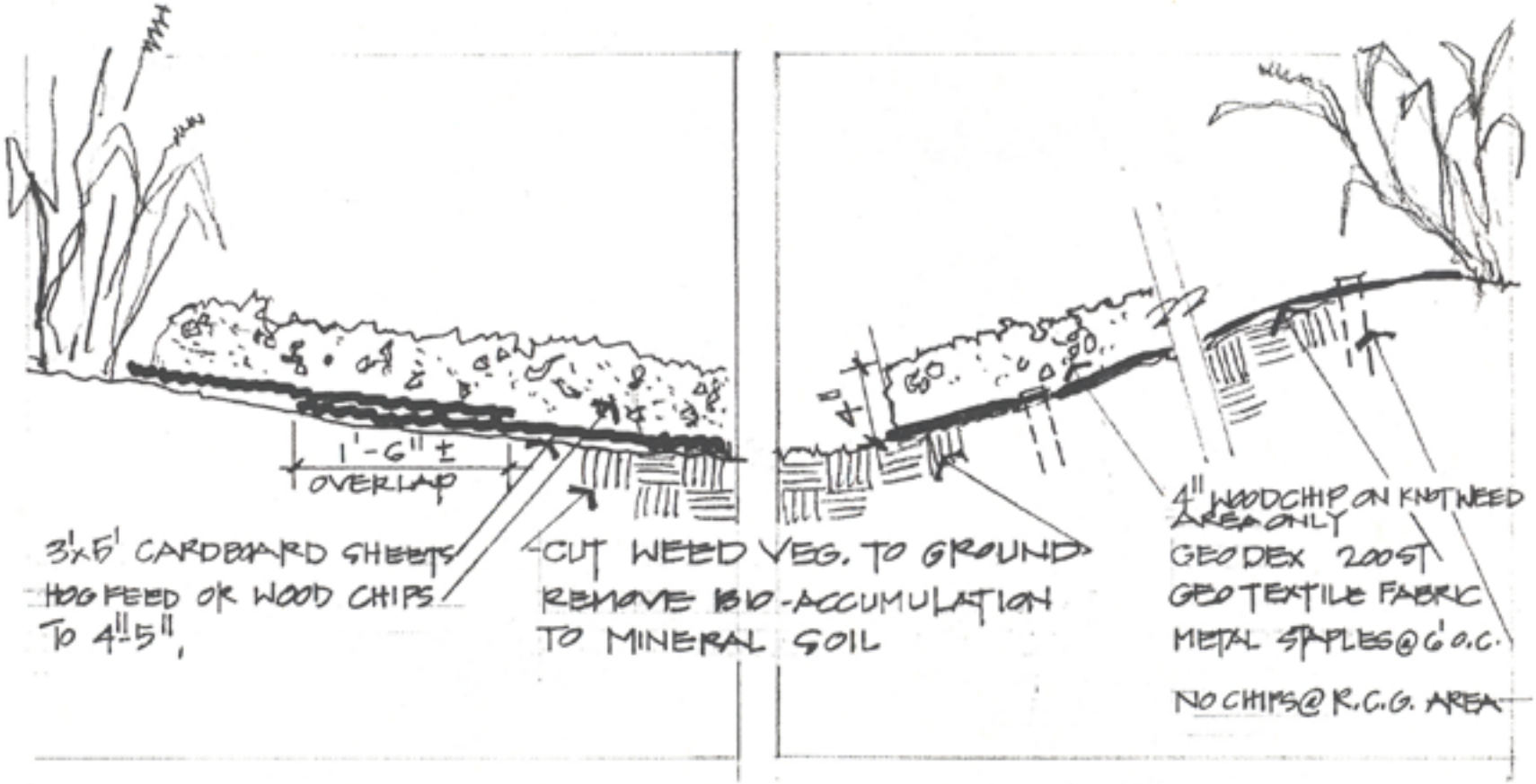
dominated by Japanese knotweed and blackberry. Native trees and shrubs were planted through the landscape fabric. The following species were planted throughout the area: skunk cabbage (*Lysichiton americanum*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectalis*), spiny wood fern (*Dryopteris expansa*), snowberry (*Symphoricarpus albus*), sword fern (*Polystichum munitum*), red elderberry (*Sambucus racemosa*) western red cedar (*Thuja plicata*), Sitka Spruce (*Picea sitchensis*) and oceanspray (*Holodiscus discolor*). Mulch chips were put over the landscape fabric to lessen the visual impact of the bare fabric. In February of 2001, more plantings were established on this site including: red flowering currant, red osier dogwood, Pacific ninebark, vine maple, and red huckleberry.

Although Area II of Zone 1 is not far in distance from Area I of Zone 1, it differs greatly hydrologically and vegetatively. Area II of Zone 1 is saturated most of the year unlike the northern portion that stays rather dry. Since the upper portion of Zone 1 has been covered with landscape fabric and will be for another year, this has resulted in a loss of cover for wildlife species in that area of the park. As a result the southern portion of Zone 2 will be left for wildlife habitat until a shrub layer is established in Area 1 of Zone 2 which could take approximately four-six years.

Area III of Zone 1 is dominated by reed canary grass. This area would benefit greatly from some grading to create a depressional area that would encapsulate water, potentially suppressing the reed canary grass in the area and attracting wildlife. Approximately 15-20 yards of material would be removed by hand. On the upland areas of this area, cardboard and mulch would be laid over the reed canarygrass to suppress its growth. The cardboard would biodegrade within two years. Upland species would be planted at the time the cardboard is installed.

Establishment of western red cedar and western hemlock along the buffers of Area III are key to the future of this zone. Placement of at least 6 logs or stumps is recommended in this zone. The accessibility of this zone to heavy equipment from the adjacent street will facilitate this process. Please refer to Figure 6 for specific information on log size, anchoring, setting and planting. The log placement shall not impede or influence the hydrology of this drainage swale.

???



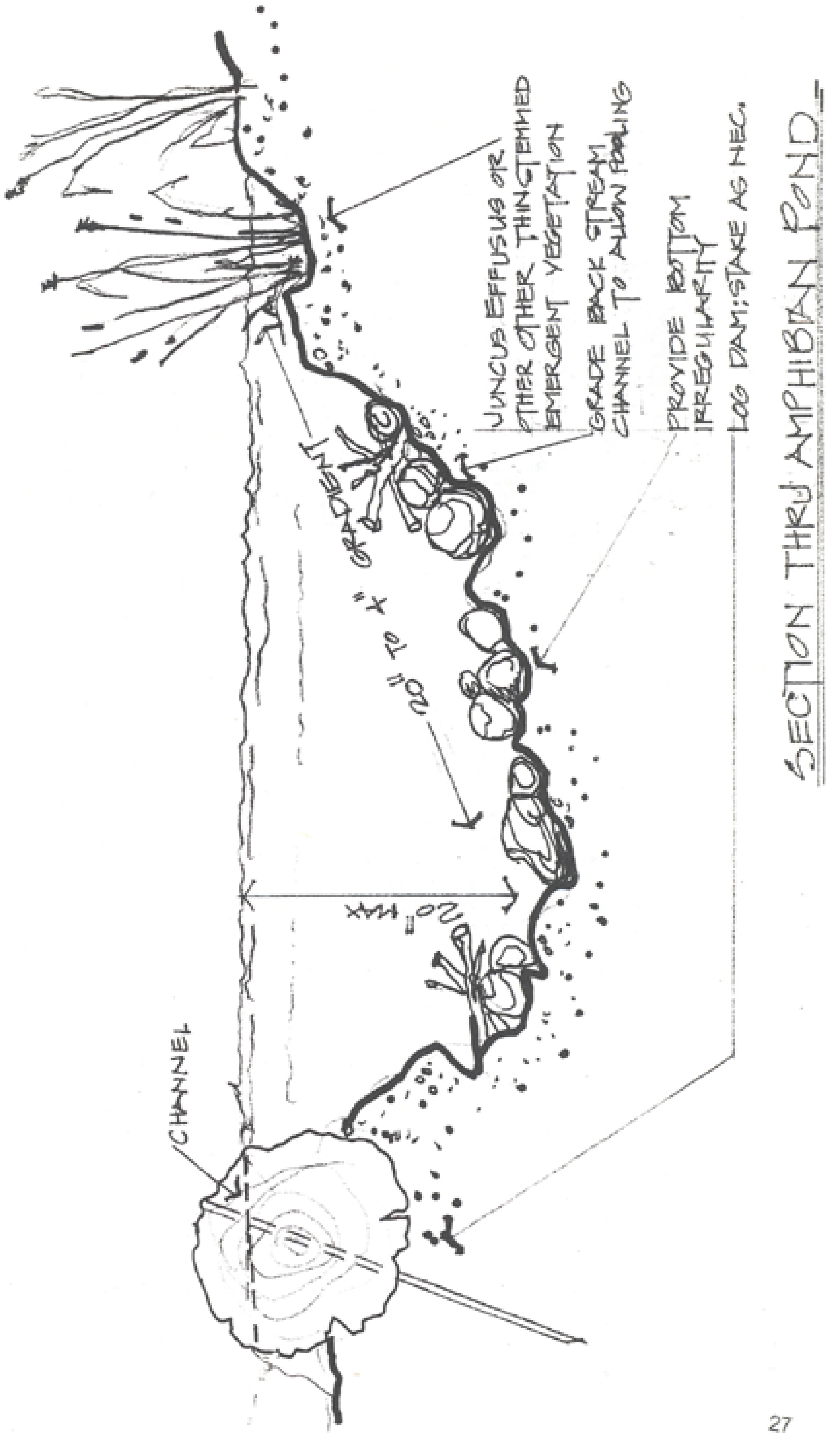
CARDBOARD OPTION

FABRIC OPTION

WEED CONTROL OPTIONS

NOT TO SCALE

Detail 2


JUNCUS EFFUSUS OR
OTHER OTHER THINSTEMMED
EMERGENT VEGETATION
GRADE BACK STREAM
CHANNEL TO ALLOW POOLING
PROVIDE BOTTOM
IRREGULARITY
LOG DAM; STAKE AS NEC.
SECTION THRU AMPHIBIAN POND
20" TO X" GRADIENT
20" MAX
CHANNEL

Zone 1 Schedule*

Action	**Timeline**	**Work Completed by**
Plant in Area I (Group A, E)	Winter 2001	Volunteer groups
Plant in Area around spring cistern (Group C, F, and G)	Fall 2001	Volunteer groups, Staff
Create depressions, install cardboard, mulch and plant transition area Area III (Group B, C)	Summer/Fall 2002	Consultant
Remove landscape fabric covering invasives (Area I)	Winter 2003	Volunteer groups, Staff
Remove invasives in Area II	Depending upon the establishment of shrub layer in Area I (2004-7)	Volunteer groups, Staff
Plant in Area II (Group B, E)	Depending upon the establishment of shrub layer in Area I (2004-7)	Volunteer groups, Staff
Plant Areas I and II (Group B,C)	Spring 2005	Volunteer groups, Staff

***** Work will be funded under the CIP

Zone 2
The current hydrology in Licton Springs allows periods of high and low water levels throughout the year. This is the type of condition is conducive to the persistence of reed canarygrass. A technique that has proven to decrease the persistence of reed canarygrass is constant water levels.

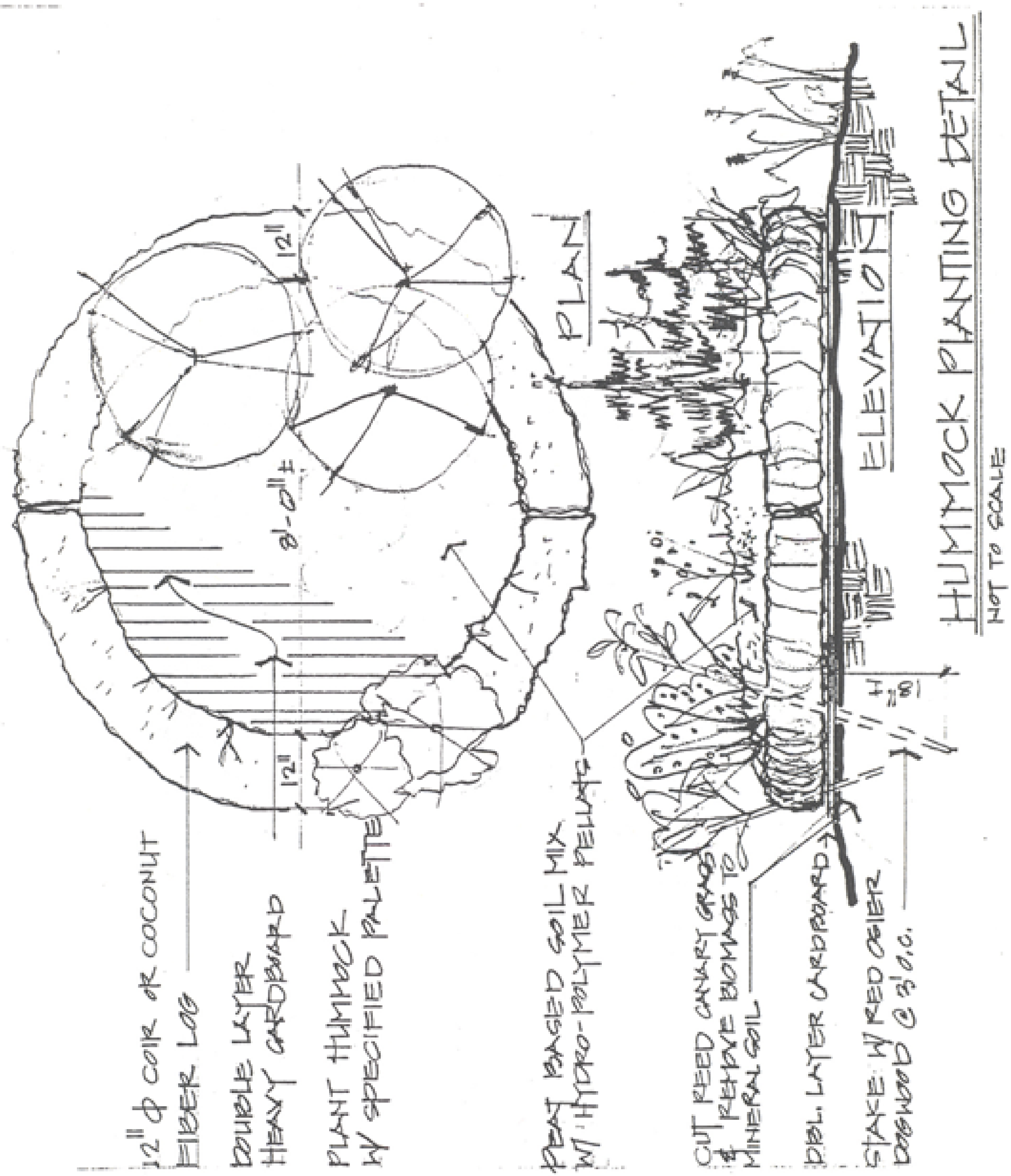
In Area I, the spring fed tributary to the main creek is an ideal site for creation of two ponds. The topography, hydrology, soils and location are all favorable. The excavation will be minimal with approximately10 cubic yards of roots and soil removed from each site. Each pond would be approximately 125 sq. ft. We are recommending lining the ponds to prevent reed canarygrass from colonizing the ponds (Figure 7).

In an attempt to mimic processes in coniferous forested wetlands we are recommending creating three hummocks to provide an environment for establishment of conifer species in Area II (Figure 8). The placement of thirteen logs or stumps is recommended in areas throughout Areas II, IV, and V (Figure 6).

In Areas II and III two invasive weed control techniques will be employed for reed canarygrass control. The first technique involves the use of heavy guage cardboard and wood chip mulch. The reed canarygrass will be cut to the ground and raked clean. A double layer of 3'x5' cardboard sheets will then be laid down and covered with approximately 5" of wood chip mulch (Figure 9). Native trees and shrubs can be carefully planted during this process Please refer to the site plant list for species Group X on page?. The biodegradation of this material while the plants are establishing is proving to be an effective method.

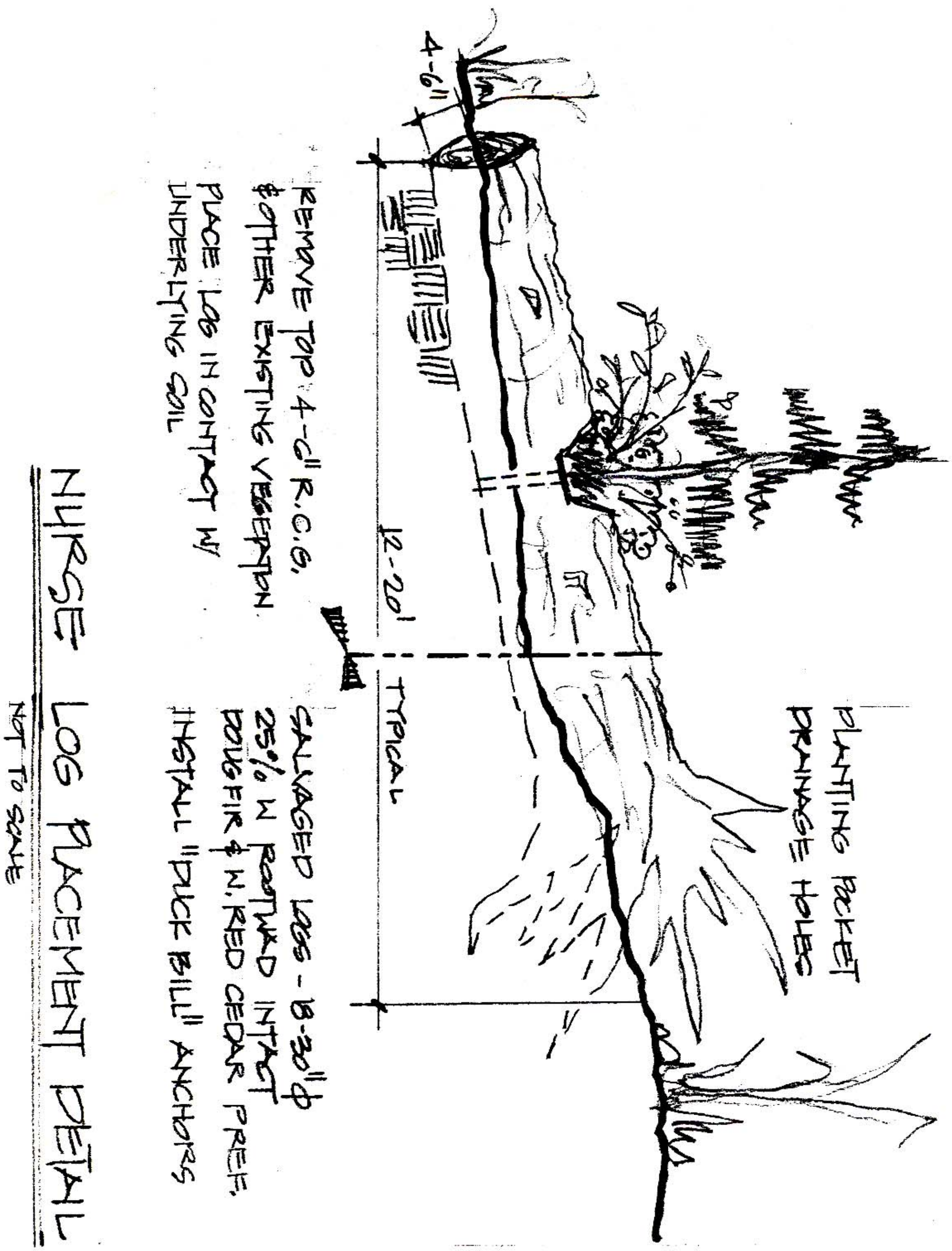
The second technique involves cutting the reed canarygrass to the ground and raking the area clean. A layer of heavy grade woven geotextile weed barrier will be laid down and secured with long metal staples. The recommended size area is approximately 800 sq. ft (Figure 9). The fabric is left is place for two years after which time the area will be revegetated with wetland shrubs and emergent plants from the site plant list (Group X, pageX).

Detail 3



12" Ø COIR OR COCONUT FIBER LOG
DOUBLE LAYER HEAVY CARDBOARD
PLANT HUMMOCK W/ SPECIFIED PALETTE
PEAT BASED SOIL MIX W/ HYDRO-POLYMER PELLATS
CUT REED CANARY GRASS & REMOVE BIOMASS TO MINERAL SOIL
DBL. LAYER CARDBOARD
STAKE W/ RED OSIER DOGWOOD @ 3' O.C.
8'-0" ±
12"
12"
18"
PLAN
ELEVATION
HUMMOCK PLANTING DETAIL
NOT TO SCALE

Detail 4


4-6"
REMOVE TOP 4-6" R.C.G.
& OTHER EXISTING VEGETATION.
PLACE LOG IN CONTACT W/
UNDERLYING SOIL
12-20'
TYPICAL
PLANTING POCKET
DRAINAGE HOLES
SALVAGED LOGS - 18-30" Φ
25% W ROOTWAD INTACT
DOUG FIR & W. RED CEDAR PREF.
INSTALL "DUCK BILL" ANCHORS
NURSE LOG PLACEMENT DETAIL
NOT TO SCALE

Zone 2 Schedule*

Action	**Timeline**	**Work Completed by**
Employ control techniques, install nurse logs and hummocks, create ponds, and plant. (Areas I, II, II IV and V)	Summer/Fall 2001	Consultant (Volunteers can assist with planting)
Install logs (Area II)	Summer/Fall 2001	Consultant
Maintain stream view corridor (Area III)	In perpetuity	Parks staff
Install logs and plant (Group B, C) (Area III)	Spring 2002	Consultant (Volunteers can assist with planting)
Install nurse logs and plant (Group A, B) (Area IV)	Summer/Fall 2001	Consultant (Volunteers can assist with planting)

***** Work will be funded under the CIP

Zone 3

Zone 3 has the largest area of reed canarygrass in Licton Springs Park (Figure 3). In Area I, nurse logs could be installed and a dense plantings of natives could occur throughout the area. In Area II, along the sides of the stairs to the boardwalk, this area is ready for planting. In Area III, invasive plants need to be removed.

Needs work

Zone 3 Schedule**

Action	Timeline	Work Completed by
Install nurse logs and plant Area I (Group A)	Fall 2001	Parks Staff
Plant Area II (Group B)	Fall 2001	Park Staff, volunteer groups
Remove invasives Area III and plant (Group B)	Fall 2001	Park Staff, volunteer groups

****Funding needs to be obtained.

Zone 4

Zone 4 is an upland transition zone from the forested wetland. This area is not completely inundated with reed canarygrass or Himalayan blackberry. As a result, this area would benefit from aggressively removing invasives and following up with a planting. An iron spring similar to those found in the north-end of the park is also present. Creating depressions to gather water would be a useful tool to help diversify the area.

Needs work

Zone 4 Schedule*

Work Completed by	Action	Timeline
Park Staff, volunteer groups	Remove Himalayan blackberry, climbing nightshade, and bindweed Areas I and II	Spring 2001
Park Staff, volunteer groups	Plant Natives in Area I (Group A)	Spring 2001
Park Staff, volunteer groups	Plant Natives In Area II	Plant Group B
Park Staff, volunteer groups	Plant Natives in Area II Group C	Plant Group C when a shrub layer is established in Area II- 2004-6

* Work will be funded under the CIP

Zone 5

Zone 5 is an area that has both Pacific and Scouler's willow. Reed canarygrass is also prevalent, but the willow keeps it from becoming a monoculture as it is in other areas of Licton Springs. A storm drain is located on the eastern boundary of this zone. A few years ago its elevation was lowered to allow more water to drain. If water could be diverted away from this area so that it would remain in the wetland area and not go into the storm drain, it could help suppress reed canarygrass from spreading further into this zone. The retention of water in the wetland is critical to preserving and enhancing wetland functions.

Zone 5 Schedule*

Action	Timeline	Work Completed by
Insert a log dam above diversion	Fall 2001	Park Staff

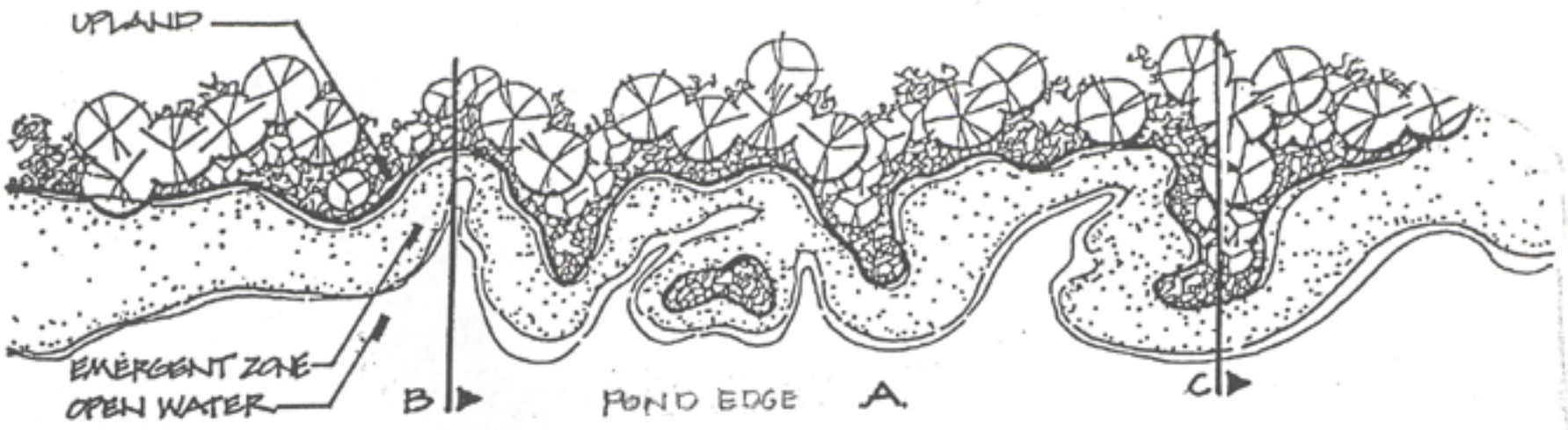
* Work will be funded under the CIP

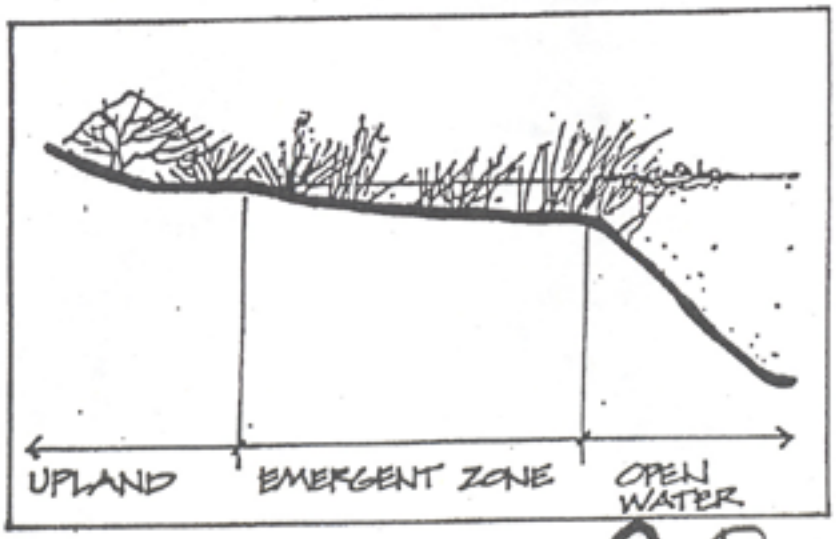
Zone 6

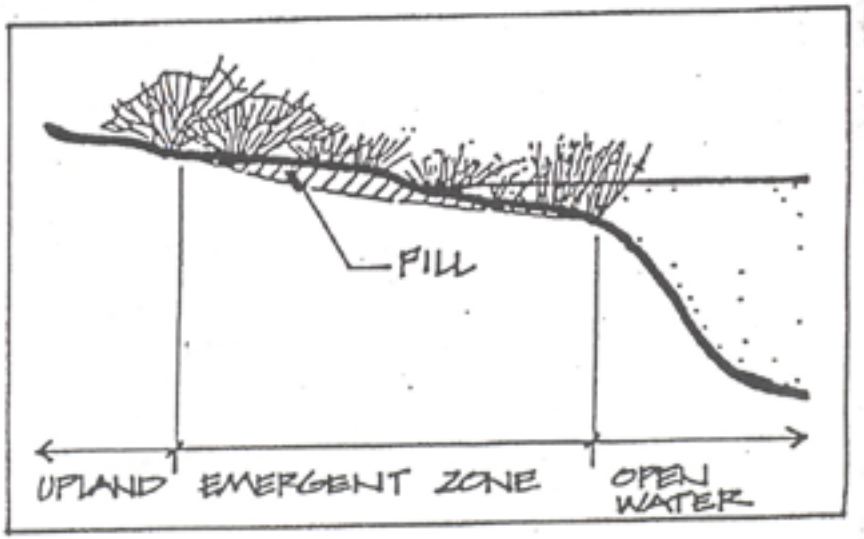
Zone 6 has several different vegetation types within this zone. The northern portion of this Zone, Area V, consists of reed canarygrass and a Polygonum species along with a patch of Himalayan blackberry. The southern portion consists of some invasives, but also areas of some native plant species. The eastern portion contains some willow. This area is in fair shape vegetatively and as a result can be left alone. This area needs to be monitored incase invasives increase rapidly, but know it will be left for wildlife cover.

Zone 7

Zone 7 consists mostly of the pond and channels draining into it (Figure 7). This area contains some reed canarygrass, but there are also quite a few natives including giant horsetail. Since the pond is lined and has not been cleaned out in a few years, it would benefit from being cleared of all of the built up sediment. The pond is a great deal smaller than its original size. The upland transition zone, the western side of pond, would benefit from invasive removal and a few plantings of natives. The eastern side of the pond would benefit from planting hydrophytic species. The northern portion of the pond that has a substantial stronghold of natives would benefit from more species. In addition, yellow flag iris should be grubbed out before it spreads further throughout the area.







EDGE DETAIL- B. **2. POND EDGE** EDGE DETAIL- C.

Detail 5

The pond should be**...**

Zone 7 Schedule**

Action	Timeline	Work Completed by
Clean out lined pond	Summer 2001	Parks Department
Install bio-swales and bio-logs	Summer 2001	Consultant
Remove invasives	Fall/Winter 2001	Volunteer groups
Plant upland transition zones with plants from Group A	Winter /Spring 2002	Volunteer groups
Plant eastern edges of pond Group B	Fall 2001	Volunteer groups
Plant Northern portion of pond Group C	Fall 2001	Volunteer groups

** Funding needs to be obtained.

Zone 8

Zone 8 has areas that are fairly wide open from past work parties that removed invasives. This is the only area in the park where English Ivy is prevalent, but it is definitely controllable. This area was planted in March of 2001 with plants from the following palettes: A, B, C, and E. Monitoring of this planting needs to done bi-annually.

Zone 9

Zone 9 contains more natives than invasives which is an anomaly in Licton Springs Park. This zone would benefit from removing the few invasive species that are present and planting more natives to decrease the likelihood of invasive species moving into this zone.

Zone 9 Schedule*

Action	Timeline	Work Completed by
Remove invasives	Winter/Spring 2002	Volunteer groups
Plant wetland areas with plants from Group C	Winter/Spring 2002	Volunteer groups
Plant upland transition zones with plants from Group A, B	Winter/Spring 2002	Volunteer groups

* Work will be funded under the CIP

Zone 10

Zone 10 is currently a landscaped area consisting of grass and a few western red cedars that are newly planted and approximately 20-30 years old. The public expressed interest in expanding the grove of cedars on the eastern perimeter out towards the sidewalk. The idea would be to turn this area into more of a natural

area; an extension of the eastern border. Zone 10 also contains a drainage corridor that would benefit greatly from native shrub and forb plantings. In the spring of 2001 blackberries were removed in the area adjacent to the stream corridor. A planting subsequently occurred with plants from the following palettes: A, B, and E.

Zone 10 Schedule*

Action	Timeline	Work Completed by
Rototill areas of landscaped grass	Fall 2001	Parks department
Plant rototilled areas from Group A, D, E	Fall 2001	Parks department, volunteer groups
Prepare areas for planting along drainage corridor	Fall 2001	volunteer groups
Plant Natives along drainage corridor from Group G	Fall 2001	volunteer groups

* Work will be funded under the CIP

Zone 11

Zone 11 is made up of highly visible areas throughout the park where alder trees are in high density and would benefit from other species being intermixed. Some of the smaller stemmed alder trees should be removed and a planting should take place soon after.

Zone 11 Schedule*

Action	Timeline	Work Completed by
Thin out alders	Fall 2001	Parks department
Plant in Zone 11 (Group A)	Fall 2001	Volunteers, Parks department

** Work will be funded under the CIP

Zone 12A and B

The blackberry patches that make up Zone 12 need to be pruned and eventually removed and re-planted with native shrubs. The approach needs to be phased so that there will not be an abrupt disturbance to wildlife. The removal of blackberries should occur approximately every fifteen feet and then a ten foot swath of blackberries should be removed.

Zone 12 Schedule

Action	Timeline	Work Completed by
Remove blackberries (12A)	Fall 2001	Volunteers, Parks Staff
Plant from Group D, E	Fall 2001	Volunteers, Parks Staff
Remove blackberries (12)	Spring 2002	Volunteers, Parks Staff
Plant from Group D ,E	Spring 2002	Volunteers, Parks Staff

Hazard Trees

Eleven trees (Figure 6) were deemed hazard trees by the Acting Senior Urban Forester based on the following criteria:

- Visible defects that will be considered in hazard evaluation include, but will not be limited to, cracks in limbs and/or trunk, seams in limbs and/or trunk, spiral cracks in limbs and/or trunks, rib cracks, weak branch unions(V crotches), decay in limbs and/or trunk, cankers in limbs and/or trunk, deadwood, root problems, and poor tree architecture (form).

- Aggravating factors in hazard evaluation will include, but not be limited to: fast-growing species, sprouting from topping cuts, weak branch attachments, heavy end weight of branches, included bark, evidence of past branch/trunk failure, saturated soil, frequent irrigation, more than 30% of buttress roots decayed and/or disturbed, evidence of excessive mechanical bark damage, large dense crown, lack of basal trunk flare (poor taper), recent construction activity, willow soil, and mushrooms visible at base or in root zone.

- A combination of any of these factors may greatly elevate the hazard rating. For determination of hazard rating the Department will utilize the Hazard Tree

Assessment Tatum Guidelines as developed by the Minnesota Department of Resources- Forestry latest revision (Appendix C)Trees that rate a high hazard will be considered an imminent risk and will be scheduled for immediate remediation. Trees that are rated a moderate risk may be reevaluated at a specific interval or scheduled for immediate remediation.

These trees will be removed and their roots grubbed out to prevent stump spouting. Saplings will be planted in their place.

SEATTLE PARKS AND RECREATION

Hazard Trees

Figure 8

Orthophoto taken: July 1999
Map date: July 2001

☆ Hazard trees

N
W E
S

1:1200

30 0 30 60 Feet

Hazard Tree Schedule

Action	Timeline	Work Completed by
Remove Hazard trees	Fall 2001	Parks staff
Plant Saplings from Group H	Fall 2001	Volunteers, Parks staff

Group H

Douglas-fir (*Pseudotsuga menziessii*)
Western red cedar (*Thuja plicata*)

Geology

Soils

Three separate soil pits were dug in the wetland soils of Licton Springs. Two sites in the north end of the wetland had very similar soil characteristics. The third site in the south end of the wetland had very different soil characteristics. From observations of all three soil pits it appears that this may be a peat bog that has suffered from severe degradation of the organic soils through filling and sedimentation. The artificial sources of water piped into this site brings with it sediment that appears to be depositing over the original peat soils and soil filling on all sides has eroded into this depressional wetland. Soil Conservation Soil Survey Maps for this site could not be obtained. The 1973 soil survey for King County did not include soil mapping within the Seattle City limits. According to soil scientist Dale Snyder this area could be a Norma soil series which is a mineral soil associated with depressional wetlands. He also indicated that it would not be unusual to find isolated depressional peat bogs in this area that do not show up on soil maps.

Soil Pits 1 and 2

Soil Pits 1 and 2 in the north end of the wetland were composed of mineral soils of a very consistent clay loam texture throughout the entire soil horizon to a depth of 20 inches deep. The soils were a consistent color throughout the entire soil depth showing up as a 10yr/3/1 on the Munsell Chart. There were no apparent mottles or other redoximorphic characteristics in the soil pits. This could be an indication of soils that have remained in a continuously saturated condition. Water quickly filled the pit stabilizing at 8 inches from the surface. These soils are considered hydric due to their Munsell color. This area could also have underlying organic soil but were not detected in the top 20 inches.

Soil Pit 3

The soil pit in the south end of the wetland is an organic soil with 8 inches of mineral soil overlaying it. The top 8 inches consists of a clay loam of a 10yr/3/1

color. The soil horizon from 8 to 20 inches consists of a mucky peat organic soil. This pit quickly filled with water to 6 inches from the surface. The overlaying mineral soils could be a result of the extensive disturbances on the site from filling and increased hydrology to the site from imported sources of water causing excessive sedimentation. It appears that this wetland could be a peat bog with very degraded soils from mineral soil import.

Wildlife

A list of known vertebrate wildlife species known to occur in the Seattle Parks system can be found in Appendix D. This list is not specific to Licton Springs Park. At this time no wildlife surveys have been completed in this park. In the future, we hope to supplement this list with site-specific information gathered from local wildlife watchers.

Many of the suggestions made in the recommendations section will benefit wildlife including: increasing the amount of water in Zone 1, 2, and 3 will attract more waterfowl. Also, adding more downed logs throughout could possibly attract more amphibians.

Monitoring

Monitoring is an essential part of any vegetation management plan. Monitoring information will be used along with existing inventory data and stated objectives to evaluate the effectiveness of our recommendations. Monitoring will be conducted by the urban forestry department, north division staff and members of CORE over the next ten years. Walkthroughs are the best way to monitor projects. After project implementation, monitoring should occur in the first year with new plantings every six months. In the second year, walk-throughs should occur bi-annually. Progess should be recorded as an addendum to this plan.

Zone 1

Objective: Create more native vegetative, landscape, and wildlife diversity. Decrease amount of invasive plant species. Improve cultural function through enhanced aesthetic value and interpretive programs (signage).

Indicators: 75% survival rate of native plants within first year. The created depressions are functioning properly by holding water and attracting more wildlife species. Wildlife diversity has increased (check with local bird watchers to see if they have noticed an increase in species since project implementation). 80% mortality of invasives treated by cardboard method after two years.

Zone 2

Objective: Create more native vegetative, landscape, and wildlife diversity. Decrease amount of invasive plant species. Improve cultural function through enhanced aesthetic value and interpretive programs (signage).

Indicators: 75% survival rate of native plants within first year. The weir and depressions are functioning properly by holding water and attracting more wildlife species. Wildlife diversity has increased. 80% mortality of invasives treated by cardboard method after two years.

Zone 3

Objective: Create more native vegetative, landscape, and wildlife diversity. Decrease amount of invasive plant species.

Indicators: 75% survival rate of native plants within first year. Wildlife diversity has increased.

Zone 4

Objective: Create more native vegetative diversity.

Indicators: 75% survival rate of native plants within first year. Wildlife diversity has increased.

Zone 5

Objective: Create saturated conditions in wetland

Indicators: Ground is perennially saturated and stream channels are no longer incised.

Zone 6

Objective: Maintain existing wildlife habitat. Monitor invasive presence.

Indicators: Existing salmonberry groves. This area will be monitored to insure that invasives do not invade this leave area.

Zone 7

Objective: Increase size of pond and create vegetative, landscape and wildlife diversity.

Indicators: 75% survival rate of native plants within first year. Depressions are functioning properly by holding water and attracting more wildlife species. Wildlife diversity has increased.

Zone 8

Objective: Create more native vegetative diversity.

Indicators: 75% survival rate of native plants within first year. Wildlife diversity has increased.

Zone 9

Objective: Create more native vegetative diversity.

Indicators: 75% survival rate of native plants within first year. Wildlife diversity has increased.

Zone 10

Objective: Create a native forested grove

Indicators: 75% survival rate of native plants within first year. Wildlife diversity has increased.

Zone 11

Objective: Decrease density of alders and increase amount of conifers.

Indicators: 75% survival rate of native plants within first year.

Zone 12/12A

Objective: Create more native vegetative diversity.

Indicators: 75% survival rate of native plants within first year. Wildlife diversity has increased.

References

Dyrness, C.T., and Franklin, Jerry F. *Natural Vegetation of Oregon and Washington*, Oregon State University Press. 1988.

Licton Springs Community Council web page http://www.lictonsprings.org.

Renfrow, Phil, Seattle Dept. of Parks and Recreation, *Licton Springs Wetlands Restoration Plan;* June. 2001.