Banner Road SE
Olalla Valley Road to SE Banfill Road
Design Report
Design Report

September 14, 2012

Prepared for:
Kitsap County
Department of Public Works
614 Division Street
Port Orchard, WA  98366

Prepared by:
KPFF Consulting Engineers
1601 Fifth Avenue, Suite 1600
Seattle, WA  98101
(206) 622-5822
KPFF Job No. 110204.60

Subconsultants:
Anchor QEA, LLC
Shannon & Wilson, Inc.
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Executive Summary

Banner Road Southeast (SE), between Olalla Valley Road SE and SE Banfill Road, is a section of high bank waterfront roadway in Kitsap County that does not meet collector arterial roadway standards, has ongoing settlement issues, and is vulnerable to landslides. In addition to the unsafe conditions associated with a future slide, the narrow roadway has no provisions for pedestrians and bicyclists. The purpose of the project is to identify a solution that maintains safe, reliable, and efficient mobility for all travel modes currently using this section of Banner Road SE.

This phase of the project identifies a preferred alternative which would then serve as a document to assist the county in pursuing funding for the design and construction of the improvements.

This report documents the process used to evaluate a wide range of alternatives that included reconstruction of the roadway along the existing alignment, closure of the existing roadway and construction of new inland roadway alignments, or closure of the existing roadway and improvements or extensions of nearby roadways.

The general process included:

- Define the purpose and need.
- Identify a list of 15 potential alternatives.
- Present and seek public input to the list of 15 alternatives.
- Screen and evaluate the list of 15 alternatives to identify three that best meet the purpose and need.
  - Alternative 1 – Reconstruct and widen this section of Banner Road SE.
  - Alternative 6C – Extend SE Culver Road to connect with SE Olalla Valley Road and close this section of Banner Road SE and Price Road SE.
  - Alternative 10 – Construct a new roadway from Banner Road SE to Olalla Valley Road and close Banner Road SE from SE Olalla Valley Road to SE Banfill Road, as well as close Price Road SE. The new road will connect to SE Olalla Valley Road at a point 1,500 feet west of the existing intersection and extend up the hillside through undeveloped land to the top of the hill.
- Present and seek public input on the three alternatives.
- Refine costs, environmental impacts and evaluate three alternatives.
- Meet and solicit input from property owners most affected by the three alternatives.
- Select a preferred alternative. Prepare preliminary plans and further refine cost estimate.
- Complete Design Report.

An extensive public outreach effort was conducted to ensure community support for the preferred solution. Two public open house meetings were held, the County Commissioner held small group neighborhood meetings, and a website was set up where local residents could download study exhibits, post written comments, and vote for their preferred alternative.
The top three alternatives included a reconstruction of the existing road, an extension of SE Culver Street, and a new road to the west, away from the developed properties. These alternatives were refined and cost estimates were updated after field reconnaissance was performed by the environmental and geotechnical engineers. A brief description and comparative project costs for these alternatives are shown in the following table.

**Table ES-1: Short-Listed Alternatives**

<table>
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<th>Alternatives</th>
<th>Description</th>
<th>Comparative Conceptual Level Cost*</th>
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<td>Alternative 1</td>
<td>Reconstruct and Widen Existing Banner Road SE</td>
<td>$4.7 Million</td>
</tr>
<tr>
<td>Alternative 6C</td>
<td>Extend SE Culver Road North and West to SE Olalla Valley Road and Close Benner Road SE; Close Price Road SE</td>
<td>$4.8 Million</td>
</tr>
<tr>
<td>Alternative 10</td>
<td>Construct New Roadway from Banner Road SE to SE Olalla Valley Road and Close Banner Road SE; Close Price Road SE</td>
<td>$7.0 Million</td>
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*Costs shown reflect cost estimates during the short list phase of report preparation, they are more detailed than the initial list of 15 alternatives but less detailed than the final preliminary plan estimate.

Based on further refinement, the recommendation is to proceed with Alternative 1. This solution maintains the existing traffic pattern, provides a safe route for pedestrians and bicyclists, has the least impact on residents in the neighborhood, has broad based community support, and is cost competitive. During completion of this report, preliminary Plans and a refined cost estimate were prepared for this alternative, the total project including design, construction, and construction management is expected to cost $6.5 million.
1. Study Description and Background

BACKGROUND

Banner Road SE, between Olalla Valley Road and SE Banfill Road (see Figures 1-1, 1-2, and 1-3), was originally constructed between 1885 and 1912. Today, the roadway is a two-lane, two-way road that ranges in width from 17 to 19 feet for the traveled way and a variable shoulder width of 1 to 4 feet on the downslope side of the road. It is currently classified as a collector arterial with an Average Daily Traffic (ADT) of 700 vehicles per day with a projected ADT of 1,000 vehicles per day in 20 years.

The original roadway was constructed by cutting into the hillside on the upslope side of the roadway and side-casting excavated material downslope to provide a bench for the roadway. This side-cast fill has resulted in a layer of loose to medium-dense soil underneath portions of the roadway, which is subject to settlement, creep, and sloughing on steep slopes. This layer is approximately 10-15 feet based on geotechnical boring data. Natural wave action at the toe of the slope causes slow erosion and a steepening of the bank that supports the layer of loose side-cast fill. The roadway is approximately 60 feet above the beach below at its highest point. Groundwater also plays a key role in the stability of the road. In general, the more saturated the native loose-fill soil layers become, the weaker and more unstable it becomes.

Figure 1-1: Vicinity Map
Evidence of instability has been observed over the years, as cracks have been found, between the center of the road and the downslope edge of the road. Episodic landslide events happen on the steep slope below the roadway that are often exacerbated by vegetation getting established, which
gets too heavy for the steep slope so a landslide occurs. The bluff can be seen in the Figure 1-4 and 1-6 photos. Due to the density of the material along this bank and the time it takes for large vegetation to get established, these events are infrequent.

In addition, the southern half of the roadway has a slope on the uphill side that is prone to sloughing material onto the roadway. Typically, the sloughing onto the roadway is on the order of a few cubic yards. This slope is seen in the Figure 1-5 photo.

Figure 1-4: Banner Road SE, slope at top of bluff.

Figure 1-5: Banner Road SE near Olalla Valley Road, looking east.
In 1991, Kitsap County (County) conducted a study to explore alternatives for this section of Banner Road SE. There were several alternatives developed that generally centered on keeping this same alignment of Banner Road SE. In the late 1990s, the County explored an alternative roadway alignment that extended SE Culver Street to SE Olalla Valley Road and closed this section of Banner Road SE.

If the fill that supports Banner Road SE is not improved and/or protected, it is anticipated that the roadway will continue to degrade until it is no longer safe for the driving public, at which point it will have to be closed, or a major reconstruction effort would have to be implemented to repair it.

A travel time study was completed in October 2010 by the County. It showed that Banner Road SE travel time is 1 minute 3 seconds between SE Culver Street to Olalla Valley Road SE, a distance of 0.38 miles. If this section of roadway were closed, travel time increases to 8 minutes 25 seconds between SE Culver Street and Olalla Valley Road SE at Banner Rd SE via SE Willock Rd and Orchard Ave SE, a distance of 5.1 miles.

Additional history can be found in Appendix E.

**STUDY DESCRIPTION**

This study was conducted to identify, evaluate, and select an alternative that provides a long term solution that addresses slope stability and traffic safety issues on the section of Banner Road SE between Olalla Valley Road SE and SE Banfill Road. The existing 0.25-mile-long section between SE Banfill Road and Olalla Valley Road SE has been a long-standing safety and maintenance problem, due to its location on a steep slope adjacent to the Puget Sound, the fact that it was founded on poor soils and in addition has a cut slope above one part of it that occasionally sloughs several cubic yards of soils and debris onto the road. This report will describe the process taken to complete this study and determine a preferred alternative.
PURPOSE AND NEED

Purpose
The purpose of this project is to maintain safe, reliable, and efficient mobility for all travel modes using Banner Road SE between Olalla Valley Road SE and SE Banfill Road with minimal impact to private property.

Need
Public Safety
Public safety is a major concern for this stretch of Banner Road SE. The roadway is load rated (5 ton max) and is no longer used by school buses.

Roadway settlement and pavement failures are likely to continue, creating a safety concern for drivers who use the roadway prior to it being closed for repair. There is exposure to steep unprotected slopes and substandard guardrail that creates a safety concern for the driving public.

In addition, the current roadway has no provisions for pedestrians or bicyclists. The narrow 9-foot lanes do not allow for two cars to pass safely when a bicyclist or pedestrian is present, and there is no safe refuge for pedestrians when cars approach.

Ongoing Maintenance
The existing roadway, located at the top of a high-bank waterfront, has been settling due to the instability of the soils atop the steep bank. In addition, a section of the roadway is at the toe of a near vertical cut slope that is prone to sloughing soil and vegetation onto the roadway. Ongoing maintenance and repair is problematic and expensive.

Environmental Degradation
The existing roadway has no provisions to treat stormwater runoff prior to discharging into the Puget Sound.

Roadway Design Deficiencies
This segment of Banner Road SE does not meet current County standards for a collector arterial roadway classification in several ways:

- The narrow roadway width.
- Roadway grade exceeds ten percent.
- Sharp horizontal curves near SE Banfill Road.
- Sight distance limitations at the SE Banfill Road intersection.
- An existing vertical curve that does not meet sight distance criteria.
- Weight restriction of 5 tons.
- Inadequate arterial for school bus use.

DATA AND STUDIES
To document existing conditions within the study area, the following studies were conducted:

- Geotechnical investigation by Shannon & Wilson, which includes information gathered from a 1991 geotechnical report.
An environmental memo by Anchor QEA to document the existing environment, potential impacts that the alternatives may have, and potential permits that would be needed.

Cultural resources memo by Anchor QEA that researched existing historical records and information in relation to this project site.

Summaries of those studies are as follows:

**Summary of Geotechnical Studies**

In 1991, Shannon & Wilson produced a geotechnical report as part of Bovay Northwest’s “Improvements to Banner Road at Olalla” report in support of the alternatives analysis to replace this section of road. As part of the current project, Shannon & Wilson is providing assistance by analyzing the geotechnical borings and findings of the past report and providing assistance in the development of new alternatives and selection of a preferred alternative. Additional information about coastal soils and potential improvements to the road are added as part of their recent work on the project. The 1991 Geotechnical Report and more recent information can be found, in full, in the appendices. Below is a summary of their findings during the project’s history.

As described in the introduction to the report, Banner Road SE was originally constructed between 1885 and 1912 by cutting into the hillside on the upslope side of the roadway and side-casting excavated material downslope to provide for a bench to support the roadway. This side-cast fill has resulted in a layer of loose-to-medium dense soil underneath portions of the roadway, which is subject to settlement, creep, and sloughing on the steep slopes. Sloughing typically occurs when the side-cast fill becomes saturated.

Four borings (B-1, B2, HB-1, and HB-2) conducted in the early 1990s were done along the Banner Road SE project site. Two of them were within the road prism and two of them were done in the shoulder as shown in Figure 1-7. The borings encountered approximately 10-12 feet of side-cast fill near the downslope edge of the roadway.

Figure 1-7: Geotechnical Investigation Boring Locations along Banner Road SE
Evidence of instability has been observed over the years as cracks and small landslides have developed. Most evidence of slope movement has been found between the center of the road and the downslope edge of the road.

Most of the native soil is glacially over consolidated, resulting in densely compacted, strong soil. In the 1991 study, natural wave action at the slope toe appeared to be the cause of slow erosion and a steepening of the bank that supports the layer of loose side cast fill.

An excerpt of the Coastal Zone Atlas is shown in Figure 1-8.

- Typical wave heights are up to 2 feet to the north of the site, and are less than 1 foot to the south of the site.
- Beach material is mixed medium (MM).
- Most of the beach below portions of the road that the project is studying is accreting (Ab). Possibly at the north end and further north, the beach is eroding (Eb).
- “Mod” shows the area that is protected with a bulkhead.

![Figure 1-8: Coastal Zone Atlas Map Excerpt](image)

Not much information is published regarding bluff erosion rates, because erosion is episodic and there is not a long enough history of measurements to establish long-term rates. Episodic erosion typically occurs through landslides. For example, the bluff eroded approximately 1 foot during a landslide event during the winter of 2010-2011. See photo in Figure 1-9, below. Before the next landslide event occurs at that site, the soil will weather and again be covered with vegetation. It could be a few decades before the soil loses sufficient strength to fail again.

Johannessen and MacLennan (2007) suggest that average erosion rates are on the order of 2 to 10 centimeters per year in the northern straits of the Puget Sound, and are on the order of a few centimeters per year or less to the south. Given that this site most likely has moderate-to-low erosion potential, it is recommended that the design assumes the average erosion rates would be on the order of 1 to 2 centimeters per year. Therefore, within 100 years, the bluff could be expected to retreat 1 to 2 meters.
This bank steepening leads to the sloughing and shallow land sliding of the fill soil above it. While the rate of erosion at the bank appears slow, this will be further evaluated during design. Groundwater also plays a key role in stability. In general, the more saturated the native and loose fill soil layers become, the weaker and more unstable they are.

The southern half of this roadway segment also has a slope above the roadway that is prone to sloughing material onto the roadway. The soil here is densely-compacted glacial soil. As the soil weathers, it loosens and becomes prone to sloughing on the steep natural and cut slopes. It is anticipated that typical sloughs from the slopes above the road would be a few cubic yards or smaller.

If the road subgrade is not improved, soil creep that causes roadway settlement and cracking will likely continue, and small landslides that affect at least one lane will likely occur periodically during exceptionally wet weather. Reconstructing the section of Banner Road SE will require:

- Constructing a fill wall on the downslope side of the roadway to replace or contain the existing layer of loose material. The wall should be embedded into the underlying dense native soil.
- Installing surface drainage that reduces stormwater infiltration and a subdrain system to collect groundwater underneath the roadway.
- Protecting the cut slope on the uphill side of the roadway from weathering using shotcrete, or laying the slope back to a typical slope of 1-1/2-horizontal-to-1 vertical, which could then be planted. Although this eliminates the need for shotcrete, it would require additional right-of-way and cause greater impacts to private property.
Summary of Environmental Studies
A reconnaissance and regulatory review, with a concentration on wetlands and streams, was done by Anchor QEA for this report, to document anticipated impacts and to facilitate the selection of a preferred alternative. The full report can be found in Appendix D: Wetland and Stream Reconnaissance. The full report focuses primarily on the three most promising alternatives that were studied further. This section will not describe specific impacts to the short-listed alternatives, but will rather focus on the research for the general area of the project. Specific impacts to the environment studied will be described in detail in Section 5 the short-listed alternatives section of this report.

Biologists performed a wetland and stream reconnaissance, as well as a regulatory review to evaluate alternatives being proposed for this report. The study area includes the immediate vicinity (about 100 feet wide) along the three alternative alignments identified for further study. During the field reconnaissance, the locations of the alternative alignments were identified based on overlays of the alternatives on aerial photographs. The field reconnaissance did not include a complete investigation of each of the alternatives due to private property access, site conditions (such as steep slopes), and the uncertainty of identifying the alternative locations in undeveloped forested areas.

The field reconnaissance provided a general overview of the study area and did not include a thorough investigation of all potential streams and wetland within the study area. Furthermore, this study does not address geologically hazardous areas, frequently flooded areas, or critical aquifer recharge areas, which are also regulated critical areas in Kitsap County. Additional assessment may be necessary to identify all critical areas that occur within the study area.

General Environmental and Potential Impacts
According to the National Wetlands Inventory (NWI) data (US Fish and Wildlife Service [USFWS] 2011), no wetlands are mapped in the study area. The nearest mapped features associated with Olalla Bay and Puget Sound are an estuary, bordering the south side of Olalla Valley Road SE to the south, and a marine wetland, adjacent to the existing Banner Road SE to the east of the study area. The nearest mapped features are Olalla Creek and an unnamed tributary, both of which are tributaries to Olalla Bay (Kitsap County 2007).

The shorelines of Olalla Bay and Puget Sound are adjacent to the study area, and are both considered a Shoreline of the State, regulated under the County’s Shoreline Management Plan (SMP). Shoreline designations established in the SMP were updated in 2004 as part of the County’s Comprehensive Plan. Within the study area, Olalla Bay and the Puget Sound are both designated as Conservancy Environment under the Kitsap County SMP (Kitsap County 2011b). Kitsap County Soil Survey data identifies hydric soils within the limits of the three short listed alternatives. This does not necessarily mean wetlands are present, particularly given the steep slopes occurring over much of the project area, but the soils are mapped as hydric because they are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. The list of hydric soils and soil survey maps are good off-site ancillary tools to assist in wetland determinations, but they are not a substitute for observations made during on-site investigations. The majority of study area is mapped as Alderwood very gravelly sandy loam, 6 to 15 percent slopes, and Dystric Xerorthents, 45 to 70 percent slopes. The Alderwood very gravelly map unit is listed as hydric and is a moderately deep, moderately well-drained soil typically found on broad uplands; the Dystric Xerorthents map unit is not listed as a hydric
soil. Other hydric soils map units identified in the study area include Harstine gravelly sandy loam and McKenna gravelly loam (US Department of Agriculture [USDA] 2011a; USDA 2011b).

In general, the habitat types associated with the alternatives include wetland, upland forest, and scrub-shrub; disturbed areas (including utility corridors and cleared areas); and mixed residential areas.

All of the Banner Road SE project alternatives have the potential to impact wetlands, streams, wetland and stream buffers, and jurisdictional ditches. The County uses the current Washington State Department of Ecology (Ecology) Washington State Wetland Rating System for Western Washington to categorize wetlands for the purposes of establishing wetland buffer widths, wetland uses, and replacement ratios for wetlands. The potential wetlands observed during the site visit appear to provide low-to-moderate functions with respect to water quality, water quantity (e.g., flood storage), and habitat, and are estimated to be Category III or IV wetlands using the Washington State Wetlands Rating System – Western Washington: Version 2 (Ecology 2006).

According to Kitsap County Code (KCC), Title 19.3 – Fish and Wildlife Habitat Conservation Areas and Title 22 – Shoreline Management Master Program – shorelines with a “conservancy shoreline” designation are required to have a 50-foot buffer and a 15-foot setback. Streams in the project area will likely require a 50-foot-wide buffer and 15-foot setback, assuming the streams are designated as perennial non-fish bearing (Np) or seasonal non-fish bearing (Ns) water types. KCC does allow road expansion in designated shorelines and Fish and Wildlife Habitat Conservation Area (FWHCA) buffers when road improvements include multiple uses, such as pedestrian and bicycle pathways. Road improvements would classify as a “substantial development” and would therefore require a shoreline substantial development or conditional-use permit.

A critical areas study, which includes wetland and stream delineations and is consistent with the requirements of KCC 19.700, is necessary to determine the extent of these critical areas and their buffers, potential impacts that may occur, and the necessary mitigation and mitigation ratios required. To the greatest extent possible, impacts to wetlands, streams, shorelines, and jurisdictional ditches should be avoided and then minimized. Mitigation will be required for unavoidable impacts to wetlands and wetland buffers, streams and stream buffers, marine nearshore habitat, and jurisdictional ditches. According to federal regulations (Federal Register Vol. 73, No. 70), the most preferred options to mitigate unavoidable impacts to jurisdictional resources are, in order: mitigation bank credits, in-lieu fee program credits, and lastly, permittee-responsible mitigation, which may include on-site mitigation. Additionally, impacts that cannot be avoided will be subject to local, state, and federal regulations, which may include but are not limited to: local critical area regulations (including a shoreline substantial development permit), State Hydraulic Code (Hydraulic Project Approval [HPA]), Sections 401 and 404 of the Clean Water Act, and Shoreline Management Act (SMA) compliance.

For alternatives near the existing alignment of Banner Road SE, it is assumed that the structural components of the project footprint are entirely above the Ordinary High Water Mark (OHWM) of Puget Sound; however, the placement of riprap material at the toe of the bluff may be necessary and would result in permanent impacts to marine nearshore habitat below the OHWM.

For alternatives that impact alignments along SE Culver Street and upland towards the north upper section of Banner Road SE, preliminary design indicates that those alternatives would traverse through
several non-fish bearing streams and wetlands and would be subject to the regulatory requirements described above.

Figure 1-10: Potential Streams and Wetlands from Field Reconnaissance

Permits

The list of permits and approvals, below, may be required for the alternatives. An expanded version of this list, with triggers and discussion, can be found in Appendix D.

- State Environmental Policy Act (SEPA).
- Shoreline Substantial Development Permit – Kitsap County SMP.
- HPA – Washington Department of Fish and Wildlife (WDFW).
- Rivers and Harbors Act Section 10 Permit – U.S. Army Corps of Engineers (Corps).
- Section 404 of the Clean Water Act – Corps.
- Section 401 Water Quality Certification – Ecology.
- Coastal Zone Management Act (CZMA) Certification – Ecology.
- Endangered Species Act consultation – U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS).
- National Historic Preservation Act (NHPA) Section 106 consultation – Washington Department of Archaeology and Historic Preservation and interested tribes.
- Aquatic Lands Use Authorization Notification – Washington State Department of Natural Resources (WDNR).
- Migratory Bird Treaty Act (MBTA).
- Bald and Golden Eagle Protection Act.
- Kitsap County Critical Areas Ordinance (CAO).
- Marine Mammal Protection Act.
Cultural Studies Summary

A preliminary desktop cultural resources study was done to facilitate selection of a preferred alternative; however, no cultural resources fieldwork was done due to limited budget for the project. The full report can be found in Appendix E. The full report focused primarily on the short listed alternatives, so some statements below are directed towards those alternatives. This section will not describe specific impacts to the short listed alternatives, but will rather focus on the research for the general area of the project. Specific impacts to cultural resources will be described in detail in the short listed alternatives section.

The proposed Banner Road project is located in Olalla in Southeast Kitsap County. It is located in a gentle rolling low hills area. While no streams were identified on the Kitsap County Streams and Surface Water Map – 2007 – they were observed during a June 2011 site reconnaissance. Soils in this area tend to be mainly from glacial drift deposited in the most recent of several glacial ice sheets. Much of the topography was formed between 13,000 and 15,000 years ago (USDA 1980:2).

The Manis mastodon site on the Olympic Peninsula near Sequim, which has been dated to about 12,000 before present (BP) (Gustafson and Manis, 1984), may be the earliest evidence for prehistoric human occupation in Western Washington. There are few other sites that date before about 5,000 BP. Numerous sites have been identified across the region dating to the period after 5,000 BP, when larger populations began to organize in more complex ways to exploit a wide range of resources, including salmon and shellfish, land mammals, and plant resources such as berries, roots, and bulbs (Matson and Coupland, 1995:97).

Over time, populations accumulated in large semi-sedentary cedar plank house villages located at river mouths and confluences and on protected shorelines. By the ethnographic period, the inhabitants of the project area were the Southern Coast Salish who spoke the Southern Lushootseed language (Suttles and Lane 1990:485). The project area is in the traditional territory of the Suquamish Tribe, just north and west of the traditional territory of the Puyallup Tribe.

Captain George Vancouver’s 1792 exploration of Puget Sound marked the first Euroamerican intrusion in the region (Kirk and Alexander 1990:271). However, Euroamerican settlement in the region was not established until 1832; the earliest instance was at Fort Nisqually at the southern end of Puget Sound. The Wilkes Expedition of 1841 used the fort as a base for explorations in southern Puget Sound, which included mapping in proximity to the project area (Kirk and Alexander 1990:308).

At the time of Euroamerican contact, the shoreline in the project area looked much like it does today. Among the earliest detailed maps is the 1857 General Land Office Map (USSG 1884), which shows no development in the project area (Figure 1-11).

Development in the project area since 1857 includes residences, small businesses, and roadways. The historic Olalla Pioneer Cemetery was established in 1901 along Olalla Valley Road SE.
There are no recorded archaeological sites or historic structures in the project area. The nearest archaeological sites surround Burley Lagoon, approximately 4 miles southwest of the project area. The nearest structure that has been determined to be eligible for the National Register of Historic Places (NRHP) is the Charles F. Nelson House. The house is at the corner of Nelson Road and Crescent Valley Road, across Olalla Creek and south of the project area.

There are no Traditional Cultural Properties (TCPs) on file at the Washington State Department of Archaeological and Historical Preservation (DAHP) in the project area. However, tribes may have knowledge of TCPs in the area. There has been one cultural resources survey conducted within 1 mile of the project area. It was conducted for a boat launch facility just west of the intersection of Banner Road SE and Olalla Valley Road SE (Berger 2009). The survey included pedestrian reconnaissance and subsurface testing. It revealed that surface sediments at the boat launch area are primarily engineered fill, with possible native sediments at 75 to 155 centimeters (2.5 to 5 feet) below the ground surface. No archaeological materials were encountered.

There may be NRHP eligible structures along the existing roadway segments for several of the alternatives. Direct effects from construction are possible, but these can likely be avoided or reduced with appropriate planning.

Several of the alternatives reviewed in this study pass near a known cultural resource and may impact it, whereas some alternatives go through previously undisturbed areas that may encounter unrecorded cultural resources. The known cultural resource is the Olalla Pioneer Cemetery occupying 1.43 acres and containing burials dated 1901 to 1933, and although unmaintained and having many unmarked graves, there is an elevated potential to encounter graves during construction of alternatives that pass close to the location.

Any one of the alternatives, if chosen, would require a cultural resources survey in compliance with applicable state and federal laws.
Other Studies and Data

Roadway and Traffic

Banner Road SE is a two-lane, two-way road that ranges in width from 17 to 19 feet for the traveled way and a variable shoulder width of 1 to 4 feet on the downslope side of the road. It is currently classified as a collector arterial with an ADT of 700 vehicles per day with a projected ADT of 1,000 vehicles per day in 20 years.

SE Culver Street traffic counts were recently taken in July 2011 and showed ADT counts totaling less than 50 vehicles per day. Alternatives that close Banner Road SE would significantly increase the ADT on SE Culver Street.

Utilities

There are no underground water or sewer services along this corridor; the homes are served by wells and septic systems. There are overhead power and telecommunications utilities at each end of the project area, but they will generally not be affected by the project. There is a stormwater system that was installed in 2009 beneath the north side of the roadway. The stormwater system consists of seven catch basins connected with 18 inch diameter corrugated polyethylene pipe which outfalls to Puget Sound. The roadway has a thickened edge to convey water to the catch basins.
2. Process

OVERVIEW

The process leading to a preferred solution included collaboration with the community, elected officials, and County staff. Initially, a wide-range of solutions was identified and screened, resulting in a long-list of alternatives that was evaluated and ranked based on the purpose and need. The local community was given the opportunity to participate in the process leading up to the selection of the top three alternatives that were further developed and reevaluated to identify the preferred solution.

The following bullets describe steps taken from project initiation through completion of the design report.

- Define purpose and need
- Conduct brainstorming session to identify a wide range of solutions, screen for feasibility, and identify a long list of alternatives
- Community meeting to seek community input on list of 15 alternatives
- Refine and estimate costs for the list of 15 alternatives
- Develop evaluation criteria
- Apply evaluation criteria and select top three alternatives
- Second community meeting to present top three alternatives and seek input
- Environmental and geotechnical field visit of top three alternatives
- Develop concept plans for top three alternative and refine construction costs
- Smaller community meetings and individual meetings with affected property owners to solicit feedback
- Select preferred alternative
- Complete design report and prepare preliminary plan of preferred alternative

The alternatives were evaluated based on social considerations, transportation considerations, and cost.

PUBLIC INVOLVEMENT

Obtaining broad-based community support for the recommended solution was seen as critical for the future phases, so the public involvement process was initiated in the summer of 2010 and continued through finalizing the design report. Commissioner Garrido organized and facilitated small group neighborhood meetings, attended both community meetings, and met with residents whose property would be directly impacted by the alternatives.
Table 2-1 shows the public involvement schedule, and Appendix F contains copies of the graphics prepared for the public meetings.

**Table 2-1: Public Involvement Schedule**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting with small community groups</td>
<td>Summer 2010</td>
</tr>
<tr>
<td>Mail invitation to open house; post alternatives on website</td>
<td>September 2010</td>
</tr>
<tr>
<td>First community meeting – initial list of alternatives input</td>
<td>October 2010</td>
</tr>
<tr>
<td>Set up vote on website following meeting</td>
<td>November 2010</td>
</tr>
<tr>
<td>Refine cost estimates, post to website</td>
<td>January 2011</td>
</tr>
<tr>
<td>Mail invitation to open house; update website</td>
<td>April 2011</td>
</tr>
<tr>
<td>Second community meeting – top three alternatives</td>
<td>May 2011</td>
</tr>
<tr>
<td>Additional smaller neighborhood community meetings</td>
<td>Late 2011, early 2012</td>
</tr>
<tr>
<td>Draft design report</td>
<td>Summer 2012</td>
</tr>
</tbody>
</table>

**Public Outreach Materials and Comment Methods**

Mailers were sent out in advance of both public open houses. The two public open house mailers are included in Appendix F. A website was created to provide graphics and information for the community to review before and after community meetings. Comments were received through email, website comment forms, and open house comment forms. The comments received are included in Appendix F.

**What we Heard**

The most prevalent comments throughout the project and at both open house community meetings were to preserve the community’s character, and a very strong desire to not demolish any homes, as well as limit impacts to private property.

The full list of comments received either in person, by mail, by email or by commenting on the website are contained in Appendix F.

In addition, an informal website vote was taken after the first community meeting. Although it was not the sole-basis for making any decisions, it was another measure of public opinion.
3. Design Criteria

DESIGN CRITERIA AND DESIGN STANDARDS

The roadway design criteria and design standards used in the preliminary design of the alternatives can be found in Tables 3-1 and 3-2. Sources for these tables come from the manuals cited in the following section and from information gathered from the County and discussions with the County.

Table 3-1: Roadway Design Criteria

<table>
<thead>
<tr>
<th>Federal Roadway Classification for Banner Road SE</th>
<th>Rural Major Collector (07)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT – Current</td>
<td>700 vehicles per day</td>
</tr>
<tr>
<td>ADT – 20 year projection</td>
<td>1,000 vehicles per day</td>
</tr>
</tbody>
</table>

Table 3-2: Design Standards

<table>
<thead>
<tr>
<th>Design Vehicle</th>
<th>Single Unit Truck¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posted Speed</td>
<td>25 miles per hour</td>
</tr>
<tr>
<td>Lane Width</td>
<td>11 feet</td>
</tr>
<tr>
<td>Shoulder Width</td>
<td>6 feet</td>
</tr>
<tr>
<td>Maximum Roadway Grade</td>
<td>10 percent</td>
</tr>
</tbody>
</table>

¹ Single Unit Truck turning radius is similar to a school bus turning radius.

RESOURCES AND SOURCE MATERIAL

- Kitsap County Road Standards, 2007
- Kitsap County, Stormwater Design Manual, 2010
- Washington State Department of Transportation, Local Agency Guidelines, April 2012
4. List of 15 Alternatives

A list of 15 alternatives was initially developed for consideration. The intent was to put all ideas on the table in order to have a process that truly considered all potentially feasible alternatives. These alternatives came from the design team and from members of the community.

The 15 alternatives can be grouped together in three categories. The first category includes Alternatives 1 through 4 and addresses solutions that lie within or near the existing corridor that would not change traffic patterns in the area. The second category includes Alternatives 6, 6B, 7, and 7B, and considered either an extension or new connection to SE Culver Street from SE Olalla Valley Road. This would result in 700 additional cars per day on SE Culver Street, as well as the closure of both Banner Road SE and Price Road SE. The third category includes Alternatives 9, 10, and 11, which reflect a new roadway connecting Banner Road SE and SE Olalla Valley Road, west of any existing homes in the area. These alternatives would have less of an impact on existing developed property; however, since it would include the closing of Banner Road SE and Price Rd SE, it would result in changed traffic patterns, including loss of a south access route into the area, and would require a substantial amount of new right-of-way on an undeveloped hillside.

Figure 4-1 shows the alternatives considered and Table 4-1 includes brief descriptions of the alternatives and planning level construction costs. Following Table 4-1 are detailed descriptions and graphics for each of the alternatives, along with common themes that capture public reaction.
### Table 4-1: List of 15 Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
<th>Planning Level Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 0</td>
<td>No build.</td>
<td></td>
</tr>
<tr>
<td>Alternative 1</td>
<td>Reconstruct and widen existing Banner Road SE.</td>
<td>$5.4 Million</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>Banner Road SE realignment.</td>
<td>$4.8 Million</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>One-way Banner Road SE and one-way Price Road SE.</td>
<td>$9.2 Million</td>
</tr>
<tr>
<td>Alternative 4</td>
<td>SE Banfill Road realignment and close Banner Road SE.</td>
<td>$10.9 Million</td>
</tr>
<tr>
<td>Alternative 5</td>
<td>Close Banner Road SE and close Price Road SE.</td>
<td>$1.88 Thousand</td>
</tr>
<tr>
<td>Alternative 6</td>
<td>Extend SE Culver Street to SE Olalla Valley Road and close Banner Road SE and close Price Road SE.</td>
<td>$9.1 Million</td>
</tr>
<tr>
<td>Alternative 6B</td>
<td>Extend SE Culver Street north and northwest to SE Olalla Valley Road, and close Banner Road SE, and close Price Road SE.</td>
<td>$4.2 Million</td>
</tr>
<tr>
<td>Alternative 6C</td>
<td>Extend SE Culver Road north and west to SE Olalla Valley Road and close Banner Road SE, and close Price Road SE.</td>
<td>$3.5 Million</td>
</tr>
<tr>
<td>Alternative 7</td>
<td>Re-align SE Culver Street and close Banner Road SE, close Price Road SE.</td>
<td>$7.9 Million</td>
</tr>
<tr>
<td>Alternative 7B</td>
<td>Re-align SE Culver Street down Fagerholm Lane SE, close Banner Road SE, and close Price Road SE.</td>
<td>$3.6 Million</td>
</tr>
<tr>
<td>Alternative 8</td>
<td>Improve Price Road SE and close Banner Road SE.</td>
<td>$6.0 Million</td>
</tr>
<tr>
<td>Alternative 9</td>
<td>Construct new roadway from the 90-degree bend in Banner Road SE to SE Olalla Valley Road; close Banner Road SE.</td>
<td>$5.7 Million</td>
</tr>
<tr>
<td>Alternative 10</td>
<td>Construct new roadway from Banner Road SE to SE Olalla Valley Road; close Banner Road SE and close Price Road SE.</td>
<td>$6.4 Million</td>
</tr>
<tr>
<td>Alternative 11</td>
<td>Construct new roadway from Banner Road SE to Orchard Avenue SE; close Banner Road SE.</td>
<td>$18.4 Million</td>
</tr>
</tbody>
</table>

*Note that the costs presented in this section were performed at this stage of the study and were later revised to reflect the advancement of design.*
ALTERNATIVE 0: NO BUILD

Cost
Annual maintenance costs for this section of Banner Road will eventually increase until it becomes too costly to keep the road open.

Description
The no-build alternative is typically analyzed in every project to determine if continuing with the status-quo is viable as an alternative measured against other possible alternatives. For this project, this alternative would keep Banner Road SE open as long as the County can continue to implement repairs to the road, or as long as the road has not severely failed. No improvements have been planned for this alternative. The risk associated with this alternative is high and it does not correct the problem for the long term. Currently the road is only 18 feet wide, which makes it very difficult for two way traffic to safely pass on the roadway, especially when a pedestrian or bicycle is present on the road. Many sections of the road have extensive repairs that are highly visible, pavement cracks indicating continued undermining of the road fill at the top of the slope and settlement under the road, and a lack of guardrail over much of the roadway adjacent to the high cliff.

Figure 4-2 shows the extent of this alternative.

Public Themes and Reaction
Most of the community felt something needed to be done in order to keep the roadway corridor functional for the long term and that this was not a viable alternative. As most were unaware of the slide repair history, most were concerned about the narrow lanes and sight distance limitations that made the roadway substandard. A few thought this was the best alternative due to the high costs of a project and it should be maintained as long as possible.
ALTERNATIVE 1: RECONSTRUCT AND WIDEN EXISTING BANNER ROAD SE

Cost
$5.4 Million.

Description
This alternative:
- Improves Banner Road SE in essentially the same horizontal alignment it currently is in.
- The cross-section would include 11-foot-wide lanes, a 4-foot-wide inside shoulder with a concrete barrier, a 6-foot-wide outside (water side) shoulder with guardrail.

This alternative corrects some of the high grades on the road down to maximum vertical grade of 10 percent. This new road would be constructed on stabilized fill and supported by a high soldier pile retaining wall or structural earth wall on the water side and a soil nail wall on the land side. This alternative does not take any homes; however, some minimal property frontage may be needed to accommodate the added width of the road. The reverse curves at the top of the hill would be widened enough that a school bus could navigate the roadway.

Figure 4-3 shows the extent of this alternative.

Public Themes and Reaction
This was generally the most favored as it maintained existing traffic patterns. There were concerns the project could be built on the steep bluff and there were concerns that adjacent properties would be affected.
ALTERNATIVE 2: BANNER ROAD SE REALIGNMENT

Cost
$4.8 Million.

Description
This alternative:

- Differs from the Alternative 1 alignment because it removes the substandard S-curves on the northeast end of the project limits and re-routes the roadway between the Banfill and Cairns homes.
- The cross-section would include 11-foot-wide lanes, a 4-foot-wide inside shoulder with a concrete barrier, a 6-foot-wide outside (water side) shoulder with guardrail.

Towards the lower half of the roadway, a soldier pile wall on the water side would still be needed and a soil nail wall would still be needed on the land side; however, the extent of these walls would not be as long as Alternative 1, since much of the road is routed away from the water and the steep cliff. No homes would be taken, but impacts to the Cairns and Banfill properties and minor impacts to Hendrickson property would result from the realignment. This would move the roadway closer to the Cairns parcel and it would split the Banfill property in half. The County also explored opportunity for land swaps so the Banfill and Hendrickson parcels could have former road right-of-way in front of their parcels.

Figure 4-4 shows the extent of this alternative.

Public Themes and Reaction
The significant impact to the three adjacent property owners was not acceptable to most of the community and the majority did not see this as a viable option.
ALTERNATIVE 3: ONE-WAY BANNER ROAD SE AND ONE-WAY PRICE ROAD SE

Cost
$9.2 Million.

Description
This alternative:
- Banner Road SE and Price Road SE become one-way streets along their same alignments, in what is known as a couplet.
- The cross-section would include 12-foot-wide lane with 6-foot-wide shoulders.

This roadway section width would satisfy the one way road requirements of 20 feet of clear area for emergency vehicles and this alternative would not be be viewed as detrimental to emergency vehicle access. There would be minor increases in travel times for most users. No homes would be taken as part of this alternative; however, some property acquisition would be needed to widen Price Road SE. A significant aspect of this alternative is the inadequate sight distance at the intersection of Price Road SE and SE Olalla Valley Road. Removal of the bluff would be required to provide adequate sight distance and significantly increases this alternative’s cost.

Figure 4-5 shows the extent of this alternative.

Public Themes and Reaction
This was generally well received by the public until they realized that major roadway improvements would be required on two roadways including improvements at the Olalla Valley Rd SE intersection, therefore increasing costs. Concerns about safety for driving public and emergency services were noted by some. In general this was only an acceptable alternative to the public if it saved money, which turned out not to be the case.
ALTERNATIVE 4: SE BANFILL ROAD REALIGNMENT AND CLOSE BANNER ROAD SE

Cost
$10.9 Million.

Description
This alternative:

- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road.
- Improves and extends SE Banfill Road south towards Southeast Olalla Valley Road.
- The extension cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders.

No homes are taken by this alternative if retaining walls are included, but a significant amount of property is still needed to connect the current west end of SE Banfill Road to SE Olalla Valley Road. The high cost is primarily a result of extensive earthwork and retaining walls.

Figure 4-6 shows the extent of this alternative.

Figure 4-6: Alternative 4 Overview

Public Themes and Reaction
There was very little interest in developing this alternative further due to the perceived significant impact to adjacent property owners and high costs. These costs were largely a function of walls included to minimize private property impacts.
ALTERNATIVE 5: CLOSE BANNER ROAD SE AND CLOSE PRICE ROAD SE

Cost
$188 Thousand

Description
This alternative:
- Effectively the eventual “no build” alternative.
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Cul-de-sacs would be installed at the end of SE Culver Street and at the intersection of SE Banfill Road and Banner Road SE.

Access revisions would be needed to continue providing access to all private property owners. Banner Road SE could be left open as a trail for pedestrians and bicyclists until it is no longer feasible to maintain. This alternative is unfavorable to emergency services as it cuts off through access on two roads. The travel time impacts are significant and could increase travel times up to 8 minutes and 25 seconds as discussed in Section 1 of this report. Kitsap County Road standards require 2 access points to a development that exceeds 100 homes. This alternative appears close to the 100-home threshold. The SE Culver Street cul-de-sac is well beyond the Kitsap County 1,000-foot maximum cul-de-sac length and would require a deviation, the Banner Road SE cul-de-sac would be close to the 1000’ maximum. No homes would be taken as part of this alternative, but minor property acquisitions would be needed to accommodate the construction of the cul-de-sacs.

Figure 4-7 shows the extent of this alternative.

Public Themes and Reaction
This was not seen as an acceptable alternative to the general public due to the inconvenience of losing this arterial connection and the increase in travel times that result.
ALTERNATIVE 6: EXTEND SE CULVER STREET TO SE OLALLA VALLEY ROAD AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Cost
$9.1 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Extends SE Culver Street from the current west end of SE Culver Street fairly straight west to connect with SE Olalla Valley Road.
- The direct extension cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders.

The extension would require lowering and reconstructing 1,000 feet of existing road on SE Culver Street to achieve a 12 percent maximum downgrade to SE Olalla Valley Road, and it would require removal of bluff to provide adequate sight distance at the future intersection of SE Olalla Valley Road and SE Culver Street. Additionally, it would require significant walls to avoid impacting homes, and private property would be needed to construct the extension. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-8 shows the extent of this alternative.

![Figure 4-8: Alternative 6 Overview](image)

Public Themes and Reaction
Cost aside, this alternative was generally looked on favorably due to the relatively direct arterial connectivity. Exceptions were those owners along SE Culver Street due to the increase in traffic. This alternative generally fell out of favor when the high cost was noted due to the regrading required along SE Culver Street and Olalla Valley Rd SE.
ALTERNATIVE 6B: EXTEND SE CULVER STREET NORTH AND NORTHWEST TO SE OLALLA VALLEY ROAD AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Cost
$4.2 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Extends SE Culver Street from the current west end of SE Culver Street towards the northwest through mostly undeveloped land to eventually connect to SE Olalla Valley Road.
- The extension cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders.

This alternative differs from Alternative 6 in that it avoids the reconstruction and wall costs that Alternative 6 has as well as the reconstruction along Olalla Valley Rd SE due to inadequate sight distance. The route is less direct to SE Olalla Valley Road in terms of arterial connectivity and would increase travel times. No homes would be taken as part of this alternative, but additional right-of-way would be needed. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-9 shows the extent of this alternative.

Public Themes and Reaction
This alternative was generally favored more than Alternative 6 due to a decrease in property impacts and costs.
ALTERNATIVE 6C: EXTEND SE CULVER STREET WEST TO SE OLALLA VALLEY ROAD AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Cost
$3.5 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Realigns SE Culver Street Road in a northwesterly direction towards SE Olalla Valley Road, but not as far northwest as Alternative 6B.
- The cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders.

This alternative is a compromise between Alternative 6 and Alternative 6C in that it reduces the road length to get to the SE Olalla Valley Road arterial compared to Alternative 6B, but still avoids extensive regrading due to sight distance on Olalla Valley Rd SE. It still requires extensive use of retaining walls on each side of the road. This alternative would not take any homes, but would require private property to construct. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-10 shows the extent of this alternative.

Public Themes and Reaction
This was suggested by a meeting attendee as a way to minimize impacts to the properties at the end of Culver Street in Alternative 6. It was received favorably by the community due to the decrease in private property impacts and lower cost.
ALTERNATIVE 7: RE-ALIGN SE CULVER STREET AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Cost
$7.9 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Realigns SE Culver Street southwest towards the intersection of Price Road SE and SE Olalla Valley Road.
- The cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders.

Removal of bluff would be required to provide adequate sight distance at the intersection of this road and SE Olalla Valley Road. No homes taken, but significant property takes would be required for two parcels. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-11 shows the extent of this alternative.

Public Themes and Reaction
There was generally very little interest in developing this alternative. Perceived as too much of an impact to adjacent property owners.
ALTERNATIVE 7B: RE-ALIGN SE CULVER STREET DOWN FAGERHOLM LANE SE AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Cost
$3.6 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Realigns SE Culver Street down Fagerholm Lane SE in a primarily southward direction.
- The cross-section would have 10-to-11-foot-wide lanes and additional shoulder width.

This alternative closes Banner Road SE, closes Price Road SE, and realigns SE Culver Street down Fagerholm Lane SE in a primarily southward direction. It would require an improvement to the Fagerholm Lane SE alignment from SE Culver Street to the existing intersection at Banner Street SE and SE Olalla Valley. This alternative would require the take of one home and additional property. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-12 shows the extent of this alternative.

Figure 4-12: Alternative 7B Overview

Public Themes and Reaction
There was generally very little interest in developing this alternative. Perceived as too much of an impact to adjacent property owners.
ALTERNATIVE 8: IMPROVE PRICE ROAD SE AND CLOSE BANNER ROAD SE

Cost
$6.0 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road.
- Improve Price Road SE to be more reliable and to take additional diverted traffic.
- The cross-section would have 10-to-11-foot-wide lanes and additional shoulder width.

The inadequate sight distance that exists at the intersection of Price Road SE and SE Olalla Valley Road would require removal of a bluff. No homes would be taken as part of this alternative, but it would require acquiring private property. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-13 shows the extent of this alternative.

Figure 4-13: Alternative 8 Overview

Public Themes and Reaction
There was very little interest in developing this alternative. Perceived as too much of an impact to adjacent property owners and a poor arterial alignment.
ALTERNATIVE 9: CONSTRUCT NEW ROADWAY FROM THE 90-DEGREE BEND IN BANNER ROAD SE TO SE OLALLA VALLEY ROAD; CLOSE BANNER ROAD SE

Cost
$5.7 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road.
- Constructs a new road between the 90-degree bend on Banner Road SE that is several miles north-northwest of the portion of Banner Road SE under consideration for closure; the new roadway then connects to SE Olalla Valley Road.
- The cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders, with 2:1 catch slopes and guardrails since the vertical profile of this new road would not fit well with the existing topography.

The alternative’s winding alignment down the hillside requires significant cut and fill slopes to maintain a maximum 12-percent grade. This alternative includes taking a home near the upper end of the new road where it ties into Banner Road SE. This alternative is not preferred by emergency services given the loss of the Banner Road SE connection closest to the water and increase in travel times. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-14 shows the extent of this alternative.

Public Themes and Reaction
Because this alignment did take one home, this alternative was generally not acceptable to most. Those that were interested wanted Banner Rd SE to remain open as well.
ALTERNATIVE 10: CONSTRUCT NEW ROADWAY FROM BANNER ROAD SE TO SE OLALLA VALLEY ROAD AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Cost
$6.4 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road. Closes Price Road SE.
- Constructs a new roadway from a northern section of Banner Road SE north of Alternative 9 down towards SE Olalla Valley Road.
- The cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders.

It would be a longer roadway alignment than Alternative 9, but it would fit better to the existing topography which would avoid larger cuts and fills. The alignment would be routed through undeveloped property; no homes would be taken, but significant undeveloped property would need to be acquired. This alternative is not preferred by emergency services due to the loss of the Banner Road SE connection nearest to the water and increase in travel times. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-15 shows the extent of this alternative.

Figure 4-15: Alternative 10 Overview

Public Themes and Reaction
This was the most favored of the new road alignments as the alignment generally stays within undeveloped land with minimal private property impacts; however, most who favored this alignment still wanted Banner Rd SE to remain open.
ALTERNATIVE 11: CONSTRUCT NEW ROADWAY FROM BANNER ROAD SE TO ORCHARD AVENUE SE; CLOSE BANNER ROAD SE

Cost
$18.4 Million

Description
This alternative:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road.
- Constructs a roadway between the northern section of Banner Road SE and Orchard Avenue SE.
- The cross-section would include 11-foot-wide lanes and 6-foot-wide shoulders and likely a large bridge to cross the ravine.

The roadway connection would require crossing a large ravine. The closure of the portion of Banner Road SE nearest to the water would eliminate the direct connection between Banner Road SE and SE Olalla Valley Road. Undeveloped property would be required for this alternative. This alternative was not preferred by emergency services due to losing the Banner Road SE connection closest to the water and increased travel times. The cul-de-sac that would be required at the closure point on Banner Road SE would be close to the 1,000-foot maximum distance allowed in the Kitsap County Road standards.

Figure 4-16 shows the extent of this alternative.

Public Themes and Reaction
There was very little support for this alternative; the great expense and thought of bridging the valley for a circuitous arterial connection were found excessive by most and did not make sense.
5. Alternatives Evaluation

LIST OF 15 ALTERNATIVES EVALUATION

The list of 15 alternatives was evaluated to identify the top three alternatives that best meet the purpose and need.

The following criteria were used to evaluate and rank the list of 15 alternatives:

- Social Considerations
  - Elimination of Existing Homes
  - Encroachment upon Existing Homes and Properties
  - Overall Impact on Neighborhood
  - Community Acceptance

- Transportation Considerations
  - Impact to Emergency Services
  - Changes in Traffic Circulation Patterns
  - Adherence to Road Standards

- Project Cost Considerations
  - Numerical Score

Although many of elements of the evaluation criteria are subjective to create a numerical score for each alternative, the following comparative standard was applied:

- Positive (+2 points): Criteria category scores better than average when compared to other alternatives.
- Neutral (+1 point): Criteria category scores neither better nor worse than average when compared to the other alternatives.
- Negative (+0 points): Criteria category scores worse than the average of the other alternatives.

- Project Cost Score Adjustment

Project costs include the acquisition of new right-of-way, design, permitting, and construction of the improvements. Based on the total costs of the project, the score for each alternative was reduced as follows.

- $0-2 Million = 0 points
- $2-4 Million = -1 point
- $4-8 Million = -2 points
- $8+ Million = -3 points

Based on the scoring and discussions between the team and the County staff, the top three alternatives were identified. Table 5-1 indicates whether an alternative advanced or whether it was dropped and why.
The relative ranking score per the criteria above also factored into the decision. See Appendix C for the detailed scoring matrix. Typically alternatives scoring higher than 4 were carried forward, with the exception of Alternative 2. While Alternative 2 scored well from a traffic perspective it received strong community opposition due to property impacts and was therefore dropped from further consideration.

Table 5-1: Ranking the List of 15 Alternatives

<table>
<thead>
<tr>
<th>Alternative Number</th>
<th>Description</th>
<th>Advanced or Dropped (and Reasons Why, if Dropped)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No build. Dropped (not a long term solution; safety concerns)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>Reconstruct and widen existing Banner Road SE.</td>
<td>Advanced</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Banner Road SE realignment.</td>
<td>Dropped (lack of community support; property impacts)</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>One-way Banner Road SE and on-way Price Road SE.</td>
<td>Dropped (high costs; safety concerns)</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>SE Banfill Road realignment and close Banner Road SE.</td>
<td>Dropped (high costs; lack of community support)</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Close Banner Road SE and close Price Road SE.</td>
<td>Dropped (lack of community support; this is effectively the “no build” alternative)</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Extend SE Culver Street to SE Olalla Valley Road and close Banner Road SE and close Price Road SE.</td>
<td>Dropped (high costs; lack of community support)</td>
<td>3</td>
</tr>
<tr>
<td>6B</td>
<td>Extend SE Culver Street north and northwest to SE Olalla Valley Road, and close Banner Road SE, and close Price Road SE.</td>
<td>Dropped (Retired alignment 6B to create alternative 6C)</td>
<td>N/A</td>
</tr>
<tr>
<td>6C</td>
<td>Extend SE Culver Road north and west to SE Olalla Valley Road and close Banner Road SE, and close Price Road SE.</td>
<td>Advanced</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Re-align SE Culver Street and close Banner Road SE, close Price Road SE.</td>
<td>Dropped (lack of community support)</td>
<td>3</td>
</tr>
<tr>
<td>7B</td>
<td>Re-align SE Culver Street down Fagerholm Lane SE, close Banner Road SE, and close Price Road SE.</td>
<td>Dropped (lack of public support; private property impacts)</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Improve Price Road SE and close Banner Road SE.</td>
<td>Dropped (high costs; property impacts; lack of public support)</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Construct new roadway from the 90-degree bend in Banner Road SE to SE Olalla Valley Road; close Banner Road SE.</td>
<td>Dropped (lack of community support, property impacts)</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Construct new roadway from Banner Road SE to SE Olalla Valley Road; close Banner Road SE and close Price Road SE</td>
<td>Advanced</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>Construct new roadway from Banner Road SE to Orchard Avenue SE; close Banner Road SE.</td>
<td>Dropped (high costs)</td>
<td>3</td>
</tr>
</tbody>
</table>
SHORT LIST OF ALTERNATIVES EVALUATION

Prior to evaluating the top three alternatives, concept plans were developed for each alternative to more accurately estimate the cost of construction and the potential environmental impacts. In addition, a one day site inspection was conducted by the environmental scientist and geotechnical engineer to further capture project impacts and costs for the three alternatives identified for further study. Expanded descriptions of each alternative including typical roadway sections and plan views along with a discussion of the environmental considerations are noted in this section, followed by a comparative evaluation.

ALTERNATIVE 1: RECONSTRUCT AND WIDEN EXISTING BANNER ROAD SE

Description

- Improve Banner Road Southwest mostly in the same horizontal alignment between SE Banfill Road and SE Olalla Valley Road.
  - 11-foot-wide lanes, a 4-foot-wide inside shoulder with a concrete barrier, and a 6-foot-wide outside (water side) shoulder with guardrail. The 4-foot inside shoulder is non-standard but minimizes property impacts. This was viewed as a likely deviation during design due to the six foot shoulder on the view side of the roadway.
- Corrects some high grades down to maximum vertical grade of 10 percent.
- Supported on stabilized fill supported by a retaining wall on the water side and a soil nail wall on the land side.
- Does not take any homes; some minimal property frontage may be needed in areas to accommodate the added width to the road.
- The existing substandard curves near SE Banfill Road will remain. The property impacts to improve these curves are extensive, as seen in Alternative 2.
- The aesthetics of the traffic and pedestrian barrier were a concern to some along the corridor and maintaining a view was important to everyone. The recommended barrier is a steel tube barrier called the Oregon 2-Tube Barrier with bicycle rails added. This barrier meets state and federal traffic safety standards while providing a water view to users. A photo of this barrier is seen in Figure 5-3.
Environmental Setting and Potential Impacts

Within the study area, the road is positioned between residential development and a fairly steep eroding bluff fronting Puget Sound. Habitat types present on the north side of the existing road include maintained lawns and ornamental vegetation. The bluff on the south side of the existing road includes ornamental and native vegetation dominated by a number of deciduous and non-deciduous trees. The understory consists of a number of wild floras.

No streams were observed during the investigation. A small seep exhibiting wetland characteristics was observed on the north side of the road between approximately Stations 24+00 and 25+00 (see Figure 1-9). Dominant vegetation in the potential wetland area consisted of horsetail (Equisetum sp.).
It is assumed that the structural components of the project footprint are entirely above the Ordinary High Water Mark (OHWM) of Puget Sound; however, the placement of riprap material at the toe of the bluff may be necessary and would result in permanent impacts to marine nearshore habitat below the OHWM.

**Cultural Resources Impacts**
Based upon the Washington State Department of Archeology and Historic Preservation (DAHP) predictive model, Alternative 1 is almost entirely within a high risk area, except for about 30 meters (100 feet) of a moderate risk area. However, no known cultural resources will be impacted.

**Public Reaction**
This alternative was generally most favored primarily because it maintained existing traffic patterns with limited property impacts.

**Costs**
With the refinement of design details, an improved but still preliminary cost estimate could be performed. This alternative is expected to cost $4.7 million.

![Figure 5-3: Recommended Steel Tube Barrier along Waterside of Banner Road SE](image-url)
ALTERNATIVE 6C: EXTEND SE CULVER ROAD NORTH AND WEST TO SE OLALLA VALLEY ROAD AND CLOSE BANNER ROAD SE, CLOSE PRICE ROAD SE

Description
- Closes Banner Road SE between SE Banfill Road and SE Olalla Valley Road, closes Price Road SE, and extends SE Culver Road in a northwesterly direction towards SE Olalla Valley Road, but not as far northwest as Alternative 6B.
- Significant earthwork cut, and some walls may be needed.
- Includes 11-foot lanes and 6-foot shoulders.
- Would not take any homes, but would require property to construct.

Figure 5-4: Aerial View of Alternative 6C

Figure 5-5: Alternative 6C Typical Section
Environmental Setting and Potential Impacts
Habitat types observed consists primarily of disturbed habitat (including utility corridor and cleared areas), ornamental vegetation, and upland and wetland forested and scrub-shrub areas. Dominant vegetation includes several varieties of deciduous and non-deciduous trees. Dominant understory vegetation includes a large number of flora.

Two potential streams and wetlands were observed along the Alternative 6c alignment. The wetlands were generally small, slope/depressional wetlands that typically consisted of several varieties of flora. The streams were small, with widths ranging from approximately 1 to 2 feet, and flowed north-to-south into a ditch on the north side of Olalla Valley Road SE, and then through an existing culvert to Olalla Bay. No fish were observed.

Preliminary design indicates the proposed alignment would traverse through several streams and wetlands and would be subject to the regulatory requirements. The closure of Banner Road SE may be subject to additional regulatory requirements depending on construction methodologies, if any, for closing the road, or other requirements necessary to stabilize the slope following removal of the road.

Cultural Resources Impacts
Based upon the Washington State DAHP predictive model, Alternative 6C traverses a high-risk area from its origin at Olalla Valley Road westward for about 320 meters (1,050 feet). The remainder of the alignment is in moderate-risk areas. No known cultural resources will be impacted by this alternative.

Public Reaction
The public liked the fact no homes were taken but generally did not like the traffic circulation as much as Alternative 1.

Cost
$4.8 million

ALTERNATIVE 10: CONSTRUCT NEW ROADWAY FROM BANNER ROAD SE TO SE OLALLA VALLEY ROAD AND CLOSE BANNER ROAD SE; CLOSE PRICE ROAD SE

Description:
- Closes Banner Road SE between SE Olalla Valley Road and SE Banfill Road, closes Price Road SE, and constructs a new roadway from a northern section of Banner Road SE north of Alternative 9 down towards SE Olalla Valley Road.
- Avoids large cut-and-fills.
- Includes 11-foot lanes and 6-foot shoulders.
- Routed through undeveloped property; no homes would be taken, but significant undeveloped property would be needed.
Environmental Setting and Potential Impacts

Habitat types observed consists primarily of disturbed habitat (including utility corridor and cleared areas), ornamental vegetation, and upland and wetland forested and scrub-shrub areas. Dominant vegetation includes several varieties of deciduous and non-deciduous trees. Dominant understory vegetation includes a number of flora.

Several potential streams and wetlands were observed along the Alternative 10 alignment. The wetlands were generally small, slope/depressional wetlands that typically consisted of several types of flora. The streams were small, with widths ranging from approximately 1 to 2 feet, and flowed north to south into a ditch on the north side of Olalla Valley Road SE, and then through an existing culvert to Olalla Bay. No fish were observed.

Preliminary design indicates the proposed alignment would traverse through several streams and wetlands and would be subject to the regulatory requirements. The closure of Banner Road SE may be
subject to additional regulatory requirements depending on construction methodologies, if any, for closing the road, or other requirements necessary to stabilize the slope following removal of the road.

**Cultural Resources Impacts**
Alternative 10 begins at Olalla Valley Road SE and traverses very high or high risk areas for about 350 meters (1,150 feet). The remainder of the alignment is in moderate or moderately low risk areas. Of the three short listed alternatives, only one will possibly impact a known cultural resource. Alternative 10 might impact the Olalla Pioneer Cemetery. Because the cemetery is unmaintained and many graves are unmarked, the marked boundaries must be considered approximate. Even if Alternative 10 avoids the marked boundaries of the cemetery, there is clearly elevated potential to encounter graves during construction.

**Public Reaction**
The public liked the fact it was through undeveloped land with minimal impacts to residences; however, the traffic circulation and added commute time was generally viewed negatively.

**Cost**
$7.0 million.

**ALTERNATIVES EVALUATION**
The criteria in Table 5-3 were used to further evaluate the three short-listed alternatives.

**Table 5-3: Short List Screening Criteria**

<table>
<thead>
<tr>
<th>Social Considerations</th>
<th>Screening criteria were tailored to the feedback received by the community and strongly centered on minimizing property impacts. Categories included:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>— Elimination of Existing Homes</td>
</tr>
<tr>
<td></td>
<td>— Encroachment upon Existing Homes and Properties</td>
</tr>
<tr>
<td></td>
<td>— Overall Impact on Neighborhood</td>
</tr>
<tr>
<td></td>
<td>— Community Acceptance</td>
</tr>
<tr>
<td>Transportation Considerations</td>
<td>Screening criteria for transportation included:</td>
</tr>
<tr>
<td></td>
<td>— Impact to Emergency Services</td>
</tr>
<tr>
<td></td>
<td>— Changes in Traffic Circulation Patterns / Increased travel times</td>
</tr>
<tr>
<td></td>
<td>— Adherence to Road Standards</td>
</tr>
<tr>
<td>Environmental Considerations</td>
<td>Qualitatively assess the potential impact on local streams, nearshore environment, riparian environment, wetlands, and potential likelihood to affect Endangered Species Act (ESA) species and/or habitat caused by each alternative. Qualitatively assess potential impacts to wildlife species that do not have ESA-listed status that are likely associated with these habitats (amphibians, birds, reptiles, mammals, and marine invertebrates).</td>
</tr>
<tr>
<td>Project Costs</td>
<td>Define the total costs of the project including design, permitting, construction, and right-of-way acquisition. Identify project cost risks.</td>
</tr>
</tbody>
</table>
Results of the evaluation are shown in Table 5-4 and also seen in Appendix C.

Table 5-4: Evaluation Summary of Short-Listed Alternatives

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Alternative 1</th>
<th>Alternative 6C</th>
<th>Alternative 10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Home Elimination</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Existing Home Encroachment</td>
<td>Neutral</td>
<td>Three</td>
<td>Neutral</td>
</tr>
<tr>
<td>Impact on Neighborhood</td>
<td>Positive</td>
<td>Negative</td>
<td>Neutral</td>
</tr>
<tr>
<td>Community Acceptance</td>
<td>Positive</td>
<td>Low</td>
<td>Neutral</td>
</tr>
<tr>
<td><strong>Transportation Considerations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact to Emergency Services</td>
<td>Positive</td>
<td>Neutral</td>
<td>Negative</td>
</tr>
<tr>
<td>Traffic Circulation</td>
<td>Positive</td>
<td>Somewhat Negative</td>
<td>Neutral</td>
</tr>
<tr>
<td>Adherence to Road Standards</td>
<td>Negative</td>
<td>Neutral</td>
<td>Positive</td>
</tr>
<tr>
<td><strong>Environmental Considerations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor wetlands, or, if toe protected, shoreline impacts</td>
<td>Streams, wetlands</td>
<td>Streams, wetlands</td>
</tr>
<tr>
<td><strong>Cost Considerations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Cost</td>
<td>$4.7 M</td>
<td>$4.8 M</td>
<td>$7.0 M</td>
</tr>
<tr>
<td>Risk</td>
<td>Increased wall costs, erosion at toe of slope, permitting</td>
<td>Cut slope stability, stream relocation, wetlands</td>
<td>Stream relocation, wetlands</td>
</tr>
</tbody>
</table>
6. Recommendation

Alternative 1, Reconstruct and Widen Existing Banner Road SE is the recommend alternative based on the following factors:

SOCIAL CONSIDERATIONS

Alternative 1 will clearly have the least amount of impact on existing homes since no new roads will be constructed and no existing roads will be closed. It will not change local traffic patterns; therefore, it has the least impact on the neighborhood. Alternatives 6C and 10 would both result in a major change to local traffic patterns. Although access to the neighborhood from the north would remain unchanged, closing Banner Road SE and Price Road SE would block off the current access, as well as require using either the Culver extension in Alternative 6C or going even further out of direction to use the new road in Alternative 10. Although the SE Culver Road Extension would not result in a significant change to local traffic patterns, it was not favored by property owners along the street who would see up to 700 additional cars a day passing in front of their house. Today the road carries between 50 and 100 cars a day, and the extension would result in a new roadway that is fairly close to three houses. Alternative 1 was the most preferred alternative based on comments heard at the public meeting and the results of the informal poll conducted on the County web site.

TRANSPORTATION CONSIDERATIONS

Alternative 1 will have the least impact on emergency services since they will continue to respond as they do today with no additional travel time. Travel times for the general public would remain unchanged with Alternative 1. For some users there would be a slight travel time increase with Alternative 6C and a substantial increase with Alternative 10. Although Alternative 1 is the recommended alternative, it will require a deviation from the County Road Standards because the left (upland side) shoulder width is four feet and not the standard six feet. This deviation was deemed appropriate to minimize retaining wall heights and the associated construction costs, as well as minimize property impacts. Alternatives 6C and 10 were laid out according to County standards; however, the Alternative 6C roadway centerline profile grade is at the upper most acceptable limit of 12 percent for 500 feet.

ENVIRONMENTAL CONSIDERATIONS

The environmental impacts of Alternative 1 are clearly understood and, with the exception on one small wetland area, are associated with working in the nearshore upland environment. The required mitigation measures necessary to obtain permit approval are fairly common and typical for this type of project. Based on the limited site investigation conducted for this study both of the other alternatives will impact at least two streams each, and will most likely impact additional wetland areas when compared to Alternative 1. At this stage it is clear the environmental impacts of Alternatives 6C and 10 are likely to be greater than Alternative 1.
COST CONSIDERATIONS

For all practical purposes, the project costs for Alternative 1 and Alternative 6C should be considered equal based on this level of design development. Initial expectations thought reconstructing Banner Road SE would be considerably more expensive than other alternatives; however, with the extended lengths of the other alternatives and increase environmental mitigation required, Alternative 1 became cost competitive.

CONCLUSION

Alternative 1 has broad based community support because it has the least impact on the community and would result in a safer and more stable roadway that can accommodate all users. When given the choice of reconstructing the existing roadway without changing traffic patterns or closing the existing section and constructing a new road on private property and near existing homes, the local community was clear that reconstruction is their preference. This is also a cost competitive option that has potentially less environmental impacts than the other two alternatives. Preliminary plans and a refined cost estimate were developed in concluding this Report; the plans and cost estimate can be found in Appendix A and B.

NEXT STEPS

The County does not currently have the capital improvement funds available to construct this project. With completion of this design report, the county will pursue funding through a variety of grant programs. Possible options include safety, non-motorized, road preservation, and hazard mitigation funding programs. With the Commissioner’s approval and a preferred alternative defined, the County will be in a position to pursue grant funding to design and construct the project. The selected alternative will be considered annually as part of the Transportation Improvement Program process.