
Grants Pass to Medford Routes (Alternative Route Segments 3C-A, 3C-B, 3D, 3D-2, and 3D3)

Pacific Connector examined several different alternative route combinations trying to find a link between its Segments 1B-5 and 1C west of I-5 and the Williams Northwest Grants Pass lateral corridor heading east to Medford. The 3C segments would leave I-5 south of Glendale. It appears that Segment 3C-A would follow Placer Road west from Sunny Valley, while Segment 3C-B would follow Jump-off Joe Creek Road west from Oxyoke to Winona. It appears that Segment 3C would continue east from the Josephine/Jackson County line along Ditch Creek Road to Evans Creek Road north of Starvation Heights. Segments 3C, 3C-A, and 3C-B were eliminated from further consideration by Pacific Connector because they would pass through populated or developing areas in Jackson County in the vicinity of the communities of White City, Eagle Point, and Wimer. Pacific Connector wanted to avoid congested residential areas, and it could not find a feasible way to link these alternative segments with portions of the proposed route either to the west or east. The 3D segments would parallel I-5 heading southeast from Grants Pass, passing by the communities of Rogue River, Rocky Point Gold Hill, Central Point, Jacksonville, Phoenix, and Talent. This route would be adjacent to the Rogue River, and would be in the vicinity of the Valley of the Rogue State Recreation area east of the community of Rogue River, and the Ben Hur Lapman State Scenic Corridor south of Gold Hill. There are numerous residential and commercial areas along these segments. It would not be feasible to install the proposed pipeline within the existing I-5 right-of-way because construction could impede traffic, and there are restrictions imposed by the Federal Highway Administration that exclude utilities from federal highway easements and access.

Butte Falls Highway and Highway 140 Routes (Alternative Route Segments 3B-1 and 3B-3b-1)

North of Medford, Pacific Connector considered alternative routes that followed the Butte Falls Highway and Highway 140 in a southeasterly direction. These alternatives were rejected because they were longer than the proposed route, and there are numerous houses along the highways, especially in the vicinity of the community of Butte Falls, along the South Fork of Butte Creek, and near Derby along the South Fork of Reese Creek.

Medford East Routes (Alternative Route Segments 3B-2, 3C-1, 3C-4A, 3C-4B, 3C-3, and 3C-6)

Pacific Connector evaluated various potential routes heading east of I-5 from the vicinity of Medford. Segments 3B-2 and 3C-1 would skirt the east side of Medford, from Butte Falls Road south to Talent. A number of existing roads could be followed in this area, including Reese Creek Road south from Butte Falls Road, to Bickham and Brown Roads, Foothill Road, and North Phoenix Road. This route would be near the Agate Lake Recreation Area south of Highway 140. There are numerous residential and commercial areas along these route segments.

Segment 3C-4A is shown on the north side of I-5 between Medford and Ashland. It was eliminated from further study because it would pass through populated and developing areas in the vicinity of the communities of Ashland, Talent, Phoenix, Medford, and Central Point. It would also cross through a number of orchards and specialty crops. Segment 3C-4B would follow Dead Indian Memorial Highway east from Ashland to Keno Road. Segment 3C-3 would follow Green Springs Highway No. 22 (State Route 66) eastward from south of Ashland, passing by the small communities of Lincoln, Mt. View, Pinehurst, and King Cole. This route would be in the vicinity of Emigrant Lake, Tub Springs State Wayside, and Cascade Siskiyou National Monument.

Segment 3C-6 would continue east along Green Springs Highway to Keno, crossing the Klamath River along the way. Alternative route segments 3C-3, 3C-4B, and 3C-6 were also eliminated from further consideration by Pacific Connector in order to avoid residential and commercial areas.

Klamath Falls East Routes (Alternative Route Segments 3B-6, 3B-7, 3B-8, and 3B-9)

During initial route selection, Pacific Connector evaluated numerous potential routes for the southeastern end of the pipeline. Segment 3B-6 heads east from I-97, south of the city of Klamath Falls. There are several existing roads that could be followed, including Cross Road to Dehlinger Lane to Crystal Springs Road. Segment 3B-7 would continue eastwardly following Poe Valley Road and the existing Klamath Falls Lateral. The existing pipeline route (3B-7) traverses steep slopes with surface rock. Segment 3B-9 would follow Highway 39 east from Merrill, then parallel the Klamath Falls – Malin Highway and the existing Northern Santa Fe Railroad corridor to Malin. This alternative would go through residential and commercial areas. Pacific Connector selected the proposed route between Klamath Falls and Malin because it would maximize the use of existing pipeline and powerline corridors, avoid residential areas, and the Kingsley Airport, and avoid steep slopes with exposed bedrock. The proposed pipeline route is also shorter than the alternative routes.

3.1.4.2 Pipeline Route Variations

During finalization of the proposed pipeline route, a number of route variations were identified by Pacific Connector, either as a result of more detailed analysis of existing data, results of field analysis, or requests from land management agencies or landowners. Route variations were identified in an effort to avoid or minimize potential impacts on specific localized resources, including residences, timber, waterbodies, and sensitive habitats. We examined a number of these route alternatives using desktop data, to determine if any had clear environmental advantages over the proposed routes. Where possible, Pacific Connector conducted on-the-ground studies of alternative routes. Elements we considered during these analyses included pipeline length, use of existing rights-of-way, forest clearing, agricultural land, waterbody and wetland crossings, residences, known cultural resources, habitat for federally listed threatened or endangered species, and geological hazards and slope stability.

Coos Bay Route Variations (MP 0 to MP 8 – WC-1, WC-1A, WC-2, WC-3, WC-4, WC-5, and WC-6A)

Pacific Connector considered several route alternatives that could be followed to take the pipeline from the proposed Jordan Cove LNG terminal to the southeastern side of Coos Bay. The Coos Bay Land Route Variation (WC-1) was the original pipeline route identified by Pacific Connector in its first draft environmental Resource Reports filed in May of 2006 during the FERC's NEPA Pre-filing phase. This variation would have crossed Haynes Inlet from the North Spit using an HDD just north of the U.S. Highway 101 McCullough Bridge. It would have continued eastward over the Glasgow peninsula, turned south to cross Kentuck Slough and the Kentuck Country Club golf course, over Villanch Slough, and through the lower portion of Echo Valley to Graveyard Point and the currently proposed crossing of the Coos River. As a result of numerous comments received during the Pre-filing scoping process concerned about impacts to residential areas, Pacific Connector revised its proposed route to place the pipeline within Coos Bay (so called in-water route). We have evaluated the original land route as a potential alternative to the proposed in-water route (figure 3.1-5). The variation and the corresponding segment of the proposed route (as well as variations discussed below) are compared in table 3.1.4.2-1.

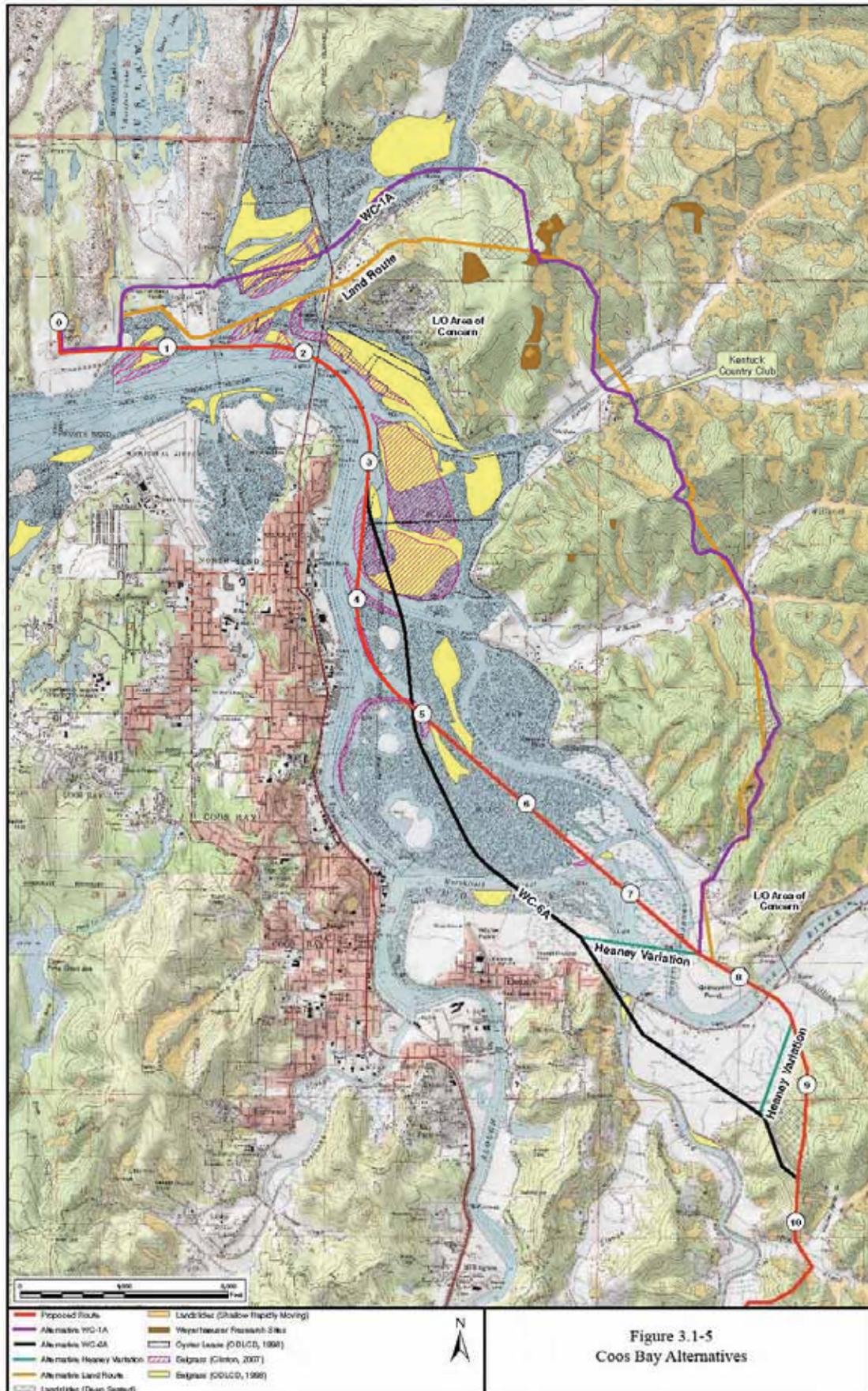


TABLE 3.1.4.2-1.

**Comparisons of the Pacific Connector Proposed Route and WC-6A, Heaney,
WC-1A, and Land Route Variations within Coos Bay**

Alternatives Analysis	Pacific Connector Proposed Route (MPs 0.00-9.68)	WC-6A Variation	Heaney Variation	WC-1A Variation	Land Route
General					
Length (miles)	9.68 <u>a/</u>	9.40	9.98	13.11	10.04
Estuary Crossing Length (miles)	6.87	5.99	6.51	2.07	Similar to WC-1A
Construction Right-of-Way (acres) <u>b/</u>	245.8	220.8	227.5 <u>b/</u>	189.9 <u>b/</u>	56.0
TEWAs (acres)	179.0	Not designed but expected to be similar to the proposed route.	Not designed but expected to require more than the proposed route. Additional work areas would be required for an additional HDD crossing of Marshfield Channel, Bull Island, Cooston Channel to Grave Yard Point. Additional work areas would also be required along the portion of the alignment that parallels the BPA powerline in the Coos River floodplain because of the expected wetland and saturated soil conditions in this area.	TEWAs for the off-shore portion of the alternative have not been designed but would be less than the proposed route based on in-water length. Approximately 34.11 acres of TEWAs would be associated with the land portion of the alternative.	224.5
Permanent Easement (acres) <u>c/</u>	82.6	89.8 <u>d/</u>	84.5	96.0	91.7
Number of Landowner Parcels Crossed	19	26	18	50	44
Number of Residences within 50 feet of Construction Right-of-Way <u>e/, f/, g/</u>	0	2 <u>e/</u>	1 <u>f/</u>	1 <u>g/</u>	2
Land Ownership (miles)	Private Land	2.61	2.89	10.25	9.22
	State	7.07	6.51	7.14	2.86
	Federal (BLM/USFS-Lands)	0.00	0.00	0.00	0.00
Geotechnical					
Steep or Difficult Terrain (miles) <u>h/</u>	0.00	0.00	0.00	1.38	0.29
Highly Erosive Soils (miles) <u>i/</u>	0.76	0.38	0.38	4.65	-
Waterbodies and Wetlands					
Number of Waterbodies Crossed <u>j/</u>	13	106	15 <u>j/</u>	19	11
Total Waterbody Crossings (miles)	6.20	6.29	6.44	2.20	0.86
Number of Wetlands Crossed	8	4 (NWI)	6 (NWI & Jones and Stokes)	8 (NWI)	8

TABLE 3.1.4.2-1.

Comparisons of the Pacific Connector Proposed Route and WC-6A, Heaney, WC-1A, and Land Route Variations within Coos Bay

Alternatives Analysis	Pacific Connector Proposed Route (MPs 0.00-9.68)	WC-6A Variation	Heaney Variation	WC-1A Variation	Land Route
Wetland crossings (miles)	1.37	1.58	1.52	0.48	1.39
Land Use					
Agricultural Lands Crossed (miles)	0.41	1.16	0.96	1.31	0.94
Forest Lands Crossed (miles)	0.00	0.00	0.00	4.07	4.90
Regenerating Forest Crossed (feet) <u>k/</u>	1.01	0.58	0.58	3.34	-
Oyster Leases (# parcels/total feet) <u>l/</u>	1/72.53	2/3,110.47	2/3,110.47	1/3,411.67	Similar to WC-1A
Miles Parallel or Adjacent to Existing Rights-of-Way <u>m/</u>	0.73	0.66	1.36	4.4 <u>l/</u>	5.41
Cultural Resources					
Number of Previously Recorded Cultural Resources	2	0	2	1	3
Number of Newly Identified Cultural Resources <u>n/</u>	8	0	0	0	1
Biological Resources					
Eelgrass (acres) <u>o/</u>	16.83	Not surveyed; expected to be similar to current proposed route	Not surveyed; expected to be similar to current proposed route	Not surveyed	Not surveyed
Eelgrass (acres) <u>o/</u> (Clinton 2007)	40.05	19.32	19.32	15.22	Not surveyed
Eelgrass (acres) <u>o/</u> (ODLCD 1998)	2.81	11.84	11.84	17.17	Not surveyed
NSO Suitable Habitat Crossed (feet) <u>p/</u>	0.00	383.39	383.39	4,385.25	Not surveyed
Marbled Murrelet Suitable Habitat Crossed (feet) <u>q/</u>	0.00	0.00	0.00	0.00	Not surveyed

a/ Mileage length cannot be calculated by subtracting milepost ranges because of engineering station equations included in route segment between MPs 0.00 - 9.68.

b/ WC-6A, Heaney Variation, and WC-1A construction right-of-way acreage calculations assumed a 95-foot on-shore width and a 250-foot off-shore width. Construction right-of-way areas that would be associated with HDDs crossings were assumed to be 95 feet in width for calculation purposes. The construction right-of-way configuration for the current proposed route varies between 225 and 300 feet.

c/ Acres of permanent easement calculated based on crossing length on private and state lands. Pacific Connector proposes a 53-foot permanent easement on federal lands; a 60-foot permanent easement on private timber lands; and a 75-foot permanent easement on private lands.

d/ The 63.77-acre figure previously submitted was incorrect.

e/ Two residences are approximately 100 feet from the centerline of WC-6A along the proposed HDD alignment of Catching Slough. Although site visit reviews expect the HDD to be feasible, geotechnical studies have not been completed for design purposes.

f/ One structure (industrial/non-residential) is located along the alignment that would require an HDD crossing between Sec. 25, T. 25S., R. 13W., across the Marshfield Channel, Bull Island and Cooston Channel to Graveyard Point in Sec. 30, T25S., R12W. Geotechnical studies have not been completed to determine potential HDD feasibility; however based on the site visit conducted for WC-6A, an HDD is likely feasible.

g/ One residence is located approximate 200 feet from the centerline of WC-1A at the off-shore/on-shore approach. The TEWA for

TABLE 3.1.4.2-1.

Comparisons of the Pacific Connector Proposed Route and WC-6A, Heaney, WC-1A, and Land Route Variations within Coos Bay

Alternatives Analysis	Pacific Connector Proposed Route (MPs 0.00-9.68)	WC-6A Variation	Heaney Variation	WC-1A Variation	Land Route
<p>staging of these activities has not been designed; therefore, work area requirements may be required within 50 feet of the residence.</p> <p><u>h/</u> Based on Soil Mapping Units that have slopes of 50-75 percent and have a water erosion rating of high or severe. NRCS. 1989. Soil Survey of Coos County, Oregon. U. S. Department of Agriculture.</p> <p><u>i/</u> Based on Soil Mapping Units that have a water erosion rating of high or severe. NRCS. 1989. Soil Survey of Coos County, Oregon. U. S. Department of Agriculture.</p> <p><u>j/</u> Assessment made using Jones and Stokes field surveys for current proposed route and where available along WC-6A, WC-6A (Heaney Variation) and WC-1A. Waterbody presence information was supplemented for WC-6A, WC-6A (Heaney Variation) and WC-1A using 2005 county aerial photo coverage (Surdex); waterbodies from PNW Hydrography Framework Clearinghouse and using USGS topographic quads.</p> <p><u>k/</u> Includes recent clear-cut forests and areas of in-road construction where forest clearing would be reduced.</p> <p><u>l/</u> Assessment based on number of subtidal land parcels crossed and crossing length. Determination of oyster lease productivity has not been determined. During final design of WC-6A, crossing length of lease would be accommodated based on engineering/ environmental feasibility.</p> <p><u>m/</u> Assessment made using 2005 county aerial photo coverage (Surdex), BLM and Weyerhaeuser GIS road data. Assessment on WC-1A includes mostly private logging gravel or native surface logging roads.</p> <p><u>n/</u> Cultural resource surveys have not been completed on the entire routes for WC-1A, Heaney Variation and WC-6A. WC-6A can still be adjusted during detailed design to avoid, or at the least, minimize impacts to pristine weirs identified in the bay. Upon further review and replotting of WC-6A, it appears that this route misses the newly identified sites and is a correction from 1 to 0 newly identified sites.</p> <p><u>o/</u> Based on Clinton 2007 and ODLCD 1998. According to Ellis Ecological surveys of the proposed route in the fall of 2007, the proposed route would affect: Low Density = 1.21 ac, Medium Density = 13.58 ac, High Density = 2.04 ac. Total = 16.83 ac. The proposed route would also affect 19.88 ac of High Marsh habitat (Bull Island). Alternatives WC-6A, WC-1A (Heaney Variation), and WC-1A would avoid High Marsh habitat.</p> <p><u>p/</u> USFS 2004: PNW-GTR-648.</p> <p><u>q/</u> Martin et al. 2006; General Technical Report PNW-GTR-65.</p>					

The primary advantage of the Coos Bay Land Route Variation is that it would avoid direct impacts on Coos Bay. The Coos Bay Land Route Variation would also avoid archaeological sites (mainly fish weirs in the bay) found along the proposed route. However, geotechnical studies indicated that it may not be possible to cross Haynes Inlet north of the McCullough Bridge using an HDD. Pacific Connector believes that there may be bald eagles nesting in the vicinity of the Coos Bay Land Route Variation WC-1. There were also concerns raised about slope stability and potential for landslides along Route Variation WC-1. The primary disadvantage of the Coos Bay Land Route Variation WC-1 is that it would go through residential areas in the Glasgow and Echo Valley neighborhoods. In a letter dated August 15, 2006, the North Bend City Council requested that the pipeline avoid all residential areas in the city. Likewise, the Mayor of the City of Coos Bay, in a letter to the FERC dated September 29, 2006, requested that the pipeline avoid residentially zoned areas. In a filing on July 27, 2006, 14 citizens of the Echo Valley community petitioned the FERC to consider an alternative to the originally proposed Coos Bay Land Route through their neighborhood. We do not find Coos Bay Land Route Variation WC-1 environmentally preferable to the proposed route.

In response to Pacific Connector’s May 2006 filing of the alternative route WC-1, Dr. Steven Shimotakahara, a resident of the neighborhood of Glasgow Heights, filed a letter dated June 27, 2006 proposing two potential alternative routes. One alternative would go up Haynes Inlet making landfall at an unpopulated portion of North Bay Drive beyond Route WC-1 MP 2. The second alternative would place the pipeline in the mudflats on the east side of the Coos Bay estuary south of the Glasgow peninsula. Pacific Connector incorporated Dr. Shimotakahara’s first suggested alternative in its Route Variation WC-1A filed February 14, 2008. The second suggested alternative was incorporated into Route Variation WC-2 as shown in Resource Report

10 of Pacific Connector's application. However, Pacific Connector eliminated Route Variations WC-2 and WC-3 from further study because these alignments on the east side of the Coos Bay estuary would go through commercial oyster leases. These route variations would also impact eelgrass beds in the bay. Additionally, it was thought that where Route Variations WC-2 and WC-3 would traverse across the mouths of Kentuck and Willanch Sloughs, respectively, would have a high potential for archaeological resources.

Route Variations WC-4 and WC-5 on the east side of the Coos Bay estuary were also eliminated from further consideration by Pacific Connector because these alignments would impact oysters and eelgrass beds. WC-5 was aligned along the Ross Slough floodplain and that alternative would cross the slough seven times. It was also thought that these route variations had the potential to affect unrecorded cultural resources and would encounter shallow groundwater.

In a letter dated November 11, 2007, the Coquille Tribe requested that we analyze another route alternative on the west side of the Coos Bay estuary, south of the proposed route between MPs 4 and 8. The tribe claims that a route on the west side of the bay, south of the proposed route, would have less impacts on known Native American fishing weir archaeological sites. Pacific Connector adopted that alternative into its Route Variation WC-6A, filed February 14, 2008. The Coquille Tribe indicated to Pacific Connector that either Route Alternatives WC-6A or WC-1A would satisfy the tribe's concerns, and were preferred over the proposed route.

In a letter dated March 29, 2008, Richard Heaney stated his opposition to Route Variation WC-6A, claiming it would impact a residential area of the city of Coos Bay, cross three roads including an Oregon State Highway, cut rock above a new bridge approach, potentially breach a road dike, and cross reclaimed tidelands with high water tables. Mr. Heaney suggested an alternative route between MPs 8 and 10 that would follow the existing Bonneville powerline right-of-way. In a data request dated June 2, 2008, we asked Pacific Connector to evaluate Mr. Heaney's route alternative. Pacific Connector responded with a filing on June 23, 2008 that indicated that the Heaney alternative route would probably require a 4,000-foot-long HDD under Marshfield Channel, Bull Island, and Cooston Channel that may not be geotechnically feasible. The Heaney Variation would be almost 0.6 mile longer than Route Variation WC-6A, and would require more acres of TEWAs. Pacific Connector stated that the Heaney Variation may be constructible, but would be more costly, and more time consuming than Route Variation WC-6A. We do not believe that the Heaney Variation is clearly environmentally superior to the other Coos Bay route alternatives.

Route Variation WC-6A would be the shortest route of all the Coos Bay alternatives. It would have a shorter crossing of the Coos Bay estuary than the proposed route or the Heaney Variation; but not as short as Route Variation WC-1A. Route Variation WC-1A would impact the fewest acres during construction, estimated at about 224 acres, including TEWAs. In comparison, the proposed route filed with Pacific Connector's application would impact a total of about 425 acres during construction, including TEWAs. This assumes a 95-foot-wide construction right-of-way onshore, and a 250-foot-wide construction right-of-way in the bay because of extra space needed for vessels to support the lay barge. Route Variation WC-1A would have the least impact on eelgrass beds in the bay, but may impact the most amount of potential NSO habitat in forested upland areas. It would also cross the most difficult upland terrain, with the most erodible soils, and the most forest, but Route Variation WC-1A would cross the least amount of wetlands, in comparison to the proposed route and the other Coos Bay alternatives. Route Variation WC-6A

would avoid Bull Island, and some of the known Native American fish weir archaeological sites in the bay, but would require an HDD under Catching Slough for which there is no geotechnical data about feasibility.

We believe that Route Variation WC-1A is environmentally preferable to the other Coos Bay alternatives, including the proposed route filed with Pacific Connector's application. It appears that all of the route alternatives with extensive crossings of the Coos Bay estuary have the potential to impact Native American fishing weir archaeological sites and other aquatic resources. Eight weir sites were recorded along the proposed pipeline route between MPs 4.7 and 7.0. Pacific Connector is concerned that it may not be able to obtain a negotiated easement with the ODSL for any alternative that has an extensive crossing of the Coos Bay estuary. The members of the Waterbody Crossing Methodologies Subgroup of the Federal and State Task Force on ESA-related issues for the JCE & PCGP Project appear to favor Route Variation WC-1A, as it would avoid impacts on aquatic resources (including listed species) and cultural resources associated with the in-bay alternative routes. Although Route Variation WC-1A is the longest Coos Bay alternative in length, installation of the pipeline along that alternative route would impact the fewest acres necessary for construction. Therefore, **we recommend that:**

- **Before the end of the comment period on the draft EIS, Pacific Connector should incorporate Route Variation WC-1A into its proposed route between approximately MPs 0.5 and 2.5, and file with the Secretary updated alignment sheets and resource tables for the new route.**

Blue Ridge Route Variation (MP 9 to MP 22)

In filings made on October 4, 2007, both Fred Messerle & Sons, Inc. and the Coos County Sheep Company proposed what they called the Blue Ridge Alternative Route between about MPs 9 and 22 (figure 3.1-6). They contend that this route, shifting the pipeline further east, would place the pipeline over tracts mainly owned by the federal government and large timber companies. They state that their alternative route would be further removed from the Coos Bay estuary, and farther away from areas that would be more likely to be developed in the future for residential and commercial purposes. Their suggested route alternative would mostly follow ridgelines. They claim that their alternative route would only have one waterbody crossing, of Steinnon Creek, and would avoid crossings of Catching and Stock Sloughs, and Boone Creek, Catching Creek, and Cunningham Creek along the proposed route. Pacific Connector believes that the alternative route would cross five waterbodies. The alternative route would be about 0.8 mile shorter than the corresponding segment of the proposed route.

In a November 21, 2007 filing, responding to a November 2, 2007 data request from the FERC, Pacific Connector provided the results of its desktop comparison of the Blue Ridge Variation Route with the proposed route between about MPs 9 and 22 (table 3.1.4.2-2). Pacific Connector contends that there are constructability issues along the Blue Ridge alternative, as two areas susceptible to landslides were identified with LiDAR. The proposed route would follow the exiting BPA powerline corridor for 5.9 miles, while the alternative would follow a one-lane asphalt road for 4.1 miles. Pacific Connector believes it would have to install its pipeline in the road under this alternative, resulting in traffic delays due to road closures, and expenses related to rebuilding the road after pipeline installation. Pacific Connector is also concerned that the alternative route would follow Razor Back Ridge Top, requiring slow and expensive stove-pipe

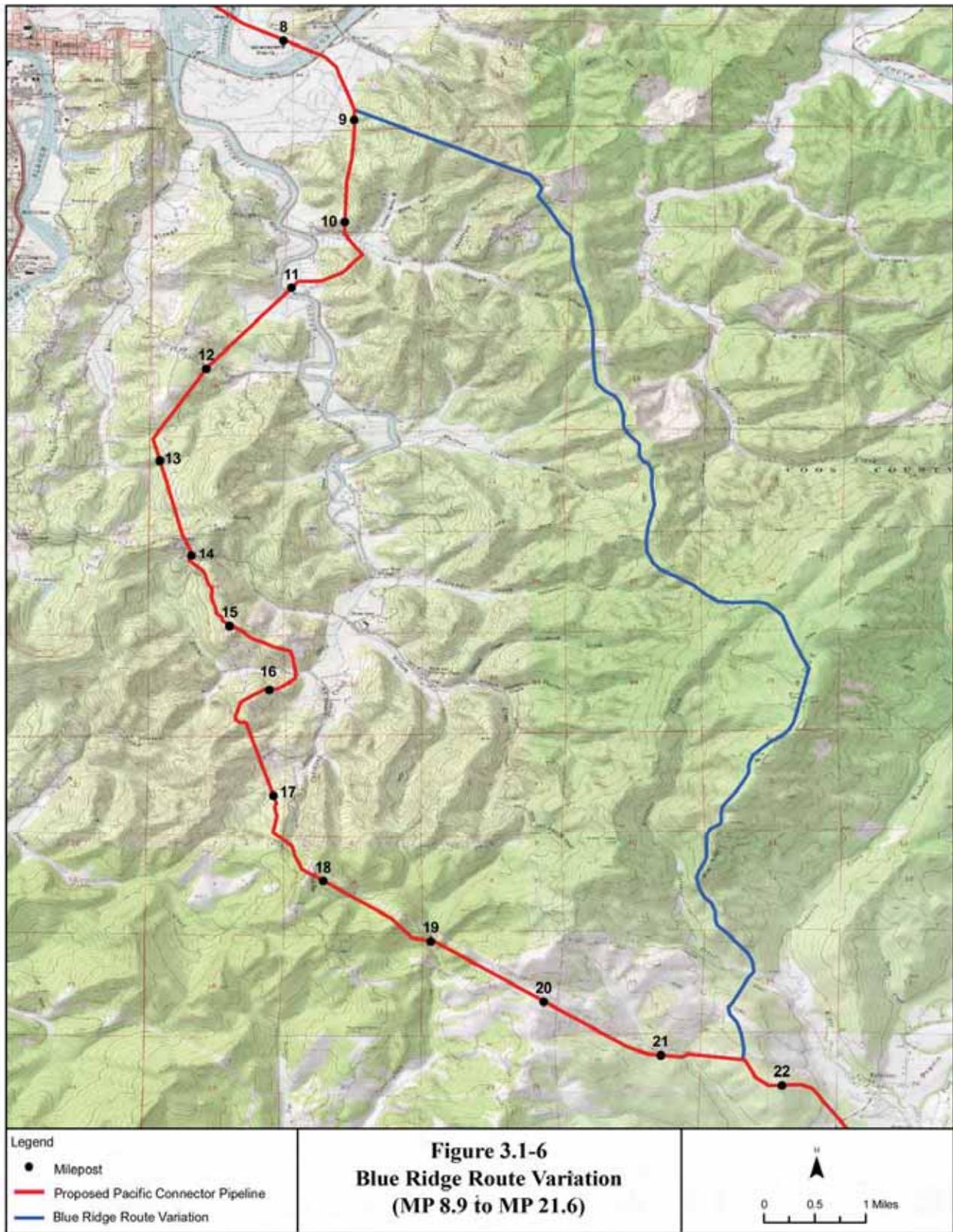


TABLE 3.1.4.2-2

Comparison of Pacific Connector's Proposed Route and Blue Ridge Route Variation (MP 9 to 22)

Impact/Issue	Proposed Route	Landowner Suggested Route
Individual Land Tracts	46	43
Total Length (miles)	13.2	12.6
Parallel/Adjoining Existing Disturbances (miles)	5.9	4.1
Timbered Land (miles)	9.4	9.5
In-Road Lay – Dirt (Gravel) – Rebuild road post-construction (miles)	0.7	0.8
In-Road Lay – Paved (Asphalt) – Rebuild road post-construction (miles)	None <u>a/</u>	4.1 <u>a/</u>
Road Closure During Construction – Flaggers, Traffic Control & Detours (miles)	None <u>a/</u>	4.1 <u>a/</u>
Creek Crossings	4	2
Slough Crossing – Dry Open Cut	1	3
Slough Crossing – Bore (feet)	400	None
Drainages, Ditches, Irrigation, Tributaries, Streams, etc.	40	10-20
Unpaved Road Crossings – Cut	28	15-20
Paved Road Crossings – Cut	5	2
Steep Up & Down Slopes – Tie-Off Equipment, etc. (miles)	0.8	0.9
Narrow Ridge Top Construction – Only access is down easement (miles)	None <u>b/</u>	9.5 <u>b/</u>
Razor – Back Ridge Top Construction – Stove-pipe, Sections, End haul, etc. (miles)	None <u>c/</u>	4.5 <u>c/</u>
Concrete Weight Coating of Pipe Required (miles)	0.5	0.7
Work off Hardwood Mats/Dewater Ditch, etc. (miles)	0.5	0.7

construction techniques, with limited access for construction vehicles, limited turn around space, and limited work space. Because the proposed route would follow a greater amount of existing right-of-way, and because there are questions about safety and buildability along the alternative route, we do not believe that the Blue Ridge Alternative is clearly environmentally superior, and do not recommend its use.

Big Creek/Spirit Mountain Route Variations (MP 36 to MP 39)

On December 9, 2007, the BLM Coos Bay District requested that the FERC analyze three potential alternative routes between about MP 36 to 39 to avoid newly identified habitat for marbled murrelet nesting sites. In a December 14, 2007 data request, the FERC asked Pacific Connector to provide desktop data comparing the suggested alternative routes (northern, southern, and intermediate variations) with the corresponding segment of proposed route (figure 3.1-7 and table 3.1.4.2-3).

The northern route variation would leave the proposed route just east of MP 36, heading northeast towards Spirit Mountain, following in a part an existing road or trail for about 1.5 miles, then rejoining the proposed route just east of MP 38. This variation would be about 0.5 mile longer than the corresponding segment of proposed route. The route variation would transverse rugged topography with steep slide-slopes (greater than 50 percent) and cross several waterbodies. The geologic hazard evaluation determined that this variation is not a reasonable alternative due to the high risk of landslides and construction difficulties on the steep slide-slopes.

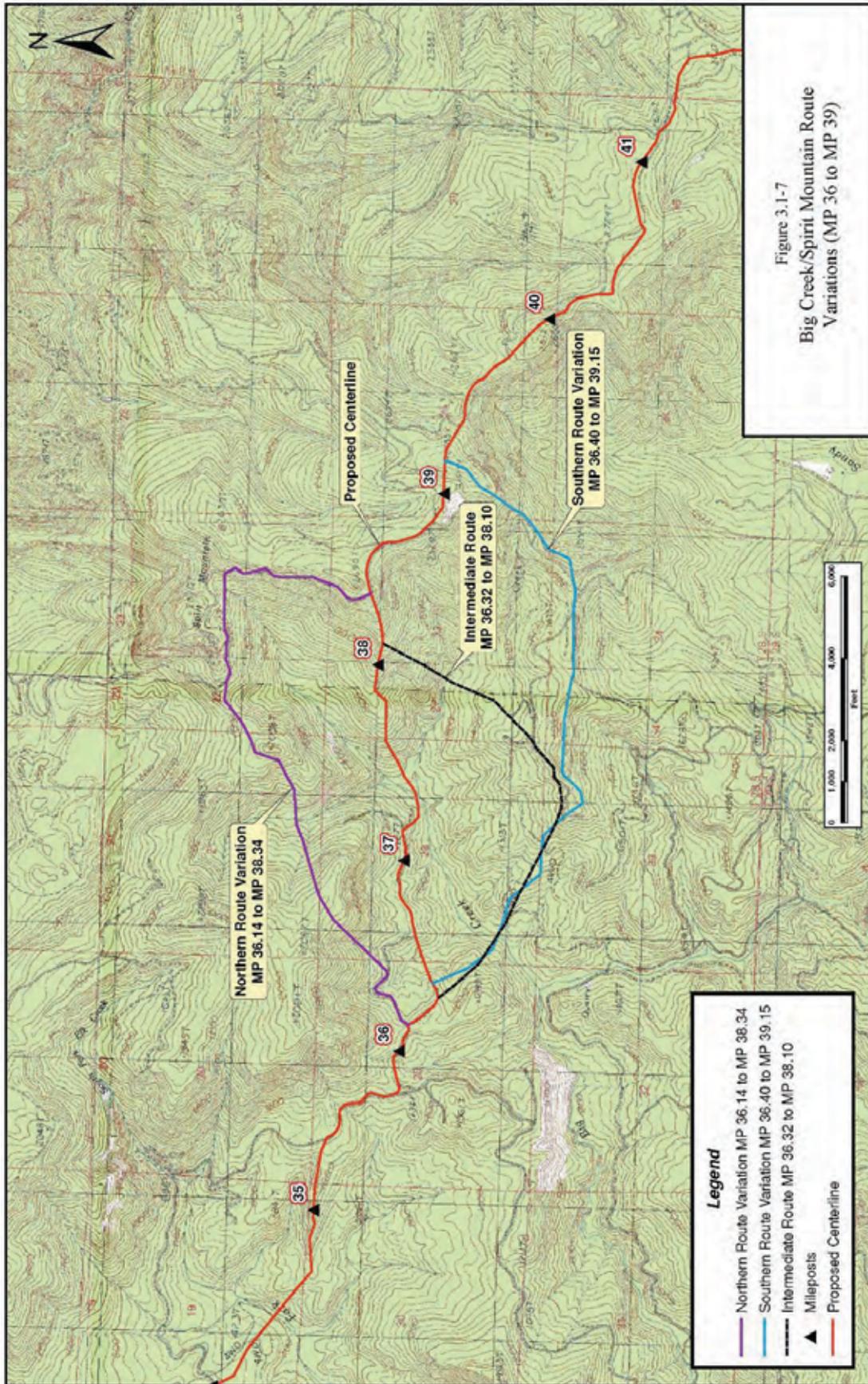


TABLE 3.1.4.2-3

**Comparison of Big Creek/Spirit Mountain Route Variations to the
Corresponding Segment of Proposed Route (MP 36 to MP 39)**

Alternatives Analysis	Proposed Route (MPs 36.14 to 39.15)	BLM Northern Variation T8S, R10W, Sec. 21,22,27,28 & 29	BLM Southern Variation T8S, R10W, Sec. 26,27,28,29,33 & 34
Length (miles)	2.75 <u>a/</u>	3.20	3.08
Construction right-of-way (acres)	31.67	36.85	35.47
TEWA (acres)	21.46	Not designed. Estimated to require more temporary work areas that the proposed route because of increased length, length of steep side slope and steep slope construction and the increased number of waterbody crossings.	Not designed. Estimated to require more temporary work areas that the proposed alignment because of increased length, length of steep side slope, and the increased number of waterbody crossings.
Permanent Easement (acres) <u>b/</u>	19.81	21.58	21.61
Number of residences within 50 feet of construction right-of-way	0	0	0
Number of waterbodies crossed	4 <u>c/</u>	10 <u>d/</u>	6 <u>d/</u>
Length of waterbody crossings (feet)	25.34 <u>c/</u>	Unknown <u>d/</u>	Unknown <u>d/</u>
Number of wetlands crossed	0 <u>c/</u>	0 <u>e/</u>	0 <u>e/</u>
Length of wetland crossings (feet)	0 <u>c/</u>	0 <u>e/</u>	0 <u>e/</u>
Agricultural lands affected (acres)	0.00	0.00	0.00
Forest clearing (acres construction right-of-way)	24.52 <u>f/</u>	24.06 <u>f/</u>	13.60 <u>f/</u>
Regenerating forest clearing (acres construction right-of-way)	7.15 <u>f/</u>	12.78 <u>f/</u>	21.87 <u>f/</u>
Number of previously recorded cultural resources	None	None	None
Miles of right-of-way parallel or adjacent to existing rights-of-way (percent alternative length)	1.31 (48 percent)	1.50 (47 percent)	1.29 (42 percent)
<p><u>a/</u> Mileage length cannot be calculated by subtracting milepost ranges because of engineering station equations included in route segment between MPs 36.14 and 39.15.</p> <p><u>b/</u> Acres of permanent easement calculated based on crossing length on private and federal timber lands. Pacific Connector proposes a 53-foot permanent easement on federal lands and a 60-foot permanent easement on private timber lands.</p> <p><u>c/</u> From Pacific Northwest Hydrography Framework Clearinghouse data layers (http://hydro.reo.gov/). No waterbody widths are provided.</p> <p><u>d/</u> No wetlands are crossed on the proposed alignment based on field surveys (see Table 2A-3 in Appendix 2A to Resource Report 2).</p> <p><u>e/</u> No wetlands are crossed on either the BLM's northern or southern alternatives based on NWI mapping.</p> <p><u>f/</u> Includes recent clear-cut forests and areas of inroad construction where forest clearing would be reduced.</p>			

The southern route variation would head southeast from the proposed route east of MP 36, crossing Big Creek, following existing roads or trails for about 1.3 miles, and rejoining the proposed route just east of an existing quarry east of MP 39. This variation would be about 0.33 mile longer than the corresponding segment of proposed route. It would require less clearing of mature forest, and would cross an area with more regenerating forest. This variation would cross Big Creek, which would be avoided by the proposed route. It would also cross tribal lands associated with the Coquille Forest that would be avoided by the corresponding segment of proposed route.

The intermediate route variation would roughly follow the first mile of the southern variation, but then turn north and rejoin the proposed route near MP 38.1. This variation was eliminated from further evaluation because it would require crossing unstable slopes composed of a landslide complex mapped and described in the Geologic Hazards Report submitted with the Certificate Application. This alternative would also cross Big Creek, which would be avoided by the corresponding segment of proposed route.

The Big Creek/Spirit Mountain route variations do not appear to be environmentally superior to the corresponding segment of proposed route. However, the BLM may require the use of one of these alternatives to avoid marbled murrelet habitat on BLM land, if further on-the-ground investigations prove that one of these variations could be constructed without compromising safety and long-term pipeline stability by avoiding potential geological hazards.

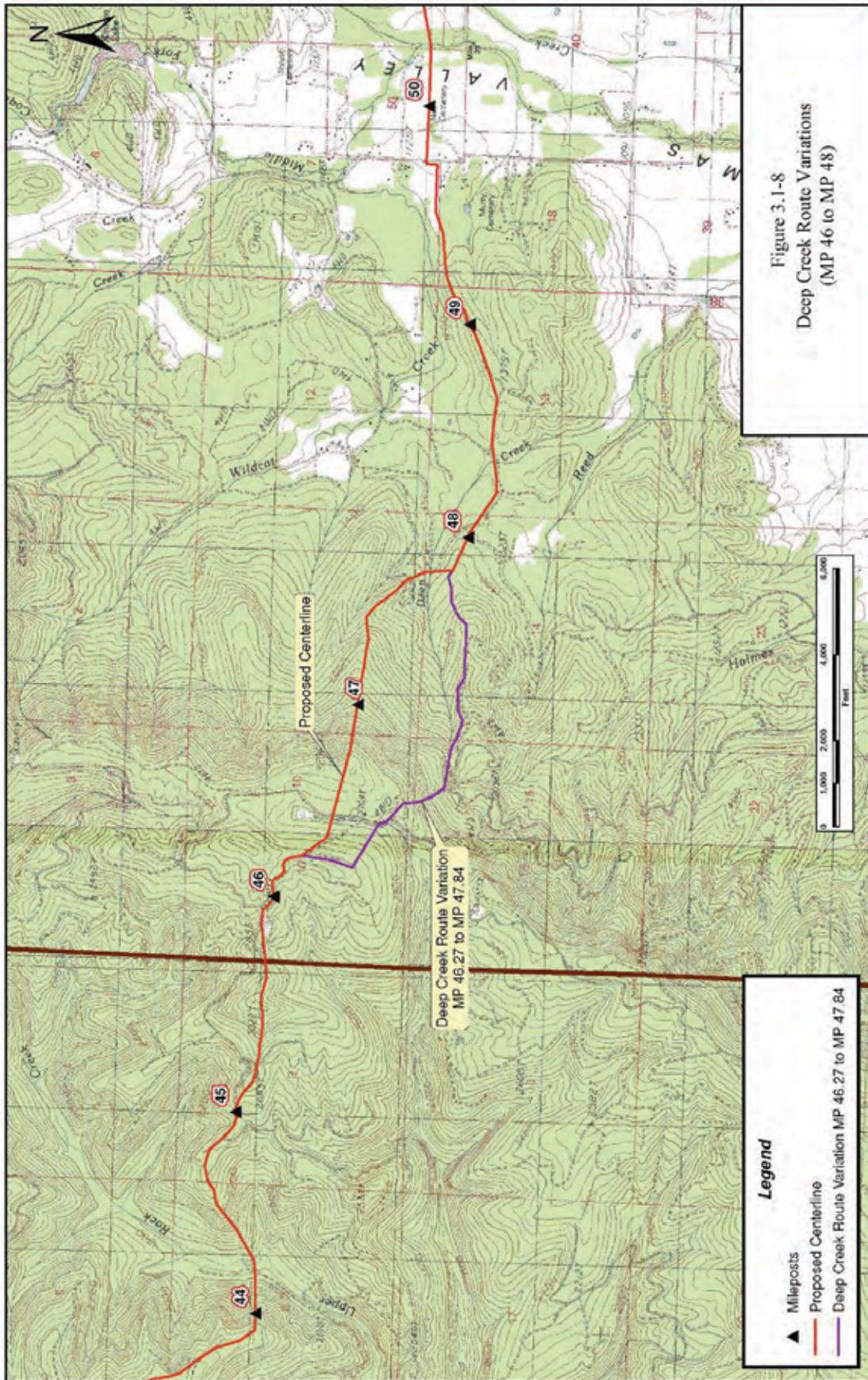
Deep Creek Route Variation (MP 46 to MP 48)

On November 30, 2007, the BLM requested that the FERC study an alternative route between MPs 46 and 48 to avoid habitat for marbled murrelet nesting sites and core areas for NSOs. In a December 14, 2007 data request, the FERC asked Pacific Connector to provide desktop data comparing the BLM suggested alternative route with the corresponding segment of proposed route (table 3.1.4.2-4 and figure 3.1-8).

The Deep Creek Route Variation would leave the proposed route just east of MP 46, follow existing 4-wheel drive trails for about 0.8 mile, go south of Deep Creek, and rejoin the proposed route just west of MP 48. This alternative would be 0.23 mile longer than the proposed route. It would cross one additional waterbody. Pacific Connector’s geologic hazard evaluation determined that this alternative segment is not a reasonable alternative due to the high risk of landslides and surface erosion where the alignment descends the eastern flank of Weaver Ridge through convergent slopes above a stream.

Alternatives Analysis	Proposed Route (MPs 46.27 – 47.84)	BLM Alternative T28S, R9W, Sec. 10, 14 & 15
Length (Miles)	1.57	1.80
Construction right-of-way (acres)	18.08	20.73
TEWAs (acres)	14.63	Not designed – estimated to be similar to proposed alignment based on topography.
Permanent Easement (acres) <u>a/</u>	10.70	12.79
Number of residences within 50 feet of construction right-of-way	0	0
Number of waterbodies crossed	1 <u>b/</u>	2 <u>c/</u>
Length of waterbody crossings (feet)	4.03 <u>b/</u>	Unknown <u>c/</u>
Number of wetlands crossed	1 <u>b/</u>	0 <u>d/</u>
Length of wetland crossings (feet)	35.42 <u>b/</u>	0 <u>d/</u>
Agricultural lands affected (acres)	0	0
Forest clearing (acres construction right-of-way) <u>e/</u>	9.67	9.33
Regenerating forest clearing (acres construction right-of-way) <u>e/</u>	8.41	11.40
Number of previously recorded cultural resources	1 – historic transportation feature	1 – historic transportation feature
Miles of right-of-way parallel or adjacent to existing rights-of-way (percent of alternative length)	0.38 (28 percent)	0.77 (43 percent)

a/ Acres of permanent easement calculated based on crossing length on private and federal timber lands. Pacific Connector proposes a 53-foot permanent easement on federal lands and a 60-foot permanent easement on private timber lands.
b/ Based on field surveys (see Table 2A-2 in Appendix 2A to Resource Report 2)
c/ From Pacific Northwest Hydrography Framework Clearinghouse data layers (<http://hydro.reo.gov/>). No waterbody widths are provided
d/ No wetlands are crossed on the BLM’s proposed alternatives based on NWI mapping.
e/ Includes recent clear-cut forests and areas of inroad construction where forest clearing would be reduced.



Camus Valley East Route Variation (MP 51 to MP 53)

On November 30, 2007, the BLM requested that the FERC study an alternative route near MP 52 to avoid habitat for marbled murrelet nesting sites and core areas for NSOs. In a December 14, 2007 data request, the FERC asked Pacific Connector to provide desktop data comparing the suggested alternative route with the corresponding segment of proposed route.

The BLM suggested variation would turn southeast from the proposed route just east of MP 51 and follow section lines and existing rights-of-way for about 1.2 miles, before rejoining the proposed route just west of MP 53. This variation would be about the same length as the corresponding segment of proposed route, but would follow an existing right-of-way for a longer distance. The variation would require less clearing of regenerating forest, and cross one less waterbody than the corresponding segment of proposed route. The route variation would be closer to one residence. Pacific Connector's geologic hazard evaluation did not identify significant differences between either route; however, the BLM identified route variation includes a Highway 42 crossing that would not be viable according to Pacific Connector. The highway crossing would be located in the midpoint of a mile-long section of highway fill approximately 80 feet deep. The highway crossing would also be at the same location as a tributary to Jim Bilieu Creek, which passes beneath the highway in a culvert.

Pacific Connector identified another potential variation in this area (Southern Route Variation) that would pass south of both its proposed route and the BLM identified Camus Valley East Route Variation. According to input received from Pacific Connector, this variation would have an acceptable crossing of Highway 42 and would avoid the occupied marbled murrelet stand. This route variation would begin east of MP 50 and would rejoin the current route near MP 53. It would cross Highway 42 in a level area and is constructible using conventional boring methods in an area with very little timber. The southern route variation is less than 0.1 mile longer than the corresponding segment of proposed route and no geologic hazards were identified along this route. These variations and the corresponding segment of the proposed route are compared in table 3.1.4.2-5 and figure 3.1-9.

The Southern Route Variation appears to have environmental and construction advantages over the BLM identified Camus Valley East Variation and the corresponding segment of proposed route. However, there would be four residences within 50 feet of the construction right-of-way. The corresponding segment of proposed route would not have any residences within 50 feet of the construction right-of-way and the BLM identified alternative route would have one. The Southern Route Variation appears to address the resource concerns of the BLM; therefore, **we recommend that:**

- **Before the end of the comment period for the draft EIS, Pacific Connector should incorporate the Southern Route Variation into its proposed route between approximately MPs 50.2 and 53.0, and file with the Secretary updated alignment sheets and resource tables for the new route, documentation of potential impacts on residences within 50 feet of the construction right-of-way, and measures to be implemented to mitigate those impacts.**

TABLE 3.1.4.2-5.

Comparison of the Camus Valley East Route Variations with the Corresponding Segment of Proposed Route (MP 52 to MP 53)

Impact/Issue	Proposed Route	BLM Alternative Segment	Southern Route Segment
Length (miles)	2.7	2.7	2.8
Construction right-of-way (acres)	31.3	31.6	32.2
TEWAs (acres)	14.5	Estimated to be similar to current segment	Estimated to be similar to current segment
Permanent easement (acres) <u>a/</u>	19.1	19.3	22.7
Number of residences within 50 feet of construction right-of-way	0	1	4 <u>b/</u>
Number of waterbodies crossed <u>c/</u>	4	3 <u>d/</u>	4 <u>d/</u>
Length of waterbody crossings (feet)	15.4	Unknown <u>d/</u>	Unknown <u>d/</u>
Number of wetlands crossed	1	0 <u>e/</u>	0 <u>e/</u>
Length of wetland crossings (feet)	2.1	0.0	0.0
Agricultural lands construction right-of-way (acres)	1.9	1.9	7.6
Forest clearing (acres)	14.0	13.9	10.6
Regenerating forest clearing (acres) <u>f/</u>	14.5	13.3	6.3
Number of previously recorded cultural resources	2 isolated finds 1, historic transportation	1 historic transportation	1 <u>g/</u>
Miles of right-of-way parallel or adjacent to existing rights-of-way	0.1	1.2	0.1

a/ Acres of permanent easement calculated based on crossing length on private and federal timberlands. Pacific Connector proposes a 53-foot permanent easement on federal lands. A 60-foot permanent easement on private timberlands and a 75-foot permanent easement on private lands.

b/ Based on field surveys.

c/ From Pacific Northwest hydrology framework clearinghouse data layers (<http://hydro.reo.gov/>). No waterbody widths are provided.

d/ Based on NWI mapping, no wetlands are crossed on BLM proposed alternative or the southern route segment alternative.

e/ Includes recent clearcut forest and areas of in-road construction, where forest clearing, would be reduced.

f/ The southern route segment alternative would avoid one site and two isolated finds on the current proposed route between MP 50.26 and MP 52.98.

g/ The construction right-of-way has not been designed. There are four unidentified structures in the vicinity of the southern route segment alternative that may be within 50 feet of the construction right-of-way. During the design process, Pacific Connector would attempt to locate all TEWAs 50 feet from any residents, where feasible. The southern route segment alternative would cross 13 parcels, compared to seven cross by the current proposed route between MP 50.26 and MP 52.98.

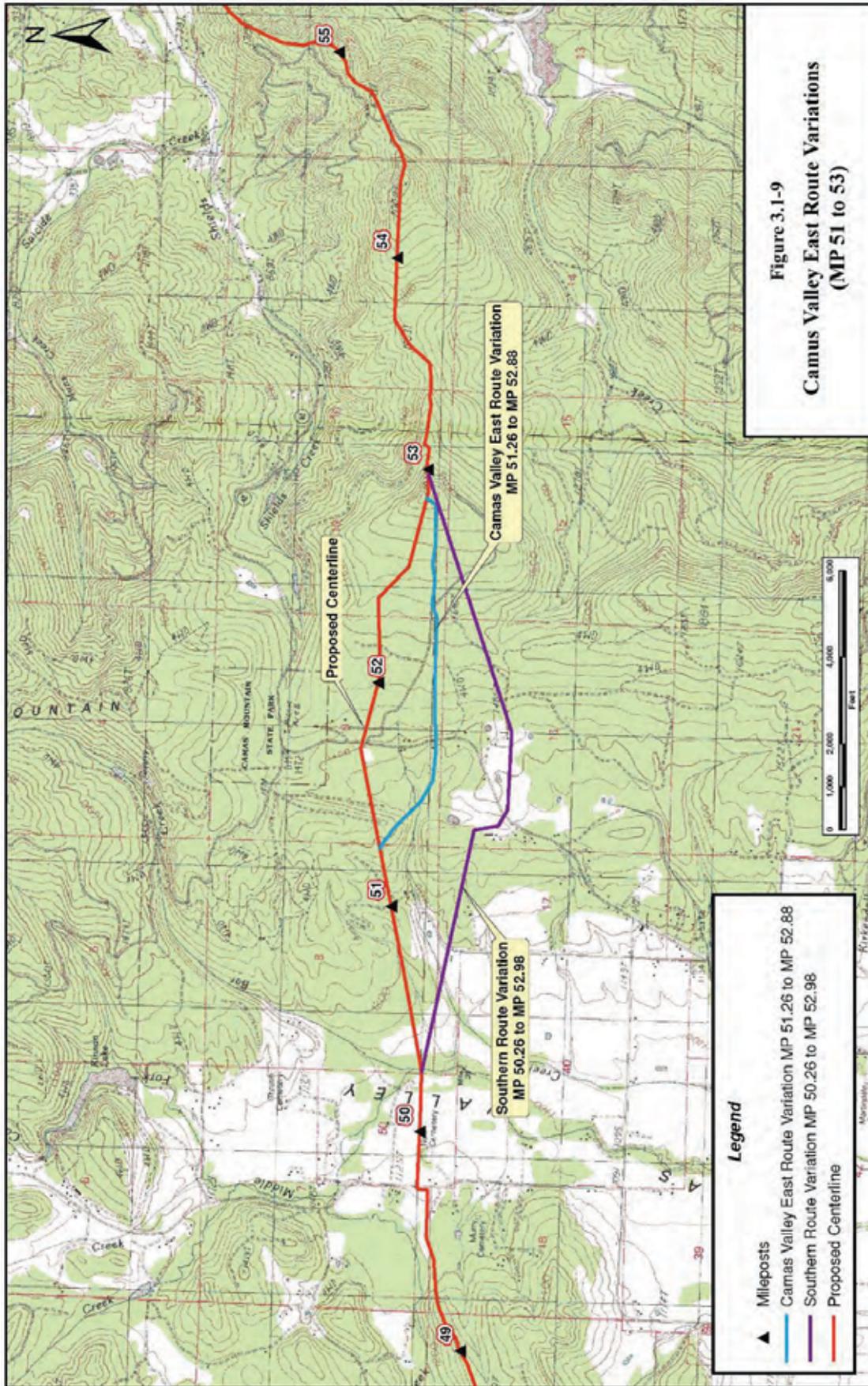
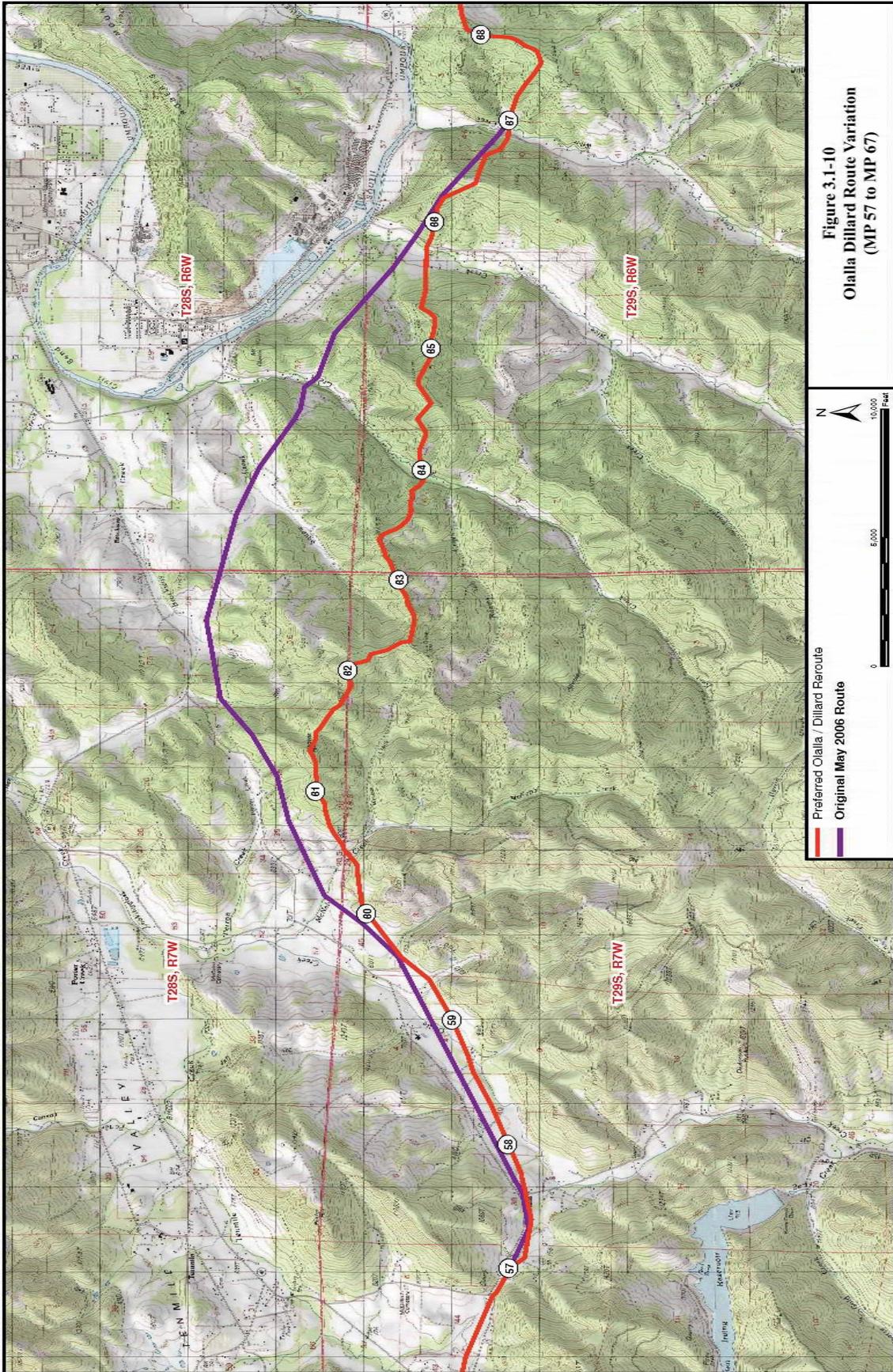


Figure 3.1-9
Camas Valley East Route Variations
(MP 51 to 53)

Olalla/Dillard Route Variation (MP 57 to MP 67)

The Olalla/Dillard Route Variation was the original route (May 2006) evaluated by Pacific Connector in the Olalla/Dillard area. During public scoping during the Pre-filing Process, and during meetings between Pacific Connector and some affected landowners, issues were identified in this area related to easement encumbrances, agricultural lands, domestic water supplies, and a proposed reservoir and subdivision. Pacific Connector evaluated a route change to avoid or minimize these issues by following forested ridgelines south of its original route. Pacific Connector has subsequently incorporated this route change into its proposed route. We evaluated the original route in this area as the Olalla/Dillard Route Variation. The variation would begin at approximately MP 57 of the proposed route and be located to the north of the proposed route (figure 3.1-10). It would closely follow the proposed route east and then northeast, crossing McNabb Creek near MP 59.1. At approximately MP 61.3, the variation would turn generally southeast. At this point it would be approximately 1.3 miles north of the proposed route. The Olalla/Dillard Route Variation would cross Kent Creek at approximately MP 63.1, Rice Creek near MP 64.4, and Willis Creek near MP 65.3. Shortly after crossing Willis Creek, the variation would connect with the proposed route near MP 67. The Olalla/Dillard Route Variation and the corresponding segment of the proposed route are compared in table 3.1.4.2-6.

The primary advantage of the Olalla/Dillard Route Variation is that it would be straighter and slightly shorter (0.2 mile) than the corresponding segment of proposed route, therefore affecting less acreage during construction. The primary disadvantage of the variation is that it would potentially conflict with land uses in the Dillard area, including a planned reservoir and subdivision, and residential water supplies, and would cross 20 more land parcels than the corresponding segment of the proposed route. The variation would also cross 21 more waterbodies and about 2,000 more feet of wetlands than the corresponding segment of the proposed route. We believe the disadvantages of the variation outweigh any advantages, and that the variation would not be environmentally preferable to the corresponding segment of proposed route. Therefore, we do not recommend use of the Olalla/Dillard Route Variation.



**Figure 3.1-10
Olalla Dillard Route Variation
(MP 57 to MP 67)**

TABLE 3.1.4.2-6

**Comparison of the Olalla/Dillard Route Variation With the
Corresponding Segment of Proposed Route (MP 57 to MP 67) a/**

Impact/Issue	Proposed Route	Olalla/Dillard Route Variation
General		
Total length (miles)	10.0	9.8
Acres of construction right-of-way <u>b/</u>	114.6	113.0
Number of TEWAs	63	Not designed <u>c/</u>
Acres of TEWAs	32.7	Not designed <u>c/</u>
Total acres of construction disturbance	147.3	113.1 <u>c/</u>
Acres affected during operations (permanent easement) <u>d/</u>	90.5	89.3
Landowner parcels crossed	51	71
Number of residences within 50 feet of construction right-of-way	0	0
Land ownership (miles)		
Private	8.9	9.6
State	0.0	0.0
Federal (BLM/-USFS lands)	1.1	0.3
Geotechnical		
Miles of steep or difficult terrain to be crossed <u>e/</u>	0.4	0.8
Waterbodies and Wetlands <u>f/</u>		
Number of waterbodies crossed <u>g/</u>	18	39 <u>g/</u>
Total waterbody crossing length <u>h/</u>	410	N/A <u>f/</u>
Number of wetlands crossed	11	11 <u>i/</u>
Total wetland crossing length (feet)	743	2,763
Total wetland disturbance during construction (acres)	1.2	1.6
Land Use		
Agricultural land affected (miles)	2.6	4.8
Forest lands affected (miles) <u>j/</u>	5.2	3.9
Miles of right-of-way that would be parallel or adjacent to existing rights-of-way	3.9	1.6
Cultural Resources		
Number of previously identified cultural resources along route	0	0
Number of newly identified cultural resources along route	5	1 <u>f/</u>
Critical Habitat		
Acres of critical habitat for federal or state listed threatened or endangered species	0	0

a/ Mileposts were computed from topographic maps.

b/ The construction right-of-way for both the proposed route and Olalla/Dillard Route Variation is 95 feet.

c/ TEWAs for the Olalla/Dillard Route Variation have not been designed and are not included in the total acres of disturbance. The need for these TEWAs would be similar to the proposed route.

d/ The assumed permanent easement for both the proposed route and Olalla/Dillard Route Variation is 75 feet.

e/ Based on slopes that are greater 50 percent (based on 10-meter DEM). However, Pacific Connector has routed the alignment to ensure constructability, safety and long-term stability by avoiding side slopes and approaching slopes with the alignment obliquely or perpendicularly to the slope.

f/ Surveys are incomplete.

g/ Waterbodies from PNW Hydrography Framework Clearinghouse.

h/ Based on review of aerial photos, topographic maps, and LiDAR data.

i/ Based on NWI coverages and photo interpretation.

j/ Includes all forestland types: Evergreen Forest, Mixed Conifer, Regenerating Forests and Clearcuts.

Miller Route Variation (MP 59 to MP 60)

In a letter dated January 28, 2007, Barbara Miller requested a re-route across property owned by Bernadeane Perron because of concerns about the proposed route crossing steep terrain prone to mass-wasting and landslides. In a June 2, 2008 data request, we asked Pacific Connector to address Ms. Miller's concerns. Pacific Connector responded with a filing on June 23, 2008 that indicated that its originally proposed pipeline route in May 2006 (Olalla/Dillard Variation discussed above) was mainly aligned along the bottom of Olalla Valley. However, in response to public comments, Pacific Connector changed the route between MPs 57 and 67 in its September 2007 application. The current proposed route minimizes impacts on easement encumbrances by traversing through timberlands along ridgelines away from agricultural fields and rural residences. Pacific Connector did not indicate that the proposed route was unbuildable, or that it could not mitigate for any potential landslide hazards. The proposed pipeline has been routed along stable toeslopes of the Olalla Valley between MPs 59 and 60. Pacific Connector provided a Geologic Hazards Report with its application that indicated that the potential RML deposits traversed by the proposed alignment between MPs 59 and 60 (as mapped in Hofmeister et al. 2002) would be within depositional zones of less than 16 percent slopes that should not be a hazard to the construction and operation of the buried pipeline. As stated above, we do not recommend the use of the Olalla/Dillard Route Variation.

Hoover Hill Route Variation (MP 61)

In a letter dated October 19, 2006, the City Council of the city of Winston, Oregon requested that the FERC consider alternative pipeline routes to avoid visual impacts on Hoover Hill, which is considered a prominent local topographic landmark. We asked Pacific Connector to address this issue in a June 2, 2008 data request. In response, on June 23, 2008, Pacific Connector made a filing that indicated that the proposed route over Hoover Hill, included as part of its September 2007 application, was developed in response to public comments on the original route filed in May 2006 (Olalla/Dillard Route Variation). The pipeline in the vicinity of Hoover Hill would be about 4 miles away from the city of Winston. The alignment traverses a forested ridge crest perpendicular to Winston, and Pacific Connector contends that pipeline should not be visible from within the city limits. Pacific Connector claims that traffic traveling on Hoover Hill Road north of Hoover Hill, and traffic on a private dead-end drive south of Hoover Hill would not have clear unobstructed views of the pipeline right-of-way because the roads parallel the pipeline route, and are about 700 feet below the crest of Hoover Hill. Visibility of the pipeline from private McNabb Creek Road west of Hoover Hill would be limited due to turns in the proposed alignment. As mentioned above, we do not recommend use of the Olalla/Dillard Route Variation.

McConnell Route Variation (MP 69.7 to MP 69.8)

In filings made on January 29, 2007, Marc and Dea McConnell proposed that the pipeline route be moved off their property, which they state is being developed into 2-acre parcels for residential homes. They suggest that one alternative would be to route the pipeline across the property directly south of their land because it is zoned for grazing. They contend that a pipeline is better suited to land zoned for grazing than it is to their property, which is zoned for rural residential, 2-acre minimum parcels. The landowners contend that the proposed route would permanently affect three of the 2-acre parcels, negatively affecting their market value. The

Douglas County Planning Department indicates that the McConnells submitted a request to subdivide their property into three parcels (4.81, 2.00, and 2.00 acres respectively) and that this request was finalized on June 13, 2007. However, the Planning Department also indicates that development plans have not been submitted (personal communication, June 30, 2008). While the property is zoned Rural Residential, these parcels do not contain residences. To ensure that impact on potential future development of this property is minimized to the extent possible, we **recommend that:**

- **Pacific Connector should consult with the landowners at MP 69.7 to 69.8 to identify ways to reduce potential impacts on future development of their property. Pacific Connector should file the results of this landowner consultation with the Secretary, before the end of the comment period on the draft EIS.**

Wood Creek/Days Creek Route Variation (MP 82.7 to MP 89.2)

The Wood Creek/Days Creek Route Variation is the original route (May 2006) evaluated by Pacific Connector in the Wood Creek/Days Creek area. As a result of meetings between Pacific Connector and affected landowners conducted during centerline surveys of the original May 2006 route, as well as comments received during the Pre-filing scoping process, a number of potential issues were identified along the original route in this area. Issues included potential impacts to shallow ground and surface water systems in the Days Creek areas and Green Gulch area, and well as easement encumbrances on residences in the Days Creek area. As a result, Pacific Connector identified a route change in this area to minimize these potential impacts by traversing primarily timberlands and minimizing the crossing of rural pasture lands and rural residences. Pacific Connector subsequently incorporated the revised route into its proposed route. We evaluated the original route in this area as the Wood Creek/Days Creek Route Variation.

The variation would begin at approximately MP 82.7 of the proposed route and be located to the south of the proposed route. The variation would follow a generally southern route for approximately 0.5 mile and then turn southeast, crossing Wood Creek, and then turn northeast and then turn southeast, and east before crossing Days Creek. The variation would rejoin the proposed route shortly after crossing Days Creek at MP 89.2 (figure 3.1-11). The alternative and the corresponding segment of the proposed route are compared in table 3.1.4.2-7.

The primary advantage of the Wood Creek/Days Creek Route Variation is that it would be straighter and slightly shorter (0.5 mile) than the corresponding segment of proposed route, therefore affecting less acreage during construction. The variation would also cross about 2 miles less federally administered land, 1.6 miles less forested land, would not cross the Oregon Women's Land Trust (OWL) Farm, and would cross four less identified cultural resource sites than the corresponding segment of proposed route. The primary disadvantage of the variation is that it would potentially impact private water supplies in the Wood Creek and Days Creek area, and would cross 7 more private land parcels than the corresponding segment of the proposed route. The variation would also cross eight more waterbodies, about 2,000 feet more wetlands, and about 0.8 mile more agricultural land than the corresponding segment of the proposed route.

We believe the disadvantages of the variation outweigh any advantages, and that the variation would not be environmentally preferable to the corresponding segment of proposed route. Therefore, we do not recommend use of the Wood Creek/Days Creek Route Variation.

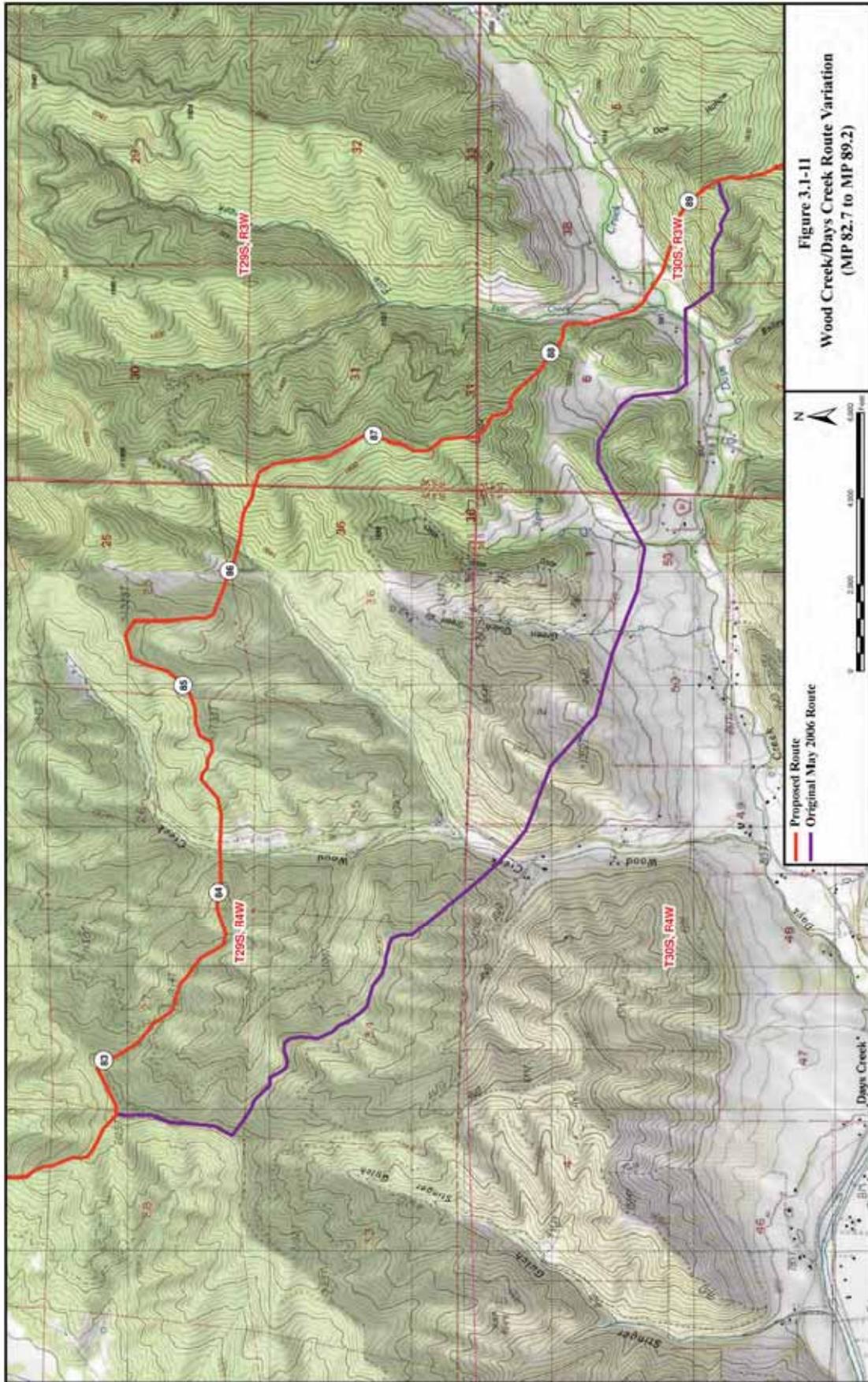


Figure 3.1-11
 Wood Creek/Days Creek Route Variation
 (MP 82.7 to MP 89.2)

TABLE 3.1.4.2-7

**Comparison of the Wood Creek/Days Creek Route Variation with the
Corresponding Segment of Proposed Route (MP 82.7 to MP 82.2) a/**

Impact/Issue	Proposed Route	Wood Creek/Days Creek Route Variation
General		
Total length (miles)	5.8	5.3
Acres of construction right-of-way <u>b/</u>	67.3	60.9
Number of TEWAs	33	Not designed <u>c/</u>
Acres of TEWAs	50.6	Not designed <u>c/</u>
Total acres of construction disturbance	117.8	60.91 <u>c/</u>
Acres affected during operations (permanent easement) <u>d/</u>	53.1	48.1
Landowner parcels crossed	21	28
Number of residences within 50 feet of construction right-of-way	0	0
Land ownership (miles)		
Private	3.8	5.2
State	0.0	0.0
Federal (BLM/USFS Lands)	2.1	0.1
Geotechnical		
Miles of steep or difficult terrain to be crossed <u>e/</u>	0.3	0.3
Waterbodies and Wetlands <u>f/</u>		
Number of waterbodies crossed	6	14 <u>g/</u>
Total waterbody crossing length <u>h/</u> (feet)	101.9	N/A <u>f/</u>
Number of wetlands crossed	1	4
Total wetland crossing length (feet)	0	2,060 <u>i/</u>
Total wetland disturbance during construction. (acres)	0.0	2.2
Land Use		
Agricultural land affected (miles)	0.4	1.2
Forest lands affected (miles) <u>j/</u>	4.8	3.2
Miles of right-of-way that would be parallel or adjacent to existing rights-of-way	2.7	1.5
Cultural Resources		
Number of previously identified cultural resources along route	0	0
Number of newly identified cultural resources along route	5	2 <u>f/</u>
Critical Habitat		
Acres of federally listed critical habitat for the NSO	0	0
NSO activity center	1 - BLM delineated 1 - ½ mile buffer of site	1 - BLM delineated
<p><u>a/</u> Mileposts correspond with topographic maps provided in Appendix D.</p> <p><u>b/</u> The construction right-of-way for the preferred route and route alternative is 95 feet.</p> <p><u>c/</u> TEWAs for the route alternative have not been designed and are not included in the total acres of disturbance. Pacific Connector assumes that the need for these TEWAs would be similar to the proposed route.</p> <p><u>d/</u> The assumed permanent easement for both the proposed route and route alternative is 75 feet.</p> <p><u>e/</u> Based on slopes that are greater 50 percent (based on 10-meter DEM). However, Pacific Connector has routed the alignment to ensure constructability, safety, and long-term stability by avoiding side slopes and approaching slopes with the alignment obliquely or perpendicularly to the slope.</p> <p><u>f/</u> Surveys are incomplete.</p> <p><u>g/</u> Waterbodies from PNW Hydrography Framework Clearinghouse.</p> <p><u>h/</u> Based on review of aerial photos, topographic maps, and LiDAR data.</p> <p><u>i/</u> Based on NWI coverages and photo interpretation.</p> <p><u>j/</u> Includes all forestland types: Evergreen Forest, Mixed Conifer, Regenerating Forests, and Clearcuts.</p>		

Oregon Women’s Land Trust Route Variation (MP 85.4 to MP 86.4)

The Oregon Women’s Land Trust identified a potential route variation that would avoid an existing guest house on their land. The route variation as suggested by the Oregon Women’s Land Trust is shown in figure 3.1-12. The variation would direct the pipeline through the northern portion of the property, eliminating two crossings of tributaries to Wood Creek and the guest house. The alternative route would be 0.6 mile longer than the corresponding segment of proposed route and would cross an historical NSO activity center; however, this activity center has been inactive for more than a decade and has been retired by resource and land management agencies. Since permission has not been granted to Pacific Connector to survey the area, only a desktop and aerial review has been completed. Pacific Connector met with the landowners to discuss the potential variation and has stated it will continue to work with them to evaluate the pipeline crossing of the property. Therefore, **we recommend that:**

- **Before the end of the comment period of the draft EIS, Pacific Connector should file with the Secretary documentation of consultations with the Oregon Women’s Land Trust, and updated alignment sheets and resource tables for any pipeline route changes resulting from those consultations.**

Wildcat Ridge/Long Prairie and Forest Road 3200 Route Variations (MP 105 to MP 112)

Pacific Connector’s original pipeline route (May 2006) followed Wildcat Ridge in a generally southeastern direction until approximately MP 108.5, where it would turn east along the edge of an LSR for approximately 0.5 mile before turning southeast and crossing Long Prairie. This route variation would rejoin the currently proposed route near MP 111.5. The Wildcat Ridge/Long Prairie Route Variation is shown on figure 3.1-13. The Umpqua National Forest proposed an alternative route through this area that would generally follow existing Forest Road 3200. In the opinion of the USFS, following this existing road corridor would minimize forest fragmentation and other effects on the South Umpqua River/Galesville LSR RO223, as well as NSO critical habitat units (CHUs), and would also avoid cultural resource concerns at Long Prairie, and minimize impacts on Riparian Reserves. By placing the pipeline within the road corridor, the USFS seeks to avoid impacts on existing undisturbed areas with the LSR and CHU. This routing would also avoid crossing the East Fork of Cow Creek, as well as the streams and wetlands at its headwaters.

Pacific Connector studied the USFS alternative, and for the reasons discussed below decided on a compromise route, that is the currently proposed route. We considered both the original Wildcat Ridge/Long Prairie Route Variation and the Forest Road 3200 Route Variation as potential alternatives to the corresponding segment of proposed route.

We do not recommend use of the originally proposed Wildcat Ridge/Long Prairie Route Variation because of concerns raised by the USFS and the Cow Creek Tribe about potential impacts on an area considered to be an important traditional cultural property. There were also concerns raised by the USFS about potential impacts this route variation may have on a LSR.

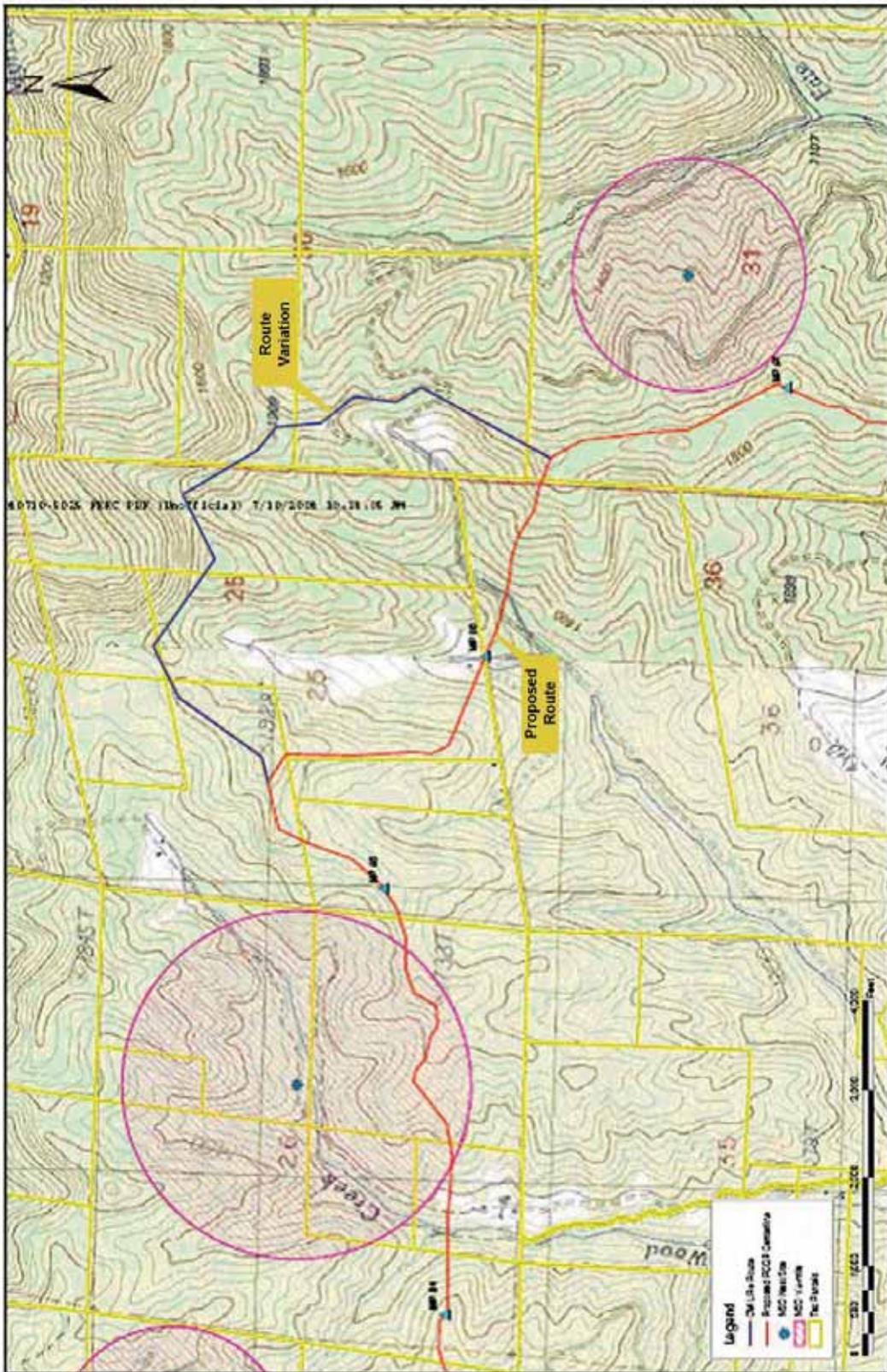


Figure 3.1-12
Oregon Women's Land Trust Route Variation
(MP 85.4 to MP 86.4)



Pacific Connector determined that use of the Forest Road 3200 route variation was not feasible because of constructability issues, including:

- High risk of landslide occurrence due to headwall swales and from constructed fill slopes;
- Earthwork necessary to construct a 95-foot-wide construction right-of-way on side slopes exceeding 70 percent along the variation is considered infeasible for geotechnical reasons;
- Steep side slopes (greater than 50 percent) require significant excavations to construct a 95-foot-wide construction corridor. Based on anticipated range of excavation, the cutslope would be between approximately 100 and 135 feet in height, and the excavation would extend at least 50 feet upslope of the existing cutslope; and
- Up to 25,000 cy of excavation material would be generated for every approximately 100 feet of right-of-way along the steep slopes.

Subsequently, the USFS commented that the compromise route would cross an area planned for expansion of the Peavine rock quarry. The Peavine quarry is the largest and most extensively developed quarry within the upper reaches of the watershed and is of strategic importance to the Umpqua National Forest. Therefore, the USFS suggested a minor route variation. The pipeline right-of-way alignment, as currently proposed uses Forest Road 3232. Several hundred feet to the northwest of the quarry in order to avoid crossing the rock quarry development area, the pipeline right-of-way would need to shift south between MP 110.7 and 111.1. The USFS has requested that Pacific Connector complete the necessary environmental and engineering field investigations to accommodate this shift. In a data response filed June 23, 2008, Pacific Connector indicated that it is still working with the USFS on potential routing options between about MPs 109 and 111 that would allow for the future expansion of the Peavine rock quarry and reduce impacts on NSO habitat in this area. Therefore, **we recommend that:**

- **Pacific Connector should continue to work with the USFS to identify a preferred route for the segment of the pipeline in the area of Peavine quarry between about MPs 109 to 111. Before the end of the comment period on the draft EIS, Pacific Connector should file with the Secretary the results of this additional consultation and updated alignment sheets and resource tables for any pipeline route changes resulting from those consultations.**

The Wildcat Ridge/Long Prairie Route Variation is compared to the corresponding segment of the proposed route in table 3.1.4.2-8.

TABLE 3.1.4.2-8

Comparison of the Wildcat Ridge/Long Prairie Variation with the Corresponding Segment of Proposed Route (MP 105 to MP 112) a/

Impact/Issue	Wildcat Ridge/Long Prairie Variation	Proposed Route
General		
Total length (miles)	6.4	6.7
Acres of construction right-of-way <u>b/</u>	73.2	76.8
Number of TEWAs	Not designed but estimated to be less than the proposed route <u>c/</u>	55
Acres of TEWAs	Not designed but estimated to be less than the proposed route <u>c/</u>	39.8
Total acres of construction disturbance	73.2 <u>c/</u>	116.6
Number of UCSAs	Not designed <u>c/</u>	2
Acres of UCSAs	Not designed <u>c//</u>	5.1
Acres affected during operations (permanent easement) <u>d/</u>	38.5	
Land ownership (miles)		
	USFS	6.7
	Private	0.0
	State	0.0
Geotechnical		
Miles of steep or difficult terrain to be crossed <u>e/</u>	0.1	0.4
Waterbodies and Wetlands <u>f/</u>		
Number of waterbodies crossed <u>g/</u>	0	6
Total waterbody crossing length <u>h/</u> (feet)	0	45
Number of wetlands crossed <u>h/</u>	0	5
Total wetland crossing length <u>i/</u> (feet)	0	328
Total wetland disturbance during construction (acres)		0.3
Land Use		
Land allocations (miles)		
	Matrix	3.3
	LSR	3.4
	Riparian Reserves	0.2
Evergreen Forest, Mixed Conifer	3.1	3.9
Regeneration Forest (miles)	2.7	2.3
Clearcuts (miles)	0.1	0.00
Total forest lands affected (miles)	5.9	6.2
Other land use types	0.4	0.5
Miles of right-of-way that would be parallel or adjacent to existing rights-of-way	5.4	
Cultural Resources		
Number of previously identified cultural resources along route	3	0
Number of newly identified cultural resources along route	1	1
Critical Habitat		
Acres of federally listed critical habitat for NSO <u>j/</u>	33.8	33.4
NSO activity center	1 - ½ mile buffer of site	1 - ½ mile buffer of site
<p><u>a/</u> Mileposts correspond with topographic maps provided in Appendix 2-1.</p> <p><u>b/</u> The construction right-of-way for the proposed route and alternative route is 95 feet.</p> <p><u>c/</u> TEWAs for the alternative route have not been designed and are not included in the total acres of disturbance. Pacific Connector estimates that the number and acres of these would be less than those required for the proposed route because the alternative route does not cross any streams or have the length of slope crossings as does the proposed route.</p> <p><u>d/</u> The assumed permanent easement for both the proposed route and alternative route is 50 feet; however, Pacific Connector will only maintain vegetation within 15 feet of the pipeline centerline for a total of 30 feet in the long-term.</p> <p><u>e/</u> Based on slopes that are greater than 50 percent (based on 10-meter DEM). However, Pacific Connector has routed the alignment to ensure constructability, safety, and long-term stability by avoiding side slopes and approaching slopes with the alignment obliquely or perpendicularly to the slope.</p> <p><u>f/</u> Surveys are incomplete.</p> <p><u>g/</u> Waterbodies from PNW Hydrography Framework Clearinghouse.</p> <p><u>h/</u> Based on review of aerial photos, topographic maps and LiDAR data.</p> <p><u>i/</u> Based on NWI coverages and photo interpretation.</p> <p><u>j/</u> Includes acres of impact associated with the construction right-of-way and TEWAs.</p>		

C-2 Cattle Company Variation (MP 142 to MP 148)

On February 8, 2008, the C-2 Cattle Company (C-2) filed a motion for late intervention. In that filing, C-2 indicated that although they thought they had negotiated an acceptable pipeline route across 7 miles of their lands that would avoid adverse impacts to irrigated fields and conservation easements, the proposed route filed by Pacific Connector in September 2007 did not reflect those negotiated changes. Therefore, C-2 identified two potential route variations. One route variation would follow Salt Creek Road to Highway 140 and avoid C-2's ranch lands and conservation easements entirely. The other route variation would still be on C-2 ranch lands, but would avoid most forested lands, irrigated fields, and conservation easements.

On March 4, 2008, Pacific Connector filed a new route alternative across the C-2 ranch, based on desktop data, that it believes would reduce impacts on irrigated pasture, forest, and conservation easements. We have analyzed that variation in this EIS as the C-2 Cattle Company Variation. Table 3.1.4.2-9 includes a comparison of environmental features between the C-2 Cattle Company Variation and the corresponding segment of proposed route based on available data. Once survey permission was granted, Pacific Connector met with C-2 to discuss the alternative alignment. Based on its discussions with C-2, Pacific Connector has stated that it will further refine its proposed route between MPs 144.2 and 145.13.

We believe that the C-2 Cattle Company Variation between MPs 142 and 148 is environmentally preferable to the corresponding segment of proposed route. Therefore, **we recommend that:**

- **Pacific Connector should incorporate the C-2 Cattle Company Variation into its proposed route between approximately MPs 142 and 148, and file with the Secretary updated alignment sheets and resource tables for the new route, together with documentation of consultations with C-2, before the end of the comment period on the draft EIS.**

Impact/Issue	Proposed Route	C2 Cattle Company Variation
Length (miles)	0.93	1.31
Construction right-of-way (acres)	10.71	12.67
TEWAs (acres)	2.19	Not designed but expected to be slightly more than the proposed route because of acute PIs, side slopes, and topsoil requirements
Permanent easement (acres)	6.45	11.91
Number of residences within 50 feet of the construction right-of-way	0	0
Number of waterbodies crossed <u>a/</u>	5 (2 perennial/3 ditches)	4 (2 perennial/2 ditches)
Length of waterbody crossings (feet) <u>a/</u>	39.24	28.00
Number of wetlands crossed <u>a/</u>	1	0
Wetlands affected (acres)	0.03	0
Agricultural lands affected (feet) <u>b/</u>	1,631	1,558
Forest/woodland clearing (acres of construction right-of-way)	3.94	4.72
Number of previously recorded cultural resources	1	1, survey not completed
Miles of right-of-way parallel or adjacent to existing rights-of-way	0.14	0

a/ From Pacific Connector wetland and waterbody surveys (see Table 2A-3 in Appendix 2A to Resource Report 2) and Pacific Northwest Hydrography Framework Clearinghouse data layers (<http://hydro.reo.gov/>). The crossing widths on the Requested Alignment are based on photo interpretation.

b/ Analysis based on photo interpretation of irrigated pastures. However, all areas of the ranch are assumed to be grazing lands.

Robinson Butte to Burton Butte/Forest Service Roads Route Variation (MP 155 to MP 169)

In August 2006, the USFS requested that the FERC study an alternative route over portions of the Rogue River-Siskiyou and Fremont-Winema National Forests. Our analysis below discusses the original route identified by Pacific Connector in May 2006 (Alternative 1), the USFS suggested route variation, mostly following existing Forest Service roads (Alternative 2), and the corresponding segment of proposed route, which is a compromise route subsequently identified by Pacific Connector. Each of these routes is shown on figure 3.1-14. Alternatives 1 and 2, and the corresponding segment of the proposed route, are compared in table 3.1.4.2-10.

The route originally identified by Pacific Connector in May 2006 would deviate from the currently proposed route at about MP 155, and remain south of it on the south side of Robinson Butte near MP 159. From that point southeastwardly, Alternative 1 would closely follow the proposed route but would be straighter and cross through older forests, which provide spotted owl habitat. As with the proposed route, Alternative 1 would cross Big Elk Road, cross northeast of Cox Butte, and would cross Daley Prairie. The original route would cross into Klamath County and rejoin the proposed route near MP 169.

Alternative 1 would be about a mile shorter than the corresponding segment of proposed route. The route variation would cross more waterbodies and wetlands, and would affect more forest. The corresponding segment of proposed route would be adjacent to existing rights-of-way to a greater extent.

The USFS suggested route variation, labeled Alternative 2, would leave the proposed route within the Rogue River National Forest in Jackson County, Oregon at about MP 155, north of Grizzly Canyon, and head east along Forest Service Roads 410 and 300, around the south side of Robinson Butte along Forest Service Road 3730, south of Big Elk Guard Station along Forest Service Road 3705, across the South Fork Little Butte Creek, turn east along Forest Service Road 3720, entering Klamath County, to Forest Service Road 700, cross the Pacific Crest National Scenic Trail several miles south of Brown Mountain, then head southeast cross-county into the Winema National Forest, across Dead Indian Memorial Highway, and would rejoin the proposed route along Clover Creek Road north of Burton Butte just east of MP 169. The variation would avoid clearing a new corridor, reducing forest fragmentation and habitat loss in the Dead Indian LSR RO227. Also, this alternative would cross the Pacific Crest Trail along an existing road, reducing potential impacts to trail users by eliminating a separate crossing. The USFS suggested variation would be about 3 miles longer than the original route and would require widening the existing roads, which are generally between 20 and 30 feet wide. This would require cutting mature forest in portions of the right-of-way.

Pacific Connector studied the USFS suggested variation and determined that the alignment was feasible for the most part, except where it followed tight radius road curves. In late September 2006, Pacific Connector met with the USFS to discuss the variation, as well as to explain project construction requirements. As a result of consultations with the USFS, Pacific Connector modified its original May 2006 route to adopt segments of the USFS suggested variation, and incorporated the modified route into its proposed route as filed with the Commission on September 4, 2007. The compromise route made further adjustments to the alignment to minimize side slope construction and extra work area requirements, and to avoid a wetland

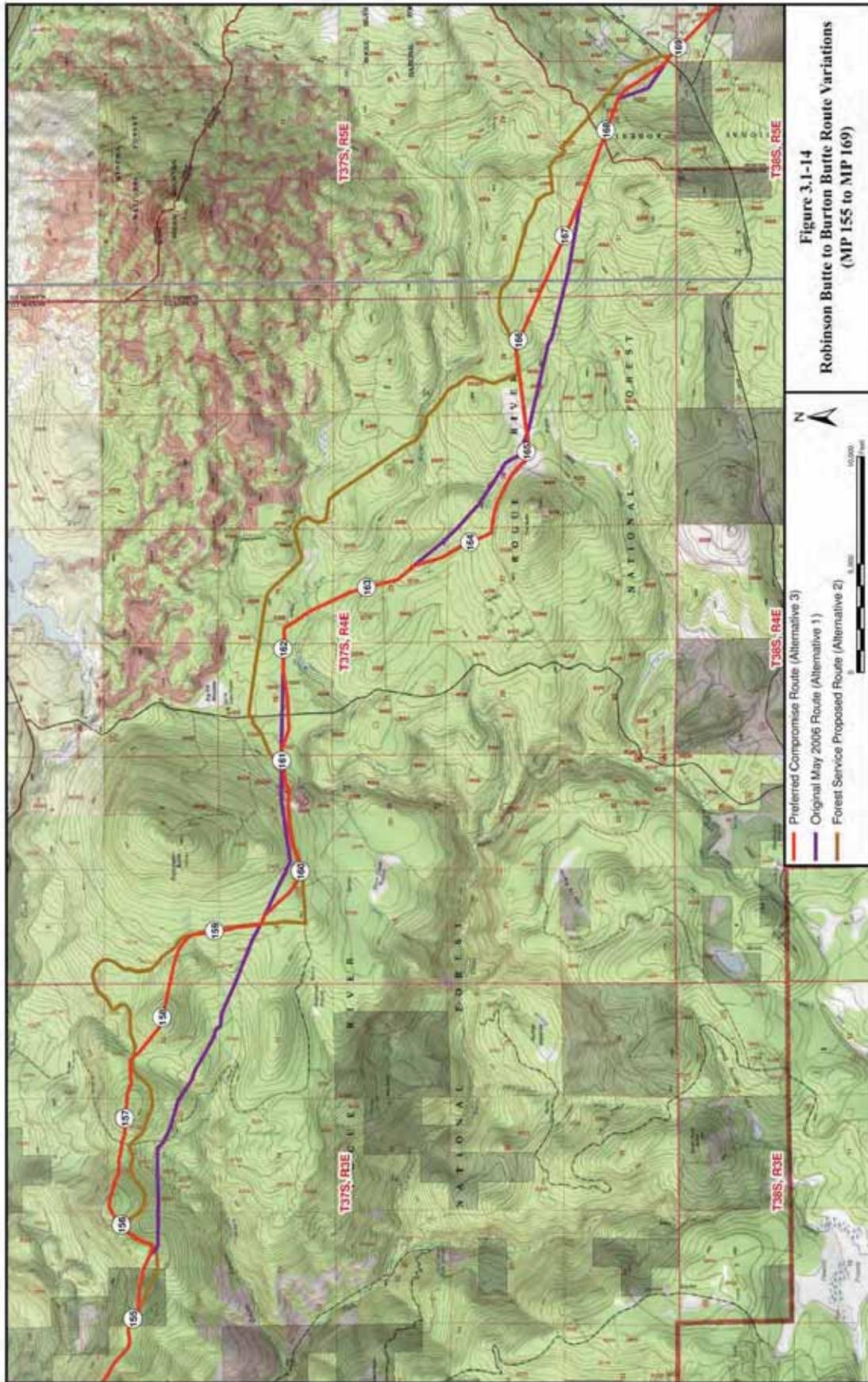


TABLE 3.1.4.2-10

**Comparison of Robinson Butte to Burton/Forest Service Roads Variations with the
Corresponding Segment of Proposed Route (MP 155 to MP 169) a/**

Impact/Issue		Original Route (Alternative 1)	USFS Suggested Variation (Alternative 2)	Proposed Route
General				
Total Length (miles)		12.9	15.7	13.8
Acres of construction right-of-way <u>b/</u>		148.0	180.4	159.4
Number of TEWAs		Not designed, but estimated to require more than the proposed route <u>c/</u>	Not designed <u>d/</u>	61
Acres of TEWAs		Not designed, but estimated to require more than the proposed route <u>c/</u>	Not designed <u>d/</u>	49.7
Total acres of construction disturbance		148.0 <u>c/</u>	180.4 <u>d/</u>	209.1
Number of UCSAs		Not designed <u>e/</u>	Not designed <u>e/</u>	45
Acres of UCSAs		Not designed <u>e/</u>	Not designed <u>e/</u>	73.0
Acres affected during operations (permanent easement) <u>f/</u>		77.9	95.0	83.9
Land Ownership (miles)	USFS	11.5	14.3	12.5
	Private	0.5	0.6	0.5
	State	0.0	0.0	0.0
Geotechnical				
Miles of steep or difficult terrain crossed <u>g/</u>		0.00	0.00	0.00
Waterbodies and Wetlands				
Number of waterbodies crossed <u>h/</u>		11	8	6
Total waterbody crossing length (feet) <u>i/</u>		1,317 <u>j/</u>	N/A <u>k/</u>	N/A <u>k/</u>
Number of wetlands crossed		3	N/A <u>k/</u>	1
Total wetland crossing length (feet) <u>l/</u>		422	N/A <u>k/</u>	56
Total wetland disturbance during construction (acres)		0.7	N/A <u>k/</u>	0.1
Land Use				
Land allocations (miles)	Matrix	0.0	0.0	0.0
	LSR	11.5	14.3	12.5
	Riparian	1.5	1.1	0.4
	Reserves			
Evergreen Forest, Mixed Conifer		6.8	6.0	6.1
Regeneration Forest (miles)		5.9	5.4	5.6
Clearcuts (miles)		0.1	0.0	0.3
Total Forest lands affected (miles)		12.8	11.4	12.0
Other land use types (including Transportation)		0.1	4.3	1.8
Miles of right-of-way that would be parallel or adjacent to existing rights-of-way		1.6	14.0	4.4
Recreation				
Pacific Crest Trail (PCT)		Mitigation required - See section 4.7.3.6.	PCT would be crossed within existing Forest Road (FR# 700) corridor	Mitigation required - See section 4.7.3.6.
Brown Mountain Trail and Trailhead		No impacts	During construction, trailhead area and trail section would be relocated or closed and later reconstructed and mitigated.	No impacts

TABLE 3.1.4.2-10

Comparison of Robinson Butte to Burton/Forest Service Roads Variations with the Corresponding Segment of Proposed Route (MP 155 to MP 169) a/

Impact/Issue	Original Route (Alternative 1)	USFS Suggested Variation (Alternative 2)	Proposed Route
South Brown Mountain Shelter	No direct impacts – construction activities would be audible from the shelter.	No direct impacts – construction activities would be audible from the shelter. This alternative is closer than the other two routes.	No direct impacts – construction activities would be audible from the shelter.
Visual Impacts along existing Forest roads	Minimal except at existing road crossings	Existing road corridors expected to be significantly altered from 95-foot construction footprint along 13.6 miles of Forest roads.	Minimal except where parallel to existing roads (i.e., 4.4 miles)
Cultural Resources			
Number of previously identified cultural resources along route	1	0 <u>k/</u>	1
Number of newly identified cultural resources along route	0 <u>k/</u>	0 <u>k/</u>	0
Critical Habitat			
Acres of federally listed critical habitat for the NSO <u>m/</u>	148.0	180.3	159.4
NSO activity center	2 - ½ mile buffer of site	2 - ½ mile buffer of site	2 - ½ mile buffer of site
<u>a/</u> Mileposts were calculated from topographic maps.			
<u>b/</u> The construction right-of-way for the proposed route and original proposed alignment is 95 feet.			
<u>c/</u> Pacific Connector estimates that the original route would likely require more TEWAs compared to the proposed route because of side slope construction between approximately MPs 149.0 and 152.9, and because of the increased number of stream crossings along the original route.			
<u>d/</u> TEWAs have not been designed for this route and are not included in total construction work area requirements.			
<u>e/</u> TEWAs for the original route have not been designed and are not included in the total acres of disturbance.			
<u>f/</u> The assumed permanent easement for all routes is 50 feet. However, Pacific Connector will only maintain vegetation within 15 feet of the pipeline centerline for a total of 30 feet in the long term.			
<u>g/</u> Based on slopes that are greater 50 percent (based on 10-meter DEM). However, Pacific Connector has routed the alignment to ensure constructability, safety, and long-term stability by avoiding side slopes and approaching slopes with the alignment obliquely or perpendicularly to the slope.			
<u>h/</u> Waterbodies from PNW Hydrography Framework Clearinghouse.			
<u>i/</u> Based on ground survey and review of aerial photos, topographic maps, and LiDAR data.			
<u>j/</u> Crossing distance based on parallel alignment with waterbody feature (i.e., intermittent stream)			
<u>k/</u> Surveys are incomplete or in progress on the proposed route and will be completed late summer of 2007.			
<u>l/</u> Based on ground survey, NWI coverages and photo interpretation.			
<u>m/</u> Includes acres of impact associated with the construction right-of-way and TEWAs.			

(Riparian Reserve) identified during the Project’s wetland and waterbody surveys. This adjustment utilized an existing forest road and regenerating clear-cut area to minimize impacts to mature forest.

The USFS suggested variation along Forest Roads would be the longest pipeline route through this area and result in the largest construction footprint. In concept, acreage of construction impact would be mitigated by the fact that most of the route (14.0 of 15.7 miles) would be along existing forest road. However, Pacific Connector has determined that the pipeline would not be constructable along some portions of the roads due to terrain and tight radius turns. All three routes would cross LSR and Riparian Reserve, with the original route crossing the least distance of LSR, and the corresponding segment of proposed route crossing the least distance of Riparian Reserve. Of the three routes, the USFS suggested variation would cross the Pacific Crest Trail (PCT) along an existing road and would likely have the least impact on visual character of the trail in the immediate vicinity of the pipeline crossing. We have also identified a route variation

specifically for the PCT crossing (see below). We believe that the compromise route in this area, which Pacific Connector has incorporated into its proposed route, would avoid or minimize environmental impacts, and neither the original route, nor the USFS suggested variation would be environmentally preferable to the proposed route. Therefore, we do not recommend use of either the original route or the Rogue River-Siskiyou National Forest Variation between MPs 155 to 169.

Pacific Crest Trail Variation (MPs 167.8 to 168.1)

The proposed route would cross the PCT at MP 167.8. Pacific Connector has proposed measures to reduce the width of the construction right-of-way at the crossing, as well as other measures to minimize short and long term impact on users of this trail (see section 4.7.3.6). However, in an attempt to further minimize the long-term visual impact on users of the trail, the USFS identified a route variation. In the opinion of the USFS, the proposed route between about MPs 165.9 and 168.3 would be a straight alignment that would create an unnatural tunnel-like visual effect through the forest that would not meet the USFS standards for Retention or Partial Retention Visual Quality Objective (VQO) for the PCT crossing.

The variation would begin at about MP 167.6 where it would turn east from the proposed route for about 0.2 mile, then back south for about 0.2 mile before rejoining the proposed route at MP 168.15 (figure 3.1-15). Pacific Connector filed an analysis of the PCT Route Variation on February 14, 2008.

The variation would be slightly longer (about 0.1 mile), and construction would affect about 0.9 acre more than the corresponding segment of the proposed route (table 3.1.4.2-11). The variation would require three more bends at points-of-intersection, resulting in the clearing of additional land for TEWAs. These TEWAs would be located with generating or forested areas. Based on a desktop analysis, Pacific Connector concluded that the variation would be buildable.

The advantage of the variation is that it would reduce the length of the permanently cleared pipeline right-of-way that would be visible from the trail. It is estimated that for the proposed route, about 4,000 feet of cleared right-of-way would be visible from the trail/right-of-way intersection. For the variation, the visible right-of-way would be reduced to about 1,000 feet. Because the visual impact of the pipeline crossing of the PCT would be a long term impact, we believe this variation would be environmentally preferable to the corresponding segment of proposed route. Also, we believe that the USFS should be able to determine the best environmental right-of-way for the pipeline over NFS lands. Therefore, **we recommend that:**

- **Pacific Connector should incorporate the PCT Variation into its proposed route between approximately MPs 167.8 to 168.1. Before the end of the comment period on the draft EIS, Pacific Connector should file with the Secretary updated alignment sheets and resource tables for the new route.**

Buck Lake/Keno Road and Clover Creek Road Route Variations (MP 169 to MP 190)

Pacific Connector's original (May 2006) pipeline route would leave the currently proposed route at about MP 171 and head southeast across Buck Lake to Keno Road, which it would follow for about five miles. The route variation then goes east from Keno Road cross country and southeast along trails to the existing GTN pipeline (1994 PGT Expansion II route). The variation would

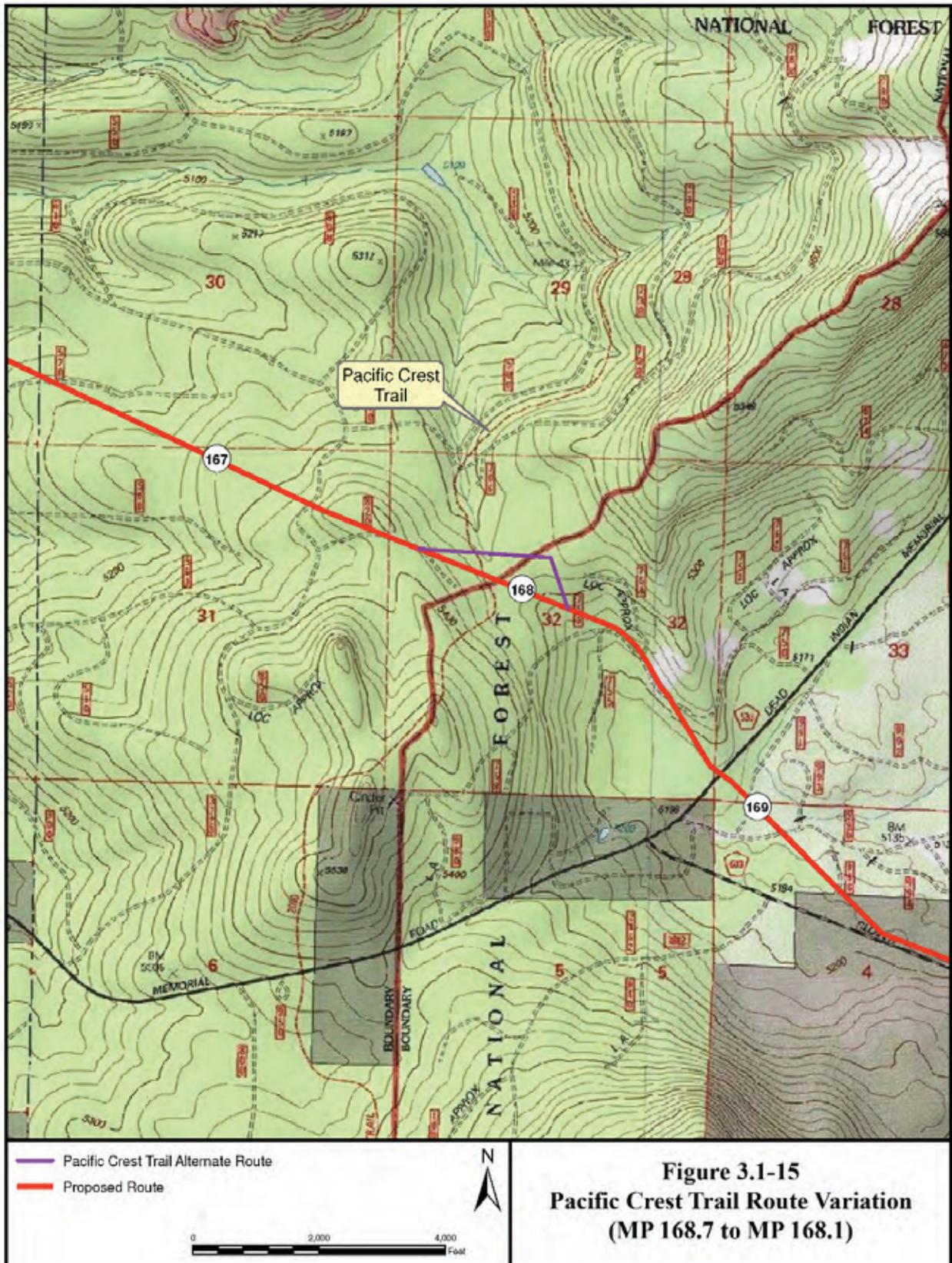


Figure 3.1-15
Pacific Crest Trail Route Variation
(MP 168.7 to MP 168.1)

TABLE 3.1.4.2-11

**Comparison of the Pacific Crest Trail Variation with the
Corresponding Segment of Proposed Route (MP 167.8 to MP 168.1)**

Impact/Issue	Proposed Route	Pacific Crest Trail Variation
Length (miles)	0.48	0.57
Construction right-of-way (acres)	5.39	6.27
TEWAs (acres)	0	Not designed but expected to be more than the proposed route because of three PIs for the alignment
Permanent easement (acres) <u>a/</u>	3.09	3.58
Number of residences within 50 feet of the construction right-of-way	0	0
Number of waterbodies crossed <u>b/</u>	5 (2 perennial/3 ditches)	4 (2 perennial/2 ditches)
Length of waterbody crossings (feet) <u>b/</u>	0	0
Number of wetlands crossed <u>c/</u>	0	0
Wetlands affected (acres)	0	0
Agricultural lands affected (feet)	0	0
Forest/woodland clearing (acres of construction right-of-way)	3.56	3.07
Regenerating forest clearing (acres of construction right-of-way)	1.83	3.20
Number of previously recorded cultural resources	0	0
Miles of right-of-way parallel or adjacent to existing rights-of-way	0	0

a/ Acres of permanent easement calculated based on crossing length on federal timber lands.. Pacific Connector proposes a 53-foot permanent easement on federal lands.

b/ From Pacific Connector wetland and waterbody surveys (Table 2A-3 in Appendix 2A to Resource Report 2) and Pacific Northwest Hydrography Framework Clearinghouse data layers (<http://hydro.reo.gov>).

c/ No wetlands are crossed on the proposed alignment based on field surveys (Table 2A-3 in Appendix 2A to Resource Report 2).

then follow the GTN pipeline corridor eastward, on the north side of the Klamath River, to where it would rejoin the currently proposed Pacific Connector pipeline route near MP 190.

During the Pre-filing process, the BLM and USFS recommended an alternative route to follow the Clover Creek Road because it would avoid known habitat for the Oregon spotted frog in the vicinity of Buck Lake, an extensive wet meadow; and trout spawning area. In a letter filed February 5, 2007, the attorney for the owner of Buck Lake objected to the originally proposed route and requested a route re-alignment. Therefore, Pacific Connector identified the route proposed in its September 2007 application.

Subsequently, the USFS requested that Pacific Connector evaluate an alternative alignment to the proposed route along Clover Creek Road between MPs 170.9 and 187.7 that would be directly adjacent to the road, rather than off-set, to eliminate the strip of trees that would be left between the road and cleared right-of-way. The proposed route would create an isolated 50-foot-wide buffer strip of trees between the pipeline right-of-way and the road. The USFS believes a variation that would locate the pipeline directly adjacent to Clover Creek with no tree buffer would reduce ground disturbance and reduce impacts on land management for owners of the buffer strip. Further, the USFS prefers that the pipeline be located as much as possible on the south side of Clover Creek Road to promote better snow melt conditions during the winter. In a February 14, 2008 filing, Pacific Connector provided a desktop review of the new Clover Creek Road alternative route, in comparison to the route it proposed in its application.

In table 3.1.4.2-12, we compare the corresponding segment of the September 2007 proposed route to the May 2006 original route (the Buck Lake/Keno Road Route Variation), and the February 2008 Clover Creek Road route variation. These routes are illustrated on figure 3.1-16.

TABLE 3.1.4.2-12			
Comparison of the Buck Lake/Keno Road and Clover Creek Road Route Variations with the Corresponding Segment of Proposed Route (MP 170.9 to MP 188.7) <u>a/</u>			
Impact/Issue	Clover Creek Road Route Variation	Buck Lake/Keno Road Route Variation	Proposed Route
General			
Total length (miles)	16.9	18.7	16.8
Acres of construction right-of-way <u>a/</u>	194.0	215.3	193.1
Number of TEWAs	Not designed but expected to be similar to the Buck Lake/Keno Road route.	103	92
Acres of TEWAs	Not designed but expected to be similar to the Buck Lake/Keno Road route	83.0	27.7
Total acres of construction disturbance		298.3	212.4
Number of UCSAs		19	
Acres of UCSAs		19.6	0
Acres affected during operations (permanent easement) <u>/</u>	140.6	140.4	139.6
Landowner parcels crossed		16	11
Number of residences within 50 feet of construction right-of-way	0	0	0
Private		15.7	12.8
State		0.2	0.2
Federal (BLM/USFS Lands)		2.8	4.9
Geotechnical			
Miles of steep or difficult terrain to be crossed	0	0	0
Waterbodies and Wetlands			
Number of wetlands and waterbodies crossed	Similar or less than the proposed alignment	23	10
Length of wetlands and waterbodies crossed (miles)	0.3	2.1	< 0.2
Land Use			
Agricultural land affected (miles)	0	9.5	0
Forest lands affected (acres)	106.9	71.4	106.5
Regenerating forest clearing (acres)	77.2	85.2	81.2
Miles of right-of-way that would be parallel or adjacent to existing rights-of-way	16.85	-	16.78
Biological Resources			
Oregon spotted frog habitat crossed <u>b/</u>		Yes	Avoided
Klamath red band trout habitat crossed <u>c/</u>		Yes	Avoided
NSO Critical habitat miles crossed <u>d/</u>		1.6	1.8
Critical habitat acres within 1 mile of route <u>d/</u>		4237.8	2,514.0
Suitable habitat within 1 mile of route <u>e/</u>		6547.0	5,533.8
Number		3 NSO within 1 mile of route (1 historical)	2 NSO within 1 mile of route (1 historical)
Bald eagle <u>f/</u>		2 active nests within 0.3 mile of route	1 active nest within 0.6 mile of route

a/ The construction right-of-way for the proposed route and the alternative is 95 feet.

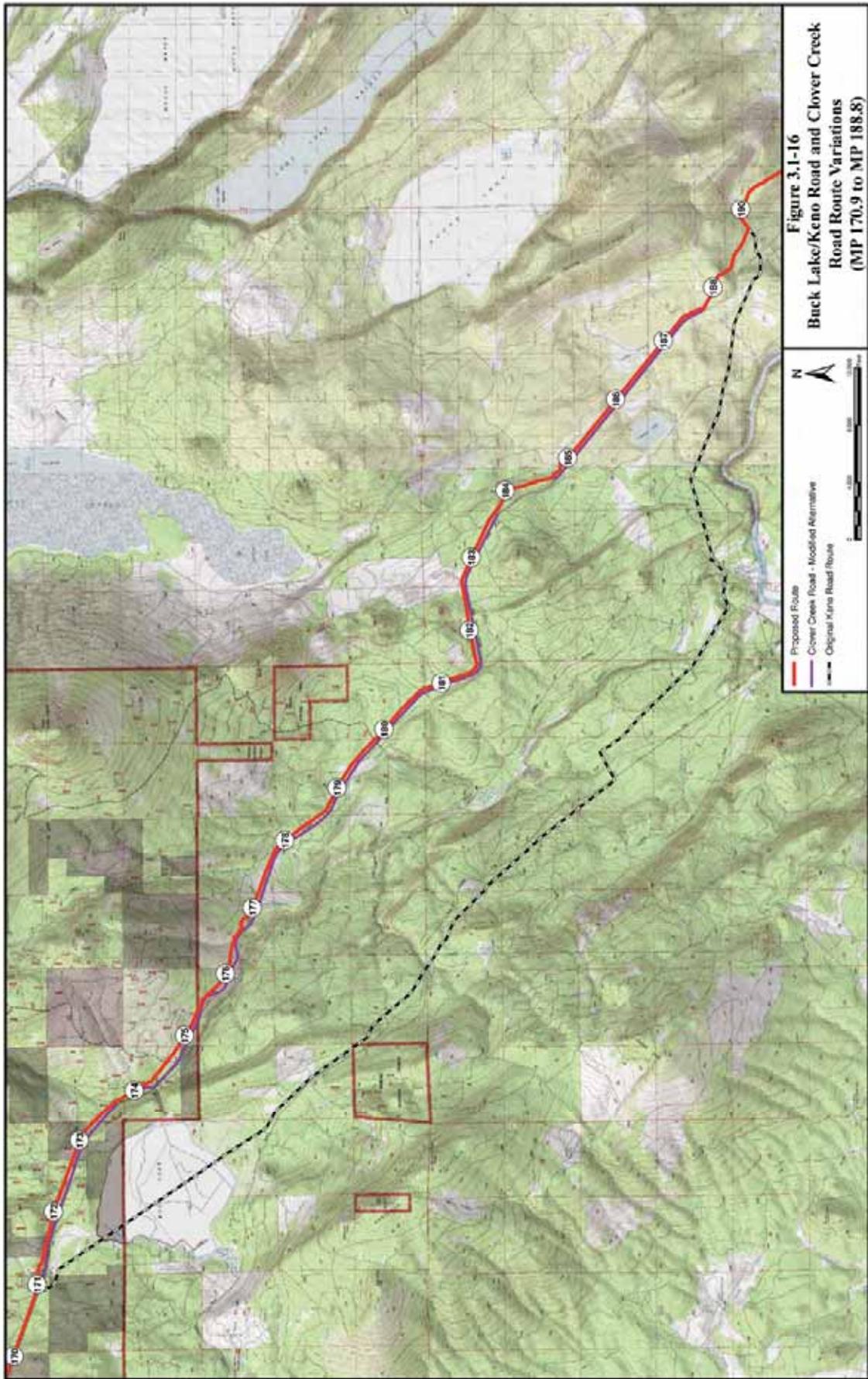
b/ Known Habitat of the Oregon spotted frog would be crossed on the proposed route between MPs 171.29 and 191.34 in Wetland AW 182. Pacific Connector would utilize conservation measures to minimize impacts to the spotted frog such as seasonal construction windows to avoid critical breeding periods and life stages. The alternative route would avoid the known Oregon spotted frog habitat.

c/ The proposed route crosses Spencer Creek above River Mile 12 in areas of known red band trout spawning habitat. Pacific Connector would use conservation measures to minimize impacts to the red band trout, including using the "dry" open cut crossing method (flume or dam and pump) within the ODFW-specified crossing window to protect the trout. The Clover Creek Road Alternative crosses Spencer Creek above River Mile 12 where red band trout is not documented. Pacific Connector would also use the "dry" open cut crossing method within the ODFW-specified crossing windows to minimize impacts to aquatic species.

d/ NSO critical habitat coverage obtained from FWS Critical Habitat Portal [online: <http://criticalhabitat.fws.gov/>].

e/ NSO suitable habitat determined through GIS analysis using a BioMapper product created by the USFS Pacific Northwest Research Station and further refined based on consultation with FWS using aerial photo reconnaissance and GIS Neighborhood Analysis to determine areas with at least 30 percent suitable habitat.

f/ Bald eagle documented sites from bald eagle nest locations and history of use in Oregon and the Washington portion of the Columbia River Recovery Zone, 1971 through 2006 (Isaacs and Anthony 2007).



The Buck Lake/Keno Road Route Variation would be nearly 0.9 mile longer and disturb approximately 86 additional acres on all ownerships compared to the corresponding segment of proposed route. The primary advantage of the variation is that it would cross about 2.1 fewer miles of federal lands, and cross 0.2 mile less NSO critical habitat than the corresponding segment of proposed route. The variation would also avoid visual impact that would result from construction of about 16.5 miles of the corresponding segment of proposed route parallel to, but offset, the Clover Creek Road (see section 4.7.3.7 of this EIS). The disadvantages of the variation are that it would affect 2.8 more miles of private land, five more landowners, 11 more waterbodies, 1.9 miles of wetlands, and 9.5 miles more agricultural land than the corresponding segment of proposed route. Although the variation would cross less NSO critical habitat, it would be within 1 mile of 1,724 more acres of NSO critical habitat and 1014 more acres of NSO suitable habitat than the corresponding segment of proposed route. We believe the disadvantages of the variation outweigh any advantages, and that the variation would not be environmentally preferable to the corresponding segment of proposed route. Therefore, we do not recommend use of the Buck Lake/Keno Road Route Variation.

The Clover Creek Road Variation would be slightly shorter, but impact more acres during construction, in comparison to the corresponding segment of the proposed route. Pacific Connector indicated that it still needs to conduct on-the-ground surveying of the alternative to determine buildability of this variation. The pipeline would probably need to be shifted away from Clover Creek Road for short stretches between MPs 173 to 174.4, 175.3 to 175.3, and 183.7 to 184.7 because of topographic constraints and side hill construction requirements. Between MPs 186.5 to 186.9, near Indian Spring Flat, the pipeline would need to be aligned away from the road to minimize impacts on an adjacent intermittent-flowing drainage.

We recommend that:

- **Pacific Connector should incorporate the Clover Creek Road Variation into its proposed route between about MPs 171 and 187.6, with minor adjustments to reduce construction impacts related to topography. Before the end of the comment period for the draft EIS, Pacific Connector should file with the Secretary updated alignment sheets and resource tables, and documentation of consultations with the BLM and USFS regarding the new route.**

General Discussion of Pipeline Alternatives Over Federal Lands

Both the BLM and the USFS requested that the FERC consider alternatives that would avoid or minimize disturbance to LSRs. In 1994, the Secretaries of Agriculture and Interior signed the *Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents with the Range of the Northern Spotted Owl* (ROD). The ROD amended LRMP for all National Forests within the range of the NSO in California, Oregon, and Washington states, and created new land use allocations known as LSRs and Riparian Reserves. The ROD indicated that LSRs are to be managed to protect and enhance old-growth forest conditions.

All of the USFS lands on the Rogue River-Siskiyou National Forest lie within the Dead Indian LSR RO227, while about half of the proposed pipeline route across the Umpqua National Forest would be within the South Umpqua River/Galesville LSR RO223. There are no designated LSRs where the pipeline would be located within the Fremont-Winema National Forest.

The ROD stipulates that non-silvicultural activities in LSR, such as the installation of a pipeline or other utilities, would only be allowed where those activities could be demonstrated to be neutral, or may have benefits for the creation and maintenance of late-successional habitat. New developments, such as a pipeline, may be allowed if it would have a public benefit and if adverse effects on the LSR could be minimized or mitigated.

The USFS indicated that the Pacific Connector pipeline through USFS lands may conflict with resource management directions in the Northwest Forest Plan, LRMPs, and specific LSRs and Watershed Assessments. It is possible that amendments to LRMPs would be necessary for this project. The alternatives analysis contained in this EIS could be adopted by the federal land managing agencies to maintain consistency with applicable agency standards and guidelines. Resource issues that are addressed in this EIS include avoiding or mitigating impacts to federally designated NSO CHUs, existing and developing habitat in LSRs, Riparian Reserves, cultural resource sites, recreation, and landform stability. In designing its pipeline project, Pacific Connector followed the principles outlined in the Regional Interagency Executive Committee memorandum dated January 3, 2001, regarding New Developments in LSRs.

Public Need

To verify that the Pacific Connector pipeline has a public need, Pacific Connector must apply for and receive a Certificate of Public Convenience and Necessity from FERC. A FERC Certificate would verify that the Pacific Connector pipeline has a public need and provides significant public benefit.

Avoidance of LSRs

Because the proposed Pacific Connector pipeline is a linear, large-diameter, high-pressure natural gas pipeline that must be routed to ensure safety, stability and integrity, it is unreasonable, impractical, and infeasible to entirely avoid all designated LSRs for the following reasons:

- The overall extent of the designated LSR land allocation in the pipeline project area makes it unrealistic to completely avoid LSRs;
- The physical length of the proposed pipeline, which extends approximately 230 miles from Coos Bay to Malin, Oregon crossing Coos, Douglas, Jackson and Klamath Counties and which traverses public lands managed by four BLM Districts (i.e., Coos, Roseburg, Medford and Lakeview) as well as three National Forests (Umpqua, Rogue River-Siskiyou and Fremont-Winema), makes it impractical to avoid designated LSRs;
- The checkerboard landownership pattern of BLM lands within the area crossed by the pipeline makes it unreasonable to avoid LSRs;
- Large contiguous areas of USFS lands in the area crossed by the pipeline make it impractical and infeasible to entirely route around these forests to avoid LSRs; and
- Where LSRs are encountered along the pipeline alignment, the routing requirements of the proposed pipeline to ensure a safe, stable, and constructable alignment to ensure long-term integrity make it infeasible/unreasonable to avoid LSRs by aligning the pipeline on steep side slopes or other potentially unstable areas.

Project Design Measures Implemented to Minimize Adverse Impacts to LSRs on Federal Lands

To comply with the Principles of the 2001 Regional Interagency Executive Committee memorandum regarding new developments in LSRs, this alternative analysis discusses how the proposed Pacific Connector pipeline and associated facilities have been designed to have the least possible adverse impacts on LSRs. In summary, this alternative analysis will discuss: 1) the project design measures that were implemented to avoid LSRs, where feasible; 2) the project design procedures that minimize impacts to LSRs; 3) the measures that would be implemented to rectify project-related impacts to LSRs; 4) the project design measures that would be applied to reduce impacts over time by maintenance operations during the life of the action; and 5) the compensatory mitigation that Pacific Connector proposes to mitigate for unavoidable impacts to LSRs. Table 10.6-6 from Pacific Connector Environmental Resource Report 10 provides a listing by milepost of the BLM LSRs that would be crossed by the proposed pipeline and describes the rationale for routing the pipeline within LSRs and the measures that were, or would be, implemented to minimize impacts. Similar information for USFS LSRs is lacking. Therefore, **we recommend that:**

- **Before the end of the comment period for the draft EIS, Pacific Connector should file with the Secretary a listing by MP for the USFS LSRs that would be crossed by the proposed pipeline and describes the rationale for routing the pipeline within LSRs and the measures that were, or would be, implemented to minimize impacts.**

Pacific Connector attempted to minimize impacts to LSRs during the proposed pipeline route selection and construction footprint design process through the following steps:

- Performing routing and geotechnical evaluations to ensure the most stable pipeline alignment for long-term stability. These efforts minimize the potential need to conduct future maintenance activities, which could require additional impacts to suitable NSO habitat and LSRs;
- Where feasible, the alignment was co-located with existing roads to minimize disturbance impacts;
- Areas of side slopes were avoided to the extent possible to minimize the need for additional TEWAs to accommodate the necessary cuts and fill to safely construct the pipeline;
- The number and size of the TEWAs in LSRs were minimized to those critical for safe pipeline construction;
- Additional TEWAs were located in previously disturbed areas (recently logged) or in young regenerating forest stands; and
- Existing roads would be used to access the construction right-of-way during construction and the right-of-way would be used as the primary travel-way to move equipment and materials up and down the right-of-way to remove the need for additional roads within LSRs on BLM land. The existing roads would also be used during operations to avoid the need for new access routes.

To help rectify pipeline-related impacts to LSRs, Pacific Connector would replant all disturbed areas of the construction footprint as described in its ECRP. Pacific Connector would replant or allow trees to naturally regenerate to within 15 feet of the pipeline centerline within the

permanent pipeline easement to minimize potential long-term effects of the pipeline easement. Vegetation within the remaining area of the pipeline easement would be maintained as necessary to allow for DOT-required visual aerial survey requirements, and to prevent the root systems of trees from damaging pipe coatings and pushing on the pipeline.

Additionally, Pacific Connector understands that unavoidable impacts to LSRs would require compensatory mitigation and thus proposes to permanently reclaim other existing disturbances within LSRs to mitigate pipeline-related impacts to LSRs. Pacific Connector would provide mitigation funds to the BLM and USFS to reclaim existing disturbance areas within LSRs such as roads that are no longer required for resource management or other locations recommended by the BLM and USFS. These funds could also be utilized to complete non-economic thinning or other management projects to accelerate old growth characteristics within young or dense forest stands. These funds could also be used to acquire conservation easements or acquire adjacent lands or in-holding parcels within agency boundaries that could be managed to maintain LSR habitat. Additionally these funds could be used to re-designate matrix or other land to LSR where feasible. The mitigation fund would be negotiated between these agencies and Pacific Connector based on the specific unavoidable impacts to LSRs.

3.1.4.3 Minor Route Variations Incorporated into the Proposed Route

During the course of refining the route alignment for the currently proposed route, Pacific Connector incorporated a number of minor route variations to address landowner requests, constructability issues or constraints, or to avoid cultural resources or geological hazards. These minor route variations are listed in table 3.1.4.3-1. We have reviewed these minor variations, and agree that these variations should be incorporated into the proposed route.

Minor Route Variation	County	Rationale for Variation
Big Creek	Coos	Geological hazards
Muenchrath/Wilson	Coos	The original preferred route was aligned to avoid potential geological hazards based on a desktop review of existing information (aerial photography/lidar, etc.) but also resulted in the route being located in close proximity to the east of the Muenchrath residence. During an on-site meeting with a Pacific Connector routing specialist and Mr. Muenchrath, an agreement was reached to route the pipeline alignment further east, away from the Muenchrath and Wilson residences. Subsequently, the pipeline was rerouted between MPs 12.11 and 12.79 to address Mr. Muenchrath's concerns. Upon review of the new agreed upon proposed reroute, LiDAR imagery interpretation by GeoEngineers identified a potential geological hazard along this route. As a result of this finding, GeoEngineers proposed a third tabletop reroute based on a field survey conducted by a GeoEngineers geologist and this reroute was mapped by a Pacific Connector routing specialists to the north and west of the Muenchrath/Wilson residences. Once the route was mapped, GeoEngineers subsequently evaluated the information they had gathered from the field and determined the new proposed reroute to the east could be built and maintained over the long-term if certain site specific construction, backfill, and restoration techniques were adhered to. Now that the potential geological hazard has been evaluated and proper mitigation of the feature identified, the current proposed route has defaulted to Mr. Muenchrath's originally suggested route.
Boone Creek	Coos	The alignment in this area was adjusted based on geological hazard evaluations. Further topographic and constructability evaluations of the rerouted alignment in the area between MPs 15.31 and 16.03 required additional adjustments. Although the adjusted reroute is slightly longer than the original reroute, the adjusted reroute minimizes sidehill and steep slope construction requirements.

TABLE 3.1.4.3-1

Minor Route Variations Incorporated into the Pacific Connector Pipeline Proposed Route

Minor Route Variation	County	Rationale for Variation
BPA Adjustments	Coos	The alignment between MPs 20.86 and 22.28 was adjusted based on Pacific Connector's meeting with BPA. BPA requested that the pipeline easement more closely abut the powerline corridor in these areas to minimize the strip of trees between the two easements. Abutting the easements would minimize the potential for tree wind throw hazards and subsequent maintenance requirements.
Lone Rock Timberlands Development	Coos	The alignment between MP 29.05 and 29.49 was rerouted to minimize impacts to Lone Rock Timberland's planned subdivision development for this parcel. The reroute would avoid impacts to a number of lots within the proposed subdivision.
Hardwood Study Plot	Coos	The alignment between MPs 31.44 to 32.22 was rerouted to avoid a long-term Hardwood Study Plot on BLM Lands that is being studied by Oregon State University. The reroute was coordinated with the BLM to ensure the study area was avoided.
Rust Parcel Subdivision	Douglas	The alignment between MPs 49.53 and 49.75 was adjusted to minimize impacts to the landowner's proposed parcel subdivision. The alignment and block valve on this parcel were realigned to the edge of the parcel to minimize potential development impacts.
Interstate 5 Crossing	Douglas	The alignment between MPs 69.85 and 70.03 was slightly realigned for constructability requirements for the bored crossing of Interstate 5. The minor alignment adjustment was made to minimize excavation and grading requirements based on topographic conditions
St. Johns Creek Reroute MPs 88.1 to 90	Douglas	Constructability issues along the original preferred route at the St. Johns Creek crossing required the reroute. St. Johns Creek along the Original May 2006 Route is extremely narrow, steep and incised. An existing road which parallels the stream created additional constructability issues which required the minor reroute. Pacific Connector's proposed reroute alignment crosses the creek in an area where the creek is not steeply incised and there is a minor floodplain on either side of the stream to facilitate the crossing.
MPs 108.5 to 109	Jackson	Geological hazards.
MPs 110.84 to 111.14	Jackson	The alignment in this area was true-up with actual civil survey data, which ensured that the alignment approached the slope perpendicularly or head-on to the contours to minimize right-of-way grading requirements.
Gagnon	Jackson	The alignment in this area (MPs 118.73 to 123.32) was adjusted based on landowner concerns/recommendations to move the alignment to the edge of the landowner's parcel/pasture.
Laudani	Jackson	The alignment between MPs 123.08 to 123.32 was adjusted based on landowner concerns. In this area the alignment was moved up-slope and away from landowners' residences as much as possible. Further, the TEWAs in this area were reduced in size and extent to minimize overall disturbance on the slope which was a concern of the landowner.
Mucky Flats Reroute	Jackson	Landowner concerns/constructability issues. Reroute to address landowner concerns with shallow groundwater, irrigation pastures. Landowner also proposed to extend private runway airstrip in Mucky Flats which would have crossed the proposed pipeline route.
Mitchell Ranch Deviations MPs 127.4 to 127.8	Jackson	Original route traversed landowner's new home site development with installed electric, septic, well and well system. Minor reroute to avoid home site development.
Obenchain Mountain MPs 130 to 132.05	Jackson	Reroute to address landowner concern and impacts to spring and seep water sources and developed pasture.
C2 Ranch MPs 143.71 to 147.54	Jackson	Between MPs 143.71 and 147.54, the alignment crosses the C2 Ranch, on which there are numerous irregularly-shaped conservation easements held by the Southern Oregon Land Conservancy (Conservancy). Pacific Connector met with the Conservancy and received GIS data showing the locations of the conservation easements. Pacific Connector reviewed this information and, using aerial surveys as a basis, adjusted the alignment to minimize the impacts to the conservation easements. The alignment on the C2 Ranch was finalized based on landowner recommendations. The alignment was realigned to minimize impacts to irrigated pastures and irrigation facilities (canals/ditches). Block Valve #11 was also relocated to MP 145.19 adjacent to Gardner/Salt Creek Road and out of the view of Highway 140.
BLM Heppsie Mountain	Jackson	Minor alignment adjustment (MPs 150.37 to 150.70) to avoid BLM Heppsie Mountain Rock Quarry.
Keno MPs 183.9 to 195.6	Klamath	Reroute to avoid cultural resources.

TABLE 3.1.4.3-1

Minor Route Variations Incorporated into the Pacific Connector Pipeline Proposed Route

Minor Route Variation	County	Rationale for Variation
MPs 194.14 to 194.43	Klamath	Pacific Connector has discovered a cultural resource site that could be eligible for listing under the NRHP at this location and would be conducting a Phase II investigation of the site during the summer of 2007. Depending on the discoveries and consultations with the Klamath Indian Tribe and the SHPO, Pacific Connector would employ appropriate mitigation and/or recovery measures of any eligible resources based on recommendations from the above listed entities. The previous jog in the alignment to avoid/minimize potential impacts was removed because it created a pipeline safety hazard within the agricultural pasture/hayfield where the short jog in the pipeline alignment may not be clearly visible. Although the alignment would be marked with aboveground pipeline markers, the markers may not be clearly evident within the pasture/hayfield where the markers are typically placed along fence lines to minimize hindrances. These alignment conditions are generally avoided wherever feasible to minimize the potential for third party damages (dig-ins) to the pipeline.
MPs 202.30 to 202.62	Klamath	The alignment in this area was shifted to minimize impacts to the hayfields by realigning the pipeline adjacent to the powerline corridor.
MPs 210.31 to 211.57	Klamath	The alignment was realigned to closely parallel State Hwy 39 to minimize land encumbrances and to minimize pipeline traversing the middle of the fields in this area.
MPs 215.30 to 217.49	Klamath	The alignment was shifted up-slope so that the alignment would parallel the powerline corridor more closely in this area. Additionally, the alignment in this area was adjusted to avoid impacting the center pivot irrigated hayfield. Wetland AW048 which is affected by this realignment adjustment is a low quality agricultural emergent pasture that is supported by stock pond seepage. Impacts to this wetland would be short-term and minor and readily mitigated during restoration.
Lions Center Pivot MPs 225.46 to 228.21	Klamath	The alignment in this area was rerouted to avoid impacts to the center pivot irrigated hayfield which the pipeline bisected. Additionally, the reroute avoids an area more than 1.5 miles long that is expected to require blasting due to shallow and hard bedrock which parallels the GTN Transmission Pipeline. The reroute was aligned along property line boundaries where feasible to minimize potential encumbrances. Pacific Connector has received survey permission along the entire reroute.

3.1.4.4 Alternative Compressor Station Locations

Pacific Connector's design criteria for siting its proposed compressor station were 1) a location between MPs 96 and 138 based on pipeline hydraulics and expected fuel usage, 2) a relatively flat area of approximately 10 acres, 3) proximity to a paved or all-weather access road, 4) proximity to electrical power, and 5) proximity to telephone connectivity. Environmental criteria included avoidance of wetlands or sensitive habitats, and distance from potential noise sensitive areas. Pacific Connector identified one alternative site, at MP 122 of the Pacific Connector pipeline that met its siting criteria. The alternative site is on a bluff near Trail, Oregon, just west of the Rogue River crossing (table 3.1.4.4-1 and figure 3.1-17).

The primary environmental advantage of the alternative site over the proposed site for the Butte Falls Compressor Station (at MP 133) is that the alternative site would not be within big game winter range, whereas the proposed site would be within big game winter range. The alternative site would also require a shorter access road (approximately 600 feet) compared to the proposed site (approximately 1,476 feet). However, the access road for the alternative site would be new road, whereas access to the proposed site would be along an existing road that would require improvement.

A disadvantage of the alternative site is greater potential noise impact during operation, as there are 8 to 10 residences within 1,000 feet, a post office, church and store within 1,500 feet, and the Rogue River within 1,500 feet, compared to the proposed site which has two residences more than 2,000 feet, and no community buildings or recreational areas. Pacific Connector also

TABLE 3.1.4.4-1.

Comparison of the Proposed Butte Falls Compressor Station Site with the Alternative Compressor Station Site near Trail, Oregon

Impact/Issue	Alternative Compressor Station Site – MP 122	Proposed Butte Falls Compressor Station Site – MP 132
Meets Site Selection Criteria <u>a/</u>	Yes	Yes
Size	Not designed, expected to be similar to proposed compressor station site	7.39
Engineering Issues	Additional engineering and piping required because proposed pipeline centerline at this location would be installed by HDD for the Rogue River crossing. Because of the HDD, the pipe would be at a significant depth below ground (> 100 foot depth - see Drawing 3430.2-0010 Resource Report 2, Appendix 2H). The near surface location of the HDD pipe is approximately 500 feet west of the site.	None
Access Road	Construction of an approximately 600-foot long access road would be required.	The improvement of an existing road approximately 1,476 feet long would be required.
Residences	8 to 10 residences within approximately 1,000 feet of site from the center of the site.	2 residences are more than 2,000 feet.
Other Community Features	A church and a store are approximately 1,500 feet from the center of the site, and the post office is 1,300 feet from the site.	None
Recreational Features	The Rogue River is approximately 1,500 feet from the center of the site.	None
Potential Noise Issues	Potential noise issues based on number of residences proximate to the site.	None
Vegetation Affected	Shrubs and mixed conifers	The site currently supports a grass meadow surrounded by oak and conifer trees.
Wetlands	None	None – (Wetland AW243 is immediately adjacent to site).
Waterbodies	None	None
Big Game Winter Range	None	Ditch EDX075 passes through the site.

a/ Site Selection Criteria: (a) location between MPs 96 and 138 based on pipeline hydraulics and expected fuel usage; (b) need for a relatively flat area approximately 10 acres (660' X 660') in size; (c) proximity to paved or all-weather access highway or road; (d) Proximity to electrical power; and (e) proximity to telephone connectivity.

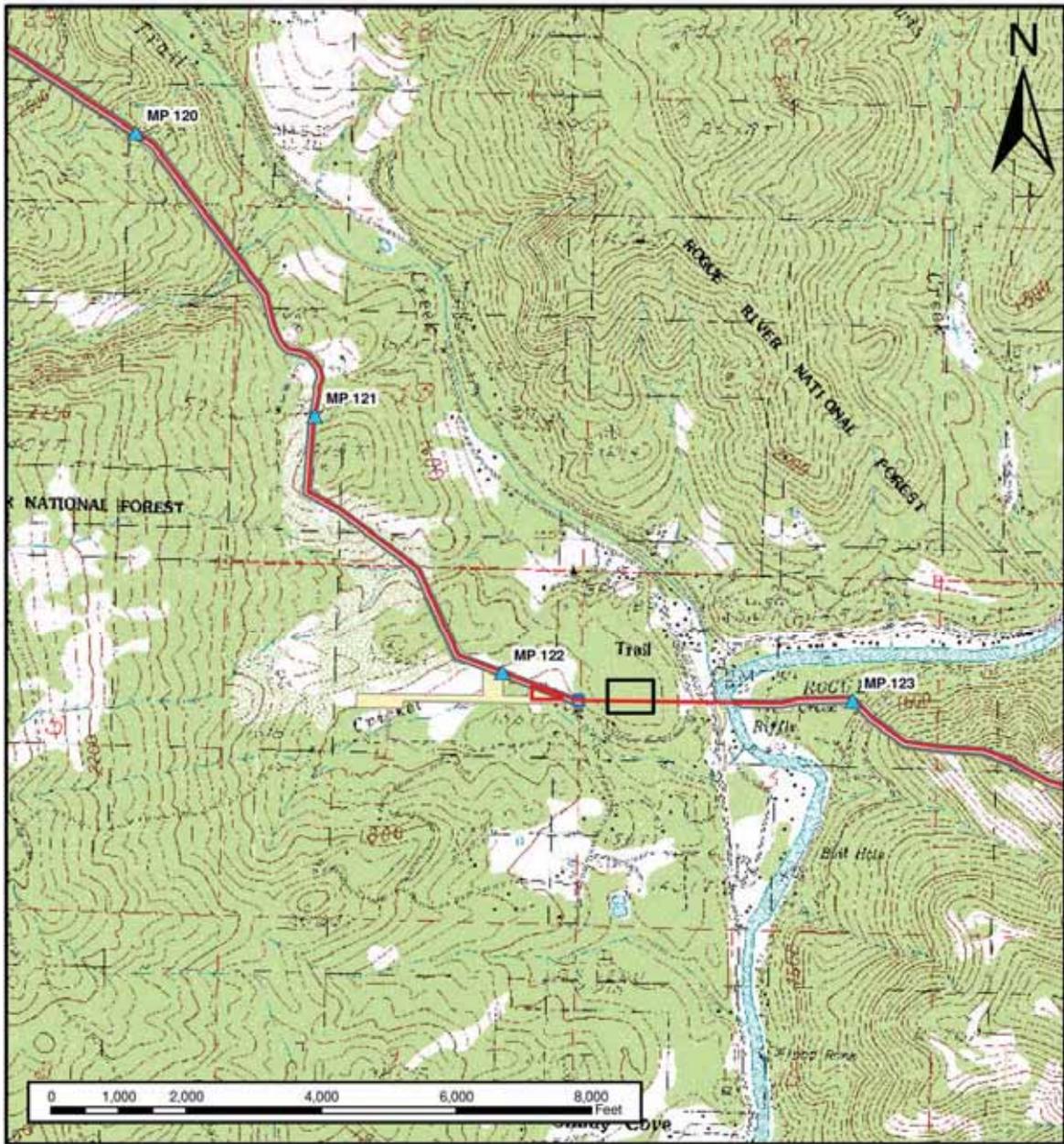


Figure 3.1-17
Alternative Compressor Station Site

identified engineering issues with the alternative site because the pipeline at that location would be installed using HDD as part of the Rogue River crossing, and would over 100 feet below surface at the site. The use the alternative site Pacific Connector would have to install about 500 feet of extra pipeline to tie into the mainline pipeline near the exit point of the HDD about 500 feet west of the alternative site.

We do not believe the alternative site offers any environmental advantage over the proposed site, and therefore do not recommend use of the alternative site for the Butte Falls Compressor Station. We also did not identify any environmental issues with the proposed compressor station site that would justify evaluation of further alternative sites for the compressor station.

3.2 COAST GUARD ALTERNATIVES

On July 1, 2008, the Coast Guard issued its WSR to the FERC (Appendix B). This report indicated that the Coos Bay waterway may be suitable for LNG marine traffic if certain safety and security measures are adopted. After the final EIS is produced, the Coast Guard will complete its review and issue an LOR to address the suitability of the waterways for LNG carrier transport.

The Coast Guard's proposed action is to issue an LOR finding the waterway suitable for LNG marine traffic with conditions. These conditions would include the safety and security measures described in the WSR, as discussed in detail in section 4.12. Among these measures are:

- a restriction on the size of LNG carriers transiting the Port of Coos Bay to a vessel with physical dimensions of a 148,000 m³ class vessel (overall length 950 feet, beam of 150 feet, and loaded draft of 40 feet). Prior to approving the transit of an LNG vessel larger than 148,000 m³ or these dimensions, additional simulator studies must be conducted;
- submission to the COTP by Jordan Cove of an annual update of its WSA to evaluate if any conditions in the waterway have changed that would require issuance of a new LOR;
- requirement that LNG vessels must board a Pilot(s) at least 5 miles outside the Coos Bay Sea Buoy;
- requirement that overtaking or crossing the LNG vessel within the security zone is prohibited for the entire transit from Coos Bay Sea Buoy to mooring the vessel at the LNG terminal;
- requirement that for the first 6 months, all transits must be during daylight hours, unless approved in advance by the COTP;
- LNG vessel transits and bar crossings must be coordinated so as to minimize conflicts with other deep draft vessels, recreational boaters, seasonal fisheries, and other Marine Events;
- 24 hours prior to arrival, the Coast Guard, FBI, Coos Bay Pilot Associate, Escort Tug Masters, and other Escort assets will meet to coordinate inbound and outbound transit details;
- escort of the vessel by at least two tugs along the waterway with a third to assist with turning and mooring where all three tugs will be at least 60 Ton Astern Bollard Pull or larger and equipped with Class 1 firefighting capability;
- requirement that LNG vessel transit is limited to periods of high tide and 25 knot winds or less;

-
- simulator training for pilots and tug operators who have responsibility for LNG traffic;
 - annual Coast Guard inspections of LNG vessels and facilities; and
 - development of a LNG Vessel Transit Management Plan, submitted to the COTP no less than 6 months prior to the first transit, and followed by an annual review.

In addition, the WSR recommends additional facilities and infrastructure to make the waterway suitable for LNG marine traffic. These measures include:

- establishment of a robust camera system capable of monitoring the entire transit route in all weather and light conditions;
- upgrades to navigational aids including installation of four new aids and relocation of eight existing aids;
- a PORTS must be contracted with the National Oceanic and Atmospheric Administration (NOAA) to provide real time river, current, and weather data;
- augmentation of regional emergency response planning resources to adequately develop, and continuously update, regional emergency response procedures;
- augmentation of shoreside firefighting capabilities to provide protection services to the facility as well as communities along the transit route;
- development of a plan for managing underway firefighting, including provisions for command and control of tactical firefighting decisions;
- implementation of a comprehensive public notification system to notify the public along the transit route, including deployment of associate equipment and training; and
- installation of gas detection equipment at strategic points along the waterway, and appropriate training and maintenance infrastructure.

Reasonable alternatives to the Coast Guard's potential action of issuing an LOR with conditions include: 1) issuance of an LOR finding the waterways suitable for LNG marine traffic without conditions; and 2) issuance of an LOR finding the waterways not suitable for LNG marine traffic (no action alternative).

If the Coast Guard finds the waterway not suitable, Project-related environmental impacts resulting from LNG marine traffic would not occur. However, the no action alternative would mean that the Project objectives would not be met. If LNG carriers are not able to transit the Coos Bay navigation channel, then the JCE & PCGP Project could not supply new sources of natural gas to meet projected future demands in the Pacific Northwest, northern California, and northern Nevada. As discussed in section 3.1.1, there are a number of environmental consequences that may result as potential users seek other sources of energy to replace the natural gas not imported in the case of a no action alternative where the JCE & PCGP Project is not constructed and operated.

A reasonable alternative to the Coast Guard action of issuing an LOR, which finds the waterway suitable for LNG marine traffic with certain conditions, is to issue an LOR without any conditions. With this alternative, some of the economic effects of the conditions would be lessened. However, the potential for adverse environmental effects could be greater if conditions were not imposed.