Frink Park Site One

A design proposal by
Sean Dugan, Kristina Fenn, Kim Frappier, Katie Gunter, Marcia Nachtigal, Masako Ota, Emily Rivers, Kirra Swenerton, and Bic Wong

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I. INTRODUCTION

Natural History

The site at which Frink Park is located was originally coniferous forest, however it was logged during the late 19th century and early 20th century after the rapid growth of the Seattle area. After logging, a secondary succession-stage forest developed, consisting mainly of deciduous trees. The forest canopy has remained in this secondary succession-stage because of the urban development surrounding the park (Frink Park Concept Plan).

Goals and Objectives for Re-Vegetation and Maintenance

The main goals for this proposal follow the guidelines outlined in the Frink Park Concept Plan. The two major goals that our group focused on are:

1. Restore forest habitat for long term sustainability
2. Make the park features more inviting to park users while retaining the sense of ungroomed, natural space

The first major goal relates to the character of the park. We want to imitate natural succession and promote native character by controlling non-native species and planting native species typical to low-elevation forests of the Pacific Northwest. This includes an attempt at moving away from the maple-dominated deciduous canopy and moving toward a more mixed canopy system. Accomplishing these objectives will allow for less intensive management of the site.

The second major goal involves how park visitors relate to the site. Trees and shrubs will be planted as buffers between the park and the road to create a separate sense of place between the park and the urban environment. The shrubs will serve to create an attractive border for the park, keeping stressors out, while welcoming visitors in. Safety is also an important issue. Thorough monitoring and assessment of the health and location of trees and shrubs, potential hazards will be minimized. This includes both unhealthy, hazardous trees as well as blind corners.

II. Frink Park Site Description and Analysis

Frink Park is located in the Leschi neighborhood of Seattle and is about 16.7 acres in size. The focus of this plan is the area on the west side of the park adjacent to the intersection of 31st Avenue S. and S. Jackson Street. The site encompasses the edge of sidewalk along 31st Avenue S. and the east-facing aspect down to the main trail.

The site is delineated into five zones to account for differences in present site conditions as well as differences in site preparation and planting regimes.

Zone A: Entrance and Street Side

The western edge of the park runs north and south along 31st Avenue S. and measures 454 square feet. Currently, there is a strip of turf grass along the park boundary. The grade is mostly flat but quickly drops off into forest.

Zone B: South Slope

Zone B measures 5,738 square feet and is the southern most region of this site. It has the steepest slope of all the zones, exceeding 50%. Slope stabilization and monitoring of hydrologic flow will be priorities for this zone, as will invasive removal.

Zone C: Path

This zone includes the 3-foot area adjacent to the path that begins from the trailhead and winds down to the main trail totaling 1,315 square feet. Trail improvements were completed in the summer of 2001. The area is sparsely vegetated except for *Hedera helix* and a few understory shrubs.

Zone D: North Slope

Zone D, measuring 3,076 square feet, drops off from the street with a 40% slope. The slope gradually flattens out before it meets the trail's edge.

Zone E: Madrone

Zone E is the 27 square foot section at the intersection of the entrance path and the main path. The main feature is an *Arbutus menziesii* (Pacific madrone). There is a bench next to the tree, which should be moved due to the hazard potential of the ailing madrone.

Soil Analysis

The soil samples at Frink Park Site 1 were collected in October of 2001. A significant amount of rainfall occurred the day prior to sampling. We collected soil samples by hammering a hollow piece of PVC pipe into the ground to a depth of approximately 30 centimeters. Samples were taken from 7 different sites within the 5 zones.

Textural analysis of the soils shows that all soils can be classified as sandy loams with the exception of the steep portion of zone D. The upper section of zone D has a loamy sand texture. These loose, coarse textured soils indicate very low moisture and nutrient holding capacities. In fact, we noted that most of the previous day's rain had not permeated beyond the first few centimeters of soil.

The soil analysis results (Appendix 1), considered comprehensively, indicate that zones B, E and D have healthier soils than the soils along the road and the newly built trail. Due to steep grades of over 50%, care should be taken to minimize the impacts of revegetation and maintenance efforts in these areas.

Vegetation Assessment

A canopy of *Acer macrophyllum* dominates the forest of the renovation site. Other tree species include *Arbutus menziesii, Fraxinus latifolia, Prunus* sp., and *Corylus cornuta* var. *californica*. Unlike a traditional early successional Northwest forest, the understory is dominated by *Hedera helix*, a class C invasive on the Washington State Noxious Weed List. The largest threats to plant health in this area are from mechanical injury by pedestrians and dogs, pollution from local traffic, and toxic runoff from cars and nearby lawns. There is no evidence of problems at this time, but mechanical injuries as well as damage from diseases and pathogens should be checked for periodically.

Tree Hazards: Inspection and Management

A tree is considered to be hazardous if it is structurally unsound *and* there is a possible target (Harris, 484). We examined Frink Park Site One for trees that could be cause for concern. Fortunately, there is only one tree that we considered to be a risk. The specimen is a mature *Arbutus menziesii* (Pacific madrone) located at the base of the stairway from

31st and Jackson, next to the main trail. The Pacific madrone exhibits a few major problems, all of which pertain to branch decline and decay.

Hydrological Assessment

The upper edge of this site marks the boundary between Frink Park and 31st Avenue South. From the street, the land drops steeply to the east and drains into Lake Washington. High runoff from the street, sidewalks and other impermeable urban surfaces moves down this steep grade as surface flow.

Failure of water to permeate the soil surface and percolate is primarily due to the steep grade of slopes within this site (from 40-50%) and sandy soil texture. The poor quality of vegetative cover and absence of large numbers of deep-rooted plants leads to erosion and gully formation.

A drainage gully exists in the southern portion of Zone B. High rainfall may wash out the path intersecting this drainage. In order to protect the integrity of the path, water flow should be slowed through this gully. We suggest placing coarse woody debris (CWD) and rocks in the main drainage channel. Fast rooting species should be planted along the sides of this gully.

The path below this drainage gully can be altered to better manage surface flow. Currently, water washing over the path is beginning to undercut its eastern edge. We suggest replacing the level, compacted fill path with a gradually dipped path that follows the natural contour of the slope. This dip can then be filled with coarse rock or gravel and leveled. When water hits this looser, uncompacted surface, it will drain quickly and continue downslope without eroding the path. Other steep portions of this site can be treated similarly.

Light Assessment

Data on plant-available light was collected with a digital light meter on an overcast fall day, when leaves were still on the trees. Data was collected in 11 locations within Site 1.

Data ranged from to 870 lux to 2,580 lux on the site. Average light measurement on the site was 1,901 lux. To provide perspective, an overcast day produces a measurement of approximately 1,000 lux, while a very dark day would only produce 100 lux. Indirect sunlight measures 10,00-20,000 lux.

The amount of light available on our site under the canopy is equal to what one would typically see on a cloudy day without any canopy. The greatest amount of light fell along the east border of our site, particularly at the outer edges of Zone E, and east of the path where the bench stands.

III. SITE PREPARATION AND INSTALLATION

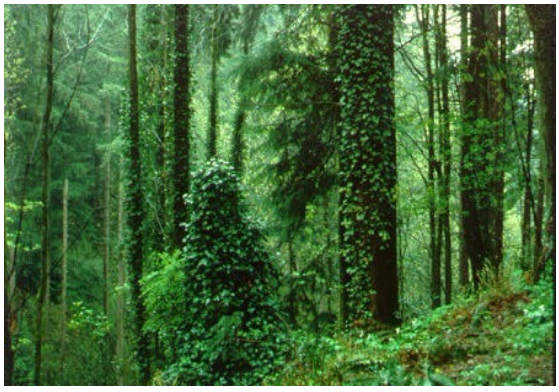
Introduction

Section three outlines the methods for site preparation, slope stabilization and plant installation. Preparation of the site should begin with ivy removal, followed by installation of the wattling. Wattling is more appropriate for our site conditions than large woody debris due to its light weight and ease of installation. Wattling should be done as soon as possible after ivy removal to reduce soil erosion and stabilize the slope. Mulching should follow, to prepare the site for the installation of plants. Installation of plant materials in zones A and E as well as areas of zones B, C, and D with minimal slope may be completed immediately following mulch application. It is recommended that areas with steep slopes be planted the following fall to allow the wattling time to establish.

Ivy Removal and Control

Background and Ecological Impacts

Hedera helix, commonly called English ivy, is a naturalized native of Europe. Culturally, *H. helix* is fairly drought tolerant and grows well in sun or shade and in many types of soil (Morisawa, 1999). *H. helix* reproduces vegetatively as well as by seeds.



Ivy creates dense growth just above the ground preventing sunlight from reaching other plants. Also, the additional weight of the vines growing on trunks and branches make trees more

susceptible to blow over during storms (NPS, 2000). As *H. helix* grows up into the canopy, it covers the apical stem of the tree. This has a similar effect to topping a tree, which induces biologic stress and hastens tree death (Ivy out project). *H. helix* also interrupts the natural process of succession by suppressing growth of conifers that would ordinarily create the next stage of the forest canopy.

Although *H. helix* is successful at out-competing native plants for water and nutrients, it is not a successful slope stabilizer. *H. helix* has very shallow, mat-like roots that tend to pond water at the soil's surface, making the top layer more likely to slide.

Removal and Control

Ivy control is not a one step process and will involve long term follow up to be most effective. There are a variety of mechanical and chemical control methods that are documented in horticultural and scientific literature.

Due to the steep slopes and sandy texture of the soil at this site, ripping the ivy out by hand may further destabilize the slopes (Baurle, personal communication). On steep slopes, mow the ivy using a brush cutter. Ivy roots should be ripped out around existing vegetation, new plantings and wattling. In areas with shallow to no slope, pull the ivy out by hand and remove roots. Simply pulling ivy is an ineffective method of control. It is important to follow ivy removal with a 6 to 8 inch layer of bark mulch. This blocks sunlight from the ivy and inhibits growth (Baurle, personal communication).

Table 1: Summary of recommended ivy removal method by zone

Zone	**Method**
A: Entrance & Street Side	Hand pull shoots and roots
B: South Slope	Mow
C: Path	Mow
D: North Slope	Mow along steep slope and hand pull as slope levels out
E: Madrona	Hand pull shoots and roots

Slope Stabilization

Live materials, specifically vegetation, may be used to control erosion and provide stabilization to slopes. In many cases, biotechnical and soil stabilization approaches are

more cost-effective than conventional structural techniques, especially when long-term maintenance and repair are factored in.

We recommended that the technique called 'fascines' be used in conjunction with native plants to stabilize the slopes at site 1. The plant we recommend for the material to build fascines is *Cornus stolonifera* (red-osier dogwood).

Fascine is an erosion control planting method, which can also be used to stabilize shallow soil structure against land sliding. This method involves packing lengths of woody plant cuttings into cables or bundles of about 8 to 10 inches in diameter. The bundles are laid continuously along slope contours (Fig 1).

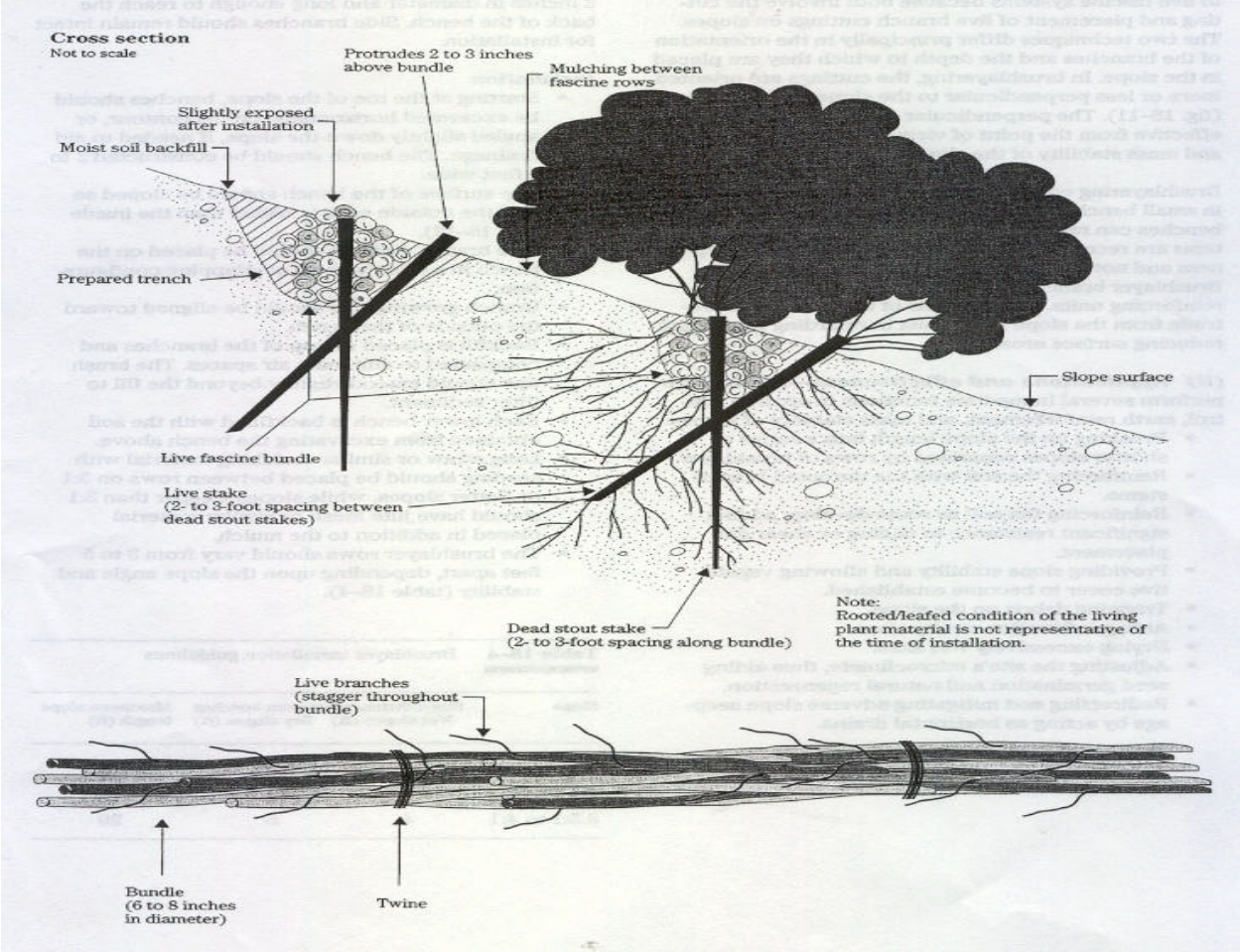


Figure 1: Installation of Fascines

Container and bare root planting

Native plant species are recommended for installation in spaces between fascine rows to increase the habitat quality and maximize the slope stabilization effect. It is recommended that installation take place during early fall or spring. Since the slope moisture is a critical issue at the site, the installation should avoid seasons of heavy rain to minimize soil disturbance. It is recommended that plants be placed in groupings that include species with different rooting and foliage characteristics, which may strengthen the overall reinforcement of the slope.

Overview of Planting Plans

The intent of adding plants to the site is to increase and diversify native vegetation, stabilize the slope and discourage invasive species. The goal is to reflect natural growth patterns.

Clump-Gap Mosaic For Shrubs and Herbaceous Perennials:

The benefit of the clump-gap mosaic is two fold. It groups species together to ensure reproduction and places individuals of the same species apart from the group in hope of reestablishing a new plant community. As this process is repeated, the clump-gap mosaic begins to form (C. Anderson). A general rule is to place species in groups of odd numbers, particularly groups of 3s. For every odd number group, a single plant must be planted apart from the group. Be sure to note the spacing table provided based on whether the plant is classified as a tree, shrub or herbaceous perennial.

Table 2: Spacing of Plants

Plant Type	Spacing
Tree	10' on center
Shrubs	3' on center
Herbaceous Perennials	1' on center

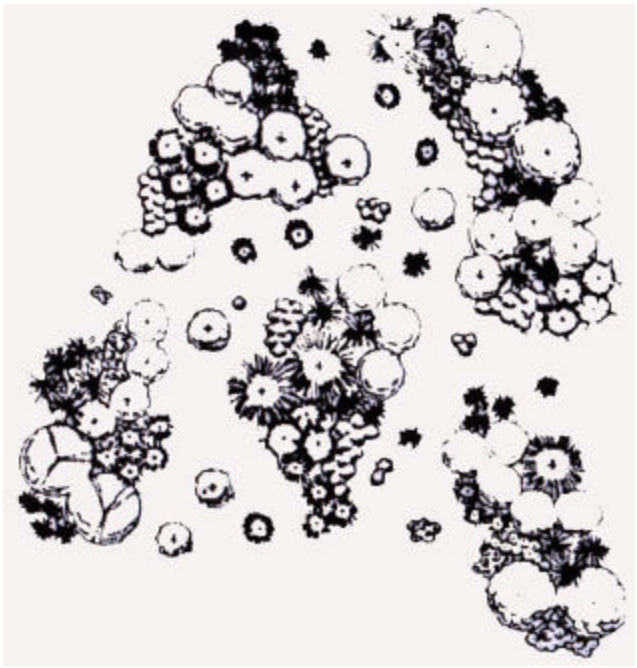


Figure 2: Clump-Gap Mosaic

The existing tree canopy is well established; however, species need to be diversified. The clump-gap mosaic does not work well with trees because of the competition for light and the requirements for spacing.

Zone	Trees	Shrubs	Shrub Clumps	Ground Cover	Ground Cover Clumps	Herbaceous Perennials	Herbaceous Perennials Clumps
A	None	56	None	None	None	None	None
B	42	288	Approx. 36 clumps, 6 plants per clump, 2 species in groups of 3	150	50 clumps of 3 plants	None	None
C	None	105	None	None	None	None	None
D	30	204	Approx. 25 clumps, 6 plants per clump, 2 species in groups of 3	99	33 clumps of 3 plants	None	None
E	2	None	None	None	None	108	27 clumps of 3 plants from same species

Table 3: Clump-Gap strategy at Frink Park Site 1

Suggested Plantings by Zone

Zone A is more open than the other parts of the site, so the plants will get more sunlight. Planting high, dense shrubs along the roadside will deter people from dumping garbage down the slope into the park. We hope to call attention to the park entrance and welcome visitors using showy, flowering plants at the trailhead. Given these considerations, our plant list consists of *Philadelphus lewisii, Holodiscus discolor, Oemleria cerasiformis, Ribes sanguineum, Rosa gymnocarpa, Mahonia nervosa* and *Vaccinium ovatum.*

Zones B and D include the expanses of slope on either side of the footpath. The two main goals for these areas are to increase diversity and stabilize steep slopes. Our plant list for these sites consists of *Tsuga heterophylla, Thuja plicata, Oemleria cerasiformis, Pteridium aqulinum, Gaultheria shallon, Mahonia nervosa, Polystichum munitum, Rubus parviflorus,*

and *Arctostaphylos uva-ursi*.

Zone C plants should be kept low to maintain visibility of other areas of the park. We also chose plants that would direct foot traffic onto the designated pathways, as well as be of visual interest to park visitors. Plants for this site are *Rosa gymnocarpa, Gaultheria shallon, Mahonia nervosa, Pteridium aquilinum,* and *Polystichum munitum.*

Zone E is an area that is frequently used by park visitors because of the bench. Therefore, plants here should be showy and interesting to look at. Visibility is also an issue here, so plants should not be tall and shrubby. For this zone we chose *Acer circinatum, Dicentra formosa, Cornus canadensis,* and *Fragaria vesca.*

Pests and Diseases

The most important thing to remember when trying to resolve a pest or disease problem is that chemical solutions should be considered only as a last resort. The best way to deal with insects and diseases is to prevent them from attacking the plants. After the pest is present, try simple solutions first. Always prune away dead and unhealthy material. Keep mulch, weeds and debris away from the base of the plants to prevent rotting, mildew, rust, nematodes and leaf miners. Avoid handling wet foliage to prevent leaf spot, rust and nematodes.

For more serious problems, further action may be needed. Insecticidal soap may control serious problems with mites, leaf hoppers and thrips. Sometimes the entire plant should be removed to prevent the problem from spreading.

IV. MAINTENANCE PLAN

Minimal aftercare requirements will be necessary for the improvements made at the 31st and Jackson entrance at Frink Park. Plants have been selected partially for their ease of maintenance following installation.

Mulching:

Mulching helps to moderate soil temperature and soil moisture, suppress weeds, improve soil quality, and reduce erosion and runoff. The main thrust of our mulching plan is to inhibit the growth of *Hedera helix*, therefore it is necessary to maintain the recommended mulch depth of 6-8 inches. When mulching, it is important to make sure that the desired plants are not being suffocated. The mulch should be kept a minimum of two inches away from the trunks of all trees/shrubs and not cover smaller ground cover plants.

Mulch should be applied annually to maintain the recommended depth. Reapplication would be best after necessary weeding and before the start of the growing season.

Weeding:

The selected plant materials, planting densities, and mulch layer are a way to suppress further weed growth. If weeds should appear, their removal is necessary before they are able to re-establish. Aggressive removal is suggested by hand pulling, discarding debris and burying the site under a 6-8 inch layer of mulch. Monthly monitoring of weed growth is necessary and removal should be executed as needed, preferably before the growing season.

Watering:

Properly watering newly installed plants is the most important aspect in aftercare. Watering will be necessary until plants have established new roots and can effectively absorb the water they need to survive. Once established, the recommended plants have low water needs. The site should be thoroughly watered immediately after planting. During the dry season of the first year, a new tree or shrub should receive no less then a gallon of water per inch of trunk caliper every 10 – 14 days. Smaller plant material should be watered at least once a week.

If signs of wilting appear, an increase in the frequency of watering may be necessary. To monitor for soil moisture dig down three to four inches next to a plant to see if the soil conditions are dry. Wet soil at that depth verifies that watering is not needed at that time.

Pruning:

Pruning of newly planted trees/shrubs is not recommended. Pruning is only advised to remove dead, broken or diseased branches or limbs.

Monitoring & Record Keeping:

The plants were chosen partially for their ability to withstand the conditions present on the site. Plants should be assessed and analyzed to determine any changes that may indicate a potential health problem. It should be noted if any of the newly planted materials succumb to pests or disease. Removal of plants may be necessary to prevent the spread of the pest or disease. Keeping accurate records of such events will allow you to determine the maintenance necessary should future problems arise. Any conditions other than normal should be recorded into a database for future reference. Indications of the plant species affected, their conditions, the date and the initials of the individual making the observation should be documented.

Fascines:

Early monitoring and maintenance of bioengineering devices is important to ensure the long-term viability of the system. Fascines should be watered immediately after installation. Monitoring should also begin at this time and treatments of additional plants should be made if areas need to be bolstered. Stakes may need to be replaced to hold the system in place until the penetrating roots have been established. Treatment of the system with a fungicide or insecticide may be necessary, but this is not likely. If so seek guidance from a professional consultant.

V. BUDGET

The maximum total cost for this budget plan includes: site assessment, planning, site preparation, installation, and aftercare of the site for a 3-year period. Material and equipment costs were obtained from local retail and rental agencies. Many of the expenditures indicated may not be necessary if materials and equipment can be procured from other sources, such as donations or loans. The proposed actions would not extend far beyond many of the activities currently taking place within Frink Park. According to section 10.2 of the Frink Park Concept Plan “Labor for most of these projects will be volunteer

based, depending on neighborhood residents and city wide groups." As per section 10.4 of the concept plan, these volunteers will be assigned a labor rate value of $12/ hour. The budget does not adjust for any variance in these rates over the course of the three years following planting.

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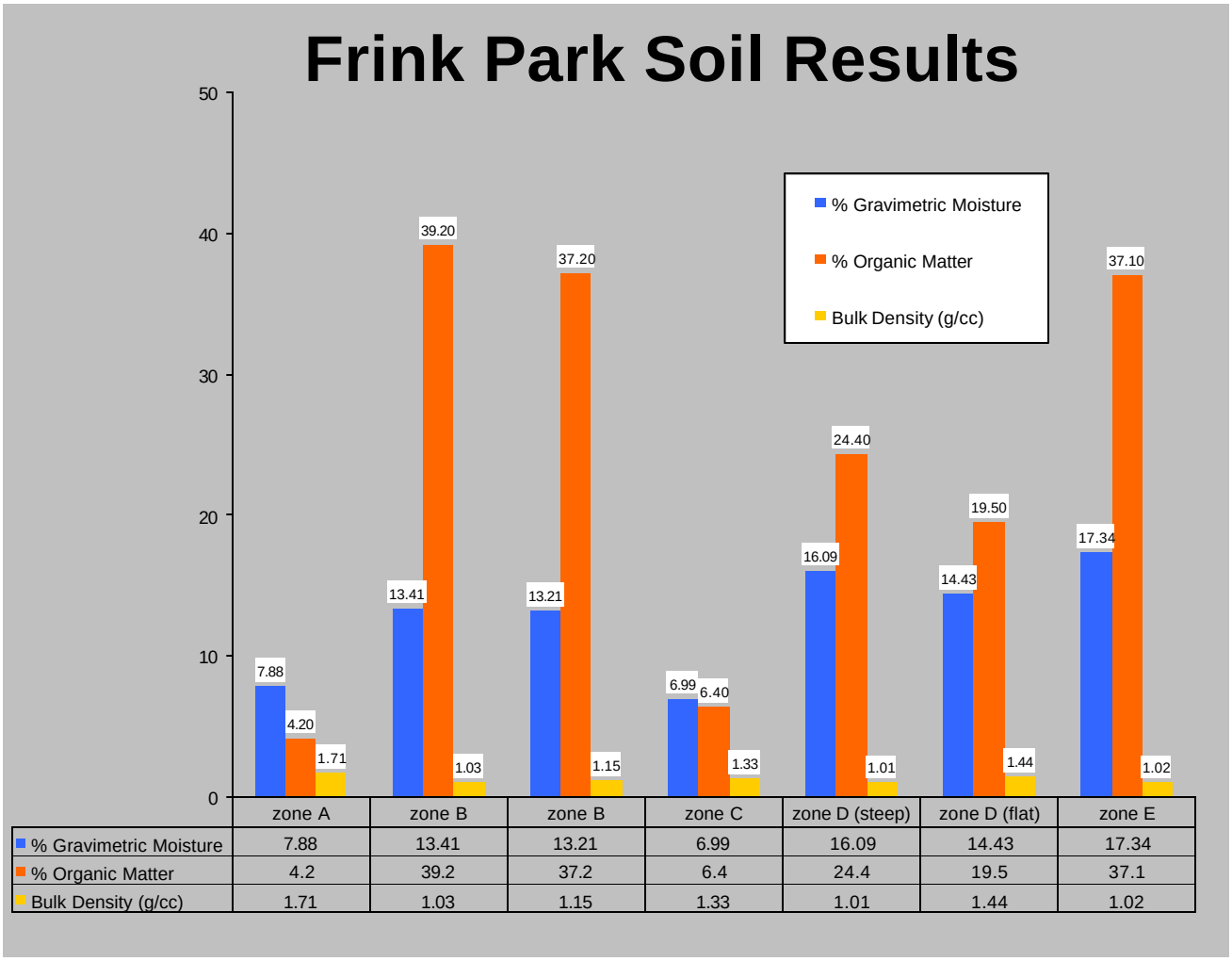

	zone A	zone B	zone B	zone C	zone D (steep)	zone D (flat)	zone E
% Gravimetric Moisture	7.88	13.41	13.21	6.99	16.09	14.43	17.34
% Organic Matter	4.2	39.2	37.2	6.4	24.4	19.5	37.1
Bulk Density (g/cc)	1.71	1.03	1.15	1.33	1.01	1.44	1.02

Appendix 1: Soil analysis results