

LAKE BALLINGER PARK: Transforming a Former Golf Course into a Passive Park

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This report is a collaboration among four unique University of Washington students: Vera Hoang, Tabitha Manalu, Cayla Stahley, and Jun Wang. This project and report are important for our educational growth. Each member of the UW Student Team is gaining a different set of skills for future development. Vera Hoang is considering a career in the field of environmental planning; therefore, this project helped her consider and visualize the planning process in a real world setting. Tabitha Manalu has a focus in water, sanitation and hygiene, and it has been beneficial for her to engage with different members of the planning community to discuss these issues. Cayla Stahley has a focus in non-profit management, and it was beneficial for her to learn to collaborate with a group of people with varying opinions and visions in the most effective way possible. Jun Wang is studying landscape architecture and has gained skills in teaching design to other team members.

Each member had different roles within the team dynamic. In order to be successful as a team, it was important to balance the overall workload (Table 1).

UW Team Members	Tasks	Skills/How we decided these roles
Cayla Stahley	Client Contact Presentation Lead Editorial Coordinator	Organization and communication skills. Experience with donor and client contact. Is proficient at writing and editing.
Vera Hoang	Meeting Facilitator Presentation Lead Editorial Coordinator	Leadership skills. Wanted to develop skills as a facilitator within a smaller group. Is proficient in writing, research, and editing.
Tabitha Manalu	Note Taker Evaluation Lead	Organization skills. Has experience creating charts and with project management.
Jun Wang	Information Lead Design Lead	GIS skills. Experience in landscape architecture. Has experience with Adobe Photoshop and Illustrator.

Table 1. Roles of each member of the UW Student Team.



Though not direct collaborators in the writing of this report, we would like to thank the members of the Mountlake Terrace Team: Edith Duttlinger, senior planner, Ken Courtmanch, Parks and Facilities Superintendent, Mike Shaw, Storm Water Program Manager, and Curt Brees, Assistant City Manager. All members of the MLT Team were critical in sharing their knowledge and experience with the City of Mountlake Terrace, Lake Ballinger Park, and general parks knowledge.

Marty Curry and Jill Sterrett, the instructors of CEP 460, also provided guidance as mentors for this project. We are thankful for their suggestions and encouragement.

INTRODUCTION

The subject of this report is a student team from University of Washington's involvement with Lake Ballinger Park located in Mountlake Terrace (MLT), Washington. This report includes a detailed description of the UW Student Team's involvement process, the research compiled, and the final products. This report and the project are important, not solely for our educational growth as students, but also because we are contributing new ideas for the City of Mountlake Terrace in order to provide inspirational options for the development of a successful passive Lake Ballinger Park.

In relation to the City of Mountlake Terrace, our project is useful because the park is considered a valuable new addition to the city itself; therefore it is very important to the community that many fresh, new ideas are presented as options. The Mountlake Terrace Team considers the UW Team a valuable resource in providing new perspectives that had not yet been considered for Lake Ballinger Park.

The reader can use this report as a detailed description of a project assembled by students from the University of Washington. The reader could also use this report as a case study for similar projects. This project serves as an excellent example for other student teams working with a professional client.

Another reason for a reader to use this report is if the ideas from the UW Student Team are eventually implemented, it could serve as a detailed history of how these ideas were formed.

First of all, we begin by specifying the purpose and scope of our project and explain our intended audiences. Then, we will describe our process from developing our project ideas to completing and presenting our final products. Next, the main portion of the report explains the research findings associated with the four components considered in this project: amenities, trails, shorelines, and fencing. Recommendations for each component will be made followed by our comprehensive recommendations when considering the interaction of the components in the future Lake Ballinger Park. Finally, we will conclude with ideas for further work that can be done using our research and recommendations.

EXECUTIVE SUMMARY

The City of Mountlake Terrace has recently acquired public space in the form of the former Lake Ballinger Golf Course. With public input, the City has decided to develop the former golf course for passive uses. In collaboration with the Mountlake



Terrace Team, we, the UW Student Team, were assigned the task of researching four different elements for the park: amenities, trails, shorelines and fencing, as well as providing combined recommendations to be applied to the future Lake Ballinger Park through presentations to the Recreation Park Advisory Commission (RPAC) and the City Council (in January 2014). Our work will be presented in the form of display boards, verbal presentations, and this written report.

The four types of amenities that were researched for this project were picnic tables, bird watching, public art, and amphitheaters or small scale stages. The appropriate trails for Lake Ballinger Park are intended for providing long-term recreational uses to all users throughout the year. Furthermore, the shorelines at Lake Ballinger Park should be selectively developed along the Hall Creek and Lake Ballinger to provide erosion control, environmental protection, and provide aesthetic human accesses to water. Lastly, there are four types of fences recommended for the Lake Ballinger Park. They are hedges, vines, wooden fences, and metal fences.

Overall, it is important to incorporate each element of the park as efficiently and synergistically as possible. Our recommendations for the future Lake Ballinger Park involve incorporating bird watching into the types of trails, green and hybrid shorelines, and fencing. Since Lake Ballinger Park's greatest assets are its wildlife and natural environment, amenities, trails, shorelines, and fences should be cohesively developed to complement each other. The result is a vibrant, welcoming space for all.

PROJECT SCOPE AND PURPOSE

The scope of the project was determined by the members of the Mountlake Terrace Team as well as the UW Student Team. Our purpose was to assist in the visioning of Lake Ballinger Park for use in the Park's Master Plan. We discussed how we could best contribute to the task at hand while recognizing that we are not experts on the topic, but are here to learn about working on a planning project first-hand. Through this project, we researched four different elements: amenities, trails, shoreline and fencing. We then expanded on and suggested approximately four different alternatives for each element. Then, we created display boards and presented our research and recommendations for these elements at the RPAC meeting on November 12th. These four elements represented the extent of our contribution to the Lake Ballinger Park Project. Elements that the UW Student Team did not address were proposed budgets for the project or step-by-step instructions on the construction process. Rather, we included detailed descriptions of where each of these elements could be located within the Lake Ballinger Park, along with clear group recommendations for the park.

BACKGROUND AND CONTEXT

This report is intended for all parties involved in developing the Lake Ballinger Park Master Plan along with users frequenting the Park. This audience includes Mountlake Terrace planners, park representatives, storm and water division, community members, and park visitors. The research compiled within this report illustrates the



diverse amenities, trail types, shoreline methods, and fencing options for the future Lake Ballinger Park with their advantages and disadvantages. General themes considered in advantages and disadvantages were: cost, maintenance, and longevity.

Lake Ballinger Park is located in the City of Mountlake Terrace which is 16 miles north of Downtown Seattle. The Park is currently two bookends on the north and east shores of Lake Ballinger; there is a set of playfields to the north and a fishing pier and boat launch to the south. A clubhouse resides between the playfields and the former golf course. We have been asked to help envision development of a passive park which would bridge these two bookends in the form of the 42-acre former golf course. When making our recommendations, we considered the playfield, former golf course, and the pier and boat launch as three components that make up one public space. Though the former golf course is not officially part of the Lake Ballinger Park description, we thought it best to think of the three parts of the park as one contiguous area since the former golf course connects the expanse of public space together. Hence, all recommendations are made with the knowledge that these three portions will be connected and considered one large park.

When considering potential development and implementation of amenities, trails, shorelines, and fencing for the site, there were multiple design constraints we had to consider: flooding, peat and soft sediment, wetland conservation areas, street runoff and passive use limits. First, history and the 100 year flood line indicate that Lake Ballinger Park will eventually flood. Thus, any development of the park must be considerate of major inundation events. Secondly, the nutrient-rich soils and constant flow of water in this area equates to peat and soft sediment. The peat can result in potential fire incidents and the soft sediment means mud and uneven traveling throughout the park. Thirdly, the park is riddled with wetland conservation areas in the form of ponds and Hall Creek which runs from east of the Clubhouse and down to the northern end of Lake Ballinger. These areas are to be unharmed and left as undeveloped as possible. Fourth, the storm water runoff from paved areas such as parking lots and streets may carry pollutants and sediments to the lake. Finally, previous open houses and workshops with community members have led to a decision to limit the park to passive uses only. According to the Mountlake Terrace Municipal Code, a passive park is

...land dedicated to the environmental preservation of the serenity and beauty of nature, its vegetation, woods and wetlands, bird and wildlife habitat, and scenic landscapes for enjoyment and educational opportunities, to include: nature trails; moderate picnic and playground areas for nonorganized play; and group activities compatible with quiet neighborhoods, churches, retirement and medical facilities, libraries, theaters of the arts, museums, and public buildings. ("Mountlake Terrace Municipal Code")

The playground and playfields and boat launch and fishing pier are considered active amenities. Active amenities usually require more maintenance than those that are passive. Because active amenities already exist, it is important that the former golf



course is transformed into a passive park. The new Lake Ballinger Park must be conducive to quiet, environmentally conscientious activities. We took into account these design constraints when researching and presenting options for the future Lake Ballinger Park.

PROCESS

In delivering new ideas for the future Lake Ballinger Park, the UW Student Team worked together with the Mountlake Terrace Team. This included bi-weekly meetings to discuss the potential park features and how they can be implemented in Lake Ballinger Park. Along with this, the UW Student Team conducted its own research and field studies of park amenities, trails and paths, shorelines, and fences using online sources, peer-reviewed articles, and other published materials. The field studies were taken at other parks in King County area – Mercer Slough Nature Park at Bellevue, Warren G. Magnuson Park at Sand Point, and Luther Burbank Park at Mercer Island.

Then, the UW Student Team provided the results of their research and studies to the Mountlake Terrace Team for feedback. After taking the feedback into account, the UW Student Team created the deliverables for the RPAC Meeting on November 12th. These deliverables consisted of four different display boards to present the Team's ideas for amenities, trails and paths, shorelines, and fencing. The audience, which was comprised of RPAC and community members, was attentive during the thirty minute presentation. There were also several inquiries raised regarding the park features afterwards from the community. As the presentation wrapped up, the community shared recommendations and comments with the UW Student Team. Our research results and recommendations follow.

RESEARCH RESULTS AND RECOMMENDATIONS

Amenities

Amenities are one of the four elements that we decided on based upon communication with the Mountlake Terrace Team and their outreach to the City of Mountlake Terrace. Through this section, we will discuss the process of narrowing down the four amenities that we chose, a description of their advantages and disadvantages and recommendations for Lake Ballinger Park.

Process

Through discussion with the Mountlake Terrace Team, we were able to narrow down four different types of amenities to focus on. These are as follows: picnic tables, bird watching, public art, and amphitheaters (or small scale stages).

The overall goal of this new park is to ease use for the citizens of Mountlake Terrace and the Mountlake Terrace Team. Once we decided on the four amenities that we would focus on, it was important for the UW Student Team to gain perspective from the Mountlake Terrace Team. We were able to gain insight through their experiences, and appreciate each of their wants and needs for the park. It was then that we were



able to be as accurate as possible when listing their advantages and disadvantages and provide recommendations, based on their unique perspectives.

Picnic Tables

The four different types of picnic tables researched include: wooden, thermoplastic coated, recycled plastic, and concrete. Wooden picnic tables are an obvious choice for discussion because they are extremely popular as a standard table type. Some of the key advantages are that they provide a natural look and feel. Moreover, they are the most comfortable type of picnic table ("Benefits of Owning a Picnic Table"). The disadvantages of this type are that they require frequent maintenance and are susceptible to rot and mold ("Benefits of Owning a Picnic Table").

Thermoplastic-coated picnic tables are important to consider because of their ability to withstand a variety of weather conditions with little to no damage. They are also attractive and durable while requiring little to no maintenance ("Benefits of Thermoplastic Coated Commercial Picnic Tables"). On the other hand, some disadvantages are that they are susceptible to vandalism and overall they are less comfortable ("Benefits of Thermoplastic Coated Commercial Picnic Tables"). After some discussion with Ken Courtmanch, the Facilities Superintendent, he stated that his experience with the thermoplastic-coated tables is that their plastic coating can be burned off completely with a torch of some sort. This was taken into consideration when researching the tables themselves.

Recycled Plastic picnic tables were considered because, as a group, we support products that are eco-friendly and believe that the City of Mountlake Terrace does as well. Along with that, these types of tables are longer lasting than wood, and there is no risk of rotting or splinters. They also require very little maintenance ("Recycled Plastic Lumber"). The disadvantages of these tables were hard to find because they are a relatively new revelation. Something we did find was that certain types of materials can irritate the skin and unfortunately, can cost more than thermoplastic-coated and wooden tables ("Recycled Plastic Lumber").

Lastly, there are concrete picnic tables to consider. In our research, we found that these tables are tip-, climate-, weather-, and vandalism-proof ("Concrete Picnic Tables"). We considered these great benefits until talking again with Ken about an instance when these same types of tables were picked up repeatedly until they crumbled into many pieces. It would seem that they are not vandalism-proof upon further reflection. A few disadvantages of these types of tables are that they are not as aesthetically pleasing, and they represent the highest cost ("Pros and Cons of a Concrete Table Top").

Bird Watching

The next amenity is bird watching. One of the reasons that we chose bird watching as one of my amenities is because the Mountlake Terrace Team was very supportive of it. Edith Duttlinger, a senior planner for the City of Mountlake Terrace, said that she had read an article that suggested that the City of Lynnwood was able to sell bird watching as a paid activity within one of their parks. Many community members of



Mountlake Terrace have stated that people would pay to bird watch within the Lake Ballinger Park because of the variety of birds and the terrain. After some research, we discovered that some of the birds you might see within the park are Dark Eyed Juncos, Black Capped Chickadees, Anna's Hummingbird as well as the Yellow-Rumped Warbler (Chase O'Neil, personal conversation). After presenting to RPAC, a citizen who lives near the park approached us and said that we should "add several varieties of hawks and Bald Eagles to our list of birds in the park." To dive into the advantages of bird watching, some are obvious such as the fact that it is open to people of all ages and physical abilities. Bird watching is an environmentally friendly pastime, easy to do, and no one can tell you that you are doing it wrong ("The Beauty of Bird Watching and Birding"). When we were researching disadvantages, they were difficult to find. The only real disadvantage of bird watching is that, in some cases, there is a risk of humans disturbing the birds' habitat (Chase O'Neil, personal conversation). We feel that this can be easily rectified by signage and fencing to block people off from sensitive areas.

Public Art

Public art would be an incredible addition to Lake Ballinger Park. Some advantages are as follows: public art can expose local artists within the Mountlake Terrace or Seattle community. Public art also helps green spaces flourish, and it encourages passion for the arts within adults and children. Some disadvantages include overall expense. Public art requires a clean, open space, and it needs maintenance and resources to keep it safe ("My APA").

Amphitheaters

Finally, amphitheaters would be a great addition to Lake Ballinger Park because amphitheaters inspire community building and creativity within kids and adults alike ("Category"). However, after researching this element of the park, we realized the main disadvantage was a difficult one to overcome: the high cost. The types of amphitheaters that we were researching ranged anywhere from \$1,500 to \$30,000 ("Category"). This, we feel is outside of the Lake Ballinger Park budget. With these ideas in mind, we will now move into a discussion of recommendations for the Lake Ballinger Park based on these four unique amenities.

Recommendations

Picnic Tables

Our recommendations for picnic tables for Lake Ballinger Park are wooden and thermoplastic-coated. The reason that we suggest wooden picnic tables is based off of our discussion with the Mountlake Terrace Team. Even though the obvious disadvantage of the tables is that they will rot and mold when in contact with water, it would be easy to find and replace those materials. The MLT Team was excited about their use in the park. Overall, we recommend wooden tables because of their ease of replacement. The second table that we recommend is the thermoplastic picnic tables because of their overall durability. If we discount the possibility of vandalism, these



tables are long-lasting and require little maintenance. They are also the most popular table to be found within most public parks ("Benefits of Thermoplastic Coated Commercial Picnic Tables"). It is important to note that these recommendations can be applied to benches as well.

Bird Watching

Our recommendation in regards to bird watching is defined in two parts: interactive displays and bird blinds. Interactive displays are an excellent way to engage community members old and young alike. They can also make for a great community-building project depending on how the display is procured. For example, have a student group or Boy or Girl Scout troop assemble the display. Bird blinds translate bird watching into a tangible activity because they provide a designated space for the activity to take place. This is where you may be able to charge community members to use/ reserve these bird blinds for different bird watching groups in the area. Each of these recommendations comes from discussion with the MLT Team.

Public Art

In terms of public art, we recommend sculpture made out of concrete or cast stone. Cast stone or concrete is most weather-resistant and vandalism-resistant and sculpture is usually made out of these types of materials (Sexton). The other half of our recommendation for public art is attached to this report (Appendix 1). We were able to procure this document which illustrates the public art implementation process from the City of Olympia. This document calls for interested individuals to contribute suggestions for public art to be placed outside of the firehouse in downtown Olympia.

Amphitheaters

Our suggestions for amphitheaters came from discussion with the MLT Team. We decided that a smaller scale stage than standard would be ideal for the Lake Ballinger Park. It would cost less and would still serve the needs of the community members. Not much information was available, but more research needs to be done on this topic.

Trails and Paths

Next, we will list and analyze four general options for recreational trail surfaces, possible locations of pathways, as well as connections between park trails and the existing and proposed interurban routes surrounding Lake Ballinger Park. A trail system can be considered the principal structural element of a designed site. It plays an important role in visitors being able to explore the space from social, aesthetic and environmental perspectives. From a functional and a design perspective, creating sustainable trails are the foundation to a successful site. The primary considerations of sustainable trails are:

- Adaptation to local environment
- Trail related activities meets users' needs
- Low maintenance



We decided to research four trail surface materials and will discuss each of their advantages and disadvantages, as well as their possible locations for installation.

Process

As aforementioned, the Park's proximity to Lake Ballinger makes it subject to flooding during high discharge periods. Under these flooding conditions, the valuable waterfront view comes at a high price. In terms of the Park, high maintenance and repair costs are likely if inappropriate surface materials are applied. In this case, permeable surface is not necessary to consider. Materials which have consistent and dense particles could lower the risk of washing out during flood events.

Concrete

Concrete is one of the most common materials in urban areas. They can provide the hardest, smoothest, and longest-lasting surface for all uses. After proper design and installation, the lifespan of a concrete trail can last up to 25 years. Concrete trails within a set range of grading are able to provide the best Americans with Disabilities Act (ADA) surface, and provide a high quality surface to all types of wheeled activities. In addition, concrete will not get washed out or break apart in flood zones (Saitta and Snyder, 2013) because they are able to keep consistent and clean surface after rains.

The high cost of concrete trails is often been considered as the most unfortunate limitation since they are the most expensive material to install and repair. When using concrete in a natural setting, the bright grey color of concrete rarely corresponds to the look and feel of the environment.

Asphalt

Asphalt is a cheaper option compared to concrete. It is appropriate for a wide variety of trail uses, ages, and abilities. When installed correctly, asphalt trails will have a lifespan less than half of a concrete trails (Anasazi Trails). Asphalt trails can last from seven to ten years on average and are usually applied thinner than concrete when used for trails. As a result, they are more susceptible to damage caused by weathering and plant rooting. Building an asphalt path requires a rock base. Later on, it will require constant maintenance, such as crack patching and filling. Building an asphalt trail can also cause possible environmental contamination during construction. For instance, the initial excavation in order to provide an adequate rock base depth could be a disruptive factor for tree roots. Today, more types of permeable asphalt are widely applied to solve the problem of non-permeable trail surfaces (Anasazi Trails). Recycled asphalt materials are also becoming popular recently, including Recycled Asphalt Products (RAP), which reuses old recycled asphalt or glassphalt which uses recycled crushed glass as an aggregate substitute (Anasazi Trails).

Gravel

Gravel and crushed rock trails can add a natural feel to the site. The raw material of gravel could complement the aesthetic appeal of the natural landscape. If gravel is



mixed and compacted properly, it can hold up under heavy use and accommodate most trail users except all wheeled activities, such as biking, skating, and wheelchairs. Gravel trails require high and ongoing maintenance costs and it is difficult to maintain consistent surface quality after heavy rains. Also, gravel trails are difficult to use in wet conditions (Saitta and Snyder, 2013).

Boardwalk

Boardwalks have the highest aesthetic value compared to the previous pathways mentioned. They can provide access to unavoidable wetland areas and provide trails in areas where grading and filling might affect plants and wildlife habitats. Boardwalks are not required for every wetland, and even a small section of boardwalk can open up wetland education opportunities to the community, and increase the public's interest to wetland restoration. Boardwalks might be used to facilitate bird-watching, ecotourism, and educational activities at all academic levels (Kusler, 2013). However, the construction cost of boardwalks is very high; boardwalks are the most expensive material per mile to build. Additionally, during winter months, the wooden surfaces of boardwalks might become slick and even grow moss. Though this is a distinct disadvantage, this problem could be solved by adding hardware cloth.

Recommendations

Boardwalks and trails should be combined in Lake Ballinger Park. In consideration of flooding and physical conditions of the site, concrete trails are highly recommended, because of their high quality surface and low maintenance cost. Concrete trails can be designed as loops meandering through the park connecting points of interest and providing visual access to the ponds and the Lake. In addition, boardwalks could be placed in some areas adjacent to the ponds or shorelines, giving opportunities to explore the ecosystem of the site. The following section will detail types of shorelines and our recommendations.

Shorelines

Shorelines are important because they are the interface between humans and bodies of water and they serve many functions (Canning and Shipman, 1995). Factors to be considered when planning shorelines are:

- Erosion control and stabilization
- Habitat preservation, restoration, or enhancement
- Human access, view corridors, and aesthetics

First, erosion control and stabilization are essential to shorelines because more erosion means less waterfront land. Erosion and destabilization are primarily caused by "wind driven waves and to a lesser extent by wakes from boats" (Bosch et al., 2006). When shorelines are not properly protected, these waves cause the shorelines to slump, become removed, and settle on the shoreline bank as sediment (Bosch et al., 2006).



In addition to being considered for human property, shorelines should also account for ecosystems' overall function. Shorelines serve as important habitat for wildlife because they harbor important species that contribute to the ecological function of the system. For example, native plants near the shorelines are important because their roots provide soil stabilization. In addition, plants provide shade (to moderate water temperatures) and habitat for insects which serve as an important food source for aquatic creatures such as fish ("Wildlife Habitat Incentive Program"). In addition, diverse sediment types near shorelines are required for beach replenishment and fish spawning. Providing habitat for fish and birds that rely on the environmental resources at Lake Ballinger Park is vital ("Bulkheads and Shore Stabilization").

The third factor to consider when developing shorelines is public access, view corridors, and aesthetics. For a public space such as Lake Ballinger Park, it is important to consider how humans can utilize and interact with the space.

When all three of these factors are considered and implemented, a vibrant and successful public space is born.

Process

Shorelines were chosen as a major component to consider in the Lake Ballinger Park design because there are several water-related areas around the site. Lake Ballinger Park currently has multiple shorelines including those flanking the multiple ponds on site, Hall Creek, and the Lake itself. The Park's shorelines are largely undeveloped except for the boat launch and fishing pier where previous erosion control methods such as bulkheads (e.g. tires filled with cement) and grass pavers have been used. When considering any shoreline development at the former golf course, our team decided it was important to consider existing site conditions such as the overgrowing vegetation including invasive species and the soft, mushy character of the ground at the site. We also viewed the current shoreline access at the boat launch and fishing pier as part of the entire Park's shoreline system in making recommendations for the former golf course.

Upon conducting research and consulting the Mountlake Terrace Team, it became apparent that erosion control, environmental protection, and human access were major areas of concern when considering any shoreline-related changes for the site.

When comparing different types of shorelines, it became incredibly obvious that all shorelines are not created equal. In fact, when analyzing the advantages and disadvantages of shoreline types, it became apparent that there is a spectrum of shoreline practices from most preferred to the least preferred. The following is a comprehensive review of shoreline methods followed by our recommendations for the future Lake Ballinger Park.

Hard Shorelines

Hard, structural shorelines are "shore erosion control practices using hardened structures that armor and stabilize the shoreline landward of the structure from further



erosion” (“Shoreline Management”, 2012). These hard shorelines usually take the form of bulkheads, sea walls, rip rap, and stone reinforcements. They are generally made out of large logs or wood pilings, rebar, concrete, and stones (“Bulkheads and Shore Stabilization”). Hard structural shoreline methods are usually used in high wave energy environments where they slow landward erosion rates (“Shoreline Management”, 2012). Though they can last up to 25 years and require little maintenance, hard, structural shorelines have several drawbacks.

Disadvantages of hard shoreline methods include increased shoreward or beach erosion, loss of vegetation, shade, and sediment for wildlife, no human access to water, an intense permitting process, and high cost (“Bulkheads and Shore Stabilization”, “Green Shorelines”). Some tires filled with concrete remain at the Lake Ballinger boat launch and fishing pier.

Soft Shorelines

Soft, non-structural shorelines are defined as “shore erosion control and restoration practices using only plantings or organic materials to restore, protect or enhance the natural shoreline environment” (“Shoreline Management”, 2012). These shorelines manifest as vegetative plantings, beach nourishment, and organic fiber logs and mats. Common materials include native plants and live dogwood or willow stakes, bamboo coir, and sand (“Green Shorelines”). Bioengineering techniques such as live revetments and fascines are currently most ecologically accepted. Live revetments use geotextile fabric secured with live stakes to stabilize steep banks. Fascines, bundles of live branches tied together with twine, are buried and staked in trenches parallel to the shore. Fascines provide structural support and keep sediment from traveling upslope. Both of these bioengineering methods provide environmental ecosystem longevity and a natural aesthetic because they provide initial structural support, but also long-term stabilization; the live stakes will grow to become plants and establish their own roots (“Green Shorelines”). Though soft, non-structural shorelines are most effective in terms of shoreline environmental protection, they do require regular vegetative maintenance, sand replenishment about every 5-10 years (if applicable), and skilled labor (“Green Shorelines”, “Shoreline Management”).

Hybrid Shorelines

Hybrid shorelines are those that combine hard, structural techniques with soft, non-structural techniques. One example of a hybrid shoreline is a bulkhead in combination with the installation of native plants along the bulkhead’s edge. In this scenario, the bulkhead would, like hard shoreline methods, provide landward erosion control and, like soft shorelines, provide environmental protection. However, over time, shoreward erosion would increase and regular vegetative maintenance is still required. Depending on construction, human access to water can be limited.

Another example of a hybrid shoreline is a setback bulkhead where the bulkhead is placed back from the water line and gravel, sand, and plants are used to fill the space between the waterline and the bulkhead. This scenario allows for protection during large



storms. By setting the bulkhead back a few feet, the ecological function can be drastically improved because gravel, sand, and plants naturally absorb and dissipate wave energy (“Green Shorelines”). Therefore, setback bulkheads decrease landward and shoreward erosion, in addition to improving the environmental conditions.

One final example of a possible hybrid shoreline is grass pavers. Grass pavers are used to facilitate grass growth in otherwise non-growing locations. They consist of sand, and gravel of diverse particle sizes topped with a plastic, usually honey-combed grid called a paver on top. Within the grid’s compartments, soil is deposited, and the grass is allowed to grow. Grass pavers are designed to withstand heavy loads and are commonly implemented to provide a more natural feel in parking lots and fire stations (“Grassy Pavers”). In addition to their aesthetics, grass pavers require little maintenance and they allow direct access to water if placed near a shoreline. However, there is not much information on grass pavers’ success along shorelines or any information on their permitting process along shorelines. Finally, one major drawback is high maintenance and installation costs (“Grassy Pavers”). A small portion of the area adjacent to the boat launch is still made up of grass pavers. However, several sets of pavers have dislodged and have sunk to the end of the boat launch.

Recommendations

Considering the spectrum of possible shoreline implementation techniques, we recommend hybrid and soft shorelines or what many refer to as “green shorelines” for Lake Ballinger Park for several reasons. First, we understand that the lake floods periodically, but is consistent in its low wave action. Thus, green shorelines would be adequate to control erosion; strictly hard structural shoreline methods are not necessary and are not recommended by our team. Secondly, Lake Ballinger’s former golf course is largely undeveloped and will be used as a passive park where people can interact with nature and have a low impact on the environment. Thus, green shorelines are the priority shoreline development method because they would take into account the ecological impacts of the shoreline habitat for wildlife and are aesthetically appealing enough to invite humans to interact with the environment.

Overall, the vegetation along the lake needs to be better maintained, and the invasive species need to be removed. Then, realistically, only a few accesses to water should be considered at Lake Ballinger Park since the boat launch is currently an extremely popular and vibrant space. To make it even more so, we propose removing the remaining bulkheads and establishing a live revetment since the area is quite steep and exposed to water.

To expand water access, we propose that water access sites are selectively chosen along Hall Creek, possibly a couple of ponds, and the Lake. For example, the old, rotted bridge along the Creek can be removed, and slope bioengineered with fascines to grant limited water access or at least a view corridor. However, since the Creek is so incredibly sensitive and the flow is low in many areas, we suggest limiting development to soft shorelines because human access will likely exacerbate the ecological sensitivity of the Creek. We also suggest implementing a setback bulkhead at



the northwestern section of the Park on the Lake. There is currently a very obvious desired path where people and possibly dogs have been accessing the water. A setback bulkhead would provide ecological function, provide erosion control, and optimize human access to the water.

Fences

Lake Ballinger Park has some natural areas which need to be protected including Hall Creek, which runs south from the residential areas at the north of the park, seven ponds, and Lake Ballinger itself. Since Lake Ballinger is located within an urban area, it faces certain urban runoff issues. Pollutants such as petroleum products, high fecal coliforms, and nutrients from fertilizers have contaminated the Lake in the past years. Furthermore, human disturbance along the creek and the ponds have still continued (Halvorson and Khan, 14). One method to protect natural areas of Lake Ballinger Park from pollutants and environmental degradation is to install fences around them. There are four types of fences which are applicable for Lake Ballinger Park, they are hedges, vines, wooden fences, and metal fences.

Process

Lake Ballinger Park used to be surrounded by forests before it became a golf course. Vegetation in the park consists of overstory trees, shrubs, herbaceous, flowers, and invasive species. Hemlock, Sitka spruce, aspen, big leaf maple, western red cedar, Douglas-fir, red alder, and black cottonwood are some trees grow in the park. Moreover, Douglas spirea and willow dominate the shrub layer. In addition, a mixture of perennial ryegrasses and bentgrasses dominate the herbaceous layer of the park (See Appendix 2 for a complete list of vegetation in Lake Ballinger Park). In addition, yellow flag iris can be found around the small ponds. On the other side, some invasive species, such as Himalayan blackberry, English ivy and Reed canary grass (See Appendix 3) (Halvorson & Khan, 8) grow along Hall Creek.

With the goal to turn this former golf course into a passive park, the use of fences will be necessary to protect natural areas within the park. Adding native vegetation (suitable to the ecology of the park) as natural barriers from human disturbances will fasten the autogenic repair of the park itself.

Shrubs & Deciduous Trees

Hedges usually made of evergreens which function as a formal border in a garden or a park serve as one of the four types of fences we researched. For Lake Ballinger, there are two families of plants that can be used as hedges, shrubs and deciduous trees. Two species of shrubs such as Red twig dogwood (*Cornus sericea*) and Swamp rose (*Rosa palustris*) will work well in the wetland conservation areas. Red twig dogwood is a form of informal hedge because its height only ranges from four to eight feet. Furthermore, it can live under the sun and shade. Its capability to live in moist soil is appropriate for the park. Furthermore, its vibrant colors will add aesthetic value to the park itself. It will bloom with white flowers in spring and its red stems will continue to



standout throughout the winter season. Nevertheless, these shrubs need to be regularly pruned every spring in order for the younger stems to deliver the vibrant color of Red twig dogwood (Tanner, 31). Swamp rose is a species of flower which is capable of living in moist to wet areas. It has pink blooms and will form thickets. This flower also has fruits which attract the birds. However, a disadvantage is that Swamp rose is susceptible to leaf spots and cankerworm (King County, 2013).

Two species of deciduous trees such as Oregon ash (*Fraxinus latifolia*) and Vine maple (*Acer circinatum*) will be suitable to protect Lake Ballinger from anthropogenic activities and pollutants. Both Oregon ash and Vine maple are able to flourish under shade and moist to wet soil conditions. As a deciduous tree, Oregon ash is a bird attracting tree, especially in relation to hummingbirds. In autumn, its leaves will turn yellow and will add to the aesthetic value of its surroundings. Oregon ash is also capable of holding stream banks and eroding soil together with its powerful roots. For Lake Ballinger Park, however, Oregon ash will most likely grow taller than any plant in the area since it can reach up to 70 feet in height. It also grows slowly when subjected to human disturbances. On the other hand, Vine maple can reach up to 25 feet in height. Moreover, its red-plum color will appear during autumn, adding to the aesthetic value of the park synchronously with the Oregon ash (King Conservation District, 2013).

Vines

Another type of fence which is applicable to certain areas of Lake Ballinger Park is vines. Vines are a form of living fences and they are used to cover wooden, metal, and chain-link fences. They maximize the display of flowers and foliage, which are tied up to the fence (Tanner, 58). Climbing roses (*Rosa* spp.) are species of flowers suitable for vines. Since they lack the tendrils of vines, they need to be tied up to a support such as a fence or metal trellis. Furthermore, *Rosa* spp. grow rapidly up to 20 feet, which will cover fences with flowers at a faster rate. Moreover, climbing roses are blooming from late spring through autumn. They come in four different shades such as white, yellow, pink, and red. On the other side, the old and dead canes of this plant need to be pruned after flowering to let the new branches grow. Since climbing roses are also susceptible to a plant disease such as rose blackspot, a fungicide spray may be needed (Ohio State University, 2013).

Wooden Fences

The third type of fence which is applicable to some areas in Lake Ballinger Park is the wooden fence. Using wooden fences will give a clearer border between protected areas and areas of amenities in the park. The look of wooden fences provides a rustic and traditional value to the natural area. However, for an area that is within the 25 year floodplain area, highly durable and weather resistant woods are required to build wooden fences. Cedar and Western Red Cedar woods are two examples of woods from the Pacific Northwest which can handle such challenging conditions (Beneke, 70).

Metal Fences



The fourth type of fence which is appropriate to border Lake Ballinger Park is the metal fence. Not only does this type of fence work as well as wooden fences in providing clear barriers between protected areas and area of amenities, metal fences are even more versatile. In order to lengthen their lifespan in a wetland areas such as Lake Ballinger, metal fences need to be painted to prevent corrosion (Beneke, 15). The types of metal fences range from the simple steel wire such as chain-link to wrought iron. Painting the metal fences regularly with oil based paints every ten years will keep the metal fence from rust and corrosion and different colors are aesthetically pleasing.

Recommendations

The location of each fence will be based on their applicability in Lake Ballinger Park. Hedges made from shrubs, such as Red twig dogwood and Swamp rose, will be best located around the small ponds in the park. This is due to their capability to live in moist to wet soils, which match the condition of soils around the six small ponds in the park. In addition, the deciduous trees, such as Oregon ash and Vine maple will be best located around Hall Creek and Lake Ballinger. They are able to hold stream banks along the creek and will help to filter the urban runoff before going into Lake Ballinger with their roots. Furthermore, vines and the wooden fences will be best used as borders in the eastern part of the park along Lakeview Drive. The soil conditions in this area are not as wet as the rest of the park because they are located on higher elevation. Using vines and the wooden fences will create a more natural sense for those who walk or drive along Lakeview Drive. Moreover, the metal fences currently installed at the northern part of the park adjacent to the residential area should be painted. By painting these chain-link fences green, a more natural aesthetic will be created while still maintaining a sturdy barrier between public and private areas.

COMPREHENSIVE RECOMMENDATIONS

Based on our assessments of amenities, trails and paths, shorelines, and fences, we can provide several recommendations to connect these elements together. These connected elements assist in envisioning the future Lake Ballinger Park and can be incorporated into its Master Plan. The recommendations are as follows:

1. Bird watching

Place bird watching amenities around the areas with plants that will attract birds such as Oregon ash and Swamp rose. Access to the creek and another lake access would be optimal in accommodating this amenity. Furthermore, wooden boardwalks should be built in conjunction with the open hybrid or green shoreline areas to allow access to birds that would otherwise be hidden from view by the vegetation.

1. Public art installment

Concrete or cast stone sculptures within the park should be placed adjacent to trails and other amenities. Appropriate installation of public art, amenities, and trails will decrease chances of vandalism and create a welcoming, creative atmosphere for visitors.

1. Hybrid and green shorelines



Lake Ballinger Park is special because it is a neighborhood park with waterfront views. Thus, to optimize access to water, all hybrid and green shorelines should be constructed with special attention to connections among the entrances and other amenities. It is important to have ADA accessible trails and boardwalks with adequate fencing that protects natural areas while also providing comfortable, inviting amenities such as picnic tables and bird watching. Effective concrete trails and boardwalks near the ponds or shorelines create opportunities to explore the ecosystem of the site.

1. Interpretive signs and way-finding

Creating interpretive signs for bird watching will inform the public possible birds they can spot at Lake Ballinger Park. They create awareness of the natural resources and wildlife within Lake Ballinger Park. In addition, way-finding along the trails and paths will lead people to their destinations: best locations for bird watching, enjoying open shorelines, and utilizing the Lake Ballinger Clubhouse.

Lake Ballinger Park is unique because of its proximity to the water. Thus, the water elements should be stressed while also protecting the natural areas. These are important components that attract people to the park. Therefore, the fences should serve to direct visitors, the trails should connect key elements of the park, and the amenities should compel visitors to relax and interact with the natural environment. All four components should be interconnectedly designed and placed to cultivate a vibrant, inviting space for visitors.

FURTHER WORK

After displaying the information boards of the four components at the RPAC meeting, along with gathering feedback from community members, there are several next steps towards completing the Lake Ballinger Park Master Plan. One next step in is for the Mountlake Terrace Team and RPAC to review and finalize different ideas for the four components presented. Then, the Mountlake Terrace Team could collect environmental data in order to create a site analysis and eventually a Master Plan for Lake Ballinger Park. This can also be accomplished by hiring professional contractors. Then, they can create a new series of detailed designs of the location of each park feature, such as where the plants, trails, benches, and art pieces should go. After design completion, the project will move into the construction process by hiring a professional construction team and bringing in a group of construction volunteers if possible.



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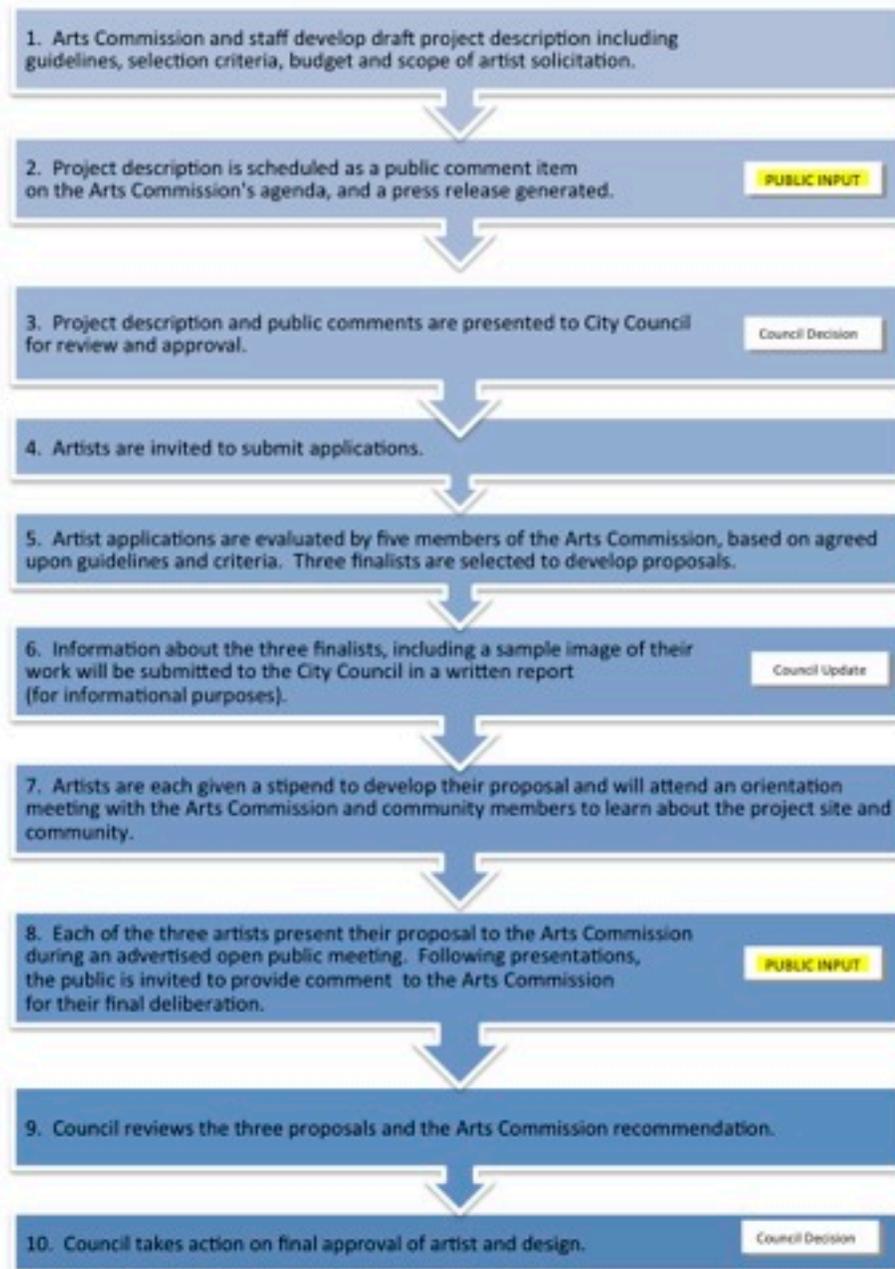


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APPENDIX

Appendix 1: City of Olympia Public Art Process



Appendix 2: Plant Species at Lake Ballinger Park

Table 1: Lake Ballinger Species List		
Emergent Layer or Canopy Plants		
Species	Location	Notes
Hemlock	Along Southeastern shore in thick forest	This tree is only present in the older forested area and is not found on other shores or on the island
Sitka Spruce	Along Southeastern shore in thick forest and a single adult on island	Very few juveniles of this species in forested area, no juveniles visible on island
Western Red Cedar	Along Southeastern shore in thick forest and a single adult on island	Very few juveniles of this species in forested area, no juveniles visible on island
Douglas Fir	Along Southeastern shore in thick forest and juveniles present periodically around shore and on island	This is the dominant tree species of the Southeastern shore and is among the few conifers with seedlings and young trees present on the island
Aspen	Located on Eastern shore along golf course, some young trees present on island	Appears to have been placed intentionally by landscapers at regular placements, no competition, as such
Black Cottonwood	Located along Eastern shore of lake, but also present periodically around other shores, none visible on island	Overhanging water and providing shade and cover for nearshore species, possibly competing with Willow
Alder	Located sporadically around lakeshore and clumped together along shore of island	This is the dominant tree species on the island and has numerous seedlings and suckers around the shoreline which are likely in competition with the island's everpresent loosestrife
Big Leaf Maple	Along Southeastern shore in thick forest	Provides large amount of shade and leaf litter for lower layer plants
Japanese Maple	Located in public park parking lot on Eastern shore	Placed decoratively by landscapers
Dwarf Plum	Located in public park parking lot on Eastern shore	Placed decoratively by landscapers



English Holly	A few individuals along Southeastern shore in thick forest	Invasive species introduced by European settlers, very difficult to get rid of
Understory or Shrub Layer Plants		
Species	Location	Notes
Bittersweet Nightshade	Northeast shore near stream inlet	Native vine takes advantage of other understory plants by climbing over them, extremely poisonous to humans
Willow	Periodically in clumps around circumference of lake, thickets on Northeastern shore near stream inlet	Provides shade over water and perching habitat for small birds
Lady Fern	Northeast shore of island	In shade beneath alders, severely inhibited by growth of purple loosestrife
Vine Maple	Along Southeastern shore in thick forest and in parking area and along Eastern shore near golf course	Native maple tree that typically forms majority of understory layer in this habitat, here disrupted by lack of historical forest and inhibited by growth of invasives
Douglas Spirea	Throughout shores and center of island and along Northeastern shore near golf course	Thick, continuous growths of tenacious shrubs, very thick cover makes it difficult for new forest floor species to colonize area
Himalayan Blackberry	Found in small patches around lake shore and a few stray vines on island	Invasive vine capable of building large piles of thorny scrub. Outcompetes other shrub layer plants, but also provides berries that are a food source to numerous species
Forest Floor Plants		
Species	Location	Notes
Sweet Flag	North shore in small clumps	Native marshgrass which provides habitat for many species, is likely in competition with cat tail grasses
Evergreen Blackberry	North shore of island in small patches of 3-10 vines	Competes with other forest floor plants, but also with other shrub layer plants, especially bittersweet nightshade. Provides berries that are eaten by many species
Aster	North and East shores in large bushy outgrowths	Invasive bush provides some shade over water, but prevents young native plants from taking root in its place



Mint	Northeastern shore in small bunches	Invasive, fast spreading, and toxic to some animals. Pleasant fragrance, but makes it difficult for other plants to colonize, also disrupts life cycles of some invertebrates
Canary Grass	Northeastern Shore	Invasive species known for clogging waterways and outcompeting native grasses and seedlings
Entirely Aquatic Plants		
Species	Location	Notes
Unknown Spear-Like Rushes	Found along Northeast corner of lakeshore and present in water up to several meters out	Provides aquatic habitat for snails and other invertebrates, as well as perches above surface for numerous flying insects. Appears to be in competition with cat tail grass and water lily
Water Lilly	Pervasive along all shores of lake and island up to several meters out from shore	No visible competition, provides tremendous amount of shade for young fish, amphibians, and invertebrates, also supports an algae culture on undersides of leaves
Richardson's Pondweed	In waters of lake 1-3 meters deep near shore	Native lakeweed, seems to provide cover for small fish and food for snails. Does not appear to be in competition with other lakeweeds
Common Mare's Tail	In waters of lake 1-3 meters deep near shore	Native lake weed seems to provide cover for small fish and food for snails. Does not appear to be in competition with other lakeweeds
Milfoil of unknown variety	In waters of lake 1-5 meters deep	It is difficult to tell if this is a native milfoil or an invasive European or Siberian milfoil. According to the books, one would need to be an expert and observe it in the flowering phase in order to tell

Source: Lombardo, 2012



Appendix 3: Location of Invasive Species at Lake Ballinger Park



Source: Halvorson and Khan, 2013

