WSDOT Report:

I-5 protection from 13th Street to Mellen Street near Centralia and Chehalis

December 19, 2012

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Executive Summary

This report summarizes work by the Washington State Department of Transportation (WSDOT) to evaluate projects to protect Interstate 5 (I-5), the Chehalis-Centralia Airport and improve access to medical and other critical facilities during flood events.

This work is part of a larger effort to identify potential flood hazard mitigation projects in the Chehalis River Basin. In 2011, as part of the capital budget (ESHB 2020, Section 1033) the Washington State Legislature required the Office of Financial Management (OFM) to prepare a report on alternative flood damage reduction projects and – in coordination with tribal governments, local governments, state and federal agencies – to recommend priority flood hazard mitigation projects in the Chehalis River Basin for continued feasibility and design work. The OFM report looks at a full range of alternatives to protect people and communities from flooding, including water retention in the upper Chehalis, smaller scale infrastructure protection, floodplain management and other projects to improve ecological and natural floodplain function, and land use management approaches to reduce potential flood damages.

As part of the OFM report, WSDOT was tasked with evaluating alternatives that could be used to protect I-5 from flooding. This is only one part of the work needed to determine how best to reduce flood damages in the Chehalis Basin. WSDOT evaluated six alternatives that could be used to protect I-5 from flooding. Due to time and funding constraints, WSDOT has done a limited amount of design work to define and evaluate these alternatives.

- **Alternative 1: I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee** – Provides protection of I-5 and the Chehalis-Centralia Airport in flood events up to the 2007 or simulated 100-year flood level. It improves conditions for approximately 1,030 buildings, but has a negative impact for approximately 140 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. Alternative 1 does not address the need to widen I-5 in the future. Alternative 1 appears to warrant further consideration as an independent project or in combination with other flood hazard mitigation efforts in the Chehalis Basin.

- **Alternative 2: I-5 Raise and Widen Only** – Provides protection of I-5 in flood events up to the 2007 or simulated 100-year flood level, but does not provide, or preclude, protection of the Chehalis-Centralia Airport. It improves conditions for approximately 840 buildings, but has a negative impact for approximately 300 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. Alternative 2 does address the need to widen I-5 in the future.

Alternative 2 appears to warrant further consideration as an independent project or in combination with other flood hazard mitigation efforts in the Chehalis Basin.

- **Alternative 3: I-5 Express Lanes** - Provides a viable route around the portions of I-5 that are inundated during a flood event. This alternative route would be protected in flood events up to the 2007 or simulated 100-year flood level, but does not provide, or preclude, protection of the Chehalis-Centralia Airport. It improves conditions for approximately 890 buildings, but has a negative impact for approximately 170 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. There are significant uncertainties with Alternative 3, including whether the City of Tacoma would sell the right-of-way to the Tacoma Rail line and, if so, at what cost, and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. However, Alternative 3 does address the future need to widen I-5 at a significant cost savings. If Alternative 3 is to warrant further consideration, more work is required to determine feasibility.

- **Alternative 4: I-5 Temporary Bypass** - Provides a viable route around the portions of I-5 that are inundated during a flood event. This alternative route would be protected in flood events up to the 2007 or simulated 100-year flood level, but does not provide, or preclude, protection of the Chehalis-Centralia Airport. It improves conditions for approximately 900 buildings, but has a negative impact for approximately 170 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. There are significant uncertainties with this alternative, including whether the City of Tacoma would sell the right-of-way to the Tacoma Rail line and, if so, at what cost, and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. Alternative 4 does not address the future need to widen I-5. If Alternative 4 is to warrant further consideration, more work is required to determine feasibility.

- **Alternative 5: I-5 Viaduct -** WSDOT does not consider this a viable alternative due to high costs and increased flood elevations in the urban areas of Centralia.

- **Alternative 6: I-5 Relocation** - WSDOT does not consider this a viable alternative due to high costs and impacts to the built and natural environment surrounding Chehalis and Centralia.

Alternatives for protecting I-5 cannot be considered in a vacuum. They are part of the comprehensive solution to protecting people and communities in the basin, and will be affected by the selection and implementation of the basin-wide solution.

A dam on the upper Chehalis will reduce the likelihood of I-5 flooding, and the extent of flooding if it does occur. The dam also has substantial benefits for downstream communities. However, in a 100-year scenario and during the 2007 flood, a dam as proposed would not have kept I-5 open.

A dam could potentially change which alternative could be chosen to protect I-5, and the design of that alternative. The selection and construction of an alternative is further complicated by the need to widen five miles of I-5 in Chehalis in the same location that has been flooded multiple times in the past. At this time, WSDOT does not have funds to widen this section of I-5, and it may be several years before funds could become available to begin the environmental process necessary for widening of this section of the interstate.

There are many unknowns at this time, and a basin-wide solution is still being discussed. As this report is completed and next steps are being considered, WSDOT proposes identifying a recommended solution to protect I-5 with and without a dam.

Public comments on the draft report

A draft of WSDOT's I-5 protection alternatives report was made available for public comment August 17-31, 2012. Thirteen written comments were received and additional oral comments were taken at a public meeting in Chehalis on August 23, 2012.

Of the 13 written comments received, eight were from local residents of the Westside Chehalis neighborhood expressing opposition to the Express Lane and Temporary Bypass project alternatives. These commenters are concerned that, if constructed, either of these alternatives could decrease their property value and business revenue, increase air pollution, noise levels, and traffic volume adjacent to and through the project area, and increase the flow of water in and through the neighborhood during major flood events. Other comments expressed concern over the estimates of flood level elevation changes and flood damage reductions in the report , and concerns that the WSDOT report did not adequately describe the flood damage reductions that may be associated with a potential water retention facility on the upper Chehalis. The report has been modified to better address these concerns.

In November 2012, a small group of Chehalis Basin leaders convened by Governor Gregoire recommended a series of actions that, taken together, will represent a $28.5 million investment to reduce flood damages in the short term, enhance natural floodplain function and fisheries, and put the Basin on firm footing to make critical decisions about large scale projects. This includes a recommendation to finish the analysis necessary to determine the best option for large-scale capital projects, and make a decision whether to move into project permitting by December 2014. The large capital projects under consideration include upstream water retention and I-5 protection alternatives.

If funded by the legislature WSDOT anticipates that further evaluation of I-5 protection alternatives would include additional effort to define and refine the alternatives, additional work to refine the analysis of potential flood damage reduction benefits including potential impacts to buildings in the

floodplain and potential environmental and community impacts or benefits, and work to better understand how other flood damage reduction alternatives such as water retention might affect the amount of effort needed to protect I-5.

Introduction and Background

This report summarizes work by the Washington State Department of Transportation (WSDOT) to evaluate projects to protect Interstate-5 (I-5), the Chehalis-Centralia Airport, and improve access to medical and other critical facilities during flood events.

This report on alternatives to protect I-5 is part of a larger effort to identify potential flood hazard mitigation projects to protect people and communities in the Chehalis River Basin from flooding. In 2011, as part of the capital budget (ESHB 2020, Section 1033) the Washington State Legislature required the Office of Financial Management (OFM) to prepare a report on alternative flood damage reduction projects and — in coordination with tribal governments, local governments, state and federal agencies — to recommend priority flood hazard mitigation projects in the Chehalis River Basin for continued feasibility and design work. The OFM report looks at a full range of alternatives to protect people and communities from flooding including water retention in the upper Chehalis, smaller scale infrastructure protection, floodplain management and other projects to improve ecological and natural floodplain function, and land use management approaches to reduce potential flood damages. It is important to emphasize that the evaluation of projects to protect I-5 is just one small piece of the ongoing work to identify a package of flood damage reduction efforts in the Chehalis. WSDOT anticipates that, if they were to move forward, projects to protect I-5 would be carried out in coordination with other projects focused on providing additional protection from flood damages to people and communities throughout the Basin.

Some of the potential projects WSDOT evaluated to protect I-5 have the potential to also reduce the negative effects of flooding on nearby people and communities. Where possible, those potential benefits have been optimized. On the other hand, some of the potential I-5 projects could potentially increase the negative effects of flooding on people and communities, particularly on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. Where possible, these effects have been avoided and minimized. Where negative effects are still anticipated, project cost estimates include funding for flood impact and environmental mitigation efforts, such as raising buildings, moving buildings, fully purchasing impacted properties, wetland mitigation, and other measures.

Six I-5 protection project alternatives were evaluated:

1. I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee;
2. I-5 Raise and Widen Only;
3. I-5 Express Lanes;
4. I-5 Temporary Bypass;
5. I-5 Viaduct; and,
6. I-5 Relocation.

Project Area and History of Flooding

The project area is in Lewis County and the cities of Chehalis and Centralia, Washington, along a five-mile stretch of I-5 that begins near the 13th Street interchange at milepost 76 and extends north to the Mellen Street interchange at milepost 81.

This stretch of I-5 is a midpoint between Seattle, Washington and Portland, Oregon, connecting two of the West Coast's major population and industrial centers. I-5 is vital to the state's economy and acts as the West Coast's major north-south transportation corridor. The uninterrupted movement of cars, trucks, freight, and recreational vehicles along I-5 is essential to the quality of life and economic vitality in the region.

Chehalis Basin floods in February 1996 and December 2007 closed I-5 at Chehalis and Centralia for four days each, and flooding in January 2009 closed the same stretch for two days. WSDOT estimates the total cost of the closure and delays in 2007 alone in the tens of millions of dollars. The major costs come from limited freight movement through the area, including costs incurred by private companies as a result of that limited movement. WSDOT has a detour route that takes drivers around I-5 using SR 7 and US 12, but this route is limited to critical freight only. It can handle only about 25 percent of the freight that typically travels this section of I-5. A more efficient, longer-term solution during flood events is still needed.

Photo courtesy of *The Chronicle*, Centralia, Washington

Other Flood Hazard Mitigation Projects Under Consideration in the Basin

The William D. Ruckelshaus Center, a joint effort of the University of Washington and Washington State University (more information available at www.ruckelshauscenter.edu), is under contract with OFM to coordinate development of a report using technical information provided by other agencies and organizations. The report is intended to provide the Washington State Legislature and other decision makers with information to aid their decisions and set the course for effective solutions that reduce negative impacts of flooding while supporting the economic prosperity of communities in the Basin and protection/restoration of fish and other natural resources.

Review and Comments on the Draft Report

A draft of WSDOT's I-5 flood protection alternatives report was made available for public comment August 17-31, 2012. Thirteen written comments were received and additional oral comments were taken at a public meeting in Chehalis on August 23, 2012.

Of the 13 written comments received, eight were from local residents of the Westside Chehalis neighborhood expressing opposition to the Express Lane and Temporary Bypass project alternatives. These commenters are concerned that, if constructed, either of these alternatives would decrease their property value and business revenue, increase air pollution, noise levels, and traffic volume adjacent to and through the project area, and increase the flow of water in and through the neighborhood during major flood events. Other comments expressed concern over the estimates of flood level elevation changes and flood damage reductions in the report , and concerns that the WSDOT report did not adequately describe the flood damage reductions that may be associated with a potential water retention facility on the upper Chehalis. The report has been modified to better address these concerns and a full discussion of comments and changes made to address them is available as Appendix F.

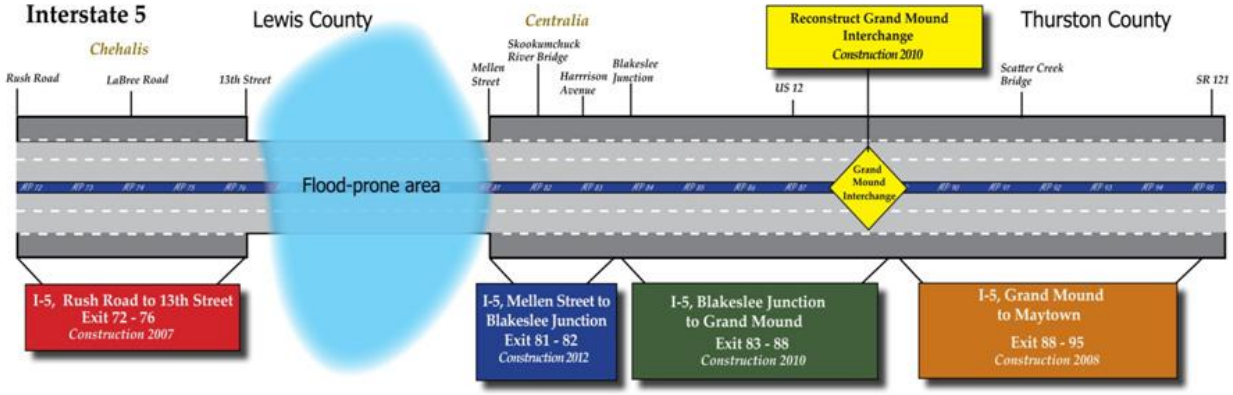
Project Context

This section provides background information on recent and ongoing projects along I-5 at Chehalis and Centralia, and each of the flood hazard mitigation projects considered.

Recent and Ongoing Improvements to I-5 in the Chehalis and Centralia Area

Since 2007, Washington State has invested $365 million in improving I-5 in the Chehalis-Centralia area. Between Exit 72 and Exit 95, 18 miles of I-5 have been or are being widened from four to six lanes.

Figure 1: Overview of I-5 Improvements between Exit 72 and Exit 95



The I-5 Mellen Street to Blakeslee Junction (MTB) project is currently under construction and scheduled for completion in fall 2014. The project improves access to the hospital from Centralia during flood events and will also reduce flood levels at some homes and businesses in the nearby area to a limited degree. The MTB project improves but does not completely resolve the issue of hospital access during flooding. Residents in Chehalis and Centralia who are able to reach the I-5, Mellen Street interchange area during flooding will have improved ability to reach the hospital in Centralia. This access depends on getting to the Mellen Street interchange area, so residents who are unable to reach the area will not have improved access to the hospital.

The Future Need to Widen I-5 from 13th Street to Mellen Street

In addition to being susceptible to flooding, the stretch of I-5 from 13th Street to Mellen Street has not yet been widened to six lanes. WSDOT plans to widen this section of I-5 to six lanes; however, it is unlikely widening will happen without a broader solution to flooding along this corridor. A widening project for this stretch of I-5 by itself would cost $250-350 million, and with the potential future flood damage reduction efforts also under consideration, it would not make sense to move ahead with this

investment until a determination is made about protection of I-5 from flooding so the flood damage reduction and widening projects can be coordinated. To ensure funds are invested properly and minimize the potential for "re-work" when I-5 widening along this stretch occurs, WSDOT evaluated whether each flood hazard mitigation project alternative addresses the need for future widening of this stretch of I-5, and considered future widening needs in project design.

Potential for a Dam on the Chehalis River

Following the major flood in 2007, the Chehalis Basin Flood Authority began to evaluate whether water retention structures in the Chehalis River Basin might be a solution to basin-wide flooding. The primary water retention alternative still under consideration in the Chehalis Basin is a multi-purpose dam located upstream of Pe Ell on the Upper Chehalis River. At an estimated cost of $245 million, the dam would be 288 feet high with 80,000 ac-ft of dedicated flood control storage, and a flow augmentation/hydropower storage capacity of 65,000 ac-ft.[1]

If the proposed dam were constructed, model simulations show that it would reduce flood elevations throughout much of the upper Chehalis Basin and in the Centralia and Chehalis area. Because it lowers flood elevations, a dam on the upper Chehalis would reduce the amount of effort needed to fully protect I-5 during major flooding and the costs of I-5 protection, but as currently modeled, a dam would not fully protect I-5 in flood events like those in 1996, 2007, or 2009. Therefore, some additional investment in I-5 protection will be needed even with a dam.

Model simulations show that the proposed dam would not have prevented flooding in the 2007 flood event in the areas where Salzer and Dillenbaugh creeks flow under I-5, and at the State Route 6 on-ramp to I-5. In the 2009 flood, water inundated the I-5 area through the Newaukum River and Dillenbaugh Creek rather than the main Chehalis River channel. Model simulations show that in the 2009 flood event the proposed dam would not have prevented I-5 from being flooded in at least one location on the west side of I-5, north of the 13th Street interchange.

In addition, in several other locations, models show that even with flood elevation reductions brought about by the dam as proposed floodwaters would be within several inches of the road surface, likely requiring the closure of I-5 to ensure safety. In particular, I-5 near the Chehalis-Centralia Airport levee (and Chamber Way) is a low spot in the area. The interstate is at least six to seven feet below the top of the levee, and significantly lower than other portions of I-5 and the surrounding area. It can easily and quickly accumulate deep floodwaters if any nearby part of the interstate is inundated, presenting obvious and significant safety concerns for drivers. With or without the construction of a dam, this risk of rapid and deep inundation of I-5 from overtopping of the Airport levee or due to a structural failure of the levee, has and will continue to prompt WSDOT to take a conservative approach to ensuring that I-5 is fully and effectively closed whenever there is serious potential for inundation and well before there is any water actually on or across the interstate.

[1] EES Consulting. 2011. Chehalis River Flood Water Retention Project: Phase IIB Feasibility Study Report. Final Submitted April 14, 2011.

Project Goals

Photo courtesy of *The Chronicle*, Centralia, Washington

The goal for all projects is the full protection of I-5 from 13th Street to Mellen Street, protection of the Chehalis-Centralia Airport, improved access to infrastructure, and optimization of any potential ensuing benefits to people, communities, and the environment. Completion of any of the I-5 protection projects would require a significant investment. It is only appropriate to invest hundreds of millions of dollars in a project if it will provide full and robust protection for a significant period of time. Therefore, WSDOT has chosen a conservative measure of performance for I-5 protection alternatives. This measure of performance looks at the distance between the potential flood water surface and the top of the flood protection element. For example, it might look at the difference in elevation between the potential flood water surface and the top of a flood wall or levee. This measurement is called "freeboard." WSDOT has chosen a measurement for freeboard similar to that used by the US Army Corps of Engineers: three feet above the projected 100-year flood level. Any modification or new construction of dikes or levees should be built at this level to ensure robust, reliable protection for I-5 and the Chehalis-Centralia Airport. Appendix A provides a more detailed technical description on how WSDOT determined freeboard.

Project Alternatives

WSDOT considered six alternatives to protect I-5, the airport, and infrastructure in the Centralia and Chehalis area.

1. I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee;
2. I-5 Raise and Widen Only;
3. I-5 Express Lanes;
4. I-5 Temporary Bypass;
5. I-5 Viaduct; and,
6. I-5 Relocation.

For each alternative, this section describes the project details, potential costs and implementation issues, and potential impacts to nearby people and communities, major infrastructure, and the environment. A side-by-side project comparison table is provided at the end of this section. As discussed earlier, the I-5 protection alternatives are only a part of a larger effort to identify potential flood hazard mitigation projects in the Chehalis River Basin. A comprehensive solution will protect people and communities throughout the Basin from flood damages. In a related effort, OFM is evaluating a full range of alternatives to protect people and communities from flooding including water retention in the upper Chehalis, smaller scale infrastructure protection, floodplain management and other projects to improve ecological and natural floodplain function, and land use management approaches to reduce potential flood damages.

ALTERNATIVE 1: I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee

Alternative 1 would protect I-5 with a combination of five miles of earthen levees and structural walls along I-5, two miles of improvements to the existing Chehalis-Centralia Airport levee, and a new one-mile-long levee in southwest Chehalis.

Alternative 1 includes replacing five bridges (four over Dillenbaugh Creek and one over Salzer Creek) with bottomless box culverts, and construction of stormwater treatment areas to store and treat stormwater runoff from I-5. Stormwater treatment is necessary because the water that flows during storm events need to be collected and stored until flood waters recede to prevent pooling on I-5. Treatment of runoff is also required to address water quality concerns.

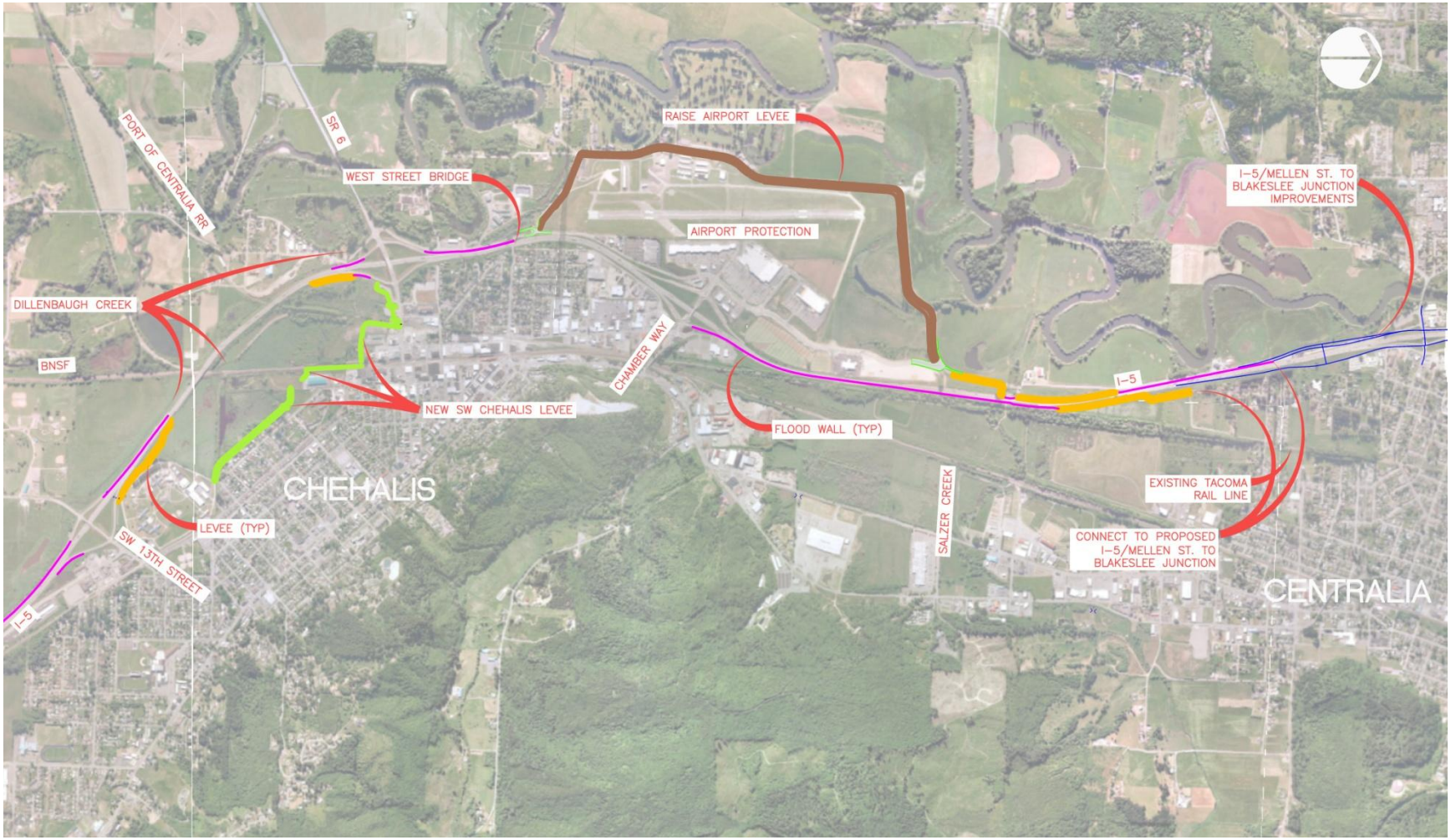
Table 1: Alternative 1 – Location and Length of Levees

Alternative 1: Levees and Walls, No Dam on Upper Chehalis	
Protective Measure	**Length (Miles)**
Airport Levee	2
SW Chehalis Levee	1
I-5 Levees and Walls	5
Total Cost: $80 to 100 million	

Levees would be used away from I-5, where impacts to property would be minimized and levees could utilize existing high ground topography. Walls would only be used in areas where levees are not possible, such as areas with space constraints.

A detailed map showing the layout of the walls and levees is provided in Figure 2.

Figure 2: Alternative 1 - I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee



How does the project increase or decrease flood levels in nearby areas?

In a 2007 flood event, model simulations show that Alternative 1 would decrease water surface elevations (the height of floodwaters) east of I-5, particularly the developed area in Centralia and along the Miracle Mile, generally between 1.4 and 1.8 feet. In the area west of I-5, which is more rural, water surface elevations are predicted to generally increase between 0.2 and 1.8 feet, but by as much as 2.0 feet in some locations. Increases in water elevations are largely because walls and levees would prevent floodwater from crossing over (or under) I-5 from west to east, resulting in more water staying to the west of I-5.

In a simulated 100-year flood event, model simulations show that Alternative 1 would decrease water surface elevations east of I-5, particularly the developed area in Centralia and along the Miracle Mile (a stretch of Kresky Avenue in Centralia containing many businesses that is susceptible to damage from flooding in the basin), generally between 0.5 and 0.8 feet. The drop in water surface elevations would be more than 11 feet in some places protected by the raised Airport levee. In the area west of I-5 and west of the Airport levee, which is closer to the river and more rural, water surface elevations are predicted to increase between 0.2 and 1.2 feet in most areas, and by as much as 1.3 feet in some locations. Increases in water surface elevations are largely because walls and levees would prevent floodwater from crossing over (or under) I-5 and over the Airport levee from west to east, resulting in more water staying on the west side of I-5 and the Airport levee closest to the river.

Appendix B provides a detailed map showing representative changes in the predicted peak water surface elevations throughout the project area in a 2007 and simulated 100-year flood event. The model simulations for determining the water surface elevations were conducted in July 2012.

How does the project impact surrounding residences and commercial buildings?

Based on a preliminary analysis, in events such as the 2007 flood Alternative 1 would lower flood elevations at 760 residences and 280 commercial buildings, generally east of I-5. Of these, 460 residences and 140 commercial buildings would no longer be flooded. Alternative 1 would raise flood levels at a total of 120 residences and 30 commercial buildings located mostly west of I-5, but no new structures would be flooded. Increases in flood elevation would need to be addressed through mitigation efforts such as raising buildings, moving buildings, buyouts, and other measures. Project cost estimates include funding for these mitigation efforts. Table 2 summarizes and rounds the results of the structure analysis conducted in August 2012. Please note that these are very rough estimates prepared using water surface elevation predictions and a standard set of assumptions about building locations within parcels. They are intended to provide a consistent way to begin to understand and compare potential community benefits and adverse impacts from I-5 protection alternatives. If alternatives move forward, additional analysis will be needed to better understand their potential impacts and benefits.

Table 2: Flood Mitigation in Twin Cities Area by Alternative 1

	I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee, Dec 07 Event		
Change in Water Surface Elevation (WSEL) (ft)	**Residence**	**Commercial**	**Total**
<-2	70	80	**150**
-2 to -1	480	130	**600**
-1 to 0	210	70	**280**
Sum Decreased Flooding	**760**	**280**	**1030**
0 to 1	90	20	**100**
1 to 2	30	10	**40**
>2	0	0	**0**
Sum Increased Flooding	**120**	**30**	**140**

	I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee, Dec 07 Event		
	Residence	**Commercial**	**Total**
Newly Flooded Buildings	0	0	**0**
Buildings No Longer Flooded	460	140	**600**

What are the potential impacts to natural resources?

Alternative 1 would create impacts to wetlands and cultural resources due to the excavation and fill necessary to build the floodwalls, levees, and stormwater treatment. Most wetland impacts would likely be mitigated at WSDOT's North Fork Newaukum Mitigation Bank. Any adverse affects to cultural resources would be addressed through consultation with interested parties.

There are no Endangered Species present in Dillenbaugh Creek or Salzer Creek. Alternative 1 may impact fish passage at these crossings due to the length of culverts needed to protect I-5, but there are mitigation opportunities nearby. WSDOT would continue to work with the Washington Department of Fish and Wildlife (WDFW) to determine how to address and minimize any impacts to fish passage at these locations.

Based on WSDOT's initial investigation, there appear to be no fatal flaws that would prevent Alternative 1 from moving forward. In addition, the natural resource impacts anticipated for Alternative 1 are essentially the same as those that would occur from anticipated (pending funding) future widening of I-5 to six lanes; therefore, these environmental impacts likely will occur regardless of whether Alternative 1 is constructed.

How much does the project cost?

Alternative 1 has an estimated cost of $80-100 million. This cost estimate includes funding for mitigation for affected properties and environmental mitigation that may be needed, as described above.

Does the project protect the Chehalis-Centralia Airport?

Yes, Alternative 1 includes improvements to the Chehalis-Centralia Airport levee that would protect the airport in a flood up to the 2007 level.

Does the project address future widening of I-5?

Yes. While it does not actually widen I-5, the improvements built as part of Alternative 1 will be needed when I-5 is widened in the future. Building these elements now avoids additional costs to build them at a later date. Additionally, elements of Alternative 1 would be designed to continue to provide flood protection when widening occurs. These include:

- Airport Levee – The levee would not be impacted by widening of I-5.
- Protection of SW Chehalis Ave. – Any wall or levee constructed to protect southwestern Chehalis between Main Street and the Green Hill School would not be impacted by widening I-5 to six lanes.
- Bridges – The project includes replacing five bridges (four over Dillenbaugh Creek and one over Salzer Creek) with culverts. These culverts will be designed to remain in place when I-5 is widened, although the Salzer Creek culvert may need to be lengthened for the widening project. Because the bridge crossings will be improved as part of the flood protection effort, WSDOT would save $15-$20 million on bridges in a future widening project.
- Right of Way acquisition – Any property acquired for the protection of I-5 would also serve the needs of any future widening project.
- Stormwater collection, conveyance, and treatment – The facilities constructed to collect, convey, store and treat stormwater runoff from I-5 will be preserved where possible. Treatment facilities are designed so they can be expanded if needed when I-5 is widened. If stormwater collection, conveyance, and treatment facilities are built as part of I-5 flood protection, they will be sized adequately where possible to serve any future widening project.
- Chamber Way Pump Station – This facility has been sited to accommodate future widening and can be preserved for continued use after widening.
- Levees – Levees have been designed and located to accommodate I-5 widening and would not need to be moved or reconstructed.
- Walls – Walls can be preserved in sections where widening will occur solely on the opposite side of I-5 (for example, adjacent to the railroad tracks).

Does the project improve access to the hospital in Centralia?

Yes. In a flood event up to the 2007 level, Alternative 1 improves access to the hospital if drivers can reach I-5 from the south or from the north of flooded areas. If drivers cannot access I-5 due to flooding on local roads in Chehalis or Centralia, they will not have improved access to the hospital under this alternative.

Would the project change if a dam were to be built on the upper Chehalis?

Yes. Because model simulations show that a dam would lower flood levels in the project area, walls and levees along I-5 could be smaller in some places and would not be needed in other places if a dam were built. The total cost of the project would be reduced by $20 million. Table 3 shows the differences in the length of walls and levees, and total costs, with and without a dam .

Table 3: Difference in Length of Levees and Total Costs in a With and Without Dam Scenario

Alternative: Levees, No Dam on Upper Chehalis	
Protective Measure	**Length (Miles)**
Airport Levee	2
SW Chehalis Levee	1
I-5 Walls and Levees	5
Total Cost: $80 to 100 million	

Alternative: Levees with Dam on Upper Chehalis	
Protective Measure	**Length (Miles)**
Airport Levee	2
SW Chehalis Levee	1
I-5 Walls and Levees	4
Total Cost: $60 to 80 million	

ALTERNATIVE 2: I-5 Raise and Widen Only

Alternative 2 would raise I-5 using fill material in areas where the interstate falls below the desired flood protection elevation, and widen I-5 from four to six lanes. It also would raise bridges within the project to above the flood elevation.

Raising I-5 using fill material would require reconstruction of all pavement, stormwater systems, illumination systems, and guardrail in the project area. In addition, because raising I-5 would reduce clearance for existing ramps and overpasses, it would require reconstruction of all aspects of the 13th Street, State Route 6, and Chamber Way interchanges and the West Street bridge.

Alternative 2 does not include raising the Chehalis-Centralia Airport Levee or building a new SW Chehalis Levee. However, these elements could be added to the project or constructed independently to provide additional protection in those areas.

How does the project increase or decrease flood levels in the nearby areas?

In a 2007 flood event, Alternative 2 would decrease water surface elevations east of I-5, particularly the developed area in Centralia and along the Miracle Mile (a stretch of Kresky Avenue in Centralia containing many businesses that is susceptible to damage from flooding in the basin), generally from 1.4 to 1.9 feet. In the area west of I-5, which is more rural, water surface elevations are predicted to generally increase between 0.2 to 0.9 feet, but by as much as 1.2 feet in some locations. Increases in water elevation are largely because raising I-5 on fill material creates a barrier, impeding flow of flood waters downstream.

In a simulated 100-year flood event, Alternative 2 would decrease water surface elevations east of I-5, particularly the developed area in Centralia and along the Miracle Mile, generally from 0.6 to 0.9 feet, but by as much as 1.9 feet lower in some locations. In the area west of I-5, which is closer to the river and more rural, water surface elevations are predicted to generally increase between 0.1 to 0.6 feet, but by as much as 0.8 feet in some locations. Increases in water elevation are largely because raising I-5 on fill material creates a barrier impeding flow of flood waters downstream.

Appendix C provides a detailed map showing representative changes in peak water surface elevations throughout the project area in a 2007 and simulated 100-year flood event. The model simulations for determining the water surface elevations were conducted in July 2012.

How does the project impact surrounding residences and commercial buildings?

Based on a preliminary analysis, in events such as the 2007 flood Alternative 2 would lower flood elevations at 660 residences and 180 commercial buildings, generally east of I-5. Of these, 360 residences and 40 commercial buildings would no longer be flooded. Alternative 2 would raise flood levels at a total of 170 residences and 130 commercial buildings located mostly west of I-5. Fewer than 10 additional buildings would be newly flooded (i.e., would experience flooding under this scenario when they have not been flooded before). Increases in flood elevation would need to be addressed through mitigation measures such as raising buildings, moving buildings, buyouts, and other measures. Project cost estimates include funding for these mitigation measures. Table 4 summarizes and rounds the results of the structure analysis conducted in August 2012. Please note that these are very rough estimates prepared using water surface elevation predictions and a standard set of assumptions about

building locations within parcels. They are intended to provide a consistent way to begin to understand and compare potential community benefits and adverse impacts from I-5 protection alternatives. If alternatives move forward, additional analysis will be needed to better understand their potential impacts and benefits.

Table 4: Flood Mitigation in Twin Cities Area by Alternative 2

	I-5 Raise and Widen Only, Dec 07 Event		
Change in Water Surface Elevation (WSEL) (ft)	**Residence**	**Commercial**	**Total**
<-2	30	0	**30**
-2 to -1	440	120	**560**
-1 to 0	190	60	**250**
Sum Decreased Flooding	**660**	**180**	**840**
0 to 1	170	130	**300**
1 to 2	0	0	**0**
>2	0	0	**0**
Sum Increased Flooding	**170**	**130**	**300**

	I-5 Raise and Widen only, Dec 07 Event		
	Residence	**Commercial**	**Total**
Newly Flooded Buildings	0	0	**0**
Buildings No Longer Flooded	360	40	**400**

What are the potential impacts to natural resources?

Alternative 2 would impact wetlands and cultural resources due to the excavation and fill necessary to raise I-5, and build stormwater treatment. Most wetland impacts would likely be mitigated for at WSDOT's North Fork Newaukum Mitigation Bank. Any adverse effects to cultural resources would be addressed through consultation with interested parties.

There are no Endangered Species present in Dillenbaugh Creek or Salzer Creek. Alternative 2 may impact fish passage at these crossings due to the length of culverts needed to protect I-5, but there are mitigation opportunities nearby. WSDOT would continue to work with the Washington Department of Fish and Wildlife (WDFW) to determine how to address and minimize any impacts to fish passage at these locations.

Noise analysis may show there would be an increase in noise levels in surrounding neighborhoods. This would only be slightly more of an increase than if I-5 were only widened and not raised. A noise analysis would determine if any noise mitigation (such as noise walls) would be appropriate.

Based on WSDOT's initial investigation, there appear to be no fatal flaws that would prevent this alternative from moving forward. In addition, as with Alternative 1, the natural resource impacts anticipated for Alternative 2 are essentially the same as those that would occur from anticipated (pending funding) future widening of I-5 to six lanes; therefore, these impacts likely will occur regardless of whether Alternative 2 is constructed.

How much does the project cost?

Alternative 2 has an estimated total cost of $450-550 million. To widen I-5 only would cost $250-350 million; to raise I-5 only would cost $350-$450 million. The cost estimates include funding for mitigation for affected properties and environmental mitigation that may be needed, as described above.

Does the project protect the Chehalis-Centralia Airport?

No, Alternative 2 does not include raising the Chehalis-Centralia Airport levee or building a new SW Chehalis levee. These elements could be added to the project or constructed independently to provide additional flood protection, but they were not included in cost estimates for this alternative.

Does the project address future widening of I-5?

Yes. Alternative 2 includes both raising and widening I-5 because WSDOT determined that it is not cost effective to only raise I-5 and defer widening. Both raising and widening I-5 would require reconstruction of the 13th Street, State Route 6, and Chamber Way interchanges, and West Street bridge. Raising and widening at the same time prevents rework in these areas and avoids associated increased costs.

The cost range to only raise I-5 as part of one project (i.e. rebuild four lanes at higher level) is $350-450 million. The cost range to raise and widen I-5 (i.e. rebuild six lanes at higher level) is $450-550 million.

The cost range to widen I-5 through a separate future project, after I-5 had been raised, is $120-170 million. The total cost of raising I-5, then widening I-5 as a separate project is $470-620 million. It would cost an additional $20-70 million to raise and widen separately.

Raising I-5 requires a complete rebuild of the interstate for the full width of 88 feet (four lanes and four shoulders). This includes stormwater treatment, illumination, pavement, concrete barrier, and all other elements of the interstate. Although a raise-only project would not widen I-5 to six lanes, where possible it would likely construct various elements to accommodate future widening to six lanes. For example, the bridges over I-5 at SR 6 and Chamber Way would be built long enough to accommodate a six lane I-

5. Overbuilding these structures as part of raising I-5 would require more upfront costs. However, it would avoid costly demolition and reconstruction as part of a future widening project.

Raising and widening I-5 at the same time also requires a complete rebuild of the interstate to a width of 112 feet (six lanes and four shoulders). It also requires stormwater treatment, illumination, pavement, concrete barrier, and all other elements of the interstate. Since all of these facilities must be rebuilt whether I-5 is four lanes or six, widening adds only the costs associated with the additional 24 feet of width for two more lanes.

Although various structures (i.e. bridges over I-5 at SR 6 and Chamber Way) would be constructed to accommodate a future six lanes, returning at a later date to widen I-5 to six lanes after only raising it could require the tear out and reconstruction of portions of stormwater facilities, illumination, and various other elements, and would include another round of traffic control costs, temporary walls, temporary water treatment, etc. At each interchange, a portion of all four ramps would need to be constructed to properly tie into the new lanes added on the outside of I-5.

Does the project improve access to the hospital in Centralia?

Yes. In a flood event up to the 2007 level, Alternative 2 improves access to the hospital if drivers can reach I-5 from the south or from the north of flooded areas. If drivers cannot access I-5 due to flooding on local roads in Chehalis or Centralia, they will not have improved access to the hospital under this alternative.

Would the project change if a dam were to be built on the upper Chehalis?

Yes. Because a dam would lower flood levels in the project area, WSDOT would not need to raise I-5 as high, would use less fill material, and would create a smaller overall footprint if a dam were built. The total cost of the project would drop approximately five to 10 percent.

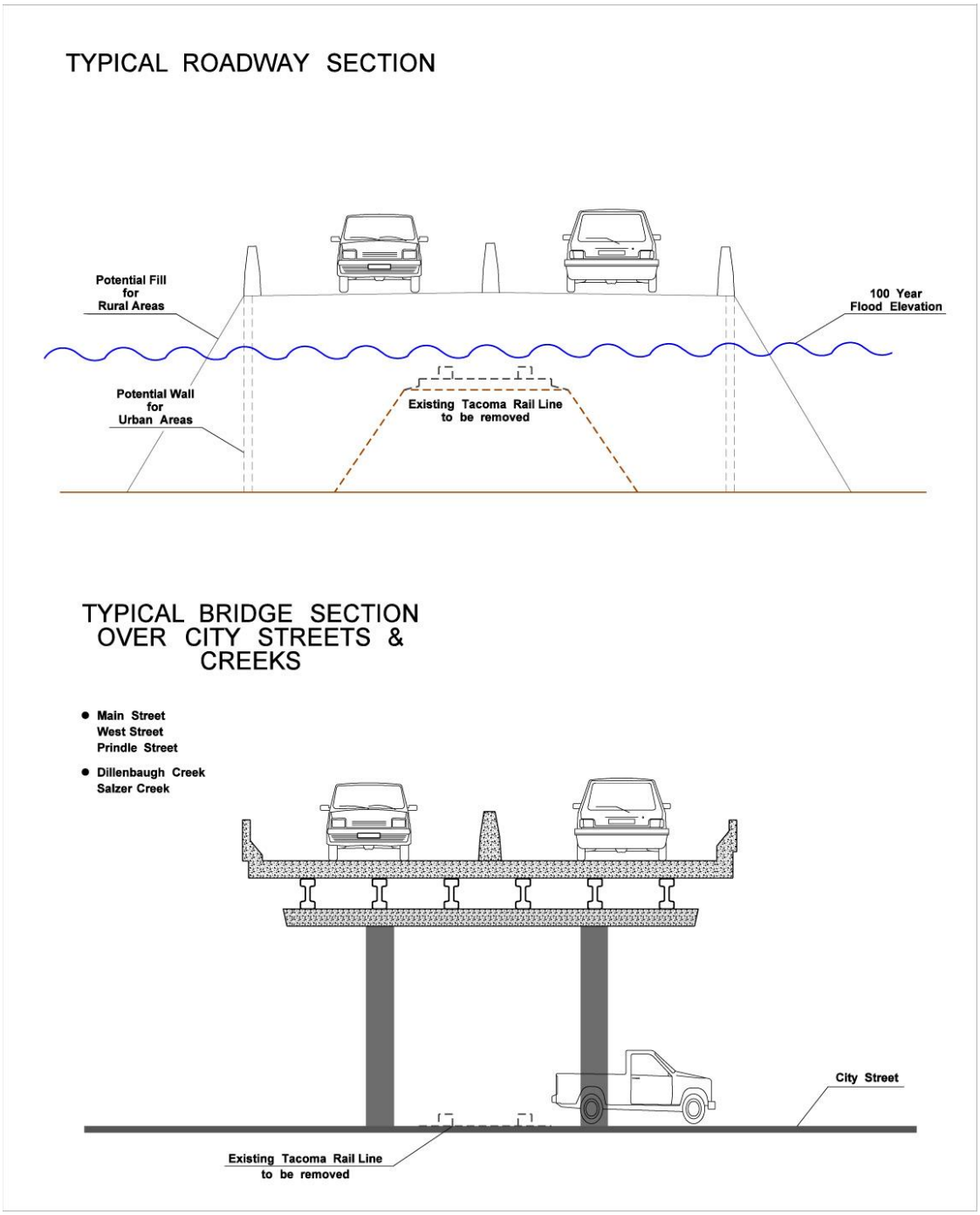
ALTERNATIVE 3: I-5 Express Lanes

Alternative 3 would construct new express lanes adjacent to I-5. Express lanes would be four miles in length and one lane in each direction, constructed a minimum of three feet above the 100-year flood elevations. This would provide traffic the opportunity to bypass I-5 if the main interstate was closed by major floods. Outside of any flood events, express lanes also would be available to traffic 24 hours a day, seven days a week.

The express lanes would diverge from I-5 at 13th Street, and then follow the existing Tacoma Rail line through Chehalis, with bridges over West, Prindle, and Main streets in Chehalis. To minimize right-of-way acquisition and impacts to adjacent properties, the lanes would be built on fill material with side slopes in rural areas and would be built on fill material contained by walls in urban areas. Figure 3

provides a cross-section view of the typical roadway section and typical bridge section over city streets and creeks for Alternative 3.

Figure 3: Cross Section View of I-5 Express Lanes or Temporary Bypass



For the most part, the Tacoma Rail line runs through the industrial area of Chehalis, but also lies adjacent to several homes and businesses in the Westside Chehalis neighborhood. The lanes likely would be visible from some homes on the edge of the Westside neighborhood. A noise study has not been conducted yet, but cost estimates for the project include funding for noise walls in the event they are needed.

There are significant uncertainties with the express lanes. Perhaps most importantly, it is not known whether the City of Tacoma would sell the right-of-way along the Tacoma Rail line, and, if so, at what cost. The express lanes would not provide local access between 13th Street and Mellen Street. The City of Chehalis has expressed strong concerns about the express lanes alternative and its potential effects on the community.

In addition, during the public comment period the Lewis County Public Utility District (PUD) expressed concerns that the express lanes would encroach on a project being built where the Tacoma Rail track borders PUD property at Main and Quincy avenues in Chehalis. Residents of the Westside neighborhood, and businesses such as the Wilco Agricultural Center, CENEX, Chehalis West Assisted Living, and National Frozen Foods also expressed strong concerns about the potential long-term adverse impacts on property value and business revenue, increased air pollution, noise levels, and traffic volume adjacent to and through the project area, and the flow of water in and through the neighborhood during major flood events. WSDOT acknowledges these concerns and that careful evaluation of potential impacts and mitigation measures would be needed if the express lanes option were to proceed.

Alternative 3 does not include raising the Chehalis-Centralia Airport Levee or building a new SW Chehalis Levee. These elements could be added to the project or constructed independently to provide additional flood protection. If express lanes are constructed, they would eliminate the need to widen I-5 in the future, saving $250-350 million.

A detailed map showing an overview and close-up view of the express lanes is provided in Figures 4 and 5.

Figure 4: Alternative 3 – I-5 Express Lanes Overview

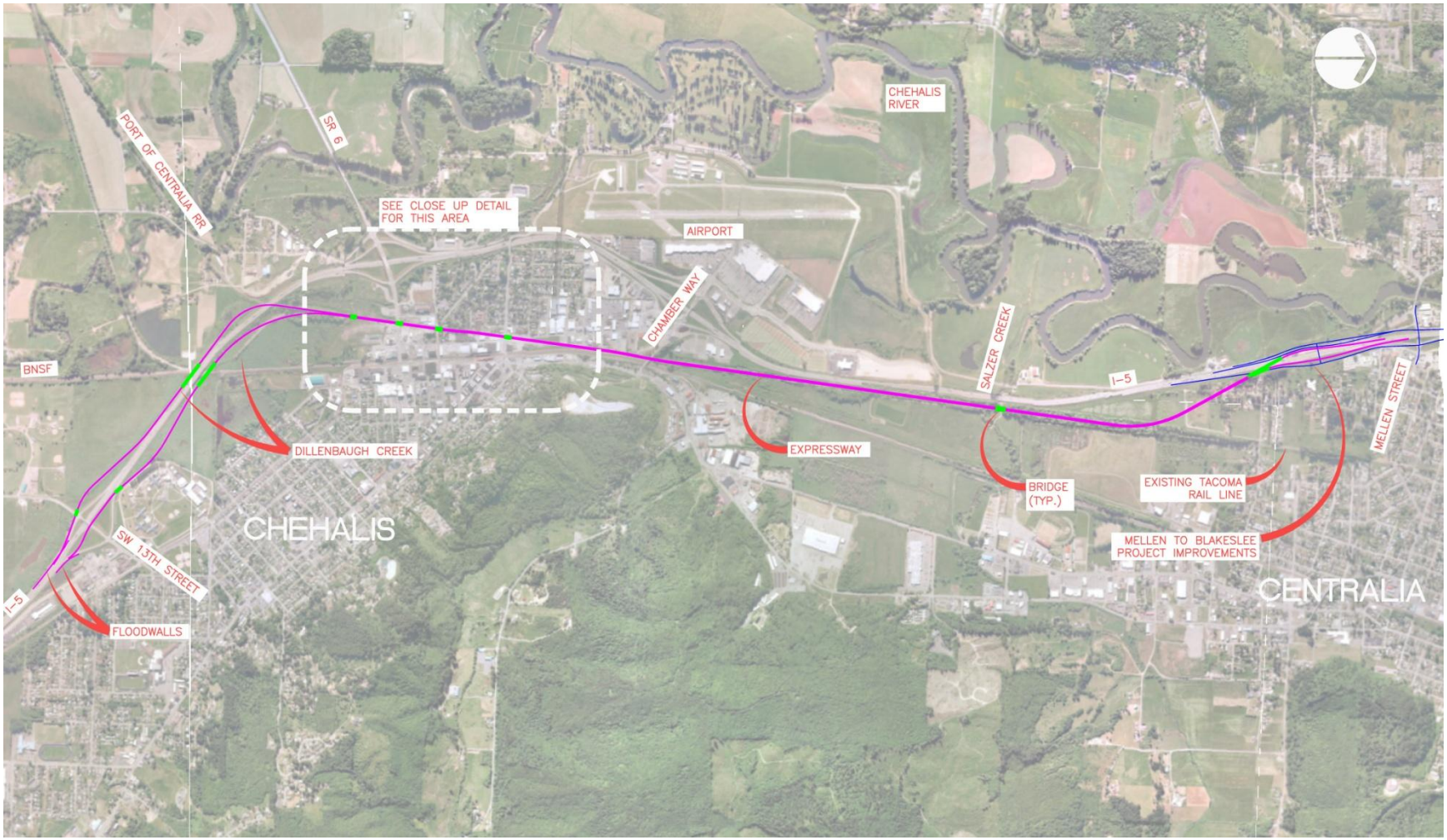
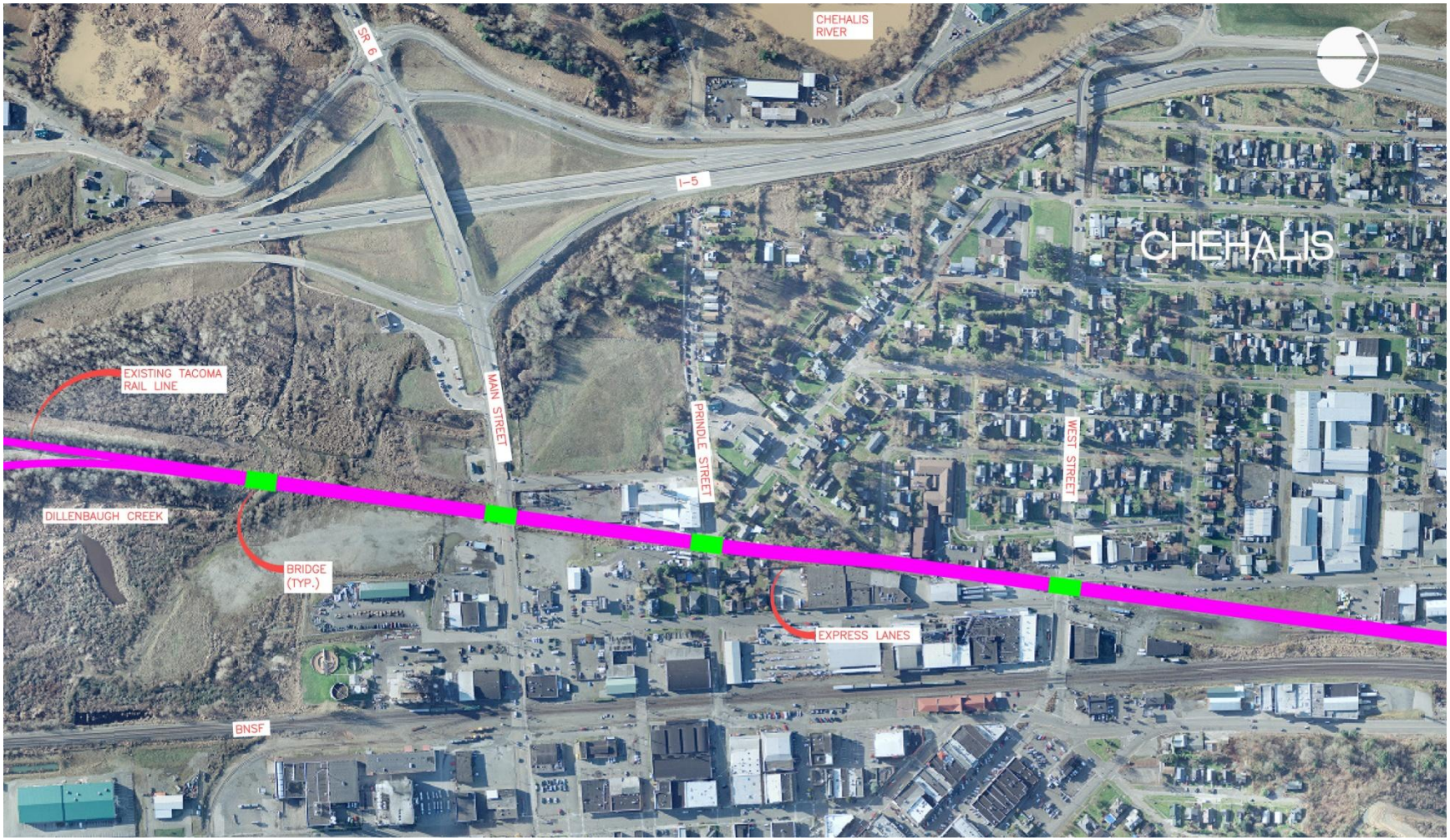


Figure 5: Alternative 3 – I-5 Express Lanes Close-up Detail



How does the project increase or decrease flood levels in the nearby areas?

In a 2007 flood event, Alternative 3 would decrease water surface elevations east of I-5, generally between 0.4 and 1.1 feet. In the area west of I-5, which is more rural, water surface elevations are predicted to increase generally between 0.0 and 0.6 feet. In a simulated 100-year flood event, Alternative 3 would decrease water surface elevations east of I-5, particularly the developed area between Salzer Creek and Mellen Street, generally between 0.6 and 0.9 feet, but by as much as 1.5 feet in some locations. In the area west of I-5, which is closer to the river and more rural, water surface elevations are predicted to increase generally between 0.1 and 0.6 feet. The modeled changes in water surface elevations are primarily due to the barrier created by placing a road above the railroad tracks; water would not flow over the existing railroad bed as it has in the past major floods. A lesser cause of the increases in water surface elevation is fill reducing the amount of flood water storage in the area..

Appendix D provides a detailed map showing representative changes in peak water surface elevation throughout the project area in a 2007 and simulated 100-year flood event. The model simulations for determining the water surface elevation were conducted in July 2012.

How does the project impact surrounding residences and commercial buildings?

Based on a preliminary analysis, in events such as the 2007 flood Alternative 3 would lower flood elevations at 700 residences and 190 commercial buildings generally east of I-5. Of these, 290 residences and 30 commercial buildings would no longer be flooded. Alternative 3 would raise flood levels at a total of 80 residences and 90 commercial buildings located mostly west of I-5, and 10 additional buildings would be newly flooded. Increases in flood elevation would need to be addressed through mitigation measures such as raising buildings, moving buildings, buyouts, and other measures. Project cost estimates include funding for these mitigation measures. Table 5 summarizes and rounds the results of the structure analysis conducted in August 2012. Please note that these are very rough estimates prepared using water surface elevation predictions and a standard set of assumptions about building locations within parcels. They are intended to provide a consistent way to begin to understand and compare potential community benefits and adverse impacts from I-5 protection alternatives. If alternatives move forward, additional analysis will be needed to better understand their potential impacts and benefits.

Table 5: Flood Mitigation in Twin Cities Area by Alternative 3

	I-5 Express Lanes, Dec 07 Event		
Change in Water Surface Elevation (WSEL) (ft)	**Residence**	**Commercial**	**Total**
<-2	0	0	**0**
-2 to -1	290	20	**310**
-1 to 0	410	170	**580**

	I-5 Express Lanes, Dec 07 Event		
Change in Water Surface Elevation (WSEL) (ft)	**Residence**	**Commercial**	**Total**
Sum Decreased Flooding	**700**	**190**	**890**
0 to 1	80	90	**170**
1 to 2	0	0	**0**
>2	0	0	**0**
Sum Increased Flooding	**80**	**90**	**170**

	I-5 Express Lanes, Dec 07 Event		
	Residence	**Commercial**	**Total**
Newly Flooded Buildings	0	10	**10**
Buildings No Longer Flooded	290	30	**320**

What are the potential impacts to natural resources?

Alternative 3 would impact wetlands and cultural resources due to the excavation and fill necessary to construct the lanes on top of fill, bridges over existing city streets and stormwater treatment. Most wetland impacts would likely be mitigated for at WSDOT's North Fork Newaukum Mitigation Bank. Any adverse affects to cultural resources would be addressed through consultation with interested parties.

There are no Endangered Species present in Dillenbaugh Creek or Salzer Creek. Alternative 3 would construct an additional stream crossing at both creeks. These would be short enough that fish passage should not be compromised. If needed, there are mitigation opportunities in the area. WSDOT would continue to work with the Washington Department of Fish and Wildlife (WDFW) to determine how to address and minimize any impacts to fish at these locations.

Noise analysis may show there would be an increase in noise levels in surrounding neighborhoods. A noise analysis would determine if any noise mitigation (potentially noise walls) would be appropriate.

There may be hazardous materials to address in the industrial area of the Tacoma Rail line. Removal may not be required since the lanes would be built on top of fill material.

Based on WSDOT's initial investigation, there appear to be no fatal flaws that would prevent this alternative from moving forward. As with Alternatives 1 and 2, the natural resource impacts anticipated for Alternative 3 are essentially the same as those that would occur from anticipated (pending funding) future widening of I-5 to six lanes, due to the proximity of the location of the Tacoma Rail line to I-5; therefore, these impacts likely will occur regardless of whether Alternative 3 is constructed.

How much does the project cost?

The estimated cost of Alternative 3 is $120-150 million, not including the cost for the Tacoma Rail line property. This cost estimate includes funding for mitigation for affected properties and environmental mitigation that may be needed, as described above.

Does the project protect the Chehalis-Centralia Airport?

No. Alternative 3 does not include raising the Chehalis-Centralia Airport levee or building a new SW Chehalis levee. Therefore, those areas are not protected. These elements could be added to the project or constructed independently to provide additional flood protection, but they were not included in cost estimates for this alternative.

Does the project address future widening of I-5?

Yes. Alternative 3 would provide the capacity needed to prevent traffic congestion on I-5. Therefore, it would eliminate the need to spend $250-350 million on a future widening project.

Does the project improve access to the hospital in Centralia?

Yes. In a flood event up to the 2007 level, Alternative 3 provides a viable route around the portions of I-5 that are inundated during a flood event and can improve access to the hospital if drivers can reach I-5 from the south or from the north of flooded areas. Drivers must be able to access I-5 north or south of where the express lanes connect to I-5 to be able to reach the hospital, as this alternative does not provide direct connections to local roads.

Would the project change if a dam were to be built on the upper Chehalis?

Yes. Because a dam would lower flood levels in the project area, WSDOT would be able to reduce the height of the express lanes in the floodplain area. The total cost of the project would be reduced by two to five percent.

ALTERNATIVE 4: I-5 Temporary Bypass

Alternative 4 would construct temporary bypass lanes adjacent to I-5. Similar to the express lane alternative, the bypass lanes would diverge from I-5 at 13th Street, and then follow the existing Tacoma Rail line through Chehalis, with a bridge over Main Street. Prindle and West streets would be at-grade intersections; however, flood gates would close these access points during flood events to keep flood waters out of the temporary bypass. The lanes would be built on fill material with side slopes in rural areas and would be built on fill material contained by walls in urban areas to minimize right-of-way acquisition and impacts to adjacent properties.

The bypass lanes would be four miles in length and one lane in each direction, constructed a minimum of three feet above the 100-year flood elevations. This would provide a local bypass opportunity if the main part of I-5 were to be closed by major floods. Because the bypass lanes would only be used during major flood events, they would not eliminate the need to widen I-5 in the future. In addition, the connections to and from I-5 could be built at the ground level (unlike express lanes which would require high speed flyover ramps). See Figure 3 in the Alternative 3 section for a cross-section view of the typical roadway section and typical bridge section over city streets and creeks for temporary bypass lanes.

There are significant uncertainties with the bypass lanes. Perhaps most importantly, it is not known whether the City of Tacoma would sell the right-of-way along the Tacoma Rail line and, if so, at what cost. The temporary bypass would not provide local access between 13th Street and Mellen Street. The City of Chehalis has expressed strong concerns about the bypass alternative and its potential effects on the community.

In addition, as with the express lanes alternative (Alternative 3), during the public comment period the Lewis County Public Utility District (PUD) expressed concerns that the express lanes would encroach on a project being built where the Tacoma Rail track borders PUD property at Main and Quincy Avenues in Chehalis. Residents of the Westside neighborhood, and businesses such as the Wilco Agricultural Center, CENEX, Chehalis West Assisted Living, and National Frozen Foods also expressed strong concerns about the potential long-term impacts on property value and business revenue, increased air pollution, noise levels, and traffic volume adjacent to and through the project area, and the flow of water in and through the neighborhood during major flood events. WSDOT acknowledges these concerns and that careful evaluation of potential impacts and mitigation measures would be needed if the bypass lanes option were to proceed.

Alternative 4 does not include raising the Chehalis-Centralia Airport levee or building a new SW Chehalis levee. These elements could be added to the project or constructed independently to provide additional flood protection.

A detailed map showing an overview and close-up view of the temporary bypass is provided in Figures 6 and 7.

Figure 6: Alternative 4 - I-5 Temporary Bypass Overview

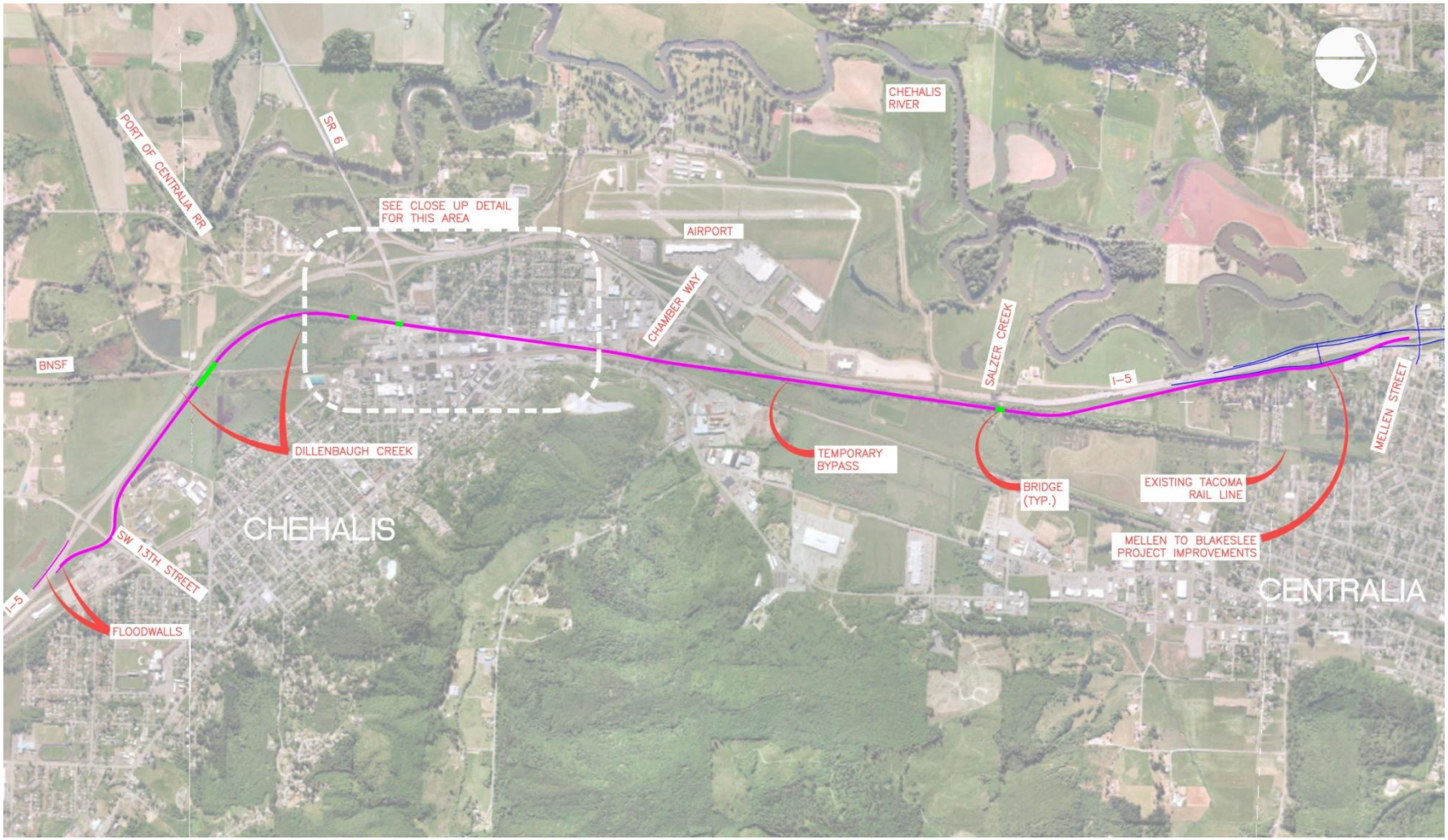


Figure 7: Alternative 4 - I-5 Temporary Bypass Close-up

How does the project increase or decrease flood levels in the nearby areas?

In a 2007 flood event, Alternative 4 would decrease water surface elevations east of I-5, generally between 0.4 and 1.1 feet. In the area west of I-5, which is more rural, water surface elevations are predicted to increase by generally 0.0 and 0.6 feet. In a simulated 100-year flood event, Alternative 4 would decrease water surface elevations east of I-5, particularly the developed area in Centralia and along the Miracle Mile (a stretch of Kresky Avenue in Centralia containing many businesses that is susceptible to damage from flooding in the basin), generally between 0.6 and 0.9 feet, but by as much as 1.5 feet in some locations. In the area west of I-5, which is closer to the river and more rural, water surface elevations are predicted to increase generally between 0.1 and 0.6 feet. The modeled changes in water surface elevations are primarily due to the barrier created by placing a road above the railroad tracks; water would not flow over the existing railroad bed as it has in the past major floods. A lesser cause of the increases in water surface elevation is due to fill reducing the amount of flood water storage in the area.

Appendix E provides a detailed map showing representative changes in peak water surface elevation throughout the project area in a 2007 and simulated 100-year flood event. The model simulations for determining the water surface elevation were conducted in July 2012.

How does the project impact surrounding residences and commercial buildings?

Based on a preliminary analysis, in events such as the 2007 flood Alternative 4 would lower flood elevations at 710 residences and 190 commercial building generally east of I-5. Of these, 290 residences and 30 commercial buildings would no longer be flooded. Alternative 4 would raise flood levels at a total of 80 residences and 90 commercial buildings located mostly west of I-5, and an additional 10 buildings would be newly inundated. Increases in flood elevation would need to be addressed through mitigation measures such as raising buildings, moving buildings, buyouts, and other measures. Project cost estimates include funding for these mitigation measures. Table 6 summarizes and rounds the results of the structure analysis conducted in August 2012. Please note that these are very rough estimates prepared using water surface elevation predictions and a standard set of assumptions about building locations within parcels. They are intended to provide a consistent way to begin to understand and compare potential community benefits and adverse impacts from I-5 protection alternatives. If alternatives move forward, additional analysis will be needed to better understand their potential impacts and benefits.

Table 6: Flood Mitigation in Twin Cities Area by Alternative 4

	I-5 Bypass Lanes, Dec 07 Event		
Change in Water Surface Elevation (WSEL) (ft)	**Residence**	**Commercial**	**Total**
<-2	0	0	**0**

	I-5 Bypass Lanes, Dec 07 Event		
Change in Water Surface Elevation (WSEL) (ft)	**Residence**	**Commercial**	**Total**
-2 to -1	290	20	**310**
-1 to 0	420	170	**590**
Sum Decreased Flooding	**710**	**190**	**900**
0 to 1	80	90	**170**
1 to 2	0	0	**0**
>2	0	0	**0**
Sum Increased Flooding	**80**	**90**	**170**

	I-5 Bypass Lanes, Dec 07 Event		
	Residence	**Commercial**	**Total**
Newly Flooded Buildings	0	10	**10**
Buildings No Longer Flooded	290	30	**320**

What are the potential impacts to natural resources?

Alternative 4 would impact wetlands and cultural resources due to the excavation and fill necessary to construct the lanes on top of fill, bridges over existing city streets and stormwater treatment. Most wetland impacts would likely be mitigated at WSDOT's North Fork Newaukum Mitigation Bank. Any adverse affects to cultural resources would be addressed through consultation with interested parties.

There are no Endangered Species present in Dillenbaugh Creek or Salzer Creek. Alternative 3 would construct an additional stream crossing at both creeks. These would be short enough that fish passage should not be compromised. If needed, there are mitigation opportunities in the area. WSDOT would continue to work with the Washington Department of Fish and Wildlife (WDFW) to determine how to address and minimize any impacts to fish at these locations.

Since the bypass lanes would be used only during flood events, the increase in noise levels in surrounding neighborhoods would be for such a short duration that a noise analysis would likely determine no noise mitigation was necessary.

There may be hazardous materials to address in the industrial area of the Tacoma Rail line. Removal may not be required since the lanes would be built on top of fill material.

Based on WSDOT's initial investigation, there appear to be no fatal flaws that would prevent this alternative from moving forward. The natural resource impacts anticipated for Alternative 4 are similar to those anticipated for Alternative 3.

How much does the project cost?

The estimated cost of Alternative 4 is $70-90 million, not including the cost for the Tacoma Rail line property. This cost estimate includes funding for mitigation for affected properties and environmental mitigation that may be needed, as described above.

Does the project protect the Chehalis-Centralia Airport?

No, Alternative 4 does not include raising the Chehalis-Centralia Airport levee or building a new SW Chehalis levee. Therefore, those areas are not protected. These elements could be added to the project or constructed independently to provide additional flood protection, but they were not included in cost estimates for this alternative.

Does the project address future widening of I-5?

No, Alternative 4 does not address the need to widen I-5 in the future.

Does the project improve access to the hospital in Centralia?

Yes. In a flood event up to the 2007 level, Alternative 4 provides a viable route around the portions of I-5 that are inundated during a flood event and can improve access to the hospital if drivers can reach I-5 from the south or from the north of flooded areas. Drivers must be able to access I-5 north or south of where the bypass lanes connect to I-5 to be able to reach the hospital, as this alternative does not provide direct connections to local roads.

Would the project change if a dam were to be built on the upper Chehalis?

Yes. Because a dam would lower flood levels in the project area WSDOT would be able to reduce the height of the bypass lanes in the floodplain area. The total cost of the project would be reduced by approximately two to five percent.

ALTERNATIVE 5: I-5 Viaduct

Alternative 5 would construct a viaduct by elevating I-5 on piers from south of State Route 6 to Mellen Street. This project would widen I-5 to six lanes and require reconstruction of all interchanges in the project area. WSDOT determined that widening should be included in any viaduct project because it would be completely ineffective to build only four lanes when six are needed to serve capacity.

The viaduct alternative has an estimated cost of more than $1.5 billion. It would reduce flood elevations west of I-5 along the Chehalis River, but would increase flood elevations east of I-5 in the urban area of Centralia. For these reasons, WSDOT does not consider this project a feasible alternative and did not evaluate the project in further detail.

ALTERNATIVE 6: I-5 Relocation

Alternative 6 would relocate I-5 outside of the flood area. The project would build a six-lane I-5, and would require constructing new interchanges in the project area.

The relocation alternative has an estimated cost of more than $2 billion. Relocating I-5 would diverge outside of the existing interstate and cut through Centralia and Chehalis, splitting neighborhoods and impacting the urban and natural environment in and around both cities. For these reasons, WSDOT does not consider this project a feasible alternative and did not evaluate the project in further detail.

Side by Side Project Comparisons

Table 7: Side-by-side Project Comparison of Alternatives

Alternative	Impacts to Buildings**				Protect Airport & SW Chehalis	Ability to Meet Future I-5 Capacity Needs	Cost of Alternative *(A)*	Cost of Future I-5 Widening After Alternative is Constructed *(B)*	Total Cost of Alternative Plus Cost to Meet Future I-5 Capacity Needs *(C)* *A + B = C*
	100 Year Flood Event		2007 Flood Event						
	Positive	*Negative*	*Positive*	*Negative*					
1. I-5 Walls and Levees, Raise Airport Levee, New Chehalis Levee	510	140	1030	140	Y	Future widening required. Allows for widening.	$80 to 100 Million	$225 to 330 Million	$305 to 430 Million
2. I-5 Raise and Widen Only	430	240	840	300	N*	Provides widening of I-5.	$450 to 550 Million	$0	$450 to 550 Million
3. I-5 Express Lanes	390	180	890	170	N*	Provides capacity, future widening unnecessary.	$120 to 150 Million****	$0	$120 to 150 Million
4. I-5 Temporary Bypass	400	150	900	170	N*	Future widening required. Allows for widening.	$70 to 90 Million****	$250 to 350 Million	$320 to 440 Million
5. I-5 Viaduct	***	***	***	***	N*	Replaces I-5 with new facility with sufficient capacity.	Greater than $1.5 Billion	$0	Greater than $1.5 Billion
6. I-5 Relocation	***	***	***	***	N*	Replaces I-5 with new facility with sufficient capacity.	Greater than $2 Billion	$0	Greater than $2 Billion

* Chehalis - Centralia Airport Levee or new SW Chehalis Levee could be added to this alternative or constructed as an independent project.

** The positive or negative '*Impacts to Buildings*' indicates the total predicted number of buildings experiencing decreased (positive) or increased (negative) flood elevations resulting from the alternative.

*** *'Impacts to Buildings'* analysis was not conducted as this Alternative was deemed not viable for further analysis.

**** Estimates do not include the costs to acquire the Tacoma Rail Right of Way

Conclusions and Next Steps

The effort to evaluate options to protect I-5 from flooding is part of a larger effort to protect people and communities in the Chehalis River Basin. While it is important that I-5 protection be part of a basin-wide solution to flooding in the Chehalis, I-5 protection is not the only flood damage reduction need and likely will not move forward without complementary efforts to provide broader protections for people and communities.

In support of the larger effort to identify basin-wide approaches to flood damage reduction in the Chehalis, this report looks only at options to protect I-5. There are a variety of approaches that could be used to protect I-5 from flooding. Some of the alternatives to protect I-5 could be considered in conjunction with other flood protection efforts in the Chehalis Basin, like a dam or flood bypasses. Due to time and funding constraints WSDOT has done a limited amount of design work to define and evaluate these alternatives. More work would be needed to refine and optimize alternatives individually or as part of a larger package of flood damage reduction efforts.

WSDOT considered six alternatives in this report:

- **Alternative 1: I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee** – Provides protection of I-5 and the Chehalis-Centralia Airport in flood events up to the 2007 or simulated 100-year flood level. It improves conditions for approximately 1030 buildings, but has a negative impact for approximately 140 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. Alternative 1 does not address the need to widen I-5 in the future. Alternative 1 appears to warrant further consideration as an independent project or in combination with other flood hazard mitigation elements in the Chehalis Basin.

- **Alternative 2: I-5 Raise and Widen Only** – Provides protection of I-5 in flood events up to the 2007 or simulated 100-year flood level, but does not provide, or preclude, protection of the Chehalis-Centralia Airport. It improves conditions for approximately 840 buildings, but has a negative impact for approximately 300 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. Alternative 2 does address the need to widen I-5 in the future. Alternative 2 appears to warrant further consideration as an independent project or in combination with other flood hazard mitigation elements in the Chehalis Basin.

- **Alternative 3: I-5 Express Lanes** - Provides a viable route around the portions of I-5 that are inundated during a flood event. This alternative route would be protected in flood events up to

the 2007 or simulated 100-year flood level, but does not provide, or preclude, protection of the Chehalis-Centralia Airport. It improves conditions for approximately 890 buildings, but has a negative impact for approximately 170 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. There are significant uncertainties with this alternative, such whether the City of Tacoma would sell the right-of-way to the Tacoma Rail line and, if so, at what cost, and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. However, Alternative 3 does address the future need to widen I-5, and provides a significant cost savings over other widening approaches. If Alternative 3 is to warrant further consideration, more work is required to determine feasibility.

- **Alternative 4: I-5 Temporary Bypass** - Provides a viable route around the portions of I-5 that are inundated during a flood event. This alternative route would be protected in flood events up to the 2007 or simulated 100-year flood level, but does not provide, or preclude, protection of the Chehalis-Centralia Airport. It improves conditions for approximately 900 buildings, but has a negative impact for approximately 170 buildings on the west side of I-5 near the Chehalis River and along the Newaukum River and Dillenbaugh Creek. These negative impacts can be mitigated and funding for flood impact and environmental mitigation is included in the cost estimates for this alternative. There are significant uncertainties with this alternative, such whether the City of Tacoma would sell the right-of-way to the Tacoma Rail line and, if so, at what cost, and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. Alternative 4 does not address the future need to widen I-5. If Alternative 4 is to warrant further consideration, more work is required to determine feasibility.

- **Alternative 5: I-5 Viaduct** - WSDOT does not consider this a viable alternative due to high costs and increased flood elevations in the urban areas of Centralia.

- **Alternative 6: I-5 Relocation** - WSDOT does not consider this a viable alternative due to high costs and impacts to the built and natural environment surrounding Chehalis and Centralia.

In late 2012, Governor Gregoire convened a small group of leaders in the Chehalis Basin to develop a plan of action to reduce damages from major flooding from the Chehalis River. The group recommends a series of actions that, taken together, will represent a significant investment to reduce flood damages in the short term, enhance natural floodplain function and fisheries, and put the Basin on firm footing to make critical decisions about large scale projects. Recommended actions include:

- Large-scale capital projects affecting a broad geographic area like a water retention, and/or improvements to protect Interstate 5
- Smaller-scale capital projects with more localized benefits
- Environmental projects to enhance overall conditions, aquatic habitat, and abundance of fish in the Basin

- Land use management to help people already in the floodplain and reduce the potential that new development will increase flood damage
- An effective system of flood warning and emergency response

Relative to I-5 protection, the group recommended funding be provided to determine the best combination of walls, levees, pumps, bypasses and other structures needed to protect Interstate 5 traffic, the airport and key urban areas of Centralia and Chehalis, if a dam is in place, to evaluate changes to the project that would be needed to secure comparable protection without a retention facility, to improve damage estimates to residential and commercial structures, and to improve the economic impact estimate from I-5 closures.

Appendix A:
Determining the right measurement for I-5 flood protection

Any major investment in flood protection must ensure that it will actually be effective in avoiding flooding and an I-5 closure under a wide range of events and potential future conditions (development, land use, climate change, etc.).

To accomplish this, WSDOT determined the distance needed from the calculated water surface during a flood to the top of the flood hazard mitigation element (e.g., levee or flood wall) to provide robust, reliable protection for I-5 and the Chehalis-Centralia Airport. This measurement is called "freeboard."

It is extremely important to identify the right amount of freeboard. The right amount of freeboard will provide confidence that, no matter what flood protection measures the legislature directs WSDOT to build, they provide protection for predicted floods in the project area.

WSDOT determined that freeboard must be three feet above the 100-year flood level. This level of protection equates to a minimum of one foot above the 2007 flood level in the Chehalis-Centralia area. This measurement was established through analysis by WSDOT's State Hydraulic Office as sufficient to cover a potential future water flow increase of 25 percent, which could be due to changes in the Chehalis River Basin such as development, land use, climate change, etc. This measurement would have protected I-5 in the 2007 flood, which was in excess of a 100-year flood event. See Appendix A.1 for a technical memorandum on WSDOT's hydrologic and hydraulic analysis to determine freeboard.

The following factors contributed to WSDOT's determination of freeboard:

- *Safety and economic risks* – In particular, there are significant safety risks if I-5 were to be inundated;
- *The size of the investment* – Any investment to protect I-5 will be substantial and there should be confidence that it will reliably prevent I-5 closures;
- *Frequency and variability of flood events in the Chehalis River Basin* – Each flood event is different, and I-5 protection must work across the full range of event types;
- *Difficulty precisely predicting flood levels and complexity of flood hydrology* – Because of its landscape and proximity to multiple water sources, there is significant variability in how flooding occurs in the Centralia-Chehalis area. When flooding predictions raise a serious risk that I-5 may be overtopped, safety concerns prompt a conservative decision about closing I-5. In addition to the threat of overtopping, serious concerns over the structural integrity of the Airport levee

have contributed to decisions to close I-5. During the last flood events there have been significant boils developing near the levee; these can cause the levee to breach instantly which would fully inundate I-5 very quickly, posing a serious safety risk; and,

- *Time required to close I-5* – Because it takes time to safely and effectively close I-5, decisions to close the interstate must be made well in advance of potential flooding impacts.

Safety and Economic Risks

I-5 is vital to the state's economy and acts as the West Coast's major north-south transportation corridor. The uninterrupted movement of cars, trucks, freight, and recreational vehicles along I-5 is essential to the quality of life and economic vitality in the region. Interruption of I-5 significantly affects the economy of Washington State and the West Coast.

The stretch of I-5 at Centralia-Chehalis is a midpoint between Seattle, Washington and Portland, Oregon. It connects two of the West Coast's major population and industrial centers, making it the most crucial transportation link in the area.

I-5 near the Chehalis-Centralia Airport levee (and Chamber Way fill) is a low spot in the area. The Interstate is at least six to seven feet below the top of the levee, and significantly lower than other portions of I-5 and the surrounding area. It can easily and quickly accumulate deep floodwaters if any nearby part of the interstate is inundated, presenting obvious and significant safety challenges to drivers. This risk of rapid and deep inundation of I-5, from overtopping of the Airport levee or due to a structural failure of the levee, prompts WSDOT to take a conservative approach to ensuring that I-5 is fully and effectively closed whenever there is serious potential for inundation and well before there is any water actually on or across the interstate.

The Size of the Investment

Any investment to protect I-5 will be substantial and there should be confidence that it will reliably prevent I-5 closures. Therefore, WSDOT must determine a measurement for freeboard that ensures robust protection.

Frequency and Variability of Flood Events in the Chehalis River Basin

Over the past 25 years, the stretch of I-5 from 13th Street to Mellen Street has closed four times due to flooding. The 1990 flood event in the Chehalis Basin closed I-5 for one day; the February 1996 and December 2007 flood events closed I-5 for four days each; and the January 2009 flood event closed this stretch of I-5 for two days. Each flood event has been unique and their effects difficult to predict with precision.

In February 1996 the flood was the result of a large frontal storm with very broad rainfall from north of Seattle to southern Oregon; in December 2007 the storm was concentrated in the Willapa Hills in the upper Chehalis Basin; and in January 2009 the storm focused on the eastern and northern portions of the Chehalis Basin. Each of these storms was different in how it contributed to the flooding of I-5, and the uncertainties of development, land use, and climate change and how that may affect future flood events, require WSDOT to be conservative when determining freeboard (see Appendix A.1). The factor WSDOT uses must be conservative enough to ensure protective measures will remain feasible across the full range of event types and well into the future.

Difficulty Precisely Predicting Flood Levels and Complexity of Flood Hydrology

I-5 protection in Chehalis and Centralia must consider the complex hydrology of the area. I-5 can be reached by floodwaters from multiple sources, and the low spot near Chamber Way accumulates deep floodwaters easily and quickly.

During major flood events, WSDOT follows the National Oceanic and Atmospheric Administration Northwest River Forecast Center (NWRFC) hydrograph predictions to monitor the potential for I-5 to be flooded. Of particular concern are predicted flood levels near the Airport levee, which keeps the low spot near Chamber Way from quickly inundating.

The height of the Airport levee is close to the height of recently predicted flood elevations. NWRFC hydrographs predicted that the levee would be overtopped in the 1996, 2007, and 2009 storm events, and I-5 was closed in each of those instances. However, the levee was actually overtopped in only the 1996 and 2007 events. In 2009, NWRFC hydrographs predicted that the Airport levee would overtop by two feet on January 8, leading WSDOT to close I-5 from January 6 – 9 (43 hours), to ensure drivers would be evacuated before any water reached the interstate. Although a wholesale overtopping did not occur, floodwaters in 2009 did rise to the top of the Airport levee and flowed across the southwest corner of the levee.

As long as the Airport levee remains such a key part of the flood protection system for I-5, it will continue to be necessary to close the interstate whenever there is serious potential for the levee to fail or be overtopped.

It is important to note that, even if the Airport levee were raised, it still would not prevent water from flooding I-5. The levee only protects I-5 from the west, and flood waters can and do encroach on the interstate from the other three directions. In 1996 and 2007, I-5 was covered by floodwaters from the west, over the Airport levee, while at the same time backwater from the Chehalis River via the Salzer Creek Basin flooded I-5 from the east.

Time Required to Close I-5

Closing I-5 in the Centralia-Chehalis area is a complex and challenging undertaking. When I-5 is anticipated to be flooded between 13th and Mellen streets, (exits 76 and 81), WSDOT closes I-5 at the US 12 interchanges (exits 68 and 88). WSDOT then uses US 12 as the major detour route.

The US 12 interchanges were chosen as closure points in part because they are far enough away from Chehalis and Centralia that diverting traffic there minimizes the potential for thousands of interstate drivers to exit onto the limited number of local streets in Chehalis, Centralia, and Lewis County. Limiting congestion on local streets is especially vital during major flood events, as the streets are needed for critical emergency relief and rescue operations.

Closing I-5 at the US 12 interchanges means WSDOT must block off the main interstate lanes and 10 separate interchanges at exits 68, 71, 72, 74, 76, 77, 79, 81, 82 and 88 to prevent traffic from entering I-5 in the closed area. This must be accomplished well before I-5 is inundated by floodwaters to ensure WSDOT's ability to safely evacuate drivers and move personnel and equipment into the affected area. The early flooding of some local streets adds to the difficulty of moving drivers out and resources in.

Figures 1-3 illustrate the comparison of levee heights that meet WSDOT's freeboard requirement in the vicinity of the Chehalis-Centralia Airport, Salzer Creek, and Main Street/SW Chehalis Avenue in a with and without dam scenario.

Figure 1: Comparison of Levee Heights in Vicinity South of Chehalis-Centralia Airport (near West Street) – With and Without Dam

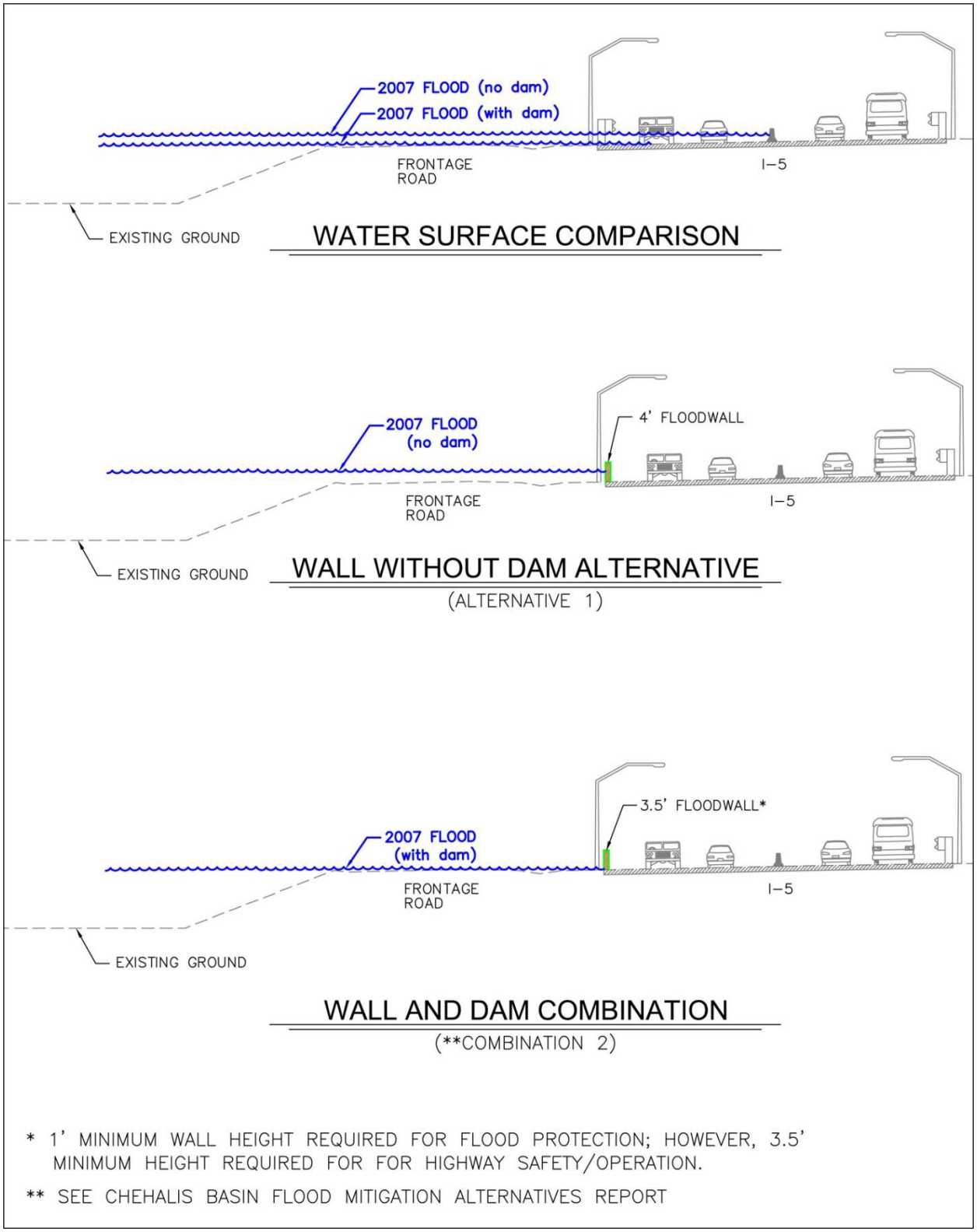


Figure 2: Comparison of Levee Heights in Vicinity of Salzer Creek – With and Without Dam

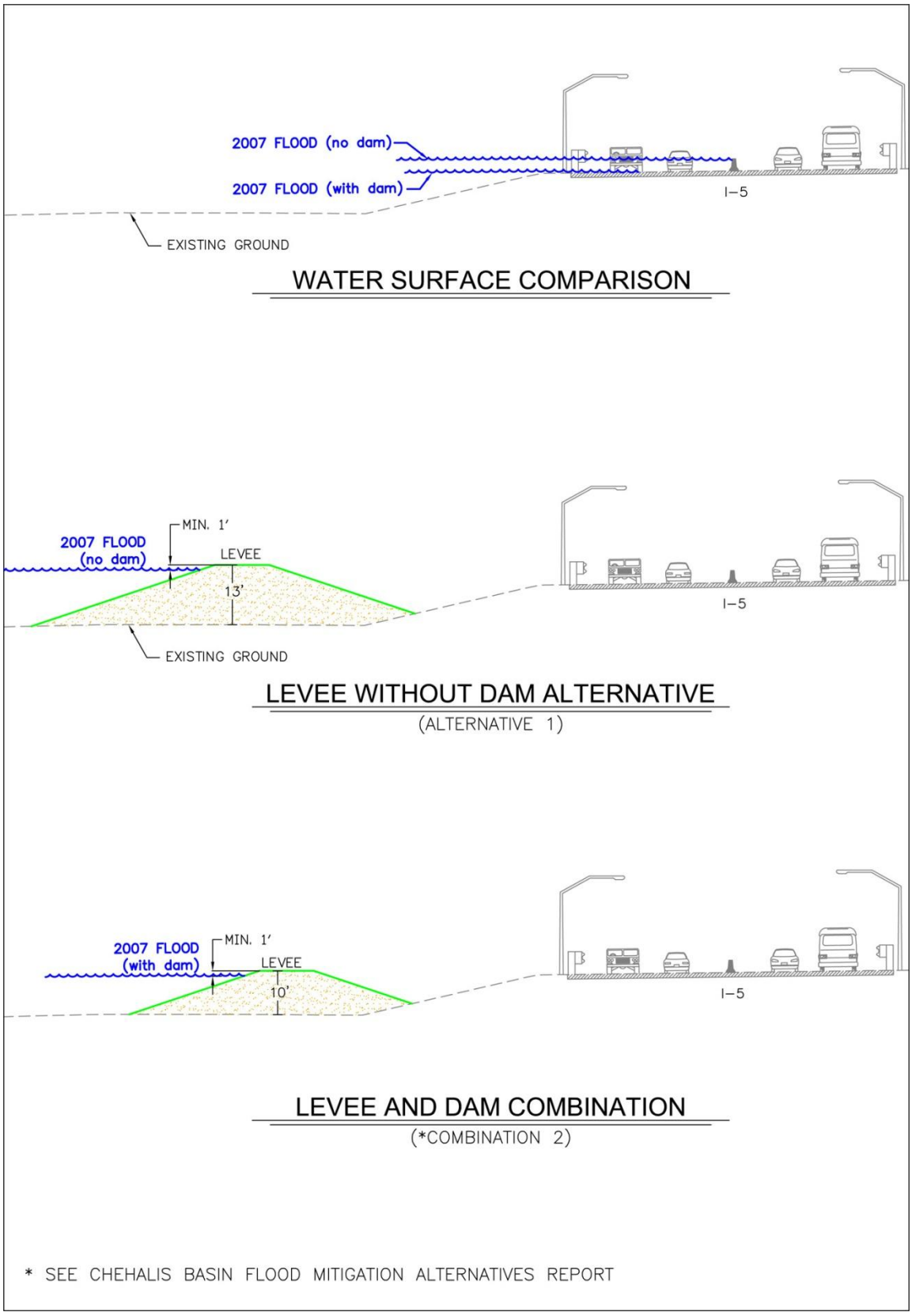
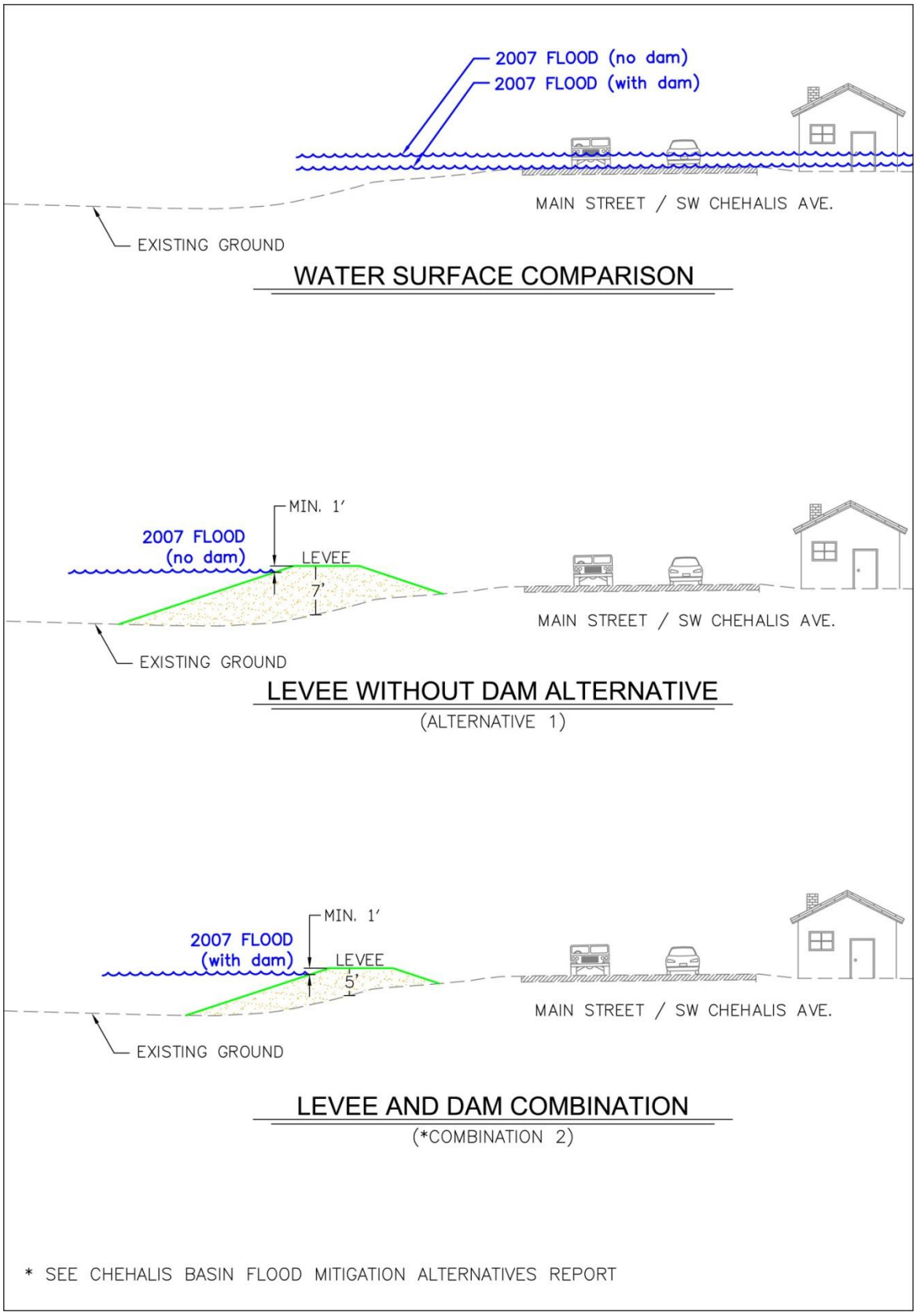


Figure 3: Comparison of Levee Heights in Vicinity of Main Street/SW Chehalis Avenue – With and Without Dam



Appendix A.1:

WSDOT - ESHB 2020 Hydrologic and Hydraulic Analysis

Memorandum

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

To: Bart Gernhart, SWR Assistant Regional Administrator

From: Casey Kramer, State Hydraulic Engineer / Katie Mozes, Hydraulic Designer

Date: 8/8/2012

Re: Engrossed Substitute House Bill 2020 Hydrologic and Hydraulic Analysis

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As requested, a detailed hydrologic and hydraulic analysis was completed to understand how flood frequency events have changed over time in the Chehalis River Basin. In 2011, the Washington State Legislature required the Office of Financial Management (OFM) to provide a report to the governor and legislature that identifies flood hazard mitigation projects in the Chehalis River Basin (Engrossed Substitute House Bill 2020 [ESHB 2020], Section 1033). This memorandum summarizes the analyses conducted by the Washington State Department of Transportation (WSDOT) to determine an acceptable freeboard height for flood hazard mitigation elements within Centralia and Chehalis, in accordance with ESHB2020.

Introduction

In the Chehalis River Basin flooding is a common occurrence often damaging infrastructure in the surrounding cities. ESHB 2020, Section (2) (c) mandates the WSDOT to "evaluate alternative projects that could protect the interstate highway and the municipal airport at Centralia and Chehalis, and ensure access to medical and other critical community facilities during flood events". In order to complete the analysis, it is important for the WSDOT to better understand the hydrology and hydraulics in the basin to determine the amount of freeboard necessary to account for potential increases in flow over time. The analysis included two main tasks, specifically a hydrologic analysis and hydraulic modeling. Each will be discussed separately in the following paragraphs.

Engineering Analysis

Hydrologic Analysis

The hydrologic analysis investigated peak flows at several United States Geological Survey (USGS) stream gages in the project area. The gages considered were the Chehalis River near Doty, WA (USGS 12020000), Chehalis River near Grand Mound, WA (USGS 12027500), Newaukum River near Chehalis, WA (USGS 12025000), and the Skookumchuck River near Bucoda, WA (USGS 12026400). Significant floods have occurred in January 1972, January 1990, November 1990, February 1996, December 2007 and January 2009. Figures 1 through 4 show annual instantaneous peak flows throughout each gage's history.

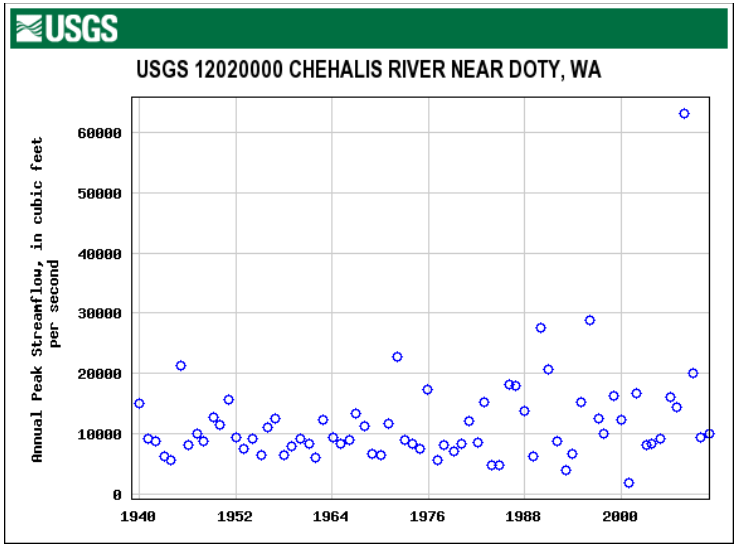


Figure 1. Chehalis River Near Doty Peak Flows

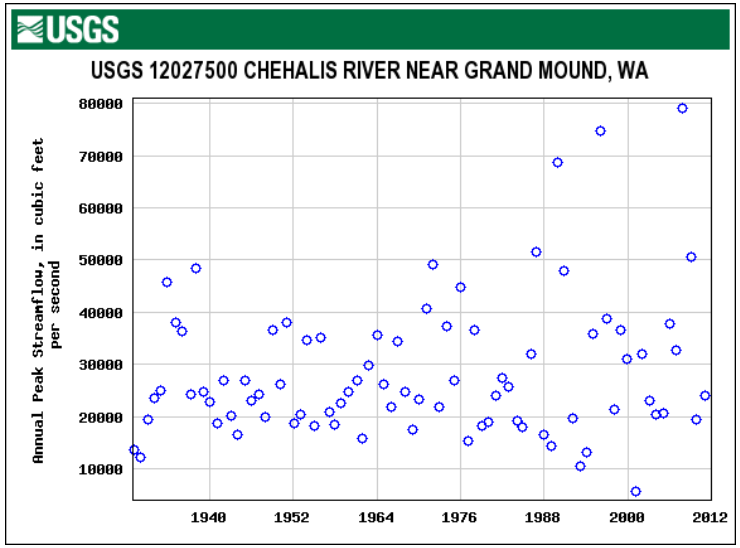


Figure 2. Chehalis River Near Grand Mound Peak Flows

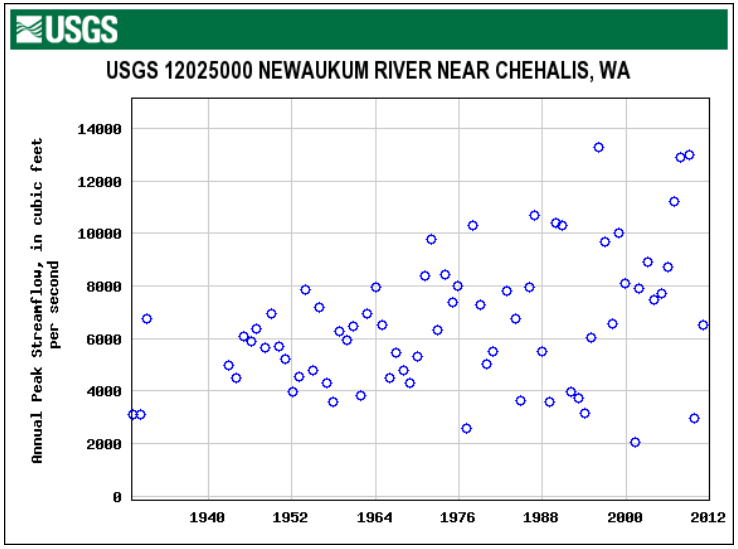


Figure 3. Newaukum River Near Chehalis Peak Flows

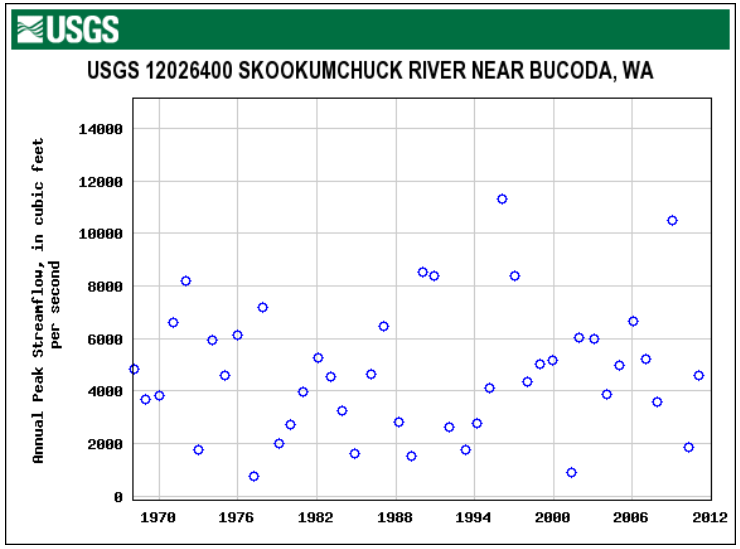


Figure 4. Skookumchuck River Near Bucoda Peak Flows

To understand how flood frequency events have changed over time, a statistical analysis was conducted following procedures outlined in Bulletin 17B of the Interagency Advisory Committee on Water Data. The statistical analysis provided estimates of instantaneous annual-maximum peak flows having recurrence intervals of 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-years. The recurrence interval or return period, is the average interval of time, expressed in years, within which the given flood will be equaled or exceeded once at a specific location, in the case of this analysis at the specific gage location. For example, a flood having a return period of 100 years (i.e. a 100-year flood) has a 1 chance in 100, or a 1-percent probability of occurring in any given year. It is important to understand that the 100-year flood is a statistical computation using as many years of data as possible and does not mean that a flood of this magnitude will only happen once every 100 years.

Peak flow estimates were determined and are plotted for the three following time periods to illustrate how flows have changed over time: 1) Beginning of gage record to 1984, 2) Beginning of gage record to 2006, and 3) Beginning of gage record to present. These time periods were chosen based on when significant floods have occurred in the basin and when other studies have been performed (e.g. 1982 FEMA Flood Insurance Study). Figures 5 through 8 illustrate the three separate flood frequency curves for each gage analyzed. All gages analyzed show that the larger recurrence flows (e.g. return period of 10-yr and greater) have increased within the period of each gage's record. Note that Skookumchuck River Near Bucoda is regulated therefore changes in recurrence flows are effected by dam operations.

It is difficult to conclude if the increases in flows will continue over time or if we are refining our estimate of a true 100-yr event with each additional year of flow data. It is well understood that flood-frequency values will change, either increasing or decreasing, as more data is collected and a new flood frequency is calculated. It was therefore determined that a flow increase of 25% provides a conservative estimate over the life of the project given uncertainties within the Chehalis River Basin such as development, land use changes, climate change, etc.

Hydraulic Analysis

To determine water surface elevations through the project area for the various flood recurrence events the United States Army Corps of Engineers (USACE) Hydrologic Engineering Center River Analysis System (HEC-RAS) software was utilized. WSDOT together with multiple public and private entities collaborated to develop an unsteady hydraulic model which represents the best available science and information on hydraulic conditions throughout the Chehalis River Basin. This model was utilized to develop rating curves, plots correlating discharge with water surface elevation, for the 100-, 500-year, and 2007 events at several representative sections throughout the basin. The rating curves were utilized with the potential flow increase of 25% to determine flood elevations throughout the project reach (Table 1). The baseline conditions used for this analysis included all of WSDOT's proposed flood hazard mitigation projects.

Columns 1 and 2 show the river and cross section location, respectively. Column 3 shows the 2007 event flow and the calculated 100- and 500-year flows. Column 5 shows the potential flow including the 25% increase. Column 6 shows the existing water surface elevations for the 100-, 500-year and 2007 events for each specified location. Column 7 shows the potential water surface elevations for the 100- and 500-year events for each specified location.

The difference between the modeled and the potential future flood elevations were analyzed and are shown in Column 8. Based on the analysis it was determined that 3 feet of freeboard above the design 100-year elevation will be adequate to cover a 25% increase in flows. The 3 feet of freeboard was also determined to be sufficient to contain the 2007 flood event (flood of record on Chehalis River) as shown in Column 9.

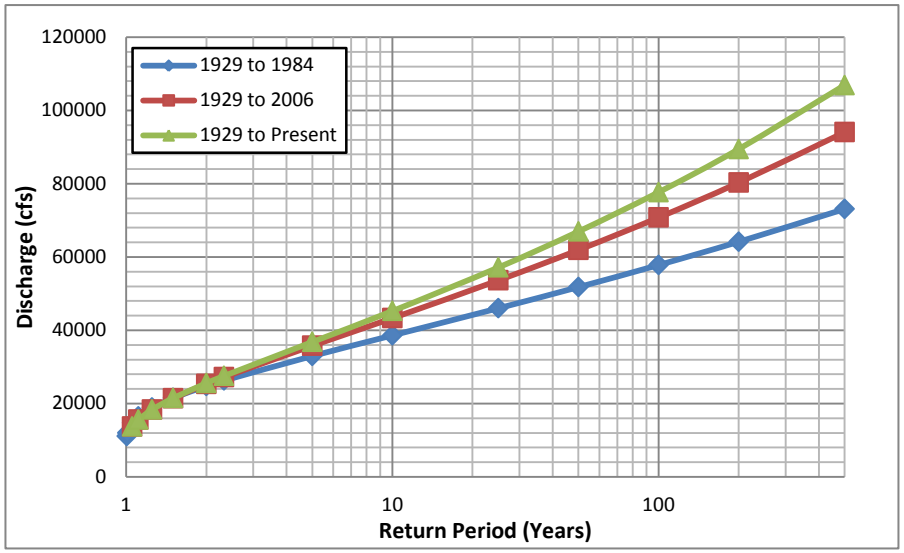


Figure 5. Flood Frequency Plot for Chehalis River Near Grand Mound, WA (12027500)

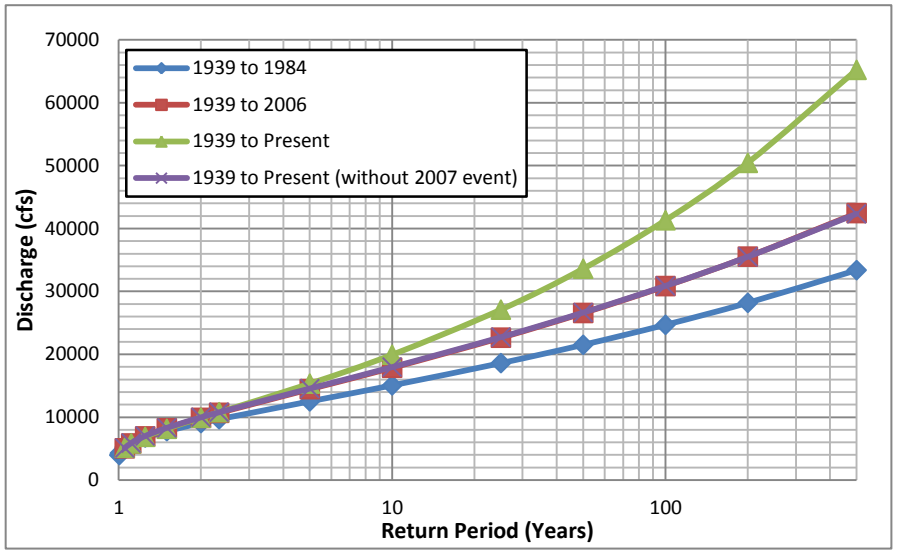


Figure 6. Flood Frequency Plot for Chehalis River Near Doty, WA (12020000)

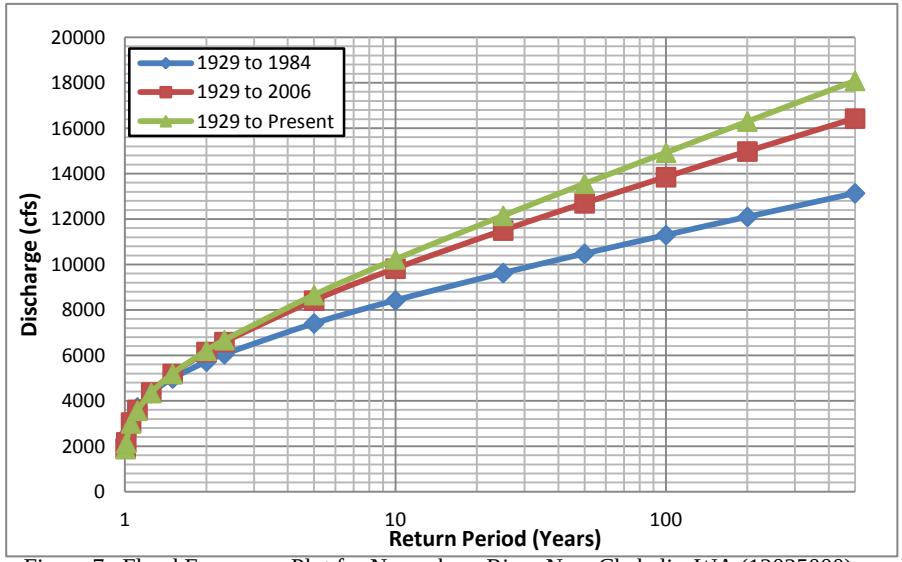


Figure 7. Flood Frequency Plot for Newaukum River Near Chehalis, WA (12025000)

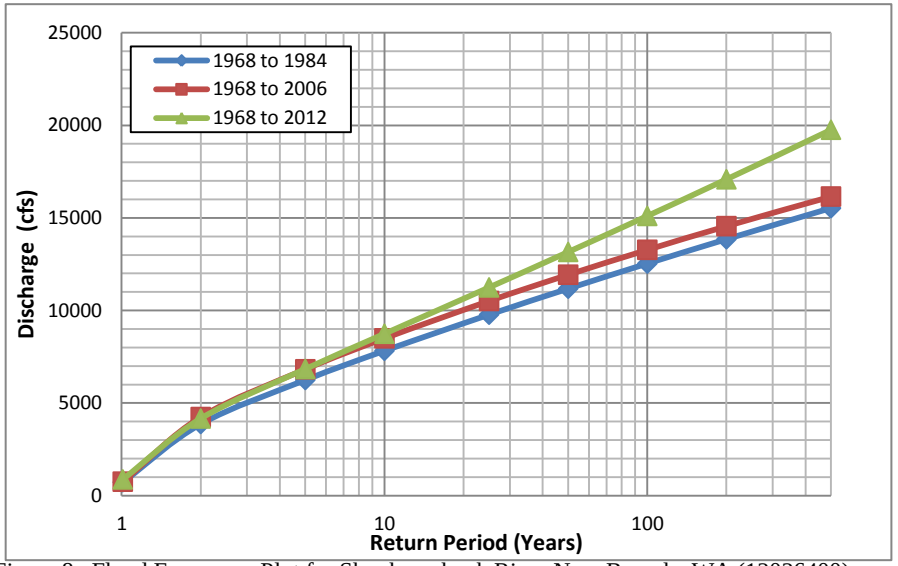


Figure 8. Flood Frequency Plot for Skookumchuck River Near Bucoda, WA (12026400)

Table 1. Hydraulic Characteristics Summary

(1)	(2)	(3)			(4)	(5)		(6)			(7)		(8)	(9)
RIVER	CROSS SECTION (RM)	EXISTING FLOW (CFS)			POTENTIAL FLOW INCREASE (%)	POTENTIAL FLOW (CFS)		EXISTING WATER SURFACE ELEVATION (FEET)			POTENTIAL WATER SURFACE ELEVATION (FEET)		MINIMUM FREEBOARD REQUIRED (FEET)	AMOUNT OF FREEBOARD AVAILABLE ABOVE 2007 ELEVATION (FEET)
		100-YR	500-YR	2007		100-YR	500-YR	100-YR	500-YR	2007	100-YR	500-YR		
Newaukum	2.27	12735	13998	12114	25%	15919	17498	191.0	191.3	190.8	191.6	191.9	0.7	3.2
	1.92	11499	12294	10589	25%	14374	15368	188.1	188.8	188.5	189.5	189.8	1.4	2.6
	1.66	11237	11350	9804	25%	14046	14188	187.4	188.3	188.1	189.7	189.7	2.3	2.3
	0.1	11701	13478	13196	25%	14626	16848	186.4	187.6	187.5	188.0	188.7	1.6	1.9
Chehalis	77.17	52911	56885	57434	25%	66139	71106	187.6	188.6	188.5	189.5	190.0	1.9	2.2
	76.36	45744	49707	49023	25%	57180	62134	186.9	188.0	187.8	188.8	189.3	1.9	2.1
	74.82	60756	67023	67081	25%	75945	83779	184.8	186.3	186.2	187.2	187.8	2.4	1.6
	72.58	45839	54730	54341	25%	57299	68413	183.1	185.0	184.7	185.3	186.4	2.2	1.4
	71.72	46492	55956	55591	25%	58115	69945	181.7	183.8	183.4	184.0	185.0	2.4	1.3
	71.48	70481	86548	85815	25%	88101	108185	181.7	183.8	183.4	183.9	185.0	2.2	1.3
	69.52	69586	85523	85325	25%	86983	106904	180.4	182.7	182.1	182.8	183.9	2.4	1.3
	69.23	65324	79582	79282	25%	81655	99478	180.4	182.7	182.1	182.9	184.2	2.5	1.3
	67.46	65120	79019	79214	25%	81400	98774	177.9	179.9	179.1	180.1	181.0	2.2	1.8

Conclusion

The analysis determined that 3 feet of freeboard above the modeled 100-year flood elevation would be sufficient to cover a potential future flow increase of 25%, given uncertainties within the Chehalis River Basin such as development, land use changes, climate change, etc. This would also provide sufficient clearance during the 2007 flood event which was in excess of a 100-yr event through the project site.

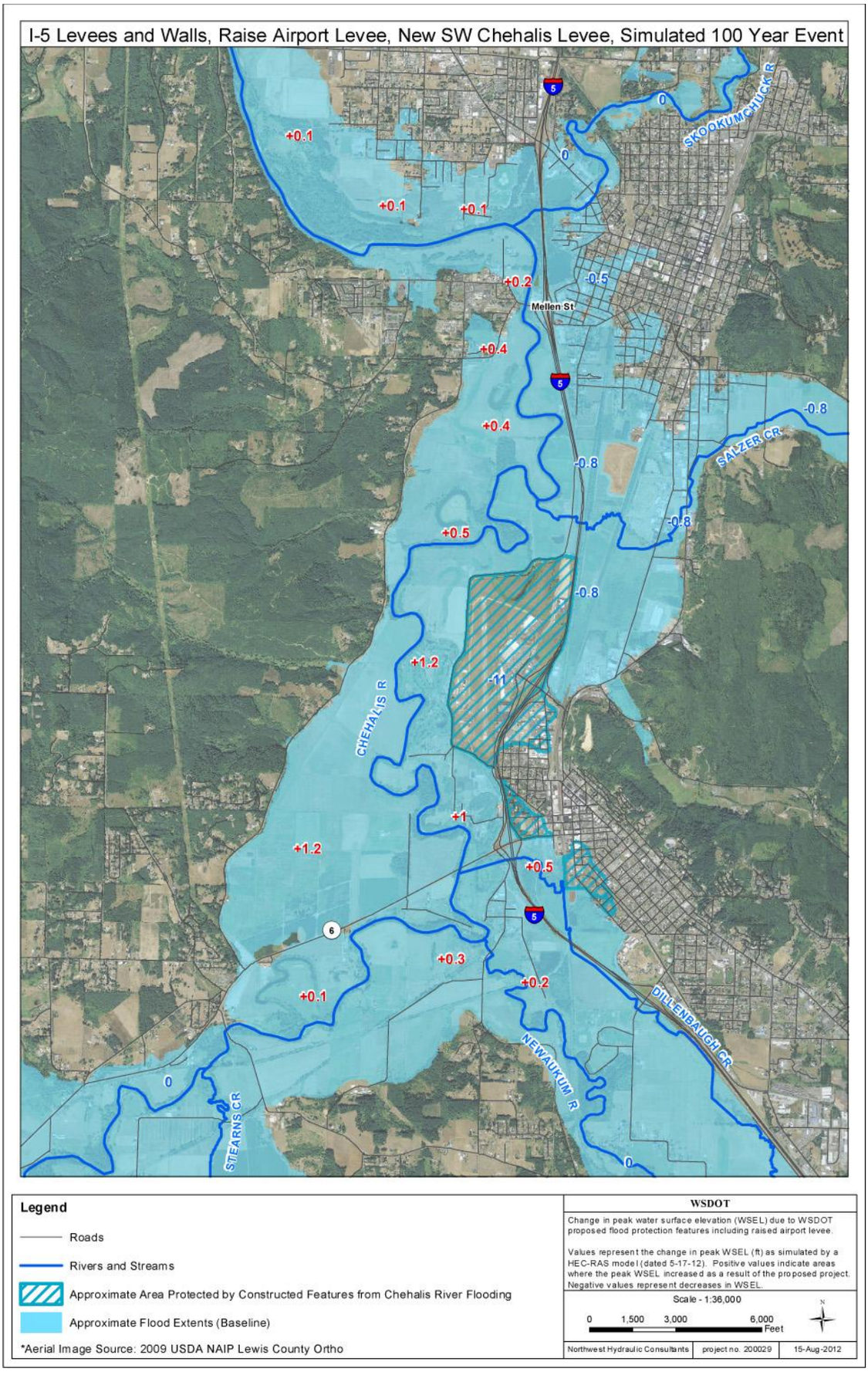
If you have any questions or need further assistance regarding the information included in this memorandum please feel free to contact Katie Mozes at (360) 705-7261 or myself at (360) 705-7262.

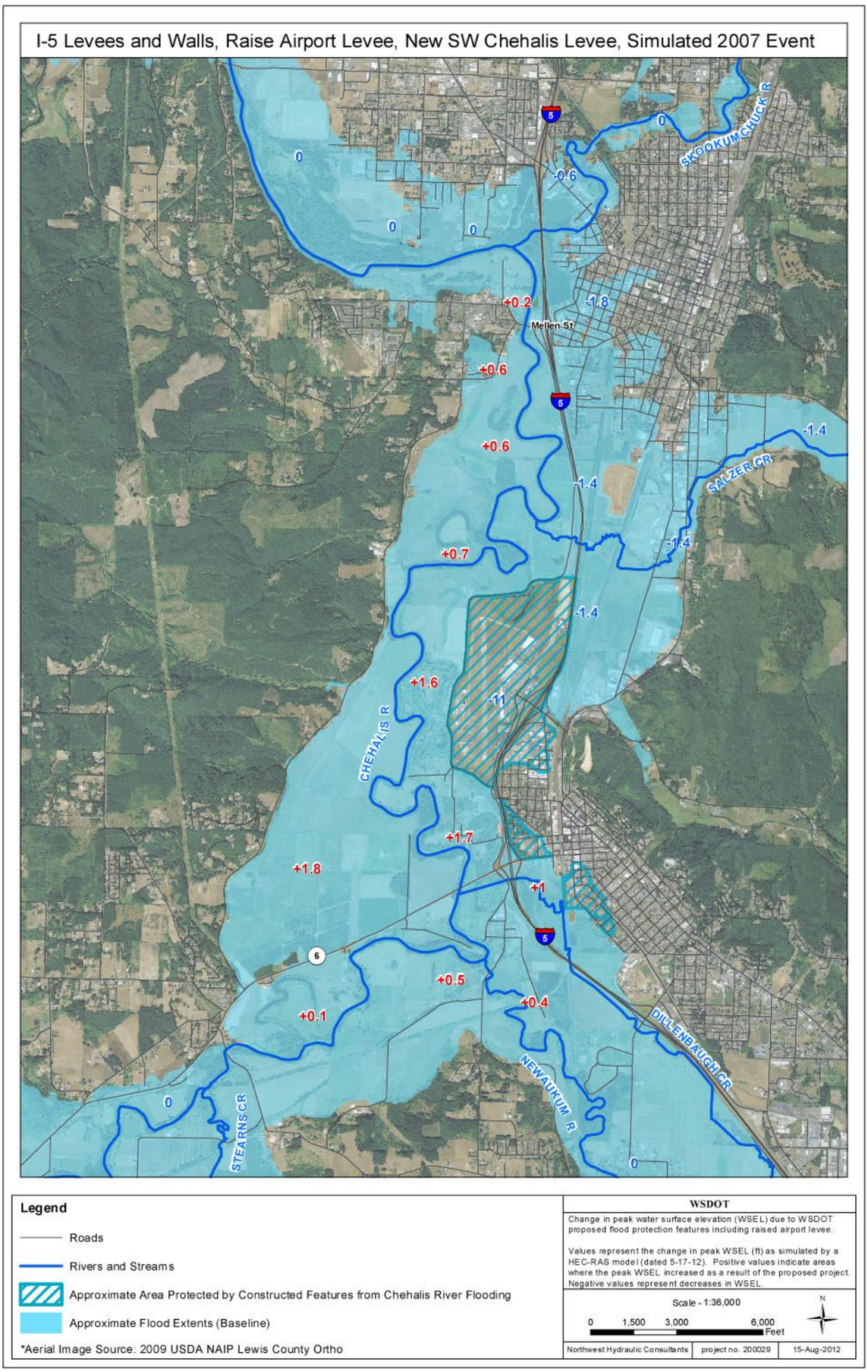
CMK

cc: HQ Hydraulics Project File

Appendix B:

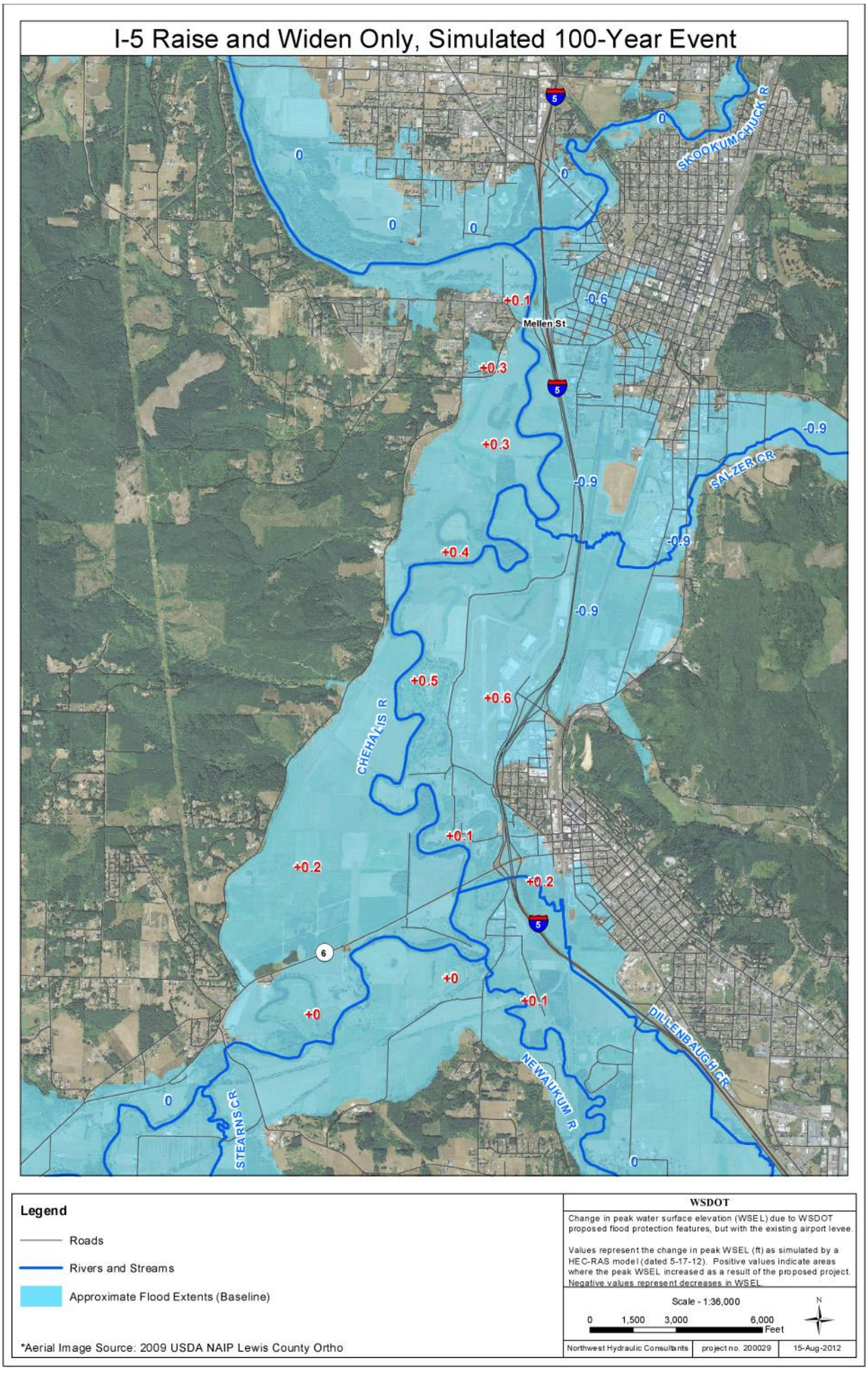
Alternative 1: I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee - Flood Relief Maps

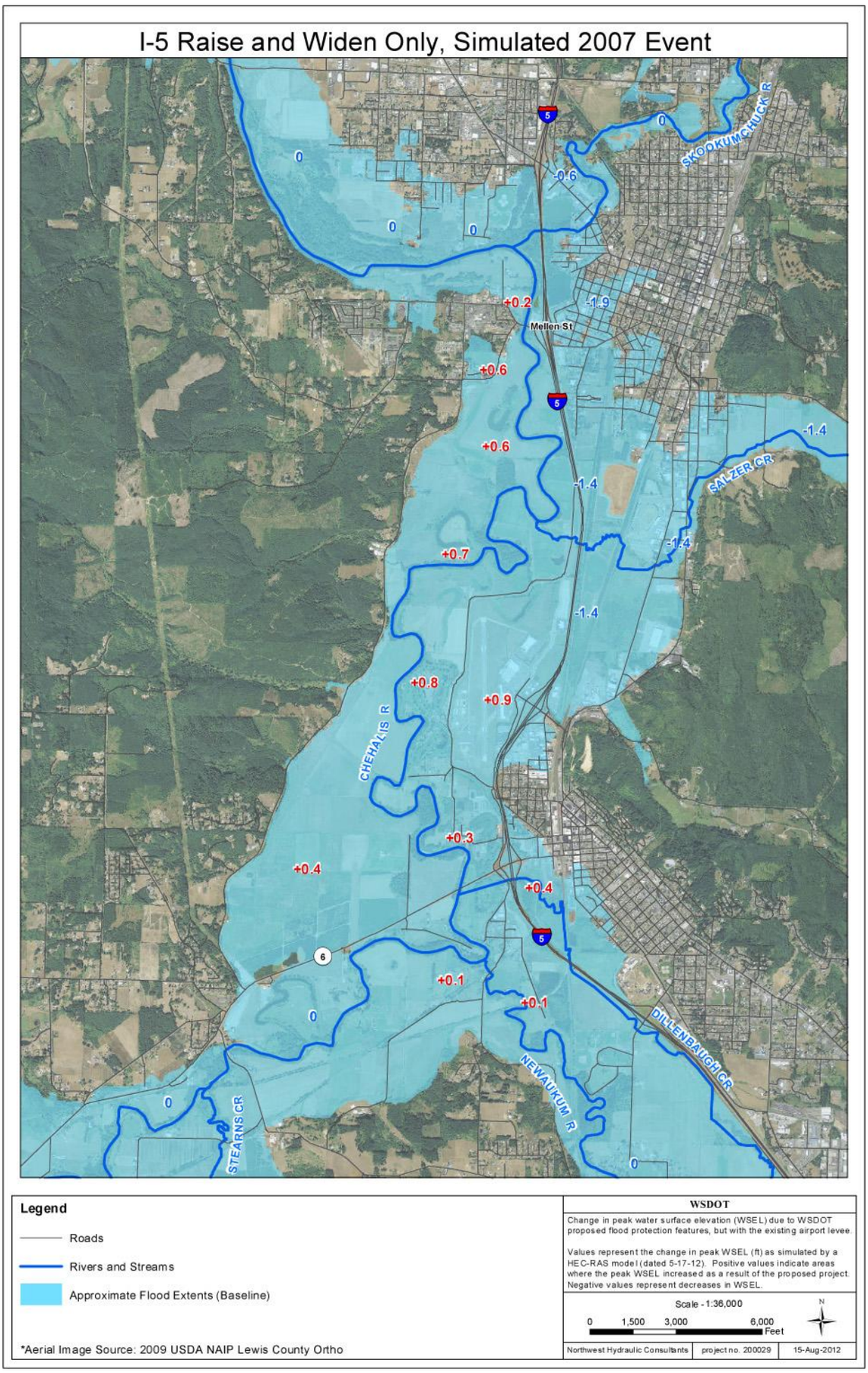



I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee, Simulated 2007 Event
Mellen St
SKOOKUMCHUCK R
SALZER CR
CHEHALIS R
STEARNS CR
NEWAUKUM R
DILLENBAUGH CR
0
-0.6
-1.8
+0.2
+0.6
-1.4
+0.7
-1.1
+1.6
+1.7
+1.8
+1
+0.5
+0.4
+0.1
Legend
Roads
Rivers and Streams
Approximate Area Protected by Constructed Features from Chehalis River Flooding
Approximate Flood Extents (Baseline)
*Aerial Image Source: 2009 USDA NAIP Lewis County Ortho
WSDOT
Change in peak water surface elevation (WSEL) due to WSDOT proposed flood protection features including raised airport levee.
Values represent the change in peak WSEL (ft) as simulated by a HEC-RAS model (dated 5-17-12). Positive values indicate areas where the peak WSEL increased as a result of the proposed project. Negative values represent decreases in WSEL.
Scale - 1:36,000
0 1,500 3,000 6,000 Feet
N
Northwest Hydraulic Consultants
project no. 200029
15-Aug-2012

Appendix C:

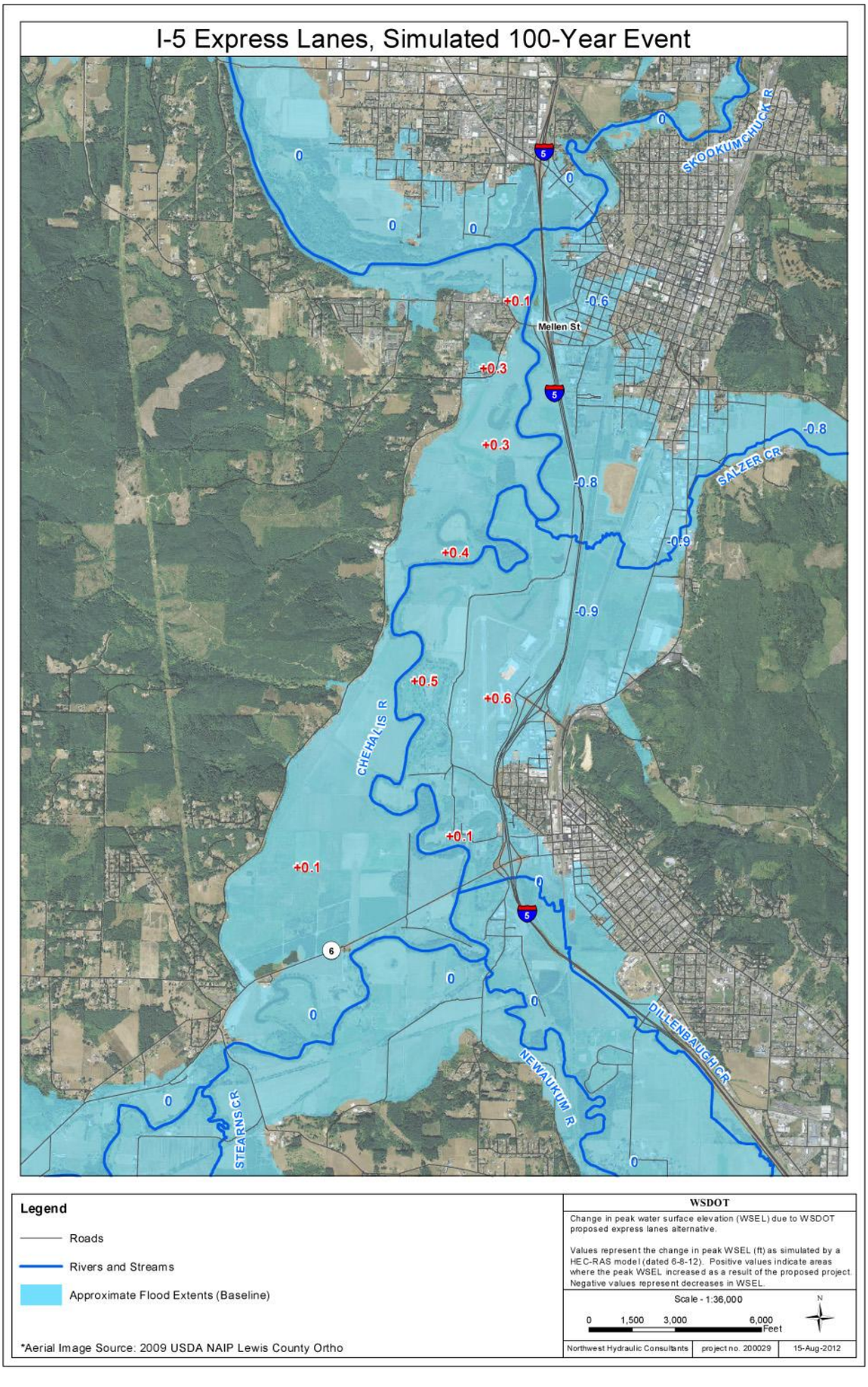
Alternative 2: I-5 Raise and Widen Only - Flood Relief Maps

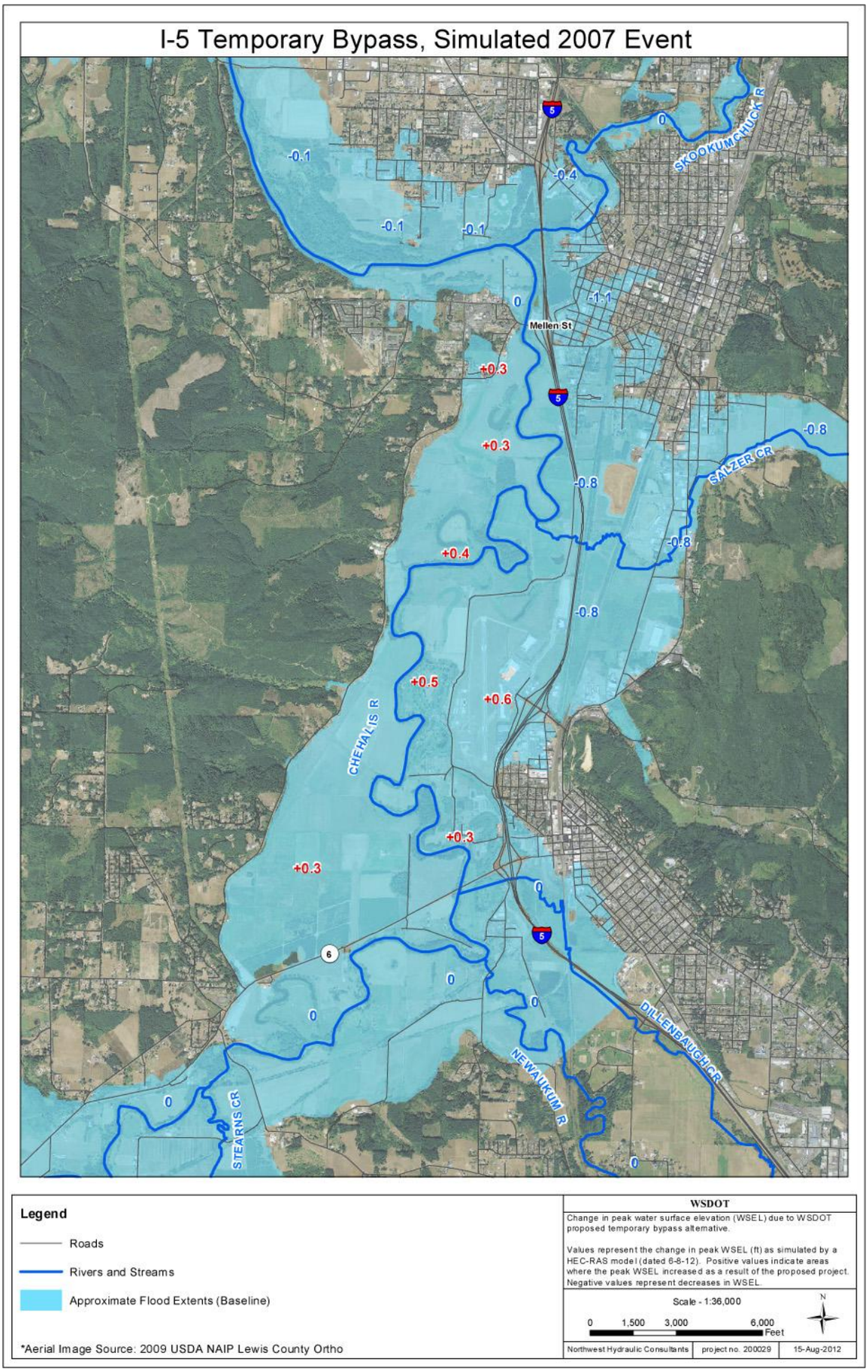



I-5 Raise and Widen Only, Simulated 2007 Event
Mellen St
SKOOKUM CHUCK R
SALZER CR
CHEHALIS R
STEARNS CR
NEWAUKUM R
DILLENBAUGH CR
0
-0.6
+0.2
-1.9
+0.6
-1.4
+0.7
+0.8
+0.9
+0.3
+0.4
+0.1
Legend
Roads
Rivers and Streams
Approximate Flood Extents (Baseline)
*Aerial Image Source: 2009 USDA NAIP Lewis County Ortho
WSDOT
Change in peak water surface elevation (WSEL) due to WSDOT proposed flood protection features, but with the existing airport levee.
Values represent the change in peak WSEL (ft) as simulated by a HEC-RAS model (dated 5-17-12). Positive values indicate areas where the peak WSEL increased as a result of the proposed project. Negative values represent decreases in WSEL.
Scale - 1:36,000
0 1,500 3,000 6,000 Feet
N
Northwest Hydraulic Consultants
project no. 200029
15-Aug-2012

Appendix D:

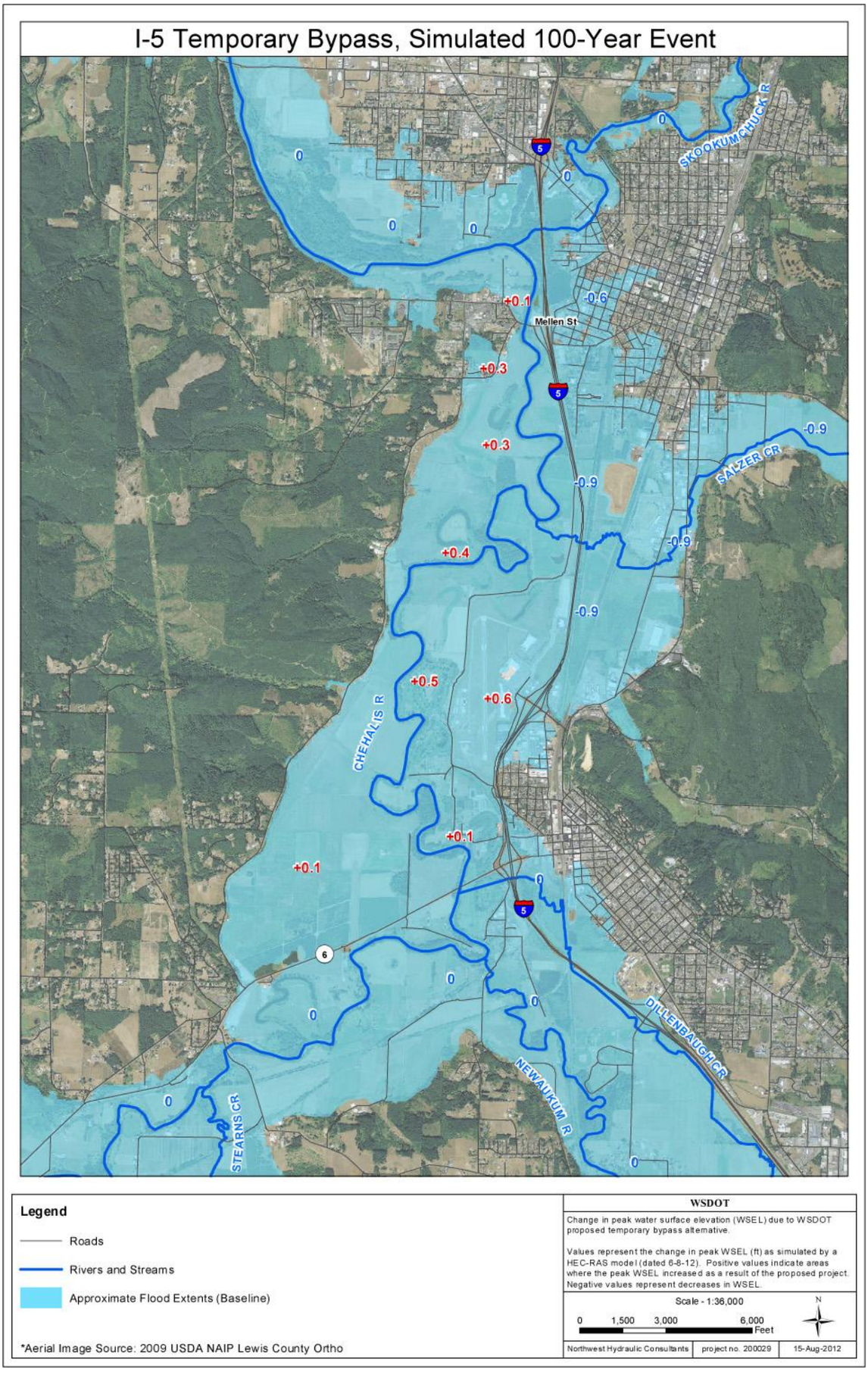
Alternative 3: I-5 Express Lanes - Flood Relief Maps

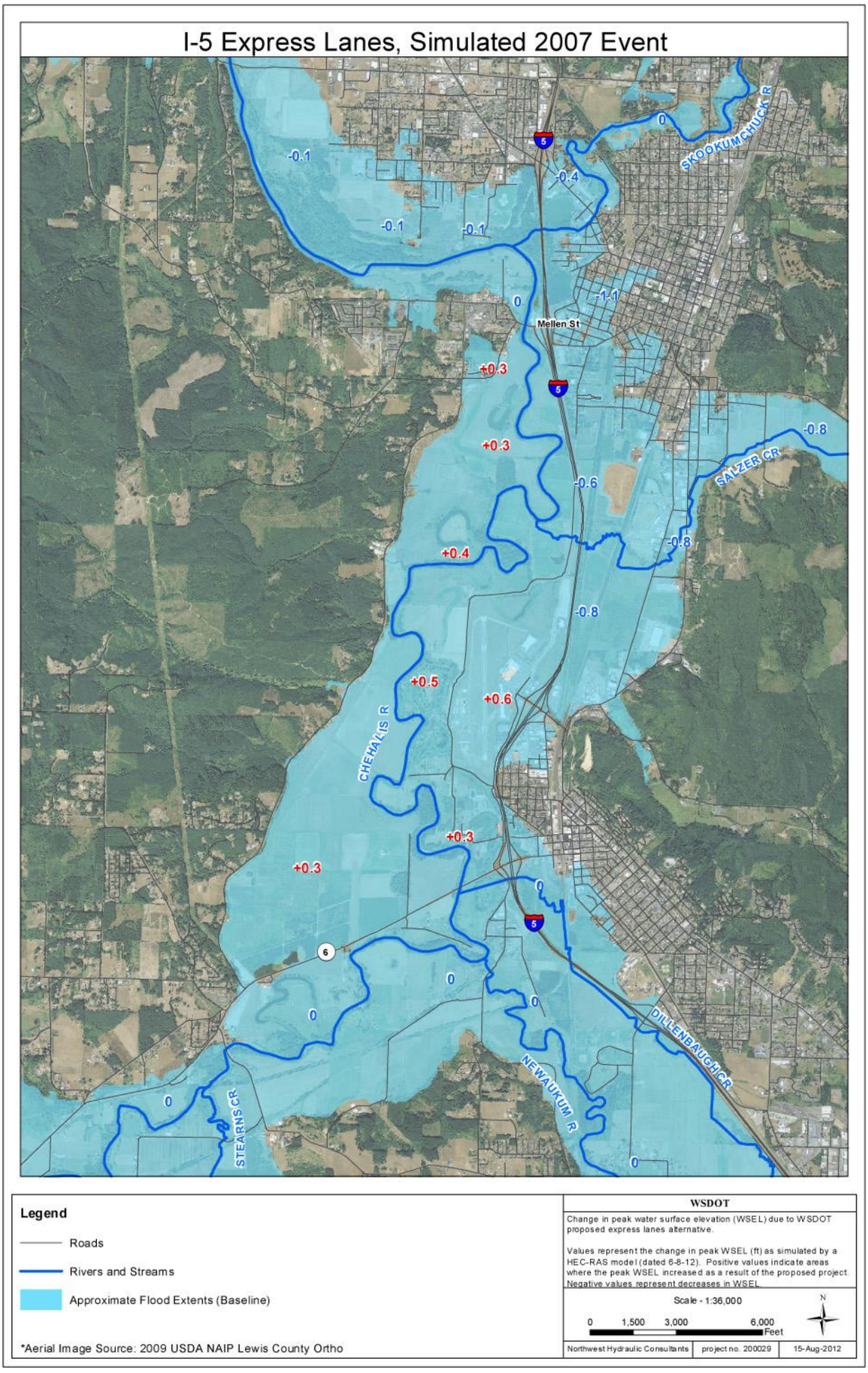



I-5 Temporary Bypass, Simulated 2007 Event
-0.1
-0.1
-0.1
-0.4
0
SKOOKUMCHUCK R
-1.1
Mellen St
+0.3
+0.3
-0.8
SALZER CR
-0.8
-0.8
+0.4
-0.8
+0.5
+0.6
CHEHALIS R
+0.3
+0.3
0
0
0
0
0
0
0
STEARNS CR
NEWAUKUM R
DILLENBAUGH CR
Legend
Roads
Rivers and Streams
Approximate Flood Extents (Baseline)
*Aerial Image Source: 2009 USDA NAIP Lewis County Ortho
WSDOT
Change in peak water surface elevation (WSEL) due to WSDOT proposed temporary bypass alternative.
Values represent the change in peak WSEL (ft) as simulated by a HEC-RAS model (dated 6-8-12). Positive values indicate areas where the peak WSEL increased as a result of the proposed project. Negative values represent decreases in WSEL.
Scale - 1:36,000
0 1,500 3,000 6,000 Feet
N
Northwest Hydraulic Consultants
project no. 200029
15-Aug-2012

Appendix E:

Alternative 4: I-5 Temporary Bypass - Flood Relief Maps




I-5 Express Lanes, Simulated 2007 Event
-0.1
-0.1
-0.1
-0.4
0
SKOOKUM CHUCK R
-1.1
Mellen St
0
+0.3
+0.3
-0.6
-0.8
SALZER CR
-0.8
+0.4
-0.8
+0.5
+0.6
CHEHALIS R
+0.3
+0.3
0
0
0
0
0
0
0
STEARNS CR
NEWAUKUM R
DILLENBAUGH CR
0
Legend
Roads
Rivers and Streams
Approximate Flood Extents (Baseline)
*Aerial Image Source: 2009 USDA NAIP Lewis County Ortho
WSDOT
Change in peak water surface elevation (WSEL) due to WSDOT proposed express lanes alternative.
Values represent the change in peak WSEL (ft) as simulated by a HEC-RAS model (dated 6-8-12). Positive values indicate areas where the peak WSEL increased as a result of the proposed project. Negative values represent decreases in WSEL.
Scale - 1:36,000
0 1,500 3,000 6,000 Feet
N
Northwest Hydraulic Consultants
project no. 200029
15-Aug-2012

Appendix F:
Public Comment and Response Summary

Stefanie Wahl 8/23/12

Chehalis West is a 65 bed assisted living facility that employs 42 people. The facility is located on the west side directly on the Tacoma rail line. The noise, exhaust, and visual aesthetics would be devastating to our business if the express or temporary bypass options were implemented. The center of the track is 12.5' from our property line.

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Edna Fund 8/23/12

Our council is in favor of a basinwide solution and sent a letter to Congresswoman Butler; agrees with Merlin MacReynold comment

Response to Comment

The WSDOT report was written to address only Section 1033 (2) (c) of ESHB 2020. This section states "evaluate alternative projects that could protect the interstate highway and municipal airport at Centralia and Chehalis, and ensure access to medical facilities …". The WSDOT report was not intended to address other potential projects or components that may be considered as part of a basin wide solution(s).

The final report more clearly describes the context for the I-5 protection analysis – it is but one component of a broader effort to summarize existing information on alternatives to

mitigate flood damage in the Chehalis Basin. The alternatives described are focused on I-5 protection because that is the focus of the report; however the final report more clearly describes protection of I-5 as only one potential component of a broader set of flood hazard mitigation efforts needed in the Basin and refer more clearly to the larger effort to determine a path forward for flood hazard mitigation in the Basin, of which protection of I-5 is only a part.

Merlin McReynold 8/23/12

City Council of Chehalis opposed to all alternatives. Official position is that this has to be a basinwide solution; how these alternatives could fit into that is critical, but City Council thinks none are viable as individual alternatives without basin wide solution

Response to Comment

The WSDOT report was written to address only Section 1033 (2) (c) of ESHB 2020. This section states "evaluate alternative projects that could protect the interstate highway and municipal airport at Centralia and Chehalis, and ensure access to medical facilities …". The WSDOT report was not intended to address other potential projects or components that may be considered as part of a basin wide solution(s).

The final report more clearly describes the context for the I-5 protection analysis – it is but one component of a broader effort to summarize existing information on alternatives to mitigate flood damage in the Chehalis Basin. The alternatives described are focused on I-5 protection because that is the focus of the report; however the final report more clearly describes protection of I-5 as only one potential component of a broader set of flood hazard mitigation efforts needed in the Basin and refer more clearly to the larger effort to determine a path forward for flood hazard mitigation in the Basin, of which protection of I-5 is only a part.

Ron Averill 8/23/12

Flood relief maps of the Walls and Levees are misleading. In all alternatives, Miracle Mile is still under water, so a 1.4 foot drop doesn't mean it's dry. The Yardbirds, Sunbirds, and Lewis County Mall are not protected by airport levee, even though Town Center and Airport are protected

Response to Comment

The flood relief maps were provided to show representative changes in peak Water Surface Elevation (WSEL) throughout the project area in a 2007 and simulated 100-year flood event, and were not meant to imply that a reduction in WSEL equates to full flood protection for all residences and businesses in that particular cross-section.

The report does not state that any particular businesses, such as Yardbirds, Sunbirds, or Lewis County Mall, would be completely protected from flooding.

Anonymous 8/23/12

Consider the property value impacts on businesses and residences in the express/bypass lanes project area that would be affected.

Express and bypass lanes don't allow for non-commercial traffic, so folks that need to access the hospital during floods may not be able to due to the backups.

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Anonymous 8/23/12

Our company leases property from Tacoma Rail, so if express/bypass lanes are built we will have nowhere to park

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If

projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Anonymous 8/23/12

Express/bypass lanes would have impact on our company because we would have to relocate our storage facility and its difficult to get ability to store hazardous material in places; this would impact our business and other residents and businesses in the area who get their propane from us

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Anonymous 8/23/12

The bypass and express lanes when going through urban area of Chehalis from West to Main street are going to have to be elevated with a ~22ft high wall through Chehalis. This is important when considering the impact on the quality of life of for the community on historic West side, as it bisects the community and would it make it difficult to traverse from one side to the other. So very objectionable by community. Impacts quality of life throughout the city

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If

projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Anonymous 8/23/12

Options 3-4 just protects I-5 and does nothing for flood control so community won't see any help

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Deanna Ziskey 8/23/12

I respect commercial interests in bypass and express lanes and know businesses are important; in area described where express lanes come through it is described as industrial, but it's also an area where residences are, partially from main street to prindle and definitely from prindle to west there are homes and property goes close to tracks; and division street and hawthonre too, so huge impact. Not just looking out window and seeing structure and breathing in fumes, but exremeley damaging to people there who own homes and their property value; we appreciate being part of the discussion and being able to comment

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If

projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Anonymous 8/23/12

Our business would be affected by express/bypass lanes. Our business provides the local and surrounding areas with fertilizer. Taking the Tacoma rail tracks away would not allow us to have product flow.

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

J. Vander Stoep 8/23/12

Think Bart's presentation does an excellent job on saying what we know and don't know. The report, however, doesn't. It is written as a govt. agency selling a specific project, which emphasizes the positive of the walls and levees option. It only says "a dam alone will not protect I-5" and needs to be more balanced.

The report moves goal post on protecting I-5. Now says 3ft of freeboard of 100 yr flood. And no differentiation of I-5 being closed for four days or a minute.

Response to Comment

The legislative purpose of this report was to evaluate alternative projects that could protect I-5. The full Chehalis Basin Flood Mitigation Alternatives Report addresses other potential projects, including a dam on the upper mainstem Chehalis, in detail. The final WSDOT report more clearly defines its intent and context and more clearly reference the full alternatives report for more information. It also more clearly describes the potential effects of a dam relative to I-5 protection alternatives, including a clear statement that a dam would lower flood elevations throughout the Basin and would, therefore, reduce the amount of effort needed to fully protect I-5 during major flooding and the costs of I-5 protection.

WSDOT agrees that it is extremely important to identify the right measurement for freeboard. The right amount of freeboard will provide confidence that, no matter what flood protection measures the legislature directs WSDOT to build, they provide protection for predicted floods in the project area.

As described in an Appendix to the draft report, WSDOT determined that freeboard must be three feet above the 100-year flood level. This amount of freeboard is in alignment with the freeboard the Army Corps of Engineers has been using for the Twin City project including the protection of I-5 for the past decade. It equates to a minimum of one foot above the 2007 flood level in the Chehalis-Centralia area. This measurement was established through analysis by WSDOT's State Hydraulic Office as sufficient to cover a potential future water flow increase of 25 percent. This issue is addressed further in the final report.

Regarding the comment on no differentiation of I-5 being closed for four days or a minute, as noted in an Appendix to the draft report, closing I-5 in the Centralia-Chehalis area is a resource intensive, complex, and challenging undertaking, regardless of the length of time the freeway is ultimately closed for. When I-5 is anticipated to be flooded between 13th and Mellen streets, (exits 76 and 81), WSDOT closes I-5 at the US 12 interchanges (exits 68 and 88). WSDOT then uses US 12 as the major detour route. Closing I-5 at the US 12 interchanges means WSDOT must block off the main interstate lanes and 10 separate interchanges at exits 68, 71, 72, 74, 76, 77, 79, 81, 82 and 88 to prevent traffic from entering I-5 in the closed area. This must be accomplished well before I-5 is inundated by floodwaters to ensure WSDOT's ability to safely evacuate drivers and move personnel and equipment into the affected area.

Dan Kay 8/27/12

Melissa,

Good morning. It appears comments from the WSDOT report are to be directed to you. After attending the DOT presentation last week discussing proposed options for I-5 flood protection, I have a few comments regarding options 3 and 4 for the express way and temporary bypass as presented by Bart Gernhart. This was the first time I was aware of these two proposed options. As for the creativity of the options we can certainly appreciate the options; however, the District is challenged with the options as they deal with one of our current projects. The District owns the property at Main and Quincy Avenues in Chehalis. The Tacoma rail track borders our property to the east. This is where the route for Options 3 and 4 were proposed. The District is currently is final stages of construction of a substation construction project on our property. This new DOT proposed route would encroach on our project as it is being built and would cost significant dollars likely well into the 100s of thousands of dollars to relocate electric facilities that would be impacted by such an expressway or bypass construction along the rail corridor. This would be a burdensome cost that should be placed on the District's customers.

Regards,

Daniel E. Kay, P.E.
Chief Engineer
Lewis County PUD
360.740.2435

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Vince Panesko 8/27/12

Comment on WSDOT Report:

Figure 1 on Page 41 depicts 2007 flood water 2-3 feet over I-5 and then depicts the effect of a dam where water is less than a foot over I-5. Page 23 of the draft Ruckelshaus report states that I-5 was covered by over 12 feet of water in places. This depth was consistent with reports in the Chronicle of depths over 10 feet.

If a dam would lower flood water from a future 2007-flood in Chehalis by only 2 feet as shown in Figure 1 on Page 41 in the WSDOT report, that would leave over 10 feet of water over I-5, not the less-than-one-foot shown in Figure 1.

The modeling shows the effect of a dam in a future 2007-flood to lower water approximately 4 feet in Chehalis and 3 feet in Centralia (see Ruckelshaus Report). Therefore, even with a dam, the existing elevation of I-5 would be covered by 8 feet of water in the Chehalis area, not the “less than a foot” shown in Figure 1 on Page 41.

The WSDOT report needs to address the “more than 12 feet of water over I-5,” and then explain that if a dam lowered the water 2-3 feet, there would still be 8-9 feet of water over I-5. Figure 1 on Page 41 needs to be modified to be consistent with I-5 covered by 12 feet of water.

Thank you for the opportunity to comment.

Vince Panesko
2132 Harris Ave.
Richland, WA 99354-2021
Phone: (509) 946-1229
e-mail: vince@owt.com

Response to Comment

The water depths acknowledged in this comment appear to be in alignment with water depths witnessed along I-5 at the Chamber Way Interchange. Figure 1 is depicting a representative cross section of I-5, south of the Chehalis-Centralia Airport near the West Street crossing. The final report has been updated to clarify the location of this cross section.

Michael Smell 8/30/12

30 August 2012, Comments on WSDOT meeting 8/23/12

I thought the presentation by Bart Gernhart was very informative and well done. WSDOT should put the Bullseye back on, however. I think the Governor knew this venture was a no-win situation from the get go. I am afraid all the hard work from the WSDOT crew will go for naught. I cannot believe that there were people at the meeting that actually thought that any of the alternatives but the first one were serious. The maps used do need to be updated since there has been development between Prindle St, Main St, and I-5 in Chehalis in the past few years that was not shown and should be taken into consideration on placement of a levee. Also, the Newaukum is a river not a creek. I thought Alternative One had some very good flood protection parts especially for the precious Airport/Strip Mall area as well as the SW Chehalis area. The 600 “Buildings no longer flooded” would be a good result also. But, because I-5 was involved, the powers that be will always object. Any project that would be accomplished in this 5 mile section of I-5 lessens the emphasis for their “basin-wide solution”. It was also not their idea and I have found in Lewis County that that usually means a negative opinion on a subject. Good Luck to WSDOT. Alternative one or two may be acceptable in 20 years or so.

By, on, and in the Newaukum River
Michael L. Smell
Chehalis

Response to Comment

The final report has been updated to acknowledge that the Newaukum is a river. Regarding the placement of a levee relative to new developments in Chehalis, if a project moves forward, this will be taken into consideration.

Karen and Raymond Monroe 8/30/12

Date: August 30, 2012

To Whom it Concerns regarding WSDOT Draft and Flood Mitigation Alternatives report

My husband and I have lived in the Westside Neighborhood for 15 years. We were drawn to this neighborhood and staying in Chehalis because it was family friendly, and peaceful. There is a park nearby and also a very friendly daycare that we were using at the time.

I am concerned about some of the suggestions being made in this process of flood protection in the area. I appreciate the draft report saying on page 8 "The goal for all projects is the full protection of I-5 from 13th Street to Mellen Street, protection of the Chehalis-Centralia Airport, improved access to infrastructure, and optimization of any potential ensuing benefits to people, communities, and the environment. It is only appropriate to spend hundreds of millions of dollars on a project if it will provide full protection." However I am concerned; as I read further it also says " Any modification or new construction of dikes or levees should be built at this level to ensure robust, reliable protection for I-5 and the Chehalis-Centralia Airport." On page 9 it says "WSDOT considered six main alternatives to protect I-5, the airport, and infrastructure in the Centralia and Chehalis area." Only on page 8 does the goal address benefits to the people and communities. Otherwise the concerns seem to be about objects (I-5, airport which could be addressed easily separately, and infrastructure which I take to mean ease of largest portion of Chehalis to get around). I hope in the final deliberations the affect to the people and communities (aka neighborhoods that have not had flood issues) are greatly considered.

Here are my thoughts and concern:

Alternative 1: "I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee" Seems alright. Does not address the issue of needing to expand I-5 which is needed. It also, sadly, creates more of an impact to the wetlands but they all impact the natural habitat of the area so this will not be addressed again.

Alternative 2: "I-5 Raise and Widen Only" Honestly, I already hear I-5 from my house and I'm not interested in hearing more of it. However, that said, I realize it needs to be widened. Regularly, cars are backed up on I-5, especially heading north. If widening improves the transit time for everyone on I-5 AND helps against flooding, then I think this needs serious consideration.

If this alternative is considered, please DO NOT put West Street Bridge back in. As I understand it, in order for cars to cross over the street at West Street once the freeway has been expanded, it will not look anything like the current bridge due to codes. Due to these codes, it will be much larger and will seriously cut into the neighborhood, park and many homes. This in turn will lower the value of homes in this neighborhood and cause immense deterioration. This is the neighborhood where the history of Chehalis is seen by the homes and property that have been lived in for a long time. In these past 15 years living here, our girls have started in the school system and graduated from the Chehalis School

District. I run a piano studio and have students that take the bus here on occasion. I believe this is the only neighborhood that is so family friendly it takes the bus two trips from the schools to get the kids back and forth both in the morning and in the afternoon. This neighborhood will not be conducive to families if a large road/bridge (encouraging even more traffic than has already been encouraged in last 2-3 years) is next to the park and possibly even reducing the park's size-let alone make it difficult for residents to maneuver their own neighborhood.

I am a bicyclist and have felt a shortage of safe bicycle routes in the area. Every time I visit my parents on Seattle and Mercer Island I admire their network for bicycle routes. Instead of putting a bridge back in for cars, please consider a bridge that is just for pedestrians and bicyclists. This would make it much safer for kids to bicycle to the other side of the freeway and to some of the stores up the road to the north. I believe there is room to put a bicycle path paralleling the freeway which would increase safety if that road becomes busier due to more people choosing to go over the freeway at mainstreet. Putting a bike path over the freeway would be attractive to STP riders and those that do the Lewis County Historical bicycle tour. Making this bike path would seem to me a way to relieve some traffic congestion. This path would be one more step closer to connect a healthy (yes, pun intended) network of pathways in the county for people to exercise on, go do their errands by (I've spent time in Holland and its is incredible what they do on their bicycles) and increase their health, like they have in Seattle and other areas. Keep in mind there are 2 other bridges cars can use very close by.

Alternative 3: "I-5 Express Lanes" It does not address it in the Draft but this option also really negatively affects the community in Chehalis in Westside Neighborhood (East of the freeway) as well as many others. It will greatly lower the values of homes, it will cause many homes to be destroyed and it will change the appearance of Chehalis greatly making it seem more like we are in Chicago with the expressway running so close to downtown and homes in this small, quiet town.

Alternative 4: "I-5 Temporary Bypass": Does not address the I-5 clogging issue. Forget it.

In summary I consider Alternative 1 and 2 are only viable options and only ones that really address the I-5 crowding condition. As stated earlier one of the goals is to protect the people and community. By tearing up a long-standing historical neighborhood in Chehalis via express lanes (alt 3) or a new West street bridge you are protecting traffic on I-5 on occasion there is a flood as well as businesses (which if I had a say would not have been allowed to be built in the floodplains). If express lanes are allowed via alternative 3 you ARE INSTEAD damaging a major neighborhood and many homes that have been safe from floods (and we chose to live where we did to avoid risk of flooding and don't feel we should be penalized for this). You would be breaking up a peaceful rural community and history for this community.

My recommendations is Alternative 1 (short of seeing impact of what the levees might do to the environment) and/or 2 and turn the west Street bridge into a pedestrian/bicycle pathway instead of cars. No express lanes! (I've never heard of any other town our size or even somewhat bigger getting an expressway put in the middle of their neighborhoods to relieve congestion of I-5.).

Thank you for your consideration,
Sincerely,
Karen and Raymond Monroe

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Lewis County Commissioners 8/31/12

LEWIS COUNTY COMMENTS
THE RUCKELSHAUS CENTER CHEHALIS BASIN FLOOD MITIGATION ALTERNATIVES REPORT
PROTECTION OF I-5 AND THE CHEHALIS-CENTRALIA MUNICIPAL AIRPORT:

1. This is probably better identified as the Washington State Department of Transportation (WSDOT) set of six proposed projects, along with improving the Airport levee to 100 year protection, to provide protection against flooding and closing of the Interstate during a flood. Two of the proposals were thrown out as being too expensive. However all of the projects were without benefit of water retention and while protecting the freeway, they did not provide substantial protection to the population living in the corridor. Protecting the freeway and not the population is just plain NOT ACCEPTABLE!
2. Of the six alternatives, the only one in our perspective which has any merit is Alternative 1: I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee; however, we do not believe it can be a standalone project. We believe that a water retention project needs to be included and then the scale and location of levees and walls can be substantially reduced both in size and location. Several of the proposed projects in this alternative, especially those from the south end of the Airport Levee and running south to 13th Street should be looked at in developing a protection plan for the corridor. We think previous plans to divert Dillenbaugh Creek into the Newaukum River further south still are worthy of consideration; however, no plan is workable without including water retention as part of the plan.

3. Alternative 2: I-5 Raise and Widen Only, Alternative 3: I-5 Express Lanes, and Alternative 4: Temporary Bypass are clearly unacceptable because they are only variations of protecting the freeway from flooding without mitigation of the impact to the surrounding residents in the inundation zone. We have said from the very beginning that a solution which leaves the freeway high and dry while leaving our residents in a bathtub below is not our idea of fixing the problem –and Governor Gregoire has promised us that would not happen.
4. We are very skeptical of the accuracy of the hydrology impacts reported by WSDOT, both from the perspective of downstream impact and the inundation maps provided as appendices. There have been extensive studies conducted by the US Army Corps of Engineers (USACE) in their 16 year study of the Twin Cities Levee project that indicate that a levee protecting the I-5 corridor and the Twin Cities would force water through the Mellen Street Choke Point sooner and in greater quantity. For that reason the USACE included additional water retention at the Skookumchuck Dam to provide mitigation against this increased flow.
5. WSDOT's predictions of increases in downstream elevation (from Mellen Street) of 0.1 to 0.2 feet are simply not believable. Furthermore, the inundation maps give an optimistic picture of reductions in flood elevation in the I-5 corridor on the east side of the freeway of 1.4 feet. The fact is that a substantial amount of land on the east side is inundated and some of it substantially. In the 2007 Flood parts of the Fairgrounds were in 12 feet of water so a reduction of 1.4 feet would still leave that area under almost 10 feet of water.

OTHER FLOOD HAZARD MITIGATION ALTERNATIVES:

6. We are aware that there are different problems to be addressed on the river other than our concern about developing water retention and protecting the I-5 corridor. Certainly, solutions that focus on the I-5 corridor alone do not address our concerns in the basin up-river of the corridor; or, for that matter, either impacts down river or other local problems in the middle and lower basin. We believe we should be good neighbors and make sure that our projects mitigate downstream impacts. We also believe that a basin wide solution must address all of the concerns in the basin and that the process of achieving a solution will be long term. For that reason we would be open to investigate any projects that will provide local protection and contribute to the eventual objective of a basin wide solution.
7. Some of the solutions will be more difficult than others. Obviously there are opponents to both dredging and flood water bypasses that will impede and cripple the approval process making pursuit not practical. There may, however, be some level of dredging or "soil modification" in parts of the river that provide mitigation and may be doable.
8. There are many other projects that can be accomplished separately with a net benefit to flood mitigation and we would fully support such projects. We also believe that achieving a basin wide solution is a long term project and that we will have to achieve parts of the solution incrementally. We will support any projects which have been properly planned and for which there is basin wide consensus that the project contributes to a basin wide flood mitigation plan. In other words, we support the Hallmarks of a Basin-wide solution presented in the Ruckelshaus Report.

Response to Comment

The legislative purpose of this report was, as the commenter notes, only to evaluate alternative projects that could protect I-5. The full Chehalis Basin Flood Mitigation Alternatives Report addresses other potential projects, including a dam on the upper mainstem Chehalis, in detail. The final WSDOT report will more clearly define its intent and context and more clearly reference the full alternatives report for more information. It also will more clearly describe the potential effects of a dam relative to I-5 protection alternatives, including a clear statement that a dam would lower flood elevations throughout the Basin and would, therefore, reduce the amount of effort needed to fully protect I-5 during major flooding and the costs of I-5 protection.

WSDOT appreciates the conditional support for the walls and levees alternative as preferable to other alternatives discussed; although WSDOT's charge and the purpose of WSDOT's analysis is to evaluation potential project to protect I-5, the Department did attempt to optimize preliminary project design wherever possible to provide collateral protection of communities and infrastructure. We understand that additional actions will be needed for community protection, and that I-5 protection alone is not a path forward that is supported in the community. We recognize the significant support, expressed by this and other commenters, for water retention as part of a package of protective efforts. WSDOT agrees that it is extremely important to identify the right measurement for freeboard. The right amount of freeboard will provide confidence that, no matter what flood protection measures the legislature directs WSDOT to build, they provide protection for predicted floods in the project area.

The primary reason the Walls and Levees alternative do not show as large of an increase in downstream elevation as the Corps Twin Cities project is that the Walls and Levees alternative does not include all of the levees in the Corps Twin Cities project. In particular, the Walls and Levees project does not include the Galvin Road levee. The Walls and Levees along I-5 alternative would restrict flow from passing to the east side of I-5 and into the Twin City area during significant flood events. Under the current conditions, (i.e., without the walls and levees), Chehalis River flows are stored and conveyed along the east side of I-5 during large storm events such as the one that occurred in December 2007. By placing walls and levees along I-5, the amount of water flowing from the Chehalis River to the east side of I-5 would be reduced; a greater portion of floodwater would stay between I-5 and the western valley wall. This water does eventually pass downstream, although some of the flow is temporarily backed up behind the Mellen Street Bridge, a narrow point (constriction) in the floodplain. When the airport levee is raised in conjunction with the I-5 Walls and Levees alternative, an additional location of floodplain narrowing occurs, further backing up flood waters. Under these scenarios, the flood elevations along the Chehalis

River are predicted to increase up to 1-2 feet for the December 2007 event at some locations between I-5 and the western valley wall. The increase in water surface elevation is predicted to be on the order of 1 foot for the 100-year event.

The predicted change in water surface elevations downstream of Mellen Street and the Chehalis River/Skookumchuck River confluence caused by the Walls and Levees alternative is significantly less during events such as the December 2007 and 100-year floods when compared to the change upstream of Mellen Street. This is due, in part, to the narrow opening at Mellen Street which limits downstream discharges. The timing of flows in the Chehalis River and their coincidence with Skookumchuck River flow is also affected. Simulations indicate that the change in downstream water surface elevations are on the order of plus or minus 0.1 feet. Larger changes in water surface elevations are seen in the area downstream of the Chehalis River/Skookumchuck River confluence with other combinations of flood protection features, such as the Corps Flood Reduction Project. Part of the reason that the Walls and Levees alternative does not cause much of a rise downstream of the Skookumchuck is that the proposal does not include any physical changes to the floodplain in this area and as such, the flood flows are free to spread across the entire floodplain as they currently do.

Marlene Hampton 8/31/12

Hello My name is Marlene Hampton. I have lived in Rochester Washington since 1980. I can in no way describe to you what it is like to be flooded to make you understand the trauma a person goes through. It is one of those experiences you have to experience to fully understand. I was very disillusioned when I heard awhile back that our governor was more interested in the commerce of out state than she was the flood victims. I went to a meeting last week hosted by WSDOT which reiterated the states goal not to interrupt commerce at the expense of the people. From what I understand the walls they plan to construct will make flooding on the west side of I-5 worse! What kind of a solution is this? Wouldn't it be great to have a advocate to expedite the Dams process. This would benefit EVERYONE and the money spent on the walls could be put towards the Dam project. The craziest aspect of the whole idea of the walls is that some tax payers will be helping to fund a project that will causing them to be flooded more!!! I honestly don't know how the folks that make these decisions can sleep at night. This is like throwing a drowning victum an anchor!

Response to Comment

Thank you for your comment. The WSDOT report was written to address only Section 1033 (2) (c) of ESHB 2020. This section states “evaluate alternative projects that could protect the interstate highway and municipal airport at Centralia and Chehalis, and ensure access to medical facilities …”. The WSDOT report was not intended to address other potential projects or components that may be considered as part of a basin wide solution(s).

The final report more clearly describes the context for the I-5 protection analysis – it is but one component of a broader effort to summarize existing information on alternatives to mitigate flood damage in the Chehalis Basin. The alternatives described are focused on I-5 protection because that is the focus of the report; however the final report more clearly describes protection of I-5 as only one potential component of a broader set of flood hazard mitigation efforts needed in the Basin and refer more clearly to the larger effort to determine a path forward for flood hazard mitigation in the Basin, of which protection of I-5 is only a part. We recognize the significant support for water retention as part of a set of projects to mitigate flood damages.

Westside Chehalis Neighborhood Association 8/31/12

Chehalis Basin Flood Mitigation Alternatives Report and 1-5 Expansion, 13th Street to Mellen Street
Westside Chehalis Neighborhood Association Comments

August 31, 2012

We value this opportunity that citizens and the Tribes living within the Lewis, Grays Harbor, and Thurston County portions of the Chehalis River Basin have been given to comment on the difficult task Governor Gregoire has assigned the Chehalis Basin Flood Authority with assistance from the Ruckelshaus Center. Developing a basin-wide flood mitigation plan that addresses everyone's interests and concerns is a virtual impossibility. But giving citizens an opportunity like this to provide comments and suggestions at every stage of the planning process offers the best opportunity to achieve something at least approaching a consensus.

We also value the opportunity granted by Jim Kramer, Chehalis Report Project Manager, of the Ruckelshaus Center to favor our request for extending the comment period for its report to allow us and other communities to utilize the contents of the WSDOT Draft Report in our responses.

In November, 2011, the President of the Westside Neighborhood Association, in her capacity as a member of the Scoping Committee for the I-5 Expansion from 13th Street to Mellen Street, presented written information gathered through a series of three local meetings in our neighborhood to help WSDOT understand our views about I-5 expansion during the WSDOT early planning for exEansion ofl-5 through Chehalis. Since then the WSDOT Draft Report on I-

5 Protection from 13 Street to Mellen Street has been completed and made available for comment.

Following receipt ofthe August 17,2012, WSDOT Draft Report and WSDOT's community meeting at the Veteran's Museum the Westside Neighborhood Association met again to address that report's content and to develop additional comments concerning flood mitigation planning in the Chehalis Basin.

For nearly a half-century the residents of the Chehalis Westside have worked together in an organized fashion to improve our neighborhood and foster a friendly, attractive, and safe community. The current version of that organization is a not-for-profit 501(c) corporation called the Westside Chehalis Neighborhood Association working on behalf of the more than 270 residences located on the west side of Chehalis. Our association encompasses all the residences from State Street to I-5 (east to west) and Main Street to Geary Street (south to north). While there are several businesses located within this area, we do not claim to represent them or their interests.

As residents of the Historic Westside Chehalis neighborhood who will be significantly impacted by expansion ofl-5 between 13th Street in Chehalis and Mellen Street in Centralia we on the Westside want our thoughts and recommendations about the I-5 expansion project to be considered. Because of our proximity to I-5, the disruption that will result from construction operations during the expansion work and the long-term impact that I-5 changes and expansion will have on air pollution, noise levels, traffic volume adjacent to and through our neighborhood, and the flow of water in and through our neighborhood during flooding, the Westside Chehalis Neighborhood Association invited all members of the Westside community to prioritize and voice their concerns, to discuss and ask questions, and to offered suggestions to be included within comments made on behalf of the Association to the Ruckelshaus Center and WSDOT.

As a result four significant questions arose and are presented here.

1. Should 1-5 be elevated between Main Street and just passed Chamber Way so that future floods will not cause a closure of that vital transportation route? Yes. Our neighbors expressed a very strong interest in making sure that the freeway is designed to remain open during all floods.
2. Should the planning for 1-5 expansion take into account the impact of the freeway on flood mitigation and floodplain management? Absolutely. Westside residents are very concerned that changes to I-5 should not adversely impact the extent of flooding in our neighborhood and that planning should incorporate responsible flood plain management considerations. Dillenbaugh Creek is the source of our south side flooding.
3. Should dense and oversized sound barriers be installed to reduce noise impact on the Westside neighborhood? Yes. We are very much in favor of adequate noise control measures being included in the I-5 expansion project, including installing oversized sound barriers. Foliage such as trees and plants also would quell some of the sound.
4. Once the West Street Bridge is removed to allow the widening and relocation of1-5,should the West Street Bridge be replaced? No. Not replacing the West Street Bridge was strongly favored. Eliminating that bridge would significantly reduce itinerant traffic speeding through the neighborhood and increase neighborhood cohesiveness. We are not interested in a replacement of West Side Bridge over 1-5 ending in a roundabout at Louisiana, especially one costing more than $6,000,000.

Specific Ideas Put Forth at Neighborhood Meetings

Specific ideas and/or recommendations offered by those attending the neighborhood meetings are listed below.

Designing for Handling Water Flow

- Make a concentrated effort to pursue funding for the elevation of and the I-5 expansion because it surely will flood again and again, continuing to destroy and damage residences and businesses through this corridor.
- Protect and keep the Westside Residential Neighborhood safe from flooding, air and noise pollution. Protect and keep the Chehalis River healthy.
- Elevate I-5 from Main Street to Chamber Way allowing water to collect and flow away from the roadway while protecting the residential neighborhood.
- Planning for I-5 expansion should make use of Preliminary FEMA Maps.
- Homes on Prindle Street near I-5 are the ones that flood in virtually every flood incident. We propose that the State purchase at fair market value all homes on Prindle Street West from Quincy Street to I-5. But leave the existing alley to allow access to the City of Chehalis Pump Station and for St. Helens Avenue home owners' access to the back of their property.
- For drainage dedicate the vacated property on Prindle Street for a large retaining pond, not for any further development of or expansion to Liberty Plaza.

Noise Control

- Retest Sound Density levels emanating from I-5 into the Westside neighborhood.
- Build extra tall and dense sound barriers for the residential neighborhood beginning at Main Street and extending to Chamber Way.
- Maintain the elevation of West Street as it currently exists and Dead End West Street at New York Avenue.

West Street Bridge & West Side Park

- Historically this % acre park was part of an elementary school playground. During the
- 1949 earthquake the school suffered extensive damage and as a consequence demolished. What remained became the West Side Park. The present West Street Bridge with the narrow lanes and extreme curve at its western end was constructed in the 1950s.
- Following its removal, do not replace the West Street Bridge with one designed for the use of autos or trucks. Rebuilding and extending West Street and the Bridge will disturb, widen, and invite even more unwanted speeding traffic to cut through our neighborhood. Not replacing the West Street Bridge will eliminate West Street as a dividing barrier in our neighborhood.
- Construct a handicap accessible covered pedestrian/bicycle bridge over 1-5 from West Street to the Airport Loop TraiL
- Don't encroach upon the existing West Side Park. Where homes on New York Avenue are removed for I-5 expansion use the vacated property wherever possible to enlarge West Side Park

Other Suggestions

- Add a cul-de-sac to every dead end street for emergency vehicles access.
- Prindle Street dead ends at I-5 and currently does not have a cul-de-sac as required or any place for emergency vehicles to turn around.
- Several of the homes nearest to I-5 in the areas flooded have been raised as a form of flood mitigation. But the ones closest to I-5 are vulnerable should large vehicles go out of control and veer off the freeway toward the east. Some sort of protective barriers need to be installed to protect those homes.
- Maintain our neighborhood character. It is a National Historic District with a friendly and cohesive neighborhood character.

WSDOT Draft Report: 1-5 Protection from 13th Street to Mellen Street

It is imperative in making progress on this extremely complex and emotional project that we remain calm and explore the options laid out before us and perhaps some that have not been mentioned. We believe one option WSDOT states is not viable because it is cost prohibitive does deserve consideration. That option, elevating I-5 for a limited distance between Main Street and just past Chamber Way is one that could have an impact on flooding because I-5 does cause closure from flooding for that distance. Combine that option with the New SW Chehalis Levee allowing the flood waters to run freely under I-5 while protecting homes and businesses.

While varying opinions regarding flood issue combinations were obvious, there is no doubt that two alternatives provided by WSDOT got resoundingly and unanimously rejected at our neighborhood meeting! Both Alternative 3, I-5 Express Lanes, and Alternative 4, I-5 Temporary Bypass, prompted the most vigorous discussion. The end result of that discussion are the following: No, No, and No!

Either of those alternatives negatively affects our entire community is drastic ways without offering significant benefits to mitigating flooding or protecting I-5. The WSDOT Draft Report at page 20 states, "However, the lanes likely would be visible from some homes on the edge of the West neighborhood in Chehalis. A noise study has not been conducted yet, but cost estimates for the project include funding for noise walls in the event they are needed." That statement comes nowhere near describing the adverse impacts of those two alternatives.

Express Lanes and Temporary Bypass Lanes at 22 feet in height and at least 50 feet width with bridges at Main Street, Prindle Street at St. Helens Avenue, and West Street at State Street would be visible and heard from most Westside streets, not to mention home owners' private property they would invade. Residents of some historic streets directly affected by the ugly sight and sounds of Alternatives 3 and 4 are West Street, Rhode Island, Hawthorne Place, Division Street, Quincy Place, St. Helens Avenue, Prindle Street, State Street, Pennsylvania Avenue, Gertrude Street, Folsom Street, and Westside Park.

Tacoma rail line traverses through the Historic Westside Neighborhood, Historic Downtown Chehalis, some industrial area, and under the Chamber Way Railroad Bridge. Is the rail line wide enough, is the existing Chamber Way railroad bridge high enough, and does it flood there are additional questions not even addressed in the WSDOT Draft Report.

Thinking about Express Lanes, Temporary Bypass Lanes, and a bigger than life West Street Bridge isolating the Historic Westside makes one know how the citizens of Kalama, Washington, must have felt when I-5 bisected their city.

The Lewis County Historic Museum, located in the former Burlington Northern Depot, sits adjacent to the Northern Pacific/Burlington Northern main line at the intersection of Market Boulevard and West Street. The museum offers the Pennsylvania Avenue - West Side, National Historic District A Public Guide, as a walking tour beginning at the downtown

Chehalis Museum crossing the tracks and up West Street into our neighborhood. In part it states, "The National Register of Historic Places is the federal government's official list of cultural resources worthy of preservation. It was authorized by the National Historic Preservation Act of 1966 and is part of a program to encourage public and private efforts to protect historic and archaeological resources. Properties listed in the National Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture. The National Register of Historic Places is administered by the National Park Service, United States Department of the Interior, Washington, D.C." Why would any Municipality or State authorize interstate express lanes/temporary bypass lanes with unhealthy, unsightly bridges or promote the deterioration of a National Historic District by building an unneeded hulking ugly West Street Bridge through the middle of that Historic District?

To add some perspective to our concerns about the impact that WSDOT Alternatives 3 and 4 have on our community we have included as an attachment to these comments a series of photographs of the area where the bypass or express lanes would traverse.

At our most recent meeting to discuss the flood mitigation planning that is going on participants offered the following specific comments about the WSDOT alternatives contained in its Draft Report.

- There are essentially two issues associated with protecting the Chehalis Basin from flood damage: the issue of flood damage and the issue of keeping transportation and commerce flowing through the area on I-5. The flooding issue may best be addressed through alternatives like a retention dam, but ifWSDOT cannot wait to protect I-5 until after retention dam is completed then the Westside residents of Chehalis would prefer Alternative 1 from the WSDOT Draft Report.
- If Alternative 1 is adopted the residents of the Westside Chehalis Neighborhood recommend that the existing West Street Bridge not be replaced. That opposition arises because replacing that bridge with a higher and wider bridge will result in substantially increased traffic through our neighborhood, particularly by commercial vehicles and large trucks.

Construction of approaches to a raised and widened West Street Bridge will also block access to West Street from New York and Ohio Avenues and will likely cause loss of some of the land that is currently occupied by the Westside Park. A bridge blocking New York and Ohio Avenues due to extended ramping will also preclude access from West Street to those two residential streets from either direction by emergency vehicles and residents.

- If either the Express Lanes or Temporary Bypass alternative is adopted residents of the Westside Chehalis neighborhood will have their real estate property values negatively impacted. If this is the direction taken then those property owners would like a "buy out" option under which they can be compensated for the lost value or have their property purchased outright at fair market value. That option should be available to all property owners on the Westside, not only to those whose property is immediately adjacent to the Tacoma Rail right of way or whose land may be used in part for construction of the new roadway.
- We don't like the idea of a being "blocked in" and set apart from our City of Chehalis.
- If the proposal for either express lanes or a temporary bypass is adopted it will lead to extensive litigation by opponents.
- NOISE! NOISE! NOISE! Express lanes will dramatically increase noise and pollution levels in the Westside neighborhood caused by trucks and automobiles. The noise will be coming at us from both the east and the west as we will be surrounded by I-5.
- Look at the west side ofl-5 for solutions to protect that arterial.
- At our most recent neighborhood meeting we also received the following comments associated with Chehalis Basin-wide proposals to mitigate flooding.
- A basin-wide solution to flooding problems is so far off in the future and there is so little agreement about what options for addressing flooding throughout the basin that WSDOT is going to be forced to protect I-5 from flooding before a basin wide plan will ever be agreed upon or funded.

The Proposal for a Retention Dam Near PeEll

If a retention dam near PeEll is to be seriously considered as a basin-wide approach to flood mitigation it is important that the residents of the entire basin, but especially those in the PeEll area, be educated about and involved in the planning process from start to finish.

The cost estimate for the proposed dam near PeEll, an earthen dam, 300 feet high and *Yz* mile long, for water retention is most likely too low. The proposed PeEll Dam site is approximately 2 miles from town and not in sight from town. Warning systems and evacuation plans for the 700 residents and about 300 school age children are concerns.

There are residents of the Chehalis Westside neighborhood who do and those who do not favor a retention dam as a way of reducing flooding below the dam site.

A retention dam may be a good idea and it may help solve flood problems in the basin. But it does not solve the I-5 flooding problem.

Other Comments Offered for Dealing With Potential Flood Damage

Improved timber practices, including management of harvested timber, need to become part of any proposed basin-wide solution to Chehalis Basin flooding.

Any basin-wide solution to flooding must also address flooding that is caused by groundwater levels that have increased during periods of flooding causing flooding from water intruding from beneath the ground's surface in low lying areas not otherwise affected by surface water flooding.

Respectfully submitted on behalf of the Westside Chehalis Neighborhood Association,

Deanna M. Zieske President
P.O. Box 1272
Chehalis, WA 98532
August 31, 2012

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Ted and Darlene Held 8/31/12

I-5 Protection from 13th St. to Mellon Street

My husband and I live in the Chehalis West Side area and belong to the Westside Chehalis Neighborhood Association. We have become very concerned with proposed alternatives being considered for flood protection and have attended the public community meeting hosted by WSDOT at the Veteran's Memorial Building in Chehalis and a meeting at our local neighborhood association on August 28th.

After considering the alternatives with the information presented, we feel we cannot endorse the temporary bypass or the express lanes. The only plan that we feel might be worthy of considering would be the earthen levy as it could keep our neighborhood from suffering from the flooding that has been an issue in the past. While our home has not flooded, we have had many neighbors and friends that have and they still are suffering. Some have not completed restoration of their home and property yet.

The temporary bypass or the express lanes would be an eyesore and a barrier that would cut off this area from the historic downtown shopping area and could create two towns. It would cause lost revenue to the already struggling small businesses. I speak from experience as we sold our business seven years ago, and during the 22 years that we owned it we found that something as minor as a change in the weather would affect our sales. The bypass/express lanes would also cause air pollution, noise and a decrease in our property values.

Please take these issues into consideration. We do not have the answers, but don't feel these are either.

Ted & Darlene Held
451 NW Division St.
Chehalis, WA 9853
August 31, 2012

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Cynthia and William Tahl 8/31/12

Cynthia & William Tahl
616 NW Hawthorne PL Chehalis, WA 98532

August 30, 2012

To whom it may concern:

We are writing this letter regarding the proposed 1-5 Express lanes.

Our home/property is on the Historic Westside of Chehalis, sitting approximately 125 feet west of the Tacoma rail line.

We have been resident homeowners here for 33 years. For many years the rail line was active and busy and was of little disturbance to our neighborhood or our lives. Lately the rail line is used much less and in open to the Historic Steam Train during the tourist season.

The proposed express lanes would turn our quiet historic neighborhood into an unsightly nightmare; our neighborhood would become or at least resemble an industrial area with bridges, concrete walls, noise & pollution. This would without doubt adversely affect the property values in our historic neighborhood.

While we are well aware of the need to improve access through this part of the 1-5 corridor, this

2-lane expressway is not a logical alternative. A two lane expressway would not have useful traffic flow during normal traffic days, and would be a virtual parking Jot during an emergency. Currently, with four lanes available, our area of 1-5 moves at a crawl every weekend. This expressway location is just not a viable option as it will not provide the solution sought.

Regards,
Cynthia Tahl

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Deanna and Lewis Zieske 8/31/12

August 31, 2012
Ruckelshaus Center, WSU West
520 Pike Street, Suite 1101
Seattle, WA 98101

We appreciate this opportunity to provide comments on both the Chehalis Basin Flood Mitigation Alternatives Report prepared by the Ruckelshaus Center as well as upon the WSDOT Draft Report: I-5 protection from 13th Street to Mellen Street near Centralia and Chehalis, both of which address flooding issues in the Chehalis River Basin.

Addressing how to prevent and/or mitigate recurring flood damage in the Chehalis Basin has been a topic of concern and discussion for over 100 years. More recently the interruption of commercial and personal travel along I-5 during major flood events has also come to the fore. Both issues now seem to be coming to a head.

In the more than 22 years that our family has lived in Chehalis we have lived through the largest flood events this basin has experienced during the lifetimes of all but any centenarians residing in our communities- those of 1996, 2007 and 2009. There have been almost constant debates about how to address flooding. And no resolution. Politics, personal interests, economic constraints and a myriad other factors have prevented action. Hopefully the current approaches outlined in the Chehalis Basin Flood Mitigation Alternatives Draft Report will lead to a different result.

It is with that hope, and as a gesture of appreciation for the work that has gone into both the Flood h Mitigation Alternatives Report and the WSDOT Draft Report: I-5 protection from 131 Street to Mellen Street near Centralia and Chehalis that we offer the following comments on the two reports.

Comments on Chehalis Basin Flood Mitigation Alternatives Report

Proposals to provide flood protection to I-5 as set forth in alternatives contained within the WSDOT Draft Report are being criticized by some policy makers and local officials because protecting I-5 does not offer basin-wide flood mitigation benefits. The rationale those individuals use in supporting that criticism is that focusing on protecting I-5 will dampen the pressure to undertake other flood protection measures to provide relief to areas outside of the I-5 corridor.

What those criticisms of the I-5 protection alternatives fail to take into account is that there are no proposals under consideration (or to our knowledge that have even been conceived) that,standing alone, protect the entire Chehalis Basin. And there is no politically viable prospect for marshalling local, state and federal funding in an amount sufficient to accomplish a basin-wide approach at one time. Face it, basin wide flood protection and mitigation will have to be phased in and should begin immediately. The surest way to niake a start- and the way that provides the earliest and greatest positive impact - is by securing the I-5 transportation corridor with its accompanying protection to the more heavily

populated areas in Chehalis and Centralia. Thus, our later comments on the WSDOT Draft Report will address the specifics of what we believe is the preferred manner for protecting I-5.

Having said that, and not wanting to ignore the balance of the Chehalis Basin, we want to now begin to address the Chehalis Basin Flood Mitigation Alternatives Report.

A large water retention dam near PeEll appears to be a popular alternative for maximizing protection throughout the basin because it is easy for a lay person to understand. But that alternative is very expensive and has drastic ecological and environmental impacts, some of which we believe are unacceptable. Furthermore, it does not preclude flooding. It merely reduces the 2007 flood level by 3 to 4 feet in the Twin Cities. A dam alone, if not augmented by I-5 protections, would still inundate and close I-5 in a flood event comparable to the 2007 flood.

It would also still leave water depths of 5 to 6 feet on Prindle Street in Chehalis and intrude about 2 feet or more into the lower level of the historic round carriage house located on our property.

And should the dam fail (which does happen, as recently as this week in the Southeastern United States) there would be catastrophic damage to property downs.tream and potentially a significant loss of life. A dam failure would also drain the reservoir area creating additional environmental havoc.

Presently, instead of a dam we believe a better basin-wide approach to mitigating flooding is to encourage implementation of programmatic options like those set forth at page 47 of the Chehalis Basin Flood Mitigation Alternatives Report. Land use management, flood plain regulations, limits on fill and development in flood plain, structure modification and raising and other options of that sort can be implemented at the lowest cost to the public at large.

We recognize the great drawback to this approach. It transfers the cost of flood mitigation to landowners through reduced property values and limits on land uses. That runs afoul of the politically conservative residents who comprise the majority of the residents here in the Upper Chehalis Basin. And our experience in trying to enforce the State's Growth Management Act here in Lewis County clearly shows the depth of political and public opposition to such measures that would be faced and would have to be overcome. But in the long run the benefit is well worth the effort.

As a fall-back position if political opposition to programmatic options cannot be overcome and a "big project" approach is undertaken, we prefer some version of Combination 3 outlined in the Flood Mitigation Alternatives Report that includes Option 1 from the WSDOT report. For that reason we now turn to comments on the WSDOT Draft Report: I-5 protection from 13th Street to Mellen Street near Centralia and Chehalis.

Comments on the WSDOT Draft Report: 1-5 protection from 13th Street to Mellen Street near Centralia and Chehalis

As residents of the Historic Chehalis Westside neighborhood and business owners in Chehalis the proposed solutions for protecting I-5 from flooding contained in the WSDOT Draft Report are of particular personal relevance to our family. Our home is located at 647 NW St. Helens Avenue in Chehalis. We travel from home to our downtown law office in Chehalis several times daily. Both our neighborhood on the Westside and the downtown Chehalis business district are National Historic areas about which our community is proud. We have lived in our home on St. Helens Avenue since early 1995. Our property is approximately one acre in size and slopes downward to the alley abutting the residences on Prindle Street. Our property includes a home built in 1910 that is on the National Historic Register and a large round carriage house/ bam built in 1900 that is also on the National Historic register and may well be the largest surviving round carriage house in Washington1

Since we moved into our home in 1995 we have lived through the major floods of 1996, 2007 and 2009, all of which closed I-5 for varying periods of time. The lower part of our property, including the carriage house, was flooded in each of those major floods, with water being more than 5-feet deep in the carriage house and to a depth of 12-feet or more in the lowest part of our yard during each of those floods. During each of these three major floods in sequence the flood waters came closer and closer to the residence itself.

In addition to those three great floods we have seen flood water intrude into our yard several other times, usually with less than 6 inches of water reaching the carriage house on those occasions. Fortunately, because our home is several feet above those flood levels and also because we do not store personal property of high value in the lower level of the carriage house, the flooding has not caused us any significant monetary loss. Our neighbors, though, especially those abutting our property on Prindle Street, have suffered huge losses from flooding.

Nevertheless, we are extremely interested in measures, including protection of I-5, that will mitigate or eliminate flooding in our neighborhood. Thus, our interest in and these comments on the WSDOT Draft Report are offered for consideration in evaluating and/or revising proposals for flood control in our area.

Of the six proposals (four analyzed briefly and two mentioned but dismissed by WSDOT as financially infeasible) discussed in the WSDOT draft report, the one we favor is Alternative 1: I-5 Levees and Walls, Raise Airport Levee, New SW Chehalis Levee, reflecting widening ofl-5 to six lanes and constructing protection assuming no dam being built in the Upper Chehalis basin. Elevating I-5 in some places should be considered as an additional alternative. We favor this approach for the simple reason that protection is needed for the Chehalis/Centralia area immediately. I-5 is not only crucial to the economy of Washington State and the west coast, it is vital to the economy and lives of the people in Lewis County.

Those losses to interstate commerce, as well as to the businesses and home owners whose property is flooded when I-5 is threatened, must not be allowed to be repeated over and over again.

While several years may pass before the improvements in this alternative will be completed, prospects for basin-wide agreement on any plan, let alone an extremely costly dam above PeEll is extremely

controversial. Prospects for construction of a dam are both much more speculative and the timing of construction, if it ever occurs, is likely to be much later in the future.

Frankly, the savings from proceeding with Alternative 1 now regardless of the outcome of a dam proposal will save more in losses from a single flood like that of 1996, 2007 or 2009 than it will cost to construct the levees, walls and I-5 widening.
While Alternative 1 is our preferred option from among those contained in the WSDOT Draft Report, there is one aspect of that alternative we want to see changed. It reflects widening ofl-5 necessitating replacement of the overpasses at Main Street, Chamber Way and West Street. The Main Street and Chamber Way exits are less than a mile apart. A new bridge at West Street would offer no access to I-5 and serves no purpose in easing the flow of traffic on I-5. But it would have two severe impacts upon the Westside Chehalis Neighborhood.

The first is the increased volume and speed of vehicle traffic through the Westside neighborhood, particularly of large trucks. The existing bridge is narrow and has a sharp curve at its western end that makes it difficult for trucks to navigate. Widening and lengthening the bridge and its approaches will make it easy for large trucks to navigate that route allowing trucks going to National Frozen Foods and/or Sorenson Trucking's terminal on State Street to get to their destinations without having to travel by way of either Chamber Way or Main Street. And a new bridge will encourage more cars to use that route through our quiet neighborhood to get to the airport, to the shopping area along Louisiana Avenue and to the Riverside Golf Course. That increases noise in the neighborhood and the potential for children and other pedestrians to be injured.

The second negative impact of replacing the West Street Bridge is its impact upon the Westside Park and the access to homes on New York and Ohio Avenues. New road construction standards will require a replacement bridge to be much wider and higher than the existing bridge. In addition, widening I-5 will push that interstate east toward Maryland Avenue and New York Avenue south of West Street. The bridge approaches for a new bridge will block access to West Street from New York and Ohio Avenues and will either take part of the already small (3/4 of an acre) Westside Park or result in retaining walls eliminating the sidewalk that runs adjacent to the park on West Street and blocking access to the park for those living north of West Street.

Two of the proposals put forth in the WSDOT Draft Report are unacceptable. Alternative 3, the I-5 Express Lanes, and Alternative 4, the I-5 Temporary Bypass, have such a negative impact upon the City of Chehalis and the Westside Chehalis neighborhood that regardless of their costs (which are for all practical purposes unknown since the availability of the Tacoma Rail Line right of way is up in the air) that they should be rejected as politically infeasible.

Both alternatives contemplate using the Tacoma Rail right of way through Chehalis as the route for a single lane of traffic each direction. Both involve construction to a height that places the surface of the express lanes/bypass lanes, including the guardrails, some 22-feet above the existing street surfaces at Main Street, Prindle Street (and St. Helens Avenue as it joins Prindle Street where the Tacoma Rail line

crosses Prindle) and West Street at State Street. Depending upon whether the option will be a temporary bypass or express lanes, the roadway through the urban development area of downtown Chehalis will be a 40 to 50 foot wide wall with vehicle and pedestrian access between the Westside and Downtown area only through the three bridge crossings at Main Street, Prindle Street and West Street.

What those two options do is bisect the City of Chehalis, separating the Westside neighborhood, including the businesses located there, from the rest of our community and permanently altering the overall nature of our city. Even worse, they result in the Westside neighborhood being completely surrounded by freeways making the area an isolated island of primarily residential development exposed to even more noise from high speed motor vehicle traffic and accompanying exhaust pollution than currently exists or would exist with a simple widening of I-5 to six lanes.

The homes in the Westside neighborhood include some of the largest, most expensive and historic homes in Chehalis. The history of our community was written by the original owners of these lovely homes - judges, bankers, politicians, prominent business leaders, etc. Evaluating Alternatives 3 and 4 looking only at construction costs, as was done in the WSDOT Draft Report, does not take into account the very real historic, cultural, social and other very important costs associated with building either of those two alternatives.

It ignores the cultural impact that will occur when either alternative severs our community. It ignores the huge impact that removing the rail service to the Wilco Agricultural Center and CENEX has on those major businesses as well as the impact upon the new Lewis County PUD electrical facility that construction of the elevated roadway there will have. It gives no consideration to the negative impact that the increased noise and pollution will have on residents of the Westside, particularly those whose homes are immediately adjacent to the proposed express or bypass lanes and to the elderly and infirm residents living at Chehalis West, a nursing home that abuts the existing Tacoma Rail right of way. And it does not take into account the tremendous loss in real property values to the homeowners living immediately adjacent to the Tacoma Rail right of way on Prindle Street, St. Helens Avenue, Division Street, Hawthorne Place and Rhode Island. Everyone else owning property on the Westside will also be damaged as a result of the inevitably loss in property values occurring because their property will be a much less desirable place in which to live if bounded on all sides by freeways and cut off from downtown Chehalis by Express Lanes or a Temporary Bypass.

We thank you for this opportunity to comment upon the Ruckelshaus and WSDOT Draft Reports.
Sincerely,

Deanna M. Zieske Lewis Zieske

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly

reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Brain Raymor 8/31/12

08/30/2012

To whom it may concern:

I am writing this letter to express my concern about the proposed changes involving I-5 and the West Side bridge in my neighborhood.

My name is Brian Raymor and I am a 7 year resident of the historic West Side neighborhood. My property is in a constant state of improvement as I attempt to add to the sense of community that is felt in this area. I feel strongly that my neighbors contribute to this end and it is important that this neighborhood remain as unified as possible.

The suggestions proposed by DOT would effectively cut the neighborhood into two distinct areas divided by a larger road. We would also experience increased traffic and noise due to large trucks being free to drive down West street.

Additionally, under this plan home owners in this area will suffer a reduction in property values as some of the equity in our properties is tied to the desire to live in a quiet, family oriented area absent large transit trucks and traffic. Surely there will be those among using the neighborhood that will propose to resolve the various conflicts of interest and damages by litigating the issues in court. This is an expensive option that would best be avoided by finding a way to resolve the DOT flooding concerns without affecting our neighborhood.

Thank you for your considering my opinion.

Brian Raymor
654 St. Helens Ave
Chehalis, WA 98532 (360) 508-6049

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.

Department of Ecology 8/31/12

Ecology comments: WSDOT Draft Report: I-5 protection from 13th Street to Mellen Street near Centralia and Chehalis

General comments

1. Mitigation for flood impacts appears to be included, but not environmental mitigation. The report mentions that there will be wetland impacts. The report states that impacts could be mitigated by using the North Fork Newaukum mitigation site. Has the cost of wetland mitigation been considered in developing the different alternatives? In some of the alternatives that are presented, the costs could be quite substantial. Potential mitigation costs for wetlands, fisheries, or other environmental impacts should be discussed, recognizing this is still at a preliminary planning stage.

   Federal and State 404/401Water quality certification may be necessary.

2. When you are evaluating the different alternatives, you should consider impact avoidance. Which project is the least environmentally damaging solution? An analysis should be done in order to follow the mitigation sequence. (Also please see Specific Comment #1 below.)

3. Portions of the project may be in shoreline jurisdiction and will need to be consistent with the Shoreline Management Act and the local Shoreline Master Programs. There may be more than one jurisdiction involved with this project and so there may be multijurisdictional review.

4. The term “miracle mile” may not be clear to all readers. Consider defining this term the first time it is used.

Project Alternatives

1. Could some hybrid of Alternative 1, with some limited use of viaducts from Alternative 5, provide environmental benefits? In particular I would picture this as a benefit in an area like Dillenbaugh Creek, where a viaduct could reopen flood plain connectivity. There may also be areas where improving the movement of water with a viaduct would have more flood hazard mitigation benefits to the community than blocking the water with a levee or well. In general, to focus on transportation benefits with community and environmental impacts as secondary considerations may be missing an opportunity to look for solutions in the valley the optimize benefits for transportation, the community, and the environment. (This comment relates to Specific Comment #3 below).

2. Alt. 2 includes raising I-5. There is discussion in the report about how much this alternative would result in new flooding or increased water surface elevations. It is not clear HOW this would be caused - is it from the added fill that would be necessary to raise the road? Some brief explanations like this would improve the readability of the document and help decision makers better understand the effects of and differences between the alternatives.

3. At meetings, Twin Cities staff and residents voiced significant concerns with the aesthetics and social issues surrounding alternatives 3 and 4. There are vague references to the concerns on pages 21 and 27, but this could be emphasized more and perhaps earlier in the report.

4. It's not clear how the natural resource impacts of alternative 3 (or alt. 4) are the same as widening I-5 to six lanes. Is this because the extent of impacted areas would be the same? Because these alternatives occur away from the existing I-5 footprint, it is hard to see how they could be the same. Consider qualifying or clarifying what is meant by this statement.

5. For alternatives 3 and 4, it seems the sentences about access to the hospital may be oversimplified. Both say access to the hospital would be improved if drivers can reach I-5 from the south or from the north.

   While on the surface this is probably true, my reading of alternative 3 is that from the express lanes one would not have access to the freeway between 13th and Mellen Street. So is this only true if the freeway is open (not inundated) both the north and south of the express lanes, or would the current Mellen to Blakely improvement project play a role?

6. Similarly alternative 4 would not provide local access to the freeway between 13th and Mellen, so I have the same question. What if downtown Centralia is flooded from Salzer Creek or the Skookumchuck and people can't get to Mellen Street or north of it on I-5, is there access to the hospital? A better explanation of the conditions and scenarios under which drivers would be able to access the hospital under these two alternatives would be more meaningful, since access to the hospital is cited as a key piece to the evaluation of each alternative.

Specific Comments

1. Executive Summary: This section notes the need to consider the proposed projects in conjunction with other flood hazard mitigation projects. It also notes the potential impact to the community, measured in terms of improved conditions or negative impacts for "buildings." However no mention is made of environmental impacts or benefits, or opportunities to develop a project that has both transportation and environmental benefits.

    a. Some mention should be made of potential environmental impacts for each alternative.
    b. The Executive Summary notes that funds for flood impact mitigation are included in the cost estimates, but it's not clear if costs for environmental mitigation are included.
    c. It's possible that there are locations where a combined highway/environmental project could result in greater benefits than a highway project alone. For example, raising the freeway could result in greater floodplain connectivity, enhanced wetlands, and fish passage or rearing areas. The possibility of projects with environmental benefits should be given some consideration and noted in the Executive Summary.

2. Page 7: The discussion of a potential dam should clarify that these are modeled estimates of a dam that has only been conceptually proposed. For example, the sentence "If a dam were constructed…it would not fully protect I-5" should be reworded to something like "If a dam as proposed were constructed…model simulations show that it would not fully protect I-5". Another example: Instead of "In 2007, a dam would not have prevented flooding…", say "In 2007, model simulations show that the dam as proposed would not have prevented flooding…"

3. Page 13, "What are the potential impacts to natural resources?": Impacts can be negative or positive. It would be good to see more discussion here of potential positive impacts, such as through improved fish passage, flood plan connectivity, wetland enhancement, or water quality treatment improvements. Improved stormwater retention and treatment would be a positive benefit in terms of compliance with TMDLs in the Chehalis River and tributaries. WSDOT might consult with WDFW to see if there are opportunities for fish and wildlife habitat enhancement in the footprint of the project, beyond the mitigation of negative impacts.

4. Page 24 of the report describes how alternative 3 may 'change' a flood. How? Is it from the fill necessary to expand the Tacoma Rail ROW to a typical road section as shown on page 20?

5. Page 34, Table 7: This table should also include a summary of environmental mitigation costs and potential enhancements.

    Also, consider adding an asterisk to the Alternative 3 and 4 stating that these estimates do not include the costs or ability to acquire the Tacoma Rail ROW.

6. Page 35, "Conclusions…" same comments as #1 for executive summary.

7. Page 39, “Difficulty Precisely Predicting…”: In this discussion you might also note that the Hydraulic model, whose results you show in Appendix D, shows a calibration error on high water marks in the area of I-5 ranging from -1.24 feet to +1.0 feet (Appendix F of Ruckelshaus Center report; page 215, 219, 221; Tables 3, 5, 7). Model uncertainty is another reason to include freeboard in your estimates.

   In addition, the Hydraulic model evaluated 3 historic events and one 100-year design flood. These four scenarios do not encompass the full range of possible future events, such as a 2007-scale atmospheric river event concentrated in the Cascade foothills, or a 100-year event focused in the Cascade foothills. This is another source of uncertainty in the hydraulic modeling and also justifies a margin of safety in the freeboard calculation.

   Given the issues raised in Casey’s memo in Appendix A.1 along with these other sources of model uncertainty, you may want to review whether a freeboard of more than 3 feet might be appropriate.

Response to Comment

General Comments

1 - The cost of wetland mitigation was factored into cost estimates for each of the alternatives. However, because the alternatives identified in the report are still in a preliminary design phase, the report does not include specifics on mitigation for wetlands, fisheries, or other environmental impacts. Further consideration of any of the alternatives will entail additional analysis related to environmental mitigation and the necessary environmental permitting. WSDOT’s process is to avoid, minimize and mitigate impacts in that order.
2 – See response to General Comment 1
3 – See response to General Comment 1
4 – Miracle mile is now defined the first time it is used in the report

Project Alternatives

1. The alternatives described in the report are in a preliminary design phase; WSDOT did not explore hybrid alternatives for combined highway/environmental benefit in this preliminary assessment. Future analysis could include hybrid options.
2 - Raising I-5 on fill material creates a barrier impeding flow downstream. This is the primary reason for the modeled increase in water surface elevations in the areas shown in Appendix C. A lesser cause of the increase in water surface elevations is due to the fill (reducing water storage) but it is not nearly as significant.
3 - New language has been added to the final report that describes the potential impacts alternatives 3 and 4 could have on homes and businesses in the Westside Chehalis neighborhood.
4 - At this preliminary design phase, the impacts on natural resources was determined to be relatively the same due to the close proximity of the location of the Tacoma Rail Line to I-5 and the similar amount and types of impact areas. Further consideration of any of the alternatives will entail additional analysis related to environmental impacts.
5 - Alternative 3: I-5 Express Lanes and Alternative 4: I-5 Temporary Bypass both provide a viable route around the portions of I-5 that are inundated during a flood event. With either of these Alternatives, I-5 will still be inundated and closed during a flood event. The report is attempting to communicate that if drivers can access I-5 north or south of the inundation area, then they can access express lanes or temporary bypass and can then reach the hospital. Moreover, these alternatives do not necessarily provide access to the hospital from portions of inundated local streets. A driver must be able to reach non-inundated portions of I-5 to access the hospital. This will be clarified in teh final report.

Specific Comments

1a – see response to General Comment 1
1b – see response to General Comment 1
1c – see response to Project Alternatives 1
2 – text was edited to better reflect model estimates of dam
3 – see response to General Comment 1
4 - The modeled ‘change’ in a flood event due to Alternative 3 is primarily due to the barrier created by the placing a road above the railroad tracks. Water would not flow over the existing railroad bed as it has in the past major floods. A lesser cause of the increase in the water surface is due to the fill reducing the amount of water storage, but it is not nearly as significant.
5 - an asterisk was included to the table to better reflect cost estimates for Alternative 3 and 4
6 – see response to General Comment 1
7 - as discussed in Appendix 1 to the report, WSDOT's analysis is that 3 feet of freeboard are sufficient to address uncertainities and protect I5 under a variety of current and potential future conditions.

Marion Ruth 8/31/12

Melissa Kuehne • Ruckelshaus Center WSUWest
520 Pike Street Suite 1101
Seattle WA 98101

Dear Ms Kuehne,

I attended a meeting of the Westside Association regarding the flood mitigation Report A. We did not learn about other options but I wanted to be sure you knew my feelings about the one presented. I had to leave the meeting early but my husband stayed and said the audience when polled were mostly against the I-5

Express lanes or Temporary Bypass. (I have attached the picture we were given.)

In my opinion it would ruin our very nice historic district. The raised two lane expressway would look so poorly with the rest of the neighborhood. The district is made up of three blocks of all maintained homes with tree lined streets. Our property values will really suffer with an elevated expressway as you enter the neighborhood.

We formed our Westside Association years ago in order to maintain the District and improve what we can. Recently we added flowering fruit trees to our playground. We payed for this with money raised at the holiday tour of homes we which we sponsored for several years. When we requested to be on the State register of historic homes the gentleman who came and evaluated the neighborhood told us it was the best in the state because all the homes weretogether in one place and were so well maintained for the period in which they were built. Some go back to the early 1900's.

Please consider other plans and let us keep our district the way it is now.

Sincerely,
Marion A. Ruth

Response to Comment

Thank you for your comment. WSDOT recognizes there are significant uncertainties with both the express lane and temporary bypass alternatives and the final report more clearly reflects your concerns and the potential impacts to homes and businesses in the Westside Chehalis neighborhood. WSDOT understands that many citizens in the Westside neighborhood felt that the express lane and bypass alternatives were proposed unexpectedly and without opportunities for citizens to provide comments and suggestions. Please note that the alternatives described in this report are in a preliminary design phase and WSDOT has not decided to move forward with any particular project. Further consideration of any of the alternatives will entail additional analysis related to potential

impacts on surrounding communities and additional opportunities for public input. If projects move forward, WSDOT will provide opportunities for citizens to provide comments and suggestions as part of the planning process.