Chapter 6. Natural Resource Mitigation

6.1 Mitigation Strategy

The mitigation strategy described in this chapter involves avoidance, minimization of natural resource impacts, and compensatory mitigation for unavoidable natural resource impacts, including wetlands, riparian areas, and Oregon White Oak woodland.

6.2 Avoidance and Minimization of Natural Resource Impacts

WSDOT has taken appropriate and practicable steps to avoid and minimize adverse impacts to wetland resources, streams, riparian areas, and associated buffers, and mature Oregon White Oak woodlands. Total avoidance was not possible due to constraints associated with safety and design guidelines, the close proximity of resources to existing highway embankments and cut slopes, proximity to cultural and historic resources, and the linear nature of transportation projects. Numerous alignments and stormwater designs with varying levels of oak woodland, wetland and buffer impacts were evaluated during the development of the project. The final proposed alignment and stormwater design affects the least amount of natural resources.

Impacts were minimized primarily through site-specific design techniques including reducing fills by steepening slopes, shifting the proposed alignment to the north to avoid resources to the south, reducing extensive excavation (cut) areas by modifying the proposed contours to match the existing terrain, and by utilizing non-traditional stormwater management techniques.

WSDOT follows the federal mitigation sequencing procedure by first avoiding environmental impacts wherever possible. When avoidance is not possible, impacts to the natural resource (Oregon White Oak woodland) are minimized to the greatest extent practicable using analysis, alternative designs, and various design/construction techniques. Remaining impacts are fully mitigation for no net loss of resource or function following a comprehensive mitigation strategy developed specifically for the individual project by qualified professionals.

In this case, after clearly establishing project purpose and need, WSDOT developed seven alternatives to better evaluate and analyze the effect on natural, scenic, and cultural resources that not only looked at resource impacts, but the projects ability to improve safety at a documented high accident location (includes fatalities) by changing substandard geometrics in a variety of configurations. All alternatives are fully described in the No Practicable Alternatives Analysis contained in Appendix B.

The selected alternative (current proposal) meets design and safety criteria, and limits environmental impacts to the greatest extent possible. Some alternatives with reduced natural resource impacts had higher cultural and historic impacts (ie - Mt Pleasant Pioneer Cemetery, Mt. Pleasant Grange), extreme scenic impacts (construction of multi-story retaining structures in full view of Crown Point and other Key Viewing Areas in Oregon), or were simply not geotechnically feasible. The current proposal has gone through numerous design refinements to further reduce impacts to the Oregon White Oak community.

This process has reduced projected impacts to the priority habitat by:

1. Selecting a slower design speed (ie 40 mph curve versus 55 mph design standard) providing slightly steeper curves that fit better into local topography
2. Steepening slopes from 2:1 to a 1.5:1, reducing the horizontal extent to the cut area
3. Design refinements to the clearing limits resulting in the preservation of a significant section of large oak and associated understory at the western end of the proposed cut.
4. Utilization and approval of a innovative stormwater treatment system that eliminated a flat bottom swale along the southern edge of SR-14 through the cut, reducing the horizontal extent to the cut area and retaining a dense section of younger oak.
5. Re-design of the Marble Road intersection to reduce footprint, thus reducing impacts to private property and wetlands.
6. Analysis of several retaining wall options to evaluate their effectiveness in retaining additional trees. This exercise looked at single and multi-level walls. It was determined that the walls would have very limited effectiveness in preserving additional trees (the northern alternatives would have preserved two <18-inch DBH oaks at the expense of a >30-inch DBH oak and millions of dollars. The wall alternatives would have also introduced six to 12 foot tall vertical structures for several hundred linear feet through the cut with minimal opportunity for scenic mitigation.

WSDOT is confident that the current proposed alignment provides the best public safety improvement with the least amount of impacts to the natural, scenic, and cultural environment. Figure 6 shows the various design alternatives developed and analyzed in the No Practicable Alternatives document, found in Appendix B.

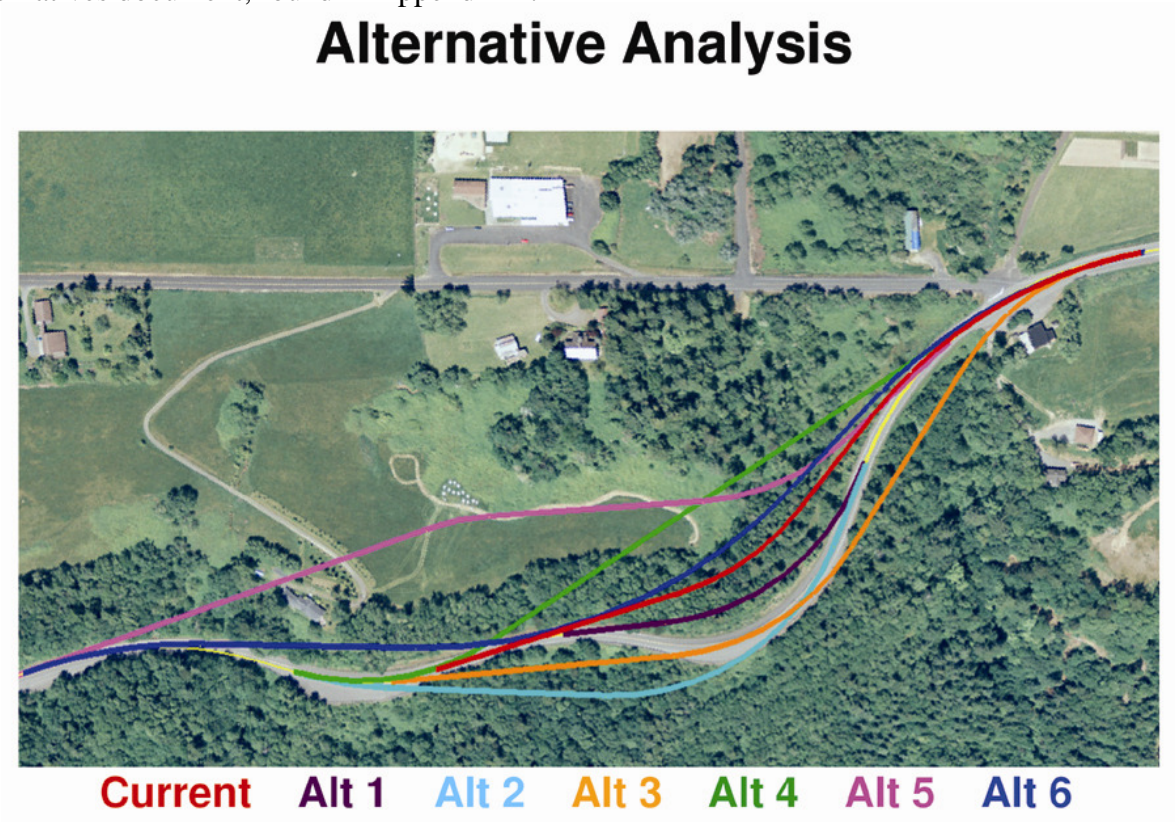

Figure 6. Alternatives Analysis Map for the Marble Rd. Project.

Figures 7 and 8 illustrate the progression of design refinements to the preferred alternative from full design standards to the current project configuration. Note the reduction of oak woodland impacts along the western and northwestern edges. Significant portions of the stand, most notably that section partially connected to larger oak woodlands to the west, are now preserved.

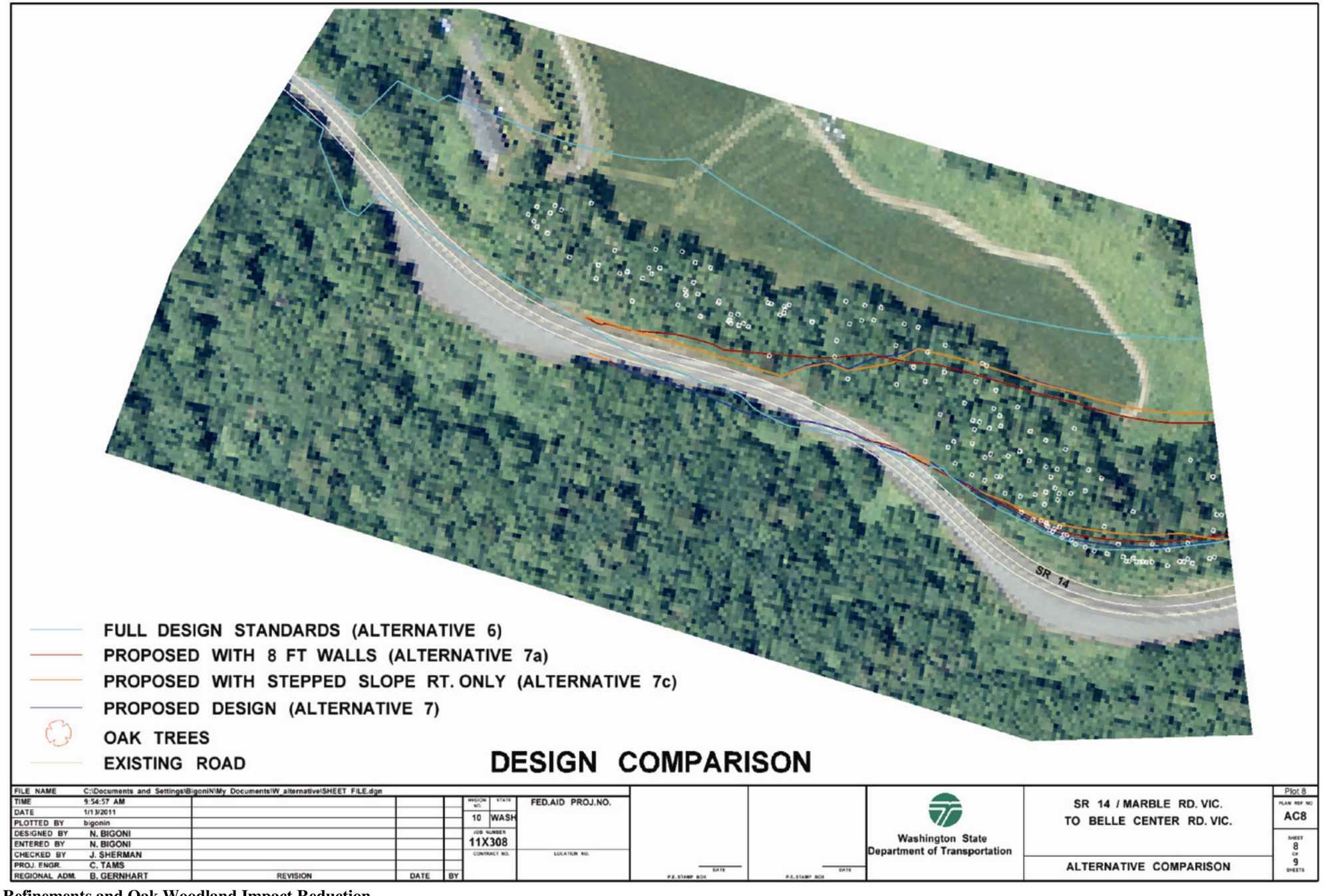

Figure 7. Design Refinements and Oak Woodland Impact Reduction.

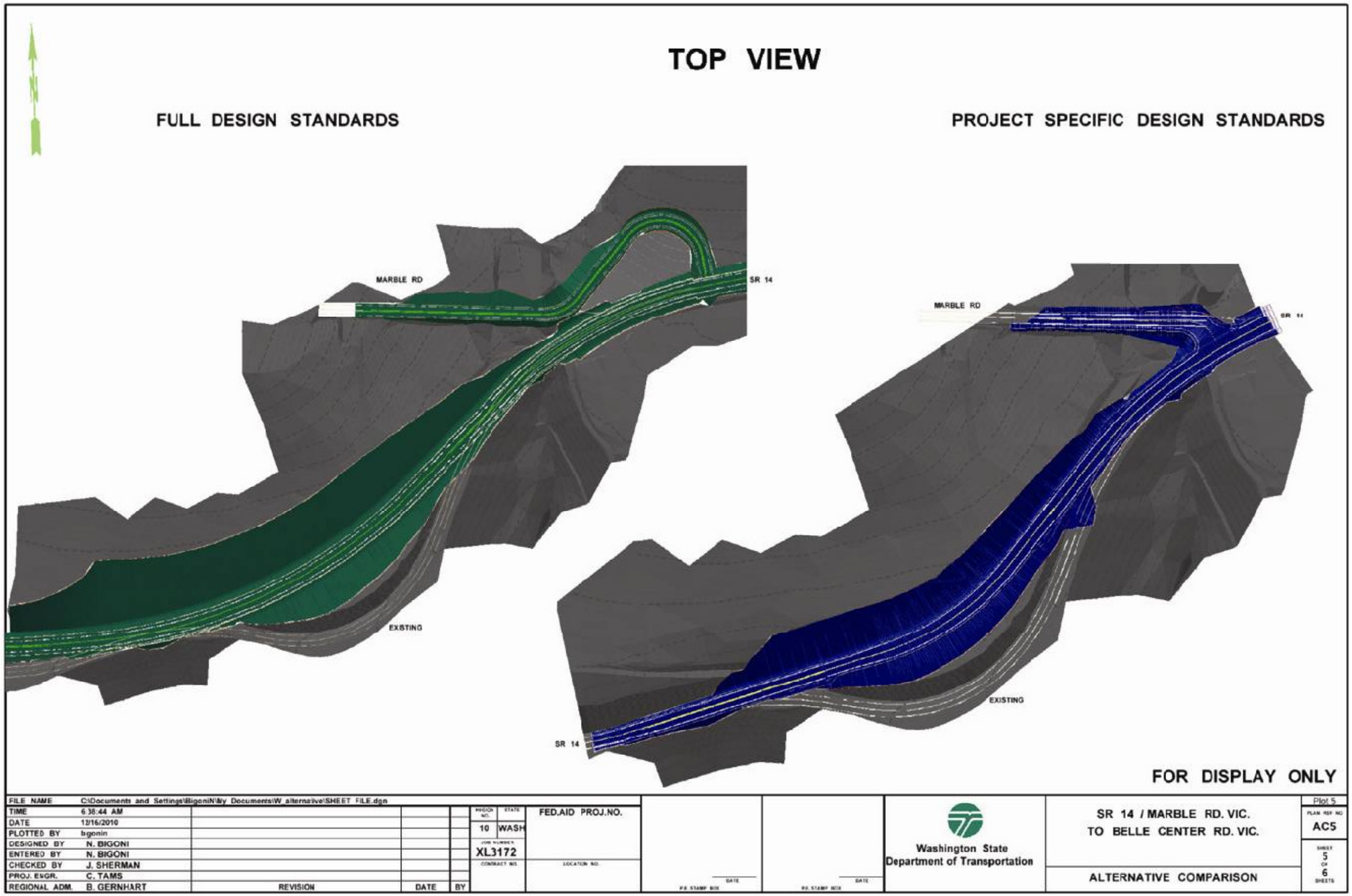

Figure 8. Cuts Associated with Full vs. Approved Project Design Standards.

6.3 Watershed Approach to Natural Resource Mitigation

The comprehensive mitigation approach proposed for this project will be implemented to address permanent and temporary impacts to several different natural resources within WRIA 28. This approach and site selection process follows Ecology's watershed-based mitigation emphasis documented in *Selecting Wetland Mitigation Sites Using a Watershed Approach*, RCW 47.01.305 which requires WSDOT to consider public lands first when selecting mitigation sites, Columbia River Gorge National Scenic Area Management Plan requirements, Skamania County Code (National Scenic Area requirements), and proximity-based opportunities specific to individual resource types. WSDOT selects mitigation sites that will provide the greatest ecological value for as many resources as possible, particularly those known to be "limiting factors" or considered at risk within a particular watershed.

RCW 47.01.305 Public Lands Consideration and WA State Parks Wetland Restoration Opportunities

The SR-14 Marble Road vicinity project has been under development since at least 1999 with WSDOT evaluating various segments of SR-14 between the Skamania County line and Cape Horn Road for safety improvements, resource impacts, and alternative designs. The corridor has been divided into multiple smaller independent projects, but suitable natural resource mitigation sites have been under consideration from early in the project development process. WSDOT has considered numerous on-site, near-site and subbasin level mitigation sites as well as working in partnership with state and federal agencies to locate suitable mitigation opportunities.

No certified wetland mitigation bank that included the project within its service area was approved or had available mitigation credits during the scoping and environmental analysis of the SR-14 corridor or early planning stages of the SR-14 marble Rd vicinity project, and WSDOT subsequently followed the requirements of RCW 47.01.305 and opportunities outlined in the WA State Parks analysis *Wetland Restoration Opportunities: An Assessment of 17 Washington State Parks* to develop a mitigation partnership opportunity at Beacon Rock State Park. The Columbia River Mitigation Bank, located near Vancouver Lake in Vancouver, WA has since been certified and has available credit (initial credit release May, 2011 per the Department of Ecology), although the National Scenic Area Management Plan and Skamania County Code do not make provisions for utilizing wetland bank credit outside of the National Scenic Area. In addition, WSDOT believes that the multi resource mitigation opportunity with WA State Parks and associated environmental benefits, including expansion of local habitat and designated recover site for the endangered western pond turtle, far outweighs the benefit of utilizing wetland mitigation bank credit for this project.

Pursuant to RCW 47.01.305, WSDOT has been in discussion with Washington State Parks since early 2009 to utilize opportunities identified at Beacon Rock in the publication *Wetland Restoration Opportunities: An Assessment of 17 Washington State Parks.* This state-wide assessment looked at 17 State Park properties to identify opportunities to restore and improve ecological function on State Park lands, to work toward overall stewardship goals by evaluating existing wetland conditions, and identifying specific prospective project areas for restoration.

The report identified four potential wetland mitigation opportunities at Beacon Rock State Park. WSDOT's proposed mitigation at Homestead Lake (identified as Turtle Pond Wetland BR-1 in the State Parks report) was the only opportunity with meaningful wetland creation opportunities that also had opportunities for wetland and riparian buffer enhancement, and oak woodland enhancement. Per the State Parks assessment, *"The functions and values provided by this wetland could be improved through wetland enhancement and creation efforts. Water quality and hydrologic function would be improved slightly by plugging the outfall ditch. Some habitat features, such as snags and large woody debris are present, but could be increased to provide additional basking sites for the state-listed endangered western pond turtle. Expanding the existing fringe wetland would increase habitat interspersion and new emergent plantings would provide more amphibian egg-laying structure."* With the exception of plugging the outlet channel (WSDOT will not plug or alter the flow of a mapped seasonal tributary of the Columbia River), WSDOT will be able to meet all of WA State Parks goals for this site and assist in the improvement and expansion of habitat for the endangered western pond turtle.

WSDOT is currently completing the necessary conservation easement boundary, agreement, and appraisal documentation for use of the Homestead Lake mitigation site.

In addition, WSDOT is utilizing a partnership opportunity with the US Forest Service to establish 12 acres of Oregon White Oak on USFS-owned property in an area identified by National Scenic Area staff as suitable for restoration activities. The Cleveland Oak Establishment mitigation site will convert a blackberry-dominated pasture adjacent to the Cape Horn Trail and proposed Cape Horn Overlook on Rim Drive to native Oregon White Oak woodland with native understory plantings. The oak mitigation site will improve visual functions in this area and provide active educational opportunities on environmental mitigation.

Partnerships with public agencies and conservation groups are specifically encouraged by the NSA management plan for projects (impacts) proposed within Special Management Areas (SMA Policies, #11).

Columbia River Gorge and Skamania County Wetland Function and Mitigation Proximity Requirements

The Columbia River Gorge National Scenic Area Management Plan, first adopted in October 1991 and revised in 2004 and 2007, addresses a multitude of land-management issues including natural resources. The current management plan contains specific language in relation to wetland impacts and mitigation including the establishment of ratios more restrictive than Joint Guidance recommendations and mitigation proximity. As outlined in the Approval Criteria for Other Review Uses in Wetlands:

H(4) The size of replacement wetlands shall be equal or exceed the following ratios.

Restoration 2:1
Creation 3:1
Enhancement 4:1

H(5) Replacement wetlands shall replicate the functions of the wetland that will be altered or destroyed such that no net loss of wetland functions occurs.

H(6) Replacement wetlands should replicate the type of wetland that will be altered or destroyed. If this standard is not feasible or practical because of technical constraints, a wetland type of equal or greater benefit may be substituted, provided that no net loss of wetland function occurs.

H(7) Wetlands restoration, creation, or enhancement should occur within 1,000 feet of the affected wetland. If this guidance is not practicable because of physical or technical constraints, replacement shall occur within the same watershed and as close to the altered or destroyed wetland as possible.

Skamania County Code, Chapters 22.20 and 22.28, codifies the NSA Management Plan requirements for natural resource protection in general and special management areas of the National Scenic Area within Skamania County. While local permitting is led by Skamania County, the US Forest Service must provide a consistency review with the overall Federal management plan since the project will affect properties owned (in fee or via easement) by the US Forest Service.

6.4 Compensatory Mitigation

To mitigate for unavoidable impacts to wetlands, riparian areas, buffers, and priority habitat areas (Oregon White Oaks), a comprehensive natural resource mitigation strategy will be implemented in accordance with the guidance outlined by the National Scenic Area Management Plan and in Chapters 22.20 and 22.28 of the Skamania County Critical Area Ordinance, the mitigation recommendations outlined in the *Wetland Mitigation in Washington State* (Ecology et al.2006s), specific requirements conditioned by the US Forest Service, measures from other environmental permits, and WSDOT roadside restoration policy as applicable. To mitigate for 2.25 acres of permanent impacts to Oregon White Oak Woodland, 0.1 acres of permanent wetland impacts, and 0.26 acres of wetland/riparian buffer impacts, (see tables 4 and 5), WSDOT proposes to implement a comprehensive multi-site mitigation strategy:

WSDOT proposes replacing the 2.25 acres of impacted Oregon White Oak Woodlands with high-quality restoration efforts at several sites; 1.5 acres of on-site Oak Woodland Restoration on reclaimed/natural reversion areas on abandoned sections of SR-14 and other disturbed project areas (canopy and understory), 12 acres of Oak Woodland Establishment on a cleared hay field within the geographic area of Mt. Pleasant (canopy and understory), 3.1 acres of Oak Woodland Preservation at the Wind Mountain oak preservation site approximately 25 miles east of the project area, and approximately 2.36 acres of Oak Woodland Enhancement at the Homestead Lake Mitigation Site at Beacon Rock State Park (understory and habitat improvements). Specific mitigation components include:

- Restore disturbed and reclaimed areas within the project limits to provide permanent erosion control, slope stabilization, sensitive area buffering, visual screening, and corridor connectivity.
- Establish 13.5 Oregon White Oak Woodland (canopy and understory), 1.5 acres on abandoned sections of SR-14 reclaimed as natural reversion areas, 12 acres at the USFS owned Cleveland Oak Establishment mitigation site (exceeds a 5:1 replacement ratio).
- Preserve 3.1 acres of Oak Woodland at the WSDOT-owned Wind Mountain Oak Preservation Site.
- Enhance 2.36 acres of disturbed Oregon White Oak woodland (invasive species removal and understory planting) at the Homestead Lake mitigation site at Beacon Rock State Park.
- Create 1.02 acres of wetland at the Homestead Lake Mitigation Site at Beacon Rock State Park (WA State Parks ownership, WSDOT conservation easement). The wetland creation and associated buffer enhancement will expand a Wapato-dominated shelf at the perimeter of Homestead Lake and enhance habitat for the Western Pond Turtle as well as waterfowl and local wildlife. 0.48 acres will be utilized as credit by the SR-14 Marble Rd. Vicinity project. Remaining mitigation acreage may be applied to future WSDOT projects within the western Columbia River Gorge with wetland impacts.
- Enhance approximately 6.82 acres of wetland and riparian buffer at the Homestead Lake Mitigation Site at Beacon Rock State Park. 3.0 acres will be utilized by the SR-14 Marble Rd. Vicinity project. Remaining wetland/riparian buffer mitigation acreage may be applied to future WSDOT projects within the western Columbia River Gorge with wetland buffer or riparian impacts.
- Significantly improve on-site (within project limits) water quality and storage functions by constructing a comprehensive stormwater treatment and management system consistent with the current WSDOT Highway Runoff Manual and approved by the WA Dept. of Ecology Demonstrative Approach Team (a stormwater treatment system does not currently exist in the project area).

Table 4. Recommended wetland mitigation ratios for projects in Western Washington.*

Category and Type of Wetland Impacts	Re-establishment or Creation	Rehabilitation Only	Re-establishment or Creation (R/C) and Rehabilitation (RH)	Re-establishment or Creation (R/C) and Enhancement (E)	Enhancement Only
All Category III	2:1	4:1	1:1 R/C and 2:1RH	1:1 R/C and 4:1 E	8:1

* Ecology et al. (2006a)

According to Skamania County Code, the following standard ratios shall apply to creation/restoration/enhancement of wetlands within the National Scenic Area, which are disturbed on this project:

Restoration 2:1
Creation 3:1
Enhancement 4:1

The results of applying the recommended mitigation ratios for Ecology et al. (2006a) and the Skamania County Wetland Ordinance are shown in Table 5. Applying the Ecology and mitigation ratios for creation results in 0.32 acres of wetland creation, and the application of the Skamania County Wetland Ordinance (National Scenic Area requirements) mitigation ratios for creation results in the need for 0.48 acres of wetland creation or restoration. The more restrictive ratio will be applied. WSDOT will create 1.02 acres of wetland at the Homestead Lake mitigation site, with 0.48 acres being utilized by the SR-14 Marble Rd. Vicinity project. Remaining mitigation acreage may be applied to future WSDOT projects within the western Columbia River Gorge with wetland impacts. The Homestead Lake mitigation site will provide outstanding wetland creation opportunities directly benefiting a sensitive species and expanding a wetland vegetation class specific to Columbia River floodplains.

Table 5. Mitigation area requirements per *Skamania County Code, Columbia River Gorge NSA Management Plan,* and *Wetland Mitigation in Washington State* (Ecology et al. 2006a).

Direct Wetland Impacts		Wetland Creation		
Ecology Wetland Category	Area (acres)	Ratio (Ecology)	Ratio (Skamania/NSA)	Proposed Creation Area (acres)
III	0.16	2:1	3:1	0.48
Total	**0.16**			**0.48**

Buffer Mitigation Requirements

Chapter 22.20.020 (F) 2 of the Skamania Critical Area Ordinance states that "Unavoidable impacts to aquatic and riparian areas will be offset through rehabilitation and enhancement efforts which shall achieve no net loss of water quality, natural drainage and fish and wildlife habitat to the affected stream, pond, lake, riparian area and/or buffer zone."

Chapter 22.28.040 (I) of the Skamania Critical Area Ordinance states that "Mitigation measures to offset impacts to resources and/or buffers shall result in no net loss of water quality, natural drainage, fish/wildlife/plant habitat, and water resources by addressing the following:

1. Restoration and Enhancement efforts shall be completed no later than one year after the sensitive resource or buffer zone has been altered of destroyed…
2. All natural vegetation within the buffer zone shall be retained to the greatest extent practicable…
3. Habitat that will be affected by either temporary or permanent uses shall be rehabilitated to a natural condition. Habitat shall be replicated in composition, structure, and function…"

WSDOT will enhance 6.82 acres of degraded wetland buffer and riparian habitat (currently mowed or grazed pasture) at the Homestead Lake mitigation site, with 3.0 acres being utilized by the SR-14 Marble Rd. Vicinity project. Remaining buffer enhancement acreage may be applied to future WSDOT projects within the western Columbia River Gorge with wetland impacts. In addition, the large majority of the impacted buffers in the project area are vegetated

roadway embankments that will be enhanced on-site by newly constructed vegetated roadway embankments. These embankment areas will include soil amendments and compost to promote infiltration, and will be vegetated with native plant species that replicate natural communities found outside of impacted buffer areas. The buffer enhancement acreage proposed by WSDOT will ensure that no loss of function occurs within the watershed, and will comply with the guidance outlined in Chapter 22.20.020 (F) 2 and Chapter 22.28.040 (I) of the Skamania Critical Area Ordinance. No functional loss of wetland or riparian buffers is anticipated by this project.

Stream Channel Mitigation Requirements

Chapter 22.20.020 (F) 2 of the Skamania Critical Area Ordinance states that "Unavoidable impacts to aquatic and riparian areas will be offset through rehabilitation and enhancement efforts which shall achieve no net loss of water quality, natural drainage and fish and wildlife habitat to the affected stream, pond, lake, riparian area and/or buffer zone."

1. Natural hydrologic conditions shall be replicated, including current patters, circulation, velocity, volume, and normal water fluctuation.
2. Natural stream channel and shoreline dimensions shall be replicated, including depth, width, length, cross-sectional profile and gradient.
3. The bed of the affected aquatic area shall be rehabilitated with identical or similar materials.
4. Riparian areas shall be rehabilitated to their original configuration, including slope and contour.

The project proposes 272 square feet of impacts, or 68 linear feet, to the channel of a small perennial WDNR Type NP stream in the western portion of the project corridor. This unnamed tributary to the Columbia River is considered "non-fish bearing" by WDFW due to the extreme gradient (in excess of 20%) below its crossing of SR-14.

17 linear feet of the channel flow through wetland I and will be impacted by the extension of an existing culvert and associated scour protection. The remaining 51 linear feet of channel impact will occur within the developed roadway prism to facilitate the replacement and/or extension of existing culverts. The primary function of the impacted channel sections is water conveyance.

Water conveyance will not be impacted. The channel within wetland I is primarily non-vegetated (sediment substrate) with its edges dominated by *Phalaris arundinacea* (Reed Canarygrass) upstream of Marble Road, and is either piped or within a incised channel downstream of Marble Road through the roadway prism.

Alignment, gradient, and pipe size, determined to be suitable to pass 100 year flows, will be maintained. Volume and velocity and natural water cycle fluctuation will not be altered.

Downstream of SR-14, the existing concrete apron will be removed and replaced with spalls within the same footprint and is designed to reduce energy and scour (the current concrete chute/apron - see figure 2B - does not provide for any velocity reduction).

Impacted buffers in the project area will be enhanced on-site by newly constructed vegetated roadway embankments. These embankment areas will include soil amendments and compost to promote infiltration, and will be vegetated with native plant species that replicate natural communities found outside of impacted buffer areas. Enhanced buffers will provide slope stabilization, screening, and shading. As the primary function of the existing stream channel will be maintained along the same alignment and grade, no additional mitigation for stream impacts is proposed.

Scenic Resource Mitigation and Roadside Restoration Requirements

The proposed highway improvement project is required to be consistent with the purposes of the Columbia River Gorge National Scenic Area Act, Section 14(d). Per typical conditions from past USFS CRGNSA Consistency Determination Findings of Fact on WSDOT projects WSDOT is required to:

- Install trees and shrubs on all cleared areas that are not permanently converted from a vegetated area [to roadway surfaces] and where rock does not limit planting.
- Native woody plants should be planted in groups to reflect the natural pattern on the landscape and should be of variable sizes.
- Species composition should reflect local plant communities.

WSDOT will establish oak woodland on the flat pasture area adjacent to the north cut to provide a continuous, unbroken tree line when viewed from Key Viewing Areas in Oregon and maintain screening to and from Marble Road and surrounding residential properties. The natural reversion area will be resloped to match historic slopes, the area covered with native topsoil salvaged from the impacted oak woodland area, and the area restored as oak woodland with woody understory to block views of the realigned highway from Oregon viewpoints. Additional woody planting adjacent to SR-14 in the eastern portion of the project will provide additional headlight screening from Oregon viewpoints. Once the vegetation is established and these conditions met, the project will be consistent with the Coniferous Woodland landscape setting guidelines set forth in the NSA Act.

Overall function of the roadside restoration includes permanent slope stabilization, erosion protection, water quality protection, soil structure improvement, sensitive area buffering, reduction in non-native noxious and nuisance vegetation, corridor continuity, blending the project area with the surrounding natural landscape, and scenic resource protection.