Volunteer Park Sustainability Coalition

Park Sustainability Improvement Measures

13 November 2015

YOUNG | architecture LLC

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Volunteer Park Sustainability Coalition
c/o
Anthonio Pettit
Friends of the Conservatory
1402 East Galer St.
Seattle, WA 98112

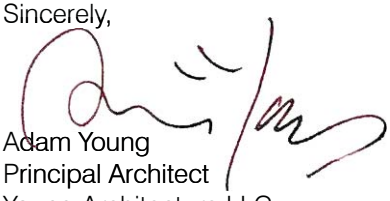
Anthonio,

Thank you for the opportunity to provide architectural consulting services for the Volunteer Park Sustainability Improvement Measures.

Here's our Final Draft for the measures that includes the project's high level goals, measurable targets, and sustainable strategies for Volunteer Park. Included is a summary page listing the sustainable measures identified in the report.

We have enjoyed working with the coalition on the project. Volunteer Park is a very special place, and we look forward to being a part of making it even better.

Sincerely,



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INTRODUCTION

The process started when the Friends of the Conservatory Members began asking questions about the future of the conservatory. Is it sustainable? Is it green? And if not, how can we make it more green?

With the support of the FOC (Friends of the Conservatory) Board of Directors, a group made up of interested individuals began meeting and discussing options and ideas for improving the performance of the facility.

To help further the cause, Audrey Van Horne initiated a fund dedicated to the sustainability of Volunteer Park and the Conservatory.

As the discussion continued and reached out to partner non-profit groups within the Park to gather feedback, more energy and excitement was generated. As a result, the VPSC (Volunteer Park Sustainability Coalition) formed as a working agreement and understanding between the FOC, AAM (Asian Art Museum), and the VPT (Volunteer Park Trust). Soon after, the area of interest expanded beyond the Conservatory to include all of Volunteer Park.

After much discussion, a team was hired to take a holistic view of the entire park and structures, and to generate Park Sustainability Improvement Measures.

Initially, the Volunteer Park Conservatory was the focus.

Currently, the scope of work encompasses all of Volunteer Park.

Stakeholders who were involved in the drafting of the sustainability improvement measures:

Owner

Seattle Parks and Recreation
Kathleen Conner, Cheryl Eastberg, Paula Hoff, and Kelly Goold

Parks Sustainable Operations

Joelle Hammerstad, Karen Galt, and Casey Rood

Volunteer Park & Conservatory Gardeners

David Helgeson, Bridget Lamp, and Jody Blecksmith

The Volunteer Park sustainability Coalition

A partnership of the Friends of the Conservatory; Volunteer Park Trust; and the Asian Art Museum.

MISSION
Restore Volunteer Park to its preeminent position as the region's premier Olmsted designed Park, along with the institutions and features that make the park a cultural and recreational treasure.

Friends Of The Conservatory

Anthonio Pettit, Rudi Opderbeck, Audrey Van Horne, Mike Cory, and Tom Eichbaum

Volunteer Park Trust

Doug Bayley

Asian Art Museum

Lee Richardson

Future Partners

Friends of Seattle's Olmsted Parks
Seattle Landmarks Preservation Board
Seattle City Light
Seattle Public Utilities

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The Seattle Parks and Recreation and the City of Seattle have stated sustainability goals and checklists that are primarily focused on maintenance and capital improvement projects.

One of the purposes of the Volunteer Park Sustainability Coalition is to inspire and implement projects and methods specifically for Volunteer Park.

Our approach for this report is to take a holistic review of Volunteer Park, and identify opportunities to integrate sustainable measures throughout the park.

This report documents the high level goals desired by the Volunteer Park Sustainability Coalition, reviews measurable targets and certification programs, and outlines sustainable strategies to achieve those goals.

Implementation may occur through specific designed projects, or as part of an ongoing maintenance project.

The process included review of the park and facilities through direct observations. We attended meetings with the Sustainability Coalition over the past two years discussing issues, opportunities, and possible solutions. We conducted targeted interviews with key park stakeholders. We made site reviews and meetings with engineers and design professionals to engage in the process and brainstorm ideas. We have begun to review data collected from water, gas, and electric meters to set benchmarks and understand the use of resources.

City of Seattle — Sustainability Goals

The Citywide goal for sustainable buildings and sites is to maximize the environmental quality, economic vitality, and social health of our city through the design, construction, operation, maintenance, renovation, and decommissioning of our buildings and sites. This policy demonstrates the City's commitment to addressing climate change and creating a sustainable future by:

- Protecting, conserving, and enhancing the region's environmental resources;
- Providing leadership in setting community standards for sustainable development;
- To providing responsible stewardship of the City's fiscal resources and public assets over time by leveraging our investments to create financial, public and environmental value;
- Creating quality environments that are healthy and provide community benefit.

The development of sustainable buildings and sites requires an integrated and holistic approach to assessing performance and value in order to meet multiple goals and maximize the efficiency of multiple systems. In order to meet this challenge, projects are strongly encouraged to utilize the following key concepts:

- Triple Bottom Line: the value or success of a project, program, or action considering costs and benefits in terms of environmental, economic, and social impacts.
- Life Cycle Cost: the total cost of ownership over the life of an asset. Life cycle cost can be used to evaluate a complete building or site as well as an individual product, process, or service.
- Integrated Design Process: a collaborative method for designing buildings and sites which emphasizes holistic design, with multidisciplinary collaboration, including key stakeholders and design professionals, from conception to completion, involving a "whole building or site design" approach in which a building or site is viewed as an interdependent system.

Seattle Parks and Recreation

Environmental Stewardship Report

OUR MISSION
Seattle Parks and Recreation provides welcoming and safe opportunities to play, learn, contemplate and build community, and promotes responsible stewardship of the land.

Progress is measured across four main categories, Community Programs, Ecological & Agricultural Resources, Sustainable Operations, Land & Buildings. Below are highlighted goals that this report addresses:

- Responsibly Manage Pests, Weeds & Invasive Plants
- Utilize Green Cleaning Products
- Divert Waste from Landfills
- Decrease Vehicle Emissions
- Improve Energy & Water Efficiency of Existing Buildings
- Generate Renewable Energy
- Design for Water Conservation

VALUES

- Access
- Opportunity
- Sustainability

DESIRED OUTCOMES

- Healthy Environment
- Healthy People
- Strong Communities
- Financial Sustainability

High Level Goals

Achieve a triple bottom line for Volunteer Park through sustainable improvements that reduces environmental impacts, reduces operational costs, and increases community access, health, and wellbeing.

Measurable Targets

Energy reduction of 20% by 2020
Water reduction of 20% by 2020
Minimize storm water runoff from the park.
and/or Certification for the Park (Salmon Safe or SITEs or Rainwise)
Capital Green Checklist and Toolkit

Sustainable Strategies & Improvement Measures

Reduce | Improve | Generate

- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Indoor Environmental Quality
- Materials & resources

The first step when reviewing a site or structure is to find ways to reduce the resources consumed. This can be achieved through a change in thermostat set point, hours of occupation, or a more efficient process. Given the unique nature of the structures in Volunteer Park many of these strategies will not apply.

Next, are improvements in the efficiency of fixtures and equipment to use less water or energy, or better thermal envelope to reduce heat loss.

Finally, to generate power on site or capture rainwater to reduce the needs on resource withdrawals.

The following sustainable strategies list improvement measures that could be part of a design solution.

Storm water Management

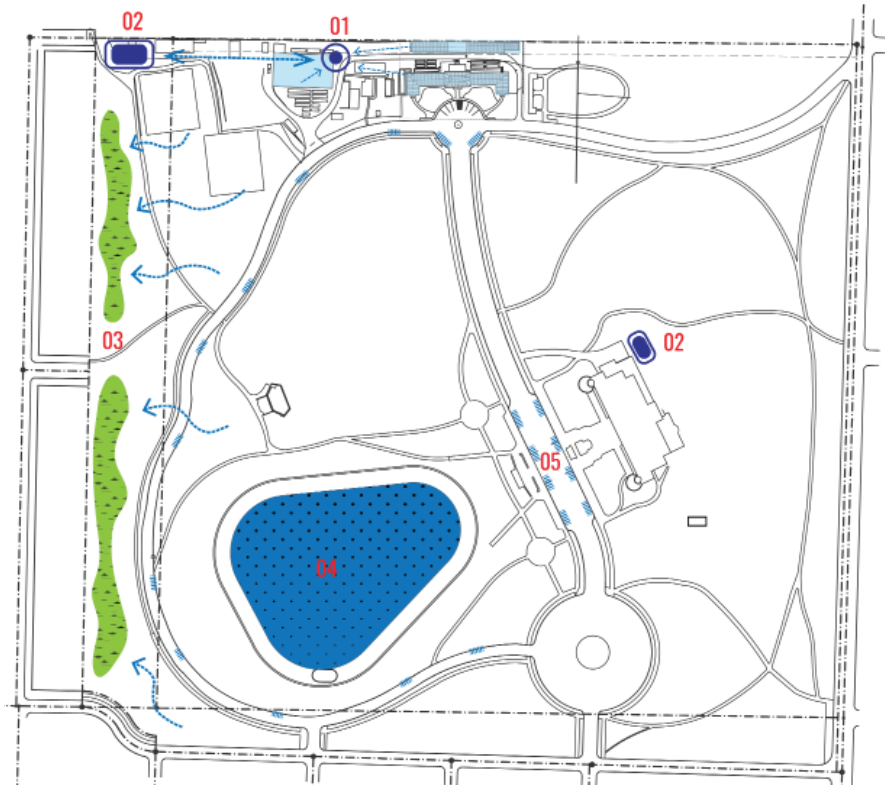
Currently

The storm water system for Volunteer Park, that includes the roads and buildings, captures rainwater in gutters and catch basins, and is piped separately from sanitary sewer through the Park. The storm water leads to a detention tank located in the NW area of the Park adjacent to the lower greenhouse. From the detention tank the storm water then merges with the sanitary system into a combined sewer.

Opportunity

About two-thirds of Seattle is served by a combined sewer system, which was designed to carry sewage and storm water runoff in a single pipe. Under dry weather conditions all sewage flows to the treatment plant. During wet weather conditions, however, storm water runoff is considerable and can cause the capacity of the combined sewer system to be exceeded. When this mixture of storm water (about 90%) and raw sewage exceed the pipe's capacity, it results in a combined sewer overflow directly into Puget Sound. This is very harmful to the environment, and eliminating CSO's (Combined Serwer Overflows) is a goal of the City and Parks.

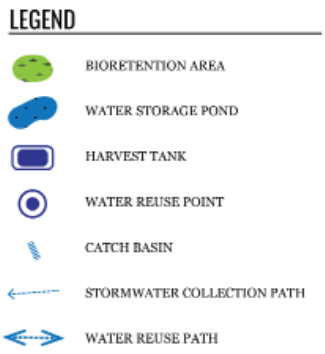
With 48 acres of Park space, we see an opportunity to treat storm water on site utilizing Low Impact Development strategies and eliminate over 2 million gallons of storm water runoff from the CSO each year.



Catch basins for current storm water system.

Improvement Measures:

- Rainwater harvesting (01) from glass rooftops and reuse for toilet flushing and indoor irrigation at the Conservatory and Greenhouses.
- Rain harvest tanks and cisterns (02).
- Bio-retention / infiltration (03) in the form of bio-swales, raingardens or infiltration trenches.
- Storm water storage for irrigation (04) utilizing the existing reservoir infrastructure and pump house.
- Storm water treatment and detention upgrades (05).
- Cover outdoor compost, mulch, and soils bins, and provide containment per code.



Water Efficient Landscaping

Map from the Volunteer Park, Vegetation Management Plan.

Currently

Volunteer Park is a Registered Historic Landmark, and the Olmsted planting plan is covered in the landmark designation.

The Park consumes over 7 million gallons of water for irrigation purposes alone on average each year, the equivalent use of about 230 people.

Opportunity

The Volunteer Park Draft VMP (Vegetation Management Plan) from 2005 addresses both historic aspects of the park planting and the inclusion of northwest native species that will be more drought tolerant and require less watering.

Improvement Measures:

- Repair the leaking irrigation system. (Currently in progress)
- Improve irrigation system with appropriate irrigation zones for the various plant species.
- Continue with work parties to remove noxious weeds, and plant appropriate species following the draft VMP.
- Deduct meter. Now that utility billing has changed for Parks citywide to be charged for water consumed and water sent down the sewer system, a deduct meter will measure the water used for irrigation purposes and deduct that from the sewer portion of the bill. The Park irrigation appears to be deducted, but further opportunities in the greenhouses may still exist.

Light Pollution Reduction

Globe street lamps without night sky cutoff.

Currently

The exterior lighting for Volunteer Park is entirely from street lights with either a single globe, or multi globes as shown in the photo. These historic streetlights line the roads within the park. The lamps for these fixtures are suspected to be a high efficacy type of lamp most likely High Pressure Sodium or Metal Halide. The entire globe is illuminated when the fixtures come on at night.

Opportunity

More efficient LED lamps could be retrofit into these fixtures that could also provide a higher CRI (Color Rendition Index) that is used to measure light quality. This would improve quality and save energy. Additionally, the lamp could be situated inside the globe to only cast light horizontally and downward with full night time sky cutoff. This helps to reduce light pollution and keep the sky and upper tree canopies dark, which is helpful for nocturnal animals that live in the park.

Improvement Measures:

- Replace lamps in light fixtures with high efficacy LED lamps.
- Increase the CRI for improved light quality.
- Full night time cutoff to reduce light pollution.

Currently

Parks utilizes very few chemicals either as a fertilizer or as a pesticide. In Volunteer Park there are no fertilizers used, as the gardeners want the plants to grow slowly. This is a mature landscape, and not one for production or crops. As a rule, pesticides are not used, except for noxious weed removals that are required.

Opportunity

The only pesticide used in the park is Round-Up which is from the Parks approved pesticide list.

Outdoor Chemical / Pollutant Control

Improvement Measures:

- Continue with work parties to remove noxious weeds, and plant appropriate species.
- Advertise efforts and educate the public about work in progress and making good plant selections to reduce the spread of invasive species.

Transportation

Currently

The lower loop road to the west is currently closed. This is done to encourage walking in the park, and to stem nefarious activity that occurs with parked cars along the road. The entrance road from Galer is a one way street that allows for parking adjacent to the wading pool and play equipment.

There is minimal bicycle parking in the park, at one location with an old style rack that only allows for front wheel lock up.

There are numerous bus stops adjacent to the park along 15th avenue. The sidewalk and curb cuts are present, but do not meet current development standards.

There is accessible parking available in front of the Conservatory and the Art Museum.

Opportunity

With anticipated development of the Band Shell and other amenities in the park, an overall review of traffic flow, and parking can take a holistic view at how each part of the park is affected by changes. By activating the edges of the park, the lower loop road would be more safe.

Decorative and functional bicycle racks can be installed in the park that will provide more spaces and allow for safe lock ups. Marked bike trails, paths, or lanes could also encourage safe biking in the park.

Volunteer–driven work parties to clean up the entrances into the park can make the park more inviting and accessible.

Loop road blocked.

Minimal bicycle racks for the park.

Bus stop does not indicate location.

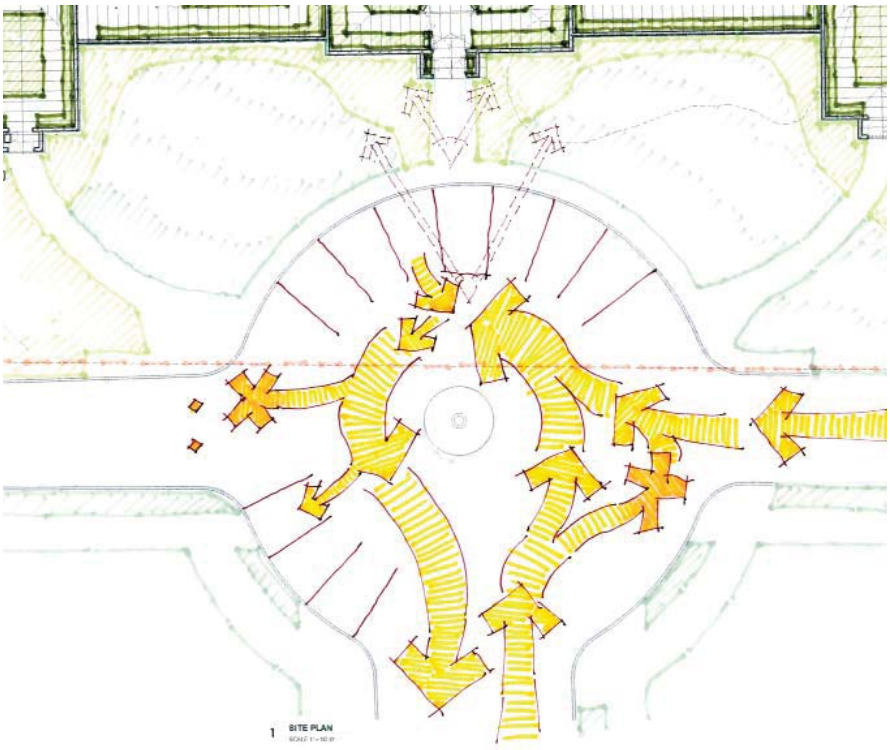
Transportation

Improvement Measures:

- Review traffic flow for the entire park.
- Provide additional and better bicycle racks near each of the amenities in the park.
- Provide bus route information on the Parks website.
- Install signage for the Volunteer Park bus stop.
- Provide better route from bus stops into the park.
- Provide better accessibility through the park both visually with pathways and signs, and by physically removing barriers

Bus stop and route to the Park are not accessible.

Decorative and functional bicycle racks..



Traffic diagram at Seward statue.

Innovative Wastewater Technologies

Currently

Waste water, both grey and black, is sent down the drain throughout Volunteer Park to the sanitary treatment facility.

Opportunity

There are numerous planned improvements throughout the park and some of the structures involved have restrooms. These new facilities whether public or not, could use innovative wastewater technologies such as composting toilets or even a waste water bio-treatment pond.

With 48 acres of space, there could be spaces in the park for a waste water treatment pond, or the spreading of compost in specified planting areas.

Improvement Measures:

- New restroom facilities should explore the implementation of composting toilets to determine if they make sense for proposed improvements.
- Explore the idea of a living machine, or on site bio-treatment pond.

Wastewater bio-treatment pond, located adjacent to the tables.

Waste water bio-treatment pond...

Water Use Reduction

Currently

The primary water use in Volunteer Park is for irrigation. The remaining facilities consume a small fraction of the water resources in the park.

Opportunity

The Volunteer Park Trust has initiated a project to improve the existing irrigation system for the park. The irrigation system is old, leaking, and needs repairs to the existing plumbing system, and relocation of sprinkler heads to accomodate growing and changing plantings.

Innovative wastewater technologies consume less water to operate.

Improvement Measures:

- Repair the existing irrigation system
- Improve the irrigation system by adding and relocating sprinkler heads
- Review during design use of composting toilets
- Specifying low flow fixtures

Rainwater Harvesting

Pump house and Reservoir.

Currently

Volunteer Park uses potable water from the Cedar River and Tolt River Watersheds for the domestic and irrigation needs. Melting snow and ice are gathered and stored in pool reservoirs created by dams. The water is released and then diverted into pipelines and pumped to treatment facilities. The vast majority of water used in the park is for irrigation purposes.

Opportunity

Typically, rainwater harvesting in Seattle provides too much water in the wet season and not enough in the dry season. However, inside the Conservatory and the greenhouses, watering takes place year roundproviding a use for captured rainwwater. Additionally, the indoor plantings, particularly the exotic and warm climate horticultural species that compose most of the Conservatory and greenhouse plant collection prefer, rainwater to treated water.

Improvement Measures:

- Collect rainwater from roof tops, particularly the glass roofs of the Conservatory and greenhouses.
- Utilize the recently installed stormwater system for the Conservatory to collect rainwater in cisterns for irrigation.
- Collect rainwater from the reservoir, the single largest impervious surface, and utilize as a storage device. The reservoir has an existing pump house that can be used to deliver water for irrigation throughout the park.

Grey Water Re-Use

Wastewater bio-treatment pond, located adjacent to the tables.

Currently

The lower greenhouse facility has showers, laundry, and sinks that drain directly to the sanitary sewer. The Wading pool located in the NE corner of the Park, uses approximately 1.7 million gallons of water each year (based on data provided by Parks). The pool is filled daily in the summer months and then drained each night directly to the sanitary sewer.

Opportunity

Grey water reuse is now legal in Washington state for subsurface irrigation. Since wading pool use coincides with the dry summer months, the drained water could serve as needed irrigation. Additionally, the water costs the city over $5 per CCF (centum cubic feet) and over $11 per CCF for the sewer. Reuse of this water could save nearly $30,000 per year on sewer alone and another $10,000 on water for irrigation each year.

Improvement Measures:

- Utilize the pump in the clothes washer for subsurface irrigation in demonstration garden.
- Route water drained from the wading pool to a cistern, where water my be pumped for sub-surface irrigation in the Park.
- Utilize the wading pool as a rainwater harvesting device in winter months and use collected rainwater for irrigation in the Conservatory.
- Install a pool filtration system to recirculate and reuse water for the wading pool.

Minimizing energy consumption and meeting energy demands with clean energy are essential to sustainable development. Passive energy strategies and use of efficient technologies will dramatically reduce fossil fuel energy consumption for Volunteer Park. The improved energy performance will lower operational costs and enhance comfort of park facilities.

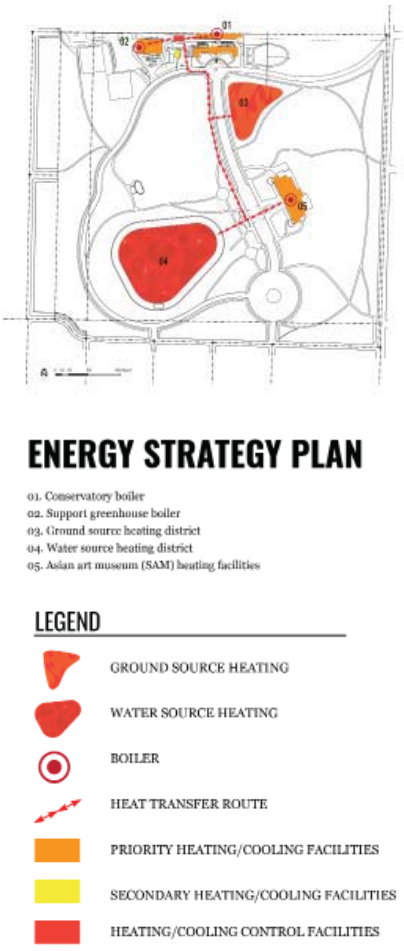
Site conditions allow for ground and water source heating and cooling opportunities (Energy Diagram Figure). These on site resources would supplement a majority of the conservatory gas fired heating needs as well as heating and cooling requirements for the Asian Art Museum. A review of heating load calculations for the conservatory depict large heating only loads which would be best served by a hybrid geo/ boiler arrangement. The best design for ground source systems are ones that are balanced or do as much cooling as heating. This helps regenerate the mean earth temperature. The Museum cooling opportunity addresses this need to a degree. There would be the opportunity at the Museum to heat, cool and generate domestic hot water. The stored reservoir water could also provide an additional source for cooling needs.

A ground source heating system built to 60-70% of the current conservatory load will typically produce heating that will match 90% +- of the entire heating season. This is a common practice with ground source system design. Implementing this approach would mean that the present boiler system would only be needed during the coldest days, which typically last no more than two weeks in the Puget Sound Region.

Ground and water heat pump systems are 300- 350% more efficient for heating and cooling using clean electricity as an energy source to run the equipment. The present gas fired boiler system in the Conservatory has an efficiency rating of 85%+- when manufactured and will continue to decrease over the years.

An integrated heating network would entail a common vertical loop field serving the two facilities. There is sufficient room in the grass areas for vertical bores to create the “Source” but there is also an opportunity to utilize the rain water retention pond as part of the source as well. Utilizing this opportunity has the potential to greatly diminish the number of vertical bores needed for the Source. For the reservoir, a series of stainless steel, closed loop heat exchangers under water would be used to capture the Source. In the buildings, existing mechanical systems would remain in each facility with only the hydronic water source being produced by the ground source equipment. There would need to be heat pumps installed at both building locations sharing the common piping systems within the buildings. The life cycle cost analysis of ground source heating/ cooling systems prove a good investment by means of less maintenance, longer equipment life expectancy and efficiency of use.

Optimize Energy Performance



Energy Use:

- Volunteer Park (month, January)
  $ 9,827
- Typical Household (year)
  $ 518 natural gas
  $ 1,427 electric
  $ 485 heat pump
- 20% savings of energy in Volunteer Park could power approximately 4 households with a heat pump for one year.

Green Power

Improvement Measures:

- Install solar panels on Potting Shed and Lower Greenhouse roof.
- Install solar panels on storage bin structures.
- Install solar panels on Art Museum roof below parapet out of view.
- Install solar panel art works or picnic shelters within the park on a permanent or temporary basis.

Currently

Although an energy consumer, Volunteer Park does not generate any power on its own in the 48 acres that it occupies.

Opportunity

More than an acre of space behind the Conservatory is outside of the public view and access. The back of house area features support buildings and facilities that are necessary for the operation of the park. Within this area are rooftops, and required storage cover structures that could provide a mounting surface for solar panels without interfering with the Olmsted designed park.

Community solar may be a possibility allowing for individuals to invest in renewables to help fund the project and receive potential tax incentives and rebates.

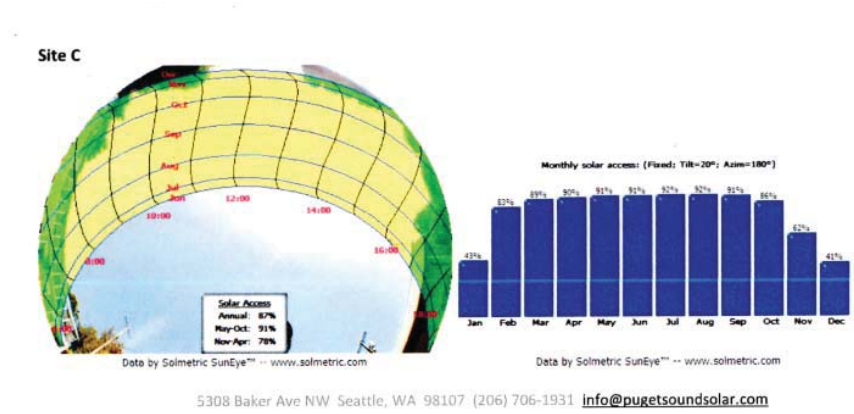
Example of solar panel structure.

Uncovered storage bins.

Energy - Water Nexus:

It takes energy to convey water and water is needed to make energy.

Discussion with Seattle City Light about the Green Up program that focuses on innovation brought to light the idea of micro-hydro. Energy production through a turbine located in a water or irrigation main. Could there be an opportunity at the Volunteer Park Water Tower?



Solar analysis for selected sites.

Conservatory

Currently

The Conservatory is a historic glass and metal structure with a concrete foundation that can not be altered. The heating system utilizes gas fired boilers and exposed large diameter pipes for the hydronic heat distribution. The controls are both pneumatic and DDC (Direct Digital Control).

The storm water is collected in gutters and downspouts from the glass roofs, and piped to the underground detention tank in the NW corner of the property.

Opportunity

The system controls are having difficulty managing the heating and cooling in the Conservatory. It has been observed that often the heat is on, while the operable vents are open. One of the issues is the leaking pneumatic tubing that will not allow for the pneumatic valves in the heat system to close, as they fail open. The operable vents do not open far enough to allow for adequate cooling, which requires them to stay open longer.

The storm water pipes enter a catch basin adjacent to the lower greenhouse, where the rainwater could be diverted and then harvested in a cistern.

Improvement Measures:

- DDC controls for the heating and ventilation system throughout the building.
- Linear actuators for operable sash throughout the building to properly vent and cool the spaces.
- More efficient heating system with pre-warmed water from roof mounted solar water heating.
- More efficient heating with electric ground source heat pump, and back up gas fired oiler for extreme temperatures.
- Create a list of synthetic fertilizers and pesticides used for the plantings. Research less toxic alternatives.
- Rainwater harvesting of roof storm water.
- Use harvested rainwater for irrigation.
- Use solar water heater to pre-warm irrigation water for exotic and tropical plantings.

DDC controlled linear actuator.

Pneumatic actuator for vent sash.

Pneumatic actuator for heating system.

Storm water sewer system.

Lower Green House Facility

Fans, lights, and shade cloth

Heating misting systems.

Grow lighting.

Currently

The lower Green House Facility is a commercial growing type of production green house that supports the Conservatory.

Opportunity

Many of the systems are now in need of repairs, maintenance, or replacing. This provides an opportunity to seek out sustainable improvements.

Improvement Measures:

- Repair shade cloth.
- More energy efficient grow lighting.
- More efficient heating system with pre-warmed water from roof mounted solar water heating.
- More efficient heat distribution system with fin tube hydronic heat pipes.
- More efficient heating with electric ground source heat pump, and back up gas fired oiler for extreme temperatures.
- Create a list of synthetic fertilizers and pesticides used for the plantings. Research less toxic alternatives.
- Rainwater harvesting of roof storm water.
- Internal cisterns or tanks along building perimeter to the north that could also form an insulation barrier to reduce heat loss.
- Use harvested rainwater for irrigation.
- Use solar water heater to pre-warm irrigation water for exotic and tropical plantings.

Garbage / Recycling / Composting

Currently

There are three types of receptacles in Volunteer Park, two are for garbage and one is for recycling. The bins are located at various places around the park. Typically, recycle bins are adjacent to garbage bins, and sometimes garbage is by itself. There are no composting receptacles in the Park.

Opportunity

The opportunity to increase recycling exists if recycle and garbage are always next to one another, clearly labeled, and differentiated in some way that is consistent. Composting was discussed, and found to be problematic in past experiences, however this could be revisited in the future.

Improvement Measures:

- Provide an historic designed combined garbage and recycling bin so there is always a recycle bin adjacent to a garbage bin.
- Make the bin designs consistent throughout the Park, and the city.
- Clearly label them recycle and landfill. Allow expansion of the design to accommodate compost in the future.

Garbage and recycling cans.

Lone garbage bin, not historic and no recycle bin nearby.

Maintenance

Currently

The majority of the Park landscaping maintenance utilizes gas or diesel powered lawn mowers, leaf blowers, weed whips, and trucks.

Opportunity

Switching to electric battery powered devices could reduce the use of fossil fuels, fuel spills, emissions and odors, and noise in the Park. The equipment can be seen and even displayed (and demonstrated) when in use to educate the public about the equipment alternatives.

Improvement Measures:

- Electric powered equipment.
- Informational signage and display.
- Charge equipment with solar panels when not in use.
- Reverse flow and use batteries from equipment as emergency back up source to run facilities during power outages.

Spills happen...

It is common to spill a small amount of fuel when re-filling small motor equipment with handheld fuel containers. The fuel leaches into the ground and evaporates into the air contributing to greenhouse gasses and contaminating ground water. Over time the spills add up to a significant amount region wide.

Building Envelope | Thermal Performance

Public Structures:

Water Tower
Asian Art Museum
Conservatory
Comfort Station
Band Shell

Support Structures:

Reservoir - Pump House
Bus Stop Shelter
Irrigation Pump - House
Potting Shed
East Green House
West Green House
Lower Green House
Horse Barn
Covered Storage
Uncovered Bins - Soils / Compost / Mulch
Shed
Cottage
Quonset House
Lathe House
Shed
Cold Frames

Currently

There are over 20 buildings and structures in Volunteer Park. Most of these structures are over 25 years old and in need of maintenance, repair, or renovation. Each of these structures are unique and will need to be reviewed individually, as no one approach will work for all of the buildings.

This report primarily discusses the major structures that consume the highest percentage of the resources.

Opportunity

As maintenance and capitol improvement projects are proposed, a review and study of the existing building envelope and thermal performance may identify opportunities for improvments.

Improvement Measures:

- Building envelope analysis
- Energy modeling
- Solar electric or heating potential
- Rainwater harvesting potential.
- Stormwater management
- Universal accessibility

STRATEGIES | SUMMARY

MEASURE	INVESTMENT	
Sustainable Sites		
Storm Water Management - Lower Loop Road	$$	
Cover Compost, Mulch, Soil Bins	$$	
Remove Noxious Weeds, Plant Appropriate Species	*	Volunteer Activities
Install Deduct Meters	$	
Light Pollution - Re-lamp Street Lights	$$	
Add Bicycle Racks	$	
Provide Bus Route Info On Website	$	
Signage at Bus Stop for Volunteer Park	$	
Improve Pathways from Bus Stops Into Park	$$	
Water Efficiency		
Explore Composting Toilets for Rest Room Facilities	$	Research & investigation
Utilize harvested rainwater for flushing toilets	$	
Repair / Improve Irrigation System	*	
Specifying Low Flow Toilets	$	Parks standard
Rain Water Harvesting and Reuse	$$$	
Re-purpose Reservoir - Cistern, Water Source Heat Pump	$$$$$	
Grey Water Reuse for Subsurface Irrigation	$$	
Energy & Atmosphere		
Ground Source Heat Pump - Energy District	$$$$	
Solar Photovoltaic - Potting Shed / Storage Bins	$$	
Solar Heating - Potting Shed	$$	
Wind Power - Back of House Areas	$$	
Indoor Environmental Quality		
DDC Controls Conservatory	$$	
Linear Actuators Conservatory	$$	
Solar Pre-Heat Boiler System	$$	
Create a List of Fertilizers and Pesticides	$	
Solar Pre-Heat Indoor Irrigation	$$	
Irrigate with Harvested Rainwater	$$$	
Commission HVAC Equipment & Systems	$$	
Materials & Resources		
Historic Recycle and Garbage Bins	$$	
Electric Powered Landscape Maintenance Equipment	$$$	
Building Envelope Analysis	$$	
Energy Modeling	$$	
Universal Accessibility	$$	

1 - Low Development/Return 5 - High Development /Return

* Work In Progress

BENEFIT	POTENTIAL	DESIGN
Divert road water runoff	3	Historic controls
Meet stormwater code	4	Historic review
Water efficient landscaping, min. pesticides/fertilizers	3	VMP plan
Saves on sewer charges	2	
Reduce energy, improve quality and night sky	4	Historic controls
Encourage alternate transportation	3	Historic controls
	1	
	1	
Improve access into the Park	3	Historic controls
Reduce water consumption & sewer usage	2	
Reduce water consumption	2	
Reduce water consumption	4	
Reduce water consumption	2	
Reduce water consumption &	4	
Start early discussions about potential uses	5	SPU controls
Reduce water consumption & sewer usage	3	
	5	
Meet stormwater code, power water pumps	4	Historic review
Create hot water for irrigation or boiler pre-heat	3	Historic controls
Create energy	3	Historic controls
Conserve energy, improve performance	4	
Conserve energy, improve performance	4	
	3	
Create knowledge base, establish benchmark	2	
	2	
	4	
Conserve energy, improve performance	4	
Increase recycling and reduce waste	3	Historic Controls
	4	
	3	
	3	
	4	

** Highlighted measures are proposed for the feasibility study.

CERTIFICATION OPTIONS

Sustainable Sites Initiative

The Sustainable Sites Initiative (SITES®) is a program based on the understanding that land is a crucial component of the built environment and can be planned, designed, developed, and maintained to protect and enhance the benefits we derive from healthy functioning landscapes. Sustainable landscapes create ecologically resilient communities better able to withstand and recover from episodic floods, droughts, wildfires, and other catastrophic events. They benefit the environment, property owners, and local and regional communities and economies.

The SITES program offers a systematic, comprehensive rating system designed to define sustainable sites, measure their performance, and ultimately elevate the value of landscapes. The SITES Rating System can apply to development projects located on sites with or without buildings.

The U.S. Green Building Council (USGBC) has been a long-time supporter and stakeholder in the Sustainable Sites Initiative.

SITES

USGBC

- Recognized Certification
- Tangible Goals
- Scorecard

Project Name: _____ Project ID#:_____ Date: _____

SITES v2 Scorecard Summary

YES	?	NO	1: SITE CONTEXT		Possible Points:	13
Y			CONTEXT P1.1	Limit development on farmland		
Y			CONTEXT P1.2	Protect floodplain functions		
Y			CONTEXT P1.3	Conserve aquatic ecosystems		
Y			CONTEXT P1.4	Conserve habitats for threatened and endangered species		
			CONTEXT C1.5	Redevelop degraded sites		3 to 6
			CONTEXT C1.6	Locate projects within existing developed areas		4
			CONTEXT C1.7	Connect to multi-modal transit networks		2 to 3

0	0	0	2: PRE-DESIGN ASSESSMENT + PLANNING		Possible Points:	3
Y			PRE-DESIGN P2.1	Use an integrative design process		
Y			PRE-DESIGN P2.2	Conduct a pre-design site assessment		
Y			PRE-DESIGN P2.3	Designate and communicate VSPZs		
			PRE-DESIGN C2.4	Engage users and stakeholders		3

0	0	0	3: SITE DESIGN - WATER		Possible Points:	23
Y			WATER P3.1	Manage precipitation on site		
Y			WATER P3.2	Reduce water use for landscape irrigation		
			WATER C3.3	Manage precipitation beyond baseline		4 to 6
			WATER C3.4	Reduce outdoor water use		4 to 6
			WATER C3.5	Design functional stormwater features as amenities		4 to 5
			WATER C3.6	Restore aquatic ecosystems		4 to 6

0	0	0	4: SITE DESIGN - SOIL + VEGETATION		Possible Points:	40
Y			SOIL+VEG P4.1	Create and communicate a soil management plan		
Y			SOIL+VEG P4.2	Control and manage invasive plants		
Y			SOIL+VEG P4.3	Use appropriate plants		
			SOIL+VEG C4.4	Conserve healthy soils and appropriate vegetation		4 to 6
			SOIL+VEG C4.5	Conserve special status vegetation		4
			SOIL+VEG C4.6	Conserve and use native plants		3 to 6
			SOIL+VEG C4.7	Conserve and restore native plant communities		4 to 6
			SOIL+VEG C4.8	Optimize biomass		1 to 6
			SOIL+VEG C4.9	Reduce urban heat island effects		4
			SOIL+VEG C4.10	Use vegetation to minimize building energy use		1 to 4
			SOIL+VEG C4.11	Reduce the risk of catastrophic wildfire		4

0	0	0	5: SITE DESIGN - MATERIALS SELECTION		Possible Points:	41
Y			MATERIALS P5.1	Eliminate the use of wood from threatened tree species		
			MATERIALS C5.2	Maintain on-site structures and paving		2 to 4
			MATERIALS C5.3	Design for adaptability and disassembly		3 to 4
			MATERIALS C5.4	Use salvaged materials and plants		3 to 4
			MATERIALS C5.5	Use recycled content materials		3 to 4
			MATERIALS C5.6	Use regional materials		3 to 5
			MATERIALS C5.7	Support responsible extraction of raw materials		1 to 5
			MATERIALS C5.8	Support transparency and safer chemistry		1 to 5
			MATERIALS C5.9	Support sustainability in materials manufacturing		5
			MATERIALS C5.10	Support sustainability in plant production		1 to 5

YES	?	NO	6: SITE DESIGN - HUMAN HEALTH + WELL-BEING		Possible Points:	30
			HHWB C6.1	Protect and maintain cultural and historic places		2 to 3
			HHWB C6.2	Provide optimum site accessibility, safety, and wayfinding		2
			HHWB C6.3	Promote equitable site use		2
			HHWB C6.4	Support mental restoration		2
			HHWB C6.5	Support physical activity		2
			HHWB C6.6	Support social connection		2
			HHWB C6.7	Provide on-site food production		3 to 4
			HHWB C6.8	Reduce light pollution		4
			HHWB C6.9	Encourage fuel efficient and multi-modal transportation		4
			HHWB C6.10	Minimize exposure to environmental tobacco smoke		1 to 2
			HHWB C6.11	Support local economy		3

0	0	0	7: CONSTRUCTION		Possible Points:	17
Y			CONSTRUCTION P7.1	Communicate and verify sustainable construction practices		
Y			CONSTRUCTION P7.2	Control and retain construction pollutants		
Y			CONSTRUCTION P7.3	Restore soils disturbed during construction		
			CONSTRUCTION C7.4	Restore soils disturbed by previous development		3 to 5
			CONSTRUCTION C7.5	Divert construction and demolition materials from disposal		3 to 4
			CONSTRUCTION C7.6	Divert reusable vegetation, rocks, and soil from disposal		3 to 4
			CONSTRUCTION C7.7	Protect air quality during construction		2 to 4

0	0	0	8. OPERATIONS + MAINTENANCE		Possible Points:	22
Y			O+M P8.1	Plan for sustainable site maintenance		
Y			O+M P8.2	Provide for storage and collection of recyclables		
			O+M C8.3	Recycle organic matter		3 to 5
			O+M C8.4	Minimize pesticide and fertilizer use		4 to 5
			O+M C8.5	Reduce outdoor energy consumption		2 to 4
			O+M C8.6	Use renewable sources for landscape electricity needs		3 to 4
			O+M C8.7	Protect air quality during landscape maintenance		2 to 4

0	0	0	9. EDUCATION + PERFORMANCE MONITORING		Possible Points:	11
			EDUCATION C9.1	Promote sustainability awareness and education		3 to 4
			EDUCATION C9.2	Develop and communicate a case study		3
			EDUCATION C9.3	Plan to monitor and report site performance		4

0	0	0	10. INNOVATION OR EXEMPLARY PERFORMANCE		Bonus Points:	9
			INNOVATION C10.1	Innovation or exemplary performance		3 to 9

YES	?	NO	TOTAL ESTIMATED POINTS	Total Possible Points:	200
0	0	0			

KEY	
YES	Project confident points are achievable
?	Project striving to achieve points, not 100% confident
NO	Project is unable to achieve these credit points

SITES Certification levels	Points
CERTIFIED	70
SILVER	85
GOLD	100
PLATINUM	135

SALMON SAFE

NW - NGO

- Recognized Certification
- Local Program
- Renewable

Salmon Safe Certification

Volunteer Park has the unique opportunity to transform park management practices to help Pacific salmon thrive again in Puget Sound. The Salmon-Safe Certification Standards for Parks & Natural Areas is a guide for park management agencies interested in maintaining park systems that demonstrate environmental stewardship by protecting sensitive aquatic and upland resources, and enhancing salmon habitat. This program was developed in partnership with the city of Portland with the collaboration of many other Northwest municipalities. Salmon-Safe park and natural area certification is a system-wide approach that relies on a comprehensive evaluation of overall management policies and planning related to habitat and water quality protection. Proposed park modifications through utility updates/retrofits or facility operations should be in alignment with the four management categories:

1. Water use management (irrigation activities): Water withdrawals have the potential to adversely impact salmonid habitat, primarily by reducing instream flows. Impacts can be minimized by selecting alternative water sources that do not reduce instream flow.

- Identify water conservation measures (i.e. low-flow irrigation and irrigation operational changes) to reduce water consumption.
- Capture and reuse rain water at roof tops and other impervious surfaces to supplement on site irrigation and heating requirements.
- Re purpose the former reservoir to provide irrigation and heating water storage. Attention should be given to reduce evaporative loss and structural issues (i.e. cracks along the reservoir base) causing losses to the ground.

2. Storm water management: Urbanized watersheds have a higher percentage of impervious surfaces which results in increases flood frequency and water quality pollution.

- Zero storm water discharge goal. Maximize on site storm water infiltration and reuse.

3. Erosion and sediment control. Sediment delivery into fish-bearing water bodies is a major cause of habitat degradation, particularly for salmonid spawning areas. Stream bank erosion and upland surface soil erosion are the principle sources of sediment.

- Ensure there are appropriate park management protocols to prevent sediment from entering the park storm drain system.

4. Chemical and nutrient containment. Salmon survival depends on clean water, free from harmful levels of fertilizers, pesticides (herbicides and insecticides, fungicides, and other biocides), storm water runoff pollutants, and organic waste. These contaminants can travel long distances in storm water runoff, from park sites to receiving streams.

- Review and update the park pesticide and fertilizer operations and procedures. This may entail providing buffer zones near storm water catch basins, minimizing impacts from high risk pesticides, and reducing fertilization rates.

NEXT STEPS

Currently

Volunteer Park Sustainability Coalition is submitting for a City of Seattle Neighborhood Matching Fund for a feasibility study.

The study shall focus on water related improvement measures (highlighted in the summary page) such as on site stormwater mitigation, rainwater harvesting, collection and re-use.

The study will provide preliminary design and engineering calculations to determine feasibility, and extent of needed modifications to the historic landscape. The public process will explore these options with the project stakeholders to find acceptable solutions. The design and engineering will need to be sufficient to establish proposed project parameters with construction and maintenance costs for the purposes of further fund raising and grant applications.

Opportunity

The Neighborhood Matching Fund requires community support and participation. This next step will further demonstrate the capability of the Coalition to execute projects and build further support towards a more sustainable park.

Next....

- Neighborhood Matching Fund - Feasibility Study
- Fund Raising Campaign and Grant Applications
- Construction of Targeted Improvement Measures

Solar panels, decorative bike rack, and storm water bio-swale at Van Dusen Garden.

REFERENCES

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Appendix G, Map 1 - 3 Olmsted 1909 Preliminary Plan

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