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# City of Tukwila

Department of Community Development

## MEMORANDUM

**TO:** Tukwila City Council

**FROM:** Carol Lumb, Senior Planner

**CC:** Mayor Haggerton  
Rhonda Berry, City Administrator  
Bob Sterbank, City Attorney

**DATE:** July 23, 2009

**SUBJECT:** Packet #1 - Handouts

Attached you will find the following handouts relative to the Planning Commission Recommended DRAFT Shoreline Master Program. Most of these items will aid you in the discussion of buffers which is the subject matter for the July 28, 2009, Work Session. Additional information has been included as per Council requests.

- ❖ **Meeting Agenda**
- ❖ **Letter from Mayor Haggerton regarding the SMP, dated July 23, 2009**
- ❖ **Letter from the Department of Ecology, dated June 30, 2009, regarding comments on the Planning Commission Recommended DRAFT Shoreline Master Program** (*This letter will be referenced several times throughout the Council review process when we discuss specific items. This week, the items regarding buffers have been highlighted for you in yellow. A separate binder tab has been incorporated for this item for easy reference*). **Please review for discussion.**
- ❖ **Duwamish River Transition Zone Map**, per Council request.
- ❖ **Buffer related information (please review for discussion):**
  1. Memo from Jim Morrow and Jack Pace, dated September 9, 2008, regarding Proposed Shoreline Buffers. Specifically, **factors considered in establishing the proposed 50-foot, 100-foot, and 125-foot buffer widths.**
  2. Memo from Carol Lumb, dated October 10, 2008, regarding Proposed Shoreline Residential Environmental Buffer Width. Specifically, **factors considered in proposing the buffer for single family residential areas along the shoreline.** Includes Best Available Science Issue Paper: Watercourses, dated June 2003, as additional background information.
  3. Memo from Jim Morrow, dated January 26, 2009, regarding Shoreline Master Program. Specifically, **in response to the January 15, 2009, letter from McCullough Hill, PS on Buffer Width and Levee Profile** (McCullough letter is included for your reference).
  4. Memo from Jim Morrow, dated May 8, 2008, regarding Levee Repair Projects. Specifically, **in response to La Pianta comments made during the April 21, 2008, Council Meeting.** (comments from meeting minutes attached for your review).

5. **King County Flood Hazard Management Plan** – Sections 5.9.9 and 5.9.10: Flood Hazard Management Corridor Conditions and Flood Hazard Management Objectives and Strategies (Lower Green and Duwamish River). If you desire additional research on this Plan, the full document is available online at:  
<http://www.kingcounty.gov/environment/waterandland/flooding/documents/flood-hazard-management-plan.aspx>
6. Memo from Jim Morrow, dated July 13, 2009, regarding Shoreline Master Program Response to Public Comments. Specifically, **public comments regarding: U.S. Army Corps of Engineers levee standard, vegetation enhancements and buffer width determination.**
7. Memo from Jim Morrow, dated July 14, 2009, regarding Shoreline Master Program Response to Public Comments. Specifically, **public comments regarding: other cities' SMP's, floodway issue/FEMA maps and property owners' engineering study.**
8. Explanation of How Shoreline Buffers Were Determined - Excerpted from Planning Commission Recommended Draft SMP dated February 5, 2009
9. Levee Profiles:
  - City of Tukwila Typical Section
  - Kent Shops - Narita Typical Section
  - Briscoe School Levee Repair - Green River Mile 16.5 (Kent)
  - Excerpt from City of Kent's Proposed SMP - Levee Profile, Pages 151 and 152



## **AGENDA**

### **Tukwila City Council SMP Work Session**

**July 28, 2009  
6:00 p.m. – 8:00 p.m.  
City Council Chambers**

- I. Agenda Packet 6:00 – 6:15 p.m.
- Opening Comments – Mayor Haggerton
  - Requested Materials – DCD Staff
  - Ecology Letter – DCD staff
- II. Shoreline Buffers 6:15 – 7:45 p.m.
- Items #1 – 8 from 7/28/09 Meeting Packet:
  - PW Director – brief recap of previous discussions on proposed buffer widths
  - Questions from Council
- III. Next Meeting:
- Next Work Session: August 11, 2008, 6:00 – 8:00 p.m.
  - Topic: Section 9.10 - Vegetation Protection and Landscaping





# City of Tukwila

6200 Southcenter Boulevard • Tukwila, Washington 98188

Jim Haggerton, Mayor

July 23, 2009

Members of the Tukwila City Council:

As you continue review of the Planning Commission recommended Draft Shoreline Master Program (SMP) I would like to share a few thoughts about how we have arrived at this point.

The effort to update our shoreline regulations has been a long process and must be understood within the context of the larger regulatory environment. Marine, lake and river shorelines have been regulated since the passage of the Shoreline Management Act through a public referendum in 1972. Tukwila's current SMP dates from 1974 and does not reflect the significant environmental and regulatory changes that have occurred since that time. Areas annexed into the City after 1974 are still regulated under the King County SMP because Tukwila's regulations were not updated to cover them.

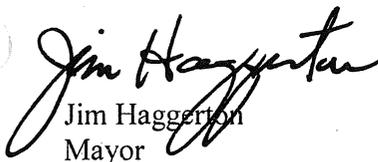
Work began on an updated SMP in 1999 with the help of a Shoreline Advisory Panel composed of four citizen and business representatives. The Planning Commission started review of that Panel-approved draft; however, in March 1999 the National Marine Fisheries Service (NMFS) listed wild Puget Sound Chinook salmon as a threatened species. This changed the shoreline regulatory environment to include the Endangered Species Act.

Subsequently, the shoreline regulations approved by Department of Ecology (DOE) in 2000 and used to guide the 1999 draft SMP were challenged and overturned in 2001. Due to that regulatory uncertainty, work on the SMP was stopped to wait for new rules to be adopted. In 2003, DOE adopted updated rules and in 2005, Tukwila received a grant to complete a comprehensive update of our shoreline regulations.

In 2007, staff took the Panel-approved draft, revised it to fit within the new regulatory framework and sent a staff draft to DOE for comments. Additional revisions were made based on these comments and Planning Commission review on this new draft began again in 2008. The Planning Commission forwarded their recommended draft to the City Council in February 2009 and that is the ~~strikeout/underline~~ version that will be the basis for Council review.

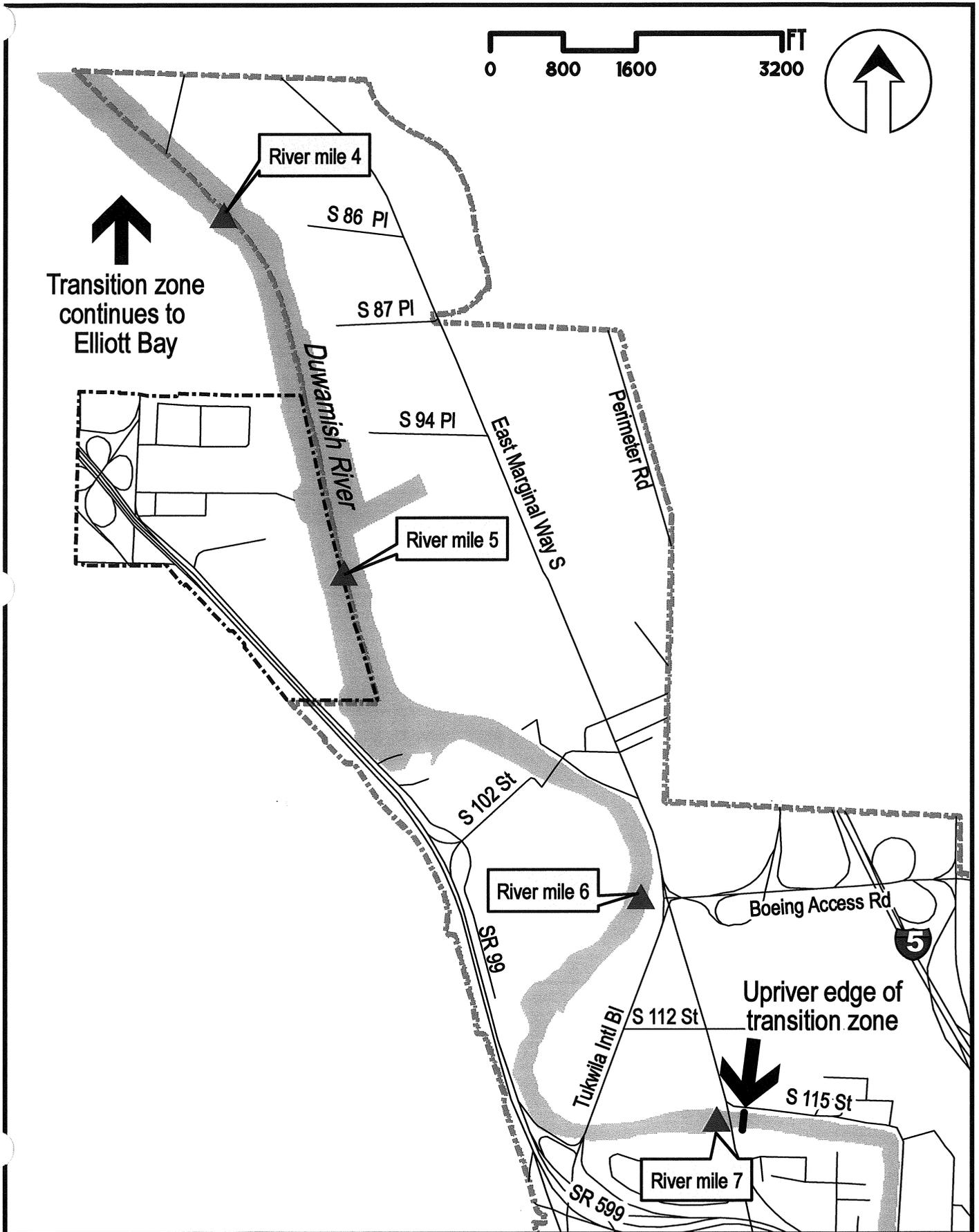
Jurisdictions are mandated to adopt updated SMP's to comply with the new regulations by December 1, 2009. DOE will then review each plan, hold a public hearing on the document and then notify the jurisdiction of any changes required to comply with State law. So, while each jurisdiction can tailor its SMP to reflect local conditions it must also meet State standards and receive approval by DOE.

Developing policies that balance property rights, public safety and the environment while meeting County, State and Federal requirements will be a difficult task. Staff's role is to provide technical, legal and regulatory information to aid you in your decision making. I know that as a Council, you will be thoughtful and thorough in your review.

  
Jim Haggerton  
Mayor



# Duwamish River Transition Zone





## **Department of Ecology Comments**





RECEIVED

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COMMUNITY  
DEVELOPMENT

STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

June 30, 2009

Carol Lumb, AICP  
City of Tukwila  
6300 Southcenter Blvd, Suite 100  
Tukwila, WA 98188-8548

RE: Comments on Planning Commission Recommended Shoreline Master Program

Thank you for the opportunity to comment on the Planning Commission Recommended Draft of the Tukwila Shoreline Master Program (SMP). The Department of Ecology has provided several comments below. This letter is divided into two major sections, general issues and detailed comments. Many of the general issues have been previously discussed in our email of March 5, 2009 and subsequent meetings.

**General Issues**

1. Maps

All appropriate maps should be included as part of the SMP. This includes the SMP environment designations, sensitive areas map, public access, and armoring.

2. Buffers

The SMP must address the effect of the proposed alternative shoreline buffers allowing for a regraded 2.5:1 slope levee as found at page 68 of the SMP. This alternative buffer has an undefined width. The undefined width is a concern. How will this proposed buffer accomplish no net loss of ecological function and protection equal to that provided by the Sensitive Areas Ordinance?

3. Archaeological Resources

Tukwila Municipal Code 18.50.110 and Draft SMP section 9.7 discuss archaeological resources. Section 9.7 contains several beneficial standards. Ecology has identified two minor concerns during our review.

WAC 173-26-221(1)(c) has two requirements of SMPs. These are:

1. Require that developers and property owners immediately stop work and notify the local government, the office of archaeology and historic preservation and



affected Indian tribes if archaeological resources are uncovered during excavation.

2. Require that permits issued in areas documented to contain archaeological resources require a site inspection or evaluation by a professional archaeologist in coordination with affected Indian tribes.

The Tukwila code and draft SMP do not require property owners to necessary stop work if archaeological resources are discovered. The TMC does require that discovered resources not be disturbed, the code does not account for the possibility of additional archaeological resources to be present nearby. The SMP needs to require that work cease in such circumstances.

The Tukwila code and draft SMP do not require a site inspection or evaluation by a professional archaeologist in coordination with affected Indian tribes for all sites where archaeological resources are documented. The TMC requires such an evaluation if there is reason to believe that archaeological resources will be disturbed. It is important to systematically know what the extent of the archaeological resources is.

#### 4. Unclassified Use

Section 14.4 of the Draft SMP contains provisions for reviewing Shoreline Unclassified Use Permits. We note that WAC 173-27-160(3) requires that unclassified uses be subject to a shoreline conditional use permit. Section 14.4 of the Draft SMP would not eliminate the need for a Shoreline Conditional Use Permit. The Unclassified Use Permit could be an additional permit requirement. It may be more effective to identify any additional criteria, in addition to the conditional use permit criteria, that must be met in order for an unclassified use to be approved.

It will be necessary to provide a different name for uses that Tukwila has historically labeled as unclassified uses in the SMP. An example of this would be major shoreline conditional use and minor shoreline conditional use.

#### 5. Zoning Standards

Section 9.3.1.1 of the draft SMP provides that standards of the zoning district apply. To be part of the SMP, these standards need to be specifically identified and reviewed by Ecology. The City may wish to consider which of these zoning standards truly need to be in the SMP.

All references to the zoning code need to identify the section of the code, the date of adoption or the section needs to be stated verbatim in the SMP. Ecology will need to review each referenced zoning code section in the SMP.

6. Use Matrix

The SMP must have a use matrix detailing uses that are permitted, conditional, or prohibited in shoreline jurisdiction. Please see the attached example. This example was previously emailed to the City. As discussed in a previous meeting, the SMP needs to identify permitted, conditional, and prohibited uses for each shoreline environment. This information cannot be incorporated by reference. Including this information in a table form is strongly preferred.

7. Public Access

Recent drafts of the Tukwila SMP significantly changed the SMP's approach to public access. Many of the requirements for individual developments to provide public access have been replaced by a public access plan conducted by the City and river trail dedication and/or construction requirements. We note that the City owns a notable amount of property contiguous with the Green River. We also note that the City is developing an extensive trail network along the Green River.

WAC 173-26-221(4)(d)(ii) states, in part, that:

*where public access planning as described in WAC 173-26-221(4)(c) demonstrates that a more effective public access system can be achieved through alternate means, such as focusing public access at the most desirable locations, local governments may institute master program provisions for public access based on that approach in lieu of uniform site-by-site public access requirements.*

Tukwila appears to have the ability to meet important aspects of its shoreline public access needs through implementation of a city led public access plan. Such a plan needs to be fully incorporated into the SMP (including Figure 6). The public access portion of the SMP needs to include identification of existing and planned public access and identified public access projects. Ideally this should include a map in the SMP showing existing and proposed public access. The SMP should include any relevant port planning for public access. The SMP should also include clear policy direction to incorporate public access projects into relevant capital improvement budgeting.

Public access planning must also be integrated with comprehensive plan transportation planning and recreation planning. Public access planning should be included in the SMP public participation process.

Public access standards for new residential development continue to be an important aspect of the SMP update. Public access in new residential developments of greater than four lots is encouraged and supported.

8. Restoration

We understand that Chapter 13, Restoration will change significantly due to the passage of HB 2199.

9. Tukwila South Annexation

The Department of Ecology will wish to review the Draft SMP for consistency with the Tukwila South Annexation Agreement. We do not wish the Tukwila South Annexation to necessitate a shoreline amendment soon after the adoption of the SMP if such a circumstance can be avoided.

10. Comments of Chuck Steele, Floodplain Specialist

**Flood Maps.** Nowhere in the text of the Draft SMP does the City define their floodplains and/or floodways. This is especially critical because there has been a dramatic change in the Tukwila floodplains which has been formally communicated to the City since September 28, 2007 in the form of a FEMA Preliminary Revised Flood Insurance Study (FIS) with accompanying maps.

While the FIS still credits the Section 205 levee affording 100-year protection to the Southcenter area from I-405 to approximately 180<sup>th</sup> Street, other levees within the City and within the south annexation area are no longer credited with providing this protection. The result is:

- There is now a floodplain in the south annexation area on the left (west) bank between 196<sup>th</sup> and 204<sup>th</sup> Streets. This floodplain did not exist on the earlier May 16, 1995 FEMA Map Panel 967.
- There is now a significant floodway on the right bank roughly between 182<sup>nd</sup> and 190<sup>th</sup> Streets, and some floodplain to the north of 182<sup>nd</sup> Street. Both of these designations are new and neither is on Map Panel 967.

The new floodplain designations represent a major change and result in large floodplains and floodways heretofore not present in the City. Yet the SMP does not acknowledge them or discuss the consequences of them. The current FEMA maps dated May 16, 1995 should not be used because they are not the best available information. They were superseded with FEMA's publication of its September 28, 2007 maps. However, these maps were appealed by all of the Valley cities and King County in early March prior to the March 18, 2008 deadline ending the FEMA Appeal Period. Along with the appeal was a new set of maps that were produced by King County; these maps have been accepted by FEMA and are now being processed for issuance of Revised Preliminary FIRMs in the near future. These maps are the best available information. They were provided to the City of Tukwila in March 2008 and can be found on the King County website.

It appears that Tukwila may not be using the new maps. Using the 1995 maps should not be acceptable for SMP purposes. The difference between the maps is obvious and has significant implications. The 1995 maps show the Green River floodplain, and the floodway for the most

part, mainly confined to the levees. This is unrealistic in that the levees are now known to not provide 100-year flood protection. Regardless of the technicality of formally releasing the maps, all local jurisdictions should be using the revised maps presently as the best available information, specifically for Tukwila Map Plate LG-4 of the King County series. Best available information is required in Chapter 16.52.050 of the Tukwila Municipal Code, Floodplain Management, and best available science is defined at Title 18.06.069 of the TMC.

**Shoreline Jurisdiction.** My understanding of shoreline jurisdiction is that it must, at a minimum, extend 200 feet from the floodway or 200 feet from Ordinary High Water if there is no floodway. The floodway can be defined either through the SMA definition or by using the floodways on FEMA flood maps. Tukwila defines shoreline jurisdiction only as the channel, banks and "... upland area which extends from the ordinary high water mark landward for 200 feet on each side of the river. ..." If the best available information is being used and the City is supposed to reference the 200 feet to a floodway, shoreline jurisdiction is expanded very significantly. The entire area of the new floodway east of the Green River between roughly 182<sup>nd</sup> and 190<sup>th</sup> plus 200 feet would be under shoreline jurisdiction. There would also be a significant expansion of shoreline jurisdiction along Frager Road in the south annexation area.

**Biological Opinion.** Nowhere in the SMP is there mention of the National Marine Fisheries Service's Biological Opinion on the National Flood Insurance Program. This Opinion set forth a Reasonable and Prudent Alternative that could severely impact the building of any new levees, through the requirement of such measures as bioengineering methods, inclusion of riparian vegetation and large wood, and measures dealing with channel migration.

**Section 9.5, Flood Hazard Reduction.** This section contains some good measures. For example, it requires that flood control structures can only be built if no net loss of ecological functions is assured, rehabilitated or replaced flood control structures must have a side slope of 2.5:1, setback levees are prescribed and mid-slope benches for planting native vegetation are specified. It is suggested in 9.5F that in placing flood control structures landward of the floodway "as determined by the U.S. Army Corps of Engineers and the State of Washington, Department of Ecology," the wording be changed to "as determined by the best available information" since it is FEMA and King County that presently have the best available information.

#### 11. Comments of Richard Robohm, Wetland Specialist

As Ecology's wetland specialist for King and Kitsap county jurisdictions, I sent a comment letter to the City of Tukwila (City) on November 12, 2004, while the City was in the process of updating its sensitive areas ordinance (SAO).

In my letter I noted the following regarding the wetland rating system that the City proposed to use and later adopted in its updated CAO:

The wetland classification system proposed in the current draft of your SAO is inconsistent with the best available science. The three-tier system of the current

ordinance and proposed draft was developed more than 20 years ago by King County, and is no longer being used by the County. Instead, they are using Ecology's four-tier, function-based rating system. The old system's criteria and thresholds for wetland size and number of vegetation classes are not related to performance of functions and should not be used as a basis for differentiating wetlands for applying varying protection measures. More recent studies have shown that other criteria and thresholds are much better correlated with wetland function.

We understand that our most recent version of the Western Washington rating system was not finalized when you developed your draft SAO. However, we urge the City to revise the SAO to adopt Ecology's *Washington State Wetland Rating System for Western Washington* (2004). [This] rating system ..., which was finalized in August, is based on a better understanding of wetland functions, ways to evaluate them, and what is needed to protect them. This function-based rating system represents best available science for rating wetlands in Washington.

An alternative is for the City to adopt a rating system developed for the unique environment in Tukwila. However, this should be based on current scientific knowledge about wetland functions and rating and should include a methodology for applying it in the field to ensure consistency.

The City declined to change its rating system in the new SAO adopted in December 2004. My comments urging the City to adopt a function-based wetland rating system apply with even greater force today. The City and its sensitive areas would be better served by a system that takes account of the hydrologic, water-quality-improvement, and habitat functions of its wetlands.

I recognize that the quality and range of wetlands within the highly urbanized environment of the City are limited, but it is important to evaluate them with the best tools available. The better we understand the functions of these wetlands, the more confidence we can have that proposed policies and regulations will promote the goal of no net loss.

### Detailed Comments

1. Elements of the Tukwila South Development Plan or the Tukwila Urban Center Plan that relate to shoreline development (as discussed in Policy 5.5.1, on page 41 for example) need to be included or incorporated into the in the SMP and reviewed by Ecology.
2. Pages 54 and 55 - Are vegetation enhancement requirements adequate and consistent with USACOE requirements? It may be helpful to clearly identify the USACOE maintained levees in the SMP.

3. Page 55 bottom row, Page 56, end of second row - What is meant by last phrase, "Director may reduce the buffer to the actual width required." It is unclear what buffers will actually result from this provision.
4. Pages 56, last row and 70, last sentence - Where the buffer stops at an existing road or street, the cumulative impact analysis will need to identify and analyze actual buffer widths resulting from ending the buffer on river side of existing improved street or roadway.
5. The Shoreline Residential Use regulations in Chapter 8 needs to address lot coverage and shoreline stabilization for each of the applicable shoreline environments, Shoreline Residential, Urban Conservancy, and High Intensity.
6. Page 65 - Last paragraph, first sentence - Is this a reference to all non-residentially zoned areas or areas with nonresidential uses?
7. Page 72 -73 Uses allowed in buffer - The revised cumulative impact analysis should address the aggregate of uses allowed in the buffer. The buffer use provision in section 8.2 could allow for a notable portion of the vegetation in the buffer to be removed.
8. Pages 72, 75, and 77 - Signs should only be allowed in a buffer if they serve a conservation use of an approved existing use in the buffer.
9. Pages 75 and 77 make reference to Tukwila Municipal Code (TMC) 18.62. Water dependent industrial or commercial development must be regulated in the SMP rather than the underlying zoning.
10. Pages 75 and 77 - Built facilities in subsection P should be located outside of the buffer unless a buffer location is necessary for the specific function of the facility.
11. Pages 75 and 77, Subsection R - This would work better if only water dependent or water related essential public facilities are permitted in shoreline jurisdiction.
12. Pages 79 and 81 - While development standards of the underlying zoning district do apply to development within shoreline jurisdiction, they should only be incorporated into the SMP if they address shoreline issues such as shoreline uses and standards. All zoning standards incorporated into the SMP must be reviewed and approved by Ecology.
13. Page 100, Regulation 9.12.A.3 - Where feasible, deck covering that allows light to pass through shall be used.
14. Page 100, Regulation 9.12.A.6 - Preservative used to treat piles should also be approved by the Washington Department of Fish and Wildlife.
15. Page 101, Regulation 9.12.B.1 - Is the no net loss review intended to be site specific?

16. Page 119, Section 10.11.B Define Type II permit process within the SMP.
17. Page 133, Section 11.5. If greater than 35 feet, increased building heights may not block the view of a substantial number of residential uses. Increase building heights need to be analyzed in the cumulative impacts analysis.
18. Page 143, Section 14.1.A. Minimum shoreline jurisdiction also includes all areas landward 200 feet from the floodway in greater than the area extending 200 feet from the Ordinary High Water Mark.
19. Page 143, Section 14.2.A. The shoreline substantial development permit criteria should be included in the SMP. Adopting approval criteria from the zoning code would require Department of Ecology approval of the zoning approval criteria and that the adopted criteria are attached to the SMP. This is also true of page 144, and Section 14.3.B and page 147, Section 14.5.B.
20. Page 148, Section 14.5.A makes reference to a zoning code definition. The definition of pre-existing use should be included in the SMP.
21. Page 150 Sections 14.6.B.6 and 7 need to be analyzed in the cumulative impact analysis. There is concern that allowing for construction of new residences within shoreline buffers will defeat the purpose of the buffers. Ecology would prefer that expansion of such single family residences require a shoreline conditional use permit and be excluded from sensitive areas and their buffers.
22. Page 150, Section 14.6.B.5 - Allowing existing buildings in what would otherwise be buffers to be classified as conforming may defeat the purpose of the buffers. If the structures are not consistent with buffer requirements, then they should be nonconforming.
23. Page 150, Section 6.B.7 - Allowing expansion of nonconforming structures. Ecology supports making this a required shoreline conditional use permit for single family residences.
24. Page 151, Section 14.6.C.1 and 2. These sections should contain language requiring the improvements causing expansion of nonconformity or pre-existing building be the minimum necessary expansion to meet the documented public safety concerns.
25. Page 153, Section 16.2. In order to implement this section as proposed, Tukwila Municipal Code Chapter 8.45 must either be included in the SMP or adopted into the SMP and attached to the SMP. Ecology will need to be able to approve Chapter 8.45 as part of the SMP after review.

Carol Lumb, AICP  
June 30, 2009  
Page 9

26. Page 155, Section 17. The referenced WAC section do not appear to be correct. The appropriate WAC references appear to be in 173-26 WAC.

If you have questions about any of these comments, Please contact me by telephone at (425) 649-4260 or email at drad461@ecy.wa.gov.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dave Radabaugh".

Dave Radabaugh Shoreline Planner

Cc: Geoff Tallent, Department of Ecology  
Chuck Steele, Department of Ecology  
Richard Robohm, Department of Ecology

**DEPARTMENT OF ECOLOGY**  
**Northwest Regional Office**

June 10, 2009

TO: Dave Radabaugh  
Shoreline Planner

FROM: Charles L. Steele *CL*  
Floodplain Management Specialist

SUBJECT: Review Comments on February 5, 2009  
Draft Tukwila Shoreline Master Program

I reviewed the subject document and have the following comments:

**Flood Maps.** Nowhere in the text of the Draft SMP does the City define their floodplains and/or floodways. This is especially critical because there has been a dramatic change in the Tukwila floodplains which has been formally communicated to the City since September 28, 2007 in the form of a FEMA Preliminary Revised Flood Insurance Study (FIS) with accompanying maps.

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cc: Dan Sokol

**Radabaugh, David (ECY)**

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**From:** Robohm, Richard (ECY)  
**Sent:** Friday, June 26, 2009 3:55 PM  
**To:** Radabaugh, David (ECY)  
**Subject:** RE: Tukwila SMP

Dave,

Re Chapter 10 of the draft Tukwila SMP:

As Ecology's wetland specialist for King and Kitsap county jurisdictions, I sent a comment letter to the City of Tukwila (City) on November 12, 2004, while the City was in the process of updating its sensitive areas ordinance (SAO).

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We understand that our most recent version of the Western Washington rating system was not finalized when you developed your draft SAO. However, we urge the City to revise the SAO to adopt Ecology's *Washington State Wetland Rating System for Western Washington* (2004). [This] rating system ..., which was finalized in August, is based on a better understanding of wetland functions, ways to evaluate them, and what is needed to protect them. This function-based rating system represents best available science for rating wetlands in Washington.

An alternative is for the City to adopt a rating system developed for the unique environment in Tukwila. However, this should be based on current scientific knowledge about wetland functions and rating and should include a methodology for applying it in the field to ensure consistency.

The City declined to change its rating system in the new SAO adopted in December 2004. My comments urging the City to adopt a function-based wetland rating system apply with even greater force today. The City and its sensitive areas would be better served by a system that takes account of the hydrologic, water-quality-improvement, and habitat functions of its wetlands.

I recognize that the quality and range of wetlands within the highly urbanized environment of the City are limited, but it is important to evaluate them with the best tools available. The better we understand the functions of these wetlands, the more confidence we can have that proposed policies and regulations will promote the goal of no net loss.

Richard K. Robohm  
Wetland Specialist  
Department of Ecology  
425-649-4447

## **INFORMATION FOR BUFFERS DISCUSSION**



**INFORMATIONAL MEMORANDUM**

**To:** Planning Commission

**From:** Director Public Works  
Director Community Development

**Date:** September 9, 2008

**Subject:** **Proposed Shoreline Buffers**

**Issue:**

What factors were considered in establishing the proposed 50-foot, 100-foot and 125-foot buffers?

**Regulatory Context:**

Under the Shoreline Management Act (SMA), the City is required to prepare a Shoreline Master Program (SMP) to regulate activities along the Green/Duwamish River and to establish development standards, including setbacks or buffers to protect the most sensitive areas of the shoreline from uses that would cause a net loss of ecological functions to the shoreline. The SMA defers to local jurisdictions to determine the most appropriate regulations in accordance with the Department of Ecology guidance. However, the Department of Ecology has the final say in approving the local SMP.

For areas that are unincorporated, King County has jurisdiction and establishes the regulations to govern uses in the shoreline. For areas that the City has annexed, but were not part of the City when it originally adopted its SMP in 1974, the City continues to administer King County's shoreline regulations. One advantage of the City's SMP Update will be to have one program that is administered for the entire City rather than two. King County's current shoreline regulations, like the City's, do not address the most recent Department of Ecology shoreline regulation requirements and if submitted to Ecology today, would not be approved. For example, King County's SMP Update is proposing a buffer width of 115-feet plus a 15-foot inspection width (Total of 130-feet) for urban areas. See accompanying chart, Attachment 1, comparing adjacent jurisdiction buffer widths. Tukwila's proposed buffer widths are generally in line with proposed buffer widths in King County and City of Seattle and existing buffer widths in Kent and Auburn.

Tukwila could adopt another jurisdictions' regulations; however, the City would need to document the basis for using those regulations rather than developing regulations itself.

## **Background:**

The Green River flows northwest about 93 miles from its headwaters in the Cascades to its outlet in Elliott Bay via the Duwamish River. The Green River basin drains 483 square miles and flows through several cities, primarily in its lower reaches, including Auburn, Kent, Tukwila, and Seattle. The lower Green River runs from Auburn down to River Mile 11 (just north of Fort Dent Park) and becomes the Duwamish River, which flows to the mouth of Elliot Bay.

The lower Green and Duwamish Rivers are almost entirely sand-and silt-bedded. In- river habitat is dominated by a single habitat type, and there has been extensive reduction and isolation of off-channel habitats, such as side channels, oxbows, and tributaries. There is extensive tidal influence from the mouth of Elliot Bay to River Mile 11. Levees and revetments severely limit the connectivity, amount, and diversity of riparian vegetation along the river. The existing riparian vegetation is dominated by invasive species.

The main period of runoff and major flood events on the Green River is from November through February. The lower Green and Duwamish levees and revetments form a nearly continuous bank protection and flood containment system. Farmers originally constructed many of these levees and revetments as the protection to the agricultural lands of the area and this original material is still in place as the structural core. In particular, these protection facilities typically have over-steepened banks, areas with inadequate rock buttressing at the toe, and a lack of habitat-enhancing features such as overhanging vegetation or in-water large woody debris. Because of these design and construction shortcomings, the river system has not always performed as intended.

In November 2006 the area experienced a severe winter storm. The Duwamish River had flows that exceeded 12,000 cubic feet per second, Flood Stage Three, and as a result, parts of the levee suffered extensive damage to its banks, levees, and streambed. The U.S. Army Corps of Engineers inspected the levee and revetments on November 16, 2006 and again in the early fall of 2007. The City was notified on February 5, 2008 that Tukwila's 205 Levee needed to be immediately repaired in order to provide adequate flood protection and retain its certification.

Since notification, the City, the Corps, and King County Flood Control District have diligently worked to create a design that would minimize the impact to the abutting property owners and reduce the need for continual repairs. The paramount criteria however has been to provide for:

1. Public Safety;
2. Maintaining levee certification;
3. Solutions that eliminate or correct factors that have caused or contributed to the need for the levee repair;
4. Levee maintenance needs; and
5. Environmental considerations.

Before arriving at the final design, the Corps analyzed 6 repair alternatives:

1. No Action Alternative;
2. Repair to Pre-Flood Condition Alternative;
3. Retaining Wall Alternative;
4. Remove and Repair with Geo-textile Wrap Wall Alternative;
5. Layback Levee Alternative; and
6. Non-structural Alternative.

The levee on the west side of the Duwamish River was built in 1991 using the Corps' minimum design standards. This standard established the angle of the waterside slope at 2:1. Since being built, there has been over \$10,000,000 of repairs, including on-going efforts, required to correct damage.

The Corps rejected the *Repair to Pre-Flood Condition* Alternative because of the past history of repeated and costly repair projects. The Corps' Project Information Report states, "The repair to pre-flood condition is not acceptable since the scour<sup>1</sup> would occur again." [Note: Scour is the erosion of the river's soils and sediments that provide support for the banks and levees and when the support is lost sloughing occurs.] Other contributing factors are contained in the 2006 *King County Flood Hazard Management Plan*:

"Levee slope is extremely over-steepened at approximately 1.4H:1V to 1.8H:1V, and therefore lacks adequate structural stability to provide minimum factors of safety for several modes of failure. No toe buttress structure has ever been constructed in this sub-reach. The riverward slopes are largely dominated by invasive blackberries and reed canary grass."

In other words, returning the levee to the *Pre-Flood Condition* using the Corps' minimum design standard would not solve the problem, result in a lower level of safety, and it would be just a matter of time before the levee would need more repairs. Further, machinery cannot reach from the top of the levee to the toe to perform periodic vegetative control maintenance, which has been repeatedly noted by the Corps in their annual inspection reports.

To overcome the existing problems and to reduce future maintenance and repair costs, the Corps chose to lessen the overall slope to a stable grade. See Attachment 2 - Profile. This selected method is consistent with recommendations set forth in the Corps of Engineers' Manual for Design and Construction of Levees (EM 1110-2-1913) for slope stability. It also is consistent with the levee rehabilitation project constructed on the nearby Briscoe School levee that has proven to be a very effective solution to scour problems – slows the river down, provides for vegetation, etc. The Corps, in a letter dated Sep 27, 2007, indicated that this type of profile would become the template for future levee repair and construction projects (Attachment 3). The City Council also reviewed all of the options and concurred with the Corps' decision. The City Council became involved because the ongoing levee repair project required the acquisition of additional land, a Tukwila responsibility resulting from the 1991 agreement between the Corps and the City.

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<sup>1</sup> Scour is the erosion of the river's soils and sediments that provide support for the banks and levees.

To minimize the levee footprint, the Corps, King County Flood Control Zone District, and the City also considered the following profile characteristics:

- Width of the levee top;
- Landward slope of the levee;
- Slope of the riverside launchable toe rock;
- Width of the mid-slope bench (needed for maintenance and lessening the effects from scour);
- Location of the “woody debris” and its associated anchor rock – environmental requirement;
- Width of the landward easement – needed for levee access and inspection.

### **Discussion:**

#### *Engineering Aspects*

Because of the similarities in the soil conditions and taking into consideration the tidal influence, we can divide the Green/Duwamish River into three areas – South of I-405; North of I-405; and areas around residential neighborhoods. Looking at the slope geometry and the difference in height between the ordinary high water mark and the 100-year flood elevation for these three areas, we find that 125-feet of setback distance (buffer) is needed to accommodate the “lay back” of the levee in the area south of I-405 and around Fort Dent Park. For areas north of I-405, a 100-foot setback distance is required. Within residential neighborhoods, a 50-foot setback is justified because of the less intense land use associated with single-family home construction.

Even though the buffer distance has been established using the levee as the example, the same problems exist where there are no levees. The river makes no distinction between an over-steepened slope associated with a levee or a riverbank. Scouring within the river will cause sloughing, property will be lost, and slope stability will be weakened. Specifically, the non-leveed riverbank can be more prone to these problems since they tend to be steeper and consist mainly of sand and silt. This makes them susceptible to erosion. Because the non-leveed riverbanks are for the most part privately owned, they are not actively monitored for damage. See attached photos, Attachment 4, of damage done to banks with over steepened slopes.

#### *Environmental Aspects*

In addition to engineering criteria for establishing the proposed buffer widths, shoreline ecological functions were also taken into account. The Shoreline Management Act and the Department of Ecology regulations require evaluation of ecological functions and that local SMPs ensure that the policies and regulations do not cause any net loss of shoreline ecological function. In addition, the SMP must identify mechanisms for restoration of lost ecological functions.

The crucial issue for the Green/Duwamish River is the presence of salmonids that are on the Endangered Species list. To protect and restore ecological functions related to these

species it is important to provide for the installation of native vegetation along the shoreline. Such vegetation provides shade for improving temperature conditions in the river and habitat for insects on which fish prey. Trees along the shoreline also provide a source of large woody debris (tree trunks, root wads, limbs, etc. that fall into the water), which in turn provides pooling and areas of shelter for fish and other animals. In order to allow for planting of native vegetation, banks need to be set back to allow for more natural slopes, so that they can be planted. The Corps of Engineers does not allow planting on levees unless they are set back to an average slope of 2.5:1 and constructed with a mid-slope bench. Plantings are allowed on the mid-slope benches and this is crucial for improving shoreline ecological functions that are needed in the river.

It is also important to note that under Tukwila's Sensitive Areas Ordinance, buffers for Type II watercourses (the Green/Duwamish is Type I – the highest quality of watercourse), are set at 100 feet and this was based on best available science. Therefore, the proposed buffers of 100 and 125 feet for the High Intensity and Urban Conservancy Environments are in line with best available science for protecting watercourses. The proposed buffer of 50 feet in the Shoreline Residential Environment, represents a compromise – 100 feet is not feasible due to the existing development pattern.

### **Summary:**

Recommended buffer widths were primarily developed with sound engineering criteria, in order to protect property from damage due to scouring and sloughing of the riverbanks, as well as to protect or restore shoreline ecological functions.

### **Attachments:**

1. Comparison of Buffer Widths Between Jurisdictions
2. Typical setback profile
3. U.S. Army Corps of Engineers letter dated Sep 27, 2007
4. Photos of bank erosion

P:\Shoreline\PC Review\PC Agendas-Memos\infomemo91608 buffer widths.doc



## ATTACHMENT C

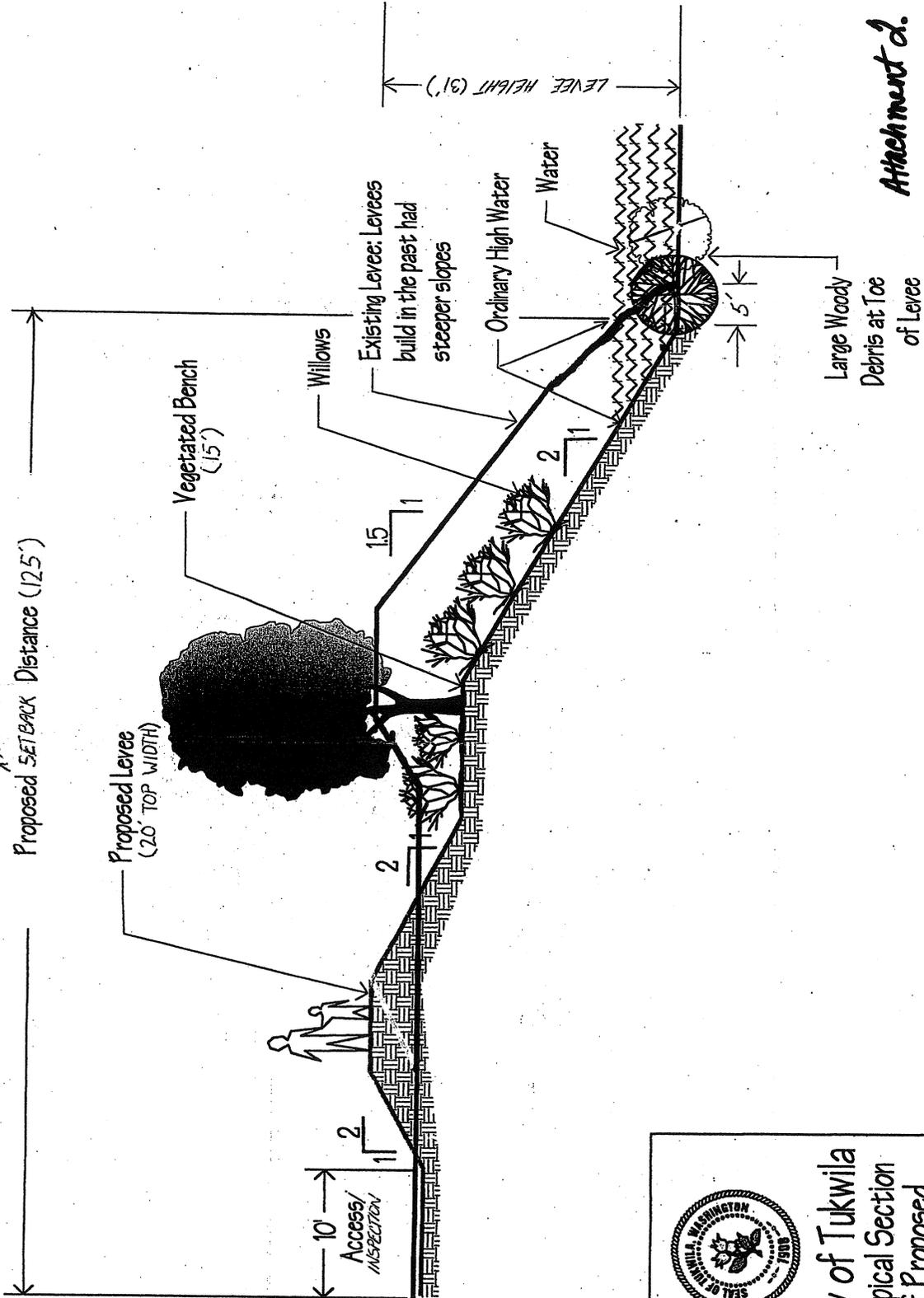
### Comparison of Existing and Proposed Buffer Distances Green/Duwamish River

Jurisdiction / Regulation or Plan	Buffer or Setback Distance	Notes
Existing Tukwila SMP (1974; TMC 18.44)	40-ft (River Environment)	Most restrictive portion of 200 shoreline jurisdiction-very limited uses permitted
	41-100 ft (Low Impact Environment)	Structures limited in height to 35 ft.; landscaping required per TMC 18.52; parking required to be screened.
	101-200 ft. (High Impact Environment)	Uses permitted in underlying zone
Tukwila SAO (TMC 18.45)	100-ft for Type 2 (salmon bearing) streams	Buffer for Green/Duwamish defers to SMP  Buffer reduction of up to 50% may be requested – mitigation required for any approved buffer reduction
Tukwila SMP Update (File L06-088)	50-ft (Shoreline Residential); 100-ft (High Intensity, Urban Conservancy north of I-405) and right bank south of I-405; 125-ft (Urban Conservancy in any area where levee is present, primarily left bank, south of I-405)	Proposed
Existing King County SMP (Title 25 KCC; )	20-ft setback (residential); 50-ft (multi-family; commercial; industrial)	
King County CAO (Ord. 15051; 2004)	115-ft for "Type S" Shorelines of the State in urban areas plus 15 ft. building setback	
King County SMP Update (2008-ongoing)	115-ft (integrate CAO standards) plus 15 ft. building setback	Proposed - not yet adopted
King County Flood Hazard Management Plan (2006)	Levee design standards require new or repaired levees at 2.5H: 1V slope;  Requires ~100-125 feet from toe of levee	Plan adopted and Flood Control Zone District created 2007

<b>Auburn SMP</b> (Ord. 6095; 2008)	100-ft (Shoreline Residential & Urban Conservancy);  200-ft (Natural)	Adopted June 2008; integrates CAO buffer; approved by Ecology 5/20/09.  Buffers may be increased up to 50%  Up to 35% reduction of buffer is permitted on case-by-case basis if an applicant can demonstrate it will not result in any adverse impacts to the stream.
Existing <b>Kent SMP</b> (KCC 11.04; 1999)	100-ft (or 75-ft from centerline of dike) (residential);  200-ft (commercial)	
Proposed <b>Kent SMP Update</b>	140-ft building setback where there is an existing levee or where flood control measures are planned. City may increase or decrease the required setback according to design of the levee improvements. No provision to request a reduction in the building setback.  150-ft building setback where there is no levee and no public plans to construct or improve a levee	Draft document – public hearing scheduled for July 27, 2009
<b>Kent CAO</b> (KCC 11.06)	100-ft Type 2 Stream	Buffer for Green/Duwamish defers to SMP
Existing <b>Seattle SMP</b> (Ord. 11845; SMC 23.60; 1996)	25-75-ft (residential); 0-100-ft – variable setbacks specified by use	Recently initiated SMP update; no specific proposed buffers
<b>Seattle ECA</b> (Ord. 122050; 2006)	0-100-ft for Type 1 Shorelines of the State; defers to SMP	Recently updated; defers to SMP

MAXIMUM

Proposed SETBACK Distance (125')



Attachment 2.

Seal of the City of Tukwila, Washington, 1958

City of Tukwila  
Typical Section  
of Proposed  
Levee

MAY 2008





REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
SEATTLE DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 3755  
SEATTLE, WASHINGTON 98124-2255

RECEIVED

OCT 16 2007

TUKWILA  
PUBLIC WORKS  
SEP 27 2007

Emergency Management Branch

Mr. James Morrow  
Director, Public Works  
City of Tukwila  
Tukwila, WA 98188

Dear Mr. Morrow

This letter is a follow up to our recent meeting regarding the Lower Green River Flood Damage Reduction Section 205 Levee Repair. The Corps has nearly completed evaluating the repair alternative for this levee and will be submitting a Project Information Report (PIR) to the City of Tukwila for review by 12 October, 2008.

The Corps of Engineers investigated and evaluated at least 3 alternatives for each site. These alternatives include:

1. Repair back to pre-flood condition.
2. Replace the landward slope of the levee with a flood wall.
3. Lay back the levee slopes to a stable grade.

The recommendation from the evaluation team for both damage sites is to lay back the levee slopes to a stable grade. The attached drawings show the proposed recommended repair alternative. This alternative provides the highest level of safety and reduces future maintenance and repair costs for the levee. The levee footprint for this alternative extends beyond the existing levee footprint and will require the City to obtain the necessary real estate interests. Our Real Estate Division staff will be working with you on the specific types of rights and interest necessary for successful project certification.

The team concluded that the pre-flood riverward slopes at both damage locations were 1.5 Horizontal to 1 Vertical or steeper. Repairing back to the pre-flood condition will result in a lower level of safety and will likely have higher maintenance and repair costs in the future.

The team also evaluated replacing the landward slope of the levee with a flood wall. This allows the riverward slope to be re-graded to a stable slope without changing the overall levee footprint. This alternative was not recommended due to the following negative impacts:

1. The flood wall alternative could increase the likelihood of seepage problems.
2. Access for maintenance and emergency response would be difficult.
3. This alternative would have increased Engineering and Construction costs over the other alternatives.
4. Future maintenance costs are anticipated to be higher for this alternative.

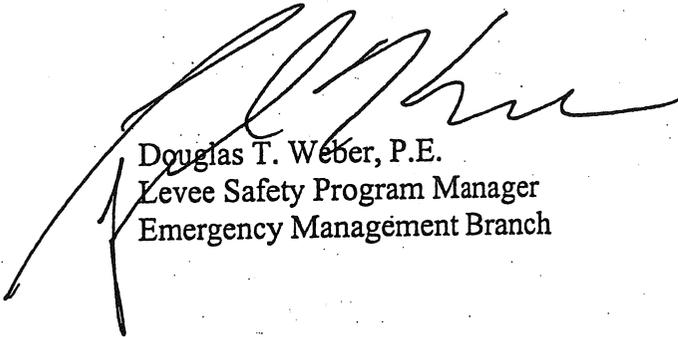
The selected repair alternative is consistent with recommendations set forth in the Corps of Engineers' Manual for Design and Construction of Levees (EM 1110-2-1913) for slope stability.

ATTACHMENT 3

This alternative is also consistent with the levee rehabilitation project currently under construction on the nearby Briscoe School levee and this type of alternative is anticipated to be used as a template for future levee repair and construction projects. Please note that the attached drawings are conceptual at this time with the intent to provide the City with an outline of the proposed levee footprint. Design changes and refinements such as the incorporation of habitat features may occur during the Engineering and Design phase of the project. The City will be provided with a fully developed levee footprint and design for review, comment, and concurrence prior to final plan approval for construction.

If you have any additional questions please contact Laura Orr, Project Manager at (206) 764-3575 or email [Laura.A.Orr@USACE.ARMY.MIL](mailto:Laura.A.Orr@USACE.ARMY.MIL) so, do not hesitate to contact me at (206) 764-3406 or email me at [Douglas.T.Weber@USACE.ARMY.MIL](mailto:Douglas.T.Weber@USACE.ARMY.MIL).

Sincerely,



Douglas T. Weber, P.E.  
Levee Safety Program Manager  
Emergency Management Branch

Copy Furnished:

Steve Bleifuhs, Manager  
River and Floodplain Management Unit  
Water and Land Resources Division  
King County Department of Natural Resources & Parks  
201 S. Jackson St., Ste. 600  
Seattle, WA 98104

# Attachment 4



Levee Repair – Site 5

8/8/2008



Levee Repair – Site 5

8/8/2008



Levee Repair – Site 3, scour location

8/8/2008



Bank Scour – Across from Site 3 Levee Repair, West Valley Highway

8/8/2008



Levee Repair – Site 3

8/8/2008



Bank Sloughing – Private property along Interurban

8/8/2008

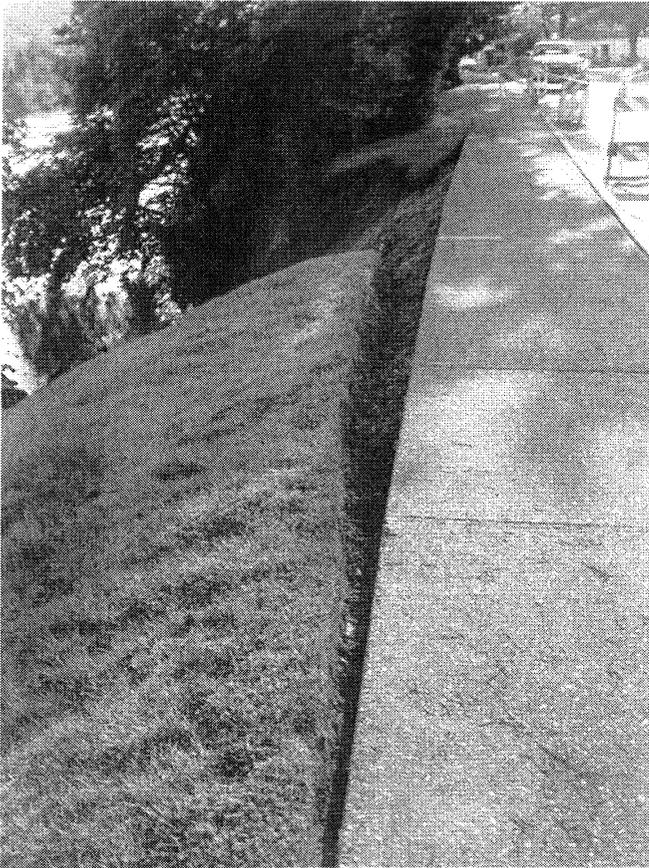


Bank Sloughing – Private property along Interurban, bank condition  
8/8/2008



Riverbank Slough, Tukwila Commerce Park

8/8/2008



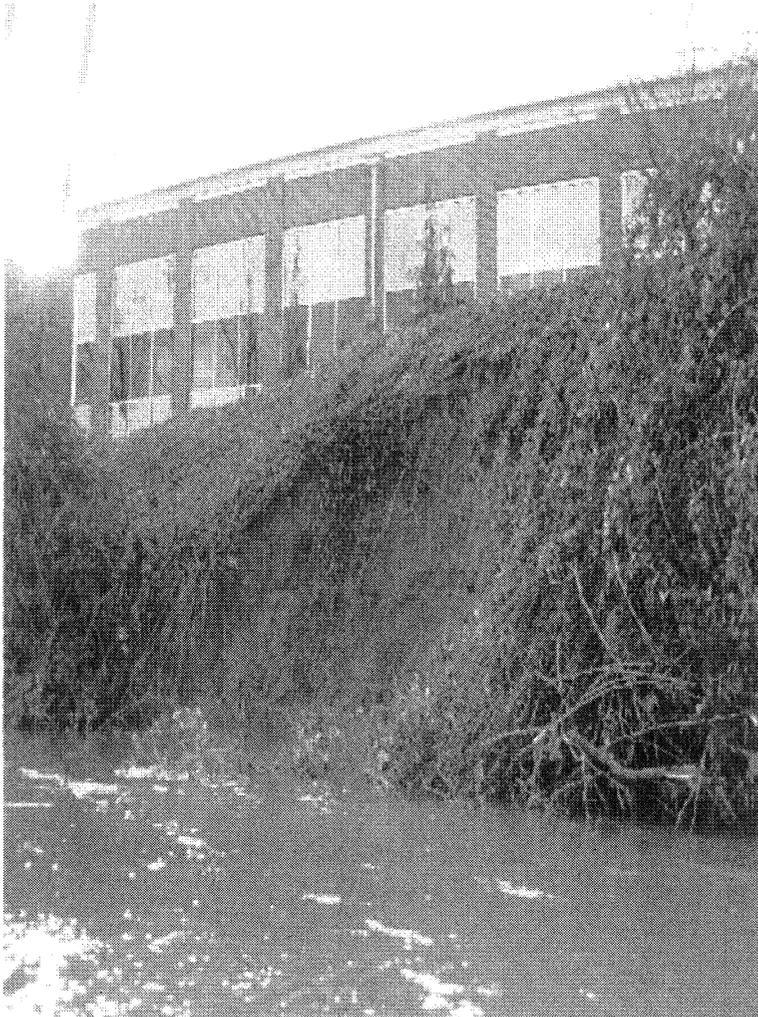
Riverbank Slough, Tukwila Commerce Park

8/8/2008



Levee Cracking- Lower Green River (Kent)

2006



Slope Erosion and slumping failure

2006



# City of Tukwila

Department of Community Development

Jim Haggerton, Mayor

Jack Pace, Director

## MEMORANDUM

October 10, 2008

TO: City of Tukwila Planning Commission Members  
 FM: Carol Lumb, Senior Planner  
 RE: Proposed Shoreline Residential Environment Buffer Width

### Issue:

What factors were considered in proposing the buffer for single family residential areas along the shoreline?

### Regulatory Context:

The majority of the residential areas along the shoreline are currently governed by the King County Shoreline Master Program (SMP) and regulations found in KCC 25.16, as these areas were annexed to Tukwila after the City adopted its SMP. The King County shoreline regulations establish a setback/buffer of twenty (20) feet from the Ordinary High Water Mark (OHWM) or the upland edge of the floodway, whichever is greater. A few residential parcels are regulated by the City's shoreline program.

The shoreline regulations issued by the Department of Ecology in 2003 require that the regulations protecting the shoreline be at least as stringent as the regulations contained in a jurisdiction's Sensitive Areas Ordinance (SAO). Tukwila's SAO establishes a buffer width of 100 feet for properties that abut a stream with salmon. Under the SAO, a property owner may request a buffer reduction of up to 50% if mitigation is provided. The mitigation provided can be such actions as removal of invasive vegetation in the remaining buffer area and planting of native vegetation to enhance the buffer.

### Functions of Watercourse Buffers

Included as an attachment to this memo is a copy of the report prepared by Adolfson Associates in June, 2003, on the Best Available Science for Watercourses, prepared during the update of the City's sensitive areas ordinance. The report identifies four key elements necessary for healthy salmonid populations:

1. Maintaining stream baseflows;
2. Maintaining water quality;
3. Providing in-stream structural diversity; and
4. Providing biotic input of insects and organic matter.

Each of these elements is discussed in more detail below – the information is taken directly from the BAS report (i.e. the information is either direct quotes or paraphrased).

### 1. Maintaining stream baseflows

Urbanization, particularly the amount of impervious surface in a stream basin, changes the volume, rate and timing of water flowing through a stream system – these changes in turn impact the physical characteristics of a stream channel, which affect the quality of salmonid habitat.

### 2. Maintaining water quality

Salmonid fish require water that is both colder and has lower nutrient levels than many other types of fish.

- *Water Temperature:* The general range of temperatures required to support healthy salmonid populations is generally between 39 degrees and 63 degrees. Riparian vegetation, particularly forested areas can affect water temperature by providing shade to reduce exposure to the sun and regulate high ambient air temperatures.
- *Dissolved Oxygen:* dissolved oxygen is one of the most influential water quality parameters for aquatic life, including salmonid fish. The most significant factor affecting dissolved oxygen levels is water temperature – cooler streams maintain higher levels of oxygen than warmer waters.
- *Metals and pollutants:* Common pollutants found in streams, particularly in urban areas, are excessive nutrients (such as phosphorous and nitrogen), pesticides, bacteria and miscellaneous contaminants such as PCBs and heavy metals. Impervious surfaces collect and concentrate pollutants from different sources and deliver these materials to streams during storm events. The concentration of pollutants increases in direct proportion to the total amount of impervious area. Undisturbed riparian areas can retain sediment, nutrients, pesticides, pathogens and other pollutants, protecting water quality in streams. Elevated nitrogen and phosphorus levels in runoff are a typical problem in urban watersheds and can lead to increased in-stream plant growth, which results in excess decaying plant material that consumes oxygen in streams and reduces aquatic habitat quality.

### 3. Providing in-stream structural diversity

Several general habitat physical elements affect the health of salmonid habitat:

- *Substrate:* Substrate refers to the sediment composition (sand, gravel, etc.) of the stream bed. Under natural conditions, the redistribution of substrate through bank

erosion, and channel movement is a natural occurrence and necessary to maintain clean, sediment free gravels. In urban basins, increases in stream flow quantity and velocity can cause scouring that displaces stream substrates which in turn reduces the quality and quantity of spawning areas. Scouring results from increased runoff from impervious surface and from increases in velocities as a result of channelization (straightening) and the removal of streamside vegetation.

- *Large woody debris (LWD):* LWD refers to limbs and tree trunks that naturally fall into the stream bed. LWD serves many functions in watercourses. LWD adds roughness to stream channels, which in turn slows water velocities and traps sediments. Sources of LWD in urban settings are limited where stream corridors have been cleared of vegetation and developed and channel movement limited due to revetments and levees. Under natural conditions, the normal movement of the stream channel, undercutting of banks, wind throw, flood events are all methods of LWD recruitment to a stream channel.
- *Pool quality and quantity:* Large, deep pools with cover provided by woody debris and overhanging vegetation provide more habitat value than smaller, shallower pools. Adult salmonids require pools with sufficient depth and cover to protect them from predators during spawning migration. Adult salmon often hold to pools during daylight, moving upstream from pool to pool at night.
- *Floodplain connectivity and off-channel refugia:* Off channel wetlands and side channels in riparian areas provide foraging habitat, overwintering habitat and refuges for rearing fish.

#### 4. Providing biotic input of insects and organic matter

Riparian areas provide foods for salmonids, such as insects falling from overhanging vegetation. Leaves and other organic matter falling into stream provide food and nutrients for many species of aquatic insects which in turn provide forage for fish.

This summarizes the key aspects of the environmental functions performed by buffers along watercourses. Appendix B of the 2003 report is a chart organized by buffer function of the width generally needed to achieve a particular buffer function. As can be seen, the buffer widths vary widely by function type from as little as 16 feet for large woody debris recruitment to over 400 feet for sediment removal. The Washington State Department of Fish and Wildlife recommends a riparian buffer width of 250 for shorelines of statewide significance (see page 8 of the 2003 report).

#### Analysis of Development Character of Residential Shoreline

An analysis was prepared that looked at the residential properties along the shoreline and identified the number of parcels with structures within 50 feet and 100 feet of the OHWM. This analysis showed the following:

ZONE	Number of parcels within 50 feet of OHWM	Number of vacant parcels within 50 feet	Number of parcels with structures within 50 feet/%	Number of parcels within 100 feet of OHWM	Number of vacant parcels within 100 feet	Number of parcels with structures within 100 feet/%
LDR	135	12	67/49%	201	25	165/82%

As can be seen from the chart above, almost half of the parcels in the residential neighborhoods have a structure within 50 feet of the OHWM – a direct result of the current King County regulations. To apply a buffer width that is consistent with the City’s SAO of 100 feet would create a situation where 82% of the properties along the river would have nonconforming structures as they relate to the proposed shoreline buffer.

Expansion of nonconforming structures in the proposed SMP buffer would be governed by the City’s zoning code, TMC 18.70.050, which permits an expansion of only 50% of the square footage of the current area that intrudes into the setback and only along the ground floor of the structure. For example, if 250 square feet of a building extended into the proposed buffer, the ground floor could be expanded a maximum of 125 feet in total area along the existing building line.

Staff considered applying a buffer of 100 feet with the potential of a property owner applying for a buffer reduction of 50%, however, under the Shoreline Management Act, this would have required an application for a shoreline variance for each requested buffer reduction, a process that requires review and approval both at the local and state level (Ecology must review and approve the variance in addition to the City of Tukwila). This did not seem a reasonable process to require of so many property owners. Since the proposed buffer is the maximum reduction that could be approved under properties affected by the SAO, the triggers for compliance with the standards of the draft SMP (identified below) serve as the way to achieve mitigation for the lower buffer width.

Summary

The purposes identified for the shoreline residential environment in the draft SMP are as follows:

- Ensure no net loss to shoreline ecological functions;
- Help protect water quality and habitat function by limiting allowed uses;
- Protect existing and new development from high river flows by ensuring sufficient setback of structures;
- Promote restoration of the natural character of the shoreline environment; and
- Allow room for reconstructing over-steepened river banks to achieve a more

stable slope and more natural shoreline bank conditions and avoid the need for shoreline armoring.

To achieve these purposes and avoid creating an overwhelming number of nonconforming structures in the residential areas along the shoreline, staff looked at establishing a buffer that would achieve some of the environmental purposes of a water course buffer and that would also allow room for the river bank to naturally achieve a more stable slope. A more stable slope would be achieved where the bank slope ratio is 2.5 (horizontal):1 (vertical), and then measuring 20 feet from the top of where the river bank would be 2.5:1, with a minimum buffer width of 50 feet. This would ensure that no new structures are located in an area that could potentially be eroded by the river. The minimum buffer width of 50 feet would be equivalent to the maximum buffer reduction a property owner could request under the SAO.

The Department of Ecology reviewed the proposed buffer width in the residential area but did not provide written confirmation that it would be acceptable. It is likely that Ecology is waiting to see how the proposed buffer width works with other aspects of the Draft SMP (such as the development standards) that provide protection and enhancement of the buffer area before determining whether the buffer width complies with the requirements of the Shoreline Management Act.

The proposed buffer does comply with the minimum width established by the SAO for Type 2 streams if a buffer reduction with mitigation has been approved. The proposed buffer width will provide enough room to remove some pollutants and sediments and allow LWD recruitment input into the river. The area within the buffer reduces the risk to new structures from being placed in locations that could be jeopardized in the future by erosion and provides an area to perform ecological buffer functions for the river.



**Please note:**

**The Best Available Science Report referenced in the 10/10/08 memo is available for review at the end of the Shoreline Web page, under “Documents Available for Review and Comment.”**



**INFORMATIONAL MEMORANDUM**

January 26, 2009

To: Tukwila Planning Commission

From: Director Public Works *JFM*

**Subject: Shoreline Master Program**

This memorandum is intended as a response to the January 15, 2009 McCullough Hill PS. letter and specifically addresses the material relating to Buffer Width and Levee Profile. Having reviewed the material, there is nothing new that La Pianta or its representatives have not previously presented to numerous individuals and agencies in an attempt to change the design and profile of current and future Tukwila Federal 205 Levee projects.

As a point of clarification, the January 15<sup>th</sup> letter cites the Corps' Project Information Report. This document was used by the Corps to internally justify the levee repair projects and was not intended as a construction specification. The McCullough Hill letter would lead one to believe that the Corps was willing to accept "a lesser construction standard – 2:1" for the repair work at Site 3 (property abutting Lily Pointe and Wells Fargo) and that this lesser standard was used to justify a smaller levee footprint. To set the record straight, all recently completed repair projects constructed by the U.S. Army Corps of Engineers (Corps) along the Green River have used the newly adopted template of an overall levee slope of 2.5:1. La Pianta has had numerous discussions with the City, King County, and the Corps in the hope of having the Corps adopt a lesser standard. These recent discussions are outlined below.

The Corps on February 5, 2008 officially notified the City that Tukwila's 205 Levee needed immediate repairs in order to retain its certification. The City, King County Flood Control Zone District, and the Corps worked diligently to create a repair design that would minimize the impact to the abutting property owners, including La Pianta. The paramount criteria for the repair was to provide for:

1. Public safety;
2. Maintain levee certification;
3. Provide solutions that eliminate or correct factors that caused or contributed to the levee problems;
4. Provide for long-term maintenance needs; and
5. Incorporate environmental considerations.

Upon receiving a copy of the Corps' Project Information Report and the 30% Repair Plans, La Pianta tried to change the Corps' design. The following are efforts taken by the Corps and the City to meet with La Pianta in an attempt to understand their concerns:

- March 4, 2008 – City, Corps, and La Pianta meet to hear La Pianta's six (6) suggestions for reducing the amount of land needed for the repair project.
  1. A smaller width for the levee top – 12 feet in lieu of Corps design of 14 feet;
  2. Steepening the landward slope of the levee;
  3. Steepening the slope of the riverside launchable toe rock;
  4. Reduce the width of the mid-slope bench (needed for maintenance and lessening the effects from scour)
  5. Move the "woody debris" and its associated anchor rock further into the river channel or bury it in the bank of the levee; and
  6. Eliminate the landward 10-foot buffer space needed for access and inspection.

Note: Representing La Pianta were Mr. Mark Segale and Gary Henderson P.E., a Senior Principle with GeoEngineers, Inc. *After a thorough discussion, Mr. Henderson stated he could not find fault with or criticize the Corps' design.*

- March 27, 2008 – Corps calls La Pianta and provides an explanation as to the need for the landward 10-foot buffer space.
- April 7, 2008 – Corps follows up with a letter of explanation addressing the need for the 10-foot landward buffer.
- April 14, 2008 – Corps meets again with La Pianta to discuss the aforementioned 6 suggestions and the Corps' design for the levee repair project. Corps informs La Pianta that after thoughtful consideration, the design would not be changed. La Pianta informs the Corps Staff that La Pianta will not cooperate in providing the necessary easements for the repair project.
- April 21, 2008 – La Pianta appears before the Tukwila City Council and alleges that the Corps' design for the levee repair project was "above and beyond" what was needed to return the levee to a safe condition.
- April 25, 2008 – Corps letter provides the City with an explanation as to why the La Pianta suggestions were not incorporated into the levee repair project design. Corps letter sent to La Pianta.
- May 8, 2008 – In response to a City Council request, Public Works prepares a response to the "above and beyond" allegation. City Council makes no changes to the amount of land needed for the levee repair projects.

- May 13, 2008 – La Pianta meets with Chief of Staff, King County Executive Office asking for help in getting the levee repair project redesigned. Chief of Staff informs La Pianta that the levee repair project was best discussed with the City and Corps.
- May 13, 2008 – La Pianta calls the Corps and alleges that King County had endorsed a change to the levee repair project; that King County had agreed to pay for any costs associated with the redesign and construction, and; King County was willing to accept the maintenance responsibilities resulting from the design change. Note: The redesign was to construct a wall on the landward side of the levee in lieu of the 2:1 landward slope.
- May 14, 2008 – La Pianta’s law firm, Perkins-Coie hand delivers a letter to the City that proposes to grant adequate easements to the City in exchange for the City’s willingness to request a design change from the Corps for the construction of a retaining wall and the Corps’ consent to build the wall along Mr. Segale’s property.
- May 14<sup>th</sup> through May 16, 2008 – Numerous telephone calls between the City, King County Flood Control Zone District, the Corps, and Chief of Staff, King County Executive Office concerning La Pianta’s statements made to the Corps.
- May 16, 2008 – Corps informs La Pianta that the design will not change.
- May 20, 2008 – Tukwila’s Mayor has several conversations with King County Executive’s Chief of Staff and the Corps’ Colonel McCormick. Col. McCormick emphatically informs the Mayor that the levee repair project design was not going to change.
- May 21, 2008 – Based upon Col. McCormick’s decision that levee repair project design was not going to change, City responds to Perkins-Coie letter stating the Corps’ levee repair project design had been finalized and would not change.
- May 22, 2008 – La Pianta and Col. McCormick meet. La Pianta informs the Corps that unless the levee repair project design is changed, La Pianta will not cooperate and the City would have to use its condemnation authority to obtain the land. La Pianta offers to provide the easements at no cost, if the Corps will change the levee repair project that abuts Mr. Segale’s property to allow the building a retaining wall in lieu of the landward slope. Mr. Segale also offers to pay for the construction of the retaining wall. In order to avoid the delay that a condemnation proceeding would cause and prevent the repair of the levee during the 2008 “Fish Window” (ended in October), Col. McCormick agrees to discuss the proposed change of the levee repair project with Mayor Haggerton.
- May 22, 2008 – Col. McCormick calls Mayor Haggerton and asks if the City can help make the retaining wall option possible. Col. McCormick and Mayor

Haggerton agree to allow the retaining wall as a “one time” deviation from the Corps’ design. Public safety is the basis for their decision because both are worried that the levee could suffer extreme damage if not repaired before the rainy season.

The above chronology shows that La Pianta had more than one opportunity to influence the Corps (design responsibility) and King County (maintenance responsibility) in an attempt to have the Corps’ design changed. It was not until La Pianta threatened to delay the project and thereby possibly jeopardizing public safety that the actual design was changed – the change allowed a retaining wall in lieu of the 2:1 landward slope. The waterside design and profile were not altered.

In summary, the Commission earlier asked, “What factors were considered by the City in establishing the proposed 50-foot, 100-foot, and 125-foot buffer widths?” Staff has provided a great deal of information delineating these factors and answering the question. The 125-foot buffer width was based upon the Corps’ levee design, which has been reviewed and tested numerous times. As a result, the Corps stated in their September 27, 2007 letter to the City (previously provided), this design and profile will be used as the template for all future repairs and new construction.

The Commission’s willingness to accept public comment on the draft Shoreline Master Program is appropriate and fruitful. However, in the interest of public safety, it is important to remember that the Corps’ design has been fully vetted and determined to provide the highest level of safety for Tukwila’s citizens. Because this is a highly technical matter, it may be unwise for the Planning Commission to substitute its well-intentioned judgment for that of the U.S. Army Corps of Engineers regarding the levee design.

**Please note:**

**The January 15, 2009 letter from McCullough Hill, referenced in the 1/26/09 memo is available for review under “Comments from the January 15, 2009 meeting, under La Pianta.”**



**INFORMATIONAL MEMORANDUM**

**To:** Mayor and City Council

**From:** Public Works Director *JSM*

**Date:** May 8, 2008

**Subject:** Levee Repair Projects

**Issue:**

Amount of land needed to accomplish the levee repairs – above and beyond what is reasonable?

**Discussion:**

Since being notified by the U.S. Army Corps of Engineers on February 5, 2008 that Tukwila's 205 Levee needed to be immediately repaired in order to retain its certification, the City, King County Flood Control Zone District, and the Corps have diligently worked to create a design that would minimize the impact to the abutting property owners. The paramount criteria however has been to provide for:

1. Public safety;
2. Maintain levee certification;
3. Solutions that eliminate or correct factors that have caused or contributed to the problem;
4. Levee maintenance needs; and
5. Environmental considerations.

The Corps did extensive analysis before arriving at its final design, including an investigation of specific requests from La Pianta. However, during the April 21, 2008 Regular Meeting of the City Council, a different picture was presented by La Pianta in opposition to the final design.

The following facts are offered to clarify the record:

- The Corps inspected the levee on November 16, 2006 (right after the severe storm) and again in the Fall 2007.
- The Corps analyzed 6 repair alternatives for the damaged areas.
- La Pianta has been kept apprised of the repair project throughout the entire process, including receiving a copy of Corps' Project Information Report, 30% Repair Plans, 90% Repair Plans, and 100% Repair Plans. Copies have been

provided to the all property owners as soon as the City received the information from the Corps.

- The City and Corps met with La Pianta on March 4, 2008 to hear their suggestions for reducing the amount of land needed for the repair project. La Pianta suggested:
  - 1) A smaller width for the levee top – 12 feet in lieu of 14 feet;
  - 2) Steepening the landward slope of the levee;
  - 3) Steepening the slope of the riverside launchable toe rock;
  - 4) Reduce the width of the mid-slope bench (needed for maintenance and lessening the effects from scour);
  - 5) Move the “woody debris” and its associated anchor rock further into the river channel or bury it in the bank of the levee;
  - 6) Eliminate the 10-foot piece of land identified as an access/inspection buffer.
- The Corps called La Pianta on March 27<sup>th</sup> and explained the need for permanent access to the levee.
- The Corps met with La Pianta a second time on April 14, 2008 to discuss the aforementioned 6 suggestions. La Pianta was informed that the Corps had considered the suggestions; however, the suggestions could not be incorporated into the final design.

La Pianta, during the April 21, 2008 Council Meeting implied that the design for the levee repair project was “above and beyond” what was needed to return the levee to a safe condition. La Pianta’s reasoning was that the levee was built, certified, and recertified without the inclusion of a mid-slope bench, the 10-feet needed for access/inspection of the backside of the levee, and the permanent access to the levee across La Pianta’s property.

The Corps’ Project Information Report provides the justification for the repair alternative that has been selected. In rejecting the alternative “*Repair to Pre-Flood Condition*,” (La Pianta’s preference) the Corps states, “The repair to pre-flood condition is not acceptable since the scour would occur again.” Other contributing factors that the Corps cited in selecting the “*Layback Levee Alternative*” are contained in the *2006 King County Flood Hazard Management Plan*:

“Levee slope is extremely over-steepened at approximately 1.4H : 1V to 1.8H : 1V, and therefore lacks adequate structural stability to provide minimum factors of safety for several modes of failure. No toe buttress structure has ever been constructed in this sub-reach. The riverward slopes are largely dominated by invasive blackberries and reed canary grass.”

The current over-steepened slopes do not allow for periodic and proper maintenance to take place, hence the occurrence of slumping since 1990. Machinery cannot reach from the top of the levee to the toe and thus the Corps is including a mid-slope bench to correct this situation and to lessen the effects from scour. Exhibits 1 and 2 provide further

reasoning why returning to the pre-flood condition and incorporating La Pianta's suggestions were rejected.

### **Summary**

La Pianta's desire to return/repair the levee to its pre-flood condition within the existing footprint would not solve the problems that led to the current failure. The U.S. Army Corps of Engineers has developed a design that provides for public safety, returns the levee to its 100-year level of protection, maintains certification, lessens future damage effects due to scour, provides for levee maintenance, and is the most cost effective alternative.

### Exhibits:

1. U.S. Army Corps of Engineers letter dated April 7, 2008 – 10' buffer
2. U.S. Army Corps of Engineers letter dated April 25, 2008 – Engineering decisions





REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
SEATTLE DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 3755  
SEATTLE, WASHINGTON 98124-2255

APR 17 2008

Emergency Management Branch

Mr. James Morrow  
Director, Public Works  
City of Tukwila  
Tukwila, WA 98188

Dear Mr. Morrow

This letter is a follow up to our recent meeting regarding the Lower Green River Flood Damage Reduction Section 205 Levee Repair. The Corps will complete the project designs on April 9<sup>th</sup> and will forward for your approval.

The Corps of Engineers design includes a requirement for the levee easement to extend at least 10' landward of the proposed levee footprint. This additional 10' is necessary for the following reasons:

1. The footprint of the levee repair may need to be adjusted during construction. The 10' buffer gives the construction team the flexibility to make minor changes to fit actual conditions.
2. The 10' area landward of the levee provides the City with access to the landward toe of the levee during high water events and allows emergency measures to be constructed at the toe of the levee.
3. The 10' area landward of the levee also acts as a buffer to keep encroachments away from the levee toe. Acceptable uses of this buffer area include paving for parking or landscaping. However, these features may be impacted during emergency response activities.

If you have any additional questions please contact me at (206) 764-3406 or email me at [Douglas.T.Weber@USACE.ARMY.MIL](mailto:Douglas.T.Weber@USACE.ARMY.MIL). You can also contact Laura Orr, Project Manager at (206) 764-3575 or email Laura at [Laura.A.Orr@USACE.ARMY.MIL](mailto:Laura.A.Orr@USACE.ARMY.MIL) . .

Sincerely,

Douglas T. Weber, P.E.  
Levee Safety Program Manager  
Emergency Management Branch





DEPARTMENT OF THE ARMY  
SEATTLE DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 3755  
SEATTLE, WASHINGTON 98124-2255

APR 25 2008

REPLY TO  
ATTENTION OF

Emergency Management Branch

Mr. James Morrow  
Director, Public Works  
City of Tukwila  
Tukwila, WA 98188

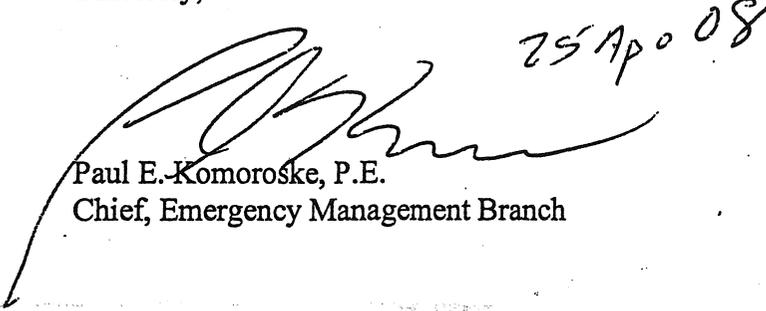
Dear Mr. Morrow

This letter is to convey the final design drawings for the Tukwila levee rehabilitation project. The Corps of Engineers (COE), City of Tukwila, and King County undertook an extensive Engineering and Design effort to develop this package. This design package is now final and it is imperative that we now move forward to meet the construction schedule.

Attached to this letter are the final design drawings and a memorandum for record which explains some of the Engineering decisions the Corps made during the design process. Public safety is paramount to the Corps and always comes first when looking at design options. Environmental considerations and local sponsor maintenance needs were also factored into the design.

If you have any additional questions please contact Laura Orr, Project Manager at (206) 764-3575 or email Laura at: [Laura.A.Orr@USACE.ARMY.MIL](mailto:Laura.A.Orr@USACE.ARMY.MIL). Or contact Douglas Weber, Program Manager at (206) 764-3406 or email Doug at: [Douglas.T.Weber@USACE.ARMY.MIL](mailto:Douglas.T.Weber@USACE.ARMY.MIL).

Sincerely,

  
Paul E. Komoroske, P.E.  
Chief, Emergency Management Branch

Copy Furnished:

Steve Bleifuhs, Manager  
River and Floodplain Management Unit  
Water and Land Resources Division  
King County Department of Natural Resources & Parks  
201 S. Jackson St., Ste. 600  
Seattle, WA 98104



Memorandum for Record: OD-EM (Komoroske)

SUBJECT: Design Considerations for Tukwila Levee Rehabilitation Project.

This memorandum summarizes the design considerations related to the City of Tukwila's specific design questions. The Corps of Engineers (Corps) design team evaluated each question and the result is reflected in the final design package. Note that public safety is always the top consideration for the Corps when evaluating design alternatives.

**Question #1:** Can the top width of the levee be narrowed to 12'?

**Answer:** No. The Corps choose to leave the top width at 14'. This width is consistent with the existing levee top width and provides the necessary width for the existing pedestrian trail.

**Question #2:** Can the landward slope of the levee be steepened to reduce the overall levee footprint?

**Answer:** No. The Corps design standards for this levee type recommends a minimum levee slope of 2 horizontal to 1 vertical. This provides for a stable landward slope.

**Question #3:** Can the launchable riprap toe be steepened to minimize the levee footprint?

**Answer:** No. The minimum slope of the launchable riprap toe is 2 horizontal to 1 vertical. This provides stability to the toe rock until it launches during a large flood event. In addition, changing the toe rock slope would push some of the launchable toe material up the levee slope. This requires that part of the levee erode prior to the toe rock being able to launch. It is preferable to have the launchable toe as close to the bottom of the levee slope as practical.

**Question #4:** Can the mid-slope bench width be reduced to the minimum necessary for installing the launchable toe?

**Answer:** The minimum mid-slope bench width was set for all of the Green river levee rehabilitation projects at 15'. This minimum bench width was requested by King County as the minimum they need to perform future maintenance on the levee.

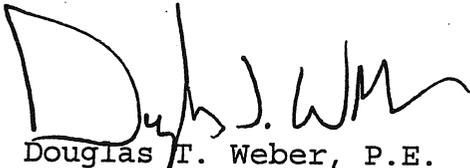


**Question #5:** Can the large wood anchor rock be moved further into the channel, which would move the entire levee footprint riverward?

**Answer:** No. The Corps considered moving the anchor rock riverward and left it in the 90% design location for two reasons.

1) Moving the anchor rock riverward would require moving the launchable toe riverward and deeper into the channel. This would require excavating below the summer river level and would be difficult to construct and would not assure proper placement of the anchor rock.

2) Moving the entire levee prism riverward encroaches on the active river channel and reduces fish habitat. Based on comments provided by resource agencies, this alternative is not acceptable from a fish habitat standpoint.



Douglas T. Weber, P.E.  
Levee Safety Program Manager  
Seattle District



Dennis Fischer, P.E.  
Levee Rehab Design Team Lead  
Seattle District



AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF TUKWILA, WASHINGTON, AUTHORIZING AND PROVIDING FOR THE ACQUISITION OF LAND FOR THE PURPOSE OF CONSTRUCTING THE TUKWILA 205 LEVEE REPAIR PROJECT AT SITES 3 AND 5; PROVIDING FOR CONDEMNATION, APPROPRIATION, TAKING AND DAMAGING OF LAND AND PROPERTY RIGHTS NECESSARY THEREFOR; PROVIDING FOR THE COST THEREOF; DIRECTING THE INITIATION OF APPROPRIATE PROCEEDINGS IN THE MANNER PROVIDED BY LAW FOR SAID CONDEMNATION; PROVIDING FOR SEVERABILITY; AND ESTABLISHING AN EFFECTIVE DATE.

**MOVED BY LINDER, SECONDED BY DUFFIE THAT THE PROPOSED ORDINANCE BE READ BY TITLE ONLY. MOTION CARRIED 7-0.**

Shelley Kerslake, City Attorney, read the proposed ordinance by title only.

**MOVED BY LINDER, SECONDED BY ROBERTSON THAT THE PROPOSED ORDINANCE BE ADOPTED AS READ.\***

Jim Morrow, Public Works Director, provided an update to the Council on this issue. The United States Army Corps of Engineers has finished their plans, with 100% design completion. Each of the 3 property owners has been provided easements and legal descriptions. There have been numerous conversations and correspondence with the property owners regarding this issue.

There has been the inclusion of an additional sentence in the ordinance on page 2, section 2, as follows: "The Mayor is additionally authorized to make minor amendments to the legal descriptions of the properties described in Exhibit "A," as may be necessary to correct scrivener's errors or to conform any legal description to the precise boundaries of the property actually acquired for the levee repair described herein."

Councilmember Hernandez inquired if the property owners are supportive of this project. Mr. Morrow indicated there has been no official notification from any property owner that they are not in support of this project. Ms. Hernandez asked if the bicycle and walking trails would be available during the levee repair. Mr. Morrow relayed that while they will not be available during construction, they will be restored for use after the project is complete. Signs will also be posted to alert users to the construction activity.

Councilmember Robertson asked if the land described in the exhibits is sufficient to meet the needs of the Army Corps of Engineers. Mr. Morrow stated it is based upon their final design and is exactly what they requested to complete the repairs successfully. The legal descriptions were compiled based upon the design presented by the Army Corps of Engineers.

Councilmember Quinn asked for a recap on the need for this project and an overview of the timeline requirements. Mr. Morrow explained the heavy rains in November 2006 did extensive damage to the levee. Upon inspection by the Army Corps of Engineers, it was determined that sites 3 and 5 required immediate repair, or certification of the levee could be jeopardized. The original deadline by the Corps was the first week of April; they are aware of the diligence the City is exercising to pull together all the issues related to this matter.

Mark Segale, LaPianta LLC, indicated they are the landowners for site 5 of the levee repair project. Mr. Segale conveyed support for the safety of the levee. They are willing to give, without compensation, whatever land is needed for the repair. Mr. Segale conveyed, that in his view, this is not a repair; there is a demand for additional land for purposes that go above and beyond the safety of the levee. The work is one of the proposed alternatives that was looked at by the Army Corps of Engineers. A correct legal description has not yet been provided, making it difficult to determine the impacts to the property.

Mr. Segale relayed that the City, the Army Corps of Engineers, and King County have been working on this project for over a year. He indicated they were brought in at the last minute and find it to be an unfair and unreasonable situation. An additional permanent access easement is being requested outside the area of this repair. The levee was built and originally certified and recertified without this access easement. The City is asking for an additional 10-foot permanent easement that was not an original requirement when the levee was certified. There is confusion as to why this minor repair is triggering

changes that were originally acceptable. Mr. Segale indicated that items such as a mid-slope bench, providing vegetation, and adding additional access easements are not necessary for the safety and repair of the levee. They are unwilling to give the easements if these unnecessary elements of the project are included. It involves a waste of taxpayer dollars to go through a condemnation process and have the City pay for land that is unnecessary.

Councilmember Linder indicated it is her understanding this project was suggested by the Army Corps of Engineers and that maintenance is required on the levees. How would maintenance be handled without this property. Mr. Morrow explained this is an Army Corps of Engineers design, and property owner suggestions have been taken into consideration. Those suggestions were incorporated, where possible, if the safety and integrity of the levee was not compromised. After all issues were considered, this is the Corps' final design, and provisions for maintenance of the levee were incorporated into the design. Mr. Morrow indicated it was in February that the final design was available to the City, and the information was provided to the property owners as soon as it was available.

Councilmember Hernandez inquired as to whether additional property was requested over and above what is needed to provide maintenance. Mr. Morrow conveyed the easements before the Council are based on the United States Army Corps of Engineers 100% design. Ms. Hernandez commented that if the repairs are not accomplished by the next flood season, the City could be responsible to make the repairs in the amount of approximately \$1.4 million and the levee could be decertified.

Councilmember Robertson spoke in favor of the motion. He indicated the previous levee did fail, and this represents a safer design. Time is also an issue on this matter, and the City would not be able to create a new design in this season, which would result in a serious safety issue.

Councilmember Quinn inquired as to the cost impact to the City if no decision were made on this issue. Mr. Morrow explained the construction cost estimate to repair the levee is \$1.5 million. Additionally, if the levee were to be decertified, property owners in the urban center would need to raise the level of their structures to 1 foot above the current levee for new construction or major remodeling. Recertification of the levee would be an extremely horrendous undertaking, and the City does not currently have that capability. This would result in millions and millions of dollars in costs to future property owners and to the City as well.

**\*MOTION CARRIED 7-0 TO ADOPT ORDINANCE NUMBER 2200.**

**d. Authorize the Mayor to sign the first amendment to the Valley Communications Center Interlocal Agreement (#00-026) to add the Valley Regional Fire Authority and King County Fire Protection District #39.**

**MOVED BY ROBERTSON, SECONDED BY LINDER TO AUTHORIZE THE MAYOR TO SIGN THE FIRST AMENDMENT TO THE VALLEY COMMUNICATIONS CENTER INTERLOCAL AGREEMENT (#00-026) TO ADD THE VALLEY REGIONAL FIRE AUTHORITY AND KING COUNTY FIRE PROTECTION DISTRICT #39. MOTION CARRIED 7-0.**

**NEW BUSINESS**

**MOVED BY DUFFIE, SECONDED BY LINDER TO AUTHORIZE THE MAYOR TO SETTLE THE CITY OF TUKWILA VERSUS NORTHFIELD VENTURES LAWSUIT IN THE AMOUNT OF \$855,000.00.\***

Shelley Kerslake, City Attorney, explained this is the result of mediation between the parties to settle both the City's claim against Northfield and Northfield's counter-claim. Under the terms of the original contract, the City is obligated to pay \$795,000 to Northfield, so the settlement amount on this issue is \$60,000.

**\*MOTION CARRIED 7-0.**

Similarly, broader areas along the valley floor that could be inundated with more widespread but slower-moving floodwaters were estimated by County staff, based on known flood stages compared with available topographic mapping data. In other locations, especially along the middle Green River, King County staff also identified tributaries and side channels within the floodplain that can be expected to exhibit deep, fast flows during flooding conditions.

Channel migration zones have also been determined and mapped for the Green River. These extend from Flaming Geyser Park at River Mile 46.2 to the Central Avenue Bridge in the City of Kent at River Mile 25.3. Both severe and moderate channel migration areas have been determined in these reaches, and the mapping has been adopted by King County for regulatory purposes.

Relationships between flooding, flood management levees and revetments, and riparian habitat have been estimated based on a mapping of a minimum riparian buffer width, based generally on the King County Critical Areas Ordinance aquatic-areas buffer for fish-bearing streams such as the Green River. In unincorporated King County and jurisdictions such as the Cities of Auburn and Kent, which regulate a 200-foot-wide shorelines zone, these buffers were drawn along the length of the river at widths measuring 165 feet from the ordinary high water mark. In more developed urban areas, largely within the City of Tukwila and previously developed portions of the City of Kent, these buffers were drawn 115 feet wide. The buffers were used to evaluate the compatibility of existing flood protection facilities with a basic riparian habitat corridor along the riverbank.

### **5.9.9 Flood Hazard Management Corridor Conditions**

An overview of conditions relevant to future flooding and erosion risks in the Green River flood hazard management corridor is provided below. For the Duwamish and lower Green Rivers, ongoing instability of levees and revetments is the primary concern, and potential levee breach and inundation of most of the valley floor would result in extreme consequences. In the middle Green River, discontinuous levees and revetments will continue to experience bank erosion due to lateral channel migration and channel avulsion.

#### ***Lower Green and Duwamish***

As described above, by the mid-1970s, a nearly continuous system of levees and revetments bordered the lower river, and several disconnected segments extended into the middle Green River valley. These levees were usually constructed at slope angles ranging from 1.5H:1V to 1.75H:1V using dragline cranes to dredge out the levee toe areas, devegetate the channel slopes, remove large woody debris from the channel, shape the riverbanks, and place a minimal thickness of angular riprap armor on the banks. The result was the basic system in place today, with minimal toe buttress structures, oversteepened, sloughing banks, eroding channel margins, minimal or invasive vegetation, and significantly degraded habitat.

Because the downstream portion of the lower Green River channel is severely constrained by levees, floodwaters are contained within a narrow cross section and peak flood levels can be as much as 20 feet above the elevation of the ordinary high water mark. The erosive power of moving water increases as depth increases, resulting in a greater shear force on the riverbed. As a result, the fine-grained channel bed is scoured, including many areas along the channel margins underneath the toe of levee slopes where the riverbank meets the riverbed. Under these conditions, even heavy rock buttress structures can be undermined and fail. Even minor shifting of the riverbed along the channel margins can result in the gradual undermining of the lower portions of over-steepened levee structures. This problem affects many lower Green River levees and results in further slumping and failure of overlying slope areas.

Sediment transport capacity is limited in this low-gradient channel and the materials carried by the river consist exclusively of sands and silts, which are deposited in narrow bands along the mid-slope areas of

the levees when flows recede. These mid-slope sand and silt deposits are largely vegetated with invasive growths of reed canary grass and blackberries. During prolonged periods of high water associated with controlled flow releases from Howard Hanson Dam, these sediment deposits become saturated, adding weight to the already over-steepened banks, and frequently slumping into the river after flows recede. This slumping is especially pronounced on levee segments with slopes in excess of 2.5H:1V where undercutting of the levee toe is present. Portions of the Desimone Levee near River Mile 14.85, where a 400-foot-long levee segment slumped into the river in 1995, exemplify this problem. This failure has not yet been repaired, and additional easement area will likely be required in order to stabilize the levee with setback reconstruction.

Thus, even though it is relatively flat and slow moving, the lower Green River is prone to chronic undercutting erosion and slumping failures; and encroachment of adjacent land uses in the proximity of its over-steepened levees restricts the opportunity to reconstruct the levees with more suitable, flatter, slopes. Despite many repairs that have been completed at substantial cost over the years, many more levee repairs will be required to address current flood risks.

The 1965 levee failure described above resulted in widespread flooding of much of the eastern valley floor. This flood highlights a flooding hazard that requires special consideration throughout the lower Green River valley. Areas affected by the 1965 flood and potential similar events have not been mapped by FEMA as part of the floodplain because they are considered to be protected by levees. However, these areas may also be seriously at risk from flooding in the event of a levee breach.

### ***Transition from Lower to Middle Green River***

The upstream portion of the lower Green River is transitional between the rapidly migrating middle Green River, and the more extensively armored portions of the downstream portion of the lower Green River. Channel gradients capable of transporting smaller gravels continue downstream into the lower Green River to about the Central Avenue Bridge at River Mile 25.3 in the City of Kent, which is also the downstream extent of mapped channel migration hazards for the Green River. A number of small levee segments are present in the City of Auburn within this reach, together with several riprap-armored revetments along stretches of the Green Valley Road in unincorporated King County.

Channel migration remains most pronounced in the vicinity of Horsehead Bend, near River Mile 26.8, between the Cities of Auburn and Kent. Additional segments of the riverbank just upstream from this site have continued to migrate, over the past decade in particular, moving up to 150 feet laterally into a corridor dedicated for future recreational trail development and impacting adjoining agricultural properties.

### ***Middle Green***

Although Howard Hanson Dam operations have limited flow magnitudes at Auburn to what was a 2-year event before the dam was built, this 2-year event is at the threshold of bank-full flow and is often considered to be "channel-forming" in alluvial systems. The 2-year flow has enough energy to erode the channel bed and banks and move and deposit sediment, leading to continued channel migration. In addition, the frequency and duration of flows at or near this 2-year level have also been increased by dam operations, as larger floods are stored and released at this rate. As a consequence, significant channel migration continues to occur in the middle Green River.

During a single flood in 1990, about 150 feet of the Hamakami Levee and an additional 300 feet of the levee access road at River Mile 36.14 were destroyed, along with nearly two acres of farmland, when the river moved laterally about 360 feet along a channel length of a quarter mile. A meander bend continues to develop just downstream from this site by progressive lateral channel migration. Other active channel

migration is visible in the middle Green River at Metzler-O'Grady Park, near River Mile 39.70, where broad meanders and braiding channels are constantly shifting within a complex of active gravel bars, vegetated riparian floodplains, and remnant side channels. A portion of this reach is called "the Mad Braid" as a consequence of its ever-changing character. Near the downstream end of this site, channel migration hazards threaten the long-term integrity a home near River Mile 38.6. The 1960s-era Loan Levee just downstream, near River Mile 38.1, has also been impacted by channel migration, which has severed the levee access road on several occasions when flows reoccupied a previous floodplain channel.

As these examples indicate, channel migration has influenced flood management efforts much more than flood inundation has along the middle Green River. Since a number of levees in the middle Green are situated in areas affected by potential channel migration, the *1993 King County Flood Hazard Reduction Plan* recommended that they be set back from the channel margins.

## 5.9.10 Flood Hazard Management Objectives and Strategies

### *Lower Green and Duwamish*

Preliminary risk assessments for the lower Green River indicate that the existing levee system prevents more than \$60 million in flood damages each year, on average. The primary objective for the lower river is to maintain the structural integrity of the levee system so that it can continue to provide this essential public service and to protect public safety. At the same time, initial levee stability studies performed at four locations along the lower Green River indicate that the existing levees fail to provide the minimum factors of safety against potential structural levee failures, based on published federal guidelines. A more thorough evaluation of individual levees and a more refined risk analysis are now underway and targeted for completion by 2007, but it is generally anticipated that the results of these investigations will further confirm the preliminary findings. Thus, it is safe to say that a program of major levee rehabilitation and reconstruction is the single overarching need within the lower Green River.

In order to correct the structural deficiencies of the levee system in this reach, the slope geometry of the levees must be modified. The most straightforward remedy is to set the levee fill back away from the top of the riverbank to create an overall levee slope of 2.5H:1V. The slope of most of the existing levees ranges from 1.5H:1V to 1.75H:1V, and the slopes of some segments are even steeper. Such steep slope angles are a primary cause of chronic structural instability and flood protection facility damage.

Additional easement area is frequently required in order to reconfigure damaged levee segments to meet even the minimum recommended slope geometry. It has often been possible to negotiate with property owners to obtain the additional area needed, but not always. Alternative levee repair solutions have been implemented in a few cases where a wider easement could not be secured, but with very high costs and increased long-term maintenance needs. As an example of this, repairs to the federal levee system at River Mile 15.5 on the left bank of the Green River have been constrained to a 2H:1V riverward levee slope angle due to easement restrictions, resulting in the need for later reconstruction of the failed levee toe. Future levee repairs will pose the need for wider easements, including the need to acquire property in some cases. While generally justified by the benefits that would occur as annualized avoided damage, additional easement costs may significantly exceed current annual Green River Flood Control Zone District revenues.

Overall, the approach throughout the lower Green River is centered on the need to provide an adequate area along the riverbank to repair and reconstruct the many damaged levees at a stable slope. Generally speaking, the width required would not exceed 110 feet landward from the aquatic edge of the river channel along each bank. With this setback template in mind, a systematic reconfiguration of the levees can be accomplished throughout the heavily urbanized lower Green River valley. This can be achieved in connection with individual levee repairs and can be incorporated into the development of properties

bordering the existing levee system, including the redevelopment of existing sites over time. A levee setback approach can also be integrated into the relocation of roads, such as Frager and Russell Roads, which currently border the river, and should strongly influence site selection and construction of the Green River Trail system. Levee setbacks should also be required as a standard condition for future redevelopment of urban areas presently abutting oversteepened levees. In some areas, it may not be possible in the near term to obtain the additional easement area needed to reconstruct oversteepened levees in more stable configurations. However, as redevelopment occurs, easement provisions should be made as needed to allow levee reconstruction that ensures the safety of the new development and surrounding area. The timescale and costs involved may present a challenge, but much has already been accomplished in a relatively short time.

In the short term, the existing levee system should continue to be maintained and repaired as needed to protect public safety and the considerable land values and improvements in the floodplains adjacent to the levees. The ongoing short-term maintenance and repair program should be carried out such that it does not preclude long-term opportunities to modify and set back the existing levees.

An assessment of potential damage due to levee breach hazards along the lower Green and Duwamish Rivers, begun in 2006, is scheduled for completion in 2007, and steps should be taken to implement its findings.

### ***Transition Area from Lower to Middle Green River***

Flood management recommendations for this upstream portion of the lower Green River emphasize the relocation of encroaching road shoulder revetments and the roadways themselves, together with the creation of a setback levee and thoroughly vegetated riparian buffer along the proposed Green River Trail corridor. This approach will help to accommodate the levels of channel migration present while sufficiently confining the corridor alignment to allow the balance of land uses, present or proposed, through existing zoning and specific development proposals, including trail construction.

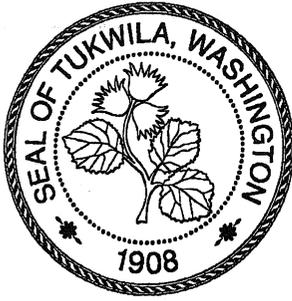
### ***Middle Green***

The primary strategy for the middle Green River is keyed to the risk to residential structures in channel migration hazard areas. Over the short term, flood protection facilities should be repaired and maintained so as to protect public safety, without precluding long-term opportunities to modify the facilities. The primary long-term goal is to set back existing flood protection facilities and allow unconstrained or less constrained channel migration. Existing at-risk structures would best be acquired and removed. Purchase of at-risk structures and flood protection facility setbacks need to be coordinated with existing acquisition programs and future grant opportunities, and may be coupled with habitat restoration projects or initiatives.

Existing land use designations and policies that protect agricultural practices may also represent an obstacle to full implementation of this strategy. In recognition of acquisition costs, funding limitations, and potentially conflicting agricultural land use policies and provisions, this strategy will likely require a very long-term timeframe for implementation. Still, opportunities exist now for setting back middle Green River flood protection facilities and may be available over the intermediate term as well as the long term (Bauman et al. draft 2005).

## **5.9.11 Proposed Actions**

Proposed projects for the Green River include 13 levee reconstruction projects, one home buyout project, and an opportunity fund for support to emerging salmon habitat recovery projects that are likely to assist in reducing risks. In addition to these projects, it is anticipated that an evaluation of the aging pumping



July 13, 2009

TO: Mayor Jim Haggerton  
Member of the Tukwila City Council

FM: Jim Morrow, Director, Department of Public Works *JM*

RE: **SHORELINE MASTER PLAN RESPONSE TO PUBLIC COMMENTS**

After reading all of the public comments, there appears to be three common themes:

1. Comment: If the U.S. Army Corps of Engineers standard is only 2:1 for slope stability, why is the City asking for 2.5:1?

Response: The Corps' standard is *not* 2:1. The Corps' Manual, *Design and Construction of Levees*, Chapter 6, Slope Design and Settlement, states, "A 1V on 2H is generally accepted *as the steepest slope* [Emphasis added] that can easily be constructed and ensure stability of any riprap layers. This is not a standard, it is the steepest slope accepted by the Corps.

The next paragraph of the Corps' Manual addresses Maintenance and states, "A 1V on 3H slope *is the steepest* [Emphasis added] that can be conveniently traversed with conventional mowing equipment and walked on during inspections. The City's Shoreline Master Program is proposing a compromise of 1V to 2.5H.

2. Comment: There are other means of providing vegetation enhancements and therefore the 15-foot mid-slope bench is not needed.

Response: The 15-foot mid-slope bench serves three purposes. The first is that the bench does provide an area for vegetation to be planted. The second purpose is for maintenance. These levees are high and therefore maintenance equipment (mowers, backhoes, etc) cannot sit on top of the levee and reach down to the levee's toe. Lastly, the mid-slope bench is needed for flood fighting. If the levee is failing, heavy equipment (backhoes, trucks, etc.) can access the area quickly and make the necessary repairs. Another benefit of the mid-slope bench is that it increases the river's width and increases the river's ability to convey more water – more water will be placed into the river as we have more growth in the Green River Basin and global warming makes it wetter in the Pacific Northwest.

3. Comment: Rather than have a "one size fits all," the setback buffer should be determined on a case-by-case basis.

**Response:** The proposed Shoreline Master Program language provides the flexibility being requested. The buffer widths being proposed are the maximum distances needed. The SMP, Section 7.7 provides the criteria that a property owner may use when constructing the levee improvements in lieu of the 125 foot buffer setback. This section provides the flexibility that the property owners seem to be seeking.



# City of Tukwila

Jim Haggerton, Mayor

Department of Public Works

James F. Morrow, P.E., Director

To: Mayor Haggerton  
City Council

From: Director of Public Works *JFM*

Date: July 14, 2009

Subject: **SHORELINE MASTER PLAN RESPONSE TO PUBLIC COMMENTS**

1. Comment: Have any other cities had their SMPs approved? If yes, do they use the 2.5:1 ratio?

Response: We checked with the City of Kent because what Tukwila and Kent do with regards to their Shoreline Master Programs and Floodplain Management Programs have a direct effect upon the other. The City of Kent is in the process of updating their Shoreline Master Program now.

Kent essentially uses the same levee profile that Tukwila is proposing. Kent's buffer width is wider [140-feet] for several reasons. National Marine Fisheries' Biological Opinion with regards to FEMA's National Flood Insurance Program specifies a 150-foot buffer on salmonid streams [Green River]. Kent's proactive approach is to wait for specific guidance from FEMA on how to enforce the Biological Opinion, but require in the mean time a 140-foot buffer.

Why Kent has a wider buffer is because their levee cross section includes a second lower bench at or just below the Ordinary High Water Mark *or* an area behind the levee that could be planted as a buffer between the river and any proposed development. This allows Kent to improve the storage capacity/flow within the river, as well as habitat. It is Kent's intention to push the levee back as far as possible and expand the lower bench to provide increased floodplain storage in the river.

As has been discussed with Council before, Ecology, as part of the National Pollutant Discharge Elimination System [NPDES] is studying the Green River and Soos Creek for Total Maximum Daily Loads [TMDL] for temperature as well as dissolved oxygen before imposing performance standards. Any improvements in temperature are going to require significant amounts of natural cover over the Green River and space will be needed to plant trees and native vegetation.

2. Comment: Floodway issue/FEMA maps – the Shoreline Master Program is inconsistent with the City’s Floodplain Management Ordinance in TMC 16.52.

Response: The Shoreline Master Program needs to be consistent with FEMA’s Floodplain Management Program. Suggestion is to change the language within the SMP and have it reference the Floodplain Management Ordinance for guidance with regards to floodways.

Tukwila will be revising its Floodplain Management Ordinance to coincide with the guidance that FEMA will be providing because of a revision to the Flood Insurance Rate Maps and as a result of the National Marine Fisheries’ Biological Opinion. If the SMP makes reference to the Floodplain Management Ordinance, then the City need only change the Floodplain Management Ordinance rather than two ordinances.

FEMA’s Floodplain Management Program should be the guiding reference with regards to floodways because if Tukwila were to not follow FEMA guidance, then the City could be removed from FEMA’s National Flood Insurance Program.

3. Comment: Property owners have suggested that they should be allowed to submit an engineering study that shows where the levee would be located when it is constructed and then have the buffer width reduced prior to actual reconstruction of the levee.

Response: Where and when failures may or may not occur cannot be predicted with a high degree of certainty. A levee may experience significant sloughing or erosion; i.e. across from the Community Center, across from Fort Dent Park, across from Lily Pointe, after the suggested engineering study has been performed. Thus there would be insufficient room to perform the reconstruction as proposed. Not having sufficient room could possibly create a greater impact upon the property owner. Additionally, before a levee reconstruction is actually performed or required, the regulations and laws may change that would require a different set of criteria. The City’s proactive approach to have the reconstruction actually performed and then establish the buffer width or to have the sufficient room (125-foot) to accomplish the improvements attempts to eliminate the unknowns associated with building next to a river and within a known floodplain.

## **Explanation of how shoreline buffers were determined – excerpted from Planning Commission Recommended Draft SMP, February 5, 2009.**

### **7.5 Determination of Shoreline Buffers**

The determination of the buffer distances for each shoreline environment was based on several factors including the analysis of buffer functions needed for protecting and restoring shoreline ecological function (as presented in the Shoreline Inventory and Characterization Report) and the need to allow space for bank stability and for protecting structures from damage from high flows, erosion and bank failures.

Staff also reviewed the rationale for the buffer widths established for watercourses under TMC 18.45, the Sensitive Areas Ordinance, as well as buffer widths recommended by resource agencies, such as the State Department of Fish and Wildlife.

The final buffer widths proposed by staff for each shoreline environment attempted to balance shoreline ecological function needs, property protection needs (including future levee repair/reconstruction) and existing land use patterns.

The following information summarizes the analysis carried out and the rationale used for determining buffer widths.

#### **A. Buffer Functions Supporting Shoreline Ecological Resources, Especially Salmonids**

Buffers play an important role in the health of any watercourse and an even more important role when considering the health of salmonids in the Green/Duwamish River system. The key buffer functions for the river are summarized below.

The Shoreline Management Act and the Department of Ecology regulations require evaluation of ecological functions and that local SMPs ensure that the policies and regulations do not cause any net loss of shoreline ecological function. In addition, the SMP must identify mechanisms for restoration of lost ecological functions.

The crucial issue for the Green/Duwamish River is the presence of salmonids that are on the Endangered Species list. To protect and restore ecological functions related to these species it is important to provide for the installation of native vegetation along the shoreline. Such vegetation provides shade for improving temperature conditions in the river and habitat for insects on which fish prey. Trees along the shoreline also provide a source of large woody debris (tree trunks, root wads, limbs, etc. that fall into the water), which in turn provides pooling and areas of shelter for fish and other animals. In order to allow for planting of native vegetation, banks need to be set back to allow for more natural slopes, so that they can be planted. The Corps of Engineers does not allow

planting on levees unless they are set back to an average slope of 2.5:1 and constructed with a mid-slope bench. Plantings are allowed on the mid-slope bench and this is crucial for improving shoreline ecological functions that are needed in the river.

The buffer widths needed to achieve a particular buffer function vary widely by function type from as little as 16 feet for large woody debris recruitment (assuming the buffer has large trees) to over 400 feet for sediment removal. The Washington State Department of Fish and Wildlife (WDFW) recommends a riparian buffer width of 250 feet for shorelines of statewide significance (this applies to the Green/Duwamish River). The Washington Department of Natural Resources (WDNR) recommends a riparian buffer of 200 feet for Class 1 Waters (the Green/Duwamish River is a Class 1 Water under the WDNR classification scheme). The National Marine Fisheries Service (responsible at the federal level for overseeing protection of endangered salmonids under the Endangered Species Act) has recommended a buffer of 150 feet in floodplain areas to allow for protection of shoreline functions that support salmonids.<sup>1</sup> Tukwila's Sensitive Areas Ordinance (TMC 18.45) has established a 100 foot buffer for Type 2 watercourses in the city (those that bear salmonid species).

The key buffer functions for the river are summarized below.

#### 1. Maintenance of Water Quality

Salmonid fish require water that is both colder and has lower nutrient levels than many other types of fish. Vegetated shoreline buffers contribute to improving water quality as described below.

- a. Water Temperature: The general range of temperatures required to support healthy salmonid populations is generally between 39 degrees and 63 degrees. Riparian vegetation, particularly forested areas can affect water temperature by providing shade to reduce exposure to the sun and regulate high ambient air temperatures.
- b. Dissolved Oxygen: dissolved oxygen is one of the most influential water quality parameters for aquatic life, including salmonid fish. The most significant factor affecting dissolved oxygen levels is water temperature – cooler streams maintain higher levels of oxygen than warmer waters.
- c. Metals and pollutants: Common pollutants found in streams, particularly in urban areas, are excessive nutrients (such as phosphorous and nitrogen), pesticides, bacteria and miscellaneous contaminants such as PCBs and heavy metals. Impervious surfaces collect and concentrate pollutants from different sources and deliver

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<sup>1</sup> Endangered Species Act – Section 7 Consultation, Final Biological Opinion and Magnuson –Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, Implementation of the Flood Insurance Program in the State of Washington, Phase One Document, Puget Sound Region, September, 2008.

these materials to streams during storm events. The concentration of pollutants increases in direct proportion to the total amount of impervious area. Undisturbed or well vegetated riparian buffer areas can retain sediment, nutrients, pesticides, pathogens and other pollutants, protecting water quality in streams. Elevated nitrogen and phosphorus levels in runoff are a typical problem in urban watersheds and can lead to increased in-stream plant growth, which results in excess decaying plant material that consumes oxygen in streams and reduces aquatic habitat quality.

## 2. Contributing to in-stream structural diversity

- a. Large woody debris (LWD) refers to limbs and tree trunks that naturally fall into the stream bed from a vegetated buffer. LWD serves many functions in watercourses. LWD adds roughness to stream channels, which in turn slows water velocities and traps sediments. Sources of LWD in urban settings are limited where stream corridors have been cleared of vegetation and developed and channel movement limited due to revetments and levees. Under natural conditions, the normal movement of the stream channel, undercutting of banks, wind throw, and flood events are all methods of LWD recruitment to a stream channel.
- b. LWD also contributes to the formation of pools in river channels that provide important habitat for salmonids. Adult salmonids require pools with sufficient depth and cover to protect them from predators during spawning migration. Adult salmon often hold to pools during daylight, moving upstream from pool to pool at night.

## 3. Providing Biotic Input of Insects and Organic Matter

- a. Vegetated buffers provide foods for salmonids and other fish, because insects fall into the water from overhanging vegetation.
- b. Leaves and other organic matter falling into stream provide food and nutrients for many species of aquatic insects which in turn provide forage for fish.

## **B. Bank Stability and Protection of Structures**

The main period of runoff and major flood events on the Green River is from November through February. The lower Green and Duwamish levees and revetments form a nearly continuous bank protection and flood containment system. Farmers originally constructed many of these levees and revetments as the protection to the agricultural lands of the area and this original material is still in place as the structural core. In particular, these protection facilities typically have over-steepened banks, areas with inadequate rock buttressing at the toe, and lack habitat-enhancing features such as overhanging vegetation or in-water large woody debris. Because of these design and

construction shortcomings, the protection to river banks has not always performed as intended. Instead, there have been bank failures that have threatened structures and infrastructure; erosion of banks – making them even steeper; and damage to levees that has required a series of repair projects.

The damage to the levee system in recent storm events lead to discussions among the City, US Army Corps of Engineers and the King County Flood Control District to determine the best levee profile to use to prevent the recurring problem of continued levee repairs. The criteria used to determine the best profile were:

- Public Safety;
- Maintaining levee certification;
- Solutions that eliminate or correct factors that have caused or contributed to the need for the levee repair;
- Levee maintenance needs; and
- Environmental considerations.

To overcome the existing problems and to reduce future maintenance and repair costs, the Corps chose to lessen the overall slope to a stable grade. This selected method is consistent with recommendations set forth in the Corps of Engineers' Manual for Design and Construction of Levees (EM 1110-2-1913) for slope stability. It also is consistent with the levee rehabilitation project constructed on the nearby Briscoe School levee that has proven to be a very effective solution to scour problems – the design slows the river down, provides additional flood storage and allows a vegetated mid-slope bench for habitat improvements. The Corps indicated that this type of profile would become the template for future levee repair and construction projects. King County also plans to use the 2.5:1 overall slope with a mid-slope bench incorporated for planting vegetation for its future levee repairs.

Because of the similarities in the soil conditions and taking into consideration the tidal influence, the Green/Duwamish River can be divided into three areas – South of I-405; North of I-405; and areas around residential neighborhoods. Looking at the slope geometry and the difference in height between the ordinary high water mark and the 100-year flood elevation for these three areas, it was found that 125-feet of setback distance (buffer) is needed to accommodate the “*lay back*” of the levee in the area south of I-405 and around Fort Dent Park.<sup>2</sup> For areas without levees, north of I-405 and those areas south of I-405 on the east side of the river (right bank), a 100-foot setback distance is required to accommodate the slopes needed for bank stability. Within residential neighborhoods, a minimum 50-foot setback is justified because of the less intense land use associated with single-family home construction.

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<sup>2</sup> The 125 foot distance includes a 2.5:1 overall slope with a mid-slope bench incorporated, 20 feet at the top of the levee and 10 feet on the back side of the levee for access and inspection.

Even though the above explanation for determining appropriate buffer distance used levee design as the example, the same problems exist where there are no levees. The river makes no distinction between an over-steepened slope associated with a levee or a riverbank. Scouring within the river will cause sloughing and slope stability will be weakened, potentially resulting in the loss of structures. In fact, the non-leveed riverbank can be more prone to these problems since they tend to be steeper and consist mainly of sand and silt. This makes them susceptible to erosion. Because the non-leveed riverbanks are for the most part privately owned, they are not actively monitored for damage by the City or County.

Appendix D is a chart that presents a Net Loss Analysis and identifies risks to ecosystem functions as well as the proposed standards to prevent a net loss and opportunities to restore some ecosystem functions.

### **C. Conclusions**

The determination of buffer widths was based on two important criteria: the need to achieve bank stability and protect structures along the shoreline from damage due to erosion and bank failures and to protect and enhance shoreline ecological function.

Applying the 200 to 250 foot buffer widths recommended by WDFW and WDNR would not be practical given the developed nature of the shoreline. It was also felt that a buffer less than that already established for Type 2 Watercourses under the City's SAO would not be sufficiently protective of shoreline functions, unless those functions were enhanced through various restoration options. Therefore, 100 feet was established as the starting point for considering buffer widths from the standpoint of shoreline ecological function in each of the Shoreline Environments. Between 100 and 125 feet was the starting point for buffer widths from the standpoint of bank stability and property protection.

Thus buffers were established taking into account (as explained in the following sections) the characteristics of each Environment, needs for protection/restoration of shoreline ecological functions, and needs for stable banks and property protection.

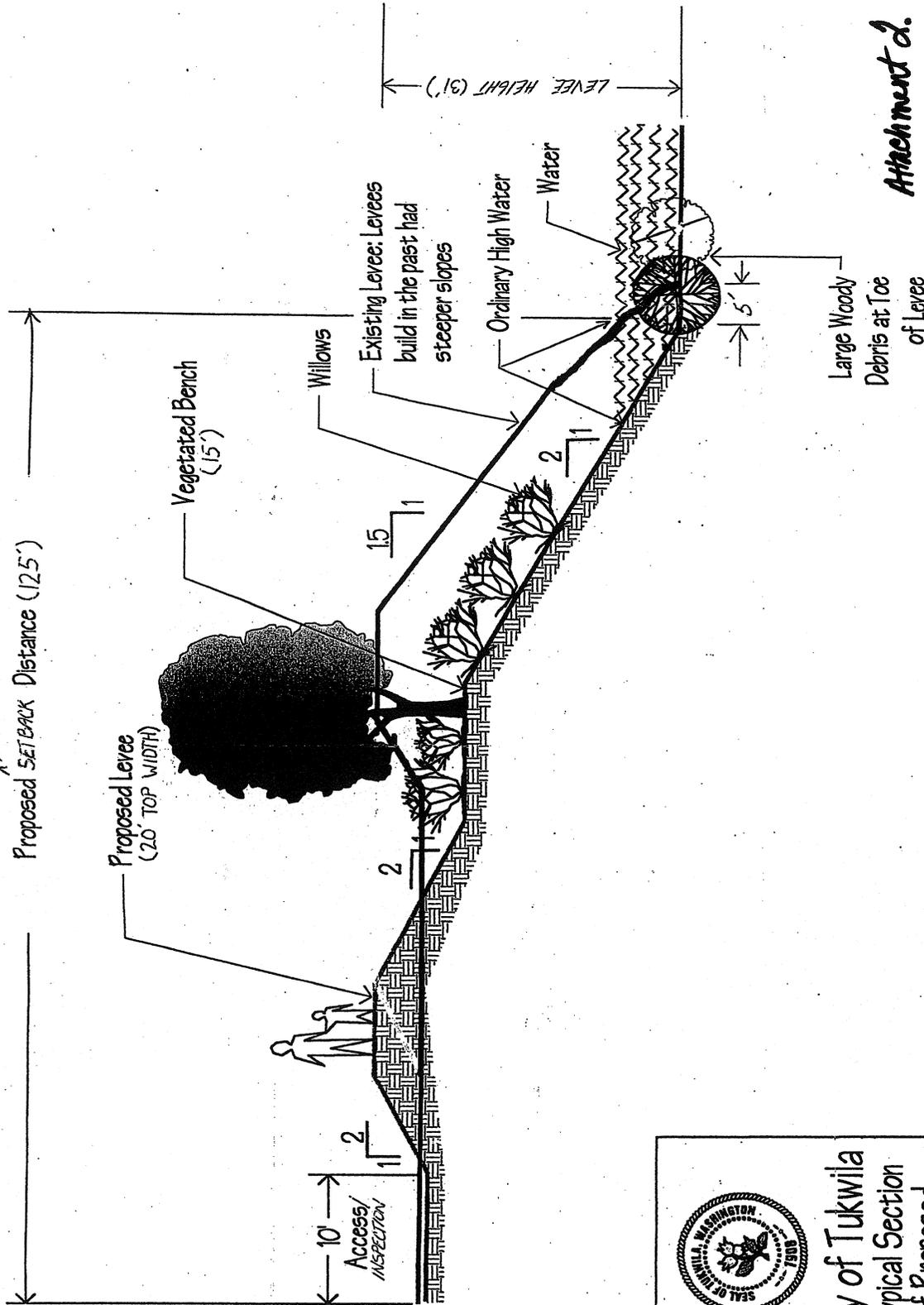


# LEVEE PROFILES



*MAXIMUM*

Proposed SETBACK Distance (125')



*Attachment 2.*



City of Tukwila  
Typical Section  
of Proposed  
Levee



Sheet	Description	Date	By	Appr.	Check



**KENT SHOPS - NARITA TYPICAL SECTION 3**

NOT TO SCALE

SEE TRAIL RESTORATION TYPICAL SECTION DETAIL, SEE PLATE C-301

APPROX. EXIST. GROUND SURFACE

116.5'

19'

EL. 16' (APPROX.) EL. 14' (APPROX.)

EL. 24' (OHW) WILLOWS W/ COR FABRIC WRAPPED SOIL WRAPS (TYP) WILLOWS PLACED EVERY 6\"/>

EL. 33' (SEL 6,000 CFS (APPROX.))

EL. 37 (UPPER LIMIT OF QUARRY SPALLS (APPROX.))

EL. 45' (APPROX.)

10' ACCESS

10'

24'

12'

16'

38'

18.5'

1' THICK TOPSOIL

1' (MIN.) BLANKET QUARRY SPALLS

CLASS III RIPRAP

LAUNCHABLE TOE CLASS III RIPRAP

HYDROSEED (TYP.) LEVEE PRISM

COMPACTED SATISFACTORY FILL

U.S. ARMY ENGINEER DISTRICT, SETTLE  
CORPS OF ENGINEERS  
SMITH, WASHINGTON  
LEON  
E-12-7-231  
FISCHER

KING COUNTY WA 98107 WASHINGTON

PL 84-99 LEVEE REHABILITATION  
KENT SHOPS-NARITA, GRN-03-07  
TYPICAL SECTION 3

Plate number: **C-303**  
Sheet 10 of 14

IF SHEET MEASURES LESS THAN 27 X 36, IT IS A REDUCED PRINT. SEE DRAWING FOR DETAILS.







the river, including agricultural, industrial, residential, and commercial. Many of these are set back more than 200 feet from the river's ordinary high water mark, but others are as close as 60 feet. The following figure is a potential cross-section for the City of Kent levee that requires a minimum of 140 feet to implement. The cross-section includes space for a "floodplain bench," sloped levee face, 16-foot-wide levee top to accommodate the Green River Trail, and the sloped upland face of the levee.

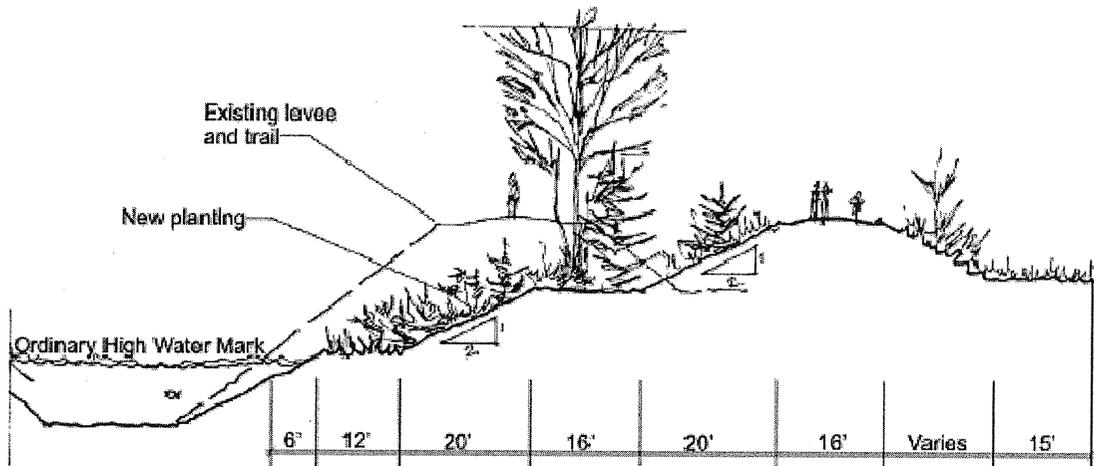


Figure 9. Illustration of proposed new levee design with plantings and trail.

The proposed floodplain bench has several purposes, including increasing the flood storage capacity (and reducing the flood elevation), increasing levee stability, and providing improved riparian habitat for fish and wildlife. The national Corps policy limits vegetation to grasses on and adjacent to levees. However, the Seattle District has obtained a Regional Variance that provides a great deal of flexibility. The floodplain bench and the streambank below the bench provide opportunities for establishment of traditional riparian vegetation and placement of large woody debris. Much of the current levee structure is vegetated with grasses and invasive weeds, primarily Himalayan blackberry. There are scattered pockets of trees and shrubs (cottonwoods, willows, some conifers) on and landward of the levee, which provide some shade depending on size and orientation.

Under the Regional Variance and per Doug Weber at the U.S. Army Corps of Engineers, any standard native riparian vegetation may be installed on the floodplain bench, including cottonwoods, alders, willows, and conifers, limited only by suitability of the species to hydrologic and soil conditions of the bench. Rows of willows, dogwoods, or other suitable species can be incorporated into the levee from the OHWM and upwards, concentrated at the water's edge. Grasses and small shrubs can be on the face of the levee above the bench. Large woody debris is allowed, so long as it is on the benches or engineered into the base of the



levee. The toe of the levee needs to still remain inspectable, but the Corps indicated that is a judgment call. Where an upgraded levee does not have sufficient room for installing a floodplain bench, the willow lifts are generally kept near the water's edge, where hydrology conditions are suitable.

The National Marine Fisheries Service (NOAA Fisheries) issued a Biological Opinion (BiOp) on 22 September 2008 on FEMA's implementation of the National Flood Insurance Program in Washington state. This BiOp has implications for alteration of the existing levee system along the Green River, and possibly development of upland areas landward of the levee. Any improvements to the levee system must be conducted in such a way that listed fish species and their habitats are not adversely affected through further degradation of the current baseline condition. During phone conversations in Fall 2008, Ryan Ike of FEMA indicated that FEMA is not planning to issue any vegetation standards or establish prescriptive setbacks in reaction to the BiOp, and the Corps indicated that it would not be changing its policies in the short term either. All of the agencies will continue to discuss the issues and the application of the BiOp.

#### **b. Big Soos Creek**

The Kent stretch of Big Soos Creek could be enhanced by vegetation planting with a buffer of native trees and shrubs, particularly conifer species, as well as placement of large woody debris to enhance in-stream fish habitat.

#### **c. Lake Meridian**

General: Investigate potential for control of Eurasian watermilfoil through chemical, mechanical or biological control methods. The City's IAPMP (Tetra Tech 2002) recommended placement of bottom barriers (burlap sheets) in localized areas. This work has not yet been conducted.

Residential: Many residential shoreline properties on Lake Meridian have the potential for improvement of ecological functions through: 1) reduction or modification of shoreline armoring, 2) reduction of overwater cover and in-water structures (grated pier decking, pier size reduction, pile size and quantity reduction, moorage cover removal), 3) improvements to nearshore native vegetative cover, or 4) reductions in impervious surface coverage.

Lake Meridian Park: Several opportunities exist to improve habitat conditions along the shoreline. These include: reduction of overwater cover by the existing pier through the installation of deck grating, removing or minimizing the impacts of shoreline armoring; and supplementation of nearshore native vegetation to improve habitat conditions.

#### **d. Lake Fenwick**

Lake Fenwick's shoreline armoring could be modified to support public access while stabilizing the banks using bioengineering techniques. Additionally, the Brazilian elodea problem should be addressed through the use of grass carp,

