CITY OF KIRKLAND
123 FIFTH AVENUE • KIRKLAND, WASHINGTON 98033-6189 • (425) 828-1243

DEPARTMENT OF PUBLIC WORKS
MEMORANDUM

To: Stacy Clauson, Planner

From: Thang Nguyen, Transportation Engineer

Date: February 21, 2006

Subject: Proposed Office Development and Marina Redevelopment Traffic Analysis Review

This memo summarizes Staff's review of the traffic impact analysis report for the proposed office and marina redevelopment located at 5001 Lake Washington Boulevard.

Project Description
Currently, the project site has a 6,878 square foot marina service building that include uses such as office, marina service and specialty retail. The marina includes 104 moorage slips, plus a fueling dock, and a dry dock storage area.

The applicant is proposing to construct a 55,000 square foot general office building, demolish the existing 6,878 sf building and construct a new 7,000 sf marina service building at a different location within the site and expand the marina to include 10 additional moorage slips.

The total proposed parking supply on site is 211 stalls. Approximately 168 stalls will be under the office building foot print. The rest of the parking stalls and two load/unload delivery service stalls will be surface stalls adjacent to the office building. The existing driveway will remain with modification to provide one 14 foot entering lane and two 12 foot exiting lanes with a six foot separation island between the entering and exiting lanes.

Trip Generation
Trip generation was determined both by data from ITE (Institute of Transportation Engineers) Trip Generation Report and local data. Based on the trip generation data, the proposed project is forecasted to generate approximately 857 net new daily, 116 net new AM and 142 net new PM peak hour trips. Table 1 summarizes the trip generation calculation.

ENCLOSURE 6
SAR06-00001

Table 1. Trip Generation Summary

	AWDT	AM Peak			PM Peak		
		Total	**In**	**Out**	**Total**	**In**	**Out**
6,878 sf Marina (Existing)	155	4	2	2	21	7	14
Proposed							
55,000 sf General Office	842	116	102	14	140	24	116
10 additional moorage slips	14	0	0	0	2	1	1
7,000 sf Marina (Existing)	155	4	2	2	21	7	14
Net New Trip Generation	**857**	**116**	**102**	**14**	**142**	**25**	**117**

The traffic report shows a lesser net new daily and PM peak trip generations. However, the results of traffic impact and mitigation remain the same.

Traffic Concurrency

The proposed project passed traffic concurrency and the concurrency test notice for the proposed project will expire in one year (August 2, 2006) unless a development permit and certificate of concurrency are issued or an extension is granted.

Traffic Impacts

Project traffic distribution and assignment was estimated using the City's BKR Traffic Model.

The City 's Traffic Impact Analysis Guidelines (TIAG) requires a Level of Service (LOS) Analysis using the Highway Capacity Manual Operational Method for intersections that have proportionate share greater than 1%. Three intersections listed below meet this requirement. The City requires developers to mitigate traffic impacts when one of the following two conditions is met:

1. An intersection level of service is at E and the project traffic is more than 15% of the intersection traffic volumes.
2. An intersection level of service is at F and the project traffic is more than 5% of the intersection traffic volumes.

- Lake Washington Blvd/NE 38th Place (1.16% proportional impact)
- Lake Washington Blvd/Lakeview Drive (2.3% proportional impact)
- State Street/NE 68th Street (1.15% proportional impact)

In addition, the intersection of Lake Washington Blvd/NE 52nd Street and the project driveway was analyzed for traffic operation and safety.

With the exception of Lake Washington Blvd/NE 38th Street and Lake Washington Blvd/NE 52nd Street, all intersections analyzed are forecasted to operate at an acceptable level of service. The intersection of Lake Washington Blvd/NE 38th Street is forecasted to operate at LOS-F without and with the proposed project. However, its proportional impact is less than 5%. Thus, specific off-site mitigation at the intersection is not warranted.

Similarly, the intersection of Lake Washington Blvd/NE 52nd Street is forecasted to operate at LOS-E without and with the proposed project. However, its proportional impact is less than 15%. Thus, specific off-site mitigation at the intersection is not warranted.

Driveway Operation

A gap analysis was completed to determine the number of available gaps in the traffic stream on Lake Washington Boulevard to accommodate the proposed project traffic. Based on the gap analysis, there are sufficient gaps in the traffic stream to accommodate project traffic. Furthermore, there is a two-way left-turn lane on Lake Washington Boulevard for project traffic to take refuge before entering and exiting the traffic stream.

Sight distance analysis at the driveway was measured and it met the City's minimum requirements.

The site plan shows a pedestrian path next to the driveway that runs the length of the south property line. The driveway is elevated above the pedestrian path without any guard rail to stop a vehicle from accidentally go over top onto the pedestrian path. Some type of guard rail/barrier meeting AASHTO guidelines shall be installed to prevent vehicle from going over to the pedestrian path.

Parking

The applicant proposed to provide 211parking spaces. According to the City's parking requirements, the applicant is required to provide 183 spaces for the office, three spaces for the additional six boat slips, and fifty two spaces would be needed for the existing 104 boat slips totaling 238 spaces.

However, based on a parking utilization study completed at the site during the summer months, it was found that the maximum parking demand is 31 spaces occurring at 7PM. During the typical office business hours (7AM to 6PM), the maximum demand is 26 stalls. Thus, using the demand of the existing use and the City's parking requirements for the proposed uses, the total demand would be 212 spaces.

To determine the actual demand of all the uses during the day, it is necessary to look at the parking accumulation for each uses and combine them to determine the maximum demand from all uses during business hours. The parking accumulation distribution is based on data published by the Urban Land Institute and the distribution for the marina is based on actual data at the existing site. As shown in Table 8 of the TIA report, the highest demand for all uses would occur between 10AM and 12PM (205 spaces). At this time period, the existing use is not at its highest for the typical office hours.

It is possible that the highest demand between 6AM and 6PM for the existing Marina could also occur at the peak of the office demand. Thus, on that assumption, the calculated demand is 211 (183 for office + 26 for existing marina + 2 for additional six slips).

It is reasonable to assume that there will be more than sufficient parking on weekday after 6PM and weekend because the office would be vacant.

The office building is required to establish a Transportation Demand Management program (TDM) to reduce commute trips. With the trip reduction, parking may be reduced. This can be a safeguard against a parking demand greater than calculated above (211 spaces). To ensure enough parking is provided for

the Marina use, thirty-four parking spaces shall be designated for the Marina use. It is recommended that the applicant work with King County METRO to establish a TMP program in addition to providing preferential parking for high occupancy vehicles and bicycle racks.

Staff recommends that the applicant provide 211 parking spaces for the project.

Transportation Demand Management (TDM)

The City of Kirkland requires all office building with 50,000 gross square feet or more to implement a TDM program. At the minimum, the TDM should provide a commuter information center located in a prominent location within the building that provides commuters with information on commute options and promotions. A minimum of 21 parking stalls nearest to the building's employee entrances should be designated for carpools and high occupancy vehicles (HOV). Furthermore, a covered secured bicycle rack for at least six bicycles.

Road Impact Fees

Per City's Ordinance 3685, Road Impact Fees per Impact Fee Schedule in effect June 14, 1999 are required for all developments. Road impact fees are used to construct transportation improvements throughout the City. The development will be assessed road impact fees as summarized in Table 1. Final traffic fee will be determined at time of building permit issuance.

Table 1. Road Impact Fee Estimate

Uses	Fee Rate	Units	Impact Fees
General Office	$2.73/sf	55,000 sf	$150,150.00
Moorage Slip	$144/berth	10 berth	$1,440.00
Marina Service Office Building	$2.73/sf	122 sf	$333.06
Total			**$151,923.06**

Staff Recommendations

Staff believes that the proposed project will not create significant traffic impacts that would require specific off-site traffic mitigation. Staff recommends approval of the proposed project with the following conditions:

- Pay road impact fees.
- Construct frontage improvements per the City of Kirkland requirements and standards.
- Provide 211 parking spaces
- Designate at least 34 parking spaces for the marina use at all times.
- *Designate at least 21 parking spaces near the office building employee entrances for carpools and* high occupancy vehicles initially and more as required following CTR surveys.
- Provide a covered secured bicycle rack for at least six bikes.
- Provide a commuter information center located in a prominent location within the building that provides commuters with transit schedules and information on commute options and promotions
- Construct a driveway that provides a 14 foot entering lane and two 12 foot exiting lanes with a six foot pedestrian refuge island separating ingress and egress.
- Install guard rail/barrier between the driveway and the pedestrian path per AASHTO guidelines.

Any uses other than general office to occupy the 55,000 sf building may require an updated traffic concurrency test and traffic impact analysis. If you have any questions, call me at (425) 587-3869.

cc: William Popps Associates

CITY OF KIRKLAND

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DEPARTMENT OF PUBLIC WORKS
MEMORANDUM

To: Stacy Clauson, Planner

From: Thang Nguyen, Transportation Engineer

Date: April 14, 2006

Subject: Yarrow Bay Marina Redevelopment, Staff Response to Public Comments

Concerns about traffic impacts were received by the Breakwater Condominiums residents on the proposed project. This memo summarizes Public Works' response to the public comments relating to traffic impacts from the proposed redevelopment of the Yarrow Bay Marina.

There were concerns about the proximity of the project driveway to the Breakwater Condominium driveway and how it would impact traffic operation at the condominium driveway. In determining the scope of traffic analysis for the proposed project, staff required the traffic consultant to provide data on the available gaps within the traffic stream on Lake Washington Boulevard and provide a detail analysis to prove that there are sufficient gaps to allow safe ingress/egress to and from the project driveway. The data has demonstrated that there are sufficient gaps to support the increase in traffic from the project site and staff agrees with the analysis.

Prior to scoping the traffic impact analysis, staff met with the applicant and their traffic engineers several time on site to discuss staff concerns about placement of the driveways as it relates to adjacent driveways and the pedestrian crosswalk on Lake Washington Boulevard. The location of the project driveway would remain where it is currently with the exception that it would be approximately 1 foot wider to the south to include a pedestrian refuge island in the middle of the new driveway. This location is ideal because it provide sufficient spacing between the Breakwater Condominium to the south and the Carillon Point parking lot driveway to the north. In addition, it provides sufficient separation from the existing crosswalk to allow an adequate refuge lane in the middle of the street for exiting vehicles turning left to go north on Lake Washington Boulevard. The driveway will be approximately 135 feet from the Breakwater Condominium driveway and 220 feet from the Carillon point parking lot driveway.

The distance between the Breakwater Condominium driveway and the project driveway is far enough so that there is no traffic conflict. There is a two-way left-turn lane on Lake Washington Boulevard to provide refuge to vehicles turn left into and out of the Breakwater Condominium. Based on the PM peak hour (time when street traffic is most congested) traffic count, the majority of vehicles exiting the Condominium turn right. That movement presents no conflict with the project traffic and there is sufficient sight distance between the driveways. The gap data indicate that there are sufficient gaps for vehicles to enter and exit the Condominium.

ENCLOSURE 7

SHR06-00001

The applicant proposed to provide 211parking spaces. According to the City's parking requirements, the applicant is required to provide 183 spaces for the office, three spaces for the additional six boat slips, and fifty two spaces would be needed for the existing 104 boat slips totaling 238 spaces.

However, based on a parking utilization study completed at the site during the summer months, it was found that the maximum parking demand is 31 spaces occurring at 7PM. During the typical office business hours (7AM to 6PM), the maximum demand is 26 stalls. Thus, using the demand of the existing use and the City's parking rate requirements for the proposed uses, the total demand would be 212 spaces.

To determine the actual demand of all the uses during the day, it is necessary to look at the parking accumulation for each uses and combine them to determine the maximum demand from all uses during business hours. The parking accumulation distribution is based on data published by the Urban Land Institute and the distribution for the marina is based on actual data at the existing site. As shown in Table 8 of the TIA report, the highest demand for all uses would occur between 10AM and 12PM (205 spaces). At this time period, the existing use is not at its highest for the typical office hours.

It is possible that the highest demand between 6AM and 6PM for the existing Marina could also occur at the peak of the office demand. Thus, on that assumption, the calculated demand is 211 (183 for office + 26 for existing marina + 2 for additional six slips).

It is reasonable to assume that there will be more than sufficient parking on weekday after 6PM and weekend because the office would be vacant.

The office building is required to establish a Transportation Demand Management program (TDM) to reduce commute trips. Staff anticipates the TMP would reduce the trips by at least 10% giving the proximity to a bus stop and basing on commute survey data for Kirkland. With the trip reduction, parking may be reduced. This can be a safeguard against a parking demand greater than calculated above (211 spaces). To ensure enough parking is provided for the Marina use, thirty-four parking spaces shall be designated for the Marina use. It is recommended that the applicant work with King County METRO to establish a TMP program in addition to providing preferential parking for high occupancy vehicles and bicycle racks.

Staff recommends that the applicant provide 211 parking spaces for the project.

Biological Evaluation

Marina Extension Project

Yarrow Bay Marina

April, 2005

2005-00077

The Watershed Company

1410 Market Street ~ Kirkland, WA 98033 ~ Phone (425) 822-5242 ~ Fax (425) 827-8136
www.watershedco.com

DRAFT BIOLOGICAL EVALUATION

for Sensitive Fish and Wildlife Species at the Proposed Yarrow Bay Marina Extension Project, City of Kirkland, King County WA: 2005-00077

Prepared for:
U.S. Army Corps of Engineers
4735 East Marginal Way South
Seattle, Washington 98124-3755

Prepared on behalf of:

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6 April 2005

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Section 7, Endangered Species Act

Applicant: Yarrow Bay Marina **Corps Reference #: 2005-00077**

1. Project Description

The purpose of this biological evaluation is to assess the potential for impacts on sensitive species from the proposed marina extension project located on the east shore of Lake Washington, in Yarrow Bay, King County, WA (Figures 1 and 2). The proposed marina extension incorporates many elements of the *Endangered Species Act Guidance for New and Replacement Piers and Bulkheads in Lake Washington, Lake Sammamish, and the Ship Canal, including Lake Union* published on 25 October 2001 by the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NOAA Fisheries) that are consistent with the applicant's use objectives and safety concerns.

The following impact reduction and enhancement measures would be implemented:

- **Existing nearshore floats (289 square feet) would be removed.**
- **New float fingers on Pier C would be 3 feet wide, and new float walkways and ells would be 5 feet wide. Approximately 420 square feet of existing float on Pier C would be removed with equivalent square footage incorporated within Pier C extension.**
- **The new ramp and connecting walkways on Pier D would only be 5 feet wide.**
- **New 22-inch-wide wide nearshore access walkway to Pier G2 pier would be fully grated and would require no new piles.**
- **Durable and non-toxic materials would be used.**
- **The project would be constructed during established work windows for Lake Washington.**

The applicant is proposing to modify portions of Piers C and D, and construct an access walkway to Pier G2. Work on Pier C consists of removing a 6-foot-wide T float section at the terminal end of the existing float and replacing it with a longer 5-foot-wide T float section that includes four 3-foot-wide fingers (Figure 3 and Section B-7 on Figure 4). Four 12-inch-diameter wood piles would be removed and eight new 12-inch-diameter steel piles would be installed. In addition, an existing buoy at the terminal end of the proposed extension would be removed. The proposed modification to Pier C would increase moorage capacity by six boats.

Work on Pier D consists of the addition of a 5-foot-wide T float section at the terminal end of the float that includes two 5-foot-wide fingers (Figure 5). A narrow, fully grated ramp with a handrail would connect the fixed-pile portion of Pier D with the proposed new float (see Section C-7 on Figure 4). Eight new 12-inch-diameter steel piles would be driven. In addition, an existing buoy at the terminal end of the proposed extension would be removed. The proposed modification to Pier D would increase moorage capacity by two boats.

Figure 1. Vicinity map (MapQuest, top) and aerial photograph (USGS, 13 June 2002, bottom) of the project area showing piers G, C, and D.

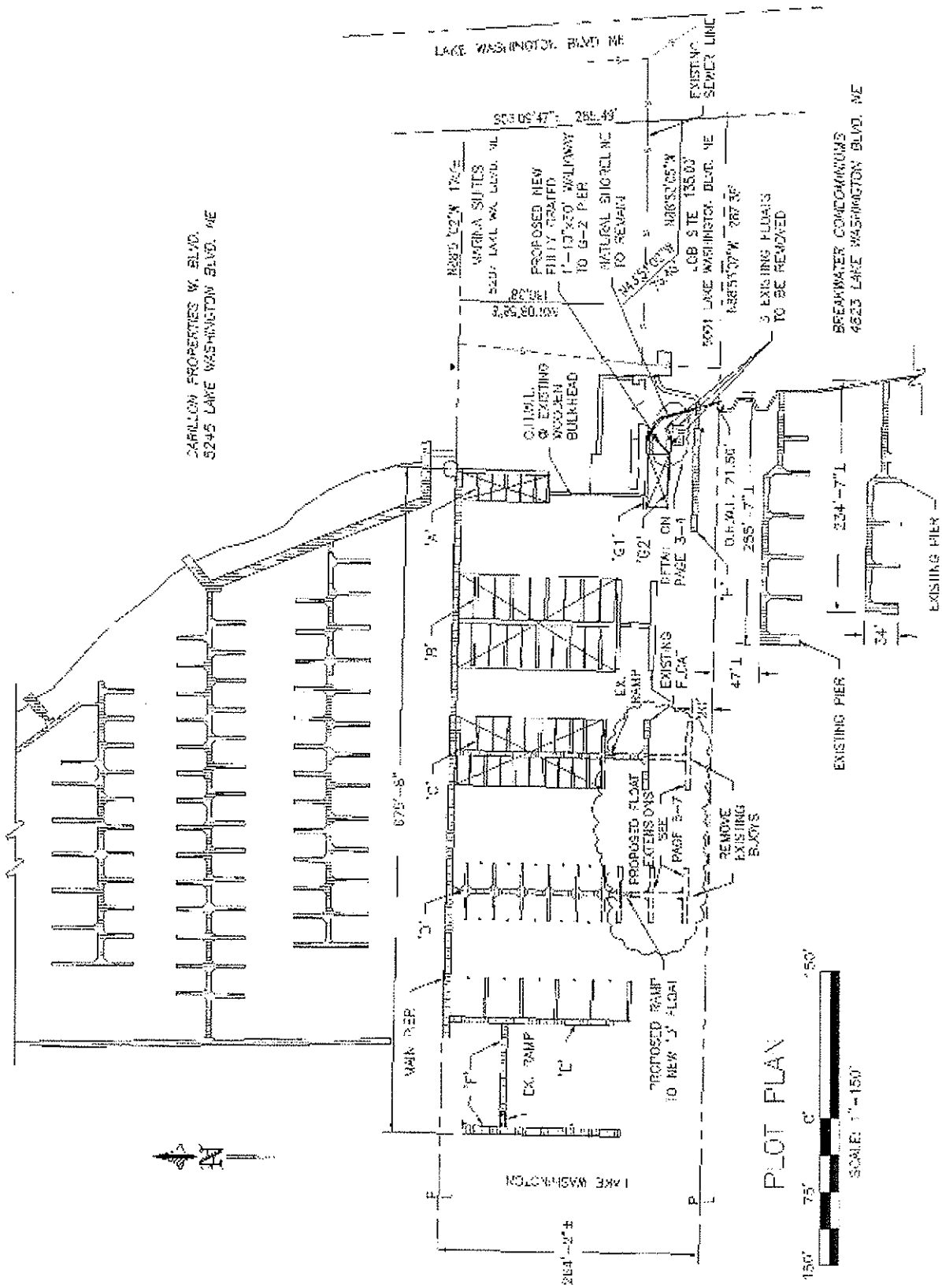

Figure 2. Plan view of the existing project site, including plan views of shoreline structures on neighboring properties (prepared by Waterfront Construction Inc.).

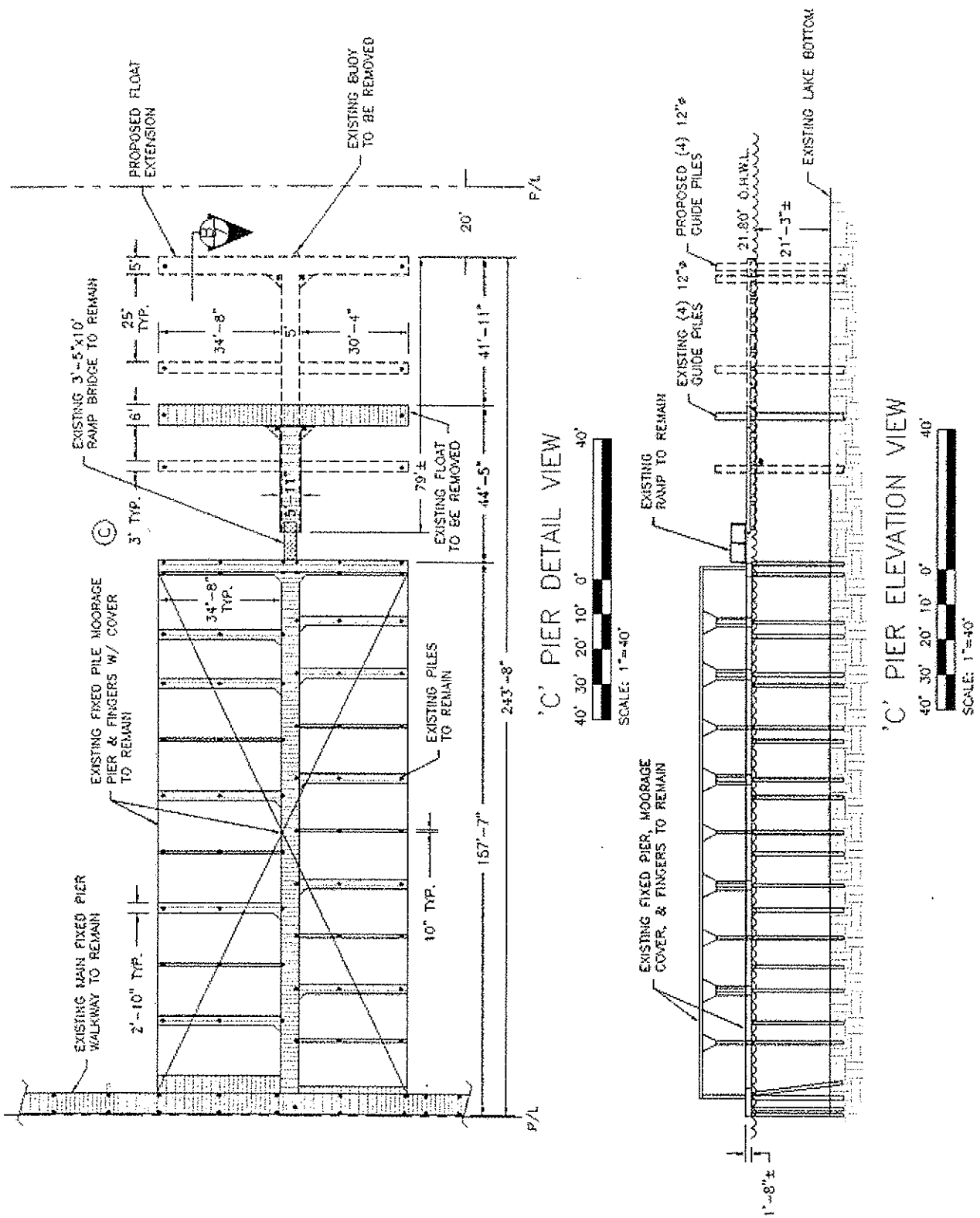

Figure 3. Plan and elevation views of the existing and proposed Pier C (prepared by Waterfront Construction Inc.).

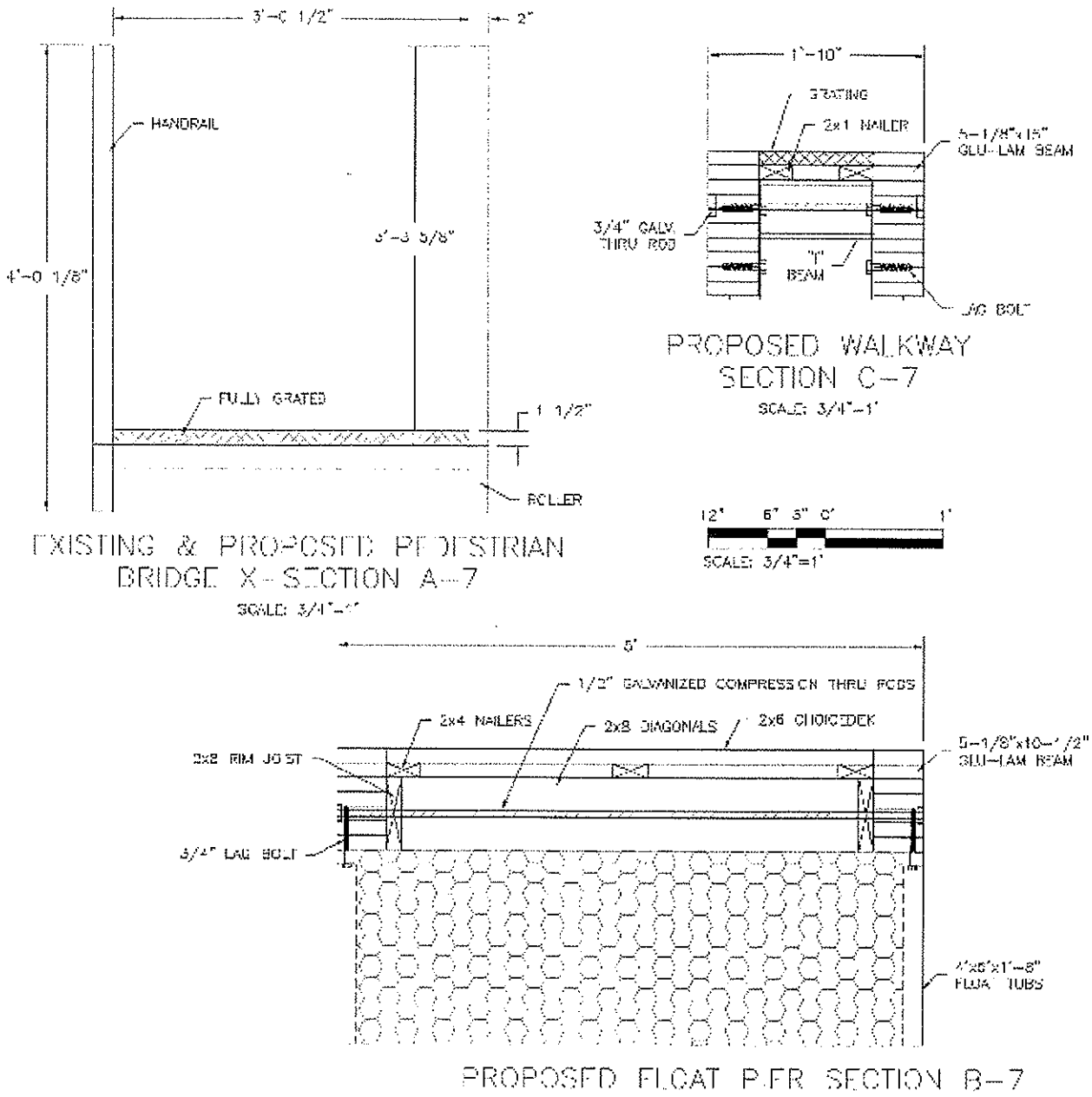

Figure 4. Cross-section views of the proposed Pier D ramp, proposed Pier G2 access walkway, and proposed Pier C and D floats (prepared by Waterfront Construction Inc.).

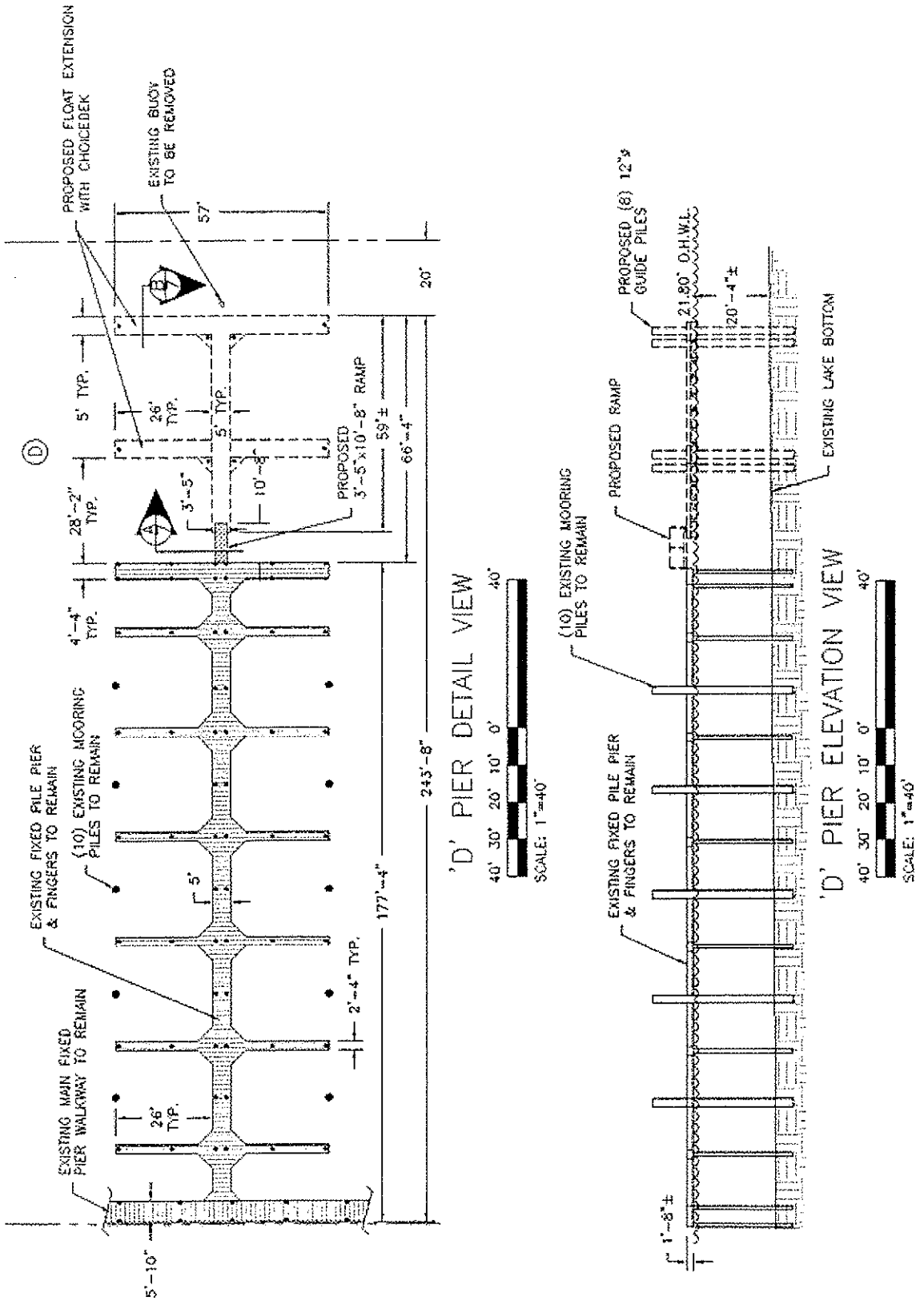

Figure 5. Plan and elevation views of the existing and proposed Pier D (prepared by Waterfront Construction Inc.).

The floats for both Pier C and D additions would be fully enclosed black rotomolded high-density polyethylene (Ace Roto-Mold) tubs filled with expanded polystyrene (EPS) foam (see Section B-7 on Figure 4). The floats would be decked with ChoiceDek™ (wood-plastic composite). Wood components would be treated with ACZA (chemonite). Steel piles and pile guides would be treated with Devtar 5-A[1]. All other hardware would be galvanized steel or aluminum. Both the Pier C and Pier D additions would occur over deep water (>20 feet), and would result in a net increase of 1,418 square feet of overwater cover. The decision to propose floats versus fixed-pile piers was driven by the number of piles required for each method and the water depth. As noted above, the float additions require 16 piles. Fixed-pile piers with the same footprints would have required 38 piles.

Currently, Pier G-2 can only be accessed by boat or by navigating an unsafe assemblage of nearshore floats. Under this proposal, the nearshore floats would be removed and a 22-inch-wide, fully grated walkway would connect the shoreline to the nearshore end of Pier G-2 (Figure 6). The grating would be plastic ThruFlow.™ City of Kirkland codes require that the narrow walkway be a maximum of 24 inches above OHW. In order to span the nearshore without piles, the minimum sized (5-$^1/_8$ inch by 15 inch) glu-lam beams (treated with ACZA) would be used, leaving 9 inches of clearance between the bottom of the glu-lam and OHW (Figure 7). The Pier G2 modifications would occur over shallow water (<2.5 feet), and would result in a net reduction of 234 square feet of nearshore overwater cover.

Construction activities would occur in the following sequence.

1. The contractor would float a construction barge and/or workboat to the site. The barge would contain all the new materials and equipment required to construct the marina extension. Work would be conducted from the barge or workboat or from land-based equipment during nearshore operations. Any construction debris would be disposed of off-site at an approved upland facility. Under no circumstances would the barge be grounded. As directed by Hydraulic Project Approvals[2] (HPAs) issued by Washington Department of Fish and Wildlife (WDFW), the contractor would take extreme care for the duration of the project to "ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the lake." All wood products used for this project would comply with the standards established by the Western Wood Preservers Institute in "Best Management Practices for the Use of Treated Wood in Aquatic Environments."
2. Request sewer locate two weeks before scheduled mobilization to site (note: sewer is upland of OHWM per survey records).
3. Pre-fabricate Pier C and D float extensions and Pier G2 connector deck at Lake Union shop.
4. Mobilize to site via barge transport with all equipment and pre-fabricated Pier C and D floats, Pier D ramp bridge, and the Pier G2 connector.

[1] "Devtar 5A is a high performance, two component, chemically cured, high build epoxy coating." http://www.altexcoatings.co.nz/5a_pds.htm

[2] The HPA would be applied for once the SEPA Determination of Non-Significance has been issued by the City of Kirkland.

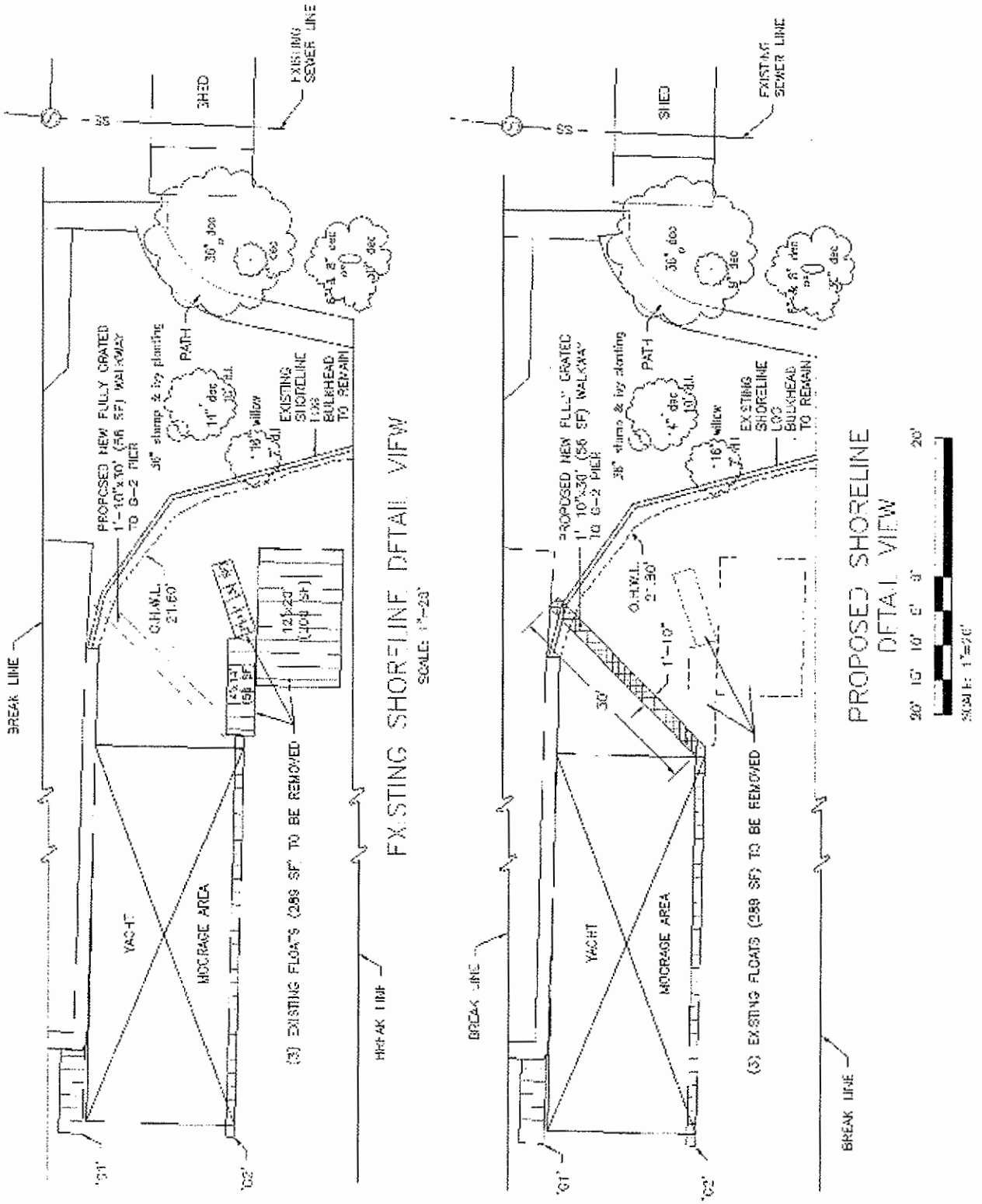

Figure 6. Plan views of the existing and proposed Pier G2 area (prepared by Waterfront Construction Inc.).

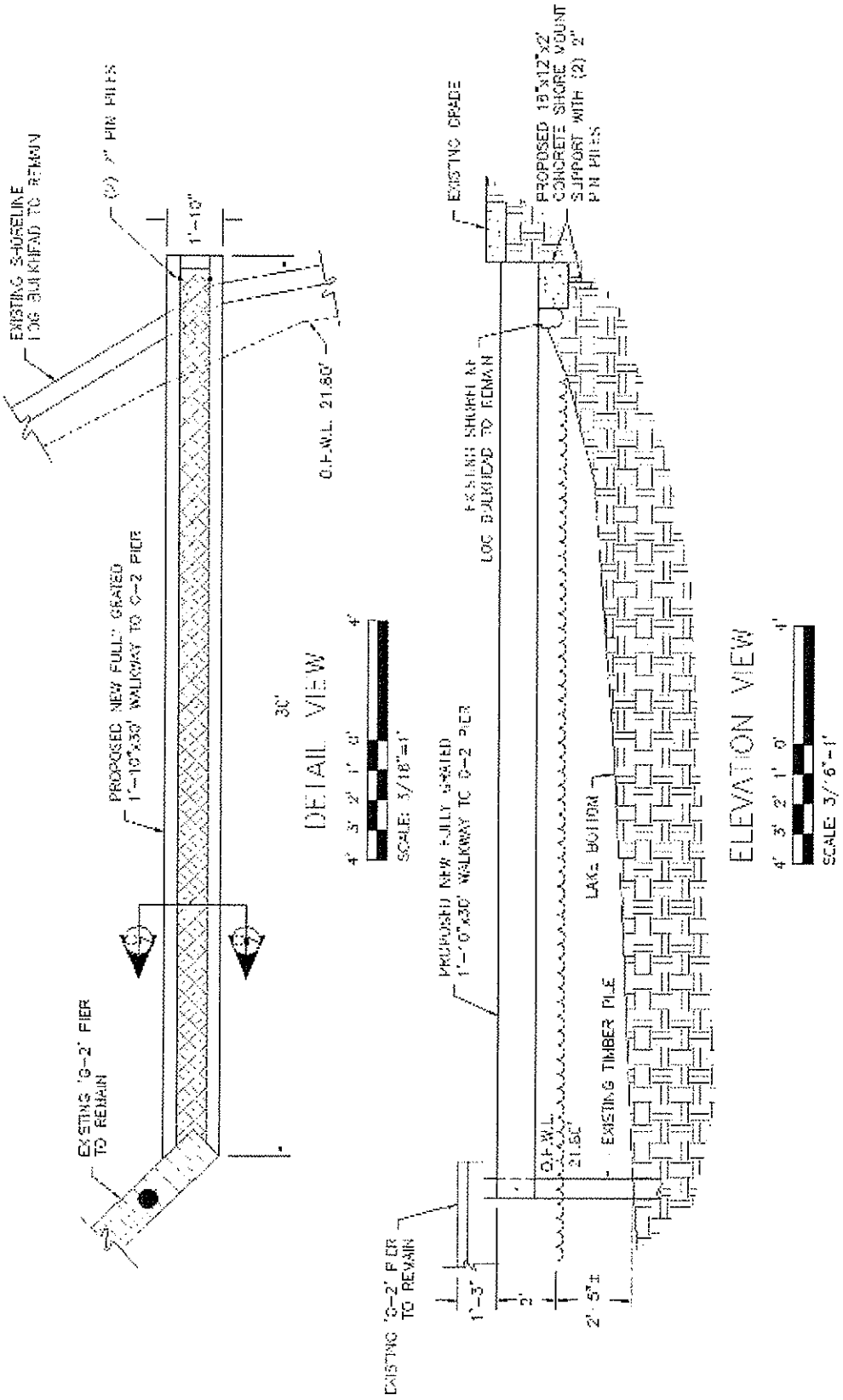

Figure 7. Elevation views of the existing and proposed Pier G2 area (prepared by Waterfront Construction Inc.).

5. Construct shoremount on-site for proposed Pier G2 connector and prepare for connection at easterly G2 pile.
6. Remove existing buoys from ends of Piers C and D.
7. Remove the existing four piles of the Pier C float. Disconnect the existing Pier C float connector and 'T' walkways. Load them all on the barge utilizing the barge-mounted crane.
8. Place the new pre-fabricated Pier C float configuration with the barge-mounted crane.
9. Utilizing the new Pier C float as template, install the eight new steel piles. Connect six piles to the pier finger ends and two piles to the main walkway fillets. Connect ramp bridge to fixed Pier C.
10. Place the new Pier D float configuration with the barge-mounted crane.
11. Utilizing the new Pier D float as template, install the eight new steel piles. Connect four piles to the finger ends and four piles to the main walkway fillets. Connect ramp bridge to fixed Pier D.
12. Remove construction and waste materials and equipment from site and mobilize barge transport from site.

Standard Conservation Measures

1. Large Woody Debris: WDFW has concluded that installation of large woody debris along the shoreline of Lake Washington does not provide desired juvenile chinook salmon refuge benefits, except in very shallow water over a mud substrate, and would not permit its placement. The existing and proposed conditions at the project site preclude placement of large woody debris. Accordingly, in-water large woody debris is not proposed or required at this site.

2. Riparian Vegetation: Native plantings are not proposed at the commercial site. The majority of the upland shorelands at the site is asphalt and concrete to the shoreline, and used for marina access, fueling, and service activities. The City of Kirkland is requiring the marina to maintain the smaller, more natural shoreline area at the south end of the project site for public access.

3. Aquatic Invasive Species Removal: The applicant would remove by hand, including roots and rhizomes, any non-native vegetation (e.g., yellow iris, Eurasian milfoil) that should colonize the nearshore area between a depth of 0 and 2 feet at OHW. The applicant shall dispose of the non-native vegetation in an upland compost pile or in a designated yard waste bin.

4. Timing Restriction: Once started, marina modification activities are estimated to take approximately two weeks at the site. In-water and over-water timing distinctions are requested so that the contractor may be able to complete the over-water portion of the project outside of the in-water construction window.

In-water work: Construction would begin as soon as permits and scheduling would allow, but no in-water work would occur from 16 March through 15 July, per the combined fish protection policies of NOAA Fisheries, USFWS, and WDFW in Lake Washington. The USFWS and NOAA Fisheries timing restrictions to protect bull trout (*Salvelinus confluentus*) and chinook salmon (*Oncorhynchus tshawytscha*) prohibit construction from 16 March through 15 July. The proposed project is located more than one-half mile south of a WDFW-indexed sockeye salmon (*O. nerka*) spawning area. Thus, application of an additional timing restriction by the WDFW is not anticipated.

The proposed project is located more than 1.0 mile from the nearest active bald eagle (*Haliaeetus leucocephalus*) nest. Accordingly, timing and equipment restrictions during the breeding season are not required. The project site is also greater than ½ mile from a WDFW-mapped sockeye salmon spawning beach, salmon carcass collection areas, and waterfowl concentrations, which are considered bald eagle foraging habitat. The project site is less than one-quarter mile from potential bald eagle perch trees. Accordingly, a vibratory pile driver would be used during the winter foraging period. Other work using hand tools would be conducted keeping noise below ambient levels.

Over-water work: All pier sections would be pre-fabricated at the contractor's Seattle yard and transported to the work site via barge. Over-water work would include float pier connections to installed pilings, associated ramps and G2 connecting walkway installation. Because the above deck construction methods do not include loud activities such as saw cutting, nailing, or other pounding, no over-water timing restriction is necessary. Timing restrictions to protect bald eagles during the breeding and foraging seasons are already covered during the in-water work windows.

The combined fish and wildlife timing and equipment restrictions are depicted graphically below. The applicant would comply with any amendments made to the below timing restriction following USACE, NOAA Fisheries and USFWS review.

<table>
<tr><th></th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>Federal and state fish protection</td><td colspan="3"></td><td colspan="4">No in-water work</td><td colspan="5"></td></tr>
<tr><td>Bald eagle protection</td><td colspan="3">Vibratory pile driving, other work below ambient noise levels</td><td colspan="7"></td><td>Vibratory pile driving, other work below ambient noise levels</td></tr>
</table>

Action Area

"Action area" is defined as *"all areas to be affected directly or indirectly by the proposed action and not merely the immediate area involved in the action."* Based on the analysis below, the disturbance effects of this project on chinook salmon, coho salmon (*O. kisutch*), and bull trout

would be realized within a 100-foot in-water radius of substrate-disturbing activities. No other areas would be affected directly or indirectly.

According to the USFWS, pile driving and other loud activities can affect foraging or nesting bald eagles up to 1.0 mile away. Thus, the action area for bald eagles would be within a 1.0-mile radius of the proposed construction activity.

2. Location

The proposed project site is located at Yarrow Bay Marina on the east shore of Lake Washington in Yarrow Bay, at 5001 Lake Washington Boulevard NE, Kirkland, King County, Washington, in NW ¼ Section 17, Township 25 North, Range 5 East, Willamette Meridian (see Figure 1). Tax parcel number 172505-9130.

3. Listed Species

Listed species in the Lake Washington watershed include Puget Sound chinook salmon, Threatened (U.S. Federal Register, 24 March 1999); Coastal-Puget Sound bull trout, Threatened (U.S. Federal Register, 11 November 1999); Puget Sound-Strait of Georgia coho salmon, Candidate (U.S. Federal Register, 25 July 1995); and bald eagle, proposed delisted (U.S. Federal Register, 6 July 1999). All of these species may be present in the action area during a portion of their life cycle.

4. Description of Project Area and Baseline Conditions

The baseline conditions that chinook and coho salmon, and bull trout presently face in the Lake Washington watershed are described in the SPN (USACE et al. 2001). This discussion describes the relevant site-specific baseline conditions within the action area, in particular focusing on those items that are different in condition than Lake Washington as a whole. The conditions for Lake Washington and the action area are summarized in Table 1 below.

Dan Nickel, Environmental Engineer, and Amy Myers, Wetland/Wildlife Biologist, of The Watershed Company, conducted a site visit on 8 March 2005. The following description of existing conditions is based upon observations from the site visit and from materials supplied by the applicant.

The Yarrow Bay Marina contains seven primary moorage areas, identified as Piers A through H. As work is only proposed at Piers C, D and G, detailed descriptions of the Marina will be limited to those areas. In general, a main walkway extends west along the north property line, with six moorage areas (Piers A through F) extending south (see Figures 1 and 2). The seventh and eighth moorage areas (Piers G and H) are accessed from shore near the south property line.

The majority of Pier C provides fixed-pile covered boat moorages (see Figure 3). All pier-support piles appear to be 12-inch-diameter wood. A 3.5'x10' fully grated ramp extends south

from the terminal end of the fixed-pile portion of Pier C (Figure 8). The deck of the ramp consists of two strips of fiberglass grating flanking a single strip of aluminum grating. The ramp connects to a floating, 6-foot-wide, T-shaped pier (see Figures 8 and 9). The decking of the float is Trex or similar plastic composite. Four 12-inch-diameter wood guide piles maintain the float's position. At the time of the site visit, the floating portion of Pier C provided moorage for six boats. The water depth at the end of the existing Pier C is approximately 21.25 feet at OHW.

Pier D provides fixed-pile, un-covered moorages (see Figure 5). Most of the slips provide moorage for two boats each, separated by a center mooring pile. All pier-support and mooring piles appear to be 12-inch-diameter wood. The decking of the pier is Trex or similar

Table 1. Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators – Draft modified by NOAA Fisheries for lakes.

PATHWAYS	**ENVIRONMENTAL BASELINE**			**EFFECTS OF THE ACTION(S)**		
INDICATORS	Properly Functioning	At Risk[1]	Not Prop. Functioning	Restore[1]	Maintain[2]	Degrade[3]
Water Quality						
Temperature/Dissolved Oxygen		X			X	
pH		X			X	
Chem. Contamination		X			X	
Nutrients/Total P		X			X	
Habitat Access						
Physical Barriers		X			X	
Habitat Elements						
Exotic Species (in water)			X		X	
Shoreline Upwelling/ Downwelling			X		X	
Structural Complexity (LWD/emergent/ submergent vegetation)		X			X	
Substrate Composition			X		X	
Shoreline Conditions						
Shoreline Vegetation and Riparian Structure			X		X	
Shoreline Gradient			X		X	

[1] For the purposes of this checklist, "restore" means to change the function of an "at risk" indicator to "properly functioning," or to change the function of a "not properly functioning" indicator to "at risk" or "properly functioning" (i.e., it does not apply to "properly functioning" indicators).
[2] For the purposes of this checklist, "maintain" means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).
[3] For the purposes of this checklist, "degrade" means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a "not properly functioning" indicator may be further worsened, and this should be noted.

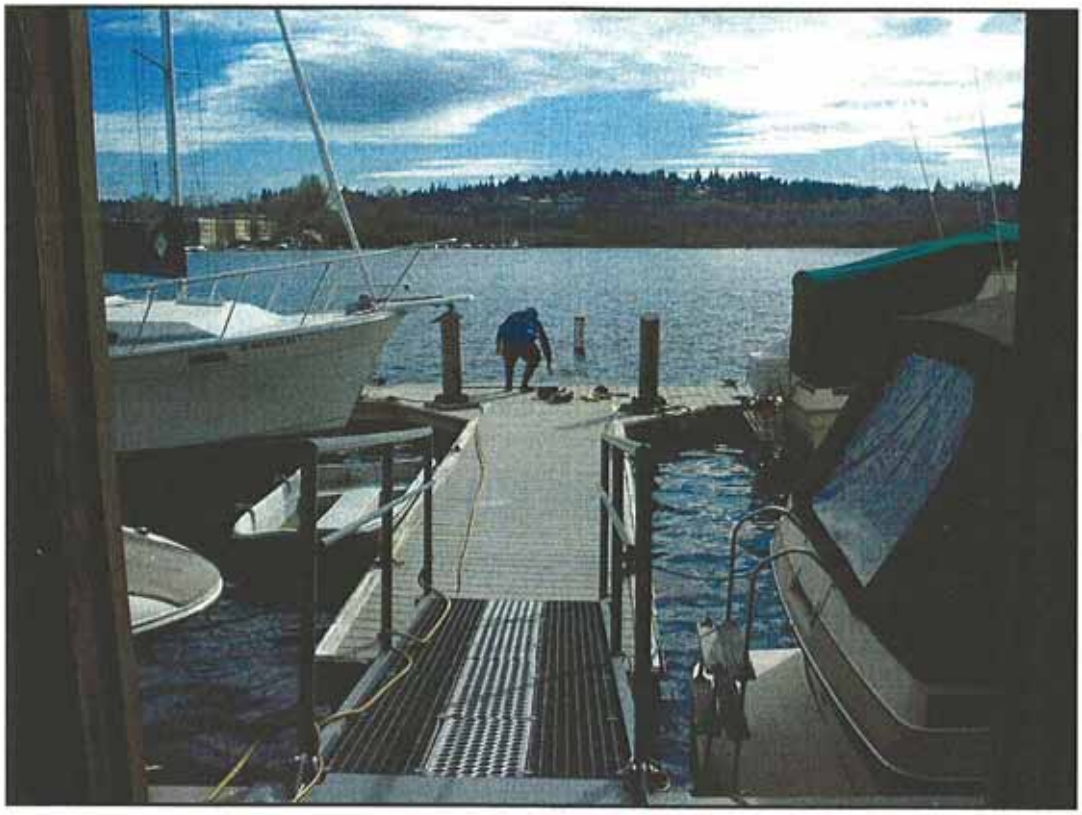

Figure 8. View facing south of the uncovered floating portion of Pier C and the grated ramp.

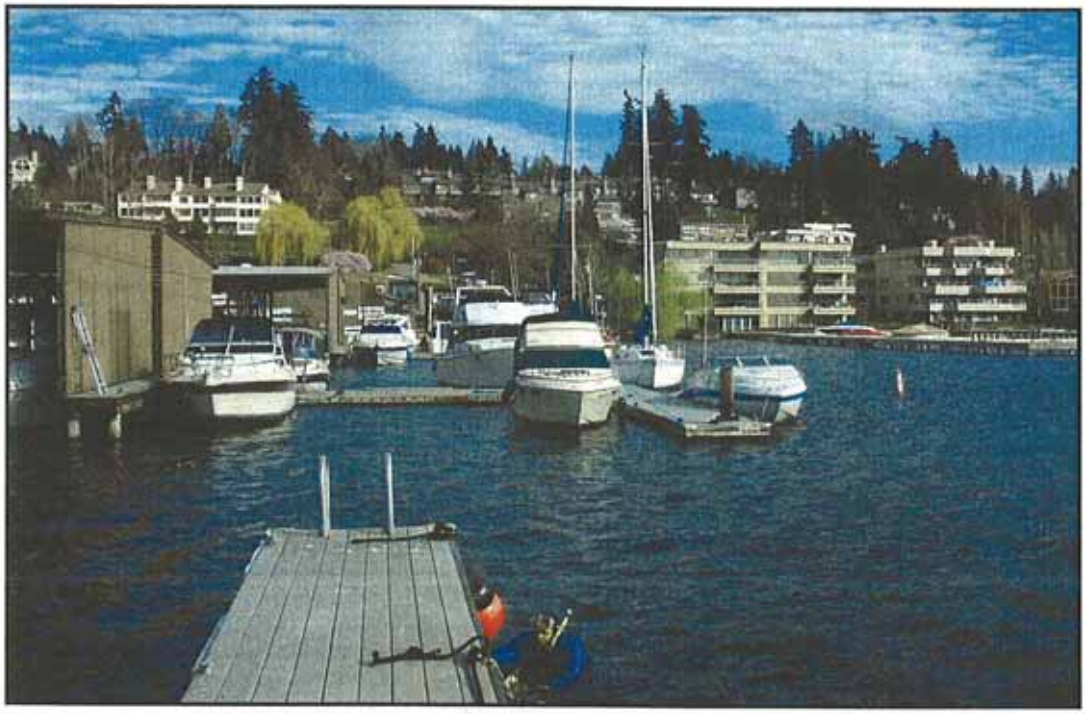

Figure 9. View of Pier C facing east from Pier D. The buoy at the right of the photo shows the extent of the proposed addition to Pier C.

plastic composite. The terminal end of Pier D is lined with skirting that extended approximately 1 foot below the water line at the time of observation (Figure 10). The water depth at the end of the existing Pier D is approximately 21.3 feet at OHW.

Pier G consists of two fixed-pile walkway sections (G1 and G2) that support a moorage cover. Pier G2 can only be accessed by navigating a series of nearshore floats or by crossing a boat that is moored between G1 and G2 (Figure 11). The three nearshore floats are 4'x14', 3'x11', and 12'x20'. At mid- and low-lake, portions of the floats are beached in the shallow nearshore area. The largest float is tied to an upland tree. The two smaller floats are linked by ropes to the nearshore end of Pier G2.

The upland shoreline area is almost entirely paved to the vertical wood bulkhead (Figure 12) with the existing marina service building nearly abutting the shoreline edge. A semi-natural shoreline area is located south of this building. This area is protected by a failing log bulkhead and logs laying across the shallow beach south of the ramp to Pier H (Figure 13). As previously mentioned, the City of Kirkland requires this area to be available for public access. Shoreline vegetation consists primarily of lawn grasses and weeds to the bulkhead edge, and is fronted at the waterward edge with soft rush, reed canarygrass, western dock, and daffodils. A few trees, locust and other deciduous species, provide a source of leaves, twigs, insects and some shade to the nearshore habitat.

A sandy beach with areas of small- to medium-sized gravel transitions to sand-silt substrate up to 15 feet waterward of the OHWM. The slope of the substrate in the nearshore area is very gradual, around 8 percent. The beach was covered with uprooted strands of Eurasian milfoil and curly pondweed, and it appears that much of Yarrow Bay is densely vegetated with Eurasian milfoil. No fish were observed during the 8 March 2005 site visit. Water temperature at the time of the site visit was 50° F, and water visibility extended 10 to 15 feet.

5. Species Information and Site Use

Site-specific information about each species is presented below. General and lake-specific life history information related to temperature, diet, and migration is contained in the Federal Register listings (U.S. Federal Register, 24 March 1999; U.S. Federal Register, 25 July 1995; U.S. Federal Register, 1 November 1999; U.S. Federal Register, 12 July 1995) and the SPN.

Chinook Salmon

In the Lake Washington watershed, summer/fall-run chinook salmon migrate through Lake Washington to reach spawning habitat in the Cedar and Sammamish River systems as well as other Lake Washington tributaries. Occasional beach spawning within Lake Washington has been observed (Roberson 1967; Fresh, pers. comm., 28 March 2000). Adults begin migrating into fresh water in June, peaking in August, and spawn in the tributaries to Lake Washington from mid-August to mid-December (Myers et al. 1998).

Graphs of trapping data indicate that juvenile chinook salmon migrating from the tributaries into Lake Washington exhibit two basic strategies: 1) direct migration to the lake as fry without

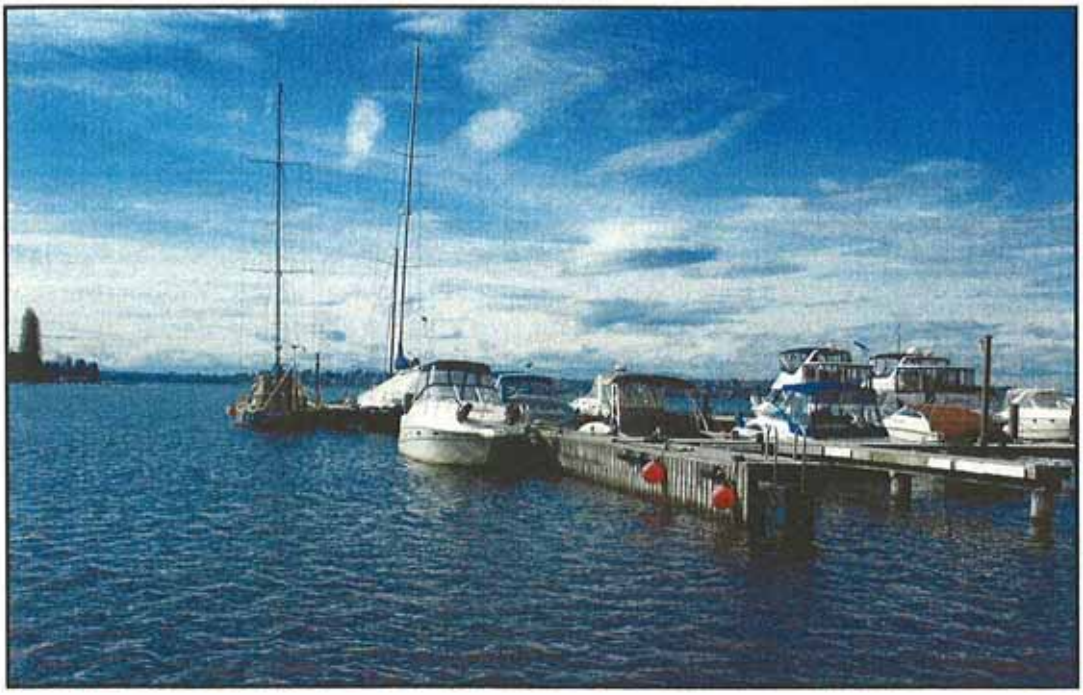

Figure 10. View of the southern terminal end of Pier D facing west from Pier C.

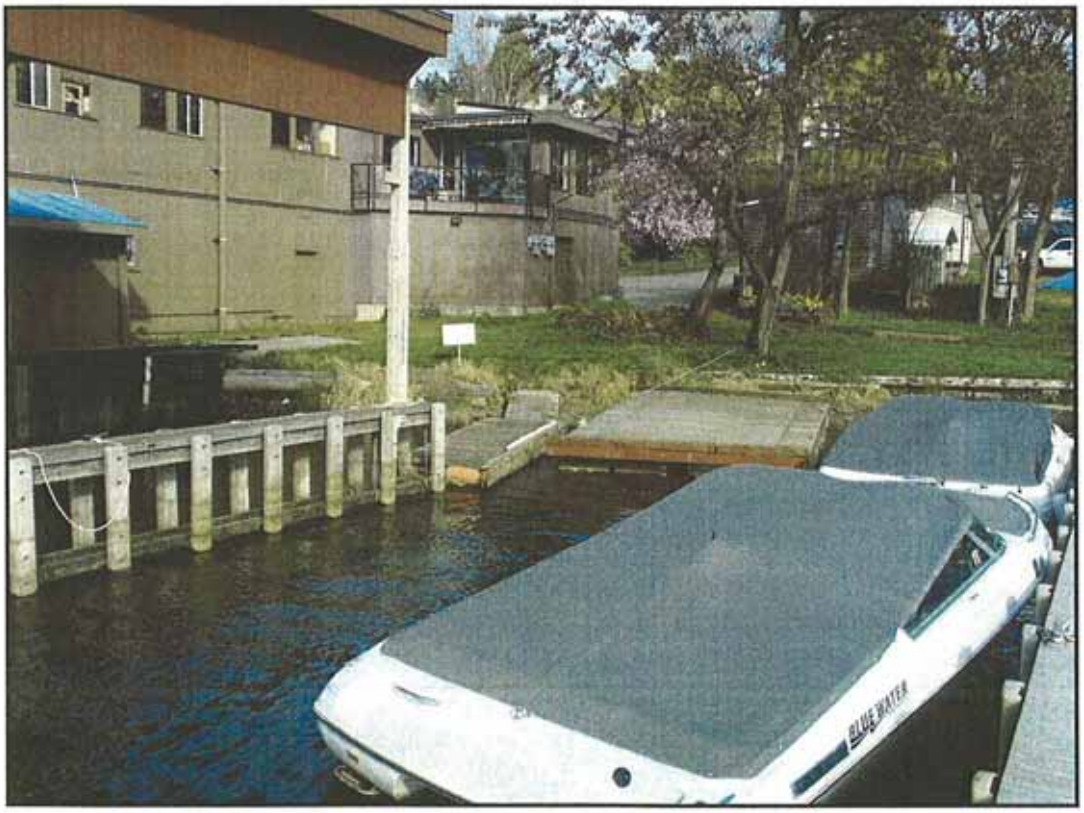

Figure 11. View of Pier G2 (left) and three nearshore floats facing northeast from Pier H.

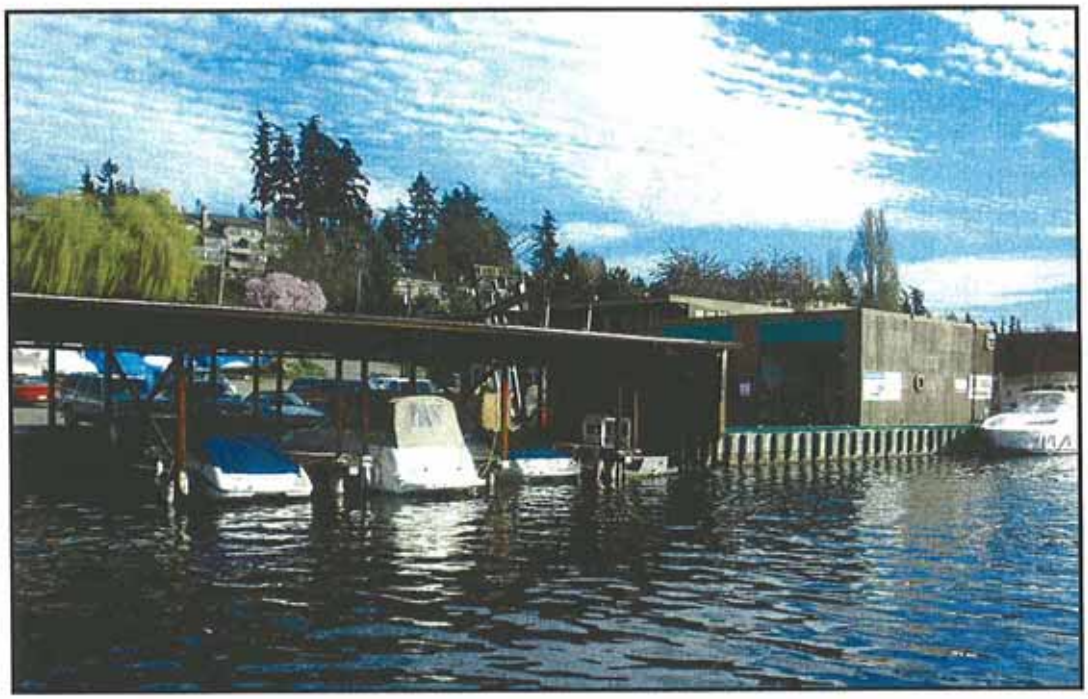

Figure 12. View of the northern portion of the applicant's shoreline facing southeast from north walkway.

Figure 13. View of the southern portion of the applicant's shoreline facing south. The weeping willow is located just off-site.

extended stream rearing; 2) migration to the lake as parr or smolts, following extended stream rearing. Chinook fry begin entering Lake Washington around the first of the year, peaking in February, while parr and smolts (average length 100 mm) enter the lake from April through July, peaking in late May. Juveniles entering the lake as fry rear in the lake until they migrate as smolts beginning in April. Fry entering the lake in winter associate closely with the shoreline, and prefer shallow water, shallow-sloped, sand and small gravel beaches proximate to sources of complex cover. The majority of the chinook juveniles in the Lake Washington watershed migrate from the system by mid-summer; most of the remaining juveniles have left by September. However, a small number of juveniles exhibit extended rearing in Lake Washington and residual chinook are also observed.

In conclusion, juvenile chinook may be migrating through or rearing in the action area from January through June. Adult chinook may be in the action area from June to November, but would not be expected in the extreme nearshore area where construction would occur. The nearest potential chinook spawning stream (Juanita Creek) is approximately 3.5 miles away.

Coho Salmon

Adult coho salmon migrate through Lake Washington to reach tributaries suitable for spawning. Adults begin migrating into fresh water in August, and spawn from late October through December in most systems (WDF et al. 1993). Beak Consultants Incorporated (1998) reported that the peak smolt migration from the Sammamish River into Lake Washington was April through mid-May coinciding with releases from Issaquah hatchery. While some coho enter Lake Washington from the tributaries as age-0 fish, most coho juveniles enter the lake as smolts (average length > 100 mm) from May to June. Thus, the majority of juvenile coho are not rearing in Lake Washington for extended periods; rather they are migrating through the lake to Puget Sound. Juvenile coho may avoid the high temperatures in the littoral zone during the summer, and are likely to migrate from the littoral zone or from the lake before water temperatures exceed 17°C, which often occurs by mid- or late- June.

In conclusion, juvenile coho may be migrating through the action area from mid-March through June. Adult coho may be in the action area from August to December, but would not be expected in the extreme nearshore area where construction would occur. The nearest coho spawning stream (Yarrow Creek) is approximately 0.4 miles away.

Bull Trout

Native char are not commonly observed within Lake Washington. Bull trout are observed at the Ballard Locks every year with numbers observed or caught varying from three to nine fish per year (Goetz, pers. comm., 14 May 2004). Bull trout entering and exiting the Ship Canal would likely occur between February and June, with those fish coming from North Puget Sound tributaries. They are observed/caught at the Locks between May and July; little or no monitoring occurs at the Locks from February through April, so data is not available for that time period. In 2003, two bull trout were observed entering the Ship Canal in June (Goetz, pers. comm., 14 May 2004). In Lake Washington, bull trout have been caught and observed during winter and spring, typically in the south Lake Washington/Cedar River area.

Little is known about their distribution and use of habitat within Lake Washington. Expectations of bull trout distribution and habitat-use in the Lake Washington system have been based upon the extrapolation of such information from other bull-trout populations. Bull trout would not be expected within the littoral zone when nearshore temperatures exceed 15°C (generally, from May through mid-October). Juvenile bull trout would remain in headwater streams until the onset of piscivory, at a body length of approximately 300 mm, at which point they would migrate as subadults in search of improved foraging opportunities. Subadult bull trout often migrate with adults to headwater streams during the summer and fall, and return to larger rivers to overwinter. Bull trout may be attracted to spawning aggregations of prey fish. Many native char in populations from north Puget Sound exhibit anadromy, migrating to marine waters in late winter.

In conclusion, the presence of juvenile bull trout in Lake Washington is very limited to unlikely, and subadult bull trout in the lake would not be subjected to similar predation pressure as juveniles. Adult and subadult bull trout would avoid the littoral zone during the summer due to excessive temperatures.

Bald Eagle

There are no known communal roosts in the project area (Negri, pers. comm., 2 September 1999). Resident bald eagles breed close to Lake Washington shorelines; the nearest known bald eagle pair in the vicinity of the proposed project is more than one mile to the southwest (WDFW 2004). There are suitable Douglas-fir perching trees on nearby properties. The project site is just over one-quarter mile from the Yarrow Bay waterfowl concentration area fringing the Yarrow Bay Wetland.

6. Species Impacts

Salmonids

The effects of the proposed project on the overall conditions of Lake Washington and the action area are indicated in the NOAA Fisheries "Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators" as revised by NOAA Fisheries for lakes (see Table 1). The proposed project could potentially affect bull trout, chinook salmon, and coho salmon in generally similar manners, other than that the affects on bull trout may often be via effects on the forage species of bull trout. Unless otherwise noted, there is no distinction between those species within the following discussion.

Direct Effects on Salmonids

1. Water Quality (substrate disturbance and discharge of waste products): Pile removal and propwash from direct overwater use or grounding of the construction vessel(s) could produce temporary, localized sediment plumes that would dissipate following cessation of activity. Pile installation could also produce temporary, localized sediment plumes, but this would likely be minimized using the proposed hollow steel piles which allow displaced sediment to enter the hollow core. The proposed project would not create and/or cause hazardous or toxic wastes or other products to be released into the water. Construction would be

completed using a barge-mounted crane. The proposed project would not affect water quantity or temperature.

To minimize construction impacts associated with increased turbidity during construction, the following timing restrictions and conditions are proposed:

a) No in-water construction activity would occur at a minimum between 16 March and 15 July for protection of fish.

b) The barge or workboat would not be allowed to ground.

c) The contractor shall stockpile construction debris on the barge or on-site above the OHWM pending off-site disposal.

d) All construction debris shall be properly disposed of on land in such a manner that it cannot enter into the waterway or cause water quality degradation (Section 13, Rivers and Harbors Act).

Construction of the proposed project is anticipated to take two weeks. Studies investigating the effects of construction-related turbidity on salmonids in a lacustrine environment have not been located. Turbidity is generally considered an undesirable condition for salmonids, as exposure to turbid water can result in lethal and sublethal affects. However, localized temporary turbidity from an individual construction activity would not represent a permanent sediment source and would not produce conditions of chronic exposure, but exposure could be minimally acute.

Considering that the turbidity produced by construction activity would be localized and temporary, the most probable impact on juvenile chinook or coho would be a behavior modification (avoidance response) rather than injury or reduction in growth potential. Since in-water work would be in areas of water greater than 20 feet deep, an avoidance response would be unlikely to expose chinook or coho to increased predation or force them away from preferred foraging areas.

The most effective strategy for minimizing or eliminating potential construction-related impacts would be to restrict construction to periods when the presence of bull trout, chinook salmon, or coho salmon is improbable. The combined fish-protection prohibitions on in-water construction by NOAA Fisheries, USFWS and WDFW result in an allowable in-water construction window of 16 July to 15 March. This window is adequate to minimize the probability that bull trout, chinook salmon, or coho salmon would be in the action area during construction. Additionally, the proposed conditions would minimize the potential for the release of waste products or construction debris to the lake. Thus, temporary water-quality impacts associated with the proposed project are unlikely to result in the take of a listed or candidate fish species.

2. Noise: Vibratory pile installation equipment would be utilized, reducing the overall noise and vibration impacts associated with common pile driving using an impact hammer. In general, pile driving activities can generate considerable noise and vibration impacts. Recent investigations of the effects of pile driving on fish have indicated that pile driving, especially

impact pile driving, can be harmful, or fatal for small fish (NOAA Fisheries 2003). Minimizing fish exposure to pile driving activities by following scientifically based construction timing restrictions is an accepted method for avoiding or minimizing adverse effects on listed species (NOAA Fisheries 2003). In order to minimize the impacts of pile driving on bull trout, chinook salmon, and coho salmon, the above timing restriction (no in-water construction at a minimum from 16 March through 15 July) would be followed. This restriction is adequate to minimize the probability that bull trout, chinook salmon, and coho salmon would be in the action area during construction. Thus, noise impacts would be insignificant and/or discountable.

3. Direct Mortality: The potential to kill bull trout, chinook salmon, or coho salmon exists as long as they are present in the action area during construction. In order to minimize the impacts of construction activity on these salmonids, the above timing restriction (no in-water construction at a minimum from 16 March through 15 July) would be followed. This restriction is adequate to minimize the probability that juvenile salmonids would be in the action area during construction.

Indirect Effects on Salmonids

The effects resulting from the activity that are later in time could potentially include: oil or gas spills; disturbance or destruction of vegetated shallows from boat moorage or from shading of the vegetated shallows; increased predation on juvenile salmonids or on forage fish of salmonids; and disruption of salmonid migration.

1. Water Quality: The proposed pier additions increase the boat moorage capacity by 8 boats. Fueling occurs at the site, at the nearshore fueling station. It is the only boat fueling station between Kenmore (north end of the lake) and Newport Shores (south end of the lake). Approximately 94 boats currently moor at the site, so the increased moorage capacity does not represent a significant increase in petroleum spill potential.

   Heavy metals from any treated wood could leach into the water, ultimately reducing the fitness of juvenile salmonids. Piling (structural members most closely associated with the water) would be Devtar 5-A epoxy-coated steel instead of treated wood. Chemonite (ACZA) pre-fabrication treatments would be utilized for the glu-lam beams on the nearshore access walkway and the float-framing members, but neither of these would be immersed. All treated wood products used for this project would comply with the most recent Best Management Practices (BMPs) established by the Western Wood Preservers Institute in cooperation with the USACE for the use of treated wood in aquatic environments. The use of wood that has been treated in conformance with these BMPs should significantly minimize the potential leaching of heavy metals into the aquatic environment (Brooks 2003). Based upon accepted models of metal leaching rates from submerged treated wood and empirical evidence from both marine and freshwater systems, the proposed installation would not result in significant increases of either water column or sediment concentrations of heavy metals, nor would any adverse environmental responses occur as a result of heavy metal leaching from the proposed installation (Brooks 2004; Brooks 2003; National Marine Fisheries Service 1998). The

proposed decking is plastic or wood-plastic composite, depending on location, but would not contain wood treatments.

Thus, potential indirect water-quality impacts at the project site are considered discountable and insignificant.

2. Habitat (vegetated shallows): Coverage by the pier additions could damage or destroy vegetated shallows, which are components of habitat quality for juvenile fish. As discussed above, aquatic vegetation is believed to be fairly abundant within Yarrow Bay, especially Eurasian milfoil. No rooted vegetation was observed in the nearshore area around Pier G2, but milfoil was observed further waterward in deeper water. The proposed floating pier extensions would cover deep water areas of previously unshaded substrate, the effects of which on the benthic community are unknown. However, the majority of the new coverage would be in water greater than 20 feet deep and approximately 110 feet waterward of the shoreline. Also, the existing floats to be removed from the nearshore shallow water would represent 289 square feet of potential area for additional growth of aquatic macrophytes. The narrow (22-inch-wide) G-2 connector represents only 55 square feet of replaced overwater cover, but would be elevated above OHW, further reducing its shading impact.

   Whether shading and potential subsequent increases or reductions in macrophyte density or abundance in the action area have any significance for juvenile salmonids has not been established. Considering that the production of juvenile salmonids in Lake Washington is not presently limited by food supply (Beauchamp and Koehler 2004), it is unlikely that changes in aquatic vegetation density or abundance in the action area would significantly affect food availability for juvenile salmonids. The question of whether a reduction would have an adverse effect on juvenile salmonid refuge habitat remains unresolved.

3. Habitat (the proposed pier modifications as predator habitat and a disruption of juvenile chinook and coho migration): The proposed pier modifications would create an additional 1,418 square feet of deep overwater coverage and a reduction of 234 square feet of shallow overwater cover. In addition, twelve new epoxy-coated steel piles would be installed and four wood piles would be removed, all in deep water. No piles would be removed or placed in the nearshore environment. Based on this proposal, the majority of the additional coverage would be located in water greater than 20 feet deep. The removal of 289 square feet of overwater coverage would occur in the nearshore 40 feet, in water up to 2.5 feet deep. Additionally, the use of full deck grating combined with the narrow width of the nearshore walkway would promote increased light transmission in the shallow nearshore area.

   The structural simplicity of the proposed structures relative to natural shorelines would favor predators such as birds and piscivorous fish, which forage on juvenile salmonids and other small fish. The applicant proposes the following measures to minimize the impacts of the proposed modified piers and to improve habitat conditions in the nearshore area.

   1) 289 square feet of floating docks would be removed from the nearshore 40 feet.
   2) The nearshore walkway to access Pier G2 would be only 22-inches wide and fully grated.

3) Pile size and number for Piers C and D would be minimized by using steel piles and floating docks out in deep water.

Findings from the ongoing Lake Washington Studies indicate that juvenile chinook avoid venturing under large, artificial overwater structures, and that migrating schools of chinook may go around wide piers rather than under them (Tabor and Piaskowski 2002). These studies have not investigated chinook response to a variety of pier configurations, but the findings do indicate that concern for the impacts of piers on chinook migration and foraging behavior are warranted. Early in the spring, most juvenile chinook salmon are found in water less than a meter deep; in May and June, chinook use deeper water farther from shore (Tabor and Piaskowski 2002). Results from hydroacoustic sampling in 2002 confirm earlier results that found juvenile chinook at greater depths and distance from shore in May and June (Tabor 2003). These studies suggest that minimizing overwater coverage and simple structure in shallow water is important for juvenile chinook in winter and early spring, but the same minimization efforts may be important in deeper water (> 2 meters) during May and June.

Other findings from the ongoing Lake Washington Studies indicate that in some areas smallmouth bass (*Micropterus dolomieu*) are closely associated with artificial overwater structures, and that larger structures can apparently support more bass (Fresh, pers. comm., 15 April 2002). Shade, while still a factor, is apparently not the primary factor in smallmouth bass habitat-selection, but the degree to which other factors, such as in-water structure influence bass habitat selection remains unknown. Preliminary study results from 2002 show that smallmouth bass distribution is patchy and driven by habitat attributes, primarily substrate, with smallmouth bass abundance positively correlated with cobble substrate and negatively correlated with mud and mud/sand substrate (Fresh et al. 2003). In areas where smallmouth bass were abundant, their selection of docks was disproportionate to the availability of dock habitat, with a much greater proportion of bass observed at docks than at non-dock habitat (Fresh et al. 2003). Concerning docks, smallmouth bass were most abundant around large docks, with lots of piles, in deeper water, and with skirting (Fresh et al. 2003). Less is known about largemouth bass in Lake Washington because they have not been thoroughly studied. Largemouth bass are much less abundant than smallmouth bass and thus it is difficult to obtain sufficient sample sizes for statistical analysis of field data. Nevertheless, smallmouth bass are unlikely to utilize the project area because they do not typically select habitat with soft substrate and aquatic macrophytes, whereas largemouth bass are likely to utilize the site because they typically select such habitat. From the limited observations in Lakes Washington and Sammamish, and from studies in other systems, largemouth bass utilize docks and in-water structure such as piles for both foraging and nesting, preferring nest sites with overhead cover.

The proposed modified marina would create additional overwater coverage and introduce in-water structure (new piles) where these obstacles previously did not exist. However, these structures would be located in water greater than 20 feet deep and immediately adjacent to areas with existing expansive overwater coverage. In addition, the reduction of the nearshore overwater coverage and limitation of the proposed walkway width to 22 inches should improve nearshore migratory conditions for juvenile chinook. Whether or not the proposed grating would influence the response of either chinook or largemouth bass remains unknown. Additionally, the response to the replacement structure by other piscivores such as yellow

perch, cutthroat trout, or northern pikeminnow in Lake Washington has not been specifically investigated. Stomachs of northern pikeminnow from developed areas of Portland Harbor contained 30 percent more juvenile salmonids than northern pikeminnow in undeveloped areas (Ward 1992). However, the study by Ward (1992) was not designed to investigate the precise response of northern pikeminnow to individual moorage structures, but looked instead to larger-scale influences of general development on predation rates and distribution of predators and prey. Regardless, the study indicates an influence of shoreline development on predation rates by non-centrarchid predators, although the exact mechanism could not be determined. Such uncertainty warrants a conservative approach. Considering the preceding discussion, the proposed project would be unlikely to negatively affect migration conditions for juvenile salmonids or predator foraging and spawning conditions in the action area.

Other Effects

For all other pathways and indicators not specifically mentioned above, the activity would not alter the present environmental baseline.

Net Effect

The proposed timing restrictions and conditions would minimize the potential for construction-related impacts. Incorporation of impact minimization measures (such as light mitigation, limiting the number of piles necessary, and removal of existing overwater coverage) reduces the collective impact of proposed projects. Thus, the proposed project:

- **may affect, not likely to adversely affect, Puget Sound chinook salmon**
- **would not jeopardize Puget Sound-Strait of Georgia coho salmon**
- **may affect, not likely to adversely affect, Coastal-Puget Sound bull trout**.

Bald Eagle

As previously mentioned, the nearest nesting bald eagle pair more than 1.0 mile to the southwest. Bald eagle habitat would not be destroyed by the project, nor would prey abundance be reduced. Populations of wildlife species preyed on by bald eagles, such as waterfowl, would not be affected.

As stated in Section 1, because the project site is located more than one mile from an active bald eagle nest, timing or equipment restrictions are not necessary to protect breeding bald eagles. The project site is not located within a quarter mile of a special foraging area, but is located within one-quarter mile of perch trees. Accordingly, pile-driving work between 1 November and 31 March must be conducted using a vibratory pile driver. Work using hand tools could be conducted between 1 November and 31 March if the work is within ambient noise levels. Thus, the proposed project:

- **may affect, not likely to adversely affect, foraging and breeding bald eagles**.

7. Critical Habitat

Chinook Salmon

The action area includes proposed critical habitat for chinook salmon, which has been defined as freshwater spawning and rearing sites and migration corridors. The action area is in the Lake Washington Sub-basin (Unit 10). Proposed chinook salmon critical habitat includes these primary constituent elements (excerpted from the proposed rule, U.S. Federal Register, 14 December 2004):

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;
3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;
4. Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
5. Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
6. Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

Project activities that introduce or remove physical elements to and/or from the lake, or that contribute to short-term changes in water quality, may alter certain primary constituent elements (Table 2). For the proposed project, these include pile removal, pile driving, and pier construction activities.

Table 2. Assessment of Primary Constituent Elements for Chinook Salmon.

Primary Constituent Elements	Direct, Indirect, Interrelated and Interdependent Effects
1. Freshwater spawning	Typically N/A in a lake environment. Chinook salmon have rarely spawned in Lake Washington. The proposed project would have no effect on substrate conditions. Water quantity would not be affected. Water quality would only be affected in the short-term during pile driving and pile removal activities.

Primary Constituent Elements	Direct, Indirect, Interrelated and Interdependent Effects
2. Freshwater rearing	The proposed project includes minor improvement in rearing habitat with the net reduction of nearshore overwater cover.
3. Freshwater migration	The proposed project would not alter migratory conditions.
4. Estuarine areas	The project would have no effect on estuarine areas.
5. Nearshore marine areas	The project would have no effect on nearshore marine areas.
6. Offshore marine areas	The project would have no effect on offshore marine areas.

The action area is suitable for rearing, foraging and may be part of an essential migratory corridor for chinook salmon. Although in-water work is proposed, the proposed project would not effectively alter any of the primary constituent elements. Given the direct, indirect, interrelated, and interdependent effects from the proposed action, the proposed project:

- **would not adversely modify the proposed critical habitat of the Puget Sound chinook salmon.**

Coho Salmon

Critical habitat has not been proposed for coho salmon.

Bull Trout

The action area includes proposed critical habitat for bull trout, which has been defined for lakes as "the perimeter of the water body as mapped on standard 1:24,000 scale maps" (U.S. Federal Register, 25 June 2004). The action area is in the *Puget Sound Unit* (Unit 28), *Lake Washington CHSU* (critical habitat subunit).

Proposed bull trout critical habitat includes these primary constituent elements (excerpted from the proposed rule, U.S. Federal Register, 25 June 2004):

1. Water temperatures ranging from 36 to 59 [deg]F (2 to 15 [deg]C), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence;
2. Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures;
3. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.25 in (0.63 cm) in diameter and minimal substrate embeddedness are characteristic of these conditions;
4. A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, a hydrograph that demonstrates the ability to support bull trout populations by minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation;

5. Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity;
6. Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows;
7. An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish;
8. Few or no nonnative predatory, interbreeding, or competitive species present; and
9. Permanent water of sufficient quantity and quality such that normal reproduction, growth and survival are not inhibited.

According to the Federal Register, Lake Washington "provides FMO [foraging, migratory and overwintering] habitat for amphidromous bull trout outside of currently delineated core areas in the Puget Sound Recovery Unit." Project activities that introduce or remove physical elements from the lake, or that contribute to short-term changes in water quality, may alter certain primary constituent elements. These include pile removal, pile driving, and pier connection activities.

Although in-water work is proposed, the proposed project would not effectively alter any of the primary constituent elements (Table 3). The action area is suitable for foraging and overwintering habitat, and may be part of an essential migratory corridor for amphidromous bull trout.

Table 3. Assessment of Primary Constituent Elements for Bull Trout.

Primary Constituent Elements	Direct, Indirect, Interrelated and Interdependent Effects
1. Water temperature	The project would have no effect on water temperature
2. Complex stream channel	NA in a lake environment
3. Substrate	NA in a lake environment. Bull trout do not spawn in Lake Washington.
4. Natural hydrograph	The project would have no effect on the hydrograph (which has reduced importance in a lake environment).
5. Spring, seeps, groundwater sources and subsurface water connectivity	The project would have no effect on subsurface supplies of clean water
6. Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering and foraging habitats	The proposed project would not create any barrier to migration, particularly as lake bull trout are larger fish that are not as subject to predation-pressure and are as such not as shoreline-oriented.
7. Abundant food base	The project would have no effect on food supplies.
8. Few or no nonnative predatory, interbreeding, or competitive species	The proposed project is not expected to increase populations of any predatory, interbreeding or competitive species
9. Permanent water of sufficient quantity and quality such that normal reproduction, growth and survival are not inhibited.	The project has the potential to reduce water quality for a short time during project construction. However, the project would be constructed during approved timing windows. Any suspended sediments would quickly settle.

Given the direct, indirect, interrelated, and interdependent effects from the proposed action, the proposed project:

- **would not adversely modify the proposed critical habitat of the Coastal-Puget Sound bull trout.**

Bald Eagle

Critical habitat has not been proposed or designated for the bald eagle.

8. Essential Fish Habitat

Discussions regarding essential fish habitat (EFH) related to Pacific salmon present in Lake Washington are indirectly included in this Biological Evaluation (BE). The information below identifies where these discussions are located within the BE and concludes with a determination of effect. In accordance with the comments from the USACE and prior concurrence letters from NOAA Fisheries, this discussion should be considered sufficient to make this determination.

Description of the Project / Proposed Activity: The project description and location are described within the first two sections of the BE. This description gives a thorough explanation of the construction plan and activities. Pacific salmon species of interest related to EFH in the project area are chinook and coho salmon.

Potential Adverse Effects of the Proposed Project: The following is a description of Pacific salmon EFH as per the federal Fisheries Management Plan (FMP). EFH for the Pacific coast salmon fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. To achieve that level of production, EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho and California. Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e. natural waterfalls in existence for several hundred years).

Potential impacts to chinook and coho salmon EFH (relevant species covered by the *Pacific Coast Salmon Plan*), as described in the BE in Sections 6 and 7, include potential impacts to refuge, migration, and forage conditions at the shoreline resulting from the pier modification; potential temporary degradation in water quality from pile removal and pile driving; substrate disturbance due to general construction activities; temporary impacts from sound during construction (disruption in foraging and predator-avoidance behavior, injury, death); threats to safe passage of juvenile salmonids (could influence predation and migratory behavior); and long-term modifications to aquatic nearshore habitat (shading of substrate/aquatic macrophytes).

EFH Conservation Measures: The following impact minimization measures are being incorporated into the proposed project in order to reduce the collective impact.

1. Existing nearshore floats (289 square feet) would be removed.
2. New float fingers on Pier C would be 3 feet wide, and new float walkways and ells would be 5 feet wide. Approximately 420 square feet of existing float on Pier C would be removed and/or incorporated within the proposed 1,128 square foot Pier C float extension.
3. The new ramp and connecting walkway on Pier D would only be 5 feet wide.
4. New 22-inch-wide wide nearshore access walkway to Pier G2 would be fully grated and would require no new piles.
5. Durable and non-toxic materials would be used.
6. Limitation of the allowable construction window from 16 July through 15 March (combined NOAA Fisheries, USFWS and WDFW timing windows) would sufficiently minimize the potential to directly affect rearing and migrating Pacific salmon.

Conclusion: All of the proposed project's potential impacts on chinook and coho salmon EFH are considered collectively. *The results of the proposed project would be an improvement in EFH* as described above. Thus, the collective impact of the proposed project:

- **may affect, not likely to adversely effect, Pacific chinook and coho salmon EFH.**

9. Cumulative Impacts

Cumulative impacts were assessed through the review of an aerial photo (see Figure 2) and a site visit. At present, the action area has a large marina containing fixed-pile piers and floating docks, and a vertical timber bulkhead. Except for the proposed project, the applicant has no plans for future alterations to the lake action area. Any future activities subject to local, but not federal, regulation would comply with all applicable ordinances governing construction and soil disturbance near water. These regulations are anticipated to become increasingly restrictive to the benefit of sensitive fish and wildlife resulting consideration of the listings of chinook salmon and bull trout, and the potential listing of coho salmon in the future. There are no significant wildlife habitats or special habitat elements present on the property that would be disturbed by any foreseeable activity.

Waterward of the OHWM in the action area, future activities include boating. Projection of activities not under federal regulation on properties adjacent to the action area is speculative at best. Changes in presently ongoing waterborne activities are not expected. Therefore, cumulative impacts (as defined in the ESA) on sensitive fish and wildlife species and their habitats are not considered significant.

10. Determination of Effect

Determination of effect for all species and their respective assessment areas are listed in Table 4. The proposed project may affect, not likely to adversely affect, Puget Sound chinook salmon, and is not likely to jeopardize Puget Sound-Strait of Georgia coho salmon. The proposed project may affect, not likely to adversely affect, Coastal-Puget Sound bull trout and the bald eagle.

Given the direct, indirect, interrelated, and interdependent effects from the proposed action, the proposed project would not adversely modify the proposed critical habitat of Puget Sound chinook salmon or Coastal-Puget Sound bull trout.

The collective impact of the proposed project may affect, not likely to adversely affect, Pacific chinook and coho salmon EFH.

Table 4. Determination of Effect.

Species	Overall Project Effect	Effect on Critical Habitat	Effect on EFH
Puget Sound Chinook Salmon	May affect, not likely to adversely affect	Would not adversely modify	May affect, not likely to adversely affect
Coastal-Puget Sound Bull Trout	May affect, not likely to adversely affect	Would not adversely modify	N/A
Puget Sound-Straight of Georgia Coho Salmon	Not likely to jeopardize	N/A	May affect, not likely to adversely affect
Bald Eagle	May affect, not likely to adversely affect	N/A	N/A

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APPENDIX A

Washington Department of Ecology's *Resource Manual for Pollution Prevention in Marinas*

RESOURCE MANUAL FOR POLLUTION PREVENTION IN MARINAS

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Resource Manual for Pollution Prevention in Marinas

Washington State Department of Ecology
Water Quality Program
Permit Management Section
P.O. Box 47600
Olympia, Washington 98504-6432

Telephone: (360) 407-6000

May 1998
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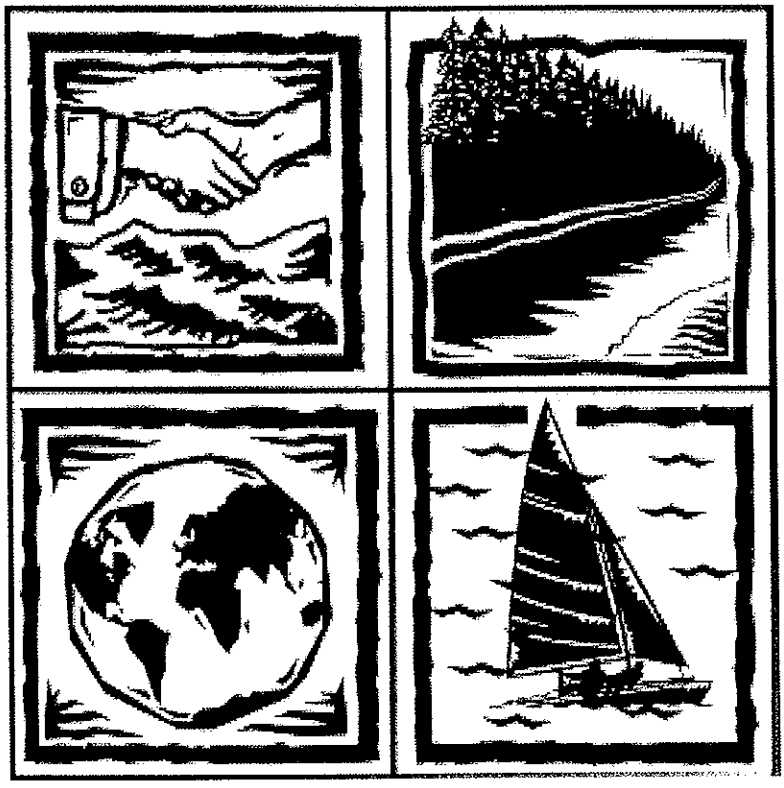
Resource Manual for Pollution Prevention in Marinas



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DISCLAIMER

This manual is intended as an educational tool for marina operators and boaters. It does not constitute a complete reference to state, federal or local laws. Relying on the information in this book will not protect you legally. This book may not be relied upon to create a right or benefit substantive or procedural, enforceable at law or in equity by any person.

Contributing agencies, organizations and individuals cannot assume any liability for the accuracy or completeness of the information in this publication. Inclusion in this book is not an endorsement of the companies listed. Final determination of the proper handling and disposal of waste is the sole responsibility of the generator.

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Ms. Lynn Schroder, Northwest Marine Trade Association
Mr. Eric Olsson, Washington Sea Grant Program
Ms. Cheryl Cutshaw, Port of Olympia
Mr. Neil Falkenburg, West Bay Marine Services
Ms. Rosemary Byrne, King County Health Department
Ms. Sue Hamilton, King County Health Department
Ms. Cynthia Hickey, King County Industrial Waste
Ms. Cynthia Balogh, King County Local Hazardous Waste Management Program
Ms. Julie Rector, Muckleshoot Indian Tribe
Mr. Gerald Tousley, Thurston County Environmental Health
Ms. Dona Wolfe, Washington State Parks and Recreation Commission

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Mr. Miles Kuntz, Hazardous Waste and Toxics Reduction Program
Mr. Scott Lamb, Hazardous Waste and Toxics Reduction Program
Ms. Patricia Jatczak, Hazardous Waste and Toxics Reduction Program
Ms. Laura Schleyer, Hazardous Waste and Toxics Reduction Program
Mr. Harry Johnson, Hazardous Waste and Toxics Reduction Program
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Paul Stasch
Project Lead
Water Quality Program
Washington State Department of Ecology

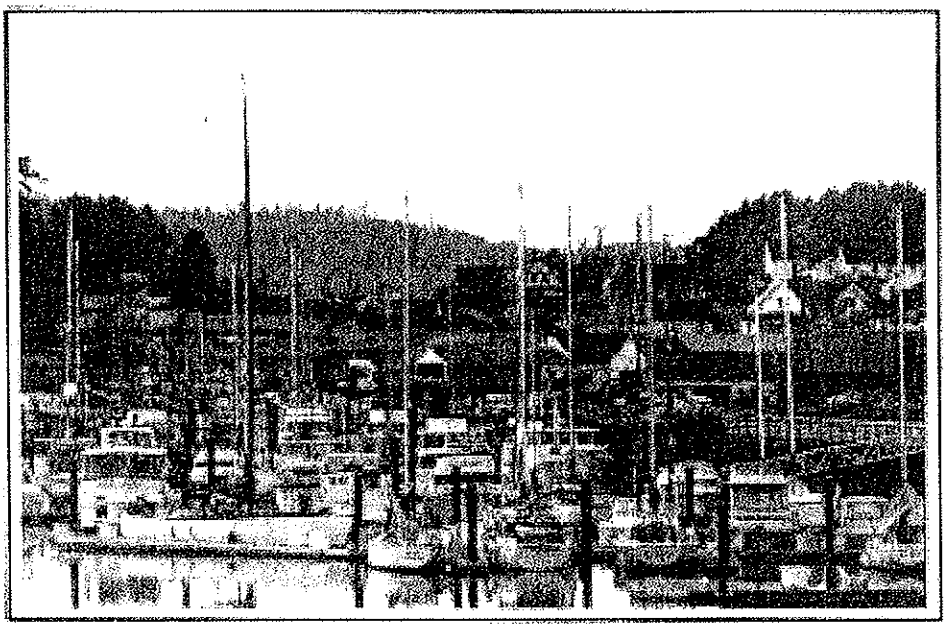

PHOTO BY NITA BARCOTT (FOTO VISION)

Daybreak at Gig Harbor announces another opportunity for boating on beautiful Puget Sound

A Resource Manual For Pollution Prevention in Marinas

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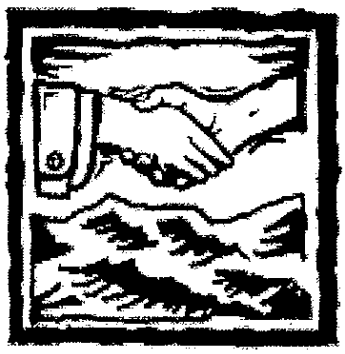
Section 1

Introduction



Introduction

This manual is intended to assist Washington State marina managers, harbormasters and yacht clubs to develop best management practices (BMPs) and sound environmental alternatives for their tenants and the marine contractors working within their facilities. Best management practices are common sense initiatives and low cost management solutions. Once adopted, these measures will prevent or minimize pollution at its source, before it reaches the waters of the state and contaminates sediments, thus reducing a marina's environmental liabilities.

Best management practices make good economic sense. It is always cheaper and easier to clean up pollution at the source. After it has dispersed throughout the environment, the costs of cleanup and remediation are many magnitudes higher. Pollution prevention practiced in marinas is important to promote an abundance of aquatic life and a healthy boating environment. Remember, the bays, rivers and lakes of Washington State are one of our most important assets.

Our rivers were once viewed as open sewers that would carry our wastes away while oceans were thought to have an unlimited capacity to assimilate them. It was not long ago that Lake Washington posed a significant human health threat to those that fished and swam in it. We have come a long way with our environmental ethic since then. We now know that all surface waters are fragile resources that require careful stewardship. Despite the obvious improvement, we must all work together to make additional improvements in the quality of our waters.

The United States congress enacted the Federal Clean Water Act (CWA) as a means to bring about many of the initial improvements we have seen in our lakes, rivers and bays. It was the primary regulatory vehicle used to limit the discharge of pollutants to navigable waters of the United States. The U.S. Environmental Protection Agency (EPA) was authorized to implement the CWA. In order to control pollutants, the EPA developed water quality criteria, effluent standards and a permitting process to control these discharges. The State Legislature enacted the Water Pollution Control Act, Chapter 90.48 RCW, to control these same pollutants in the State of Washington. This law reads in part:

> *"It shall be unlawful for any person to throw, drain, run, or otherwise discharge into any of the waters of this state, or to cause, permit or suffer to be thrown, run, drain, allowed to seep or other wise discharge into such waters any organic or inorganic matter that shall cause or tend to cause pollution..."*

The legislature enabled the Washington State Department of Ecology (Ecology) to adopt water quality criteria and effluent standards and implement the federal permitting program. This program is responsible for issuing National Pollutant Discharge Elimination System (NPDES) permits to point source discharges.

Since there are few, if any, marinas that qualify as point source discharges, they do not need to apply for and receive an NPDES permit. This does not mean however, that marinas do not pollute. They do. However, their sources of pollutants (antifouling paints, gray water, sewage and detergents) are diffuse and/or intermittent. Because of this marinas are by their very nature considered non-point sources, not subject to the permitting requirements. This is why BMPs are the control mechanism of choice.

Implementation of BMPs is typically voluntary and can be completed over time. However, if voluntary implementation is slow and incomplete, or if violations of the water quality standards exist, regulatory implementation may be a necessity. Obviously, this would be a less than desirable situation.

One thing we know for sure, BMPs cannot work if nobody knows about them. You and your staff should become completely familiar with the BMPs you have developed for your marina. Train your staff about your marina BMPs and how to recognize those practices of tenants and marine contractors that cause water-borne pollution. Post them so everybody knows what to follow. Everyone should understand that plumes of discolored water, piles of treated wood sawdust on the floats and oil sheens from bilges have no place in your marina. Explain the water quality impacts of the in-water hull cleaning of vessels painted with antifouling paints. Do not permit any tenants to use a tidal grid for anything other than changing propellers, zincs or for conducting emergency repairs. Incorporate your BMPs into your moorage agreement.

"...BMPs cannot work if nobody knows about them"

Marine contractors working in your marina can present a unique challenge. You should consider having them read your BMPs and then sign a clean worker contract. Require proof of insurance and make them produce their business license. Consider the use of environmental deposits to ensure they will not leave your floats and surrounding waters a disaster.

Should a problem develop with a particular tenant or contractor, bring it to their attention and remind them of your BMPs. Often that is not enough so be prepared to explain why their actions are not protective of the environment. If a problem persists, do not be afraid to terminate a tenant's lease or bar a contractor from working in your marina.

We hope this manual will be a living document that you can use for years to come. We selected the durable three-ring binder design so it would fit nicely on a shelf. You can add pertinent information of your choosing, (such as your spill plan and marina specific BMPs) or replace that which becomes out dated. We have included a reference section of relevant materials you might find worthy of ordering. Also enclosed is a resource guide of governmental contacts and a service directory of private vendors.

Let's all work together to keep our marinas ship shape!

Common Questions

These questions are frequently asked by marina owners, tenants, and boaters as we work together to understand our impact on the environment. Short answers are provided, including some section references for more information.

What about divers conducting in-water hull cleaning?

Ecology has determined that in-water hull cleaning is a commercial operation whose discharge requires an NPDES permit. However, Ecology cannot permit an activity that has a reasonable potential to violate the water quality standards necessary to protect aquatic life. Cleaning a vessel's hull painted with an anti fouling paint can violate the water quality standard for copper. As a result, Ecology has issued a draft environmental advisory withdrawing support for the practice. This draft advisory will not become effective until issued in final form. A copy of the draft advisory is available through the Department of Ecology. For additional information call Paul Stasch at (360) 407-6446.

What about tidal flushing action in Puget Sound? Don't our strong, twice-a-day tides flush and get rid of most of the pollutants from boating and marinas?

Contrary to popular belief, the circulation of water in Puget Sound is relatively poor. In fact, in the South Sound, pollutants may take many years to be fully flushed from the waters. Many marinas are sited in protected low-flushing bays.

In addition, pollutants such as heavy metals found in some bottom paints fall to the bottom and contaminate the sediments. These toxic pollutants remain in the bottom sediments indefinitely, unless they are removed.

How big a problem is boating/marina pollution? How does it compare with <u>other</u> sources?

Individual boaters are only a very small part of the problem, but multiplied by tens of thousands the combined effects of individual actions do have a significant impact on the health of the ecosystem. It has been estimated that boating activities represent 5% of the pollution entering our waters, but that small amount is often obvious and visible in the water.

Runoff from streets and parking lots, industrial discharges, failing residential septic systems, poor farming or livestock practices, commercial fishing boats, recreational boaters, and household toxics all contribute to the pollution of the waters of our state. Each of us must take responsibility for our part of the problem. We can change many habits and practices to lessen our impact on water quality.

Why are they "Picking on" boaters?

"They" can mean federal, state, local government agencies or environmental groups depending upon who is talking. Many boaters feel they have been unfairly taxed and regulated in recent years. They feel they are more visible and easily identified than other larger sources of pollution, and that many people assume boaters have "deep pockets." Boaters and marinas **<u>are</u>** very visible; they are located on shorelines and directly in the waters of the state. These are the areas where direct impacts can have serious effects.

Sewage discharges have forced restrictions or closure of about 40% of commercial shellfish beds. This is an alert to all who care about this resource and the health of our environment. Many sources contribute to water pollution. Large industry has been regulated for years; more recently other sources are receiving attention. As responsible users of the resource, we have an opportunity to lead the way in initiating and supporting clean boating and marina practices to preserve and protect the natural beauty of our waters.

Can anything be dumped overboard?

Trash-NO. Oil, fuel, or other petroleum products-NO. Oily bilge water- NO. Toxic paint and cleaners-NO. Sewage-in Puget Sound it is illegal to discharge any sewage (including treated sewage) at the moorage. Use the holding tank when you are cruising and use a pump-out when you return. Never discharge any sewage near sensitive areas such as shellfish beds.

Which materials and products degrade water quality?

Many boat cleaning and maintenance products and paints are toxic. Oil and petroleum products are toxic. It is illegal to use liquid detergents to disperse oil either in the bilge or in the water. Liquid soaps may get rid of the sheen but not the oil. Soap breaks oil into smaller droplets that are harder to see, harder to contain and more damaging to sensitive marine life. There is no dispersant (liquid soap) that is acceptable for getting rid of oil and petroleum products in the water. IT IS IMPORTANT TO KNOW THAT "BIODEGRADABLE" DOES NOT MEAN "NON TOXIC" OR NONPOLLUTING. Many products listed as "biodegradable" are toxic to the environment. Additionally, soaps degrade water quality by contributing to algae bloom. Check labels carefully! See Section 7.

What can I use instead?

Section 7 includes some alternative products and companies that make environmentally friendly products.

What are the current laws? Who is responsible for enforcement?

Current federal and state laws (and corresponding penalties) that pertain to marina and boating activities are listed in Section 3.

What are my liabilities as a marina owner/operator?

As a business owner, you are personally responsible for any spills or discharges of pollution from your property. You are ultimately liable for the actions of your employees and customers engaged in work that relates to your business. You can be held personally and financially responsible for any damage caused to property, health or to the environment and can be susceptible to administrative and criminal fines and penalties for breaking the law. The bottom line is that you are liable for the impacts of any hazardous, toxic, or dangerous releases from your operation.

Where can I get help?

Section 8 lists resource agencies and organizations that you may contact for advice and assistance. Several will provide free on-site visits and consultations.

Is there any money available to help with costs of pollution prevention, pumpouts, etc?

The Clean Vessel Act (enacted by Congress in 1992) makes funds available to construct, renovate, and operate pumpout stations and to conduct boater environmental education programs. Contact Washington State Parks and Recreation, (360) 902-8511 for information and applications.

Contact the local Hazardous Waste Program Library (206) 689-3051 for information in the Incentives Data Base on grant money available to King County small businesses.

Why do I have to get involved with all this?

To preserve and protect our waters, it is the right thing to do. To protect yourself from future liability issues, it is the right thing to do. Legally, it is the right thing to do. Contamination of your property, or property that you lease, can result in expensive fines and remediation costs as well as impairing future use, sale or transfer of your property. Economically, it is substantially less costly to prevent than it is to clean up.

What are Best Management Practices (BMPS)?

Best Management Practices are pollution control activities designed to prevent or reduce the discharge of pollutants into surface or ground water. BMPs are required by Ecology under both individual and general NPDES discharge permits for boatyards and shipyards. BMPs are not legally required for marinas at this time. But marinas and boaters are still required not to pollute. This manual contains BMPs recommended for marinas and boaters in order to control pollution associated with their activities.

What kind of maintenance can still be done at the slip?

Slip-side maintenance should be limited to projects involving less than 25% of the above- water surface area. If the work is more extensive than that, the repair is a boatyard-type repair needing a permit, or a haul-out at the local permitted boatyard. Before boaters begin a maintenance project, they should check with the marina operator or harbor master. Many marinas have adopted strict maintenance policies which limit or prohibit some types of slip-side maintenance. Most other maintenance procedures can be done by adopting Best Management Practices (BMPs) and using common sense.

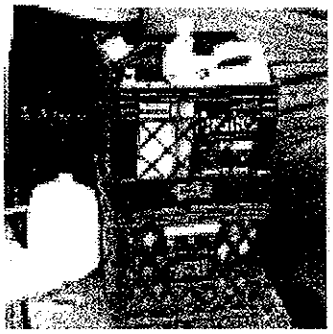
What about commercial fishing boats? Do they follow any best management practices?

Much pollution prevention outreach has been done to commercial fishermen in the last few years. Fishing organizations are involved in education and publishing information in newsletters. FISH EXPO and similar tradeshows provide opportunities to demonstrate new environmentally friendly products and equipment. Pacific States Marine Fisheries Commission F.I.S.H. Habitat Education Program distributes BMP information and pollution prevention products and materials, including a pledge form of personal commitment to reducing pollution. Washington Sea Grant also works with commercial fishermen on small oil spill prevention and response. Most ports now provide facilities for collecting and recycling waste oil from commercial fishing vessels. These are widely used.

How do I get people to be responsible for their own clean boating practices?

Education is the key. We are rapidly becoming aware of the impact of many human activities upon the health of our natural resources. Boaters need to know how they can still enjoy boating activities with the least "boat print" left behind. Marina operators can implement BMPs and post them at their marinas. Yacht clubs can lead by example and through education/information programs at their clubs. Yacht brokers can provide educational materials. Recreational boating classes can include environmental information. Boaters need to "pass the word" along to others moored at their docks.

What can I do about "orphan wastes" at my marina?



"Orphan wastes" are those mysterious deposits of stuff (usually liquid) left near marina dumpsters and on docks. These are often unidentified and unlabeled, abandoned for the marina operator to deal with. Talk with the guilty dumper if you can identify who did it. Most important, clearly post a sign indicating WHERE and HOW to dispose of common boat waste products. Encourage boaters to buy the right quantity in the first place, giveaway or trade what they don't need, and make sure boaters understand that they are responsible for disposing of hazardous waste at a household hazardous waste collection place. Treat any orphaned waste as hazardous waste, unless you know differently. Do not mix it with your other waste oil and thereby risk contamination of the entire batch. Talk with your local moderate risk waste program about the possibility of their sponsoring hazardous waste collection events during the year.

What kind of boat work can I do on the "tidal grid?"

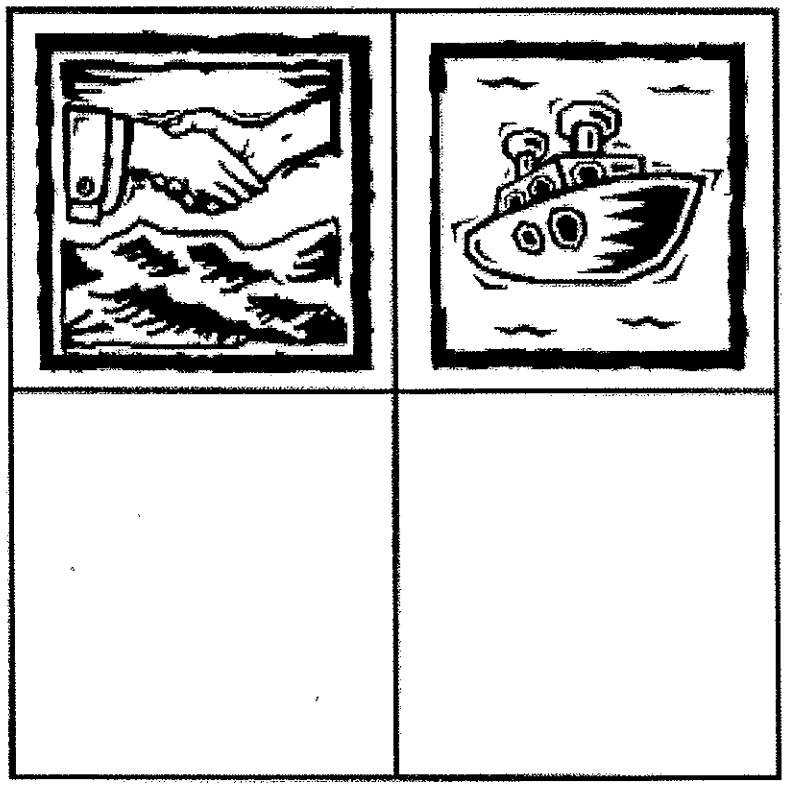
Grids may be used for marine surveys, changing zincs, and doing minor prop and shaft work that does not disturb bottom paint. No hull scraping, washing, cleaning and painting are allowed. These are all boatyard activities that require a NPDES permit.

What about liveaboards?

Key issues with liveaboards in marinas are sewage disposal and heavy use of marina facilities. Some marinas with large numbers of liveaboards are considering sewage management plans, perhaps with scheduled pumpouts and/or submitted pumpout records.

Section 2

A Partnership to Prevent Pollution



A Partnership to Prevent Pollution

The policies and practices of a marina influence the habits of boaters. A marina which provides adequate facilities for waste oil, garbage, sewage pump-out, and properly manages fuel docks and hazardous materials encourages boaters not to pollute. Marinas can also influence boaters by establishing policies that prohibit operation and maintenance of vessels in ways that add pollutants to the water or hazardous wastes to the dumpster.

No matter how well a marina is designed, constructed, or maintained, pollution prevention will not occur without the cooperation of boaters. **Marinas and boaters must work as partners in pollution prevention.** The marina operator provides a policy of best management practices, as well as support services such as used oil receptacles, recycling, and well equipped fuel docks. The boater uses the facilities responsibly, pays for his/her share of these services, and undertakes to reduce use of toxic products.

The purpose of this manual is to provide harbormasters and marina operators with ways to forge such a partnership. For each source of boater pollution identified in this document a Best Management Practice (BMP) is described and methods to influence or educate tenants and other boaters in order to achieve the BMP are suggested. Tips for boaters are also included so that you, the marina operator, can both educate and influence your customers. Finally, a section listing agency/business resources, recyclers, hazardous waste management companies, and alternative products is provided to help you in implementing the measures described.

This manual focuses on sources of pollution such as:

- discharge of oil or oil-based products into the marine waters during engine maintenance and repair, fueling, discharging oily bilge wastes, and improper disposal of oil products
- pollutants discharged from boats during operation (sewage, detergents, graywater)
- hazardous materials (paints, lacquers, thinners, strippers, solvents and preservatives) which find their way into our surface waters directly or in storm water
- trash and plastics tossed (intentionally or inadvertently) overboard
- spill prevention and spill response
- introduction of exotic species.

These sources of pollution can degrade the health of the region's marine environment and threaten public health. They may also effect the viability of businesses which rely on a healthy ecosystem. Certainly the health of our waters and all the life that they support is worth an ounce of prevention.

Incentives for Pollution Prevention at Marinas

Pollution costs money.

By preventing pollution instead of creating it, you reduce costs for waste disposal, cut material costs, and improve safety both for employees and visitors. If you provide waste recycling and collection facilities and educate boaters about best management practices when using and disposing of hazardous materials at the marina, your facility will be cleaner and you will spend less time and money cleaning up spills and wastes left by boaters. It is substantially less costly to prevent a spill than it is to clean it up.

Compliance with the law.

This is another reason to operate a marina in a manner consistent with best environmental management practices. Owners and operators of marinas must comply with numerous hazardous waste control and oil spill response laws. If hazardous waste contamination occurs, a marina may be liable for significant remediation costs.

If a property is being sold and contamination is a possibility, lenders may require sellers to perform extensive hazardous waste assessments. A business which has hazardous waste contamination will have a hard time selling the property without taking significant and expensive steps to remediate the problem. It's easier and less expensive to employ pollution prevention measures before contamination becomes a problem.

In addition, the recreational boating industry is receiving increased attention as a source of coastal "non-point source" pollution. All states are required by recent amendments to the Coastal Zone Management Act (CZARA) to adopt programs which control a number of industries identified as sources of coastal non-point source pollution. Marinas are identified as one of these sources of non-point source pollution. Washington is at the formative stage of structuring a program in response to the CZARA requirements (for further information look in the Environmental Regulations Section.)

Clean marinas also attract customers.

A clean marina increases the pleasure of boating experiences, and reinforces the public image that boating is clean and fun. Establishing environmental policies promotes good management practices by staff and customers.

Public opinion is important.

The best way to promote and establish the perception of marinas and boaters as responsible, careful stewards of water quality is to become proactive. Take steps to protect water quality. Let your community know you care about the environment and that you are actively doing something about it.

The Bigger Picture: Environment, Economy, Responsibility, Beauty

Boating and water related recreational activities are an integral part of life in Washington State and an important part of our economy. Residents of the Northwest value our waters for commercial fishing and shellfish production, recreational activities, and for the beauty this natural resource brings to our lives. It is estimated that 50,000 boats are permanently moored in Puget Sound, and thousands more are trailered in for occasional use. Marinas and boaters are certainly a very small part of the problem, but multiplied by 50,000 the combined effects of our individual actions do have a direct impact on the health of the ecosystem. Increasingly, we are learning to value and protect the richness and diversity of our aquatic ecosystems as a whole.

"...marine pollution can have devastating effects on the entire food chain..."

Environment, economy, responsibility, and beauty are simple answers to the "Why?" of pollution prevention.

Environment

Our aquatic ecosystems are an intricately connected web of life. This vast web, which links the survival of the smallest plants and animals on the surface and in the sediments to that of the largest, exits in a delicate state of balance. The health of organisms at each level of the food chain depends on the health of those on which they feed and which feed on them. Destruction of wetlands, losses in spawning grounds and declining food sources from other forms of marine pollution can have devastating effects on the entire food chain, including people.

Although nature often surprises us with its resiliency, small changes can have lasting effects throughout the region. Contaminants that are released into our waters enter the food chain at many different levels and affect the health of all organisms within the ecosystem. Concentrated over time, the effect of these contaminants is magnified greatly.

The physical properties of our waters also affect whether these wastes can be diluted or flushed from the waters. For example, the circulation of water in Puget Sound is relatively poor. In fact, in the South Sound pollutants may take many years to be fully flushed from the waters. Pollutants discharged into rivers are moved downstream, and those discharged into lakes often remain for years.

Fish and Shellfish

In Puget Sound, sediment contamination has been scientifically linked to cancerous liver tumors and reproductive failure in several species of bottom fish.

Most shellfish (such as clams and oysters) feed by filtering huge quantities of water through their systems. When the waters or sediments are contaminated, shellfish pick up and accumulate disease-causing bacteria and viruses called pathogens. While these pathogens may not directly harm the shellfish, they can be passed on to marine mammals or humans, sometimes with deadly consequences.

Sewage discharges have forced restriction or closure of about 40% of the Sound's commercial shellfish beds.

Economy

Washington's commercial shellfish harvest contributes an estimated $26 million to the state's economy every year. Many of our prime shellfish beds have been closed to harvesting as a result of fecal coliform bacteria an indicator of elevated levels of raw sewage. Because of convincing circumstantial evidence, many state regulators and citizen groups are creating strict no-anchorage zones near sensitive shellfish beds.

Healthy marina and boating industries rely on people buying and using their boats enjoying fishing, sailing, and recreation. Recreational boat sales account for $700 million per year in Washington State, and recreational fishing contributes $26 million. Clean water is essential for successful marina and boating business.

Responsibility

Marina and boating activities are one of many sources of pollution that impact our waters. All activities that deal with engines and fuels do cause pollution. In order to minimize their environmental impact, boaters need to be more aware of the effects of certain practices such as pumping out an oily bilge, "topping off" the fuel tank, in-water sanding and varnishing and using toxic cleaning and maintenance products. However, boater education will do little without adequate waste management facilities and policies that encourage pollution prevention at marinas.

Why should marinas become environmentally compatible and proactive? Most simply, it makes common sense. Profitable boating businesses need clean environments. The public expects and demands environmental protection today. It helps business move boating services into the 21st Century. It is the right thing to do. It is the law. The good news it is not that difficult. For most questions, answers exist; for others, they can be found. And there are people and agencies willing to help.*

Beauty

"It is written on the arched sky,
It looks out from every star...
It is spread out like a legible language
upon the broad face of an unsleeping ocean.
It is the poetry of Nature,
It is that which uplifts the spirit within us ..."

John Ruskin

*This paragraph adapted from reprints by Neil Ross Consultants Inc.

What are Best Management Practices (BMPs)?

Best Management Practices (BMPs) are low technology ways to protect the environment.

In general, BMPs are pollution control activities designed to prevent or reduce the discharge of pollutants into surface or ground water. Achieving pollution reduction through BMPs may require business operators to alter practices of operation and housekeeping. The amount of change required varies depending on the type of activities conducted at each marina. To be successful, BMPs must fit the needs of the business using them and be incorporated into routine activities.

BMPs fall into two categories: source control and treatment.

Source control BMPs are measures which *prevent* pollutants from coming into contact with ground water or surface waters. Typical source control measures for marinas include the use of tarpaulins when boaters are doing maintenance and painting, berms for hazardous wastes and storage areas, covers, sweeping or vacuuming, drip pans, and waste segregation. Source control BMPs rely heavily on the diligence and cooperation of operators and boaters in following management practices. **Source-control BMPs need to be especially monitored when allowing independent contractors and boat owners to work on their own boats.** Most BMPs at marinas are source control.

Treatment BMPs at marinas are measures that reduce toxicity or volume of a waste *after* it has been generated. Examples include oil/water separators for storm water in parking lots or boat haul-out facilities, or remediating contaminated sediments. In general, most treatment BMPs are more expensive and labor intensive than source control measures.

What is Your Liability?

As a business owner, you are personally responsible for any spills or discharges of pollution from your property. You are ultimately liable for the actions of your employees and customers engaged in work that relates to your business. You can be held personally and financially responsible for any damage caused to property, health or to the environment and susceptible to administrative and criminal fines and penalties for breaking the law. The bottom line is that you are liable for the impacts of any hazardous, toxic or oily release from your operations.

Financial liabilities can include, but are not limited to, the cost of specialized spill prevention equipment, medical bills and financial compensation for injured workers or customers, any cleanup expenses and fines of up to $10,000 per day per event for discharges of pollutants to surface waters, ($20,000 per day per event for oil).

How Can You Reduce Your Liability?

Reducing your environmental liabilities by implementing BMPs sends a strong message to your customers that you care about the health of your community and the environment. For many businesses this message has resulted in increased business and marketing opportunities. The last few years have brought a marked change in philosophy for most people who value nature and outdoor experience; the public now understands that human activities are having a negative impact on our natural resources and they want to do their part to help protect those resources. The key is to identify low cost, practical, relatively simple ways to protect the water and then to help make it as easy as possible for people to follow through.

Implementing BMPs and helping to educate your tenants and transient boaters also sends a strong message to local, state, and federal agencies that you care about water quality and environmental concerns, that you are proactive, cooperative, and willing to be a leader in establishing clean marinas and clean boating practices. Government agencies would much rather work with you than come in as enforcers. They can help you in your efforts at waste minimization and pollution reduction so that enforcement measures will not be necessary. You, as marina owners and operators, also have an opportunity to give clear feedback and input so that agencies gain from your business experience and ideas. It is the preferred working relationship for all concerned!