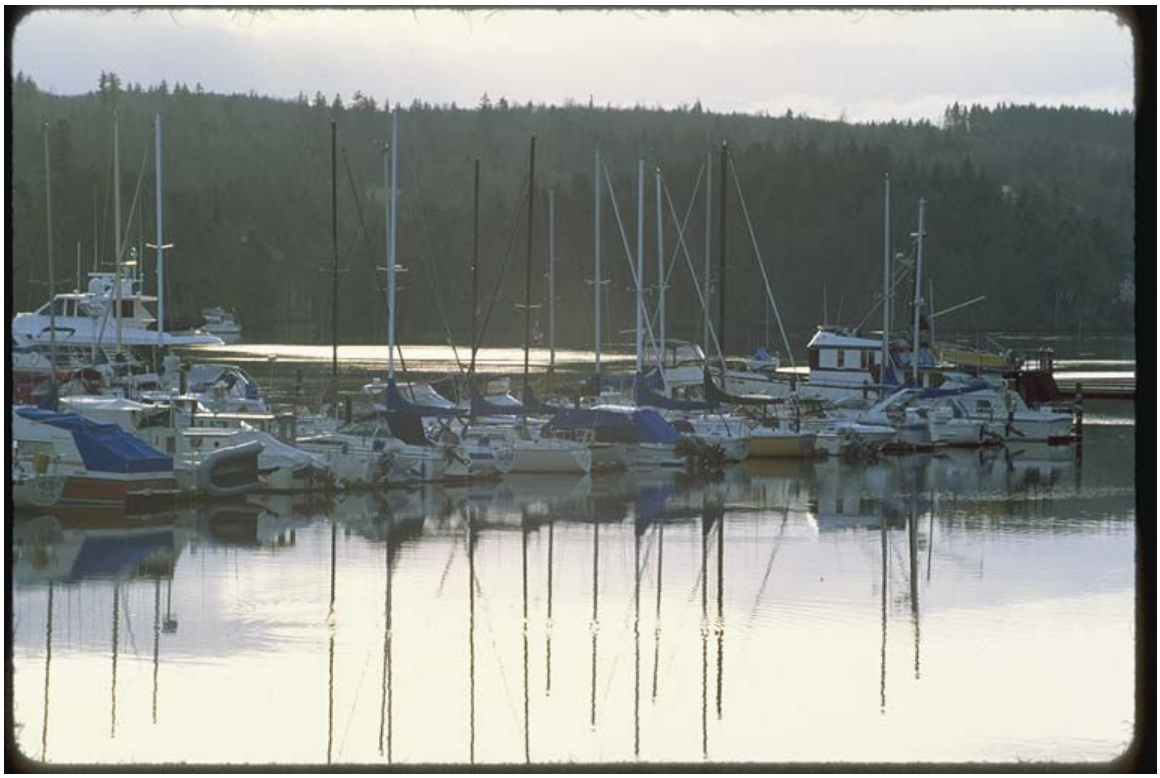
Port Ludlow Marina Expansion

Draft Supplemental Environmental Impact Statement



Jefferson County Department of Community Development

July 5, 2002

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FACT SHEET

Proposed Action:
The proposed action is the addition of 100 slips (plus additional side ties) and associated electrical and utility improvements to the existing 280-slip Port Ludlow Marina. The existing kayak and dinghy floats will also be replaced. The Port Ludlow Marina, built in the late 1960s and early 1970s as part of the Port Ludlow development, provides moorage for residents of Port Ludlow and transient moorage service to guests. This Port Ludlow Marina Expansion Draft Supplemental Environmental Impact Statement supplements the 1993 Programmatic Environmental Impact Statement for the Port Ludlow Development Program.

Location:
Port Ludlow Marina is located in Port Ludlow Bay, Jefferson County, Washington. Port Ludlow Bay is located on the west shore of Admiralty Inlet at the mouth of Hood Canal (Section 16, Township 28 North, Range 01 East, W.M.). The location of the project is shown in Figures 1 and 2.

Lead Agency:
Jefferson County Department of Community Development
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Port Townsend, WA 98368

Project Proponent:
Port Ludlow Associates
70 Breaker Lane
Port Ludlow, WA 98365

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Jefferson County File No.:
SDP00-00014, Shoreline Primary Use Substantial Development Permit

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Required Permits and Approvals:
Jefferson County

- Shoreline Primary Use Substantial Development Permit – Department of Community Development – Development Review Division
- Building Permit – Department of Community Development – Building Permits/Inspections.

State of Washington

- 401 Water Quality Certification – Department of Ecology
- Coastal Zone Management Consistency Determination
- Hydraulic Project Approval – Department of Fish and Wildlife

Federal Government

- U.S. Army Corps of Engineers Section 10 Permit – Docks and Pilings

Date of issue of Draft SEIS:
July 5, 2002

Date Comments are Due:
August 5, 2002

Location of Draft SEIS for Review:
Copies of this Draft SEIS are available at the following locations for review:

Jefferson County Department of Community Development
621 Sheridan Street
Port Townsend, WA 98368

The Bay Club At Port Ludlow
120 Spinaker Place
Port Ludlow, WA 98365

Port Ludlow Beach Club
121 Marine Drive
Port Ludlow, WA 98365

Port Hadlock Branch, Jefferson County Public Library
Port Hadlock, WA 98339

Technical reports, background data, and other relevant information are available at the Jefferson County Department of Community Development.

Electronic copies of this DSEIS are available to download and print at the Jefferson County website. The URL for this site is http://www.co.jefferson.wa.us/commdevelopment

Copies of this DSEIS are also available for sale for $40 at the Jefferson County Department of Community Development.

DISTRIBUTION LIST

Copies Distributed:

Applicant
Port Ludlow Associates LLC

Jefferson County Departments
Jefferson County Public Works
Jefferson County Natrual Resources

Federal Government Agencies
US Army Corps of Engineers – Susan Glenn
National Marine Fisheries Service – Shandra O'Haleck
U.S. Fish and Wildlife Service – Lou Ellyn Jones

State of Washington Agencies
Department of Ecology – SEPA Review
Department of Ecology – Shorelands, SW Region
Department of Natural Resources – SEPA Review
Department of Natural Resources – Jeff Shreck
Department of Fish & Wildlife – SEPA Review
Department of Fish & Wildlife – Anne Shaffer

Tribal Government
Port Gamble S'Klallam Tribe
Jamestown S'Klallam Tribe

Port Ludlow Roster
LMC Governmental Affairs Com
Port Ludlow Village Council

Utilities and Services
Jefferson County Fire District 3

Local Organizations
Port of Port Townsend
Olympic Environmental Council
The Bay Club at Port Ludlow
Port Ludlow Beach Club
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Chapter 1 - Summary

1.1 Proposed Action

The proposed action is the addition of 100 slips (plus additional side ties) and associated electrical and utility improvements to the existing 280-slip Port Ludlow Marina. The existing kayak float will also be replaced and enlarged, and the existing dinghy float will be replaced with three smaller floats. The Port Ludlow Marina was built in the late 1960s and early 1970s as part of the 1,200-acre Port Ludlow development and provides moorage for residents of Port Ludlow, residents of other area boating groups, and transient moorage service to guests. The 100-slip expansion was included as a projected aspect of the Port Ludlow development in the 1993 programmatic EIS*, Port Ludlow Development Program EIS.*

1.2 Location of the Proposal

Port Ludlow Marina is located in Port Ludlow Bay, Jefferson County, Washington. Port Ludlow Bay is located on the west shore of Admiralty Inlet at the mouth of Hood Canal. The Bay is a 2.2 square mile, J-shaped tidal basin, which extends from the mouth of Ludlow Creek 3.5 miles to Admiralty Inlet (Section 16, Township 28 North, Range 01 East, W.M.). The location of the project is shown in Figures 1 and 2.

1.3 Purpose/Objectives of the Proposal

The objectives of the Port Ludlow Marina expansion are:

- To accommodate the increasing market demand for boat slips.
- To respond to market trends for an increased diversity of berth sizes.
- To sustain the growth of the Port Ludlow community.
- To improve customer satisfaction with the condition of the facility.
- To upgrade and enhance services and amenities provided on moorage docks.
- To minimize potential environmental impacts.
- To comply with Jefferson County development regulations.

1.4 Project History

The Port Ludlow Marina was developed by Pope and Talbot in the late 1960s and early 1970s as part of the Resort at Ludlow Bay development. It was expanded in the late 1970s and has undergone subsequent minor modifications. The Marina serves guests, boating groups, and Port Ludlow area residents. Visitors to the Resort at Ludlow Bay and Heron Beach Inn also utilize the facilities.

Figure 1 - Vicinity Map

Figure 2 - Location Map

The Marina was transferred to Pope Resources (along with other real properties in Port Ludlow) in 1985 and was managed by a Pope Resources subsidiary company, Olympic Real Estate Management, Inc. until August 2001.

The Marina is currently owned and managed by Port Ludlow Associates. Property below Ordinary High Water (OHW) is leased from the Washington Department of Natural Resources (DNR).

Peratrovich, Nottingham, and Drage conducted a marina expansion study in 1992. In 1993, the resort area and surrounding residential development underwent a permitting process for redevelopment. The redevelopment included the addition of the 36-room Heron Beach Inn, 53 residential townhomes, 5 single family lots, an 800 square foot marina building, and a 100-slip expansion of the Port Ludlow Marina. Two EIS documents were prepared. The programmatic *EIS for the Port Ludlow Development Program* included the 100-slip expansion for the Marina together with the proposed buildout of the residential and commercial components of a Port Ludlow master plan. The project *EIS for the Inn at Port Ludlow* included impacts from the expansion for the upland Marina facilities (office, etc.) as described above.

In August of 1998, Jefferson County adopted a new comprehensive land use plan that designated the Port Ludlow community as a Master Planned Resort (MPR). Subsequent to the adoption of the Comprehensive Plan, Jefferson County adopted Development Regulations for Port Ludlow Master Planned Resort under Ordinance Number 08-1004-99. The adoption date for the Code was October 1999.

Under Section 3.902.1 of Ordinance No. 08-1004-99, a project level SEIS "analyzing the resort plan is required prior to issuance of building permits for any new resort development." Section 3.902.6 similarly provides, *"Actual resort development may be undertaken in phases, but only following completion of review and approval of a full resort buildout plan through the SEIS process."* A key element of the SEIS is to compare the change in cumulative development impact between the permitted plan of Ludlow Bay Village to proposed changes for any new resort components. Jefferson County will issue a land use or building permit for the Marina expansion only after a project level SEIS for the Resort at Ludlow Bay is complete. That SEIS must address the cumulative impacts of both the Resort and Marina Expansion.

For a variety of reasons, the applicant (PLA) has formally requested that Jefferson County allow the preparation of an SEIS for the Marina separate from an SEIS for the Resort. The elements of the two reports would then be combined into one overall project SEIS to meet the conditions of Section 3.902 as described above. The reasons for the request follow:

- The Marina expansion EIS requires multi-agency review with the DNR, Washington Department of Fish and Wildlife (WDFW), U.S. Army Corps of Engineers (COE), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) all having some level of jurisdiction over the expansion proposal. These agencies have little if no review authority over the upland Resort development plans.

- Although the Marina expansion project is part of the Resort plan, it is not an interdependent part of the Resort plan and does not depend on the Resort plan as its justification or for its implementation (see WAC 197-11-060(3)(b)(ii)).

There are two separate issued related to a "phased" review of this project. On the one hand, Section 3.902 of the MPR ordinance provides, "Environmental review of the Resort Plan shall not be piecemealed or broken into small segments." Based upon this language, the County is authorized to require only a single review of the project, however, the State Environmental Policy Act clearly authorizes the phased review of land use approvals. This process is described in Section 1.5 below. Jefferson County has agreed to allow the applicant to proceed with separate review of the Marina and the Resort with the clear understanding that no land use permits or building permits will be issued for the Marina Project until a Resort SEIS process (including cumulative impacts) is complete.

1.5 Phased Review

Jefferson County is using phased review, as authorized by SEPA (WAC197-11-060(5)(b)) in its review of development projects in Port Ludlow. As noted above, a programmatic, non-project environmental impact statement was issued in 1993 for the Port Ludlow Development Program. The 100-slip expansion of the Marina was one element of the proposed development program identified in that document. This Draft Supplemental Environmental Impact Statement (Draft SEIS) assesses site-specific impacts and specific mitigation related to the Marina expansion.

Using "Phased Review" under SEPA, the sequence of environmental review can take two forms. The review can be from a non-project document (the 1993 FEIS for the Port Ludlow Development Plan) to a document of narrower scope (a site specific analysis regarding the environmental impacts of the Marina expansion project (see WAC 197-11-060(5)(c)(i)). Alternatively, the environmental review can take an environmental document on a specific proposal at an early stage to a subsequent environmental document at a later stage (see WAC 197-11-060(5)(c)(ii)).

Phased review does not divide a larger system into exempted fragments or avoid discussion of cumulative impacts (see WAC 197-11-060(5)(d)(ii)). Phased review does not segment and avoid present consideration of proposals and their impacts that are required by SEPA to be evaluated in a single environmental document (see WAC 197-11-060(5)(d)(iii)).

The applicant is pursuing phased review as authorized by SEPA but modified by the Port Ludlow MPR Ordinance that will restrict the issuance of any permits until the cumulative Resort SEIS process is complete.

1.6 Summary of Alternatives

The proposed project and three alternatives are evaluated in this Draft Supplemental EIS. The alternatives include:

Alternative 1: Proposed Project

The Proposed Project adds 100 slips to the Marina in a westward and waterward direction. The existing D-Dock and E-Dock will be extended (12 and 48 new slips respectively), and a new F-Dock (40 slips) will be constructed. A major trend in the marina industry is towards larger boats (*Statewide Recreational Boating Study – Recreational Moorage Analysis and Boating Sewage Disposal Facility Analysis*, BST Associates, October 2001); thus, all the new slips will be 36 feet and larger, up to 60 feet in length. The existing kayak float and a dinghy float will also be replaced and/or upgraded. The proposed project is shown in Figure 3.

Figure 3 - Alternative 1 - Proposed Project

Alternative 2: Deep Water Expansion

Alternative 2 provides for a 100-slip expansion primarily waterward, rather than laterally to the west. An additional 19 slips will be added waterward and on the east side of E-Dock. A new F-Dock (35 slips) and new G-Dock (14 slips) will be constructed waterward of E-Dock; and A-Dock will be extended waterward to provide an additional 32 slips. A new float will also be constructed to connect B-Dock and C-Dock, and the existing kayak float will be repositioned to the new waterward extension of A-Dock. Alternative 2 is shown in Figure 4.

Alternative 3: 1993 Design

Alternative 3 will include a 100 slip expansion and improvements as conceptually proposed in the 1993 *Port Ludlow Development Program Final Environmental Impact Statement.* The 100 new slips will be accommodated by: a new dock with 14 slips along the eastern shore of the Marina (i.e., east of the fuel float); an extension of A-Dock approximately 150 feet waterward to accommodate a new T-shaped dock; a new L-shaped dock approximately 150 feet waterward of E-Dock; and extension of C-, D-, and E-Docks to the west. Dredging will occur in a slightly less than one acre area near the eastern shore of the Marina (along Burner Point) in order to increase water depths and improve access to the new inner dock. Alternative 3 is shown in Figure 5.

Alternative 4: No Action

This alternative will result in maintenance of the existing Marina facilities, but no expansion of slips or upgrade of amenities such as the dinghy float or kayak float, at this time. Alternative 4 is shown in Figure 6.

1.7 Scoping Notice and Request for Comments

The scoping period for this Draft SEIS was from October 3 to November 2, 2001. Notice of the scoping period was published in *The Port Townsend and Jefferson County Leader* on October 3, 2001. A public scoping meeting was held at the Port Ludlow Bay Club on October 12, 2001. Both written and oral comments were received. A summary of the scoping comments is contained in Appendix A. A full copy of the scoping comments is on file with the Jefferson County Department of Community Development.

Figure 4 - Alternative 2 - Deep Water

Figure 5 - Alternative 3 - 1993 Design

Figure 6 - Alternative 4 - No Action

1.8 Significant Issues for Consideration

Major issues identified during the scoping process relate to: the configuration of the proposed expansion with respect to adjacent residential properties; potential impacts to marine resources, especially Endangered Species Act (ESA) listed species; and potential water quality impacts. These issues are summarized below.

- Impacts of the expansion on views from adjacent properties, adjacent property values, and ingress and egress to the adjacent dock:
  Three waterfront residential homes, a vacant waterfront residential lot and their associated private four-slip dock are located directly west of the Marina. The proposed Marina expansion will extend to the west, potentially affecting the views currently enjoyed by these residents and potentially limiting ingress and egress to their dock.

- Impacts of the proposed project on shoreline resources, wildlife habitat, and ESA listed species:
  Listed ESA salmonid species, (i.e., chinook salmon and Hood Canal summer-run chum salmon) are known to use this area. The proposed expansion could have adverse impacts to food sources, habitat, and water quality.

- Impacts of the expansion on water quality:
  Expansion of the Marina and the increase in Marina usage could potentially result in an increase in gray and black water discharge and the potential for hazardous material spills. The proposed action could potentially result in adverse impacts to water quality.

Table 1 - SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

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Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Earth				
Environmental Impacts				
Topography	No impacts to topography.	Similar to proposed project.	Approx. 500 cy of dredging required over one-acre area.	No impacts to topography, soils or subsurface materials.
Soils and Subsurface Materials	Installation of 100 – 130, 24" diameter steel piles will result in temporary increase in turbidity and permanent loss of substrate at location of piles.	Similar to proposed project, except that 36" piles will be required.	Similar to proposed project.	
Mitigating Measures				
Soils	Construction activities to be limited to times when salmon are not likely to be present. Best Management Practices (BMPs) to be employed during construction.	Similar to proposed project.	Similar to proposed project.	None required.
Water				
Environmental Impacts				
Water Quality	Construction activities increase potential for leakage of petroleum products; driving of 100 – 130 piles will temporarily increase localized turbidity and increase suspended sediment concentrations.	Similar to proposed project.	Similar to the proposed project except within dredge area. Dredging will further temporarily increase turbidity and suspended sediment concentrations and will reduce benthic habitat.	No impacts to water quality resulting from construction activities.
	Potential incremental increase in gray/black water discharge, and bilge water discharge.	Similar to proposed project.	Similar to proposed project.	No impacts from additional boats/slips.
	Potential for increase in hazardous material spills.	Similar to proposed project.	Similar to proposed project.	No impacts from additional boats/slips.

Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Mitigating Measures				
Water Quality	New pilings to be steel.	Similar to proposed project.	Similar to proposed project.	None required.
	Silt fences to be installed where necessary.	Similar to proposed project.	Silt fences to be installed around dredging area.	
	One additional portable sewage pump-out facility to be provided.	Similar to proposed project.	Similar to proposed project.	
	Boaters to be educated re. potential impacts of hazardous material spill.	Similar to proposed project.	Similar to proposed project.	
	Enforce a no black water (sewage) discharge rule and provide better boater education on black and gray water discharge.	Similar to proposed project.	Similar to proposed project.	
Marine Plants and Animals				
Environmental Impacts				
Marine Vegetation	No eelgrass present at project site. Loss of benthic habitat at location of new piles.	Impact on nearshore habitat is less than the other expansion alternatives.	Similar to proposed project.	No Impacts.
Threatened and Endangered and Priority Species*:*				
Salmonid Species	Juvenile salmonids may avoid areas of localized high turbidity and areas of reduced dissolved oxygen level. Increase overwater coverage may increase predation, alter migratory behavior, and reduce prey production and availability.	Impact on nearshore habitat is less than the other expansion alternatives.	Similar to proposed project.	No Impacts.
Bald Eagles	Potential temporary disruption of foraging behavior.	Similar to proposed project.	Similar to proposed project.	No Impacts.

Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Marbled Murrelets	Potential temporary and localized impact to foraging behavior and prey availability.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Steller Sea Lions	No impact anticipated.	No impact anticipated.	No impact anticipated.	No Impacts.
Other Fish and Invertebrates	Temporary disruption of foraging behavior and fish may avoid project area during construction. Increase overwater coverage and increased shading may result in minor decreases in microalgae and benthic productivity.	Impact on nearshore habitat is less than the other expansion alternatives.	Similar to proposed project.	No Impacts.
Avian Species	Temporary impacts include disruption of foraging behavior and may result in bird species avoiding project area during construction.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Mammals	Mammalian species may avoid project area during construction and foraging behavior may be disrupted.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Mitigating Measures				
Marine Vegetation	No mitigation is proposed.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Threathened and Endangered and Priority Species*:*	New kayak float will include light transmissive capabilities.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Other Fish and Invertebrates	New kayak float will include light transmissive capabilities.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Avian Species	No mitigation is proposed.	Similar to proposed project.	Similar to proposed project.	No Impacts.
Mammals	No mitigation is proposed.	Similar to proposed project.	Similar to proposed project.	No Impacts.

Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Land Use				
Environmental Impacts	Construction activities to result in temporary increase in noise, and vehicular and barge traffic.	Similar to proposed project.	Similar to proposed project.	No construction impacts.
	Expansion consistent with Jefferson County Comprehensive Plan and MPR land use designations.	Similar to proposed project.	Similar to proposed project.	Expansion anticipated in MPR development regulations.
Mitigating Measures	Construction to be limited to 8:00 am – 8:00 pm, non-holidays weekdays & Saturdays.	Similar to proposed project.	Similar to proposed project.	None required.
	Stationary equipment to be positioned as far as possible from residential properties.	Similar to proposed project.	Similar to proposed project.	
	All mufflers to be properly maintained.	Similar to proposed project.	Similar to proposed project.	
	Dust will be suppressed with wetting techniques.	Similar to proposed project.	Similar to proposed project.	
	Energy efficient equipment will reduce emissions.	Similar to proposed project.	Similar to proposed project.	
Consistency with Plans and Policies				
Environmental Impacts				
County Comprehensive Plan	Proposed project is consistent with County Comprehensive Plan.	Similar to proposed project.	Similar to proposed project.	No impact.
Shoreline Management Master Program	Proposed project is consistent with the Shoreline Management Master Program.	Similar to proposed project.	Similar to proposed project.	No impact.

Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Aesthetics/Visual Quality				
Environmental Impacts	Low impact to existing view from Oak Bay Rd. High impact to existing view from Scott Court. Low impact to existing views from across Port Ludlow Bay.	High impact to existing view from Oak Bay Rd. Low impact to existing view from Scott Court. Low impact to existing views from across Port Ludlow Bay.	Low-Medium impact to existing view from Oak Bay Rd. High impact to existing view from Scott Court. Low impact to existing views from across Port Ludlow Bay.	No impact.
Mitigating Measures	No boats in excess of 60' in length to be side-tied to the west end of D-Dock or E-Dock.	None proposed.	None proposed.	None required.
Transportation				
Environmental Impacts	Incremental increase in vehicular and boat traffic, but adopted level of service (LOS) will not be exceeded. Adequate off-street parking available.	Similar to proposed project. Similar to proposed project.	Similar to proposed project. Similar to proposed project.	No increase in traffic. No increased demand for off-street parking.
Mitigating Measures	None required	Similar to proposed project.	Similar to proposed project.	None required.

Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Public Services and Utilities				
Environmental Impacts				
Fire/Emergency Services	Incremental increase in demand for fire services. Piped fire suppression system required for new floats.	Similar to proposed project.	Similar to proposed project.	No increase in demand for services or utilities.
Electrical Service	New electrical service (on new docks) and landside transformers required.	Similar to proposed project.	Similar to proposed project.	
Water Service	0.7% increase in total Port Ludlow water usage anticipated.	Similar to proposed project.	Similar to proposed project.	
Sanitary Sewer Service	Proportional increase in demand for sewage pump-out facilities.	Similar to proposed project.	Similar to proposed project.	
Mitigating Measures				
Fire/Emergency Services	Fire hydrants and emergency access to be provided.	Similar to proposed project.	Similar to proposed project.	None required.
	New dry line fire suppression system to be installed on C-Dock, the central walkway and all new docks.	Similar to proposed project.	Similar to proposed project.	
	Training for marina personnel and live-aboard residents in emergency fire fighting procedures.	Similar to proposed project.	Similar to proposed project.	
	Fire call boxes to be installed on new docks and central walkway.	Similar to proposed project.	Similar to proposed project.	
Electrical Service	Construct new connection between B-Dock and C-Dock.	Similar to proposed project.	Similar to proposed project.	
Water Service	A-Dock electrical system to be renovated; all new electrical systems installed in conduit, per Code requirements.	Similar to proposed project.	Similar to proposed project.	

Table 1 - Summary Of Environmental Impacts And Mitigating Measures

Element	Alternative 1 Proposed Project	Alternative 2 Deep Water Design	Alternative 3 1993 Design	Alternative 4 No Action
Sanitary Sewer Service	100-slip expansion anticipated in plan for water system.	Similar to proposed project.	Similar to proposed project.	
	Two portable pump-outs and stationary pump-out to be available for use.	Similar to proposed project.	Similar to proposed project.	
	The Port Ludlow sanitary sewer treatment plant was designed to accommodate expansion of the marina.	Similar to proposed project.	Similar to proposed project.	

Chapter 2 – Proposed Project and Alternatives

2.1 Description of Proposal

2.1.1 Name of Proposal

"Port Ludlow Marina Expansion"

2.1.2 Project Sponsor

Port Ludlow Associates, LLC
70 Breaker Lane
Port Ludlow, WA 98365

2.1.3 Project Location

The Port Ludlow Marina is located in Port Ludlow Bay, Jefferson County, Washington. The Marina is located on the north shore of the Bay, inside Burner Point. Port Ludlow Bay is located on the west shore of Admiralty Inlet at the mouth of Hood Canal. (Section 16, Township 28 North, Range 01 East, W.M.) The location of the project is shown in Figures 1 and 2.

2.1.4 Existing Project Features

The Port Ludlow Marina currently provides 280 slips, additional side tie areas for 20 to 40 boats, as well as a boat sewage pumpout, dinghy float, fuel float, kayak float, and public access to the water. Water, fire protection, and electrical service are available at the docks. Upland facilities include a store, rest rooms and showers, parking areas, and waterfront trails. In December 2001, the moorage distribution was 225 permanent residents, seven permanent non-residents, and 48 slips available for guests.

Water depths at the Marina vary from shallow intertidal (approximately –10 feet Mean Lower Low Water - MLLW) around the perimeter of the Marina to depths of –38 feet MLLW. The Marina is configured with five dock systems and one fuel float. The fuel float, as well as the A- and B-Docks, are located at the east end of the Marina, just inside Burner Point, and extend from shore in a north-south direction. A floating breakwater is located at the end of A-Dock. Two 55-foot gangways provide access to A- and B-Docks, the fuel float, and the kayak float from the upland facilities. The C-, D-, and E-Docks are connected by one central walkway and are located to the west, in a general east-west configuration. These docks are accessed from the upland facilities by a third gangway.

The existing 1,600 square foot wood and foam kayak float accommodates 40 kayaks in racks and is located on the west side of B-Dock. The existing 680 square foot wood dinghy float is located at C-Dock, at the junction of the main walkway and the lateral. This dinghy float completely covers the area between the walkway and the first finger to the south.

The boat sewage pump-out station is located on the fuel float. The fuel float also accommodates a small structure for fueling accessories and the cash register. The fuel float is also used occasionally by seaplanes for docking.

The current mix of slips at the Port Ludlow Marina ranges from 24-foot slips up to side tie areas for boats in the 80-foot range. The recent trend in boat design is toward boats that are longer, have wider beams, and include amenities such as "swim steps."

2.2 Proposed Project and Alternatives

The proposed project is an addition of dock systems at the Port Ludlow Marina to provide an additional 100 slips. For all expansion alternatives, the existing kayak and dinghy floats will be replaced. The new Marina floats will be constructed of concrete sections with structural wood wales and an encapsulated foam floatation core. The new floats will generally be 5 feet to 8 feet in width and will be held in place by new steel piling. Floats for the outer dock will be 12 feet in width. These outer floats serve as a floating breakwater to protect the Marina from waves and wakes. The wider width is necessary to provide this protection.

The only upland actions associated with this project are new utility tie-ins that will be required in an area of approximately 50 feet upland of OHW.

Alternative 1: Proposed Project

The proposed project (i.e., the Marina expansion as proposed by the project sponsor) is shown as Alternative 1. The proposed project adds 100 slips to the Marina by expanding the existing float system both westward and waterward. The proposed configuration of the new floats/slips is as follows:

- D-Dock will be extended 120 feet to the west to accommodate an additional twelve 36-foot slips.
- E-Dock will be extended 400 feet to the west to accommodate an additional 42 slips (seven 50-foot, nine 60-foot, and twenty-six 45-foot slips).
- The east side of E-Dock will be reconfigured to accommodate sixteen slips (eight 36-foot slips and eight 40-foot slips, to replace 10 existing slips).
- A new F-Dock will be constructed waterward of E-Dock. The new F-Dock will extend 700 westerly and 250 feet easterly of the central walkway. The new F-Dock will accommodate 40 new slips (thirty 45-foot slips and ten 50-foot slips). F-Dock will serve as a floating breakwater to protect the Marina.

The existing 1,600-sq. ft. timber kayak float will be replaced in the same location with a 2,850-sq. ft. float with light transmission capabilities. The new kayak float will be constructed using plastic pontoons for floatation and timber for the connection system. The float cross

section will consist of three pontoons. A space will be left open between each of the pontoons in the cross section. The new float design will incorporate light-transmission panels. The two gaps between the three pontoons will be spanned by grating or sandblasted plexiglass (versus timber decking), which will allow light to penetrate beneath the float.

The existing 680-sq. ft. dinghy float on C-Dock will also be replaced with three new floats totaling 1,086 sq. ft. The floats will be 6 feet wide and attached to the sides of the main walkway and the C-Dock lateral, the E-Dock lateral, and the F-Dock lateral. The new dinghy floats at E-and F-Docks will be located at water depths of greater than 20 feet (MLLW=0 Datum). The new dinghy float at the junction of the main walkway and the C-Dock lateral will open up a now covered side space between the dinghy dock and the first finger.

The proposed project is shown in Figure 3.

Alternative 1 will result in an additional 33,745 sq. ft. of overwater structure. Of this total, 966 sq. ft. of new overwater structure will be located in water depths of less than 20 feet (MLLW=0). The remaining 32,779 sq. ft. will be located at water depths of 20 feet or greater. Approximately 100-130 new steel piles will be required. All but one of the piles will be located in water greater than 20 feet in depth.

Pile-driving equipment will be barge-mounted and will be either a diesel-powered hammer or vibratory driver. Pile-driving equipment will be sized according to the geotechnical characteristics of the substrate. The barge will be sized to accommodate the equipment used during the pile driving. The one piling to be installed in shallow water (18 to 20 feet deep) will be shorter than those to be installed in deeper water, requiring less energy to install than the pilings in deeper water. Installing the one piling in shallow water will take less than 1 day, minimizing the time of potential disturbance of any salmonids that may be present in the nearshore area. The remaining piles will be installed at water depths of greater than 34 feet. The barge will be maintained at sufficient depth to ensure that it will not ground. All pile driving will be done outside the closed work window for listed species.

Alternative 2: Deep Water Expansion

Alternative 2 provides for a 100-slip expansion primarily waterward, rather than laterally to the west. The existing dinghy dock will remain in place. The proposed configuration of the new floats/slips is as follows:

- Thirteen 45-slips will be added to the waterward side of E-Dock, west of the central walkway.

- The east side of E-Dock will be reconfigured to accommodate sixteen slips (eight 45-foot slips and eight 50-foot slips, replacing 10 existing slips).

- New F- and G-Docks will be constructed waterward of E-Dock. The new F-Dock will extend 250 westerly and 180 feet easterly of the central walkway, and will accommodate 35 slips (twenty-one 45-slips, eight 50-foot slips, and six 60-foot slips. The new G-Dock will extend 170 feet westerly and 180 feet easterly of the central walkway, and will

accommodate 14 slips (eight 45-foot slips and six 60-foot slips). This will serve as a floating breakwater.

- A-Dock will be extended 270 feet waterward and will accommodate an additional thirty-two 45-foot slips. This will serve as a floating breakwater.

- A new float will provide a connection between B-Dock and C-Dock, and the existing kayak float will be repositioned to the new extension on the A-Dock.

Alternative 2 will result in an additional 37,865 sq. ft. of overwater structure. All of the 37,865 sq. ft. of additional overwater coverage will be located at water depths of 20 feet or greater. Approximately 100-130 new steel or concrete piles will be required. None of the piles will be located in water less than 20 feet in depth (MLLW=0 Datum).

Alternative 2 is shown in Figure 4.

Alternative 3: 1993 Design

Alternative 3 will include a 100 slip expansion and improvements with the configuration proposed in the 1993 *"Port Ludlow Development Program Final Environmental Impact Statement."* The proposed configuration of the new floats/slips is as follows:

- C-Dock will be expanded 60-feet to the west to accommodate 120 feet of side ties.

- D-Dock will be extended 240 feet to the west to accommodate an additional fourteen 40-foot slips and twelve 48-foot slips.

- E-Dock will be extended 200 feet to the west to accommodate an additional ten 48-foot slips, and seven new 50-foot slips will be added to the east side of E-Dock.

- A new L-shaped dock will be constructed approximately 150 feet waterward of E-Dock to provide additional side-ties.

- A-Dock will be extended 150 feet waterward and will accommodate an additional thirty-four 40-foot slips.

- A new dock will be constructed between the fuel float and Burner Point. This new dock will accommodate fourteen 40-foot slips and will be located in water less than 20 feet in depth.

- Approximately 500 cubic yards of dredging will be required at slightly less than a 1-acre area along Burner Point in order to increase water depths and improve access to this new inner dock.

Alternative 3 will result in an additional 31,164 sq. ft. of overwater structure. Of this total, 23,208 sq. ft. of new overwater structure will be located in water depths of less than 20 feet. The remaining 7,956 sq. ft. will be located in water depths of 20 feet or greater. Approximately

100-130 new steel piles will be required. Approximately two-third of these piles will be located in water greater than 20 feet in depth. Alternative 3 is shown in Figure 5.

Alternative 4: No Action

This alternative will result in maintenance of the existing Marina facilities, but no expansion of docks or slips, and no upgrade of amenities such as the dinghy float or kayak float, at this time. Alternative 4 is shown in Figure 6.

2.3 Benefits/Disadvantages of Delaying Implementation

The SEPA Guidelines encourage permitting agencies to view each generation as a trustee for succeeding generations. With this perspective, environmental review is encouraged to consider whether approving/implementing a proposal at this time will preclude future options (WAC 197-11-440(5)(c)(vii).

The benefits of delaying expansion of the Marina relate to delaying the associated impacts to the natural and built environments. No expansion of the Marina at this time will result in no immediate construction or additional operational impacts to the marine environment or impacts to views from adjacent residential properties and the traveling public.

The Port Ludlow Marina is now at full capacity, and there is an increased demand for both more boating facilities and larger slips to accommodate larger boats. The Marina now turns away approximately 30 vessels each month between Memorial Day and Labor Day. It is unknown whether delaying implementation will result in potential Marina customers constructing their own docks in Port Ludlow Bay, additional boats anchoring in the Bay, and/or increased use of alternate marina locations.

The disadvantage of delaying the expansion relates to delaying provision of planned facilities and services for local and traveling boaters. As stated above, if the expansion is not permitted at this time, the demand for boating facilities in and around Port Ludlow Bay will continue to increase. Also, merely delaying implementation to a later point in time will not minimize identified impacts.

Chapter 3 - Affected Environment, Environmental Impacts, Mitigating Measures and Unavoidable Adverse Impacts

3.1 Earth

3.1.1 Affected Environment

Topography

Port Ludlow Marina is located in Port Ludlow Bay, on the west shore of Admiralty Inlet at the mouth of Hood Canal. The bay is a 2.2 square mile, J-shaped tidal basin, which extends from the mouth of Ludlow Creek 3.5 miles to Admiralty Inlet. The location of the project is shown in Figures 1 and 2.

The eastern approach to the bay is characterized by a submerged sill which forms a submerged basin open to the north. The average depth at the mouth of the bay is 78 feet (MLLW). From this point, the bottom of the basin slopes upward for a distance of 0.5 mile to a depth of 48 to 54 feet. From here, the depth of the bay remains fairly uniform throughout most of its length to within 0.5 mile of Ludlow Creek. The innermost 0.5 mile of the bay has a maximum depth of 40 to 42 feet. The Port Ludlow Marina was constructed in the late 1970s along the north shore of the inner portion of the bay.

The upland topography in the vicinity of the Marina consists of a quarry spall and small riprap sloped beach, and a generally level upland area at approximately + 15 to 17 feet mean sea level (MSL). Burner Point wraps around the east side of the Marina.

West of the Marina, the slope of the beach steepens and the 15- to 40-foot bank is covered with vegetation. During the Scoping process, property owners in this area stated they have experienced problems with sloughing and erosion.

Within the Marina, subsurface elevations range from –0 feet (MLLW) adjacent to the beach, to -38 feet under the outermost docks (i.e., E-Dock and the end of A-Dock). Existing slips are located at depths of -10 to -38 feet. Underwater slopes adjacent to the beach average 9 to 11 percent. Further waterward, in the vicinity of E-Dock, the bottom flattens, with slopes ranging from 2 to 4 percent.

Subsurface Conditions

Explorations of the Marina subsurface were conducted by Landau Associates from December 7-10, 2001. Seven borings were drilled to depths ranging from about 32 feet to 50 feet below the mudline. The location of these borings is shown in Figure 7. The laboratory soil testing was accomplished on representative soil samples obtained from the borings. Testing was done to classify the type of subsurface material. A full copy of the Draft Report is contained in Appendix B of this Draft SEIS and is summarized below.

Figure 7 – Subsurface Boring Locations

Based on the conditions encountered in the borings, the area in the vicinity of the proposed expansion is generally underlain by an upper unit of very soft, recent marine sediment over a lower unit of medium dense/stiff, older marine sediment. Underlying the marine sediment is an upper unit of medium stiff glacial deposits and a lower unit of dense/hard glacial deposits.

The upper marine sediment is typically a very soft silt with clay and variable amounts of sand and shell fragments. The upper marine sediment extends to a depth of about 4 feet in the boring closest to shore (i.e., B-1) to about 25 feet in boring B-5. In general, the thickness of the soft sediment increases with distance from the shoreline. The upper marine sediment also contains a variable amount of soft, woody material and other organics as observed in borings B-2 and B-6.

Below the very soft, upper marine deposit is a denser unit of older marine sediments ranging in composition from silty, fine to medium sand with gravel to fine sandy silts. The density of this lower marine sediment ranges from loose to dense and from stiff to very stiff. This unit also contains shell fragments and some woody debris. The lower marine unit was observed in borings, B-2, B-3, and B-4 and was encountered as shallow as 8.5 feet in boring B-2 and as deep as 29 feet below the mudline in boring B-4.

Two different glacial deposits were encountered. The upper glacial unit was primarily soft to stiff, clayey silt with sand and fine gravel. The upper glacial unit was encountered in borings B-3, B-4, and B-5 and was encountered between depths of 27 feet and 42 feet below the mudline.

A denser, lower glacial unit was encountered underlying the softer upper glacial unit in borings B-3, B-4, and B-5, and directly below the marine sediments in borings B-1, B-2, B-6, and B-7. The lower glacial unit had a variable composition including silty gravelly sand, sand with silt and gravel, and clayey silt with sand and gravel. The lower unit includes soil consistent with consolidated glacial outwash, glaciomarine drift, and glacial till, and was medium dense to very dense/hard. The top of the lower glacial unit generally increases in depth with distance from the shore ranging from about 7 feet below the mudline in boring B-1 to about 29 feet in boring B-4.

Cross-sections of the subsurface profile are shown in Figure 8. The subsurface conditions present at this site preclude the shallow anchoring of new floats (i.e., with chains). Anchors with chains would drag in the soft sediment. Chains with stub piles are also not feasible due to the length of the finger docks and the need for structural support at the end of each finger.

Figure 8 – Subsurface Cross-Sections

Figure 8B – Subsurface Cross-Sections

Sediment Quality

Port Ludlow Bay and its watershed have been monitored since 1984 in order to evaluate water quality. A non-point monitoring program has been in place since 1989; the results of this monitoring have been documented in a series of reports. Sediment sampling was conducted in 1987, 1991, 1993, and 1995 (in conjunction with proposed dredging near the western end of C-Dock), 1997 and 1999. The sampling program has been adjusted over time to reflect issues of concern. A full copy of the "Port Ludlow Non-Point Monitoring Program, 1999 Report" prepared by Berryman & Henigar (the most recent report with sediment sampling) is on file with the Jefferson County Department of Community Development and is summarized below.

Sediment samples were collected from five permanent monitoring stations in the bay and subsequently analyzed for metals, in order to evaluate metals accumulation. The primary source of metals is urban runoff within the watershed. Sediment samples were collected from the bay at locations where stormwater discharge is known to occur. Metals tested for include: arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, and zinc. Samples in 1995 were also analyzed for the content of organic carbon, fats/oils/grease (FOG) and pH.

Results of the sediment quality monitoring demonstrate that sediments in Port Ludlow Bay contain low concentrations of heavy metals. The 1999 Report concluded *"...sediment quality is comparable to other non-urban Puget Sound bays, metal concentrations are generally much lower than in urban bays of Puget Sound, and sediment quality is not declining."*

3.1.2 Environmental Impacts

Short-Term Impacts

Temporary, short-term impacts will result from construction activities. For all expansion alternatives, construction work will occur in or over water.

Alternatives 1, 2, and 3 reflect alternate dock configurations for the 100-slip expansion. The alternate dock configurations include different lengths of docks, located in different depths of water. The size and number of pilings required for each expansion alternative is determined by the depth from the new dock to bearing soil (i.e., the depth required to penetrate below the upper silt layer) and the depth of embedment required to support the lateral loads generated by the new docks.

For structural reasons, typical marina construction occurs in –10 to –20 feet of water. At these depths, there is good structural capacity for the loads imposed by wind and waves. As the water depth increases, the greater distance from bearing soil to the point where the dock "loads" the piling (known as the "moment arm") decreases the capacities of the individual pilings. At Port Ludlow, installing a piling in –40 feet of water requires a minimum 70-80 foot piling due to the presence of a 20 foot layer of soft sediment, and 10 feet of tidal change (i.e., to accommodate high tide). Pilings of this length must be larger in diameter and installed in a greater number to support the proposed docks.

Because of the quality of the existing sediments in Port Ludlow Bay, re-suspension and movement of contaminated sediments is not considered a significant impact. Upland earthwork will be associated with utility connections. Pipe will run from the docks to connect to landside utilities.

Alternative 1: Proposed Project

Construction of the proposed project will require installation of approximately 100-130 new 24-inch steel piles at bottom depths of approximately –18 feet to –40 feet. The depth from the bottom to bearing soils varies from 4 feet closest to shore, to approximately 16 feet along the western side of the new F-Dock, and to approximately 18½ feet along the eastern side of F-Dock. Installation of the new piles will result in a temporary increase in localized turbidity. A more detailed discussion of turbidity is included in Section 3.2, Water. No dredging will be required to construct this alternative.

Alternative 2: Deep Water Design

Alternative 2 will require installation of approximately 100 to 130 new 24 to 30-inch steel piles at bottom depths ranging from approximately -36 feet and -40 to -42 feet for the new slips on E-, F-, and G-Docks, to –22 feet and –40 to -42 feet for the extension of A-Dock. The depth from the bottom to bearing soils varies from approximately 8½ feet along E-Dock to 25½ feet along the new G-Dock and at the end of the expanded A-Dock. The greater number and/or size of pilings is due to the greater depth to bearing soils (i.e., on the outside of the new F-Dock, the new G-Dock, and at the end of the expanded A-Dock). Installation of the piles will result in a temporary increase in localized turbidity. A more detailed discussion of turbidity is included in Section 3.2, Water. No dredging will be required to construct this alternative.

Alternative 3: 1993 Design

Alternative 3 will require dredging approximately 500 ($\pm$ 100) cubic yards of material along the eastern shore of the Marina (i.e., on the inside of Burner Point) in order to increase water depths and to increase access to the new inner dock. The silty nature of the marine sediments will result in a significant, but localized, temporary increase in turbidity. Dredging will also temporarily displace substrate for marine plants and animals. Dredged materials will be disposed at an approved in-water disposal site. A more detailed discussion of turbidity is included in Section 3.2, Water.

Alternative 3 will also require installation of 100-130 new 24-inch steel piles at various bottom depths ranging from -10 feet on the inside of Burner Point, to –6 feet along the western end of C-Dock, and –40 feet at the extensions of E- and A-Docks.

Alternative 4: No Action

No expansion of the Marina will result in no earth-related impacts.

Long-Term Impacts

Alternatives 1, 2, and 4

Alternatives 1, 2, and 4 will not affect geologic conditions at the Marina. Minor maintenance dredging may be required at the northwest corner of the existing C-Dock at some point in the

future, but the timing is not known. This maintenance dredging will be required for all alternatives.

Expansion of the Marina to the west (Alternatives 1 and 3) will increase boat activity in the vicinity of properties that have experienced previous problems with bank erosion. Residents of these properties have expressed concern regarding the potential for further erosion from additional boat wakes. It is unclear whether past erosion problems were the result of boat wakes and/or storms and upland runoff. The docks will reduce wave impact on shoreline behind the floats.

Increased boat use of the fuel float as a result of the expansion could potentially increase scour within the areas adjacent to the fuel float. However, the water depth in this area is deep enough that further scour is unlikely. Erosion of the Burner Point shoreline is also unlikely due to the 40-120 foot distance between the fuel float and the shoreline.

Alternative 3: 1993 Design

Construction of Alternative 3 may result in the need for periodic maintenance dredging along the eastern edge of the Marina, on the inside of Burner Point, in order to maintain water depths.

Increased scour within the areas adjacent to the fuel float is unlikely. The dredging associated with Alternative 3 will increase water depths, and propeller wash is not likely to result in scouring. Erosion along the east shoreline is also unlikely because the new dock will be positioned between the maneuvering area and the shoreline.

3.1.3 Mitigating Measures

Proposed:

- Construction activities will be limited to the period between July 16 and February 16, in order to minimize potential impacts to juvenile Puget Sound chinook salmon, Hood Canal summer-run chum salmon, and bull trout.

- Best Management Practices will be employed during construction including silt fences, spill control measures, floating booms, etc.

3.1.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to topography, soils, or subsurface conditions are anticipated.

3.2 WATER

3.2.1 Affected Environment

Water Quality and Stormwater

The Washington State Department of Ecology has classified all waters of Port Ludlow as Class AA. Water Quality monitoring of Port Ludlow Bay since 1984 has demonstrated that overall water quality in Port Ludlow Bay is excellent, consistent with its Class AA designation (Jefferson County 1993a, b; Berryman & Henigar 2001).

A National Pollutant Discharge Elimination System (NPDES) point-source monitoring program for the Port Ludlow Wastewater Treatment Plant was conducted from 1989 through 1997. This monitoring program documented water quality in Port Ludlow Bay during the environmentally critical months of May through October. The results of the point-source monitoring demonstrated continued excellent water quality in Port Ludlow Bay. The point-source monitoring program in no longer required by the Department of Ecology and was discontinued in 1998 (Berryman & Henigar 1999, 2001).

A program to monitor non-point sources of pollutants to Port Ludlow Bay was initiated by Pope Resources, developers of Port Ludlow Marina. Monitoring has continued since 1989, with the objectives of (1) establishing baseline water quality conditions, (2) evaluating the impacts of development activities and related nonpoint sources, (3) evaluating the effectiveness of nonpoint source controls such as stormwater management systems, and (4) monitoring long-term trends of bay water quality. Pope Resources conducted its most recent nonpoint monitoring in 1998. This nonpoint-source monitoring program was designed to assess long-term trends in water quality during baseflow and stormflow conditions in the major tributaries to Port Ludlow Bay. Baseflow conditions are generally measured May through October, while stormflow water quality was measured during December. Stations were monitored for flow, fecal coliform, conductivity, dissolved oxygen, pH, turbidity, and temperature. During some years, some stations were monitored for metals and pesticides.

No long-term upward or downward trends in constituent concentrations are evident for any of the monitoring stations. A graphic showing the long-term trends of the stormwater monitoring results for nitrates is contained in Appendix E. Constituent concentrations, for the most part, have not been increasing along with the increased population density of the watershed. Concentrations of most constituents (e.g., fecal coliform) have been higher during storm events than during baseflows, which is consistent with the findings of other watershed studies (Berryman & Henigar 1999, 2001).

Gray and Black Water Discharge

The potential for the discharge of gray (galley, bath and shower water) and black water (sewage containing human body wastes and the waste from toilet and other receptacles intended to receive or retain body waste) exists within all marinas. Discharge of black water is illegal and prohibited within the Port Ludlow Marina (please refer to Appendix C and Section 3.8.4 Sanitary Sewer Service for a more detailed discussion of the Marina's policies for controlling discharge of sewage and gray water within the Marina). The State Department of Natural Resources (DNR)

is now studying the issue of gray water discharge for the state as a whole. Such discharge is currently "discouraged" at the Port Ludlow Marina. At such time as DNR promulgates new rules for gray water discharge, the Port Ludlow Marina will address the rules, as will all other marinas.

Of particular concern is the discharge of sewage black water. The Washington State Department of Ecology (Ecology) has established water quality standards for fecal coliform bacteria (Chapter 173-201 WAC). For Class AA marine waters, including Port Ludlow Bay, the fecal coliform standard is a geometric mean of 14 organisms per 100 milliliters (ml) of water. This standard applies to waters where edible shellfish are present. The U.S. EPA has established water quality criteria for fecal coliform and enterococcus bacteria based on health risk to swimmers at both freshwater and saltwater beaches. These criteria are geometric means of 200 and 35 organisms/100 ml, respectively.

Current Port Ludlow Marina regulations require that all live-aboard tenant vessels must be equipped with a Coast Guard-approved holding tank and that live-aboard tenants can be required to submit to inspection of their vessels' plumbing and mechanical systems to verify compliance with state and local public health and safety laws. The U.S. Coast Guard Auxiliary-Port Ludlow Chapter provides voluntary vessel inspections (whether tenants or guests) to insure compliance with Coast Guard regulations - safe boating and mechanical systems. The Vessel Safety Check (VCS) form includes marine sanitation devices as an item to be checked.

The Marina now provides one sewage pump-out station at the fuel dock and one portable pump-out facility. A monthly log of the pump-outs, completed by Marina staff and boat owners, is kept at the Marina office. Shore-side restroom facilities are also available for Marina patrons. As stated above, water quality monitoring data for Port Ludlow Bay indicates no long-term upward or downward trends in constituent concentrations for any of the monitoring stations.

Bilge Water

Another potential source of pollution in marinas comes from the discharge of bilge water, which may contain a variety of chemical constituents, but predominantly petroleum hydrocarbons. Port Ludlow Marina's BMPs (Appendix C) expressly forbids the discharge of bilge water within the Marina. The BMPs state:

- *The discharge of contaminated bilge water is illegal. Do not discharge bilge water that is contaminated with oil, detergents, or bilge cleaners. The fine for discharging oil from your bilge can be as high as $20,000 per day/per violation. Use oil absorbent bilge pads or pillows in your vessel's bilge to soak up oil and fuel.*

- *Prevent oil contamination of bilge water. Do not drain oil into bilge. Fit a tray underneath the engine to collect drips. Put a couple of pads in the pan to make cleanup easier. Keep bilge area as dry as possible. Fix all fuel and oil leaks in a timely fashion.*

- *Disposal of oil soaked adsorbents, as a household hazardous waste is possible. Otherwise, wrap in newspaper; place in a plastic bag, and place into the garbage.*

Water Quality – Shellfish Harvesting

In areas with recreational and commercial shellfish harvesting, water quality issues are extremely important. Sewage and chemical discharges to shellfish-bearing waters can act as sources of contamination for shellfish, creating health risks to human and animal consumers alike.

The nearest recorded shellfish beds to the Port Ludlow project area are geoduck beds located along the beach between Mats Mats Bay and Port Ludlow (PSWQA and DNR 1992). Recreational shellfish beds are located in the North Hood Canal area south of Port Ludlow with recorded populations of native littlenecks, manila littlenecks, butter clams, eastern softshell clams, *Macoma* clams, geoducks, horse clams, and oysters (WDFW 2002). There are no recorded shellfish beds (i.e., softshell clams, geoducks, and other bivalve mollusks) within the project area or within the inner bay of Port Ludlow Bay (PSWQA and DNR 1992), nor are there any records of recreational shellfish harvesting within Port Ludlow Bay in the past decade (WDFW 2002; Strom, A. WDFW shellfish biologist, personal communication, February 28, 2002). The Washington State Department of Health has closed the inner bay of Port Ludlow Bay to shellfish harvesting due to the presence of a municipal sewage outfall (D. Christensen, Jefferson County Department of Natural Resources, personal communication, March 1, 2002).

Port Ludlow Bay Flushing Characteristics

The location, geometry, and orientation of Port Ludlow Bay is such that the strong offshore ebb-and-flood tidal currents in Admiralty Inlet create a large eddy in the outer portion of Port Ludlow Bay that appears to reverse direction with each tidal stage. Waters from Admiralty Inlet are drawn into the bay under a wide variety of tidal conditions. Current measurements, drogue observations, and salt balance calculations made in 1984 and 1986 indicated that the outer bay eddy is accompanied by a complex pattern of currents that exert influence into the central portion of the bay. Significantly more water is circulated into and out of the bay due to eddies and currents than would be the case if only a simple ebb-and-flood pattern existed. As a consequence, the bay may be better mixed and better flushed than many bays within Puget Sound. Mixing is further enhanced by vertical currents and upwelling at the entrance and head of Port Ludlow Bay (Jefferson County 1993a, b).

Flushing of the bay is caused by tidal currents, fresh water from streams and rainfall, wind-mixing of the surface water, and local vertical mixing. Salt balance calculations indicated that the volume of water exchanged daily between Port Ludlow and Admiralty Inlet averages 39 percent per day and varies from 20 to 50 percent of the total volume of the bay, dependent upon the time of year and prevailing tidal range. The time to exchange the water volume of the bay, including the innermost reaches, was estimated to be between 2 to 5 days. Localized portions of the bay may have longer or shorter flushing rates. The flushing time for the outer bay has been estimated to be 9 hours on average (Jefferson County 1993a, b).

3.2.2 Environmental Impacts

Construction Impacts

During construction, potential discharges to surface water include leakage of petroleum products from construction equipment. These substances can enter marine water directly or in stormwater runoff.

Few, if any, juvenile salmonids are expected in the action area during construction activities; also, few adult chinook salmon or bull trout are expected in the project area during construction. Short-term and localized decreases in dissolved oxygen or increases in turbidity due to project construction may result in avoidance of immediate work areas. Should this avoidance occur, it would have only insignificant and unmeasurable effects on salmonids.

Alternatives 1 and 2: Expansion Alternatives

Alternatives 1 and 2 may result in temporary and localized impacts to water quality due to pile driving. Elevated turbidity plumes are likely to occur in the immediate vicinity of the pile driving. However, the majority of the pile-driving activities will occur at water depths of 35 to 40 feet, away from intertidal areas that are used predominantly by juvenile salmonids. Because of the depth of the water where pilings will be installed, it is highly unlikely that any increased turbidity due to pile driving will affect areas frequented by juvenile salmonids. Pile-driving activities are not expected to appreciably affect dissolved oxygen concentrations in the project area.

Juvenile salmon have been shown to avoid areas of unacceptably high turbidities (e.g., Servizi 1988), although they may seek out areas of moderate turbidity (10 to 80 NTU), presumably as cover against predation (Cyrus and Blaber 1987a,b). Feeding efficiency of juveniles is also impaired by turbidities in excess of 70 NTU, well below sublethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 mg/l suspended sediments). However, chinook salmon exposed to 650 mg/l of suspended volcanic ash were still able to find their natal water (Whitman et al. 1982). Based on these data, it is highly unlikely that the locally elevated turbidities generated by the proposed action will directly affect juvenile or adult salmonids that may be present.

The installation of 100-130 steel pilings in the project area at water depths of 18 to 40 feet will result in the destruction of benthic habitat (i.e., habitat for organisms living in or at the bottom of the Bay) within the footprint of each piling. Assuming that each piling is approximately 2 feet in diameter, the area covered by the foot of each piling is about 3.14 sq. ft., or 314 sq. ft. for 100 pilings. Benthic habitat within the footprint of each piling will be permanently destroyed. However, the pilings will provide a substantially greater new surface area for colonization by marine plants and animals. Colonization by marine algae will, in turn, provide additional habitat for juvenile fish and invertebrates. Furthermore, adjacent benthic habitat will continue to provide ample foraging habitat for juvenile salmonids that may occur in the project area. In general, juvenile salmonids are not expected to be foraging on benthos in water depths greater than about –10 ft MLLW.

Sediment chemistry data from the Marina indicate that sediments beneath the Marina do not contain elevated concentrations of any organic chemicals or metals. Pile driving, therefore, will not compromise water quality by the resuspension of contaminants in the water column.

Alternative 3: 1993 Design

In addition to impacts from pile driving, the required dredging and dewatering associated with Alternative 3 may cause additional temporary and localized impacts to water quality in the vicinity of active equipment. Elevated turbidity plumes and reductions in dissolved oxygen could occur in localized areas near active dredging. Juvenile salmon are not expected to be present at the time when dredging will occur, however.

It is anticipated that any dredging associated with Alternative 3 would be accomplished with a barge-mounted clamshell dredge. Due to the characteristics of clamshell buckets, it is generally accepted that they do not have the potential to entrain pelagic fish such as salmonids. Specifically, the clamshell bucket descends to the substrate in an open position. The force generated by the descent drives the jaws of the bucket into the substrate, which "bite" the sediment upon retrieval. During the descent, the bucket cannot trap or contain a mobile organism because it is totally open. Based on the operation of the clamshell dredge bucket, it is concluded that the proposed project would not entrain juvenile, subadult, or adult salmonids, although some entrainment of demersal fish and epibenthic invertebrates (e.g., crab) may occur.

Dredging will produce long-term changes in the depth and slope in the area to be dredged. It will also sequentially eliminate nonmobile benthos over approximately one acre of bottom area, resulting in a temporary reduction in abundance and diversity of benthic macroinvertebrates. However, the benthic habitat disturbed during dredging is expected to be quickly recolonized by infauna and epifauna (McCauley et al. 1977, Richardson et al. 1977, Romberg et al. 1995, Wilson and Romberg 1995). Diversity and health of the benthic assemblage recolonizing the areas to be dredged are expected to quickly equal those of the benthic community now present.

Alternative 4: No Action

No impacts to water quality from construction activities would occur.

Long-Term Effects

Alternatives 1, 2, and 3: Expansion Alternatives

No long-term direct or indirect effects to water quality are anticipated for any of the construction activities proposed in the project area.

Further, although expansion of the Marina will result in increased boat activity, the proposed alternatives are not expected to significantly degrade water quality or impact any populations of shellfish that may be present in the vicinity of the project area. Increasing marina capacity by one third would be expected to increase the present rates of releases of bilge wastewater, petroleum products, and gray water by about 33% (assuming no new regulations and no improvement in boat owner compliance with Port Ludlow BMPs). Past monitoring data have not identified a specific problem associated with existing rates of discharges of these pollutants at Port Ludlow. Specific pollutants associated with these vessel discharges (nutrients, fecal coliform, and petroleum hydrocarbons) also enter the bay from upland sources and the relative contributions (loadings) from upland and vessel sources are unknown and likely vary seasonally.

Some long-term incremental increase in ambient levels of these pollutants in Port Ludlow may result from the proposed action. These increases may be offset, in part, by continuing the existing trend of reductions in non-point source loadings of the same pollutants (e.g., Berryman & Henigar 2001).

Alternative 4: No Action
No impacts to water quality are anticipated.

3.2.3 Mitigating Measures

Proposed:

- A hazardous material spill clean-up kit will be available on the fuel float and on one of the expanded docks and crews will be trained in the use of this kit.

- The Port Ludlow Marina will continue to educate users of the Marina regarding Best Management Practices (BMPs).

- Port Ludlow Associates is committed to ongoing enforcement. BMPs will be enforced via fines and/or revocation of Marina use.

- Port Ludlow Associates will educate marina users regarding the effects of discharging gray water and strongly discourage such discharge.

- Two portable boat sewage pump-outs will be installed providing further ability to pump out sewage from vessels.

3.2.4 Significant Unavoidable Adverse Impacts

No significant adverse impacts to water quality are anticipated.

3.3 Marine Plants and Animals

The following information is taken from the *"Port Ludlow Marina Expansion Biological Evaluation"* (Pentec, 2001), the *"Port Ludlow Marina Expansion – Eelgrass Survey, Revised " (Pentec, 2001),* previous studies and field surveys undertaken for Port Ludlow, and a review of current literature, including Priority Species and Habitats data from the WDFW.

The *"Port Ludlow Marina Expansion Biological Evaluation"* (2001) was prepared by Pentec Environmental (the BE) and submitted to the COE for their review as required under the COE Section 10 (Docks and Pilings) permit procedure. This report will be reviewed and evaluated by the COE, the NMFS and the USFWS prior to issuance of any Section 10 Permit. The WDFW will also review all environmental reports prepared for this project in conjunction with their consideration of the request for a Hydraulic Project Approval (HPA). A full copy of the *Biological Evaluation* is contained in Appendix D of this DSEIS.

Project Area

Port Ludlow Bay, located at the mouth of Hood Canal, provides a variety of habitats for marine fauna and flora. The shoreline in the Bay includes marine and estuarine intertidal mudflats, sand flats, mixed gravel and sand, and rocky shoreline. Rock riprap occurs on the upper shorelines within the Marina.

3.3.1 Marine Vegetation

3.3.1.1 Affected Environment

Marine vegetation provides both food and cover for fish and primary production that is essential to all levels of the food web. Within Puget Sound, the primary focus is eelgrass and macroalgae. Eelgrass beds are recognized as habitats of statewide significance due to their high production rates of prey for salmonids and other fishes, for the structural diversity they provide, and as a site for herring spawning (e.g., Simenstad et al. 1988). Macroalgae (i.e., green algae, brown algae, kelp, etc.) are also recognized as contributors to habitat complexity and primary productivity. In contrast to eelgrass, macroalgae readily colonizes all appropriate rocky, cobble, or artificial substrates. Particular macroalgal beds (e.g., kelp forests) have more specific habitat needs.

Aquatic vegetation in Port Ludlow Bay is primarily attached to intertidal cobbles, docks, and pilings. No subtidal eelgrass or kelp beds have been found within the project area (Echelon Engineering 2000, Pentec 2001), but macroalgae and eelgrass are both found on existing floats within the Marina. *Ulva* spp, (sea lettuce) and *Mastocarpus* sp. (red algae) were identified along the lower intertidal shoreline immediately north of the Marina during visits on December 10, 1999, and February 9, 2000. Shoreline vegetation observed along the upper intertidal area north of the Marina included pickleweed (*Salicornia virginica*), seaside plantain (*Plantago maritima*), gumweed (*Grindelia integrifolia*), fleshy jaumea (*Jaumea carnosa*), and saltweed (*Atriplex patula*).

Pentec conducted an eelgrass survey for the proposed Marina expansion on September 12, 2001 (Appendix D). The survey conformed to the WDFW preliminary protocols for conducting such surveys. The survey was confined to the fuel-dock and D-dock areas. Areas under the proposed offshore docks were not surveyed, because the depth of the water (e.g., deeper than –25 ft MLLW) will not support eelgrass.

No eelgrass was found in the project area during the September 2001 survey. Isolated plants of *Laminaria saccharina* (kelp) and *Ulva lactuca* (sea lettuce) were the only macrophytes reported during the survey; however, the abundance of these species was low.

3.3.1.2 Environmental Impacts

Alternatives 1, 2 and 3 – Expansion Alternatives

None of the proposed alternatives will adversely impact eelgrass, as no eelgrass is present within the project area. Furthermore, no adverse impacts to other marine macrophytes are expected from any of the proposed alternatives. Of the three alternatives, Alternatives 1 and 2 would be the least likely to impact marine vegetation as in each of these alternatives the majority of new overwater structure would be placed in water greater than –20 ft. MLLW. Eelgrass and other macrophytes would likely occur in water depths of less than –20 ft MLLW. Under Alternative 3, all new overwater structure would be placed in water less than –20 ft. MLLW, reducing light transmission to the substrate in the shallow nearshore environment that would provide the best habitat for marine macrophytes.

The new (additional) pilings will displace benthic habitat at the location of the pilings. The installation of 100-130 steel pilings in the project area at water depths of 18 to 40 feet will result in the destruction of benthic habitat for macrovegetation within the footprint of each piling. Assuming that each piling is approximately 2 feet in diameter, the area covered by the foot of each piling is about 3.14 sq. ft., or 314 to 408.2 sq. ft. for 100 to 130 pilings. Benthic habitat within the footprint of each piling will be permanently destroyed. However, the pilings will provide a much greater new surface area for colonization by marine plants and animals. Colonization by marine algae will, in turn, provide additional habitat for juvenile fish and invertebrates.

Alternative 4 - No Action

There are no anticipated environmental impacts to marine vegetation from this alternative.

3.3.1.3 Mitigating Measures

No mitigation is required.

3.3.1.4 Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to marine vegetation are anticipated.

3.3.2 Threatened and Endangered and Priority Species

3.3.2.1 Affected Environment

A number of salmonid species listed under the ESA may use Port Ludlow Bay. These species include the Hood Canal summer-run chum salmon (threatened), the Puget Sound chinook salmon (threatened), and bull trout (threatened). Coho salmon, a candidate species under the ESA, may also occur in Port Ludlow Bay. It is assumed that these salmonids originate from one or more of the river systems in the northern part of Hood Canal. The river basin closest to Port Ludlow that contains both Puget Sound chinook salmon and Hood Canal summer-run chum salmon is the Quilcene River system, located roughly 38 miles south of Port Ludlow, draining to Quilcene Bay on Hood Canal (Williams et al. 1975). The Quilcene River contains runs of fall chinook, coho, and summer-run chum salmon, although these runs are dependent in part on hatchery production. For purposes of this assessment, the Quilcene River system is considered to be a representative source of chinook salmon, summer-run chum salmon, and coho salmon but it is recognized that fish originating in other Hood Canal or Puget Sound streams may also be found in the action area.

The lower section of Ludlow Creek was used historically by coho and chum salmon as spawning and rearing habitat, but is no longer believed to support native salmon runs.

Hood Canal also supports populations of bull trout/Dolly Varden, which are listed as "Threatened" under the ESA. Surveys conducted in the Big Quilcene River indicate that there is not a distinct bull trout/Dolly Varden stock in the river (WDFW 1998a). Thus, any bull trout that may occur in Port Ludlow Bay originate in rivers other than the Quilcene River system.

In addition to the salmonids species discussed above, other ESA-listed species that may use Port Ludlow Bay include the bald eagle (*Haliaeetus leucocephalus*), marbled murrelet (*Brachyramphus marmoratus*), and Steller sea lion (*Eumetopias jubatus*). Steller sea lions have not been recorded in Port Ludlow, but could potentially occur.

Chinook Salmon. Chinook salmon prefer to spawn and rear in the mainstem of rivers and larger streams (Williams et al. 1975, Healey 1991). In the Quilcene River system, the Big Quilcene River is the only system containing sufficient flows during the late summer–early fall spawning migration period to accommodate a sustained run of fall chinook. In general, juvenile chinook salmon would be expected to be in and around the Port Ludlow Marina along the shoreline between February and July of each year and adult salmon can be found further offshore from Spring through Fall (Williams et al. 1975). As of 1992, the stock status of the Hood Canal chinook salmon stock was rated as healthy (WDFW and WWTIT 1994).

Critical Habitat. In Puget Sound, designated critical habitat for chinook salmon includes all marine, estuarine, and river reaches accessible to the listed species. Thus, all of the waters within the project area are designated as critical habitat for chinook salmon.

Coho Salmon. All accessible streams and tributaries draining the upper Hood Canal-Straits basin are used by coho salmon. Spawning occurs in almost every stream area where suitable spawning habitat and conditions permit.

Juvenile coho would be expected to occur in the project area from approximately March through July, and mature coho from August through the end of December (Williams et al. 1975).

Ludlow Creek is the largest subbasin within the Port Ludlow Bay watershed and contributes the greatest discharge of fresh water (FishPro 1993). Waterfalls that occur approximately 1,800 feet upstream of the mouth of the creek serve as a migration barrier to anadromous salmonids**.** Fish usage of this lower section of Ludlow Creek is documented for coho and chum salmon as spawning and rearing habitat. Field surveys by Washington State Department of Fisheries (WDF; now WDFW) biologists were conducted in the lower 0.5 mile of Ludlow Creek during 1974, 1975, and 1984. Surveys indicated that both coho and chum salmon spawn in this section of the creek, although natural propagation of these species is limited by the short length of stream available (FishPro 1993)**.** Data from 1974 indicated that the highest numbers of salmon spawning recorded were 23 coho and 14 chum (FishPro 1993). No salmonids were observed in Ludlow Creek during surveys conducted in 1984 and 1986 by WDF (Egan, R., WDFW, pers. comm., 2000). Currently it is believed that no native runs occur in the creek (Egan, R., WDFW, pers. comm., 2000).

The status of the Hood Canal-Quilcene/Dabob Bays coho stock was considered depressed as of 1992 (WDFW and WWTIT 1994).

Critical Habitat. No critical habitat has been proposed for Puget Sound/Strait of Georgia coho salmon.

Chum Salmon. Chum salmon usually spawn in coastal areas, and juveniles outmigrate to salt water almost immediately after emerging from the gravel (Johnson et al. 1997). It is believed that survival and growth in juvenile chum salmon depend less on freshwater conditions than on favorable estuarine conditions (Johnson et al. 1997).

Juvenile summer-run chum salmon could occur in and around the Port Ludlow Marina between the middle of January through the middle of June, and mature chum from September through December (Williams et al. 1975).

Chum and ocean-type chinook salmon usually have longer residence times in estuaries than do other anadromous salmonids. The period of estuarine residence appears to the most critical phase in the life history of chum salmon and appears to play a major role in determining the size of the subsequent adult run back to fresh water (Johnson et al. 1997).

Surveys conducted by WDF in 1974 reported 14 chum salmon spawning in the lower reach of Ludlow Creek below the waterfalls (FishPro 1993). However, no chum salmon were reported in surveys conducted by WDF in 1984 and 1986 (Egan, R., WDFW, pers. comm., 2000). In the past, private citizens have attempted enhancement projects for chum salmon in the lower section of Ludlow Creek, but have had minimal success (FishPro 1993). Currently, it is believed that the creek does not support native chum salmon runs (Egan, R., WDFW, pers. comm., 2000).

Stock status for the entire Hood Canal summer-run chum salmon stock was assessed. As of 1992, this stock was classified as critical (WDFW and WWTIT 1994).

Critical Habitat. Designated critical habitat for Hood Canal summer-run chum salmon includes all river reaches accessible to listed chum salmon (including estuarine areas and tributaries) draining into Hood Canal as well as Olympic Peninsula rivers between and including Hood Canal and Dungeness Bay. Also included are estuarine/marine areas of Hood Canal, Admiralty Inlet, and the Strait of Juan de Fuca to the international boundary and as far west as a straight line extending north from Dungeness Bay (50 CFR Part 226). This designation includes the project area.

Bull Trout (Native Char). Bull trout (*Salvelinus confluentus*) exhibit four life history patterns: resident, fluvial, adfluvial, and anadromous (Brown 1994). Anadromous bull trout in Puget Sound typically spend the first two years rearing in freshwater before migrating to marine waters (WDFW 1998b). It is highly unlikely that bull trout occur in Port Ludlow, as Ludlow Creek likely does not provide suitable spawning habitat for this species, nor are there any river basins in close proximity to Port Ludlow that are known to support bull trout.

The status and occurrence of anadromous populations of bull trout in Puget Sound are subject to some scientific debate; separation of anadromous bull trout from the closely related anadromous Dolly Varden char (*S. malma*) is very difficult. Until further resolution is possible, WDFW has made a decision to manage all Puget Sound stocks as if they were a single bull trout/Dolly Varden (native char) complex (Washington Department of Wildlife [WDW; now WDFW] 1993).

Critical Habitat. The USFWS does not have sufficient information to conduct analyses required to determine critical habitat for bull trout (native char) in Puget Sound. As a result, the service has not yet proposed or designated critical habitat (Chan, J., USFWS, pers. comm., March 22, 2000; USFWS 1999b).

Bald Eagles. The bald eagle's habitat includes estuaries, large lakes, rivers, and coastal areas. In Washington, resident bald eagle populations occur primarily near large bodies of water west of the Cascade Mountains (Rodrick and Milner 1991). The nearest recorded bald eagle nesting area to the Port Ludlow Marina is located approximately 4,900 feet west of the Marina (Guggenmos, L., WDFW, pers. comm., 2000).

In July 1999, the USFWS proposed to remove the bald eagle from the list of threatened and endangered species. A final decision on delisting is pending.

Critical Habitat. No critical habitat has been designated for bald eagles in Puget Sound.

Marbled Murrelet. The marbled murrelet, a small seabird that nests in the coastal, old-growth forests inhabits the Pacific coast of North America. Murrelets do not form dense colonies, and may fly 70 km or more inland to nest. They are more commonly found inland during the summer breeding season, but make daily trips to the ocean to gather food, and have been detected in forests throughout the year. When not nesting, the birds live at sea, spending their days feeding and then moving several kilometers offshore at night (SEI 1999).

In recent decades the murrelet population in Alaska and British Columbia has suffered a marked decline. Trends in Washington, Oregon, and California are also down, but the extent of the decrease in unknown. The most serious limiting factor for marbled murrelets is the loss of habitat through the removal of old-growth forests and fragmentation of forests**.** Marbled murrelets forage in nearshore waters where recreational boats are most often found. Disturbance by boats may cause them to abandon the best feeding areas (Environment Canada 1999).

Winter and summer aerial surveys were conducted by WDFW throughout Puget Sound to assess marbled murrelet densities. Summer surveys, conducted from 1992 through 1999, and winter surveys, conducted from 1993 through 2000, indicated marbled murrelet densities in the outer bay of Port Ludlow Bay to be 0.5 to 1 animal per square kilometer, with no animals reported in the inner bay in the vicinity of the proposed action (Nysewander, D., WDFW wildlife biologist, personal communication March 21, 2002).

Critical Habitat. No critical habitat has been designated for the marbled murrelet in Puget Sound.

Steller Sea Lion. Steller sea lions are rare in the project area. There are currently no breeding colonies in Washington State (NMFS 1992), although four major haul-out areas (none of which are located in Puget Sound) do exist. (NMFS 1992). The majority of Steller sea lions are found in Alaska.

Critical Habitat. No critical habitat for Steller sea lions has been designated in Puget Sound.

3.3.2.2 Environmental Impacts

Threatened and Endangered and Priority Species

Alternatives 1, 2, and 3 – Expansion Alternatives

Salmonids. Listed salmonids that may occur within the project area may potentially be impacted by construction and operation of the expanded Marina. These include the Hood Canal summer-run chum salmon, Puget Sound chinook salmon, and bull trout.

Short term Construction Impacts

Approximately *100-130* steel pilings will be installed as part of the Marina expansion. Piles will be installed using a barge-mounted pile driver. Feist et al. (1996) investigated the impacts of pile driving on juvenile pink and chum salmon behavior and distribution in Everett Harbor, Washington. The authors reported that there may be changes in general behavior and school size, and that fish appeared to be driven toward the acoustically isolated side of the site during pile driving. However, the prevalence of fish schools did not change significantly with and without pile driving, and schools were often observed about the pile-driving rigs themselves. No impacts on feeding were reported. The study concluded that any effects of pile-driving noise on juvenile salmonid fitness would be very difficult to measure quantitatively. Once the pilings are in place, pre-constructed sections of walkways and finger piers will be floated into place and assembled. No significant noise or disturbance will be generated by these actions. Because the

proposed inwater construction would occur outside of time periods when significant numbers of juvenile salmonids are expected to be present, no significant effect or take is expected from project construction activities.

Grette (1985) enumerated the rates of adult salmon (chinook, sockeye, and coho) movement through the fish ladders at the Ballard Locks during periods when steel sheet-piles were being driven immediately downstream of the locks and during periods of no pile driving. He reported a strongly diurnal pattern of movement through the locks with little movement at night. However, he reported that pile driving did not influence the rate of movement of adult salmon through the locks. Thus, it is unlikely that project pile driving would significantly influence migrations of adult salmon that may be present in the action area during work periods.

Juvenile salmon have been shown to avoid areas of unacceptably high turbidities (e.g., Servizi 1988). Feeding efficiency of juveniles is impaired by turbidities in excess of 70 NTU, well below sublethal stress levels (Bisson and Bilby 1982) and reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 mg/l suspended sediments). However, chinook salmon exposed to 650 mg/l of suspended volcanic ash were still able to find their natal water (Whitman et al. 1982) and juvenile salmon may seek out areas of moderate turbidity (10 to 80 NTU), presumably as cover against predation (Cyrus and Blaber 1987a,b). Based on these data, it is highly unlikely that the locally elevated turbidity generated by the proposed action will directly affect juvenile or adult salmonids that may be present.

Few, if any, juvenile salmonids are expected in the action area during construction activities; also, few adult chinook salmon or bull trout are expected in the project area during construction. Short-term and localized decreases in dissolved oxygen or increases in turbidity due to project construction may result in avoidance of immediate work areas. Should this avoidance occur, it would have only insignificant and immeasurable effects on salmonids.

Studies by Pentec (1997), Salo et al. (1980), and Ratte and Salo (1985) have shown evidence that migrating juvenile salmonids use overwater structures as cover when they are disturbed by overhead activities. These studies also found no evidence that overwater structures in Puget Sound concentrate predators on juvenile salmonids. The margins of new floating structures will support growth of a productive epibiota that will add to the overall biological production of the project area.

Long Term Impacts
Increase in overwater coverage by floats will impact marine habitat and may alter movements of juvenile salmonids within the marina. Table 2 below illustrates the overwater coverage for each alternative:

Table 2
Overwater Coverage (Square foot)

	Alternative 1 Proposed Project	Alternative 2 Deep Water	Alternative 3 1993 Design	Alternative 4 No Action
Total increase from existing, <-20 ft. MLLW	966	-0-	7,956	N/A
Total increase from existing, >-20 ft. MLLW	32,779	37,865	23,208	N/A
Total increase in overwater coverage	33,745	37,865	31,164	N/A

The new dock floats will not contain any breaks for light transmission, as breaks result in structural and performance problems. All finger floats will be less than eight feet in width.

Simenstad et al. (1999) examined three issues regarding the impacts of overwater structures on juvenile salmon. These include alteration in migratory behavior, reduction in prey production and availability, and increased predation. An assessment of over 60 direct sources of information found evidence that juvenile salmon react to shadows and other artifacts in the shoreline environment created by shoreline structures. While changes in light have been shown to affect salmon migration behavior and thus potentially place them at increased mortality risk, the authors reported that they found no quantitative information on the significance of these behavioral responses to juvenile salmon survival. Juvenile salmon also encounter limited prey resources under shoreline structures when important habitats such as eelgrass *(Zostera marin*a) are disturbed.

Simenstad et al. (1999) also conducted short-term underwater diving and video surveys at five ferry terminals in Puget Sound (Clinton, Kingston, Port Townsend, Seattle, Vashon) during the major period of juvenile salmon migration to gather preliminary information on the relationships among variations in overwater structures, fish occurrence and relative abundance, light conditions, biological communities, and potential predators. Juvenile salmon were observed migrating under several structures. Existing information indicates that the effects of shoreline structures on migrating juvenile salmon may vary, depending on the design and orientation of the shoreline structure, extent of alteration of the underwater light field, and presence of artificial light. The surveys indicated that summer light intensities were above the critical 10^{-4} foot candles threshold level required for maintenance of juvenile salmon feeding and schooling, even under the darkest portion of the terminal, at four of the five terminals investigated. However, according to the authors, the significance of short-term delays in the salmons' migration and cumulative or synergistic effects is insufficient to provide the quantitative relationships that would be necessary as the basis for developing retrofitting or design modifications to overwater structures. In ongoing studies in the Everett Marina, Pentec (2002 unpublished data) has noted a

wide dispersion and apparently undisturbed feeding of juvenile salmonids around floats within about 100 feet of the shoreline. Lesser numbers of juvenile salmonids were seen around floats farther from shore. Expansion of the Port Ludlow Marina will not impact fish access, fish refugia, substrate, shoreline, riparian conditions, flow and hydrology, current patterns, or saltwater–freshwater mixing patterns, nor will it result in other habitat disturbances. Increased overwater coverage, except under Alternative 3, will occur in waters generally deeper than –20 ft MLLW where there is little existing benthic primary productivity. Primary productivity on the sides of floats and pilings will more than offset the slight reduction in deepwater primary productivity that may occur.

The Port Ludlow Marina expansion project may affect, but is not likely to adversely affect, juvenile chinook salmon, Hood Canal summer-run chum salmon, coho salmon, or bull trout (native char). While the conclusion is focused on chinook salmon and chum salmon, it is applicable to coho salmon and bull trout (native char) as well; however, because of their presumed lesser dependence on nearshore habitat, these species will be less affected by both the negative and positive aspects of each project component. The proposed action will result in no adverse modification or destruction of designated chinook or Hood Canal summer-run chum critical habitat. No measurable effects and no take[1] of salmonids are expected.

Bald Eagles.

Short Term Construction Impacts

Ambient noise levels will increase during pile-driving activities and may temporarily disrupt foraging behavior of bald eagles in the vicinity of the project area. The Washington State Department of Transportation (WSDOT) has conducted two monitoring studies to determine the potential impacts on wintering eagles associated with wood and steel pile-driving activities. According to the authors, between 0.25 and 0.5 mile from the construction site and beyond, construction noises were similar in level to background noise.

The nearest recorded bald eagle nesting area to the Port Ludlow Marina is located approximately 4,900 feet west of the Marina (Guggenmos, L., WDFW, pers. comm., 2000). It is likely that residential development within the Port Ludlow area produces background noise levels typical of other communities of similar population and size.

The proposed construction noise thus may affect, but is not likely to adversely affect, bald eagles or their critical habitat.[2]

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[1] Section 3 of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect, or attempt to engage in any such conduct." The USFWS further defines "harm" as, "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavior patterns such as breeding, feeding, or sheltering," and "harass" as, "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." This section of the DSEIS summarizes the conclusions of the project biological evaluation (BE).

[2] NMFS/USFWS guidelines for the preparation of biological assessments state that a conclusion of "may affect, but is not likely to adversely affect" is the "…appropriate conclusion when the effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive

effects without any adverse effects…." Insignificant effects, in the NMFS/USFWS definition, "…relate to the size of the impacts and should never reach the size where take occurs…[One would not expect to]…be able to meaningfully measure, detect, or evaluate insignificant effects."

Marbled Murrelets.

Short Term Construction Impacts

Proposed project activities will be confined to limited intertidal and subtidal areas and will not significantly affect murrelet foraging areas or prey. Any marbled murrelets that may forage in the Bay during times of active construction may be disturbed by construction-related noise, thus avoiding the area during these times. However, any such disturbances to foraging behavior of marbled murrelets is expected to be localized and of short-term duration. Thus, the proposed action may affect, but is not likely to directly or indirectly adversely affect**,** marbled murrelets that may occur in the project vicinity.

Steller Sea Lions

Steller sea lions are rare in the action area. Because of the innate escape responses of marine mammals and the pelagic habitats they use, there is virtually no risk of a direct take or injury that could result from project-related activities. Although Port Ludlow could potentially be used as a haul-out area for Steller sea lions, it would be unusual (Jefferies, S., WDFW, pers. comm., 2000).

The conclusion of the BE is that the project may affect, but is not likely to adversely affect, Steller sea lions.

Alternative 4 – No Action

No environmental impacts are anticipated from this alternative.

3.3.2.3 Mitigating Measures

Proposed:

The new kayak float will include features to provide light transmission through a portion of the decking. All new pilings and floats will be steel or concrete. All inwater work will be conducted during periods allowed for those activities in this area. This will minimize the potential for construction disturbance impacts to important resources, especially juvenile salmonids.

3.3.2.4 Unavoidable Adverse Impacts

No unavoidable adverse impacts to biota are anticipated as a result of the proposed expansion.

3.3.3 Other Fish and Invertebrates

3.3.3.1 Affected Environment

Port Ludlow May provides a variety of habitats that are used by migratory and resident fish and invertebrate species. Among the fish species that may occur in Port Ludlow Bay are groundfish and salmonid fish species that have designated Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267). These species are listed in Table 3.

Table 3 – Fish Species with Designated EFH in the Estuarine Composite (NMFS 2001)

Groundfish Species	English sole, *Pleuronectes vetulus*
spiny dogfish, *Squalus acanthias*	Pacific sanddab, *Citharichthys sordidus*
California skate, *R. inornata*	rex sole, *Errex zachirus*
spotted ratfish, *Hydrolagus colliei*	starry flounder, *Platichthys stellatus*
lingcod, *Ophiodon elongatus*	
cabezon, *Scorpaenichthys marmoratus*	
kelp greenling, *Hexagrammos decagrammus*	
Pacific cod, *Gadus macrocephalus*	
Pacific whiting (hake), *Merluccius productus*	
sablefish, *Anoplopoma fimbria*	**Pacific Salmonid Species**
bocaccio, *S. paucispinis*	chinook salmon, *Oncorhynchus tshawytscha*
brown rockfish, *S. auriculatus*	coho salmon, *O. kisutch*
copper rockfish, *S. caurinus*	pink salmon, *O. gorbuscha*
quillback rockfish, *S. maliger*	

Forage Fish. Larval, juvenile, and adult Pacific herring (*Clupea pallasi*), surf smelt (*Hypomesus pretiosus*), and Pacific sand lance (*Ammodytes hexapterus*) are important forage fish for juvenile, subadult, and adult salmonids (Healey 1991). These species also constitute the basis for baitfish fisheries in Puget Sound and are among the species WDFW is charged with protecting, along with other habitats, in the Hydraulic Code (WAC 220-110). Alteration of spawning habitat for these species may directly affect the abundance of forage for a range of age groups of chinook salmon. Surf smelt and sand lance spawn within Port Ludlow however, there are no data indicating that spawning occurs within the project area (Bargmann, G., WDFW, pers. comm., 2000). A very large school of juvenile herring (e.g., 100 to 150 mm) was seen foraging in the west-central portion of the Marina during a site visit on December 10, 1999.

Epibenthic Zooplankton. Epibenthic zooplankton, primarily crustaceans, and terrestrial insects occur in Port Ludlow Bay and are important prey for juvenile chinook salmon in estuaries (Simenstad et al. 1988, Healey 1991).

Pelagic Zooplankton. Calanoid copepods are often abundant in the diet of juvenile chinook salmon in urban estuaries (Weitkamp and Schadt 1982). Production of calanoids and other potential pelagic prey of salmonids is largely dependent on water-column processes in outer Port Ludlow and adjacent marine waters. Pelagic zooplankton productivity is dependent on the presence of adequate light and nutrients to stimulate phytoplankton and is not influenced greatly by conditions along shorelines or in deeper water in the vicinity of the Port Ludlow Marina.

Bivalve Mollusks. Mussels and barnacles were observed within Port Ludlow Marina during a site visit on December 10, 1999. The nearest recorded shellfish beds to the project area are geoduck beds located along the beach between Mats Mats Bay and Port Ludlow (PSWQA and DNR 1992, Sizemore and Ulrich 2001). Recreational shellfish beds are located in the North Hood Canal area south of Port Ludlow with recorded populations of native littlenecks, manila littlenecks, butter clams, eastern softshell clams, *Macoma* clams, geoducks, horse clams, and oysters (WDFW 2002). There are no recorded shellfish beds (i.e., softshell clams, geoducks, and other bivalve mollusks) within the project area or within the inner bay of Port Ludlow Bay (PSWQA and DNR 1992), nor are there any records of recreational shellfish harvesting within Port Ludlow Bay in the past decade (WDFW 2002; Strom, A. WDFW shellfish biologist, personal communication, February 28, 2002). However, it is likely that at least some of these species occur within Port Ludlow Bay.

3.3.3.2 Environmental Impacts

Alternatives 1, 2 and 3 – Expansion Alternatives

Construction Impacts/Short-Term Effects

Short-term effects to fish from construction associated with the Port Ludlow Marina expansion may include disruption of foraging behavior or avoidance of the project area during active construction. Pile driving may produce temporary and localized impacts to water quality, causing elevated turbidity plumes in the immediate vicinity of the pile driving. However, such impacts will be temporary and localized and will not persist beyond the active construction phase.

Long-Term Effects

Expansion of the Port Ludlow Marina will result in an increase in the area of overwater structure within the project area, which will in turn result in increased shading of predominantly deep (>35 feet) subtidal habitats beneath the structures. Under existing conditions, the project area does not provide substantial habitat for aquatic vegetation except on Marina floats and on intertidal hard structures. Increased shading of underlying substrates may result in minor decreases in microalgae and benthic productivity in the area directly beneath the new floats; however, the floats will also provide substantial additional surface area for colonization by aquatic vegetation and invertebrates.

The Washington State Department of Fisheries conducted a study of Skyline Marina in north Puget Sound in which fish, zooplankton, and water quality characteristics were compared to the Marina's source water in monthly surveys conducted from March to October 1978 (Cardwell et al. 1980). The study concluded that the Marina's fish populations were numerically larger, more diverse, and richer in species than those in the Bay. Predation on baitfish and salmon juveniles in the Marina was judged to be low due to an apparent scarcity of potential bird and fish predators during the period of maximum juvenile fish abundance (May to September) (Cardwell et al. 1980).

Surface zooplankton in the Marina were less dense and rich in species than those in the Bay, and several holoplanktonic species (e.g., siphonophores and tunicates) were either absent or present in reduced densities. Calanoid copepods, the primary prey of chum and pink salmon, surf smelt,

and Pacific herring, were most abundant in the Bay. Conversely, the principal prey of chinook and coho salmon, brachyuran and teleost larvae, were most abundant in the Marina (Cardwell et al. 1980).

The expanded Marina may allow increased use by forage fish such as the large school of herring that was observed in the Marina in December 1999.

Illumination of the Port Ludlow Marina at night with artificial lighting is not expected to adversely impact salmonids that may use the Marina area. Salo et al. (1977, as cited in Parametrix 1993b) and Prinslow et al. (1979) studied the effects of artificial lighting along the edges of a pier apron on Hood Canal. However, this study considered only the effects of lights at night. Young salmon, as well as other fish, were attracted to the lighted areas at the edge of the aprons. These light levels also attracted young herring and sand lance. Light levels of 19 to 37 ft.-c attracted substantial numbers of chum salmon and other fish. These attractions of young fish were to areas adjacent to the piers rather than under the aprons.
Ratte and Salo (1985, as cited in Parametrix 1993b) studied the effects of artificial lighting under a Port of Tacoma pier apron. Generally they obtained higher catches in traps with the lights off than with the lights on. These results suggest that young salmon tended to avoid the artificially lighted area to some degree.

The Washington State Department of Health has closed the inner bay of Port Ludlow Bay to shellfish harvesting due to the presence of a municipal sewage outfall (D. Christensen, Jefferson County Department of Natural Resources, personal communication, March 1, 2002). The proposed alternatives are not expected to degrade water quality or impact any populations of shellfish that may be present in the vicinity of the project area.

No adverse long-term, indirect effects to fish or invertebrates are expected to result from the proposed action.

Net Effects
The expansion of the Port Ludlow Marina will result in biota in the project area generally being maintained in their current condition, but will increase the substrate available for colonization by plants and animals. Floats and upper portions of pilings may support production of some epibenthic zooplankton preferred as prey by juvenile salmonids (e.g., Kozloff 1987).

Alternative 4 – No Action
No environmental impacts are anticipated from this alternative.

3.3.3.3 Mitigation Measures
Proposed:
- The new kayak float will include light transmissive capabilities.

3.3.3.4 Unavoidable Adverse Impacts
No unavoidable adverse impacts to other fish and invertebrates are anticipated as a result of the proposed expansion.

3.3.4 Avian Species

3.3.4.1 Affected Environment

A biological inventory was conducted in March and May of 1992 to describe animal communities within the project area. Seventy-six bird species are expected to use the open-water and shoreline areas of the Marina and Port Ludlow Bay (Raedeke Associates 1992). Of these, 18 species were reported during the inventory.

Nine species of waterfowl were observed near the Marina and within Port Ludlow Bay. Nineteen species were reported or expected to use the area. American wigeon (*Anas Americana*) and scoter (*Oidema nigra, Malanina deglandi, M. perspicillara*) were the most abundant ducks observed during the inventory (Raedeke Associates 1992).

Common loon (*Gavia immer*), a state sensitive species, were observed feeding near the Marina. Arctic (*G. arctica*) and red-throated (*G. stellata*) loon are expected to use the area during the winter (Raedeke Associates 1992).

Horned grebe (*Podiceps aurius*) were observed within 20 feet of the Marina docks. Red-necked (*P. grisegena*), eared (*P. caspicus*), and western (*Aechmophorus occidentalis*) have also been reported or are expected to use Port Ludlow Bay (Raedeke Associates 1992).

Other common birds observed in Port Ludlow Bay include double-crested cormorant (*Phalacrocorax auritus*) and pigeon guillemot (*Cepphus columba*). Brandt's (*P. penicillatus*) and pelagic (*P. pelagicus*) cormorant are also expected to use the Bay. Killdeer (*Charadrius vociferous*), glaucous-winged gull (*Larus glaucescens*), herring gull (*L. argentatus*), belted kingfisher (*Megaceryle alcyon*), bufflehead (*Bucephala albeola*), mallard (*Anas platyrhynchus*), pintail (*Anas acuta*), lesser scaup (*Aythya affinis*), great blue heron (*Ardea herodias*), common merganser (*Mergus merganser*), hooded merganser (*Lophodytes cucullarus*), and Barrow's goldeneye (*Bucephala islandica*) have also been observed in Port Ludlow Bay (Raedeke Associates 1992). Residents of Port Ludlow have reported osprey (*Pandion haliaetus*) and black-crowned night heron (*Nycticorax nyticorax*) and merlin (*Falco columbianus*) are expected to use the Bay during certain times of the year (Raedeke Associates 1992).

Passerine and upland birds observed near the Marina include the song sparrow (*Melospiza melodia*), violet-green swallow (*Tachycineta thalassina*), American robin (*Turdus migratorius*), rufous-sided towhee (*Pipilo erythrophthalmus*), violet-green swallow (*Tachycineta thalassina*), European starling (*Sturnus vulgaris*), purple finch (*Carpodacus purpureus*), and American crow (*Corvus brachyrhynchos*) (Raedeke Associates 1992).

3.3.4.2 Environmental Impacts

Alternatives 1, 2 and 3 – Expansion Alternatives

Construction Impacts/Short-Term Effects

Short-term effects to avian species resulting from construction associated with the Port Ludlow Marina expansion may include disruption of foraging behavior or avoidance of the project area during active construction. Pile driving will likely result in a temporary exceedance of background noise levels during active construction. However, such impacts will be temporary and localized and will not persist beyond the active construction phase.

Long-Term Effects
None of the three expansion alternatives are expected to result in long-term effects to avian species using Port Ludlow Bay.

Alternative 4 – No Action
No environmental impacts are anticipated from this alternative.

3.3.4.3 Mitigation Measures
No mitigation measures are proposed.

3.3.4.4 Unavoidable Adverse Impacts
No significant unavoidable adverse impacts to avian species are anticipated as a result of the proposed expansion.

3.3.5 Mammals

3.3.5.1 Affected Environment
River otter (*Lutra Canadensis*), gray whale (*Eschrichus glaucus*), Dall's porpoise (*Phocoenoides dalli*), and harbor seal (*Phoca vitulina*) are reported to use Port Ludlow Bay (Raedeke Associates 1992).

3.3.5.2 Environmental Impacts

Alternatives 1, 2, and 3 – Expansion Alternatives
Construction Impacts/Short-Term Effects
Short-term effects to mammalian species resulting from construction associated with the Port Ludlow Marina expansion may include disruption of foraging behavior or avoidance of the project area during active construction. Pile driving will likely result in a temporary exceedance of background noise levels during active construction. However, such impacts will be temporary and localized and will not persist beyond the active construction phase.

Long-Term Effects
None of the three expansion alternatives are expected to result in long-term effects to mammalian species using Port Ludlow Bay.

Alternative 4 – No Action
No environmental impacts are anticipated from this alternative.

3.3.5.3 Mitigation Measures

No mitigation measures are proposed.

3.3.5.4 Unavoidable Adverse Impacts

No unavoidable adverse impacts to mammals are anticipated as a result of the proposed expansion.

3.4 Land Use and Land Use Designations

3.4.1 Affected Environment

Project History

Port Ludlow, located in eastern Jefferson County on the western shoreline of Puget Sound, was originally settled in the mid-1800s as a shipbuilding, logging, and sawmill community. By the 1880s, Port Ludlow encompassed a sawmill, log dump, numerous homes, a hotel, and other facilities. The sawmill was permanently closed in 1935 and subsequently dismantled. The existing homes were moved to Port Gamble.

Development of the current Port Ludlow Resort and residential community was initiated in the late 1960s. As approved by Jefferson County, the original Port Ludlow development includes approximately 2,250 dwelling units (1,800 of which have been developed to date), a 21 acre Resort complex, a 27-hole golf course, a small retail center, parks, and open space.

The 280-slip Marina was constructed in the 1970s as part of the Port Ludlow Resort. Property below Ordinary High Water (OHW) is leased from the State of Washington Department of Natural Resources. The Marina serves guests, boating groups, and Port Ludlow area residents. Other central Puget Sound yacht clubs have requested to use slips at Port Ludlow as a "satellite facility," but the number of available slips has limited this function. The Marina is now full.

In 1993, the Resort area and residential development underwent a permitting process for redevelopment for the following 10 year period. The proposed redevelopment program included 700 additional residential units, 47,500 sq. ft. of additional commercial space, a 36-room inn, a 100-slip expansion of the Marina, construction of a new club house at the golf course, approximately 815 acres of open space and recreation areas, and supporting infrastructure including roads and utilities. The *EIS for the Port Ludlow Development Program* (April, 1993) was issued to address the impacts of the redevelopment at a programmatic level.

A second, project-level EIS (*EIS for the Inn at Port Ludlow*, 1993) was also prepared at that time. The second EIS was a project-specific EIS which analyzed the site-specific impacts of a 36-room Inn, 72 residential units, 2,500 sq. ft. of commercial space, renovation of upland Marina support facilities, expansion of the "Mill Pond" (a man-made pond), additional parking, landscaping with sand dunes, shoreline public access provisions, riprap rock installation, and replacement of underground fuel tanks with above-ground tanks.

In August of 1998, Jefferson County adopted a new *Comprehensive Plan* that designated the Port Ludlow community as a Master Planned Resort (MPR). Jefferson County Ordinance Number 08-1004-99 was subsequently adopted in October 1999. This ordinance established new development regulations consistent with the new Comprehensive Plan designation.

Project Area

Port Ludlow is located in a generally rural portion of Jefferson County, approximately six miles north of SR-104. The 1800 ± acre MPR is centered on the inner portion of Port Ludlow Bay and extends both north and south of this inner portion of the Bay.

Within the MPR, the Resort area is located on the northern shore of the Bay, in the area of Burner Point. The Marina is located on the inside of Burner Point, and is bounded by Resort uses on the north and east. The upland resort uses include the Harbormaster Restaurant, parking areas, Marina support facilities, four undeveloped single-family lots, "Mill Pond" (a man-made pond), the Heron Beach Inn, town homes, and open space, including a viewing area at Burner Point.

West of the resort area, MPR properties around the inner portion of the Bay are occupied by single-family homes and condominiums. The majority of the Resort area is separated from surrounding single-family development by Oak Bay Road.

Properties immediately west of the Marina lie within a designated "Single-Family" area and are occupied by one undeveloped single-family lot and three single-family dwellings. These properties access Oak Bay Road via Scott Court, and for purposes of this discussion are referred to as the "Scott Court Properties." A four-slip dock serving these residential lots was constructed in the mid to late 1990s. This dock, known as the "Scott Dock," is located approximately 150 feet from shore, approximately 300 feet west of the Port Ludlow Marina C- and D-Docks.

Within the inner portion of the Bay, the number of existing private docks is small; these docks are generally located on the southwestern shore of the Bay. The Meydenbauer Bay Yacht Club uses four dock slips at the west end of Port Ludlow Bay, as well as rafting boats together and anchoring boats in the Bay, as a satellite club facility.

Land Use Designations

Jefferson County Comprehensive Plan

The 1998 *Jefferson County Comprehensive Plan: Jefferson County, Washington* designates Port Ludlow a Master Planned Resort (MPR). The Marina and adjacent upland properties are designated as "Resort Complex/Community Facilities." Single-family residential properties to the west are designated "Single Family Residential."

Zoning

Jefferson County has adopted specific regulations to address development within the Port Ludlow MPR. These regulations are contained in the *Phased Development Agreement*, recorded on August 4, 2000. These development regulations are applied to development proposals within the Port Ludlow MPR while the Jefferson County Unified Development Code (UDC) contains the development regulations for the rest of the County. These Development Regulations (the "MPR Development Regulations") are found in Appendix B of the Jefferson County UDC adopted as Ordinance 08-1004-99.

The Marina lies within the "Resort Complex/Community Facilities" zone (MPR-RC/CF) established in the MPR Development Regulations. The purpose of this zone is to provide amenities and services associated with a resort and the surrounding community, and to support existing residential uses. Uses allowed in this zone *"...recognize the recreational nature of the resort and include the existing and planned resort complex, as well as limited permanent residential uses, and non-resort community facilities including a beach club and Kehele Park."* The Marina is a permitted use within this zone.

Section 3.901 "Resort Plan" of the development regulations addresses the plan for future development of the Resort. Section 3.901 includes a 100-slip expansion of the Marina.

The Scott Court single-family development immediately west of the Marina is zoned Single Family (MPR – Single Family). The purpose of this zone is to recognize, maintain, and promote single family residential areas within the MPR, and provide opportunities for reasonably priced housing.

MPR land use designations are shown in Figure 9.

3.4.2 Environmental Impacts

Short-term (Construction) Impacts

Alternatives 1, 2, and 3: Expansion Alternatives

For all expansion alternatives, construction activities will result in short-term impacts to the adjacent resort and single-family residential development. Construction activities will temporarily increase noise levels, and barge and vehicular traffic; fumes from construction equipment may also be noticeable.

Construction noise will be generated primarily by pile driving, but will also come from the use of generators, other small engines, and hand tools. Data from the *Shilshole Bay Marina Dock Replacement/Moorage Expansion Project Draft Supplemental Environmental Impact Statement* (Port of Seattle, 2000) indicates that, from a noise standpoint, the "worst case" pile driving scenario is a diesel-powered hammer driving steel piles into a very hard subsurface soil layer, with no noise abatement shrouding. In this scenario, the Leq measured 100 feet from the diesel hammer was 95.9 dBA. At 180 feet, the Leq will be 90.8 dBA, and at 300 feet, 86.4 dBA.

For the Port Ludlow Marina expansion, noise from pile driving will be heard from the Resort area and the Scott Court properties to the west. The noise level will be determined largely by the number of piles to be driven and the depth to which they are driven. Given the subsurface conditions at the Marina, it is anticipated that both a vibratory hammer and a drop hammer and/or diesel hammer will be used. The pile driving will occur over an approximate 45-day period. Because sound travels well over water, construction noise will likely be heard around the entire Bay, but will not be as significant.

Jefferson County regulates noise impacts per Section 6.19 ("Noise") of the Unified Development Code. Resolution Number 67-85, Establishment of Environmental Designation (EDNA) for

Noise Abatement Areas for Jefferson County, adopted WAC 173-60 in its entirety to establish maximum permissible noise levels for various environments or classes of use.

Figure 9 – Existing Land Use and Zoning

WAC 173-60 states that noise emitted by any commercial or industry activity shall not exceed those levels established by the Washington State Department of Ecology. WAC 173-60.030 classifies residential sites and parks and recreational sites as Class A EDNA. The maximum noise exposure levels for noise emitted in Class A EDNA that is received by Class A EDNA is 55 dBA (WAC 173-60-040).

WAC 173-60-050 lists activities that are exempt from the maximum noise level requirements of WAC 173-60-040. Section 3-a exempts sounds originating from temporary construction sites as a result of construction activity with the exception that these sounds are not allowed between the hours of 10:00 p.m. and 7:00 a.m. in Class A EDNA receptors.

Construction noise associated with the Marina expansion is a temporary impact. Construction hours will be limited to non-holiday weekdays and Saturdays from 8:00 a.m. to 8:00 p.m.

Impacts from increased construction vehicle and barge traffic will be concentrated within the Marina area, although the pile-driving barge will also be located in the vicinity of the Scott Dock. The barge will not block access to that dock. Fumes from the construction activities are not anticipated to be significant.

Alternative 4: No Action

Alternative 4 would result in no short-term construction impacts to adjacent properties.

Long Term Impacts

Alternative 1: Proposed Project

Alternative 1 will add a maximum of 100 additional slips to the existing 280-slip Marina. The expansion will occur both westward and waterward.

The number of new slips accommodated by Alternative 1 is consistent with the approved Resort Plan and existing MPR regulations. The proposed project is within the designated MPR boundary and it will aid in maintaining Port Ludlow as Jefferson County's only Master Planned Resort. The expansion will provide additional slips for area residents and may also allow use of slips as satellite facilities for other yachts clubs. This may in turn, reduce the number of boats anchored-out in the Bay during summer months.

Impacts to the adjacent resort and residential properties will include an incremental increase in noise (from boat engines and human voices), boat traffic, and vehicular traffic. Odors associated with a marina, such as exhaust from boats, will also likely increase incrementally. Extensive boat repairs are not allowed within the Marina, so odors from repair activities will not be significant.

Impacts of Alternative 1 on adjacent land use relate primarily to potential impacts to the Scott Court residential properties. Alternative 1 will result in Port Ludlow docks lying within approximately 150 to 200 feet of the Scott Dock, and within 250 to 350 feet of the closest residential lot (currently undeveloped). Residents of Scott Court have expressed concerns

regarding the increased boat activity adjacent to their homes, the ability of boats and seaplanes to access their dock, and the ability to expand their dock if Alternative 1 were to be approved.

The industry standard for "fairway width" (distance between individual docks) within a marina is 1.5 times the length of the boat, or 1.75 times boat length if maneuvering conditions warrant (*Marinas and Small Craft Harbors*, Tobiasson 2000 and *Environmental Engineering for Small Boat Basins, Manual No. 1110-2-1206*, Army Corps of Engineers, October, 1993). The 1.5 times standard is considered appropriate for Port Ludlow Bay due to the absence of strong currents. Thus, a 40 –foot boat would require a 60 – 70 foot fairway, and a 60-foot boat would require a 90-105 foot fairway. With Alternative 1, the closest portion of the expanded Port Ludlow C-Dock would provide an approximate 180-foot fairway for the Scott dock, and the D-Dock extension would provide an approximate 120-foot fairway for Scott Dock (assumes side-ties at both the Port Ludlow and Scott Docks).

Impacts to views are addressed in Section 3.6 Aesthetics.

Impacts of Alternative 1 on marine resources are discussed in Section 3.3.

Alternative 2: Deep Water Alternative

Alternative 2 will also add 100 slips to the Marina, but all new docks and slips will be placed waterward of the existing docks. The number of new slips will be consistent with the adopted Resort Plan and MPR regulations. As with Alternative 1, the expansion will provide additional slips for area residents and boating groups, and may reduce the number of boats anchored in the Bay during summer months.

Impacts to adjacent residential properties will be minimized, as no new slips will be located closer than the existing 300 feet to the Scott Dock, or 300 to 400 feet to residential property.

Impacts to views are addressed in Section 3.6 Aesthetics.

Impacts of Alternative 2 on marine resources are discussed in Section 3.3.

Alternative 3: 1993 Design

Alternative 3 will result in a 100-slip expansion westward and eastward. As with Alternatives 1 and 2, the expansion will provide slips for area residents and boating groups, and may reduce the number of boats anchored in the Bay during summer months.

Alternative 3 will have the greatest impact on adjacent residential properties. The 1993 configuration was developed prior to the construction of any other dock in the immediate vicinity and is now partially infeasible. As drawn, the expanded D-Dock will extend westward to the Scott Dock, providing no space to navigate between the two uses. The expanded D-Dock will block access to both the inside of the Scott Dock and to C-Dock. If this alternative were to be selected, several slips on D-Dock will have to be relocated, probably to the outside of E-Dock.

Impacts to views are addressed in Section 3.6 Aesthetics.

Impacts of Alternative 3 to marine resources are discussed in Section 3.3.

Alternative 4: No Action

Alternative 4 will result in no expansion of the existing Marina. No new impacts to existing land uses will occur. Whether demand for additional docking space will result in proposals for other docks elsewhere in Port Ludlow Bay, or increased anchoring in the Bay, is unknown.

3.4.3 Mitigation Measures

Proposed:

Construction Impacts

- Hours of construction will be limited to 8:00 a.m. to 8:00 p.m., on non-holiday weekdays and Saturdays.
- Stationary construction equipment will be positioned as far as possible from residential properties.
- The construction contract will require that all mufflers are maintained in good working order
- Any dust will be suppressed by utilizing wetting techniques.
- Energy efficient equipment will be used to control emissions.

Navigation Impacts

- Alternative 1, 2, and 3 docks will be located to provide adequate fairway and maneuvering area for access to existing Scott Docks.

3.4.4 Significant Unavoidable Adverse Impacts

No significant unavoidable impacts to existing land uses are anticipated.

3.5 Land and Shoreline Use – Relationship to Plans and Policies

3.5.1 Affected Environment

Jefferson County Comprehensive Plan

The *Jefferson County Comprehensive Plan* includes specific goals and policies related to the Port Ludlow Master Planned Resort (MPR). The Goals and Policies related to the MPR and the Resort area are as follow:

Goals:

LNG 25.0 *Maintain the viability of Port Ludlow as Jefferson County's only existing Master Planned Resort (MPR) authorized under RCW 36.70A.362.*

Policies:

LNP 25.1 *Ensure that development in Port Ludlow complies with County development regulations established for critical areas and that on-site and off-site infrastructure impacts are fully considered and mitigated.*

LNP 25.2 *The provision of urban-style services to support the anticipated growth and development at Port Ludlow shall occur only within the designated MPR boundary.*

LNP 25.6 *Support efforts to preserve and protect Port Ludlow's greenbelts, open spaces, and wildlife corridors.*

The *Jefferson County Comprehensive Plan* also includes goals and policies related to both Parks and Recreation and Shorelines.

Regarding parks and recreation, the goal is to develop and maintain facilities that are responsive to the needs and interests of Jefferson County residents and visitors. The associated policies state that existing facilities should: not be overburdened; be planned to support designated residential development; and should include adequate infrastructure. The facilities should also be consistent with the needs and desires of the citizens of the area, and be compatible with the Shoreline Management Master Program. Policies related to Parks and Recreation are listed in Appendix F.

Regarding shorelines, the goals relate to preserving the long-term benefits of shoreline resources and allowing development that is compatible with the natural environment. Associated policies establish a hierarchy of preferred uses, promote public access, and allow development that is compatible with the natural processes, conditions and functions of the shoreline. Policies related to Shorelines are listed in Appendix F.

Jefferson County Shoreline Management Master Program

The Shoreline Management Act (SMA) of 1971 (Revised Code of Washington, RCW, Chapter 90.58) was enacted to provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses. It is the policy of the state to protect against

adverse effects to public health, land and its vegetation and wildlife, and the waters of the state and its aquatic life. Permitted uses in the shorelines are to be designed and conducted in a manner to minimize, insofar as practical, any resultant damage to the ecology and environment of the shoreline, and any interference with the public's use of the water.

The SMA gives responsibility to the local governments in initiating and administering the regulatory program of the Act. As a result, Jefferson County developed and adopted a Shoreline Management Master Program (SMMP) in March of 1989. The SMMP is a regulatory ordinance with performance standards for development intended to implement adopted goals and policies.

The SMMP is adopted as Section 5 of the Jefferson County Unified Development Code. All shorelines subject to the SMA are given a shoreline environment designation designed to locate the most appropriate uses in particular areas and to enhance the character of that shoreline environment. The environment designation for the area of the Port Ludlow Marina is "Urban." Shoreline environment designations are shown in Figure 10.

The Urban shoreline environment is an area of high intensity land use, including residential, commercial, and industrial development. The policies and performance standards of the SMMP, Urban Environment give preference to water-dependent, water-related, and water-enjoyment uses (SMMP 4.105).

Shoreline uses are classified as "primary," "secondary," or "conditional," in order of preference or appropriateness on a particular shoreline. The Marina is a use that is deemed as preferable within the Urban designation, and is thus classified as "primary"(SMMP 4.201).

The SMMP defines marinas as facilities that provide launching, storage, moorage, and other services for six or more pleasure and commercial watercraft. Policies and Performance Standards for marina uses are listed in SMMP 5.110. The Policies and Performance Standards address construction of new marinas. The Port Ludlow Marina is an existing marina and the proposed action is to expand the Marina by 100 additional slips. The Policies and Performance Standards of marina uses also apply to expansion of existing marinas. The policies and performance standards are listed below:

Marinas - Policies:

1. *In locating marinas, special plans should be made to protect the fish and shellfish resources that may be harmed by construction and operation of the facility.*

2. *Marinas should be designed in a manner that will reduce damage to fish and shellfish resources and be aesthetically compatible with adjacent areas.*

3. *Marinas should be located at or near high use or potentially high use areas. Local as well as regional need data should be considered as input in location selection.*

4. *Special attention should be given to the design and development of operational procedures for fuel handling and storage in order to minimize accidental spillage and provide satisfactory means for handling those spills that do occur.*

Figure 10 – Shoreline Environment

5. *Shallow water embayments with poor flushing action should not be considered for overnight and long term moorage facilities.*

6. *The Washington State Department of Fisheries' guidelines should be consulted in planning for marinas.*

7. *State and local health agencies have standards and guidelines for the development of marinas that should be consulted.*

8. *Floating breakwaters should receive valid considerations as an alternative to conventional breakwaters.*

Marinas - Performance Standards:

1. *Marinas shall be located with regard to favorable conditions related to wind, current, and bathymetrics.*

2. *Marinas that provide overnight or long-term moorage facilities shall not be located in areas with poor flushing action.*

3. *Marinas shall be compatible with the general aesthetic quality of the shoreline area where they are located.*

4. *Marinas and ancillary facilities shall be located, designed, constructed, and operated to minimize adverse effects on fish, shellfish, wildlife, water quality, and existing geohydraulic shoreline processes.*

5. *Marinas shall be located, designed, constructed, and operated so as to not unnecessarily interfere with the rights of adjacent property owners, nor interfere with adjacent water uses.*

6. *Parking and loading areas shall be located well away from the immediate water's edge and beaches.*

7. *Design of parking and loading areas shall assure that surface runoff does not pollute adjacent waters or cause soil or beach erosion.*

8. *Provisions shall be made to facilitate orderly launching, retrieval, and storage of boats.*

9. *Provisions shall be made to facilitate the orderly circulation of vehicles and pedestrians in the vicinity of the marina.*

10. *Marinas shall make adequate provisions to minimize the probability of fuel spills during handling or storage. Provisions shall be made to handle accidental spills that do occur.*

11. Marinas shall be equipped with vessel pump-out and on-shore sewage and waste disposal facilities. Pump-out facilities shall be available at no direct charge to the user.

12. No more than fifteen (15) percent of the wet slips within a marina shall be covered.

In general, the SMMP policies place an emphasis on protecting the environment. The performance standards dictate the design for marinas with the intent of minimizing the impact on the natural environment while taking into consideration impacts to existing uses and adjacent property owners.

3.5.2 Environmental Impacts

Alternatives 1, 2, and 3 – Expansion Alternatives

Jefferson County Comprehensive Plan

Alternatives 1, 2, and 3 are consistent with the goal and policies related to maintaining the viability of the Port Ludlow MPR, limiting urban services to locations within the MPR, and supporting efforts to preserve and protect certain open spaces. Consistency with critical area regulations related to fish and wildlife habitat for each of the alternatives is addressed in Section 3.3.

The proposed project is also consistent with the Parks and Recreation Goals and Policies of the Jefferson County *Comprehensive Plan*, Open Space Element that encourage development and maintenance of park and recreational facilities which are responsive to the needs and interests of Jefferson County residents and visitors. The expansion will relieve existing and potential overburdening of existing recreational areas and facilities. Currently, both the Seattle Yacht Club and Meydenbauer Bay Yacht Club have requested the use of marina slips at Port Ludlow for use as a "satellite facility." The request has been denied, due to the lack of available slips. As a result, the Meydenbauer Bay Yacht Club uses four slips at the west end of Port Ludlow Bay, as well as rafting and anchoring-out in the Bay for its satellite facility.

The proposed recreational facilities will support areas designated for future residential development and adequate infrastructure will be available. The location, type, and amount of park and recreational facilities is consistent with the needs and desires of the citizens in the area and will accommodate a diversity of user groups.

Regarding Shoreline goals and policies, consistency with the policies and performance standards contained in the Shoreline Management Master Program (SMMP) would result in consistency with the Shoreline goals and policies. This consistency is addressed below. The Marina expansion will increase public access to the water.

Shoreline Management Master Program (SMMP)

Expansion of this existing Marina will create an additional 100 slips with additional side-ties. The Marina use is a "primary" use within the urban environment, and thus is consistent with the intent of the SMMP. Impacts to marine resources (Policies 1 and 2) are addressed in Section 3.3.

Aesthetic impacts (Policy 2) are addressed in Section 3.6. The proposed expansion is consistent with policies related to locating a marina at or near high use areas (Policy 3), and in areas with adequate flushing action (Policy 5). BMPs are in place to minimize potential fuel spills and to handle any spills that do occur (Policy 4). There are no state or local specific guidelines for dock design, as each site has unique conditions related to waves, winds, currents, users, etc. The Washington State Department of Fish and Wildlife (DFW) does, however, review each project on a case by case basis to determine consistency with current policies regarding protection of marine resources. Consistency with DFW policies will be determined via issuance of a Hydraulic Project Approval (HPA); that action has not yet occurred. A breakwater (Policy 8) is not proposed. A shoreline public access plan for the Port Ludlow Resort has been prepared and implemented through recording of a shoreline public access easement. The proposed project will not alter this Plan, although the expanded Marina will expand public recreational boating access to the water.

Regarding SMP performance standards: the marina is favorably located in terms of wind, current, bathymetrics and flushing action (Standards 1 and 2); the marina is compatible with the general aesthetic quality of this shoreline area (Standard 3); the marina expansion has been designed to minimize adverse effects impacts on fish, shellfish, wildlife, water quality, and existing geohydraulic processes (Standard 4); parking and loading areas are located away from the water's immediate edge and beaches (Standard 6); design of parking and loading areas includes adequate storm drainage facilities (Standard 7); there is orderly pedestrian and vehicular circulation in the vicinity of the marina (Standard 9); the Marina Operations Manual includes procedures for minimizing fuel spills and handling spills that do occur (Standard 10); and sewage pump-out and waste disposal facilities are available (Standard 11). No slips within the marina are covered (Standard 12), and there is no boat launch facility at the marina (Standard 8). The expanded marina will, however, impact the views of the four adjacent Scott Court property owners (Standard 5).

The proposed expansion must be consistent with local, state, and federal requirements regarding protection of marine resources, including water quality. Any expansion alternative must comply with the guidelines of the WDFW, the COE, the NMFS and USFWS. Impacts to marine resources and the differences related to the alternative marina configurations are addressed in Section 3.3.

Best Available Science (BAS; *sensu* WAC 365-195-900 *et seq*.) has been considered in the design of the expansion and coordination with WDFW is ongoing. BAS requires the use of current scientific information that is derived from a valid scientific process. BMPs related to the use and maintenance of the Marina will aid in protecting the shorelines.

Impacts to adjacent property owners from the alternative expansion configurations are addressed in Sections 3.4 and 3.6.

Alternative 4: No Action

Jefferson County Comprehensive Plan

Alternative 4 will result in no expansion of the existing Marina. No expansion of the Marina may or may not effect the viability of the MPR. With regard to policies related to Parks and

Recreation, Alternative 4 will not address the problem of overburdening the existing facility. Whether or not demand for additional docking space in Port Ludlow Bay will result in proposals for other docks elsewhere in the Bay, or increased anchoring in the Bay, is unknown.

The No Action alternative will be consistent with policies related to preservation and protection of the shoreline environment (see Section 3.3).

Shoreline Management Master Program (SMMP)
The No Action alternative will retain the 280-slip Marina in its current configuration. This alternative is consistent with the SMMP. Public access to the shoreline is not increased with this alternative. The short-term benefit of preserving the existing environment is achieved, however the long term benefit would not be achieved if demand for additional slips increases and existing facilities become overburdened over time.

3.5.3 Mitigating Measures

The permitting process for the expansion will require consistency with the Port Ludlow MPR Ordinance and the Comprehensive Plan and Shoreline Management Master Program goals and policies as well as any other applicable ordinances, such as the Critical Areas Ordinance.

3.5.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are anticipated.

3.6 AESTHETICS/VISUAL QUALITY

A visual quality study was prepared by Reid Middleton, dated February 2002, to evaluate potential changes to visual qualities of the environment from the proposed project and alternatives. The study describes the existing landscape character, viewer groups, viewpoints, and identified visual impacts.

Study and Methodology

To evaluate potential visual impacts of a proposed project, both the visual quality of the existing site and viewer sensitivity to the proposed changes must be analyzed. Analyzing aesthetic and visual impacts includes concern for the nature of the visual experience and its quality. Because this type of analysis can be subjective, sets of proven evaluative measures have been developed. The methodology described below was developed from such evaluative measures as they apply to expansion of the Port Ludlow Marina. The methodology employs both quantitative and qualitative analysis of the described landscape components.

The project site was first analyzed with respect to three key factors identified below. Ratings from 1 to 5 express the degree to which the landscape contains a high degree of each factor, with 5 being the highest rating. Table 4 summarizes the results of the Existing Scenic Quality Inventory.

- **General landscape (**landform, vegetation, water, color, adjacent scenery, scarcity, and cultural or modifications) relative to the basic design elements of form, line, color, and texture.

- Degree of **visual interest** (vitality, vividness, and variety). How memorable, striking, or distinctive are the elements of the landscape and the visual patterns inherent in it?

- **Sense** (congruence, clarity, and coherence) **and unity** (fit, intactness, and harmony) are related and explore whether the landscape is compositionally harmonious. Are there visual encroachments to the essential quality of the site that detract from the overall experience? Do manmade elements add and fit within the natural elements of the landscape? Do the visual patterns in the landscape represent a confusing and chaotic quality rather than a coherent and congruent experience?

Viewer sensitivity was then analyzed relative to the type of viewers, amount of use (i.e., frequency and duration), the level of public interest, adjacent land uses, and uniqueness of the scenery. Viewer sensitivity levels were identified for four viewer categories relative to six factors in Table 4.

Other related analyses involve identifying key view or observation points, viewsheds in the area, and distance zones related to views of the site.

Lastly, impacts were assessed by contrasting the visual quality of the existing area and viewpoints with the visual quality of the proposed changes, via the use of computer simulation

photographs. Contrast ratings are developed for each alternative, and an analysis of impacts is developed. The level of viewer sensitivity is factored into the impact assessment.

Several of the inventory and analytical worksheets used for this analysis were adapted from the Bureau of Land Management's Visual Resource Management Manual (September 2001). Consequently, some of the charts may reflect their system of classification.

3.6.1 Affected Environment

Existing Visual Environment

The Port Ludlow Marina is located on the north side of Port Ludlow Bay, on the western shore of Puget Sound, just north of where Hood Canal enters Puget Sound. The intimately-sized Bay is partially enclosed by medium steep and rounded slopes that surround it on most of three sides. Although views east of the site may include some expanses of the larger Puget Sound, the more immediate views of the Marina area are of the protected Bay and surrounding hillsides. The relative steepness of the slopes gradually lessens to gentle banks to the north of the Marina and the flat promontory area (known as Burner Point), east of the Marina. Existing views of the site are shown below.

Adjacent hillsides are mostly covered with a variety of deciduous and evergreen trees that provide a variety of interesting forms, textures, color, and patterns. The Bay is a dominant factor in the landscape. The J-shaped Bay lends a quality of protection that gradually spirals out to larger, more expansive vistas of the Sound as one leaves the immediate vicinity of the Marina.

The Marina is located along the north shore of the Bay. The Marina itself provides visual interest to the scene. It provides texture, pattern, color, and movement, while generally fitting well in its natural setting and within the scale of the surrounding Bay. The upland area of the Marina is developed with parking, and small marina buildings. Beyond this to the north are undeveloped parking areas. The upland area to the east is flatter topographically and is developed with larger-scaled buildings including a restaurant, inn and condominium development. There is less natural and landscape vegetation here partially due to the amount of development, but also due to the nature of a less protected and windy promontory location. To the west of the Marina is an undeveloped wooded slope. An area of single-family residences

is located west of this slope; generally characterized by homes on individual lots surrounded by a combination of natural and landscaped vegetation.

The visual analysis of the existing landscape is summarized in Table 4 below. The general landscape rating was based upon a site inspection, using a form adapted from the Scenic Quality Inventory and Evaluation Chart developed by the Bureau of Land Management (BLM) for Scenic Quality Assessment of federal lands use, as published in the Visual Resource Management Manual 8400 BLM Standards. Visual Interest and Sense & Unity are described earlier in the Methodology section. In the table below, the General Landscape, Visual Interest and Sense and Unity Ratings are broken down relative to the elements of Landform, Vegetation, Water, Color, Influence of Adjacent Scenery, Uniqueness/Scarcity, and Cultural Modifications/Manmade Form.

Table 4
Port Ludlow Marina
Existing Scenic Quality Inventory and Evaluation Chart:

Key Factors	General Landscape Rating*	Visual Interest Rating	Sense & Unity Rating	
Landform	3	5	5	
Vegetation	5	5	5	
Water	5	5	5	
Color	5	5	5	
Influence of Adjacent Scenery	5	5	4	
Uniqueness/Scarcity	4	5	3	
Cultural Modifications/ Manmade Form	4	4	4	
Subtotal	**31**	**34**	**31**	
		Total		**96**

*Visual Resource Management Manual 8400 BLM Standards, Scenic Quality Inventory and Evaluation Chart.
Totals of 80 and above = High Visual Quality
Totals of 79 to 42 = Medium Visual Quality
Totals of 41 or below are of Low Visual Quality

Based on the scoring techniques used in this analysis, a total score of 80 or more is considered a high rating. The analysis resulted in a high rating of 96 points. It was rated slightly lower relative to only two issues, intactness and uniqueness/scarcity. Intactness relates to whether development has had a negative impact on the natural scenic quality of the setting. In the case of previously developed areas with high visual quality, intactness may also refer to whether new development is congruent with the existing pattern of built form that has been key to the visual

quality of the setting. Intactness is reflected in the factors of Influence of Adjacent Scenery, Cultural Modifications/Manmade Form, and would affect ratings under the General Landscape and Sense and Unity Ratings. In this case, much of the development has been well integrated into the natural setting (e.g., homes on well-vegetated lots). A few examples of more recent development are less successful in this regard and consequently the rating for Adjacent Scenery indicates a slight impact to the intactness of the scenery. Regarding Uniqueness/Scarcity, the Marina site cannot be characterized as being completely one of a kind in northwest Washington, but it is still a highly-valued example of this type of landscape setting in this area.

Viewer Sensitivity

Viewer sensitivity issues of the Port Ludlow Marina have been divided into four **locations** based on different views. These locations are:

- Views from **Oak Bay Road**, above the Marina.
- Views from **Other Roads** and public areas with views of the Marina.
- Views from **Adjacent or near-by Residential Properties**.
- Views from **Other Residential Properties** further inside, or across, the Bay.

Viewer sensitivity levels were evaluated on the basis of the following **factors**:

- Viewer type
- Amount of use (i.e., duration and frequency)
- Public Interest
- Adjacent Land Use
- Uniqueness/Cultural Value of the Areas
- Other Factors such as Level of Impact

Four viewer sensitivity categories listed above were identified and analyzed. Sensitivity levels for each of the four locations were then rated as High, Medium, or Low relative to the **factors** listed above. Viewer sensitivity ratings are shown in Table 5 below.

Table 5
Port Ludlow Marina
Viewer Sensitivity Rating

KEY FACTORS	Oak Bay Road	Other Roads	Adjacent Residential Properties	Other Residential Property
Type of Users	Passengers and drivers in vehicles, bicyclists	Passengers and drivers in vehicles and pedestrians	Single-family, and condominium full-time and vacation/ part-time residents	Single-family, and condominium full-time and vacation/ part-time residents
Amount of Use	H	M-H	M-H	M-H
Public Interest	H	H	L	L
Adjacent Land Use	H	L	H	L
Uniqueness/Cultural Value of Area	M+	L	L+	L
Other Factors*	M	L	H	L
TOTAL – H	**H**	**L**	**M+**	**L**

*This considers the level of impact likely to the group of viewer, such as the impact that is inherent from views that impact home environment.

The analysis of viewer sensitivity issues for each location above, demonstrates that of the locations have significant levels of sensitivity to proposed expansion of the Marina:

1. Those related to viewing the site from **Oak Bay Road**,
2. Those related to viewing the site from **Adjacent Residential Properties**.

Oak Bay Road provides important views for those traveling past the site. These views are public views, close to the site, on a well-traveled public road, and hence, important to a large number of viewers. This is the best, if not the only good view of this portion of Port Ludlow Bay from a public road. It is recognized, however, that most viewers are travelling at a speed that lowers sensitivity. Trees and vegetation obscure the Marina in many places. The over-all sensitivity level for views from Oak Bay Road is "High."

The viewer sensitivity for views from adjacent and nearby properties have a "Medium to High" sensitivity level. The group of viewers associated with this view is relatively small and characterized by a private, as opposed to public interest. However, there is a higher potential for impact associated with this view because the views of the Marina extend over a greater period of time, at different view angles, at various times of day, with a range of light conditions, and it is unobscured. The viewers in this group view the Marina from their home environment.

Views from other properties across the Bay or further away from the Marina and from public roads in the study area have lower sensitivity levels since the proposal site is obscured or too distant to have a significant impact.

View Analysis

In a separate study by Reid Middleton, a View Analysis was conducted. Several viewpoints and their related viewsheds in three distance zones were identified (Figures 11 through 13). Five viewpoints, noted below, were reviewed for potential impacts. Three of these viewpoints (Viewpoints #1, 2, and 3) were identified as key viewpoints subject to a more detailed analysis in the following section.

Viewpoint #1 represents views from Viewshed 1, that segment of Oak Bay Road located directly above the Marina. Views from this area are characterized by being high in frequency and high in public interest, but sometimes obscured by vegetation and the speed at which the viewer is moving.

Viewpoint #2 represents views from Viewshed 2, adjacent private residential waterfront property (known as the "Scott Court" property). These views are characterized by a limited number of viewers with a prolonged viewing time. Views of the Marina and Bay are unobscured.

Viewpoint #3 represents views from Viewshed 3, private residential waterfront properties across the Bay. These views are unobscured by topography or vegetation, but are obscured by distance.

Viewpoint #4 represents views from public roadways across the Bay. There are few views of the Marina from this viewshed; vegetation, buildings, and distance often obscure what views there are.

Viewpoint #5 represents views from homes or residential streets that are distant. These views may or may not be obscured by topography, vegetation, or buildings. The number of viewers is small and the public interest is low.

3.6.2 Environmental Impacts

Key Viewpoints

As stated above, one key viewpoint was identified in each of Viewsheds #1, 2, and 3 for a more detailed analysis through view simulation. These key viewpoints are:

- View #1 looking south from Oak Bay Road. For purpose of analysis, this view is divided into "Left," "Middle," and "Right" in order to adequately depict the expansive view of the Marina from this location.

- View #2 from Scott Court. View #2 represents the view to the southeast from adjacent residential properties located immediately west of the Marina.

- View #3 looking north from across Port Ludlow Bay. View #3 provides for further analysis of the visual impact to waterfront properties located further away.

Figure 11 – Key Viewpoints

Figure 12 – Viewsheds

Figure 13 – Distance Zones

Contrast Ratings

Photographs of each of the above views were taken in November and December 2001. Computer simulations of the proposed project and alternatives were then produced and compared to the existing views. The existing views were evaluated and contrasted to the simulation view of the proposed changes using the "Viewer Contrast Rating Sheet" shown below. The contrasts are evaluated and rated as "Strong," "Moderate," or "Weak." The existing and simulated views are shown in Figures 14 through 22.

Sample Viewer Contrast Rating:

Existing:	1. Land/Water	2. Vegetation	3. Structures
Form			
Line			
Color			
Texture			
Proposed:	1. Land/Water	2. Vegetation	3. Structures
Form			
Line			
Color			
Texture			

Existing- Visual Quality	**Existing-** Visual Sensitivity	**Impacts-** Construction	**Impacts-** Operational	**Comments**

The results of the Viewer Contrast Rating Sheets based on the photographic simulations prepared for the three key viewpoints are summarized in Table 6 below. A weak contrast rating means that the difference in the existing view and the view with simulated changes is very slight. Moderate contrast rating means that the change in the simulated view is more than discernible. A strong contrast rating means there is a good amount of difference between the computer simulated photograph and the photograph of the existing view.

Table 6
Visual Contrast Ratings/Key Viewpoints

Alternatives	View #1 Oak Bay Road			View #2 Scott Court	View #3 Across The Bay
	Left	***Middle***	***Right***		
# 1 – Proposed Project	None	Weak	Weak-Moderate	Strong	Weak-None
# 2 - Deep Water	Moderate	Moderate-Strong	Weak – Moderate	Weak-None	Weak-None
# 3 – 1993 Design	Weak-Moderate	Weak	Weak-Moderate	Moderate-Strong	Weak-none
#4 – Existing/No Action	None	None	None	None	None

Figure 14 – Existing and simulated View, Alternative 1, View 1

Figure 15 – Existing and simulated View, Alternative 1, View 2

Figure 16 – Existing and simulated View, Alternative 1, View 3

Impact Assessment

The contrast rating shown in Table 6 was then combined with viewer sensitivity shown in Table 5 and a determination was made as to how the view was different in order to evaluate the degree of visual impact (see Table 7 below). It is generally assumed that within areas exhibiting a high value of existing scenic quality (such as Port Ludlow Bay), any significant change results in a "Strong" contrast rating and potentially a high visual impact. On the other hand, a moderate contrast rating does not necessarily mean only a moderate visual impact; the degree of viewer sensitivity and other view analysis issues also may lead to a high impact.

Table 7
Port Ludlow Marina
Visual/Aesthetic Impact

Alternatives	Oak Bay Road – Viewshed #1	Scott Court – Viewshed #2	Across the Bay – Viewshed #3
# 1 - Proposed Project	**L**	**H**	**L**
# 2 - Deep Water	**H**	**L**	**L**
# 3 – 1993 Design	**L-M**	**H**	**L**
#4 – Existing/No Action	**N**	**N**	**N**

H = High M = Medium L = Low N = None

The analysis of the contrast rating and visual impact for each key view for each alternative is summarized below:

Alternative 1: Proposed Project

Alternative 1 will expand the Marina primarily westward and waterward, and will be visible to some degree from all three key views.

View #1. The simulation View #1 "Left" has no discernable change from the existing view. The View #1 "Middle" will have a very slight change and received a weak contrast rating. The change to View #1 "Right" was greater than the other portions of this view, but considering the speed at which the Marina is viewed and the location of trees that obscure the view of proposed modifications, the contrast rating is still relatively weak.

View #1 is considered the most significant view because of the number of viewers, the greater public interest, and visual access to Port Ludlow Bay. In conclusion, the proposed project has a low visual impact on this key viewpoint (see Figures 14A, 14B, and 14C).

View #2. The contrast rating for View #2 is rated strong. Some expansion of docks here could have a positive visual impact by providing a transition from the foreground structure (Scott

Dock) to the background structures (houses and housing developments across the Bay). The degree of expansion is more than necessary for this transition and the positive aspects are outweighed by the negative impacts on this view. Although the contrast rating is strong for the photographic simulation, it should be stated that the photographic simulation does not encompass the total view available to the viewers in the viewshed. Views to the south and west would be unaffected by any marina expansion in this viewshed. However, the proposed project has a high visual impact to this viewshed, especially when the length of time viewers are exposed to the view is weighed. The view is part of their daily, home environment and has a great impact to those private residents that are subject to the changes proposed (see Figure 15). This key viewpoint is not as significant as View #1 because although its view is unobscured, it has a smaller number of viewers.

View #3. The visual impact to View #3 is visible, but has only a weak contrast rating, so the impact is low (See Figure 16).

Alternative 2: Deep Water Design

Alternative 2 results in expansion of the Marina primarily waterward. The expansion will be primarily visible from View #1.

View #1. This alternative has a moderate to strong contrast rating for View #1. This is important because this view received a high viewer sensitivity rating, although the visual impact is lessened by the speed at which viewers tend to see the Bay. While trees obscure portions of the existing Marina

Figure 17 – Existing and simulated View, Alternative 2, View 1

Figure 17 – Existing and simulated View, Alternative 2, View 1

Figure 17 – Existing and simulated View, Alternative 2, View 1

Figure 18 – Existing and simulated View, Alternative 2, View 2

Figure 19 – Existing and simulated View, Alternative 2, View 3

view, the area of the waterward expansion will be very visible from Oak Bay Road. The simulated photographs only partially capture this view due to constraints regarding the location of the photograph (see Figures 17A, 17B, and 17C). This is a case where a medium to strong contrast rating based on a photo simulation does not result in merely a medium visual impact on this viewshed. A very important part of the view, the Bay itself, is being obscured. When considering that the view of the Bay is now obscured from the public on most of the public roads in the Port Ludlow area by trees, especially within Distance Zone 1, it is evident that the alteration of the existing view from Oak Bay Road would have more than a medium impact. The traveling viewer in this viewshed does not have much of an opportunity to visually search for an unobscured view of the Bay.

Views #2 and #3. The Deep-Water expansion has a weak contrast rating and low visual impacts on Views #2 and #3 (see Figures 18 and 19).

Alternative 3: 1993 Design

Alternative 3 will result in a generally lateral expansion of the Marina, to both the east and west. The expansion will be visible, at least to some degree, from all three key views.

Views #1 and #3. Since the expansion is spread throughout the Marina, the contrast ratings are weaker (see Figures 20A, 20B, 20C, and 22). The visual impact is low.

View #2. View #2 will have a strong - moderate contrast rating and a high visual impact (see Figure 21).

Alternative 4: No Action

No expansion of the Marina will result in no changes to existing views.

In summary, analysis of views, viewsheds, viewer sensitivity issues, and contrast ratings for photographic simulation of key viewpoints have been evaluated to identify the visual impacts to each viewshed for each alternative. Alternative 1 - Proposed Project has high visual impact on Viewshed #2. Alternative 2 - Deep Water has high visual impact on Viewshed #1. Alternative 3 - 1993 Design has spread out visual impacts so that its visual impacts range from low to high on all of the views, but has a high impact on Viewshed #2.

In general, all of the expansion alternatives will result in visual impacts. The differences between the alternatives are related to which view the particular alternative would most impact and the number of viewers impacted. All alternatives including the existing/no action also share a visual impact that stems from the trend towards a preference for larger sized vessels. Because the proposals represent expansion of existing development, the impacts are relatively less than if new, different, and larger-scaled development was proposed.

Construction Impacts

Short-term, construction-related impacts were also considered. During the first phase of construction, one or two barges will be used, one with a barge-mounted crane. One or two small workboats (around 20 feet) will also be present. It is anticipated that the new piles will be brought in by barge. The new floats will be assembled on-shore and dropped in place by the crane after the piles are driven. Typically, the construction will take place first in the vicinity of the more landward docks and then proceed waterward. After the piles and floats are installed, construction activity will include installation of water and fire lines on the newly constructed docks.

Figure 20 – Existing and simulated View, Alternative 3, View 1

Figure 20 – Existing and simulated View, Alternative 3, View 1

Figure 20 – Existing and simulated View, Alternative 3, View 1

Figure 21 – Existing and simulated View, Alternative 3, View 2

Figure 22 – Existing and simulated View, Alternative 3, View 3

A fenced, contractor lay-down area will be located upland. Semi-trucks and trailers will visit the site to drop off materials and workers will be arriving daily.

Although temporary, the visual impact of the construction stage is not only larger but also more intense than that of the long-term impacts of the proposed project. There will be temporary, visual, and aesthetic impacts on all views, especially on View #2.

3.6.3 Mitigation Measures

Proposed

Boats in excess of 60' in length will not be side-tied to the west end of D-Dock or E-Dock.

3.6.4 Unavoidable Adverse Impacts

Views from the four Scott Court properties will be impacted by the proposed marina expansion.

3.7 Transportation

3.7.1 Affected Environment

Vehicular Traffic

The Port Ludlow community is currently accessed via both SR 19/Oak Bay Road and Paradise Bay Road. Roadways in the project area are shown in Figure 23. The Resort area, including the Marina, is accessed from Oak Bay Road. Approximately 1,400 linear feet of existing private internal roads (including Marine Drive, which provides access to the Marina) serve the Marina, restaurant, and the Inn.

Traffic Volumes

Port Ludlow Associates is required by Jefferson County to provide a yearly traffic-monitoring program for Port Ludlow. The purpose of the monitoring program is to provide a cumulative summary of traffic volumes in the area and an assessment of current operating conditions at critical intersections in the general area. The Washington State Department of Transportation had also expressed concern about traffic in Port Ludlow during July and August, particularly on weekends. Their comments were submitted for the 1993 programmatic EIS for the Port Ludlow Development Plan. The Port Ludlow monitoring program has thus focused on weekend counts by taking machine counts on a Saturday, Sunday, and Monday in August. These times also coincide with peak Marina usage. The year 2001 is the eighth year that data has been collected for this program. The 2001 detailed data, analysis, and conclusions of this monitoring program can be found in Appendix G of this Draft SEIS.

Jefferson County collects weekday traffic data on a yearly basis. This information allows for a comparison between weekday and weekend traffic, and an analysis of the impacts that the Port Ludlow development has on local traffic volumes.

The 2001 traffic volume patterns in the monitoring study represent the impact of recreational traffic on weekends during the summer months. The monitoring study generally concludes that overall, 2001 traffic volumes are higher than in 1994, although a few locations are still below the volumes recorded seven years ago. As noted in the previous monitoring reports, Port Ludlow traffic does not appear to be contributing significantly to the higher volumes.

On SR 104, the 24-hour traffic volumes were higher on the weekend than during the week. The difference between the weekend and weekday volumes on the County arterials is relatively small. Previously, the higher weekend volumes have been attributed to travelers heading to the Port Angeles and Port Townsend areas for summertime recreation. The higher traffic volumes on the County arterials on a weekday have been attributed to the presence of commuter traffic.

The County arterials serving Port Ludlow experience relatively low volumes when compared to the state highways. The overall rate of growth at the locations counted in the monitoring program ranged from approximately -3.5 to 4.3 percent per year over the past seven years, with most locations falling into the 1 percent growth range.

Figure 23 – Roadway Network

Traffic counts have also been conducted on Marine Drive just east of Oak Bay Road (which serves the Marina and Resort Area) since 1994. Traffic counts were highest on Saturday, but the 2001 Saturday, Sunday, and Monday traffic volumes on Marine Drive were lower than those recorded in 1994.

Level of Service

Level of service (LOS) ratings are a measure of the quality of service and efficiency provided by an area's roadways. Traditionally, the LOS ratings for roadways have been based on an A through F quantitative scale measuring roadway capacity, as defined in the *Highway Capacity Manual* prepared by the Transportation Research Board. These alphabetical ratings describe the quality of service provided at peak hours and average daily conditions. The standard for signalized intersections is based on seconds of delay. In general, LOS A indicates free flow with no delays, while LOS F signifies very severe congestion with slow travel speeds. In the middle is LOS C, which represents a condition of stable flow with slightly reduced speeds and reduced maneuverability.

Level of Service (LOS) calculations have been conducted at five locations in and around Port Ludlow where p.m. peak hour traffic counts were collected for the monitoring program. The five intersections are:

- SR 104 and Paradise Bay Road
- SR 104 and Beaver Valley Road
- Teal Lake Road and Paradise Bay Road
- Oak Bay Road and Beaver Valley Road
- Paradise Bay Road and Oak Bay Road

Table 8 below shows the overall weekday and weekend peak hour LOS for the two intersections with SR 104 for the years 1992 to 2001.

Table 8
Weekday and Weekend Peak Hour
SR-104 Intersections - Overall Levels of Service

Year	SR-104/Paradise Bay Road		SR-104/Beaver Valley Road	
	Weekday	*Weekend*	*Weekday*	*Weekend*
1992	A	N/A-	A	N/A-
1994	B	D	B	D
1995	A	D	A	E
1996	A	E	D	F
1997	F	D	A	F
1998	A	E	B	F
1999	A	C	B	D
2000	C	B	B	C
2001	A	B	B	E

Table 9 below shows the overall weekday and weekend peak hour LOS for the remaining three intersections for the years 1992 to 2001.

Table 9
Weekday and Weekend Peak Hour
Overall Levels of Service

Year	Teal Lake Road/ Paradise Bay Road		Oak Bay Road/ Beaver Valley Road		Paradise Bay Road/ Oak Bay Road	
	Weekday	*Weekend*	*Weekday*	*Weekend*	*Weekday*	*Weekend*
1992	A	N/A	A	N/A	A	N/A
1994	A	A	A	A	A	A
1995	A	A	A	A	A	A
1996	A	A	A	A	A	A
1997	A	A	A	A	A	A
1998	A	A	A	A	A	A
1999	A	A	A	A	A	A
2000	A	A	A	A	A	A
2001	A	A	A	A	A	A

All of the intersections were at overall LOS B or better on the weekdays for 2001. During weekends, the intersections along SR-104 operated at a lower LOS than on the weekdays with SR 104/Paradise Bay Road and SR 104/Beaver Valley Road at LOS B and LOS E, respectively. The remaining intersections did not differ from their weekday operations. The year 2001 pattern was very similar to those of past years.

Data collected for intersections with SR 104 vary significantly with the season. During the summer months, the volume of traffic will be much higher due to vehicles traveling to recreational destinations. During winter months, traffic volume is at a much lower level for the SR 104 intersections, which would result in better levels of service during the winter months.

A traffic study prepared by Jefferson County for the year of 2000 collected data on existing Level of Service and Average Daily Traffic (ADT) for road segments within the County. This study included the roadway segment of Oak Bay Road between Paradise Bay Road and Olympus Boulevard, the roadway used to access the Marina. The current LOS on this Oak Bay Road segment is C with an ADT of 3,624 trips (ADT LOS "C" capacity is listed as 7,400, and the current Jefferson County LOS standard is C). It is not anticipated that the LOS or capacity of this roadway segment will be exceeded prior to 2021.

Parking

A *Parking Management Plan – Port Ludlow Marina Expansion* was prepared by the project sponsor and submitted to the Jefferson County Department of Community Development in July 2000. At that time, a standard of one parking space for every two slips was assumed. In Jefferson County, all marina projects are reviewed on a case-by-case basis, with parking

approved by the Administrator. Parking space requirements for marinas vary greatly between jurisdictions. In general, parking space requirements are typically one parking space for every two to four slips.

As shown in the following table, Kitsap County, the City of Des Moines, and the City of Tacoma all have parking requirements of one space for every two to four slips.

Table 10
Parking Requirements for Marina at various Washington State Cities and Counties

	Kitsap County	City of Des Moines	City of Tacoma
All Slips	1 space for 4 slips	1 space for 2 slips	1 space for 4 slips

Using a general requirement of one parking space per two slips, the required number of parking spaces for the existing Port Ludlow Marina is 140. Existing off-street parking areas serving the Marina are shown in Figure 24. Currently, 89 paved parking spaces are located immediately adjacent to the Marina (Area PP). An additional 60 parking spaces are available in the first and second upper gravel lots located on either side of the Marina access road (Areas A and B). Overflow parking for 14 vehicles (Area C) is available off the resort road across from Area B.

In addition, the Marina has a lease agreement with the Ludlow Maintenance Commission (LMC) for use of a minimum of 50 percent of the LMC parking area and a maximum of 100 percent for overflow parking. There are 56 parking spaces available at the LMC parking area located north of Areas B and C. Thus, a maximum of 56 parking spaces are available for the Marina use for overflow parking.

A total of 219 parking spaces are now available for the existing 280 Marina slips, which is greater than one space per two slips. Parking requirements for the Resort area will be addressed in the upcoming Resort SEIS. Required parking for the Marina will be reviewed again at that time, once the use mix within the Resort is determined.

Currently, peak parking demand occurs on summer weekend days, with the greatest demand during large events such as Ludlow Days.

3.7.2 Environmental Impacts

For all expansion alternatives, it is anticipated that the majority of the new slips will serve residents of Port Ludlow. These residents will access the Marina from Paradise Bay Road and Oak Bay Road. Boat owners from outside Port Ludlow will access the Marina from SR 104, Beaver Valley Road, Paradise Bay Road, and Oak Bay Road.

Figure 24 – Parking Management Plan

Vehicular traffic generated from the proposed 100-slip Marina expansion was included in the traffic analysis contained in the 1993 *Port Ludlow Development Program EIS*.

The Transportation element of the Jefferson County Comprehensive Plan concludes that historically, traffic growth on SR 104 is influenced primarily by regional or through-traffic and is not as significantly increased by local developments. Thus, the proposed Marina expansion is not likely to have a significant influence on traffic growth on SR 104.

Additional information regarding impacts on the County arterials follows:

Alternatives 1, 2, and 3: Expansion Alternatives

The proposed expansion will create additional traffic on Oak Bay Road, Paradise Bay Road and within the Resort area. The roadway segment most affected by the proposal is Oak Bay Road between Paradise Bay Road and Olympus Boulevard.

The Institute of Transportation Engineer (ITE)'s *Trip Generation Manual* (Sixth Edition) provides data of trip generation based on surveys of marinas in the metropolitan areas of San Francisco, San Diego, and Seattle. In addition to docks and berths for boats, some of the sites surveyed also had social and club activities, limited retail and restaurants.

The ITE data indicates that an average of 2.96 trips are generated per slip on weekdays, an average of 3.22 trips per slip are generated on Saturdays, and an average of 6.40 trips per slip are generated on Sundays. According to this manual, the proposed 100-slip expansion of the Marina will generate an additional 296 trips approximately on weekdays, 322 trips on Saturdays, and 640 trips on Sundays.

Traffic from expansion of the Marina is not anticipated to exceed LOS standards. The greatest increase in traffic will occur on weekends. Currently, peak traffic use on Oak Bay and Paradise Bay Roads in the vicinity of the Marina is 3:15-4:15 p.m., on weekdays.

The LOS for this segment of Oak Bay Road is C and the ADT capacity for LOS Standard of C is 7,400 ADT. Trip generation by the Marina is highest on Sundays and the additional 640 trips generated by the Marina expansion results in a total volume of 4,264 on Sundays, which is below the capacity for LOS Standard of C.

Table 11 shows the estimated daily volumes along Oak Bay Road for Saturday, Sunday, and on weekdays with the addition of the Marina trips.

Table 11
Oak Bay Road – Estimated Traffic Volumes

Roadway Segment providing access to the Marina	LOS Standard	LOS Capacity (ADT)	Ex. LOS	Ex. ADT	ADT after expansion (Weekday)	ADT after expansion (Saturday)	ADT after expansion (Sunday)
Oak Bay Road (between Paradise Bay Road and Olympus Boulevard)	C	7,400	C	3,624	3,920	3,946	4,264

LOS at Oak Bay Road between Paradise Bay Road and Olympus Boulevard will remain at C despite the proposed Marina expansion.

Parking

The increase in the number of slips in the Marina will result in an increased demand for parking. Using a standard of one parking space for every two slips, an additional 50 parking spaces (for a total of 190 spaces) will be required.

The total number of available proposed parking space for the Marina is 219, 29 more than what is required. Existing off-street parking provision is sufficient for the proposed expansion.

Alternative 4: No Action

No expansion of the Marina will result in no traffic or parking impacts associated with expansion.

3.7.3 Mitigating Measures

No mitigation measures are required for this project.

3.7.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to traffic or parking are anticipated from this project.

3.8 Public Service And Utilities

3.8.1 Fire/Emergency Services

3.8.1.1 Affected Environment

The Port Ludlow Resort is served by Jefferson County Fire Protection District 3. Fire District 3 operates from four fire stations: one in Port Ludlow, one in Paradise Bay, one on South Point Road, and one in Chimacum. The construction of the new Port Ludlow fire station is complete. The new Port Ludlow fire station received its final occupancy permit in early May 2002 and a dedication of the station was held on May 11, 2002. The new station is manned by two career fire fighters/EMTs 24 hours a day, 365 days per year and three volunteers and eight program volunteers. This station houses one pumper truck, one tender, an ambulance, and support vehicles. The Jefferson County Fire Protection District No. 3 responded to a total of 373 alarms in 2000 with 69 of those for North Bay/Port Ludlow and 52 for South Bay/Port Ludlow.

The existing fire protection system at the Marina consists of three individual portable saltwater pump units located in small shed storage areas dispersed throughout the float system. The prior fire suppression system consisted of a wet line to fire standpipes located throughout the float system. The older pipe system was abandoned due to its deteriorated condition and replaced with the portable fire suppression system in 1997. The County Fire Marshall was consulted and approved the current fire suppression system when it was installed.

Chapter 9 of the Port Ludlow Marina Operations Manual includes addresses marina emergencies, and outlines procedures for responding to emergencies such as person overboard, medical emergencies, fire control, safety, security, fueling, oil spills, sinking boats, hazardous materials, severe weather, earthquakes and threats. The Marina staff is trained to respond to emergencies per procedures set forth in this manual.

3.8.1.2 Environmental Impacts

For all expansion alternatives, the marina expansion is likely to increase the number of alarms generated. It is anticipated that this increase will not be significant. The fire-fighting system at the new station will accommodate the anticipated increase in number of alarms. In addition to the impacts to the fire station, there will be impacts to the fire suppression system at the marina.

For all expansion alternatives, a piped fire suppression system with call boxes will be required for all new floats. The system will consist of a piped connection to the existing fire line on land near the existing Marina office. A double detector check valve, post indicator valve and siamese fire department connection will be provided in the vicinity of the Marina office. A dry line pipe will run from the landside, down the existing gangway and will be run along the docks under the walers. A fire department connection standpipe will be installed on the dock system per code such that no point on the new dock system will be more than 75 feet from a fire connection standpipe. In addition, a fire hose cabinet with a direct connection to the standpipe will be located at each fire standpipe location; a fire extinguisher will also be located at each of the fire hose cabinets.

Additional fire standpipes may be added to the existing floats on A-, B-, C-, D-, and E-Docks and along the existing central walkways to improve fire-fighting capabilities on these existing floats.

Alternatives 1, 2, and 3: Expansion Alternatives

The increase in the number of boat slips will generate an incremental increase in service calls to the fire district. It is not anticipated this increase will be significant.

The new fire suppression system will improve the ability to control and contain fires at the Marina. With the presence of a fire piping system, additional fire extinguishers, fire hose cabinets, and numerous fire connection ports, the ability to fight fires is greatly improved. This will reduce the pollution of the environment through faster containment of fires resulting in less sunken vessels, oils, and other debris that may occur in the event of a fire.

Alternative 4: No Action

No expansion of the Marina will result in no increased demand for fire/emergency medical services. There will also be no new additional fire suppression system, which may result in a longer containment time for fires than Alternatives 1, 2, and 3, resulting in more debris and pollution from any fire events.

3.8.1.3 Mitigating Measures

Proposed:

- At least two fire hydrants and adequate emergency access will be provided in the area of the proposed Marina expansion.

- A dry line piped fire suppression system will be provided on float C, down the central walkway, and on all new docks. Additional extensions to the existing docks may also be constructed. This new piped system will provide fire-fighting capabilities such that each area on the new float system is no more than 75 feet from a fire fighting apparatus. Improved fire fighting capabilities will reduce the potential for debris and pollutant contamination from fire events.

- Marina personnel and liveaboard residents will receive mandatory training in emergency fire fighting procedures.

- Fire call boxes will be provided on the new floats and down the main walkway. These alarms and the main fire alarm for the Marina will be linked to a monitoring service or other entity to assure automatic alert of appropriate authorities.

- A connection will be provided between B-Dock and C-Dock to provide additional access to the docks for fire fighting crews and for egress for boaters from the docks in the event of a fire emergency. This will allow each dock to be accessed by two gangways instead of the current one gangway access system for Docks C, D, and E.

3.8.1.4 Significant Unavoidable Adverse Impacts
No significant unavoidable adverse impacts to fire and emergency medical services are anticipated.

3.8.2 Electrical Service

3.8.2.1 Affected Environment
The condition of the existing electrical system at the Marina varies based on the year of installation. The electrical systems on A-Dock are functional, but the system should be renovated to improve reliability and increase service capacity at several slips. The Marina is currently in the process of replacing the electrical system on A-Dock. The electrical system for B-Dock was recently rebuilt and is a state-of-the-art vessel power distribution system. In 2000, 100-ampere service was installed to the end tie slip on the west end of D-Dock. The new service is routed under the waler from the nearest transformer.

3.8.2.2 Environmental Impacts

Alternatives 1, 2, and 3: Expansion Alternatives
The addition of 100 slips will increase the demand for electrical service; and during construction, electrical service may be temporarily lost. The existing electrical distribution system is not capable of supplying power necessary for the expansion. This will require transformers to be placed on the landside and on some dock structures to provide power supply for the new dock facilities. There is adequate capacity in the landside supply system to support the new loads.

All electrical services on the floats will be run in conduits internal to the float system. Where the electrical service runs along existing dock structures, and the dock structure does not have the capacity for additional conduit, some sealed conduits will be run along the existing floats under the walers.

Alternative 4: No Action
No expansion of the Marina will result in no expansion of the electrical service.

3.8.2.3 Mitigating Measures

Proposed:
- Renovate the electrical service distribution system to A-Dock.
- Install all electrical systems in conduit internal to the float or isolated in conduit from the water.
- Install electrical system per code regarding safety and environmental requirements.

3.8.2.4 Significant Unavoidable Adverse Impacts
No significant adverse impacts to the electrical service are anticipated.

3.8.3 Water Service

3.8.3.1 Affected Environment

Domestic water service to Port Ludlow is provided by the Olympic Water and Sewer Company. The source of water is groundwater. The Port Ludlow development has water rights, which equal to 186 million gallons per year.

Olympic Water and Sewer, Inc. produces an annual "Well Productions Report" to monitor their water usage. For the year 2001, the Port Ludlow development used a total of 89.2 million gallons of water. Of the total 89.2 million gallons, the Marina accounted for approximately 1.7 million gallons (4,602 gallons per day), or approximately 2 percent of total water use. In the year 2000, the Marina accounted for approximately 3 percent of total water usage.

Currently there are 280 slips at the Marina, as well as upland restrooms, showers, and laundry facilities.

Annual water use for the Port Ludlow development is expected to stay well below the 186 million gallons of annual water rights.

The adequacy of fire flow is addressed in Section 3.8.1, Fire/Emergency Services.

3.8.3.2 Environmental Impacts

Alternatives 1, 2 and 3: Expansion Alternatives

All expansion alternatives will result in an increased demand for domestic water. Water will be used at the slips, as well as at existing upland facilities such as the laundry, restroom, and showers. The following summarizes past water use at the Marina and the anticipated increase in water usage:

- Average Marina Water Usage (1991-2001) = 4,757 gallons per day (GPD)/1,736,305 gallons per year.
- Number of Slips = 280 slips.
- Water Usage per slip at the Marina = 4,757/280 = approximately 17.0 GPD.
- Anticipated increase in daily water usage at the Marina = 1,700 GPD.
- Anticipated total Marina Water Usage with expansion = 6,457 GPD/2,356,805 gallons per year.
- Total annual increase in water usage = 620,500 gallons per year, or a 0.7 percent increase in year 2001 total Port Ludlow water usage.

Thus, with the Marina expansion, the annual water usage for the Port Ludlow development will not exceed their 186 million gallons of annual water rights.

Future redevelopment/expansion of the upland restrooms, showers, and laundry facilities will be evaluated as part of the Draft EIS required for the Resort expansion. The Uniform Building Code does not address the number of restroom facilities required in marinas. Marina design guidelines recommend adding one additional bathroom stall per 100 slips for expansion (Tobiason, 2000).

Alternative 4: No Action
No expansion of the Marina will result in no substantial increased demand for domestic water from the Marina. Water previously allocated for the Marina expansion could be transferred to other uses.

3.8.3.4 Mitigating Measures

Proposed:

- A 100-slip expansion of the Marina was anticipated in planning for the water system.

3.8.3.5 Unavoidable Adverse Impacts
No unavoidable adverse impacts are anticipated.

3.8.4 Sanitary Sewer Service

3.8.4.1 Affected Environment
The existing sanitary sewer system consists of one stationary boat sewage pump-out system installed on the fuel float and a new portable pump-out facility. The stationary boat sewage pump-out is a Keco Model installed in the early 1990s. The existing discharge piping and system is in working condition and has sufficient capacity to support the Marina. The new portable pump-out facility was installed in April 2002.

The draft Resort at Ludlow Bay Marina Regulations and Policies address discharge of gray and black water in Section III D., as follows:

> D. DISCHARGE OF BLACK WATER AND GRAY WATER
>
> 1. All vessels, which moor in the Marina, must be in compliance with all regulations established by the United States Coast Guard or other federal or state regulatory agencies.
>
> 2. Discharge of black water from vessels while in Ludlow Bay is prohibited.

3. Sanitary waste disposal facilities are available at designated locations within the Marina a t no charge to users. All users shall use these facilities for the disposal of raw sewage.

4. Liveaboards must pump their holding tanks on a monthly basis.

5. A pump out log is located on the fuel dock shed, all vessels utilizing the pump out must sign the pump out log.

6. The discharge of gray water is currently under review by the State, but discourage while in the Marina. Only Biodegradable soaps and cleaners may be used while in the Ludlow Bay Marina.

Item 9 of the *Resort at Ludlow Bay Liveaboard Agreement* addresses sewage disposal as follows:

- *Vessels must be equipped with a Coast Guard approved holding tank. Liveaboards are required to use the pump-out station Monthly. Failure to do so will result in termination of the live aboard agreement. You will move off your boat or move the boat out of the Marina within ten (10) days of non-compliance. A liveaboard pump out log will be kept and updated daily.*

Boats at-anchor in the Bay (both transient and permanent at-anchor) can use Port Ludlow pump-out facilities, but cannot be required by Port Ludlow to do so (per existing state and federal laws).

3.8.4.2 Environmental Impacts

Alternatives 1, 2, and 3: Expansion Alternatives
The expansion of the Marina will create an increased demand for sewage pump-out and enforcement services. A second portable sewage pump-out facility will be provided as part of the Marina expansion construction project.

Alternative 4: No Action
No expansion of the Marina will result in no increased demand for sewage services.

3.8.4.3 Mitigating Measures

Proposed:

- Two portable pump-out carts will be available for use in addition to the existing fixed pump-out facility.

- Enforcement of rules regarding discharge of black water will be strictly enforced by Marina management.

- The *Marina Live Aboard Agreement*, *Regulations and Policies*, *and Best Management Practices* have been reviewed and revised to address current Marina issues, including discharge of sewage.

3.8.4.4 Significant Unavoidable Adverse Impacts

No significant adverse impacts related to sanitary sewer service are anticipated.

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