



with

DIKE DISTRICT #12 AS CO-LEAD AGENCY

**DRAFT ENVIRONMENTAL IMPACT STATEMENT
TO ADOPT A STRATEGIC PROGRAM FOR COMPREHENSIVE FLOOD
HAZARD MITIGATION IN THE BURLINGTON URBAN AREA AND
ADJACENT LAND WITH A RANGE OF STRUCTURAL
AND NON-STRUCTURAL COMPONENTS**

THIS IS A PHASED REVIEW PURSUANT TO WAC 197-11-060 (5)

CITY OF BURLINGTON, WASHINGTON AND DIKE DISTRICT #12

Prepared for review by Citizens and Government Agencies in Compliance with the State Environmental Policy Act of 1971 (Chapter 43.21C Revised Code of Washington) as revised; the State Environmental Policy Act Rules, as revised (Chapter 197-11 Washington Administrative Code); and City of Burlington Municipal Code Chapter 15.12 Environmental Policy; and the National Environmental Policy Act Pub. L 91-19, 42 U.S.C.4321-4347 as amended.

DATE OF ISSUE: *February 13, 2009*

COMMENTS DUE: *March 13, 2009*

TABLE OF CONTENTS

	<u>Page</u>
FACT SHEET.....	5
INTRODUCTORY NOTE	9
SUMMARY	14
SIGNIFICANT IMPACTS, MITIGATION MEASURES & SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS.....	18
ALTERNATIVES INCLUDING THE PROPOSED ACTION	19
AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS, AND MITIGATION MEASURES.....	25
APPENDICES – <i>Detailed reports in Appendices A, B and C are available on CD</i>	31
Appendix A	32
▪ City of Burlington 2008-2013 Floodplain Management and Natural Hazard Mitigation Plan and the 2008-2013 Skagit County Natural Hazard Mitigation Plan	
Appendix B	33
▪ Current studies on Hydrology and Hydraulics	
1. Skagit River Basin Hydrology Report Existing Conditions prepared by Pacific International Engineering, October 2008	
2. Skagit River Basin, Washington Revised Flood Insurance Study Hydrology Summary Draft, May 2008, U.S. Army Corps of Engineers for Federal Emergency Management Agency	
3. Skagit River Basin, Washington Revised Flood Insurance Study Hydraulics Summary, May 2008, U.S. Army Corps of Engineers for Federal Emergency Management Agency	
4. Re-evaluation of the Magnitude of Historic Floods on the Skagit River near Concrete, Final Report October 2008, Northwest Hydraulics Consultants for Skagit County Department of Public Works	
5. Skagit River Flood Elevations and Flood Frequency Data presentation for NORMFA meeting 2008 by Chal Martin, P.E. and Albert Liou, P.E.	
6. Microscopical Studies of Concrete WA Historical Flood Investigation by WJE Associates, Inc.	

Appendix C	34
▪ Background Reports – There are 51 Exhibits in this Appendix documenting the history of flooding and flood studies and reports prior to the current studies.	
Appendix D	35
▪ Maps	
Exhibit 1 – Skagit River and Tributaries Basin Map	
Exhibit 2 – Vicinity Map showing levee system	
Exhibit 3 – Urban Growth Area Map from 2005 Comprehensive Plan	
Exhibit 4 – Map showing Alternative 3 with proposed changes to Urban Growth Area to add new school site, remove comparable acreage from the Urban Growth Area at the northeast corner adjacent to Peacock Lane; and Alternative 4, adding Raspberry Ridge as Open Space so that sanitary sewer can be made available.	
Exhibit 5 – Special Flood Risk Map with Gages Slough & Open Space	
Exhibit 6 – Overbank Flow Paths, FEMA Levee Failure Policy with no levee credit, Levee segment corrected hydrology, Certified Levee Options	
Appendix E	36
▪ Project Description for Farmland Preservation through Burlington Agricultural Heritage Credit Program	
Appendix F	37
▪ Distribution list	
Appendix G	38
▪ Overview of Burlington’s flood hazard mitigation program as it relates to the Corps of Engineers Measures List, and the need for a realistic approach to the Skagit River Comprehensive Flood Hazard Management Plan update	
Appendix H	39
▪ Background Report - Dike District #12	
▪ Levee Plan and Profile Existing Conditions as of December 2007	
▪ Aerial Photos keyed to each Plan Sheet	
▪ Burlington Levee Certification Project Overview	
▪ FEMA Fact Sheet Requirements of 44 CFR Section 65.10	
▪ 44 CFR Section 65.10	
▪ Joint Resolution 01-2007	
▪ Interlocal Agreement between Burlington and Dike District #12 – Preliminary Work for Levee Certification	

Appendix I 40

- Environmental Information and Scope of Future Environmental Phases
- Summary of scoping meetings-
 1. Upper Skagit Fisheries
 2. Skagit System Cooperative
 3. FEMA Environmental Review and NOAA Fisheries
- Washington State Department of Fish and Wildlife Priority Habitats and Species information
- Endangered Species Act – Section 7 Consultation Final Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation including correspondence from FEMA and Burlington Response
- FEMA requirements for Conditional Letter of Map Revision including Archeology and Historic Preservation

Appendix J 41

- Comment Letters received to date with Response

FACT SHEET

PROJECT TITLE AND DESCRIPTION: Strategic Program for Comprehensive Flood Hazard Mitigation in the Burlington Urban Area and Adjacent Land with a Range of Structural and Non-Structural Components

The proposed action is to construct 100-year certified levees in appropriate locations, and provide other flood measures as necessary and appropriate based on the Federal Emergency Management Agency's (FEMA) final Flood Insurance Study, when this study is adopted following resolution of any appeals.

Levee certification with FEMA accreditation is required so that FEMA will include the existence of the levees in their computer model that sets the Base Flood Elevations for Burlington. Without the levees being considered in the modeling, Base Flood Elevations will increase significantly and this is a serious problem in a city that has very small lots and anticipates a substantial redevelopment of much of the City over the next twenty years.

The City of Burlington and Dike District 12 recognize their responsibility to ensure that flood protection measures which help protect Burlington's urban area are, to the extent possible, also helpful in protecting adjacent communities. It is the goal of the City and Dike District 12 to implement flood measures which lower risk to adjacent communities, in addition to Burlington's urban area, to the maximum practicable extent.

Other components of the proposed action include modification of the City of Burlington Urban Growth Area (UGA) consistent with the City's 2005 adopted Comprehensive Plan. This includes a transfer and purchase of development rights program, the Burlington Agricultural Heritage Credit program, to help fund the Skagit Farmland Legacy program to acquire farmland development rights in a targeted area around Burlington to protect overbank flow paths for floodwaters and preserve agriculture in the Skagit River valley. The potential health hazard posed by the high density Raspberry Ridge farmworker housing site that is on septic tanks is also covered. A range of land use alternatives is presented, in order to maximize flexibility in the decision-making process and ensure adequate analysis of the impacts of each alternative.

This project consists of several related actions implementing the 2008-2013 update of the Burlington Floodplain Management and Natural Hazard Mitigation Plan.

PROPOSED ACTION AND ALTERNATIVES

1. Proposed Action – Construct 100-year certified levees in appropriate locations, and provide other flood measures as necessary and appropriate based on FEMA’s final Flood Insurance Study, when this study is adopted following resolution of any appeals.

Alternative #1A - Modify existing levees, including certification of some levee segments, and take other appropriate flood control measures based on the hydrology developed for Skagit County, Burlington and Mount Vernon by Pacific International Engineering that is not presently accepted by the Army Corps of Engineers. It is not known at present whether FEMA would accredit levees certified using this hydrology.

Alternative #1B - Modify existing levees, including certification of some levee segments, and take other appropriate flood control measures based on the Army Corps of Engineers hydrology, if that becomes the basis for the new FIRM maps, and evaluate options within that framework.

2. No Action – This is essentially embodied in the current General Investigation study that has been underway for many years by the County and the Corps of Engineers, and because of lack of adequate funding will not be completed until 2018 at the earliest.

Doing nothing will result in mandatory adoption of higher Base Flood Elevations that may show up to 6.4 feet increase in height in some locations in Burlington. This will be devastating for the future development of vacant and underutilized land in Burlington, and may preclude the redevelopment of historic downtown Burlington with its 30-foot wide lots.

No action will generate extremely high flood insurance premiums for the families that live in the community. While the existing buildings will be “grandfathered in”, according to FEMA, citizens have already been hit hard with much higher rates for existing conditions when mortgage lenders get involved at the time of sale or refinancing. Crawl spaces are often reclassified as basements, and if insurance carriers are changed, the policy is no longer subject to the low original rates.

3. Remove approximately 30 acres of land from the UGA and exchange for land located at the northeast corner of Pulver and Peterson Road for a school site.

The 30 acres currently in the UGA will be returned to agricultural resource zoning and the school site will be redesignated as UGA, from its agricultural zoning classification. Adjacent farmland development rights will be acquired and a permanent urban separator designed along the boundaries of the site, coordinated with the adopted Connected Open Space Plan for Burlington.

4. Evaluate the concept of adding Raspberry Ridge to the UGA so that sanitary sewer is provided to mitigate potential health hazard in event of a flood.

This area is proposed to be added to the Burlington UGA and zoned as Open Space in order to be able to provide sanitary sewer to the high density farmworker housing that has been constructed on the site that is zoned as Agricultural Natural Resource Land (Ag-NRL). The goal is to protect the citizens of Burlington from contamination by sewage from failed septic systems in the event of a flood. This area was proposed to be included as a sending zone for farmland development rights under the transfer/purchase of development rights provisions adopted in the Burlington Zoning Code in 1994. However, this proposal was rejected by Skagit County at that time.

PROPONENT

The City of Burlington in cooperation with Skagit County

TENTATIVE DATE FOR IMPLEMENTATION

2009 to start the projects; end date to be determined

CO-LEAD AGENCIES

City of Burlington and Dike District #12

RESPONSIBLE OFFICIALS AND CONTACT PERSON

- Department of Planning and Community Development
Margaret Fleek, Planning Director
833 South Spruce Street
Burlington, WA 98233
- Dike District #12
1317 South Anacortes Str.
Burlington, WA 98233

PHONE NUMBER AND STREET ADDRESS FOR WALK IN INQUIRIES

360-755-9717
833 South Spruce Street
Burlington, WA 98233

LICENSES, PERMITS AND APPROVALS

- Amendment to Burlington Natural Hazard Mitigation Plan
- Amendment to Skagit County Natural Hazard Mitigation Plan
- Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR) for 100-year certified levees
- Federal Emergency Management Agency approval and/or permits
- Shoreline Substantial Development Permit
- Coastal Zone Management Consistency Determination
- Skagit County Action to approve plan and issue permits as needed for work in unincorporated areas

AUTHORS AND PRINCIPAL CONTRIBUTORS

- Margaret Fleek, City of Burlington Planning Director
- Dike District #12 Commissioners: Charles Bennett, John Burt, Marv Cannon
- Chal Martin, Public Works Director
- Federal Emergency Management Agency procedures and levee certification program
- Skagit County Planning and Community Development and Public Works Departments
- Pacific International Engineering (PIE)
- Northwest Hydraulic Consultants (NHC)
- Many related reports and studies including work by the US Army Corps of Engineers

DATE OF ISSUE OF DRAFT ENVIRONMENTAL IMPACT STATEMENT

February 13, 2009

PUBLIC HEARING TO RECEIVE COMMENTS

March 12, 2009 at 4:00 p.m., in the City Council Chambers at 833 South Spruce Street, Burlington WA

DATE COMMENTS ARE DUE ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

March 13, 2009

DATE FINAL ACTION IS PLANNED

To be determined

TYPE AND TIMING OF SUBSEQUENT ENVIRONMENTAL REVIEW

Supplemental environmental review may be required if work is needed waterward of the Ordinary High Water (OHW) mark on the Skagit River or when additional site specific components are identified. A review under the National Environmental Policy Act (NEPA) including a biological assessment with discipline reports is in process for the levee setback and certification project through the three bridge corridor. This work will be incorporated by reference for the overall program when it is completed.

LOCATION OF BACKGROUND MATERIAL

Background material and supporting documents may be found at the offices of the Burlington Planning Department located at 833 S. Spruce Street, Burlington, Washington, with copies available at the Burlington Public Library located at 820 East Washington Avenue.

COST OF DRAFT ENVIRONMENTAL IMPACT STATEMENT

\$20.00

INTRODUCTORY NOTE

The first programmatic step will be completed by the end of 2008 with final approval of the five year update of the multi-jurisdictional Skagit County Natural Hazard Mitigation Plan that includes significant amendments to the Burlington Floodplain Management and Natural Hazard Mitigation Chapter. This is the framework planning document to set the goal of upgrading appropriate sections of the existing levees and constructing new levees, or providing other measures as necessary to result in certified levees where appropriate to protect the City of Burlington's Urban Area. The purpose is to stabilize the Base Flood Elevations for the long term future, ensure predictable development standards, protect the public from the 100-year flood (which has a 1% probability of occurring in any year) initially, while planning for and implementing measures to provide incrementally greater protection as time goes by.

The purpose and need to prepare an Environmental Impact Statement arises because the City of Burlington is evaluating the options for the future to protect the urban area from flooding. An array of complicated issues is unfolding in a manner that forces the City to focus action on improving the levee system to provide 100-year flood protection with certified levees, and take related actions to optimize local flood hazard mitigation. The engineering, design and construction work necessary for certification will be overseen by a licensed engineer with expertise in levee design because the U.S. Army Corps of Engineers is not available or funded to do that work. The accreditation of the levees will be overseen by FEMA. This is a two part process involving application for a Conditional Letter of Map Revision (CLOMR) followed by a Letter of Map Revision (LOMR).

This program will fit into what is generally perceived to be the long term regional strategy. In order to work effectively with local, state and federal agencies and elected officials to protect the urban area of Burlington from flooding, the plan of action must be evaluated in the regional setting to ensure that projects done here will not adversely affect adjacent jurisdictions and interests.

The following actions have led to the decision by the City of Burlington and Dike District #12 to move ahead at this time to obtain better protection from potential flooding:

- 1. FEMA changes its policies on key program components, leading to long term uncertainty for property owners and businesses.**

July 3, 1984 is the date of publication of the City of Burlington, Washington Flood Insurance Study. The purpose of the study was to convert Burlington to the regular program of flood insurance.

At that time, conventional floodways were determined not to be appropriate for the Skagit River delta area for a number of reasons (See Appendix D, Exhibit 6, page 18.) In lieu of a floodway, pursuant to additional study, FEMA accepted a "most probable failure point" analysis, which had the flood overtopping the railroad tracks at Sterling. In Burlington, FEMA helped with a compromise which was to designate Gages Slough a "Special Flood Risk Area." This area does not have all the qualities of a floodway, but the designation is quite restrictive with flow-through

house designs and other elements. Now, a regulatory floodway is being proposed for “later adoption” by FEMA, following changes to the Base Flood Elevations, and it is critical to Burlington that the adopted program of protecting overbank flow paths through farmland preservation be retained as a floodway-like option.

In addition, a compromise was reached on how high the Base Flood Elevations would be. Today, the criteria for the “map modernization” program does not allow the type of compromises made in the past, as described above. Further, current flood modeling under FEMA’s guidance does not allow any credit to be given for levees that are not certified.

2. Burlington is not assured that all the dams in the river will be functioning to optimize flood hazard mitigation.

Additional potential for enhancing flood management and mitigation utilizing the hydropower dams that are owned by Puget Sound Energy was not directly addressed in the recently final relicensing process.

The relicensing of the Baker Dams for an additional 50 years includes agreements for funding mitigation actions of many kinds, and expenditure of funds to accomplish those goals; however, flood hazard mitigation is not currently being addressed, and no funding has been set aside to upgrade the spillways on Lower Baker Dam. Without the ability to more quickly evacuate water in advance of a flood, any future benefits of additional flood storage in this river system cannot be counted on to assist in taking the peaks off flood events. Puget Sound Energy has stated that they intend to work with local jurisdictions on an informal basis. The November 2008 flood threat was handled extremely efficiently with the Corps of Engineers taking over operation of the dams and the peak flood elevation was reduced by about four feet.

For the mainstem Skagit system, Ross Dam and reservoir provide valuable flood storage during the winter flood season; however, the availability of this flood storage must be moved to mid-October, instead of 1 December as the license currently allows.

3. Higher base flood elevations are certain under any option and Burlington has major concerns with computer modeling and hydrology and hydraulic assumptions.

The studies and estimates that have been completed for determining how much water will get to Burlington in a 100-year base flood event (called the Flood Frequency Analysis) are inconsistent, and independent third party review indicates that there is a need to lower the estimates. The U.S. Army Corps of Engineers, as FEMA’s technical consultant for the Skagit River Flood Insurance Study remapping effort, is responsible for the hydrologic analysis and hydraulic modeling that provides the basis for updating the Flood Insurance Rate Maps. The Corps is continuing to incorporate into its flood frequency analysis estimates of historic flooding that have been questioned by the City’s qualified technical consultant. In addition, the Corps’ work also discounts a number of years of gage data. Several other issues, some emerging, raise valid concerns about hydrology and hydraulic assumptions. The complications of flood hazard analysis in the Skagit River Delta area are very real, not to be overstated.

The different numbers are presented by three different groups with respect to the Skagit River hydrology, as shown in the table below. As can be seen at a glance, the options for effective flood hazard mitigation are significantly different depending on the assumptions about hydrology.

The results of the current approach used by FEMA (via the Corps) are of great concern for the City of Burlington, because it is FEMA policy to base its analysis on an artificial condition; that is, that none of the levee system currently in place exists. No credit is given for having levees at all, unless the levees are certified as providing 100-year flood protection. It is the City's position that this policy constitutes a change in the Levee Failure Policy that must be reviewed under NEPA pursuant to Title 44: Emergency Management and Assistance, Subpart B, Section 10.6.

The model that has been presented by FEMA to the City identifies over 6 feet of water on Interstate 5 in the middle of the Burlington retail core using the current assumptions by the Corps of Engineers combined with the FEMA floodplain modeling assumptions.

It is the City's position that these Base Flood Elevations, if adopted, will have a severe, long term negative impact the economy of the region. Immediate effects will be on the redevelopment of old downtown, where the lots are 30 feet wide. Elevating the first occupied floor up one story will be a difficult and costly challenge for property owners and the community. The market conditions for redevelopment of old downtown are slow to emerge and there is no predicting the timeline for revitalization at this point.

Even the most accurate computer modeling appears to result in Higher Base Flood elevations.

4. A viable regional strategy is not in place.

An array of flood hazard mitigation strategies exist and have been studied for many years in Skagit County, but there is no regional strategy for approving or implementing them. Skagit County is working toward development of an update of the Skagit County Comprehensive Flood Hazard Management Plan. The City of Burlington is not represented on the Advisory Committee and the scope of work appears limited to the Corps of Engineers General Investigation without consideration of independent studies by Burlington and Skagit County. There does not appear to be an emerging consensus on the best course of action, for a number of reasons, including the fact that few of the proposed measures will work with the hydrology set forth by the Corps.

Some of the relevant components include flood storage at Lower Baker Dam, better utilization of the Nookachamps area for flood storage when combined with better protection of the Sedro-Woolley sewer plant, extending levee protection along the railroad east of Burlington to a point so the site does not require flood fighting, setting back the levees in the multiple bridge corridor through Burlington and Mount Vernon, and protecting overbank flow paths in lieu of a regulatory floodway.

These are close-to-Burlington examples of flood hazard mitigation strategies that offer real opportunities for flood hazard mitigation, some of which may be cost effective from a practical

point of view, but which may not meet the Corps of Engineers' test for cost effectiveness using the Corps' very limited cost-benefit analysis methodology.

5. There is no other option to ensure access to flood insurance to protect property owner's rights.

- a. FEMA has stated its plans to propose significant increases in the 100-year Base Flood Elevation, and because FEMA regulates by controlling the lending institutions, opting out of the flood insurance program is not an alternative.
- b. Burlington strongly supports participating in the National Flood Insurance Program. The only viable option for the City at this time appears to be taking expeditious action to get the levees certified for 100-year flood protection, including any related actions such as training levees, control mechanisms to move water north to overbank flow paths through farmland areas, ensuring Gages Slough is protected as a flood drainage mechanism and facility, and other measures. This will ensure that the levees are given credit in setting the Base Flood Elevations and that the elevations are reasonably close to the existing condition.
- c. With certified levees, flood insurance may become optional in some locations. The City of Burlington will continue to strongly support the flood insurance program.
- d. This action must be taken to protect the interests of the public, in the midst of grave uncertainty and controversy over what constitutes the 100-year flood hydrology and what the 100-year Base Flood Elevations should be in Burlington and the Skagit River delta area.
- e. The financial impact to individual property owners of skyrocketing flood insurance rates that will never provide full coverage, combined with the extreme disparity in mandatory building elevations that will result if flood elevations are increased by what amounts to an entire story, are key components in the decision of the City Council to partner with Dike District #12 and Skagit County to take local control of the future of the community.

There are three significant problems and one good option for Burlington:

1. Hydrology assumptions and computer modeling provided by the Corps of Engineers to FEMA combine to raise Base Flood Elevations even higher than the significant increases that will be seen with the correct analysis.
2. Base Flood Elevation increases of up to 6.4 feet will have a severe negative impact on economic development in this community, and have significant ramifications for the future of much of Skagit County, over a period of time.
3. FEMA has also proposed creation of a Regulatory Floodway at some point in time after the Base Flood Elevations are put in place. It is the City's position that the Regulatory Floodway issue must be considered together with the Base Flood Elevations and the correct hydrology and hydraulic modeling, so that cumulative effects can be evaluated and a responsible course of action can be selected.

Given the uncertainties with points 1-3 above, it is therefore the City's position that the best option for Burlington is to devise a plan to obtain 100-year levee certification for the Burlington Urban Area, and update the existing Special Flood Risk Zones as a comparable alternative to a classic regulatory floodway that is specifically designed to work in the Skagit River delta area.

The lead agencies have identified the following areas for discussion in the EIS:

1. Impact of 100-year flood protection on Burlington and surrounding areas, including analysis of levee height, levee configuration and other flood control measures, and design options for those measures, based on a comparison of Corps of Engineers versus Pacific International Engineering hydrology alternatives and assumptions about Baker Dam storage, Nookachamps storage with Sedro-Woolley protection, control structures in the Sterling area, overbank flow paths to the north and west, and levee setbacks through the bridge corridor.
2. Impact of alternative UGA designs:
 - a. Emphasis on environmental mitigation such as riparian buffer enhancement, wetland buffer restoration, connected open space for habitat improvements and public access.
 - b. Impact of removal of land on the northeast from the UGA and adding land on the west for the school district.
 - c. Consideration of sanitary sewer service to the Raspberry Ridge development that is high density farmworker housing on septic tanks.
3. Alternatives that meet the project objectives and/or mitigate environmental impacts.

SUMMARY

The proposed action is to construct 100-year certified levees in appropriate locations, and provide other flood measures as necessary and appropriate based on FEMA's final Flood Insurance Study, when this study is adopted following resolution of any appeals.

There are two major alternatives presented: one is to modify existing levees, including certification of some levee segments, and take other appropriate flood control measures based on the hydrology developed for Skagit County, Burlington and Mount Vernon by Pacific International Engineering that is not currently accepted by the Army Corps of Engineers. At present it is not known if FEMA will accredit levees certified using this hydrology. The other major alternative is to modify existing levees, including certification of some levee segments, and take other appropriate flood control measures based on the Army Corps of Engineers hydrology, if that becomes the basis for the new FIRM maps, and to evaluate options within that framework.

This project consists of several related actions implementing the 2008-2013 update of the Burlington Floodplain Management and Natural Hazard Mitigation Plan.

1. The updated plan adds the flood hazard mitigation strategy of designing and building certified levees at appropriate locations near the City of Burlington, and providing other appropriate flood control measures to protect the City's urban area. This action may result in some or all of Burlington's urban area being removed from the 100-year floodplain, and/or reduced Base Flood Elevations in some or all of Burlington's urban area; however, flood insurance will continue to be promoted.
2. Levee upgrades require coordinating with Dike District #12 and Skagit County on the location of levees and control structures. In order to protect the urban area, some of these will of necessity be constructed in Skagit County's rural jurisdiction in.
3. Modify the UGA for the City of Burlington to implement flood hazard mitigation measures including but not limited to the restoration of the Gages Slough wetland corridor with native plant buffer restoration projects, water quality improvements through source control with Low Impact Design standards, designing an urban separator along Pulver Road, and connecting open space from Gages Slough to the riparian corridor along the Skagit River in conjunction with the planned setback levees in the three-bridge corridor. The proposal is to add the three sites identified in the 2005 Comprehensive Plan, straightening out the very irregular UGA boundary on the west side of Burlington to line up with Pulver Road to a point north of the intersection of Peterson Road and Pulver Road, that would represent an extension of West Fairhaven Avenue.
 - Land added to the UGA at the northwest corner of Burlington is proposed for a future school site. In order to comply with the Skagit County policy of "no net loss" of land that is zoned Agricultural Resource Land, a comparable amount of farmland is proposed to be removed from the northeast corner of the Burlington UGA just east of Burlington Hill.

- The remainder of the agricultural resource land added to the UGA will be used as a sending zone for farmland development rights under the Burlington Transfer of Development Rights standards or for the purchase of development rights using funds raised by the Burlington Agricultural Heritage Credit program.
 - Implement the adopted Burlington Connected Open Space Plan with a diverse array of riparian buffer upgrades, wetland buffer restoration projects, and related native vegetation enhancement opportunities and corridors that are appropriate for protecting and enhancing habitat.
4. Add the existing Raspberry Ridge high density urban farmworker housing project to the UGA to get the site on sanitary sewer to prevent sewage from flooding the City in the event of failure of the septic systems during high water. The site could retain zoning comparable to the existing Agriculture Natural Resource zoning in Skagit County as needed to adhere to the current no net loss of farmland policy in Skagit County. This area includes the land along the Skagit River east of Gardner Road that is owned by the City of Burlington and consists of a forested riparian buffer on the riverside of the levee.
 5. Amend the Zoning Code to include the Burlington Agricultural Heritage Credit program and fee structure. Amendments to Skagit County Code may also be required to facilitate the purchase and/or transfer of development rights from land in the unincorporated UGA to land within the City limits.

OBJECTIVES OF THE PROPOSAL

The objectives of the proposal are as follows:

- ◆ Focus on the long term best interests of the City of Burlington in a regional context.
- ◆ Design and implement a program for levee certification along the Skagit River frontage to mitigate significant adverse effects on the City of flood hazard, through an extensive public involvement process, and in coordination with all affected jurisdictions, including Mount Vernon, Skagit County, Sedro-Woolley and all of the Dike Districts in the Skagit River delta area.
- ◆ Work with private property owners and Skagit County to assist in efforts to permanently preserve farmland around Burlington to reserve overbank flow paths in the event of a major flood. New residential development in Burlington would be required to participate in the Burlington Agricultural Heritage Credit program, and funds raised would be donated to the Skagit Farmland Legacy program to target acquisition of farmland development rights around Burlington.
- ◆ Work to ensure that the most accurate hydraulics and hydrology form the basis for the most accurate computer modeling that generates the new Base Flood Elevations, so that the levee elevations and freeboard are correct for 100-year certified levees. This includes pursuing technical appeals of proposed FEMA maps as necessary.
- ◆ Work with all affected local districts and jurisdictions to develop reasonable flood hazard mitigation measures that work for the region, such as additional flood storage behind Baker Dams, Nookachamps drainage basin storage with Sedro-Woolley sewer plant

protection, overbank flow paths to the north and west, and levee setbacks through the bridge corridor.

- ◆ Revise the existing FEMA approved alternate to the regulatory floodway to clarify the role of Gages Slough, to add overbank flow paths that include the Nookachamps drainage basin and farmland located to the north and west of Burlington Hill.
- ◆ Evaluate the impact of alternative UGA configurations, with removal of land on the northeast and adding land on the west, including consideration of Raspberry Ridge development, with two goals: long term school sites and public health and safety.
- ◆ Develop and implement reasonable and prudent alternatives such as those presented in the NPDES Phase II Municipal Stormwater permit, Burlington Connected Open Space Plan, the Gages Slough Management Plan and related alternative future concepts, to comply with all local, state and federal environmental requirements, including the Endangered Species Act.
- ◆ Consider other alternatives that meet the project objectives and/or mitigate environmental impacts.
- ◆ Address the unresolved national and state environmental policy issues, including the requirement for NEPA review of the change in the FEMA Levee Failure Policy., FEMA has taken the position that the agreement reached in 1985 when the Flood Insurance Rate Maps were first set up in the Skagit River Delta Area is no longer valid. At that time, there was no regulatory floodway established because it is not practical in this situation and the levees were assumed to fail at a single point. Today, FEMA is stating that if the levees are not certified to 100-year flood protection, they are assumed not to exist at all for the purpose of setting base flood elevations. Rather than consider the issues together, FEMA is also proposing to establish a classic regulatory floodway through the Skagit River delta area at an unknown future date.

MAJOR CONCLUSIONS AND SIGNIFICANT AREAS OF CONTROVERSY AND UNCERTAINTY

There is little debate about the need to protect existing developed urban areas from flooding. However, there is a great debate about what constitutes 100-year flood protection and how much water arrives in the Skagit River delta in that flood event. It is expected that this debate will escalate once FEMA makes a decision on flood hydrology, and produces new Flood Insurance Rate Maps. The City of Burlington and Dike District #12 are prepared to file technical appeals if necessary. Extensive levee enlargement work has been in process since 1990 by Dike District #12. With correct flood hydrology in place, the feasibility of obtaining 100-year levee certification would be improved. The process involves certification by a private consultant with review and accreditation by FEMA. This is a recent change from past practice, with substantially less direct federal involvement in the process.

Land Use – There is a clear need for permanent acquisition of farmland development rights to provide paths for floodwaters to move during a major flood event. This option is critical to protect Burlington from becoming a regulatory floodway.

Environmental Quality - If the City's recommendations for a plan of action that mitigates urban flooding through levee system upgrades is not feasible or practical, and Base Flood Elevations

are substantially increased, there will be significant adverse impacts on the future growth and development of the City, aesthetic and economic impacts on local property owners, and the quality of the human environment will suffer. The opportunity to improve and protect fish and wildlife species and habitats arise with the program for levee certification and connected open space design and enhancement.

Floodway or “Floodway-like Tool” – Gages Slough is currently identified as a Special Flood Risk Area with some, but not all, of the restrictions that would be in place if it were designated as a floodway; however, Gages Slough cannot carry enough water to be considered a floodway conveyance area. The Skagit River, from a point three hundred feet behind the landward toe of the levees across the river, is considered a Special Flood Risk Area and the typical floodway rules apply in this area. The proposed addition to the program is to protect farmland that will provide overbank flow paths, the actual course of floodwaters in a flood event. FEMA is proposing to establish a floodway or floodway-like tool, but there is no information or schedule for this action and it needs to be considered together with the Base Flood Elevations, and the proposals outlined in this document.

Further Study - If the flood hazard mitigation issues for the City of Burlington cannot be solved, further study will be necessary, and there will be significant adverse effects that cannot be mitigated. These include gradual deterioration of the city and loss of economic vitality, loss of protection of major regional transportation infrastructure, inability to continue with ecosystem restoration efforts and continued poor storm water quality entering the Skagit River, as examples.

SIGNIFICANT IMPACTS, MITIGATION MEASURES, AND SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

This is a programmatic environmental impact statement intended to address planning issues related to flood hazard mitigation including levee certification. The typical environmental impacts of site preparation and construction are addressed by the existing land use and construction codes and are not considered significant adverse effects and they will be adequately mitigated. Supplemental environmental assessments ranging from biological assessments and evaluations to discipline reports pursuant to NEPA will be incorporated into the program as they become available or required.

With certified levees and a committed plan for farmland and open space preservation and restoration, with a defined urban separator, there will be long term stability in the character of the area around the existing City limits.

Continued increase in commercial activity and residential density will occur, but it will be confined to the existing urbanized area.

There will be an unavoidable adverse impact on frequently flooded farmland and rural residential areas that are located in overbank flow areas when flooding occurs. This is an existing condition.

Levee certification may result in more water moving down the river past Burlington, with potential impacts to rural and agricultural lands if there is levee overtopping or failure downstream.

With respect to fish and wildlife, benefits include a range of programs and projects, including but not limited to stormwater cleanup, wetland buffer restoration, riparian habitat enhancement, levee setbacks and connected open space.

Mitigation measures include the restoration of the Gages Slough Habitat corridor through Burlington, providing clean water, a wetland buffer, and habitat for birds and small animals.

Levee setbacks are planned through the three-bridge corridor on the south side of Burlington. The setback area will be maintained as part of the Burlington Connected Open Space, affording new potential opportunities for public access, buffer enhancement, and flood hazard mitigation, all of which will benefit fish and wildlife and their habitats. Preliminary study with regard to the three-bridge corridor has identified the 100-year old BNSF railroad bridge, at the upstream end of the corridor, as a restriction to flood conveyance.

Additional studies will be prepared as part of the request for levee certification, addressing issues of environmental justice and archeology and historic preservation and completing the Endangered Species Act consultation process.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The purpose of including a discussion of alternatives is to inform decision-makers and the public of reasonable alternatives, including mitigation measures that would avoid or minimize adverse impacts or enhance environmental quality.

1. Proposed Action – *The proposed action is to construct 100-year certified levees in appropriate locations, and provide other flood measures as necessary and appropriate based on FEMA’s final Flood Insurance Study, when this study is adopted following resolution of any appeals.*

There are two major alternatives presented: one is to modify existing levees, including certification of some levee segments, and take other appropriate flood control measures based on the hydrology developed for Skagit County, Burlington and Mount Vernon by Pacific International Engineering that is not presently accepted by the Army Corps of Engineers. At present it is not known if FEMA will accredit levees certified using this hydrology. The other major alternative is to modify existing levees, including certification of some levee segments, and take other appropriate flood control measures based on the Army Corps of Engineers hydrology, if that becomes the basis for the new FIRM maps, and to evaluate options within that framework.

(see table on next page)

Technical Report	Regulated 100-year peak flow estimate (how much water gets here)	Effects on upstream water levels	Effects on downstream measures	Effect on base flood elevations in Burlington
Corps of Engineers	215,270 cfs at Sedro-Woolley, Highway 9 Bridge	May raise upstream surface water levels 1-4 feet, depending on how much water downstream constrictions such as the BNSF bridge and the levees hold back	Overtopping or control structures critical Levee certification may not be feasible at all without ring dike and then adverse effects cascade both upstream and downstream	Up to 7 feet increase; generally, between 3 and 7 feet throughout the City No plausible scenario of levee improvements without significant detrimental impacts to upstream and downstream neighbors
Pacific International Engineering	184,700 cfs at Sedro-Woolley, Highway 9 Bridge	Minimal effect depending on levee configuration; less than 3 inches	Levee certification along river front feasible Levee setbacks and habitat improvement feasible Flood insurance still needed most places	Up to 6 feet increase; generally between 2 and 6 feet throughout the City BFE's near status quo if levee segment is certified; parts of town out of floodplain
FEMA review results	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN

Consultant	Unregulated Peak Flow Input Data Points				
	<u>1897</u>	<u>1909</u>	<u>1917</u>	<u>1921</u>	<u>1932</u>
Corps of Engineers	265,000	245,000	210,000	228,000	182,000
Northwest Hydraulic Consultants	220,000	205,000	185,000	195,000	182,000
Pacific International Engineering	181,200	179,000	158,700	169,700	165,000

Consultant	100-Year Regulated Peak Flow Estimate		
	Concrete	Sedro-Woolley	Mount Vernon
Corps of Engineers	209,490	215,270	192,900
Northwest Hydraulic Consultants	191,400	196,690	176,250
Pacific International Engineering	184,400	184,700	162,200

1. Running the Flo-2 D computer model with the levees as they are today, a significant volume of water never gets to the RR bridge; the Nookachamps fills, Sterling area fills, and water overtops the RR in the Sterling area, heading north and then west to the farmland. At some point, when the bridge corridor is at maximum capacity, levee failure or overtopping occurs at one of several locations; Avon Bend, Riverbend, Fir Island are examples.
2. Running the model with the FEMA levee failure policy in place yields different results depending on the assumption of how much water gets to Burlington, but even with the lower numbers supported by the City, Base Flood Elevations go up significantly within the City limits and future development and redevelopment will be costly and aesthetically displeasing and function poorly. Levee certification is the only way to get credit for having levees at all in setting the Base Flood Elevations.

This project consists of several related actions implementing the 2008-2013 update of the Burlington Floodplain Management and Natural Hazard Mitigation Plan.

1. *The updated plan adds the flood hazard mitigation strategy of designing and building certified levees at appropriate locations near the City of Burlington, and providing other appropriate flood control measures to protect the City of Burlington's urban area. This action may result in some or all of Burlington's urban area being removed from the 100-year floodplain, and/or reduced Base Flood Elevations in some or all of Burlington's urban area; however, flood insurance will continue to be promoted.*
2. *Levee upgrades require coordinating with Dike District #12 and Skagit County on the location of levees and control structures. In order to protect the urban area some of these will of necessity be constructed in Skagit County's rural jurisdiction.*
3. *Modify the UGA for the City of Burlington to implement flood hazard mitigation measures including the restoration of the Gages Slough wetland corridor with native plant buffer restoration projects, water quality improvements through source control with Low Impact Design standards, designing an urban separator along Pulver Road, and connecting open space from Gages Slough to the riparian corridor along the Skagit River in conjunction with the planned setback levees in the three-bridge corridor. The proposal is to add the three sites identified in the 2005 Comprehensive Plan, straightening out the very irregular UGA boundary on the west side of Burlington to line up with Pulver Road to a point north of the intersection of Peterson Road and Pulver Road, that would represent an extension of West Fairhaven Avenue.*
 - *Land added to the UGA at the northwest corner of Burlington is proposed for a future school site. In order to comply with the Skagit County policy of "no net loss" of land that is zoned Agricultural Resource Land, a comparable amount of farmland is proposed to be removed from the northeast corner of the Burlington UGA just east of Burlington Hill.*
 - *The remainder of the agricultural resource land added to the UGA will be used as a sending zone for farmland development rights under the Burlington Transfer of Development Rights standards or for the purchase of development rights using funds raised by the Burlington Agricultural Heritage Credit program.*
 - *Implement the adopted Burlington Connected Open Space Plan with a diverse array of riparian buffer upgrades, wetland buffer restoration projects, and related native*

vegetation enhancement opportunities and corridors that are appropriate for protecting and enhancing habitat.

- 4. Add the existing Raspberry Ridge high density farmworker housing project to the UGA to get the site on sanitary sewer to prevent sewage from flooding the City in the event of failure of the septic systems during high water. It could retain zoning comparable to the existing Agriculture Natural Resource zoning in Skagit County as needed to adhere to the current no net loss of farmland policy in Skagit County. This area includes the land west of Gardner Road that is owned by the City of Burlington and consists of a forested riparian buffer on the riverside of the levee.*
- 5. Amend the Zoning Code to include the Burlington Agricultural Heritage Credit program and fee structure. Amendments to Skagit County Code may also be required to facilitate the purchase and/or transfer of development rights from land in the unincorporated UGA to land within the City limits.*

Discussion:

The proposed action is designed to reflect the unique location of Burlington in the Skagit River delta area with the river on two sides, Gages Slough diagonally crossing the City, major state and interstate transportation corridors (both highways and railroads) running north-south and east-west, combined with agricultural resource land of long term significance to the north and west. The goal is to make the best of the situation for all parties, focus on public health, safety, welfare and the character of the area, and protect the long term interests of the community and the region with an effective and practical combination of measures.

Fortunately for Burlington, the Dike District #12 has been focused on protecting the interests of the citizens they serve and working on the ground to upgrade the levee system. There has been an excellent supply of acceptable fill material available since the project began after the 1995 flood event, and the levee system upgrade is designed as an overtopping levee with wide top and long backslope. The current levee profile is generally higher than the 1979 Corps of Engineers 100-year water surface elevation. To gain the required three feet of freeboard under any hydrology and hydraulic scenario that is currently on the table, a range of between two and five feet of additional levee height will be required. With the wide levee top and long backslope profile, there is ample space for additional material. Many of the technical considerations for levee design identified in the Corps' Levee Design Manual are addressed by this design.

Burlington is ready to make its case to get credit for the levee system in the establishment of Base Flood Elevations. While "No Action" may continue in the region into the indefinite future, Burlington is simply asking for good data to finalize the levee profiles, complete the work, get a clear understanding from FEMA on the specific submittals required to document the case for levee certification by a registered professional engineer, and file for Map Revisions.

2. No Action

The current General Investigation study has been underway for many years by the County and the Corps of Engineers, and will continue for several years to come. Doing nothing will result in mandatory adoption of higher Base Flood Elevations that may show up to 6.4 feet increase in height in some locations in Burlington. This presents an extremely difficult challenge to Burlington's future economic stability and for the future development of vacant and underutilized land in the City, and may preclude the redevelopment of historic downtown Burlington with its 30-foot wide lots.

No action will continue to generate extremely high flood insurance premiums for the families that live in the community. While the existing buildings will be "grandfathered in", according to FEMA, citizens have already been hit hard with much higher rates for existing conditions when mortgage lenders get involved at the time of sale or refinancing. Crawl spaces are often reclassified as basements, and if insurance carriers are changed, the policy is no longer subject to the original lower rates.

Discussion:

Under this alternative, the community will participate in the on-going exercise, action will be delayed, Base Flood Elevations will increase when the FEMA maps are produced, flood insurance premiums will increase, possibly substantially, and investment in economic development will nearly cease, particularly the revitalization of historic downtown Burlington and infill development in the retail core and industrial areas. Without levee certification, the potential for overtopping and widespread contamination is very great, particularly when combined with the potential for establishing a regulatory floodway through the Skagit River delta area.

3. Remove approximately 30 acres of land from the Urban Growth Area and exchange for land located at the northeast corner of Pulver and Peterson Road for a school site.

Land currently in the UGA will be returned to agricultural resource zoning and the school site will be redesignated as UGA, from its agricultural zoning classification. Adjacent farmland development rights will be acquired and a permanent urban separator designed along the boundaries of the site, coordinated with the adopted Connected Open Space Plan for Burlington.

Discussion:

See Appendix C, Exhibit 3 for a map that illustrates the proposal. Long term growth in the Burlington-Edison School District population means that two new school sites are needed for the long term future. With the policy of no net loss of farmland in mind, a swap of land from one side of the UGA to the other is proposed.

4. Evaluate the concept of adding Raspberry Ridge to the UGA so that sanitary sewer is provided to mitigate potential health hazard in event of a flood.

This area is proposed to be added to the Burlington UGA and zoned as Open Space in order to be able to provide sanitary sewer to the high density farmworker housing that has been constructed on the site. The site is currently zoned as Agricultural Natural Resource Land (Ag-NRL). The goal is to protect the citizens of Burlington from contamination by sewage from failed septic systems in the event of a flood. This area was proposed to be included as a sending zone for farmland development rights under the transfer/purchase of development rights provisions adopted in the Burlington Zoning Code in 1994. However, this proposal was rejected by Skagit County at that time.

Discussion:

See Appendix C, Exhibit 3 for a map that illustrates the proposal. Today, all of the land in this area has been taken from long term agricultural resource use and high density housing has been constructed by Skagit County with very large septic systems and drainfields. The likelihood of failure in a flood event with high water table is high and this area needs to be connected to sanitary sewer.

AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Comparative Impacts of Alternatives	Alternative #1 – Proposed Action 100-yr levees + preserve farmland + modified floodway	Alternative #2 – No Action-study	Alternative #3 – land swap for school site	Alternative #4 – Sanitary sewer to farm worker housing
Does it meet applicant's objectives?	Yes	No	Yes	Yes
Mitigate flood hazard	Yes	Unknown & unlikely	No net change	Yes
Viable future community	Yes	No	Yes	Yes
Enhance Wild and Scenic River	Yes	No	No net change	No net change

AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS AND MITIGATION MEASURES

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage or release of toxic or hazardous substances; or production of noise?

The recent amendment of the Flood Hazard Mitigation Plan to add the goal of 100-year flood protection, combined with an update of the existing alternative regulatory floodway program and playing a role in other regional flood hazard mitigation components, will allow the existing community within the current UGA/ City limits to continue to thrive as a small city. As stated in the 2008-2013 Floodplain Management and Natural Hazard Mitigation Plan, page 39, there is an available supply of 222 acres of commercial and industrial land within the City limits of Burlington, out of a total of 1,349 acres, and there are 80 acres of vacant residential land located primarily on Burlington Hill. Infill and redevelopment will be the primary activities that will affect the environment. Levee upgrades will have a temporary impact on air quality and noise during construction.

Proposed measures to avoid or reduce such increases are:

All new development shall comply with all federal state and local regulations including the Critical Areas Ordinance, federal and state air and water quality standards, state noise standards and other applicable laws and regulations. Green development principles, state of the art surface water management, low impact infrastructure design, and sustainable development techniques are proposed to be integrated into codes and plans for design and construction. Following participation in a state Technical Assistance program, an Interim Low Impact Design Code is in process for adoption for a trial period so that code language can be improved after practice in the field.

2. How would the proposal be likely to affect plants, animals, fish or marine life?

The proposal for levee certification and maintenance of floodway-like open space components is expected to have no adverse effect on fish or wildlife or their habitats. While new development including infill and redevelopment is part of the future of the City, in addition to using environmentally sound practices, a major component of the project is restoration, maintenance and management of the Gages Slough habitat and wetland corridor and other surface waters and outfall locations to meet or exceed state and federal clean water standards.

Proposed measures to protect or conserve energy and natural resources are:

The Skagit River is home to threatened and endangered species of fish, such as Chinook salmon, native steelhead, and bull trout, as well as the bald eagle. The overall program of surface water quality management, habitat and buffer restoration and maintenance of floodway-like open space components is a unique mitigation opportunity and no adverse effects are expected. This plan will benefit listed and priority habitats and species. Part of the proposal includes levee setbacks and connected open space with additional mitigation opportunities for listed and priority species and habitat.

Additional biological evaluation and assessment work will be completed for implementation of the plan, including the application for Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR), with any supplemental documentation, consultation and determinations required.

3. How would the proposal be likely to deplete energy or natural resources?

All development uses energy and natural resources. Part of this proposed action is Gages Slough restoration, maintenance and habitat management which is a major turnaround opportunity to restore critical habitat and natural resources. While not on the main stem of the Skagit River, there is substantial migratory bird use, as well as other habitat.

This proposed action protects and permanently conserves farm land in the agricultural natural resource designation and that is a significant opportunity to preserve natural resources.

Proposed measures to protect or conserve energy and natural resources are:

The project has a specific goal of natural resource conservation, including acquisition of farmland development rights through the Skagit County Farmland Legacy, funded by the Burlington Agricultural Heritage Program (See Appendix E).

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for government protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

The proposal is a Flood Hazard Mitigation project to provide protection to a finite existing urban area, while completely extinguishing development rights from prime farmland that also provide overbank flow paths for flood hazard mitigation, restore and maintain the Gages Slough wetland corridor, implement, monitor and manage water quality improvement programs so that clean water reaches the Skagit River which is designated critical habitat for several species of listed salmonids.

By this means, through a cooperative effort representing the interests of fish and wildlife habitat, wetlands, floodplains, and threatened or endangered species habitat, farmland preservation, opportunities for improvements in sensitive areas will be optimized for future generations, while protecting the lives of the existing community now in the floodplain.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Adopt effective codes to regulate development over the years; monitor the ecosystems in the area and manage restoration planning and implementation in a cooperative venture among interested parties with future generations in mind. Strong maintenance and management action plans are critical to long term viability and they must be adequately funded and monitored.

Additional biological evaluation and assessment work will be completed for implementation of the plan, including the application for Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR), with any supplemental documentation, consultation and determinations required.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

This plan will protect and maintain substantial connected open space through and around the urban area, while providing levee certification around the urban area, and will retain rural and agricultural uses in perpetuity in protected agricultural resource lands where there will continue to be less than 100-year levee protection and urban development will not be allowed. This program is consistent with existing land and shoreline use plans in place.

Proposed measures to avoid or reduce shoreline and land use impacts:

This plan should accomplish the goal of reducing impacts.

6. How would the proposal be likely to increase demands on transportation or public service and utilities?

There will be a minor increase in population and business activity within the urban area.

Proposed measures to reduce or respond to such demand(s) are:

The plan and code addresses this issue by establishing a Level of Service and concurrency requirements.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

The plan is consistent with requirements for protection of the environment.

8. Earth

Appendix F describes the Levee certification and accreditation process. Geotechnical reports are required to be developed and filed as part of the application for map revision. The scope of the reports needed for levee modifications will be determined in cooperation with the Dike District Commissioners, the Public Works Department, a Registered Professional Engineer, a Geotechnical Engineer and FEMA.

9. Air

Levee vegetation is intended to reduce dust and airborne particulates. Construction emissions are a temporary, unavoidable adverse effect. Dust control is used during the dry season.

10. Water

- *Long term improvement of surface water quality is an important goal. Storm water quality monitoring and management through a long range plan to implement the NPDES Phase II storm water program is in place.*
- *Drinking water supply is managed by the PUD #1.*
- *The Burlington Wastewater Treatment Plant uses ultraviolet light for disinfection and has a major pretreatment program in place to exceed water quality standards for effluent.*
- *Protection of the urban area from flooding, while providing overbank flow paths for floodwaters should help protect water quality from hazardous waste, septage, and other industrial hazards.*

11. Plants

There are no known threatened or endangered plants in the area. A component of the project is buffer restoration with native plants in the Gages Slough area. There are very restrictive standards for management of levee vegetation to protect the integrity of the levee system. The installation of setback levees may afford greater opportunities for shoreline plants in the riparian corridor along the river.

12. Animals

The Skagit River is home to several species of threatened or endangered fish, including salmon, steelhead and bull trout. The bald eagle is also found in the area, along with many other birds, mammals and other animals. Buffer restoration and enhancement and upgrading the environmental qualities of the Gages Slough corridor are positive for animals.

13. Energy and Natural Resources

Protecting property, protecting the environment and ensuring that there is long term ability for passage of floodwaters through protected open space will conserve both energy and natural resources.

14. Environmental Health

Protection of the urban area from flooding will directly benefit environmental health by preventing from potential contamination by a variety of sources.

15. Land and Shoreline Use

Preservation of farmland in open space, maintaining the existing urban area with no potential for future expansion into floodplains and farmland, improving and cleaning up habitat in the wetland corridor, and setting back levees are all actions that are positive for land and shoreline use. Levee modification to provide for overtopping, instead of potential failure, increases protection for the existing land use.

16. Housing

Protecting the ability of the citizens to be able to afford flood insurance in conjunction with home mortgages is critical for the working families of Burlington. In addition, infill housing needs to fit into the character of the neighborhoods at the same Base Flood Elevations as the other homes in Burlington. New higher density housing that is planned for the redevelopment of downtown and may occur in the retail core needs to be affordable market rate. This means reasonable elevations are necessary without the need for fill or parking garages on the ground floor.

17. Aesthetics

The design and development of the existing urban area will be able to proceed and preserve the character of the community. Some significant historical structures will be protected in context, and new construction will be in keeping with the historical and existing community character of the area. Preserving farmland in open space will protect the aesthetics of the Skagit Valley for future generations.

18. Light and Glare

Limiting the expansion of the urban area to the land protected by certified levees, and protecting farmland around the perimeter, will help keep excess light at night to current levels.

19. Recreation

Access to Gages Slough and the Skagit River for fishing, bird watching, and fish viewing will be enhanced as restoration projects proceed over the years ahead. Connected open space in the setback levee area will be accessed by paths and sidewalks as appropriate. Local parks in the Gages Slough corridor and along the Skagit River function to protect flood hazard areas and provide recreational opportunities. Where protection of priority habitats and species is needed, public access will be restricted to specific viewing locations without direct access.

20. Historic and Cultural Preservation

Cultural and historic resources will be evaluated for each element of the project and appropriate action taken if archeological sites are identified. Preserving Burlington's history is directly linked to being able to build at reasonable Base Flood Elevations. Historic Burlington has 30-foot wide lots and infill development needs to be at the same elevation as the existing buildings.

21. Transportation

State Route 20, Interstate 5 and the BNSF Railroad all intersect in Burlington. Protecting these critical infrastructure components is a key goal of the levee certification program. The first project designed to protect Interstate 5 (the three-bridge corridor levee setback and certification project) is currently in the process of NEPA review.

22. Public Services

Levee certification decreases the need for on the ground flood fighting. This has already been the experience in the 2003 and 2006 flood events with the current levee improvements in place, allowing emergency resources to provide assistance to others.

23. Utilities

Protecting utilities and infrastructure with an adequate levee system ensures that vital services are available.

APPENDICES

NOTE: Attachments for Appendices are in three separate attachments as follows:

- ▶ **Appendices A – C**
- ▶ **Appendices D – G**
- ▶ **Appendices H – J**

APPENDIX A

City of Burlington 2008-2013 Floodplain Management and Natural Hazard Mitigation Plan

and

2008-2013 Skagit County Natural Hazard Mitigation Plan

Available via the following weblink:

<http://www.skagitcounty.net/Common/asp/default.asp?d=EmergencyManagement&c=General&p=2003NHMPFinaltoc.htm>

APPENDIX B

Current studies on Hydrology and Hydraulics

1. Skagit River Basin Hydrology Report Existing Conditions prepared by Pacific International Engineering, October 2008
2. Skagit River Basin, Washington Revised Flood Insurance Study Hydrology Summary Draft, May 2008, U.S. Army Corps of Engineers for Federal Emergency Management Agency
3. Skagit River Basin, Washington Revised Flood Insurance Study Hydraulics Summary, May 2008, U.S. Army Corps of Engineers for Federal Emergency Management Agency
4. Re-evaluation of the Magnitude of Historic Floods on the Skagit River near Concrete, Final Report October 2008, Northwest Hydraulics Consultants for Skagit County Department of Public Works
5. Skagit River Flood Elevations and Flood Frequency Data presentation for NORMFA meeting 2008 by Chal Martin, P.E. and Albert Liou, P.E.
6. Microscopical Studies of Concrete WA Historical Flood Investigation by WJE Associates, Inc.

APPENDIX C

Background Reports

APPENDIX D

Maps

Exhibit 1 – Skagit River and Tributaries Basin Map

Exhibit 2 – Vicinity Map showing levee system

Exhibit 3 – Urban Growth Area Map from 2005 Comprehensive Plan

Exhibit 4 – Map showing Alternative 3 with proposed changes to Urban Growth Area to add new school site, remove comparable acreage from the Urban Growth Area at the northeast corner adjacent to Peacock Lane; and Alternative 4, adding Raspberry Ridge as Open Space so that sanitary sewer can be made available.

Exhibit 5 – Special Flood Risk Map with Gages Slough & Open Space

Exhibit 6 – Overbank Flow Paths, FEMA Levee Failure Policy with no levee credit, Levee segment corrected hydrology, Certified Levee Options

APPENDIX E

Project Description for Farmland Preservation through Burlington Agricultural Heritage Credit Program

APPENDIX F

Distribution List

APPENDIX G

Overview of Burlington's flood hazard mitigation program as it relates to the Corps of Engineers Measures List, and the need for a realistic approach to the Skagit River Comprehensive Flood Hazard Management Plan update

APPENDIX H

- **Background Report - Dike District #12**
- **Levee Plan and Profile Existing Conditions as of December 2007**
- **Aerial Photos keyed to each Plan Sheet**
- **Burlington Levee Certification Project Overview**
- **FEMA Fact Sheet Requirements of 44 CFR Section 65.10**
- **44 CFR Section 65.10**
- **Joint Resolution 01-2007**
- **Interlocal Agreement between Burlington and Dike District #12
– Preliminary Work for Levee Certification**

APPENDIX I

- **Environmental Information and Scope of Future Environmental Phases**
- **Summary of scoping meeting**
 1. **Upper Skagit Fisheries**
 2. **Skagit System Cooperative**
 3. **FEMA Environmental Review and NOAA Fisheries**
- **Washington State Department of Fish and Wildlife Priority Habitats and Species information**
- **Endangered Species Act – Section 7 Consultation Final Biological Opinion And Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation including correspondence from FEMA and Burlington Response**
- **FEMA requirements for Conditional Letter of Map Revision including Archeology and Historic Preservation**

APPENDIX J

Comment Letters Received to Date with Response



with

**DIKE DISTRICT #12
AS CO-LEAD AGENCY**

APPENDICES ATTACHMENT ONLY

for

DRAFT ENVIRONMENTAL IMPACT STATEMENT

TO ADOPT A STRATEGIC PROGRAM FOR COMPREHENSIVE FLOOD

HAZARD MITIGATION IN THE BURLINGTON URBAN AREA AND

ADJACENT LAND WITH A RANGE OF STRUCTURAL

AND NON-STRUCTURAL COMPONENTS

THIS IS A PHASED REVIEW PURSUANT TO WAC 197-11-060 (5)

CITY OF BURLINGTON, WASHINGTON AND DIKE DISTRICT #12

Prepared for review by Citizens and Government Agencies in Compliance with the State Environmental Policy Act of 1971 (Chapter 43.21C Revised Code of Washington) as revised; the State Environmental Policy Act Rules, as revised (Chapter 197-11 Washington Administrative Code); and City of Burlington Municipal Code Chapter 15.12 Environmental Policy; and the National Environmental Policy Act Pub. L 91-19, 42 U.S.C.4321-4347 as amended.

APPENDICES

Appendix A

**City of Burlington 2008-2013 Floodplain Management and Natural
Hazard Mitigation Plan**

And

2008-2013 Skagit County Natural Hazard Mitigation Plan –

Available via the following weblink:



2008-2013
FLOODPLAIN
MANAGEMENT
&
NATURAL HAZARD
MITIGATION PLAN



***2008-2013 FLOODPLAIN MANAGEMENT AND
NATURAL HAZARD MITIGATION PLAN***

TABLE OF CONTENTS

<u>Contents</u>	<u>Page</u>
Introduction.....	1
Planning Process	5
Review of Existing Studies, Reports, and Technical Information and of the Community's Needs, Goals and Plans for the Area.	8
Risk Assessment	22
Assessment of the Problem.....	25
Mitigation Strategy	41
Action Plan for Flood Hazard and other Natural Hazard Reduction.....	63
 <u>Appendices</u>	
Appendix A Example of recent Flood Hazard Bulletin.....	76
Appendix B Maps	77
Appendix C City of Burlington Flood Emergency Plan – 2008-2013 with Dike District No. 12, Standard Operating Guidelines	78
Appendix D Levee Certification Program	79
Appendix E Resolutions establishing process and adopting plan.....	80

INTRODUCTION

This document adds 2008 amendments to the plan and provides an overall update. Updates are for the most part identified in Italics and Underlined for ease of reference to the changes except for the updated statistics; these changes are not underlined.

Burlington is a Community Rating System (CRS) community with a No Adverse Impact Floodplain Management focus. Public education and outreach are taking a new direction in 2008 with Neighbor to Neighbor Plans coming together around the city. The Levee Certification project for the Urban Area is a critical component of the program, with current plans for private Professional Engineering Certification and FEMA Accreditation. The Countywide All-Natural Hazard Mitigation Plan is in place and 2008 is the five-year update cycle. Operation and Maintenance programs are in compliance with PL 84-99.

The objective of the combined floodplain management plan and hazard mitigation plan is to produce an on-going program of activities that will best tackle the community's vulnerability to each natural hazard and meet other community needs. All possible activities have been reviewed and implemented so that the most appropriate solutions are used to address each hazard. The activities are coordinated with each other and with other community goals, objectives, and activities, preventing conflicts and reducing the costs of implementing individual activities. Residents are involved in continuing public education about the hazards, loss reduction measures, and the natural and beneficial functions of floodplains. Public and political support is strong for projects that prevent new problems, reduce losses and protect the natural and beneficial functions of floodplains. The community and associated special districts and other jurisdictions in the area want to see the plan's recommendations implemented.

The City of Burlington is actively involved in Flood Hazard Reduction Planning *and the 2008 update is focused on setting a new course towards 100-year certified Levees in Burlington's reach of Dike District #12 with applicable companion projects and recommendations. The goal is to coordinate with all of the diking districts to plan for levee setbacks through the bridge corridor, certified levees in urban areas and 80-year protection in rural areas to prevent inappropriate development outside of urban areas.* Dike District #12 and the Skagit County Department of Emergency Management work closely with the City of Burlington and the Burlington Fire Department to plan and prepare for an integrated emergency management response to flooding. The City of Burlington has a detailed plan that integrates the detailed guidelines now followed by Dike District #12 and the City of Burlington and makes additional specific recommendations for the community as needed.

2002 brought the implementation of a Flood Evacuation Plan, with permanently signed Evacuation Routes throughout the City. *2008 and beyond will focus on development and implementation of a Certified Burlington Emergency Volunteer to provide an available group of Citizens who are certified flaggers with specific training on evacuating Burlington, posted at the signed routes. Participants in the Neighbor-to-Neighbor Plan get very early evacuation notice.*

This plan is *part of the* countywide plan to address all natural hazards in coordination with all of the jurisdictions of Skagit County. Hazards that are identified for Burlington include Flood,

Earthquake, Land Movement (on Burlington Hill), Severe Storms (wind in particular), Volcanic Eruption, Fire and Drought. The other natural hazards are Avalanche and Tsunami/Seiche.

The City of Burlington is located primarily in the 100-year floodplain, defined as a Special Flood Hazard Area by the Federal Emergency Management Agency. On December 15, 1993, the City of Burlington applied for participation in the Community Rating System. This program is designed to encourage a proactive program to address the issues of flood hazard reduction. There is a substantial benefit to the community for successful participation in the program. Not only is public awareness and preparedness enhanced, but each property owner benefits from a reduction in Federal Flood Hazard Insurance rates. Many other property owners have received substantial additional rate reductions by having an Elevation Certificate issued by a licensed civil engineer. All the elevation benchmarks in Burlington have been surveyed and are available for use. The City participated in an exhaustive planning process as part of the Multi-Jurisdictional effort, leading to the adoption of the countywide plan in 2003.

Because of the critical nature of the changes that are proposed to the Plan, the City of Burlington utilized the detailed process identified in the Community Rating System Handbook in 2007 and also participated in the mandatory update for 2008 with a regional outreach focus.

The process includes the following steps:

1. The planning process is organized under the direction of a professional planner and conducted through a committee composed of staff from those community departments that implement the majority of the plan recommendations. The City has a planning committee in addition to the Multi-jurisdictional All Natural Hazards Planning Committee to focus on the unique elements in Burlington.

The planning process and the committee were formally created by adoption of a Resolution by the City of Burlington. The 2007 update process was created by City Council Resolution #04-2007 and #03-2008 for the Multi-Jurisdictional update. The City of Burlington's Planning Committee includes the Planning Director, the Fire Chief, the Police Chief, the Building Official, the City Administrator, the Public Works Director/ Engineer, the Skagit County Department of Emergency Management and Dike District #12.

2. Involving the public includes several steps.

A public meeting was held at the beginning of the process to obtain public input on the natural hazards, problems, and possible solutions. In 2007, the Burlington Chamber of Commerce sponsored a Town Meeting on May 24, 2007 that was attended by nearly 250 people and many elected officials from the region, because of regional concerns about proposed major increases in the 100-year Base Flood Elevations on the Flood Insurance Rate Maps and the threat of requiring establishment of a Regulatory Floodway through the Skagit River Delta area.

The process for 2007 Public Notice was very similar to the original plan adoption, and participation is high because of the immediacy of the threat of increases in base flood elevations of as high as one story and broad concern and awareness about serious questions on the accuracy of the work done by the Corps of Engineers in terms of hydrology and other

assumptions in the computer modeling work, and the substantive unresolved questions about dam storage behind Lower Baker Dam.

The 2007 five meeting series was conducted by the Burlington Planning Commission, all of whom reside in the 100-year floodplain in the City of Burlington, with presentations by the Natural Hazard Mitigation Planning Committee. The 2008 five meeting series was conducted by the Skagit County Natural Hazard Mitigation Planning Committee. Public notice included issuing a press release to every media outlet. In addition, every Burlington citizen receiving the monthly Land Use Bulletin was invited to the five meeting series. Each meeting specifically provided for general public input on the issues to insure broad discussion and opportunity for participation beyond the committees. Residents in the Burlington Floodplain also received a questionnaire. A countywide flood survey was completed in the fall of 2006, focusing on flood insurance issues.

A series of five public meetings were held with the Planning Committee, other Stakeholders, and Citizen representatives comprising at least one-half of the committee primarily from floodprone areas. The following topics were the major agenda item at each meeting:

Meeting #1: Assess the hazard. 2007: Overview of hydrology and hazard assessment.

2008: Review of Natural Hazards.

Meeting #2: Assess the problem. 2007: Opportunity for dam storage enhancement.

2008: Risk Assessment.

Meeting #3: Set goals. 2007: Evaluation of alternatives and impacts. 2008: Review Mitigation Goals.

Meeting #4: Review possible activities 2007: Overview of process for 100 year levee certification. 2008: Review possible activities.

Meeting #5: Draft an action plan. 2007: Proposed action plan and presentation of Annual Report on progress implementing the Hazard Mitigation Plan. 2008: Review proposed Multi-Jurisdictional Plan.

A public meeting and public hearing was held to obtain input on the draft plan prior to adoption at the end of the planning process.

3. The floodplain management and all natural hazard mitigation plan is required to be developed using a standard planning process, outlined as follows:
 - A. Review of existing studies, reports, and technical information and of the community's needs, goals and plans for the area.
 - B. Risk Assessment
 - 1) Map of known flood hazard
 - 2) Description of known flood hazards
 - 3) Discussion of past floods
 - 4) Map, description and history of other natural hazards that affect the community
 - C. Assessment of the problem
 - 1) Overall summary of each hazard identified and its impact on the community

- 2) Description of the impact that the hazards identified have on life, safety, and health and the need and procedures for warning and evacuating residents and visitors.
- 3) Number and types of buildings subject to the hazards identified
- 4) Review of properties with flood insurance claims, and repetitive loss, or an estimate of potential dollar losses to vulnerable structures
- 5) Description of areas that provide natural and beneficial functions, such as wetlands, habitat, riparian areas.
- 6) Description of development, redevelopment and population trends and what the future brings for the area
- 7) Summary of the impact of each hazard on the community's economy and tax base
- 8) Critical Facilities

D. Mitigation Strategy

- 1) Statement of the goals of the community's floodplain management or hazard mitigation program.
- 2) Review of possible activities:
- 3) Preventive activities, such as zoning, stormwater management regulations, building codes and preservation of open space and the effectiveness of the programs
- 4) Property protection activities, such as acquisition, retrofitting, and insurance
- 5) Protection of natural and beneficial functions of floodplains, such as wetlands protection
- 6) Emergency services activities, such as warning and sandbagging;
- 7) Structural projects, such as dike setbacks
- 8) Public information activities, such as outreach projects and environmental education programs
- 9) Draft action plan; must have action items from at least two of six categories above

E. Plan Maintenance

- 1) The plan and later amendments will be officially adopted by the City Council.
- 2) Implement, evaluate and revise.
 - a. The community has procedures for monitoring implementation, reviewing progress, and recommending revisions to the plan in an annual evaluation report, submitted to the City Council, released to the media and made available to the public.
 - b. The evaluation report should be prepared by the same planning committee that prepared the plan.
 - c. The plan is updated every five years. The 2007 update is beginning in the fourth year because of the immediacy of the threat to the community. It will be finished in 2008 because of the complexity of the issues, but work will be needed on a constant update basis.

PLANNING PROCESS

Introduction

Uniquely located nearly 100 percent in the 100-year floodplain, residents of the City of Burlington are very aware of the possibility of flooding. The key goals of the 2008 update to the flood hazard mitigation plan component are to set 100-year Certified Levees as the goal for the City of Burlington in partnership with Dike District #12, evaluate related alternative components of the program such as options for the regulatory floodway including farmland preservation to protect overbank flow paths, Gages Slough role in mitigation, and the need for ring dike elements and coordination with Skagit County on components that affect both jurisdictions.

The rationale for this plan of action is that the urban area should have the best possible flood hazard mitigation. The community does not generally object to paying flood insurance premiums although there is considerable concern about the insurance industry and FEMA's track record of inconsistent handling of flood insurance issues that further demonstrates the need for getting credit for levees.

The worst case may be realized here because the proposed increase by FEMA of base flood elevations was initially identified at 6 feet and higher in some areas. This will devastate future economic development in the community and preclude the revitalization of historic Downtown Burlington.

In 1991, the City of Burlington made a commitment to on-going Neighborhood Planning Meetings, held in the spring and fall with each neighborhood. Issues relating to flood hazard reduction planning were identified early in the process and have been incorporated into the City of Burlington's adopted Comprehensive Plan, through an extended public involvement process. With the adoption of the 2003 all natural hazards mitigation plan, the focus is expanded to look at other hazards including earthquake, volcano, severe storms, fire, drought, tsunami/seiche, and land movement.

This plan was first adopted in 1995 and a major update of the plan was adopted in 1999. The purpose of the plan is to take the goals and objectives specified in the Comprehensive Plan and refine them into an action plan that will be implemented over time. There has been substantial progress in implementing the 1999 action plan, and it is now timely to add new projects and to update the status of ongoing projects and programs. Another element of the 2003 update of the plan was to incorporate the Burlington Evacuation Plan into the flood disaster preparedness plans that exist including the Skagit County Disaster Plan and the Dike District #12 guidelines with specifics that are tailored to the conditions of the City of Burlington.

This plan also identifies the potential hazard to Burlington of each of the other natural hazards, makes a determination about the vulnerability of the community, and recommends additional actions to mitigate those identified.

Plan Review Process

Because Burlington is a participant in a multi-jurisdictional approach to developing the All Natural Hazards Mitigation Plan, the city has been actively involved in designing and implementing the process, as outlined in the Introduction.

The Multi-jurisdictional plan that includes the City of Burlington's plan element was developed through an exhaustive process. The draft plan is circulated to all agencies with jurisdiction and agencies located in the area, along with all special purpose districts. Of particular concern to Burlington are the Skagit Department of Emergency Management, Corps of Engineers, the State Department of Ecology, the Federal Emergency Management Agency, Skagit County, Mount Vernon, Sedro-Woolley, Drainage Districts #14 and #19, and Dike District #12, and Fire District #6.

The plan is reviewed by the City's Flood and Natural Hazard Mitigation Technical Committee, consisting of Skagit County's flood engineer, Dike District #12 Commissioners, the Department of Emergency Management, Search and Rescue, the Fire Chief, the Police Chief, the Building Official, the City Engineer and the Planning Director. This committee is responsible for development of the early warning, preparedness and evacuation plan specifically tailored to the City of Burlington. See Appendix C. Each year, the committee reviews the Action Plan and evaluates progress as part of the reporting process, both to the community and to the Community Rating System program. In 2002, the Flood Emergency Plan was updated to add the Evacuation Plan. This work will continue, even if the process for annual reporting on the Multi-Jurisdictional Plan remains with the Planning Committee established for the program, due to the unique needs and issues in the community.

Availability of the document for public review is published in the local papers and the city's monthly Planning and Land Use Bulletin, posted in the Library and City Hall. The plan is reviewed by the on going precinct based Neighborhood Planning Committees.

Following revision of the plan to incorporate comments received during the review period; there are two public hearings, one before the Planning Commission and one before the City Council.

Plan Implementation Process

Funding for plan implementation is integrated in city's overall Capital Improvement Plan and in the individual budgets of each participating department. It is an integral part of the city's work program and separate funding is not necessary. Today, diverse responsibilities are managed by each responsible department. Examples include management of the Drainage Utility, development and implementation of the Gages Slough Management Plan, maintenance of the city's drainage system, planning for street closures and evacuation routes and acquiring equipment needed for the operation.

Prioritization of Action Items

The City of Burlington operates under the requirements of the Washington State Growth Management Act. City government format is a strong mayor with council. City staff evaluates actions based on community needs as expressed in the Growth Management Act and the various comprehensive plans adopted by the city council. Staff prepares recommendations for specific actions to the council for consideration. Council weighs the input from staff and citizens before making any decision.

Before an action may proceed there must be a demonstrated need and funding must be secured. When funding is available and approval of council is given, the project is included in the annual budget. Need for an action to proceed may be determined in a variety of ways including but not limited to: action items identified in adopted plans, cost benefit analysis, necessary service, emergency, directive from state or federal agency, safety or other benefit to the community. For planning purposes projects are evaluated and included in the annual update of the 6-year capital improvement plan. Many projects in the capital facilities plan are dependent on outside funding. Possible sources of funding are the general fund, capital improvement funds, utility reserves, local improvement districts, grant funding from a variety of sources including but not limited to private agencies, economic development organizations, state agencies, federal agencies and philanthropic sources. Other sources of funding may, from time to time, become available for specified actions that may or may not be included in the community planning process.

Appendix B

Current studies on Hydrology and Hydraulics

1. Skagit River Basin Hydrology Report Existing Conditions prepared by Pacific International Engineering, October 2008
2. Skagit River Basin, Washington Revised Flood Insurance Study Hydrology Summary Draft, May 2008, U.S. Army Corps of Engineers for Federal Emergency Management Agency
3. Skagit River Basin, Washington Revised Flood Insurance Study Hydraulics Summary, May 2008, U.S. Army Corps of Engineers for Federal Emergency Management Agency
4. Re-evaluation of the Magnitude of Historic Floods on the Skagit River near Concrete, Final Report October 2008, Northwest Hydraulics Consultants for Skagit County Department of Public Works
5. Skagit River Flood Elevations and Flood Frequency Data presentation for NORMFA meeting 2008 by Chal Martin, P.E. and Albert Liou, P.E.
6. Microscopical Studies of Concrete WA Historical Flood Investigation by WJE Associates, Inc.

Skagit River Basin Hydrology Report Existing Conditions

October 2008

Prepared For:

**City of Burlington
City of Mount Vernon
Dike, Drainage and Irrigation District 12
Dike District 1**

By:

 **PACIFIC
INTERNATIONAL
ENGINEERING ^{PLLC}**

Table of Contents

1.0	Summary	1
2.0	Skagit River Watershed Characteristics	5
2.1	Topography.....	6
2.2	Geology.....	6
2.3	Sediment.....	7
2.4	Climate	7
2.4.1	Temperature.....	8
2.4.2	Precipitation	8
2.4.3	Snowfall.....	8
2.4.4	Wind	9
2.5	Channel Characteristics.....	9
2.5.1	International Border to Gorge Dam	9
2.5.2	Gorge Dam to Newhalem.....	9
2.5.3	Newhalem to Concrete.....	10
2.5.4	Concrete to Mount Vernon	10
2.6	Streamflow Characteristics	10
2.7	Floods	11
2.7.1	Flood Runoff from Uncontrolled Watersheds	12
2.7.2	November 1949 Flood.....	13
2.7.3	February 1951 Flood.....	13
2.7.4	November 1990 Floods.....	13
2.7.5	November 1995 Flood.....	14
2.7.6	October 2003 Floods.....	15
3.0	Flood Frequency Analysis for Unregulated Flows at Concrete.....	17
3.1	Unregulated Systematic Flow Data (WY 1925–2008) in the Skagit River at Concrete	17
3.1.1	Unregulated Flow Data for WY 1944–2007 Estimated by the Corps.....	20
3.1.2	Unregulated Flow Data for WY 1925–1943 Estimated by the Corps.....	20
3.1.3	Unregulated Flow Data Estimated by PI Engineering.....	21
3.2	Peak Flow Data for the Four Historical Floods of 1897, 1909, 1917, and 1921	22
3.2.1	Background	22
3.2.2	Correlation with Flows in Sedro-Woolley	25

3.2.3	Historical Flood Marks in Lyman – Hamilton Area.....	27
3.2.4	Hydraulic Analysis Using Smith House Flood Marks	32
3.2.5	Hydraulic Analysis using Stewart Surveyed Flood Marks in Concrete to Estimate 1917 and 1921 Flood Peak Discharges.....	35
3.2.6	Datum of Stewart-surveyed HWMs.....	48
3.2.7	Forensic Investigation of Crofoot Residences for Historical Flood Marks	49
3.2.8	Selected Literature Review	53
3.2.9	Estimates of 1897 and 1909 Flood Peak Discharges Using Stewart’s Flood Marks Downstream of the Dalles.....	53
3.2.10	Estimates of Unregulated One-Day Flows for the Four Historical Floods	56
3.3	Flood Frequency Analysis for Unregulated Annual Peak and One-Day Flows in the Skagit River near Concrete	57
4.0	Synthetic Flood Hydrographs at Concrete	61
4.1	Development of Unregulated Synthetic Flood Hydrographs	61
4.2	Development of Regulated Synthetic Flood Hydrographs	64
5.0	Synthetic Flood Hydrographs at Mount Vernon	67
5.1	Local Inflows below Concrete	67
5.2	Routing of Regulated Flood Hydrographs below Concrete	68
5.3	Flood Frequency Curves at Mount Vernon.....	70
6.0	List of References	73

Appendices

Appendix A	Hydraulic Analysis – Smith House Flood Stages
Appendix B	Output of the PEAKFQ Run for Unregulated Peak and One-Day Flows in the Skagit River near Concrete
Appendix C	April 1, 2005 PI Engineering Draft Technical Memorandum – Skagit River Basin Historical Flood Modeling - Hydrology
Appendix D	November 29, 2004 PI Engineering Draft Technical Memorandum – Skagit River Basin Historical Flood Modeling - Hydraulics

Appendix E	Output of the PEAKFQ Runs for Observed Regulated Peak and One-Day Flows in the Skagit River near Concrete
Appendix F	Regulated and Unregulated Flood Hydrographs at Selected Locations in the Upper Skagit River Basin for Four Synthetic Flood Events Routed by HEC-5 and HEC-RAS
Appendix G	Regulated Flood Hydrographs at Concrete, Sedro-Woolley, and Mount Vernon for Four Synthetic Flood Events Routed by HEC-RAS
Appendix H	Output of the PEAKFQ Runs for Observed Regulated Peak and One-Day Flows in the Skagit River near Mount Vernon
Appendix I	Review of Selected Historical Literature

List of Figures

Figure 1.	Skagit River Basin.....	3
Figure 2.	Historical Flood Marks in Lyman-Hamilton Area.....	29
Figure 3.	Smith House in Hamilton, undated photograph of the 1909, 1917, or 1921 flood event (Hamilton Museum archives).....	33
Figure 4.	Interior wall cavity, Smith House, 2006.....	34
Figure 5.	HEC-RAS cross-section location map for Concrete reach of the Skagit and Baker Rivers.....	37
Figure 6.	October 2003 Flood – Jenkins House at 7752 South Dillard (RM. 56.18) in Concrete. Photo provided by Allen Jenkins.....	40
Figure 7.	Skagit River 2003 flood high water marks near Concrete surveyed in summer 2004 by USGS. Notes: XS6 (RM 54.15) is the current gage site. Data provided by USGS.....	40
Figure 8.	Corps 1911 survey map in Concrete area.....	43
Figure 9.	Comparison of 1911 and 2008 surveyed Skagit River channel bottom profiles in Concrete reach.....	45
Figure 10.	Skagit River flood stage-discharge curves at old Wolfe residence in Concrete.....	45
Figure 11.	HEC-RAS modeled flood profiles in Concrete reach of the Skagit and Baker Rivers.....	47
Figure 12.	Ripple House #1, parcel #70749.....	51
Figure 13.	Ripple House #2, parcel #P70748. First floor elevation 184.96. Annotated photo showing with exterior siding removed for inspection of interior wall cavity.....	52
Figure 14.	Skagit River flood stage-discharge curves at Kemmerick and Savage Ranches near Birdsvew.....	55
Figure 15.	Regression curve of peak to one-day flow for the flood events unregulated by the Corps.....	56

Figure 16.	The unregulated peak flow frequency curve for the Skagit River near Concrete, and the confidence band together with all data used in the frequency analysis at Concrete	58
Figure 17.	The unregulated one-day flow frequency curve and the confidence band together with all data used in the frequency analysis at Concrete	59
Figure 18.	Skagit River HEC-RAS model routing reaches	61
Figure 19.	Flood frequency curve for unregulated peak discharges at Concrete, compared with the HEC-RAS simulated peak flows at Concrete for the 10-, 50-, 100-, and 500-year synthetic events	63
Figure 20.	Flood frequency curve for unregulated one-day discharges at Concrete, compared with the HEC-RAS simulated one-day flows at Concrete for the 10-, 50-, 100-, and 500-year synthetic events	64
Figure 21.	Flood frequency curve for regulated peak discharges observed by USGS at Concrete, compared with the HEC-RAS simulated regulated peak flows at Concrete for the 10-, 50-, 100-, and 500-year synthetic events	65
Figure 22.	Flood frequency curve for regulated one-day discharges observed by USGS at Concrete, compared with the HEC-RAS simulated regulated one-day flows at Concrete for the 10-, 50-, 100-, and 500-year synthetic events	66
Figure 23.	Regression of regulated peak flows observed by USGS at Concrete and Mount Vernon, compared with the HEC-RAS simulated peak values for the 10-, 50-, 100-, and 500-year synthetic events	69
Figure 24.	Regression of the regulated one-day flows observed by USGS at Concrete and Mount Vernon, compared with the HEC-RAS simulated one-day values for the 10-, 50-, 100-, and 500-year synthetic events	70
Figure 25.	Flood frequency curve for regulated peak discharges observed by USGS at Mount Vernon, compared with the HEC-RAS simulated peak flows at Mount Vernon for the 10-, 50-, 100-, and 500-year synthetic events ..	71
Figure 26.	Flood frequency curves for regulated one-day discharges observed by USGS at Mount Vernon, compared with the HEC-RAS simulated one-day flows at Mount Vernon for the 10-, 50-, 100-, and 500-year synthetic events	72

List of Tables

Table 1	Annual peak and one-day discharge data at the USGS Gage 12194000 - Skagit River near Concrete ..	17
---------	--	----

Table 2	USGS estimated peak stages and discharges of Skagit River near Concrete for four historical floods (Drainage Area = 2,700 sq. mi.)	23
Table 3	Stewart and USGS peak discharge estimates for historical floods at Sedro-Woolley	25
Table 4	Comparison of Stewart's peak discharge estimates (cfs) for four historical floods in the Skagit River at Concrete and Sedro-Woolley	26
Table 5	Comparison of Modeled and Observed 2003 Flood Elevations (NGVD-29) in Concrete.....	41
Table 6	Estimated unregulated peak and one-day discharges for four historical floods in the Skagit River near Concrete	57
Table 7	Unregulated synthetic flood one-day coincident flows (cfs) for upper Skagit River subbasins.....	62
Table 8	Unregulated synthetic flood one-day coincident flows (cfs) for lower Skagit River subbasins	68
Table 9	Peak and one-day flows (cfs) at Concrete, Sedro-Woolley and Mount Vernon for regulated synthetic floods.....	68

1.0 Summary

This report presents an update of Skagit River hydrology conducted by Pacific International Engineering (PI Engineering) under an Agreement for Engineering Services authorized in June 2007 by the City of Burlington. The technical work pursuant to this Agreement is funded through a cost-share partnership between the City of Burlington, the City of Mount Vernon, Dike, Drainage, and Irrigation District 12, and Dike District 1. The City of Burlington is administrative lead agency. The information and results of the analyses presented herein are intended for use in the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS).

The hydrology presented in this report updates the Skagit River flood hydrology contained in the December 2005 report prepared by PI Engineering for Skagit County, entitled "Hydrology and Hydraulics, Skagit River Flood Basin – Existing Conditions" (PI Engineering 2005). The river's hydrology has been the subject of measurement and study for over 85 years, and predictions of flood behavior have been revisited periodically in the light of a growing body of recorded data. PI Engineering has, over the last six years, conducted analyses of the available data, and has been actively in discussion with other consultants and the agencies involved.

The purpose of this report is to determine the flood frequency and synthetic flood hydrographs for the highly developed floodplain areas of the Skagit River basin from Sedro-Woolley downstream to the confluences of the North and South Forks of the Skagit River with Puget Sound (Figure 1). This report describes the analyses performed to make those determinations with the highest degree of confidence and presents peak flows and flood hydrographs for the 10-, 50-, 100-, and 500-year events that meet the requirements for the Skagit River FIS in accordance with the current FEMA guidelines (FEMA 2003).

Hydrologic studies have covered the entire Skagit River basin with an emphasis given to the lower basin from Concrete downstream to Puget Sound. Above this stretch of river are the Ross, Gorge and Diablo Dams and Seattle City Light hydroelectric plants on the main stem of the Skagit, and Puget Sound Energy's hydroelectric development on the Baker River, a tributary of the Skagit with its confluence at Concrete. Since their completion, these hydroelectric facilities have provided regulation to the flow in the Skagit in accordance with agreements since 1954 and 1980 respectively. Prior to these dates, the presence of the facilities contributed to some regulation of the flows, the extent of which cannot be determined with exactitude.

Prior to 1925, there are no stream gage records on the Skagit River at Concrete. Earlier records are available for gages at Sedro-Woolley, and on tributary streams including the Sauk River and Baker River, as well as stage readings and anecdotal reports of high water observed during high-flow events. In the three decades before the Concrete gage was installed, and before the construction of the hydroelectric developments, high flows caused flooding on the Skagit, notably in 1897, 1909, 1917, and 1921. James E. Stewart, of the U.S. Geological Survey, set out to collect and analyze observations of these major flood events and used two engineering methods available at the time to estimate discharges of these events (Stewart 1923).

Stewart's early work was not revisited until the 1950s, documented in USGS memoranda, and was finally published as USGS Water Supply Paper 1527 in 1961. In spite of the fact that Stewart had access only to limited amounts of historical data and could only roughly estimate the flood discharges, his study was a valuable contribution to codifying flood expectations for the Skagit River. Recent high-flow events in 1990, 1995, 2003, and 2006, have lent urgency to the need for refinement of hydrologic studies of the Skagit River, particularly as they affect development and investment in the region's urbanizing areas.

It is consistent with FEMA's *Guidelines and Specifications for Flood Hazard Mapping* to update estimates of flood discharge frequency as the length of gage records increases. There are now over 80 years of records at the Concrete gage, supplemented by the limited observations and estimates of the "historical" floods.

The four historical floods included in Stewart's study have very significant effects on the FIS and the flood maps. Consistent with FEMA guidelines to use the best quality data possible, PI Engineering for the 2005 flood hydrology study used the most up-to-date HEC-RAS modeling method, in conjunction with the use of the USGS published water surface elevations at Concrete, to estimate these four historical flood discharges. Recent detailed review of Stewart's 1922-23 field survey notes revealed that there is no scientific evidence to support the published flood elevations at the current gage. This finding invalidates the historical flood estimates based on the published flood elevations. Also, this review further revealed that useful historical flood elevations in the Concrete to Hamilton area are available from Stewart's survey notes. Additional new data, including flood marks along the old road and railroad in the Hamilton-Lyman floodplain, and a finding of the location of the old Wolfe residence in Concrete where Stewart surveyed the 1917 and 1921 flood elevations, lent further support to use Stewart's highwater marks in conjunction with the use of the HEC-RAS model to provide the best scientific estimates for the 1897, 1909, 1917, and 1921 floods.

Data for these historic events are combined with data sets developed by the Corps and PI Engineering to compile a record covering 84 years of unregulated systematic peaks and 4 years of unregulated historical peaks for frequency analysis. The analysis results in a prediction of 240,800 cfs as the unregulated peak flow at the Concrete gage for a 100-year flood. Using similar data sets, values are also derived for unregulated one-day flows at Concrete. Using synthetic hydrographs originally developed by the Corps, and the HEC-RAS and HEC-5 models originally developed by the Corps, runs were conducted routing the floods through the Ross/Diablo/Gorge and Baker Dams storage regulation and downstream Skagit Valley to Puget Sound. This enabled regulated flood peaks and hydrographs reflecting the existing basin conditions, to be developed at the location of the highly developed floodplain areas downstream of Sedro-Woolley.



U.S. Army Corps of Engineers
Seattle District

Draft
SKAGIT RIVER BASIN, WASHINGTON
REVISED FLOOD INSURANCE STUDY
HYDROLOGY SUMMARY



SKAGIT COUNTY, WA

Prepared For: Federal Emergency Management Agency

1 MAY 2008

Table of Contents

REVISIONS	5
AUTHORITY	5
INTRODUCTION	5
1.0 BACKGROUND	6
1.1 Skagit River Flood Damage Reduction Study Background	6
1.2 Purpose of Documentation	6
1.3 Study Area	6
2.0 General Basin Characteristics	7
2.1 Topography	7
2.2 Geology	10
2.3 Sediment	10
2.4 Climate	11
2.4.1. Temperature	11
Climatological normals based on record period 1971-2000.	14
2.4.2. Precipitation	15
2.4.3. Snowfall	15
2.4.4. Wind	15
2.4.5. Storms	17
2.4.5.1. November 1909 Storm	17
2.4.5.2. November 9-12 and 21-25, 1990 Storms	17
2.4.5.3. November 27-30, 1995 Storm	19
2.4.5.4. October 16-21 2003 Storm	19
2.4.6. Channel Characteristics	21
2.4.6.1 International Border to Gorge Dam	21
2.4.6.2. Gorge Dam to Newhalem.	21
2.4.6.3. Newhalem to Concrete	21
2.4.6.4. Concrete to Mount Vernon	21
2.4.7. Streamflow Characteristics	22
2.4.8 Streamgage Stations	24
2.4.9. Floods	24
2.4.9.1. Flood Runoff From Uncontrolled Watersheds	26
2.4.9.2. November 1949 Flood	27
2.4.9.3. February 1951 Flood	27
2.4.9.4. November 1990 Floods	27
2.4.9.5. November 1995 Flood	28
2.4.9.6. October 2003 Floods	29
3.0 Hydrologic Study of the Skagit River Basin	29
3.1 Upper Skagit River Basin Above Concrete, WA to Ross Dam	29
3.2 Baker River	30
3.3 Sauk River	33
3.4 Cascade River and Local Flow from Marblemount to Concrete	34

3.5	Local Flow from Newhalem to Marblemount	35
3.6	Thunder Creek and Local Flow from Ross Dam to Newhalem	35
3.7	Skagit River Above Ross Dam	36
4.0	<i>Skagit River near Concrete Frequency Analysis</i>	37
4.1	Developing a Consistent Record	37
4.1.1	Methodology Used To Estimate Unregulated Peak Annual Discharge from Regulated Discharges For The Skagit River Near Concrete	38
4.1.1.1	Methodology Used to Estimate the Effects of Regulation from the Skagit Project	40
4.1.1.2	Methodology Used to Estimate the Effects of Regulation from the Baker River Project	42
4.1.1.3	Estimated Unregulated Peak Annual 1-day Discharges in the Skagit River at Concrete	43
4.1.2	Determining the Relationship between Historic 1-day Flows and Historic Peak Flows	44
4.2	Winter Flood Frequency Curve	45
4.2.1	Computed Flows without the Expected Flow Adjustment	45
4.3	Hypothetical Unregulated Hydrographs for Skagit River near Concrete	45
4.4	Regulated Frequency Curve at Concrete	46
4.4.1	Data Available with Existing Flood Control Operation	46
4.4.2	Development of Regulated Lower Frequency Events	47
4.4.2.1	Unregulated Skagit River near Concrete to Upper Basin Flow Regressions	47
4.4.2.2	Development of Hypothetical Hydrographs for Upper Basins	47
4.4.2.3	Determining of Low Frequency Regulated Peak Flows for Skagit River near Concrete	49
4.4.2.4	Detail of Methods to Model Existing Flood Control Regulation	49
4.4.2.4.1	Reservoir Flood Operation	50
4.4.2.4.2	Flood Regulation	51
4.4.2.4.3	Flood Regulation Simulation	51
4.4.2.5	Regulated Frequency Curve for Skagit River near Concrete	52
4.4.3	Confidence Limits for the Regulated Frequency Curve at Concrete	53
5.0	<i>Lower Skagit River Basin from Concrete, WA to Mouths of the North and South Forks of the Skagit River</i>	53
5.1	Local Flow from Concrete to Sedro-Woolley	54
5.2	Nookachamps Creek	56
5.3	Development of Hypothetical Hydrographs for Lower Basin	57
5.4	Timing of Lower Basin Flows	57
6.0	<i>Hydrologic Results</i>	57
7.0	<i>Limits of Downstream Flood Protection</i>	58
	<i>References</i>	60
	<i>APPENDIX A</i>	61

List of Tables

TABLE 1 - SUMMARY OF CLIMATOLOGICAL DATA (STANDARD UNITS)	13
TABLE 2 - NORMAL MONTHLY MEAN TEMPERATURE DATA (°F)	13
TABLE 3 - NORMAL MONTHLY MEAN PRECIPITATION DATA (INCHES)	14

TABLE 4 – PRECIPITATION DURING THE NOVEMBER 8-11, 1990 STORM (INCHES).....	18
TABLE 5 – PRECIPITATION DURING THE NOVEMBER 21-25, 1990 EVENT.....	18
TABLE 6 - CHANGE IN SNOW-WATER EQUIVALENT FOR THE NOVEMBER 27-30, 1995 STORM.....	19
TABLE 7 - SUMMARY OF STREAMFLOW DATA IN CFS 1/.....	23
TABLE 8 - MEAN MONTHLY STREAMFLOWS (CFS).....	23
TABLE 9 - SUMMARY OF HISTORICAL FLOODS (CFS).....	25
TABLE 10 - UPPER BAKER FLOOD CONTROL STORAGE REQUIREMENTS.....	32
TABLE 11 – RATIO OF LOWER BAKER INFLOWS TO UPPER BAKER INFLOWS	33
TABLE 12 - SAUK RIVER CONTRIBUTION TO SKAGIT RIVER FLOODING.....	33
TABLE 13 – COMPARISON OF RUNOFF PER SQUARE MILE OF DRAINAGE AREA BETWEEN MARBLEMOUNT TO CONCRETE (MMCC) LOCAL AND CASCADE RIVER.....	35
TABLE 14 – RATIO OF ROSS DAM TO NEWHALEM LOCAL TO THUNDER CREEK.....	36
TABLE 15 - ROSS FLOOD CONTROL STORAGE REQUIREMENTS.....	37
TABLE 16 - HISTORICAL FLOODS FOR THE SKAGIT RIVER AT CONCRETE	38
TABLE 17 – TRIBUTARY TIME OF PEAK IN HOURS BEFORE SKAGIT RIVER NEAR CONCRETE PEAKS	48
TABLE 18 – SCALED UPPER BASIN 1-DAY COINCIDENT FLOWS (IN CFS) DERIVED FROM REGRESSION WITH UNREGULATED SKAGIT RIVER NEAR CONCRETE 1-DAY COMPUTED PEAK FLOWS.....	49
TABLE 19 - SYNOPSIS OF DAM CONSTRUCTION AND FLOOD CONTROL EVENTS.....	50
TABLE 20 – CONCRETE TO SEDRO-WOOLLEY 1-DAY COINCIDENT FLOWS (IN CFS) DERIVED FROM REGRESSION EQUATIONS	56
TABLE 21 – NOOKACHAMPS 1-DAY COINCIDENT FLOWS (IN CFS) DERIVED FROM REGRESSION EQUATIONS.....	57
TABLE 22 – COMPUTED PEAK FLOWS AT CONCRETE, SEDRO-WOOLLEY, AND MOUNT VERNON GAGES	58
TABLE 23 - FLOOD CONDITIONS RELATED TO THE SKAGIT RIVER NEAR MOUNT VERNON GAGE.....	59

List of Figures

Error! No table of figures entries found.

List of Appendices

Appendix A - Flow Deregulation Methods for Skagit River near Concrete

Cover photo: Skagit River flooding at Fairhaven and Anacortes Street, Burlington, WA on 12/13/1921.

REVISIONS

This report revises the hydrology and flood frequency curves of the mainstem Skagit River in the Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FISs) for Skagit County, October 17, 1984, in the State of Washington. These studies used hydrology and flood frequency data covering through Water Year 1976. This restudy uses hydrology and flood frequency data covering through Water Year 2007 and is modified to incorporate the revisions by USGS of their derived historic flows for the flood events at the Skagit River near Concrete gage in Water Years 1898, 1910, 1918, and 1922.

AUTHORITY

The U.S. Army Corps of Engineers, (USACE), Seattle District, performed this restudy for FEMA pursuant to Interagency Agreements EMW-2002-IA-0113 - Project Order No. 5 and EMW01-IA-0244-5.

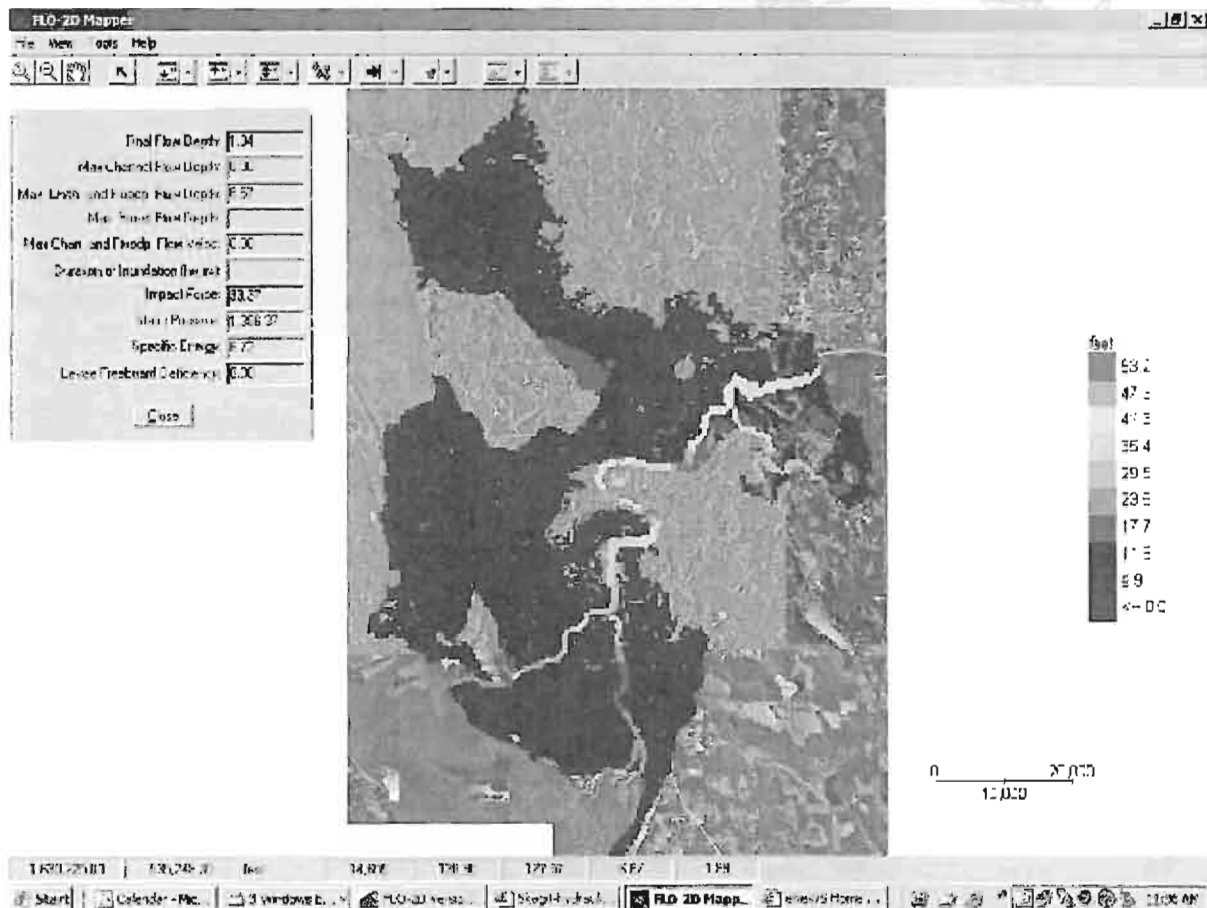
INTRODUCTION

The hydrology for this re-study is built off the hydrologic analysis that was developed as part of the Skagit River Flood Damage Reduction (FDR) Study. There are two differences between this analysis and the FDR Study. The first is that a FDR Study requires using an expected flow adjustment for the derived flows and the methodology for a FEMA Flood Insurance Study does not use this adjustment (see section 4.2.1 for a description of this adjustment). The second is that the Flood Insurance Study evaluates the 10-, 50-, 100-, and 500-year events with the main emphasis on the 100-year, whereas the FDR study requires more events to be analyzed. The following report is the FDR study report that is revised to the format necessary to present the Revised Flood Insurance Study results.



U.S. Army Corps of Engineers
Seattle District

SKAGIT RIVER BASIN, WASHINGTON REVISED FLOOD INSURANCE STUDY HYDRAULICS SUMMARY



SKAGIT COUNTY, WA

Prepared For: Federal Emergency Management Agency

1 MAY 2008

TABLE OF CONTENTS

AUTHORITY	6
INTRODUCTION	6
I. BACKGROUND	7
A. Revised Skagit River Flood Insurance Study Background.....	7
B. Skagit River Flood Damage Reduction Study Background	7
C. Purpose of Documentation.....	8
D. Study Area	8
E. Skagit River Basin	8
II. HYDRAULIC ANALYSIS METHODOLOGY	11
A. Model Extent.....	11
B. Study Approach	11
C. Floods Studied	11
D. Description of Hydraulic Models	12
1. <i>HEC-RAS Model Development</i>	12
a. Purpose of Model.....	13
b. Procedures and Process.....	13
c. Boundary Conditions	15
d. Basic Assumptions and Limitations	15
2. <i>FLO-2D Model Development</i>	16
a. Purpose of Model.....	16
b. Procedures and Process.....	16
c. Boundary Conditions	17
d. Basic Assumptions and Limitations	17
3. <i>Structures Affecting Flow</i>	18
a. Levees	18
c. Diversion/Impoundment Structures	18
4. <i>Levee Methodology</i>	19
III. MODEL CALIBRATION	29
A. Sources of Data	29
B. Datum.....	29
C. Hydrology used for Hydraulic Model Calibration.....	29
D. HEC-RAS Calibration and Validation Upstream of Sedro-Woolley	30
E. FLO-2D Channel Calibration Downstream of Sedro-Woolley	41
F. FLO-2D Overbank Calibration	46
IV. Floodway Analysis	47
V. HEC-RAS/FLO-2D Model Floodplain Results and Output.....	49
A. Mapping Datum	49
B. Mapping Description	49
C. Floodplain Flow Paths	49
D. Flood Profiles.....	49
E. Comparison of Floodplain Flow Path Profiles to Historic Floods.....	53
REFERENCES	59

LIST OF TABLES

Table 1 – Modeled Bridges on the Skagit River.....	18
Table 2 – HEC-RAS Roughness Ranges (Manning’s n values).....	31
Table 3 – October 21, 2003 Simulated vs. Observed High Water Marks	40
Table 4 – November 29, 1995 Simulated vs. Observed High Water Marks	41
Table 5 – FLO-2D 2003 Flood Calibration	42
Table 6 – FLO-2D 1995 Flood Calibration	46
Table 7 – FLO-2D Floodplain Roughness Values.....	47

LIST OF FIGURES

Figure 1 – Skagit River Basin and the Upper Study Boundary	9
Figure 2- Skagit River Stream Profiles	10
Figure 3 – Map Outlining the Downstream Modeling Efforts in the Flood Damage Reduction Study	14
Figure 4 - All Levees Intact	21
Figure 5 - All Left Bank Levees Removed with Right Bank Levees Intact	22
Figure 6 - Fir Island Levees Removed While All Other Levees Remain Intact.....	23
Figure 7 - South Fork Skagit River Right Bank Levee Removed While All Other Levees Remain Intact	24
Figure 8 - North Fork Skagit River Left Bank Levees Removed While All Other Levees Remain Intact	25
Figure 9 - Right Bank Levees on Mainstem and North Fork Skagit River Removed While All Other Levees Remain Intact	26
Figure 10 – Left Bank Levees on Mainstem and South Fork Skagit River Removed While All Other Levees Remain Intact	27
Figure 11 – Depiction of the Floodplain Scenario Location of Implementation.....	28
Figure 12 – Skagit River at Marblemount 2003 Stage – Modeled vs. Actual.....	32
Figure 13 – Sauk River 2003 Stage – Modeled vs. Actual.....	33
Figure 14 – Skagit River at Rockport 2003 Stage – Modeled vs. Actual.....	34
Figure 15 – Skagit River near Concrete 2003 Stage – Modeled vs. Actual	35
Figure 16 – Skagit River near Sedro-Woolley 2003 Stage – Modeled vs. Actual	36
Figure 17 – Skagit River at Marblemount 2003 Rating Curve – Modeled vs. Actual	37
Figure 18 – Sauk River 2003 Rating Curve – Modeled vs. Actual	38
Figure 19 – Skagit River near Concrete 2003 Rating Curve – Modeled vs. Actual.....	39
Figure 20 – October 2003 Mount Vernon Gage Stage Comparison between HEC-RAS, FLO-2D, and Observed	43
Figure 21 – Mount Vernon Rating Curve Comparison between USGS gage and FLO-2D.....	44
Figure 22 – 1995 Skagit River near Mount Vernon Stage Comparison between USGS gage, HEC-RAS, and FLO-2D	45
Figure 24 – Floodplain Flow Paths 1, 2 and 3	50
Figure 25 – Floodplain Flow Path 4	51
Figure 26 – Floodplain Flow Path 5	52
Figure 27 – December 1921 Flood at Fairhaven and Anacortes Streets	54
Figure 28 – December 1921 Flood at Fairhaven Street.....	55
Figure 29 – 1937 Aerial Photo of Mount Vernon and Burlington.....	56
Figure 30 – 2001 Aerial Photo of Mount Vernon and Burlington.....	57

Figure 31 – Conway Area in February 1951 Flood 58

LIST OF APPENDICES

Appendix A Flood Profiles

Appendix B Floodplain Maps with 100-year Base Flood Elevation, Floodway, and 500-year Floodplain

Cover photo: Example FLO-2D Output for the Lower Skagit River below Sedro-Woolley.



REVISIONS

This detailed restudy is provided to update the floodplain boundaries and floodway delineations provided in the FEMA report dated October 17, 1984 for Skagit County, Washington and Unincorporated Areas. The study scope called for the determination of the water surface profiles for the 10-, 50-, 100-, and 500-year return frequency floods and delineation of the 100- and 500-year floodplain boundaries from the Skagit River and of the 100-year regulatory floodway. Significant improvements in the modeling capability of complex floodplains such as the lower Skagit River Basin has been made since the previously published FEMA report for Skagit County (1984). The hydraulic model limits extend from river mile (RM) 78.87 on the Skagit River down to the mouths of the North and South Forks of the Skagit River as well as the lower 5.4 miles on the Sauk River and the lower 2.9 miles on the Cascade River. At this time, only the floodplain and base flood elevations for the lower basin below Sedro-Woolley, just downstream of the Highway 9 bridge, to the bays is being updated. A floodway for this lower area and floodplains and floodways for the upper basin will be developed later.

AUTHORITY

The U.S. Army Corps of Engineers, (USACE), Seattle District, performed this restudy for FEMA pursuant to Interagency Agreements EMW-2002-IA-0113 - Project Order No. 5 and EMW01-IA-0244-5.

INTRODUCTION

The hydraulics for this re-study is built off the hydraulic analysis that was developed as part of the Skagit River Flood Damage Reduction (FDR) Study. The following report will detail how this analysis was performed and how it differs from the methodology used for the FDR.

SKAGIT COUNTY DEPARTMENT OF PUBLIC WORKS



Skagit River at The Dalles looking upstream from The Dalles bridge, 7 November 2006

RE-EVALUATION OF THE MAGNITUDE OF HISTORIC FLOODS ON THE SKAGIT RIVER NEAR CONCRETE FINAL REPORT

OCTOBER 2008

nhc northwest
hydraulic
consultants

**RE-EVALUATION OF THE MAGNITUDE OF HISTORIC
FLOODS ON THE SKAGIT RIVER NEAR CONCRETE
FINAL REPORT**

Prepared for:

Skagit County Department of Public Works
1800 Continental Place
Mount Vernon, WA 98273

Prepared by:

northwest hydraulic consultants
16300 Christensen Road, Suite 350
Seattle, WA 98188-3422

30 October 2008
nhc project # 21637

CREDITS AND ACKNOWLEDGEMENTS

This report was prepared by Malcolm Leytham of Northwest Hydraulic Consultants (**nhc**). Hydraulic modeling was performed by Brad Singley and Bob Elliot also of **nhc**.

We would like to thank: Ted Perkins (USACE) for providing unregulated discharge data; Albert Liou (Pacific International Engineering) for helpful pointers in interpreting Stewart's 1922 field notes; and Larry Kunzler for his continued and much appreciated historical research.

TABLE OF CONTENTS

1.0	Introduction.....	1
2.0	Determination of 1921 High Water Elevations between Concrete and The Dalles	3
2.1	Interpretation of Concrete Herald Report.....	3
2.2	Interpretation of Stewart’s Field Notes	6
3.0	Hydraulic Modeling and Re-evaluation of 1921 Peak Discharge	10
3.1	Current Conditions	10
3.2	1921 Conditions	16
3.3	Sensitivity Runs.....	23
3.4	Assessment of Hydraulic Model Results	24
4.0	Estimation of Peak Discharges for 1897, 1909 and 1917 Floods.....	28
4.1	Flood of November 1897	28
4.2	Flood of November 1909	33
4.3	Flood of December 1917.....	33
4.4	Estimation of Peak Discharges.....	33
5.0	Estimation of 1-Day and 3-Day Historic Discharges	35
5.1	1-Day Maximum Winter Volumes.....	35
5.2	3-Day Maximum Winter Volumes.....	35
6.0	Flood Frequency Analyses.....	37
7.0	Conclusions.....	43
8.0	References.....	45

1.0 INTRODUCTION

The principal purpose of this report is to provide a re-evaluation of the magnitude of historic floods on the Skagit River near Concrete (USGS gage 12194000). The report also proposes revised unregulated flood quantiles based on our re-evaluation of historic flood magnitudes. The report has been prepared for Skagit County Public Works to submit to the Federal Emergency Management Agency, the United States Geological Survey and the United States Army Corps of Engineers, for the purpose of improving confidence in the estimates of the magnitudes of historic floods and unregulated flood quantiles.

Current estimates of design flood quantiles on the lower Skagit River are influenced to a large degree by the magnitude of historic floods which occurred in 1897, 1909, 1917 and 1921 (water years 1898, 1910, 1918 and 1922). The estimated peak discharge for the flood of 13 December 1921 is of particular importance since that estimate provides the basis for the estimated magnitudes of the other events.

The peak discharge for the 13 December 1921 flood was determined by J.E. Stewart at the location of the Skagit River near Concrete gage on the basis of indirect discharge measurements. Using various high water information, three slope-area measurements were made for a reach of the Skagit immediately below The Dalles and one contracted-opening estimate was made at The Dalles. The average of those four measurements (240,000 cfs) was published as the peak discharge.¹

High water marks for the December 1921 flood were identified by Stewart in field work conducted from mid-November 1922 through early 1923, a year after the flood. Stewart provides very few details on the nature of the high water marks in the reach below The Dalles used for the slope-area estimates. From information in his 1922/1923 field notes, the high water marks in this reach all appear to be natural indicators such as "moss scoured off of tree" (Stewart 1922/1923 field notes, page 79). There is no indication that Stewart was able to tie any high water marks in this reach into eye witness reports of flood levels. We know from experience that identification of high water marks from natural indicators one year after a flood can be quite uncertain. For example, for the same reach of the Skagit below The Dalles, the USGS had difficulty in identifying reliable high water marks from the October 2003 flood in field work conducted nine months after the event (Mastin and Kresch, 2005). In that case, the scatter in high water marks at any particular location was as much as 6 feet. We recognize that the December 1921 flood was larger than that of October 2003 and it may have left more distinct evidence of its passage. Nevertheless, uncertainty in definition of the high water marks used for

¹ Re-evaluation of the December 1921 peak discharge in 2007 (Mastin, 2007) resulted in a downward adjustment to 228,000 cfs and a corresponding reduction in the estimated magnitude of the other historic floods. This adjustment relied on an n-verification study using data from the flood of November 1949.

the slope-area estimates should be considered when evaluating the magnitude of the event and alternative means of estimating flood magnitude should be investigated where possible.

We note that neither the US Army Corps of Engineers nor FEMA have a mechanism for explicitly accounting for uncertainty in historic discharge measurements.² Further, we interpret the Corps risk-based approach to flood damage reduction (see ER1105-2-101) as requiring use of best estimates of data values rather than values which are inherently conservative. As will be shown in this report, there are strong indications that the currently published magnitudes for the historic floods are conservatively high, despite the downward adjustment made by the USGS in 2007 (Mastin, 2007).

The focus of this report is on use of high water information from the Town of Concrete to provide alternative estimates of the magnitude of the December 1921 flood (and by association the magnitudes of the earlier historic events). The approach adopted was to identify high water information for the December 1921 flood between The Dalles and Concrete and to develop a hydraulic model of this reach which could then be used to estimate the peak discharge consistent with the available high water data. Advantage is taken of a contemporary newspaper report of flooding in Concrete as well as high water measurements surveyed by Stewart, but not previously used in estimates of the December 1921 peak discharge.

² Confidence limits applied to the Corps flood frequency analyses do NOT account for uncertainty in discharge measurements.

Skagit River Flood Elevations and Flood Frequency Data

presented at

NORFMA Floodplain Meeting 2008
Tuesday, November 18, 2008

By: Chal A. Martin, P.E.
Public Works Director / City Engineer, City of Burlington

Albert Liou, P.E.
Principal, Pacific International Engineering

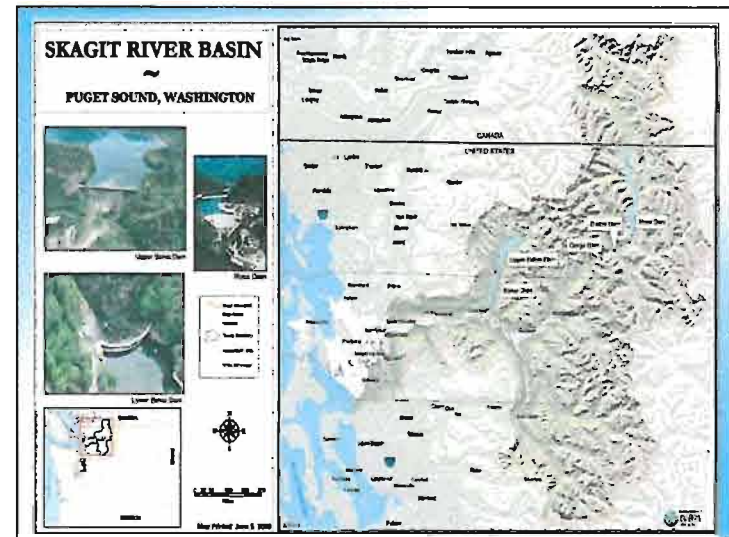


Skagit River Flood Elevations and Flood Frequency Data

presented at

NORFMA Floodplain Meeting 2008
Tuesday, November 18, 2008

By: **Chal A. Martin, P.E.**
Public Works Director / City Engineer, City of Burlington
Albert Llou, P.E.
Principal, Pacific International Engineering



Background

- Corps of Engineers began a General Investigation study in 1996
 - Skagit County the local sponsor
 - Study to be completed maybe 2015
 - County hired Pacific International Engineering in 2002 to supplement COE effort
 - PI Engineering and Corps could not agree on hydrology
 - County made policy decision to terminate PI Engineering contract in 2006

More Background

- FEMA contracted with the Corps to develop revised flood insurance maps in 2003
 - Hydrology was still an issue
- Skagit County contracted with Northwest Hydraulic Consultants in early 2006 to further study the hydrology issue
- Mount Vernon, Burlington and 2 Dike Districts contracted with PI Engineering in late 2006 to further study the hydrology issue
- COE issued revised hydrology report in May 2008
- PI Engineering issued revised hydrology report in October 2008
 - *Topic of this presentation*
- nhc issued revised hydrology report in November 2008

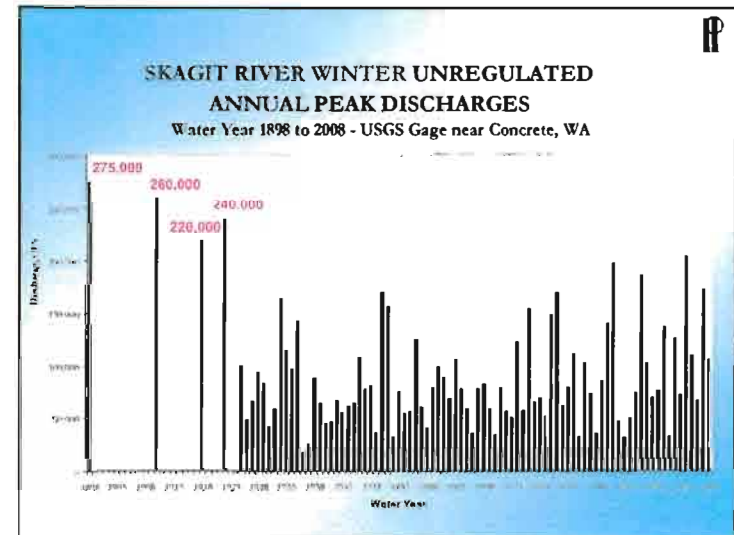
Even More Background

- Following the extensive work of James E. Stewart, a Hydraulic Engineer who studied the Skagit Basin from 1917 – 1922, a gage was installed in 1924 near Concrete and has been continuously recording river stage/discharge information since
 - 84 years of data at a stable gage site
- Stewart's work is extensively documented in his 1918 report and field notes of 1922-23



At Issue

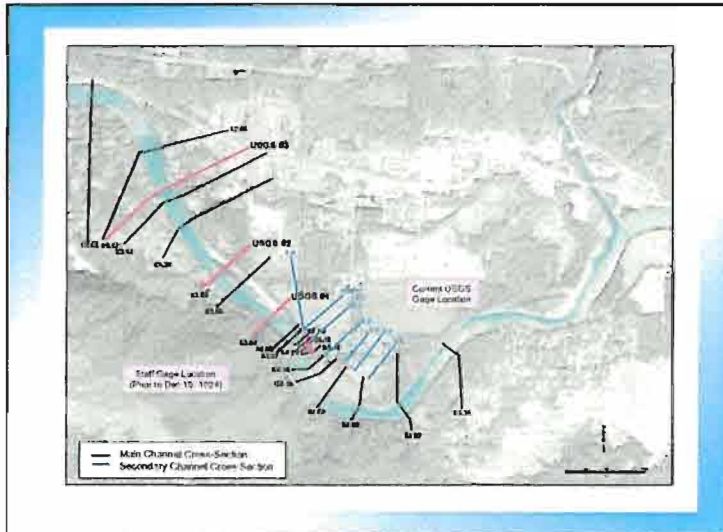
Magnitude of historic floods



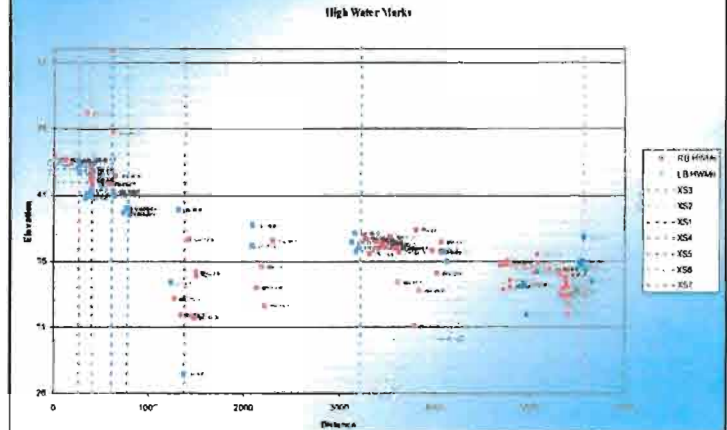
Stewart and USGS Peak Discharge Estimates for Historical Floods at Sedro-Woolley

Flood	Stewart		USGS		
	1918	1923	Rigg & Robinson	Hidaka	Bodhaine
1897	171,000	190,000	170,000	145,000	170,000
1909	169,000	220,000	190,000	175,000	200,000
1917	157,000	195,000	160,000	—	195,000
1921	—	210,000	170,000	—	210,000

(Source: Stewart 1918 & 1923 Reports, Proposed Revision of Skagit River Peaks, H.C. Rigg & W.H. Robinson, 11/16/50, Skagit River near Sedro-Woolley, Wash. Proposed revisions of historical flood peaks, F.L. Hidaka, 1/12/54, Skagit River Flood Peaks Memorandum of Review by G.L. Bodhaine, USGS, 5/13/54) Available at www.skagitriverhistory.com



2003 Main Channel High Water Marks Stewart's slope/area reach below the Dalles Surveyed (in summer 2004) by USGS





USGS Estimated Peak Stages and Discharges of Skagit River near Concrete for Four Historical Floods (Drainage Area = 2,700 sq. mi.)

Flood	Gage Height at Current Gage* as Published in 1961 (ft)	Gage Height** Estimated by Stewart in 1923*** (ft)	Discharge Estimated by Stewart in 1923*** (cfs)	Discharge Revised by USGS in 2007**** (cfs)
1897	51.1	38.4	275,000	265,000
1909	49.1	36.4	260,000	245,000
1917	45.7	33.0	220,000	210,000
1921	47.6	34.9	240,000	228,000

* Current gage datum El. 130.00 (NGVD29) at RM 54.15

** At the Upper Dalles gage installed by Stewart for his flood investigation during the winter of 1922-23. Gage Datum El. 140.89 surveyed by Stewart (Stewart's survey notes, pp. 86-87)

*** These unpublished 1923 estimates by James Stewart were documented in the 1961 U.S. Geological Survey Water Supply Paper (WSP) 1527 (USGS 1961).

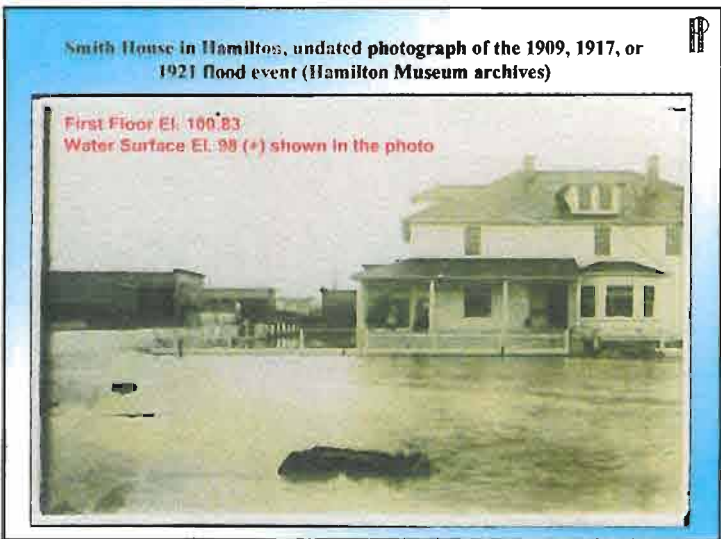
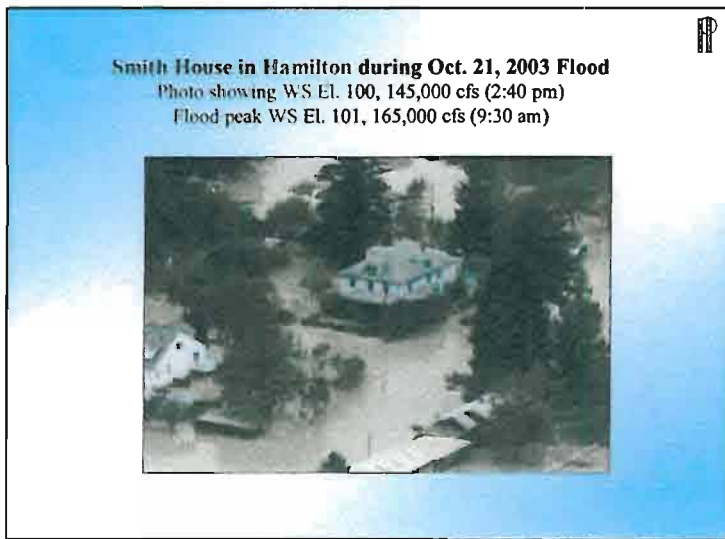
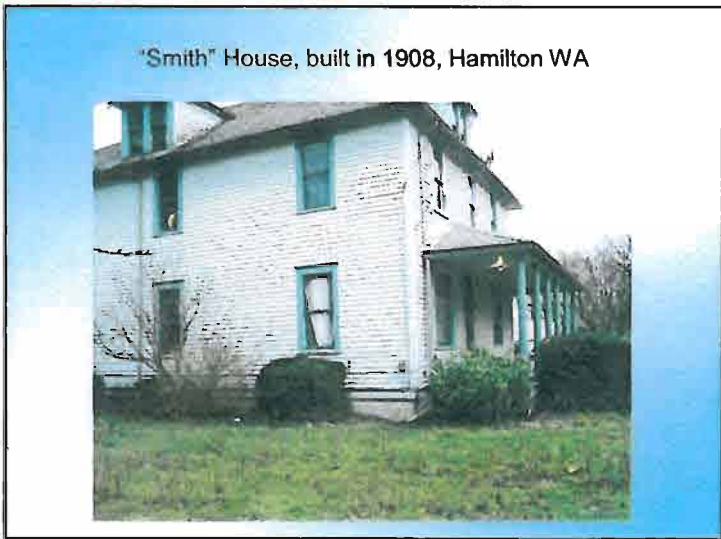
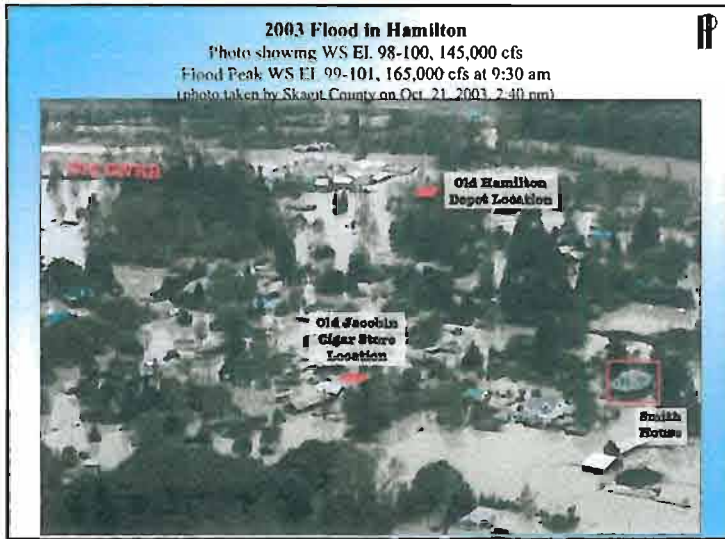
**** Revised due to Manning's "n" verification in Scientific Investigations Report 2007-0038 (USGS 2007)

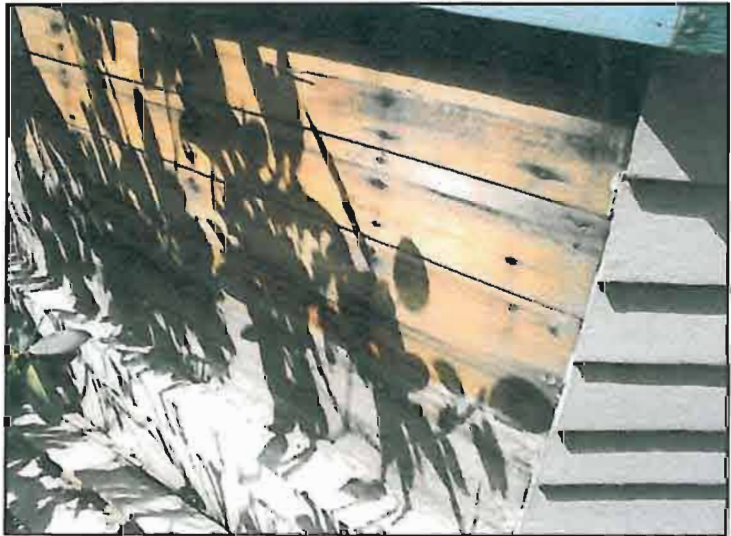
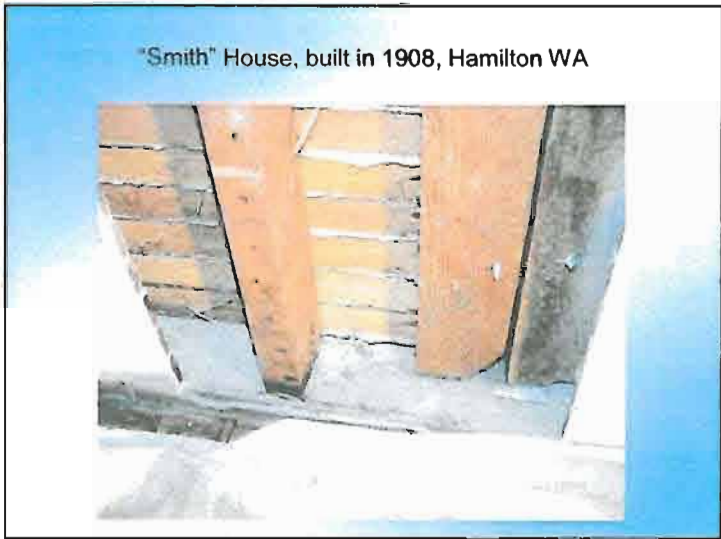
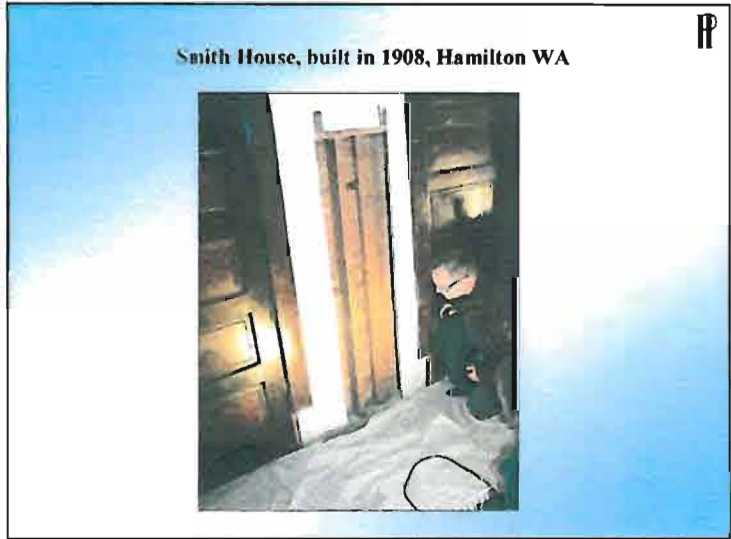
PI Engineering Approach:

Use modern hydraulic modeling techniques to assign a discharge estimate to Stewart-surveyed high water marks of the 1921 flood

At Hamilton --

- "Smith" house – constructed in 1908
– Survived floods of 1909, 1917, and 1921
- Stewart-surveyed high water marks (based on citizen interviews in 1922), and additional information documenting the 1909 flood in County records



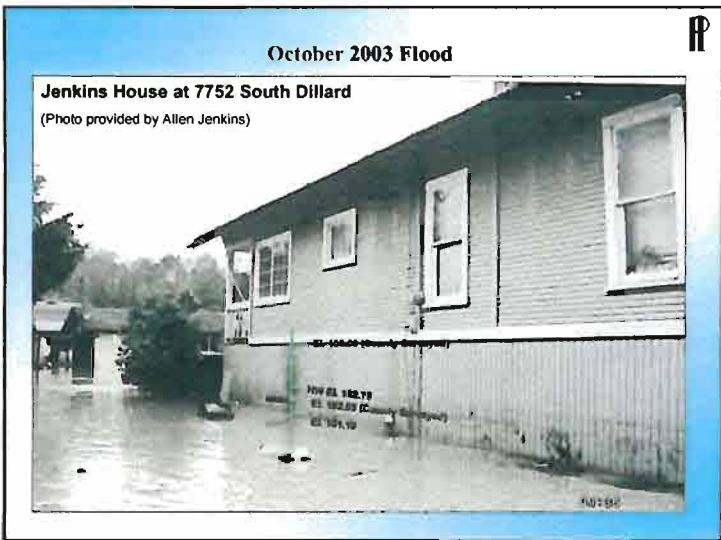


Hamilton Flood Elevations
Then and Now

Water Level in Hamilton,
A. J. Jacobin Cigar Store
And Smith House

<u>Year</u>	
1897	(no data)
1909	96.17
1917	95.62
1921	96.46
1995	101.00
2003	100.83

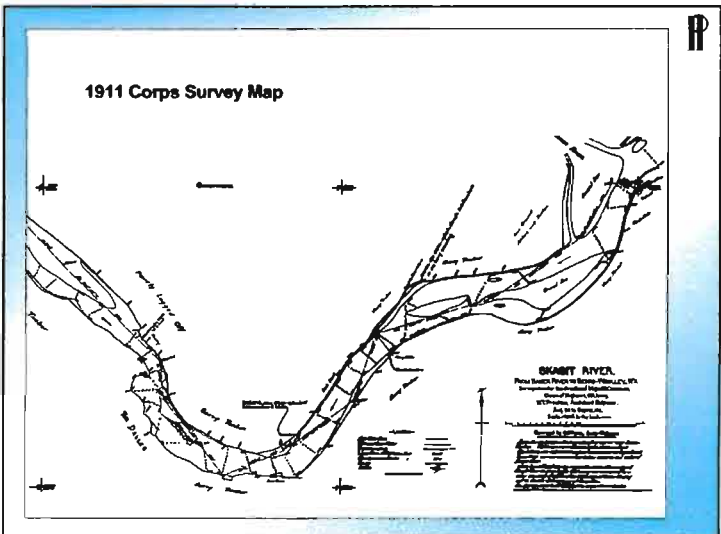
RP

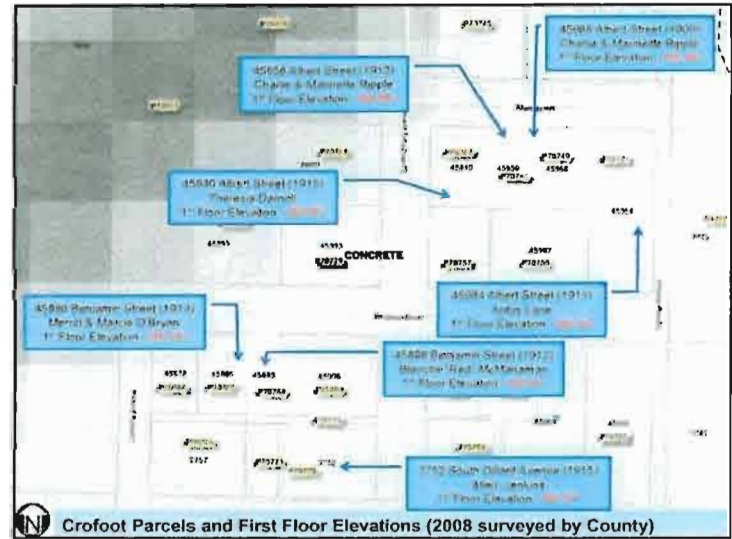
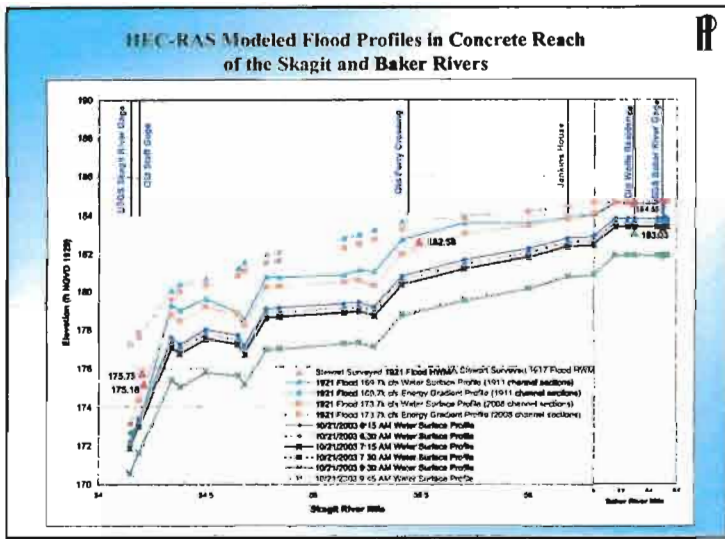
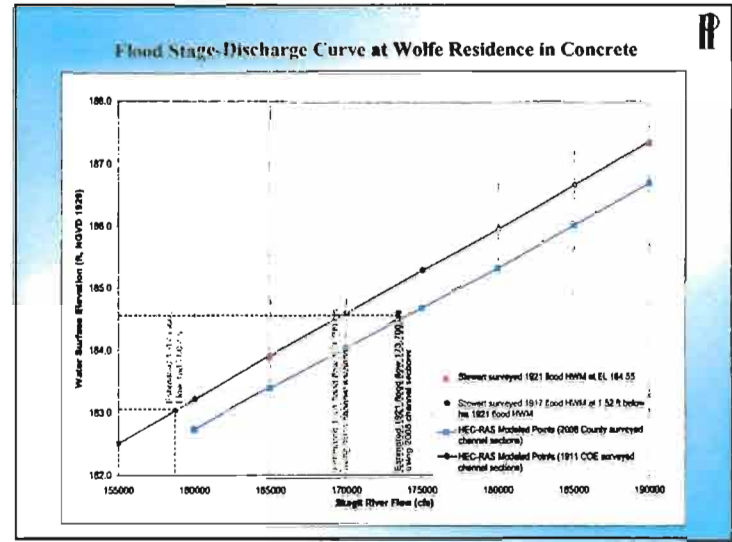
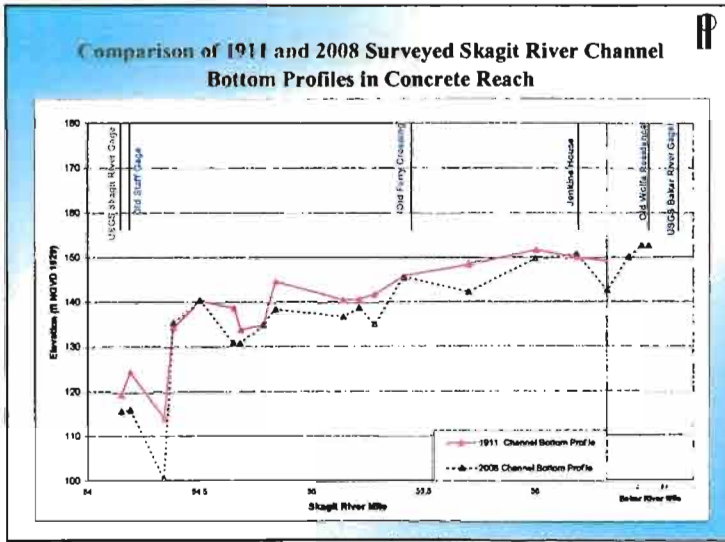


Comparison of Modeled and Observed 2003 Flood Elevations (NGVD-29)

Date of Flood	Time	Skagit River Flow* (cfs)	Baker River Flow** (cfs)	High Water Mark Location	Source of Data	Observed (ft)	Modeled (ft)	Difference (ft) Obs. - Modeled and observed Flood elev.
21-Oct-03	8:15 AM	106,466	4,647	Baker River gage	USGS gage record	183.48	183.70	0.21
21-Oct-03	8:30 AM	104,100	4,656	Riskin River gage	USGS gage record	183.48	183.60	0.02
21-Oct-03	7:15 AM	182,002	4,710	Baker River gage	USGS gage record	183.32	183.20	-0.03
21-Oct-03	7:30 AM	182,342	4,747	Baker River gage	USGS gage record	183.22	183.25	0.03
21-Oct-03	9:30 AM	180,950	4,822	Baker River gage	USGS gage record	181.77	181.70	-0.07
21-Oct-03	9:45 AM	161,538	4,822	Baker River gage	USGS gage record	181.64	181.78	0.14
21-Oct-03	8:15 AM	105,855	4,647	Jenkins House	Resident provided photo	182.75	182.78	0.03
21-Oct-03	9:30 AM	104,100	4,655	Jenkins House	Resident provided photo	182.75	182.57	-0.18
21-Oct-03	9:30 AM	180,058	4,822	Jenkins House	Resident provided photo	181.15	180.74	-0.41
21-Oct-03	9:45 AM	161,538	4,822	Jenkins House	Resident provided photo	181.15	180.83	-0.32
21-Oct-03	8:15 AM	105,855	4,647	Old staff gage at the Dalles	USGS 2004 survey	173.58	173.70	0.12
21-Oct-03	8:30 AM	104,100	4,656	Old staff gage at the Dalles	USGS 2004 survey	173.30	173.21	-0.09

*USGS provided flow data (15-minute intervals) at the Skagit River gage near Concrete
**PSE provided hourly flow data (interpolated for 15-minute intervals) below Lower Baker Dam and powerhouse





Ripple House #1, parcel #70749



Ripple House #1,
45968 Albert Street,
Crofoot Addition, Concrete



Ripple House #1 with exterior
siding removed for inspection of
interior wall cavity.
First floor elevation 185.51



Ripple House #2, parcel #P70748

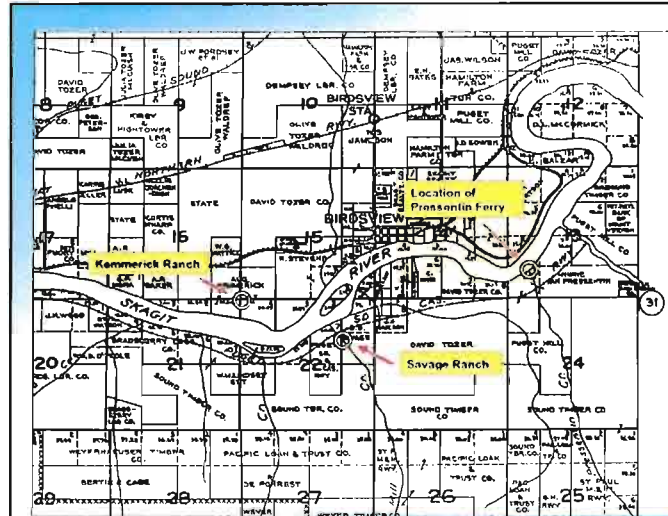
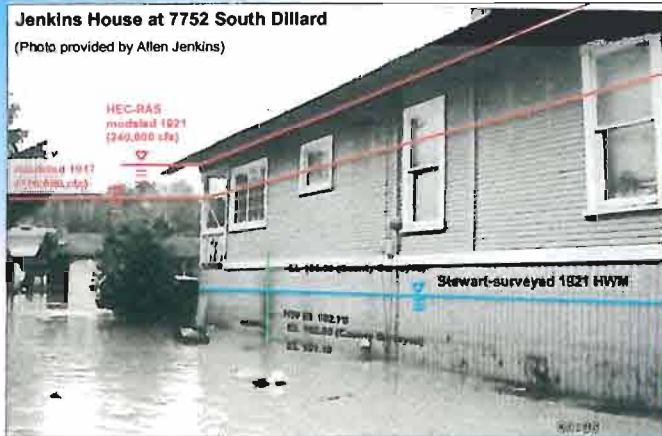
First Floor Elevation 184.96. Annotated photo showing exterior siding
removed for inspection of interior wall cavity

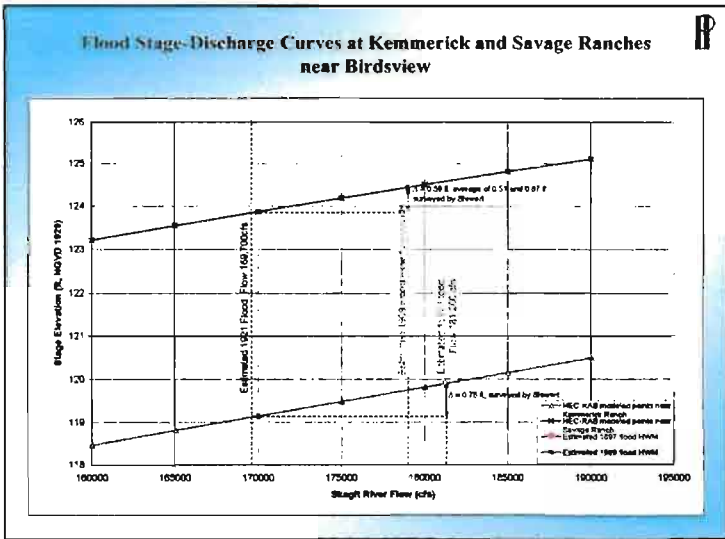


October 2003 Flood

Jenkins House at 7752 South Dillard

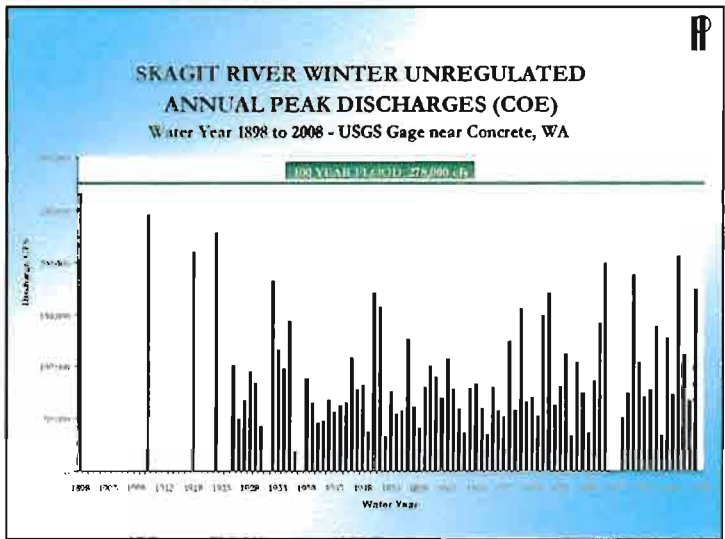
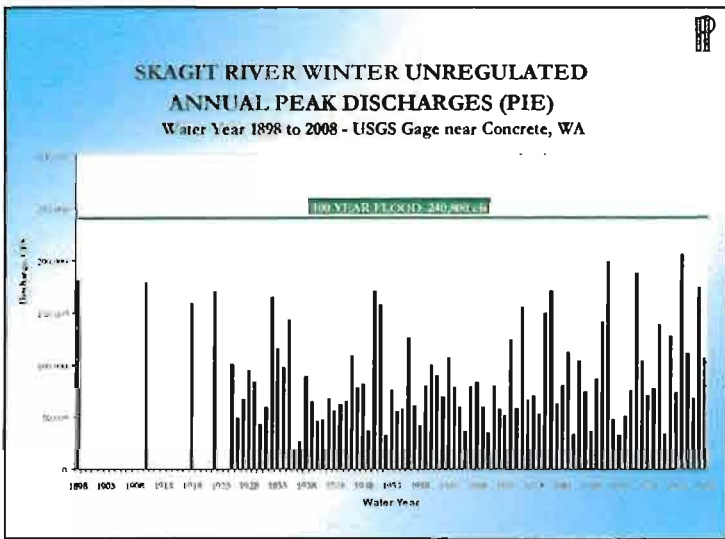
(Photo provided by Allen Jenkins)

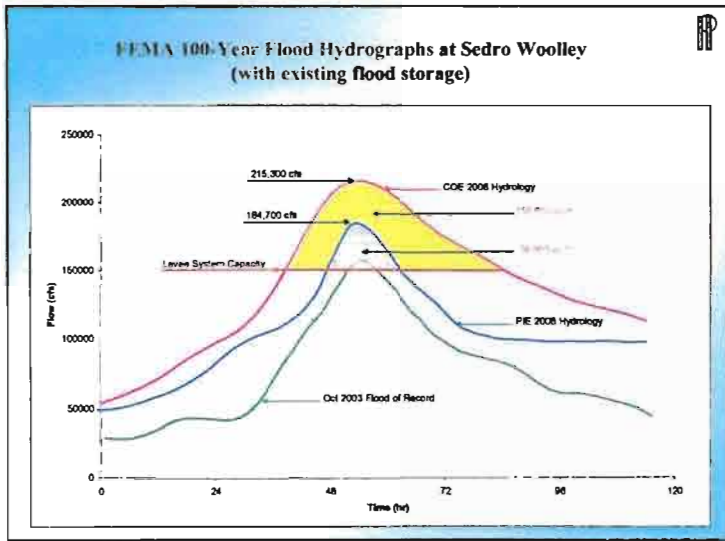




Estimated Peak Discharges of Skagit River near Concrete for Four Historical Floods (Drainage Area = 2,700 sq. mi.)

Flood	Discharge Estimated by Stewart In 1923 (cfs)	Discharge Revised by USGS in 2007 (cfs)	Discharge Modeled by PIE In 2008 (cfs)
1897	275,000	265,000	181,200
1909	260,000	245,000	179,000
1917	220,000	210,000	158,700
1921	240,000	228,000	169,700





Questions?

INTEROFFICE MEMORANDUM

Via: Email

To: Richard Dethlefs

From: Laura Powers

Date: May 14, 2008

Project: Concrete, WA Historical Flood Investigation
WJE No. 2008.0860

Subject: Microscopical Studies

Microscopical studies have been conducted on samples of wood exhibiting deposits of debris and silt deposits taken from five residences to characterize the nature of the deposits. Presented in Tables 1 through 5 are sample designations, locations, and brief descriptions of the materials observed.

Table 1 – F Samples from 612 Fairhaven Residence Taken March 19, 2008

Sample ID Figure No.	Sample Type	Location	Description
F-1 Figure 1	Wood chip	Not stated	Very small amounts of dust-size siliceous mineral grains and gray-black biological material on one side
F-2 Figure 2	Wood chip	Not stated	Locally heavy deposits of dust-size, light gray deposits and small amounts of gray-black biological material
F-3 Figure 3	Wood chip	Not stated	Scattered locally heavy deposits of dust-size light gray minerals and traces of gray-black biological material
F-4 Figure 4	Wood chip	Not stated	Small amounts of gray-black, yellow and white biological material and traces of dust-size minerals

Mineral grains examined microscopically in immersion mounts mainly consisted of quartz, feldspar, and micaceous minerals.

Table 2 – G Samples from Gifford Residence Taken April 3, 2008

Sample ID Figure No.	Sample Type	Location	Description
G-1 Figure 5	Wood chip	Board sheathing SW ext. wall opening	Moderate to locally heavy deposits of silt-size siliceous mineral grains and small amounts of spider silk, various parts, and other biological materials
G-2 Figure 6	Wood chip	Board sheathing SW ext. wall opening	Light to moderate deposits of siliceous mineral grains and biological materials
G-3 Figure 7	Wood chip	Board sheathing SW ext. wall opening	Heavy coating a caulk-like material on one side, light deposits and biological material on another side
G-4 Figure 8	Wood chip	Board sheathing SW ext. wall opening	Light deposits of biological materials, traces of silt-size siliceous mineral grains

Sample ID Figure No.	Sample Type	Location	Description
G-5 Figure 9	Wood chip	Board sheathing SW ext. wall opening	Light to moderate deposits of silt-size siliceous mineral grains, small amounts of spider silk and other biological materials
G-6 Figure 10	Wood chip	Board sheathing SW ext. wall opening	Light to moderate deposits of silt-size siliceous mineral grains, small amounts of insect silk, rodent pellets, and other biological materials
G-7 Figure 11	Wood chip	Board sheathing SW ext. wall opening	Moderate to locally heavy deposits of silt-size siliceous mineral grains, small amounts of biological materials
G-8 Figure 12	Wood chip	Board sheathing SW ext. wall opening	Light deposits of silt-size siliceous mineral grains, small amounts of biological materials
G-10 Figure 13	Wood chip	Vertical post Basement crawlspace	Very heavy deposits of silt-size siliceous minerals and possibly cementitious material, small amounts of insect parts and other biological materials
G-11 Figure 14	Wood chip	Vertical post	Locally heavy deposits of silt-size siliceous mineral grains and possibly cementitious materials, traces of biological materials
G-12 Figure 15	Wood chip	Basement crawlspace	Moderate amounts of fibrous biological materials, scattered patches of possibly cementitious material
G-13 Figure 16	Wood chip	Vertical post	Light to locally heavy deposits of silt-size siliceous minerals, possible cementitious materials, small amounts of biological materials
G-14 Figure 17	Wood chip	Basement crawlspace	Light deposits of silt-size siliceous mineral grains, small amounts of biological materials
G-15 Figure 18	Wood chip	Vertical post	Light deposits of silt-size siliceous mineral grains, small amounts of biological materials
G-16 Figure 19	Wood chip	Basement crawlspace	Light deposits of silt-size siliceous mineral grains, small amounts of biological materials
G-17 Figure 20	Wood chip	Vertical post	Moderate to heavy deposits of silt and dust-size siliceous minerals and biological materials
G-18 Figure 21	Wood chip	Basement crawlspace	Moderate to heavy deposits of silt-size siliceous mineral grains, small amounts of biological materials
G-20 Figure 22	Debris	Top of concrete foundation wall, SW ext. wall opening	Wood chips, paint flakes, insect casts, insect parts, plant fibers/rootlets, spider silk, rodent pellets, corrosion scale, siliceous mineral grains ranging from silt-size to coarser particles (about 1 mm)

Mineral grains examined microscopically in immersion mounts mainly consisted of quartz, feldspar, micaceous minerals, opaque grains (magnetite and others), and miscellaneous rock fragments (quartzite, schist, and others).

Table 3 – R Samples from Ripple Residence #1 45968 Albert Street Taken April 3, 2008

Sample ID Figure No.	Sample Type	Location	Description
D-10 Figure 23	Debris	Sill plate West ext. wall opening	Wood fragments, insect parts, rodent fecal pellets, various plant debris, small amounts of siliceous minerals (mostly coarse), paint flakes, mortar
R-1 Figure 24	Wood chip	Sill plate, first floor West ext. wall opening	Heavy deposits of silt-size siliceous mineral grains, insect parts, and other biological materials
R-2 Figure 25	Wood chip	Sill plate, first floor West ext. wall opening	Heavy deposits of silt-size siliceous mineral grains, insect parts, and other biological materials
R-3 Figure 26	Wood chip	Sill plate, first floor West ext. wall opening	Moderate to heavy deposits of silt-size siliceous mineral grains, insect parts, and other biological materials
R-4 Figure 27	Wood chip	Board sheathing West ext. wall opening	Moderate deposits of silt-size siliceous mineral grains, insect parts, and other biological materials
R-5 Figure 28	Wood chip	Board sheathing West ext. wall opening	Traces of dust to silt-size mineral grains and biological materials
R-6 Figure 29	Wood chip	Board sheathing West ext. wall opening	Moderate deposits of insect parts and other biological materials, traces of dust-size mineral grains
R-7 Figure 30	Wood chip	Board sheathing West ext. wall opening	Moderate deposits of insect parts and other biological materials, traces of dust-size mineral grains
R-8 Figure 31	Wood chip	Board sheathing West ext. wall opening	Light deposits of insect parts and other biological materials, traces of dust-size mineral grains
R-9 Figure 32	Wood chip	Board sheathing West ext. wall opening	Light deposits of insect parts and other biological materials, traces of dust-size mineral grains
R-10 Figure 33	Wood chip	Board sheathing West ext. wall opening	Moderate deposits of dust-size mineral grains, insect part and other biological materials
R-11 Figure 34	Wood chip	Board sheathing West ext. wall opening	Moderate deposits of dust-size mineral grains, insect part and other biological materials
R-12 Figure 35	Wood chip	Board sheathing West ext. wall opening	Moderate deposits of dust-size mineral grains, insect part and other biological materials
R-13 Figure 36	Wood chip	Board sheathing West ext. wall opening	Light deposits of dust to silt-size mineral grains and small amounts of biological materials

Mineral grains examined microscopically in immersion mounts mainly consisted of quartz, quartzite, feldspar, micaceous minerals, amphiboles, pyroxene, opaque grains, epidote, and miscellaneous rock fragments.

Table 4 – S Samples from Ripple Residence #2 45956 Albert Street Taken April 3, 2008

Sample ID	Sample Type	Location	Description
S-1 Figure 37	Wood chip	Base of wood stud, 1st floor East ext. wall	Light deposits of silt-size siliceous mineral grains and biological material
S-2 Figure 38	Wood chip	Base of wood stud, 1st floor East ext. wall	Light deposits of biological materials, possible traces of dust-size mineral grains
S-3 Figure 39	Wood chip	Base of wood stud, 1st floor East ext. wall	Light deposits of biological materials, possible traces of dust-size mineral grains
S-4 Figure 40	Wood chip	Board sheathing East ext. wall opening	Moderate deposits of biological materials, light deposits of dust-size mineral grains
S-5 Figure 41	Wood chip	Board sheathing East ext. wall opening	Light deposits of biological materials, traces of dust-size mineral grains
45956 #1 Figure 42	Silt	Wood sill plate 40" below floor level	Fine pale beige gray powder visually similar to dust-size material on various samples. <u>Microscope:</u> clay, insect parts, pollen, spores, minor quartz, feldspar, wollastonite, iron oxides, plant material, soot, traces of others
45956 #2 Figure 43	Silt	Foundation wall sill plate 30" below floor level	Fine medium beige powder visually similar to silt-size material. <u>Microscope:</u> Quartz, feldspar, mica, epidote, volcanic glass and other volcanic rocks, iron oxides, mafic mineral grains, fiberglass and mineral wool, insect parts, wood fragments, cloth fibers, plant fibers
45956 #3 Figure 44	Silt	Top of CMU foundation wall 20" below floor level	Medium brown fine to medium grained powder with abundant fiberglass and dyed cloth fibers. <u>Microscope:</u> Quartz, feldspar, volcanic glass and other volcanic rocks, quartzite, schist, mica, epidote, iron oxides, mafic mineral grains, fiberglass and mineral wool, insect parts, wood fragments, cloth fibers, plant fibers, and pollen
45956 #4 Figure 45	Silt	Top of 6x6 beam 8" below floor level	Medium to dark brown, small sample, mostly granular minerals with small amounts of green paint chips, wood fragments, insect parts, and fibrous material. <u>Microscope:</u> Quartz, feldspar, volcanic rock fragments, quartzite, schist, mica, iron oxides, epidote, pyroxene, amphiboles, traces of pollen, and fiberglass

Mineral grains removed from the wood fragments and examined microscopically in immersion mounts mainly consisted of quartz, quartzite, feldspar, micaceous minerals, opaque mineral grains (mostly magnetite), amphiboles, pyroxenes, epidote, and miscellaneous rock fragments (including glassy volcanic rocks and schist).

Table 5 – M Samples from McManaman Residence 45898 Benjamin Street Taken April 3, 2008

Sample ID	Sample Type	Location	Description
M-1 Figure 46	Wood chip	Vertical post in crawlspace	Heavy deposits of silt-size siliceous mineral grains and biological material (much is fibrous)
M-2 Figure 47	Wood chip	Vertical post in crawlspace	Heavy deposits of silt-size siliceous mineral grains, smaller amounts of biological material (much is fibrous)
M-3 Figure 48	Wood chip	Vertical post in crawlspace	Moderate deposits of silt-size siliceous mineral grains, insect parts, and other biological materials
M-4 Figure 49	Wood chip	Vertical post in crawlspace	Light to moderate deposits of dust to silt-size siliceous mineral grains and biological material
M-5 Figure 50	Wood chip	Vertical post in crawlspace	Light to moderate deposits of dust to silt-size siliceous mineral grains and biological material
M-6 Figure 51	Wood chip	Vertical post in crawlspace	Light deposits of dust and silt-size siliceous mineral grains, mostly in crevices, fibrous biological materials, and insect parts
M-7 Figure 52	Wood chip	Vertical post in crawlspace	Light deposits of dust to silt-size siliceous mineral grains and fibrous biological material
M-8 Figure 53	Wood chip	Vertical post in crawlspace	Light deposits of dust to silt-size siliceous mineral grains, insect parts, and fibrous biological material
M-10 Figure 54	Wood chip	Board sheathing North ext. wall opening	Light to moderate deposits of dust to silt-size siliceous mineral grains, insect parts, and biological material
M-11 Figure 55	Wood chip	Board sheathing North ext. wall opening	Light deposits of dust to silt-size siliceous mineral grains and biological material
M-12 Figure 56	Wood chip	Board sheathing North ext. wall opening	Light deposits of dust-size whitish grains and biological material, traces of dust-size siliceous mineral grains
M-13 Figure 57	Wood chip	Board sheathing North ext. wall opening	Trace deposits of dust-size siliceous mineral grains and biological material
M-14 Figure 58	Wood chip	Board sheathing North ext. wall opening	Light deposits of dust to silt-size siliceous mineral grains and biological material

Mineral grains examined microscopically in immersion mounts mainly consisted of quartz, quartzite, feldspar, micaceous minerals, and opaque mineral grains (mostly magnetite).

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 1	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1800 - 1918		1800	
Exhibit 2	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1920 - 1929		1920	
Exhibit 3	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1930 - 1939		1930	
Exhibit 4	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1940 - 1949		1940	
Exhibit 5	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1950 - 1959		1950	
Exhibit 6	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1960 - 1969		1960	
Exhibit 7	Geological Survey Water-Supply Paper 1527, "Floods in the Skagit River Basin Washington. James E. Stewart and G. Lawrence Bodhaine. January 22, 1962. United States Government Printing Office, Washington: 1961.	6/22	1962	
Exhibit 8	Communication from the Acting assistant Secretary of the Army: Transmitting a Corps of Engineers Report on the Upper Baker Project, Skagit River Basin, Washington, Pursuant to Section 209 of the flood Control Act of 1962; May 9, 1977 – Referred to the Committee on Public Works and Transportation and ordered to be printed.	5/9	1977	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 9	Flood Insurance Study, City of Burlington, Washington, Skagit County July 3, 1984	7/3	1984	
Exhibit 10	Federal Emergency Management Agency: Flood Insurance Study, Skagit County, Washington, Unincorporated Areas, Community Number 530151, Revised September 29, 1989: Revised October 17, 1984.	10/17	1984	
Exhibit 11	Draft Technical Memorandum, "Skagit River UNET Modeling Technical Memorandum." Tetra Tech/KCM. Inc. February 2003	2/1	2003	
Exhibit 12	Draft Technical Memorandum, "Assessment of Additional Flood Control Storage at Baker River Project." Pacific International Engineering, PLLC, April 9, 2003	4/9	2003	
Exhibit 13	Draft Memorandum, "Technical Review of the Baker PMF Analysis." Ted Perkins, Seattle District, Corps of Engineers with Responses and Backcheck Comments by Albert Liou, Pacific International Engineering. November 10, 2003.	11/10	2003	
Exhibit 14	Draft Upper and Lower Baker Dams Probable Maximum Flood Study Report. Pacific International Engineering, PLLC, March 2004.	3/1	2004	
Exhibit 15	Technical Memorandum, "sensitivity Analysis of Flood Frequency at the Skagit River Gage Near Concrete." Pacific International Engineering, PLLC. April 30, 2004.	4/30	2004	
Exhibit 16	Memorandum: "Technical Review of the Hydrology and Hydraulics for the Skagit River Flood Damage Reduction Study." To Ted Perkins and Linda Smith, Seattle District, Corps of Engineers, from Mike Stansbury, Skagit County. June 16, 2004.	6/16	2004	
Exhibit 17	Technical Memorandum, "Analysis of Flood Control Storage at Baker River Project." Pacific International Engineering, PLLC. August 27, 2004.	8/27	2004	
Exhibit 18	Draft Technical Memorandum: "Hydrology and Hydraulics Technical Issues and Proposed Resolution." Pacific International Engineering, PLLC. October 8, 2004.	10/8	2004	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 19	Technical Memorandum, "Draft Evaluation of Flood Peaks Estimated by USGS." Pacific International Engineering, PLLC. November 16, 2004.	11/16	2004	
Exhibit 20	Submittal of Offer of Settlement for Baker River Hydroelectric Project (FERC Project No. P-2150), November 23, 2004 (Appendices A-1 through A-6 and B, of this Settlement Agreement, referenced by this citation but not included in this Exhibit.	11/23	2004	
Exhibit 21	Letter to Chal A. Martin, P.E. from Mark Mastin, USGS, response to a letter dated December 13, 2004. February 10, 2005.	2/10	2005	
Exhibit 22	Review and Comments of "Draft Evaluation of Flood Peaks Estimated by USGS." Reviewed by Robert D. Jarrett, Ph.D., USGS, National Research Program, Paleohydrology and Climate Change Project, Lakewood, Colorado, February 14, 2005.	2/14	2005	
Exhibit 23	Memorandum from Phil Hilgert and Sue Madsen, R2 resource Consultants, Inc. to Cary Feldmann, Puget sound Enrcgy, Inc. "Comments on August 2004 report authored by Steward and Associates titled: "Environmental Effects of Additional Flood Control on the Baker River." March 11, 2005.	3/11	2005	
Exhibit 24	Independent Technical Review of "Draft Evaluation of Flood Peaks Estimated by USGS." Incomplete memo, March 17, 2005.	3/17	2005	
Exhibit 25	"Independent Technical Review of Hydrology and Hydraulics Models for the Skagit River Flood Damage Reduction Study." Undated and not completed independent technical review conducted by the Hydrologic Engineering Center (HEC) for the Seattle District. 76 pages. Pacific International Engineering submitted responses to the backchecks to Skagit County on May 3, 2005. No further responses were received from HEC Davis.	5/3	2005	
Exhibit 26	"Verification of 1921 Peak Discharge at Skagit River near Concrete, Washington, Using 2003 Peak-Discharge Data." USGS Scientific Investigations Report 2005-5029, Version w.o., August 2005.	8/1	2005	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 27	“Draft Skagit River Basin, Washington, Revised Flood Insurance Study Hydrology Summary. Prepared for: Federal Emergency Management Agency by the U.S. Army Corps of Engineers, Seattle District, November 10, 2005.	11/10	2005	
Exhibit 28	“Hydrology and Hydraulics, Skagit River Flood Basin – Existing Conditions.” Pacific International Engineering, December 2005.	12/1	2005	
Exhibit 29	“Skagit River Flood Reduction Feasibility Study – Interim Evaluation of Measures.” Pacific International Engineering, April 2006.	4/1	2006	
Exhibit 30	“James E. Stewart, Skagit River Flood Reports and Assorted Documents: A Citizen Critical Review Whitepaper. Larry J. Kunzler, 2-14-2004. Updated and republished July 11, 2006.	7/11	2006	
Exhibit 31	Letter to Mr. Dan O’Donnell from Matthew C. Larsen, Chief Scientist for Hydrology, USGS, Reston, Virginia, re: response to whitepaper authored by Mr. Larry Kunzler. October 26, 2006.	10/26	2006	
Exhibit 32	Technical Memorandum, “Response to Review Comments Prepared by Wilbert O. Thomas on behalf of FEMA Region X for the Skagit River Flood Frequency Analyses.” Pacific International Engineering, PLLC. November 20, 2006.	11/20	2006	
Exhibit 33	Presentation by Ted Perkins, Seattle District, US Army Corps of Engineers. “Skagit River Flood Damage Reduction Study, Hydraulic Measure Evaluation.” February 2007.	2/1	2007	
Exhibit 34	Letter to Mr. Carl Cook, FEMA Region X from Jon T. Aarstad, City Administrator, City of Burlington re: Report on Hamilton “Smith” House preliminary Investigation. February 8, 2007.	2/8	2007	
Exhibit 35	“Draft Skagit River Basin, Washington, Revised Flood Insurance Study Hydrology Summary. Prepared for: Federal Emergency Management Agency by the U.S. Army Corps of Engineers, Seattle District. February 22, 2007.	2/22	2007	
Exhibit 36	“Skagit River Hydrology Independent Technical Review Final Report. Prepared for Skagit County Department of Public Works by Northwest Hydraulic Consultants. April 2007.	4/1	2007	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 37	Declaration of Chal A. Martin, P.E. in the matter of the relicensing of the Baker River Hydroelectric Project, FERC 2150. April 30, 2007.	4/30	2007	
Exhibit 38	Technical Memorandum, "Hydraulic Analysis – Smith House Flood Stages." Pacific International Engineering, PLLC. May 31, 2007.	5/31	2007	
Exhibit 39	Washington State Department of Transportation. "BNSF Skagit River Bridge Debris Management Study – summary of Options." June 2007.	6/1	2007	
Exhibit 40	"Skagit River Basin Hydrology Draft Report, Existing Conditions." Pacific International Engineering, PLLC. August	8/1	2007	
Exhibit 41	"Response to Northwest Hydraulic Consultants, Inc. review comments regarding "Skagit River Basin Hydrology Draft Report Existing Conditions." Pacific International Engineering, PLLC. August 2007.	8/1	2007	
Exhibit 42	"Re-evaluation of the 1921 Peak Discharge at Skagit River near Concrete, Washington." USGS Scientific Investigations Report 2007-5159. August 8, 2007.	8/8	2007	
Exhibit 43	Letter from Chal A. Martin, P.E. to the Skagit County Board of Commissioners re: Comments on USGS Scientific Investigations Report 2007-5159, "Re-evaluation of the 1921 Peak Discharge at Skagit River near Concrete, Washington. August 13, 2007.	8/13	2007	
Exhibit 44	"An Independent Technical Review – Comments on Flood Frequency Analyses of the Skagit River, Skagit County, Washington." Theodore V. Hromadka, II, Principal, Hromadka & Associates. August 15, 2007.	8/15	2007	
Exhibit 45	Investigative Report by Richard A. Dethlefs, P.E., S.E; Wiss, Janney, Elstner Associates, Inc. re; evidence of historic flood levels in the Town of Hamilton, Washington. August 17, 2007.	8/17	2007	
Exhibit 46	Letter from Esco Bell, P.E. to Mark Carey, FEMA Region X re: USGS Report 2007-5159. August 20, 2007.	8/20	2007	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 47	Presentation by Chal A. Martin, P.E. Public Meeting re: competing revised base flood elevations. Burlington, Washington October 9, 2007.	10/9	2007	
Exhibit 48	Presentation by Chal A. Martin, P.E. Public Meeting re: competing revised base flood elevations. Mount Vernon, Washington October 23, 2007.	10/23	2007	
Exhibit 49	"Review of Skagit River Basin Hydrology Draft Report Existing Conditions." Northwest Hydraulic Consultants, Inc. November 1, 2007.	11/1	2007	
Exhibit 50	"Draft Review of US Army Corps of Engineers Lower Skagit River Flo-2D Model." Northwest Hydraulic Consultants Inc. November 9, 2007.	11/9	2007	
Exhibit 51	"Measures Report." US Army Corp of Engineers, August 18, 2008 presentation.	8/18	2008	

Appendix C

Background Reports

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 1	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1800 - 1918		1800	
Exhibit 2	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1920 - 1929		1920	
Exhibit 3	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1930 - 1939		1930	
Exhibit 4	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1940 - 1949		1940	
Exhibit 5	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1950 - 1959		1950	
Exhibit 6	Master Index to Historical Newspaper Flood Article Research, Researched, assembled and organized by: Dan Berentson, Josef and Larry Kunzler, Index prepared by Larry Kunzler, 9-4-05. 1960 - 1969		1960	
Exhibit 7	Geological Survey Water-Supply Paper 1527, "Floods in the Skagit River Basin Washington. James E. Stewart and G. Lawrence Bodhaine. January 22, 1962. United States Government Printing Office, Washington: 1961.	6/22	1962	
Exhibit 8	Communication from the Acting assistant Secretary of the Army: Transmitting a Corps of Engineers Report on the Upper Baker Project, Skagit River Basin, Washington, Pursuant to Section 209 of the flood Control Act of 1962; May 9, 1977 – Referred to the Committee on Public Works and Transportation and ordered to be printed.	5/9	1977	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 9	Flood Insurance Study, City of Burlington, Washington, Skagit County July 3, 1984	7/3	1984	
Exhibit 10	Federal Emergency Management Agency: Flood Insurance Study, Skagit County, Washington, Unincorporated Areas, Community Number 530151, Revised September 29, 1989: Revised October 17, 1984.	10/17	1984	
Exhibit 11	Draft Technical Memorandum, "Skagit River UNET Modeling Technical Memorandum." Tetra Tech/KCM. Inc. February 2003	2/1	2003	
Exhibit 12	Draft Technical Memorandum, "Assessment of Additional Flood Control Storage at Baker River Project." Pacific International Engineering, PLLC, April 9, 2003	4/9	2003	
Exhibit 13	Draft Memorandum, "Technical Review of the Baker PMF Analysis." Ted Perkins, Seattle District, Corps of Engineers with Responses and Backcheck Comments by Albert Liou, Pacific International Engineering. November 10, 2003.	11/10	2003	
Exhibit 14	Draft Upper and Lower Baker Dams Probable Maximum Flood Study Report. Pacific International Engineering, PLLC, March 2004.	3/1	2004	
Exhibit 15	Technical Memorandum, "sensitivity Analysis of Flood Frequency at the Skagit River Gage Near Concrete." Pacific International Engineering, PLLC. April 30, 2004.	4/30	2004	
Exhibit 16	Memorandum: "Technical Review of the Hydrology and Hydraulics for the Skagit River Flood Damage Reduction Study." To Ted Perkins and Linda Smith, Seattle District, Corps of Engineers, from Mike Stansbury, Skagit County. June 16, 2004.	6/16	2004	
Exhibit 17	Technical Memorandum, "Analysis of Flood Control Storage at Baker River Project." Pacific International Engineering, PLLC. August 27, 2004.	8/27	2004	
Exhibit 18	Draft Technical Memorandum: "Hydrology and Hydraulics Technical Issues and Proposed Resolution." Pacific International Engineering, PLLC. October 8, 2004.	10/8	2004	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 19	Technical Memorandum, "Draft Evaluation of Flood Peaks Estimated by USGS." Pacific International Engineering, PLLC. November 16, 2004.	11/16	2004	
Exhibit 20	Submittal of Offer of Settlement for Baker River Hydroelectric Project (FERC Project No. P-2150), November 23, 2004 (Appendices A-1 through A-6 and B, of this Settlement Agreement, referenced by this citation but not included in this Exhibit.	11/23	2004	
Exhibit 21	Letter to Chal A. Martin, P.E. from Mark Mastin, USGS, response to a letter dated December 13, 2004. February 10, 2005.	2/10	2005	
Exhibit 22	Review and Comments of "Draft Evaluation of Flood Peaks Estimated by USGS." Reviewed by Robert D. Jarrett, Ph.D., USGS, National Research Program, Paleohydrology and Climate Change Project, Lakewood, Colorado, February 14, 2005.	2/14	2005	
Exhibit 23	Memorandum from Phil Hilgert and Sue Madsen, R2 resource Consultants, Inc. to Cary Feldmann, Puget sound Energy, Inc. "Comments on August 2004 report authored by Steward and Associates titled: "Environmental Effects of Additional Flood Control on the Baker River." March 11, 2005.	3/11	2005	
Exhibit 24	Independent Technical Review of "Draft Evaluation of Flood Peaks Estimated by USGS." Incomplete memo, March 17, 2005.	3/17	2005	
Exhibit 25	"Independent Technical Review of Hydrology and Hydraulics Models for the Skagit River Flood Damage Reduction Study." Undated and not completed independent technical review conducted by the Hydrologic Engineering Center (HEC) for the Seattle District. 76 pages. Pacific International Engineering submitted responses to the backchecks to Skagit County on May 3, 2005. No further responses were received from HEC Davis.	5/3	2005	
Exhibit 26	"Verification of 1921 Peak Discharge at Skagit River near Concrete, Washington, Using 2003 Peak-Discharge Data." USGS Scientific Investigations Report 2005-5029, Version w.o., August 2005.	8/1	2005	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 27	“Draft Skagit River Basin, Washington, Revised Flood Insurance Study Hydrology Summary. Prepared for: Federal Emergency Management Agency by the U.S. Army Corps of Engineers, Seattle District, November 10, 2005.	11/10	2005	
Exhibit 28	“Hydrology and Hydraulics, Skagit River Flood Basin – Existing Conditions.” Pacific International Engineering, December 2005.	12/1	2005	
Exhibit 29	“Skagit River Flood Reduction Feasibility Study – Interim Evaluation of Measures.” Pacific International Engineering, April 2006.	4/1	2006	
Exhibit 30	“James E. Stewart, Skagit River Flood Reports and Assorted Documents: A Citizen Critical Review Whitepaper. Larry J. Kunzler, 2-14-2004. Updated and republished July 11, 2006.	7/11	2006	
Exhibit 31	Letter to Mr. Dan O’Donnell from Matthew C. Larsen, Chief Scientist for Hydrology, USGS, Reston, Virginia, re: response to whitepaper authored by Mr. Larry Kunzler. October 26, 2006.	10/26	2006	
Exhibit 32	Technical Memorandum, “Response to Review Comments Prepared by Wilbert O. Thomas on behalf of FEMA Region X for the Skagit River Flood Frequency Analyses.” Pacific International Engineering, PLLC. November 20, 2006.	11/20	2006	
Exhibit 33	Presentation by Ted Perkins, Seattle District, US Army Corps of Engineers. “Skagit River Flood Damage Reduction Study, Hydraulic Measure Evaluation.” February 2007.	2/1	2007	
Exhibit 34	Letter to Mr. Carl Cook, FEMA Region X from Jon T. Aarstad, City Administrator, City of Burlington re: Report on Hamilton “Smith” House preliminary Investigation. February 8, 2007.	2/8	2007	
Exhibit 35	“Draft Skagit River Basin, Washington, Revised Flood Insurance Study Hydrology Summary. Prepared for: Federal Emergency Management Agency by the U.S. Army Corps of Engineers, Seattle District. February 22, 2007.	2/22	2007	
Exhibit 36	“Skagit River Hydrology Independent Technical Review Final Report. Prepared for Skagit County Department of Public Works by Northwest Hydraulic Consultants. April 2007.	4/1	2007	

EIS Flood Documents

EXHIBIT	DOCUMENT	DATE	YEAR	PAGE
Exhibit 37	Declaration of Chal A. Martin, P.E. in the matter of the relicensing of the Baker River Hydroelectric Project, FERC 2150. April 30, 2007.	4/30	2007	
Exhibit 38	Technical Memorandum, "Hydraulic Analysis – Smith House Flood Stages." Pacific International Engineering, PLLC. May 31, 2007.	5/31	2007	
Exhibit 39	Washington State Department of Transportation. "BNSF Skagit River Bridge Debris Management Study – summary of Options." June 2007.	6/1	2007	
Exhibit 40	"Skagit River Basin Hydrology Draft Report, Existing Conditions." Pacific International Engineering, PLLC. August	8/1	2007	
Exhibit 41	"Response to Northwest Hydraulic Consultants, Inc. review comments regarding "Skagit River Basin Hydrology Draft Report Existing Conditions." Pacific International Engineering, PLLC. August 2007.	8/1	2007	
Exhibit 42	"Re-evaluation of the 1921 Peak Discharge at Skagit River near Concrete, Washington." USGS Scientific Investigations Report 2007-5159. August 8, 2007.	8/8	2007	
Exhibit 43	Letter from Chal A. Martin, P.E. to the Skagit County Board of Commissioners re: Comments on USGS Scientific Investigations Report 2007-5159, "Re-evaluation of the 1921 Peak Discharge at Skagit River near Concrete, Washington. August 13, 2007.	8/13	2007	
Exhibit 44	"An Independent Technical Review – Comments on Flood Frequency Analyses of the Skagit River, Skagit County, Washington." Theodore V. Hromadka, II, Principal, Hromadka & Associates. August 15, 2007.	8/15	2007	
Exhibit 45	Investigative Report by Richard A. Dethlefs, P.E., S.E; Wiss, Janney, Elstner Associates, Inc. re; evidence of historic flood levels in the Town of Hamilton, Washington. August 17, 2007.	8/17	2007	
Exhibit 46	Letter from Esco Bell, P.E. to Mark Carey, FEMA Region X re: USGS Report 2007-5159. August 20, 2007.	8/20	2007	

EIS Flood Documents

<u>EXHIBIT</u>	<u>DOCUMENT</u>	<u>DATE</u>	<u>YEAR</u>	<u>PAGE</u>
Exhibit 47	Presentation by Chal A. Martin, P.E. Public Meeting re: competing revised base flood elevations. Burlington, Washington October 9, 2007.	10/9	2007	
Exhibit 48	Presentation by Chal A. Martin, P.E. Public Meeting re: competing revised base flood elevations. Mount Vernon, Washington October 23, 2007.	10/23	2007	
Exhibit 49	"Review of Skagit River Basin Hydrology Draft Report Existing Conditions." Northwest Hydraulic Consultants, Inc. November 1, 2007.	11/1	2007	
Exhibit 50	"Draft Review of US Army Corps of Engineers Lower Skagit River Flo-2D Model." Northwest Hydraulic Consultants Inc. November 9, 2007.	11/9	2007	
Exhibit 51	"Measures Report." US Army Corp of Engineers, August 18, 2008 presentation.	8/18	2008	

Appendix D

Maps

Exhibit 1 – Skagit River and Tributaries Basin Map

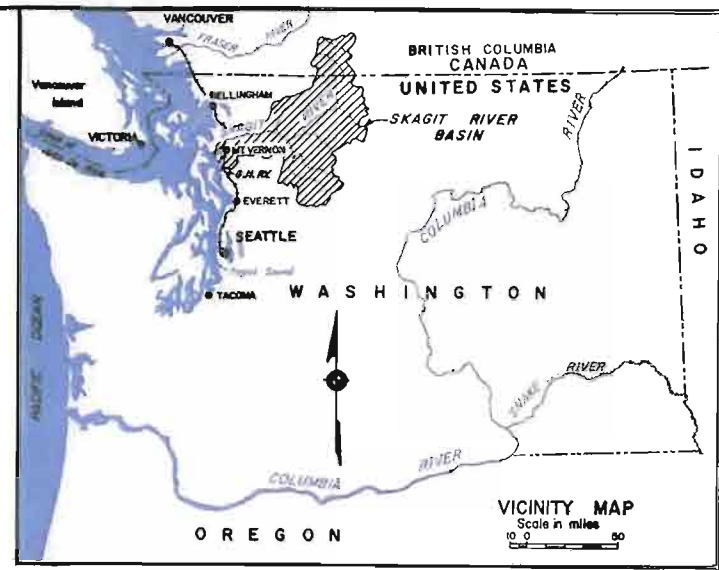
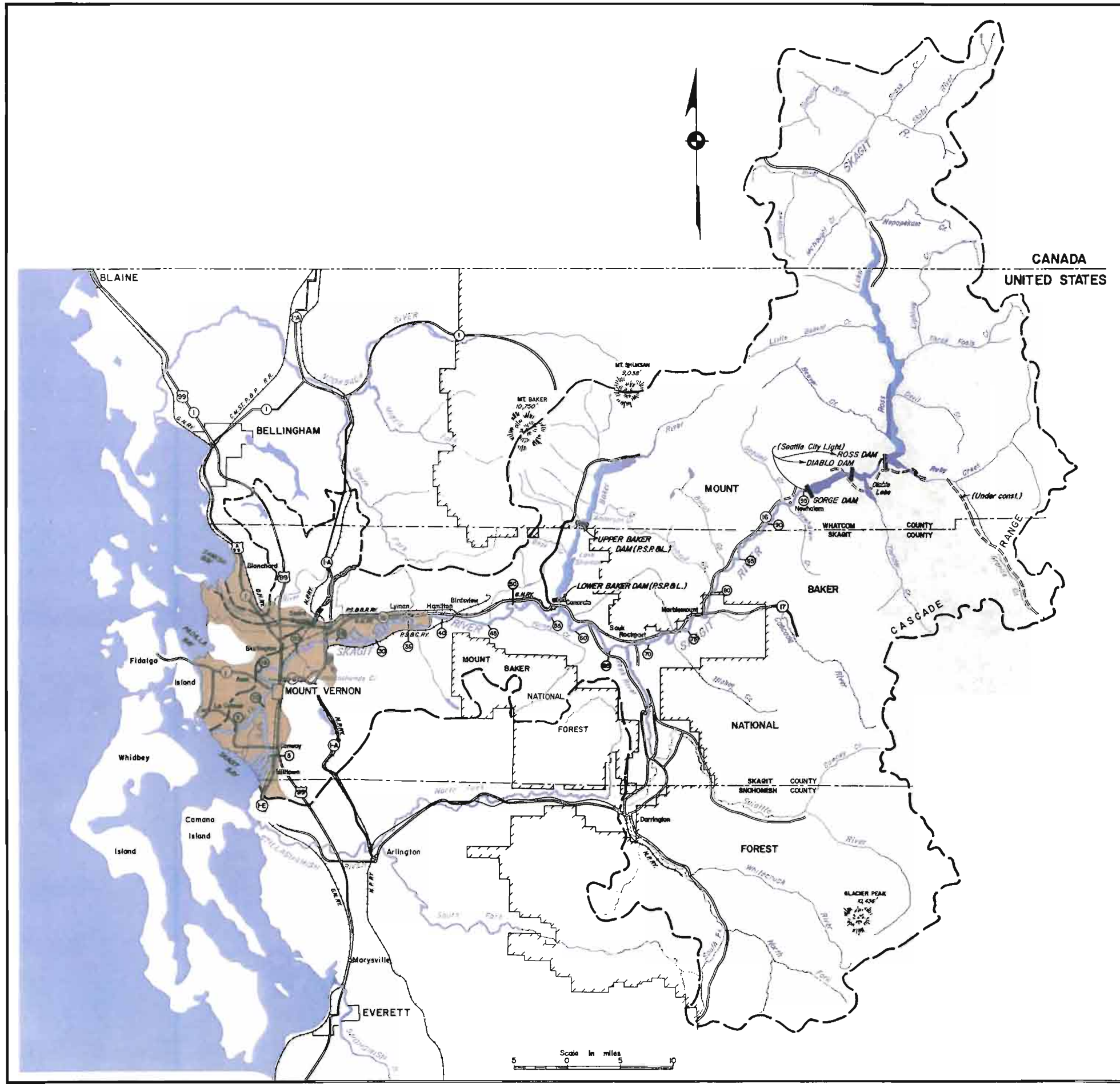
Exhibit 2 – Vicinity Map showing levee system

**Exhibit 3 – Urban Growth Area Map from 2005
Comprehensive Plan**

Exhibit 4 – Map showing Alternative 3 with proposed changes to Urban Growth Area to add new school site, remove comparable acreage from the Urban Growth Area at the northeast corner adjacent to Peacock Lane; and Alternative 4, adding Raspberry Ridge as Open Space so that sanitary sewer can be made available.

Exhibit 5 – Special Flood Risk Map with Gages Slough & Open Space

Exhibit 6 – Overbank Flow Paths, FEMA Levee Failure Policy with no levee credit, Levee segment corrected hydrology, Certified Levee Options



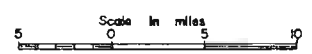
LEGEND

- EXISTING PROJECTS
- MAJOR FLOOD DAMAGE AREA

**SKAGIT RIVER AND TRIBUTARIES
WASHINGTON
FLOOD PLAIN INFORMATION STUDY
BASIN MAP**

In 1 sheets Sheet No. 1 Scale: As shown
U. S. Army Engineer District, Seattle, Wash. July 1966

Drawn by: Sparhawk Traced by: Parkowitz Checked by: Wills Transmitted with report File No. E-6-6-261



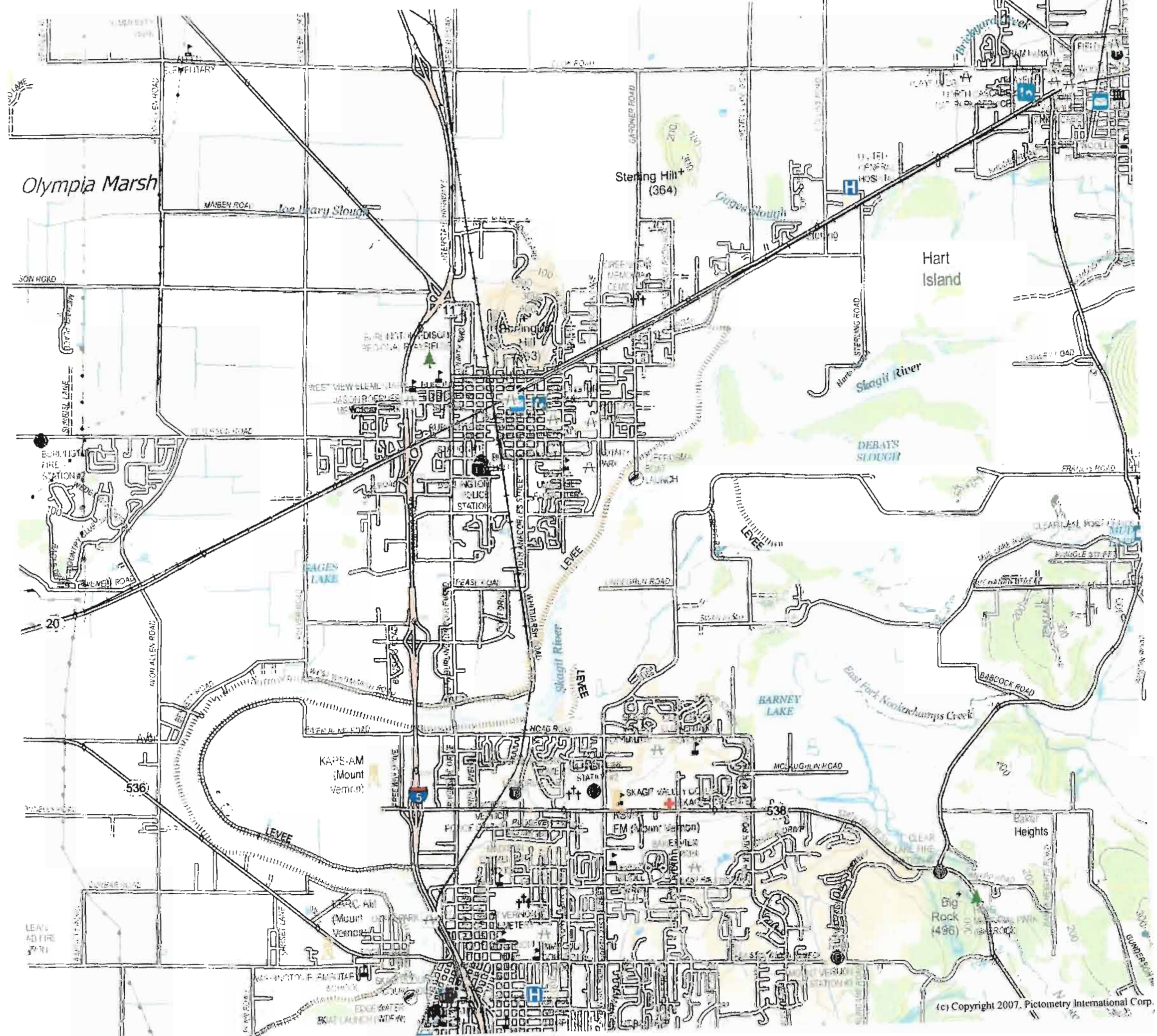
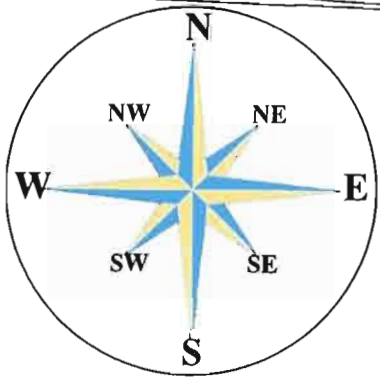


EXHIBIT 2

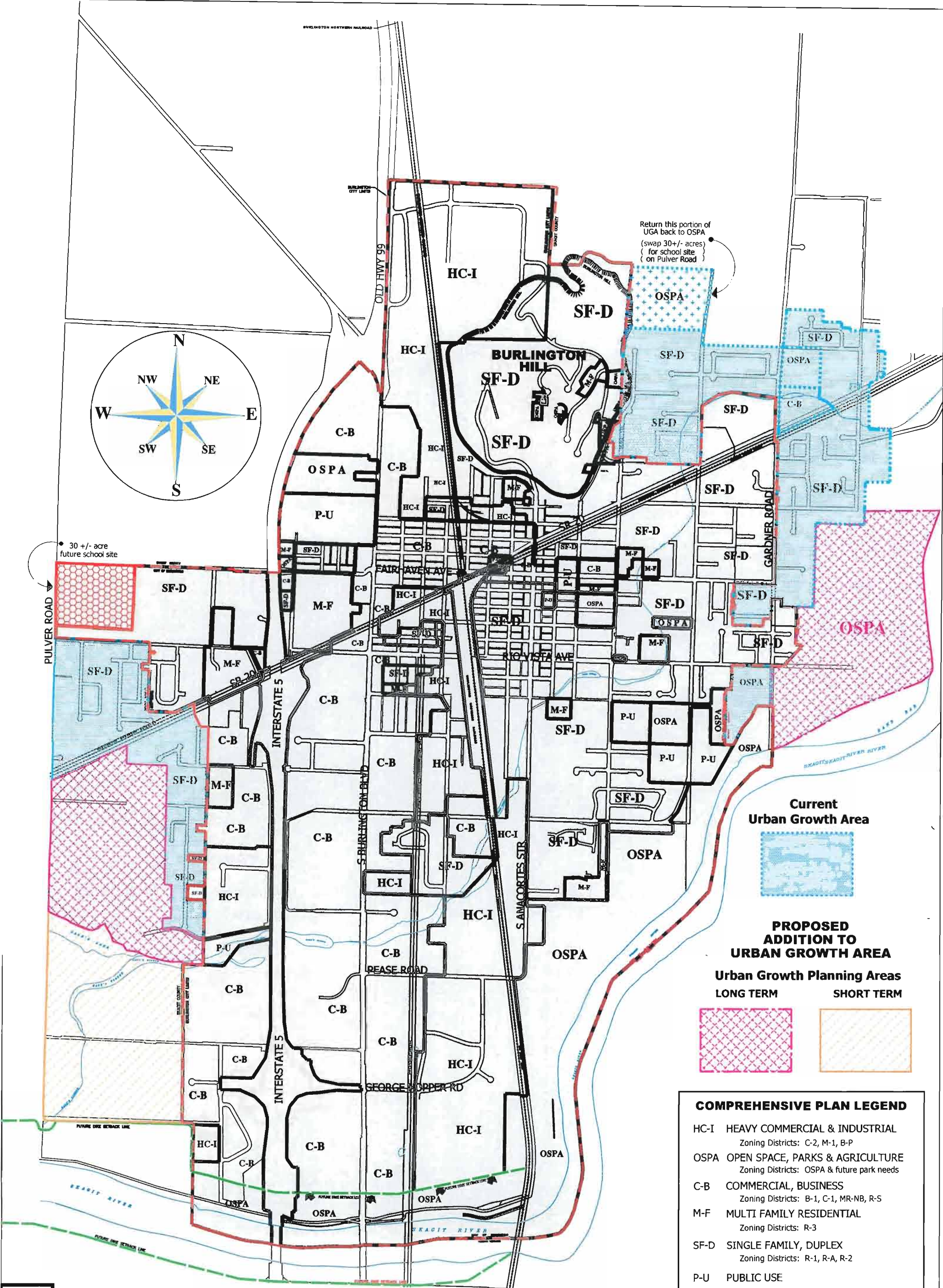
(c) Copyright 2007, Pictometry International Corp.



COMPREHENSIVE PLAN LEGEND	
HC-I	HEAVY COMMERCIAL & INDUSTRIAL Zoning Districts: C-2, M-1, B-P
OSPA	OPEN SPACE, PARKS & AGRICULTURE Zoning Districts: OSPA & future park needs
C-B	COMMERCIAL, BUSINESS Zoning Districts: B-1, C-1, MR-NB, R-S
M-F	MULTI FAMILY RESIDENTIAL Zoning Districts: R-3
SF-D	SINGLE FAMILY, DUPLEX Zoning Districts: R-1, R-A, R-2
P-U	PUBLIC USE Zoning Districts: R-S Identifies Schools & Public Buildings
..... URBAN GROWTH AREA BOUNDARY	

CITY OF BURLINGTON
 2008
 Comprehensive Plan & Urban Growth Area

EXHIBIT 3



COMPREHENSIVE PLAN LEGEND

HC-I	HEAVY COMMERCIAL & INDUSTRIAL Zoning Districts: C-2, M-1, B-P
OSPA	OPEN SPACE, PARKS & AGRICULTURE Zoning Districts: OSPA & future park needs
C-B	COMMERCIAL, BUSINESS Zoning Districts: B-1, C-1, MR-NB, R-5
M-F	MULTI FAMILY RESIDENTIAL Zoning Districts: R-3
SF-D	SINGLE FAMILY, DUPLEX Zoning Districts: R-1, R-A, R-2
P-U	PUBLIC USE Zoning Districts: R-S identifies Schools & Public Buildings
..... URBAN GROWTH AREA BOUNDARY	

Current Urban Growth Area

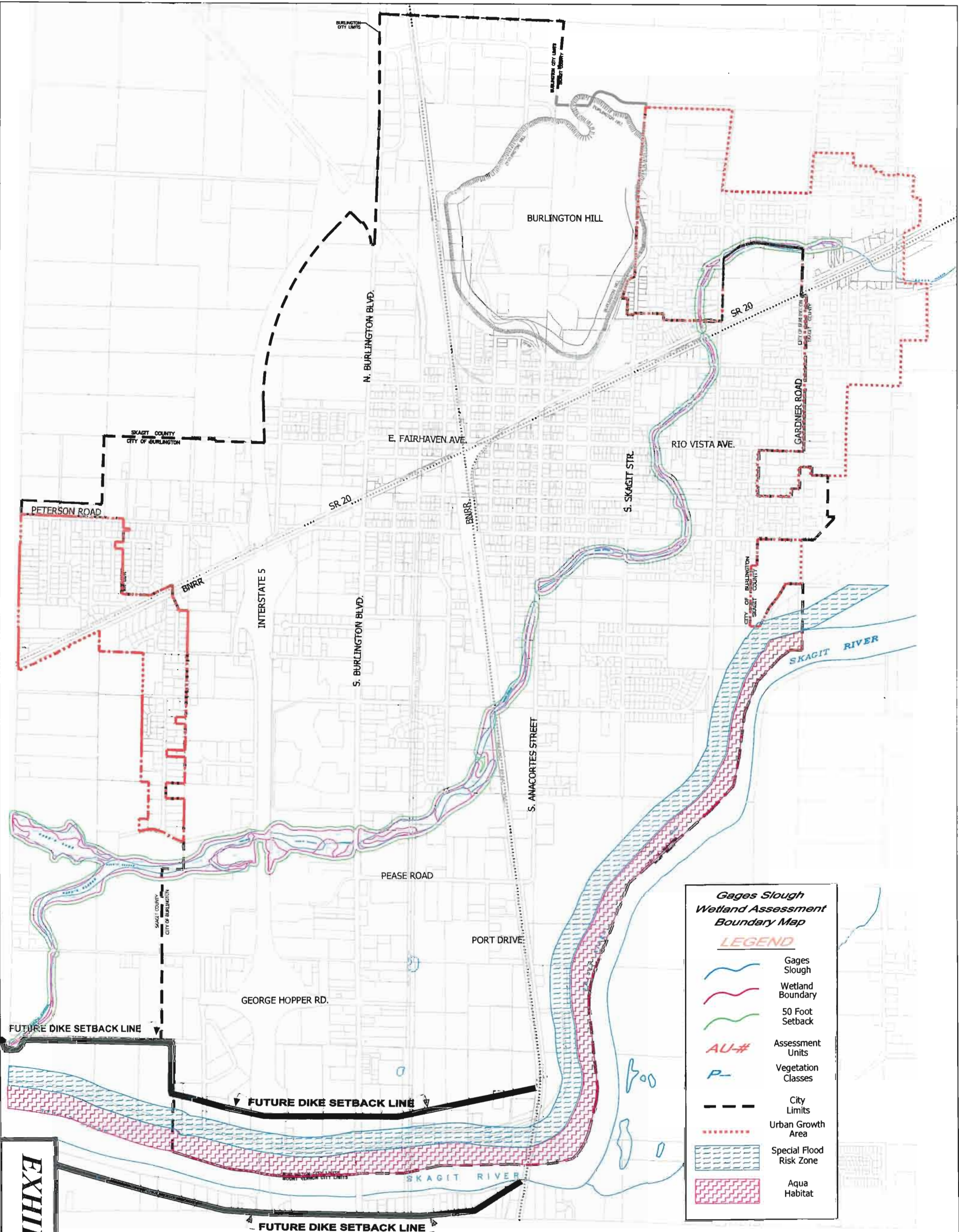
PROPOSED ADDITION TO URBAN GROWTH AREA

Urban Growth Planning Areas

LONG TERM	SHORT TERM

CITY OF BURLINGTON
 Comprehensive Plan & Urban Growth Area
 Issues related to Agriculture and Sanitary Sewer

EXHIBIT 4



CITY OF BURLINGTON

Special Flood Risk Map & Gages Slough & Connected Open Space

EXHIBIT 5

Gages Slough Wetland Assessment Boundary Map

LEGEND

- Gages Slough
- Wetland Boundary
- 50 Foot Setback
- AU-# Assessment Units
- P Vegetation Classes
- City Limits
- Urban Growth Area
- Special Flood Risk Zone
- Aqua Habitat

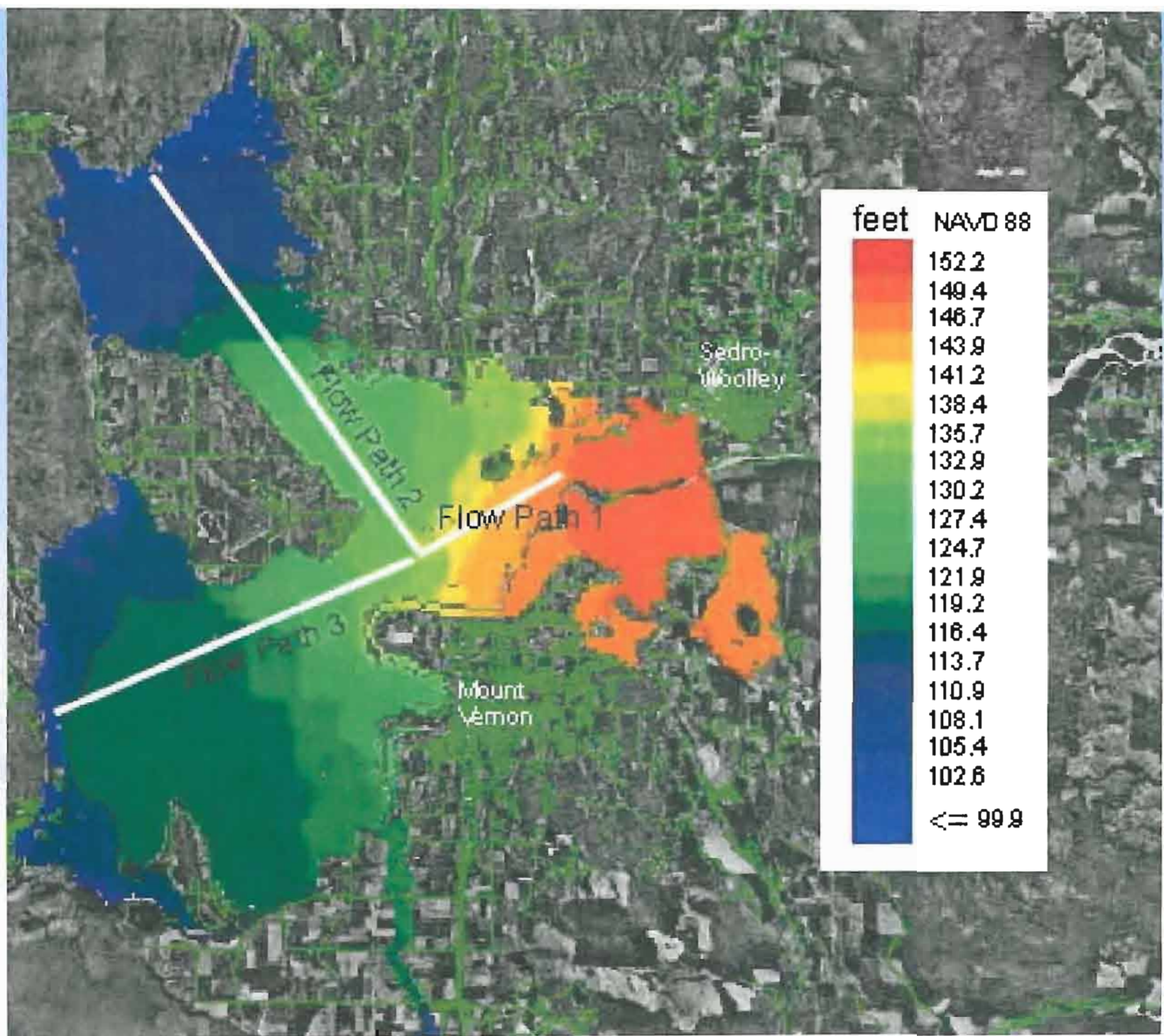


EXHIBIT 6a

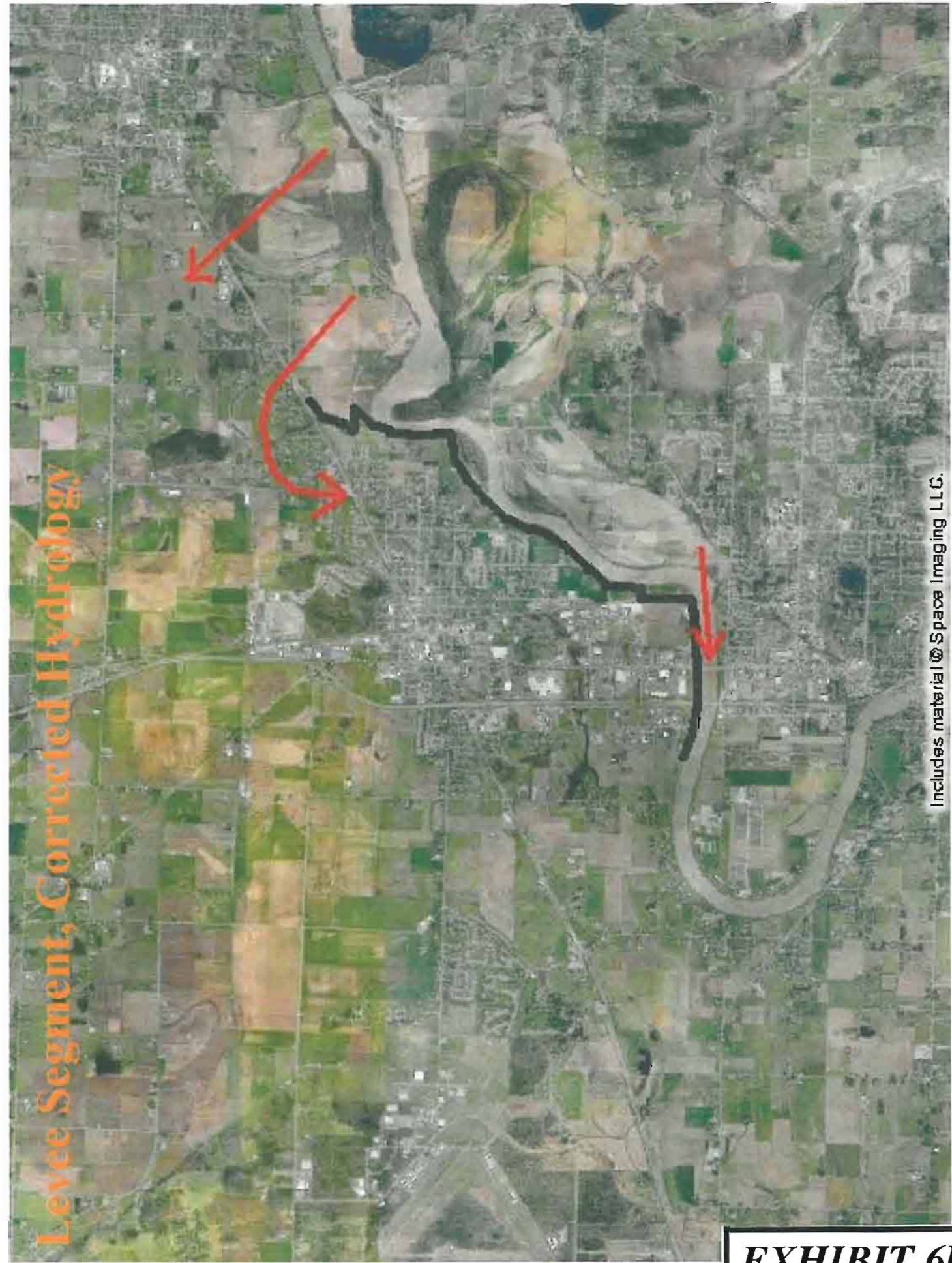
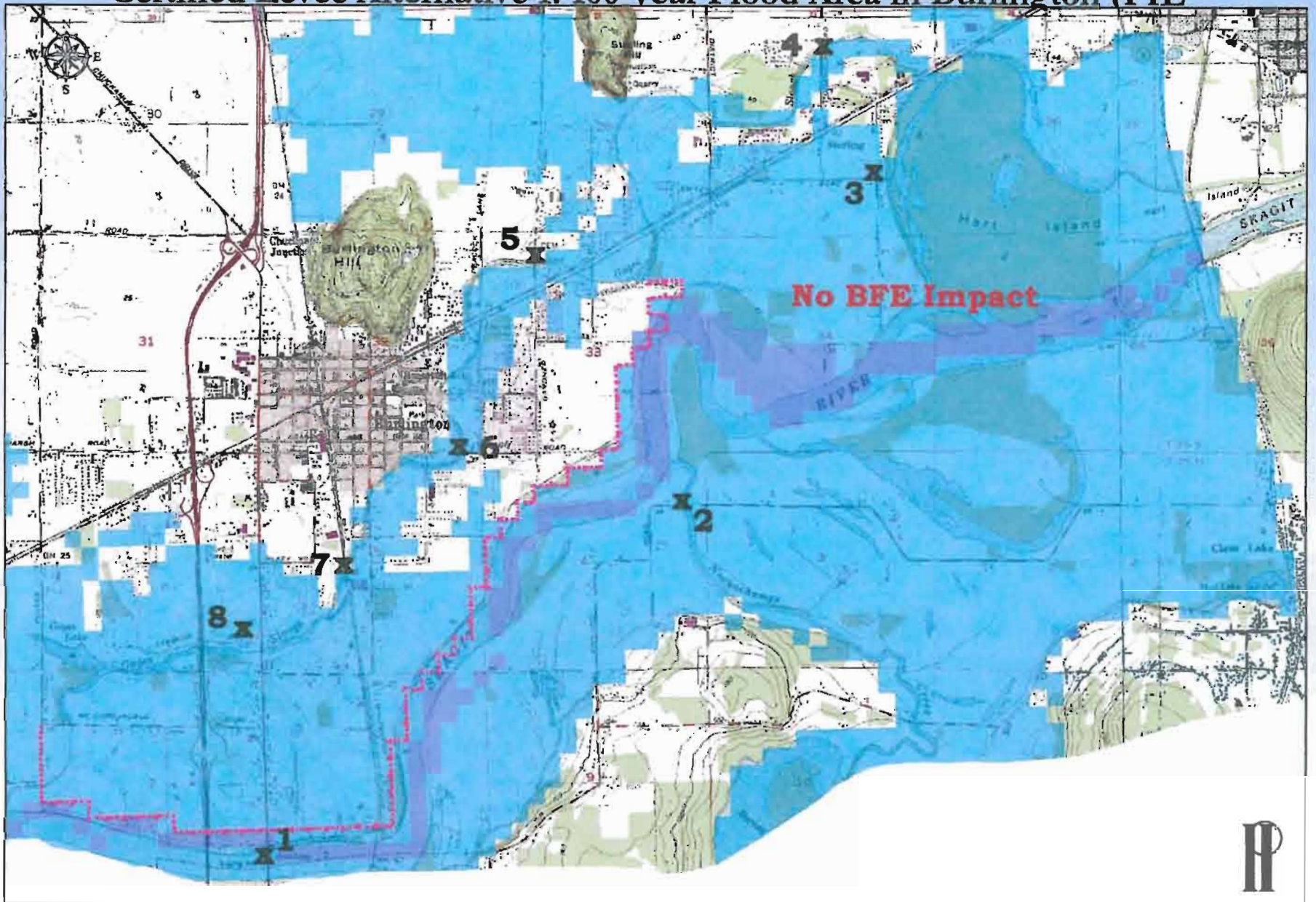


EXHIBIT 6b

Certified Levee Alternative 1: 100-year Flood Area in Burlington (PIE)



Certified Levee Alternative 2: 100-year Flood Area in Burlington (PIE Hydrology)

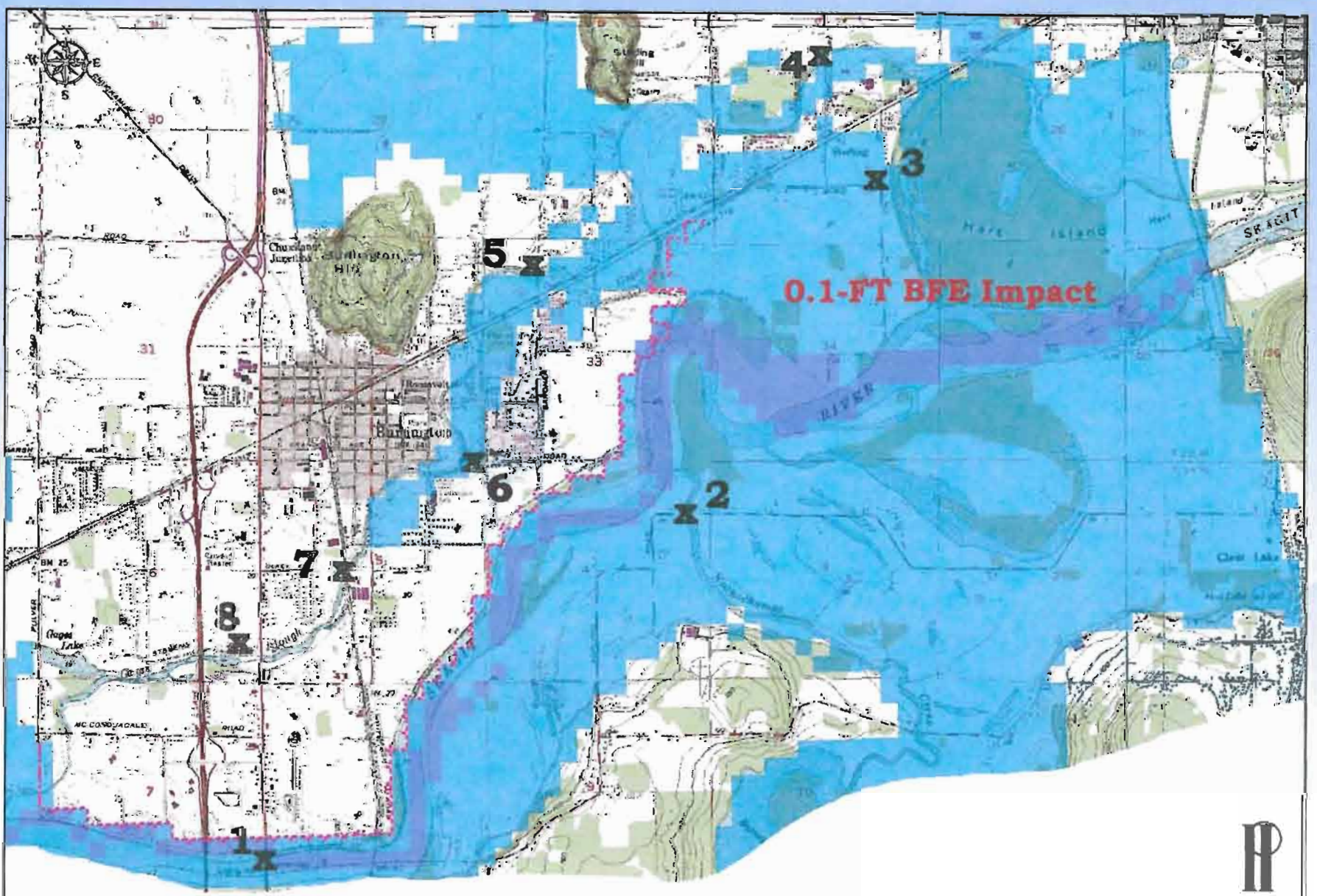
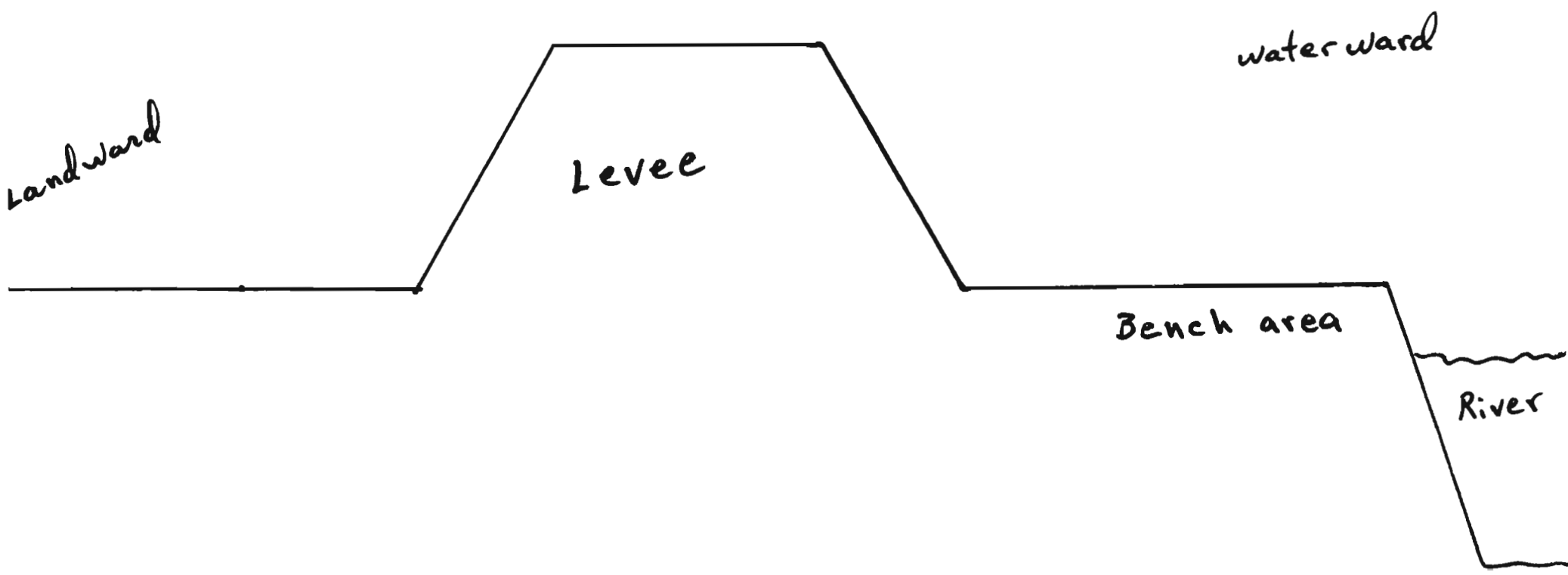
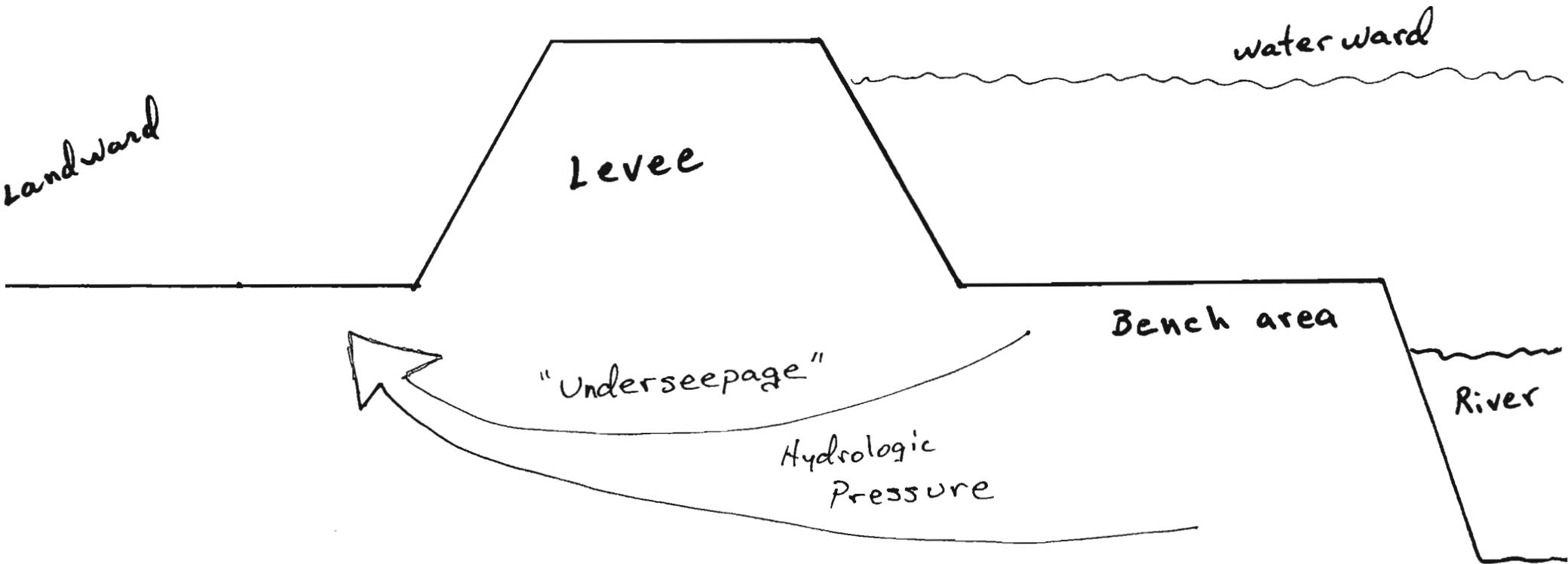


EXHIBIT 6c

"NORMAL CONDITION"

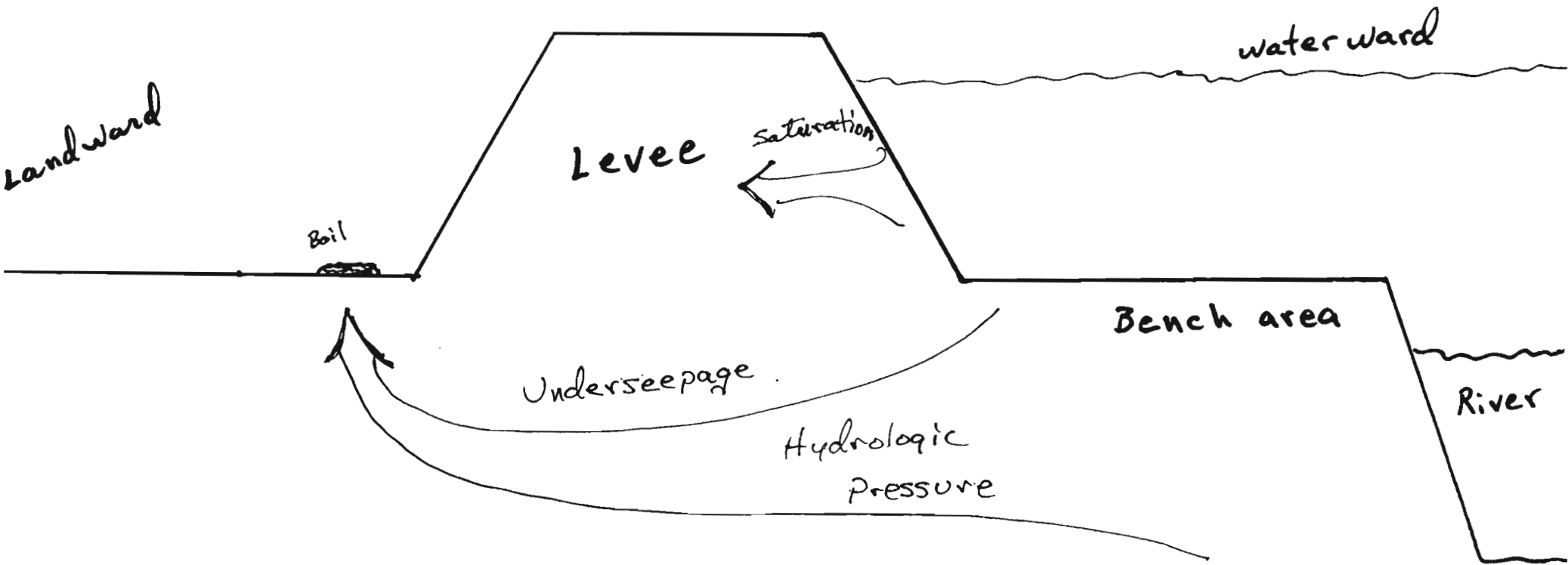


"Flood Condition"

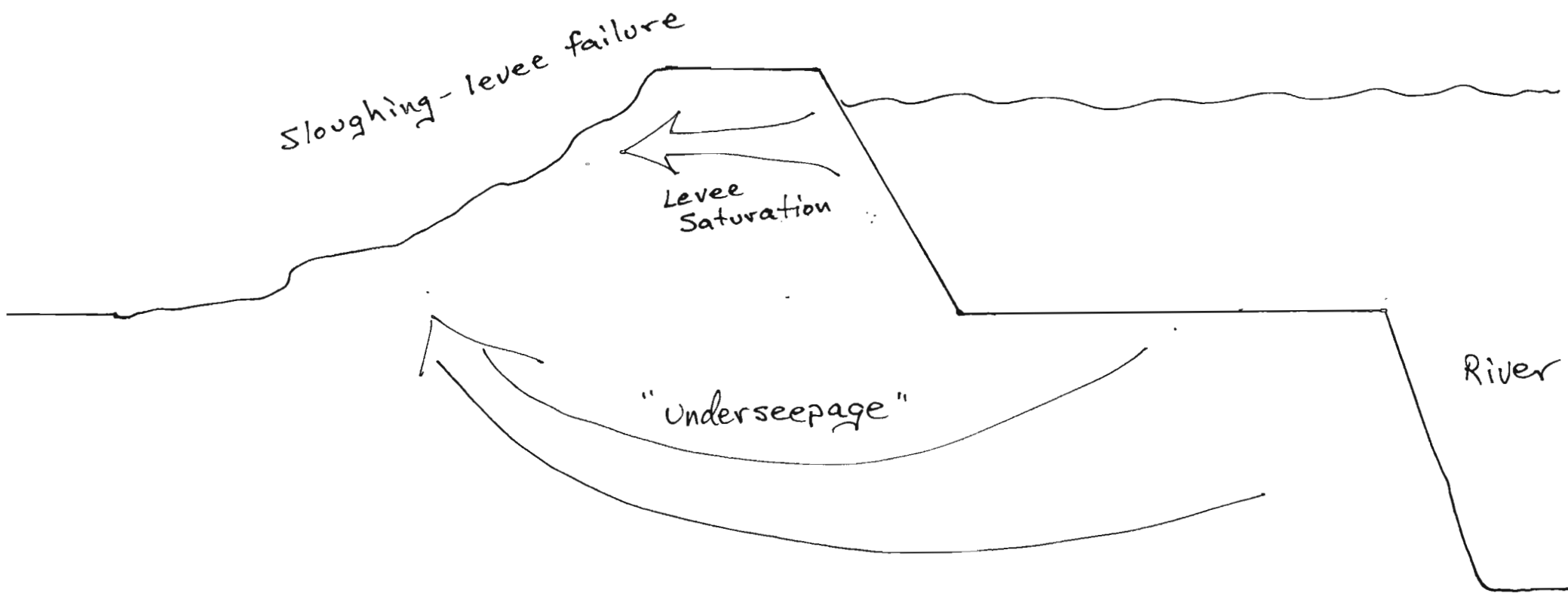


"Flood Condition"

Underseepage causing boils which can lead to levee failure.

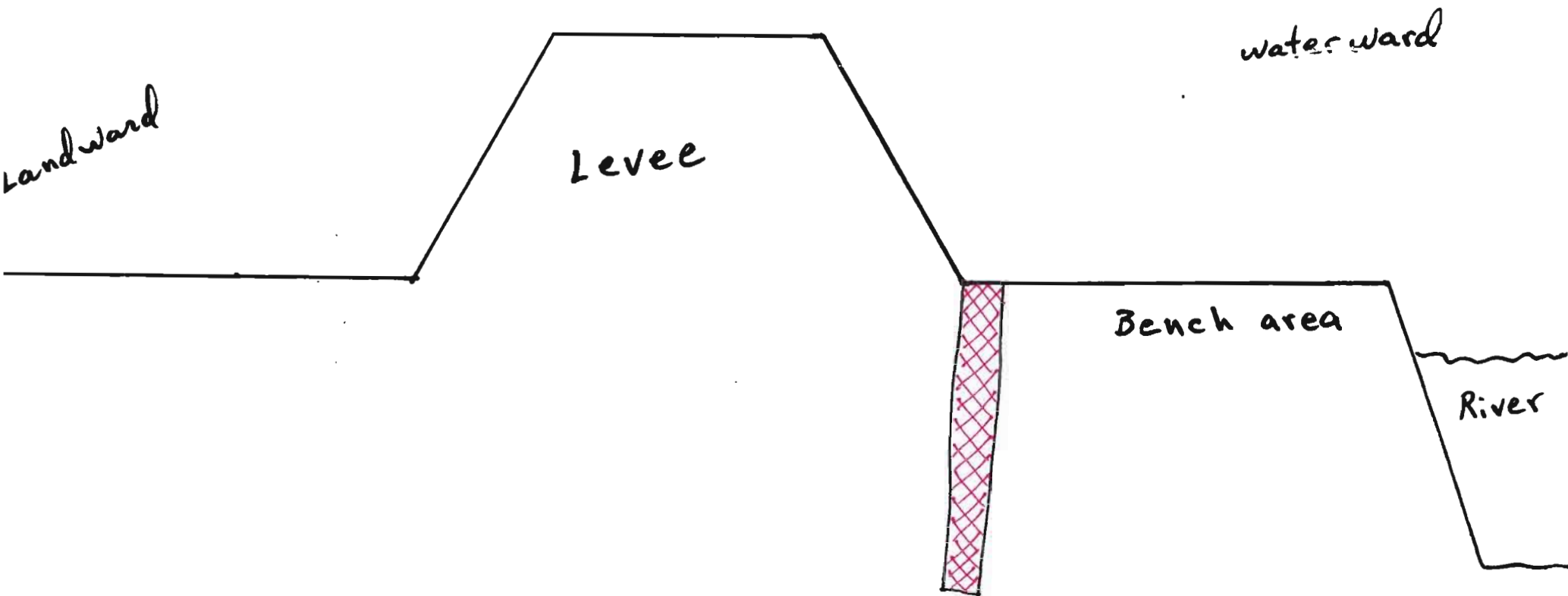


Levee Failure



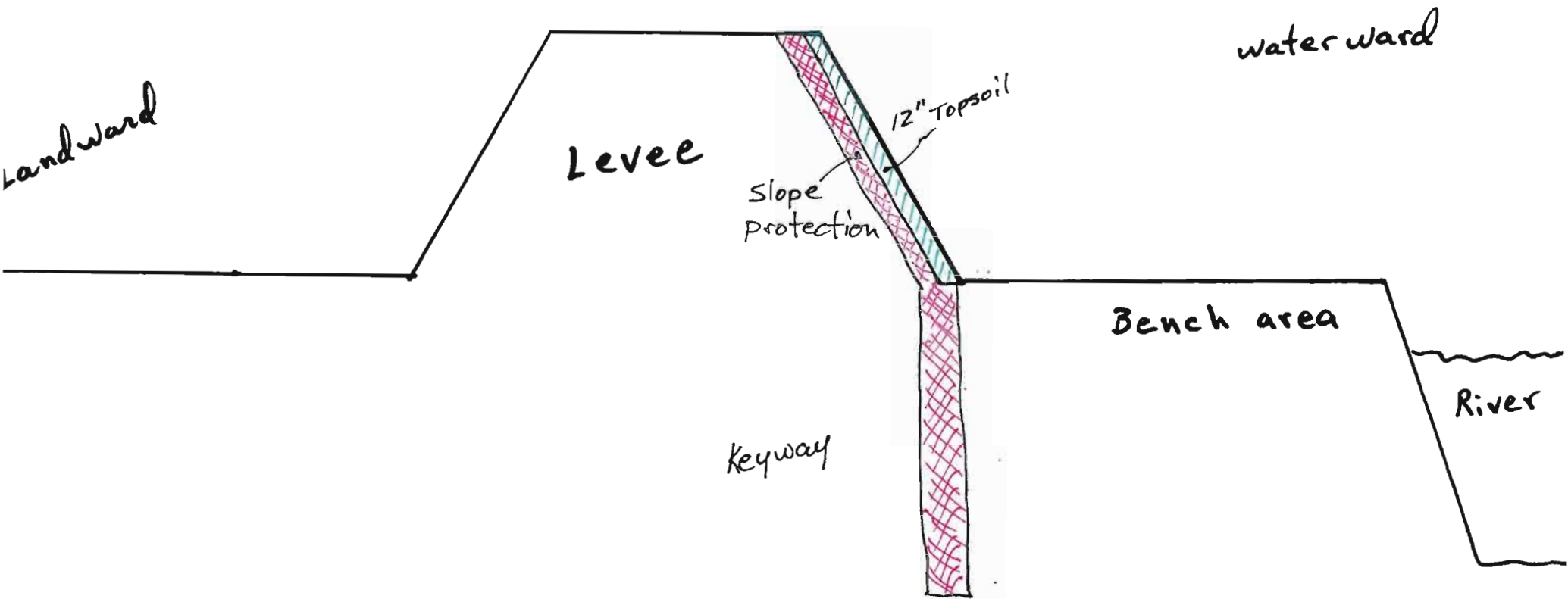
"Keyway installation"

4' wide, 25'-30' deep trench
Backfilled w/ impervious glacial till (clay)
Compacted



"Keyway/Slope protection"

"Keyway" is tied into "Slope protection" to protect Levee from underseepage and levee saturation.



landward

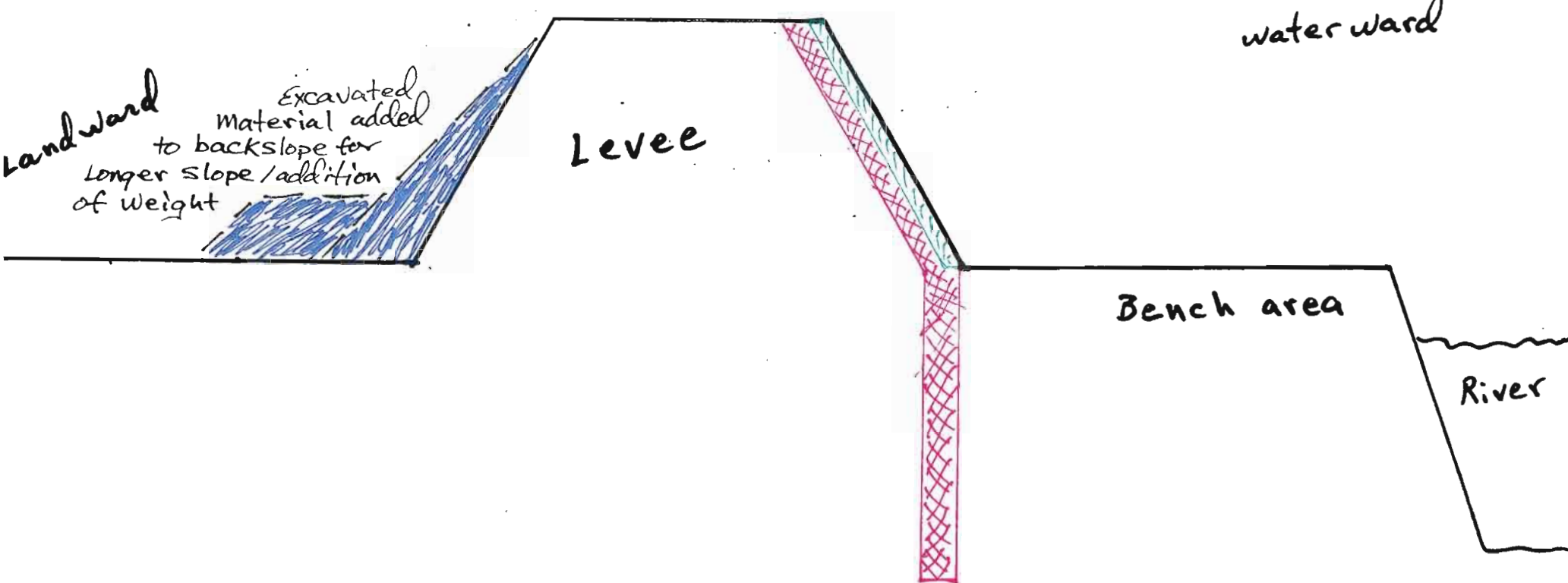
Excavated material added to backslope for longer slope / addition of weight

Levee

waterward

Bench area

River



Appendix E

Project Description for Farmland Preservation through Burlington Agricultural Heritage Credit Program

Summary

Burlington intends to protect the Agricultural Natural Resource Land around the City Limits through the following measures:

1. Enact a program authorizing transfer or purchase of development rights. –

a. Facilitate preservation of threatened agricultural resource lands around the City through the Burlington Agricultural Heritage Credit fee program.- This is a simple fee based approach and the funds generated by the receiving zone are provided to the existing countywide program who administers a Purchase of Development Rights program. A more traditional Transfer of Development Rights approach is included as an acceptable alternative in the proposed code. The sending zones are prioritized around the City Limits.

b. Create a marketable Downtown Receiving Zone. Design an attractive Downtown that provides options for in-city living with complementary uses such as personal services, shops, restaurants, and public amenities including open space connections – a walking town. Excellent design guidelines are mandatory to enhance the historic character of the area.

c. Zoning for Downtown has two optional paths, a base density and a higher density that is achieved by purchasing Burlington Agricultural Heritage Credits to help fund the purchase of development rights in key agricultural resource land locations around Burlington.

2. Minimize future Urban Growth Area expansion

a. Focus on increased density and intensity of development in the existing City Limits, including the Downtown area, consisting of about 48 blocks in a mixture of existing uses and conditions. This includes new zoning, design/historic guidelines, and establishing the area as a receiving zone for farmland development rights.

b. Some expansion of the Urban Growth Area is necessary to protect and restore the Gages Slough critical area which is a series of connected wetlands that constitutes the primary stormwater outfall for the city and is a severely degraded body of water that outfalls directly into the Skagit River.

c. Implement this program throughout the comprehensive planning framework, by specifically stating the planning limits for transportation, sewers, stormwater, land use, parks and capital facilities.

3. Community Connections – The desire of the city and community is to create a band of permanent connected open space in and around Burlington, reinforcing the framework that limits future growth and development activity and enhancing the quality of life of Burlington’s citizens and visitors. The open space will be a combination of riverfront, pathway, pedestrian walkway, interpretative walkways and wildlife viewing areas, and agricultural resource land.

Background

This is a program designed to establish the framework for the future context and quality of the City of Burlington, including decisions about the future of the Urban Growth Area, development of a program to actively protect threatened Agricultural Resource Lands through a Purchase and/or Transfer of Development Rights program, and a new vision for Downtown Burlington, all elements linked through a connected community open space plan.

The bright line question on the table has been whether Burlington will to be a major player in making the Growth Management Act succeed in Skagit County. Burlington has stepped up to partner with the County and other agencies, organizations and individuals to design a program to actively protect the Agricultural Resource Lands at the edge of the City and encourage high density development in the existing City Limits, focused on the Downtown area.

For over ten years, the Downtown Burlington Association met once a month and struggled with how to move forward to revitalize old downtown. There was no funding available to hire major urban planning and design firms, and limited vision for the future. While everyone shared the goal of bringing new vitality and commerce and people to the area, there was a need for material to work with.

In the City Limits of Mount Vernon, an unusual challenge was presented with farmland located in the City Limits and the question of retaining it in agricultural use by transferring development rights to another location was raised. They have a Transfer of Development Rights ordinance on the books, but not enough detail to be workable. Mount Vernon eventually dropped out of the project and handled their in-city agricultural land with amendments to their code. However, the products of this project will be available to any jurisdiction as the need arises in the future.

Defining Long Term Limits on Urban Growth Area

In 2003, local farmland property owners around the City Limits of Burlington and applied to Skagit County and Burlington to add their property to the Urban Growth Area for future annexation and urban development. Burlington is located mostly in the 100 year floodplain with the Skagit River on two sides and agricultural resource land on two sides, including farmland that directly abuts Interstate 5.

The Urban Growth Area Task Force was formed by City Council Resolution 15-2003. The City Council established the Urban Growth Area Task Force to study the long term future expansion of the City Limits, with all the parties at the table, including farmland property owners, interested citizens, developers and organizations. By June of 2004, the Urban Growth Area Task Force made recommendations to the City Council, and the framework for the land use and technical comprehensive plans was established with the recommendation of the City Council to “stay small and rich”. With this issue addressed today, adequate long range plans are able to be put in place to provide an overall framework for the future.

All of the land around the City Limits was studied by the Task Force. The limitations on future expansion because of the adopted 20-year population forecast and the studies that have identified

limited additional demand for commercial and industrial land over the 20-year planning horizon were considered. Opportunities for clear boundaries were evaluated, the development pressure on land directly adjacent to Interstate 5 was considered, as well as availability of urban services. See Appendix A for the Chronology of events and detailed exhibits.

Designing for Downtown Density and creating a receiving zone for farmland development rights

With explosive big box development occurring in the I-5 corridor, beginning in 1989 with the Cascade Mall, and expanding to over 3 million square feet in 15 years, old Downtown Burlington has been left behind. Efforts to promote revitalization and encourage new development were hampered by the lack of participation combined with the perception that nothing would actually happen. The core group in the Downtown Burlington Association recognized the need for new ideas to bring fresh interest in the program, but did not see adequate funding to develop a new vision and plan. Downtown is defined as an area of 47 + blocks with a wide variety of uses and existing conditions.

While urban density is a controversial topic when it comes to annexing land in the Urban Growth Area, the idea of increased in-city living in old Downtown was met with enthusiasm by citizens and property owners. The Skagitonians to Preserve Farmland came up with the idea to try to interest a University of Washington Design Studio in coming to Burlington to generate ideas for the redevelopment of Downtown and provide an opportunity to establish a Transfer of Development Rights program to help preserve Skagit Valley farmland around the perimeter of the city. The Graduate School of Landscape Architecture took on the challenge and generated great excitement and enthusiasm in the Fall of 2003. The project report provides an exciting wealth of ideas and information, including a plan for connected open space around and through the community and many ideas for achieving higher density residential and mixed use development as a trade-off for protecting Agricultural Resource Lands.

The Downtown Burlington Association conducted a series of meetings in 2005 to review and make recommendations on the Design Studio report. There is general consensus on the scope and implementation plan. Design concepts were refined through participation in workshops presented by Bill Kreager, AIA, one called "Honey I Shrank the Lots", and the second an intense two hour session focused on Downtown Burlington. This program was sponsored by the Skagitonians to Preserve Farmland and a consortium of different interests, from Realtors to cities. The recommended concepts for the Downtown Code and Burlington Agricultural Heritage Credit Program, along with a framework for Design Guidelines based on historic Burlington are being refined for adoption in late 2005, or whenever clear consensus is reached on the implementation details.

As envisioned, the new Downtown Plan will provide a "base" level of development which can be achieved without participating in the Heritage Credit Program, and a "bonus" density that can be achieved by purchasing Heritage Credits.

Creating a Permanent Urban Growth Boundary with Connected Open Space

The open space connections extend along Skagit River Park to the south boundary of Burlington along the Skagit Riverfront as part of the dike setback flood hazard mitigation project to a point of connection with Pulver Road, then north along Pulver Road. Some areas along the east side of Pulver Road will remain outside the Urban Growth Area boundary as sending sites for farmland development rights, but this is the common sense boundary for connected open space. Gages Slough will be a link with wildlife viewing and interpretative areas.

Then the boundary extends to a point north of the intersection with Peterson Road, east to Interstate 5, north along the west side of I-5 to a point across from Joe Leary Slough, thence east following the City Limits and Urban Growth Area boundary around and then south to the Skagit River, full circle at the Gardner Road Boat Launch Ramp that connects to Skagit River Park.

The regular update of the Parks and Recreation Comprehensive Plan in 2004 included adopting the connected open space plan developed by the UW Design Studio in concept, to set a framework in place that would later be detailed. The planning process to design the details is underway in 2005, and a key element will be the public spaces in Downtown and their connections through and around the community.

Transfer of Development Rights - The Burlington Agricultural Heritage Credit Program

Early in 2004, Burlington, Mount Vernon, Skagit County and the Skagitians to Preserve Farmland decided to partner on a project to develop a Transfer of Development Rights program that would result in the permanent preservation of farmland in exchange for increased development rights in the Cities. However, the only local expert on farmland values and appraisals came to the conclusion that this project was too complex and withdrew from consideration as the consultant for the job. A consultant with broad experience in the region agreed to take on the project, recognizing the challenge of developing a program in a more rural county as compared with the central Puget Sound region, and a representative Steering Committee was formed.

After reviewing the options, an innovative strategy was determined to be the best choice and the Burlington Agricultural Heritage Credit program was designed. The Heritage Credit Program would provide a way for developers to “earn” that added density for their projects by contributing to the preservation of nearby farms. In return for added density, developers would purchase density transfer credits --- called “Heritage Credits”--- from the City. The proceeds from the sale of those credits would be earmarked by the City for farmland preservation in specific areas identified by the City Council as priorities for protection. If agreement can be reached with Skagit County, City will contract with the Farmland Legacy Program to purchase development rights from the properties it wishes to protect. This would provide the Legacy Program with additional financial resources, simplify the process of engaging property owners, and minimize Burlington’s costs for administering the Heritage Credit Program.

The highest priority for including new land within the Urban Growth Area boundaries is the end of Gages Slough, and it needs to be in public ownership because most of the City’s storm water is collected in the Slough which discharges directly into the Skagit River and water quality is unacceptable.

BURLINGTON HERITAGE CREDIT PROGRAM

Overview of the Concept

The Burlington Heritage Credit Program is intended to create a new tool to help the community achieve two important goals:

- To revitalize Downtown Burlington as an attractive place to live, shop, work, and gather; and
- To protect nearby farmland to preserve the community's agricultural heritage and provide open space nearby the city.

The connection between these goals is the strongly held belief that Burlington's character and livability are directly related to, and dependent upon, the preservation of the working landscapes and natural resources of the Skagit Valley. In combination with a new zoning plan for the Downtown, the Heritage Credit Program will contribute to the realization of these goals by providing a mechanism to channel a portion of the profits that will be generated by Downtown revitalization into the protection of nearby farms. By protecting farmlands, Burlington will in turn contain sprawl, protect the scenic resources and agricultural activity that are a key part of the city's heritage, and reinforce the quality of life its citizens treasure.

Description of the Proposal

The Heritage Credit Program is designed to work in concert with the new Downtown Plan, which is currently being created under the auspices of Burlington's city government. Building upon the results of community workshops led by the University of Washington School of Architecture, the Plan will create opportunities for new types of pedestrian-friendly development in the downtown area which will add significantly to the housing supply and the vitality of downtown businesses. It is anticipated that, in the aggregate, the new plan will create the potential for developers to achieve significantly higher densities than under the existing code.

The Heritage Credit Program would provide a way for developers to "earn" that added density for their projects by contributing to the preservation of nearby farms. In return for added density, developers would purchase density transfer credits --- called "Heritage Credits"--- from the City. The proceeds from the sale of those credits would be earmarked by the City for farmland preservation in specific areas identified by the City Council as priorities for protection.

As envisioned, the new Downtown Plan will provide a "base" level of development which can be achieved without participating in the Heritage Credit Program, and a "bonus" density that can be achieved by purchasing Heritage Credits. For example, many of the participants in the University of Washington's community workshops envisioned development along Fairhaven that incorporates housing above retail shops. If the City Council concurs in that vision, the Downtown Plan and zoning code may be structured to allow one floor of housing above retail as a "base", and an additional floor (or floors) of housing as a "bonus" with the purchase of Heritage Credits.

The concepts that emerged from the community workshops also included cottage housing, townhouse development and live-work housing in the areas adjoining the Fairhaven business district. Each of these housing types could be encouraged in the Downtown Plan at specific locations, with greater densities earned through the Heritage Credit Program. Design guidelines, developed as part of the Downtown Plan, will assure that the additional densities are accommodated in a manner that enhances the quality of life in the community.

Developers will have two incentives to purchase the Heritage Credits:

- In the near term, they will be able to achieve higher densities, and greater profits, by participating in the Program.
- In the longer term, the value of their developments will be enhanced by the added vitality of downtown and by the certainty that the beauty and character of nearby farmlands will be protected.

The price of the Heritage Credits will be established by the Burlington City Council in the context of developing the new Downtown Plan. In setting the price, the Planning Department is reaching out to real estate experts, builders and other stakeholders to assure the price reflects the realities of the marketplace. If the price of the credits is set too high, no one will buy them. If they are set too low, the public will lose precious resources to protect farmland. The Council may choose to adjust the price on an annual basis to reflect conditions in the marketplace with the goal of creating as much public benefit as possible while still providing effective financial incentives to participate.

Strategy for Farmland Preservation

As downtown revitalization occurs the sale of Heritage Credits will generate revenue, which will be dedicated to preserving farmland on the periphery of the City. The most efficient way to protect that farmland is to purchase development rights from the property so that it remains in agricultural use in perpetuity. This mechanism sustains the community's agricultural heritage not only through land preservation, but through compensating farmers for their development rights in a manner that enables them to recapitalize their operations. Fortunately, a highly-respected purchase of development rights (PDR) program, the Farmland Legacy Program, has already established a solid track record in Skagit County, preserving more than 4,000 acres of Skagit Valley farmland through the PDR mechanism. If agreement can be reached with Skagit County, City will contract with the Farmland Legacy Program to purchase development rights from the properties it wishes to protect. This would provide the Legacy Program with additional financial resources, simplify the process of engaging property owners, and minimize Burlington's costs for administering the Heritage Credit Program.

Comparison With Traditional TDR Programs

The proposed Burlington Heritage Credit Program is a streamlined version of the "Transfer of Development Rights" ("TDR") programs that have been created in more than one hundred local jurisdictions across America in the past two decades. The concept of the Heritage Credit Program, like virtually all TDR programs, is straightforward: it is a tool to move development away from areas the community wishes to protect to areas in which the community wants to encourage new

development. The Heritage Credit Program shares the following characteristics with most successful TDR programs:

- The Program would provide financial compensation to property owners for development rights purchased in the area to be preserved as farmland.
- The Program will be voluntary. Owners of farmland parcels in the areas nearby Burlington will be encouraged to sell their development rights through the Program, but they will not be compelled to do so. By the same token, developers will be encouraged to purchase Heritage Credits to earn higher densities for their developments, but they may choose instead to develop properties at the lower base densities allowed by the new Downtown Plan without participating in the Program.
- The Program will be an integral part of the City's zoning code. The new Downtown Plan will spell out the number of credits that must be acquired in order to achieve specific density bonuses within each area of the Downtown.

The proposed Heritage Credit Program will differ from traditional TDR programs in the following ways:

- The Heritage Credit Program will be much less complex than most TDR programs. Traditional TDR programs often require developers to negotiate deals with landowners to obtain development rights before they can receive the bonus. Developers in Burlington will be able to earn the density bonus by purchasing credits directly from the City at a set price.
- The Heritage Credit Program will allow greater flexibility in the timing of purchases of both credits and development rights. Most TDR programs which do not require developers to negotiate with property owners for development rights have established "TDR banks" as a mechanism for brokering the movement of development rights between property owners and developers. By contrast, the Heritage Credit Program does not require a TDR bank, and enables developers to make timely decisions in response to market conditions.
- The Heritage Credit Program will be easier and far less costly to administer than most TDR programs. If agreement can be reached with Skagit County, Burlington could contract with the Farmland Legacy Program to purchase development rights from landowners in the areas the city identifies as its priorities, and use the proceeds from the sale of Heritage Credits solely for that purpose. This would have the dual benefit of providing more resources to the Farmland Legacy Program, and greatly reducing the City's administrative burden to operate the Program.

BURLINGTON TDR PROJECT

CHARACTERISTICS OF SUCCESSFUL TDR PROGRAMS

1. THE PUBLIC RECOGNIZES THE VALUE OF THE COMMUNITY ASSET REPRESENTED BY THE SENDING AREAS (E.G., SKAGIT FARMLAND)
2. THE PUBLIC SUPPORTS THE TYPE, DENSITY AND LOCATION OF DEVELOPMENT GENERATED BY THE PROGRAM.
3. THE ZONING CODE REFLECTS THESE VALUES AND INCLUDES INCENTIVES TO USE TDRs.
4. SENDING SITE OWNERS ARE MOTIVATED TO SELL THEIR DEVELOPMENT RIGHTS.
5. RECEIVING SITE DEVELOPERS ARE MOTIVATED TO BUY TDRs.
6. TDR APPROVALS ARE FAST, EASY, AND CERTAIN.
7. DESIGN GUIDELINES ARE IN PLACE TO ENSURE QUALITY DEVELOPMENT AND CONTINUED PUBLIC SUPPORT.
8. A TDR BANK AND/OR REVOLVING FUND IS USED TO ENSURE THAT THERE IS A WILLING PURCHASER FOR THOSE WHO WISH TO SELL DEVELOPMENT RIGHTS, AND A READY SUPPLY FOR THOSE WHO WISH TO PURCHASE THEM.
9. ADEQUATE STAFF AND RESOURCES ARE AVAILABLE TO IMPLEMENT THE PROGRAM.
10. MECHANISMS ARE IN PLACE TO MONITOR THE PROGRAM AND REVISE IT AS NEEDED TO ENSURE SUCCESS.

Memo

To: Margaret Fleek

From: Tom Byers

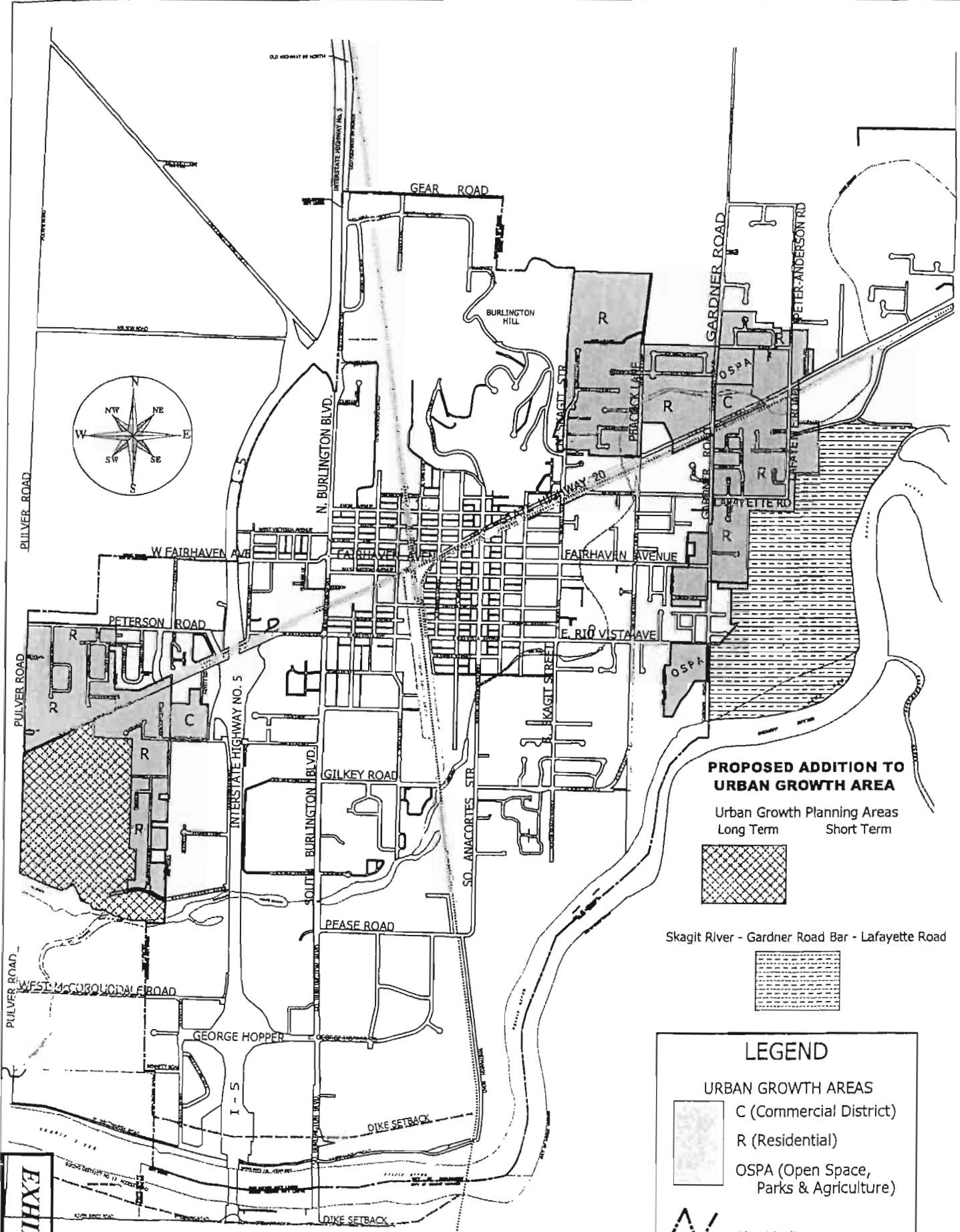
Re: Setting the value of the Heritage Credits

This memo responds to your request for a method to set the value of the Heritage Credits. I propose a formula that uses the value of the building site as the basis for setting the cost of the credits. My proposal is based on the following logic:

- With the credits, the developer will be able to create additional space on a given site.
- That space will have significant financial value which the developer would otherwise not be able to realize unless he bought a second site with equal development potential.
- Therefore, the cost of an identical building site represents the developer's alternative means of realizing the same development potential as he could with the credits.
- I suggest that this cost serves as a proxy for the maximum value that could theoretically be charged for the credits for a given project.
- In practice, however, the cost of the credits will need to be lower than the cost of the land or the developer will have no financial incentive to buy the credits rather than a second site.
- There are several advantages of using the land value to set the value of the credits: 1) It is a figure that can easily be determined through appraisal; 2) It is a method that can be easily understood by all parties involved; 3) Since land values will increase if the downtown redevelopment effort succeeds, the value of the credits will rise along with them; and, 4) This method frees you from having to link the cost of the credits to the number of units in the project.
- Within the maximum established by the value of the site, you have a policy choice about where to set the cost of the credit. The goal is to find the point at which you believe the greatest public benefit will be realized within the realities imposed by market forces.

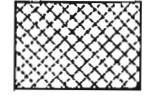
- When we met a few weeks ago, I suggested setting the initial cost of the credits at half the value of the land. That suggestion was based upon the belief that the City will need to provide adequate incentive to jump-start the desired new development by offering the first few developers who use the credits a favorable rate. This recognizes that they will be taking a certain amount of risk by creating a new type of building and the market for this building type in Burlington has not yet been firmly established.
- Developers may be willing to take that risk if the cost of the credits is 50% of the cost of an identical second site. It is possible that they may be willing to make that choice at 60%, or 75%, but we cannot be certain.
- If the program is successful, it may be possible to increase the percentage in later years when there is less risk involved for developers because earlier projects have succeeded. This is what happened with the federal low-income housing tax credit program. When the program was first launched, project sponsors were fortunate if they received 75% of the value of the credits. Now they are getting 95% in some cases.
- I suggest that it may be useful to take the following steps to gain further confidence as we complete this part of the code:
 1. Draft code language that captures these ideas. (I would be happy to draft some language if you would like. I will need the latest draft of the sections of the code that apply to the areas of the city covered by the credits program).
 2. Conduct interviews with development experts within the region to test the draft language and get their opinions about whether the 50% level is, in fact, the right place to start. I would suggest we include some leading developers who are outside the Burlington group and therefore have no vested interest in driving the percentage lower.
 3. Based upon this review, we could finalize the code language and be more confident that we are launching the program with the cost of the credits set at the right level.

I look forward to your response to these suggestions. Please let me know if you think it would be useful to meet to review these ideas in greater detail.



PROPOSED ADDITION TO URBAN GROWTH AREA

Urban Growth Planning Areas
 Long Term Short Term






Skagit River - Gardner Road Bar - Lafayette Road



LEGEND

URBAN GROWTH AREAS

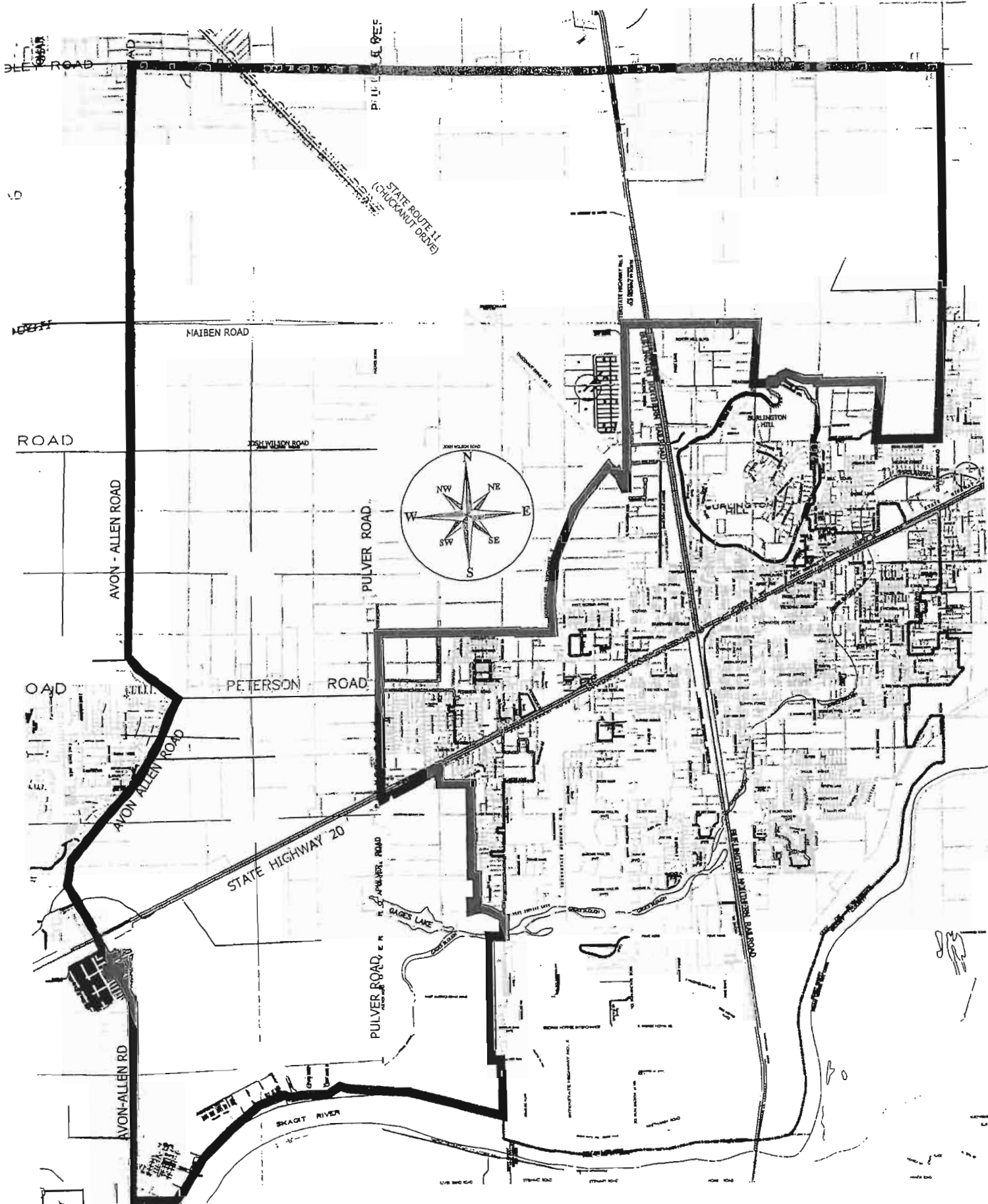
-  C (Commercial District)
-  R (Residential)
-  OSP (Open Space, Parks & Agriculture)



City Limits

EXHIBIT 1

CITY OF BURLINGTON
 DRAFT - 2007 UGA Growth Expansion Area Map



DEVELOPMENT RIGHT ACQUISITION AREA
5,316 ACRES

EXHIBIT 2

DRAFT

June 12, 2008

Allen Rozema
Executive Director
Skagitonians to Preserve Farmland (SPF)
414A Snoqualmie Street
PO Box 2405
Mount Vernon, WA 98273

Dear Allen:

This letter is a proposal on the part of Thomas/Lane & Associates (TLA), in association with Bill Mundy & Associates, Inc., to analyze the fair market value of real estate in downtown Burlington under different density assumptions and – based on that analysis – recommend to the city the fee it should charge for its Agricultural Heritage Credits. Bill Mundy, Ph.D. will be the lead analyst for this assignment. Dr. Mundy is one of the foremost land valuation professionals in the United States. He will be joined for this assignment by Theodore Lane, Ph.D. Dr. Lane's experience is concentrated in analyzing the public policy implications of local and regional economics and land use analyses. They jointly provide the mix of skills, experience and education to execute this assignment in a sound and professional manner. Resumes for Dr. Mundy and Dr. Lane are attached, as is a full qualifications statement for TLA.

It is our understanding that the goals of the Burlington Agricultural Heritage Credit Program (AHCP) are to revitalize downtown Burlington while preserving the city's agricultural heritage by protecting farmland close to the city. The AHCP is designed to work in concert with Burlington's new Downtown Plan which will create the potential for developers to achieve significantly higher densities than are permitted under the existing zoning and land use codes. The AHCP would provide the mechanism for developers to build higher density projects by allowing them to buy density credits (known as "Heritage Credits") from the city. The city will use the money it receives from the sale of the Heritage Credits to contract with the Farmland Legacy Program (which has successfully protected 4,000 acres of Skagit County farmland by transfer of development rights (TDR)

mechanism during the past decade) to purchase development rights from farmers in specific areas identified by the City Council as priorities for protection.

The Burlington AHCP will require payment of a fee set by the City Council for each dwelling unit over four units per acre located in Downtown Burlington (zoning districts Downtown Neighborhood, Downtown Office and Downtown Business) and it contains mechanisms that encourage increased residential density in Downtown Burlington.

In effect, the Burlington AHCP is a three legged stool, with two of the three legs in place and the third remaining to be created. The first leg is the pricing, negotiation and acquisition of development rights for farmland the city wants to protect – and this will be done by a contract with the Farmland Legacy Program. The second leg is a zone ordinance that provides encouragement for increased density in downtown Burlington and a method by which developers can purchase density-permitting credits – and this is being done through revisions now under way to the city’s zoning ordinance. The third leg is the establishment of a price that Burlington will charge developers for an Agricultural Heritage Credit. The price of a credit needs to be high enough to generate the revenues that will be needed to buy the development rights of the properties Burlington wants to protect. At the same time, the credit must make sense within the realities of Burlington’s downtown real estate market including the importance of giving developers an incentive to pursue higher density projects. This third leg involves complex issues that now and in the future will affect the market for higher density structures in downtown Burlington. To address these issues, we propose a 3-phased work program, as follows:

1. The first phase will set the context for determining reasonable AHCP credits.
 - Market research into the nature of, and trends in, Burlington’s GMA real estate market area will be done, including
 - Use of County records to establish the assessed value of downtown properties, by type of building structure, use, size and location.
 - Use County records to obtain recent sales data for properties located in the Burlington GMA area

- Case study research will be done to uncover similar areas where higher density development has been allowed to determine how it has worked and how successful it has been.
2. The second phase will consist of policy research that will identify options which can be used in setting up alternative AHCP credit regimes. Among the policy options we think need to be looked at are the following:
- Alternative methods of increasing downtown density need to be identified, for example, increasing downtown zoning from 4 units per acre to 8 – or more – units per acre instead of having quarter acre lot sizes and allowing building to go higher. Options that best fit Burlington’s downtown real estate market need be defined.
 - The AHCP credits can be set in absolute terms (i.e., dollars) or in relative terms (i.e., as a percent of market value), or some combination of the two. What are the pros and cons of each?
 - How can the program be immediately successful so that funds become available in a reasonably short time period to begin acquiring agricultural development rights?
 - Once a full range of feasible policy options has been defined, we anticipate sitting down with SPF and Burlington officials to identify their priority rankings.
3. The third and final phase will develop an implementation strategy, including recommended AHCP credit prices. It will also fully document the findings and conclusions of the entire 3-phase work effort that formed the basis of the final recommendations.

We understand that SPF and the City of Burlington have \$10,000 available to support an analysis of a price that Burlington should charge developers for an Agricultural Heritage Credit. We estimate that the above work program will cost more than that if billed at Dr. Mundy’s and Dr. Lane’s customary rates. We support the goal of preserving farmlands through the use of appropriately structured market mechanisms however and while we will keep records of time and charges associated with accomplishing the above work program, we will charge a firm fixed fee (including all time and materials costs) of \$10,000 for the first work phase— with the time and materials costs in excess of \$10,000 being an in-kind contribution to the City of Burlington and SPF. We anticipate that phases 2 and 3 will cost \$5,000 each, although there may have to be some adjustment based on the findings of the first work phase. Phases 2 and 3 will also be done as fixed fee contracts with the time and materials costs in excess of the agreed

too fixed fee amounts being an in-kind contribution to the City of Burlington and SPF

If this is acceptable to you, we are prepared to enter into a simple letter contract with the City of Burlington and/or SPF for this assignment.

Sincerely

Theodore Lane

cc: Bill Mindy

Skagit Valley Agricultural Land Value Analysis

Transactions received from assessor Dave Thomas for years 2006 – 2008 and analyzed (plat map, aerial, allowable dwelling units, physically inspected & photographed): 43.

Transactions ultimately used: 39.

Conclusions based on analysis of sales:

- Average value per acre of agricultural land:
 - No demand or zoning for dwelling unit;
 - Highest land productivity rating (Skagit or =);
 - No urban influence;
 - Average value: \$5,910, say \$6,000/acre.
- Value of “agricultural” land with urban influence based on the following assumptions:
 - Typical home-site size: Less than or equal to 5 acres;
 - Home-site value: \$220,000.
 - Value of excess home-site land:
 - Sites greater than 5 acres;
 - Value: \$5,000/acre.
 - Size and shape are the principle reasons value is less than \$6,000/acre.
 - Urban influence factor (proximity of urban area, freeway interchange)
 - Moderate influence: \$2,000/acre;
 - High influence: \$4,000/acre.

Conclusions based on analysis of:

1. rental data:

- Interviews were conducted with 6 knowledgeable farmers and appraisers;
- Potato ground: \$275/acre/year
- Non-potato ground: \$175/acre/year
- Grassland (Sedro Wooley area): \$75/acre/year.
- Weighted averages based on potato/other rotation:
 - 1/3 rotation: \$208/year
 - 1/4 rotation: 200/year.

2. Capitalization rates:

- Indiana: 8 year average = 7.59%
 - Realty Rates: Weighted average for 11 non-agricultural property types = 9.62%
 - Bill Mundy: Build-up method (rates from WSJ 11/28/08)
 - a. Safe rate: T-bills (unusually low due to credit crisis) = 2.1%
 - b. Prime: 4.00%
 - c. Risk: 1.00%
 - d. Non-liquidity: 1.00%
 - e. Conclusion: 6.00%.
3. Agricultural land rate of return:
- a. \$6,000/acre value
 - b. \$205/acre/year rental (net)
 - c. Rate of return: 3.42%.

5 T → 4.1
4 T → 5.1

PROGRESS REPORT

Analysis of the Value of the City of Burlington's Heritage Credits
(including a review of the Hovee Report's land requirements findings to the City of Mt. Vernon)
October 15, 2008

Meetings

Two meetings were held in Burlington by Theodore Lane, Ph.D. and Wilber Mundy, Ph.D.:

- with Margaret Fleek, Planning Director, City of Burlington on July 21st which also was attended by Kirk Johnson, Senior Planner, Skagit County Community Planning.
- with Margaret Fleek, Planning Director, City of Burlington on September 15th.

Site Visits

- Using zoning and land maps provided by Margaret Fleek, Theodore Lane, Ph.D. and Wilber Mundy, Ph.D. did a windshield survey of Burlington.
- Using maps and reports provided by Allen Rozema, Theodore Lane took part in a SPF sponsored tour of significant agricultural lands in Skagit County.
- Theodore Lane, Ph.D. and Wilber Mundy, Ph.D. visited with Kendra Smith, Skagit County Natural Resource Lands Policy Coordinator
- Theodore Lane, Ph.D. and Wilber Mundy, Ph.D. visited with Wesley Hagen, Skagit County Chief Deputy Assessor
- Theodore Lane, Ph.D. and Wilber Mundy, Ph.D. visited with Molly Doran and Martha Bray, Skagit Land Trust

Data Collection

- Wilber Mundy, Ph.D. obtained 42 transactional data case studies ("comps") from Wes Hagen in the Skagit County Assessor's Office. Forty of these case studies contained information from which it will be possible to quantify the values for and value differences between (a) "pure" agricultural land, (b) agricultural land that has development potential and (c) agricultural land that has been converted from agricultural use to urban development land use.
- Allen Rozema provided two complete appraisal reports that were done for SPF and which will be used to supplement the Assessor's case study data: one on a 29 acre property and one on a 109 acre property,
- Theodore Lane, Ph.D. obtained the following data bases for Skagit County, Burlington and Mt. Vernon:
 - Census of Population & Housing
 - Economic Census
 - Census of Agriculture
 - Employment & Earnings
 - OFM Population Estimates & Projections
 - Taxable Retail Sales

These data bases will be used to establish the macro economic trends within which land uses will be established and land values will be determined

Future Activity

- We currently anticipate delivering both the Burlington Heritage Credit Valuation Strategy report and the Review of the Hovee Report by January 15, 2009. Both reports will be submitted in draft and, after review and comment, will be revised as appropriate.

An outline of the Burlington Heritage Credit Valuation Strategy report is presented on the next page.

Outline of Burlington Report

Background

- Description of Heritage Credit initiative
- Likely impact of Heritage Fees on land use patterns

Macro Trends

- Regional Patterns (Snohomish, Skagit & Whatcom Counties)
- Skagit County Patterns
- Burlington Patterns

Micro Trends

- Value of development rights
 - Agricultural land with development rights
 - Agricultural land without development rights
- Value of Heritage (density) Credits
- Land Absorption Patterns

Conclusions & Recommendations

- A Development Strategy Using Heritage Credits
 - Creating different types of credits
 - Differences in use of credits in different areas
 - Expected demand, by time phasing, for Heritage credits
 - Expected revenues generated, by time phasing, from Heritage credits

**BURLINGTON AGRICULTURAL HERITAGE CREDIT PROGRAM
DRAFT ZONING CODE LANGUAGE**

17.68.155 Burlington Agricultural Heritage Credit Program.

A. Purpose. The purpose of the Agricultural Heritage Credit Program is to provide additional residential density in specific zoning districts in exchange for a fee dedicated to transfer and/or purchase of development rights through the Skagit County Farmland Legacy Program. The program provides a voluntary, incentive-based process for permanently preserving agricultural lands that provide a public benefit. The provisions of this Program are intended to supplement land use regulations, resource protection efforts and open space acquisition programs and to encourage increased residential development density inside the City where it can best be accommodated with the least impacts on the natural environment and public services by:

1. Providing an effective and predictable incentive process for agricultural land property owners to preserve lands with a public benefit;
2. Providing an efficient and streamlined administrative review system to ensure that transfers of development rights to receiving sites are evaluated in a timely way and balanced with other county goals and policies, and are adjusted to the specific conditions of each receiving site.

B. Application. The DTN, DTB, DTO and C-1 zoning district areas as shown on the official zoning map of the city of Burlington are a receiving zone for Burlington Agricultural Heritage Credits that are assigned towards the purchase of development rights from land zoned Agriculture Natural Resource in the Skagit County zoning ordinance and designated as significant open space connections on the official city of Burlington comprehensive plan map of the Urban Growth Area and the Community Connected Open Space Planning Area Map Exhibit A.

The residential use in the receiving zone shall be permitted at the rate of one additional residential dwelling unit per Burlington Agricultural Heritage Credit. The applicant may opt to acquire development rights from farmland that is included in the Skagit Farmland Legacy program and transfer those rights into the receiving zone at a rate comparable to the Burlington Agricultural Heritage Credit formula.

C. Definition of Terms Used in This Section.

1. "Burlington Agricultural Heritage Credit Program" means a voluntary program where density of new development may be increased as specified in this Title through the purchase of Heritage Credits at a set price established by Resolution directly from the City of Burlington and the funds are used by the Skagit Farmland Legacy Program towards the purchase of farmland development rights through an Interlocal Agreement/Contract.

2. "Development right" means one residential unit of credit. This is calculated for unincorporated Skagit County at the rate of one residential unit per 40 acres of farmland, or at the rate of one residential unit per county certified lot of record if the adjacent property is not owned by the same party, excluding land that is subject to a conservation easement, submerged, in the floodway, or otherwise must remain undeveloped. (A new code proposal is under review by the State Growth Management Hearings Board in 2005 that may eliminate development rights for lots less than 40 acres.) The Farmland Legacy Program will accumulate Burlington Heritage Credits until a willing seller is identified and there is enough funding to acquire one or more development rights from Agricultural Resource Land in the area specified on Map Exhibit A.

3. "Receiving site" means the site in the recipient zoning district that will receive the increased density by purchasing Burlington Heritage Credits at a set fee or transferring development rights from the sending site. Receiving sites in the city of Burlington are further described in the DTO, DTN and DTB zoning districts. (*note: reference to be replaced with BMC citations once available*).

4. "Sending site" means the site that is to be preserved as agricultural resource land by selling or transferring its residential development rights to the Skagit Farmland Legacy Program or other entity approved by the Skagit Farmland Legacy Program. Sending sites shall be maintained permanently as agricultural lands and no structures may be built on the land. Sending sites may not be in public ownership. If the sending site consists of more than one tax lot, the lots must be contiguous. For purposes of this section, lots divided by a street are considered contiguous if the lots would share a common lot line if the street was removed. For lots on which the entire lot or a portion of the lot has been cleared or graded pursuant to a Class II, III or IV special forest practice as defined in chapter 76.09 RCW within the six years prior to application as a sending site, the applicant must provide an affidavit of compliance with the reforestation requirements of the Forest Practices Act, and any additional reforestation conditions of their forest practice permit. Lots on which the entire lot or a portion of the lot has been cleared or graded without any required forest practices or county authorization, shall not be qualified or certified as a sending site for six years unless the six-year moratorium on development applications has been lifted or waived. See Map Exhibit A for land eligible as sending sites for the purpose of this ordinance.

D. General Requirements.

1. Property eligible for increased residential density is described in the DTO, DTN and DTB zoning districts (*note: reference to be replaced with BMC citations once available*).
2. Burlington Agricultural Heritage Credits shall be used by the Skagit Farmland Legacy Program for the acquisition of residential development rights on agricultural resource land in target locations to protect the Connected

Community Open Space Planning Area around the Burlington Urban Growth Area as identified on Map Exhibit A.

3. The residential development rights of agricultural resource land shall be considered as interests in real property and may be transferred by sale or gift in part or in total as provided in this section. Once used, credits for residential development rights shall not be used again and the residential development rights of the subject property providing them shall be considered severed forever.
4. Residential development rights on agricultural resource land may be transferred to a specific parcel in Burlington or sold to an individual(s) or other entity such as the Skagit Farmland Legacy Program.
5. On the receiving site the purchase of Burlington Agricultural Heritage Credits shall increase the underlying zoning density by one dwelling unit per Heritage Credit, as further designated in the DTN, DTO and DTB zoning districts. Owners of the parcels within the recipient zone districts gain additional density for their property when they purchase Burlington Agricultural Heritage Credits for the receiving site. Detailed use and development standards for the receiving site are specified in each zoning district.
6. Burlington Agricultural Heritage Credits shall be allocated to a specific receiving site.
7. Conservation easements shall be required for land contained in the sending site to indicate development limitations on the sending site.

E. Procedure to sell or transfer development rights from sending site. (*Note: this process may be amended by the Farmland Legacy Program.*)

1. The Farmland Legacy Program will receive Burlington Heritage Credit fees collected by the city and use those fees to acquire residential development rights on farmland in the areas identified on the official Burlington Community Connected Open Space Planning Area map.
2. Property owners participating in the farmland preservation program will use the following process to sell or transfer their residential development rights.
 - a. An owner of real property desiring to sell or transfer development rights shall submit an application for severance of development rights (sending site certification) to the Skagit Farmland Legacy Program or other such entity as the City Council may nominate. The Farmland Legacy Program shall determine the form of the application and the information required for a complete application. The Farmland Legacy Program shall determine if

the application may be accepted. Responsibility for preparing a completed application rests exclusively with the applicant. Application for sending site certification shall include:

1. A legal description of the site;
 2. A title report;
 3. A brief description of the site resources and public benefit to be preserved.
 4. A site plan showing the proposed conservation easement area, existing and proposed dwelling units, submerged lands, any area already in a conservation easement or other similar encumbrance and any other area, except setbacks, required by Skagit County to remain open;
- b. The applicant shall submit a Skagit County Lot Certification if the lot is less than 40 acres in size and the Farmland Legacy Program shall determine the number of residential development rights available for severance.
- c. A preliminary estimate of value is defined by reviewing the site selection criteria and pricing formula and the estimate is transmitted to the Conservation Futures Committee for approval and any additional steps required by the Farmland Legacy Program.
- d. To sever residential development rights approved by the Farmland Legacy Program, the property owner shall execute a restrictive easement,(the “conservation easement”), granting to the Farmland Legacy Program or a tax exempt organization or other governmental agency, as approved by the Farmland Legacy Program. The conservation easement shall preclude subdivision of the subject If the sending site includes Federal funds, an appraisal is ordered.
- e. Once development rights have been severed from a sending area property in accordance with this code, the property owner may sell or transfer the development rights by executing and recording with the Skagit County auditor a deed of residential development rights, using a deed form prescribed by the Farmland Legacy Program. The deed shall describe the number of development rights being sold or transferred.
- g. The certificate of residential development rights and the restrictive easement shall be recorded by the escrow agent of the Farmland Legacy Program with the Skagit County auditor. The owner shall provide a copy of the recorded documents to the Farmland Legacy Program. When the documents have been recorded and the recorded documents have been received by the department, the severance is complete.

D. Procedure to acquire and use Burlington Agricultural Heritage Credits.

1. A request to increase residential density within a receiving area by purchasing Burlington Agricultural Heritage Credits must be part of a land use permit application under chapter 17.68 BMC. The site plan must indicate the number of Burlington Agricultural Heritage Credits necessary to implement the project.
2. Prior to final approval of the site plan, the applicant must buy Burlington Agricultural Heritage Credits at the rate of one credit per additional dwelling unit.
3. The site plan, referencing the Burlington Agricultural Heritage Credits, shall be recorded by the owner with the Skagit County auditor.

Appendix F

Distribution List

KAPS Radio
P.O. Box 70
Mount Vernon WA 98273

KBRC Radio
P.O. Box 250
Mount Vernon WA 98273

Skagit County Commissioners
1800 Continental Place
Mount Vernon WA 98273

Public Utility District #1
P.O. Box 1436
Mount Vernon WA 98273

Port of Skagit County
P.O. Box 348
Burlington WA 98233

Puget Sound Energy
1700 E. College Way
Mount Vernon WA 98273

Cascade Natural Gas
1520 S. Second
Mount Vernon WA 98273

Verizon Northwest
595 Pease Road
Burlington WA 98233

Washington State
Dept. of Community Development
Growth Management Division
ATTN: Douglas Peters
P.O. Box 48300
Olympia, WA 98504-8300

Courier Times
807 Metcalf Street
Sedro Woolley WA 98284

Burlington-Edison School District
ATTN: Office of the Superintendent
927 E. Fairhaven Avenue
Burlington WA 98233

Comcast Cable
400 Sequoia Drive
Bellingham WA 98225

Sedro-Woolley School District
Attn: Office of the Superintendent
801 Trail Road
Sedro-Woolley WA 98284

Dept. of Agriculture
USNRC
2021 E. College Wy, Suite 214
Mount Vernon WA 98273-2373

Federal Emergency Management Agency
Mark Carey
130 228th St SW
Bothell WA 98021

Charles H. Ifft, P.E.
US Army Corps of Engineers
PO Box 3755
Seattle WA 98124-3755

Dept of Interior
US Fish & Wildlife Service
510 Desmond Dr Suite 102
Lacey WA 98503

Environmental Protection Agency
Teena Reichgott
1200 6th Ave (So 141)
Seattle, WA 98101

Federal Highway Administration
FWHA Area Engineer
711 S. Capitol Way, Suite 501
Olympia WA 98501-1284

Tom Sibley
NMFS, NW Region
7600 Sand Point Wy NE Bldg 1
Seattle, WA 98115

Washington State Dept. of Trans.
Mount Baker Area Headquarters
Attn: Roland Storme
1043 Goldenrod Road Suite 101
Burlington, WA 98233-3415

Washington State
Department of Natural Resources
N. W. Regional Office
919 N. Township
Sedro Woolley WA 98284

Washington State Office of
Archeology & Historic Preservation
111 West 21st Avenue
Olympia WA 98504-8343

Department of Ecology
Environmental Review Section
P.O. Box 47703
Olympia, WA 98504-7703

Washington State
Department of Wildlife
Attn: Wendy Cole
P.O. Box 1100
La Conner, WA 98257

Skagit Conservation District
2021 E. College Way
Suite 203
Mount Vernon WA 98273

Mrs. Gloria Y. Green
Sauk-Suiattle Tribal Council
5318 Chief Brown Lane
Darrington WA 98241-9421

Skagit System Cooperative
Cheryl Ryder
P.O. Box 368
La Conner WA 98257

Ms. Marilyn Scott
Upper Skagit Tribal Council
25944 Community Plaza Way
Sedro-Woolley WA 98284

Mr. M. Brian Cladoosby
Swinomish Indian Tribal Community
11404 Moorage Way P.O. Box 817
La Conner WA 98257

Skagit County Public Works
1800 Continental Place
Mount Vernon WA 98273

Skagit County Health Department
700 S. Second Street
Mount Vernon WA 98273

Northwest Air Pollution
1600 S. 2nd Street
Mount Vernon WA 98273

Sedro Woolley Planning Department
720 Murdock Street
Sedro Woolley WA 98284

Skagit Valley Herald
P.O. Box 578
Mount Vernon WA 98273

KLKI Radio
P.O. Box 96
Anacortes WA 98221

Skagit Argus
P.O. Box 589
Burlington, WA 98233

Skagit County Planning Department
1800 Continental Place
Mount Vernon WA 98273

Anacortes Planning Department
P.O. Box 547
Anacortes WA 98221

La Conner Planning Department
P.O. Box 400
La Conner WA 98257

Mount Vernon Planning Department
P.O. Box 809
Mount Vernon WA 98273

Skagit Council of Governments
204 W. Montgomery
Mount Vernon WA 98273

Burlington Chamber of Commerce
P.O. Box 1096
Burlington WA 98233

Skagit Valley Herald
P.O. Box 578
Mount Vernon WA 98233

State of Washington Department of Ecology
Northwest Regional Office
Attn: Chuck Steele
3190 160th Avenue S.E.
Bellevue WA 98008-5452

State of Washington Department of Ecology
Northwest Regional Office
Attn: Dan Sokol
3190 160th Avenue S.E.
Bellevue WA 98008-5452

Appendix G

Overview of Burlington's flood hazard mitigation program as it relates to the Corps of Engineers Measures List, and the need for a realistic approach to the Skagit River Comprehensive Flood Hazard Management Plan update

FROM REALITY TO A PLANNED END STATE, A PROGRESSION OF PROGRAMS AND PROJECTS IN FLOOD HAZARD MITIGATION

OVERVIEW

The planned end state for the Skagit River Region is still in the works with the Alternative Futures Project looking 50 years ahead, the Puget Sound Partnership, and other projects and programs, so it is really critical to take the opportunity presented by the update of the Skagit River Comprehensive Flood Hazard Management Plan to base the plan on existing conditions, then lay out a framework for action that builds on real programs and projects step by step, protecting the diverse interests that are represented in this region.

The goal of this report (from the Burlington/Hamilton perspective) is lay out real projects and existing conditions that should be identified and recognized in the update of the Skagit River Comprehensive Flood Hazard Management Plan as existing work in process. One important task is to agree on reasonable assumptions that need to be part of the framework that is built in to the program, then take a look at links and tough spots. It is critical to be clear about the state of the river today, as it relates to the Corps of Engineers 7 categories of measures, so that a reasonable approach is recognized and the parties have a positive framework to work together and move forward expeditiously with plan development in the context of current action.

As the process to update the Skagit River Comprehensive Flood Hazard Management Plan appears today, there is a sense of deliberate avoidance of taking on real issues, of framing the issues in a way that ignores practical reality, and putting another useless product on the shelf.

The Corps of Engineers General Investigation Measures report and planned development of a full array of alternative configurations of their measures list for National Environmental Policy Act review is clearly a paper exercise and no projects will emerge that meet the exhaustive array of tests nor will any be constructed in that framework. The process is simply not viable in this specific situation. Staff at the Corps of Engineers is rotating to two new people with no background on the Skagit River, and their Supervisor sees this as one of several future staff rotations on a project that has marginal funding and no schedule. Without a clear and committed local framework for action, their ability to play a useful role is severely constrained, even in the best of all possible funding climates.

The assumed goal of the update of the Skagit River Comprehensive Flood Hazard Management Plan is to implement flood hazard mitigation projects, execute companion conservation and restoration projects to restore ecosystem functions, and to complete them in a manner that minimizes adverse impacts while maintaining the economic vitality of the region. This unique area has unusual challenges with long term viability of agriculture, forestry, fisheries, listed species and habitat, programs such as recreation and public access, and existing urban uses. It is critical to a successful flood hazard

mitigation program that the plan recognizes that each component does coexist and provides the ability to work on common goals. Common interests include water quality and quantity, natural resource preservation and enhancement, quality of life, public safety, and many others.

The issue of using the correct hydrology for evaluating flood hazard mitigation measures in concert with appropriate ecosystem restoration measures is a key to the ability of this region to successfully implement realistic measures that avoid damage to upstream and downstream areas.

A regional perspective is critical to protecting existing armored urban areas while taking action to restore ecosystem functions and prevent further encroachment of development into the floodplain.

The opportunity is here today to put a plan of ACTION together that reflects what is REALLY happening on the ground today, looks for a balanced approach to the overall flood hazard mitigation program, looks at the links among diverse interests, and comes up with a workable approach that will be funded by primarily local interests, or includes a mint for cash.

REAL PROJECTS *by category*

Modification of Existing Dams, operational and structural changes – Measures 1,2,3

The Baker Dams have been relicensed, and operation of the dams is a major interagency issue that is making substantial progress today, as evidenced in recent flood events. One concern that has been expressed is whether the weather forecast is good enough to ensure that the ponds will refill in a timely manner to prevent harm to salmon.

The goal for downstream communities is to support changes in the Water Control Manual that will result in a drawdown based on the weather forecast, early and then timed through the event to optimize the benefit in reducing the peak of the flood event. Formal Interlocal Agreements with the dams and local agencies are proposed.

Ross Dam follows the same procedure and it has a substantial amount of storage available.

Once the hydrographs begin to rise, it is too late.

Additional Storage (non-dam related)- Measures 4,5,6,7,8,9,10,11,12,13,14,15,16

The existing condition for storage in the delta area is that Hart Slough and De Bay Slough fill, the Nookachamps basin fills, the Sterling area fills and overtops the railroad heading north to farmland and west in the Gages Slough corridor.

There is limited flood fighting along the railroad line and if it overtops, water is directed north and some goes west in Gages Slough (does not hold much).

All Dike District #12 levees are designed for overtopping and are either being raised, strengthened or setback. Levee segments in the existing urban area are being studied and designed for Certification through the FEMA Conditional Letter of Map Revision (CLOMR) process. A key goal is to stabilize base flood elevations close to their current elevation to protect the economic vitality of the city. Flood insurance will continue to be required and promoted; there will be larger floods no matter where the paperwork line is drawn, and the FEMA levee failure policy results in an unrealistic outcome in the river delta area.

Burlington and Dike District #12 are in the design process for enlarging the levee segment from the BNSF Railroad Bridge to the eastern end of the levee system at Lafayette Road. This segment includes the Burlington Wastewater Treatment Plant. The goal is to develop a design for 100-year Certification via the CLOMR process and a SEPA EIS is in process to gather information prior to the CLOMR application.

Today, the three-bridge corridor levee setback and certification project is underway with land acquisition and preliminary design and a biological assessment completed under the funding from FHWA. Skagit County is the lead entity, Dike Districts #12 and #17 as well as city staff from Burlington and Mount Vernon are participating in the program. This will be designed for a 100-year certification through the CLOMR process. Dike District #12 has already acquired the land for one segment of this project and all parties desire to move ahead with completing required reports and studies and pursuing additional funding for construction. This is levees only, no bridges at this time.

Burlington and Mount Vernon are working with all parties to seek funding for the design of a replacement bridge for the BNSF railroad. There are canned bridge designs, and it is definitely prudent to be ready in case the bridge fails, at a minimum.

Mount Vernon and Dike District #17 have a project in process for 100-year protection of the downtown business district, and documentation such as detailed design including completed environmental review for submittal of the CLOMR is nearing completion.

Sedro-Woolley is seeking 100-year flood protection for the Wastewater Treatment Plant; that project is listed in the measures under ring dikes; the final design concept has not been completed to date.

There has been at least one levee setback project downstream of Mount Vernon in the Fir Island Area by Dike District #3.

Bypass Systems – Measures 17,18,19,20,21

The question of extending the levee a few hundred feet towards Sterling, a training levee, is being studied by Burlington/Dike District #12. This will focus overbank flows to the

north prior to the three-bridge corridor. If the correct hydrology is used, this has potential to help Burlington without hurting Sedro-Woolley; more data is being collected at this time. The ability to accomplish this without mixing up the gene pool with the salmon in the Samish River may be relatively simple since the fish strand and die and there is no pathway back to either river.

If an official bypass route with flood easements and a structure is possible that is preferred. If not, it will happen at the discretion of the flood fight authorities in the next major flood event.

There is a clear limit on how much water fits under the BNSF Railroad bridge, so the choices of how to lower the water level are to dump water before it gets there, and at some point during the event, it may also overtop (or blow out) in a downstream location (see map of potential areas), lowering the water surface upstream.

The potential for acquisition of flood easements for overbank flows in flood events needs further study. It is a practical option.

Relocation/Ecosystem Restoration – Measures 22,23,24

Watershed Council Projects are a significant component here, and they include Skagit System Cooperative and Washington Department of Fish and Wildlife. They have a very scientific approach to studying potential projects.

The Cockreham Island Study is being followed up by additional plan development. The Watershed Council is starting a Middle Skagit Reach Study to take a hard look at the area from near Sedro-Woolley upriver. This computer modeling exercise is designed to evaluate the effects on the river if you recreate some of the distribution network. This will have the added benefit of helping prioritize floodway buyouts and land acquisitions to facilitate successful restoration in addition to ensuring that the type and sequence of projects will be successful.

Note: FEMA has been asked to look at adding Ecosystem Value to their BCA model to enhance the ability of repetitive flood loss properties to qualify for buyouts.

In the river area between Sedro-Woolley and the point of salt water influence around south Mount Vernon, there are several potential opportunities.

Skagit County prepared an assessment several years ago, of work that could be done to improve Hart Slough, discussion of existing conditions and next steps, such as talk to landowners, look at easements. There are conflicting opinions, one stating the area is not suited for salmon rearing habitat because of the angle of the river and it does not have hydrology to be maintained for salmon rearing; the other is that Skagit County government has changed to be more salmon friendly and there is potential in this location if the study is continued.

The Big Bend Study was authorized by the Watershed Council containing additional documentation about opportunities and constraints in the area from the north and south forks of the Skagit at Fir Island to the mouth of Nookachamps Creek. Johnson's Bar is partly owned by the City of Burlington and it has restoration potential IF vehicle use is prohibited for starters.

De Bay Slough was purchased for swans. It is a naturally functioning habitat that has relatively constant water levels and provides a safe roosting area. Today, this conflicts with the new paradigm. Someday it is possible to connect the side channel and provide controlled access for fish, while maintaining the swan habitat that is needed for protection. Restoring hydrology is no problem.

Generally, how far the levees are set back in the floodplain is important.

Opportunities for riparian buffer enhancement should be evaluated to see if there is a benefit, such as the riparian buffer east of the Gardner Road Boat Launch Ramp (owned by the city, water side of the levees), and the riparian buffer that is below the crossdike just east of the Railroad Bridge – these are the locations in the immediate vicinity of Burlington, there are no doubt others.

Wylie Slough is the estuarine habitat restoration project. At times, there was opposition from hunters and recreational users, even bird watchers who later recognized that ecosystem function restoration is good for birds in general. This is a salmon project that appears to have the potential to function better than expected. It is ½ constructed as they are waiting for the new dikes to settle in place before the old ones are removed, planned for this year.

Gages Slough restoration is focused on storm water quality improvement and buffer restoration with 15 projects identified, two completed and several ready to go. Salmon are not allowed since the area has been used as a dump for over 100 years. If the end of the Slough gets in public ownership and all the restoration work is completed, water quality is good, water temperature is good, then very expensive opportunities for salmon rearing habitat could emerge; unlikely at best and 50 years out.

Non-structural – Measures 25,26,27

The one idea that may have great potential is purchase of easements for overbank flow of floodwaters. This is NOT establishing floodway channels or relocating gene pools, it is simply accommodating overtopping in an organized program and paying for the infrequent use of the land. The Skagit Farmland Legacy program also includes acquisition of conservation easements for riparian buffers or habitat, and perhaps could assist in working with easements for overbank flow of floodwaters, as an added feature of a conservation easement.

The Town of Hamilton relocation program has a small approved urban growth area and next steps for the town are being evaluated in light of existing conditions.

Debris management is an existing maintenance program at several locations for bridges.

Ring Dikes- Measures 28,29,30,31,32,33,34,35,36,37

La Conner has plans developed for a ring dike to protect the town from Skagit River flooding.

Anacortes Water Treatment Plant levee upgrade is a work in process; design is to 100-year event.

Sedro-Woolley Wastewater Treatment Plant needs 100-year protection.

No Ring Dike is proposed around Burlington and likely only feasible in a very few locations, because of the upstream and downstream adverse effects. Most of the ring dike measures should be removed from further consideration and NOT included in the plan.

3 Bridge Corridor (Multi-bridge)

Modify bridges: a Freight/Rail Assistance application is in the works for the BNSF railroad bridge design.

Setting back the levees in this corridor is addressed earlier. Options for excavation after levee setback are several years down the road after construction and the new levees have hardened in place; further study of impacts and approach that might make this type of project compatible with the Dike Districts mission is clearly needed if there are to be companion restoration components when levees are set back in existing urban areas. This may require that the companion restoration project is in a different acceptable location that could be jointly sponsored by several agencies to get results where success is definite.

LINKS & Tough Spots

Existing Urban Areas

The Skagit River as it passes through urban areas must remain armored to protect life and property; this assumption is really important. Restoration projects may need to be located away from some of the levee segments to ensure that they will function properly and any riverside projects need to be carefully studied, implemented and monitored.

Communities with significant assets located in the 100-year floodplain are working on survival plans. The long term ability to maintain in terms of economy and quality of life requires stability in Base Flood Elevations.

The FEMA levee failure policy was adjusted in 1985 to accommodate the unique conditions in the Skagit River Delta area through a series of trade-offs that have proven

practical over the years. This was and continues to be a viable approach to the regulatory floodway issue, but FEMA is not yet considering continuing the existing framework. The levee failure policy that FEMA uses in its computer modeling to set base flood elevations is flawed in a large delta area such as the Skagit.

The difficulty of getting levee certification without federal support in terms of money and process is large, but there is considerable need to make it work in Burlington and Mount Vernon because of the massive public transportation infrastructure that must be protected for the region, in addition to the existing people, businesses and homes.

Burlington is committed to stay within current boundaries in terms of future expansion for development in the floodplain; all the urban growth area issues in the city are directly linked to floodplain management.

Rural Areas

Stop new development in the rural floodplain – already prohibited in the floodway except for agricultural and some nonresidential structures.

Protect resource lands.

Agriculture

What is the means to get a long term viable future? The Alternative Futures project is looking at this component. How much loss for habitat restoration is workable? What is the extent of the threat of development?

Options for flood hazard mitigation are limited; there will be overtopping into farmland and a means to provide for overflow without destroying farmland through easements or other mechanisms is needed. Options are limited to organized overflow versus flood by flood.

ESA/Fish

Ecosystem restoration has relatively long timelines and a tough planning process. There are frequently difficult conflicts with siting regardless of location, whether it is loss of agricultural land, removal of homes through the FEMA buyout process, or ensuring that the upstream and downstream effects are acceptable. An example is removing riprap at Cockreham Island.

Existing armoring may be perceived as always bad, but keeping existing urban areas from flooding to the extent practical protects water quality, so this is an example of a problem that may need be resolved by looking at a larger reach for ecosystem restoration opportunities and partnering with others.

A review of the slate of potential projects for each reach of the river, such as estuary, tidal and salt-water influenced, migration/rearing habitat in the delta, and spawning areas upriver and evaluation of needs for further study may be appropriate.

There appear to be internal environmental/resource conflicts on what is the best approach, is it “do nothing and litigate” or could get to “communicate and collaborate.” Why not take a regional approach and get river reach partners who want/need to participate in restoration opportunities?

NOAA fisheries concern about cross-genes with the Samish when there is overbank flow should be addressed; if it hasn't happened yet, and there are NO projects to link those systems, why would it. Stranding in a flood event leads to death it would appear.

Restoring the Wild and Scenic River as envisioned in the 1976 designation that begins upstream of Sedro-Woolley includes floodway restoration, removal of riprap, replanting riparian buffers, restoring riverine processes and functions, channel migration zones, and levee removal.

Planning for the restoration of the floodway at Hamilton is one big project that needs to begin soon because of the positive environmental benefits.

	Modifications of Existing Dams operational and structural changes	Description
1	Add'l. storage at Upper Baker Dam	Evaluating 85K, 100K storage, 110K storage, altered timing of rule curve release during at Upper Baker Dam during flood. Assuming operational changes to the dams, or use of PSE provided data for physical dam modifications. Early event draw down. Changes to Ross Dam would be operational only.
2	Add'l. storage at Lower Baker Dam	
3	Add'l. storage at Ross Dam	
	Additional Storage (non-dam related)	
4	Nookachamps storage	Levees/weir to store during peak flow in Nookachamps Basin
5	Hart's Slough Storage	Off-channel storage, levees and gate
6	Sterling Levee	Evaluating alignments to eliminate flooding upstream of Burlington.
7	Setback levees downstream of 3-br. Corridor	Setback levees on main-stem Skagit River and North and South Forks. May entail modification of Division Street bridge and North Fork and South Fork bridges.
8	Three bridge corridor – Setback levees	Setback levees in transportation corridor. (Multi-bridge)
9	Overtopping levees	Allow "controlled" overtopping of levees that do not protect urban areas
10	Setback Main stem and North fork	Setback levees on main stem Skagit and North Fork only
11	Raise and strengthen existing levees	Keep existing levee alignments, raise levees
12	Setback Levees with Excavation	Setback levees, excavate material riverward of levee
13	Setback Levees w/o excavation	Setback levees from 3 bridge corridor, for left bank, right bank, and left and right
14	Improve levee system – Left bank	Left bank levee improvements only
15	Improve levee system – Right bank	Right bank levee improvements only
16	Mount Vernon Floodwall	To provide 100-year protection to Mount Vernon business district, either as a stand-alone measure or in combination with setback levees. (Downtown flood protection)
	Bypass Systems	
17	North Swinomish Diversion, Avon bypass	Bypass from left bank of Skagit River to Padilla Bay or Swinomish Slough. (Avon)
18	Fir Island Bypass, Cross-island connect	Bypass from north Fork Skagit River through to Skagit Bay
19	Samish Bypass	Or "No Action" alternative
20	Mount Vernon Bypass	Right bank bypass through river bend downstream of Mount Vernon. An alternative to a floodwall and setback levee in this river reach. (Mount Vernon Diversion Channel)
21	River Bend Cut-off Levee. Big Bend	Would begin on west side of I-5 and extend west then south and parallel I-5 to River bend RD then east to I-5 embankment.
	Relocation/Ecosystem Restoration	
22	Cockreham Island	Removal of levee, restoration of riparian habitat
23	Estuarine Restoration projects (misc)	Removal of agricultural dikes/tide gates, restoration of sloughs, marine shoreline
24	Riparian Restoration projects (misc.)	Removal of levees, restoration of riparian vegetation, off-channel habitat.
	Non-structural	
25	Non-structural measures	May include structural elevation, relocation, and purchase of floodway easements, flood warning and the establishment of evacuation routes. May be combined with other measures.
26	City of Hamilton	Relocation of town and additional options. See 25 above.
27	Debris Management	Coordinated efforts for annual debris management for all bridges
	Ring Dikes	
28	Sedro Woolley	Levee system to provide 100-year protection to Sedro-Woolley
29	Sedro Woolley STP	Ring dike to protect waste water treatment plant.
30	Sedro Woolley Hospital	Ring dike to protect hospital
31	Burlington	Ring dike to provide 100-year protection to Burlington
32	North Mount. Vernon	Ring dike to provide 100-year protection to north Mount Vernon
33	West Mount Vernon	Ring dike to provide 100-year protection to West Mount Vernon
34	East Mount Vernon	Ring dike to provide 100-year protection to East Mount Vernon
35	La Conner	Ring dike to provide 100-year protection to La Conner
36	Clear Lake	Ring dike to protect Clear Lake
37	Anacortes Water Treatment Plant	Ring dike to provide 100-year protection to treatment plant
	3 Bridge Corridor (Multi-bridge)	
38	Modify bridges	Widen bridge spans (I-5, RR, State) or modify piers. (w, w/o setback levees)
39	Setback levees	Setback levees in 3 bridge corridor area, w, w/o excavation

Appendix H

Background Report - Dike District #12

Levee Plan and Profile Existing Conditions as of December 2007

Aerial Photos keyed to each Plan Sheet

Burlington Levee Certification Project Overview

FEMA Fact Sheet Requirements of 44 CFR Section 65.10

44 CFR Section 65.10

Joint Resolution 01-2007

**Interlocal Agreement between Burlington and Dike District #12 –
Preliminary Work for Levee Certification**

Background Report - Dike District #12

Dike District Commissioners: Chuck Bennett, Marv Cannon, John Burt

Date: February 2008

Background

Dike District #12 levee system is operated in compliance with Public Law 84-99, the Rehabilitation and Inspection Program, following the US Army Corps of Engineers Levee Owner's Manual for Non-Federal Flood Control Works, March 2006 Edition. The levee system is also required to comply with the current Corps policies for vegetation on levees, and the standards are restrictive. The latest Interim Vegetation Guidance for control of Vegetation on Levees is June 12, 2007, as the Corps is in the process of reviewing its current policies for addressing vegetation on levees.

Levee design is based on 44 CFR Chapter 1, Part 65, combined with the US Army Corps of Engineers, EM 1110-2-1913 Engineering and Design Manual, Design and Construction of Levees.

As stated in the April 1967 Floodplain Information Study Skagit River Basin Washington, Technical Report, periodic flooding led to the construction of low levees along the river shortly after initial settlement of the flood plain. These levees were effective in preventing spring flooding, but were not adequate for protection from winter floods with larger discharges. Later diking districts were formed and the original levees were raised and strengthened to prevent much of the winter flooding. The present levee system extends along both banks of the North and South Forks from their mouths to their junction forming the Skagit River. Continuous levees extend up the main Skagit River Channel past Mount Vernon to a point just above Burlington on the right bank and start at the Great Northern Railway (now BNSF) Bridge between Mount Vernon and Burlington on the left bank. The entire city of Burlington relies on levees for flood protection.

Overview of Dike District #12 in the Burlington area

There are approximately 10 freshwater miles of levees in the district, serving about 20,000 acres. The district also has saltwater dikes west of Burlington as they assumed Dike and Drainage District #8's territory.

The 1990 flood event occurred late in the same year the district installed keyways in the levee system along the south city limits. After the flood, that stretch of the river had lost some topsoil and the keyways where exposed were left standing vertical along the shoreline. An extensive keyway program followed combined with levee enlargement for wider tops and longer backslopes designed for overtopping. After the 1995 flood event, Burlington partnered with the dike district to acquire 130 acres of land along the riverfront to preclude additional development and provide land for levee enlargement. Today, levee enlargement has been completed for the

most vulnerable stretches of the riverfront upstream of the BNSF bridge and there is additional work in progress.

With the wider tops and longer backslopes, the framework is in place to add additional material to get to the correct elevation, looking at the range of elevations that have been identified, and that is from 2-5 feet to get the required 3 feet of freeboard.

There are a couple of gravel pits in this area that supply Glacial Till. This is an impervious material with a high clay content. When compacted, this makes ideal material for the keyways. The keyway prevents seepage of floodwaters through and/or under the levee.

Materials used for the backslopes include sandy loam, loam, clay and similar materials.

Documentation of Existing Levee Conditions at Burlington

See Levee Plan and Profile Sheets and Aerial Photos for visual overview of levee system. This background report starts at the upriver end of Dike District #12. One of the major components of the levee enlargement program is installation of clay keyways. The purpose of the keyway is to prevent seepage under the levee, as illustrated at the end of this report.

Plan Sheets 2,3,4

District boundaries extend east of Burlington to the United General Hospital that lies north of the railroad tracks, east of Collins Road.

The area south of SR 20 is called the Sterling area, and there are options for improved flood protection in this area. The Railroad Grade is considered to be a “natural barrier”. Three options are illustrated on the Aerial Photograph at this location.

A. In the 2006 flood event, fill was placed on the north side of the railroad tracks from District Line Road east to facilitate quicker, easier sandbagging operations. A levee could be constructed along that line so that future sandbagging would not be required.

B. A levee could be constructed 100 feet south of the center line of the railroad tracks at the edge of Lafayette Road.

C. At one time, a levee was proposed along the Skagit River in this area. The District put up 50% of the funding, and the people in Sterling were funding 50% of the cost. One property owner refused to have the levee on their land and the project was not built. A variation on that option would be to construct a levee on the south side of Lafayette Road behind the existing row of houses, to protect the existing homes that are routinely flooded.

Plan Sheets 4,5

This is the point at which Lafayette Road turns to the southwest and runs parallel to Gages Slough. Lafayette Road is on the old levee alignment from the Railroad to the intersection with the levee access road/Jones driveway. The road will remain in place and material will be added to the levee profile on the east side of the road.

Plan Sheet 5,6 and 7

The Skagit River makes a complete 180 ° turn at this point, and the river becomes significantly more narrow, leading to the term “stuffing an elephant through a mouse hole” and the plan of action that includes installation of a keyway, an 80’ levee top and a backslope that ranges from 6:1 to 8:1. The access drive that constitutes the levee top from the connection to Lafayette Road was widened to a 35-40 foot top with a longer backslope.

Plan Sheet 8 and 9

As of January 2008, the next section of levee improvements from Erchingers downstream to Boettchers has been permitted by Skagit County to complete levee enlargement connecting with Gardner Road Boat Launch Ramp. The existing 15’ top will be widened to a minimum of 30’ with longer backslope. After the pressure and force at the tight turn in the river, this area is around the corner and a more quiet backwater area.

Plan Sheet 9 and 10

At the Gardner Road Boat Launch Ramp area and heading down the river, the levee has a 30-35 foot top with a backslope of 4-5:1. from the outfall at the Wastewater Treatment Plant south to the next bend in the river, the levee has a keyway installed with a top that is approximately 50 feet wide and a backslope of 7-8:1.

Plan Sheet 11

This area has an approximate 40 foot top and 5:1 backslope

Plan Sheet 12

This location extends to the cross dike and has a 30-35’ top with an approximate 5:1 backslope.

Plan Sheet 13

This levee section is along the railroad grade. One of the first keyways ever installed in Skagit County was placed in this section in 1977. The backside is filled with ballast under the road. The railroad rebuilt this levee section when the second rail line was installed, utilizing the compacted glacial till.

Plan Sheet 14

In 1990, this levee was improved with the installation of a keyway to the Old 99 Bridge. The levee top was improved with the addition of a berm on the River side.

Plan Sheet 15, 16 and 17

The 1990 keyway project extended through this area to Bouslog Road. Another keyway project was completed in 1992-3 that extended from Bouslog Road to Pulver Road.

Remainder of District is outside the Urban Area .

Plan Sheet 18

Land has been acquired and the removal of the trailer park from the Gages Slough outfall area is underway. Backslope will be increased.

Plan Sheet 19 and 20

A keyway was installed from Main Street to Avon Street . In the Avon Bend area, beginning on Sheet 20, the profile was widened in the spring of 2007 to a 35-40 foot top and an increase in height of 3.5-4 feet. A keyway was installed in 1995 from Old Avon cannery downstream to the end of the district.

Plan Sheet 21 and 22

The profile was widened in the spring of 2007 to a 35-40 foot top and an increase in height of 3.5-4 feet. A keyway was installed in the summer of 1995 prior to the 1995 flood event.

Requirements of 44 CFR Section 65.10, Mapping of Areas Protected by Levee Systems in Summary

The FEMA requirements in Section 65.10 are separated into five categories. Following the description of the 65.10 requirement is the proposal by Dike District #12 to meet the requirement:

1. *General criteria* – FEMA will only recognize levee systems in its flood hazard and risk mapping effort that meet, and continue to meet, minimum design, operation and maintenance standards that are consistent with the standards for providing protection from the base flood. The FEMA review will be for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and shall not constitute a determination by FEMA as to how a structure or system will perform in a flood event.

Burlington's levee system is being designed, constructed, operated and maintained to meet 100-year base flood protection.

2. *Design criteria* – For levees to be recognized by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:

Freeboard –Riverine levees must provide a minimum freeboard of three feet above the water-surface level of the base flood. An additional one foot above the minimum is required within 100 feet on either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional one-half foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

Freeboard is designed to meet standards. The Dike District does control the upstream end of the levee and that will be an addition one-half foot above the minimum, tapering to not less than the minimum. The downstream end of the Dike District #12 levee system is a continued levee system under Dike District #1. There are three bridges in the levee system and an additional one foot above the minimum will be installed within 100 feet on either side of structures riverward of the levee or wherever the flow is constricted. No exceptions are requested.

Closures – All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.

The Wastewater Treatment Plant, the Stormwater Pump Station, the Valve at Old Highway 99, the Gages Slough Pump Station, Gages Slough outfall structure, and the Anacortes Water Treatment Plant are examples of the openings in the system. Written documentation of maintenance procedures and operation plan including flood warning system, plan of operation, periodic inspection of closures and interior drainage plan are being compiled for levee certification.

Embankment protection – Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability. The factors to be addressed in such analyses include , but are not limited to: Expected flow velocities (especially in constricted areas); expected wind and wave action; ice loading; impact of debris; slope protection techniques; duration of flooding at various stages and velocities; embankment and foundation materials; levee alignment, bends, and transitions; and levee side slopes.

A licensed Professional Engineering firm with expertise in the field will be hired to complete this documentation. Geotechnical work under the supervision of a licensed Geotechnical Engineer will address this component as well.

Settlement- Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum standards. This analysis must address embankment loads, compressibility of embankment soils, compressibility of foundation soils, age of the levee system, and construction compaction methods. In addition, detailed settlement analysis using procedures such as those described in the COE manual, "Soil Mechanics Design-Settlement Analysis" (EM 1100-2-1904) must be submitted.

A licensed professional engineer will be hired to complete this documentation, with expertise in the field. Geotechnical work will address this component as well. Mechanical compaction is used. Equipment, trucks, and roller compact the material.

Interior Drainage – An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and , if the average depth is greater than one foot, the water-surface elevations of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.

The levee enlargement program for the Burlington levee system is designed to prevent sand boils and interior flooding with the installation of keyways, wide tops, and long backslopes designed for overtopping. Documentation of levee problems over the past 50 years has assisted in identifying problem locations and those have been substantially upgraded.

Other design criteria- In unique situations, such as those where the levee system has relatively high vulnerability, FEMA may require that other design criteria and analyses be submitted to show that the levees provide adequate protection. In such situations, sound engineering practice will be the standard on which FEMA will base its determinations. FEMA will also provide the rationale for requiring this additional information.

No unique situations are apparent at this time.

3. *Operations plans and criteria* - All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual is revised.

Closures- Operation plans for closures must include the following:
Documentation of the flood warning system, under the jurisdiction of community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure.

A formal plan of operation including specific actions and assignments of responsibility by individual name or title.

Provisions for periodic operation, at not less than one-year intervals, of the closure structure for testing and training purposes.

The Flood Emergency Plan is updated annually and lays out the timeline for this action. It is included in the Natural Hazard Mitigation Plan in Appendix A.

Interior drainage systems – Interior drainage systems associated with levee systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof. These drainage systems will be recognized by FEMA on NFIP maps for floor protection purposes only if the following minimum criteria are included in the operation plan:

Documentation of the flood warning system, under the jurisdiction of community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure.

A formal plan of operation including specific actions and assignments of responsibility by individual name or title.

Provision for manual backup for the activation of automatic systems.

Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes. No more than one year shall elapse between either the inspections or the operations.

Existing procedural and maintenance manuals will be updated and expanded as need to include this data.

Other operation plans and criteria. Other operating plans and criteria may be required by FEMA to ensure that adequate protection is provided in specific situations. In such cases, sound emergency management practice will be the standard upon which FEMA determinations will be based.

Maintenance plans and criteria. For levee systems to be recognized as providing protection from the base flood, the maintenance criteria must be as described herein. Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner. All maintenance activities must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

Dike Districts operate under RCW Title 85.

The COE 500-1-1 standard is the maintenance program.

The levee maintenance program includes mowing 3 times a year. April, July (after the 4th) and Oct - but they do NOT mow the riverside in Oct. In 1995 it looked like there was going to be a flood and the District left the grass long on the riverside and bench. It laid down like a mat and did an excellent job of not allowing erosion. The COE likes it.

Removing unwanted vegetation, such as trees and blackberries is accomplished by Industrial Mowing and spraying (contractor)

Animal burrow control program is limited with respect to moles, but Beaver, Nutria and Muskrats pose much greater risk and are terminated. One problem is people taking their dogs with them on the levee and the dogs digging holes in the levee chasing after a mouse or something.

The standard states that vegetation on the riverside where the Ordinary High Water Mark is below the toe, heavy vegetation to promote ecological needs on the riverside is appropriate provided it is at least 15 feet beyond the toe of the levee. For levees where the Ordinary High Water Mark is above the levee toe, growth two inches in diameter or less on the levee is appropriate to retard bank erosion from the OHWM out to 15 feet beyond the toe of the levee or to the existing project easement limits. Dike District #12 is working on nothing within 40' of levee toe on either side. NO cottonwoods allowed and very few alder /other types. COE wants everything 4" diameter at DBH cut.

Trees must be cut down, rootballs dug out and back filled with good import material that will not allow piping action, ie: impervious glacial till or clay.

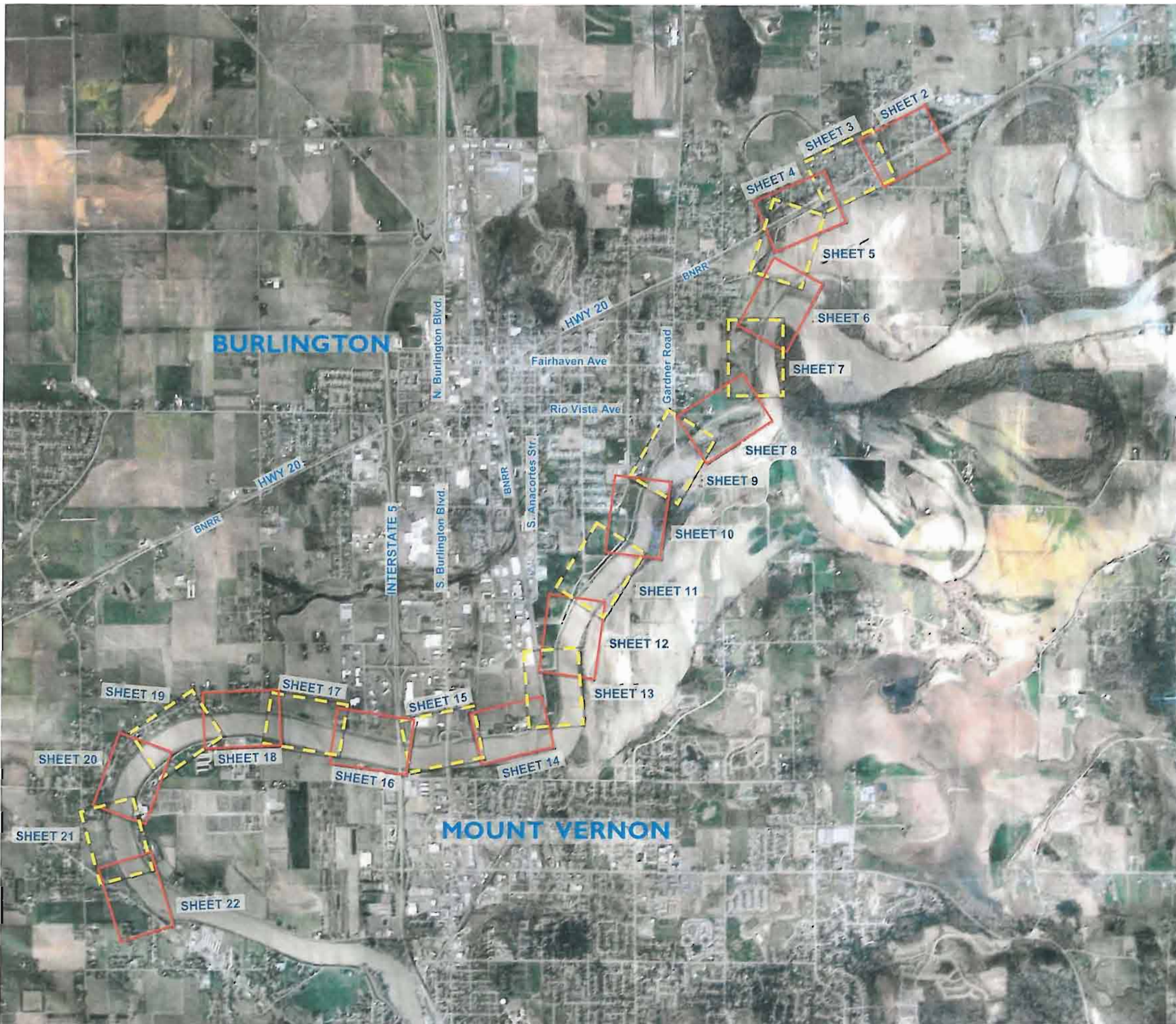
The guidance document is the March 2006 levee owners manual PL 84-99 program.

Certification requirements. Data submitted to support that a given levee system complies with the structural requirements set forth in the Design Criteria must be certified by a registered professional engineer. Also, certified as-built plans of the levee must be submitted. Certification is defined as follows:

A certification by a registered professional engineer or other party does not constitute a warranty or guarantee of performance, expressed or implied. Certification of data is a statement that the data is accurate to the best of the certifier's knowledge. Certification of analyses is a statement that the analyses have been performed correctly and in accordance with sound engineering practices. Certification of structural works is a statement that the works are designed in accordance with sound engineering practices to provide protection from the base flood. Certification of "as built" conditions is a statement that the structure(s) has been built according to the plans being certified, is in place, and is fully functioning.

In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection against the base flood.

A licensed professional engineering firm has hired to complete this documentation, with expertise in the field.



**DIKE DISTRICT #12
LEVEE PLANS**

November 2008

SKAGIT COUNTY DIKE DISTRICT # 12

SKAGIT RIVER LEVEE PLAN AND PROFILE

SKAGIT COUNTY, WASHINGTON

MAY 2008

COMMISSIONERS

CHARLES H. BENNETT

MARVIN CANNON

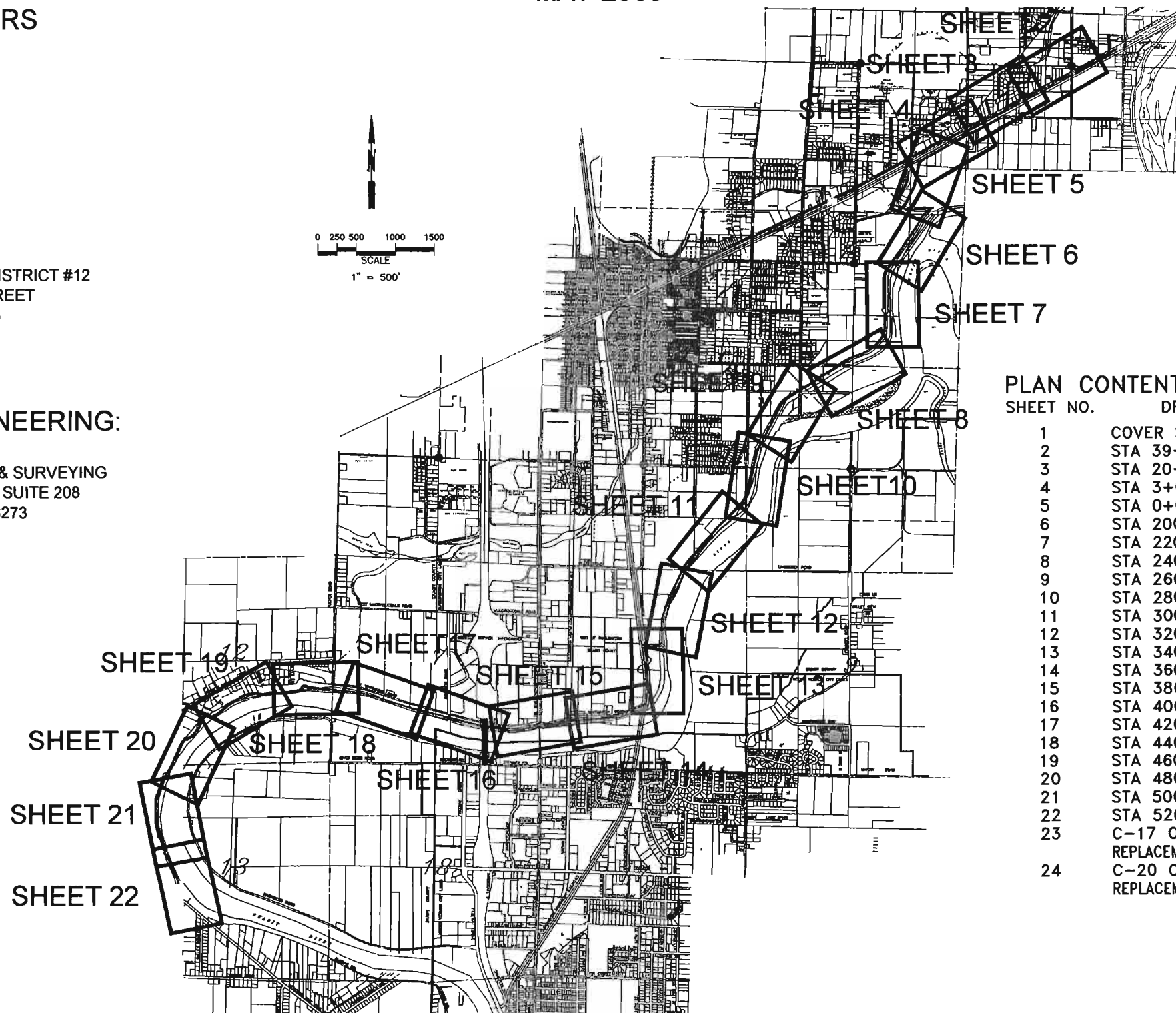
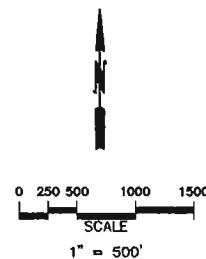
JOHN BURT

OWNER:

SKAGIT COUNTY DIKE DISTRICT #12
1317 S. ANACORTES STREET
BURLINGTON, WA 98233
TEL. (360) 757 - 3484

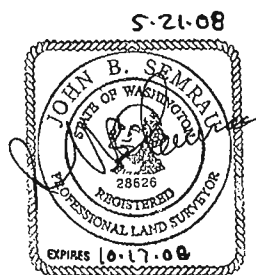
SURVEY/ENGINEERING:

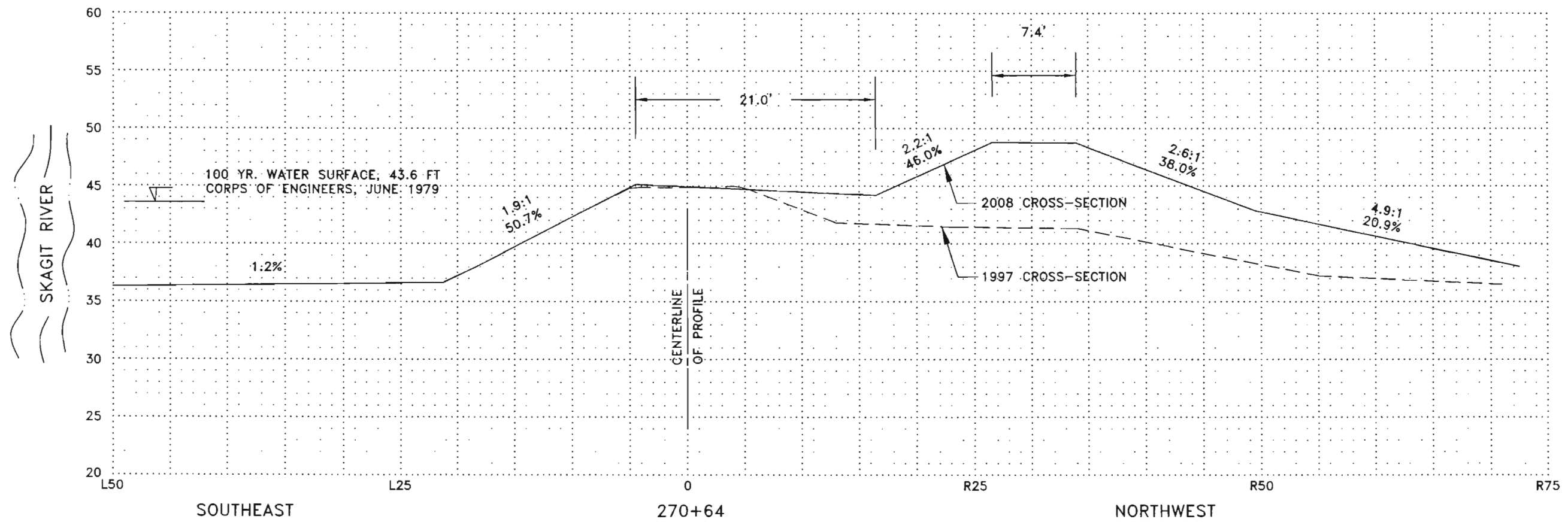
SEMRAU ENGINEERING & SURVEYING
2118 RIVERSIDE DRIVE - SUITE 208
MOUNT VERNON, WA 98273
TEL. (360) 424 - 9566



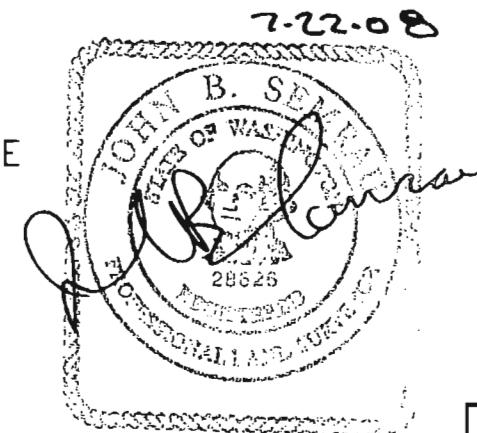
PLAN CONTENTS

SHEET NO.	DRAWING TITLE
1	COVER SHEET
2	STA 39+00 TO STA 47+00, BNRR
3	STA 20+00 TO STA 38+00, BNRR
4	STA 3+00 TO STA 19+00, BNRR
5	STA 0+00 TO STA 20+00, LAFAYETTE
6	STA 200+00 TO STA 219+00
7	STA 220+00 TO STA 239+00
8	STA 240+00 TO STA 259+00
9	STA 260+00 TO STA 279+00
10	STA 280+00 TO STA 299+00
11	STA 300+00 TO STA 319+00
12	STA 320+00 TO STA 339+00
13	STA 340+00 TO STA 359+00
14	STA 360+00 TO STA 379+00
15	STA 380+00 TO STA 399+00
16	STA 400+00 TO STA 419+00
17	STA 420+00 TO STA 439+00
18	STA 440+00 TO STA 459+00
19	STA 460+00 TO STA 479+00
20	STA 480+00 TO STA 499+00
21	STA 500+00 TO STA 519+00
22	STA 520+00 TO STA 524+00
23	C-17 OF CITY OF ANACORTES WATERLINE REPLACEMENT PROJECT SEGMENTS 5 & 6
24	C-20 OF CITY OF ANACORTES WATERLINE REPLACEMENT PROJECT SEGMENTS 5 & 6



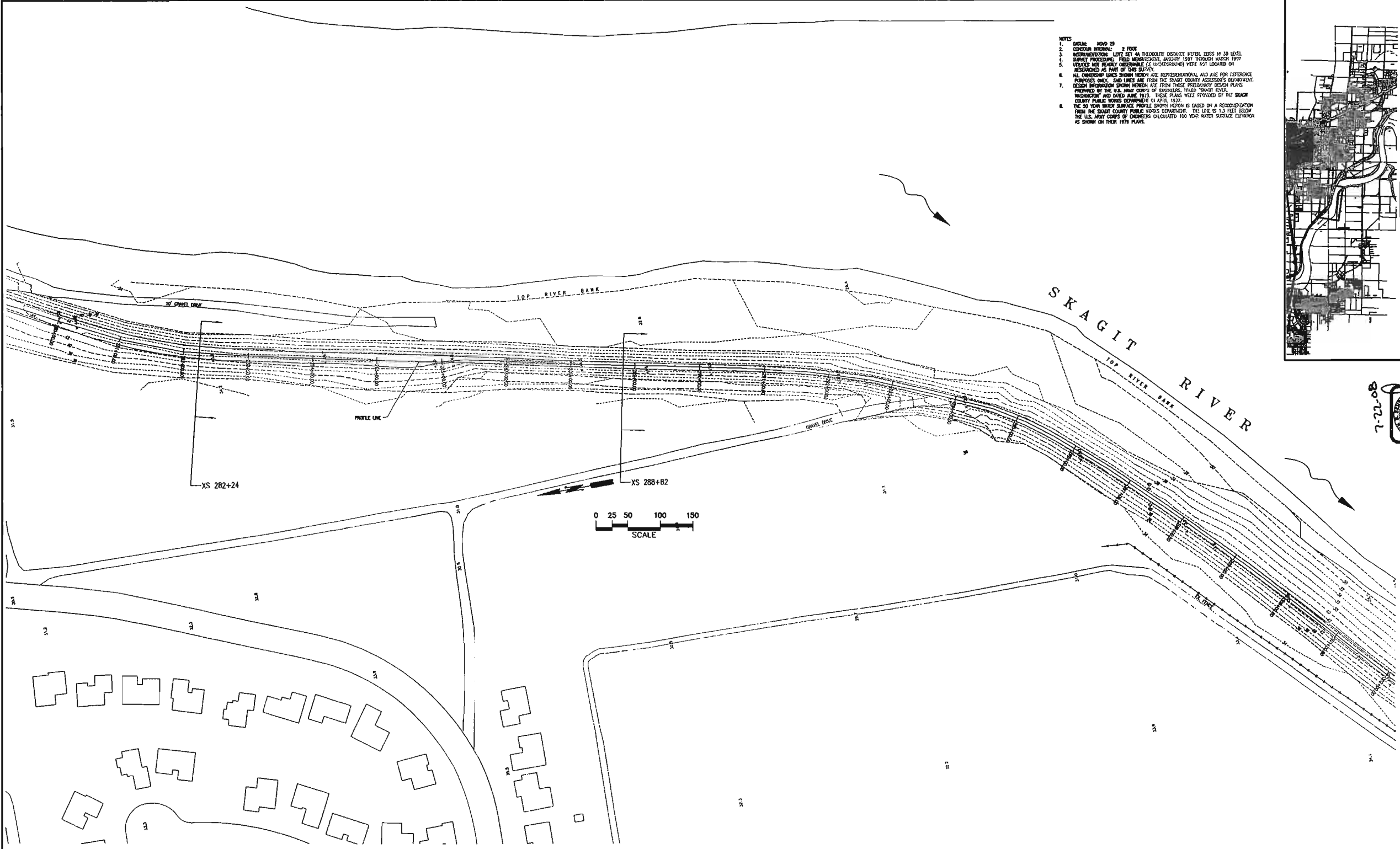


CROSS-SECTION 270+64
 SKAGIT COUNTY DIKE DISTRICT #12
 SKAGIT RIVER LEVEE PLAN AND PROFILE
 SHEET 9 OF 25
 APRIL 2008

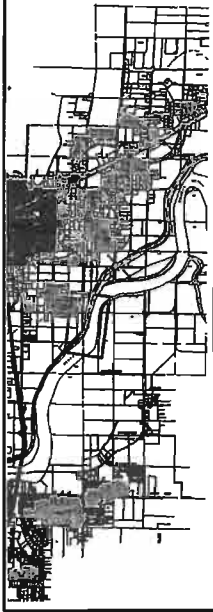


COPYRIGHT 2008
SEMRAU ENGINEERING & SURVEYING, PLLC
 CIVIL ENGINEERING • LAND SURVEYING • PLANNING
 2118 RIVERSIDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-424-9566

SCALE VERT: 1" = 10'	DATE: 6/30/08
SCALE HORZ: 1" = 10'	DRAWING: XS27064.DWG
NOTE: IF THIS SHEET IS LESS THAN 11"x 17" THEN SHEET HAS BEEN REDUCED	JOB NO.: 4450
	SHEET: 1 OF 7



- NOTES
1. DATE: 7/22/08
 2. CONTOUR INTERVAL: 2 FEET
 3. INSTRUMENTATION: LEVY SET AT THEODORE DISTANCE METER ZERO IN 30 LEVEL
 4. SURVEY PROVISIONS: FIELD MONITORING, JANUARY 1997 THROUGH MARCH 1997
 5. UTILITIES NOT REASILY OBSERVABLE (E. UNDERGROUND) WERE NOT LOCATED OR RECORDED AS PART OF THIS SURVEY.
 6. ALL UNDERGROUND LINES SHOWN HEREIN ARE REPRESENTATIONAL AND ARE FOR REFERENCE PURPOSES ONLY. SAID LINES ARE FROM THE SPOKANE COUNTY ASSESSOR'S DEPARTMENT. DESIGN INFORMATION SHOWN HEREIN ARE FROM THESE PROFESSIONAL DESIGN PLANS PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS, TITLED "SKAGIT FLOOD MITIGATION AND DRAINAGE STUDY". THESE PLANS WERE PROVIDED BY THE SPOKANE COUNTY PUBLIC WORKS DEPARTMENT ON APRIL 1977.
 7. THE 50 YEAR WATER SURFACE PROFILE SHOWN HEREIN IS BASED ON A RECONSTRUCTION FROM THE SPOKANE COUNTY PUBLIC WORKS DEPARTMENT. THE USE IS 1.5 FEET BELOW THE U.S. ARMY CORPS OF ENGINEERS CALCULATED 100 YEAR WATER SURFACE ELEVATION AS SHOWN ON THEIR 1978 PLANS.



COPYRIGHT 2008
 BERNDT ENGINEERING, PLLC
 CIVIL ENGINEERING - LAND SURVEYING - PLANNING
 2118 RIVERSIDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-431-6086

NO.	DATE	REVISION	BY	REV

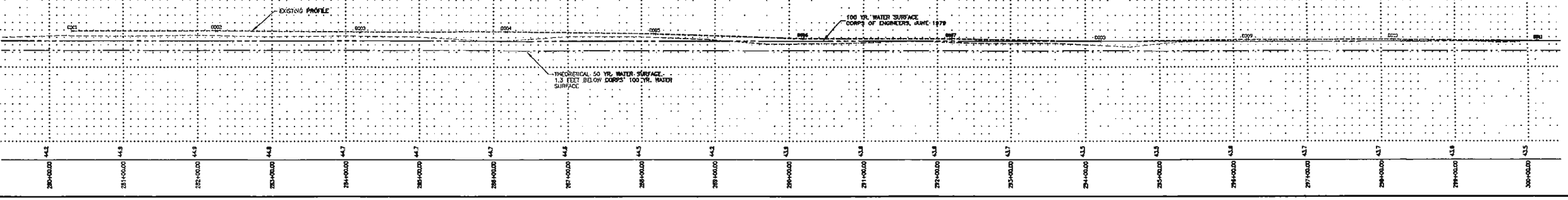


7-22-08
 STA 280+00 TO STA 299+00
 RIGHT BANK OF SKAGIT R. DIKE

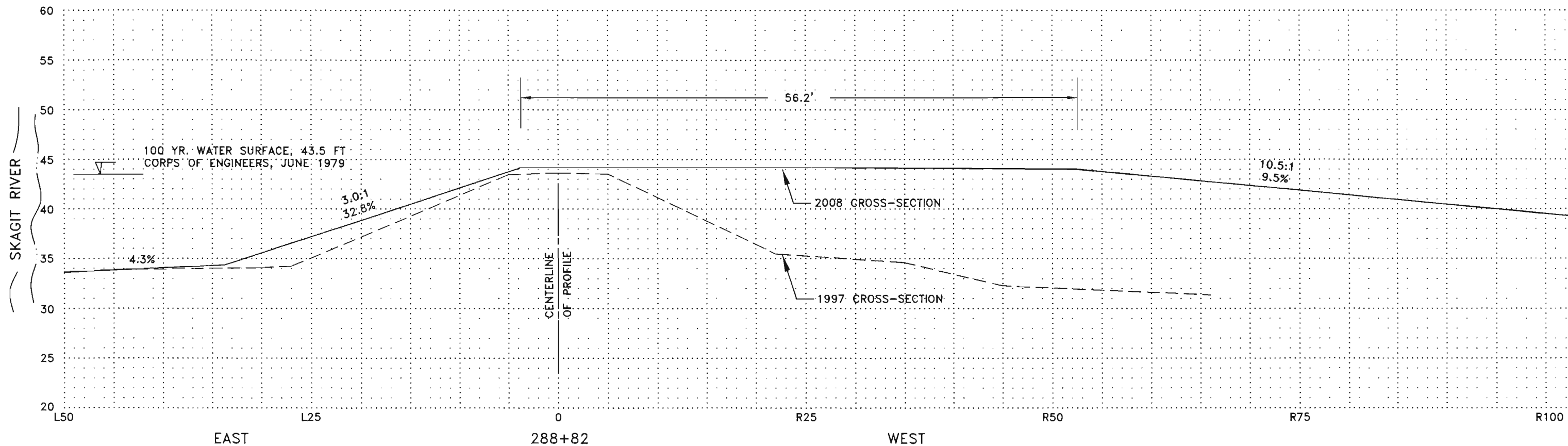
SCALES
 HORIZONTAL: 1" = 50'
 VERTICAL: 1" = 5'
 THIS SHEET IS LAYED
 OUT AT A SCALE OF 1" = 50'
 AND HAS BEEN REDUCED

DIKE DISTRICT NO. 12
 LEVEE PLAN AND PROFILE
 SECTION 4, T. 34 N., R. 4 E., W.M.
 SECTION 5, T. 34 N., R. 4 E., W.M.

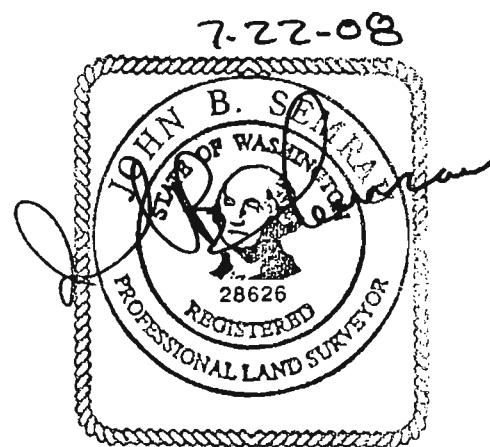
ALIGNMENT: A RB 280+00 TO 299+00
 Elevation displayed at 10X scale.



FIELD BOOK/PAC: 7/22/08
 DATE: 7/22/08
 DRAWING: DKS-P280LW0
 JOB NO: 4486
 SHEET: 10

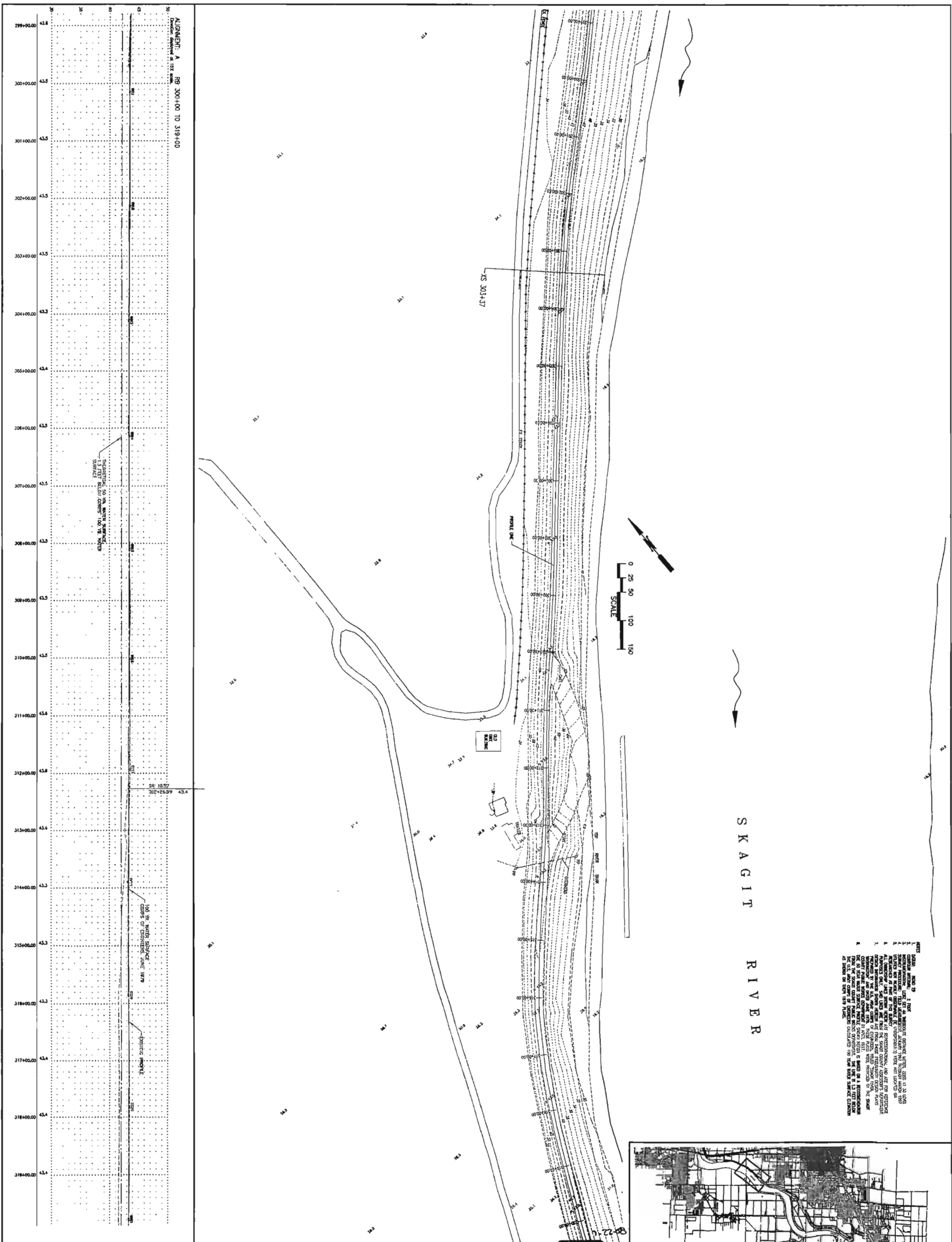


CROSS-SECTION 288+82
 SKAGIT COUNTY DIKE DISTRICT #12
 SKAGIT RIVER LEVEE PLAN AND PROFILE
 SHEET 10 OF 25
 APRIL 2008

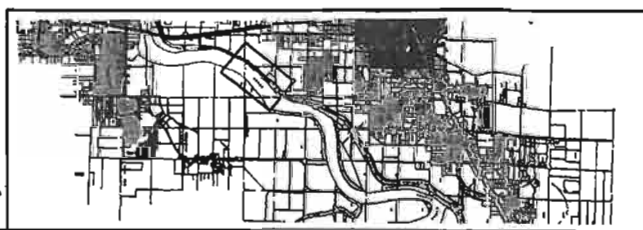


COPYRIGHT 2008
SEMRAU ENGINEERING & SURVEYING, PLLC
 CIVIL ENGINEERING • LAND SURVEYING • PLANNING
 2118 RIVERSIDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-424-9566

SCALE VERT: 1" = 10'	DATE: 6/30/08
SCALE HORZ: 1" = 10'	DRAWING: XS28882.DWG
NOTE: IF THIS SHEET IS LESS THAN 11"x 17" THEN SHEET HAS BEEN REDUCED	JOB NO.: 4450
	SHEET: 3 OF 7



NOTES:
 1. THE DRAWING IS TO BE CONSIDERED AS A PRELIMINARY DESIGN AND IS SUBJECT TO CHANGE WITHOUT NOTICE.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
 3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND STRUCTURES.
 5. THE CONTRACTOR SHALL MAINTAIN THE DIKE IN GOOD REPAIR AT ALL TIMES.
 6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL DEBRIS AND WASTE.
 7. THE CONTRACTOR SHALL MAINTAIN THE DIKE AT ALL TIMES.
 8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL ADJACENT PROPERTIES.
 9. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.
 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND STRUCTURES.



FIELD BOOK/PLO:
 DATE: 7/22/08
 DRAWING: DKS-P200.DWG
 JOB NO.: 4460
 SHEET: 11

DIKE DISTRICT NO. 12
LEVEE PLAN AND PROFILE
 SECTION 5, T. 34 N., R. 4 E., W.M.
 SECTION 8, T. 34 N., R. 4 E., W.M.

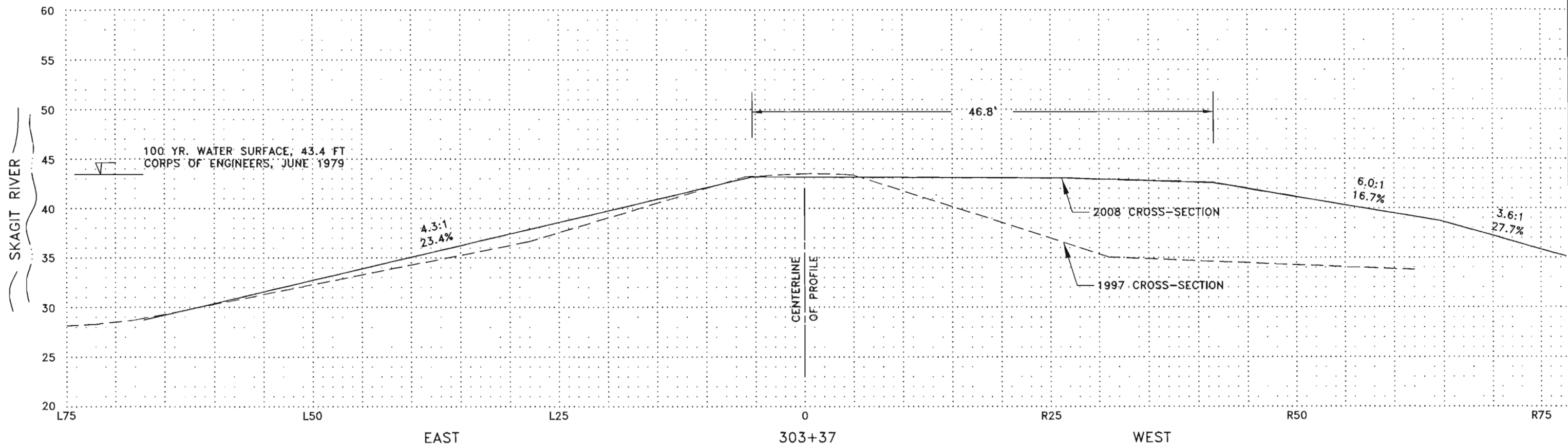
SCALE:
 HORIZONTAL: 1" = 50'
 VERTICAL: 1" = 5'
 NOTE: IF THIS SHEET IS LESS THAN 36" x 48" THEN SHEET HAS BEEN REDUCED

STA 300+00 TO STA 319+00
 RIGHT BANK OF SKAGIT R. DIKE



NO.	DATE	REVISION	BY	REV.

COPYRIGHT 2008
 SHERRILL ENGINEERING & SURVEYING, PLLC
 CIVIL ENGINEERING • LAND SURVEYING • PLANNING
 2118 REVERDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-424-8548

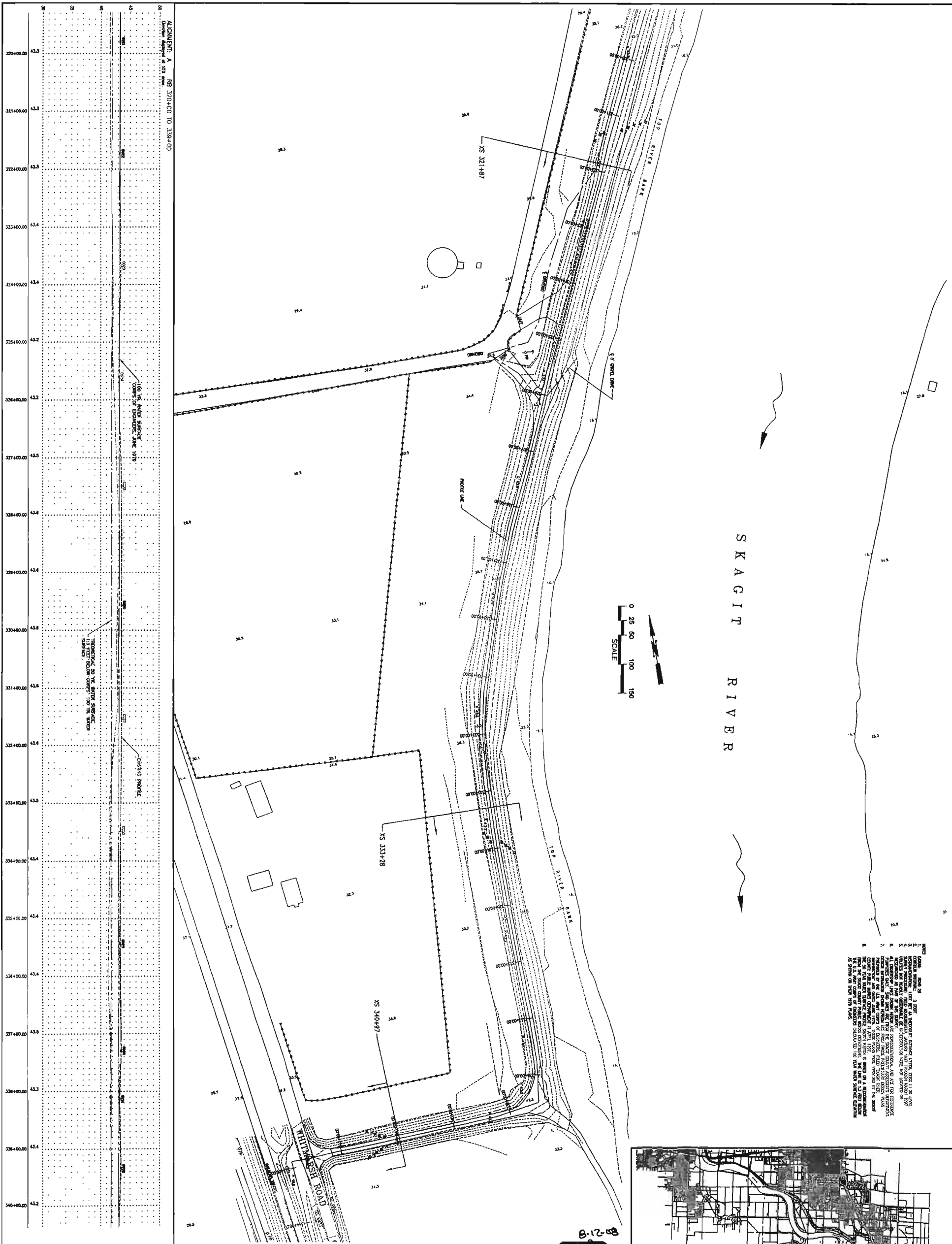


CROSS-SECTION 303+37
 SKAGIT COUNTY DIKE DISTRICT #12
 SKAGIT RIVER LEVEE PLAN AND PROFILE
 SHEET 11 OF 25
 APRIL 2008

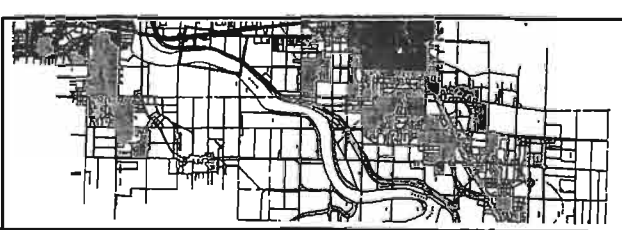


COPYRIGHT 2008
SEMRAU ENGINEERING & SURVEYING, PLLC
 CIVIL ENGINEERING • LAND SURVEYING • PLANNING
 2118 RIVERSIDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-424-9566

SCALE VERT: 1" = 10'	DATE: 6/30/08
SCALE HORZ: 1" = 10'	DRAWING: XS30337.DWG
NOTE: IF THIS SHEET IS LESS THAN 11"x 17" THEN SHEET HAS BEEN REDUCED	JOB NO.: 4450
	SHEET: 4 OF 7



NOTES:
 1. CONTRACT NO. 27
 2. CONTRACT NO. 28
 3. CONTRACT NO. 29
 4. CONTRACT NO. 30
 5. CONTRACT NO. 31
 6. CONTRACT NO. 32
 7. CONTRACT NO. 33
 8. CONTRACT NO. 34
 9. CONTRACT NO. 35
 10. CONTRACT NO. 36
 11. CONTRACT NO. 37
 12. CONTRACT NO. 38
 13. CONTRACT NO. 39
 14. CONTRACT NO. 40
 15. CONTRACT NO. 41
 16. CONTRACT NO. 42
 17. CONTRACT NO. 43
 18. CONTRACT NO. 44
 19. CONTRACT NO. 45
 20. CONTRACT NO. 46
 21. CONTRACT NO. 47
 22. CONTRACT NO. 48
 23. CONTRACT NO. 49
 24. CONTRACT NO. 50
 25. CONTRACT NO. 51
 26. CONTRACT NO. 52
 27. CONTRACT NO. 53
 28. CONTRACT NO. 54
 29. CONTRACT NO. 55
 30. CONTRACT NO. 56
 31. CONTRACT NO. 57
 32. CONTRACT NO. 58
 33. CONTRACT NO. 59
 34. CONTRACT NO. 60
 35. CONTRACT NO. 61
 36. CONTRACT NO. 62
 37. CONTRACT NO. 63
 38. CONTRACT NO. 64
 39. CONTRACT NO. 65
 40. CONTRACT NO. 66
 41. CONTRACT NO. 67
 42. CONTRACT NO. 68
 43. CONTRACT NO. 69
 44. CONTRACT NO. 70
 45. CONTRACT NO. 71
 46. CONTRACT NO. 72
 47. CONTRACT NO. 73
 48. CONTRACT NO. 74
 49. CONTRACT NO. 75
 50. CONTRACT NO. 76
 51. CONTRACT NO. 77
 52. CONTRACT NO. 78
 53. CONTRACT NO. 79
 54. CONTRACT NO. 80
 55. CONTRACT NO. 81
 56. CONTRACT NO. 82
 57. CONTRACT NO. 83
 58. CONTRACT NO. 84
 59. CONTRACT NO. 85
 60. CONTRACT NO. 86
 61. CONTRACT NO. 87
 62. CONTRACT NO. 88
 63. CONTRACT NO. 89
 64. CONTRACT NO. 90
 65. CONTRACT NO. 91
 66. CONTRACT NO. 92
 67. CONTRACT NO. 93
 68. CONTRACT NO. 94
 69. CONTRACT NO. 95
 70. CONTRACT NO. 96
 71. CONTRACT NO. 97
 72. CONTRACT NO. 98
 73. CONTRACT NO. 99
 74. CONTRACT NO. 100



FIELD BOOK/POL:
 DATE: 8/01/08
 DRAWING: DK4-P200LDW0
 JOB NO.: 4450
 SHEET: 12

DIKE DISTRICT NO. 12
LEVEE PLAN AND PROFILE
 SECTION B, T. 34 N., R. 4 E., W.M.
 SKAGIT COUNTY, WASHINGTON

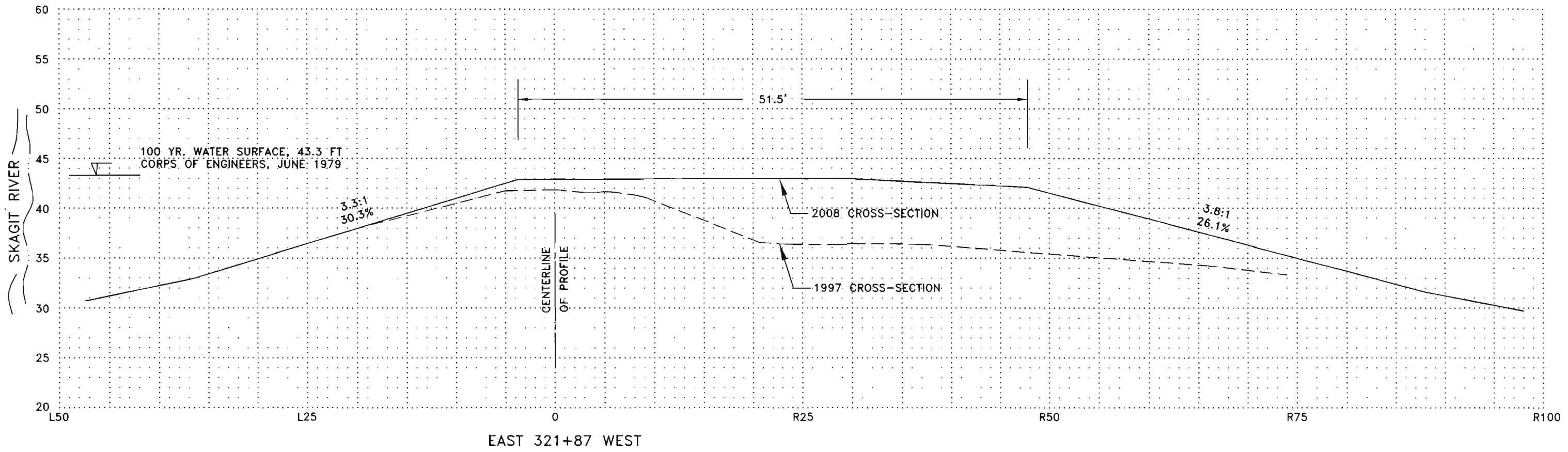
SCALES:
 HORIZONTAL: 1" = 60'
 VERTICAL: 1" = 5'
 NOTE: IF THIS SHEET IS LESS THAN 36" x 48" THEN SHEET HAS BEEN REDUCED

STA 320+00 TO STA 339+00
RIGHT BANK OF SKAGIT R. DIKE

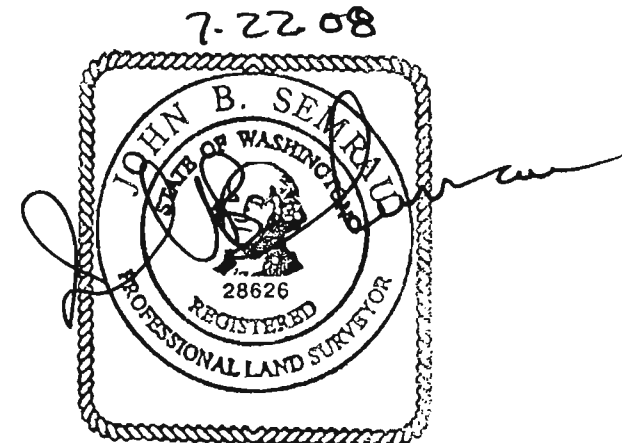


NO.	DATE	REVISION	BY	REV.

COPYRIGHT 2008
 HENRAU ENGINEERING & SURVEYING, PLLC
 CIVIL ENGINEERING • LAND SURVEYING • PLANNING
 1118 RIVERSIDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-424-8268



CROSS-SECTION 321+87
 SKAGIT COUNTY DIKE DISTRICT #12
 SKAGIT RIVER LEVEE PLAN AND PROFILE
 SHEET 12 OF 25
 APRIL 2008



COPYRIGHT 2008
SEMRAU ENGINEERING & SURVEYING, PLLC
 CIVIL ENGINEERING • LAND SURVEYING • PLANNING
 2118 RIVERSIDE DRIVE - SUITE 208
 MOUNT VERNON, WA 98273
 360-424-9566

SCALE VERT: 1" = 10'	DATE: 6/30/08
SCALE HORZ: 1" = 10'	DRAWING: XS32187.DWG
NOTE: IF THIS SHEET IS LESS THAN 11"x 17" THEN SHEET HAS BEEN REDUCED	JOB NO.: 4450
	SHEET: 5 OF 7

BURLINGTON LEVEE CERTIFICATION PROJECT

Overview

The process the City is following in order to change the map to show 100-year protection along the Skagit River frontage involves submitting an application for a Conditional Letter of Map Revision (CLOMR) to FEMA. This must occur prior to any work starting on the project itself because it will be FEMA's detailed review of the engineering plans and specifications to determine whether or not the levee will meet their standards, found at 44 CFR 65.10 of the NFIP regulations. This process is FEMA's statement that, if a project is built as planned, it will meet all of their requirements. A Letter of Map Revision (LOMR) application must then be submitted by the City after the project is built in order to change the maps.

Testing and Engineering Reports and Requirements for Levees

See also the FEMA March 2007 Fact Sheet, Requirements of 44 CFR Section 65.10: Mapping of Areas Protected by Levee Systems.

The objective of this report is to identify the testing and engineering reports and requirements for upgrading the existing levees to meet levee certification requirements, so that a Conditional Letter of Map Revision (CLOMR) may be applied for and issued through the Federal Emergency Management Agency (FEMA), setting the stage for completing the work to the satisfaction of the US Army Corps of Engineers with the final product being Certified Levees and a Letter of Map Revision (LOMR) issued by FEMA changing the BFEs accordingly.

This is a summary of the requirements from the US Army Corps of Engineer's Manual. Today, the City is required to hire a private engineering firm to prepare the design for submittal to FEMA. However, this information is still useful.

The US Army Corps of Engineers is the agency responsible for technical review of the design and construction of levees. The City of Burlington and Dike District #12 are working together to upgrade the existing levees so they will be certified as providing 100-year flood protection. By this means, the levees will be considered in computer models that may be used now and in the future to modify base flood elevations (BFEs). The goal is long term stability in the Base Flood Elevations that will specifically accommodate the revitalization of the historic Downtown Burlington that is designed with 30 foot wide lots, or the buildout and future redevelopment of both residential and commercial land over the long term. The historic small lot sizes cannot accommodate a significant increase in Base Flood Elevations.

The US Army Corps of Engineers Manual EM 1110-2-1913, 30 April 2000, Design and Construction of Levees is the framework document for the project. Looking at Table 1-1, Major and Minimum Requirements, a procedure is summarized for the design and construction of new levees, as follows:

Step	Procedure
1	Conduct geological study based on a thorough review of available data including Analysis of aerial photographs. Initiate preliminary subsurface explorations.
2.	Analyze preliminary exploration data and from this analysis establish preliminary soil profiles, borrow locations, and embankment sections.
3	Initiate final exploration to provide: a. Additional information on soil profiles. b. Undisturbed strengths of foundation materials. c. More detailed information on borrow areas and other required excavations.
4	Using the information obtained in Step 3: a. Determine both embankment and foundation soil parameters and refine preliminary sections where needed, noting all possible problem areas. b. Compute rough quantities of suitable material and refine borrow area locations.
5	Divide the entire levee into reaches of similar foundation conditions, embankment height, and fill material and assign a typical trial section to each reach.
6	Analyze each trial section as needed for: a. Underseepage and through seepage. b. Slope stability. c. Settlement. d. Trafficability of the levee surface.
7	Design special treatment to preclude any problems as determined from Step 6. Determine surfacing requirements for the levee based on future use.
8	Based on the results of Step 7, establish final sections for each reach.
9	Compute final quantities needed; determine final borrow area locations.
10	Design embankment slope protection.

In addition to determining the scope of work for Engineering studies to document existing conditions, identify any gaps in the work, establish final design parameters for each reach, and ensure that the levees now in place and any additional levee construction meets standards, there may be a need for Ring Levees and Setback Levees in the program. These will be new levees subject to the standards in the Design Manual. The height may exceed 3-4 feet, but that has not yet been determined. If so, a most rigorous engineering analysis is required.

Section 8-12, Earth-Levee Enlargement, sets out the engineering requirements for the Burlington main stem levees. Earth-Levee Enlargement is the technique being employed by Dike District #12 in constructing the addition to the existing mainline levees which raises the grade, widens the levee top, and extends the landside backslope to meet overtopping design standards. Riverside and Straddle levee enlargement is used as applicable in specific reaches.

Engineering Scope for Levee Enlargement as stated in EM 1110-2-1913, Section III Levee Enlargements, 8-11 and 8-12.

1. The modified levee section should be checked for through seepage and underseepage.

The two methods employed by Dike District #12 include cutoffs and landside seepage berms. Cutoffs in the form of clay keyways have been installed in stretches of the levee where landside boils have occurred in previous flood events. At other locations where major strengthening of the levee system was clearly prescribed because of previous flood event experience, landside berms have been installed as part of the long backslope.

A. Underseepage: Documentation of the work completed is required and further analysis may be required if the potential exists for underseepage. Principal seepage control measures for foundation underseepage are (a) cutoff trenches, (b) riverside impervious blankets, (c) landside

seepage berms, (d) pervious toe trenches, and (e) pressure relief wells. There are substantial literature references as needed in EM 1110-2-1913 and additional references utilizing seepage control methods as given in Turnbull and Mansur (1959), EM 1110-2-1901 and EM 1110-2-1914. If there is a determination of underseepage problems, as generally occurs most acutely where a pervious substratum underlies a levee and extends both landward and riverward of the levee and where a relatively thin top stratum exists on the landside of the levee.

B. Seepage through Embankments: This is unlikely to occur with long landside slopes that are adequately bermed, as constructed in the Dike District #12 levee upgrade program. Additional information on seepage control is presented in EM 1110-2-1913 and Chapter 8 of EM 1110-2-1901.

2. The modified levee section should be checked for foundation and embankment stability. Sufficient soil borings should be taken to determine the in situ soil properties of the existing levee embankment for design purposes.

Key features of the enlarged levees along the mainstem in Burlington are the long landside backslopes at 1V on 5-7H, and the extra wide crowns.

For existing levees, the minimum factors of safety for levee slope stability are 1.4 for Long-Term (Steady Seepage) and 1.0-1.2 for Rapid Drawdown. Detailed information on applicable shear strengths, methods of analysis and assumptions made for each case is referenced in EM 1110-2-1902.

3. An earth-levee enlargement should be made integral with the existing levee.

A. Enlargement shall have at least the same degree of compaction as the existing levee on which it is constructed.

B. Preparation of the interface along the existing levee surface and upon the foundation shall be made to ensure good bond between the enlargement and the surfaces on which it rests.

C. Foundation surface shall be cleared, grubbed, and stripped. Existing levee surface upon which the levee enlargement is placed shall also be stripped of all low-growing vegetation and organic topsoil. The stripped surfaces of the foundation and existing levee shall be scarified before the first lifts of the enlargement are placed.

Requirements of 44 CFR Section 65.10: Mapping of Areas Protected by Levee Systems

As part of a mapping project, it is the levee owner's or community's responsibility to provide data and documentation to show that a levee meets the requirements of Section 65.10 of the National Flood Insurance Program (NFIP) regulations. Links to Section 65.10 and many other documents are available on FEMA's Web site at www.fema.gov/plan/prevent/fhm/lv_fpm.shtm.

The FEMA requirements in Section 65.10 are separated into five categories:

1. General criteria;
2. Design criteria;
3. Operations plans and criteria;
4. Maintenance plans and criteria; and
5. Certification requirements.

The requirements for each of these areas are summarized below.

(A) GENERAL CRITERIA

For purposes of the NFIP, FEMA will only recognize in its flood hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with the level of protection sought through the comprehensive floodplain management criteria established by Section 60.3 of the NFIP regulations. Section 65.10 of the NFIP regulations describes the types of information FEMA needs to recognize, on NFIP maps, that a levee system provides protection from the flood that has a 1-percent chance of being equaled or exceeded in any give year (base flood). This information must be supplied to FEMA by the community or other party seeking recognition of a levee system at the time a study or restudy is conducted, when a map revision under the provisions of Part 65 of the NFIP regulations is sought based on a levee system, and upon request by the Administrator during the review of previously recognized structures. The FEMA review is for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and does not constitute a determination by FEMA as to how a structure or system will perform in a flood event.

(B) DESIGN CRITERIA


For the purposes of the NFIP, FEMA has established levee design criteria for freeboard, closures, embankment protection, embankment and foundation stability, settlement, interior drainage, and other design criteria. These criteria are summarized in subsections below.

(B)(1) FREEBOARD

For riverine levees:

- A minimum freeboard of 3 feet above the water-surface level of the base flood must be provided.
- An additional 1 foot above the minimum is required within 100 feet on either side of structures (e.g., bridges) riverward of the levee or wherever the flow is constricted.



- 
- An additional 0.5 foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

Exceptions to the minimum riverine freeboard requirements above may be approved if the following criteria are met:

- Appropriate engineering analyses demonstrating adequate protection with a lesser freeboard must be submitted.
- The material presented must evaluate the uncertainty in the estimated base flood elevation profile and include, but not necessarily be limited to:
 - An assessment of statistical confidence limits of the 1-percent-annual-chance discharge;
 - Changes in stage-discharge relationships; and
 - Sources, potential, and magnitude of debris, sediment, and ice accumulation.
- It must be also shown that the levee will remain structurally stable during the base flood when such additional loading considerations are imposed.

Under no circumstances will freeboard of less than 2 feet be accepted.

For coastal levees, the freeboard must be established at 1 foot above the height of the 1-percent-annual-chance wave or the maximum wave runup (whichever is greater) associated with the 1-percent-annual-chance stillwater surge elevation at the site.

Exceptions to the minimum coastal freeboard requirements above may be approved if the following criteria are met:

- Appropriate engineering analyses demonstrating adequate protection with a lesser freeboard must be submitted.
- The material presented must evaluate the uncertainty in the estimated base flood loading conditions. Particular emphasis must be placed on the effects of wave attack and overtopping on the stability of the levee.

Under no circumstances will a freeboard of less than 2 feet above the 1-percent-annual-chance stillwater surge elevation be accepted.

(B)(2) CLOSURES

The levee closure requirement is that all openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice.

(B)(3) EMBANKMENT PROTECTION

Engineering analyses must be submitted to demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.

The factors to be addressed in such analyses include, but are not limited to:

- Expected flow velocities (especially in constricted areas);
- Expected wind and wave action;

- Ice loading;
- Impact of debris;
- Slope protection techniques;
- Duration of flooding at various stages and velocities;
- Embankment and foundation materials;
- Levee alignment, bends, and transitions; and
- Levee side slopes.

(B)(4) EMBANKMENT AND FOUNDATION STABILITY

Engineering analyses that evaluate levee embankment stability must be submitted.

The analyses provided shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability.

An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in U.S. Army Corps of Engineers (USACE) Engineering Manual 1110-2-1913, Chapter 6, Section II, may be used.

The factors that shall be addressed in the analyses include:

- Depth of flooding;
- Duration of flooding;
- Embankment geometry and length of seepage path at critical locations;
- Embankment and foundation materials;
- Embankment compaction;
- Penetrations;
- Other design factors affecting seepage (e.g., drainage layers); and
- Other design factors affecting embankment and foundation stability (e.g., berms).

(B)(5) SETTLEMENT

Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum freeboard standards set forth in B(1).

This analysis must address:

- Embankment loads,
- Compressibility of embankment soils,
- Compressibility of foundation soils,

- Age of the levee system, and
- Construction compaction methods.

A detailed settlement analysis using procedures such as those described in USACE Engineering Manual EM 1100-2-1904 must be submitted.

(B)(6) INTERIOR DRAINAGE

An analysis must be submitted that identifies the source(s) of such flooding; the extent of the flooded area; and, if the average depth is greater than 1 foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters. Interior drainage systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof.

For areas of interior drainage that have average depths greater than 1 foot, mapping must be provided depicting the extents of the interior flooding, along with supporting documentation.

(B)(7) OTHER DESIGN CRITERIA

In unique situations, such as those where the levee system has relatively high vulnerability, FEMA may require that other design criteria and analyses be submitted to show that the levees provide adequate protection. In such situations, sound engineering practice will be the standard on which FEMA will base its determinations. FEMA also will provide the rationale for requiring this additional information.

(C) OPERATIONS PLANS AND CRITERIA

For a levee system to be recognized, the operational criteria must be as described below. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual for a previously recognized system is revised in any manner. All operations must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.

(C)(1) CLOSURES

Operation plans for closures must include the following:

- Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure;
- A formal plan of operation, including specific actions and assignments of responsibility by individual name or title; and
- Provisions for periodic operation, at not less than 1-year intervals, of the closure structure(s) for testing and training purposes.

(C)(2) INTERIOR DRAINAGE SYSTEMS

Interior drainage systems associated with levee systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof. FEMA will recognize these drainage systems on NFIP maps for flood protection purposes only if the following minimum criteria are included in the operation plan:

- Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists to permit activation of mechanized portions of the drainage system;
- A formal plan of operation, including specific actions and assignments of responsibility by individual name or title;
- Provision for manual backup for the activation of automatic systems; and
- Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes; no more than 1 year shall elapse between either the inspections or the operations.

(C)(3) OTHER OPERATION PLANS AND CRITERIA

FEMA may require other operating plans and criteria to ensure that adequate protection is provided in specific situations. In such cases, sound emergency management practice will be the standard upon which FEMA determinations will be based.

(D) MAINTENANCE PLANS AND CRITERIA

For levee systems to be recognized as providing protection from the base flood, the following maintenance criteria must be met:

- Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner.
- All maintenance activities must be under the jurisdiction of a(n):
 - Federal or State agency;
 - Agency created by Federal or State law; or
 - Agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance.
- The maintenance plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained.
- At a minimum, the maintenance plan shall specify:
 - Maintenance activities to be performed;
 - Frequency of their performance; and
 - Person by name or title responsible for their performance.



(E) CERTIFICATION REQUIREMENTS

Data submitted to support that a given levee system complies with the structural requirements set forth in B(1) through B(7) above must be certified by a Registered Professional Engineer. Also, certified as-built plans of the levee must be submitted. Certifications are subject to the definition given in Section 65.2 of the NFIP regulations. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection against the base flood.

occurred in the flood plain since the existing floodway was developed. If the original hydraulic computer model is not available, an alternate hydraulic computer model may be used provided the alternate model has been calibrated so as to reproduce the original water surface profile of the original hydraulic computer model. The alternate model must be then modified to include all encroachments that have occurred since the existing floodway was developed.

(ii) The floodway analysis must be performed with the modified computer model using the desired floodway limits.

(iii) The floodway limits must be set so that combined effects of the past encroachments and the new floodway limits do not increase the effective base flood elevations by more than the amount specified in §60.3(d)(2). Copies of the input and output data from the original and modified computer models must be submitted.

(3) Delineation of the revised floodway on a copy of the effective NFIP map and a suitable topographic map.

(d) *Certification requirements.* All analyses submitted shall be certified by a registered professional engineer. All topographic data shall be certified by a registered professional engineer or licensed land surveyor. Certifications are subject to the definition given at §65.2 of this subchapter.

(e) *Submission procedures.* All requests that involve changes to floodways shall be submitted to the appropriate FEMA Regional Office servicing the community's geographic area.

[51 FR 30315, Aug. 25, 1986]

§ 65.8 Review of proposed projects.

A community, or an individual through the community, may request FEMA's comments on whether a proposed project, if built as proposed, would justify a map revision. FEMA's comments will be issued in the form of a letter, termed a Conditional Letter of Map Revision, in accordance with 44 CFR part 72. The data required to support such requests are the same as those required for final revisions under §§ 65.5, 65.6, and 65.7, except as-built certification is not required. All such re-

quests shall be submitted to the FEMA Headquarters Office in Washington, DC, and shall be accompanied by the appropriate payment, in accordance with 44 CFR part 72.

[62 FR 5736, Feb. 6, 1997]

§ 65.9 Review and response by the Administrator.

If any questions or problems arise during review, FEMA will consult the Chief Executive Officer of the community (CEO), the community official designated by the CEO, and/or the requester for resolution. Upon receipt of a revision request, the Administrator shall mail an acknowledgment of receipt of such request to the CEO. Within 90 days of receiving the request with all necessary information, the Administrator shall notify the CEO of one or more of the following:

(a) The effective map(s) shall not be modified;

(b) The base flood elevations on the effective FIRM shall be modified and new base flood elevations shall be established under the provisions of part 67 of this subchapter;

(c) The changes requested are approved and the map(s) amended by Letter of Map Revision (LOMR);

(d) The changes requested are approved and a revised map(s) will be printed and distributed;

(e) The changes requested are not of such a significant nature as to warrant a reissuance or revision of the flood insurance study or maps and will be deferred until such time as a significant change occurs;

(f) An additional 90 days is required to evaluate the scientific or technical data submitted; or

(g) Additional data are required to support the revision request.

(h) The required payment has not been submitted in accordance with 44 CFR part 72, no review will be conducted and no determination will be issued until payment is received.

[51 FR 30315, Aug. 25, 1986; 61 FR 46331, Aug. 30, 1996, as amended at 62 FR 5736, Feb. 6, 1997]

§ 65.10 Mapping of areas protected by levee systems.

(a) *General.* For purposes of the NFIP, FEMA will only recognize in its flood

hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with the level of protection sought through the comprehensive flood plain management criteria established by § 60.3 of this subchapter. Accordingly, this section describes the types of information FEMA needs to recognize, on NFIP maps, that a levee system provides protection from the base flood. This information must be supplied to FEMA by the community or other party seeking recognition of such a levee system at the time a flood risk study or restudy is conducted, when a map revision under the provisions of part 65 of this subchapter is sought based on a levee system, and upon request by the Administrator during the review of previously recognized structures. The FEMA review will be for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and shall not constitute a determination by FEMA as to how a structure or system will perform in a flood event.

(b) *Design criteria.* For levees to be recognized by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:

(1) *Freeboard.* (i) Riverine levees must provide a minimum freeboard of three feet above the water-surface level of the base flood. An additional one foot above the minimum is required within 100 feet in either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional one-half foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

(ii) Occasionally, exceptions to the minimum riverine freeboard requirement described in paragraph (b)(1)(i) of this section, may be approved. Appropriate engineering analyses demonstrating adequate protection with a lesser freeboard must be submitted to support a request for such an exception. The material presented must

evaluate the uncertainty in the estimated base flood elevation profile and include, but not necessarily be limited to an assessment of statistical confidence limits of the 100-year discharge; changes in stage-discharge relationships; and the sources, potential, and magnitude of debris, sediment, and ice accumulation. It must be also shown that the levee will remain structurally stable during the base flood when such additional loading considerations are imposed. Under no circumstances will freeboard of less than two feet be accepted.

(iii) For coastal levees, the freeboard must be established at one foot above the height of the one percent wave or the maximum wave runup (whichever is greater) associated with the 100-year stillwater surge elevation at the site.

(iv) Occasionally, exceptions to the minimum coastal levee freeboard requirement described in paragraph (b)(1)(iii) of this section, may be approved. Appropriate engineering analyses demonstrating adequate protection with a lesser freeboard must be submitted to support a request for such an exception. The material presented must evaluate the uncertainty in the estimated base flood loading conditions. Particular emphasis must be placed on the effects of wave attack and overtopping on the stability of the levee. Under no circumstances, however, will a freeboard of less than two feet above the 100-year stillwater surge elevation be accepted.

(2) *Closures.* All openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice.

(3) *Embankment protection.* Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability. The factors to be addressed in such analyses include, but are not limited to: Expected flow velocities (especially in constricted areas); expected wind and wave

action; ice loading; impact of debris; slope protection techniques; duration of flooding at various stages and velocities; embankment and foundation materials; levee alignment, bends, and transitions; and levee side slopes.

(4) Embankment and foundation stability. Engineering analyses that evaluate levee embankment stability must be submitted. The analyses provided shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability. An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in the U.S. Army Corps of Engineers (COE) manual, "Design and Construction of Levees" (EM 1110-2-1913, Chapter 6, Section II), may be used. The factors that shall be addressed in the analyses include: Depth of flooding, duration of flooding, embankment geometry and length of seepage path at critical locations, embankment and foundation materials, embankment compaction, penetrations, other design factors affecting seepage (such as drainage layers), and other design factors affecting embankment and foundation stability (such as berms).

(5) Settlement. Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum standards set forth in paragraph (b)(1) of this section. This analysis must address embankment loads, compressibility of embankment soils, compressibility of foundation soils, age of the levee system, and construction compaction methods. In addition, detailed settlement analysis using procedures such as those described in the COE manual, "Soil Mechanics Design—Settlement Analysis" (EM 1100-2-1904) must be submitted.

(6) Interior drainage. An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than one foot, the water-surface elevation(s) of the base

flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.

(7) Other design criteria. In unique situations, such as those where the levee system has relatively high vulnerability, FEMA may require that other design criteria and analyses be submitted to show that the levees provide adequate protection. In such situations, sound engineering practice will be the standard on which FEMA will base its determinations. FEMA will also provide the rationale for requiring this additional information.

(c) Operation plans and criteria. For a levee system to be recognized, the operational criteria must be as described below. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual for a previously recognized system is revised in any manner. All operations must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.

(1) Closures. Operation plans for closures must include the following:

(i) Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure.

(ii) A formal plan of operation including specific actions and assignments of responsibility by individual name or title.

(iii) Provisions for periodic operation, at not less than one-year intervals, of the closure structure for testing and training purposes.

(2) Interior drainage systems. Interior drainage systems associated with levee systems usually include storage areas,

gravity outlets, pumping stations, or a combination thereof. These drainage systems will be recognized by FEMA on NFIP maps for flood protection purposes only if the following minimum criteria are included in the operation plan:

(i) Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists to permit activation of mechanized portions of the drainage system.

(ii) A formal plan of operation including specific actions and assignments of responsibility by individual name or title.

(iii) Provision for manual backup for the activation of automatic systems.

(iv) Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes. No more than one year shall elapse between either the inspections or the operations.

(3) Other operation plans and criteria. Other operating plans and criteria may be required by FEMA to ensure that adequate protection is provided in specific situations. In such cases, sound emergency management practice will be the standard upon which FEMA determinations will be based.

(d) Maintenance plans and criteria. For levee systems to be recognized as providing protection from the base flood, the maintenance criteria must be as described herein. Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner. All maintenance activities must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures

and systems are maintained. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

(e) Certification requirements. Data submitted to support that a given levee system complies with the structural requirements set forth in paragraphs (b)(1) through (7) of this section must be certified by a registered professional engineer. Also, certified as-built plans of the levee must be submitted. Certifications are subject to the definition given at § 65.2 of this subchapter. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection against the base flood.

[51 FR 30316, Aug. 25, 1986]

§ 65.11 Evaluation of sand dunes in mapping coastal flood hazard areas.

(a) General conditions. For purposes of the NFIP, FEMA will consider storm-induced dune erosion potential in its determination of coastal flood hazards and risk mapping efforts. The criterion to be used in the evaluation of dune erosion will apply to primary frontal dunes as defined in § 59.1, but does not apply to artificially designed and constructed dunes that are not well-established with long-standing vegetative cover, such as the placement of sand materials in a dune-like formation.

(b) Evaluation criterion. Primary frontal dunes will not be considered as effective barriers to base flood storm surges and associated wave action where the cross-sectional area of the primary frontal dune, as measured perpendicular to the shoreline and above the 100-year stillwater flood elevation and seaward of the dune crest, is equal to, or less than, 540 square feet.

(c) Exceptions. Exceptions to the evaluation criterion may be granted where it can be demonstrated through authoritative historical documentation that the primary frontal dunes at a specific site withstood previous base flood storm surges and associated wave action.

[53 FR 16279, May 6, 1988]

RESOLUTION NO. 01 - 2007

A JOINT RESOLUTION OF THE CITY OF BURLINGTON, WASHINGTON, AND SKAGIT COUNTY DIKE AND DRAINAGE DISTRICT NO. 12 TO SET A GOAL TO ACHIEVE FEMA-CERTIFIED 100-YEAR FLOOD PROTECTION FOR THE CITY OF BURLINGTON, WASHINGTON.

WHEREAS, the Federal Emergency Management Agency ("FEMA") is currently directing a flood plain study of the Skagit River, which affects the City of Burlington, and

WHEREAS, this study will likely result in a significant increase in the base flood elevation throughout the City of Burlington, and

WHEREAS, the Burlington City Council finds that increased base flood elevations in the City will, immediately and over time, negatively affect the character and quality of life for Burlington residents and work force due to reduced commercial and industrial growth; reduced residential, commercial and industrial redevelopment; and reduced ability of the City to invest in infrastructure and amenities necessary for a vibrant and thriving community, and

WHEREAS, the Burlington City Council further finds that such reduced residential development places the City at risk of failing to accommodate the population projections established by the state Office of Financial Management, thereby leading to the conversion of agricultural and natural resource lands, and a possible inefficient extension of City infrastructure and facilities, and

WHEREAS, Dike and Drainage District No. 12 has worked conscientiously over decades to improve the existing levee system, and the District believes that it can, in partnership with the City and other local, state, and federal entities, further improve its levee system to achieve certification by FEMA, with the goal that the system will withstand a 100-year Skagit River flood event, and

WHEREAS, obtaining such FEMA certification will likely proceed incrementally as sections of the levee system are studied, engineered, and further improved to meet FEMA certification standards, thereby over time removing sections of the City from the 100-year flood plain incrementally, and

WHEREAS, a certified levee system will provide additional protection from flood events to the constituents of Dike District 12 and the City of Burlington, and

WHEREAS, this levee improvement and certification program is expected to require many years to achieve;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BURLINGTON AND THE BOARD OF SKAGIT COUNTY DIKE AND DRAINAGE DISTRICT NO. 12 AS FOLLOWS:

The City of Burlington and Skagit County Dike and Drainage District 12 hereby mutually agree to work together cooperatively and in partnership, and along with

other Local, State, and Federal entities and to formalize any necessary agreements, including Interlocal Agreements, to achieve FEMA-certified 100-year flood protection for the City of Burlington, with the goal of removing the City from the FEMA flood plain.

Adopted this 8th day of February, 2007

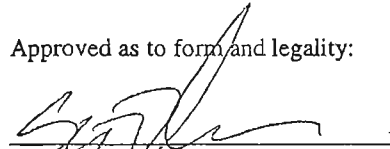
CITY OF BURLINGTON:


Roger "Gus" Tjebdsma, Mayor

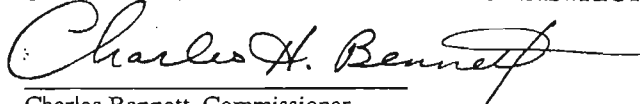
Attest:


Rick Patrick, Finance Director

Approved as to form and legality:


Scott G. Thomas, City Attorney

SKAGIT COUNTY DIKE AND DRAINAGE DISTRICT #12:


Charles Bennett, Commissioner


John Burt, Commissioner


Marv Cannon, Commissioner

Published: Argus 02-14-2007

INTERLOCAL AGREEMENT

BETWEEN CITY OF BURLINGTON AND DIKE AND DRAINAGE DISTRICT NO. 12 – PRELIMINARY WORK FOR LEVEE CERTIFICATION

THIS INTERLOCAL AGREEMENT (“Agreement”) is entered into between the CITY OF BURLINGTON, a Washington municipal corporation (“City”), and SKAGIT COUNTY DIKE, DRAINAGE AND IRRIGATION IMPROVEMENT DISTRICT NO. 12, a Washington special purpose district, (“District”) (collectively, “the Partners”).

RECITALS

1. The Partners are public agencies as defined by Ch. 39.34 of the Revised Code of Washington, and may enter into Interlocal agreements on the basis of mutual advantage to provide services and facilities in the manner and pursuant to forms of governmental organization that will accord best with geographic, economic, population, and other factors influencing the needs of local communities.

2. The Partners recognize that human life, transportation, infrastructure, natural resources, private property and the lives and safety of our community are at risk with each flood season.

3. The Partners are interested in finding cost-effective, long-term, and reasonable methods to reduce the risks from flood damage.

4. This Interlocal Agreement between the Partners will mutually benefit each Partner, by pursuing joint efforts to obtain engineering, geotechnical, and levee design work to form the basis of levee certification and ultimate accreditation by FEMA, for the protection of life and property in the jurisdictions of the Partners.

NOW THEREFORE, in consideration of the terms and provisions contained herein, the Partners agree as follows:

BACKGROUND

1. Skagit County Dike, Drainage, and Irrigation Improvement District No. 12 provides significant protection to areas in Skagit County, District boundaries, and the City of Burlington from Skagit River flood damage.

2. It is anticipated that Revised Flood Insurance Rate Maps (FIRMs) will soon be published by FEMA, indicating a substantially increased 1% flood surface water level estimates, therefore indicating a higher risk than previous analyses.

3. It is a joint goal of the City of Burlington and Dike, Drainage, and Irrigation Improvement District No. 12 to achieve accreditation for those sections of the levees which protect the City's urban growth areas, and to provide substantial (but not 1%) flood protection elsewhere within the District.

4. In order to achieve this goal, it is necessary to form a Partnership to conduct technical analysis of the existing levees, begin environmental permitting activities, commence preliminary engineering to design the levee improvements which will be necessary to achieve certification and ultimately, after the capital levee improvements are in place, accreditation by FEMA.

5. The City of Burlington has the staff expertise necessary to oversee this effort, in coordination with Dike, Drainage, and Irrigation Improvement District No. 12.

6. That the District has the staff, resources, and expertise necessary to coordinate flood control structure technical analysis, design, and repairs and improvements to the levees, for protection of life and property from flooding.

AGREEMENT

1. Partnership Purpose. A Partnership is hereby formed between the City of Burlington and Skagit County Dike, Drainage and Irrigation Improvement District #12, hereinafter designated "Partners", for the purpose of initiating engineering, technical, and levee design analysis which will form the basis for levee modification, reconstruction, repairs, and improvements; and producing construction bid documents for initiating and constructing projects required to bring the City's Urban Growth Area, and other areas determined by the Partners, out of the 100-year flood plain, resulting in accreditation to the 100-year flood level, (or 1% flood) from FEMA.

2. Administration of Agreement. The City of Burlington will provide technical oversight and management of the engineering design efforts, in partnership and in consultation with the District. The City will administer this Agreement to carry out its purpose, in partnership with the District, and with the advice, consent, and approval of the District. The City, through independent contractors, after approval of District, will provide the engineering services addressed in this Agreement, and will be responsible for compliance with all laws, rules, and regulations.

3. Joint Cooperation and Approval. As this effort proceeds, all activities, milestones, intermediate steps, selection of consultants, key decisions, political advocacy, budgeting, public information, use of resources and any/all other decisions important to either Partner, will be agreed upon by both Partners prior to proceeding and initiating such activities or decisions. It is understood and agreed between the Partners that, as the owner of the levee system, the prior approval of District will be required before initiating all broad conceptual design approaches as well as specific design concepts and techniques. Further, District shall control all access to its levee system and other property; approve all exploratory investigation including the location of any and all exploratory drilling or digging; and approve the bidding and contract award of all individual construction projects prior to commencement of the same.

4. Process of Levee Improvement. As this effort proceeds to construction of levee system improvements, initial effort will be focused on achieving accreditation to the 1% flood; however, the Partners recognize it is in the public interest to continually improve the levee system beyond 1% flood protection, to the extent that such continual improvement does not adversely affect other entities for the sole benefit of the Partners.

5. Additional Partners. As this effort proceeds, the Partners may, from time to time, enter into additional partnership agreements with other government entities which will further the goals of this Agreement. Additional partners may be admitted to this Partnership in the future, after approval of the initial Partners named and specified herein.

6. Payment and Funding. For the preliminary engineering phase of this project, the City and Dike and Irrigation Improvement District No. 12 agree that the financial contribution to this effort shall be 2/3rds City of Burlington and 1/3rd Dike and Drainage and Irrigation Improvement District No. 12, with any outside funding obtained by either Partner for this purpose to be credited 100% to the effort.

6.1 The initial budget, not to exceed \$750,000.00, without further approval between the Partners, shall be as follows: City of Burlington, Five Hundred Thousand Dollars (\$500,000); Skagit County Dike, Drainage and Irrigation Improvement District No. 12, Two Hundred Fifty Thousand Dollars (\$250,000).

7. Amendments. This Agreement is intended to be amended from time to time to address project funding and construction arrangements, subject to the mutual agreement of the Partners.

8. Indemnification and Hold Harmless. Each Partner hereto shall be liable for its own negligent acts, or omissions committed by its elected officials, officers, employees, agents, representatives, subcontractors, and assigns. Each Partner further agrees to indemnify, defend, and hold harmless the other Partners for any and all liability, claims, losses, demands, actions or causes of action arising from its act or omission in connection with this Agreement. This indemnification and hold harmless shall extend to any representatives and subcontractors of the Partners, and their elected officials, officers, employees, and agents. By virtue of this provision, the Partners shall not be deemed to have waived their immunity pursuant to Title 51 RCW, and nothing contained in this Agreement shall be construed so as to operate as a waiver.

9. Termination by Notice. Any participating Partner may terminate its participation in this Agreement by providing thirty (30) calendar days prior written notice to the other Partner, provided that termination shall not affect or impair any joint purchases of the Partners that are agreed to on or before the termination. The terminating Partner shall pay the full share of costs or participation in funding accruing up to and including the final date of termination.

10. Assignment. The Partners shall not assign this Agreement or any interest, obligation or duty therein without the express written consent of the other Party.

11. Insurance. Each Partner shall maintain, at all times during the term of this Agreement, at its cost and expense, general liability insurance coverage with limits of not less than One Million Dollars (\$1,000,000.00), per each occurrence, or a like amount of coverage available through any insurance pool. The policy or coverage of each Partner shall further name the other Partner's elected officials, officers, employees, and agents as additional named insureds on each said policy, or coverage through any insurance pool.

12. Attorney's Fees. If either Partner shall be required to bring any action to enforce any provision of this Agreement, or shall be required to defend any action brought by the other Partner with respect to this Agreement, and in the further event that one Partner shall substantially prevail in such action, the losing Partner shall, in addition to all other payments required therein, pay all of the prevailing Party's reasonable costs in connection with such action, including such sums as the court or courts may adjudge reasonable as attorney's fees in the trial court and in any appellate courts.

13. Notices. All notices and payments hereunder may be delivered or mailed. If mailed, they shall be sent to the following respective addresses:

To Dike District 12

To City of Burlington

1317 N Anacortes Street
Burlington WA 98233
Attn: District Attorney

833 S Spruce Street
Burlington WA 98233
Attn: City Attorney

or to such other respective addresses as either Partner hereto may hereafter from time to time designate in writing. All notices and payments mailed by regular post (including first class) shall be deemed to have been given on the second business day following the date of mailing, if properly mailed and addressed. Notices and payments sent by certified or registered mail shall be deemed to have been given on the day next following the date of mailing, if properly mailed and addressed. For all types of mail, the postmark affixed by the United States Postal Service shall be conclusive evidence of the date of mailing.

14. Severability. If any term or provision of this Agreement or the application thereof to any person or circumstance shall, to any extent, be held to be invalid or unenforceable by a final decision of any court having jurisdiction on the matter, the remainder of this Agreement or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable shall not be affected thereby and shall continue in full force and effect, unless such court determines that such invalidity or unenforceability materially interferes with or defeats the purposes hereof, at which time either Partner shall have the right to terminate the Agreement.

15. Entire Agreement. This Agreement constitutes the entire Agreement between the Partners. There are no terms, obligations, covenants or conditions other than those contained herein. No modifications or amendments of this Agreement shall be valid or effective unless evidenced by an agreement in writing signed by both Partners. All items incorporated herein by reference, oral or otherwise, regarding the subject matter of this Agreement, shall be deemed to exist or to bind any of the Partners hereto.

MISCELLANEOUS

A. All of the covenants, conditions and agreements in this Agreement shall extend to and bind the legal successors and assigns of the Partners hereto.

B. This Agreement shall be deemed to be made and construed in accordance with the laws of the State of Washington jurisdiction and venue for any action arising out of this Agreement shall be in Skagit County, Washington.

C. The captions in this Agreement are for convenience only and do not in any way limit or amplify the provisions of this Agreement.

D. Unless otherwise specifically provided herein, no separate legal entity is created hereby, as each of the Partners is contracting in its capacity as a municipal corporation of the State of Washington. The identities of the Partners hereto are as set forth hereinabove.

E. The purpose of this Agreement is to accomplish the objectives of this Agreement.

F. The funding of the respective obligations of the Partners shall be out of the respective general funds/current expenses of the Partners, except as otherwise specifically provided.

G. The performances of the duties of the Partners provided hereby shall be done in accordance with standard operating procedures and customary practices of the Partners.

H. No joint oversight and administration board is created hereby.

I. Copies of this Agreement shall be filed with the Skagit County Auditor's Office by Burlington.

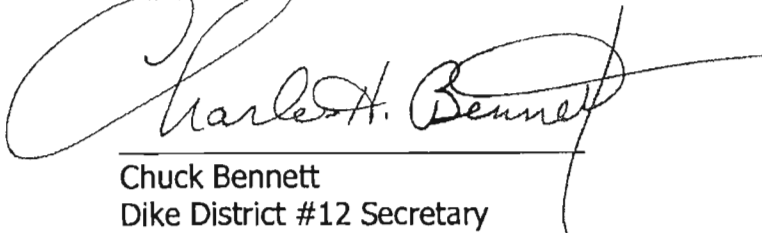
ADOPTED by the City Council of the City of Burlington at a regular meeting held on the 13th day of March, 2008.

ADOPTED by the Board of Commissioners of Skagit County Dike, Drainage and Irrigation Improvement District No. 12, at a regular meeting held on the 13th day of March, 2008.

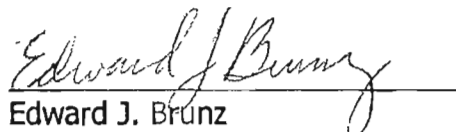
IN WITNESS WHEREOF the Partners hereto have executed this Agreement as of the day and year first above written.

DIKE DISTRICT #12

CITY OF BURLINGTON

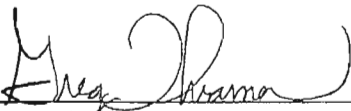


Chuck Bennett
Dike District #12 Secretary



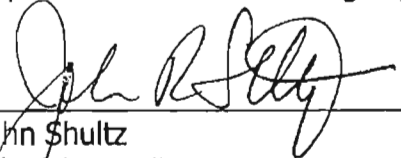
Edward J. Brunz
Mayor

Attest:

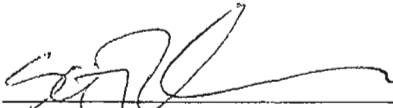


Greg Thramer, Finance Director

Approved as to form and legality:



John Shultz
Dike District #12 Attorney



Scott G. Thomas
City Attorney

Appendix I

Environmental Information and Scope of Future Environmental Phases

Summary of scoping meetings-

- 1. Upper Skagit Fisheries**
- 2. Skagit System Cooperative**
- 3. FEMA Environmental Review and NOAA Fisheries**

Washington State Department of Fish and Wildlife Priority Habitats and Species information

Endangered Species Act – Section 7 Consultation Final Biological Opinion And Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation including correspondence from FEMA and Burlington Response

FEMA requirements for Conditional Letter of Map Revision including Archeology and Historic Preservation

Environmental Information and Scope of Future Environmental Phases
Summary of scoping meetings

Discussions about the proposed project were held with the Upper Skagit Tribe, the Skagit System Cooperative, and FEMA with NOAA fisheries. A comment letter was received from the Skagit Conservation District, suggesting levee setbacks and riparian zone restoration along the entire levee system.

There was overall agreement that it is important to use the most accurate information available for all program components, and that all proposed actions need to address the upstream, downstream, and cumulative effects. One big consideration is handling interrelated and interdependent actions and the cumulative effects through the three-bridge corridor.

Some of the general comments include the following: The neighbors to the south are at risk, even without changes. The maps do not reflect that risk. The study of 10, 50, 100 and 500 year events, even though not regulated, it does show changes. The 50 year event may be impacting others downstream more than before the changes. Are there channel migration zones here; geologic time and the volcano was discussed, noting that the volcanic eruption over 5,000 years ago created the majority of the Skagit River delta, a unique condition that further complicates traditional floodplain analysis.

Habitat is the major concern for ESA. Mitigation measures that include improving the riparian corridor, such as riparian corridor restoration tree plantings established along the river, is one potential positive aspect of levee setbacks, if the new conveyance calculations are revised to include wood and riparian vegetation. Gages Slough and the potential for removal of stranded salmon was discussed. The concept of certifying a levee segment through levee enlargement on the landward side and installation of keyways with no work below high water minimizes direct project impacts on listed species.

Understanding the position of all the different players is important. At this point, SEPA is a good tool to generally approach the work to carry the program forward.

The ESA aspects of the project are addressed in this programmatic EIS. The EIS is intended to demonstrate the effects and provide an opportunity to help influence the design of the projects.

Technical assistance has been provided by both FEMA and NOAA, but there is no federal nexus until Burlington makes application for the Conditional Letter of Map Revision, the CLOMR. A question is who the lead would be if there are other federal agencies involved and the answer is that inherently, FEMA becomes the Lead Agency.

The goal of this process is to get public involvement early, have a transparent process and vet out the issues to be addressed.

The plan of action is to develop the preferred alternative before the CLOMR application in consultation with NOAA fisheries and FEMA in order to minimize effects. By this means, it is feasible to address any reasonable and prudent alternatives to minimize harm.

The following information is presented as discussion in response to the comments received to date:

Description of the Species and Habitat

The two major Federal listed species of concern are Chinook Salmon and Bull Trout, both identified as Threatened. Chinook Salmon was listed as Threatened in Puget Sound on 08/02/1999. Bull Trout was listed as Threatened in the Puget Sound Unit on June 10, 1998. This information is from the U.S. Fish and Wildlife Service website.

Critical habitat is designated for areas containing the physical and biological habitat features, or primary constituent elements (PCEs) essential for the conservation of the species or that require special management considerations.

This area is a Designated Critical Habitat for 19 Evolutionarily Significant Units of Salmon and Steelhead. This action was finalized after litigation by rule published in the Federal Register Vol. 70 No. 170 on September 2, 2005. NMFS believes that adopting a more inclusive, watershed-based description of critical habitat is appropriate because it: “(1) recognizes the species’ use of diverse habitats and underscores the need to account for all of the habitat types supporting the species’ freshwater and estuarine life stages, from small headwater streams to migration corridors and estuarine rearing areas;(2) takes into account the natural variability in habitat use that makes precise mapping problematic (e.g., some streams may have fish present only in years with abundant rainfall); and (3) reinforces the important linkage between aquatic areas and adjacent riparian/upland areas.” The essential habitat features for salmon include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation. Essential habitat types include juvenile rearing areas, juvenile migration corridors, areas for growth and development to adulthood, adult migration corridors, and spawning areas.

The literature cited in the series of Federal Register publications over several years concluded that fully protected riparian management zones of one site-potential tree height would adequately maintain 90-100 percent of most key riparian functions of Pacific Northwest forests if the goal was to maintain instream processes over a time frame of years to decades. A minimum 30-meter riparian management zone for salmonid protection was also cited in the literature review. Site specific analysis is always the best means to characterize the adjacent riparian zone.

Diking and bank stabilization, construction/urbanization, habitat restoration projects, wastewater/pollutant discharge, wetland and floodplain alteration and woody debris/structure removal from rivers summarizes the items identified in the Federal Register that reflect the existing condition along the Skagit River and Gages Slough Corridor in the City of Burlington and Dike District #12. These are the types of activities

that will affect the riparian area's contribution to properly functioning conditions for salmonid habitat.

The Lower Skagit River has been managed for flood control and channel stability for more than a century. The natural channel meander has been restricted, channel complexity has been lost, and floodplain connectivity, especially to wetlands, has been lost. These are existing problems that have accumulated for many years. Conservation and restoration opportunities need to be a collaborative effort among the parties represented by the Skagit Watershed Council and approached as a regional program. Offsite restoration opportunities could be jointly sponsored when restoration is not feasible in the immediate vicinity of a levee segment, for example.

Further, the Federal Register states that in areas where the existing riparian zone is seriously diminished (e.g. in many urban settings and agricultural settings where flood control structures are prevalent), Federal agencies should focus on maintaining any existing riparian functions and restoring others where appropriate, for example, by cooperating with local watershed groups and landowners. NMFS acknowledges in its description of riparian habitat function that different land use types will have varying degrees of impact and that activities requiring a federal permit will be evaluated on the basis of disturbance to the riparian zone.

Federal permitting agencies will be required to ensure that the permitted action, regardless of whether it occurs in the stream channel, adjacent riparian zone, or upland areas, does not appreciably diminish the value of critical habitat for both the survival and recovery of the listed species or jeopardize the species' (i.e., ESUs) continued existence.

For reasons presented in the Federal Register document, NMFS has revised its designation of freshwater and estuarine critical habitat for Chinook salmon to include riparian areas that provide the following functions: shade sediment transport, nutrient or chemical regulation, streambank stability, and input of large woody debris or organic matter. Habitat quality in this range is intrinsically related to the quality of riparian and upland areas and of inaccessible headwater or intermittent streams which provide key habitat elements (e.g., large woody debris, gravel, water quality) crucial for salmon and steelhead in downstream reaches.

Critical habitat was also designated for bull trout in the Federal Register on October 26, 2005 (50 CFR Part 17). Primary constituent elements are provided by the mainstem river including appropriate water temperature range, hydrograph supporting year-round bull trout populations, migratory corridor, abundant food base and permanent water. In this area of the river, the primary function is as a migration corridor.

Species Presence and Use within the Area

The Biological Assessment Report for the Riverside Bridge Replacement Project, prepared by Harding Lawson Associates, dated September 21, 1999 provides local information on the Skagit River situation. Many species of salmon are found in the

project area that is generally the upstream area from Sterling east of the end of the levee at Lafayette Road, the levee frontage along the Skagit River through Burlington, and the areas downstream that may be affected by the levee certification program. Based on the project's location in the Skagit River system, the area is used for both adult and juvenile migration. Fish do not spawn in the vicinity of the project. Almost all the salmon that migrate through the project area move upstream and begin to spawn at Gilligan Creek near Highway 9, although a few chum may spawn below the creek. There are adult fish (of one kind or another) in the project area almost every month of the year (mid-July to June). Only the first half of July is relatively fish-free. Juveniles are moving downstream through the project area from February to the end of June. Nearly all juvenile fish are absent from the project area by July 1. Factors such as temperature and rainfall affect where the salmon will occur in the river (surface vs. bottom, middle vs. streambank). Fish in general are more active during rainfall events.

A fish trap is in service just upstream of the Old 99 Bridge, but below the Burlington Northern Santa Fe Railroad Bridge. The trap is operated by the Washington Department of Fish and Wildlife (WDFW) and was first installed in 1990. The traps are checked every night and every third day, January through September. Traps are checked at night more frequently because many species of fish prefer to travel at night. Data from this trapping effort is very helpful.

A draft biological assessment prepared by Anchor Environmental, LLC, is in process in 2008 to be finalized in early 2009 for the Skagit River Bridge Modification Project through the three-bridge corridor and information presented here has been reviewed and updated to ensure general consistency with the draft assessment. Numerous actions have occurred in the past few years including litigation that have shaped the ESA program. Interesting information is presented on bull trout. They rear in the mainstem Skagit River and spawn in the tributaries. Autumn floods in 2003 and 2006, combined with summer low flows in 2005 and 2006 have reduced bull trout spawning by as much as 60% in recent years (WDFW 2007).

Washington State Department of Fish and Wildlife Priority Habitats and Species information

The City of Burlington requested information that documents the location of important fish and wildlife resources from the State of Washington Department of Fish and Wildlife on March 4, 2008. Subsequently, the city contacted DFW on October 28, 2008 to determine if the information was still up to date, and received a follow-up telephone call stating that the Skagit River information was updated at about that time, and in all likelihood, there have been no changes.

One of the products of the Skagit Watershed Council is the publication of the Skagit Chinook Recovery Plan in 2005, prepared by the Washington Department of Fish and Wildlife and the Skagit River System Cooperative. It appears that many of these recommendations have been included in the

PRIORITY HABITATS AND SPECIES

Effective Date: March 2008 State of Washington Department of Fish and Wildlife Priority Anadromous Fish in the Skagit River:

1. Fall , Spring and Summer Chinook
2. Coho Salmon
3. Summer and Winter Steelhead
4. Pink Salmon
5. Sockeye Salmon
6. Fall Chum
7. Dolly Varden/Bull Trout
8. Resident Coastal Cutthroat

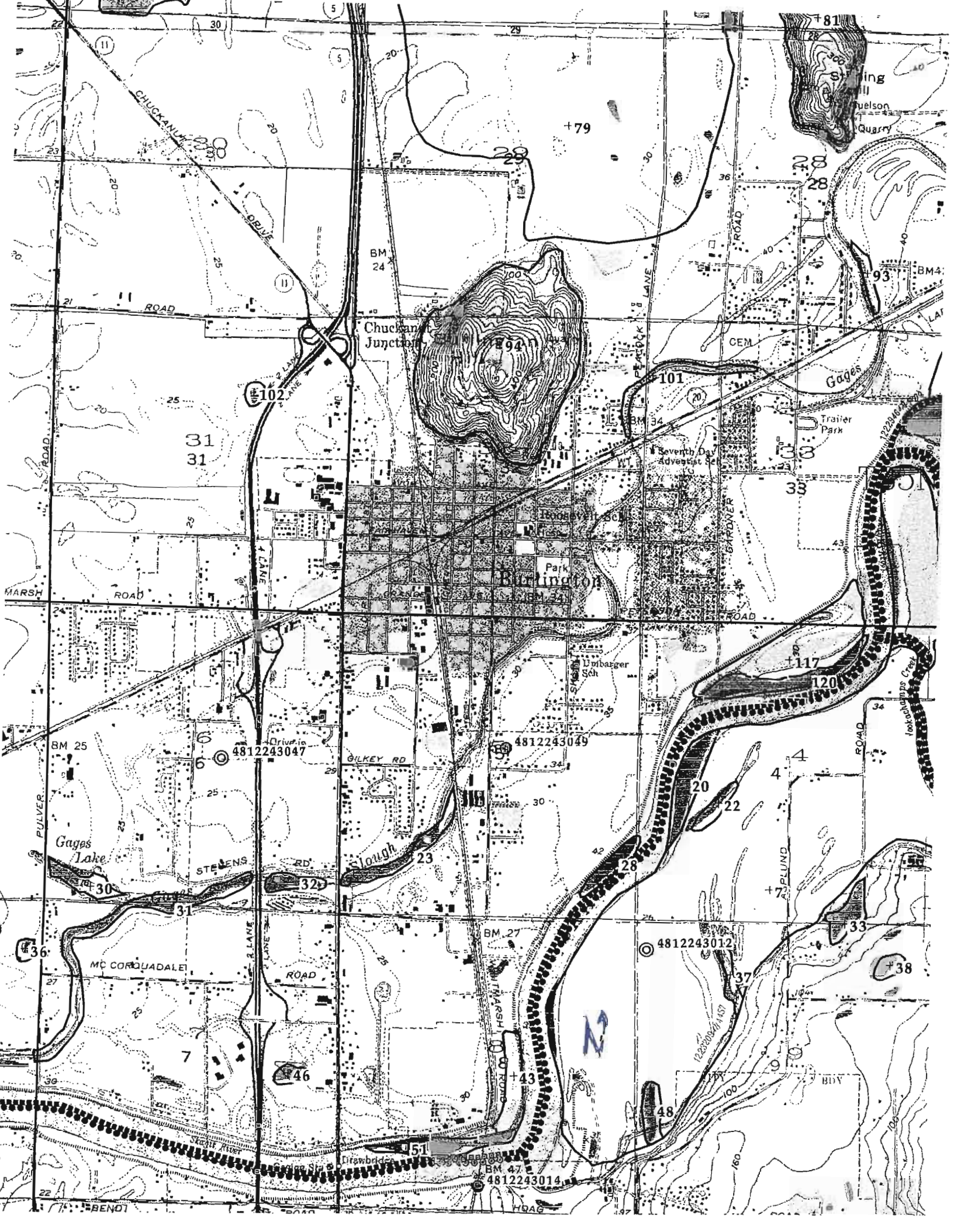
The Skagit has a priority anadromous and resident fish presence.

There are also several bald eagles in the general area, and migratory waterfowl and many other birds and small mammals.

Priority Habitats in the Burlington Area:

The Gages Slough corridor is identified as a priority habitat area, and there are 15 identified wetland buffer restoration project sites included in the current adopted Gages Slough Management Plan, with two completed and several in the planning stages. Low Impact Development standards and other water quality improvement programs are also coming together.

There are also riverine and other types of wetlands along the river on the river side of the levees and upstream of the levee system, and one mitigation effort that is being discussed is how to take advantage of opportunities to enhance the riparian zone along the Skagit, and to determine whether there may be additional opportunities for habitat improvement that may be feasible in this area, or in collaboration with others to achieve regional mitigation goals.



Washington Department Of Fish And Wildlife

HABITATS AND SPECIES MAP

FOR TOWNSHIP: T34R04E

Map Scale - 1 : 24,000














Coordinate System - State Plane South Zone 5626 (NAD27)

Production Date - February 29, 2008




Map Designed by WDFW Information Technology Services GIS

MAP LEGEND




Priority Habitats/Species:

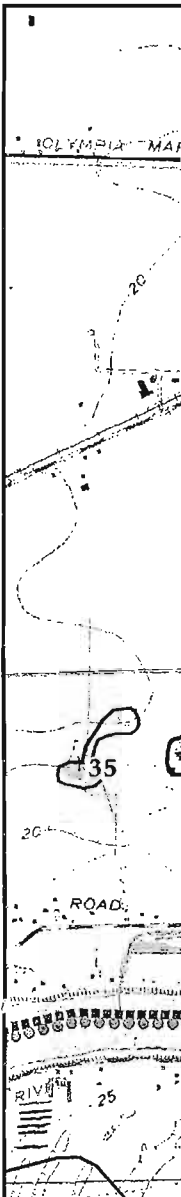
- | | | | |
|---|---------------------|---|--|
|  | Marine Wetlands |  | Priority Habitat and Species (PHS) Polygon Borders |
|  | Estuarine Wetlands |  | Priority Wildlife Heritage Points |
|  | Riverine Wetlands |  | Priority Habitat Points |
|  | Lacustrine Wetlands |  | Marbled Murrelet Points (Occupancy Sites) |
|  | Palustrine Wetlands |  | Spotted Owl Site Centers (Official Status 1-3) |
| | |  | Spotted Owl Site Centers (Official Status 4) |
| | |  | Priority Anadromous Fish Presence |
| | |  | Priority Resident Fish Presence |

Other Habitats/Species:

- | | |
|---|---|
|  | Other Wildlife Heritage Points |
|  | Spotted Owl Management Circles Established Territory |
|  | Spotted Owl Management Circles Insufficient Evidence to Establish Territory |

Other Symbols:

- | | |
|---|---|
|  | Rivers and Streams at 1:24,000 Scale Resolution |
|  | Township Lines |
|  | Section Lines |



Endangered Species Act – Section 7 Consultation Final Biological Opinion And Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation including correspondence from FEMA and Burlington Response

The ESA – Section 7 Consultation Final Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation was transmitted to FEMA from National Marine Fisheries Service Northwest Region on September 22, 2008. The report is in response to litigation and is intended to provide an Opinion on the effects of the National Flood Insurance Program on listed species found within the Puget Sound region, which are Puget Sound Chinook salmon, Puget Sound Steelhead, Hood Canal summer-run chum salmon, Lake Ozette sockeye salmon, and the Distinct Population Segment of endangered Southern Resident killer whales.

Subsequently, FEMA transmitted a letter to the City of Burlington, and the city provided a response. Copies of those letters are included in this appendix. At this time the city is preparing a detailed analysis of the NMFS Biological Opinion on the National Flood Insurance Program and the implications for Burlington. The city is working with other cities, towns, counties and FEMA to come up with a series of responses to the list of Reasonable and Prudent Alternative Elements presented in the Opinion. This is clearly an opportunity for a positive outcome for all parties if there is a collaborative approach. The NMFS Biological Opinion is available at <http://www.nwr.noaa.gov/> .

FEMA requirements for Conditional Letter of Map Revision including Archeology and Historic Preservation

The application of the City for a Conditional Letter of Map Revision (CLOMR) is the action that officially creates the federal nexus and triggers review under both the Endangered Species Act and the National Environmental Policy Act.

Based on information provided by the agency, FEMA completed an Environmental Impact Statement in 1976 that addressed the NFIP regulations including designation of a regulatory floodway. It also explained why the various standards were selected such as the 100-year floodplain and 1-foot rise in a regulatory floodway. The proposal by FEMA to make a substantial change in the base flood elevations because a new computer model is available and at the same time, to implement a major change in the levee failure policy as applied to the Skagit River mapping process in the 1980's are actions that are purportedly all covered by the work in 1976. The fact is that water is removed from the Skagit River channel before it makes it to the bridge corridor between Burlington and Mount Vernon, thus the need for preserving farmland from development to protect overbank flow paths for floodwaters to the north and west of Burlington, and protecting the Nookachamps and Sterling areas as floodwater storage areas.

Based on federal policy, in order to get credit for the existence of the levee that protects Burlington from flooding, the city/dike district is required to certify their levees using a

private engineering firm and submit a request to the Federal Emergency Management Agency to get the levee accredited. The first step is the application for a Conditional Letter of Map Revision, where the city/dike district presents the proposed plans and documents and asks for approval of the plans. This triggers a review under the National Environmental Policy Act and Endangered Species Act. The National Environmental Policy Act review is generally limited in scope because of the prior EIS in 1976 to site specific review of Cultural Resources, Archeology and Historic Preservation, and to site specific consideration of Environmental Justice. This work is scheduled to be completed as part of the background work for completing the levee design and documentation for the CLOMR application, and any related issues will be identified and studied at that time.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

NMFS Tracking
No.: 2006/00472

September 22, 2008

Mr. Mark Eberlein
Regional Environmental Officer
U.S. Department of Homeland Security
Federal Emergency Management Agency
Region X
130-228th Street SW
Bothell, Washington 98021-97963755

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the on-going National Flood Insurance Program carried out in the Puget Sound area in Washington State. HUC 17110020 Puget Sound.

Dear Mr. Eberlein:

The enclosed document contains a biological opinion prepared by the National Marine Fisheries Service pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), on the effects of certain on-going elements of the National Flood Insurance Program throughout Puget Sound in Washington State. This biological opinion is provided to the Federal Emergency Management Agency in accordance with the judicial order in *NWF v. FEMA*, 345 F. Supp. 2d 1151 (W.D. Wash. 2004). This biological opinion is based on the information provided in the February 2006 Biological Evaluation, numerous meetings, and phone calls, emails, and letters exchanged on the program. A complete administrative record of this consultation is on file at the National Marine Fisheries Service's Washington State Habitat Office in Lacey, Washington.

The National Marine Fisheries Service provides this biological opinion following consultation with the Federal Emergency Management Agency on effects of the National Flood Insurance Program on listed species found within the Puget Sound region, which are Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*), Puget Sound steelhead (*O. mykiss*), Hood Canal summer-run chum salmon (*O. keta*), Lake Ozette sockeye salmon (*O. nerka*), and Southern Resident killer whales (*Orcinus orca*). In the biological opinion, the National Marine Fisheries Service concludes that the proposed action is likely to jeopardize the continued existence of Puget Sound Chinook salmon, Puget Sound steelhead, Hood Canal summer-run chum salmon, and Southern Resident killer whales, and is likely to adversely modify Puget Sound Chinook salmon, Hood Canal summer-run chum salmon, and Southern Resident killer whale critical habitat (Puget Sound steelhead critical habitat is not designated




at this time). The proposed action is not likely to jeopardize Lake Ozette sockeye salmon or adversely modify Lake Ozette sockeye salmon critical habitat.

As required under the Endangered Species Act for consultations concluding with Jeopardy and Adverse Modification determinations, the National Marine Fisheries Service discussed with the Federal Emergency Management Agency, the availability of a reasonable and prudent alternative that the Federal Emergency Management Agency can take to avoid violation of the Federal Emergency Management Agency's Endangered Species Act section 7(a)(2) responsibilities (50 CFR 402.14(g)(5)). Reasonable and prudent alternatives refer to alternative actions identified during formal consultation that 1) can be implemented in a manner consistent with the intended purpose of the action, 2) that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, 3) that is economically and technologically feasible, and 4) that the Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat (50 CFR 402.02). The biological opinion includes a reasonable and prudent alternative which can be implemented to avoid jeopardy and adverse modification of critical habitat, while meeting each of the other requirements listed above. Accordingly, the National Marine Fisheries Service prepared an Incidental Take Statement describing and exempting the extent of incidental take reasonably certain to occur under the reasonable and prudent alternative.

If you have questions, please contact DeeAnn Kirkpatrick of National Marine Fisheries Service's Washington State Habitat Office at (206) 526-4452 or via email at deeann.kirkpatrick@noaa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Robert Lohn", written in a cursive style.

D. Robert Lohn
Regional Administrator

Enclosure



FEMA

October 21, 2008

The Honorable Edward J. Brunz, Mayor
City of Burlington
833 South Spruce Street
Burlington, Washington 98233

Dear Mayor Brunz:

In 2003 the National Wildlife Federation sued the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) for failure to consult under the Endangered Species Act (ESA) with respect to its administration of the National Flood Insurance Program (NFIP). On November 17, 2004, the United States District Court, Western District of Washington at Seattle agreed, and required FEMA to consult with the National Marine Fisheries Service (NMFS) on the impacts the NFIP was having on salmon. FEMA complied by submitting a Biological Evaluation on Feb 14, 2006 to NMFS, concluding that the NFIP affected salmon, but not adversely.

In September 2008 NMFS provided a Biological Opinion in which they concluded that development consistent with the NFIP jeopardizes threatened or endangered Chinook salmon, chum salmon, steelhead, and killer whales and adversely modifies critical habitat based on potential take of listed species. Federal agencies are prohibited by the Endangered Species Act (ESA) from causing Jeopardy or Adverse Modification.

Although the Biological Opinion determination is made for FEMA, the Endangered Species Act (ESA) is applicable to everyone, whether a federal agency, state agency, local jurisdiction or individual. We all have a legal responsibility to ensure our actions do not cause a take (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) to threatened or endangered species. Under Section 9 of the ESA, actions or decisions enacted by you and your officials are subject to this prohibition regardless of federal involvement. Additionally, any person can be subject to criminal or civil penalties for causing a take. NMFS considers the issuance of floodplain development permits without addressing the impacts on listed species or their critical habitat as a take under the Endangered Species Act.

With a Jeopardy and Adverse Modification determination, NMFS is obligated to provide a Reasonable and Prudent Alternative, which are measures FEMA can do to avoid Jeopardy and Adverse Modification to critical habitat. These measures outline steps FEMA and communities participating in the NFIP can do to minimize harm to Puget Sound Chinook salmon, Puget Sound steelhead, Hood Canal summer-run chum and Southern Resident killer whales. For details on these measures, please see NMFS' Biological Opinion at <http://www.nwr.noaa.gov/>.

The Honorable Edward J. Brunz, Mayor
October 21, 2008
Page 2

NMFS requires FEMA to modify implementation of the NFIP according to recovery priorities. The Biological Opinion requires FEMA to focus our efforts of assistance according to a tiered approach (see attached Appendix 3). We will focus our technical assistance efforts according to this tiered approach.

The Incidental Take section of the Biological Opinion authorizes a certain amount of harm to the species or their habitat during the time necessary for FEMA and participating NFIP communities to implement the Reasonable and Prudent Alternative (RPA). Thereafter, take is exempted in all county and municipal NFIP jurisdictions as soon as they implement the floodplain management criteria set forth in RPA Element 3 of the Biological Opinion, provided the activity resulting in take is carried out in conformance with RPA Element 3, including applicable mitigation requirements. In the interim, one immediate option suggested by NMFS is for your community to voluntarily implement a temporary moratorium on floodplain development that adversely impacts species or their habitat.

FEMA will be working on identifying other options or methods that your community can implement and will be sharing that with you as we develop them. Those options may include guidance, training, technical assistance, education tools, etc. One option we are working with NMFS on is the development of a model ordinance that would meet FEMA's minimum criteria while also avoiding or minimizing impacts to listed species. Once we've finalized this model ordinance, we will share it with you. Should your community adopt it, then you will have Endangered Species Act coverage under the Incidental Take Statement of the Biological Opinion.

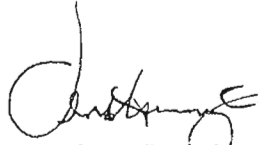
During the interim, until full implementation of the Reasonable and Prudent Alternative, FEMA and its participating communities will be required to report our progress, including the extent of take that has occurred, mitigation that is utilized and any unmitigated actions. FEMA intends to develop a reporting tool to track activities that will help minimize the time and effort imposed upon your staff in meeting this requirement. Should communities issue floodplain development permits without mitigating for take on species or their critical habitat, FEMA will be bound, in coordination with NMFS acting under their own authority, to initiate appropriate enforcement action.

FEMA recognizes that many of you have already been implementing measures which protect/mitigate floodplain development actions affecting listed species and their habitat. However, for others, these requirements may pose a burden on your community. We will work diligently with you, the state resource agencies and the NMFS to alleviate this burden as much as

The Honorable Edward J. Brunz, Mayor
October 21, 2008
Page 3

possible and to facilitate favorable opportunities for complying with the Endangered Species Act (ESA). We will keep you advised as we further develop our strategy for implementation. If you have any questions, please call Mark Carey, Mitigation Division Director at 425-487-4682.

Sincerely,



Dennis A. Hunsinger, PhD
Acting Regional Administrator

cc: Margaret Fleek, Planning Director, City of Burlington ✓
Dan Sokol, NFIP Coordinator, WA State Dept. of Ecology

JG:bb



October 29, 2008

RE: Endangered Species Act Compliance
Reasonable and Prudent Alternatives

Federal Emergency Management Agency
Dennis A. Hunsinger, PhD, Acting Regional Administrator
Region X
130 228th Street, SW
Bothell WA 98021-9796

Dear Mr. Hunsinger:

The City of Burlington has reviewed your letter of October 21, 2008, and the Biological Opinion regarding development consistent with the National Flood Insurance Program having the potential for jeopardizing threatened or endangered Chinook salmon, chum salmon, steelhead, and killer whales and adversely modifying critical habitat.

The Endangered Species Act has been a matter of concern to the City of Burlington since the listing of the fish in the Skagit River. In 2001, the City of Burlington prepared a detailed background report on the multi-faceted approach that the city has designed and is implementing to mitigate the impact of urban development on listed species and their habitat. That report was transmitted to the National Marine Fisheries Service at that time and the city has continued to diligently pursue a mitigation strategy. Burlington recognizes that it has a responsibility to take a proactive approach on a local ESA mitigation strategy and has been diligently pursuing that strategy.

Today, the City of Burlington is focused on a multi-faceted approach to mitigation that includes an emphasis on improving stormwater quality through the NPDES II municipal stormwater program, including implementation of the Gages Slough Management Plan that includes regular water quality monitoring, inspection and action to correct stormwater problems ranging from plugged catch basins to cleaning up detention ponds and bioswales at the source. A major focus is the wetland buffer restoration program with fifteen sites identified, two completed projects with long term monitoring and management in place and other projects scheduled for the upcoming planting season. Code development of Low Impact Development (LID) standards is in process and staff review is underway at this time.

Office of the Mayor

833 South Spruce Street, Burlington, WA 98233 • Phone (360) 755-0531 • Fax (360) 755-1297 • cityhall@ci.burlington.wa.us

Burlington is a regional provider of sanitary sewer service. In 2000, the Sewage Treatment Plant was upgraded and the use of Chlorine disinfectant was eliminated and replaced by UltraViolet light to disinfect the waste stream. Today, that program has been combined with a focused Pretreatment program that works with individual businesses and industries to make sure that the waste stream is as clean as possible at the source. These programs have a direct impact on improving water quality in the Skagit River.

A major step was taken in 2004 as the Parks and Recreation Comprehensive Plan was updated to add the Connected Open Space Plan and the overall Comprehensive Plan was updated in 2005 to specifically limit future urban growth area expansion for Burlington to protect farmland and resource land from development. The Connected Open Space Plan addresses the long range program to set the levees back along a major stretch of the Skagit River to allow for future riparian habitat. The City of Burlington and Dike District #12 are partners in an aggressive land acquisition program to prevent development along the Skagit River shoreline, including acquisition of a forested riparian area on the riverside of the levees at Gardner Road Bar, and the acquisition of more than 100 acres adjacent to the levees including a forested riparian area that is on the riverside of the levees in the area upstream from the railroad bridge.

The city, as part of the Skagit County Natural Hazard Mitigation Planning Committee, has just completed the five-year update of the Natural Hazard Mitigation Plan and we are moving forward with a programmatic Environmental Impact Statement on our overall flood hazard mitigation program in concert with Dike District #12.

Finally, there is minimal land remaining for development, with minimal potential for harm to listed species. All the levee setback and enlargement work is being accomplished on the landward side of the levees, and the potential for fish stranding in the urban area is very limited.

In summary, Burlington takes its location in an area that is home to endangered and threatened species very seriously and is directly engaged in a multi-pronged approach to mitigation. Our staff is available to work with you to further refine the implementing measures which protect/mitigate floodplain development actions that may affect listed species and their habitat.

Sincerely,



Edward J. Brunz
Mayor

Office of the Mayor

833 South Spruce Street, Burlington, WA 98233 • Phone (360) 755-0531 • Fax (360) 755-1297 • cityhall@ci.burlington.wa.us

Appendix J

Comment Letters received to date with Response



PLANNING & DEVELOPMENT SERVICES

GARY R. CHRISTENSEN, AICP, DIRECTOR

BILL DOWE, CBO, DEPUTY DIRECTOR

PATTI CHAMBERS
Administrative Coordinator

TIM DEVRIES, CBO
Building Official

August 27, 2008

Margaret Fleek
Planning Director, City of Burlington
833 S. Spruce Street
Burlington, WA 98233

RE: City of Burlington and Dike District #12 Determination of Significance and Request for Comments on Scope of EIS

Dear Margaret:

Thank you for the opportunity to comment on the Scope of the Environmental Impact Statement (EIS) for the proposed construction of 100-year certified levees and other flood control measures deemed necessary to protect the City of Burlington Urban Growth Area; modification of the City's urban growth area (UGA) to accommodate future flood control measures; and other measures as proposed in the legal notice published August 12, 2008 (SVH-2645). Skagit County Planning and Development Services appreciate the City of Burlington's desire to protect the city, people, and property from the risk of flooding and to plan for its long-term future.

In addition to the issues mentioned in the legal notice, the County requests that the EIS also address the following land use and flood hazard protection matters:

1. Countywide Planning Policies (CPPs), specifically including (but not limited to):
 - CPP 1, Urban Growth
 - CPP 2, Reduce Sprawl
 - CPP 8, Natural Resource Industries, including agriculture
 - CPP 9, Open Space and Recreation
 - CPP 10, Environment, specifically, specifically CPP 10.13
2. The 2002 Framework Agreement Among Skagit County, the City of Burlington, the City of Mount Vernon, the City of Anacortes, the City of Sedro-Woolley, and the Town of LaConner, specifically in regards to processes and procedures for conducting regional planning in an integrated, coordinated and on-going manner, and for modifying UGA boundaries.

Mailing Address: 1800 Continental Place • Mount Vernon, WA 98273

Temporary Physical Location: 1700 E. College Way, Mount Vernon

Phone: (360) 336-9410 • Fax: (360) 336-9416

“Helping You Plan and Build Better Communities”

3. The Urban Growth Area Modification Criteria as approved by the Growth Management Act Steering Committee.
4. UGA designation criteria found in Chapter 2, the Urban, Open Space and Land Use Element of the Skagit County Comprehensive Plan, specifically, but not limited to: policies 2A-1.1 through 2A-1.5.
5. Policies regarding frequently flooded areas found in (defined as lands in the floodplain subject to a one-percent or greater change of flooding in any given year) found in Chapter 5, the Environment Element, of the Skagit County Comprehensive Plan, specifically including, but not limited to: policies 5A-5.2, 5A-5.3 (e-k), and 5A-5.5.
6. The flood protection project should be evaluated holistically in a coordinated, comprehensive, and equitable manner consistent with other flood control measures being considered in the update to the 1989 Skagit County Comprehensive Flood Control Management Plan and in the U.S. Army Corps of Engineer's Skagit River Flood Damage Reduction and Ecosystem Feasibility Study (Skagit River GI).
7. Levees often provide a false sense of security because they are subject to failure as witnessed in the Katrina disaster and the recent flooding in the Midwest. For your consideration in this regard refer to the attached position paper "*National Flood Policy Challenges Levees: The Double-edged Sword*" prepared in 2007 by the Association of State Floodplain Managers, (ASFPM), a non-profit professional organization dedicated to the reduction of flood losses in the United States. The flood protection project should include a well planned, feasible and periodic exercise of an evacuation plan should a levee fail, similar to recommendation #19 of this paper.

With the exception of the referenced document in #7 above, you should have copies of the countywide planning policies; the framework agreement; urban growth area modification criteria; and, the county comprehensive plan. If necessary, the Department can provide you these documents for review and reference upon your request.

Once again, the County thanks you for the opportunity to comment on the Scope of the EIS and look forward to continuing to work with you in a cooperative manner to coordinate land use planning and flood hazard mitigation efforts to protect the lives and interests of residents of the City of Burlington, other jurisdictions and municipalities, and Skagit County as a whole.

Sincerely,



Gary R. Christensen, AICP
Director

Attachment: National Flood Policy Challenges Levees: The Double-edged Sword

Cc: Gary Rowe; Will Honea; Jim Voetberg; Tom Karsh; Ric Boge; Mark Watkinson; Tim DeVries; and Kirk Johnson

RESPONSE TO COMMENT LETTER FROM SKAGIT COUNTY DATED AUGUST 27, 2008

Background

Burlington is situated in a key location in the Skagit River delta area. There are unique issues and problems that must be assessed, alternatives developed and evaluated, effects on other regional entities evaluated, and a program designed that is in the best interest of the City of Burlington and Dike District #12, all factors considered.

The City and Dike District #12 are paying to get correct answers to long standing questions that are absolutely critical to the region and the community's ability to have cost effective long term flood hazard mitigation. This is not work that would have been addressed by the Corps of Engineers long term study, because the Corps is not considering the legitimate issues raised about the accuracy of the flood hydrology. The report prepared by the City's consultants is complete, and if not accepted by FEMA and the Corps when the revised flood maps come out, this will provide the basis for a technical appeal of the revised flood insurance rate maps. ***This is the critical issue to determine whether or not there will be effective flood hazard mitigation for the Burlington area.***

There is urgency in completing the work and moving ahead with the first programmatic phase of environmental review, because of the pending threat of the issuance of new Flood Insurance Rate Maps that may indicate two things; one is an increase in the base flood elevation of up to six feet making infill development impossible, and the second is the threat of turning Burlington into a regulatory floodway because no credit is given for the existence of the levee system that fronts the Skagit River shoreline through Burlington. Credit can only be given for levees that are accredited by FEMA as providing 100-year flood protection; the City needs to work towards levee certification for the levee segment that runs through Burlington, and work is proceeding to prepare the engineering and geotechnical studies necessary to apply for a Conditional Letter of Map Revision (CLOMR) from FEMA.

The goal of the program is TO RETAIN BASE FLOOD ELEVATIONS AT OR NEAR THEIR PRESENT LEVELS in order to maintain the City's ability to provide economic opportunity for its citizens and the region. The goal is **not** to completely remove the City from the flood plain. We believe this is a reasonable and responsible approach. The community will continue to be on flood insurance and in the FEMA NFIP program, but this approach also addresses the critical issues related to future reasonable opportunities for economic development and redevelopment. The City of Burlington is an economic engine for the region and the state, providing a significant commercial property tax base that supports schools and vital government services. In addition, the City also provides over \$50 million per year in sales tax revenue to the State of Washington, which then uses this revenue to provide basic education and social services for all state residents. It is important to our quality of life, our local economy and to the entire state that the City remain viable as a strong economic entity.

Of great importance as well is the need to address the Endangered Species Act issues that are the subject of a very recent Biological Opinion in this river system.

Burlington is nearing build-out and the City has made a clear commitment NOT to expand urban development into the farmland and floodplains beyond the current Urban Growth Area. Burlington is committed to developing a program to help finance the acquisition of farmland development rights in an area of over 5,000 acres around the City in order to protect open space for overbank flow paths for floodwaters, and to help maintain a viable agricultural resource for the long term future. In addition, Burlington is committed to help solve existing problems outside the City Limits, such as the Raspberry Ridge farmworker housing development that is on septic tanks and located in Dike District #12 in Skagit County.

The City formally asked Skagit County to be SEPA CoLead on this program, consistent with all of the planning documents cited in the letter from Skagit County Planning and Permits; the County has refused and deferred their responsibility to the Flood Advisory Committee, a largely unfunded program, and a Board on which the City of Burlington is not represented. It is hoped that Skagit County will join the City of Burlington at some point down the road in a collaborative process for the good of the community.

Skagit County has requested that the EIS address the following land use and flood hazard protection measures:

1. Countywide Planning policies (CPPs), specifically including (but not limited to):

Date: October 10, 2007

1. URBAN GROWTH

ENCOURAGE URBAN DEVELOPMENT IN URBAN AREAS WHERE ADEQUATE PUBLIC FACILITIES AND SERVICES EXIST OR CAN BE PROVIDED IN AN EFFICIENT MANNER.

1.1 Urban growth shall be allowed only within cities and towns, their designated UGAs and within any non-municipal urban growth areas already characterized by urban growth, identified in the County Comprehensive Plan with a Capital Facilities Plan meeting urban standards. Population and commercial/industrial land allocations for each UGA shall be consistent with those allocations shown in the following table:

URBAN GROWTH AREAS	RESIDENTIAL POPULATION (2015)	COMMERCIAL/INDUSTRIAL LAND ALLOCATIONS (NEW)
Anacortes	18,300	558

Bayview Ridge ¹	5,600	750
Burlington	12,000	242
Concrete	1,350	28
Hamilton	450	60
La Conner	950	2
Lyman	550	0
Mount Vernon	47,900	959
Sedro-Woolley	15,000	278
Swinomish	3,650	0
Urban Growth Area Total	105,750	2,877

-
- 1.2 Cities and towns and their urban growth areas, and non-municipal urban growth areas designated pursuant to CPP 1.1, shall include areas and densities sufficient to accommodate as a target 80% of the county's 20 year population projection.
- 1.3 Urban growth areas shall provide for urban densities of mixed uses and shall direct development of neighborhoods which provide adequate and accessible urban governmental services concurrent with development. The GMA defines urban governmental services as those governmental services historically and typically delivered by cities, and includes storm and sanitary sewer systems, domestic water systems, street cleaning services, fire and police protection services, public transit services, and other public utilities associated with urban areas and normally not associated with nonurban areas.
- 1.4 Urban growth areas shall include greenbelt, open space, and encourage the preservation of wildlife habitat areas.
- 1.5 Cities shall encourage development, including greenbelt and open space areas, on existing vacant land and in-fill properties before expanding beyond their present corporate city limits towards urban growth boundaries.
- 1.6 Annexations beyond urban growth areas are prohibited.
- 1.7 Development within established urban growth boundaries shall, as a minimum, conform to those urban development standards in effect within the respective municipality as of April, 1, 1999. Bayview Ridge UGA urban standards for roads, sewer, and stormwater shall meet or exceed those in effect in the City of Burlington on April 1, 1999. UGAs with populations of over 1500 or a Commercial/Industrial land allocation (new) over 100 acres shall have, as a

minimum, the following levels of urban law enforcement and fire service levels:

Law Enforcement:

One commissioned law enforcement officer per 1,000 population served or per 100 acres of developed commercial or industrial property, whichever is the higher number.

Fire:

Urban fire level of service standard for Urban Growth Areas are as follows:

1. For Cities and their adjacent Urban Growth Areas, an ISO grading of 5 or better shall be maintained; otherwise
2. Within 5 minutes of being dispatched, the Fire Department shall arrive and be able to deliver up to 200 gallons per minute fire flow in an offensive (interior) attack, with a minimum of 4 firefighters, for responses to: structural fires, vehicle fires, other outside fires, motor vehicle accidents, activated fire alarm systems, or other hazardous conditions. The Fire Department shall also be capable of delivering a minimum of Basic Life Support including defibrillation, with a minimum of one First Responder or Emergency Medical Technician, for medical responses.

Within 10 minutes of being dispatched, the Fire Department shall be able to support the interior structural fire attack with teams which may include: a ventilation team, a search & rescue team, a team for a backup line, and standby firefighters, totaling between 8 and 12 firefighters on-scene. The Fire Department shall also be capable of providing Heavy Rescue capability, including heavy hydraulics, at Motor Vehicle Accidents.

Within 20 minutes of being dispatched, the Fire Department shall be capable of delivering 1500 gallons per minute fire flow in a sustained defensive attack mode for structural fire responses. For buildings larger than 10,000 square feet, the Fire Department shall be capable of delivering 2000 Gallons per Minute, and shall have an elevated master stream capability.

These requirements shall be met for 90% of all incidents.

Mutual aid requested under the Mutual Aid Contract may be used to provide relief to the initial operating crews, but shall not be used to provide initial attack capability, support functions, or sustained attack capability. This does not preclude automatic aid agreements under separate contract which does provide these capabilities or functions from other agencies.

Times are considered to be "Response Time," which shall be measured by the sum of turnout time (the time from dispatch until the first arriving unit is enroute to the incident), plus travel time. Dispatch time shall be allocated a maximum of 1 additional minute which is measured from the time the 9-1-1 call is received until the fire department is dispatched.

All operations shall be conducted in compliance with state and federal regulations, including training requirements for firefighters, and maintenance requirements for equipment and apparatus.

All commercial and industrial facilities shall be inspected for compliance with the Uniform Fire Code at least annually. Water systems shall be installed in accordance with the Skagit County Coordinated Water System Supply Plan, with a fire flow meeting the requirements of the Uniform Fire Code.

- 1.8 All growth outside the urban growth boundary shall be rural in nature as defined in the Rural Element, not requiring urban governmental services, except in those limited circumstances shown to be necessary to the satisfaction of both the County and the affected city to protect basic public health, safety and the environment, and when such services are financially supportable at rural densities and do not permit urban development.

2. REDUCE SPRAWL

REDUCE THE INAPPROPRIATE CONVERSION OF UNDEVELOPED LAND INTO SPRAWLING, LOW-DENSITY DEVELOPMENT.

- 2.1 Contiguous and orderly development and provision of urban services to such development within urban growth boundaries shall be required.
- 2.2 Development within the urban growth area shall be coordinated and phased through inter-agency agreements.
- 2.3 Rural development shall be allowed in areas outside of the urban growth boundaries having limited resource production values (e.g. agriculture, timber, mineral) and having access to public services. Rural development shall have access through suitable county roads, have limited impact on agricultural, timber, mineral lands, critical areas, shorelands, historic landscapes or cultural resources and must address their drainage and ground water impacts.
- 2.4 Rural commercial and industrial development shall be consistent with that permitted by the Growth Management Act, specifically including RCW 36.70A.060(5)(d) and

related provisions and the 1997 ESB 6094 amendments thereto. This development shall not be urban in scale or character or require the extension of urban services outside of urban growth areas, except where necessary to address an existing public health, safety or environmental problem.

- 2.5 Rural commercial and industrial development shall be of a scale and nature consistent and compatible with rural character and rural services, or as otherwise allowed under RCW 36.70A.070(5)(d), and may include commercial services to serve the rural population, natural resource-related industries, small scale businesses and cottage industries that provide job opportunities for rural residents, and recreation, tourism and resort development that relies on the natural environment unique to the rural area.
- 2.6 Priority consideration will be given to siting of new rural commercial and industrial uses in areas of existing development, including existing Rural Villages and existing Rural Centers, followed by already developed sites in the rural area, and only lastly to wholly undeveloped sites in the rural area.
- 2.7 Master planned sites designated for industrial and large-scale commercial uses shall be clustered, landscaped, and buffered to alleviate adverse impacts to surrounding areas.
- 2.8 Commercial areas should be aggregated in cluster form, be pedestrian oriented, provide adequate parking and be designed to accommodate public transit. Strip commercial development shall be prohibited.
- 2.9 Urban commercial and urban industrial development, except development directly dependent on local agriculture, forestry, mining, aquatic and resource operations, and major industrial development which meets the criteria contained in RCW 36.70A.365, should be restricted to urban or urban growth areas where adequate transportation networks and appropriate utility services are available.

The process to consider siting of specific major industrial developments outside of urban growth areas shall follow the process included in the Memorandum of Understanding between the County and the cities for adoption of Countywide Planning Policies. Major industrial developments shall mean a master planned location for specific manufacturing, industrial, or commercial business that:

1. Requires a parcel of land so large that no suitable parcels are available within an urban growth area; or
2. Is a natural resource-based industry requiring a location near agricultural land, forest land, or mineral resource land upon which it is dependent. The major industrial development shall not be for the purpose of retail commercial development or multi-tenant office park.

A major industrial development may be approved outside an urban growth area if the following criteria are met:

1. New infrastructure is provided for and/or applicable impact fees are paid;
2. Transit-oriented site planning and traffic demand management programs are implemented;
3. Buffers are provided between the major industrial development and adjacent non-urban areas;
4. Environmental protection including air and water quality has been addressed and provided for;
5. Development regulations are established to ensure that urban growth will not occur in adjacent non-urban areas;
6. Provision is made to mitigate adverse impacts on designated agricultural lands, forest lands, and mineral resource lands;
7. The plan for the major industrial development is consistent with the County's development regulations established for the protection of critical areas; and
8. An inventory of developable land has been conducted and the County has determined and entered findings that land suitable to site the major industrial development is unavailable within the urban growth area. Priority shall be given to applications for sites that are adjacent to or in close proximity to the urban growth areas.

Final approval of an application for a major industrial development shall be considered an adopted amendment to the Comprehensive Plan adopted pursuant to RCW 36.70A.070 designating the major industrial development site on the land use map as an urban growth area. Final approval of the application shall not be considered an amendment to the Comprehensive Plan for the purposes of RCW 36.70A.130(2) and may be considered at any time.

- 2.10 Establishment or expansion of local improvement districts and special purpose taxing districts, except flood control, diking districts and other districts formed for the purpose of protecting water quality, in designated commercial forest resource lands shall be discouraged.

8. NATURAL RESOURCE INDUSTRIES

MAINTAIN AND ENHANCE NATURAL RESOURCE-BASED INDUSTRIES, INCLUDING PRODUCTIVE TIMBER, AGRICULTURAL, AND FISHERIES INDUSTRIES. ENCOURAGE THE

**CONSERVATION OF PRODUCTIVE FOREST LANDS AND PRODUCTIVE AGRICULTURAL LANDS,
AND DISCOURAGE INCOMPATIBLE USES.**

- 8.1 Identified critical areas, shorelands, aquatic resource areas and natural resource lands shall be protected by restricting conversion. Encroachment by incompatible uses shall be prevented by maintenance of adequate buffering between conflicting activities.
- 8.2 Land uses adjacent to agricultural, forest, or mineral resource lands and designated aquatic resource areas shall not interfere with the continued use of these designated lands for the production of food, agricultural and aquatic based products, or timber, or for the extraction of minerals.
- 8.3 Forest and agricultural lands located within urban growth areas shall not be designated as forest or agricultural land of long-term commercial significance unless a program authorizing transfer or purchase of development rights is established.
- 8.4 Mining sites or portions of mining sites shall be reclaimed when they are abandoned, depleted, or when operations are discontinued for long periods.
- 8.5 Long term commercially significant natural resource lands and designated aquatic resource areas shall be protected and conserved. Skagit County shall adopt policies and regulations that encourage and facilitate the retention and enhancement of natural resource areas in perpetuity.
- 8.6 When plats, short plats, building permits and development permits are issued for development activities on or adjacent to natural resource lands and aquatic resource areas, notice shall be provided to those seeking permit approvals that certain activities may occur that are not compatible with residences.
- 8.7 Fishery resources, including the county's river systems inclusive of their tributaries, as well as the area's lakes, associated wetlands, and marine waters, shall be protected and enhanced for continued productivity.
- 8.8 Skagit County shall encourage sustainable use of the natural resources of the County, including but not limited to agriculture, forestry, and aquatic resources.
- 8.9 Skagit County shall conserve agricultural, aquatic based, forest and mineral resources for productive use by designating natural resource lands and aquatic resource areas where the principal and preferred land uses will be long term commercial resource management.

9. OPEN SPACE AND RECREATION

ENCOURAGE THE RETENTION OF OPEN SPACE AND DEVELOPMENT OF RECREATIONAL OPPORTUNITIES, CONSERVE FISH AND WILDLIFE HABITAT, INCREASE ACCESS TO NATURAL RESOURCE LANDS AND WATER, AND DEVELOP PARKS.

- 9.1 Open space corridors within and between urban growth areas shall be identified. These areas shall include lands useful for recreation, fish and wildlife habitat, trails, and connection of critical areas.
- 9.2 To preserve open space and create recreational opportunities, innovative regulatory techniques and incentives such as but not limited to, purchase of development rights, transfer of development rights, conservation easements, land trusts and community acquisition of lands for public ownership shall be encouraged.
- 9.3 The use of Open Space Taxation Laws shall be encouraged as a useful method of land use control and resource preservation.
- 9.4 Expansion and enhancement of parks, recreation and scenic areas and viewing points shall be identified, planned for and improved in shorelands, and urban and rural designated areas.
- 9.5 Property owners shall be encouraged to site and design new construction to minimize disruption of visual amenities and solar resources of adjacent property owners, public road ways, parks, lakes, waterways and beaches.
- 9.6 Development of new park and recreational facilities shall adhere to the policies set out in this Comprehensive Plan document.
- 9.7 The Skagit Wild and Scenic River System (which includes portions of the Sauk, Suiattle, Cascade and Skagit Rivers) is a resource that should be protected, enhanced and utilized for recreation purposes when there are not potential conflicts with the values (fisheries, wildlife, and scenic quality) of the river system.
- 9.8 Incompatible adjacent uses including industrial and commercial areas shall be adequately buffered by means of landscaping, or by maintaining recreation and open space corridors.
- 9.9 A park and recreation system shall be promoted which is integrated with existing and planned land use patterns.
- 9.10 Indoor and outdoor recreation facilities shall be designed to provide a wide range of opportunities allowing for individual needs of those using these facilities.
- 9.11 School districts, public agencies and private entities should work together to develop joint inter-agency agreements to provide facilities that not only meet the

demands of the education for our youth, but also provide for public recreation opportunities that reduce the unnecessary duplication of facilities within Skagit County.

- 9.12 In planning new park and recreation facilities, Skagit County shall take into consideration natural features, topography, floodplains, relationship to population characteristics, types of facilities, various user group needs and standards of access including travel time.

10. ENVIRONMENT

PROTECT THE ENVIRONMENT AND ENHANCE THE STATE'S HIGH QUALITY OF LIFE, INCLUDING AIR AND WATER QUALITY, AND THE AVAILABILITY OF WATER.

- 10.1 Natural resource lands, including aquatic resource areas and critical areas shall be classified and designated, and regulations adopted to assure their long-term conservation. Land uses and developments which are incompatible with critical areas shall be prohibited except when impacts from such uses and developments can be mitigated.
- 10.2 Land use decisions shall take into account the immediate and long range cumulative effects of proposed uses on the environment, both on and off-site.
- 10.3 The County shall reduce the loss of critical aquatic and terrestrial habitat by minimizing habitat fragmentation.
- 10.4 Wetlands, woodlands, watersheds and aquifers are essential components of the hydrologic system and shall be managed to protect surface and groundwater quality.
- 10.5 Skagit County shall recognize the river systems within the County as pivotal freshwater resources and shall manage development within the greater watershed in a manner consistent with planning practices that enhance the integrity of the aquatic resource, fish and wildlife habitat, and recreational and aesthetic qualities.
- 10.6 Rural character shall be preserved by regulatory mechanisms through which development can occur with minimal environmental impact.
- 10.7 Development shall be directed away from designated natural resource lands, aquatic resource areas and critical areas.

- 10.8 The conversion of tidelands to uplands by means of diking, drainage and filling shall be prohibited, except when carried out by a public body to implement a Comprehensive Plan for flood plain management or to respond to a natural disaster threatening life and property.
- 10.9 Septic systems, disposal of dredge spoils and land excavation, filling and clearing activities shall not have an adverse significant affect on Skagit County waters with respect to public health, fisheries, aquifers, water quality, wetlands, wildlife habitat, natural marine ecology and aquatic based resources.
- 10.10 Usual and accustomed activities on natural resource lands and aquatic resource areas shall be protected from interference when they are conducted in accordance with best management practices and environmental laws.
- 10.11 When evaluating and conditioning commercial, industrial or residential development, Skagit County shall consider threatened or endangered wildlife.
- 10.12 Skagit County shall enter into inter-agency agreements with appropriate state and local agencies and Native American Tribes for compliance with watershed protection, including but not limited to, the cumulative effects of construction, logging and non-point pollution in watersheds.
- 10.13 Skagit County and Cities and Towns, in cooperation with appropriate local, state and Federal agencies, shall develop and implement flood hazard reduction programs, consistent with and supportive of the Corps Feasibility Study.
- 10.14 The Skagit River Floodway and the Skagit River Floodplain shall be regulated to protect human life, property and the public health and safety of the citizens of Skagit County; minimize the expenditure of public money; and maintain flood insurance eligibility while avoiding regulations which are unnecessary restrictive or difficult to administer.
- 10.15 Skagit County and Cities and Towns shall work together to provide ongoing public education about flooding in a coordinated and consistent program, and shall adopt a flood hazard reduction plan, that works together with the natural and beneficial functions of floodplains.

2. The 2002 Framework Agreement specifically in regards to processes and procedures for conducting regional planning in an integrated, coordinated and on-going manner, and for modifying UGA boundaries.

The purpose section appears to be the relevant element for this letter:

SECTION 1: PURPOSE

It is the intent of Skagit County and the Cities to cooperate in efforts to provide visionary

leadership on regional plan, policies and issues. It is the purpose of this Agreement to enhance the ability of the parties to improve the present health, safety, convenience and welfare of their citizens and to plan for the future development of the Cities and the County to the end that the governments achieve a county-wide pattern of community-building, land use, and conservation that reflects the environmental, economic, aesthetic, and social values of city and county residents.

This Agreement will improve the collective ability of the parties to address pertinent issues in an integrated, coordinated and on-going manner, and to respond flexibly and intelligently to events that affect the welfare of city and county citizens. The Agreement also will encourage the effective design and implementation of appropriate tools—both regulatory and non-regulatory—that can provide the means to manage and direct growth in a manner that will achieve compliance with the Washington Growth Management Act.

To assist in accomplishing the above and other tasks related to developing complimentary comprehensive plans, it is the intent of Skagit County and the Cities to cooperatively support a planning organization as further described in Section 3 below, to recommend CPPs and thereby ensure the adoption of consistent comprehensive planning policies. The primary functions of such planning organization shall be to:

- Develop, as appropriate, policies for transportation, growth management, environmental quality, and other topics determined by the GMA Committee's Steering Committee;
- Provide agreed and accepted data and analysis to support local and regional decision making;
- Build community consensus on regional issues through information, and citizen involvement at the local level;
- Build intergovernmental consensus on regional plans, policies and issues, and advocate local implementation;
- Establish a mechanism to systematically and logically update the CPPs as necessary; and
- Develop procedures for siting regional essential public facilities that includes regional input.

3. The Urban Growth Area Modification Criteria as approved by the Growth Management Act Steering Committee.

The City has prepared a draft Urban Growth Area (UGA) Expansion Report based on the approved UGA Modification Criteria.

Background

In the 2005 Burlington Comprehensive Plan, three proposed additions to the Burlington Urban Growth Area (UGA) were adopted, consisting of two Short Term Urban Growth Planning Areas and one Long Term Urban Growth Planning Area, as shown in Exhibit 1.

The reasons for including this land in the future UGA are to get the end of Gages Slough into public ownership and to provide a location for a true urban separator at a logical boundary, which is clearly Pulver Road on the west. The Gages Slough pump station is adjacent to Pulver Road, it is owned by the City. This is a major component of the adopted Connected Open Space Plan of the City of Burlington, specifically designed to establish a buffer to permanently protect farmland around the City and to restore the buffers and open space along Gages Slough, providing public access as appropriate. Burlington is responsible to clean up the storm water that enters the Slough.

Additionally, this is a component of the flood hazard mitigation plan that is being updated to plan for construction of 100-year levee protection around the urban area which may include a levee at the Pulver Road location.

The position of “no net loss of agricultural land” is assumed to be unchanging as this report is prepared. This report proposes a land swap, of farmland that is located in the Burlington UGA today, for the parcel of land located at the corner of Peterson Road and Pulver Road to be used as a site for a future school. See Exhibit __1__.

The City is demonstrating its commitment to farmland preservation by raising funds towards the acquisition of farmland development rights. The City is working to protect against the loss of farmland through the Burlington Agricultural Heritage Credit program where additional residential density is proposed to be allowed in exchange for buying BAHC’s at a specified rate per dwelling unit that results in a density of more than 4 units per acre. The proposed area of influence is 5628 acres, shown on Exhibit 3.

The existing farmland to the east of Pulver Road is proposed to remain in agricultural use with development rights acquired permanently through the Skagit Farmland Legacy Program. This is the logical boundary for the community, because it consists of a road, and if a small dike is critical for flood protection, then it will be in a straight line heading north. At a point north of Peterson Road, the boundary will head east to Interstate 5, north to Gear Road, follow the City Limits to the east and south including a very modest urban growth infill area. There will be additional levee work required along the railroad tracks, and possibly in the vicinity of Gardner Road.

Burlington faces unique challenges as a result of its location in the Skagit River floodplain, and in conjunction with the request to modify the Urban Growth Area boundaries, the city is proposing to amend the Flood Hazard Mitigation Plan to set 100-year flood certified levees as the goal for community flood protection.

Short Term Urban Growth Planning Areas

The northerly site is proposed for a location for a new School, consisting of 28.70 acres. It is located at the intersection of Peterson and Pulver Road, north of the existing homes that are in the City Limits. The Burlington-Edison School District is growing and this location has access to all urban services, meets the size needs for a new school, and is located in the area where the school population is growing. **There is NO land in the City Limits today that is available for a new school site that lies in reasonable proximity to the student population. The City and the School District do not support locating elementary schools in commercial/industrial areas as a matter of policy. The only existing land owned by the Burlington-Edison School District that is vacant and not part of the High School campus is not able to be annexed because of not enough petitioners, it is over half a mile from the nearest utilities, and it is not large enough to accommodate a school. (Should there be a table of existing school sites in Burlington or the district with acreage, availability and student forecast?)**

The southerly site extends east from Pulver Road and south from Gages Lake, consisting of the Gages Slough area with a 50 foot buffer, a total of 37.08 acres that is being increased by about 10 acres with a constructed wetland planned to be developed by WSDOT as a mitigation site for the SR 20/Fredonia project. This leaves a remainder of about 119.34 acres behind the planned dike setback that extends along the unopened Bennett Road right-of-way. This land could remain in agricultural use and development rights could be acquired over time. The Gages Slough Management plan has identified this portion of the Gages Slough corridor as needing to be in public ownership so that the functions of the Slough in storm water cleanup, restoration of wetland buffers, and providing a key community connection in terms of public open space will be able to be enhanced and improved.

Long Term Urban Growth Planning Area

This is located east of Pulver Road, south of SR 20, north of Gages Lake. There is an isolated wetland of about 1 acre in size on the site, along with the former site of All-West Sires and an abandoned farm worker housing site, and land that is in agricultural use. Total acreage is 143.26 acres. This location abuts a single family residential neighborhood to the east. This area may have potential as a sending zone for farmland development rights, a location where development rights should be purchased, with the exception of the former All-West Sires site, or alternatively, provide housing opportunities if there is sufficient population allocated to Burlington for housing in the future.

Summary of Existing Conditions in the City Limits

Zoning District	Number of Acres	Vacant as of February 2008	Underutilized
Residential, single family (R-1, R-2, MR-NB)	900	Infill only except West Burlington Hill (very steep),	Redevelopment potential minor

		& 1 -30 unit site	
Multi-family Residential	127	4 (3 on Peterson Road; 1 on B.H.)	None (except mixed use & redevelopment)
Commercial & R-S	653	100	101
Industrial (M-1 & C-2)	696	161	Included in C
Parks/Open Space/Ag	222	N/A	
River/Interstate/Rail Yard	224		
TOTAL	2,822	261 C/I; Res. Infill only	101 C/I; mixed use; minor infill

Countywide Planning Policy Status

Countywide Planning Policy Allocations	Commercial/Industrial	Residential	
	242 New Acres	12,000 Population by 2025; 9691 in City Limits; 2307 in UGA	

Conformance of Plan with Recommended Amendments to the Countywide Planning Policies

The proposed amendments to the Countywide Planning Policies provide for consideration of amendments to the Urban Growth Area outside of the basic 7 year cycle under the following circumstances:

*1,10 The county may change adopted UGA boundaries more frequently than the once every seven (7) year cycle required in CPP 1.9 **only** when one or more of the following conditions are met:*

- 1. The boundary adjustment is necessary to make minor technical corrections to a UGA boundary due to a mapping error or to be more consistent with identifiable physical boundaries such as natural features, roads, or special purpose districts. Minor boundary adjustments shall not increase the buildable land development capacity by more than 1 percent within the affected UGA.*
- 2. The boundary adjustment is the result of an emergency comprehensive plan amendment by the affected jurisdiction in accordance with RCW 36.70A.130(2)(b).*
- 3. The boundary adjustment is necessary to comply with changes to state or federal laws, regulations or standards.*

4. *When required as part of a compliance order from the Western Washington Growth Management Hearings Board or court of higher authority.*
5. *The boundary adjustment will permanently preserve a substantial land area containing one or more significant natural or cultural feature(s) as open space and will provide separation between urban and rural areas. Provided that the boundary adjustment does not result in a significant increase to population or employment capacity. The presence of significant natural or cultural features shall be determined by the respective legislative bodies of the county and the municipality or municipalities immediately adjacent to the proposed expansion, and may include, but are not limited to, landforms, rivers, bodies of water, historic properties, archaeological resources, unique wildlife habitat, and fish and wildlife conservation areas.*
6. *There is less than 50% remaining of the vacant and buildable land base (residential, commercial, or industrial, respectively) that was designated within the incorporated and unincorporated areas of the particular UGA at the time of the last sub-allocation, or through any subsequent expansion of the UGA boundaries; or*
7. *The board of county commissioners may waive the requirement in 1.10.6 above upon finding that:*
 - a. *The request has been formally reviewed and endorsed by the impacted municipality; and*
 - b. *The inability to reach the fifty percent (50%) threshold is accounted for either by 1) a small number of parcels within the UGA which account for a significant portion of remaining buildable lands and for which it can be clearly demonstrated are not likely to develop in the planning horizon of the existing boundary; 2) an assessment that concludes there is a deficiency of larger parcels within that UGA to accommodate the remaining commercial or industrial growth projected for that UGA; or 3) other documented local circumstances that relate to the land market factors relevant to UGA expansion or reduction; and/or*
 - c. *The expansion will allow the development of a school, K-12, public or private, provided that the expansion area is adjacent to an existing UGA and will be designated and zoned exclusively for that use and will not add any residential, commercial or industrial capacity to the affected UGA.*

The City of Burlington is applying for consideration to expand the UGA under criteria #5, and 7 c. above.

Criteria #5 is the major focus, with the protection of the Gages Slough corridor and existing farmland east of Pulver Road. The boundary adjustment will permanently preserve a substantial land area containing one or more significant natural or cultural feature(s) as open space and will provide separation between urban and rural areas. The boundary adjustment does not result in a significant increase to population or employment capacity. The significant natural feature is the Gages Slough Corridor. Preservation of existing farmland is a critical element of the plan to provide 100-year flood protection around Burlington. Protection of overbank flow paths through farmland is critical.

Criteria #7 c will allow the development of a public school. The expansion area is adjacent to the City Limits and has access to urban services. The site will be designated and zoned exclusively for that use and will not add any residential, commercial or industrial capacity to the UGA.

1.9 *All UGA boundary adjustments shall be subject to the following requirements:*

1. *UGA boundary adjustments shall be consistent with the requirements of the Skagit County Comprehensive Plan.*
2. *Sufficient land area must be included in the UGAs to accommodate the adopted 20-year population and employment forecast allocation as adopted by the SCOG and consistent with OFM projections. The extent of a UGA boundary expansion shall be that necessary to provide a minimum ten (10) and a maximum twenty (20) year supply of vacant and buildable lands within the UGA.*
3. *A jurisdiction, as part of its comprehensive plan amendment that proposes an expansion of its UGA to accommodate additional population or employment capacity, shall conduct planning and analysis sufficient to update and confirm the development capacity analysis for buildable land within the existing UGA for residential, commercial, and/or industrial lands, which takes into account all development approved within the overall UGA since the last UGA expansion. Minimum requirements for UGA buildable lands development capacity analyses shall include the following steps:*
 - a. *Define vacant and underutilized (but likely to redevelop) parcels by zone*
 - b. *Deduct from the gross land capacity by zone—identified in step a. — the following lands not available to accommodate future population or employment:*
 - (i) *critical areas (and buffers as appropriate)*
 - (ii) *future roads/rights-of-way needs*

- (iii) *future public or quasi-public facilities needs*¹
 - (iv) *remaining lands likely to be held off-the-market (e.g., market or other factors)*²
 - c. *Apply the minimum (or average achieved) density or intensity of use in each zone to the remaining net developable acres identified in step b.*
 - d. *Apply appropriate household size and/or employee land intensity standards to the remaining net buildable acres—identified in step c.—to determine total UGA population or employment capacity.*
4. *Document consistency of the proposed UGA expansion with Countywide Planning Policy 1.1 and the adopted 20-year population and employment allocation, including identification of any allocated but undesignated forecast population or employment.*
 5. *Preparation of a comparative evaluation of potential areas for UGA expansion, including: 1) planning and zoning regulations currently in place; 2) an evaluation of how a full range of urban-level infrastructure and services would be provided within potential expansion areas, including appropriate capital facility analysis; and 3) an evaluation of reasonable alternatives, other than expanding the UGA, to accommodate the forecast UGA population or employment allocation. This shall include consideration of development regulation amendments to allow for increased densities and intensities of use in the existing UGA. Consideration of reasonable alternatives to UGA expansion shall be within the discretion afforded to local governments by RCW 36.70A.110 (2) to make choices about accommodating growth.*
 6. *Document the proposed UGA expansion for consistency with any applicable inter-local agreement between the affected municipality and the county.*
 7. *Review the planning and zoning regulations and any incentive programs in place to determine expected densities in the existing UGA consistent with the GMA, as interpreted by the Growth Management Hearings Board, and the adopted Comprehensive Plan.*
 8. *In evaluating potential changes to a particular UGA boundary, the county shall consider countywide implications for other UGAs and their population and employment sub-allocations.*
 9. *In cases of residential lands proposed for inclusion within a UGA, annexation or incorporation should be encouraged to occur if immediately feasible, or an interlocal agreement shall be executed between the municipality and county regarding the timing and conditions of future annexation and provision of urban services.*

¹ Not otherwise accounted for in the allocation of commercial/industrial lands in CPP 1.1.

² Not otherwise accounted for in the allocation of commercial/industrial lands in CPP 1.1.

10. *The UGA expansion shall not include areas that are designated as natural resource lands (agricultural, forest, or rural resource) unless:*
- a. the jurisdiction has an adopted transfer of development rights program in place and an agreement with the property owner(s) that will allow for continuation of the natural resource land activities on said lands following UGA designation; or*
 - b. said lands have been re-designated to an appropriate non-resource land use designation consistent with the applicable provisions of the Skagit County Comprehensive Plan, Skagit County Code, and RCW 36.70A.*
11. *The county and cities shall conduct early and continuous public involvement when establishing, expanding, or adjusting UGAs, and shall do so jointly when appropriate. Residents of unincorporated areas should be consulted and actively involved in the process affecting them.*
12. *The county shall exercise its best efforts to coordinate UGA boundary change proposals with the affected municipality(ies), including the preparation of joint staff recommendations where possible. Unless waived by the affected municipality(ies), such municipality(ies) shall be given at least sixty (60) days notice of the proposal prior to a county hearing thereon.*

The final component of the Urban Growth Area expansion consideration is the Raspberry Ridge site. While zoned as Agricultural Resource land of long term commercial significance, Skagit County has opted to locate high density Farmworker Housing Apartment Complexes on the site, just behind the levee at the most dangerous area of the Skagit River. It is on septic tanks, and they need to be on sanitary sewer. Steps need to be taken to address this potential health disaster if the area is flooded and sewage flows into the city. The two options are to wait until the septic tanks fail, or to place this land in the Urban Growth Area, retaining its current designation as Ag/NRL or the comparable Open Space designation in city zoning, which will allow the connection to the sewer system.

4. UGA designation criteria found in Chapter 2, the Urban, Open Space and Land Use Element of the Skagit County Comprehensive Plan, specifically, but not limited to: policies 2A-1.1 through 2A-1.5

The relevant section of the plan is attached as Exhibit A. The response to the inquiry is discussed in item #3 above.

5. Policies regarding frequently flood areas found in (defined as lands in the floodplain subject to a one-percent or greater chance of flooding in any given year) found in Chapter 5, the Environment Element, of the Skagit County Comprehensive

Plan, specifically including, but not limited to: policies 5A-5.2, 5A-5.3 (e-k), and 5A-5.5.

The relevant section of the plan is attached as Exhibit B. The response to the policy framework is that all development in the City Limits of Burlington is required to fully comply with the standards in the Burlington Critical Areas Ordinance that includes the Flood Code. The Flood Code standards are in full compliance with all federal regulations. We would point out that despite draft work products that have been generated by the Corps' General Investigation Study which indicate Burlington will sustain a flood loss on average, every 9 years, the City has not been flooded since 1921. This is consistent with the City's recently published hydrology report that indicates a 1% flood event for the Skagit is significantly smaller purported by the Corps. Nevertheless, we understand the Skagit is a serious flood risk the the City.

The concept expressed in the county policy document is that there should be no development in the floodplain, that habitat restoration and conservation should be the number one priority. The City of Burlington has been in existence for over 100 years and it is an urban area. By committing to no further expansion into the floodplain, and to protecting the existing urban area from flooding to the maximum extent feasible, Burlington is fitting into the countywide planning framework consistent with the county's comprehensive plan. Each jurisdiction is mandated to work towards the protection of fish and wildlife habitat through programs such as water quality and habitat restoration using best management practices. Burlington has an extensive water quality monitoring program and is implementing the Gages Slough Management Plan to improve habitat and wetland buffers.

6. The flood protection project should be evaluated holistically in a coordinated, comprehensive, and equitable manner consistent with other flood control measures being considered in the update to the 1989 Skagit County Comprehensive Flood Control Management Plan and in the U.S.Army Corps of Engineer's Skagit River Flood Damage Reduction and Ecosystem Feasibility Study (Skagit River GI).

This flood protection program is being evaluated in relationship to the information currently available from the Corps of Engineers proposed measures and the Corps Hydrology. The FEMA mapping program is also a serious consideration.

In light of those two programs, the City of Burlington and Dike District #12 have no option but to develop an independent and technically correct and accurate program that will lead to the protection of the City of Burlington in a reasonable manner with a strong program of flood hazard mitigation, including levee certification, promotion of flood insurance, protection of farmland for overbank flow paths, public education, emergency preparedness including evacuation plans, and flood fight preparations.

With regard to the levee certification concept and its relationship to a "flood protection project [that] should be evaluated holistically in a coordinated, comprehensive, and equitable manner consistent with other flood control measures being considered in the

update to the 1989 Skagit County Comprehensive Flood Control Management Plan and in the U.S.Army Corps of Engineer's Skagit River Flood Damage Reduction and Ecosystem Feasibility Study (Skagit River GI)." The upstream segment of Dike 12's levee must be accredited by FEMA under any possible local or regional set of flood measures related to the GI study, the Comprehensive Flood Control Management Plan, or any other upstream or downstream flood measure scenario.

7. Levees fail, as in Katrina and the mid-west. The flood protection project should include a well planned, feasible and periodic exercise of an evacuation plan should a levee fail...

Burlington has an Evacuation Plan and a Flood Emergency Plan and the plan is reviewed and evaluated annually. Evacuation routes are posted throughout the city. There is a system in place for evacuation of critical facilities, and an early notification program called the Neighbor-to-Neighbor Plan for all interested communities and block watch programs. Critical facilities were evacuated in 2003, and on notice in 2006. This is an on-going program in Burlington.

GOAL A URBAN GROWTH AREAS

Guide most future development into concentrated urban growth areas where adequate public facilities, utilities, and services can be provided consistent with the Countywide Planning Policies.

GOAL A1 URBAN GROWTH AREA DESIGNATION

Establish Urban Growth Areas in which urban development will be encouraged and outside of which growth can occur only if it is rural in character.

Policies:

- 2A-1.1** Work with local jurisdictions to designate and maintain Urban Growth Areas (UGAs) of sufficient size to accommodate the County's 20-year urban population and employment allocations. Areas proposed for UGA designation shall meet the following criteria:
- a. Compact development can be accomplished through infill or expansion, while minimizing the fiscal and environmental impacts of growth and assuring opportunities for housing, jobs, and commerce.
 - b. A range of governmental facilities and services presently exists or can be economically and efficiently provided at urban levels of service. These services include sewer, water, storm drainage, transportation improvements, fire and law enforcement protection, and parks and recreation.
 - c. The area has a physical identity or social connection to an existing urban environment.
 - d. Natural features and land characteristics are capable of supporting urban development without significant environmental degradation.
 - e. The land does not have long-term, commercially significant value for agriculture, forestry, or mineral production and that can accommodate additional development without conflicting with activities on nearby natural resource lands.

2A-1.2 Work with cities and towns to establish criteria for evaluating future proposals for Urban Growth Area expansions including: land capacity analysis; ability to provide urban services; impacts on critical areas, natural resource lands, and hazard areas; and compliance with related Countywide Planning Policies.

Urban Growth Area expansion proposals shall demonstrate that expansion is necessary within the 20-year planning period, that public facilities and services can be provided concurrent with development, and that reasonable efforts have been made to encourage infill and redevelopment within existing Urban Growth Area boundaries before those boundaries can be expanded.


2A-1.3 In designating Urban Growth Areas, consider GMA requirements to provide for recreational lands, critical areas, open space corridors, greenbelts, and view sheds, and to avoid natural hazard areas prone to flooding or other risks to public safety.

2A-1.4 The following Urban Growth Areas are designated within Skagit County:

- Anacortes
- Bayview Ridge
- Burlington
- Concrete
- Hamilton
- La Conner
- Lyman
- Mount Vernon
- Sedro-Woolley
- Swinomish

2A-1.5 Overall residential densities within Urban Growth Areas shall be a minimum of four (4) dwelling units per net acre, when urban services are provided. “Net density” is what results when only the area of the residential lots is counted, not roads, open spaces, drainage facilities, or other site uses that are not residential.

- m. Habitat fragmentation shall be minimized to enhance wildlife diversity by protecting important wildlife areas, open space, and interconnecting corridors that form a continuous habitat network.
- n. Protective measures will be required in all areas that have the potential to introduce sediments into fish bearing streams, unless the applicant can adequately demonstrate that other mitigating measures will avoid impacts to instream resources.
- o. Habitats or species that have been identified as priority species or priority habitats by the state, federal or tribal governments should not be reduced and should be preserved through regulation, acquisition, incentives and other techniques. The County should determine which habitats are of local importance.
- p. The level of protection for HCAs shall be commensurate with the resource population status and management objectives as determined by appropriate resource managers.
- q. Native vegetation shall be preferred and retained over exotic species in Fish and Wildlife Conservation Areas.
- r. Native plant communities should be integrated with land uses wherever possible.

 **5A-5.2** Land uses that are incompatible with critical areas shall be discouraged.

Frequently Flooded Areas

- a. Low intensity land use activities such as agricultural, forestry, and recreational land uses should be encouraged in floodplain areas and other land uses in these areas should be discouraged.
- b. Land uses, densities, and development activities in the floodplain and coastal high hazard areas should be limited to protect public health, safety, and welfare, to minimize expenditure of public money and costly flood control projects, and to maintain hydrologic systems.

Geologically Hazardous Areas

- c. Low land use densities and intensities or open space shall be preferred in geologically hazardous areas where this practice can provide site specific mitigation.

- d. Land use regulations and practices for geologically hazardous areas shall be established so that development does not cause or exacerbate natural processes that endanger lives, property, infrastructure, and resources on or off site.

Fish and Wildlife Habitat Conservation Areas

- e. Fish and Wildlife Habitat Conservation Areas shall be protected against habitat degradation to the fullest extent possible while allowing reasonable use of property.
- f. Urban density development in the County and adjacent to Habitat Conservation Areas shall be sited such that HCA functions and values are protected.

5A-5.3 Development allowed in critical areas shall be conducted without risk to lives, and with minimum risk to property, infrastructure, and resources.

Wetlands

- a. Development adjacent to wetlands should be sited such that wetland and buffer functions are protected and an adequate buffer around the wetland is left undisturbed.
- b. Alterations to wetlands that are allowed in order to maintain or enhance specific wetland functions and values, shall consider all quantitative and qualitative functions of the wetlands and required buffers.

Aquifer Recharge Areas

- c. Consistent with state and federal laws and regulations, the County shall develop in unincorporated areas and facilitate on a county-wide basis performance standards and regulate uses for activities which can adversely impact water quality or quantity in aquifers, watersheds, and surface waters.
- d. Performance standards shall be established to maintain aquifer recharge and protection and require that new developments meet these performance standards and that existing facilities be retrofitted, where feasible, to meet the standards.

Frequently Flooded Areas

- e. Development regulations shall be adopted that prohibit intensive uses such as urban subdivisions, multi-family dwellings, commercial buildings, and industrial parks in the floodplain.
- f. The construction of critical facilities (i.e. schools, hospitals, police, fire, emergency response installations, nursing homes, and installations which produce, use or store hazardous materials or hazardous waste) should be prohibited within the 100 year floodplain.
- g. Development shall protect water quality and minimize run-off by limiting impervious surfaces, grading and filling, as well as maximizing vegetative cover and other best management practices.
- h. Flood-proofing of substantial improvements and new structures in frequently flooded areas shall be required.
- i. Where the effects of hazards can be mitigated, appropriate design standards shall be required for site development and livestock sanctuary areas within the 100-year floodplain.
- j. Best management practices shall be required for maintaining the river channel configurations during dredging and gravel removal.
- k. Compensatory storage and a "no net loss" land use approach to maintaining flood water storage capacity and conveyance shall be required in frequently flooded areas.

Geologically Hazardous Areas include erosion hazards, landslide hazards, mine hazards, volcanic hazards and seismic hazards

- l. Critical facilities (i.e., schools, hospitals, police, fire, emergency response installations, nursing homes, and installations which produce, use or store hazardous materials or hazardous waste) should be prohibited in geologically hazardous areas.
- m. Development proposals in designated geologically hazardous areas, where applicable, shall include a geotechnical report and a mitigation plan for development activities, with the amount of information required based on the severity of the geologic hazard and the susceptibility of the development on or off site.

- n. Independent third party review of geotechnical reports for development in designated geologically hazardous areas may be required by the planning director when the report is found to be deficient with the review to be paid for by the applicant as a way of expediting development permits.
- o. Any development should be carried out in a way that will not cause or exacerbate hazardous geological conditions.
- p. Public or private utility service or extensions (sewer, water, natural gas, and electric) should be discouraged in geologically hazardous areas and carefully sited to avoid potential damage to the utility or properties.
- q. When residential development is proposed in areas subject to geologic hazards it should be clustered and the development designed to minimize risk to human life, property, and the natural environment.

Fish and Wildlife Habitat Conservation Areas

- r. New development within or adjacent to HCAs should incorporate design elements that protect wildlife habitat values.
- s. All development that may significantly adversely impact HCAs shall require a mitigation plan, prior to any permit approval. A threshold shall be established on a case by case basis by a qualified professional.
- t. Storm water runoff, flow rates, flow volumes and pollution caused by site development shall be managed so that detrimental impacts to water resources and property are maintained at pre-development levels.
- u. Clearing and grading ordinances shall be developed to avoid impacts of erosion on critical areas.
- v. Impacts to fish and wildlife resources associated with instream flows shall be considered in the Comprehensive Plan and development regulations.

5A-5.4 Impacts to critical areas should be monitored to ensure the long-term success of mitigation measures.

- a. Performance standards shall be adopted through appropriate codes and administrative procedures for development in critical areas; including, but not limited to:

- (i) Critical area report information and analysis;
 - (ii) Site inspections and development review of construction within critical areas;
 - (iii) The use of critical area designations to prohibit, restrict, or otherwise control land uses within short subdivisions, subdivisions, and residential cluster developments;
 - (iv) The use of protective covenants or conservation easements to protect critical areas in non-land division developments.
- b. Land used for critical area mitigation should be preserved in perpetuity. Monitoring and maintenance of critical area mitigation sites shall be provided until the success of the site is established.
- c. Monitoring of the mitigation site should take appropriate measures utilizing one or more of the following:
- (i) Applicants should develop comprehensive mitigation plans in order to ensure long term success of the mitigation project. Such plans should provide for sufficient monitoring, maintenance, and contingencies to ensure mitigation persistence.
 - (ii) Applicants should demonstrate sufficient scientific expertise, supervisory capability and financial resources to complete and monitor mitigation projects and address cumulative impacts to the surrounding area.
 - (iii) Applicants should restore critical areas that are temporarily impacted by development upon project completion.
 - (iv) During development review, applicants should identify potential erosion and sedimentation impacts and submit appropriate mitigation plans that shall be monitored during construction and assessed periodically thereafter.
- d. Critical area mitigation proposals should improve overall critical area functions, recognizing that it may be inappropriate to impact certain critical areas. All critical area functions shall be considered.
- 5A-5.5** Critical areas should be avoided, maintained, restored, acquired, replaced or enhanced.

- a. Mitigation for proposed alterations to critical areas or associated buffers should be sufficient to maintain the function and values of the critical area or to prevent risk from a critical area hazard. Proposed mitigation should follow the mitigation sequence of:
 - (i) Avoid the impact altogether.
 - (ii) Minimize the impact utilizing appropriate technology and design.
 - (iii) Rectify the impact by restoring, repairing or rehabilitating the affected environment to the conditions existing at the time of initiation of the project or activity.
 - (iv) Reduce or eliminate the impact over time by preservation and maintenance operations during the life of the project.
 - (v) Compensate for the impact by replacing, enhancing or providing substitute resources or environments.
- b. On-site replacement of critical area impact is preferred. Where on-site replacement is not feasible or practical due to characteristics of the existing critical area location, replacement should occur within the same watershed and proximity.
- c. Critical area restoration, creation, and enhancement projects should be completed prior to alteration, where possible. In all other cases, replacement should be completed prior to use or occupancy of the development.
- d. The County shall place a high priority on the proper placement or other correction of all identified county road culverts causing blockage of fish passage.
- e. Acquiring additional natural water storage areas, drainage systems and conveyance capacity should be accomplished through public means.
- f. Protection of aquifer recharge areas and potable water resources is preferred, and restoration should be supported where warranted by cost-benefit analysis or limited water supply.

5A-5.6 Develop enforcement procedures to ensure compliance with applicable Skagit County ordinances.



Skagit Conservation District

2021 E. College Way, Suite 203 - Mount Vernon, WA 98273-2373 - Phone: (360) 428-4313 - Fax: (360) 424-6172
Email: skagitcd@skagitcd.org

August 25, 2008

Margaret Fleek
City of Burlington Planning Dept.
833 South Spruce St.
Burlington WA 98233

Subject: Public Comment EIS Scoping Burlington Floodplain Management and Natural Hazard Mitigation.

Dear. Ms. Fleek:

In response to the City of Burlington and Skagit Dike District No. 12's August 12, 2008 public notice, Skagit Conservation District wishes to provide the following comments on the scope of the EIS for the proposed amendment to the Burlington Floodplain Management and Natural Hazard Mitigation Chapter of the Skagit County Natural Hazard Mitigation Plan. We request that scoping items No. 1 (local impact of 100-year flood protection) and No. 3 (alternatives) should be interpreted broadly enough to consider setting back levees throughout DD12 and Burlington's jurisdiction (rather than limited solely to the three-bridge corridor) and to include planting the resulting floodway area outside (riverward) of any setback levees with native forest vegetation.

Skagit Conservation District appreciates the opportunity to comment on the proposed EIS and would be happy to provide further input on these issues.

Sincerely,

Tom Slocum, PE
District Engineer

RESPONSE TO COMMENT LETTER FROM SKAGIT CONSERVATION DISTRICT DATED AUGUST 25, 2008

The Conservation District has requested consideration of setting back levees throughout Diking District #12 and Burlington's jurisdiction, rather than limited solely to the three-bridge corridor) and to include planting the resulting floodway area riverward of any setback levees with native forest vegetation.

See Appendix I for additional discussion of mitigation measures.

Following a review of the literature, there is no doubt that it would be excellent to have a forested riparian buffer along the Skagit River of at least 100 feet and have trees growing for decades already. Burlington and Dike District #12 have maintained a strong focus on acquiring land adjacent to the levees to prevent development along the shoreline. Today, there is approximately 5300 feet of forested riparian buffer in two locations starting just upriver from the Wastewater Treatment Plant and extending to the dike road at the corner of Lafayette. There is approximately 2200 feet of forested riparian buffer between the Whitmarsh Road crossdike and the BNSF Bridge, and the future levee setback area is approximately 5600 feet to the City Limits, the end of proposed levee certification. In total, there is approximately 9400 feet of levee without a buffer, 7500 feet of existing riparian buffer on the riverside and the planned levee setback area of approximately 5600 feet.

The existing levees have been under reconstruction since 1990 and an in-depth study of their condition and configuration including geotechnical studies is planned. If feasible, existing levees will be retained and improved up to the beginning of the bridge corridor. There are two existing forested riparian buffer areas in public ownership upstream from the Railroad Bridge, the first just around the corner and the second at the Gardner Road Bar. One mitigation measure that is being considered is to restore and possibly expand these existing forested riparian buffers. Combined with the levee setbacks and potential for connected open space along the bridge corridor, it becomes apparent that substantial mitigation is possible.

As local governments and FEMA review the recent Biological Opinion, the goal is to work in a collaborative manner to develop a mitigation program that yields positive results for habitat restoration.

The comment letter presents an excellent concept, and it is consistent with the goals of the Critical Habitat designation of this river system; however, that same designation speaks to mitigation for existing developed conditions by a combination of measures, and that is very likely necessary in this area. It is the city's intent to work with all agencies that are concerned and interested to develop the preferred alternative that will meet the goals for habitat restoration.

August 12, 2008

Margaret Fleek, Planning Director & Charles Bennett, Skagit County Dike District No. 12 Commissioner
Burlington City Hall
833 S. Spruce Street
Burlington, WA 98233

RECEIVED

AUG 14 2008

PLANNING DEPT.

RE: City of Burlington and Dike District #12 Determination of Significance

Dear Ms. Fleek and Mr. Bennett:

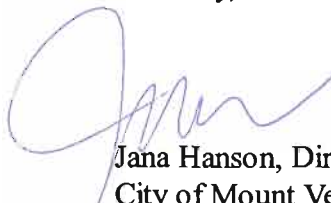
Thank you for the opportunity to comment on the scope of the EIS for the modification and construction of flood protection measures and UGA expansion. First of all, on behalf of the City of Mount Vernon administration, I applaud your initiative to begin the process to plan for and implement certified flood protection measures to protect Burlington in the event of a 100-year flood and preserve the City's economic interests through stabilizing the base flood elevations.

The City of Mount Vernon is also impacted by Skagit River flooding and concerned with the future changes in base flood elevations resulting from the revised Flood Insurance Rate Maps. It is extremely important for the cities of Mount Vernon and Burlington and the dike districts to continue to work closely together on proposed flood protection measures and ensuring that the correct hydraulic modeling and data are utilized for the purpose of analyzing flood protection measures and for determining base flood elevations in a 100-year flood event.

To ensure that any proposed actions will not negatively impact the City of Mount Vernon, the scope of the EIS should include any and all probable adverse effects to the Mount Vernon built and natural environment. The City of Mount Vernon staff will be happy to assist with any scoping meetings and or study sessions with the City of Burlington, Dike District No. 12 and your consultants.

We look forward to continuing to work with the City of Burlington and Dike District No. 12 to achieve the desperately needed solutions to flooding from the Skagit River.

Sincerely,



Jana Hanson, Director
City of Mount Vernon
Community & Economic Development

**RESPONSE TO COMMENT LETTER FROM THE CITY OF MOUNT VERNON
DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT DATED
AUGUST 12, 2008**

The City of Mount Vernon supports all efforts to work closely together on proposed flood protection measures and ensure that the correct hydraulic modeling and data are utilized for the purpose of analyzing flood protection measures and for determining base flood elevations. The request is to ensure that the EIS includes any and all probable adverse effects to the Mount Vernon built and natural environment.

Dike District #17 and Dike District #12 are working closely together on the front line and the two cities are also working together to protect the cities long term interests. Sharing a common border along the Skagit is helpful for both communities.