Appendices

Appendix A: Alternatives Evaluated in Detail but Eliminated from Consideration

As previously discussed in Chapter 2 these two alternatives were evaluated but eliminated from consideration. Based on the evaluation completed by the Dosewallips IDT the Agencies' Responsible Officials determined that the environmental consequences of these two alternatives would be unacceptable. An additional factor in making this determination was a comment from NMFS that they had serious concerns about replacing the washed-out road into the Dosewallips River channel due to serious long-term affects to Puget Sound chinook salmon. A full description of these alternatives is included here. These alternatives were developed based on site conditions as existed in late 2005 and have not been modifified to reflect the current conditions. Additionally costs were estimated for these alternatives in 2006 and have not been updated. They should not be compared with costs displayed in the main body of this EIS.

Alternative D – Replace-in-Kind

Objective
This alternative is designed to meet the project's purpose and need and to minimize impacts to terrestrial habitats by avoiding the clearing associated with road construction in LSR and to soil productivity, while reestablishing road access in the washout area as close to the preexisting conditions, in terms of grade and alignment, as possible.

Description
A 14-foot wide single lane road about 500 feet in length would be reconstructed similar to what existed prior to the washout (maintenance level 3). It would provide access for passenger cars, recreational vehicles, and vehicles pulling trailers. The horizontal alignment would swing into the hillside as much as possible without undercutting the slope while also providing sufficient catchment area at the base of the slope to accommodate bank sloughing and ravel (Figure 31). Cross drains would be needed to allow for proper road drainage. The bluff slope would be laid back to a slope angle of 1 horizontal: 1 vertical to create a more stable slope. This would require moving the top of the slope back about 60 feet, removing up to 0.7 acre of ground or about 13,250 cubic yards of material. Some of this material could be used to build the road fill with the remainder (about 30 percent or 4,000 cubic yards) hauled to an off-Forest disposal site. There would be clearing of danger trees for approximately 100 feet from the top of the laid back slope involving about 1 acre of forest within LSR. The height of the roadway surface would be at a grade to minimize the road's footprint while meeting design criteria for a 100 year flood (Q100). This design would be about 10 to 15 feet above the channel at the washout with the road extending outward from the base of the slope 40 to 55 feet depending on the final design height. Near the upstream portion of the washout the road fill would occupy about one half of the existing bankfull channel width. Road bank protection (most likely in the form of riprap) would extend along the new construction area and approaches for a distance of about 680 feet.

Figure 31: December 2005 aerial view of washout showing estimated alignment for Alternative D. Dashed line approximates toe of fill at channel elevation.

Under this alternative the existing north edge of the Dosewallips River would be relocated between 20 and 60 feet back toward the pre-damage location. Fill and riprap would be placed within the existing river channel to form the road prism. The toe of the fill would be well within the wetted perimeter of the river. Near the upstream portion of the washout the new road fill would occupy approximately ½ of the existing bankfull channel width (Figure 32). The new road fill would occupy less of the existing channel near the downstream portion of the washout. The existing bankfull channel width at the riverbend is approximately 195 feet with the low water channel width estimated at 90 feet. The revetment would reduce the width of the current bankfull channel by about 33 percent and potentially as much as 70 percent of the low water channel width at the washout site. These are short-term effects as the river would be expected to shift outward (toward the south) and eventually regain needed flow area. In addition an armor layer would extend out about 15 feet from the toe of the riprap and beneath the channel bed. Approximately 680 feet of riprap would be placed to stabilize the streambank. The surface of the riprap revetment would be roughened to dissipate flow energy by placing a series of rock clusters or large individual rocks along the riprap, placing rocks in conjunction with wood, and constructing an uneven surface to the riprap.

Figure 32: View upstream at the washout showing approximate location of roadway for Alternative D. Dashed line indicates toe for the riprap at channel bed elevation.

The river would be expected to adjust to the channel relocation, the reduced channel cross section, and the bank armoring with some combination of down cutting, lateral shifting and/or bed coarsening. The extended riprap toe would protect the integrity of the riprap revetment and limit the amount of channel bed scour adjacent to road.

Approximately five log complexes estimated to cost $400,000 would be constructed within the project reach to partially mitigate for the loss of aquatic habitat, channel function, spawning gravels, and large wood caused by the reconstruction of the road and subsequent hardening of the bank. One log complex would be located at the upstream end of the revetment. Another complex would be located at the downstream end of the revetment. Three complexes would be constructed 160 to 1150 feet downstream of the revetment. These structures would function to reduce flow energy, redirect flow and scour pools, and create cover for aquatic species. The structures would be designed to mimic natural logjams. The log complexes would consist of interlocking pieces of large wood that are stacked and racked against several large trees with attached root wads. Like natural accumulations of large wood the constructed log complexes would provide streambank protection while creating valuable fish and wildlife habitat.

Constructing the five log complexes would require work with a track excavator in the channel below ordinary high water. It may also involve crossing the river channel with heavy equipment,

excavating channel-bed and floodplain material, removing riparian vegetation, placing large wood in the excavated area, and partial burial of the wood with the excavated material. Existing dispersed campsite roads would be used to access the river and would be rehabilitated post construction. Approximately 80 to 90 conifer trees ranging from 24 to 32 inches dbh would be removed along FSRs 2610, 2620-030, and 2620-032 to provide materials for the log complexes. In the event this alternative had been selected for implementation a more detailed proposal would have been developed with its own NEPA analysis and ESA consultation.

The estimated cost of this alternative is $1.7 million. This estimate includes additional maintenance needed on FSR 2610 from the Forest boundary to the reroute location due to the increased road wear associated with the disposal of excess excavation, estimated at $15,840, and the deferred maintenance on FSR 2610 past the reroute to the Forest boundary, estimated at $13,200. The estimated annual maintenance cost for the new road itself is $2,210 for the first two years and then $1,320 annually. Annual maintenance on FSR 2610 past the washout to the Forest boundary would also be needed, estimated at $9,200.

During construction FSR 2610 would be closed to the public from the Forest boundary up to the washout site to provide for public safety. Portions of FSR 2610 and previously disturbed dispersed camping areas (approximately 2 acres) near the washout would be used for construction equipment staging areas. The dispersed camping areas would be rehabilitated at the conclusion of construction activities. Rehabilitation would include soil improvement work, scattering of large wood, seeding/planting, and treatment for invasive species.

A wood use plan would be developed to insure the best use of the trees removed during construction activities. Trees would be tipped instead of cut when possible as stems with root wads attached are more suitable for restoration projects. The FS would give priority use for these downed trees for restoration and enhancement uses such as instream large woody debris structures, terrestrial coarse woody debris, and tribal uses. Additional uses may include road decommissioning rehabilitation and repair of the park's Dosewallips Road. Trees in excess to these uses may be sold.

Additionally ONP and WFLHD propose to repair the Dosewallips Road at MP 0.85 in the vicinity of the Dosewallips Falls, at an estimated cost of $550,000. Approximately 120 feet of road that was constructed in the 1940's on log retaining wall/structures failed in late 2003. The road would be repaired by removing the old road fill material and reconstructing the road prism by using riprap and crushed rock to form a foundation on which structural backfill would be constructed. Stabilization techniques (such as gabions or other wall structures) would be used to protect the stabilized fill from erosion. All of the construction would be above the ordinary high water line of the river. Deferred maintenance on the park's Dosewallips Road would be needed prior to the repair work at an estimated cost of $3,800.

Forest Plan Amendments

Selection of this alternative would include site-specific, non-significant amendments (as defined under the National Forest Management Act) to the Forest Plan. The following amendments are associated with Aquatic Conservation Strategy (ACS) objectives and management direction for Key Watersheds as identified in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (referred to as the NWFP ROD), which amended the Olympic's Forest Plan.

1. Projects must be consistent with the nine ACS objectives (ROD B 9-11) at both the project or site scale and the watershed scale. The preliminary effects analysis for this alternative indicated that isolating the high bank at the washout from the river by road bank protection would degrade fifth-field watershed conditions over the long-term and prevent the maintenance or restoration of some of the ACS objectives at project and watershed scales. The proposed amendment would waive the requirement that the project be consistent with all the ACS objectives.

2. Management within Key Watersheds must maintain or improve conditions for at-risk fish (ROD B-18). The preliminary effects analysis for this alternative indicated that there would be substantial short and long-term adverse impacts to aquatic habitat and fish in the Dosewallips watershed. The proposed amendment would waive the direction that this project maintain or improve conditions for at-risk fish.

Alternative E – Low-water Revetment (Original Proposed Action)

Objective
This alternative is designed to meet the project's purpose and need and minimize impacts to terrestrial habitats by avoiding the clearing associated with road construction in LSR and to soil productivity. It also lessens aquatic habitat and riparian function impacts by reducing the road's footprint or the amount that the road and associated fill encroach into the river and allowing some gravel recruitment from the high bank.

Description
Alternative E would be similar to Alternative D except the reconstructed roadway would be lower, the road footprint would be narrower and it would encroach less into the river channel. A 14-foot wide single lane road about 500 feet in length would be constructed to maintenance level 3 standards. It would provide seasonal access for passenger cars, recreational vehicles, and vehicles pulling trailers. The horizontal alignment would be similar to Alternative D and would swing into the hillside as much as possible without undercutting the slope while also providing sufficient catchment at the base of the slope to accommodate bank sloughing and ravel. A catchment structure, such as a jersey barrier, would be installed to prevent material raveling off the bluff slope from reaching the road. There would be no scaling back of the bluff slope but there would be clearing of danger trees for approximately 100 feet from the top of the slope, involving about 1 acre of forest within LSR.

The height of the roadway surface would be at a grade to minimize the road's footprint while meeting design criteria for a 10-year flood (Q10). The design would be such that the road would be overtopped by the river during moderately large flood events (10-year flood and larger), estimated to be slightly more than 8 feet above the channel bottom. The road fill would be constructed of riprap with a sacrificial surfacing which would be scoured during high flow events. Since the bankfull water surface elevation is about 5.5 feet above channel bottom, the road's surface height is estimated to be between 6 and 8 feet above the channel bottom. Depending on actual road height the road would extend outward from the base of the slope 30 to 35 feet. Near the upstream portion of the washout the road fill would occupy about one third of the existing bankfull channel width. Road bank protection (most likely in the form of riprap) would extend along the new construction area and approaches for a distance of about 680 feet.

Because the roadway would be lower the road footprint within the existing river channel would

be narrower. The new roadway would encroach approximately 20-22 feet less into the existing river channel than under Alternative D. The toe of the fill would be within the wetted perimeter of the river for all flow conditions. At the maximum the new road fill would occupy approximately 1/3 of the current bankfull channel width. At the riverbend the revetment would reduce the width of the existing bankfull channel width by about 25 percent and potentially as much as 53 percent of the low water channel. An armor layer would extend out about 15 feet from the toe of the riprap and beneath the channel bed. With the reduced cross sectional area of the bankfull channel within the project area the river would be expected to adjust with some combination of down cutting, lateral shifting and/or bed coarsening. The extended toe would secure the integrity of the riprap revetment and limit the amount channel bed scour adjacent to road.

The estimated cost of this alternative is $1.4 million. This estimate includes additional maintenance needed on FSR 2610 from the Forest boundary to the low-water revetment due to the increased road wear associated with the disposal of excess excavation, estimated at $6,570, and the deferred maintenance on FSR 2610 past the reroute to the Forest boundary, estimated at $13,200. The estimated annual maintenance cost for the low-water revetment itself is $6,040 for the first two years and then $4,840 annually. Annual maintenance on FSR 2610 past the washout to the Forest boundary would also be needed, estimated at $9,200.

To provide for safety there would be a seasonal road closure from October 15 through April 30. A gate or some type of removable barricade along with signs would be installed on the downstream approach.

Road construction activities would involve:

- Isolation of the work site from the flowing water of the river by placement of temporary flow deflectors.
- Work below the ordinary high water mark including subexcavation of channel bed material and placement of riprap toe and revetment; roadway embankment; and backfilling riprap toe with streambed material, and placement of habitat and roughness feature at the toe of the riprap.
- Removal of temporary flow diversions.
- Completion of work above ordinary high water including the remaining portion of the roadway embankment and riprap revetment, gravel placement, and seeding and mulching.

During construction FSR 2610 would be closed to the public from the Forest boundary up to the washout site to provide for public safety. Portions of FSR 2610 and previously disturbed dispersed camping areas (approximately 2 acres) near the washout would be used for construction equipment staging areas. The dispersed camping areas would be rehabilitated at the conclusion of construction activities. Rehabilitation would include soil improvement work, scattering of large wood, seeding/planting, and treatment for invasive species.

This alternative would also include the following mitigation activities:

- Gravel raveling from the high bank and deposited in the catchment area located adjacent to the new section of road would be stockpiled along the river in locations where the river could recruit it during high flows.

- Construction of approximately five constructed log complexes near the project area and up to 1150 feet downstream from the washout area, estimated to cost $400,000. This activity would require work in the channel below ordinary high water, excavation of channel bed and floodplain material, removal of riparian vegetation, placement of large wood in the excavated area, and partial burial of the wood with excavated material. Existing dispersed campsite roads would be used to access the river and would be rehabilitated post construction. Approximately 80 to 90 conifer trees ranging from 24 to 32 inches dbh would be removed along FSR 2610, 2620-030, and 2620-032 to provide materials for the log complexes. In the event this alternative is selected for implementation a more detailed proposal will be developed with its own NEPA analysis and ESA consultation.

A wood use plan would be developed to insure the best use of the trees removed during construction activities. Trees would be tipped instead of cut when possible as stems with root wads attached are more suitable for restoration projects. The FS would give priority use for these downed trees for restoration and enhancement uses such as instream large woody debris structures, terrestrial coarse woody debris, and tribal uses. Additional uses may include road decommissioning rehabilitation and repair of the park's Dosewallips Road. Trees in excess to these uses may be sold.

Additionally ONP and WFLHD propose to repair the Dosewallips Road at MP 0.85 in the vicinity of the Dosewallips Falls, at an estimated cost of $550,000. Approximately 120 feet of road that was constructed in the 1940's on log retaining wall/structures failed in late 2003. The road would be repaired by removing the old road fill material and reconstructing the road prism by using riprap and crushed rock to form a foundation on which structural backfill would be constructed. Stabilization techniques (such as gabions or other wall structures) would be used to protect the stabilized fill from erosion. All of the construction would be above the ordinary high water line of the river. Deferred maintenance on the park's Dosewallips Road would be needed prior to the repair work at an estimated cost of $3,800.

Forest Plan Amendments

Selection of this alternative would include site-specific, non-significant amendments (as defined under the National Forest Management Act) to the 1990 Forest Plan. The following amendments are associated with Aquatic Conservation Strategy (ACS) objectives and management direction for Key Watersheds as identified in the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (referred to as the NWFP ROD), which amended the Olympic's Forest Plan.

1. Projects must be consistent with the nine ACS objectives (ROD B 9-11) at both the project or site scale and the watershed scale. The preliminary effects analysis for this alternative indicated that isolating the high bank at the washout from the river by road bank protection would degrade fifth-field watershed conditions over the long-term and prevent the maintenance or restoration of some of the ACS objectives at project and watershed scales. The proposed amendment would waive the requirement that the project be consistent with all the ACS objectives.

2. Management within Key Watersheds must maintain or improve conditions for at-risk fish (ROD B-18). The preliminary effects analysis for this alternative indicated that there would be substantial short and long-term adverse impacts to aquatic habitat and fish in

the Dosewallips watershed. The proposed amendment would waive the direction that this project maintain or improve conditions for at-risk fish.