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Lake Sammamish boat launch and parking improvement project

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ESTU 436: Environmental Impact Assessment
Huxley College of the Environment
Western Washington University

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Under supervision of Troy D. Abel

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Environmental Impact Assessment
Huxley College of the Environment

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Date 12/8/2009

Lake Sammamish Boat Launch and Parking Improvement Project
Environmental Impact Assessment-ESTU 436
Western Washington University
Huxley College of the Environment
Bellingham, WA

November 8th, 2009

Dear concerned citizens,

This environmental impact assessment was prepared by a group of students as part of a capstone course through Huxley College of the Environment at Western Washington University. One of the goals of the course is to simulate the Washington State Environmental Policy Act (SEPA) process (WAC, SEPA rules, Chapter 197-11). The purpose of SEPA is to prevent adverse environmental impacts from a proposed government action including issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. The first step in the process is to complete an environmental checklist to determine whether further environmental review is necessary. Following completion of the checklist one of three outcomes is possible which include a Determination of Non-Significance, Determination of Significance, or a Mitigated Determination of Non-Significance. If a Determination of Significance is reached than an Environmental Impact Statement (EIS) must be prepared to develop strategies to eliminate significant environmental impacts and identify alternatives.

The upgrades proposed to the boat launch facility at Lake Sammamish are being led the Washington State Parks and Recreation Commission as part of the Redevelopment and Restoration Concept Plan. The boat launch was built in 1970 and has not been significantly upgraded since and is one of the busiest in the state. The improvements include replacing existing pilings and docks, installing new abutments, adding trench drains, eight rain-gardens, and three Continuous Deflection System (CDS) units to treat stormwater.

Under the current proposal the upgrades made to the boat launch facility will not have negative impacts on either the natural or built environment but will provide an improvement from existing conditions. The main improvement will be seen in stormwater treatment because runoff that is currently untreated will begin to receive treatment prior to entering the lake. In addition, new floating docks will be put in place to benefit the public and users of the boat launch facility.

Sincerely,

Mitchell Olson Blair Buchan Karly McKee

Christopher White Brian Pickard

Fact Sheet

Title

Lake Sammamish Boat Launch and Parking Improvement Project

Project Description

The Lake Sammamish State Park Boat Handling Pier Replacement project proposes replacing the six boat launch piers with five new floating dock strings, and removing all creosote soaked pilings with 19 new steel pilings. Each of the five new floating docks will need a single precast concrete guide pile, which is located at the far end of each floating string of docks, and a new concrete abutment located on shore. There will also be improvements to the storm drainage system. The project proposes to install three CDS Units, eight rain gardens, 875 feet of trench drains and a new storm drainage outfall.

Location of Project Site

Lake Sammamish State Park
4460 East Lake Sammamish Parkway
Lake Sammamish State Park
King County, WA

Permits/Applications

State Environmental Policy Act (SEPA- approved 10/07),
Letter of Permission (LOP- approved 10/29/07, ID No. 200500557)
Nation Wide Permit No. 27 (NW27- approved 10/29/07, ID No. 200500557)
Hydraulics Project Approval (HPA- approved 4/10/07)
Shoreline Permit, King County (approved 9/12/07, ID No. L07SH004)
Building Permit, King County (date of application 7/1/08)
Joint Aquatic Resource Permits Application (JARPA- 8/11/08)

Lead Agency

Washington State Parks and Recreation Commission
7150 Cleanwater Drive S.W., P.O. Box 42650
Olympia, WA 98504-2650

Responsible Official

Western Washington University, Environmental Studies 436 students, Fall 2009

Authors

Blair Buchan-	Air, Environmental Health, Noise
Brian Pickard-	Existing Conditions, Alternative Action, Plants & Animals, Land and Shoreline Use
Chris White-	No Action Summary, Aesthetics, Recreation, Transportation, Socio-Economic Considerations
Karly McKee-	Proposed Action Summary, Earth, Historical and Cultural Preservation
Mitch Olson-	History and Background, Water

Date of Issue

December 1, 2009

Public Presentation Date, Place, and Time

December 1, 2009, WWU Haggard Hall room 153, 5 pm

Acknowledgements

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1. Executive Summary

The *Final Lake Sammamish State Park Boat Launch Environmental Impact Statement* (EIS) analyzes a range of alternatives and management actions for the proposed improvements to several piers at the Lake Sammamish State Park boat launch. This EIS assesses the impacts that could result from continuation of current management (the no-action alternative) or the implementation of any of two other action alternatives. Through this analysis the proposed alternative to replace the six piers at the Lake Sammamish Boat launch" has been identified as the preferred alternative for this EIS.

The general project location is at 4460 East Lake Sammamish Parkway in King County, Washington north of the city of Issaquah. The project area lies at the northeastern tip of Lake Sammamish State Park and is boarded on both sides by undeveloped shoreline. To the north of the project area Laughing Jacobs Creek and several other small tributaries flow into the lake. Deciduous shrubs and trees cover the shoreline within the immediate area, however within a quarter mile to the north of the boat launch there is residential development. To the south, the shoreline is densely vegetated with deciduous shrubs and trees. This southern area is part of a large wetland and natural area within the state park and shares a boundary with the existing boat launch action area.

The piers at the Lake Sammamish State Park boat launch have exceeded their useful life. Currently the six piers are old and deteriorating due to several main factors. During the summer months the piers receive consistent and heavy use by recreational boaters as currently the park is the most heavily used State Park in Washington. Secondly, the piers are fixed to six creosote treated wood pilings which do not allow for the piers to float. Due to the inability to float, the piers become submerged during winter months when lake levels reach their highest water levels. In addition, the connections between entrance ramps and piers have loosened over time. This has allowed for piers to change in position each winter.

The goal of the project is to replace the six deteriorating piers with new floating docks. This would be to improve year round use of the boat launch, improve safety of those using the docks and improve conditions for wildlife using both the near shore habitat and that on shore.

1.1 Historical Background

Initially, the land around Lake Sammamish was used for agricultural purposes. Areas now in State Park ownership were historically part of two large dairy farms- The Anderson Farm built in the 1870's and the Giese Farm built in 1898. The farms included a residence, barn, and milk house. In addition to the buildings, the farms played a significant role in altering the natural environment by clearing trees, channeling streams, and constructing an elaborate series of ditches to drain wetlands for pasture and haying. In 1942 Hans Jensen acquired the Giese farm and later donated it to the State Parks and Recreation Commission. The park's group camp area now bears his name in honor of his generosity.

Development of the park began around 1950 with the construction of swimming, picnicking, and group camping facilities at Sunset Beach. The second major phase of developing the park took place in the early 1970's with the construction of Swim Beach, the Rotunda and Kitchen Shelter group picnic facilities, ball fields, and the park boat launch. However since the 1970's the park has seen very little improvements.

The Lake Sammamish Boat launch is the busiest public boat launches in the state of Washington and is the only public launch that serves the lake with only one other private launch available for public use. Often times during summer weekend mornings, lines of vehicles wait for the launch gate to open at 6:00 am. Currently the handling piers and docks at the boat launch are in poor condition and are often underwater during the winter months because they are fixed and not floatable. Parking areas around the launch do not meet current standards for stormwater treatment and need to be upgraded to prevent adverse impacts to water quality.

1.2 Existing Conditions and Proposals

In 1970, Lake Sammamish State Park created a boat launch at the south end of Lake Sammamish. Lake Sammamish State Park is the most heavily used state park in Washington State and since 1970 recreational boating use has steadily increased. There were six piers created in an effort to enhance boating opportunities on the lake, however over the last forty years there has been substantial deterioration. The six piers were installed to creosote treated pilings which

inhibited the piers from floating and causes the piers to be submerged during winter months. Due to being installed below the ordinary high water mark the boat launch is subjected to deterioration every winter while it is submerged. Connections between the ramps and piers have loosened over time causing the piers to shift their position with every high water event. The boat launch consists of boat ramps, finger piers, and an associated parking area. Each of the nine submerged boat ramps are made of concrete slabs and a concrete curb separates the concrete slab from the asphalt parking lot. In 1993, the lake in the area of the boat ramps were dredged and concrete planks were installed at each boat ramp. Other than regular maintenance of the piers, no other action has been executed.

1.2.1 Proposed Action

The proposed action for the Lake Sammamish Boat Launch is located in King County, Washington and is to improve the launching area and install a stormwater treatment system. The location of this project is on the southeast end of Lake Sammamish, within the Issaquah city limits just south of the area. The boat launch project site has approximately 300 feet of shoreline, which is mostly paved and about 7.75 acres in size. It is located in the northeast corner of Lake Sammamish State Park, and has its own entrance from East Lake Sammamish Parkway Southeast. The boat launch has Laughing Jacobs Creek to its north and a large wetland to its south.

This proposed project by the Washington State Park and Recreation Commission is to replace the deteriorating wooden piers with new floating docks, with other minor changes to the remaining of the project area. This project will occur in two phases with the first phase including stormwater and parking lot improvements. The first phase will include the entire parking lot and installation of new concrete abutments past the ordinary high water. The work that will be included in the second phase consists of all work done in water and below the ordinary high water level, including the pier replacement. Specific construction activities associated with this project will include demolition, concrete formwork, pile removal and driving, landscaping of rain gardens, the installation of stormwater pipes and stormwater treatment units.

The construction that is associated with the improvements to the piers and boat launch area is everything excluding the stormwater treatment activities and the landscaping of the rain

gardens. The six existing wood piers will be dismantled and the 40 creosote treated wood pilings will be removed. Pilings that have been treated with creosote have been found to be one of many sources of polycyclic aromatic hydrocarbons (PAHs), which are a carcinogen (Chemically Contaminated Aquatic Food Resources and Human Cancer Risk: Retrospective 1991). There will be five new boat launch piers constructed and each boat launch pier will be made of three sections of 20 feet long floating docks anchored to the nineteen new steel pilings that will be replacing the creosote treated wood pilings. The pier farthest to the south will be a total of 100 feet long, using five sections of 20 feet long floating docks. The concrete curbing at the bottom of the six existing ramp abutments will be removed. Five new concrete abutments will be constructed above the ordinary high water level and five pre-fabricated gangway ramps will be installed to connect the new abutments to the floating docks. Other construction activities related to the boat launch improvements include the installation of a floating hazard logboom with anchor piles at the north end of the boat launch area and gravel being placed under the gangway ramps.

The other construction consists of the landscaping of the rain gardens and the stormwater treatment improvements and installations. It is important that the rain gardens be monitored and maintained. A study was conducted which found that the likely reason the rain gardens failed was due to a lack of maintenance (Asleson 2009). Construction activities related to these improvements consists of the construction of eight rain gardens, including their landscaping, installation of trench drains and stormwater piping, and the installation of three Continuous Deflective Separation (CDS) Units. To accommodate the trench drains, pipes, stormwater CDS Units, and rain garden areas of the current ramp and parking lot areas will be saw cut, removing pavement and then excavated. The only removal of materials related to these improvements will be a portion of the current pavement at the north end and a portion of the current stormwater pipe at the south end of the boat launch.

Numerous Best Management Practices are to be used, including weekly inspections of the areas disturbed by construction activities and of all stormwater discharge sites. It is projected that there will only be stockpiles of materials for a short-term, with the time dependent upon the weather. The trenches will be backfilled the same day of excavation and excavated materials will be transported off the project site. The total construction time is approximately three to four

months for phase one and two. With the use of BMPs and other preventative construction activities, the proposed action has a mitigated determination of non-significance (MDNS).

1.2.2 Alternative Action

This alternative action has been established to provide different possible options for the Lake Sammamish Boat Launch. The alternative action is located within the Lake Sammamish State Park in King County, Washington. The location is the same project area as the proposed action which resides on the south end of Lake Sammamish, consists of 300 linear feet of shoreline and totals roughly 7.75 acres in size. The project site is mostly paved and includes its own entrance. There are wetlands to the south which is a key focus for this alternative.

The proposed alternative would stay relatively consistent with the proposed project set forth by Washington State Parks and Recreation Commission but would include two additional changes to the overall plan. The original proposed project included wetlands restoration but was later stricken from the plan; it is proposed in this alternative that restoration to these wetlands to the south be incorporated. The wetlands area has been designated a “wetlands sensitive area” and provides suitable habitat for many plants and animals as well as provides a buffer between the heavily populated city of Issaquah and Lake Sammamish. The identified wetlands in the action area have been identified as waterfowl concentration areas, which is used by bald eagles. Currently the bald eagle is a species listed as threatened on the Endangered Species Act and restoration to the wetlands would increase the quality and size of their habitat.

Additionally, the proposed alternative would make small changes to the dock design by creating two docks in full compliance with the Americans with Disabilities Act (ADA), rather than have every dock designed for wheel chair access. These longer ramps protrude into the current loading zone and by limiting the total of docks in compliance with ADA there should be more room for users to load and unload their boats. It is anticipated that an increase in efficiency will be achieved through this action. New abutments and ramps will be constructed for the docks, with two of the docks having 6 feet wide and 24 feet long ramps to allow for easy wheel chair access. By only creating two wheel chair accessible docks instead of making all docks in compliance, the existing abutments can be repaired rather than replaced. This should minimize some environmental impacts as well as reduce cost for this aspect of the project.

Including these additions the proposed alternative will follow the same schedule, inspections, and overall plan of the proposed action. These small changes should not amount to additional time needed for the project scope as well as detract from the overall goal to repair the boat launch.

1.2.3 No Action Proposal

In the case where no action will be taken, the remaining parking facility and dock will continue to be used as the primary service for boat launching into Lake Sammamish. Discontent with the current state of existing docks will remain unaddressed and traffic congestion occurring on peak use days will not be relieved. In addition, the runoff and poor rainwater management systems from the existing parking facilities will continue to be potential contaminates to Laughing Jacobs Creek and the nearby wetlands.

1.3 Decision Matrix

Decision Matrix Impacts	
(++) – Strong Positive Impacts	(-) – Slight Negative Impacts
(+) – Slight Positive Impacts	(--) – Strong Negative Impacts
(Ø) – No Impacts	(?) – Unknown Impacts
(*) – Minor Impacts during Construction	

		Proposed Action	Alternate Action	No Action
Natural Environment				
Earth	Soil	*	*	Ø
	Slope	Ø	Ø	Ø
	Impervious Surface	+	+	Ø
Air		-*	-*	-
Water	Surface	++	++	- -
	Groundwater	Ø	Ø	Ø
	Water Runoff	++	++	- -
	Stream	Ø	Ø	Ø
	Wetland	Ø	+	Ø
Plants	Terrestrial	-	+	Ø
	Aquatic	-	+	- -
Animals	Terrestrial	Ø	Ø	Ø
	Aquatic	-	-	- -
	Endangered Species	-	-	- -
Built Environment				
Environmental Health	Environmental Health Hazards	*	*	Ø
	Noise	-*	-*	Ø
Land & Shoreline Use	Land Use	+	++	-
	Shoreline Use	++	++	-
Aesthetics		+	+	-
Recreation		+	+	-
Historical & Cultural Preservation		Ø	Ø	Ø
Transportation	Traffic	+	+	-
	Parking	Ø	Ø	Ø
Social & Economic Considerations				
		?	?	Ø

Determination		MDNS	MDNS	DNS

2. Natural Environment

2.1 Earth

Existing Conditions

The Lake Sammamish State Park boat launch is currently approximately 50 percent impervious surface and the remaining is mostly grass and gravel areas for parking, with few vegetated areas (PBS Engineering & Environmental 2008). The area is relatively flat, with a minor gradual slope to the boat launch area where the slope is the areas steepest. The area consisting of the launching lanes is approximately ten percent to accommodate for launching boats (PBS Engineering & Environmental 2005).

The Lake Sammamish boat launch has approximately two percent of Bellingham Silt Loam, which only exists under an impervious service, but is primarily located on Si Silt Loams soils (PBS Engineering & Environmental 2009). The Si Silt Loams where formed under hardwoods and grass, which consist of fairly well-drained soils in sediments deposited by water on stream terraces in close proximity to North Bend, Washington (King Conservation District). When the boat launch was constructed several feet of fill was placed over these native soils (PBS Engineering & Environmental 2008). The boat launch area seems to be free of any history of unstable soils and areas highly susceptible to erosion.

Proposed Action

The largest concern of the proposed action of improving the stormwater drainage system and the construction of the docks is erosion. Erosion is predicted to be minimal due to a number of Best Management Practices (BMPs) that will be incorporated throughout construction (PBS Engineering & Environmental 2008). Only limited amounts of grading will be needed for the construction of new abutments anchorages above the original high water (OHW), rain gardens and Continuous Deflective Separation (CDS) Units. The total acreage of the rain gardens is under 0.25 acres of the 7.75 acre project area and grading will be done to slightly slope the rain gardens to direct the flow of water (Neal 2009). Rain gardens have been found to remove up to 99% of the pollutant load from the water travel through the rain gardens (Emery 2006).

Treatment soil will be transported to the site for the rain gardens and grading will be done to keep slight slope. Any other soil fill to be used would come from excavated soils from the site itself, which would be used when replacing pipes to improve stormwater drainage (Neal 2009). When the creosote pilings are removed a clean sand and gravel mix will be used to fill the holes to the level of the lake bottom (PBS Engineering & Environmental 2008). Other fill will include the nineteen new steel pilings and seventeen 20 feet long floating dock sections, which will be provided by contractor from a local source (PBS Engineering & Environmental 2008).

During the construction there will be exposed soils during the installation of new pipes, trench drains, CDS Units and the building and planting of the rain gardens. After construction the rain gardens will continue to be susceptible to erosion due to wind, rain or water that is being moved through the rain gardens for further filtration. All these impacts will be minimal due to the use of several Best Management Practices.

Alternative Action

If the restoration to the adjacent wetland, south of the boat launch area was included, the natural element of the earth will be affected. With the restoration of wetlands it will increase the amount of excavation. Restoration of wetlands usually includes the removal of invasive species, planting of native species and installation of woody debris. All of these construction activities would increase the amount of excavation, leading to a possible increase of erosion. The possibility of erosion will be minimal due to the use of a number of Best Management Practices.

No Action

If no action is taken the slopes, soils and impervious service will stay the same. There will be no rain gardens, or improvements to the stormwater drainage system and the risk of erosion will continue to be low.

2.2 Air

Existing Conditions

Lake Sammamish in Issaquah, WA is located in an area that experiences temperate weather and mild temperatures. The surrounding environment is residential, commercial, and natural, with no major air quality concerns associated with any neighboring activity. The western side of the lake is far more developed than the eastern side, with small semi-developed mountains lying to the south

of the lake.

The majority of air odors are associated with recreational use of the lake in the form of watercraft motors. During the summer months, when use of the lake is at its highest and temperatures are also high, the least amount of rainfall occurs, resulting in moderate air quality. This is in contrast to the fall, winter, and spring months when air quality tends to be better due to increased rainfall and cooler temperatures.

Proposed Action

The proposed action would require the use of large construction machinery that emits small particulate matter into the air. Construction would result in minor exhaust and fugitive dust emissions, the quantities of which are unknown (during the months of construction the lake will be closed off to boaters, which would remove air pollution from watercraft temporarily).

Proposed measures to reduce or control emissions or other impacts to air include: replacing gravel parking areas with pervious paving systems in order to reduce dust from automobiles; using building materials and finishes that do not emit fumes or gases; and providing facilities and encouraging participants in park programs to use mass transit and carpool, thereby reducing exhaust emissions from vehicle trips in and out of the park (State of Washington 2007).

Alternative Action

The installation of signs along the roadway discouraging car idling would be helpful in encouraging park users to turn off their cars when waiting to reach the boat launch. During periods of high use, the line of cars waiting to use the boat launch stretches out beyond the stop light outside the park and down the main road. Reminding drivers to turn off their vehicles when waiting in line would reduce unnecessary emissions. Due to the use of preventative construction activities listed in the proposed action as well as the inclusion of installation of signs encouraging drivers to help lower emissions, the Alternative Action is sound.

No Action

The no action proposal would not affect air quality any more than the current conditions allow. Conditions on the lake would remain as they are, with regular use of the boat launch and the lake, and with highest use in the summer months. There would be no need for any construction machinery. The largest contributor to air pollution would remain the watercraft using the lake. In addition, cars would continue to idle in their vehicles as they wait to access the

boat launch, adding to the air pollution in the area. The no action proposal would have fewer impacts than the proposed or alternative actions.

2.3 Water

Existing Conditions

Currently, all water entering Lake Sammamish from the proposed site area is untreated. Water enters the lake as either overland runoff from paved surfaces adjacent to the lake or through one of two twelve-inch diameter drainage pipes that run from east to west. A total of thirteen catch basins are in place to feed the drainage pipes that dispense untreated water directly into the lake. Additionally, some water near the southern access road drains to the adjacent wetland. Tributaries near the site include Laughing Jacobs Creek which is located nearby to the north and Issaquah Creek which is one-half mile to the south.

Proposed Action

The proposal to upgrade the boat launch facility at Lake Sammamish will result in an overall increase in water quality treatment. Improvements will include installation of eight bioretention curb-enclosed rain gardens, three Continuous Deflection System (CDS) Units from Contech Stormwater Solutions Inc., 875 feet of trench drains, and a new storm drainage outfall. The construction of these water quality treatment mechanisms will occur in the first phase of construction and a Stormwater Pollution Prevention Plan (SWPPP) has been adopted from the Department of Ecology to prevent adverse impacts to Lake Sammamish water quality (PBS Engineering & Environmental 2008).

Eight sections of the paved parking area will be removed and excavated in order to construct the rain gardens resulting in a slight decrease in impervious surface area. Each rain garden will contain specific plant and soil types that promote pollutant removal or "filtering" when stormwater flows through the soil and comes into contact with the roots of vegetation. The rain gardens have been designed to prevent significant maintenance from being required. During the first two weeks after installation watering must be done to promote plant growth unless significant rainfall occurs. Also for the first two to three years periodic weeding should be done to prevent invasive weeds from disrupting filtration done by native vegetation.

The location of the rain gardens lies within the 100-year floodplain but in the event that the rain gardens become submerged water quality in the lake will not be adversely affected and

rain gardens are anticipated to perform well after full inundations. All rain gardens will be located above the ordinary high water mark (Stormwater Drainage System: Operations and Maintenance Manual 2009).

The three CDS Units will be installed to pre-treat stormwater from the west side of the boat launch parking area. The units are designed to screen, separate, and trap sediment, debris, oil, and grease from stormwater by a technique known as continuous deflection. Stormwater enters the separation unit where swirl concentration and screen deflection forces floatables and suspended solids to the center where they become trapped. Finally, the water moves under the oil baffle for further treatment before being directed to one of four rain gardens for primary treatment. Overall, the system results in 100% removal of floatables and neutrally buoyant material as well as meeting screening and TMDL requirements.

CDS Units require very little maintenance after initial inspections are made to ensure the devices are working properly. Following installation, the units should be inspected after each significant rain event for the first 30 days. During the rainfall season inspection should occur after the first six inches of rain has fallen and once every 30 days thereafter. Cleaning of the litter sump of the units should occur at the beginning and end of the rainfall season or as needed if visual inspection requires. The sump should be cleaned when approximately 75-85% full using a vactor truck (Stormwater Drainage System: Operations and Maintenance Manual 2009). For a picture of the CDS Units see Appendix 1.

The 875 feet of trench drains are designed to collect stormwater from the parking area and direct the water to one of the eight rain gardens for treatment by plants, microbes, and soil prior to entering the lake. The drains will be covered by metal grates that are able to withstand traffic loads.

Drains should be periodically inspected to prevent leaves, soil, or debris from disrupting the normal flow of the drains. This may include shoveling off the grates at the surface as well as shoveling/vacuuming debris underneath grates that may cause a disruption of flow capacity, direction, or slope. Coordination with CDS unit cleaning by the vactor truck is possible (Stormwater Drainage System: Operations and Maintenance Manual 2009).

Since overall water quality treatment will be enhanced following the improvements made to the boat launch area the only threat that exists results from the construction that will take place

during installation. Therefore, a Stormwater Pollution Prevention Plan (SWPPP) has been adopted from the Department of Ecology in order to prevent adverse impacts from occurring to surface and/or groundwater during both construction phases, see Appendix 2.

The key on-sight measures that will be taken to prevent adverse impacts to water quality include: catch basin inserts or seals, plastic coverings for any temporary stockpiles, silt fence between the work area and lake, hard surface guard for pavement, protective sleeves around creosote pilings and water quality monitoring during construction. Since the project will not have more than one acre of exposed soils a Washington State National Pollution Discharge Elimination System (NPDES) permit and regular water quality testing is not required. But water quality tests will be conducted anyway for turbidity and pH once per calendar week throughout the construction phase at both the stormwater drainage outfall and at the lakes edge to insure stormwater leaving the site does not exceed Washington State standards (PBS Engineering & Environmental 2008).

Alternative Action

This course of action which consists of leaving the creosote pilings in place, creating wheelchair access to only two docks rather than all five, and incorporating wetlands restoration will have mostly positive impacts to water quality in Lake Sammamish. Leaving the creosote pilings in place will prevent contamination to surface water because disruption of sediment on the lake floor will not occur. On the other hand creosote pilings have been known to be carcinogenic. The second change from the proposed action of making only two docks wheelchair accessible will require that less fill and grading be done which will eliminate the possibility for sediment runoff to occur. Finally, and most important, wetlands are considered to be the kidneys of the landscape and restoration of wetlands often provides improvements for water quality, habitat restoration and flood mitigation (Mitsch 2007).

No Action

Keeping the boat launch area the same will mean that all stormwater runoff will continue to enter the lake untreated rather than receiving pre-treatment from a CDS Unit or primary treatment from one of the eight rain-gardens.

2.4 Animals

Existing Conditions

Lake Sammamish is part of a salmonid migratory route to Issaquah, Tibbetts and other creeks flowing to the Sammamish River. Chinook and Steelhead salmon, as well as Bull trout, use or may use Lake Sammamish and the surrounding tributaries as their migration route and juvenile rearing area. The Bull trout and Chinook salmon have been identified to be in the project area and are both listed as threatened under the Endangered Species Act. The US Fish and Wildlife Service has identified Lake Sammamish as a foraging, migration, and over-wintering habitat for the bull trout. Most of the fish that are within the Lake Sammamish ecosystem are considered "ocean" type, migrate to the Pacific Ocean, and then return the following year. Research over more than three decades has shown that the annual deposition of salmon-borne marine derived nutrients is important for the productivity of freshwater communities throughout the Pacific coastal region (Naiman et al 2002). This makes the fisheries of Lake Sammamish especially important for the entire state park, as well as the entire ecosystem.

Bald eagle nests have been sited within the action area. Information from the WDFW indicates that there are two bald eagle nests over 0.5 miles northwest of the project area. Management and protection of these nests is governed by the *Recovery Plan for the Pacific Bald Eagle* (WDFW 1986). The bald eagle has been listed as threatened under the Endangered Species Act. Furthermore, McGarigal et al. (1991) found that boating significantly altered foraging habits of nesting bald eagles on the Columbia River estuary. Similar effects are predicted and have been observed for bald eagle populations of Lake Sammamish.

Additionally, there is a Great Blue Heron rookery known to exist south of the project site near Issaquah Creek.

Proposed Action

The proposed action will time construction so as not to disturb nesting species during migratory periods. Since there is a known presence of fish in the project area a silt curtain will be placed in the water to prevent turbid water from leaving the project area as well as keep fish out. There is a possibility that fish could become trapped within the silt curtain surrounding the in

water portion of the project area. Workers will try and scare fish from the work area prior to closing off each work section. There are several reasons for not removing fish from the work area. The depth of the water provides ample space for fish to escape thus making fish removal ineffective. Also, electro-shocking will not be used since that could easily cause more harm to the fish than would occur during the demolition and construction phases of the project. Phasing the work, which would require blocking off only a few piers at a time, will reduce the likelihood of trapping a significant number of fish.

To protect bald eagles from noise or visual disturbance the proposed action recommends a 0.5 mile buffer around the nests that have a line of sight view of the disturbance. A 0.25 mile buffer will be used around nests that do not have a line of sight view of the disturbance. Work windows have also been established to protect roosting, perching, and foraging birds during winter months. The proposed action will have little to no long term environmental effects to any species of concern. However, during construction there will be some negative impacts to wildlife.

Alternative Action

The proposed alternative action has no differences than the proposed action with respect to wildlife. All actions will be executed in similar form for both the alternative and proposed action in an attempt to protect fish and bird species.

No Action

The no action proposal will leave conditions as they currently are. There will be no noise or visual disturbance impacts to bald eagles and fish will not be disturbed due to demolition or construction. The no action proposal's initial impacts to wildlife will be less than both the proposed and alternative actions.

2.5 Plants

Existing Conditions

Lake Sammamish State Park has provided one of the few areas of the lake where the shoreline remains in its relatively natural state. Within the project area all riparian vegetation has been removed, the lake bottom has been covered with concrete planks for the boat launch, and overhanging vegetation on the lake surface has been replaced with wood piers. These changes to

the natural environment were implemented prior to this proposal. The project area's vegetation includes deciduous and evergreen trees, shrubs, grass, wet soil plants and water plants. *Cyperus bipartitus* is a state sensitive species and has been found near the project site. The wetlands to the south as well as Laughing Jacobs Creek has provided suitable habitat for native shoreline plants.

Proposed Action

Within the proposed action there should be little to no removal of vegetation. Lake Sammamish State Park has maintained the shoreline in its natural state and will continue to do so. In addition, some existing lawn will be removed at the canoe launch area and replaced with wetland plants. Within the mitigation area any Reed canary grass will also be removed. Although within proximity to the project site, *Cyperus bipartitus* (a state sensitive species) should not be affected.

Lake shore in and around the boat launch has been paved and all vegetation has been removed. Furthermore, since the lake bottom's current surface is paved it contains little to trace amounts of vegetation. The proposed action will have no effect on the vegetation in the project area. However, aquatic plants further into the lake than the project area may be affected due to storm water runoff. This will be mitigated through the storm water treatment plan.

Alternative Action

The proposed alternative action will also have little to no effect on the vegetation within the project area and will have a positive effect on the wetlands to the south. The proposed restoration to these wetlands will include additional native plants as well as removal of any invasive plant species that are found. Some non-native plants may be removed, potentially resulting in an overall decrease of vegetation. However, the removal of invasive species should allow for native vegetation to grow and replace areas of known invasive species.

No Action

If no action is taken, the vegetation surrounding the project site will remain as it is. There will be no planting of additional native species in the wetlands restoration or the rain garden parking islands. Therefore the impact to vegetation will be the same as described in the existing conditions.

3. Built Environment

3.1 Environmental Health

Existing Conditions

Currently, Issaquah is experiencing some of the highest development rates in the greater Seattle region. With more development comes more people, more use, and, consequently, more pollution.

Lake Sammamish experienced a toxic algae bloom in September of 1997, caused by high levels of cyanobacteria. Since then, water quality monitoring has been implemented on a weekly basis at all seventeen swimming beaches on the lake from March through October according to the Freshwater Algae Control Program through the Department of Ecology ("1997 Lake Sammamish Toxic Algae Bloom." 2009).

The boat launch area within Lake Sammamish State Park contains four 4.5 by 40.3 feet wooden piers and two 5.5 by 60.3 feet wooden piers, as well as 40 creosote-treated wooden pilings used for pier support. The six existing boat ramps are made of asphalt and are 4.5 by 8 feet in dimension (Washington State Parks 2008).

Proposed Action

The proposed action involves the removal of all six piers, replacing them with five strings of floating piers. Each pier will consist of three separate 6 by 20 feet floats, totaling 60 feet in length. The southernmost floating pier will have two additional 6 by 20 feet floats, each extending south and perpendicular to the main pier. Each pier float will be supported by one 70 feet long and ten inches in diameter and two (four for the southernmost pier, with a total of 12) 70 feet long and eight inches in diameter galvanized steel pilings (Washington State Parks 2008).

An aluminum gangway ramp measuring 40 feet long by 4 feet wide will connect each set of floats to one each (5 total) 6 by 28.5 feet concrete approach abutments located above Ordinary High Water. The old wooden fixed piers will be replaced by float decks that allow 59% light penetration, constructed of Ecograte fiberglass grating material. Light penetration is important for the growth of submerged aquatic vegetation which, in turn, provides habitat and food for small marine animals (City of Bainbridge 2003). The portion of the floats that rest in the water will be constructed of

non-toxic HDPE plastic and each pier will be supported with six crosswise 24 inch diameter HDPE plastic tubes filled with expanded polystyrene foam for floatation. The shoreward most float on each string of floating decks will have a set of 18 inch high plastic tube feet on the shoreward side to keep the floats from sitting on the bottom at extreme low water (Washington State Parks 2008).

Construction activities may have adverse impacts to fish, wildlife, water quality, and recreational uses from removal of old piers, pilings, ramps, and installation of new ones. Discharge of turbid or poor quality water from on-site construction could have negative impacts on aquatic resources in the Lake (Washington State Parks 2008).

Proposed measures to mitigate harmful environmental hazards have been made. All wood decking and skirting will be removed by hand. The existing asphalt abutments are to be removed and replaced with beach sand and gravel above the OHW. Best Management Practices are to be used and may include but are not limited to catch basin inserts or seals, plastic coverings for any temporary stockpiles, silt fence, hard surface guard for pavement, protective sleeves around creosote pilings and water quality monitoring during construction (Washington State Parks 2008).

To the extent possible, the project will schedule major earthwork during the dry season. Particular emphasis will be placed on managing the excavation of trench drains, conveyance pipes, and rain gardens to minimize the amount of area exposed at any one time, the duration of exposure, and the timing of exposure (Washington State Parks 2008).

Alternative Action

An alternative action does not differ greatly from the proposed action, as areas of concern have already been addressed and mitigation measures have been proposed. However, it is suggested that no in–water pile driving (impact or vibratory) should occur if any marine mammal is located within 200 meters of the vibratory hammer in any direction. If any marine mammal is sighted within or approaching this 200 meter safety zone, pile–driving or chipping must be suspended until the animal has moved outside the 200 meter safety zone or the animal is not re-sighted within fifteen minutes (United States of America, National Archives and Records Administration, U.S. Government Printing Office, *Title 50*).

No Action

The proposed no action solution would be to leave the piers, pilings, abutments, and parking lot in their existing condition. While some studies have shown that creosote pilings can

cause negative effects to the environment due to polycyclic aromatic hydrocarbons (PAHs), phenols and cresols, other studies have shown that creosote pilings provide critical habitat for sea life and do not have any negative impacts (United States of America, Environmental Protection Agency 2008). Consequences to environmental health concerning the no action proposal include untreated runoff from the parking lot into the lake and surrounding wetlands, car idling contributing to air pollution, and the possible continued pollution of the lake from creosote flaking. The no action proposal would not result in any new adverse impacts to the area and would not require any hazard mitigation.

3.2 Noise

Existing Conditions

Lake Sammamish State Park lies in an increasingly urbanized area and noise effects must be taken into account. Interstate 90, State Route 900, and local arterials surround the park and create noise that can impact visitor experiences. Powerboats on the lake create additional noise and along with traffic can be heard throughout the park.

Proposed Action

Noise levels are expected to increase during construction, including the noise generated from the installation of the galvanized steel pilings, which will be installed 50 feet in depth using a vibratory hammer from an off-shore barge. A muffling block will be used to reduce noise (Washington State Parks 2008). Noise associated with additional use of the park (cars, boats, crowd noises, amplified music, etc.) can be expected to increase from current levels.

Alternative Action

The Alternative Action does not differ greatly from the Proposed Action. It is suggested, however, that loud construction activities take place during a contained period of time so as to not disturb any animals or residents of the area. These hours of construction should be posted to alert residents as to when they can expect noise levels to rise.

No Action

If no action is taken, the current noise levels at Lake Sammamish will remain as is.

3.3 Land and Shoreline Use

Existing Conditions

The project area at the northeastern tip of Lake Sammamish is bordered on both sides by undeveloped shoreline. Further beyond, adjacent properties are mostly privately owned residences where natural shorelines have been replaced by manicured landscapes with few shrubs and trees, which would limit views of the lake. On the project site there are boat ramps, finger piers and an associated parking area. In addition, there are also restroom facilities, picnic shelters, equipment and wood shop, residences and a park office.

Proposed Action

The proposed alternative will remedy deficiencies in recreation delivery due to an inadequate boat launch facility that has exceeded its useful life. However, there will be some adverse effects to the shoreline and the surrounding areas. During the construction phase creosote pilings will be removed and enclosures will be in place to collect all debris during the removal. Trace sediments from the creosote pilings may be introduced into Lake Sammamish. Also, modification to the size and length of the boat launch will introduce anthropogenic influences further offshore of Lake Washington due to an increase in pier size. However, both of these impacts will have minimal affects to aquatic life and most likely no effect to wildlife in the surrounding area.

Alternative Action

The alternative action will have the same effects as described in the proposed action. During the wetlands restoration phase of the project shorelines may be improved depending on severity and need. In any case, the result would be a positive impact on the environment. Repairs to abutments will not cause further adverse impacts to the shoreline. In general, the potential for adverse impacts would be largely due to creosote piling removal and will be the same in both the proposed and alternative actions.

No Action

Should no action be taken, the shoreline would remain in its present condition with finger piers and outdated abutments. The creosote pilings would remain and they, as well as the entire

docks, would continue to deteriorate. The shoreline and water body would be exposed to the deteriorating docks and potential exposure to creosote would continue.

3.4 Historical & Cultural Preservation

Existing Conditions

In 2002, there was a cultural resource survey was conducted and found there were no culturally significant sites in the site area. There was also an archaeology survey was performed of the entire park and no historical sites were found (Archaeological and Historical Services Eastern Washington University 2002).

Proposed Action

Since no historical or cultural sites were found there will be no possible impacts of the proposed action. If any artifact or site should be discovered during the construction of the proposed action, activity will discontinue and the State Parks' archaeologist will be notified and appropriate action taken (Archaeological and Historical Services Eastern Washington University 2002).

Alternative Action

The possibility of impacts will be the same for the proposed action as for the alternative action. If any artifact or site should be discovered during the construction of the proposed action, activity will discontinue and the State Parks' archaeologist will be notified and appropriate action taken (Archaeological and Historical Services Eastern Washington University 2002).

No Action

If no action is taken the historical and cultural status will stay the same, as having no significant sites in the area.

3.5 Aesthetics

Existing Conditions

The current docking and parking facility has been the source of many complaints from local boat launch users. The general appearance and design of both structures is the source of complaints that the facility is simply out of date. Having received no upgrades in design since its construction in the early 1970's, the six piers have now existed beyond their useful life, the dock

design is out of date, and parking lot needs upgrades in surface water control and general appearance.

Proposed Action

The aesthetic value will be enhanced to the parking facility by installing a curb system along the northern edge of the launch facility and planting rain gardens in the first row of parking. Both contributions would augment the design of the parking structure by controlling surface water runoff and increasing viewing pleasure by boat users. The curb system, in conjunction with the new CDS surface water treatment will help to reassure users of the facility that the runoff is being properly captured and filtered prior to being released into the lake (Neal and Hanrahan 2009). By planting on parking lot islands, native rain gardens will not only contribute to the CDS water treatment by collecting runoff itself, but will also contribute the general aesthetics by adding row's of native plant species that will break up the appearance of strictly pavement and gravel. The improvements to the parking lot would improve the visual appeal without hampering functionality.

The proposed action includes changing the materials of the dock. Rather than Douglass Fir boarding and creosote pilings as supports, one steel piling and a plastic floating design will support the dock. The material used for the docks covering will include aluminum structural framing members that are designed to allow 59 percent open space for light passage (PBS Engineering & Environmental 2005). An additional twenty feet will be added to the dock length on four of the new floating docks. The floating dock design will be 1.8 feet wider, making the docks more stable and safer for public use (PBS Engineering & Environmental 2005).

Alternative Action

The design of the parking lot and dock system in the alternate action will not deviate from that of the proposed. Only two will only incur modifications to follow ADA guidelines. This will not change the aesthetic value of the docking system. The parking lot plan will be the same for both proposals. The alternative action may enhance the viewing pleasure of the wetlands area to the south, which is available for viewing from the southernmost docks. Restored wetlands could handle additional plant, animal, and fish populations, which would refurbish the natural appearance of the area.

No Action

If no action is taken, the facility will not receive improvements from its 1970's design or functionality. The native plants to be incorporated into the parking lot's rain gardens will not break up the appearance of uninterrupted concrete and gravel. Consequentially, during rainstorms, the surface runoff will continue to streak off directly into the lake. The docks will receive no improvements in safety or quality, and complaints may continue to filter in because the current demand for replacement is left unaddressed.

3.6 Recreation

Existing Conditions

The Lake Sammamish State Park is publicly owned parkland, used for general recreation purposes. The boat launch is separately located from the main recreation area to the north and is served by its own entrance. The purpose of the boat launch and facility is to accommodate only those users who require the boat launch facility for the purpose of moving their boat from trailer to water.

The parking lot capacity accommodates a total of 250 vehicles with trailers, and capacity is often reached during weekends in the summer months. On those peak use days, boat launch users are often lined up on Shoreline Avenue waiting to use the facility (PBS Environmental and Engineering 2005). According to the accounts of local park rangers, the wait times are often lengthy. A motivation for the project initially was to address the dock design. Currently the docking system does a poor job in handling busy day demands. Traffic congestion and wait times are characteristic of the docks, therefore serving as the limiting factor in getting boats on the water. In addition, the dock design also prohibits use of the boat launch during the winter because the fixed dock is often submerged and unusable. Park Rangers must keep the docks closed during these months. The combination of a closed facility during the winter and a dock design that cannot handle peak use inhibits the recreational opportunities for users.

Proposed Action

The proposed action calls for the new docks to be twenty feet longer than the existing ones. With the extended dock design boaters will be able to move their boats from the trailer to the water faster. As a user launches his boat, the extended docks will be sufficiently long enough to keep a continuous flow of boats entering the water through the same dock. This is

accomplished by moving boats from the original launch point towards the end of the dock. With more boats tied up at the end of the dock, more boats can fill in behind others. So, as a user parks his vehicle, he has more time to return before the user's boat inhibits the function of the dock by preventing the next person in line from using that space on the dock. The goal of the extension will be to increase the turnover of boats launched and to lessen the wait times associated with boat launch use. Inversely, dock design will impact the boats coming back from using the lake waiting to be loaded back onto the trailers. As dock space is needed to park the boats and prepare the vehicles and trailers for loading, boaters must sit idling nearby waiting for a spot to open up or beach their vessels along Laughing Jacobs Creek (PBS Environmental and Engineering 2005). The problem is that wait times may develop on days of heavy usage. The dock extensions make the movement of boats and vehicles run smoother and more efficiently and make lines move faster. With lines that move faster, the wait times will be lessened and current quantity demand of the boat launch services will satisfied sooner.

The proposed action includes a floating dock design. A floating dock will respond to changes in water height, allowing the facility to open during the three months in the winter. Use during these months is forecasted to be very minimal because boating in the winter climate does not attract many boaters. Congestion and traffic are not expected during these months either. Overall, by opening up during these months, the boat launch will experience a net gain in recreational opportunity.

Alternative Action

The only change in recreational opportunity between the proposed and alternative will be in the dock design. Since only two docks will be ADA approved, the distance that the other three docks extend towards the parking lot will be less, creating more space. With more space it will be easier for vehicles to maneuver their trailers to launch their boats. There is no significant difference between the alternative and proposed actions.

No Action

Wait times that are deemed unsatisfactory by public opinion will persist as a problem on busy days. Therefore, by not addressing the traffic and congestion concerns, recreational opportunities will be negatively impacted by choosing the no action alternative.

3.7 Transportation

Existing Conditions

A bus line along East Lake Sammamish Parkway currently serves the boat launch facility (State of Washington 2007). The public transit system is responsible for delivering visitors to the park for many of its recreational activities, however for boat launch users; the abilities of the public transit system to assist are limited. Since no public transit offers trailer-towing services, those users of the boat launch are required to have private vehicles in order to transport their boats.

The existing parking structure is designed to accommodate 250 vehicles and trailers at capacity (PBS Environmental and Engineering 2005). As vehicles enter the facility they turn left and enter the parking lot and dock area via the south entrance. Pick up and exit from the docking area is to the north. In effect, the flow of traffic goes clockwise from entrance to exit. The reason for this design is because for drivers, it is easier to back their trailers in from an angle approached from the south. Using the driver side mirror is preferable than to use the passenger side mirror.

Towards the end of spring and through the summer, Friday, Saturday, and Sunday of every weekend experience many days in which capacity it reached, or busy days that are near capacity. Frequent wait times have been a source of contention amongst both annual permit users and day use users. From the accounts of local park rangers, on busy summer mornings the line can extend down shoreline drive, and time delays can continue past an hour. The motivation for this project is address the negative impacts these lines and wait times have on boat launch users.

Proposed Action

With no additional pavement being added, the proposed action for the parking lot does not include changes in capacity. However, the traffic lines that extend down Shoreline Drive are likely to move faster with the new dock design. By increasing the length of the boat dock, the rate that boats enter the water will be faster (see recreation 3.6). The increased rate of boat launches will accommodate a faster moving line. There will be a positive impact from allaying the congestion and traffic currently experienced within the existing conditions.

Alternative Action

The alternative action requires that only two of the docks be designed to accommodate ADA standards. Since ADA standards require that the ADA approved docks be extended further towards the parking lot, there would be less space between the dock and closest parked car. If you eliminate the need to extend three, there is more space available for the driver to maneuver his vehicle and trailer. With more space, the docks may be marginally more efficient, making the alternative action marginally more effective at reducing wait times.

No Action

The no action alternative will not yield any change from the current parking capacity and the wait times from the current traffic lines will remain unaddressed. Considering that a limiting factor in the decision to replace boat launch was to tackle the problem of traffic a slight negative impact will not be alleviated.

4. Social and Economic Considerations

Existing Conditions

The current facility adequate supplies users with the only public boat launch facility on the lake. Private boaters who own slips and docks along the lake as well as those who launch from the public facility share the lake's water surface.

Proposed Action

Since there will be no change in parking lot capacity, there seems to be little worry about changes in overall quantity of boats entering the water and how much time boats launched from the public facility will spend on the water. However, the report made by the state of Washington indicates that there is uncertainty over changes in quantity of traffic on busy days. Three arguments indicate a potentially substantial impact (State of Washington 2007). They include: opening the facility during the winter, extending the docks to make them more efficient at launching boats, and changing the consumer's preferences for using the facility.

By opening the facility during the winter, those users who would use the facility during the winter months would now be able to. Since the State Park boat launch is the only public facility serving the lake, only private users have access during these months. A cut off in supply

of services leaves demand for boat use looking to use other lakes that are open or choosing other activities besides boating recreation. By replacing the dock with a floating design, the docks will sit on top of the water year round and the facility will be able to accommodate the winter demand. The result of opening during the winter will be an increase the quantity of boats using the facility year round and a rise in the total amount of boat hours on the water per year provided by the services offered from the public boat launch facility.

From Recreation (3.6), the boat dock extensions will increase the rate at which boats can enter the water. Equivalently, wait times will be lessened, demand for the facility will be satisfied sooner, and capacity will be reached earlier. On those peak days, even as capacity is reached, a line is still represented by users waiting for parking spaces to open up. In effect, when capacity is reached, the docks are no longer the limiting factor, but rather the parking lot capacity itself. Given that there is a boater waiting for the next parking space, the changes in dock design will allow more boats to access the water on days that reach capacity. If boaters follow the economic principle of non-satiation, and their determination of how much time to spend on the water follows that more is better (Katz, and Rosen 1998). Given the opportunity to spend more time on the water because a faster line allows them more time, they will spend more time boating recreationally. The result would be more boat hours per year on the water provided by the public boat launch facility. Although some boaters would follow this principle, some boaters may choose to spend a specified amount of time on the water that isn't dependent on the exact time their boat would enter the water. Rather than stay to a specified time, they would choose to spend a set amount of hours on the water. Without the non-satiation principle, if boaters accessed the water earlier because wait times were lessened, then they would also exit the water sooner in the day as well. With someone waiting for a parking space to open up, the exit of the boater sooner would allow the next user in line to launch his or her boat and use the now-available parking space. The net result would be more boat usage for the public facility and more boat hours per year.

Utility theory of demand states that changes to consumer's tastes and preferences will change quantity demanded (Katz, and Rosen 1998). The variable, wait times, is considered by potential users in determining whether to use the public launch facility. If the variable is altered, there will be a subsequent change in behavior. Long wait times for the facility act as a deterrent

for potential users in deciding to use the public boat launch versus their other available alternatives because they pay to use the facility (Antonides, Verhoef, and van Aalst 2002). As the dock design increases the efficiency of boats entering the lake and thereby, lowering wait times, the consumer will experience lower negative utility from the wait times. With less utility subtracted from the overall enjoyment of using the boat launch recreation opportunities, consumers will be more willing to use the launch and there will be an increase in the quantity demanded on days where wait times are expected. With more quantity demanded, more boats will use the facility to access Lake Sammamish and there will be more boats on the water per year.

There will be a rise in quantity of boats using the facility and an increase in the boats on water per year because the facility will be open during the winter, the docks will be more efficient and capable of handling busy days, and by changing consumer preferences for using the public facility. With a rise in quantity of boats on the water per year, the social impacts include: more competition for water space when boating and increased probabilities of boating accidents because of the increased congestion. More use of the facility enables the park receive more revenue from day permit purchasers. The impacts from changes in quantity of use may also increase the environmental degradation by the percent change in boat hours per year times the damage to the environment provided by one boat.

The impacts of social and economic considerations are based on theoretical assumptions and the evidence is not backed by empirical studies of changes in quantity or consumer behavior. The social and economic considerations are made by the lead agency in response to a potential increase in quantity of use. Since it lacks substantial evidence and research, its role in the deliberation of the project proposal should serve only as a red flag. This red flag is designed in hopes of pushing for further research and analysis of the possible impacts associated with changes in quantity.

Alternative Action

Since the role of this section emphasizes a critique of the proposed action, the lead agency restricts formulating mitigations to this problem until further research is performed to determine a more concrete understanding of this prospective problem.

No Action

With no changes to the docks replacement, the gains from the new dock design as well as parking structure will not be actualized. No changes in net use will be attributed to changes in the boat launch facility. No impact is assigned for the no action alternative because there is no negative impact currently assigned for the quantity of boats using the lake or the quantity of boat hours on the lake provided from the public launch.

5. Summary of Findings

The purpose of this environmental impact statement was to evaluate a proposed action to improve an existing boat launch within Lake Sammamish State Park, Washington. In accordance with SEPA, an environmental impact statement (EIS) is required when state or local agencies propose an action that may cause adverse impacts to the environment. This EIS analyzes a range of alternatives and management actions and has selected the preferred alternative to replace six piers at the Lake Sammamish boat launch.

There were three alternatives reviewed throughout this EIS. The proposed alternative was to replace the existing six piers and make improvements to abutment ramps in order to make all docks within the boat launch in full compliance with the Americans with Disabilities Act (ADA). The alternative action differed from the proposed action by suggesting only two docks be constructed in full compliance with ADA standards. The rationale behind limiting ADA designed docks is to allow more space for vehicle maneuverability, thereby increasing the efficiency of the launch itself. Additionally, the alternative would require an extensive restoration of a parcel of wetland adjacent to the boat launch. Both the proposed and the alternative action recommended rain gardens in an ongoing effort to mitigate impervious surface runoff. The last alternative, the no action, was used as a baseline to compare how the environment will be impacted should nothing change from the current conditions.

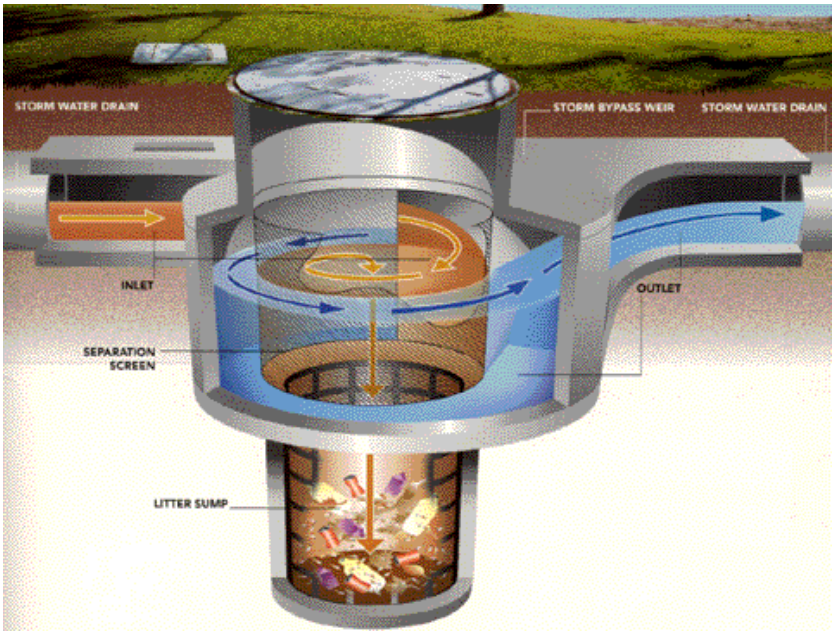
Both of the proposed and alternative action would help to reduce potential further impacts to water quality. Storm water runoff and pollutants would be collected and filtered by rain gardens CDS units. Water quality would further be enhanced in the immediate area of the boat launch with the removal of several creosote treated pilings. Creosote, especially when exposed in water for long periods of time, has been known to have adverse effects on aquatic species. The suggested wetlands restoration in the alternative action would further help to mitigate storm water runoff and help offset some of the impacts from the nearby city of Issaquah. There will some minor impacts to the wildlife and aquatic species during construction; however the overall adverse impacts are expected to decrease.

The development of the proposed and alternative action was motivated to address the traffic, appearance and dock design between the parking and docking facilities. The structures in place have not received upgrades from its construction in the early 1970's and new docks and parking lot amenities were included in the proposed and alternative actions to address these considerations. Traffic times with a new docking structure will decline as the docks become more efficient with extensions in length and width. Additionally, having floating a dock design will enable the park to remain open to boating recreation throughout the three months in the winter. The quality of appearance of the docks themselves will be revamped as well as the quality of the parking lot, which will receive upgrades from additional structural features and the rain garden's native plants. In addressing traffic and wait time concerns, the proposed and alternative action have the potential to change how much use the public facility will experience. The corollary to this impact is a string of contradictory effects. Where it is difficult to measure relative change amongst social factors, it is even more so to analyze the net impact of such a rise in quantity.

It is the determination of the lead agency that the proposed action should receive a mitigated determination of non-significance. The proposed action adequately addresses the concerns for the natural environment, traffic and congestion, and appearance of State Park's boat launch. If the recommendations for the construction techniques are followed, threats facing the natural environment during construction should be mitigated. The additional habitat and improved water quality gains from the wetlands restoration included in the alternative action should further benefit the natural environment.

6. Appendices

Appendix 6.1: Continuous Deflection Separation (CDS) Unit by Contech Stormwater Solutions Inc.



Appendix 6.2: Stormwater Pollution Prevention Plan (SWPPP)

Section 1 – INTRODUCTION. This section provides a summary description of the project, and the organization of the SWPPP document

Section 2 – SITE DESCRIPTION. This section provides a detailed description of the existing site conditions, proposed construction activities, and calculated stormwater flow rates for existing conditions and post–construction conditions

Section 3 – CONSTRUCTION BMPs. This section provides a detailed description of the BMPs to be implemented based on the 12 required elements of the SWPPP (SWMMEW 2005)

Section 4 – CONSTRUCTION PHASING AND BMP IMPLEMENTATION. This section provides a description of the timing of the BMP implementation in relation to the project schedule

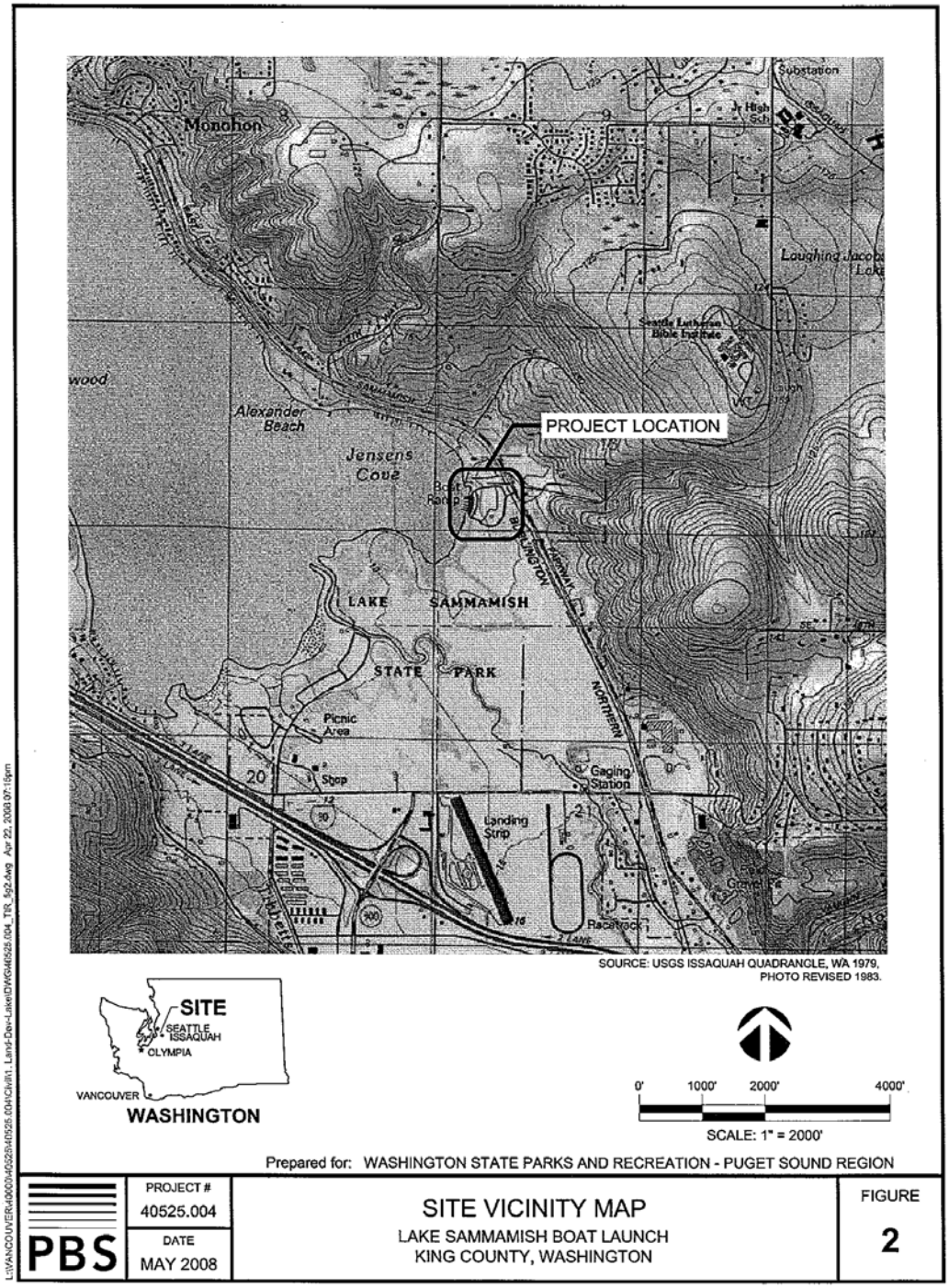
Section 5 – POLLUTION PREVENTION TEAM. This section identifies the appropriate contact names (emergency and non-emergency), monitoring personnel, and the onsite temporary erosion and sedimentation control inspector

.Section 6 – INSPECTION AND MONITORING. This section provides a description of the inspection and monitoring requirements such as the parameters of concern to be monitored, sample locations, sample frequencies, and sampling methods for all stormwater discharge locations from the site

Section 7 – RECORDKEEPING. This section describes the requirements for documentation of the BMP implementation, site inspections, monitoring results, and changes to the implementation of certain BMPs due to site factors experienced during construction

Section 8 – LONGTERM STORMWATER MANAGEMENT. This section discusses the permanent stormwater management elements that have been incorporated into the project design.

Appendix 6.3: Project Location and Site Vicinity Map



Appendix 6.4: Photos

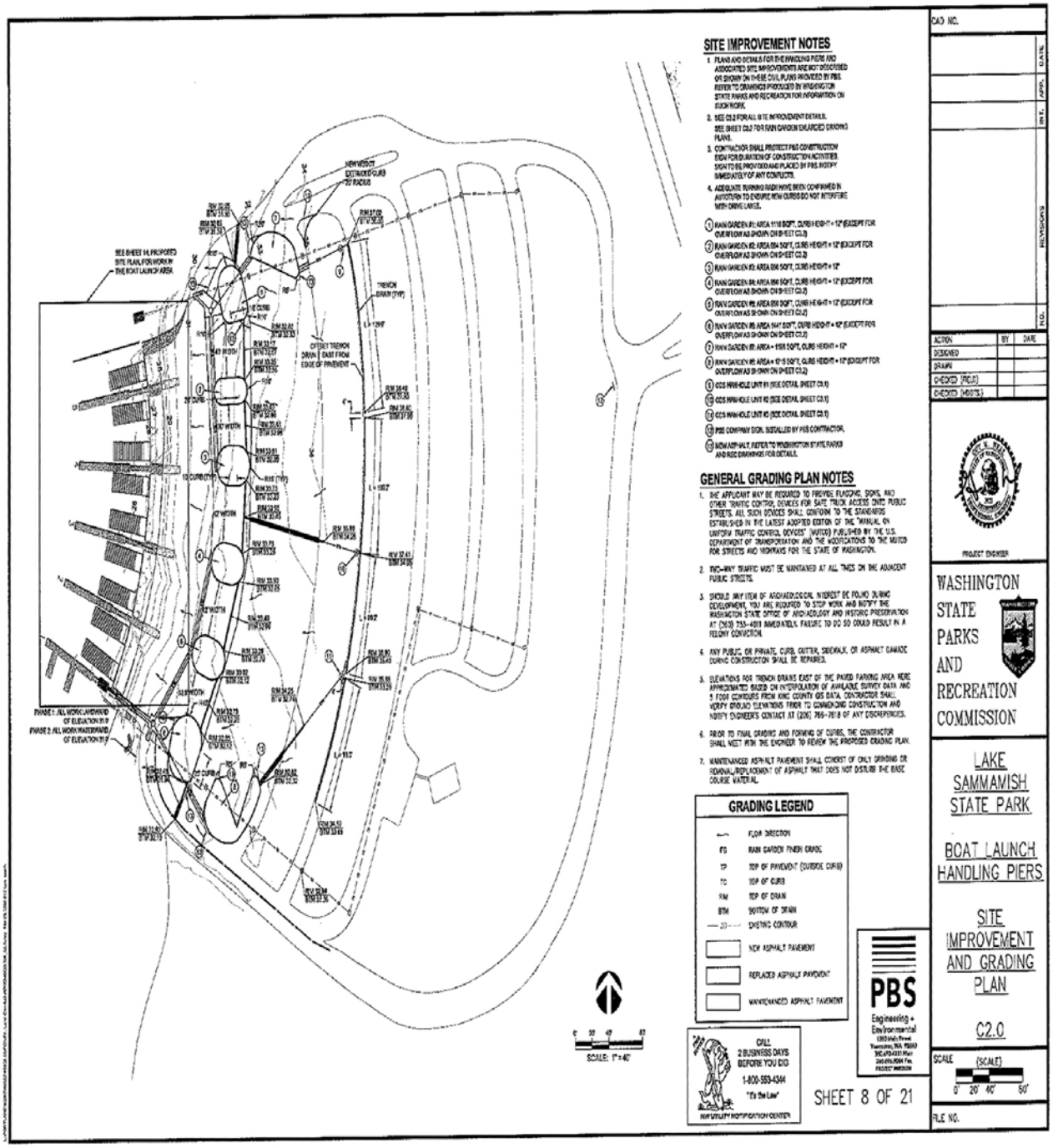
Photo 1 Submerged pier during the winter when Lake Sammamish experiences heavy rainfall. Park officials have placed white markers on the borders of the pier to alert users to its location.

Photo 2 Submerged pier during the winter where the water level has risen above the ordinary high water mark and is encroaching on the concrete abutments and parking lot area.

Photo 3 Existing condition of the parking lot area.

Photo 4 Deteriorated creosote pilings next to a water level marker.

Appendix 6.5: Proposed Boat Launch design.



7. References

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This textbook gives a thorough overview of utility theory, introducing consumer preferences and their role in a utility function. Wait times can be attributed to a variable in a utility function, so altering wait times changes a variable in consumer's respective utility. The textbook also includes how quantity demanded responds to changes in consumer's utility function.

This textbook was also used to illustrate the non-satiation principle. Non-satiation is an assumption made when determining consumer's preferences and it was an effective tool in illustrating how usage can increase boat hours with or without that assumption.

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