Title 18E

DEVELOPMENT REGULATIONS - CRITICAL AREAS

CHAPTERS:

Chapter 18E.10

GENERAL PROVISIONS

Sections:

18E.10.010 Authority.

This Title is established pursuant to RCW 36.70A, RCW 86.16, WAC 173-22, and Pierce County Resolution No. R91-9. (Ord. 2004-56s § 4 (part), 2004)

18E.10.020 Title.

This Title shall be known as "Title 18E, Development Regulations - Critical Areas." (Ord. 2004-56s § 4 (part), 2004)

18E.10.030 Purpose.

Erosion, landslide, seismic, volcanic, mine, and flood hazard areas; streams; wetlands; certain fish and wildlife species and habitat; and aquifer recharge areas constitute critical areas. All of these areas are of special concern to the people of Pierce County and the State of Washington. The purpose of this Title is to protect critical areas of Pierce County from the impacts of development and protect development from the impacts of hazard areas by establishing minimum standards for development of sites which contain or are adjacent to identified critical areas and thus promote the public health, safety, and welfare by:

A. Avoiding impacts to critical areas;
B. Mitigating unavoidable impacts by regulating development;
C. Protecting from impacts of development;
D. Protecting the public against losses from:
    1. Costs of public emergency rescue and relief operations where the causes are avoidable; and

2. Degradation of the natural environment and the expense associated with repair or replacement.

E. Preventing adverse impacts on water availability, water quality, wetlands, and streams;
F. Protecting unique, fragile, and valuable elements of the environment, including critical fish and wildlife habitat;
G. Providing County officials with sufficient information to adequately protect critical areas and proposed development when approving, conditioning, or denying public or private development proposals;
H. Providing the public with sufficient information and notice of potential risks associated with development in natural hazard critical areas; and
I. Implementing the goals and requirements of the Growth Management Act of 1990, the State Environmental Policy Act, the Puget Sound Water Quality Management Plan, the Pierce County Charter, the Pierce County Comprehensive Plan, and all updates and amendments, functional plans, and other land use policies formally adopted by Pierce County.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.040 Interpretation.

In the interpretation and application of this Title, all provisions shall be:

A. Considered the minimum necessary;
B. Liberally construed to serve the purposes of this Title; and
C. Deemed neither to limit nor repeal any other powers under State statute.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.050 Applicability.

A. This Title shall apply to all lands or waters within unincorporated Pierce County that are designated as critical areas by Pierce County.
B. No development shall hereafter be constructed, located, extended, converted, or altered or land subdivided without full compliance with the terms of this Title.
C. When the requirements of this Title are more stringent than those of other Pierce County codes and regulations, including the Uniform Building Code, the requirements of this Title shall apply.
D. Compliance with these regulations does not remove an applicant's obligation to comply with applicable provisions of any other Federal, State, or local law or regulation.
E. Criteria for determining critical areas is contained within each Chapter of this Title.
F. When a site contains two or more critical areas, the minimum standards and requirements for each identified critical area as set forth in this Title shall be applied.
G. Critical areas, as defined and regulated by this Title, are identified on the following Pierce County Critical Areas Atlas Maps:
    1. County Wetland Inventory Maps;
    2. Landslide Hazard Area Maps;
    3. Erosion Hazard Area Maps;
    4. Seismic Hazard Area Maps;
    5. Volcanic Hazard Area Maps;
    6. Mine Hazard Area Map;
    7. Aquifer Recharge and Wellhead Protection Areas Maps;
    8. Fish and Wildlife Habitat Area Maps; and
    9. Flood Hazard Area Maps.

H. The exact boundary of each critical area depicted on the Critical Areas Atlas Maps is approximate and is intended only to provide an indication of the presence of a critical area on a particular site. Additional critical areas that have not been mapped may be present on a site. The actual presence of a critical area or areas and the applicability of these regulations shall be determined based upon the classification or categorization criteria and review procedures established for each critical area.

I. The Pierce County Critical Areas Atlas Maps shall be updated and maintained by the Cartography Laboratory of the Planning and Land Services Department.

J. Development of the Pierce County Critical Areas Atlas Maps were derived from the sources listed in 18E.10.140 - Appendix A. These sources may be updated from time to time and will result in a correlating update to the applicable Critical Areas Atlas Maps.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.060 Definitions.

See Chapter 18.25 for a complete list of defined terms. (Ord. 2004-56s § 4 (part), 2004)

18E.10.070 Administration.

A. **Approvals Required.** An approval must be obtained from Pierce County when the Department determines that the site or project area may contain a critical area or its buffer, as set forth in each Chapter.

B. **Application Requirements.**

1. **Preliminary Review.** The provisions for conducting a preliminary review for an application is set forth in Chapter 18.40, Development Regulations - General Provisions.
2. **Application Filing.**
   a. Applications shall be reviewed for completeness in accordance with Department submittal standards checklists and pursuant to Chapter 18.40, Development Regulations - General Provisions.
   b. The County shall maintain a roster of consultants (e.g., wetland specialists, fish and wildlife biologists, etc., except those professionals who are licensed by the State of Washington such as engineers, geologists and surveyors) who are eligible to submit applications and accompanying assessments, reports, studies, evaluations, delineations, verifications, surveys, etc. as required under this Title. A consultant may be removed from the County's eligibility roster (i.e., given an ineligibility status) for a time period of not less than six months nor greater than twelve months when the Director determines that the consultant knowingly or repeatedly (three times) submits inaccurate assessments, reports, plans, surveys, certification forms, etc. The consultant will be informed in writing of the County's decision for removal from the roster, the time period for such removal, and appeal procedures.
3. **Modifications.**
   a. The Department may request an update of any required assessment, report, delineation, study, etc. due to the potential for change in the existing environment that may have been caused by a natural event (e.g., seismic event, landslides, flooding, etc.) that occurred after the original document was initially submitted but prior to the Department granting issuance of the permit or approval.

b. The request to update any required assessment, report, delineation, study, etc. shall be utilized when there is a potential for life safety issues that may occur as a result of the natural event (e.g. increased potential for landslide).
c. The Department shall request any required updates in writing.

C. **Public Notice.** Public notice provisions for notice of application; public hearing, if applicable; and final decision pursuant to this Title are outlined in Chapter 18.80, Development Regulations - General Provisions.

D. **Review.**

1. **Initial Review.** The Department shall conduct an initial review of any application in accordance with the provisions outlined in Chapter 18.60, Development Regulations - General Provisions.
2. **Review Responsibilities.**
   a. The Department is responsible for administration, circulation, and review of any applications and approvals required by this Title.
   b. The Examiner shall be the decision authority for any approval under this Title requiring a public hearing, including, but not limited to Reasonable Use Exceptions and Variances.
   c. Other County departments and State agencies, as determined by the Department, may review an application and forward their respective recommendations to the Director or Examiner, as appropriate.
3. **Review Process.**
   a. The Department shall perform a critical area review for any application submitted for a regulated activity, including but not limited to those set forth in Section 18E.20.020. Reviews for multiple critical areas shall occur concurrently.
   b. The Department shall, to the extent reasonable, consolidate the processing of related aspects of other Pierce County regulatory programs which affect activities in regulated critical areas, such as subdivision or site development, with the approval process established herein so as to provide a timely and coordinated review process.
   c. As part of the review of all development or building-related approvals or permit applications, the Department shall review the information submitted by the applicant to:
      (1) Confirm the nature and type of the critical area and evaluate any required assessments, reports, or studies;
      (2) Determine whether the development proposal is consistent with this Title;
      (3) Determine whether any proposed alterations to the site containing critical areas are necessary; and
      (4) Determine if the mitigation and monitoring plans proposed by the applicant are sufficient to protect the public health, safety, and welfare consistent with the goals, purposes, objectives, and requirements of this Title.
   d. When it is determined that regulated activities subject to SEPA (Title 18D, PCC) are likely to cause a significant, adverse environmental impact to the critical areas identified in this Title that cannot be adequately mitigated through compliance with this Title, mitigation measures may be imposed consistent with the procedures established in 18D.40.060.

e. Critical area applications required under this Title shall be approved prior to approval of any related action (parent application) such as, but not limited to, a building permit, land division action, site development action, forest practice application, TPCHD permit, use permit, or shoreline permit.

f. The requirement to submit critical area assessments, reports, etc. required under this Title may be waived at the Department's discretion when the proposed project area for a regulated activity is located in an area that has been the subject of a previously submitted and approved assessment, report etc. if all of the following conditions have been met:

(1) The provisions of this Title have been previously addressed as part of another approval.

(2) There has been no material change in the potential impact to the critical area or required buffer since the prior review.

(3) There is no new information available that is applicable to any critical review of the site or particular critical area.

(4) The permit or approval has not expired or, if there is no expiration date, no more than five years have elapsed since the issuance of that permit or approval.

4. **Approval.**

a. Pierce County may approve, approve with conditions, or deny any development proposal in order to comply with the requirements and carry out the goals, purposes, objectives and requirements of this Title. Approval or denial shall be based on the Department's or Examiner's, as applicable, evaluation of the ability of any proposed mitigation measures to reduce risks associated with the critical area and compliance with required standards.

b. Applicants shall comply with the recommendations and/or mitigation measures contained in final approved assessments or reports and any Department or Examiner conditions of approval.

c. Approval of an application required under this Title must be given prior to the start of any development activity on a site.

5. **Denial.** The Department or Examiner, as applicable, shall have the authority to deny any application for development or building-related approvals or permits when the criteria established in this Title have not been met.

6. **Time Period for Final Decision.** The provisions for issuing a notice of final decision on any application filed pursuant to this Title are set forth in Chapter 18.100, Development Regulations - General Provisions.

E. **Time Limitations.**

1. **Expiration of Approval.**

a. Approvals granted under this Title shall be valid for the same time period as the underlying permit (e.g. preliminary plat, site development, building permit). If the underlying permit does not contain a specified expiration date then approvals granted under this Title shall be valid for a period of three years from the date of issue, unless a longer or shorter period is specified by the Department.

b. The approval shall be considered null and void upon expiration, unless a time extension is requested and granted as set forth in subsection 2. below.

2. **Time Extensions.**

a. The applicant or owner(s) may request in writing a one-year extension of the original approval.

b. Knowledge of the expiration date and initiation of a request for a time extension is the responsibility of the applicant or owner(s).
c. A written request for a time extension shall be filed with the Department at least 60 days prior to the expiration of the approval.
d. Upon filing of a written request for a time extension, a copy shall be sent to each party of record together with governmental departments or agencies that were involved in the original approval process. By letter, the Department shall request written comments be delivered to the Department within 30 days of the date of the letter.
e. Prior to the granting of a time extension, the Department may require a new application(s), updated study(ies), and fee(s) if:
   (1) The original intent of the approval is altered or enlarged by the renewal;
   (2) If the circumstances relevant to the review and issuance of the original approval have changed substantially; or
   (3) If the applicant failed to abide by the terms of the original approval.
f. If approved, the one-year time extension shall be calculated from the date of granting said approval.
g. The Director has the authority to grant or deny any requests for time extensions based upon demonstration by the applicant of good cause for the delay.

F. **Recording.**
   1. **Approvals.**
      a. Approvals issued pursuant to this Title shall be recorded on the title of the project parcel(s) at the Pierce County Auditor's Office prior to issuance of any site development permits or building permits, as applicable. Failure to record an approval in this timeframe may result in the imposition of enforcement actions. Also refer to Section 18E.10.080 C., Title and Plat Notification, for additional recording requirements.
      b. Recording of critical area approvals for work completed within utility line easements on lands not owned by the jurisdiction conducting the regulated activity shall not be required.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.080 Critical Area Protective Measures.

A. **General.** All critical area tracts, conservation easements, land trust dedications, and other similarly preserved areas shall remain undeveloped in accordance with the conditions of approval, except as they may be allowed to be altered pursuant to each Chapter.

B. **Financial Guarantees.**
   1. Pierce County may require an applicant to submit one or more financial guarantees to the County, as set forth in each Chapter, to guarantee any performance, mitigation, maintenance, or monitoring required as a condition of permit approval. The approval for the project will not be granted until the financial guarantee is received by the Department. Projects where Pierce County or one of its departments is the applicant shall not be required to post a financial guarantee.
   2. Financial guarantees required under this Title shall be:
      a. In addition to the site development construction guarantee required in Title 17A, Construction and Infrastructure Regulations – Site Development and Stormwater Drainage Appendix.

b. Submitted on financial guarantee forms found in Title 17A, Construction and Infrastructure Regulations - Site Development and Stormwater Drainage Manual.
c. In the amount of 125 percent of the estimate of the cost of mitigation or monitoring to allow for inflation and administration should the County have to complete the mitigation or monitoring, unless the provisions set forth in 18E.10.080 C. below are applicable.
d. Released by the County only when County officials have inspected the site(s) and the applicant's appropriate technical professional has provided written confirmation that the performance, mitigation, or monitoring requirements have been met.

C. **Title and Land Division Notification.**

1. **General.**
   a. Title and/or land division notice shall be required to be recorded with the Pierce County Auditor on each site that contains a critical area, prior to approval of any regulated activity on a site.
   b. If more than one critical area subject to the provisions of this Title exists on the site, then one notice, which addresses all of the critical areas, shall be sufficient.
   c. Title and land division notifications and notes shall be approved by the Department and shall be consistent with 18E.10.140 - Appendix B.
2. **Title Notification.**
   a. When Pierce County determines that activities not exempt from this Title are proposed, the property owner shall file a notice with the Pierce County Auditor. The notice shall provide a public record of the presence of a critical area and associated buffer, if applicable; the application of this Title to the property; and that limitations on actions in or affecting such critical area and associated buffer, if applicable, may exist.
   b. The notice shall be notarized and shall be recorded with the Pierce County Auditor prior to approval of any regulated use or activity for the site.
   c. Notice on title is not required for utility line easements on lands not owned by the jurisdiction conducting the regulated activity (e.g., gas pipelines).
3. **Land Division Notification and Notes.** The applicant shall include notes, as referenced in 18E.10.140 - Appendix B, on the face of any proposed final plat, binding site plan, large lot, and short subdivision documents for projects that contain critical areas or critical area buffers. The applicant shall also clearly identify the critical area boundaries and the boundary of any associated buffers on the face of these documents.

D. **Tracts and other Protective Mechanisms.** Prior to final approval of any subdivisions, short subdivisions, large lot divisions, or binding site plans, the part of the critical area and required buffer which is located on the site shall be placed in a separate tract or tracts. (See Figure 18E.10-2 in Chapter 18E.120), or alternative protective mechanism such as a protective easement, public or private land trust dedication, or similarly preserved through an appropriate permanent protective mechanism as determined by Pierce County. Approval of an alternative protective mechanism will be based upon the Department's or Hearing Examiner's, as applicable, determination that such alternative mechanism provides the same level of permanent protection as designation of a separate tract or tracts. Each lot owner within the subdivision, short plat, large lot, or binding site plan shall have an individual taxable interest in the tract(s) or protective mechanism created by this Section.

E. **Homeowners Covenants.** A description of the critical area and required buffer shall be placed in any required homeowners' covenants. Such covenants shall contain a detailed description of the allowable uses within the critical area and, if applicable, associated buffer and long-term management and maintenance requirements.

F. **Identification of Critical Areas and Required Buffers on Construction Plans.** Critical areas and required buffers shall be clearly identified on all construction plans such as, but not limited to, site development plans, residential building plans, commercial building plans, forest harvest plans, conversion option harvest plans, etc.

G. **Markers, Fencing, and Signage.**

1. **Markers.** The Department may require the outer edge of the critical area boundaries or, if applicable, required buffer boundaries on the site to be flagged by the qualified professional, as outlined in each Chapter. These boundaries shall then be identified with permanent markers and located by a licensed surveyor, unless otherwise stated in this Title. The permanent markers shall be clearly visible, durable, and permanently affixed to the ground.
2. **Fencing.**
   a. **Temporary Construction Fencing.** Temporary fencing is required when vegetation is to be retained in an undisturbed condition within the critical area and required buffer. In such cases, the applicant will be required to construct silt fencing, construction fencing, or other County approved method of temporary fencing at the edge of the critical area or, if applicable, the edge of the required buffer prior to beginning construction on the site. Temporary fencing shall not be required when alteration to a critical area or the buffer is allowed.
   b. **Permanent Fencing.** The Department may require the construction of permanent fencing along the buffer boundary of a wetland, fish or wildlife habitat conservation area or active landslide hazard area.
3. **Signage.**
   a. The Department may require permanent signage to be installed at the edge of the critical area or, if applicable, the edge of the required buffer.
   b. When a sign is required, it shall indicate the type of critical area and if the area is to remain in a natural condition as permanent open space.
   c. Exact sign locations, wording, size, and design specifications shall be established by the Department. Required signage shall be clearly visible, durable, and permanently affixed to the ground.
   d. Prior to final approval of any critical area application, the applicant shall submit an affidavit of posting to the Department as proof that any required signs were posted on the site.

H. **Building Setbacks.**

1. Unless otherwise provided in this Title, buildings and other structures shall be set back a distance of 15 feet from the edge of all critical area buffers or, where no buffers are required, the edge of the critical area.
2. The following uses and activities may be allowed in the building setback area:
   a. Landscaping;
   b. Uncovered decks;
   c. Building overhangs if such overhangs do not extend more than 18 inches into the setback area;

d. Impervious ground surfaces, such as driveways, parking lots, roads, and patios, provided that such improvements conform to the water quality standards set forth in Title 17A and that construction equipment does not enter the buffer during the construction process; and
e. Clearing and grading.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.090 Reconsideration and Appeal Procedures.

Procedures for appeal of an administrative decision and procedures for reconsideration or appeal of a Hearing Examiner decision issued pursuant to this Title are set forth in Chapter 1.22 PCC. (Ord. 2004-56s § 4 (part), 2004)

18E.10.100 Fees.

Fees for applications and/or review of reports, studies, or plans filed pursuant to this Title are set forth in Chapter 2.05 PCC. (Ord. 2004-56s § 4 (part), 2004)

18E.10.110 Compliance.

A. The regulations for compliance with the provisions of this Title are set forth in Chapter 18.140, Development Regulations - General Provisions.
B. When a critical area or its required buffer has been altered in violation of this Title, the Department shall require the property owner to bring the site into compliance. The property owner shall be required to submit the appropriate critical area application and commence review, as applicable for each Chapter. In addition to any required site investigation, delineations, assessments, reports, etc., the property owner shall be required to submit a restoration plan that identifies the proposed mitigation to bring the subject property into compliance with the requirements of this Title.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.120 Warning and Disclaimer of Liability.

To promote public health, safety, and welfare, this Title provides the minimum standards for development of sites which contain or are adjacent to identified critical areas. The minimum standards are deemed to be reasonable for regulatory purposes and are based on scientific and engineering considerations. However, natural and manmade events that exceed the scope regulated under this Title may include but are not limited to: erosion of land, landslides, seismic and volcanic activity, mining, and flooding. Such events may cause serious personal or bodily injury, including death, and damage to or loss of property. The minimum standards in this Title are not a guarantee against damage or injury. Applicants under this Title are responsible for fully investigating and making their own assessment of all potential risks, harm, and dangers that may be present in or near their site and are free to exceed the established standards if they choose.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.130 Severability.

If any provision of this Title or its application to any person or circumstance is held invalid, the remainder of this regulation or the application of the provision to other persons or circumstances shall not be affected.

18E.10.140 Appendices.

A. Mapping Sources.

B. Title and Plat Notification/Plat Notes.

C. Forfeiture of Financial Guarantees.

18E.10.140 - Appendix A
Mapping Sources

The following sources of information, or latest available version, may be used to indicate the presence of critical areas within Pierce County and provide data used in the development of the Pierce County Critical Area Atlas Maps:

A. The following sources identify wetlands that are depicted in the Pierce County Wetland Inventory Maps and/or used as indicators of wetland presence:
   1. Soil Survey of Pierce County Area, Washington, 1979, Soil Conservation Service, United States Department of Agriculture (USDA);
   2. Soil Survey of Snoqualmie Pass Area, Parts of King and Pierce Counties, Washington, United States Department of Agriculture, Soil Conservation Service, December 1992;
   3. National Wetland Inventory Maps, U.S. Department of Interior, Fish and Wildlife Service, 1973;
   4. FEMA FIRM Maps and Flood Insurance Study Maps;
   5. Aerial photographs, Department of Natural Resources, 1985 (Assessor's Office aerials);
   6. Ongoing field investigation to categorize and delineate wetlands; and
   7. Buildable Lands Wetland Inventory, 2001.

B. The following sources identify landslide and erosion hazard areas that are depicted in the Critical Areas Atlas-Landslide Hazard Area Maps and Erosion Hazard Areas Maps and/or used as indicators of landslide and erosion hazard area presence:
   1. Soil Survey of Pierce County Area, Washington, 1979, Soil Conservation Service, United States Department of Agriculture (USDA);
   2. Soil Survey of Snoqualmie Pass Area, Parts of King and Pierce Counties, Washington, United States Department of Agriculture, Soil Conservation Service, December 1992;
   3. Areas designated as slumps, earthflows, mudflows, lahars, or landslides on maps published by the United States Geological Survey or Washington Department of Natural Resources Division of Geology and Earth Resources;
   4. Pierce County topographic data;
   5. United States Geologic Survey Quadrangle maps;
   6. Coastal Zone Atlas of Washington, Volume VII, Pierce County, Washington Department of Ecology;
   7. Applicant supplied and verified data of active landslide areas and potentially unstable areas; and
   8. Buildable Lands Slope Data, 2001.

C. The following sources identify seismic hazard areas which are depicted in the Critical Areas Atlas-Seismic Hazard Areas Map and/or used as indicators of seismic hazard area presence:
   1. Washington State Department of Natural Resources Division of Geology and Earth Resources 1-100,000 Scale Digital Geology of Washington State; and
   2. Areas designated as faults or subject to liquefaction or dynamic settlement on maps or data published by the United States Geological Survey or Washington Department of Natural Resources Division of Geology and Earth Resources;

3. Washington State Department of Natural Resources Division of Geology and Earth Resources 1-100,000 Scale Digital Geology: Liquefaction Susceptibility of the Greater Tacoma Urban Area, Pierce and King Counties, Washington; Sumner 7.5 Minute Quadrangle, Washington; and the Auburn and Poverty Bay 7.5 Minute Quadrangles, Washington; and
4. Liquefaction Hazard Ranking by S.P. Palmer, Ph.D., L.E.G., based on Youd and Hoose (1977) and Youd and Perkins (1978).

D. The following sources identify mine hazard areas which are depicted in the Critical Areas Atlas-Mine Hazard Areas Map and/or used as indicators of mine hazard area presence:
   1. The Washington Department of Natural Resources, Division of Geology and Earth Resources, Washington State Coal Mine Cap Collection, Open File Report 94-7, June 1994;
   2. Ashford Vicinity Map and Map of Lands of Mashell Coal & Coke Company at Ashford, Washington by Andrew Kennedy as verified by Allan J. Papp, P.E.
   3. Washington Geological Survey, Bulletin No. 10, *The Coal Fields of Pierce County*, Joseph Daniels, 1915; and
   4. Maps of Pierce County Coal Mines compiled by Timothy J. Walsh, Chief Geologist, Division of Geology and Earth Resources, Washington Department of Natural Resources.

E. The following sources identify volcanic hazard areas that are depicted in the Critical Areas Atlas-Volcanic Hazard Areas Map:
   1. "Map Showing Debris Flows and Debris Avalanches at Mount Rainier, Washington--Historical and Potential Future Inundation Areas," Hydrogeologic Investigations Atlas HA-729, U.S. Dept. of Interior, Geologic Survey, 1995 as amended by Kevin Scott, USGS, on November 10, 1997, to be consistent with the reports listed as b. and c. below;
   2. Volcano Hazards from Mount Rainier, Washington by Hoblitt, Walder, Driedger, Scott, Pringle, and Valance, U.S. Geological Survey Open File Report 95-273, 1995;
   3. Sedimentology, Behavior, and Hazards of Debris Flows at Mount Rainier, Washington, U.S. Geological Survey Professional Paper 1547, 1995;
   4. Emergency Action Plan for Nisqually Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project No. 1862, December 13, 1996, City of Tacoma, Department of Public Utilities, Light Division; and
   5. Table of Estimated Lahar Travel Times for Lahars107 to 108 Cubic Meters in Volume (Approaching a "Case I" Lahar in Magnitude) in the Puyallup River Valley, Mount Rainier, Pierson, T.C., 1998, An empirical method for estimating travel times for wet volcanic mass flows; Bulletin of Volcanology, v. 60, p. 98-109.

F. The following sources identify fish and wildlife habitats or presence and/or are used as indicators of critical fish or wildlife presence:
   1. Commercial Shellfish Harvesting Areas in Puget Sound, Washington Department of Health, was used as a source to identify fish and wildlife habitat areas which are depicted in the Critical Areas Atlas-Fish and Wildlife Habitat Areas-Commercial Shellfish Harvesting Areas Map;
   2. Water Type Reference Maps, Washington Department of Natural Resources, were used as sources to identify fish and wildlife habitat areas that are depicted in the Critical Areas Atlas-Fish and Wildlife Habitat Areas-Stream Typing Maps;

3. Natural Heritage Data Base, Washington Department of Natural Resources, was used as a source to identify fish and wildlife habitat areas which are depicted in the Critical Areas Atlas-Fish and Wildlife Habitat Areas-Vascular Plants and Fish and Wildlife Habitat Areas-Animals Maps;
4. Puget Sound Environmental Atlas, Puget Sound Water Quality Authority;
5. Coastal Zone Atlas of Washington, Volume VII, Pierce County, Washington Department of Ecology;
6. Priority Habitats and Species Program and Priority Habitat Species Maps, Washington Department of Fish and Wildlife;
7. Nongame Data Base, Washington Department of Fish and Wildlife;
8. Streamnet Database, Washington Department of Fish and Wildlife;
9. Water Resource Index Areas (WRIA), Washington Department of Fish and Wildlife;
10. Annual Inventory of Commercial and Recreational Shellfish Areas in Puget Sound, Washington State Department of Health, Office of Shellfish Programs;
11. Salmon Distribution Maps, Washington Department of Fish and Wildlife and Washington State Conservation Commission Data, January 2000.

G. The following sources identify the aquifer recharge and wellhead protection areas that are depicted in the Critical Areas Atlas-Aquifer Recharge Area-DRASTIC Zones Map and Aquifer Recharge Area-Clover/Chambers Creek Basin Map:
   1. The boundaries of the two highest DRASTIC zones which are rated 180 and above on the DRASTIC index range, as identified in Map of Groundwater Pollution Potential, Pierce County, Washington, National Water Well Association, U.S. Environmental Protection Agency;
   2. The Clover/Chambers Creek Aquifer Basin boundary as identified in the Clover/Chambers Creek Basin Groundwater Management Program (TPCHD 1991); and
   3. Wellhead protection areas as identified by the Tacoma-Pierce County Health Department.

H. The following sources identify flood hazard areas:
   1. The areas of special flood hazard identified by the Federal Insurance Administration in a scientific and engineering report entitled "The Flood Insurance Study for Pierce County" dated August 19, 1987, with accompanying Flood Insurance Rate Maps (FIRM) and floodway maps and any map amendments or corrections are hereby adopted by reference and declared to be a part of this Title. Pierce County may add or delete land from areas of special flood hazard or revise base flood elevations in accordance with federal regulations.
   2. The Flood Insurance Study and Maps provide the base information used in the administration of this Title. The Flood Insurance Study is on file at the Pierce County Public Works and Utilities Department, 2401 South 35th Street, Tacoma, Washington; and
   3. Where the Flood Insurance Study, FIRM, and floodway maps do not provide adequate, best, or most recent information, Pierce County may utilize flood information that is more restrictive or detailed than the FEMA data which can be used for identifying flood hazard areas. This information may include but is not limited to new and more accurate mapping or data on: channel migration, high water elevations from flood events, base flood elevations, groundwater flooding areas, potholes, maps showing increased flood inundation based on future build-out or

changed hydrologic conditions, specific maps from watershed basin plans or related studies, studies by federal or state agencies, or other information deemed appropriate by the County.

4. Channel Migration Zones (CMZs).
   a. Channel migration zones shall be regulated as floodways, and shall apply only to those watercourses listed below
      (1) South Prairie Creek;
      (2) Carbon River;
      (3) Puyallup River;
      (4) White River (including W. fork White River);
      (5) Greenwater River;
      (6) Nisqually River; and
      (7) Mashel River.
   b. Channel Migration Zones on regulated watercourses (listed in subsection 4.a. above) will be regulated when CMZ studies are completed, accepted and adopted by Pierce County, except for the Puyallup River downstream of the confluence with the White River, where the default CMZ shall be the regulated FEMA floodway area. For more information regarding Channel Migration Zones, please refer to Chapter 18E.70 Flood Hazard Areas.
   c. Geomorphic Evaluation and Channel Migration Zone Analysis; Puyallup, Carbon and White Rivers, for Pierce County Public Works and Utilities, Water Progams Division, June 19, 2003, GeoEngineers, Inc.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.140 - Appendix B
Title and Plat Notification/Plat Notes

A. **Notice for Title Notification.**

(EXAMPLE: WETLAND AND/OR WETLAND BUFFER NOTICE)

Tax Parcel Number:

Address:

Legal Description:

Present Owner:

NOTICE: This property contains (example: wetlands or wetland buffers) as defined by Title 18E, Pierce County Code. The site was the subject of a development proposal for _____ application number _____ filed on _____ (date). Restrictions on use or alteration of the site may exist due to natural conditions of the property and resulting regulations. Review of such application has provided information on the location of the (example: wetland or wetland buffers) and any restriction on use.

_____ _____

Date Signature of owner

Notary acknowledgment and notary seal

B. **Additional Title Notification Statements.**

1. Title notification for liquefaction and dynamic settlement hazard areas shall include a statement of the performance criteria (i.e., protection of life safety only, provision for minimal structural damage so that post-earthquake functionality is substantially unchanged, no structural damage for the design earthquake).
2. Title notification for fault rupture hazard areas shall include a statement that a fault rupture hazard area or associated buffer exists on the site. The title notification shall include a site plan of the subject property with the fault rupture hazard area and associated buffer identified.
3. Properties that contain flood hazard areas shall include the following statement: "Flood Elevation Certificates are kept on file at the Department of Planning and Land Services."

4. Properties that have used a portion or the total of the "substantial development or substantial improvement" value shall include the following statement: "This property is regulated by the Flood Hazard Chapter (Title 18E.70 of the Pierce County Code. Development on this property has used a portion or the total of the value allotted for "substantial improvement" or substantial development" of the property. To verify what is remaining to be used, the records are kept electronically on file at the Pierce County Department of Planning and Land Services."

C. **Notice for Plat Notification/Plat Notes.**

1. **General.** The following notice shall be placed on the face of the final plat, short plat, large lot, or binding site plan documents when said subdivision contains critical areas or critical area buffers:

   Notice: This site lies within a (example: landslide hazard area) as defined in Title 18E Pierce County Code. Restrictions on use or alteration of the site may exist due to natural conditions of the site and resulting regulation.

2. **Native/Natural Vegetation Preservation Areas.** The following notice shall be placed on the face of the final plat, short plat, large lot, or binding site plan documents when said subdivision contains critical areas or critical area buffers and when said critical areas or critical area buffers have been identified as native/natural vegetation preservation areas.

   Notice: "The *Critical Areas (e.g., Oregon White Oak Preservation Areas)* appearing on this (*final site plan/ preliminary plat/final plat/short plat/large lot/engineering drawing*) contain areas of natural/ native vegetation intended to buffer the *Critical Area* from the adverse effects of development. These *Critical Areas (e.g,. Oregon White Oak Preservation Areas)* shall remain and be maintained in a natural, undeveloped, open space state. There shall be no clearing, grading, filling, or construction within the *Critical Areas (e.g., Oregon White Oak Preservation Areas)*, except as shown on plans or documents approved by Pierce County and contained in the official files for this development. Each *Critical Area (e.g., Oregon White Oak Preservation Area)* shall remain undisturbed except for periodic watering and hand weeding of plants designated as noxious by the State of Washington."

3. **Plat Notes for the Puyallup, Carbon, and White Rivers.** The following notes shall be placed on the face of any of final plat, short plat, large lot, or binding site plan (includes commercial, industrial, multi-family and single family residential) documents which lies within a flood hazard area adjacent to the Puyallup, Carbon, or White River:

   The owner, their heirs, successors and assigns grant to Pierce County, its officers, employees, agents, successors, assigns, contractors, a perpetual easement with a right of immediate entry and continued access over, under, and across the floodplain land area adjoining the _____River, as an unobstructed ingress and egress to access the ____ River and associated flood control levee and/or bank protection revetment facility. The purpose of this easement shall also be for the following purposes:

a. Ingress and egress;
b. Trucking and hauling of rock, other material, equipment, and crews to the river, river bank (including the top of bank, channel side slope, channel toe, and bottom), floodplain (including the floodway and flood fringe);
c. Performing work related to riverbank protection, channel construction, development/rehabilitation, and river systems maintenance;
d. Levee, dike, and/or revetment construction, relocation, and maintenance as required by Pierce County;
e. Constructing, maintaining, and/or repairing the river including top of bank, river channel side slopes, channel toe, channel bottom, embankment side slopes (including embankment side slopes that extend beyond the easement width);
f. Together with the right of Pierce County to remove gravel or natural/foreign debris from the river system, manage vegetation, grading, and other such work required to maintain and/or stabilize the river system and its appurtenance in and adjacent to the subject floodplain area described hereon the Plat of _____; and
g. This easement and stated conditions shall be enforceable in law or equity against any person or persons violating or attempting to violate this covenant either to restrain violation or to recover any cost or damages or otherwise enforce this easement and/or covenant. If Pierce County is required to bring action to recover any costs, or otherwise enforce this agreement and covenant, Pierce County will be entitled to recover reasonable attorney fees and interest of 12 percent per annum. Said interest to run from the date work was performed by Pierce County.

4. **Plat Notes for Flood Hazard Areas.** The following notes shall be placed on the face of any of final plat, short plat, large lot, or binding site plan (includes commercial, industrial, multi-family and single family residential) documents which lie within a flood hazard area:
   a. Grading, clearing, and/or filling within the limits of the 100-year floodplain is regulated per Chapter 18E.70, Flood Hazard Areas.
   b. The property relating to this subject final plat, short plat, large lot, or binding site plan lies within a flood hazard area. This means that flood events may and can occur that cause serious personal or bodily injury, including death, and damage to or loss of property.
   c. The owner on his behalf and on behalf of his/her heirs, successors and assigns hereby waives any right to assert any claim against Pierce County for any loss, or damage to people or property either on or off the property site resulting from flooding except only for such losses that may directly result from the sole negligence of the County.

(Ord. 2004-56s § 4 (part), 2004)

18E.10.140 - Appendix C
Forfeiture of Financial Guarantees

Failure to complete any performance, mitigation, or monitoring requirement may result in the forfeiture of a financial guarantee. Once a financial guarantee is forfeited, the following process will apply:

A. Financial guarantees necessary to ensure the completion of required improvements will no longer be accepted by PALS (Development Engineering, Resource Management, Current Planning) to allow final approval of any plat (short plat, formal plat, large lot) from any principal with any outstanding default(s). Necessary improvements must be constructed and must be accepted as complete prior to the final approval (short plat, large lot, formal plat).

B. Financial guarantees that are necessary for approval of a permit (such as a site development permit) to allow construction to begin will still be accepted from applicants who have defaulted as follows:
   1. Financial guarantees for work in existing County right-of-way will still be accepted, however these financial guarantees must be by bond and must be for two times the required amount (2 x 125 percent of estimate).
   2. Financial guarantees for reclamation will still be accepted, however these financial guarantees must be by bond and must be for two times the required amount (2 x number of disturbed acres x $1,500.00).
   3. Financial guarantees for wetland mitigation construction and wetland monitoring will be accepted, however these financial guarantees must be by bond and must be for two times the required amount.
   4. Financial guarantees for temporary road approaches must be by assignment of funds and must be for two times the required amount.
   5. Financial guarantees that have been accepted in order to allow permit approval to construct plat improvements do not create rights to obtain final approval of the plat (short plat, formal plat, large lot).

C. 18-month guarantees are required after site development improvements are complete to warranty defects in design, construction, etc. 18-month guarantees will still be accepted from applicants who have defaulted, but these guarantees must be by bond and must also be equal to two times the required amount or $5,000.00, whichever is higher.

D. Applicants who have defaulted on a financial guarantee can clear the outstanding default and return to normal financial guarantee processing through any of the following actions:
   1. Completing the improvements that were defaulted on;
   2. Proving to the Director that the requirement is impossible to meet;
   3. Showing that completing the requirements will cause a hardship for the affected community; or
   4. Showing that the requirement has been substantially met so as to constitute constructive, although not absolute, compliance with the requirement or condition.

(Ord. 2004-56s § 4 (part), 2004)

Chapter 18E.20

USE AND ACTIVITY REGULATIONS

Sections:

18E.20.010 Permitted Uses.

Uses permitted on properties containing critical areas shall be the same as those permitted in the zone classification shown in the Pierce County Zoning Atlas unless specifically prohibited by this Title. (Ord. 2004-56s § 4 (part), 2004)

18E.20.020 Regulated Uses and Activities.

A. Unless the requirements of this Title are met, Pierce County shall not grant any approval or permission to alter the condition of any land, water, or vegetation, or to construct or alter any structure or improvement regulated through the following: building permit, commercial or residential; binding site plan; franchise right-of-way construction permit; site development permit; right-of-way permit; shoreline permits; short subdivision; large lots; use permits; subdivision; utility permits; or any subsequently adopted permit or required approval not expressly exempted by this Chapter.
B. The following activities are regulated within critical fish and wildlife habitat areas, wetlands, aquifer recharge areas, landslide hazard areas, erosion hazard areas, flood hazard areas, and/or their buffers unless exempted by Section 18E.20.030:
    1. Removing, excavating, disturbing, or dredging soil, sand, gravel, minerals, organic matter, or materials of any kind;
    2. Dumping, discharging, or filling;
    3. Draining, flooding, or disturbing the water level or water table. In addition, an activity which involves intentional draining, flooding, or disturbing the water level or water table in a wetland or stream in which the activity itself occurs outside the regulated area may be considered a regulated activity;
    4. Driving piling or placing obstructions, including placement of utilities;
    5. Constructing, reconstructing, demolishing, or altering the size of any structure or infrastructure;
    6. Altering the character of a regulated area by destroying or altering vegetation through clearing, harvesting, cutting, intentional burning, shading, or planting;
    7. Activities which result in significant changes in water temperature or physical or chemical characteristics of wetland or stream water sources, including changes in quantity of water and pollutant level;
    8. Application of pesticides, fertilizers, and/or other chemicals unless demonstrated not to be harmful to the regulated area.

9. The division or redivision of land pursuant to Title 16, PCC and boundary line adjustments.
10. The creation of impervious surfaces.

(Ord. 2004-56s § 4 (part), 2004)

18E.20.030 Exemptions.

The following activities are exempt from the provisions of this Title:

A. Existing agricultural activities established prior to February 2, 1992; that after that date, do not cause permanent conversion of a critical area through actions such as filling, ditching, draining, clearing, grading, etc. provided that:
   1. Existing agricultural activities and structures shall comply with the provisions of Chapter 18E.070 Flood Hazard Areas; and
   2. Determination of an agricultural exemption status is limited to the specific area(s) upon which lawfully established agricultural activities are being conducted. A determination that an activity is exempt within one portion of a property does not necessarily extend to other portions of the property.

B. The following forest practice activities shall be exempt from the provisions of this Title when conducted in accordance with the requirements of the Forest Practice Act (Chapter 76.09 RCW) and its rules:
   1. Forest practice activities that meet all of the following:
      a. Are located outside the urban growth area and located outside any area designated by Washington Department of Natural Resources as "lands likely to convert" pursuant to RCW 76.09;
      b. Do not take place on lands platted as of January 1, 1960; and
      c. Do not result in the conversion of land to a use other than commercial forest product.
   2. Forest practices that are conducted in accordance with a ten-year forest management plan approved by the Washington State Department of Natural Resources (DNR).
   3. Any other forest practice activity that the DNR has determined is exempt from Pierce County jurisdiction, provided that the DNR has issued a written notice of this determination to Pierce County.

C. Maintenance or reconstruction of existing, lawfully established public facilities provided that reconstruction does not involve expansion of the facility:
   1. Roads, paths, bicycle ways, trails, bridges, and associated storm drainage facilities or other public rights-of-way;
   2. Flood control improvements, such as but not limited to levees, revetments, floodwalls, regional storm drainage facilities, drainage structures, or channel capacity projects to protect public infrastructure and/or existing development, when administered by Pierce County Public Works and Utilities provided that the work shall:
      a. Not increase the height of the facility or linear length of the affected stream edge;
      b. Not expand the footprint of the facility waterward or into any landward aquatic habitat; and
      c. Use approved fish-friendly bioengineering techniques to the extent feasible.

D. Maintenance or reconstruction of existing private roads, driveways, onsite septic systems, and wells, provided that reconstruction does not involve expansion of facilities, widening, or relocation.

E. Public and private utility line work (new construction, maintenance and repair) within improved surfaces (e.g. driveways, parking lots, concrete or asphalt surfaces, gravel roads and road shoulders, and hard surface-earthen rights-of-way or easements).

F. Reconstruction, remodeling, or maintenance of existing single-family residential structures and accessory structures that are located outside a flood hazard area and active landslide hazard area, provided that a one-time only expansion of the building footprint does not increase by more than 25 percent and that the new construction or related activity extends away from the critical area or related buffer. The exemption shall not apply to reconstruction which is proposed as a result of structural damage associated with a critical area, such as slope failure in a landslide hazard area or flooding in a flood hazard area. Expansion up to 25 percent may also occur in a direction parallel to the critical area or related buffer if the expansion takes place upon existing impervious surfaces.

G. Reconstruction, remodeling, or maintenance of structures, other than single-family structures and accessory structures that are located outside a flood hazard area and active landslide hazard area, provided that such reconstruction, remodeling, or maintenance does not increase the floor area nor extend beyond the existing ground coverage. The exemption shall not apply to reconstruction which is proposed as a result of site or structural damage associated with a critical area, such as slope failure in a landslide hazard area or flooding in a flood hazard area.

H. Site investigative work necessary for land use application submittals such as surveys, soil logs, percolation tests, and other related activities. Critical area impacts shall be minimized and disturbed areas shall be immediately restored.

I. Emergency action necessary to prevent imminent threat or danger to public health or safety, or to public or private property, or serious environmental degradation.
   1. The Department shall review all proposed emergency actions to determine the existence of the emergency and reasonableness of the proposed actions taken, however, post-emergency actions, such as submittal of permits and completion of County review shall be required by the Department. Modification or removal of the emergency repair work or mitigation may be required by the Department.
   2. Shoreline erosion protection measures shall only be allowed as an emergency action when the owner can demonstrate that there is an imminent threat to an existing residential, commercial, industrial, or agricultural structure or associated utilities.

J. Activities in artificial wetlands intentionally created from upland sites, including but not limited to irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities; or, those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Artificial wetlands intentionally created from upland to serve as mitigation are regulated.

K. Activities affecting:
   1. Category III wetlands less than 2,500 square feet in size which are not contiguous with a freshwater or estuarine system, or part of a mosaic wetland complex, as set forth in Section 18E.30.020 D.3.
   2. Category IV wetlands less than 10,000 square feet in size which are not contiguous with a freshwater or estuarine system, or part of a mosaic wetland complex, as set forth in Section 18E.30.020 D.4.

3. Activities within Category III and IV wetlands that are exempt under this Section may still be considered regulated under the provisions of Title 17A, Construction and Infrastructure Regulations - Site Development and Stormwater Drainage.

L. Placement of access roads, utility lines, and utility poles across a Category IV wetland and/or a buffer for a Category IV wetland if there is no reasonable alternative.

M. Activities on improved portions of roads, rights-of-way, or easements, provided there is no expansion of ground coverage.

N. Activities in wetlands in areas managed according to a Special Area Management Plan or other plan adopted by Pierce County and specifically designed to protect wetland resources.

O. Removal by hand of manmade litter and control of noxious weeds that are included on the State noxious weed list (WAC 16-750) or invasive plant species as identified by Pierce County. Control may be conducted by clipping, pulling, over-shading with native tree and shrub species, or non-mechanized digging. Alternative methods such as mechanical excavation, barrier installation, or herbicide use may be allowed upon approval by the Department and acquisition of any necessary permits.

P. Activities undertaken to comply with a United States Environmental Protection Agency superfund related order or a Washington Department of Ecology order pursuant to the Model Toxics Control Act, including the following activities:
   1. Remediation or removal of hazardous or toxic substances;
   2. Source control; and
   3. Natural resource damage restoration.

Q. Maintenance of lawfully established landscaping and gardens within a regulated critical area or its buffer, including but not limited to mowing lawns, weeding, removal of noxious and invasive species as identified by Pierce County, harvesting, and replanting of garden crops, pruning and planting of vegetation to maintain the condition and appearance of such areas as they existed on the effective date of this Title and planting of indigenous native species.

R. Activities designed for previously approved maintenance and enhancement of critical areas and/or their associated buffers.

S. Activities undertaken on the site of an existing holding pond where the water flow and/or water table is controlled by a previously approved pump system.

T. A residential building permit for a lot which was created through a land division action subject to previous reports and assessments as required under this Title; provided that the previous reports and assessments adequately identified the impacts associated with the current development proposal as outlined in Section 18E.10.070 D.3.f.

U. Maintenance of individual cemetery plots in established and approved cemeteries.

V. Activities that are within a fish and wildlife habitat area buffer or wetland buffer, but are separated from the critical area by an existing permanent substantial improvement, such as a paved area, dike, levee, or other permanent structure which serves to eliminate or greatly reduce the impact of the proposed activity upon the critical area. The Department shall review the proposal to determine the likelihood of associated impacts.

W. Passive recreation such as hunting, hiking, fishing, and wildlife viewing that does not involve the construction of trails.

X. Enhancement actions that do not involve clearing, grading, or construction activities (e.g., revegetation with native plants and installation of nest boxes). Enhancement activity proposals shall be reviewed by the Department.

Y. Repair or replacement of existing shoreline erosion protection measures or structures provided that the repair or replacement shall not serve to expand the area protected by any existing structures or increase the length of erosion protection structures nor increase the impacts of such structures on regulated fish or wildlife habitat.

Z. In addition to the general exemptions listed in this Section, the following uses or activities are exempt from the provisions of Chapter 18E.50, Aquifer Recharge and Wellhead Protection Areas:
   1. Sewer lines and appurtenances;
   2. Biosolids and sludge land application sites provided that these activities comply with the requirements established in WAC 173-200, 173-216, and 173-304; and
   3. Single-family and two-family dwellings and associated accessory structures.

AB. Activities in artificial channels.

AC. Trails. Construction of pedestrian trails of twelve foot maximum width may be allowed within the buffer of a wetland or a buffer of a riparian area, lake or pond subject to the following criteria:
   a. The trail is constructed within the outer 10 percent of the standard (i.e. not averaged or reduced) wetland buffer or buffers identified in Table 18E.40.060.
   b. The trail is constructed of pervious material.
   c. The trail results in less than 6000 square feet of disturbance.
   d. The trail requires less than 50 cubic yards of fill.
   e. The trail does not cross or alter any regulated drainage features or natural waters.
   f. The trail is located outside of any fish and wildlife habitat conservation areas and their associated buffers (except as noted in a. above).
   g. The trail is a component of a pedestrian-only public trail system approved by the County Council.
   h. Mitigation, pursuant to Section 18E.40.050, for impacts is provided through the standard wetland review process.

(Ord. 2004-56s § 4 (part), 2004)

18E.20.040 Nonconforming Uses and Structures.

Uses and structures lawfully established prior to the effective date of this Title which become nonconforming due to the application of the requirements of this Title may continue subject to the following:

A. **Nonconforming Use Expansion.** Nonconforming uses shall not be expanded or changed in any way that increases the nonconformity without a permit issued pursuant to the provisions of this Title;

B. **Nonconforming Structure Expansion.** Existing structures shall not be expanded or altered in any manner that will increase the nonconformity without a permit issued pursuant to the provisions of this Title, except as provided in Section 18E.20.030 F. and G.

C. **Discontinued Uses.** Activities or uses which are discontinued for 12 consecutive months shall be allowed to resume only if they are in compliance with this Title; and

D. **Substantial Damage.** Nonconforming structures, except for structures located in a floodway, active landslide hazard area, fault rupture hazard area, or active shoreline erosion hazard area which are damaged or destroyed by fire, explosion, flood, or other casualty, may be restored or replaced if reconstruction is commenced within one year of such damage and is substantially completed within 18 months of the date such damage

occurred. The reconstruction or restoration shall not serve to expand, enlarge, or increase the nonconformity except as allowed through the provisions in 18E.20.030 F. and G.

1. Floodway - Channel Migration Zone. Structures that are located in a floodway only by the fact they are in the Channel Migration Zone, may only be allowed to be restored up to the limits of substantial improvement, as set forth in 18E.20.070, if the structure is damaged or destroyed as a result of flooding or channel migration. Damage as a result of fire, explosion or other casualty may be restored or replaced as described in 18E.20.040 D.3.
2. Floodway - Other Categories. Structures that are located in these areas must comply with Chapter 18E.70.040 - Flood Hazard Area Standards.
3. Active Landslide Hazard Area, Fault Rupture Hazard Area, or Active Shoreline Erosion Hazard Area. Structures in an active landslide hazard area, fault rupture hazard area, or active shoreline erosion hazard area may only be allowed to be restored up to the limits of substantial improvement, as set forth in 18E.20.070, if the structure is damaged or destroyed as a result of landslide, seismic, or shoreline erosion respectively. Damage as a result of fire, explosion or other casualty may be restored or replaced as described in 18E.20.040 D.3.
4. All other Critical Areas. Nonconforming structures which are damaged or destroyed by fire, explosion, or other casualty, may be restored or replaced if reconstruction is commenced within one year of such damage and is substantially completed within 18 months of the date such damage occurred. The reconstruction or restoration shall not serve to expand, enlarge, or increase the nonconformity except as allowed through the provisions in 18E.20.030 F. and G.

E. **Nonconforming Mobile Home Replacement - Channel Migration Zone.** Nonconforming mobile homes that are located in a floodway only by the fact they are in the Channel Migration Zone, may be replaced even if the mobile home exceeds the substantial damage or improvement threshold in 18E.20.070. Because the valuation of a mobile home is calculated in a different manner than manufactured housing or conventional construction, it is the intent to allow the replacement of the mobile home with approximately a like for like structure.

(Ord. 2004-56s § 4 (part), 2004)

18E.20.050 Reasonable Use Exceptions.

A. **General Requirements.**

1. If the application of this Title would deny all reasonable use of a site, development may be allowed which is consistent with the general purposes of this Title and the public interest. Nothing in this Title is intended to preclude all reasonable use of property.
2. The provisions outlined in this Section shall only be used when application of this Title would deny all reasonable use of a site and a proposed project cannot meet the prescriptive standards outlined in this Title.
3. Reasonable use provisions shall apply to new construction, expansions, additions, replacements, and redevelopment projects.
4. Applications for a reasonable use shall automatically constitute an application for a variance to reduce front, side, or rear yard setback requirements. The Hearing Examiner shall examine the feasibility of reducing setbacks as a method of locating a structure outside a critical area or its associated buffer prior to granting a reasonable

use exception for allowing construction to occur within a critical area or its associated buffer. Reductions in setback requirements shall be given preference over granting of a reasonable use exception.

5. The Reasonable Use Exception process shall not be used to create lots that are deemed unbuildable through application of the provisions outlined in this Title.
6. The proposal must comply with all provisions in Chapters 18E.70, Flood Hazard Area, and 18E.110, Erosion Hazard Areas.

B. **Application Requirements.** An application for a reasonable use exception shall include the following information:

1. A description of the areas of the site that contains a critical area, buffers, or within setbacks required under this Title;
2. A description of the amount of the site that is within setbacks required by other standards of the Zoning Code;
3. A description of the proposed development, including a site plan;
4. An analysis of the impact that the amount of development described in Section 18E.20.050 B.3. above would have on the critical area(s);
5. An analysis of whether any other reasonable use with less impact on the critical area(s) and associated buffer(s) is possible;
6. A design of the proposal so that the amount of development proposed as reasonable use will have the least impact practicable on the critical area(s);
7. An analysis of the modifications needed to the standards of this Title to accommodate the proposed development;
8. A description of any modifications needed to the required front, side, and rear setbacks; building height; and buffer widths to provide for a reasonable use while providing greater protection to the critical area(s);
9. Such other information as the Department determines is reasonably necessary to evaluate the issue of reasonable use as it relates to the proposed development, such as but not limited to a wetland analysis report, mitigation plan, habitat evaluation study, and/or a buffer enhancement plan;
10. An analysis of cumulative impacts based upon best available science.

C. **Review.**

1. **Public Hearing Required.** The Department shall set a date for a public hearing before the Pierce County Hearing Examiner after all requests for additional information or plan correction, as set forth in Section 18.60.020 C., have been satisfied. The public hearing shall follow the procedures set forth in Chapter 18.80, Development Regulations - General Provisions and Chapter 1.22 PCC.
2. **Decision Criteria.** The Hearing Examiner may approve a reasonable use exception if the Examiner determines all of the following criteria are met:
    a. The proposed development is located on a lot that was vested (see Chapter 18.160) prior to March 1, 2005 and there is no other reasonable use or feasible alternative to the proposed development with less impact on the critical area(s) and/or associated buffers including phasing or project implementation, change in timing of activities, buffer averaging or reduction, setback variance, relocation of driveway, or placement of structure.
    b. The development cannot be located outside the critical area and/or its associated buffer due to topographic constraints of the parcel or size and/or location of the parcel in relation to the limits of the critical area and/or its associated buffer and

a building setback variance or road variance has been reviewed, analyzed, and rejected as a feasible alternative.

c. The proposed development does not pose a threat to the public health, safety, or welfare on or off the site, nor shall it damage nearby public or private property.
d. Any alteration of the critical area(s) shall be the minimum necessary to allow for reasonable use of the property.
e. The inability of the applicant to derive reasonable use of the property is not the result of actions by the applicant in subdividing the property or adjusting a boundary line thereby creating the undevelopable condition after the effective date of this Title.
f. The proposal mitigates the impacts on the critical area(s) to the maximum extent possible, while still allowing reasonable use of the site.
g. The proposed activities will not jeopardize the continued existence of species listed by the State or Federal government as endangered, threatened, sensitive, or documented priority species or priority habitats.
h. The proposed activities will not cause significant degradation of groundwater or surface water quality.

3. **Additional Decision Criteria for Wetlands and Associated Buffers.** In addition to the decision criteria listed in subsection 2. above, a reasonable use exception for wetlands and associated buffers shall also demonstrate that the proposed activity will result in minimum feasible alteration or impairment to the wetland's functional characteristics and existing contours, vegetation, fish and wildlife resources, and hydrological conditions.
4. **Additional Decision Criteria for Critical Fish and Wildlife Habitat Areas and Associated Buffers.** In addition to the decision criteria listed in subsection 2. above, the Hearing Examiner may approve a reasonable use exception for critical fish and wildlife habitat areas and associated buffers if the Examiner determines that the proposal complies with the mitigation measures as set forth in Section 18E.40.050.
5. **Additional Decision Criteria for Volcanic Hazard Areas – Special Occupancy Structures or Covered Assemblies.** In addition to the decision criteria listed in subsection 2. above, the Hearing Examiner may approve a reasonable use exception for special occupancy structures or covered assemblies located within volcanic hazard areas if the Examiner determines that the proposal complies with the following conditions:
   a. The applicant has shown through submittal of a travel time data the amount of time that is anticipated for a lahar to reach the proposed project and evacuation route.
   b. The applicant has demonstrated through submittal of a volcanic hazard emergency evacuation plan that:
      (1) The proposed project is located directly adjacent to a safety zone (area completely located outside the limits of a Case I lahar) that is within walking distance in an amount of time less than the anticipated time that it takes a lahar to reach a given point (refer to Section 18E.60.020 C). (Note: The time that it takes a lahar to reach a given point is calculated from either the source of the event to the given point, or from the source of the lahar warning signal to the given point, i.e., only the Puyallup and Carbon River drainages at this time have the Acoustic Flow Monitoring System. Other drainages, such as the Nisqually and White Rivers, have no warning

systems. Persons in those areas would be reliant on other emergency notification systems, such as the National Weather Radio. At this time, no other warning system is planned for the Nisqually or White River drainages.) The time of walking distance shall be calculated based upon the amount of time necessary for physically or mentally challenged individuals to get from the proposed project to the safety zone.

(2) The estimated travel time analysis for the lahar to reach the evacuation route is greater than the estimated travel time for physically or mentally challenged individuals to have cleared the evacuation route and reached the safety zone.

(3) The evacuation route must be at a slope and surface to be considered handicapped accessible (e.g., slopes may not exceed 1' in 12' rise and surface must be an all weather, hard material) as determined by the County Building Official.

(4) The evacuation route has been determined not to contain any other potential natural hazards, such as landslide or flood hazards, to cause a blockage or destruction of the evacuation route during an event (i.e., seismic event triggers a landslide that results in the evacuation route becoming impassible).

(5) The evacuation route is not located adjacent to any highways or arterial road networks that may cause a life safety threat to evacuating pedestrians.

(6) The safety zone is an area with adequate ingress/egress (i.e., a direct exit once individuals reach this location).

c. If the system is available for the affected river drainage, the proposed structure(s) shall have an automated emergency warning system that is connected into the County's Automated Lahar Warning System.

d. Proposed public structure(s) shall have an adequate contingency plan that identifies where occupants and emergency response equipment and vehicles will be relocated in the event that a lahar damages the facility to an uninhabitable condition.

6. **Additional Decision Criteria for Volcanic Hazard Areas - Fire Stations.** The Hearing Examiner may approve a reasonable use exception for fire stations, located within volcanic hazard areas if the Examiner determines that the proposal complies with the following conditions:

a. The applicant has shown through submittal of travel time data (available from Pierce County) the amount of time anticipated for a lahar to reach the proposed project and evacuation route.

b. The applicant has demonstrated through submittal of a volcanic hazard emergency evacuation plan that:

(1) The proposed project has an identified safety zone (area completely outside the limits of a Case 1 lahar) that is within a distance that can be traveled in an amount of time less than the anticipated time that it takes a lahar to reach a given point (refer to Section 18E.60.020 C.). (Note: The time that it takes a lahar to reach a given point is calculated from either the source of the event to the given point, or from the source of the lahar warning signal to the given point, i.e., only the Puyallup and Carbon River drainages at this time have the Acoustic Flow Monitoring System. Other drainages, such as the Nisqually and White Rivers, have no warning systems. Persons in those

areas would be reliant on other emergency notification systems, such as the National Weather Radio. At this time, no other warning system is planned for the Nisqually or White River drainages).

(2) The evacuation route must be at a slope and surface to be considered accessible by the fire equipment and personnel as determined by the County Building Official.

(3) The evacuation route has been determined not to contain any other potential natural hazards, such as landslide, to cause a blockage or destruction of the evacuation route during an event (i.e., seismic event triggers a landslide that results in the evacuation route becoming impassible).

(4) The safety zone is an area with adequate ingress/egress (i.e., a direct exit once individuals reach this location).

(5) The estimated travel time analysis for the lahar to reach the evacuation route is greater than the estimated travel time to relocate emergency response equipment, vehicles, and personnel to a safety zone.

c. If the system is available for the affected river drainage, the proposed structure(s) shall have an automated emergency warning system that is connected into the County's Automated Lahar Warning System.

d. Proposed fire stations shall have an adequate contingency plan that identifies where occupants and emergency response equipment and vehicles will be relocated in the event that a lahar damages the facility to an uninhabitable condition. Proposed fire stations shall indicate their proposed back-up station or stations.

7. **Additional Decision Criteria for Active Landslide Hazard Areas and Their Associated Buffers.** In addition to the decision criteria listed in subsection 2. above, a reasonable use exception for active landslide hazard areas and their associated buffers shall also demonstrate the following:

   a. Mitigation measures are provided for proposed driveways, shared accesses, roads or bridges that will ensure that these facilities will not be susceptible to damage from landslide-induced ground deformation or impact/coverage by landslide debris. Mitigation measures shall be designed for static and seismic loading condition in accordance with the most recent version of the American Association of State Highway and Transportation Officials (AASHTO) Manual.

   b. For developments that propose access through an active landslide area or its associated buffer, a secondary access route is provided when the development will contain more than 20 dwellings (existing or proposed dwellings). The secondary access route must, as a minimum, meet emergency vehicle standards and shall not be located in an active landslide hazard area or its associated buffer.

   c. The proposed development shall not create the need for larger landslide hazard area buffers or setbacks on neighboring properties unless approved through a notarized written agreement with the affected property owners.

   d. Any dwellings proposed as part of the development shall not be located within the active landslide hazard area or its associated buffer.

8. **Examiner's Authority.** The Examiner has the authority to approve an application for a reasonable use exception, approve with additional requirements above those specified in this Title, require modification of the proposal to comply with specified requirements or local conditions, or deny the application if it fails to comply with the requirements of this Title.

9. **Required Written Findings and Determinations.** A reasonable use exception may be approved by the Examiner only if all of the following findings can be made regarding the proposal and are supported by the record:
    a. The granting of the proposal will not be detrimental to the public health, safety, and general welfare.
    b. The granting of the proposal will not be injurious to the property, regulated critical area(s), or improvements adjacent to and in the vicinity of the proposal.
    c. The proposal minimizes adverse environmental impacts to the maximum practicable extent and provides mitigation to offset any impacts.
    d. The granting of the proposal is consistent and compatible with the goals, objectives, and policies of the Comprehensive Plan; community plan, if applicable; and the provisions of this Title.

(Ord. 2004-56s § 4 (part), 2004)

18E.20.060 Variances.

A. **General.** An applicant, who seeks to reduce a wetland buffer below the standards of Section 18E.30.060, or a critical fish and wildlife habitat buffer below the standards of Section 18E.40.060, may pursue a variance.

B. **Application Requirements.**
    1. **Preliminary Review.** The provisions for conducting a preliminary review of a proposed variance are set forth in Chapter 18.40, Development Regulations – General Provisions.
    2. **Application Filing.** Variance applications shall be reviewed for completeness in accordance with Department submittal standards checklists and pursuant to Chapter 18.40, Development Regulations - General Provisions.

C. **Public Notice.** Public notice provisions for notice of application, public hearing, and final decision pursuant to this Title are outlined in Chapter 18.80, Development Regulations - General Provisions.

D. **Review.**
    1. **Initial Review.** The Department shall conduct an initial review of any variance application in accordance with the provisions outlined in Chapter 18.60, Development Regulations - General Provisions.
    2. **Public Hearing Required.** The Department shall set a date for a public hearing before the Pierce County Hearing Examiner after all requests for additional information or plan correction, as set forth in Section 18.60.020 C., have been satisfied. The public hearing shall follow the procedures set forth in Chapter 18.80, Development Regulations - General Provisions and Chapter 1.22 PCC.
    3. **Decision Criteria for Wetland Buffers and Fish and Wildlife Habitat Buffers.**
        a. The Hearing Examiner shall have the authority to grant a variance from the requirements of Sections 18E.30.060 and 18E.40.060 when, in the opinion of the Examiner, all of the following criteria have been met:
            (1) There are special circumstances applicable to the subject property or to the intended use such as shape, topography, location, or surroundings that do not apply generally to surrounding properties or that make it impossible to redesign the project to preclude the need for a variance;
            (2) The applicant has avoided impacts and provided mitigation to the maximum practical extent;

(3) The buffer reduction proposed through the variance is limited to that necessary for the preservation and enjoyment of a substantial property right or use possessed by other similarly situated property, but which because of special circumstances is denied to the property in question; and
(4) Granting the variance will not be materially detrimental to the public welfare or injurious to the property or improvement.

b. In lieu of criteria 18E.20.060 D.3.a.(1)-(4), above, an applicant may pursue a wetland buffer variance through demonstration of all of the following criteria:
(1) The variance results in an overall increase in the function of the wetland.
(2) The variance results in the preservation or enhancement within the project area of other Habitats of Local Importance discussed in Section 18E.40.020 D.
(3) The applicant has avoided impacts and provided mitigation, pursuant to Section 18E.30.050 to the maximum practical extent.

c. In lieu of criteria 18E.20.060 D.3.a.(1)-(4), above, an applicant may pursue a fish and wildlife habitat buffer variance through demonstration of all of the following criteria:
(1) The variance will not adversely impact receiving water quality or quantity.
(2) The variance will not adversely impact any functional attribute of the habitat area.
(3) The variance will not jeopardize the continued existence of species listed by the Federal government or the State as endangered, threatened, sensitive, or documented priority species or priority habitats.
(4) The applicant has avoided impacts and provided mitigation, pursuant to Section 18E.40.050 to the maximum practical extent.

4. **Examiner's Authority.** When granting a variance, the Examiner may attach specific conditions to the variance, which will serve to meet the goals, objectives, and policies of this Title. The Examiner has the authority, as part of the approval of the variance, to establish expiration dates or time periods within which the approval must be exercised. Upon expiration the permit or approval shall be considered null and void. No extensions of the expiration date shall be permitted.

(Ord. 2004-56s § 4 (part), 2004)

18E.20.070 Substantial Improvement and Substantial Damage.

A. **Substantial Improvement.** Substantial improvement is the repair, reconstruction, addition, rehabilitation, or other improvement of a structure taking place during a period of 10 years, the cumulative cost of which equals or whereby the current permit valuation for the work exceeds 40 percent of the current permit valuation of the existing structure.
1. The Building Official shall determine the current permit valuation based on the cost per square foot values in effect at the time of permit application.
2. Substantial improvement is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. Substantial improvement does not, however, include either:
a. Any project for improvement of a structure to correct existing violations of State or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

b. Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

B. **Substantial Damage.** A structure is considered substantially damaged when the current permit valuation for the work of reconstructing or restoring a structure to its before damage condition exceeds 40 percent of the current permit valuation of the existing structure.

1. Damage to a structure may be sustained through any origin such as but not limited to earthquakes, fire, explosion, flood, landslides, or other calamity.
2. The Building Official shall determine the current permit valuation based on the cost per square foot values in effect at the time of permit application.

(Ord. 2004-56s § 4 (part), 2004)

18E.20.080 Current Use Assessment Program.

A. An owner of agricultural land, timberland, or open space desiring current use classification under RCW 84.34 may file for such current use classification as provided for in Chapter 2.114 of the Pierce County Code.

B. The Department shall notify the Assessor-Treasurer's Office when restrictions on development occur on a particular site.

C. The Assessor-Treasurer's Office shall consider the critical areas and buffering requirements of this Title in determining the fair market value of land. Any owner of an undeveloped buffer which has been placed in a separate tract or tracts, protective easement, public or private land trust dedication, or other similarly preserved area shall have that portion of land assessed consistent with those restrictions.

(Ord. 2004-56s § 4 (part), 2004)

Chapter 18E.30

WETLANDS

Sections:

18E.30.010 Purpose.

The purpose of this Chapter is to avoid impacts arising from land development and other activities affecting wetlands, and to maintain and enhance the biological and physical functions and values of wetlands with respect to water quality maintenance, stormwater and floodwater storage and conveyance, fish and wildlife habitat, primary productivity, recreation, education, and historic and cultural preservation. In appropriate circumstances it may be necessary to minimize, rectify, reduce, or compensate for wetland impacts. When wetland impacts occur, mitigation will be required to achieve no net loss of wetlands in terms of acreage, function, and value. (Ord. 2004-56s § 4 (part), 2004)

18E.30.020 Wetland Areas.

A. **General.**

1. Wetlands are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
2. The County will require the use of the following documents to determine the presence or absence of potential wetlands:
   a. Federal Manual for Identifying and Delineating Jurisdictional Wetlands, Corps of Engineers Wetlands Delineation Manual, 1987 Edition and corresponding guidance letters; and
   b. Washington State Wetlands Identification and Delineation Manual, March 1997 Edition (DOE Publication 96-94).

B. **Wetland Indicators.** Indicators of wetlands normally include, but are not limited to: saturated soils or standing water; water-tolerant plant species such as salmonberry, Oregon ash, Western red cedar, rushes and sedges; and dark-brown or black soil colors. Refer to the documents listed in 18E.30.020 A.2. for detailed wetland indicator criteria.

C. **Potential Wetland Areas.** Potential wetland areas, as depicted on the Critical Areas Atlas – County Wetland Inventory Maps, are those areas where wetland indicators have been mapped or identified. Potential wetlands include:
   1. Areas within 315 feet of: hydric soils identified on the Soil Survey of Pierce County and Soil Survey of Snoqualmie Pass area; wetlands identified on the National Wetland Inventory Maps or Pierce County Wetland Inventory Maps; areas of known flooding identified on the FEMA FIRM and Flood Insurance Study Maps; or any other indicators of hydrology such as Department of Natural Resource stream data.
   2. Areas that possess one or a number of wetland indicators as set forth in Section 18E.30.020 B. and any adjacent areas within 315 feet.
   3. Areas within the buffer of any wetland previously identified through the wetland review process.

D. **Wetland Categories**. Wetlands shall be classified into categories which are reflective of each wetland's function and value and unique characteristics. Wetland categories shall be based on the generalized criteria provided in 18E.30.070 – Appendix A and the specific criteria provided in the Washington State Wetland Rating System for Western Washington, revised April 2004 (Ecology Publication #04-06-025). Wetlands shall be generally designated as follows:
   1. **Category I Wetlands.** Category I wetlands are those regulated wetlands of exceptional resource value based on their functional value and diversity, wetland communities of infrequent occurrence, association with documented habitat for sensitive, threatened or endangered animal species, and other attributes which may not be adequately replicated through creation or restoration.
   2. **Category II Wetlands.** Category II wetlands are those regulated wetlands of significant resource value based on their functional value and diversity, wetland communities of infrequent occurrence, and other attributes which may not be adequately replicated through creation or restoration.
   3. **Category III Wetlands.** Category III wetlands are those regulated wetlands that have important resource value, principally due to vegetative diversity.
   4. **Category IV Wetlands.** Category IV wetlands are those regulated wetlands of ordinary resource value based on monotypic vegetation of similar age and class, lack of special habitat features, and isolation from other aquatic systems.

E. **Wetland Categorization Criteria.**
   1. **Categorizing Wetlands Divided by a Manmade Feature.** When a wetland is divided by a manmade feature (e.g., a road embankment), the wetland shall be rated as if it is not divided if there is a perennial or intermittent surface water connection between the two wetlands and either of the following criteria are met:
      a. It can be demonstrated that the separate wetlands were one discrete wetland prior to construction of the manmade feature. This may be accomplished through an analysis of secondary information such as aerial photographs and soils maps; or
      b. The two separated wetlands can be shown to function as one wetland. This shall be determined based on normal conditions (i.e., in the absence of unauthorized activity, the wetlands possess similar vegetative or wildlife assemblages or hydrologic regime).

c. Separated wetland areas may be rated jointly in the absence of a perfectly level culvert where it can be demonstrated that a level surface water connection is present within the culvert that permits flow of water, fish, or other organisms in both directions. Separated wetland areas may be rated jointly in the absence of a perfectly level culvert with two-way water flow if the bottom of the culvert is below the high water marks in the receiving wetland or if the high water marks on either side differ by six inches or less in elevation

2. **Connecting Mosaic Pattern Wetlands.** In cases where the wetlands to be categorized are smaller than one acre in size and separated from each other by less than 100 feet (on average), the DOE mosaic methodology shall be used to determine the wetland category. The area of the wetlands must be greater than 50 percent of the total combined area of wetland and upland for the patchwork to be categorized as one wetland. The boundary of the mosaic wetlands must reflect the ecological interconnectedness of the wetlands within the mosaic. The County will not accept mosaic boundaries drawn to minimize the area of wetland within the mosaic. (See Figure 18E.30-1 in Chapter 18E.120.)

(Ord. 2004-56s § 4 (part), 2004)

18E.30.030 Wetland Review Procedures.

A. **General Requirements.**

1. The requirement for wetland review shall be waived when it is determined that the proposed activity is located on a parcel where the existing development received a previous wetland approval subject to the Pierce County wetland regulations in effect as of February 2, 1992, when all of the following conditions have been met:
   a. The wetland has been categorized and delineated and the impact of the existing development on the wetlands was considered in prior decisions in accordance with the regulations cited above;
   b. There are no outstanding violations of conditions in the previously issued approval for the protection of wetlands;
   c. The activity remains in compliance with all wetland approval requirements; and,
   d. The proposed activity involves a use that is an equal or lesser intensity than the existing development. When determining intensity, the Director may consider impacts including, but not limited to, density, traffic, impervious surface, noise, glare, dust, and hours of operation.
2. The Critical Areas Atlas – County Wetland Inventory Maps provides an indication of where potential wetlands are located within the County. The actual presence or location of a potential wetland or a potential wetland that has not been mapped, but may be present on or adjacent to a site shall be determined using the procedures and criteria established in this Chapter.
3. The Department will complete a review of the Critical Areas Atlas – County Wetland Inventory Maps and other source documents for any proposed regulated activity to determine whether the project area for a proposed single-family dwelling unit or site for all other proposed regulated activities is located within a potential wetland. Identification of a potential wetland may also occur as a result of field investigations conducted by Department staff.

4. When the Department's maps, sources, or field investigation indicate that a potential wetland is located within 315 feet of the project area for a proposed one family dwelling unit or within 315 feet of the site for all other proposed regulated activities, the Department shall require a site evaluation (field investigation) to determine whether or not a regulated wetland is present and if so, its relative location in relation to the proposed project area or site. The findings of the site evaluation shall be documented as outlined in subsections 18E.30.030 B., C., D., or E. below.
5. If Department staff completes the site evaluation and determines that no regulated wetlands are present, then wetland review will be considered complete.
6. All site evaluations shall include a proposed categorization of the wetland in accordance with the guidelines set forth in Section 18E.30.020 B. and a calculation of the standard wetland buffer as set forth in Section 18E.30.060.
7. Unless otherwise stated in this Chapter, the critical area protective measure provisions contained in Section 18E.10.080 shall apply.

B. **General Wetland Review.** General wetland review shall include the submittal of a wetland verification report or a wetland analysis report, together with a wetland application and fee. (See Figure 18E.30-2 in Chapter 18E.120.)
   1. **Wetland Verification Report.**
      a. A wetland verification report shall be submitted when the site evaluation determines that:
         (1) No regulated wetland is present within 315 feet of the site;
         (2) A regulated wetland is present, but its standard buffer does not extend within the site; or
         (3) Wetlands are identified but are evaluated and found to be non-regulated as set forth in Section 18E.20.030 K.
      b. The wetland verification report shall include data sheets, site maps, and other field data and information necessary to confirm wetland presence or absence and category. If non-regulated wetlands (refer to Section 18E.20.030 K.) are identified, a site plan must be provided that identifies their location.
      c. The wetland verification report shall identify and discuss wetland boundaries within the site as well as those that extend offsite. Offsite wetlands and associated standard buffers do not have to be marked in the field.
      d. Department staff shall review the wetland verification report and either:
         (1) Accept the report and approve the wetland application; or
         (2) Reject the report and require the submittal of a wetland analysis report.
   2. **Wetland Analysis Report.**
      a. If a regulated wetland or its standard buffer extends onto the site, the Department shall require a wetland analysis report. Information required in a wetland analysis report is identified in 18E.30.070 – Appendix B.
      b. If the Department determines that a Category I wetland is onsite which is associated with documented habitat for endangered, threatened, or sensitive species or for potentially extirpated plant species recognized by State or Federal agencies, the Department shall also require the submittal of a habitat assessment report as set forth in Chapter 18E.40.
      c. If the Department determines that mitigation is necessary to offset the identified impacts, the applicant shall comply with the mitigation requirements set forth in Section 18E.30.050.

d. Approval of the wetland application shall be granted upon a determination that the wetland analysis report and mitigation plan, if applicable, are thorough and accurate, and meet all requirements of this Title, and that the monitoring program and contingency plan are tied to an acceptable financial guarantee as set forth in Section 18E.10.080 to assure that the requirements will be followed.

C. **Single-family Dwelling Wetland Review.** Two alternative review procedures exist for construction of a single-family dwelling and regulated activities accessory to a single-family dwelling. (See Figure 18E.30-3 in Chapter 18E.120.) Both review procedures require the completion of a site evaluation as follows:

1. **Wetland Certification Process for Single-family Dwellings (No Encroachment into a Regulated Wetland or its Standard Buffer).**
   a. Prior to issuance of a building permit, site development permit, or on-site sewage system permit, the applicant shall submit a single-family wetland certification form completed by a wetland specialist that certifies either:
      (1) No regulated wetlands are present within 315 feet of the project area; or
      (2) Wetlands are present within 315 feet of the project area, but all regulated activities associated with the dwelling (i.e., landscaped areas, septic facilities, outbuildings, etc.) will occur outside of the standard buffer of the identified wetland.
   b. If regulated wetland buffers extend onto the site, the wetland specialist shall place permanent, clearly visible, wetland buffer signs at the edge of the buffer. A wetland buffer sign affidavit, signed by the wetland specialist, shall be submitted to the Department as verification that the wetland buffer signs have been placed on the site.
   c. A survey as outlined in Section 18E.10.080 G. will not be required.
   d. The single-family certification form may be used only to authorize single-family dwellings and associated homesite features such as driveways, gardens, fences, wells, lawns, and on-site septic systems. It may not be used for new agricultural activities, expansion of existing agricultural activities, forest practice activities, commercial projects, land divisions, buffer width modifications (as set forth in Section 18E.30.060), or violations.
   e. The single-family certification process will be monitored by the Department for accuracy, and enforcement actions will be initiated should encroachment into a regulated wetland or buffer occur.
   f. The applicant/property owner assumes responsibility for any and all errors of the single-family certification form and all associated mitigation imposed by the Department.
   g. Single-family certification forms shall be filed with the Pierce County Auditor's Office in accordance with Sections 18E.10.070 F. and 18E.10.110 B.
2. **Single-family Wetland Application Process (Encroachment into the Standard Buffer of a Regulated Wetland).**
   a. A wetland application and wetland delineation report shall be submitted to the Department when the single-family dwelling and associated homesite features are located within the standard buffer of a regulated wetland.
   b. The applicant may retain either a wetland specialist or Department staff to delineate the limits of a regulated wetland and determine the impacts associated with the project, subject to the following:

(1) A wetland delineation report, as defined in Section 18E.30.030 C.3. below, shall be submitted to the Department for review; or
(2) Upon the applicant's request and payment of fees, the Department shall delineate the regulated wetland(s).

c. If the Department determines that mitigation is necessary to offset the identified impacts, the applicant shall comply with the mitigation requirements set forth in Section 18E.30.050.
d. The applicant shall place permanent, clearly visible, wetland boundary buffer signs at the edge of the buffer.
e. A survey as defined in Section 18E.10.080 G. will not be required.

3. **Wetland Delineation Report.** The wetland delineation report shall include data sheets; scaled site maps showing the project boundary, wetland boundary, categorization of the wetland and standard buffer boundary, boundary flag location and sample plot location and designation; a vicinity map with driving instructions; and any other field data and information necessary for the Department to confirm wetland presence, location, and category.

D. **Agricultural Activity Wetland Review.** A wetland application and wetland delineation report shall be submitted to the Department when the site evaluation indicates that a regulated wetland or its standard buffer extends into a site proposed for an agricultural activity.

1. The applicant may either retain a wetland specialist or Department staff to delineate the limits of a regulated wetland and determine the impacts associated with the project area, subject to the following:
   a. A wetland delineation report, as defined in Section 18E.30.030 C.3. above, shall be submitted to the Department for review; or
   b. Upon the applicant's request and payment of fees, the Department shall delineate the regulated wetland(s).
2. If the Department determines that mitigation is necessary to offset the identified impacts, the applicant shall comply with the mitigation requirements set forth in Section 18E.30.050.
3. The applicant shall place permanent, clearly visible, wetland boundary buffer signs at the edge of the buffer.
4. A survey as defined in Section 18E.10.080 G. will not be required.
5. Agricultural activities may be initiated subject to compliance with the requirements set forth in Section 18E.30.030 D.1. through 4. above and the submittal of a best management plan developed by the Pierce County Conservation District or Natural Resource Conservation Service (NRCS).

E. **Forest Practice Wetland Review.**

1. All forest practice activities regulated under Title 18H, Development Regulations-Forest Practice Activities that are not exempt from the provision of this Title shall be reviewed pursuant to the criteria set forth in 18E.30.030 B. General Wetland Review, except for Conversion Option Harvest Plan (COHP).
2. An abbreviated wetland review process may be used for COHPs as follows:
   a. A wetland application and verification report shall be submitted when a site evaluation determines that no regulated wetland is present within 315 feet of the area to be logged.

b. A wetland application and delineation report shall be submitted when a site evaluation determines that a regulated wetland or its buffer extends within 315 feet of the area to be logged. At a minimum the report shall include:
   (1) A detailed description of all wetlands on or within 315 feet of the area to be logged, including the wetland(s) approximate size(s), vegetation, categorization, and hydrology source(s).
   (2) Sample data sheets for each wetland.
   (3) An accurate map delineating the boundaries of the wetland(s) and standard buffer(s) in relation to the boundaries of the site.
c. The wetland delineation report shall be prepared, signed, and dated by a wetland specialist.
d. The accuracy of the wetland delineation, flagging, and categorization shall be field verified by the Department.
e. A survey as defined in Section 18E.10.080 G. will not be required.

3. Requests for deviation from the standard buffer requirements set forth in Section 18E.30.060 A. will not be allowed as part of a forest practice application.

(Ord. 2004-56s § 4 (part), 2004)

18E.30.040 Wetland Standards.

The following activities may be allowed within the standard buffer established pursuant to Section 18E.30.060, when mitigated according to Section 18E.30.50 A. and B.:

A. New construction of a single-family residence; or the reconstruction, remodeling, or maintenance of an existing single-family residence, within an existing lot of record subject to the following:
   1. No more than one residential structure may be present within the lot.
   2. Both the size of the proposed home and the character and intensity of development are consistent with the surrounding area or are of lesser intensity.
   3. Impervious surface shall be limited to the minimum amount necessary to accommodate the proposed homesite and, where possible, surfaces such as driveways and patios shall be made of pervious materials.
   4. The single-family residence must comply with applicable site development stormwater requirements.
   5. Any well and necessary appurtenances, including a pump and appropriately sized pump house, but not including a water storage tank (unless the water storage tank can be contained within the pump house), must comply with the following conditions:
      a. The pump house is a one-story building with a ground area of less than 120 square feet; and
      b. The well is more than 75 feet deep; and
      c. Access to the well and pump house shall be by a pervious trail for pedestrian traffic only or, if necessary, by an unimproved access for a maintenance vehicle.
   6. In no case shall the Department allow development within a buffer to occur closer to a wetland boundary than 75 percent of the buffer size as determine through use of 18E.30.060 and Appendix F. An applicant who wishes to modify a buffer beyond these limits must pursue a variance as defined within Section 18E.20.060.
   7. The conversion from one family to multi-family use is prohibited.

B. The placement of utility lines which do not require excavation or utility pole installation in any part of a buffer for a Category II, III, or IV wetland. They may be placed in a buffer for a Category I wetland, provided that the minimum distance from the wetland edge is no less than 50 percent of the Category I buffer width established for the specific land use intensity type in the table in Section 18E.30.060 A.

C. New farm and agricultural activities may be permitted within a buffer subject to the following:
   1. Agricultural activities and structures shall comply with the provisions of Chapter 18E.070 Flood Hazard Areas.
   2. The agricultural activity is in compliance with the USDA, NRCS Conservation Reserve Program farm management standards.
   3. A copy of an approved NRCS or Pierce County Conservation District farm management plan that documents compliance with the USDA, NRCS Resource Management System Standards within the critical area has been submitted to the Department for review and approval.

D. Trimming of vegetation for purposes of providing view corridors will be allowed without a complete mitigation plan provided that trimming shall be limited to view corridors of a maximum 20-foot width and that benefits to fish and wildlife habitat are not reduced. Trimming shall be limited to hand pruning of branches and vegetation. Trimming shall not include felling, topping, or removal of trees. An applicant that wishes to remove trees or create a view corridor of larger size must complete review as set forth in Sections 18E.30.030 and 18E.30.060.

(Ord. 2004-56s § 4 (part), 2004)

18E.30.050 Mitigation Requirements.

A. **Mitigation.** All regulated development activities in wetlands or buffers shall be mitigated according to this Title subject to the following order:
   1. Avoiding the impact altogether by not taking a certain action or parts of actions;
   2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to reduce impacts;
   3. The following types of mitigation (in the following order of preference):
      a. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
      b. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
      c. Compensating for the impact by replacing or providing substitute resources or environments;
   4. Monitoring the impact and compensation and taking appropriate corrective measures; and
   5. Mitigation for individual actions may include a combination of the above measures.

B. **Mitigation for Regulated Activities in Wetland Buffers.** Non-compensatory mitigation shall be required for all regulated activities in buffers. Specific mitigation plan requirements are provided in Section 18E.30.070 - Appendix C. Approval of the mitigation plan shall be signified by a notarized memorandum of agreement signed by the applicant and Department Director or designee, and recorded with the Pierce County Auditor. The agreement shall refer to all requirements for the mitigation project.

C. **Mitigation for Regulated Activities in Wetlands.** Compensatory mitigation shall be required for regulated activities that result in the loss of wetland acreage. Non-compensatory mitigation shall be required for regulated activities that do not result in the loss of wetland acreage. Specific mitigation plan requirements are provided in Section 18E.30.070 - Appendices D and E.

1. The compensatory mitigation plan shall be completed in two phases, a conceptual phase and a detailed phase.
    a. Conceptual phase. The applicant shall submit to the Department a conceptual mitigation plan for compensatory mitigation. Where environmental review is required, the Department shall not make a threshold determination prior to Department review and approval of the conceptual mitigation plan. See 18E.30.070 - Appendix D for specific requirements of the conceptual mitigation plan.
    b. Detailed phase. Following the Department's approval of the conceptual mitigation plan, the applicant shall submit a detailed mitigation plan for compensatory mitigation to the Department. See 18E.30.070 - Appendix E for specific requirements of the detailed mitigation plan.
2. The detailed mitigation plan shall be prepared, signed, and dated by the wetland specialist to indicate that the plan is in accordance with specifications determined by the wetland specialist. A signed original mitigation plan shall be submitted to the Department.
3. Approval of the detailed mitigation plan shall be signified by a notarized memorandum of agreement signed by the applicant and Department Director or designee, and recorded with the Pierce County Auditor. The agreement shall refer to all requirements for the mitigation project.
4. The mitigation project shall be completed according to a schedule agreed upon between the Department and the applicant.
5. Wetland mitigation shall occur according to the approved wetland mitigation plan and shall be consistent with provisions of this Chapter and Title.
6. The wetland specialist shall be onsite during construction and plant installation phases of all mitigation projects.
7. On completion of construction for the wetland mitigation project, the wetland specialist shall submit an as-built report to the Department for review and approval.

D. **Mitigation Banking.** [Reserved]

(Ord. 2004-56s § 4 (part), 2004)

18E.30.060 Buffer Requirements.

A. **Determining Buffer Widths.** Buffer widths shall be measured horizontally from a perpendicular line established at the wetland edge based on the Base Buffer Width identified in Table 1 and adjustments in Appendix F:

Table 1	
Generalized Category of Wetland	**Base Buffer Width**
Category I	150 feet
Category II	100 feet
Category III	50 feet
Category IV	25 feet

Table 2. Land Use Impact "Intensity" Based on Development Types	
Rating of impact from proposed changes in land use	**Types of land uses that cause the impact based on common zoning categories**
High	Commercial, Urban, Industrial, Institutional, Retail Sales, Residential with more than 1 unit/acre, New agriculture (high-intensity processing such as dairies, nurseries and green houses, raising and harvesting crops requiring annual tilling, raising and maintaining animals), High intensity recreation (golf courses, ball fields), hobby farms
Moderate	Residential with 1unit/acre or less, Moderate -Intensity Open Space (parks), New agriculture (moderate- intensity such as orchards and hay fields)
Low	Forestry, Open space (low-intensity such as passive recreation and natural resources preservation)

B. **Modification of Buffer Widths.** The standard buffer widths of Section 18E.30.060 A. may be decreased through the averaging or reduction mechanisms of this Section. The standard buffer width may also be increased.

1. **Standard Conditions.** The buffer widths recommended for land uses with "high intensity" impacts to wetlands can be reduced to those recommended for "moderate intensity" impacts under the conditions identified below.
   a. For wetlands that score moderate or high for habitat (20 points or more), the width of the buffer around the wetland can be reduced if both the following conditions are met:
      (1) A relatively undisturbed vegetated corridor at least 100 feet wide is protected between the wetland and any other Priority Habitats as defined by the Washington State Department of Fish and Wildlife. The corridor must be protected for the entire distance between the wetland and the Priority Habitat via some type if legal protection such as a conservation easement; and
      (2) Measures to minimize the impacts of different land uses on wetlands, as summarized in the following table, are applied.

Examples of Disturbance	Examples of Measures to Minimize Impacts	Activities that Cause the Disturbance
Lights	Direct lights away from wetland	Parking Lots, Warehouses, Manufacturing, High Density Residential
Noise	Place activity that generates noise away from the wetland.	Manufacturing, High Density Residential
Toxic runoff	Route all new untreated runoff away from wetland, Covenants limiting use of pesticides within 150 feet of wetland Integrated pest management programs	Parking Lots, Roads, Manufacturing, Residential Areas, Application of Agricultural Pesticides, Landscaping
Change in water regime	Infiltrate or treat, detain and disperse into buffer new runoff from surfaces	Any impermeable surface, Lawns, Tilling
Pets and Human disturbance	Fence around buffer Plant buffer with "impenetrable" natural vegetation appropriate for region	Residential areas
Dust	BMP's for dust	Tilled fields

b. For wetlands that score less than 20 points for habitat, the buffer width can be reduced to those required for moderate land use impacts if measures to minimize the impacts of different land uses on wetland as summarized in the table above in 18E.30.060 B.1.

2. **Buffer Averaging.** Buffer width averaging may be allowed only where the applicant demonstrates all of the following:
   a. The decrease in buffer width is minimized by limiting the degree or magnitude of the regulated activity.
   b. A habitat assessment has been submitted which demonstrates that no documented habitat for endangered, threatened, or sensitive fish, or animal species is present; or
   c. For wetlands and/or required buffers associated with documented habitat for endangered, threatened, or sensitive fish, or wildlife species, a habitat assessment report has been submitted that demonstrates that the buffer modification will not result in an adverse impact to the species of study.
   d. Width averaging will not adversely impact the wetland.
   e. The total buffer area after averaging is no less than the buffer area prior to averaging. (See Figure 18E.30-4.)
   f. The minimum buffer width will not be less than 75 percent of the widths established after the categorization is done and any buffer adjustments applied.
   g. The averaging is accomplished within the project boundaries or through an off-site conservation easement or tract (or other acceptable protective mechanism) approved by the Department.
3. **Buffer Increases.** The Department may require increased buffer width(s) when any of the following are identified:
   a. A larger buffer is necessary to maintain viable populations of existing species;

b. The wetland is used by, or associated with, species listed by the Federal government or the State as endangered, threatened, sensitive, or as documented priority species or habitats, or essential or outstanding potential sites such as heron rookeries or raptor nesting areas;
c. The adjacent land is susceptible to severe erosion and erosion control measures will not effectively prevent adverse wetland impacts;
d. The adjacent land has minimal vegetative cover or slopes greater than 20 percent.

C. If buffer width averaging is utilized and significant trees are identified on the outer edge of the reduced buffer such that their drip line extends beyond the buffer edge, the following tree protection requirements must be followed:
1. A tree protection area shall be designed to protect each tree or tree stand during site development and construction. Tree protection areas may vary widely in shape, but must extend a minimum of five feet beyond the existing tree canopy area along the outer edge of the dripline of the tree(s), unless otherwise approved by the Department.
2. Tree protection areas shall be added and clearly labeled on all applicable site development and construction drawings, submitted to the Department.
3. Temporary construction fencing at least 30 inches tall shall be erected around the perimeter of the tree protection areas prior to the initiation of any clearing or grading. The fencing shall be posted with signage clearly identifying the tree protection area. The fencing shall remain in place through site development and construction.
4. No clearing, grading, filling or other development activities shall occur within the tree protection area, except where approved in advance by the Department and shown on the approved plans for the proposal.
5. No vehicles, construction materials, fuel, or other materials shall be placed in tree protection areas. Movement of any vehicles within tree protection areas shall be prohibited.
6. No nails, rope, cable, signs, or fencing shall be attached to any tree proposed for retention.
7. The Department may approve the use of alternate tree protection techniques if an equal or greater level of protection will be provided.

(Ord. 2004-56s § 4 (part), 2004)

18E.30.070 Appendices.

A. Wetland Categories.
B. Information to be Included in a Wetland Analysis Report.
C. Mitigation Plan for Regulated Activities in Buffers.
D. Compensatory Mitigation Plan for Regulated Activities in Wetlands, Conceptual Phase.
E. Compensatory Mitigation Plan for Regulated Activities in Wetlands, Detailed Phase.
F. Wetland Buffer Widths.

18E.30.070 -- Appendix A
Wetland Categories

Wetland categories shall be designated according to the following generalized criteria:

CATEGORY I

Category I wetlands are:
- Relatively undisturbed estuarine wetlands larger than 1 acre
- Wetlands that are identified by scientists of the Washington Natural Heritage Program/DNR as high quality wetlands
- Bogs
- Mature and Old growth forested wetlands larger than 1 acre
- Wetlands in coastal lagoons
- Wetlands that perform many functions well (wetlands scoring 70 points or more – out of 100) on the questions related to functions.

These wetlands are those that:
- represent a unique or rare wetland type; or
- are more sensitive to disturbance than most wetlands; or
- are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or
- provide a high level of functions.

CATEGORY II

Category II wetlands are:
- Estuarine wetlands smaller than 1 acre, or disturbed estuarine wetlands larger than 1 acre,
- A wetland identified by the state Department of Natural Resources as containing "sensitive" plant species,
- Wetlands with a moderately high level of functions (wetlands scoring between 51-69 points (out of 100) on the questions related to the functions

CATEGORY III
Category III wetlands are:
- wetlands with a moderate level of functions (scores between 30 -50 points)

CATEGORY IV
- Category IV wetlands have the lowest levels of functions (scores less than 30 points) and are often heavily disturbed.

The Category of a wetland shall not be changed to recognize illegal modifications to the wetland.
(Ord. 2004-56s § 4 (part), 2004)

18E.30.070 - Appendix B
Information to be Included in a Wetland Analysis Report

A wetland analysis report shall include the following:

A. Vicinity map and detailed driving instructions to the site;

B. A site map setting forth all of the following:
   1. Surveyed wetland boundaries based upon a delineation by a wetlands specialist (Note: this information may also be submitted in a digital format, which is designated as acceptable by the County);
   2. Wetlands and buffers offsite, within 315 feet of the site boundaries, are also to be discussed and shown in as much detail as possible;
   3. Site boundary property lines and roads;
   4. A north arrow and scale;
   5. Internal property lines, rights-of-way, easements, etc.;
   6. Existing physical features of the site including buildings, fences, and other structures, roads, parking lots, utilities, water bodies, etc.;
   7. Contours at the smallest readily available intervals, preferably at two-foot intervals;
   8. Hydrologic mapping showing patterns of surface water movement and known subsurface water movement into, through, and out of the site area; and
   9. Location of all test holes and vegetation sample sites, and wetland boundary flags numbered to correspond with flagging in the field and field data sheets.

C. A report which includes the following:
   1. Location information (legal description, parcel number, and address);
   2. Delineation analysis results. The wetland boundaries on the site established by the delineation shall be staked and flagged in the field. If the wetland extends outside the site, the delineation report shall discuss all wetland areas within 300 feet of the site, but need only delineate those wetland boundaries within the site;
   3. General site conditions including topography, acreage, and surface areas of all wetlands identified in the Pierce County Wetland Atlas and water bodies within one-quarter mile of the subject wetland(s);
   4. Hydrological analysis, including topography of existing surface and known significant sub-surface flows into and out of the subject wetland(s); and
   5. Discussion of the values of existing wetlands, including vegetative, faunal, and hydrologic conditions and the presence of threatened, endangered, candidate, sensitive or monitor species;

E. A summary of the proposed activity and potential direct or indirect impacts to the wetland(s) including stormwater-related impacts to wetland hydrology;

F. Recommended wetland category, including rationale for the recommendation;

G. Recommended buffer boundaries, including rationale for boundary locations;

H. Proposed on-site residential density transfer from wetlands and/or buffers to upland areas;

I. Site plan of proposed activity, including location of all parcels, tracts, easements, roads, structures, and other modifications to the existing site. The location of all wetlands and buffers shall be identified on the site plan.

J. The wetland analysis report shall be signed and dated by the wetland specialist.

(Ord. 2004-56s § 4 (part), 2004)

18E.30.070 - Appendix C
Mitigation Plan for Regulated Activities in Buffers

A. A mitigation plan for regulated activities in buffers shall be prepared, signed, and dated by a wetland specialist and shall contain the following:
   1. General goals of the mitigation plan including a discussion of the function and values of impact and enhancement areas;
   2. Approximated site topography before and after alteration;
   3. Location of proposed mitigation area (include a north arrow and scale);
   4. General hydrologic patterns on the site before and after construction;
   5. General plant selection and justification, planting instructions, and approximate planting sequencing and schedule;
   6. A maintenance plan;
   7. A monitoring and contingency plan. Monitoring is to occur a minimum of three years.
   8. Estimated costs for the installation, maintenance, and monitoring phases of the project. Separate estimates shall be prepared for the installation phase and monitoring and maintenance phase of the project; and
   9. Address and phone number of person or organization responsible for monitoring requirements.

B. Upon Department review and approval of this plan, it shall become the detailed plan.

(Ord. 2004-56s § 4 (part), 2004)

18E.30.070 - Appendix D
Compensatory Mitigation Plan for
Regulated Activities in Wetlands - Conceptual Phase

A. The conceptual phase of a mitigation plan for regulated activities in wetlands shall be prepared, signed, and dated by a wetland specialist and shall include the following:
    1. General goals of the compensatory mitigation plan, including an overall goal of no net loss of wetland function, value, and acreage;
    2. Mitigation projects that involve Category I wetlands associated with documented habitat for endangered or threatened plant, fish, or animal species or for potentially extirpated plant species recognized by State or Federal agencies must also demonstrate a net benefit to the conservation of the affected species;
    3. Site topography before and after construction;
    4. Location of proposed wetland mitigation area;
    5. General hydrologic patterns on the site before and after construction;
    6. Field data confirming the presence of adequate hydrology to support the existing and created wetland area(s). At a minimum, the following information shall be included:
        a. Seasonal (growing season) water level;
        b. Sources of water (if the water source is adjacent to a stream or river then no instream structures will be allowed that restrict fish migration or access);
        c. Pre- and post-development inflow and outflow volumes and velocity and frequency of flooding;
        d. Groundwater and surface water table (from "Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals," 1994, COE, EPA, DOE, USFWS, WDFW);
    7. Nature of mitigation, including wetland types (in-kind and out-of-kind), general plant selection and justification, approximate project sequencing and schedule, and approximate size of the new wetland buffer. A discussion of the function and values of both the impact and creation areas is also to be provided;
    8. A conceptual maintenance plan; and
    9. Conceptual monitoring and contingency plan.

B. Once the Department approves the conceptual mitigation plan, a detailed mitigation plan shall be submitted. Due to the complex nature of creating and restoring wetlands, very detailed plans are needed (See 18E.30.070 - Appendix E for further information on detailed mitigation plans).

(Ord. 2004-56s § 4 (part), 2004)

18E.30.070 - Appendix E
Compensatory Mitigation Plan for Regulated Activities in Wetlands - Detailed Phase

I. OUTLINE OF DETAILED MITIGATION PLAN

A. The detailed mitigation plan shall contain the following:
   1. Site specific, quantifiable criteria for evaluating whether or not the goals for the proposed compensation are being met. Such criteria shall include the establishment of viable plant communities, hydric soil formation, and establishment of wetland hydrology, and may include water quality standards, species abundance and diversity targets, habitat diversity indices, or other ecological, geological, or hydrological criteria (see subsection III. below for specific performance standards).
   2. Pre-development analysis of the proposed compensation area including:
      a. Existing vegetation community analysis;
      b. Hydrological analysis that demonstrates the project will not adversely impact existing wetland and buffer areas and that ensures adequate hydrology for any created wetland areas (see subsection V. for specific requirements);
      c. Onsite soils analysis data and, where appropriate, Natural Resources Conservation Service Mapping;
      d. Detailed description of flora and fauna existing on the site; and
      e. Description of existing site conditions in relation to historic conditions for those sites which have been recently altered or degraded.
   3. Proposed post-development conditions within existing wetland and buffer areas and mitigation areas, including:
      a. Relationship of the project to the watershed and existing water bodies;
      b. Topography, using one-foot contour intervals;
      c. Hydrologic analysis (see subsection V. for specific requirements);
      d. Grading, filling, and excavation, including a description of imported soils;
      e. Irrigation requirements;
      f. Erosion control measures during construction; and
      g. Areal coverage of planted areas to open water areas (if any open water is to be present.
   4. Detailed site diagrams, to-scale construction drawings with cross-section data, topographic maps showing slope percentage and final grade elevations, and any other drawings appropriate to show construction techniques or anticipated final outcome. The plan shall provide for elevations which are appropriate for the desired habitat type(s). The construction drawings must include a note that requires the contractor to refer to the approved mitigation plan.
   5. Planting plan prepared by a wetland specialist that shall include the following:
      a. Soils and substrate characteristics;
      b. Specification of substrate stockpiling techniques;
      c. Planting instructions, including species, stock type and size, density or spacing of plants, and water and nutrient requirements; and
      d. Specification of where plant materials will be procured. Documentation shall be provided which guarantees plant materials are to be procured from licensed regional nurseries or from wetlands on site which are part of the mitigation plan.

6. Schedule showing dates for beginning and completing the mitigation project, including a sequence of construction activities.
7. Monitoring and maintenance plan which includes the following:
   a. Specification of procedures for monitoring and site maintenance; and
   b. Schedule for submitting monitoring reports.
8. Detailed contingency plan, consistent with subsection IV. below.
9. Detailed budget for implementing the mitigation plan, including construction, monitoring, maintenance, and contingency phases.
10. Financial guarantee for the work to be performed as planned and approved. Separate guarantee estimates shall be prepared for the installation phase and monitoring and maintenance phase of the project.
11. Address and phone number of the person or organization responsible for monitoring requirements.

II. LOCATION CRITERIA

In cases in which it is determined that compensatory mitigation is appropriate, the following shall apply:

A. Compensatory mitigation shall be provided on-site, except where the applicant demonstrates that on-site mitigation is not scientifically feasible or practical due to physical features of the site.
B. When compensatory mitigation cannot be provided on-site, it shall be provided in the immediate vicinity of and within the same watershed as the regulated activity.

III. MITIGATION PERFORMANCE STANDARDS

A. When regulated activities occur in wetlands, the applicant shall restore, create, or enhance equivalent areas of wetlands. Equivalent areas shall be determined according to acreage, functional value, type, location, time factors, and projected success. No overall net losses shall occur in wetland acreage, functions and/or values, and any restored, created, or enhanced wetland shall be as persistent as the wetland it replaces.
B. When an applicant proposes to alter or eliminate wetland, the applicant shall replace acreage at the following ratios:
   Category I: 6:1 (acreage replacement: acreage lost)
   Category II: 3:1
   Category III: 2:1
   Category IV: 1.5:1
C. Ratios provided are for proposed projects with on-site, in-kind replacement which occurs prior to regulated activities on the site. The Department may increase the ratios under the following circumstances:
   1. Uncertainty as to the probable success of the proposed restoration or creation; or
   2. Significant period of time between destruction and replication of wetland functions; or
   3. Projected losses in wetland functions and value; or
   4. Off-site and/or out-of-kind compensation.

D. The Department may allow enhancement of existing or created wetland area(s) as a means of reducing the standard acreage replacement ratio if the applicant demonstrates that no net loss of wetland function or value will result provided that:
   1. Enhancement mitigation ratios shall be no less than twice the standard creation ratio of the impacted wetland.
   2. The applicant may be required to complete an analysis of the impact and mitigation areas in support of the acreage replacement ratio reduction. An example of an acceptable analysis methodology is the Washington State Department of Ecology Wetland Function Assessment Methodology (Ecology Publication # 99-116); however, other methodologies may be proposed.
   3. The County will not allow the acreage replacement ratio to be reduced to less than 1:1 except as described in III-E below.

E. In the case of Category II, III, and IV wetlands, the replacement ratio may be decreased to a ratio of less than 1:1 if, following a public hearing, the Hearing Examiner determines the following:
   1. A replacement ratio of greater than 1:1 is either not feasible on-site or would be likely to result in substantial degradation of other natural features; and
   2. The mitigation plan shows that a net increase in wetland functional values will result from the mitigation; and
   3. The mitigation is completed, and then monitored by the Department for one year prior to the issuance of permits. If after one year of monitoring, the Department is not satisfied that the anticipated final outcome of the mitigation plan will be met, modifications to the mitigation plan and further monitoring may be required. When the Department is satisfied that the mitigation will be successful, permits pending will be issued.

F. In-kind compensation shall be provided except where the applicant demonstrates that:
   1. Greater functional and habitat values can be achieved through out-of-kind mitigation; and
   2. The wetland system is already significantly degraded; or
   3. Problems such as the presence of exotic vegetation and changes in watershed hydrology make implementation of in-kind compensation infeasible; or
   4. Out-of-kind replacement will best meet identified regional goals (e.g., replacement of historically diminished wetland types).

G. Design requirements for the mitigation plan shall, at a minimum, include the following:
   1. Use only native plants indigenous to Pierce County (not introduced or exotic species);
   2. Use plants appropriate to the depth of water at which they will be planted;
   3. Use plants that originate and are available from local sources;
   4. Use plant species high in food and cover value for fish and wildlife;
   5. Plant mostly perennial species;
   6. Avoid committing significant areas of site to species that have questionable potential for successful establishment;
   7. Water depth is not to exceed 6.5 feet (2 meters);
   8. The grade or slope that water flows through the wetland is not to exceed 6 percent;
   9. Slopes within the wetland and buffer should not be steeper than 3:1 (horizontal to vertical);
   10. Planting densities and placement of plants shall be shown on the design plans;

11. The wetland should not contain more than 60 percent open water as measured at the seasonal high water mark;
12. Stockpiling shall be confined to upland areas and contract specifications should limit stockpile durations to less than four weeks. Erosion control measures shall be in effect at the stockpiling location;
13. Planting instructions shall describe proper placement, diversity, and spacing of seeds, tubers, bulbs, rhizomes, sprigs, plugs, cuttings, and transplanted stock;
14. Apply controlled release fertilizer at the time of planting and afterward only as plant conditions warrant (determined during the monitoring process), and only to the extent that the release would be conducted in an environmentally sound manner;
15. Install an irrigation system, as necessary, until plants are established.

H. Mitigation projects are unique and performance standards will differ based upon the goals and objectives of the project. However, performance standards pertaining to water regime, vegetative structure and establishment, and hydric soil formation are to be established for all mitigation projects, as defined below:
   1. The mitigation wetland must meet the technical criteria for wetland hydrology, seasonal inundation, and/or saturation to the surface for a consecutive number of days greater than or equal to 12.5 percent of the growing season. Areas that are seasonally inundated and/or saturated to the surface for a consecutive number of days between 5 percent and 12.5 percent of the growing season may also be wetlands. Hydrology may be monitored through the use of one or a combination of the following: groundwater wells, piezometers, crest gauges, hand-dug soil pits, staff gauges, and continuous recording flow meters.
   2. At a minimum, vegetative success equals the establishment of a multi-species, mixed canopy community comprised of emergent, scrub-shrub, and tree species. Yearly standards pertaining to survival and aerial coverage shall also be established for each vegetative stratum.
   3. Hydric soil characteristics shall be monitored through the use of one or a combination of the following: Munsell soil color, pH, particle size, redox potential, organic content, microbial activity, time and duration of saturation or ponding, and alkalinity.

IV. MONITORING PROGRAM AND CONTINGENCY PLAN

A. A contingency plan shall be established for compensation in the event the mitigation project is inadequate or fails. The contingency plan is to provide specific corrective measures for such common mitigation plan failings as plant mortality, vandalism, damage due to wildlife grazing, grading errors, and hydro-regime problems. A financial guarantee on a form acceptable to the County is required for the duration of the monitoring period, and the guarantee plus any accrued interest will be released by the County when the required mitigation and monitoring are completed. To determine the amount of the financial guarantee, an estimate shall be submitted to the County detailing the work to be accomplished and the cost thereof. The estimate shall be based on current costs. The County will review the estimate and, if acceptable, will establish the financial guarantee at 125 percent of the estimate to allow for inflation and administration expenses should the County have to complete the project.

B. Requirements of the monitoring program are as follows:
   1. Scientific procedures are to be used for establishing the success or failure of the project.
   2. Monitoring reports prepared by a wetland specialist are to be submitted for Department review. Monitoring reports shall include discussions of wildlife utilization of the site, vegetation establishment, water quality, water flow, stormwater storage and conveyance, and existing or potential degradation, according to the following schedule:
      a. At completion of construction of mitigation project (as-built report);
      b. Thirty days after completion;
      c. Early in the first growing season after construction;
      d. End of the first growing season after construction;
      e. Twice the second year; and
      f. Annually after the second year.
   3. Monitor for a period of time appropriate to the nature of the project (single-family versus commercial) and the complexity of the mitigation project. The majority of monitoring programs will last a minimum of five years.
   4. The County will require a Right of Entry Form, as set forth in 18E.10.140 - Appendix C., be recorded that allows County staff access to the mitigation area through completion of the monitoring program.
   5. Correct for failures in the mitigation project.
   6. Replace dead or undesirable vegetation with appropriate plantings.
   7. Repair damages caused by erosion, settling, or other geomorphological processes.
   8. If necessary, redesign mitigation project and implement the new design.
   9. Correction procedures shall be approved by a wetland specialist and the Department Director or designee.

V. HYDROLOGY MONITORING GUIDELINES

A. Applicants are required to ensure that the proposed development does not result in adverse impacts to regulated wetland and/or buffers. To achieve this, an applicant must demonstrate the project will not adversely affect the wetland hydroperiod. To determine existing hydroperiod, use one of the following methods, listed in order of preference:
   1. For Category I, II, III, and forested Category IV wetlands:
      a. Estimation by a continuous simulation computer model. The model should be calibrated with at least one year of data taken using a continuously recording level gage under existing conditions and should be run for the historical rainfall period. Acceptable computer models include HSPF, KCRTS, or Department of Ecology WWHM. The resulting data can be used to express the magnitudes of depth fluctuation, as well as the frequencies and durations of surpassing given depths.
      b. Measurement during a series of time intervals (no longer than one month in length) over a period of at least one year of the maximum water stage, using a crest stage gage, and instantaneous water stage, using a staff gage.

(1) The resulting data can be used to express water level fluctuation (WLF) during the interval as follows:

Average base stage = (instantaneous stage at beginning of interval + instantaneous stage at end of interval)/2

WLF = Crest stage - Average base stage

(2) Compute mean annual and mean monthly WLF as the arithmetic averages for each year and month for which data are available.

2. For scrub-shrub and emergent Category IV wetlands a single-event model may be used to ensure that there is no change in the volume of water delivered to the wetland under post-development conditions.

B. To forecast future hydroperiod, complete an estimation by the continuous simulation computer model calibrated during pre-development analysis and run for the historical rainfall period. The resulting data can be used to express the magnitudes of depth fluctuation, as well as the frequencies and durations of surpassing given depths. [Note: Post-development modeling results should generally be compared with pre-development modeling results, rather than directly with field measurements, because different sets of assumptions underlie modeling and monitoring. Making pre- and post-development comparisons on the basis of common assumptions allows cancellation of errors inherent in the assumptions.]

C. A hydroperiod analysis is to be used to ensure that the following hydroperiod limits are met:
   1. Mean annual WLF (and mean monthly WLF for every month of the year) does not exceed 20 cm. Vegetation species richness decrease is likely with: (1) a mean annual (and mean monthly) WLF increase of more than 5 cm (2 inches or 0.16 feet) if pre-development mean annual (and mean monthly) WLF is greater than 15 cm, or (2) a mean annual (and mean monthly) WLF increase to 20 cm or more if pre-development mean annual (and mean monthly) WLF is 15 cm or less.
   2. The frequency of stage excursions of 15 cm above or below pre-development stage does not exceed an annual average of six.
   3. The duration of stage excursions of 15 cm above or below pre-development stage does not exceed 72 hours per excursion.
   4. The total dry period (when pools dry down to the soil surface everywhere in the wetland) does not increase or decrease by more than two weeks in any year.
   5. The following hydroperiod limits characterize wetlands inhabited by native amphibians listed as regulated wildlife species in Section 18E.40.020 and apply to breeding zones during the time period of February 1 through May 31. (Note: If these limits are exceeded, then amphibian breeding success is likely to decline.)
      a. The magnitude of stage excursions above or below the pre-development stage does not exceed 8 cm, and the total duration of these excursions does not exceed 24 hours in any 30-day period.
      b. To apply this guideline a continuous simulation computer model needs to be employed. The model should be calibrated with data taken under existing conditions at the wetland being analyzed and then used to forecast post-development magnitude and duration of excursions.

(Ord. 2004-56s § 4 (part), 2004)

18E.30.070 - Appendix F
Width of Buffers by Category of Wetland

Table 1. Width of Buffers Needed to Protect Category IV Wetlands		
Wetland Characteristics	**Buffer Width Adjustment to 25 feet base width (based on impact of land use)**	**Other Protection**
Score for functions < 30 points	Low – No change Moderate – No change High – Increase by 25 feet	N/A

Table 2: Width of Buffers Needed to Protect Category III Wetlands		
Wetland Characteristics	**Buffer Widths Adjustments to 50 feet base width (by impact of land use)**	**Other Protection**
Moderate level of function for habitat (score for habitat is 20 - 28 pts.)	Low – Increase by 25 feet Moderate – Increase by 60 feet High – Increase by 100 feet	N/A
Not meeting above criteria	Low – Decrease by 10 feet Moderate – No change High – Increase by 30 feet	N/A

Table 3: Width of Buffers Needed to Protect Category II Wetlands		
Wetland Characteristics	**Buffer Widths Adjustments to 100 feet base width (by impact of land use/apply most protective)**	**Other Protection**
High level of function for habitat (score for habitat is 29-36 pts.)	Low – Increase by 50 feet Moderate – Increase by 125 feet High – Increase by 200 feet	Maintain connectivity to fish and wildlife species and ha 18E.40 areas
Moderate level of function for habitat (score for habitat is 20 - 28 pts.)	Low - Decrease by 25 feet Moderate – Increase by10 feet High – Increase by 50 feet	N/A
High level of function for water quality improvement and low for habitat (score water quality is 24-32 pts and habitat is less than 20)	Low – Decrease by 50 feet Moderate – Decrease by 25 feet High – No change	No additional discharges of untreated runoff
Estuarine	Low – Decrease by 25 feet Moderate – Increase by 10 feet High – Increase by 50 feet	N/A

Table 3: Width of Buffers Needed to Protect Category II Wetlands		
Wetland Characteristics	**Buffer Widths Adjustments to 100 feet base width (by impact of land use/apply most protective)**	**Other Protection**
Category II not meeting above criteria	Low – Decrease by 50 feet Moderate – Decrease by 25 feet High – No Change	N/A

Table 4: Width of Buffers Needed to Protect Category I Wetlands		
Wetland Characteristics	**Buffer Widths Adjustments to 150 feet base width (by impacts of land use/apply most protective)**	**Other Protection**
Natural Heritage Wetlands	Low – Decrease by 25 feet Moderate – Increase by 40 feet High – Increase by 100 feet	No additional discharges of surface water. No septic systems within 300 feet Restore degraded parts of buffer
Bogs	Low – Decrease by 25 feet Moderate – Increase by 40 feet High – Increase by 100 feet	No additional surface discharges Restore degraded parts of buffer
Forested	Buffer size to be based on score for habitat functions or water quality functions	If forested wetland scores high for habitat need to maintain connectivity to other natural areas Restore degraded parts of buffer
Estuarine	Low - Decrease by 50 feet Moderate – No Change High – Increase by 50 feet	N/A
Wetlands in Coastal Lagoons	Low – Decrease by 50 feet Moderate – No Change High – Increase by 50 feet	N/A
High level of function for habitat (score for habitat is 29-36 pts.)	Low – No Change Moderate – Increase by 75 feet High – Increase by 150 feet	Maintain connectivity to other natural areas Restore degraded parts of buffer
Moderate level of function for habitat (score for habitat is 20 - 28 pts.)	Low – Decrease by 75 feet Moderate – Decrease by 40 feet High – No change	N/A
High level of function for water quality improvement (score for WQI is 24-32) and low for habitat (score for habitat is less than 20 points)	Low – Decrease by 100 feet Moderate – Decrease by 75 feet High – Decrease by 50 feet	No additional discharges of untreated runoff

Table 4: Width of Buffers Needed to Protect Category I Wetlands		
Wetland Characteristics	**Buffer Widths Adjustments to 150 feet base width (by impacts of land use/apply most protective)**	**Other Protection**
Category I wetlands not meeting any of the above criteria	Low – Decrease by 100 feet Moderate – Decrease by 75 feet High – Decrease by 50 feet	N/A

NOTE: If the wetland meets more than one of the criteria listed in each table, the buffer needed to protect the wetland is the widest one.

(Ord. 2004-56s § 4 (part), 2004)

Chapter 18E.40

REGULATED FISH AND WILDLIFE SPECIES AND HABITAT CONSERVATION AREAS

Sections:

18E.40.010 Purpose.

Many land use activities can impact the habitats of fish and wildlife. Special care must be taken in the management of lands that support critical fish and wildlife species to ensure that development occurs in a manner that is sensitive to their habitat needs. The purpose of this Chapter is to identify regulated fish and wildlife species and habitats and establish habitat protection procedures and mitigation measures that are designed to achieve no "net loss" of species and habitat due to new development or regulated activities. (Ord. 2004-56s § 4 (part), 2004)

18E.40.020 Fish and Wildlife Species and Habitat Conservation Areas.

A. **General.** Fish and wildlife habitat conservation areas are those areas that support regulated fish and wildlife species, typically identified either by known point locations of specific species (such as a nest or den) or by habitat areas or both.

B. **Federally- and State-Listed Species and their Associated Habitats.** Areas which have a primary association with federally-listed endangered, threatened, and candidate species of fish or wildlife (as specified in 50 CFR 17.11 or 50 CFR 17.12) or State-listed endangered, threatened, sensitive, candidate, and monitor species (as specified in WAC 232-12-297 and WDFW Policy M-6001) that if altered may reduce the likelihood that the species will survive and reproduce over the long term. A list of endangered, threatened, sensitive, candidate, and monitor species found in Pierce County is available at the Pierce County Planning and Land Services Department.

C. **Species of Local Importance and their Associated Habitats.** In addition to federally- and state-listed species, the following fish and wildlife species and their associated habitat areas shall be regulated under this Chapter:

1. **Fish.** Coho salmon, chinook salmon, bull trout, pink salmon, chum salmon, sockeye salmon, cutthroat trout, native/wild rainbow trout/steelhead, greenlings (lingcod), Pacific whiting, smelt (longfin, surfsmelt), herring, and sandlance (Pacific).
2. **Birds.** Osprey.

3. **Vulnerable Aggregations.** Vulnerable aggregations of fish and wildlife species as defined in the Washington Department of Fish and Wildlife Priority Habitats and Species/Heritage Program that reside in Pierce County. A list of vulnerable aggregations of fish and wildlife species found in Pierce County is available at the Pierce County Planning and Land Services Department.

D. **Habitats of Local Importance.** Documented habitat areas or potential habitat areas and point locations for fish and wildlife species. These areas include specific habitat types, which are infrequent in occurrence in Pierce County and may provide specific habitats with which endangered, threatened, sensitive, candidate, or monitor fish and wildlife species have a primary association, such as breeding habitat, winter range, and movement corridors. These areas include the following:

1. Oregon white oak trees and woodlands. Oregon white oak woodlands, stands, and individual trees meeting the following criteria shall be considered priority habitat and shall be subject to protection under the provisions of this Chapter:
   a. Priority Oregon White Oak Woodlands. Stands of Oregon white oak or oak/conifer associations where the stand is at least one acre in size and the canopy coverage of the oak component of the stand is greater than or equal to 25 percent. (See Figure 18E.40-1 in Chapter 18E.120.)
   b. Significant Oaks and Stands. Within the urban growth area, single oaks or stands of oaks smaller than one acre in size when any of the following criteria are met:
      (1) Individual trees having a diameter at breast height of 20 inches or more; or
      (2) Oregon white oak stands in which the oak trees have an average diameter at breast height of 15 inches or more regardless of stand size.
2. Prairies.
3. Old growth/mature forests.
4. Caves.
5. Cliffs.
6. Snag-rich areas and downed logs. Priority logs are $\geq$ 30 cm (12 in) in diameter at the largest end, and $\geq$ 6 m (20 feet) long. Priority snag and downed log habitat includes individual snags and/or logs, or groups of snags and/or logs of exceptional value to wildlife due to their scarcity or location in a particular landscape. Areas with abundant, well-distributed snags and logs are also considered priority snag and log habitat. Examples include large, sturdy snags adjacent to open water, remnant snags in developed or urbanized settings, and areas with a relatively high density of snags.
7. Elk herd winter range.
8. Talus. Talus areas that support pica or rock rabbit, Van Dyke's salamander, western redback salamander, northern alligator lizard, or western fence lizard.
9. Commercial and recreational shellfish areas.
10. Kelp and eelgrass beds.
11. Herring, smelt, and sandlance spawning areas.
12. Waters of the state and/or natural waters and adjacent riparian-shoreline areas (165 feet landward measured from the ordinary high water mark) including:
    a. All water bodies classified by the Washington Department of Natural Resources (DNR) water typing classification system as detailed in WAC 222-16-030 and -031.
    b. All waters that support regulated fish or wildlife species (i.e., areas that have connectivity to fish bearing waters and may potentially provide habitat given no

natural barriers to fish passage).

c. Ponds and their submerged aquatic beds.
d. Side channels and/or off-channel habitat.

13. Estuaries and tidal marshes.
14. Connectable relic channels and oxbows. A relic channel or oxbow may be considered connectable when any of the following criteria are met:
    a. The channel or oxbow is associated with the river during high flow events;
    b. The depth of the channel or oxbow is at or very near the groundwater elevation;
    c. The channel or oxbow is likely to be captured by the river during high flow events;
    d. Excavation between the channel or oxbow and river will not result in adverse impacts to local groundwater levels or adjacent wetlands.
15. Wetlands (refer to Chapter 18E.30).
16. Heron rookeries.
17. Cavity nesting duck habitat.
18. Western bluebird non-artificial nesting sites.

E. **Potential Fish and Wildlife Habitat Conservation Areas.** Potential regulated fish and wildlife habitat conservation areas, as depicted on the Critical Areas Atlas-Critical Fish and Wildlife Habitat Area Maps, are those areas where the suspected presence of regulated fish or wildlife species is sufficient to require fish or wildlife habitat conservation area review. (See Figure 18E.40-2 in Chapter 18E.120.) Potential regulated fish and wildlife habitat conservation areas are determined using the following criteria:

1. A habitat area identified on one of the maps listed in 18E.10.140 - Appendix A, G. (includes but is not limited to breeding habitat, winter ranges, movement corridors, kelp and eelgrass beds, commercial and recreational shellfish areas, oak woodlands, rivers, streams, lakes, ponds, etc., as outlined in Section 18E.40.020 A.-D. above) plus the adjacent 165 feet surrounding the habitat area. Note: the 165 foot distance around rivers, streams, lakes, and ponds shall be measured from the ordinary high water mark.
2. A point location identified on one of the maps listed in 18E.10.140 - Appendix A, G. (including but not limited to nests, dens, rookeries, etc.) plus the adjacent 800 feet surrounding the point location.
3. Bald eagle foraging areas (1/2 mile from the nest in either direction along the shoreline and 250 feet landward measured from the ordinary high water mark).

(Ord. 2004-56s § 4 (part), 2004)

18E.40.030 Fish and Wildlife Habitat Conservation Area Review Procedures.

A. **General Requirements.**

1. The Pierce County Critical Areas Atlas-Critical Fish and Wildlife Habitat Area Maps provide an indication of where potential regulated fish and wildlife habitat areas are located within the County. The presence or location of a potential regulated fish or wildlife species, habitat area, or point location that has not been mapped, but that may be present on or adjacent to a site, shall be determined using the procedures and criteria established in this Chapter.
2. The Department will complete a review of the Critical Areas Atlas - Critical Fish and Wildlife Habitat Area Maps and other source documents for any proposed regulated activity to determine whether the site for the regulated activity is located within a

potential regulated fish or wildlife habitat. Identification of a potential regulated fish or wildlife habitat area may also occur as a result of field investigation conducted by Department or Washington Department of Fish and Wildlife staff.

3. When the Department's maps, sources, or field investigation indicates that the site for a proposed regulated activity is located within a potential regulated fish or wildlife habitat area, the Department shall require the submittal of a fish and wildlife application and habitat assessment to determine the presence or absence of regulated fish or wildlife species or habitat. The habitat assessment shall be documented as set forth in subsection 18E.40.040 B, below. (See Figure 18E.40-3 in Chapter 18E.120.)
4. Projects undergoing review for regulated fish and wildlife habitat areas shall be routed to tribal agencies with jurisdiction for review. Tribes will have an opportunity to provide specific species or habitat related information on proposed development sites. If necessary, the Department will seek additional assistance from the Washington Department of Fish and Wildlife and similar appropriate State and Federal agencies.
5. Approval of a fish and wildlife application shall be granted upon a determination that the habitat assessment and mitigation plan, if applicable, are thorough and accurate and meet all requirements of this Title.
6. If application of the standards contained in this Chapter would deny all reasonable use of a site, the applicant may pursue a Reasonable Use Exception as set forth in Section 18E.20.050.
7. Unless otherwise stated in this Chapter, the critical area protective measure provisions contained in Section 18E.10.080 shall apply.

B. **Habitat Assessment.** A habitat assessment is a site investigation process to evaluate the potential presence or absence of a regulated fish or wildlife species or habitat affecting a subject property.

1. The applicant may select a wetland specialist or a fish or wildlife biologist, as allowed by this Section, or Department staff to conduct a habitat assessment to determine whether or not a regulated fish or wildlife habitat area, point location, and any associated buffer are located on the site for a proposed development as outlined below:
    a. Applicants for single-family dwellings or agricultural activities may retain Department staff to complete the habitat assessment as follows:
        (1) Requests for Department staff to conduct a habitat assessment shall be accompanied with a fish and wildlife habitat area application and associated fee(s).
        (2) If Department staff conducts the habitat assessment and determines that no regulated fish or wildlife habitat areas, point locations, or associated buffers are present on the site, then fish and wildlife habitat area review will be considered complete.
        (3) If Department staff conducts the habitat assessment and determines that regulated fish or wildlife habitat areas, point locations, or associated buffers are present on the site, then the Department will offer the applicant the option of either complying with standard requirements set forth in Section 18E.40.040 or seeking approval of an alternate approach. For alternate approaches, applicant shall be required to submit a habitat assessment study or a habitat assessment report as outlined in subsection 18E.40.030 B.1.b.

b. If the regulated fish or wildlife habitat area is a point location or species-related habitat area, then a fish or wildlife biologist, as appropriate, shall conduct the habitat assessment. If the regulated fish or wildlife habitat area is solely related to the presence of a natural water, then either a fish or wildlife biologist or Wetland Specialist may conduct the habitat assessment. In either instance the following documentation shall be submitted to the Department.
   (1) If the field investigation determines that a fish or wildlife habitat conservation area, point location or associated buffer is not located on the site, then a habitat assessment letter shall be submitted for County review. The habitat assessment letter shall meet the requirements contained in 18E.40.070 - Appendix A. (See Figure 18E.40-3 in Chapter 18E.120.)
   (2) If the field investigation determines a fish or wildlife habitat conservation area, point location, or associated buffer is located on the site and the proposed regulated activity complies with the standards set forth in Section 18E.40.040 and the buffer requirements as set forth in Section 18E.40.060, then a habitat assessment study shall be submitted for County review. The habitat assessment study shall meet the requirements contained in 18E.40.070 - Appendix B. (See Figure 18E.40-3 in Chapter 18E.120.)
   (3) If the field investigation determines a fish or wildlife habitat conservation area, point location, or associated buffer is located on the site but the proposed development activity does not or cannot comply with the standards set forth in Section 18E.40.040 or the buffer requirements as set forth in Section 18E.40.060, then a habitat assessment report shall be submitted for County review. The habitat assessment report shall meet the requirements contained in 18E.40.070 – Appendix C. (See Figure 18E.40-3 in Chapter 18E.120.)
   (4) Habitat assessments shall be submitted to the Department for review and approval together with a fish and wildlife habitat area application and associated fee(s).
   (5) Habitat assessments shall be prepared, signed, and dated by a wetland specialist, fisheries or wildlife biologist, as applicable to the particular species or habitat type.
   (6) Habitat assessment reports shall address the mitigation requirements set forth in Section 18E.40.050.

2. All habitat assessments submitted under the requirements of this Chapter shall, at a minimum, include the following:
   a. The parcel number of the subject property.
   b. The site address of the subject property, if one has been assigned by the County.
   c. The date and time when the site evaluation for the habitat assessment was conducted and the date when the habitat assessment was prepared.
   d. The credentials of the fish or wildlife biologist who prepared the habitat assessment.
   e. The mailing address and phone number of the property owner and the fish or wildlife biologist that prepared the habitat assessment.
   f. A detailed description of the vegetation on and adjacent to the site.

g. Identification and a detailed description of any critical fish or wildlife species or habitats, as set forth in Section 18E.40.020, on or adjacent to the site and the distance of such habitats or species in relation to the site. Describe efforts to determine the status of any critical species in the project area, including information on survey methods, timing, and results of surveys for species or suitable habitat identification.
h. Include any information received from biologists with special expertise on the species or habitat type, such as WDFW, Tribal, USFS, or other local, regional, federal, and university fish, wildlife and habitat biologists and plant ecologists. Include any such conversations in the habitat assessment and cite as personal communication.
i. A map showing the location of the site, including written directions.
j. The Department may also require that the applicant request a separate evaluation of the site by WDFW staff to confirm the findings of the habitat assessment.

3. The Department shall review the habitat assessment and either:
   a. Accept the habitat assessment and approve the critical fish and wildlife application; or
   b. Reject the habitat assessment and notify the applicant in writing of the reasons why the habitat assessment was rejected.

C. **Combined Habitat Assessment – Wetland Review Process.** When the Department's maps, sources, or field investigation indicates that the site of a proposed regulated activity is located within both a potential regulated fish and wildlife habitat area and a wetland or buffer, the applicant may be allowed to submit the results of both the habitat assessment, as set forth in subsection 18E.40.040 B., and wetland review, as defined in Section 18E.30.030, as one application along with the associated fee.

(Ord. 2004-56s § 4 (part), 2004)

18E.40.040 Fish and Wildlife Habitat Conservation Area Standards.

A. **General.**
1. All regulated activities shall be located outside fish and wildlife habitat conservation areas and their associated buffers, as outlined in Section 18E.40.060.
2. Where encroachment into the standard or averaged buffer as allowed by Section 18E.40.060 cannot be avoided, the applicant may follow the standards outlined in Section 18E.40.040, subsections B., C., or D.
3. If a regulated activity cannot meet the requirements of Section 18E.40.040, subsections B., C., or D., then an applicant may pursue a variance or reasonable use exception as outlined in Chapter 18E.20.
4. If the Department determines that mitigation is necessary to offset the identified impacts from a proposed development, the applicant shall comply with the mitigation requirements set forth in Section 18E.40.050.
5. Wetlands shall be regulated pursuant to the requirements contained in Chapter 18E.30.

B. **Riparian Areas, Ponds, and Lakes, and Associated Buffers.** The following specific regulated activities may occur within a riparian area, river, stream, pond, or lake, or associated buffer subject to the following standards:
1. **Clearing and Grading.** When clearing and grading is permitted as part of an authorized regulated activity or as otherwise allowed in these standards, the following shall apply:

a. Grading is allowed only during the dry season, which is typically regarded as beginning on May 1st and ending on October 1st of each year, provided that the Department may extend or shorten the dry season on a case-by-case basis, determined on actual weather conditions. Clearing and grading may be allowed during the wet season if all drainage will flow away from any waterbody/ watercourse.
b. Filling or modification of a wetland or wetland buffer is permitted only if it is conducted as part of an approved wetland permit issued by the Department.
c. The soil duff layer shall remain undisturbed to the maximum extent possible. Where feasible, any soil disturbed shall be redistributed to other areas of the project site.
d. The moisture-holding capacity of the topsoil layer shall be maintained by minimizing soil compaction or reestablishing natural soil structure and infiltrative capacity on all areas of the site that impervious surfaces do not cover.
e. Erosion and sediment control that meets or exceeds the standards set forth in the Pierce County Stormwater Drainage Manual shall be provided.

2. **Vegetation Removal, Disturbance, and Introduction.** Vegetation removal shall be allowed subject to the following standards:
   a. Hazard trees may be cut provided that:
      (1) The applicant submits a report from a certified arborist, licensed architect, or professional forester that documents the hazard and provides a replanting schedule for the replacement trees and receives written approval from Pierce County authorizing tree removal;
      (2) Tree cutting shall be limited to limbing and crown thinning, unless otherwise justified by the landowner's expert. Where limbing or crown thinning is not sufficient to address the hazard, trees should be topped to remove the hazard rather than cut at or near the base of the tree. All vegetation cut (tree stems, branches, tops, etc.) shall be left within the critical area or buffer unless removal is warranted due to the potential for disease transmittal to other healthy vegetation;
      (3) The landowner shall replace any trees that are felled or topped with new trees at a ratio of two replacement trees for each tree felled or topped. Tree species that are native and indigenous to the site shall be used;
      (4) Hazard trees determined to pose an imminent threat or danger to public health or safety, or to public or private property, or serious environmental degradation may be removed or topped by the landowner prior to receiving written approval from Pierce County provided that within 14 days following such action, the landowner shall submit the necessary report and replanting schedule demonstrating compliance with 18E.40.040 B.2.a.(1) through (3) above.
   b. Trimming of vegetation for purposes of providing view corridors adjacent to freshwater types will be allowed without a complete mitigation plan provided that trimming shall be limited to view corridors of 20 feet in width or less and that benefits to fish and wildlife habitat are not reduced. Trimming shall be limited to hand pruning of branches and vegetation. Trimming shall not include felling, topping, or removal of trees. An applicant who wishes to remove trees or create a view corridor of larger size must complete review as set forth in Section 18E.40.030.

c. Vegetation and tree removal subject to the conditions contained in an approval for a regulated activity.
d. Introduced vegetation shall be limited to species that are native and historically indigenous to the site.

3. **Fencing.** Fencing shall be placed in such as manner as to maintain wildlife movement corridors and not create any fish passage blockages. The Department has the authority to approve the location, type, and height of any proposed fencing unless superceded by any Federal or State agency approvals.
4. **Shoreline Erosion Control Measures.** New or replacement shoreline erosion control measures shall be subject to the following standards:
   a. The proposal complies with the provisions set forth in Chapter 18E.110.
   b. The applicant has submitted a habitat assessment report, as set forth in Section 18E.40.030.
   c. The habitat assessment report demonstrates the following:
      (1) Natural shoreline processes will be maintained. The project will not result in increased beach erosion or alterations to, or loss of, shoreline substrate within 1/4 mile of the site.
      (2) The shoreline erosion control measure will not adversely impact critical fish or wildlife habitat areas or associated wetlands.
      (3) Adequate mitigation measures, as set forth in Section 18E.40.050, are provided that ensure no net loss of intertidal or riparian habitat or function occurs as a result of the proposed shoreline erosion control measure.
      (4) No alteration of intertidal migration corridors occurs as a result of the proposed shoreline erosion control measure.
5. **Streambank Stabilization.** Streambank stabilization to protect new structures from future channel migration is not permitted except when such stabilization is achieved through bioengineering or soft armoring techniques or public flood control projects. Streambank stabilization shall comply with the provisions set forth in Chapter 18E.70.
6. **Launching Ramps - Public or Private.** Launching ramps may be allowed when the applicant has submitted a habitat assessment report as set forth in Section 18E.40.030 that has demonstrated the following:
   a. The project will not result in increased beach erosion or alterations to, or loss of, shoreline substrate within 1/4 mile of the site.
   b. The ramp will not adversely impact critical fish or wildlife habitat areas or associated wetlands.
   c. Adequate mitigation measures, as set forth in Section 18E.40.050, are provided that ensure no net loss of intertidal or riparian habitat or function occurs as a result of the ramp.
   d. No alteration of intertidal migration corridors as a result of the ramp.
7. **Docks.** Repair and maintenance of an existing dock or pier or construction of a new dock or pier shall be permitted subject to the following:
   a. Repair and maintenance:
      (1) There is no increase in the use of materials creating shade for predator species or eelgrass;
      (2) There is no expansion in overwater coverage;
      (3) There is no new spanning of waters between 3 and 13 feet deep;

(4) There is no increase in the size and number of pilings; and
(5) There is no use of toxic materials (such as creosote) that come in contact with the water.

b. New docks and piers subject to compliance with any WDFW HPA or US Army Corps of Engineers permit conditions.

8. **Roads, Trails, Bridges, and Rights-of-Way.** Construction of trails, roadways, and minor road bridging may be allowed subject to the following standards:
   a. There is either no feasible alternative route with less impact on the environment or it has been approved by the County Council as part of a nonmotorized public trail system.
   b. The crossing allows for uninterrupted downstream movement of wood and gravel.
   c. Mitigation, pursuant to Section 18E.40.050, for impacts is provided.
   d. Road bridges are designed according to the WDFW Habitat and Lands Environmental Division's Fish Passage Design at Road Culverts, March, 1999 and the NMFS Guidelines for Salmonid Passage at Stream Crossings, 2000.
   e. Trails and associated viewing platforms shall be made of pervious materials.
9. **Utility Facilities.**
   a. Installation of a utility is permitted if constructed in an existing, improved roadway, driveable surface or shoulder, in Pierce County rights-of-way subject to compliance to the Pierce County Manual on Accomodating Utilities in the Right-of-Way road.
   b. New utility lines and facilities are permitted to cross regulated streams and bodies of water if they comply with the following standards:
      (1) Avoid critical fish and wildlife habitat areas to the maximum extent possible.
      (2) Crossings are contained within the footprint of an existing road or utility crossing where possible.
      (3) Avoid paralleling the stream or following a down-valley course near the channel.
      (4) Do not increase or decrease the natural rate of shore migration or channel migration.
      (5) Bore beneath the scour depth and hyporheic zone of the water body and CMZ where feasible. Whenever boring under the channel is not feasible then any channel crossings shall occur at an angle that is between 60 and 90 degrees from the centerline of the channel.
10. **Public Flood Protection Measures.** New public flood protection measures and expansion of existing ones may be approved, subject to the County's review and approval of a habitat assessment report or the approval of a Federal Biological Assessment.
11. **Instream Structures.** A new instream structure (e.g., such as but not limited to high flow bypass, sediment ponds, instream ponds, retention and detention facilities, tide gates, dams, weirs, engineered wood systems, etc.) shall be allowed only as part of an approved mitigation or restoration project or watershed basin plan approved by the County and upon acquisition of any required State or Federal permits. The structure shall be designed to avoid modifying flows and water quality in ways that may adversely affect critical fish species.

12. **Stormwater Conveyance Facilities.** Conveyance structures whose sole purpose is to convey stormwater already treated for quality, or water bypassed around water quality treatment facilities pursuant to an approved stormwater plan, may be constructed subject to the following standards:
    a. No other feasible alternatives with less impact exist;
    b. Mitigation for impacts is provided;
    c. Stormwater conveyance facilities shall incorporate fish habitat features;
    d. Vegetation shall be maintained and, if necessary, added adjacent to all open channels and ponds in order to retard erosion, filter out sediments, and shade the water.
13. **On-site Sewage Systems and Wells.**
    a. New on-site sewage systems and individual wells are permitted if accessory to an approved structure.
    b. Repairs to failing on-site sewage systems associated with an existing structure shall be accomplished by utilizing one of the following methods that result in the least impact:
        (1) Connection to an available public sewer system pursuant to Title 13 PCC;
        (2) Replacement with a new on-site sewage system located in a portion of the site that has already been disturbed by development and is located landward as far as possible, provided the proposed sewage system is in compliance with the provisions in Chapter 18E.70; or
        (3) Repair to the existing on-site septic system.
14. **New Agricultural Activities.** New agricultural activities are permitted subject to the following:
    a. Agricultural activities and structures shall comply with the provisions of Chapter 18E.70 Flood Hazard Areas.
    b. The agricultural activity is in compliance with the USDA, NRCS farm management standards.
    c. A copy of an approved NRCS or Pierce County Conservation District farm management plan that documents compliance with the USDA, NRCS farm management standards has been submitted to the Department for review and approval.
15. **Structures and Landscaped Areas.** New construction, redevelopment, reconstruction, or additions or expansions of single-family, two-family, multi-family, mobile/manufactured homes, commercial, industrial or agricultural building structures and associated landscaped areas and other related appurtenances (driveways, utilities, accessory structures, parking areas, etc.) that exceed the exemption standards set forth in Section 18E.20.030 F. and G. may be permitted subject to the following:
    a. The proposed single-family, multi-family, commercial, industrial, or agricultural building structure, accessory structures, or related appurtenances (e.g. wells, septic systems, sheds, driveways, parking areas) is located on a lot that was vested (see Chapter 18.160) prior to March 1, 2005, subject to the following conditions:
        (1) Applicants shall demonstrate there are no other feasible alternatives on the lot that would allow the proposed development to occur completely outside the fish or wildlife habitat conservation area or the required buffer.

(2) The principle structure, accessory structures or related appurtenances (such as landscaped areas, wells, onsite septic systems, etc.) cannot be located outside the fish or wildlife habitat conservation area or required buffer due to topographic constraints of the parcel, parcel size and/or location of the parcel in relation to the limits of the fish or wildlife habitat conservation area or required buffer.

(3) If applicable, buffer averaging pursuant to Section 18E.40.060 C.1. or a buffer reduction/building setback variance has been reviewed, analyzed, and rejected as a feasible alternative to encroachment into the fish or wildlife habitat conservation area or associated buffer.

(4) The habitat assessment report includes a buffer enhancement plan as part of the mitigation required by Section 18E.40.050. The buffer enhancement plan shall use native, non-invasive plant species that are indigenous to the underlying soils and plant community types contained within the project area and shall substantiate that an enhanced buffer will improve the functional attributes of the buffer to provide additional protection for fish or wildlife habitat values.

b. The proposed development is not located on a transitory feature such as a sandbar, spit, or sand point.

c. Maximum disturbance (including the principal structure, accessory structures, and related appurtenances such as landscaped areas, wells, onsite septic systems, etc.) within the habitat area and/or associated buffer shall be:

(1) 2,500 square feet if the area of the lot within the buffer is 5,000 square feet or less;

(2) 5,000 square feet if the area of the lot within the buffer is 10,000 square feet or greater;

(3) 50 percent of the area of the lot if the area within the buffer is between 5,001 and 9,999 square feet; and

(4) Expansions and redevelopment projects shall be limited to the lesser of 1,000 additional square feet of disturbance area or the same area and disturbance criteria that would have been permitted if the site were undeveloped.

d. Development that exceeds the requirements outlined in 18E.20.040, must be located landward to the extent possible and is prohibited within 50 feet of any Type S, F1, F2, N1, or N2 water, channel migration zone, side channel, spring, or off-channel habitat.

e. Development that exceeds the requirements outlined in 18E.20.040, must be located landward to the extent possible and is prohibited within 35 feet of any Type N3 water, including connectable relic channels or oxbows.

f. The area not disturbed by development shall be managed for native or approved vegetation and planted with native or approved vegetation where necessary following adopted guidelines to reestablish natural forested conditions (example: WDFW's Restoring the Watershed, A Citizen's Guide to Riparian Restoration in Western Washington).

g. The proposal complies with the standards set forth in Chapter 18E.70, Flood Hazard Areas.

h. To avoid stormwater impacts, impervious surface shall be limited to the minimum amount necessary to accommodate the proposed development. Where possible, impervious surfaces such as driveways, sport courts, patios, etc. shall be made of pervious materials and rooftop runoff shall be dispersed and directed into bioretention facilities.
i. The conversion of lots from single-family to any other land use (e.g., multi-family, commercial, industrial, agricultural) permitted in the underlying zone, except forest land or natural resource conservation uses, is prohibited.

16. **Alteration of Watercourses.** Alterations and relocations of watercourses, including stabilization projects, shall not degrade fish habitat and shall be subject to the following provisions:
    a. Structures that cross all watercourse and water bodies shall meet fish habitat requirements of the Washington State Department of Fish and Wildlife (WDFW).
    b. Any culverts that are used on fish-bearing watercourses shall be arch/bottomless culverts or equivalent that provides comparable fish protection, and must meet fish habitat requirements of the latest edition of WDFW's Design Manual for Culverts.
    c. Bridges or other crossings shall allow for uninterrupted downstream movement of wood and gravel, be as close to perpendicular to the watercourse as possible, and be designed to minimize fill and to pass the base flood flows.
    d. Watercourse alterations shall maintain natural meander patterns, channel complexity, and floodplain connectivity. Where feasible, such characteristics shall be restored as part of the watercourse alteration.
    e. The applicant shall identify the channel migration zone for the watercourse at the project site and for a reasonable reach upstream and downstream of the site, and shall not undertake actions as part of the alteration that would in any way inhibit movement of the channel.
    f. Existing culverts that do not meet fish habitat requirements shall be removed or replaced as part of an approved watercourse alteration project.
    g. Watercourse alteration projects shall not result in a fish blockage of side channels. Known fish barriers into side channels shall be removed as part of the approved watercourse alteration project.
    h. For any watercourse alteration of a Type S or F water (pursuant to Section 18E.40.060 B.) whose channel is subject to migration, bioengineered (soft) armoring of streambanks is required to allow for woody debris recruitment, gravels for spawning, and creation of side channels. The bioengineering technique used must be designed in accordance with the latest edition of WDFW's Integrated Streambank Protection Guidelines.

17. **Artificial Channels - Type FW.**
    a. New activities adjacent to artificial channels - type FW are exempt from the buffering provisions of this Title.
    b. Protection of these channels will be provided through compliance with all of the following:
        (1) A 15-foot building setback shall be maintained from the ordinary high water mark or top of bank of the channel.
        (2) Clearing and grading activities within the building setback shall comply with the requirements of Section 18E.40.040 B.1.

(3) A silt fence shall be installed along the outer edge of the developed area, which shall be no closer to the channel than the top of bank or ordinary high water mark.

c. The Department may also require the applicant to do any of the following:
   (1) Post signs along the channel indicating the presence of the fish and wildlife habitat area. Sign design shall be established by the Department.
   (2) Construct permanent fencing along the top of bank of the channel.

d. Any proposed channel alteration will require the submittal of a fish and wildlife application, as set forth in 18E.40.030, and a habitat assessment report as defined within Section 18E.40.070 - Appendix C.

C. **Oregon White Oak Trees and Woodlands.**

1. **Habitat Protection.** Oak woodlands, stands, and individual trees meeting the criteria set forth in Section 18E.40.020 D. shall be protected as follows:

   a. **Priority Oregon White Oak Woodlands.**
      (1) Priority Oregon white oak woodlands shall be protected through inclusion within a conservation tract meeting the requirements set forth in Section 18E.40.060. The tract shall extend a minimum of 5 feet beyond the outermost dripline of the trees within the woodland.
      (2) A minimum of 80 percent of the Oregon white oak trees on site having a diameter at breast height of six inches or larger shall be preserved within the conservation tract.
      (3) The conservation tract shall be maintained in an undisturbed state except for periodic watering, grass mowing of not more than four times per year, and hand removal of noxious or invasive plants, including conifer seedlings and saplings.
      (4) No clearing, grading, filling, or construction of any kind shall occur within the conservation tract.
      (5) Use of pesticides, herbicides, rodenticides, fungicides, or fertilizers in the conservation tract shall be prohibited.
      (6) All oak snags and broken, diseased and dying oak trees and live oak trees with cavities, heartwood rot, and insect infestations shall be retained within the conservation tract.
      (7) Downed or felled oak trees within the conservation tract shall be retained, provided that such trees may be selectively cut to further enhance habitat value.
      (8) Top-cut (leave main trunk standing) selective oak trees in dense, even-aged oak stands to encourage oak regeneration and create oak snags. Select top-cut, prune, or limb these individual oaks between December and May. Very old or large oaks as defined in 18E.40.020 D. shall not be removed.
      (9) Conifers that encroach on oaks within a conservation tract may be removed.
      (10) Plant Oregon white oak acorns and oak seedlings to encourage regeneration as necessary in conservation tracts.

   b. **Significant Oaks and Stands.**
      (1) Significant Oaks. Seventy percent of all Oregon white oaks having a diameter at breast height of 20 inches or greater shall be preserved.
      (2) Significant Oak Stands. A minimum of 50 percent of the Oregon white oak trees within the stand shall be preserved.

(3) Downed or felled oak trees and snags within significant oak stands shall be retained when located within a tract of land separate from individually owned lots.
(4) The largest of the significant trees on the site shall be preserved within a conservation tract. The remaining trees may be located within individually owned lots or a separate tract(s) at the discretion of the developer.

2. **Protection of Trees During Construction.** Trees conserved pursuant to this subsection shall be protected before and during site development and construction through adherence to the following requirements:
   a. A tree protection area shall be designed to protect each tree or tree stand during site development and construction. Tree protection areas may vary widely in shape, but must extend a minimum of five feet beyond the existing tree canopy area along the outer edge of the dripline of the tree(s), unless otherwise approved by the Department.
   b. Tree protection areas shall be added and clearly labeled on all applicable site development and construction drawings, submitted to the Department.
   c. Temporary construction fencing at least 30 inches tall shall be erected around the perimeter of the tree protection areas prior to the initiation of any clearing or grading. The fencing shall be posted with signage clearly identifying the tree protection area. The fencing shall remain in place through site development and construction.
   d. No clearing, grading, filling, or other development activities shall occur within the tree protection area, except where approved in advance by the Department and shown on the approved plans for the proposal.
   e. No vehicles, construction materials, fuel, or other materials shall be placed in tree protection areas. Movement of any vehicles within tree protection areas shall be prohibited.
   f. No nails, rope, cable, signs, or fencing shall be attached to any tree proposed for retention.
   g. The Department may approve the use of alternate tree protection techniques if an equal or greater level of protection will be provided.

D. **Standards for Other Critical Habitat Areas.** Standards for critical habitat areas not listed subsections 18E.40.030 A. and B. above shall be determined on a case by case basis, based upon the needs of specific species or habitat area of study. The Department will coordinate with the Washington Department of Fish and Wildlife in these instances, and when available utilize WDFW PHS management recommendations, to determine appropriate standards and development of a habitat management plan.

(Ord. 2004-56s § 4 (part), 2004)

18E.40.050 Mitigation Requirements.

A. All regulated development activities in critical fish and/or wildlife habitat areas and associated buffers shall be mitigated in the following order:
   1. Avoiding the impact altogether by not taking a certain action or parts of actions.
   2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to reduce impacts.
   3. The following types of mitigation (in order of priority):

a. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
b. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
c. Compensating for the impact by replacing or providing substitute resources or environments.

4. Monitoring the impact and compensation and taking appropriate corrective measures. Specific monitoring requirements are provided in Section 18E.40.070 - Appendix D.
5. Mitigation for individual actions may include a combination of the above measures.

B. Specific mitigation elements are to be discussed within a habitat assessment report, as defined in Section 18E.40.070 - Appendix C. The habitat assessment report is to provide specific recommendations to reduce, eliminate, or mitigate for the adverse effects of the proposed activity. Potential measures include timing restrictions for all or some of the activities; clearing limitations; avoidance of specific areas; special construction techniques; COHP conditions; HPA conditions; planting with native vegetation; habitat enhancement (i.e., fish passage barrier removal); best management practices; etc. If applicable, append a copy of the HPA, specifications for BMPs, or other documentation to support the implementation of the conservation measure.

C. The Department may require an enhancement plan that provides mitigation for the impacts associated with any encroachment into the habitat area or associated buffer, in conjunction with a request for buffer averaging/reduction as set forth in Section 18E.40.060 C., or where vegetation is inadequate to provide optimal function as set forth in 18E.40.060 D. The enhancement plan shall use native plant species that are indigenous to the project area and shall substantiate that an enhanced habitat area and/or buffer will improve the functional attributes of the affected area to provide additional protection for critical fish or wildlife habitat, wetlands, landslide hazard areas, or adjacent properties that may be affected by the proposal. At a minimum, the enhancement plan shall include detailed information on the following:

1. Type of species proposed.
2. Exact location of proposed enhancement area.
3. Timing and schedule of planting.
4. Schedule for monitoring and maintenance and any financial guarantees for these as required in Section 18E.10.080.
5. Name, address, and telephone number of the person(s) responsible for the enhancement project.
6. Any additional information required by the Department.

D. Mitigation of alterations to habitat areas shall achieve equivalent or greater biological functions and shall include mitigation for adverse impacts upstream and downstream of the development proposal site. Mitigation shall address each functional attribute affected by the alteration to achieve functional equivalency or improvement on a per function basis. Mitigation elements to be addressed may include, but are not limited to: restoration of previously degraded areas and key habitat features, restoration of riparian vegetation communities to provide shade and large woody debris, addition of large woody debris, and installation of upland habitat features.

E. In cases in which it is determined that aquatic habitat mitigation is appropriate, the following shall apply:

1. Mitigation shall be provided on-site, except where the applicant demonstrates that on-site mitigation is not scientifically feasible or practical due to physical features of the site or where it can be demonstrated that greater functional and habitat values can be achieved through offsite mitigation; and
2. When mitigation cannot be provided on-site, it shall be provided in the immediate vicinity of and within the same watershed as the regulated activity.

(Ord. 2004-56s § 4 (part), 2004)

18E.40.060 Buffer Requirements.

A. **Buffer Delineation.** Buffers shall be required as set forth for each habitat type. The required buffers shall be delineated, both on a site plan or plat and on the property, prior to approval of any regulated activity.

B. **Buffer Widths.**

1. **Riparian Areas, Lakes, and Ponds.**
   a. Riparian areas (rivers, streams, and creeks), lakes, and ponds shall be managed through the use of buffers. Buffers shall be based upon the water type classification of the water body as established by the Department of Natural Resources Stream Typing Classification System. Refer to Table 18E.40.060 for the water types and the associated buffer requirements.
   b. The required riparian buffer width is measured from the edge of the channel migration zone (CMZ), where identified, or the ordinary high water mark, whichever is greater. The criteria for determining the locations of the CMZ is provided in Chapter 18E.70.
   c. The required lake or pond buffer width is measured from the edge of the ordinary high water mark (OHWM).
   d. The required buffer shall be extended to include any adjacent regulated wetland(s), landslide hazard areas and/or erosion hazard areas and required buffers. (See Figures 18E.40-4 and 18E.40-5 in Chapter 18E.120.)
2. **Buffers for Other Critical Habitat Areas.** Appropriate buffers for critical habitat areas not listed in Table 18E.40.060 shall be determined on a case by case basis, based upon the needs of specific species or habitat area of study. The Department will coordinate with the Washington Department of Fish and Wildlife in these instances to determine an appropriate buffer width and when available shall rely upon buffer widths specified in WDFW Priority Habitats and Species management recommendations.

TABLE 18E.40.060. Buffer Requirements		
Water Type[1]	**Water Body Criteria**	**Buffer Width[2,4]**
Type F1	All segments of natural waters within the bankfull widths of defined channels or within lakes, ponds, or impoundments which provide habitat for or support any portion of the lifecycle of a critical fish species[3]. Waters that are diverted for use by federal, state, tribal, or private fish hatcheries shall be considered to be Type F1 waters upstream from the point of diversion for 1,500 feet and tributaries if highly significant for protection of downstream water quality.	150 feet landward from the OHWM
Type F2	Type F1 water adjacent to a landslide hazard area as set forth in Chapter 18E.80.	150 feet landward from the OHWM or the minimum buffer distance required in Chapter 18E.80, whichever is greatest
Type N1	Perennial or seasonal non-fish bearing[3] natural waters within the bankfull widths of defined channels that are not Type F1 or F2 waters but are located within ¼ mile of the confluence with a Type F1 or F2 water.	115 feet landward from the OHWM
Type N2	Perennial or seasonal non-fish bearing[3] natural waters within bankfull width of defined channels that are not Type F1 or F2 waters and are either located more than ¼ mile upstream from the confluence with a Type F1 or F2 water or are not connected to a Type F1 or F2 water.	65 feet landward from the OHWM
Type N3	Lakes or ponds that do not support any critical fish species[3]	35 feet landward from the OHWM

[1] Water types are approximately based on the following: Type F1 (Type 1-3, Type 4 if greater than 2 feet and less than 20 percent grade unless documented as non-fish bearing by Federal or State agencies or Tribes), Type N1 (Type 4 if less than 2 feet and greater than 20 percent grade unless documented as fish bearing by Federal or State agencies or Tribes), Type N2 (Type 5 waters and those waters not connected to another water type). The new nomenclature anticipates the new classification system established in WAC 222-16-030 and 031. Water types are mapped in the Pierce County Critical Areas Atlas: Fish and Wildlife Habitat Areas-Stream Typing Maps and Fish and Wildlife Habitat Areas-Critical Fish Presence Maps.

[2] There may be wetlands associated with ponds or lakes that are regulated and which may have a required buffer greater than those listed in Table 18E.40.060, e.g., a lake with a 35-foot buffer requirement may have associated wetlands with 25-300 foot buffers.

[3] Fish species are those identified in Section 18E.40.020.

[4] Lake Tapps and Spanaway Lake are not subject to the buffering requirements shown above in Table 18E.40.060 of this Chapter.

C. **Modification to Buffer Width Requirements.** The standard buffer widths of subsection 18E.40.060 B. may be modified by averaging or increasing as follows:

1. **Buffer Averaging.** Buffer width averaging may be proposed through submittal of a habitat assessment study or report. Buffer width averaging shall be allowed only when the applicant demonstrates all of the following:
   a. The decrease in buffer width is minimized by limiting the degree or magnitude of the regulated activity.
   b. Buffer averaging will not adversely impact the water body.

c. Buffer averaging is consistent with other buffer requirements set forth under this Title (e.g., wetlands, critical fish and wildlife species and habitats, landslide hazard areas, etc.).
d. Buffer averaging will not increase the risk of slope failure or downslope stormwater drainage impacts.
e. The total buffer area after averaging is no less than the buffer area prior to the averaging. (Refer to Figure 18E.40-6 in Chapter 18E.120.)
f. The minimum buffer width after averaging will not be less than 50 percent of the widths established in subsection 18E.40.060 B.
g. The averaging is accomplished within the project boundaries or through an off-site conservation easement or tract (or other acceptable protective mechanism) approved by the Department.
h. The applicant demonstrates one or more of the following conditions:
   (1) The proposed buffer area contains a diversity of native vegetation distributed within at least two stratum (i.e., groundcover, shrub, sapling, tree); or
   (2) The project includes a buffer enhancement plan as part of the mitigation required by Section 18E.40.050. The buffer enhancement plan shall use plant species, which are native and non-invasive to the project area. The plan must substantiate that the enhanced buffer will improve the functional attributes of the buffer to provide additional protection for habitat functional values.

2. **Buffer Reduction.** Buffer width reduction may be proposed through submittal of a habitat assessment study or report. Buffer width reduction shall be allowed only when the applicant demonstrates all of the following:
   a. Buffer reduction is unavoidable.
   b. Buffer reduction has been minimized by limiting the degree or magnitude of the regulated activity.
   c. Buffer reduction is consistent with other buffer requirements set forth under this Title (e.g., wetlands, critical fish and wildlife species and habitats, landslide hazard areas, etc.)
   d. Buffer reduction will not adversely impact the water body.
   e. The buffer meets the requirements of Section 18E.40.060 D., or
   f. A buffer enhancement plan is provided as required by Section 18E.40.050. The buffer enhancement plan shall use plant species, which are native and non-invasive to the project area. The plan must substantiate that the enhanced buffer will improve the functional attributes of the buffer to provide additional protection for habitat functional values.
   g. The buffer has less than 15 percent slopes.
3. **Buffer Width Increases.** The Department may require an increased buffer width when a larger buffer is necessary, based on site conditions, to protect habitat area functions and values. This determination shall be reasonably related to protection of the functions and values of the regulated habitat area. Such determination shall demonstrate any of the following:
   a. A larger buffer is necessary to maintain viable populations of existing species or protect the existing functions of habitat areas identified in 18E.40.020.
   b. The adjacent land has minimal vegetative cover.
   c. The adjacent land has slopes greater than 20 percent.

d. The habitat area is in an area of high tree blow down potential. In these cases the habitat area may be expanded an additional 50 feet on the windward side.

4. Where an application for a development permit, other than a site development permit, has not been submitted in association with a proposed forest practice activity, a deviation from the standard buffer, as set forth in 18E.40.060 C.1. and C.2. shall not be allowed.
5. **Buffer Reduction – Lakes.** The standard buffer within a vacant lot along a lake may be reduced as follows:
   a. Where the vacant lot has a common property line with two or more lots which abut the ordinary high water line and which are developed with single-family residences, the standard buffer may be reduced to the greater of 50 feet or the average of the standard buffer and the setbacks of the residences on the adjacent properties. This reduction does not apply where the criteria of 18E.40.060 C.3. apply.
   b. Any water dependent accessory use may be allowed within the reduced buffer upon the issuance of a Conditional Use Permit. The issuance of a Conditional Use Permit shall be predicated upon a determination that the project will be consistent with the Conditional Use criteria in this Section, and the Conditional Use criteria listed in WAC 173-14-140, if applicable, and will cause no reasonable adverse effects on the environment and other uses. The Conditional Use Criteria area:
      (1) Views from surrounding properties will not be unduly impaired.
      (2) Adequate separation will be maintained between the structure and adjacent properties and structures.
      (3) Screening and/or vegetation will be provided to the extent necessary to ensure aesthetic quality.
      (4) Design and construction materials shall be chosen so as to blend with the surrounding environment.
      (5) No additional harm to the aquatic environment will result from the project.

D. **Buffer Functioning Condition.**
   1. **General Buffer Requirements.**
      a. Buffers should be adequately vegetated with native, non-invasive plant and tree species necessary to help provide long term protection of identified habitat areas. The Department may require mitigation and the submittal of a buffer enhancement plan, as outlined in Section 18E.40.050 C., for buffer areas where the vegetation is inadequate to provide this function.

E. **Protection of Significant Trees within the Buffer.** If buffer width averaging or reduction is utilized or buffers are otherwise reduced through a variance process and significant trees are identified on the outer edge of the reduced buffer such that their drip line extends beyond the buffer edge, the following tree protection requirements must be followed:
   1. A tree protection area shall be designed to protect each tree or tree stand during site development and construction. Tree protection areas may vary widely in shape, but must extend a minimum of five feet beyond the existing tree canopy area along the outer edge of the dripline of the tree(s), unless otherwise approved by the Department.
   2. Tree protection areas shall be added and clearly labeled on all applicable site development and construction drawings, submitted to the Department.

3. Temporary construction fencing at least 30 inches tall shall be erected around the perimeter of the tree protection areas prior to the initiation of any clearing or grading. The fencing shall be posted with signage clearly identifying the tree protection area. The fencing shall remain in place through site development and construction.
4. No clearing, grading, filling or other development activities shall occur within the tree protection area, except where approved in advance by the Department and shown on the approved plans for the proposal.
5. No vehicles, construction materials, fuel, or other materials shall be placed in tree protection areas. Movement of any vehicles within tree protection areas shall be prohibited.
6. No nails, rope, cable, signs, or fencing shall be attached to any tree proposed for retention.
7. The Department may approve the use of alternate tree protection techniques if an equal or greater level of protection will be provided.

(Ord. 2004-56s § 4 (part), 2004)

18E.40.070 Appendices.

- **A. Habitat Assessment Letters.**
- **B. Habitat Assessment Studies.**
- **C. Habitat Assessment Reports.**
- **D. Monitoring Requirements.**

18E.40.070 - Appendix A
Habitat Assessment Letters

A. The habitat assessment letter shall, at a minimum, include the following:
   1. The information required in Section 18E.40.030 B.2.
   2. Documentation that the potential regulated habitat is not present. Discuss the habitat features or types that are available as compared to the habitat features that define the potential habitat. Describe why potential restoration measures would not be feasible.
   3. Documentation that potential species are not present. Note: a finding that a species is lacking based upon limited field investigation, occurring at an inappropriate time of the year for the species of study will not be acceptable. In such cases, the County will require separate confirmation of absence provided by the Washington Department of Fish and Wildlife.

18E.40.070 - Appendix B
Habitat Assessment Studies

A. The habitat assessment study shall, at a minimum, include the following:
   1. The information required in Section 18E.40.030 B.2.
   2. Identify the presence of the habitat area or species on the site.
   3. Identify and discuss how the project complies with the standards set forth in Section 18E.40.040.
   4. Provide a detailed description of the proposed project. At a minimum, the following items should be included:
      a. A legal description (Section, Township, Range) and vicinity map that clearly show the site and project area in relation to nearby waterbodies, sensitive habitats, etc.
      b. A site plan of the habitat area and associated buffer in relation to the proposed project area. If the applicant proposes to reduce a standard buffer, the site plan shall identify all significant trees adjacent to the reduced buffer.
      c. Photographs, especially color copies, are useful to orient the reviewer to the project area. A combination of aerial or orthophotos and snapshots are ideal.
   5. Describe the environmental baseline (current or pre-project) condition of the habitat and the project area. The baseline description should address all pertinent habitat parameters for the species.
   6. Describe in detail the type and scope of development activity proposed:
      a. Describe the overall purpose of the project and a brief summary of project objectives.
      b. List all proposed project related construction activities and types of equipment. Provide a chronology of activities, timing of construction, hours of operation, phasing.
      c. Provide to-scale plans that show where work is proposed relative to habitat areas and buffers.
      d. Quantify areas of vegetation removal, include clearing and grubbing, vegetation type.
      e. Describe proposed grading and filling or other earthwork, include specific BMPs for erosion, sedimentation, stormwater, and spill control. If appropriate, append the TESC Plan, Spill Control Plan, BMP specifications, etc.
      f. Provide stormwater treatment information including:
         (1) Amount of new impervious surface;
         (2) Percent of surface and type of treatment for new and existing impervious surface;
         (3) Specify BMPs to treat for quality and quantity; and
         (4) Identify the receiving area /waterbody for each BMP, including overflow channels.
      g. If buffer averaging or reduction is proposed for use, and significant trees are identified on the outer edge of the reduced buffer such that their drip line extends beyond the buffer edge, the tree protection measures described in Section 18E.40.060 are to be implemented.

(Ord. 2004-56s § 4 (part), 2004)

18E.40.070 - Appendix C
Habitat Assessment Reports

A. The applicant is advised to refer to the following guidance documents during the course of the habitat assessment report (HAR) preparation:
   1. Washington Department of Fish and Wildlife Priority Habitat and Species Management Recommendations, May 1991 (or as hereafter amended), and supplemental documents including but not limited to:
      a. Priority Habitats and Species List;
      b. Management Recommendations for Washington's Priority Habitats: Oregon White Oak Woodlands;
      c. Management Recommendations for Washington's Priority Habitats: Volume I Invertebrates; and
      d. Management Recommendations for Washington's Priority Habitats: Volume III Amphibians and Reptiles.
   2. Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale (NMFS, 1996).
   3. A Guide to Biological Assessments (NMFS, revised March 23, 1999).
   4. Biological Assessment Preparation and Review (USFWS, March 1999).
   5. NMFS Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators.
   6. Stream Survey Report Criteria, King County Department of Development and Environmental Services.

B. The following information must be included in every habitat assessment report:
   1. **Project Description.** Describe in detail the type and scope of action proposed:
      a. Describe the overall purpose of the project and a brief summary of project objectives.
      b. List all proposed project related construction activities and types of equipment.
      c. Provide to-scale plans that show where work is proposed relative to sensitive areas and/or habitat. If the applicant proposes to reduce a standard buffer, the site plan shall identify all significant trees adjacent to the reduced buffer.
      d. Quantify areas of vegetation removal, include clearing and grubbing, vegetation type, replanting plans.
      e. Provide a chronology of activities, timing of construction, phasing.
      f. Describe proposed grading and filling or other earthwork, include specific BMPs for erosion, sedimentation, stormwater, and spill control. If appropriate, append the TESC Plan, Spill Control Plan, BMP specifications, etc.
      g. Provide stormwater treatment information including:
         (1) Amount of new impervious surface;
         (2) Percent of surface and type of treatment for new and existing impervious surface;
         (3) Specify BMPs to treat for quality and quantity;
         (4) Identify the receiving area /waterbody for each BMP, including overflow channels.

h. Describe proposed in-water work (below OHWM or extreme high tide) and work over waterbodies, and potential for impacts to riparian or aquatic vegetation. Include conditions and work windows as described in the WDFW Hydraulic Project Approval. State clearly if the project does not include any in-water or over water work.

2. **Description of the Project Area.** The following items should be addressed as appropriate:
   a. Provide a legal description (Section, Township, Range) and vicinity map that clearly shows the project in relation to nearby waterbodies, sensitive habitats, etc.
   b. Date of field review(s) of project, credentials of personnel involved, and results of visit(s).
   c. Describe the environmental baseline (current or pre-project) condition of the habitat and the project area. The baseline description should address all pertinent habitat parameters for the species.
   d. If buffer averaging is proposed for use, and significant trees are identified on the outer edge of the reduced buffer such that their drip line extends beyond the buffer edge, the tree protection measures described in Section 18E.40.060 are to be implemented.
   e. Describe the project setting in terms of physiographic region, general topography, dominant habitat and vegetation type(s), aquatic resources, land use patterns, and existing disturbance levels from human activities, roadways, etc.
   f. Include information about past and present activities in the area that relate to the species or its habitat and/or the proposed action. This could include information on adjacent development projects, past consultations with State or Federal agencies, previously established conservation measures, or species management plans.
3. **Regulated Fish and Wildlife Species and Habitat Conservation Area Occurrence.** The HAR must be based on current site-specific information about the species and its life history. Cite any relevant scientific literature or research findings. At a minimum, the following items should be addressed:
   a. Cite species listings provided by NMFS, WDFW, and/or USFWS. Append a copy of the listing to the report. Species listings should be updated every six months.
      (1) Identify any State-listed, Federal or State proposed species (and candidate or species of concern if appropriate), and designated or proposed critical habitat that are known or have the potential to occur on site or in the vicinity of the project area.
      (2) Identify fish by ESU.
   b. Describe the species, its habitat requirements and ecology in general, and relate that to the local populations. A lengthy life history is not required, but enough information should be provided to adequately explain the potential impacts.
   c. Describe the potential suitable habitat for the species found on site or in the project vicinity and how local populations use it. Discuss the local status of the species as appropriate. Determine the likely level and type of use of the area by each species.

4. **Analysis of Effects on Listed and Proposed Species and Designated and Proposed Habitat.** The HAR should provide a thorough analysis of (and a separate Section addressing) the potential direct, indirect, interrelated and interdependent, and cumulative effects of the action on the regulated species and its habitat within the project area. The following items should be addressed:
   a. Define the project area (area of potential impacts, both indirect and direct). The area of impact is usually larger than the project area or project vicinity (i.e., the river upstream and downstream from a bridge project, waterbodies receiving stormwater).
   b. Describe how the environmental baseline (current or pre-project condition of the habitat in the project area) will be degraded, maintained or improved (restored). If appropriate, append the completed NMFS Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators.
   c. Direct Effects: Describe and analyze the effects of the action that would directly affect the species. Include actions that would potentially remove or destroy habitat, displace or otherwise influence the species, either positively (beneficial effects) or negatively (adverse effects).
   d. Describe potential for impacts from disturbance (i.e., noise above ambient levels, sudden loud noises, increased human activity), from construction and continuing operation. Construction impacts would be considered a direct effect whereas operation noise impacts could be considered indirect effects as they occur later in time.
   e. Indirect Effects: Describe any potential indirect impacts (those that occur later in time) such as impacts to future food resources or foraging areas, and impacts from increased long-term human access.
   f. Interrelated/Interdependent Effects: Describe and analyze any potential effects from interdependent actions (actions that have no independent utility apart from the primary action) and interrelated actions (actions associated with the primary action and dependent upon that action for their justification) on the species or habitat that would not occur if not for the proposed action. Examples of these two effects include site clearing activities associated with new home construction (an interdependent effect) and increases in light, noise, and glare that occur as a result of land division (an inter-related effect).
   g. Cumulative Effects: Identify to the extent possible those cumulative effects within the project area that are reasonably certain to occur.
   h. If species specific recovery plans or management plans have been established by the U.S. Fish and Wildlife Service, Washington State Department of Fish and Wildlife, or National Marine Fisheries Service, address the project in terms of compliance and recommendations.
   i. For proposed species, analyze the potential for the project to jeopardize the continued existence of the species.
   j. The HAR must contain a distinct statement of the overall effect of the project on each species. It must also provide supporting evidence to justify the effect determination (for listed species) or jeopardy call (for proposed species). The determination must be consistent throughout and worded correctly. See attached NMFS or USFWS Guidance for specific wording for each status.

4. **Recommended Conservation Measures.** The HAR should describe components of the project that may benefit or promote the recovery of listed species and are included as an integral part of the proposed project. These conservation (or mitigation) measures serve to minimize or compensate for project effects on the species under review. The following items should be addressed:
   a. Provide specific recommendations, as appropriate, to reduce or eliminate the adverse effects of the proposed activity. Potential measures include: timing restrictions for all or some of the activities; clearing limitations; avoidance of specific areas; special construction techniques; HPA conditions; replanting with native vegetation; potential of habitat enhancement (i.e., fish passage barrier removal); best management practices, etc.
   b. If applicable, append a copy of the HPA, specifications for BMPs, or other documentation to support the implementation of the conservation measure.
   c. Include a description of proposed monitoring of the species, its habitat, and mitigation effectiveness.
4. **Conclusions and Effect Determinations.**
   a. Summarize the proposed project and objectives, and restate the listed species that may occur near the project and the expected level of use.
   b. State what conclusions regarding potential impacts to the species discussed can be supported from the information presented in the report. The following items should be addressed:
      (1) A finding of effect must be made for each identified fish and wildlife species or habitat area. For each, only one of the following finding of effect is acceptable:
         - No Effect: The appropriate finding to make when the direct or indirect impacts of a project will have no affect of any kind, negative or beneficial, upon a species or habitat area;
         - May Affect, Not Likely to Adversely Affect: The appropriate finding to make when the direct or indirect effects of a project are insignificant, discountable, or beneficial; or
         - Likely to Adversely Affect: The appropriate finding to make when the direct or indirect effects of a project may adversely impact a species or habitat area and the effects are not insignificant.
      (2) Findings of "no effect" or "may affect, not likely to adversely affect" may not be based upon the argument that species will be displaced to other suitable habitat or that (based upon a limited number of surveys) species are not known to occur. The failure to provide site-specific surveys at the appropriate time of the year for the species of study will result in the Department assuming a worst-case scenario in regards to project-related impacts.
   c. For any proposed species or proposed habitat discussed, the conclusions should indicate whether the proposed project is likely to jeopardize the continued existence of the species (as in the entire species, not individual(s)), or adversely modify the proposed critical habitat.

7. **References and Appendices.** Refer to all appropriate project documents, particularly if the assessment depends upon information located elsewhere (e.g., in an EIS). Applicants may consider providing the Department with copies of pertinent documents along with the HAR. At a minimum, the following items should be addressed:
    a. Provide citations for other information referred to in the HAR, such as current literature and personal contacts used in the assessment. Include name, affiliation, and date.
    b. Include as appropriate any photographs, survey methods, protocols, and results. Do not provide specific information regarding the exact location of State- or Federally-listed species within the HAR document. Federal and State restrictions exist regarding the release of such information.

(Ord. 2004-56s § 4 (part), 2004)

18E.40.070 - Appendix D
Monitoring Requirements

A. A contingency plan shall be established for compensation in the event the mitigation project is inadequate or fails. The contingency plan is to provide specific corrective measures for such common mitigation plan failings as plant mortality, vandalism, damage due to wildlife grazing, grading errors, and hydro-regime problems. A financial guarantee on a form acceptable to the County is required for the duration of the monitoring period, and the guarantee plus any accrued interest will be released by the County when the required mitigation and monitoring are completed. To determine the amount of the financial guarantee, an estimate shall be submitted to the County detailing the work to be accomplished and the cost thereof. The estimate shall be based on current costs. The County will review the estimate and, if acceptable, will establish the financial guarantee at 125 percent of the estimate to allow for inflation and administration expenses, should the County have to complete the project.

B. Requirements of the monitoring program are as follows:
   1. Scientific procedures are to be used for establishing the success or failure of the project.
   2. Monitoring reports prepared by a fish or wildlife biologist are to be submitted for Department review. Monitoring reports generally will include discussions of wildlife utilization of the site, habitat structure establishment, water quality, and existing or potential degradation.
   3. Monitoring reports for mitigation projects specific to vegetative restoration or enhancement shall comply with the following:
      a. Monitor for a period of time appropriate to the nature of the project (single-family versus commercial) and the complexity of the mitigation project. The majority of monitoring programs will last a minimum of three years and are to be submitted according to the following schedule:
         (1) At completion of construction of mitigation project (as-built report);
         (2) Thirty days after completion;
         (3) Early in the first growing season after construction;
         (4) End of the first growing season after construction;
         (5) Twice the second year; and
         (6) Annually after the second year.
      b. Deviation from this schedule may be allowed based upon project specific conditions
   4. Monitoring reports for mitigation projects whose goals are other than vegetative restoration or enhancement are to be submitted to the Department for a period of time, and upon a schedule, appropriate for the species or habitat of concern. The specifics of such mitigation projects will be determined on a project by project basis.

C. The County will require a Right of Entry Form, as set forth in 18E.10.140 - Appendix C., be recorded that allows County staff access to the mitigation area through completion of the monitoring program.

D. Failures in the mitigation project shall be corrected as required by the County, such as, but not limited to:
   1. Replace dead or undesirable vegetation with appropriate plantings.
   2. Repair damages caused by erosion, settling, or other geomorphological processes.
   3. If necessary, redesign mitigation project and implement the new design.

E. Correction procedures shall be approved by the fish or wildlife biologist and the Department Director or designee.

(Ord. 2004-56s § 4 (part), 2004)

Chapter 18E.50

AQUIFER RECHARGE AND WELLHEAD PROTECTION AREAS

Sections:

18E.50.010 Purpose.

The purpose of this Chapter is to protect critical aquifer recharge and wellhead protection areas from degradation or depletion resulting from new or changed land use activities. Due to the exceptional susceptibility and/or vulnerability of groundwater underlying aquifer recharge areas to contamination and the importance of such groundwater as sources of public water supply, it is the intent of this Chapter to safeguard groundwater resources and wellhead protection areas by mitigating or precluding future discharges of contaminants from new land use activities. (Ord. 2004-57s § 2 (part), 2004)

18E.50.020 Aquifer Recharge and Wellhead Protection Areas.

A. **General.** Aquifer recharge and wellhead protection areas are areas that have a critical recharging effect on groundwater used for potable water supplies and/or that demonstrate a high level of susceptibility or vulnerability to groundwater contamination from land use activities.

B. **Aquifer Recharge Areas.**
   1. The boundaries of the two highest DRASTIC zones that are rated 180 and above on the DRASTIC index range, as identified in Map of Groundwater Pollution Potential, Pierce County, Washington, National Water Well Association, U.S. Environmental Protection Agency; and
   2. The Clover/Chambers Creek Aquifer Basin boundary as identified in the Clover/Chambers Creek Basin Groundwater Management Program (TPCHD 1991).

C. **Wellhead Protection Areas.** Wellhead protection areas that lie within the ten-year time-of-travel zone boundary of a group A public water system well, as delineated by the water system purveyor or its designee, pursuant to WAC 246-290-135.

(Ord. 2004-57s § 2 (part), 2004)

18E.50.030 Aquifer Recharge and Wellhead Protection Area Review Procedures.

A. **General Requirements.**
   1. The Pierce County Critical Areas Atlas-Aquifer Recharge and Wellhead Protection Area Map provides an indication of where aquifer recharge and wellhead protection areas are located within the County.
   2. The Department will complete a review of the Aquifer Recharge Area Map for any development proposal to determine whether the proposed project area for a regulated activity falls within an aquifer recharge or wellhead protection area.

3. When the Department's maps or sources indicate that the proposed project area for a regulated activity is located within an aquifer recharge or wellhead protection area, the Department shall require aquifer recharge and wellhead protection area review as set forth in this Chapter.
4. Any regulated activity located within an aquifer recharge or wellhead protection area shall comply with the standards set forth in Section 18E.50.040.
5. Any hazardous uses, as defined in Section 18E.50.040, shall require the submittal of a hydrogeologic assessment, as set forth in Section 18E.50.030 B. below.
6. The Department may waive some of the critical area protective measure provisions contained in Section 18E.10.080.

B. **Hydrogeologic Assessment.**
1. The hydrogeologic assessment shall be prepared under the responsible charge of an appropriately licensed geotechnical professional, and signed, sealed, and dated by an appropriately licensed geotechnical professional.
2. The hydrogeologic assessment shall be submitted in the form of a report detailing the subsurface conditions, the design of a proposed land use action, and the facilities operation which indicates the susceptibility and potential for contamination of groundwater supplies. The hydrogeologic assessment shall, at a minimum, include the following:
   a. Information sources;
   b. Geologic setting—include well logs or borings used to identify information;
   c. Background water quality;
   d. Groundwater elevations;
   e. Location/depth to perched water tables;
   f. Recharge potential of facility site (permeability/transmissivity);
   g. Groundwater flow direction and gradient;
   h. Currently available data on wells located within 1/4 mile of the site;
   i. Currently available data on any spring within 1/4 mile of the site;
   j. Surface water location and recharge potential;
   k. Water source supply to facility (e.g., high capacity well);
   l. Any sampling schedules necessary;
   m. Discussion of the effects of the proposed project on the groundwater resource;
   n. Discussion of potential mitigation measures, should it be determined that the proposed project will have an adverse impact on groundwater resources; and
   o. Any other information as required by the TPCHD, including information required under Washington Department of Ecology Publication 97-30.
3. The TPCHD shall provide written notice to all Group A water systems in whose wellhead protection area the proposed regulated activity lies. The TPCHD shall consider comments received from the water system(s) when reviewing the hydrogeologic assessment.
4. Uses requiring a hydrogeologic assessment may be conditioned or denied based upon the TPCHD's evaluation of the hydrogeologic assessment. Any project denied a permit based upon the TPCHD's evaluation of the hydrogeologic assessment shall receive a written explanation of the reason(s) for denial and an explanation of standards required, if any, to comply with these regulations.

C. **Storage Tank Permits.** In addition to the requirements set forth in this Title, the following agencies also have the authority to regulate the installation, repair, replacement, or removal of underground storage tanks:

1. The Pierce County Fire Prevention Bureau regulates and authorizes permits for underground storage tanks, pursuant to the Uniform Fire Code (Article 79) and this Chapter.
2. The Washington Department of Ecology regulates and authorizes permits for underground storage tanks (WAC 173-360).
3. The TPCHD regulates and authorizes permits for the removal of underground storage tanks (Chapter 8.34 PCC).

(Ord. 2004-57s § 2 (part), 2004)

18E.50.040 Aquifer Recharge and Wellhead Protection Area Standards.

A. **General.** All regulated activities that are not exempt, prohibited, or otherwise excluded in the following standards under the provisions of this Chapter shall ensure sufficient groundwater recharge. In order to achieve sufficient groundwater recharge the applicant shall either comply with the impervious surface limitations set forth in Table 18E.50.040 A. or demonstrate that the volume of water infiltrated at the proposed project area will be the same or greater amount for post-development as the pre-development volume.

Table 18E.50.040-A. Aquifer Recharge Area Impervious Surface Limitations

Comprehensive Plan Land Use Classification	Maximum Impervious Surface Coverage (1)
Employment Center	60%
Major Urban Center	75%
Activity Center	50%
Community Center	50%
Urban Neighborhood Center	50%
Mixed Use District	75%
High Density Residential District	50%
High Density Single Family	50%
Moderate Density Single Family	35%
Rural Activity Center	60%
Rural Neighborhood Center	50%
Rural Separator	10%
Rural 5	10%
Rural 10	10%
Rural 20	10%
Rural 40	10%
Reserve 5	10%
Reserve 10	10%
Gateway Community	50%
Master Planned Community	20%
Employment Based Planned Community	20%
Master Planned Resort	10%

(1) The maximum impervious surface coverage is calculated for the total amount of impervious surface per each individual site. The percentage for maximum total impervious surface per lot or site may be exceeded if the applicant can demonstrate that the effective impervious surface on the site is less than or equal to what is allowed for the total impervious surface.

B. **Prohibited Uses.** Landfills (other than inert and demolition landfills), underground injection wells (Class I, III, and IV), metals mining, wood treatment facilities, pesticide manufacturing, petroleum refining facilities (including distilled petroleum facilities), and the storage of more than 70,000 gallons of liquid petroleum or other hazardous products are prohibited within aquifer recharge and wellhead protection areas.

C. **Agricultural Activities.** New agricultural activities that do not involve hazardous substance handling or application are allowed within an aquifer recharge or wellhead protection area subject to the following:
   1. The applicant is required to submit a farm management plan prepared by the USDA, NRCS, Pierce County Conservation District, or Washington State University, Cooperative Extension Office that certifies that water quality and quantity within the aquifer recharge area is maintained. The farm management plan shall at a minimum address the following:
      a. The limits of the proposed agricultural activities.
      b. The proposed scope of agricultural activities, including the use of any pesticides, fertilizers, or other chemicals.
      c. The existing nitrate levels on the site and any proposed increases in nitrate levels.
   2. Integrated Pest Management (IPM) practices for pest control and Best Management Practices (BMPs) for the use of fertilizers, as described by the Washington State University, Pierce County Cooperative Extension Office shall be utilized.
   3. Nitrate levels at down-gradient property line shall not exceed 2.5 mg/L or, if the background nitrate concentration exceeds 2.5 mg/L, that the concentration will not be increased more that 0.1 mg/L.
   4. Additional protective measures may be required if deemed necessary by the Department or TPCHD to protect public health or safety.

D. **Non-Hazardous Uses.** Subdivision of land as defined in Title 16 PCC, residential structures housing three or more units and all commercial and industrial sites or activities that do not include or involve hazardous substance processing or handling in an aquifer recharge and/or wellhead protection area are allowed subject to the following standards:
   1. Stormwater treatment and control shall be provided in conformance with the Pierce County Stormwater Management and Site Development Manual.
   2. Floor drains shall not be allowed to drain to the stormwater system and must be designed and installed to meet the Uniform Plumbing Code (UPC) Section 303.
   3. If any roof venting carries contaminants, then the portion of the roof draining this area must go through pretreatment pursuant to UPC Section 304(b).
   4. All vehicle washing done somewhere other than at a residence must be self-contained or be discharged to a sanitary sewer system, if approved by the sewer utility, and is subject to UPC Sections 708 and 711.
   5. Integrated Pest Management (IPM) practices for pest control and Best Management Practices (BMPs) for the use of fertilizers as described by the Washington State University. Pierce County Cooperative Extension Office shall be utilized.
   6. For new or changes in regulated activities served by on-site sewage systems, the applicant must demonstrate to the TPCHD that nitrate levels at the down-gradient property line will not exceed 2.5 mg/L or that, if the background nitrate concentration exceeds 2.5 mg/L, the concentration will not be increased more than 0.1 mg/L.

7. Additional protective measures may be required if deemed necessary by the TPCHD to protect public health or safety.

E. **Hazardous Uses - General.** Hazardous substance processing or handling, hazardous waste treatment and storage facilities, animal containment areas, and solid waste facilities that require a Solid Waste Handling Permit from the TPCHD shall be allowed only in an aquifer recharge and/or wellhead protection area subject to review and approval of a hydrogeologic assessment by the TPCHD. For this Chapter natural gas distribution systems are exempted. The TPCHD has the authority to apply whatever standards deemed necessary to mitigate any negative impacts that may be associated with the proposed development. At a minimum, the activity must employee AKART (all known, available, and reasonable treatment) to protect ground water quality.

F. **Hazardous Uses - Storage Tanks.** In addition to the requirement to submit a hydrogeologic assessment, the following standards apply to storage tanks in an aquifer recharge and/or wellhead protection area:

1. **Underground Tanks.** All new underground storage facilities used or to be used for the underground storage of hazardous substances or hazardous wastes shall be designed and constructed so as to:
   a. Prevent releases due to corrosion or structural failure for the operational life of the tank;
   b. Be protected against corrosion, constructed of non-corrosive material, steel clad with a noncorrosive material, or designed to include a secondary containment system to prevent the release or threatened release of any stored substance; and
   c. Use material in the construction or lining of the tank which is compatible with the substance to be stored.
   d. The installation of underground storage tanks shall also be subject to other state and local permit requirements.
2. **Aboveground Tanks.**
   a. No new aboveground storage facility or part thereof shall be fabricated, constructed, installed, used, or maintained in any manner which may allow the release of a hazardous substance to the ground, groundwater, or surface waters of Pierce County within an aquifer recharge area.
   b. A new above tank that will contain a hazardous substance will require both a double walled tank and a secondary containment system separate from the tank that will hold 110 percent of the tank's capacity. The secondary containment system or dike system must be designed and constructed to contain material stored in the tank(s).

(Ord. 2004-57s § 2 (part), 2004)

Chapter 18E.60

VOLCANIC HAZARD AREAS

Sections:

18E.60.010 Purpose.

At over 14,411 feet high, Mount Rainier dominates the skyline of the southern Puget Sound region. This glacier-clad potentially active volcano is capable of spewing ash from pyroclastic eruptions, and generating large volumes of lahars and floods which have, in the recent geologic past, inundated various watersheds and reached the shores of Puget Sound significantly altering pre-flood conditions. The purpose of this Chapter is to promote the public health, safety, and general welfare of the citizens of Pierce County by providing standards that minimize the loss of life that may occur as a result of volcanic events emanating from Mount Rainier. (Ord. 2004-57s § 2 (part), 2004)

18E.60.020 Volcanic Hazard Areas.

A. **General.** Volcanic hazard areas are areas subject to pyroclastic flows, lava flows, and inundation by lahars, debris flows, or related flooding resulting from geologic and volcanic events on Mount Rainier.

B. **Volcanic Hazard Area Categories.** Volcanic hazard areas are those areas that, in the recent geologic past, have been inundated by a Case I, Case II, or Case III lahars or other types of debris flow, or have been affected by pyroclastic flows, pyroclastic surges, lava flows, or ballistic projectiles. Volcanic hazard areas also include areas that have not been affected recently, but could be affected by future such events. Volcanic hazard areas are classified into the following categories:

1. **Inundation Zone for Case I Lahars.** Areas that could be affected by cohesive lahars that originate as enormous avalanches of weak chemically altered rock from the volcano. Case I lahars can occur with or without eruptive activity. The average reoccurrence rate for Case I lahars on Mount Rainier is about 500 to 1,000 years.
2. **Inundation Zone for Case II Lahars.** Areas that could be affected by relatively large non-cohesive lahars, which most commonly are caused by the melting of snow and glacier ice by hot rock fragments during an eruption, but which can also have a non-eruptive origin. The average time interval between Case II lahars from Mount Rainier is near the lower end of the 100 to 500 year range, making these flows analogous to the so-called "100-year flood" commonly considered in engineering practice.
3. **Inundation Zone for Case III Lahars.** Areas that could be affected by moderately large debris avalanches or small non-cohesive lahars, glacial outburst floods, or other types of debris flow, all of non-eruptive origin. The average time interval between Case III lahars at Mount Rainier is about 1 to 100 years.

4. **Pyroclastic-Flow Hazard Zone.** Areas that could be affected by pyroclastic flows, pyroclastic surges, lava flows, and ballistic projectiles in future eruptions. During any single eruption, some drainages may be unaffected by any of these phenomena, while other drainages are affected by some or all phenomena. The average time interval between eruptions of Mount Rainier is about 100 to 1,000 years.

C. **Travel Time Zones.** The ability to evacuate people from within a volcanic hazard area correlates to the distance from the source of an event (i.e., those areas closest to the event will have less time to evacuate than those areas farther away from the source of an event) and the amount of time for evacuation from the public notification (via a warning alarm system) that a lahar event has occurred. The amount of time that is anticipated for a debris flow, lahar, flood, or avalanche (estimated at 100,000,000 cubic feet of volume) to travel from either the source of the event or the point where the AFM alarm is sounded is classified into the following travel time zones:

1. **Travel Time Zone A.**
   a. Travel Time Zone A on the Nisqually and White River systems is that area within an estimated one-hour travel distance from the source of the event.
   b. Travel Time Zone A on the Puyallup and Carbon River systems is that area within an estimated one-half hour travel distance from the point where the AFM alarm is sounded.
2. **Travel Time Zone B.**
   a. Travel Time Zone B on the Nisqually and White River systems is that area greater than an estimated one-hour travel distance and less than or equal to an estimated 1-1/2 hour travel distance from the source of the event.
   b. Travel Time Zone B on the Puyallup and Carbon River systems is that area greater than an estimated one-half hour travel distance and less than or equal to an estimated one-hour travel distance from the point where the AFM alarm is sounded.
3. **Travel Time Zone C.**
   a. Travel Time Zone C on the Nisqually and White River systems is that area greater than an estimated 1-1/2 hour travel distance and less than or equal to an estimated two-hour travel distance from the source of the event.
   b. Travel Time Zone C on the Puyallup and Carbon River systems is that area greater than an estimated one-hour travel distance and less than or equal to a 1-1/2 hour travel distance from the point where the AFM alarm is sounded.
4. **Travel Time Zone D.**
   a. Travel Time Zone D on the Nisqually and White River systems is that area greater than an estimated two-hour travel distance from the source of the event.
   b. Travel Time Zone D on the Puyallup and Carbon River systems is that area greater than an estimated 1-1/2 hour travel distance from the point where the AFM alarm is sounded.

(Ord. 2004-57s § 2 (part), 2004)

18E.60.030 Volcanic Hazard Area Review Procedures.

A. The Pierce County Critical Areas Atlas-Volcanic Hazard Area Map provides an indication of where volcanic hazard areas are located within the County.

B. The Department will complete a review of the Volcanic Hazard Area maps for any development proposal to determine whether the proposed project area for a regulated activity falls within a volcanic hazard area.

C. When the Department's maps or sources indicate that the proposed project area for a regulated activity is located within a volcanic hazard area, the Department shall apply the standards for regulated activities in volcanic hazard areas, as set forth in Section 18E.60.040.
D. Title and land division notification shall be required, as set forth in Section 18E.10.080 C.

(Ord. 2004-57s § 2 (part), 2004)

18E.60.040 Volcanic Hazard Area Standards.

The following standards apply within the Inundation Zones for Case I, II, and III Lahars and within the Pyroclastic Flow Hazard Zone (refer to Table 18E.60.040):

A. Bonus densities, as set forth in Chapter 18A.35 Development Regulations-Zoning shall be prohibited.
B. All essential facilities and hazardous facilities, as defined in Chapter 18.25, shall be prohibited, except sewer collection facilities and any other utilities that are located underground or not likely to cause harm to people or the environment if inundated by a lahar.
C. Special occupancy structures, as defined in Chapter 18.25, are subject to the following:
    1. **Travel Time Zone A.** Special occupancy structures located within the Travel Time Zone A area shall be limited to a maximum 100 person occupancy.
    2. **Travel Time Zone B.** Special occupancy structures located within the Travel Time Zone B area shall be limited to a maximum 500 person occupancy.
    3. **Travel Time Zone C.** Special occupancy structures located within the Travel Time Zone C area shall be limited to a maximum 1,000 person occupancy.
    4. **Travel Time Zone D.** Special occupancy structures located within the Travel Time Zone D area shall be limited to a maximum 5,000 person occupancy.
D. Covered assemblies, as defined in Chapter 18.25, are subject to the following:
    1. **Travel Time Zone A.** Covered assemblies located within Travel Time Zone A area and which are located within the Case II lahar inundation zone shall be limited to 100 person occupancy and covered assemblies located within Travel Time Zone A which are outside the Case II lahar inundation zone, but within the Case I lahar inundation zone shall be limited to a maximum 400 person occupancy.
    2. **Travel Time Zone B.** Covered assemblies located within Travel Time Zone B area and which are located within the Case II lahar inundation zone shall be limited to 500 person occupancy and covered assemblies located within Travel Time Zone B which are outside the Case II lahar inundation zone, but within the Case I lahar inundation zone shall be limited to a maximum 700 person occupancy.
    3. **Travel Time Zone C.** Covered assemblies located within Travel Time Zone C area shall be limited to a maximum 1,000 person occupancy.
    4. **Travel Time Zone D.** Covered assemblies located within Travel Time Zone D area shall be limited to a maximum 5,000 person occupancy.

Table 18E.60.040 Volcanic Hazard Area Standards				
Facility/ Occupancy List	**Case I Lahar Inundation Zone**	**Case II Lahar Inundation Zone**	**Case III Lahar Inundation Zone**	**Pyroclastic Flow Hazard Zone**
Bonus Densities(1)	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Essential Facilities(2)	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Hazardous Facilities(3)	Not Allowed	Not Allowed	Not Allowed	Not Allowed
Special Occupancies(4)	In Travel Time Zone A – Limited to 100 person occupant load. In Travel Time Zone B – Limited to 500 person occupant load. In Travel Time Zone C – Limited to 1,000 person occupant load. In Travel Time Zone D – Limited to 5,000 person occupant load.	In Travel Time Zone A – Limited to 100 person occupant load. In Travel Time Zone B – Limited to 500 person occupant load. In Travel Time Zone C – Limited to 1,000 person occupant load. In Travel Time Zone D – Limited to 5,000 person occupant load.	Not Allowed	Not Allowed
Covered Assemblies (5)	In Travel Time Zone A – Limited to 400 person occupant load. In Travel Time Zone B – Limited to 700 person occupant load. In Travel Time Zone C – Limited to 1,000 person occupant load. In Travel Time Zone D – Limited to 5,000 person occupant load.	In Travel Time Zone A – Limited to 100 person occupant load.(6) In Travel Time Zone B – Limited to 500 person occupant load. In Travel Time Zone C – Limited to 1,000 person occupant load. In Travel Time Zone D – Limited to 5,000 person occupant load.	Not Allowed	Not Allowed
Other Occupancies	No Limitation	No Limitation	No Limitation	No Limitation

(1) Bonus Density as set forth in Chapter 18A.35, Development Regulations-Zoning.
(2) Essential Facility as defined in Section 18.25.030.
(3) Hazardous Facility as defined in Section 18.25.030.
(4) Special Occupancy structures as defined in Section 18.25.030.
(5) Covered Assemblies as defined in Section 18.25.030.
(6) Occupancy may be increased pursuant to the requirements of 18E.60.050.

(Ord. 2004-57s § 2 (part), 2004)

18E.60.050 Increased Occupancy for Covered Assembly

The occupancy limits for covered assembly structures within the Case II Lahar Inundation Zone, Travel Time Zone A, may be increased by the Director to a maximum of 400 persons when the following criteria have been met:

A. The applicant has demonstrated through submittal of a travel time analysis the amount of time that is anticipated for a lahar to reach the proposed project and evacuation route.
B. The applicant has demonstrated through submittal of a volcanic hazard emergency

evacuation plan that:

1. The proposed project is located directly adjacent to a safety zone (area completely located outside the limits of a Case I lahar) that is within walking distance in an amount of time less than the anticipated time that it takes a lahar to reach a given point (refer to Section 18E.60.020 C.). (Note: The time that it takes a lahar to reach a given point is calculated from either the source of the event to the given point, or from the source of the lahar warning signal to the given point, i.e., only the Puyallup and Carbon River drainages at this time have the Acoustic Flow Monitoring System. Other drainages, such as the Nisqually and White Rivers, have no warning systems. Persons in those areas would be reliant on other emergency notification systems, such as the National Weather Radio. At this time, no other warning system is planned for the Nisqually or White River drainages.) The time of walking distance shall be calculated based upon the amount of time necessary for physically or mentally challenged individuals to get from the proposed project to the safety zone.
2. The estimated travel time analysis for the lahar to reach the evacuation route is less than the estimated travel time for physically or mentally challenged individuals to have cleared the evacuation route and reached the safety zone.
3. The evacuation route must be at a slope and surface to be considered handicapped accessible (e.g., slopes may not exceed 1' in 12' rise and surface must be an all weather, hard material) as determined by the County Building Official.
4. The evacuation route has been determined not to contain any other potential natural hazards, such as landslide or flood hazards, to cause a blockage or destruction of the evacuation route during an event (i.e., seismic event triggers a landslide that results in the evacuation route becoming impassible).
5. The evacuation route is not located adjacent to any highways or arterial road networks that may cause a life safety threat to evacuating pedestrians.
6. The safety zone is an area with adequate ingress/egress (i.e., a direct exit once individuals reach this location).

(Ord. 2004-57s § 2 (part), 2004)

Chapter 18E.70

FLOOD HAZARD AREAS

18E.70.010 Purpose.

The purpose of this Chapter is to promote the public health, safety, and general welfare of the citizens of Pierce County. Under this Chapter, development is protected from the impacts of flood hazards by establishment of minimum standards for sites which contain or are adjacent to identified flood hazard areas. The standards contained in this Chapter are intended to minimize public and private losses due to flood conditions in flood hazard areas and provide special criteria necessary for regulated activities located within flood hazard areas in unincorporated Pierce County. The following statements describe the purpose of this Chapter:

A. Protect human life and health;
B. Minimize expenditure of public money and costly flood control projects;
C. Minimize the need for rescue and relief efforts associated with flooding;
D. Minimize prolonged business interruptions;
E. Minimize damage to public infrastructure, facilities and utilities;
F. Minimize damage to critical fish and wildlife habitat areas;
G. Minimize net loss of ecological functions of floodplains;
H. Ensure that potential buyers are notified that property is in a flood hazard area;
I. Ensure that those who occupy flood hazard areas assume responsibility for their actions; and
J. Qualify Pierce County for participation in the National Flood Insurance Program, thereby giving the citizens of Pierce County the opportunity to purchase flood insurance with particular emphasis to those in flood hazard areas.

(Ord. 2004-57s § 2 (part), 2004)

18E.70.020 Flood Hazard Areas.

Pierce County regulates per 18E.10.140 - Appendix A "Mapping Sources" the following flood hazard areas:

A. **Potential Flood Hazard Areas.**
    1. Potential flood hazard areas, as depicted on the Critical Areas Atlas-Flood Hazard Area Map, include:
        a. **Detailed Study Areas.** (See Figure 18E.70-1 in Chapter 18E.120.)
            (1) FEMA Flood Insurance Rate Map and Floodway Map numbered A zones and V zones.
            (2) Areas within 300 feet horizontal distance from the base flood elevation established for the mapped A and V zones.
            (3) Areas within 5 feet of vertical height from the base flood elevation established for the mapped A and V zones.

b. **Unstudied Areas.** FEMA Flood Insurance Rate Map unnumbered A zones and B zones and areas within 300 feet horizontal distance from the mapped areas of the mapped A and B zones. (See Figure 18E.70-2 in Chapter 18E.120.)
c. **Natural Waters/Watercourse.** Areas within 65 feet horizontal distance from the ordinary high water mark of an identified natural watercourse. (See Figure 18E.70-3 in Chapter 18E.120.)
d. **Groundwater Flooding Areas.** Areas within 300 feet horizontal distance from a mapped groundwater flooding area. (See Figure 18E.70-4 in Chapter 18E.120.)
e. **Potholes.** Areas not identified as a mapped flood hazard area, but within 10 feet of vertical relief from the bottom of an identified pothole or within 2 feet of vertical relief of a potential surface water spillway or other type of outlet. (See Figure 18E.70-5 and Figure 18E.70-6 in Chapter 18E.120.) Potholes may be identified by Pierce County topographic mapping, field survey, or site inspections.
f. **Channel Migration Zones (CMZ).** Channel Migration Zones shall apply only to those watercourses listed below in 18E.70.020 B.4. In those areas where detailed CMZ studies have been completed and accepted by Pierce County, additional horizontal and vertical review threshold criteria (i.e., 300' horizontal and 5' vertical) shall not apply. (See Figure 18E.70-7 in Chapter 18E.120.)

1. The Critical Areas Atlas-Flood Hazard Areas Maps (referenced in 18E.10.140 - Appendix A, Mapping Sources) may not show all potential flood hazard areas that may be necessary for a specific site analysis. The Department may make interpretations, where needed, as to the approximate location of the boundaries of potential flood hazard areas. Where the Flood Insurance Study, FIRM, and floodway maps do not provide adequate, best, or most recent information, flood information that is more accurate or detailed may be used. When there is a conflict between the elevations and the mapped potential flood hazard area boundaries, the elevations shall govern.
2. Where there is insufficient information shown on the Critical Areas Atlas-Flood Hazard Areas Maps, the Department may require the applicant to verify that the site is out of the flood hazard area using the flood hazard area review procedures set forth in Section 18E.70.030.

B. **Floodway.** A floodway is an extremely hazardous area due to the depth and/or velocity of floodwaters which carry debris, potential projectiles, and have erosion potential. (See Figure 18E.70-8 in Chapter 18E.120.) The following areas are regulated by Pierce County as floodways:

1. **Regulatory Floodway.** Regulatory floodway designated by flood hazard area maps.
2. **Deep and/or Fast Flowing Water Areas.** Areas of deep and/or fast flowing water shall be regulated as a floodway. Based on the criteria set forth in Section 18E.70.030 D., the Department shall make the determination after review and approval of the applicant's analysis of whether the project site falls within the floodway area based on deep and/or fast flowing waters. (See Figure 18E.70-9 in Chapter 18E.120.)
3. **Potholes and B Zones.** That portion of a pothole and B zone area that is three feet or greater in water depth in a 100-year flood event shall be regulated as a floodway. (See Figure 18E.70-10 in Chapter 18E.120.)

4. **Channel Migration Zones (CMZs).**
   a. Channel migration zones shall be regulated as floodways, and shall apply only to those watercourses listed below
      (1) South Prairie Creek;
      (2) Carbon River;
      (3) Puyallup River;
      (4) White River (including W. fork White River);
      (5) Greenwater River;
      (6) Nisqually River; and
      (7) Mashel River.
   b. Channel Migration Zones on regulated watercourses (listed in subsection 4.a. above) will be regulated when CMZ studies are completed, accepted and adopted by Pierce County, except for the Puyallup River downstream of the confluence with the White River, where the default CMZ shall be the regulated FEMA floodway area.

C. **Flood Fringe.** All areas subject to inundation by the base flood, but outside the limits of the floodway and the limits of the channel migration zone as set forth in 18E.70.020 B. Those portions of the A and B zones not defined as floodway, and that portion of a pothole and FEMA B zone area that is between 0 feet (base flood elevation) and three feet in depth shall be regulated as a flood fringe.

D. **Coastal Flood Hazard Areas.** Areas that are adjacent to Puget Sound marine waters that are designated as "A" or "V" zones as defined by FEMA and depicted on the FEMA maps or other maps adopted by Pierce County. For coastal flood hazard areas, the base flood elevation shall be the estimated highest tide level plus two feet for added freeboard, established in Figures 18E.70-11 and 18E.70-12 in Chapter 18E.120.

E. **Other Areas of Special Flood Hazard.**
   1. **Groundwater Flooding Areas.** Groundwater flooding areas are those areas identified by Pierce County and shown on flood hazard maps and are subject to flood inundation from subsurface waters that result from a fluctuation of the groundwater table. Groundwater flooding areas shall be regulated as a floodway or flood fringe pothole.
   2. **Natural Waters/Watercourse.** Natural waters/watercourse as identified on Pierce County topographic, planimetric or orthophoto maps, WDNR stream classification maps, USGS quadrangle maps, or other source maps that are not identified as a flood hazard area on the FEMA maps. That portion of the natural watercourse located within 65 feet horizontal distance from the ordinary high water mark shall be regulated as a floodway or flood fringe.

(Ord. 2004-57s § 2 (part), 2004)

18E.70.030 Flood Hazard Area Review Procedures.

A. **General Requirements.**
   1. The Pierce County Critical Areas Atlas-Flood Hazard Area Map provides an indication of where potential flood hazard areas are located within the County. The actual presence or location of a flood hazard area shall be determined using the procedures and criteria contained in this Chapter.

2. The Department will complete a review of the Flood Hazard Area Maps, and other source documents, for any development proposal to determine whether the proposed project area for a regulated activity falls within a potential flood hazard area. When there is a conflict between the elevations and the mapped 100- or 500-year floodplain or floodway boundaries, the elevations shall govern.
3. When the Department's maps or sources indicate that the proposed project area for a regulated activity is or may be located within a potential flood hazard area, the Department shall require a flood boundary delineation survey as outlined in subsection B. below, and may require a flood study as outlined in subsection C. below, a deep and/or fast flowing water analysis as outlined in subsection D. below, and/or a zero-rise analysis as outlined in subsection E. below, except for coastal flood hazard areas which shall not be required to submit a flood study, deep and/or fast flowing water analysis, or a zero-rise analysis.
4. Any proposed development located within a flood hazard area shall comply with the flood hazard area standards set forth in Section 18E.70.040.
5. A FEMA Letter of Map Amendment (LOMA) or Letter of Map Revision (LOMR) shall not be submitted to FEMA until review and approval has been granted by Pierce County. Pierce County shall not recognize any LOMA or LOMR as an amendment to the Department's Flood Hazard maps unless prior approval has been granted by the County Public Works and Utilities Department.
6. Unless otherwise stated in this Chapter, the critical area protective measure provisions contained in Section 18E.10.080 shall apply.

B. **Flood Boundary Delineation Survey.**

1. If the Department's maps or sources indicate that the proposed project area for a regulated activity is located within a potential flood hazard area, then a flood boundary delineation survey that delineates the horizontal and vertical limits of the base flood elevation shall be submitted to the Department.
   a. In areas where a base flood elevation has not been previously determined, it will be necessary to conduct a flood study pursuant to subsection D. below in order to produce the flood boundary delineation survey.
   b. A base flood elevation that has been established through a detailed flood study accepted by Pierce County may be used in lieu of conducting a flood study.
   c. The floodplain limits for a natural watercourse as set forth in Section 18E.70.020 E.2. shall be established at 65 feet horizontal distance from the ordinary high water mark.
2. The requirement to submit a flood boundary delineation survey may be waived at the Department's discretion, when the Department can determine, using contour elevations, base flood data, orthophotos, and parcel data, that the extent of the regulated activity is clearly above the base flood elevation.
3. The flood boundary delineation survey shall be prepared, signed, and dated by a registered land surveyor.
4. The Department shall review the flood boundary delineation survey to evaluate if the proposed development is located within a flood hazard area.
5. If the proposed development lies within the flood hazard area, the limits of the floodway, as well as the base flood elevation, shall be shown on the flood boundary delineation survey, except for coastal flood hazard areas which shall be required to show the Pierce County regulatory Tidal Base Flood Elevation. Refer to Figure 18E.70-11 and Figure 18E.70-12 in Chapter 18E.120.

C. **Flood Study.**
   1. A flood study shall be conducted when the Department's maps or sources indicate that the proposed project area for a regulated activity is or may be located within a potential flood hazard area where base flood elevation data is not available through the Flood Insurance Study or other authoritative sources, or when an established base flood elevation is contested. An engineering analysis to determine the base flood elevation shall be required by Pierce County. Base flood elevations shall be determined using the detailed methods established in 18E.70.050 - Appendix A. Alternative methods may be approved by the County.
   2. The flood study shall be prepared under the responsible charge of and signed and dated by a professional engineer.
   3. Once the Department has reviewed and approved the flood study, the applicant shall be required to provide a flood boundary delineation survey, utilizing the newly established base flood elevation, as outlined in subsection C. above.
   4. Flood studies shall not be required for coastal flood hazard areas.

D. **Deep and/or Fast Flowing Water Analysis.**
   1. When the Department determines that a proposed project area for a regulated activity is located within a flood hazard area, a deep and/or fast flowing water analysis based on Figure 18E.70-9 in Chapter 18E.120 and 18E.70.050 - Appendix A. shall be required to determine the floodway limits.
   2. The floodway limits and flood fringe limits identified in the deep and/or fast flowing water analysis shall be depicted on the flood boundary delineation survey, as outlined in subsection B. above.
   3. The deep and/or fast flowing water analysis shall be prepared under the responsible charge of and signed and dated by a professional engineer.
   4. Deep and/or fast flowing water analysis shall not be required for coastal flood hazard areas.

E. **Zero-Rise Analysis.**
   1. When the Department concludes that a proposed project area for a regulated activity is located within a flood hazard area, a zero-rise analysis shall be required to determine that no increase in base flood elevation, displacement of flood volume, or flow conveyance reduction will occur as a result of the development.
   2. The zero-rise analysis shall be conducted utilizing HEC-RAS modeling methodology or other alternative methodology approved by the County (see 18E.70.050 - Appendix A.). The analysis shall show that no rise (0.001 foot or less) has occurred as a result of the proposed development. The proposed development may need to be reduced or specially engineered (such as utilizing piers or pilings) to achieve zero-rise.
   3. The zero-rise analysis shall be prepared under the responsible charge of and signed and dated by a professional engineer.
   4. The zero-rise analysis shall be documented on the Zero-Rise Analysis Form, as set forth in 18E.70.050 - Appendix A., and shall be attached to the flood hazard area permit.
   5. Zero-rise analysis shall not be required for coastal flood hazard areas.
   6. The requirement to submit a zero rise analysis may be waived at the Department's discretion for the following types of projects:
      a. Structures elevated by pier or pilings, or where no fill is placed in the flood hazard area.

b. Placement of instream structures for the purpose of fish habitat enhancement, stream restoration, and monitoring, where it is readily apparent that such placement will not negatively impact adjacent properties or heighten flood risk.

(Ord. 2004-57s § 2 (part), 2004)

18E.70.040 Flood Hazard Area Standards.

A. **General.**

1. New construction done by or for Pierce County, such as bridges, roads, flood control works, revetments, retaining walls, drainage structures, sewer or water lines, parks, or other structures necessary to promote the public's health, safety, and welfare shall be allowed in a flood hazard area when:
   a. The project shall be prepared under the responsible charge of and signed and dated by a registered professional engineer in the State of Washington and shall be designed so the project does not result in any increase in flood levels during the occurrence of the base flood discharge (zero-rise) and shall not obstruct the floodway or cause an adverse impact to critical fish or wildlife habitat or adjacent, cross-channel, or upstream or downstream properties; and
   b. The improvements utilize appropriate flood hazard protection standards.
2. A Federal Emergency Management Agency (FEMA) elevation certificate shall be required for new construction, additions affixed to the side of a structure, and substantial improvements located within flood hazard areas. The most current version of the FEMA elevation certificate must be completed and certified by an engineer or professional land surveyor, currently licensed in the State of Washington, and kept on file with the Pierce County Planning and Land Services Department.
3. Agricultural chemicals, fertilizers, pesticides, and similar hazardous materials that may contaminate surface and groundwater in the event of flood inundation shall not be stored in agricultural accessory structures[1].
4. Plat notes for the Puyallup, Carbon and White Rivers and for other Flood Hazard Areas as well, shall be placed on the face of any final plat (includes commercial, industrial, single family, and multi-family residential), short plat, large lot, or binding site plan documents which lie in these areas. The plat notes shall be per 18E.10.140 - Appendix B, Title and Plat Notification Forms.

B. **Floodways.** Any development, encroachments, filling, clearing or grading, new construction, and substantial improvements shall be prohibited within the floodway, except as allowed in 18E.20.040 - Non Conforming Uses and the following standards:

1. Structures that do not require a building permit and that do not have any associated fill.
2. Agricultural activities that do not require the installation of structures and that do not have any associated fill.
3. Park and recreational uses and facilities that do not require the installation of structures and that do not have any associated fill.
4. Individual recreational vehicles, not located in a RV park, that are licensed and ready for highway use and are not permanently attached to the site.
5. Habitat enhancement/stream restoration activities are permitted subject to the provisions outlined in Section 18E.70.040 D.

1 Agricultural accessory structures mean a non-residential structure such as, but not limited to, sheds and silos.

6. Rehabilitation, reconstruction, or an upper story addition to an existing structure that does not exceed the limits for a substantial improvement.
7. Private bridges may be allowed to cross the floodway provided that the structure meets the requirements contained in Section 18E.70.030 and the following:
   a. The lowest structural member of a private bridge proposed to cross the floodway portion of any of the rivers listed in Section 18E.70.020 B.4. shall be a minimum of six feet above the base flood elevation.
   b. The lowest structural member of a private bridge proposed to cross the floodway portion of any other watercourse shall be a minimum of one foot above the base flood elevation.
8. The Reasonable Use Exception process as described in Section 18E.20.050 may be used for those parcels of land that are categorized as Channel Migration Zone only or have both the Channel Migration Zone and the Flood Fringe classifications only. For those parcels of land with the Channel Migration Zone and the Flood Fringe classifications, in addition to the Reasonable Use review criteria found in Section 18E.20.50 C.2., the standards in the Section 18E.70.020 C. apply.

C. **Flood Fringe Areas.** All activities allowed in Section 18E.70.040 B. shall be permitted in a flood fringe area. Any other proposed development, encroachments, filling, clearing or grading, new construction, and substantial improvements are prohibited in a flood fringe area except as permitted under the following standards:
   1. Structures that do not require a building permit and that do not have any associated fill are permitted.
   2. All other regulated activities shall only be allowed when the proposed development is located on an existing lot of record that was created prior to March 1, 2005. Applicants shall demonstrate there are no other feasible alternatives that would allow the proposed development to occur completely outside the flood hazard area. At a minimum, the following shall be demonstrated:
      a. The development cannot be located outside the flood hazard area due to topographic constraints of the parcel or size and/or location of the parcel in relation to the limits of the flood hazard area and a building setback variance has been reviewed, analyzed, and rejected as a feasible alternative to encroachment into the flood hazard area; and
      b. The proposed development shall not cause an adverse impact to adjacent, cross-channel, or upstream or downstream properties.
   3. **Access.**
      a. Roads, bridges, driveways, emergency vehicle access, and access routes and easements, where allowed, shall be constructed and armored based on the standards in 18E.70.040 C.4. below and elevated a minimum of one foot above the base flood elevation.
      b. Parking lots shall be elevated to a minimum of one-half foot below the base flood elevation.
   4. **Grading and Filling.** When development is permitted under this subsection, it shall be designed to a zero-rise standard as set forth in Section 18E.70.030 E. and 18E.70.050 - Appendix A. Any filling, grading, or clearing associated with the permitted development shall not increase flood hazards, water velocities, or flood elevations. In addition to meeting the requirements for zero-rise, all permitted development must also meet the following requirements:

a. Compensatory Storage. New excavated storage volume shall be equivalent to the flood storage capacity eliminated by filling or grading within the flood fringe. Equivalent shall mean that the storage removed shall be replaced by equal live storage volume between corresponding one-foot contour intervals that are hydraulically connected to the floodplain through their entire depth (refer to Figure 18E.70-13 in Chapter 18E.120).
b. Flow Conveyance. New excavated conveyance areas shall be equivalent to existing conveyance within the flood fringe. Equivalent shall mean a mechanism for transporting water from one point to another using an open channel system.
c. Erosion Protection. Development shall be protected from flow velocities greater than 2 feet per second through the use of bio-engineering methods or, when bio-engineering methods have been deemed insufficient to protect development, then hard armoring may be utilized. All erosion protection shall extend 1 to 3 feet, depending on development requirements, above the base flood elevation and shall be covered with topsoil and planted with native vegetation. (See Figure 18E.70-14 in Chapter 18E.120.)

5. **Critical Facilities.**
   a. New construction, additions affixed to the side of an existing structure, and substantial improvement of hazardous facilities and special occupancy structures are prohibited.
   b. New construction of an essential facility, reconstruction of an existing essential facility, or additions to an existing essential facility that exceed the threshold for substantial improvement shall be permitted when no feasible alternative site is available outside the flood hazard area. Such regulated activities are subject to the following:
      (1) Essential facilities with a crawlspace elevated by fill shall have the lowest floor[2] and any utilities and ductwork elevated a minimum of three feet above base flood elevation. (See Figure 18E.70-14 in Chapter 18E.120.)
      (2) Essential facilities elevated by piers or pilings shall have the finished floor[3] and any utilities and ductwork elevated a minimum of three feet above the base flood elevation and must be designed by a professional structural engineer. (See Figure 18E.70-15 in Chapter 18E.120.)
      (3) Essential facilities shall be armored based on the standards in Section 18E.70.040 C.4. above. Flood resistant materials, construction methods and practices shall be used in construction of such facilities.
      (4) Adequate containment and sealing measures must be taken to insure that toxic or explosive substances will not be displaced or released into floodwaters.

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2 "Lowest floor" means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access, or storage, in an area other than a basement area, is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this Title. For purposes of the National Flood Insurance Program Elevation Certificate the lowest floor referenced in this regulation shall equal the top of the bottom floor.

3 "Finished floor" means the top of the next higher floor above the lowest floor. For purposes of the National Flood Insurance Program Elevation Certificate the finished floor referenced in this regulation shall equal the top of the next higher floor.

6. **Structures.** Single-family, two-family, multi-family, mobile/manufactured homes, commercial, industrial, etc., except for critical facilities as set forth in Section 18E.70.040 C.5. above, shall be allowed subject to the following standards:
   a. New construction, additions affixed to the side of an existing structure, and substantial improvement of any structure with a crawlspace shall have the lowest floor elevated a minimum of two feet above base flood elevation. (See Figure 18E.70-14 in Chapter 18E.120.) Flood resistant materials, construction methods and practices shall be used.
   b. New construction, additions affixed to the side of an existing structure, and substantial improvement of any structure elevated by piers or pilings shall have the bottom of the lowest horizontal structural member elevated a minimum of two feet above the base flood elevation and must be designed by a professional structural engineer. Electrical, heating, ventilation, plumbing, air-conditioning equipment, and other service facilities and associated ductwork shall be elevated a minimum of two feet above base flood elevation; however, the Department may approve a lesser minimum distance above base flood elevation provided that the systems are designed to prevent floodwater from entering or accumulating within the components. (See Figure 18E.70-15 in Chapter 18E.120.) Areas below the lowest horizontal structural member shall not be enclosed and shall remain free of obstructions. Flood resistant materials, construction methods and practices shall be used. Fully enclosed areas below the lowest horizontal structural member are prohibited.
7. **Agricultural Accessory Structures.** The lowest floor in an agricultural accessory structure shall be located at the base flood elevation or higher provided that the structure is designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a professional engineer in the State of Washington or must meet or exceed the following minimum criteria:
   a. A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided;
   b. The bottom of all openings shall be no higher than one foot above grade; and
   c. Openings may be equipped with screens, louvers, or other covering or devices provided that they permit the automatic entry and exit of floodwaters.
8. **Construction Standards.**
   a. Construction of a basement is prohibited.
   b. Crawl spaces shall be backfilled with clean earth material and shall meet Pierce County Building Code requirements. Finished grade within the crawlspace shall be at least two feet above the base flood elevation.
   c. Flood proofing in lieu of elevating the structure is prohibited.
   d. All single-family, two-family, multi-family, mobile/manufactured homes, commercial, and industrial structures shall be placed on standard concrete stemwall/footing foundations or piles, piers, or column foundations as designed in accordance with Figures 18E.70-14 or 18E.70-15 in Chapter 18E.120. Structures shall also be anchored to the foundation to resist floatation, collapse, and lateral movement.

9. **Sewage Disposal and Potable Water Installation.**
    a. New and replacement public water sources (i.e., wells and water supply lines) and public sanitary sewage conveyance systems are allowed. These systems shall be designed to withstand scour resulting from flow velocity, minimize or eliminate infiltration of floodwaters into the systems, and minimize or eliminate discharge from the systems into floodwaters.
    b. All replacement wells and replacement on-site sewage system (OSS) shall be designed to minimize or eliminate impairment to them or contamination from/to them during flooding (i.e., infiltration of floodwaters into or discharge out of the systems). They shall not be located in pothole or no-outlet floodplains.
    c. All new individual wells and new on-site sewage system (OSS) shall be prohibited. Conveyance systems from a structure to a well or OSS located outside of the flood hazard area shall be allowed provided these systems are designed to meet the standards in Section.18E.70.040 C.3. above.

D. **Alteration of Watercourses.** Any alteration of a watercourse shall comply with the following standards:
    1. Pierce County will notify adjacent communities and the Washington State Department of Ecology prior to any alteration or relocation of a watercourse proposed by the applicant and submit evidence of such notification to the Federal Insurance Administration.
    2. Pierce County shall require that maintenance be provided within the altered or relocated portion of said watercourse, so that the flood-carrying capacity is not diminished. Therefore, if the maintenance program calls for future cutting of planted native vegetation used in performing the alteration, the system shall be oversized at the time of construction to compensate for said vegetation growth or any other natural factor that may need future maintenance.
    3. The project engineer shall design the watercourse alteration so the activity does not increase the water surface elevation (zero-rise); decrease the capacity, storage, and conveyance of the watercourse; nor cause an adverse impact to adjacent, cross-channel, or upstream or downstream properties. Pierce County has the discretion to determine if potential impacts may be insignificant or not applicable.

E. **Coastal Hazard Areas.** Any proposed development, encroachments, filling, clearing, grading, new construction, and substantial improvements within a coastal flood fringe area shall be subject to the following standards:
    1. **Access.**
        a. Roads, bridges, driveways, emergency vehicle access, and access routes and easements, where allowed, shall be constructed and armored based on the standards in 18E.70.040 C.3. and elevated a minimum of one foot above the base flood elevation.
        b. Parking lots shall be elevated to a minimum of one-half foot above the base flood elevation.
        c. Private bridges may be allowed to cross Puget Sound marine waters subject to all Federal, State and local requirements.
    2. **Grading and Filling.** All permitted development must also meet the following requirements:
        a. The use of fill for structural support of buildings is prohibited.
        b. Man-made alteration of sandbars or spits shall be prohibited.

3. **Structures.** Single-family, two-family, multi-family, mobile/manufactured homes, commercial, and industrial structures, shall be allowed subject to the following standards:
   a. New construction, additions affixed to the side of an existing structure, and substantial improvement of any structure with a crawlspace may be located only landward of a line two feet above the regulatory tidal base flood elevation. (See Figure 18E.70-16 in Chapter 18E.120.) Flood resistant materials, construction methods and practices shall be used.
   b. New construction, additions affixed to the side of an existing structure, and substantial improvement of any structure located seaward of a line two feet above the base flood elevation may be allowed when elevated by piers or pilings provided:
      (1) The bottom of the lowest horizontal structural member is elevated a minimum of two feet above the regulatory tidal base flood elevation.
      (2) The structure must be designed by a professional structural engineer.
      (3) Electrical, heating, ventilation, plumbing, air-conditioning equipment, and other service facilities and associated ductwork shall be elevated a minimum of two feet above base flood elevation. (See Figure 18E.70-16 in Chapter 18E.120.)
      (4) Areas below the lowest horizontal structural member shall not be enclosed and shall remain free of obstructions.
      (5) Structures shall be anchored to the foundation to resist floatation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Flood resistant materials, construction methods and practices shall be used. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by the Pierce County Building Code.
      (6) All new construction shall be located landward of a contour line delineated at elevation 6', NGVD 1929. (Note: The 6' elevation approximates mean high tide, where mean high tide varies from 4.50 to 5.75 NGVD 1929 along Pierce County Puget Sound Marine Waters.)
   c. Adequate containment and sealing measures must be taken to insure that toxic or explosive substances will not be displaced or released into Puget Sound marine waters.
   d. Rehabilitation, reconstruction, or an upper story addition to an existing structure that does not exceed the limits for a substantial improvement shall be allowed.
4. **Sewage Disposal and Potable Water Installation.**
   a. New and replacement public water sources (i.e., wells and water supply lines) and public sanitary sewage conveyance systems are allowed. These systems shall be designed to withstand scour resulting from flow velocity, minimize or eliminate infiltration of floodwaters into the systems, and minimize or eliminate discharge from the systems into floodwaters.
   b. All new or replacement individual wells and on-site sewage system (OSS) shall be subject to the Tacoma-Pierce County Health Department regulations.

(Ord. 2004-57s § 2 (part), 2004)

18E.70.050 Appendices.

A. Floodplain/Floodway Analysis.

18E.70.050 - Appendix A
Floodplain/Floodway Analysis

This Appendix describes the flood hazard analyses and studies as required by Title 18E.70, Flood Hazard Area Chapter. Flood hazard studies establish the base flood elevation and delineate floodplain and/or floodway(s) when a proposed project contains or is adjacent to a river, stream, lake, or closed depression.

Flood hazard studies must conform to FEMA regulations described in Part 65 of 44 Code of Federal Regulations (CFR). In addition, the following information must be provided and procedures performed for flood hazard studies used under Chapter 18E.70 to examine development proposals or improvements within a floodplain.

I. FLOODWAY DETERMINATION

Pierce County recognizes two distinct floodways. The FEMA Floodway describes the limit to which encroachment into the natural conveyance channel can cause one foot or less rise in water surface elevation. The Deep and/or Fast Flowing (DFF) water floodways are hazardous areas and conditions of the floodplain for both people and habitable structures. Life safety and protection to improved properties are compromised if encroached upon. Encroachment cannot occur within these areas. DFF areas are determined by using Figure 18E.70-9 in Chapter 18E.120.

A. **FEMA Floodways.**
   1. FEMA Floodways are determined through the procedures outlined in the FEMA publication Guidelines and Specifications for Study Contractors using the 1-foot maximum allowable rise criteria.
   2. Transitions shall take into account obstructions to flow such as road approach grades, bridges, piers, culverts, or other restrictions. General guidelines for transitions may be found in *HEC-RAS, Water Surface Profiles-Users Manual, Appendix IV, Application of HEC-RAS Bridge Routines, published by the Hydrologic Engineering Center, Davis, California.*

B. **Deep and/or Fast Flowing (DFF) Floodways.**
   1. DFF floodways are generally assumed to include the entire 100-year floodplain until Pierce County approves a detailed floodway analysis that defines areas of DFF within the entire floodplain area based on the criteria.
   2. The hydraulic model must adequately be calibrated to known or recorded stage elevations of past flood events with a computed recurrence frequency intervals for the 100-year flood recurrence interval. This is to ensure model accuracy.

II. FLOOD STUDY CONTENT AND REQUIRED INFORMATION

Three copies of the completed floodplain/floodway analysis study report and the modeling digital files shall be submitted. The report submittal must be stamped by a licensed professional civil engineer and include the following information in addition to that required for the drainage plan of a proposed project:

A. **Floodplain/Floodway Map.**
   1. A scaled survey base map stamped by a licensed professional land surveyor registered in the State of Washington. The map must accurately locate the proposed development with respect to the floodplain and floodway, the channel of the subject stream, river, and/or pothole location, and the existing improvements within the subject study area. It must also supply all pertinent information such as the nature of the proposed project, legal description of the property on which the project would be located, fill quantity, limits and elevation, the building floor elevations, and use of compensatory storage.
   2. The map must show elevation contours at a minimum of 2-foot vertical intervals and shall comply with survey and map guidelines published in the FEMA publication *Guidelines and Specifications for Study Contractors.* The map must show the following:
      a. Elevations, ground contours and spot elevations, reported in vertical datum NGVD 1929 (or most recent vertical datum accepted by Pierce County).
      b. Elevations and dimensions of existing structures, fill, and compensatory storage areas.
      c. Size, location, elevation and spatial arrangement of all proposed structures on the site.
      d. Location and elevations of roadways, drainage facilities, water supply lines, and sanitary sewer facilities.
      e. Areas of DFF must clearly be shown and plotted on the map sheet depicting the bounded area of the floodway on both sides of the study channel, through the subject site. DFF floodway studies must reflect all transitions as referenced above as well.
      f. The base maps must also be accompanied by all field survey notes/computations, drawings, etc. for each cross-section with water surface elevation at the time the cross section field survey was done.

B. **Study Report.**
   1. Soil maps, groundcover maps, and photographs.
   2. A narrative report containing purpose of the study and description of the study area, data collection, methodology for both the hydrology and hydraulics, detailed discussion on the input parameters used, modeling results, and conclusions.
   3. A floodplain/floodway analysis must include calculations and all computer analysis input and output information, supporting graphical illustrations as well as the following additional information:
      a. Scaled cross-sections showing the current/existing conditions of the river/stream channel, the floodplain adjoining each side of the channel, the computed floodway, the cross-sectional area to be occupied by any proposed development and all historic high water information.
      b. Profiles showing the bottom of the channel, the top of both left and right banks and computed base flood water surface elevations for the 10-, 25-, 50- and 100-year events.
      c. Plans and specifications of any flood protection for structures, construction areas, filling, dredging, channel improvements, storage of materials, water supply, and sanitary facilities within the floodplain.

d. Complete printout of input and output data of the model that was used for the analysis. Liberal use of comments and written discussion will assist considerably in understanding the model logic and minimize misinterpretations and/or questions.
e. A map showing the graphical/plotted location and limits of the computed floodway and/or floodplain. All mapping must conform to the County's accepted horizontal/vertical datum standards.
f. Three copies of ready-to-run digital files of both the hydrologic and hydraulic model and its input and output files used in the study. Data shall be submitted on a disk in standard ASCII format, ready to use on an IBM-compatible personal computer and in the applicable software application (i.e., HEC-RAS, HSPF, SBUH, etc.).
g. A section on the flood flow including computer modeling and/or calculations (see below for additional requirements on flood flow determinations).
h. Aerial photographs of the site including pre-Feb. 1996 and post-Feb. 1996 photos of the site.
i. All field survey notes/computations, maps, and drawings for each cross-section with water surface elevation at the time of the cross-section field survey.

C. **Computer Modeling Information.** Floodway/floodplain studies submitted to Pierce County for review must include output summary tables and include the following (but not limited to) items:
1. Cross-section(s) identification number.
2. Range of flows being examined.
3. Computed water surface elevation at each cross-section.
4. Energy grade line at each cross-section.
5. Graphical plots of the channel cross-sections with computed water surface elevations for all model runs including calibrated model runs.
6. All model input and output printouts.
7. Graphical plots of the model output data that shows the points and segments along each cross-section where Deep and/or Fast Flowing water occurs. This shall include cross-section plots of depth and velocity in one-unit increments. The plots shall also be accompanied with a table listing the station distance (right and left bank), flow rate, area, hydraulic depth, velocity, and whether each point is floodway.
8. A plan sheet clearly showing the graphical representation of the bounded area of the floodway based on DFF criteria through the entire study site and reach. Note that identified "islands" or "pockets" within the middle of the bounded floodway area are generally considered as part of the floodway, unless otherwise approved by Pierce County.
9. Discussion on the starting water surface elevation for the hydraulic model.

III. DETERMINING FLOOD FLOWS

The three techniques used to identify the flows used in a flood study depend on whether gage data is available, whether a basin plan has been adopted, or a detailed flood study has been done and approved for use by Pierce County. The first technique is for basins with adopted basin plan areas. The second technique is used if a gaging station exists on the stream. The third technique

is used on un-gaged catchments or those with an insufficient length of record. In all cases (and at minimum) the engineer shall be responsible for assuring that the hydrologic methods used are technically reasonable, conservative, conform to the FEMA publication *Guidelines and Specifications for Study Contractors,* and are acceptable by FEMA and Pierce County.

A. **Flood Flows from Adopted Basin Plan Information.** For those areas where Pierce County has adopted basin plans with future conditions flow modeling, flood flows may be calculated using information from the basin plan. The hydrologic model used in the basin plan shall be updated to include the latest changes in zoning or any additional information regarding the basin which has been acquired since the adoption of the basin plan. Flows that are used for the hydraulic modeling must be for future basin conditions.

B. **Flood Flows from Stream Gage Data.** Calculating flood flows from stream gage data uses the Log-Pearson Type III distribution method as described in the *Guidelines for Determining Flood Flow Frequency, Bulletin 17B of the Hydrology Committee, United States Water Resources Council (revised September 1981).*

1. This methodology may only be used if data from a gaging station in the basin is available for a period of at least 10 years.
2. If the difference in the drainage area on the stream at the study site and the drainage area to a gaging station on the stream at a different location in the same basin is less than or equal to 50 percent, the flow at the study site shall be determined by transferring the calculated flow at the gage to the study site using a drainage area ratio raised to the 0.86 power, as in the following equation:

$$Q_{SS} = Q_S (A_{SS} / A_G)^{0.86}$$

where

Q_{SS} = estimated flow for the given return frequency on the stream at the study site.

Q_S = flow for the given return frequency on the stream at the gage site.

A_{SS} = drainage area tributary to the stream at the study site.

A_G = drainage area tributary to the stream at the gage site.

3. If the difference in the drainage area at the study site and the drainage area at a gaging station in the basin is more than 50 percent and a basin plan has not been prepared, a continuous model shall be used as described below to determine the flood flows at the study site.
4. In all cases where dams or reservoirs, floodplain development, or land use upstream may have altered the storage capacity or runoff characteristics of the basin so as to affect the validity of this technique, a continuous model shall be used to determine flood flows at the study site.
5. This methodology can only be used for areas outside of the urban growth boundary. Future flow values must be used for rural areas when an adopted basin plan provides such flow values. Within the urban growth boundary, future flows from current adopted basin plans must be used. Where adopted basin plans are not existent, then

continuous flow simulation modeling must be used to determine future conditions.

6. Flows for major river systems within the urban growth boundary do not need to be computed using continuous simulation modeling. Regression analysis using the referenced Bulletin 17B may be used instead to determine flow magnitudes where an adopted or formally approved and accepted flood study done by or for the County (purposes of regulatory or best information) is non-existent.

C. **Flood Flows from a Calibrated Continuous Model.** Flood flows may be calculated by utilizing a continuous flow simulation model such as HSPF or other equivalent continuous flow simulation model, as approved by the County. Where flood elevation or stream gaging data are available, the model shall be calibrated to the known gage data. Otherwise, County accepted and approved regional parameters may be used.

IV. IDENTIFYING FLOOD ELEVATIONS, PROFILES and FLOODWAYS (Hydraulic Model)

A. **Reconnaissance.** The applicant's project engineer is responsible for the collection of all existing data with regard to flooding in the study area. This shall include a literature search of all published reports in the study area and adjacent communities and an information search to obtain all unpublished information on flooding in the immediate and adjacent areas from Federal, State, and local units of government. This search shall include specific information on past flooding in the area, drainage structures such as bridges and culverts that affect flooding in the area, available topographic maps, available community maps, photographs of past flood events, and general flooding problems within the community. Documented discussions with nearby property owners should also be done to obtain a witness account of the flooding extent. A field reconnaissance shall be made by the applicant's project engineer to identify hydraulic conditions of the study area, including type and number of structures, locations of cross-sections, and other parameters including the roughness values necessary for the hydraulic analysis.

B. **Base Data.** Channel cross-sections used in the hydraulic analysis shall be current/existing (unless otherwise approved by the County) at the time the study is performed and shall be obtained by field survey. Topographic information obtained from aerial photographs/mapping may be used in combination with surveyed channel cross-sections in the hydraulic analysis. The elevation datum of all information used in the hydraulic analysis shall be verified. All information shall be referenced directly to NGVD 1929 unless otherwise approved by Pierce County.

C. **Methodology.** Flood studies and analysis (including Deep and/or Fast Flowing floodways and Zero-Rise Analysis) shall be calculated using the U.S. Army Corps of Engineers HEC-RAS computer model (or subsequent revision) unless otherwise approved by Pierce County.

D. **Adequacy of the Hydraulic Model.** Pierce County considers the following (but not limited to) factors when determining the adequacy of the hydraulic model for use in the floodway/floodplain model:
   1. Cross-section downstream starting location and spacing.
   2. Differences in energy grade line (significant differences in the energy grade line from cross-section to cross-section are an indication that cross-sections should be more closely spaced or that other inaccuracies exist in the hydraulic model.)

3. Methods and results for analyzing the hydraulics of structures such as bridges and culverts.
4. Lack of flow continuity.
5. Use of a gradually varied flow model. In certain cases, rapidly varied flow techniques may need to be used in combination with a gradually varied flow model such as weir flow over a levee, flow through a spillway of a dam, or special application of bridge flow (pressure flow if bridge superstructure is shown to be submerged for the study event).
6. Mannings "n" value.
7. Calibration of hydraulic model to known and/or observed flow stage elevations including past flood events.
8. Special applications. In some cases, steady state-one dimensional hydraulic models may not be sufficient for preparing the floodplain/floodway analysis. This may occur where sediment transport, two-dimensional flow, or other unique hydraulic circumstances affect the accuracy of the model. In these cases, the project engineer must propose and obtain Pierce County approval of alternative models for establishing the water surface elevations.
9. All reported error and/or warning messages by the model must be properly and adequately addressed and/or resolved and included in the report for review verification.

V. ZERO-RISE ANALYSIS (ZRA)

A. Zero-rise analysis (ZRA) is required where encroachment within the flood fringe area is allowed and approved by Pierce County. The ZRA must show that the proposed development encroachment in the flood fringe area will not show a measurable rise in the base flood elevation (i.e., less than 0.001 foot), resulting from a comparison of existing conditions and proposed conditions. This is directly attributable to development in the floodplain but not attributable to manipulation of mathematical variables such as roughness factors, coefficients, discharge, and other hydraulic parameters.

B. In addition to those items listed in A. above, the following shall be included in a ZRA:
   1. Floodway boundaries (based on zero-rise) are to follow the stream lines and reasonably balance the rights of property owners on either side of the floodway. Use of the automatic equal conveyance encroachment option in the model will be considered equitable.
   2. The ZRA must include a sufficient number of cross-sections in order to accurately model the subject fill and compensatory storage areas of the site. In all cases, cross-sections shall be located downstream, through the subject site and upstream of the site at a very minimum. They shall also be located where changes in channel and the fill material characteristics occur, such as slope, shape, and roughness. The sections shall also be located perpendicular to the flow path in the channel and the outside overbank areas. Pierce County shall review and approve the proposed number and location of cross-sections. All cross-sections and surveys shall be prepared and certified by a professional land surveyor or registered professional engineer in the State of Washington.

3. Difference between two profiles water surface elevation at the cross-section (e.g., difference between existing and encroached water surface). The model must report 0.001-ft or less an allowable change in the water surface elevation. This must be shown in the profile graphical plot as well.
4. Difference between profiles of the energy grade line at the cross-section. The model must report 0.001-ft or less. This is the allowable change in the energy grade line. This must be shown in the profile graphical plot as well.

C. Conveyance Capacity.

1. The ZRA must also show that the proposed development encroachment in the flood fringe area will not show a measurable decrease (less than 0.001 CFS) in the conveyance capacity of the channel, resulting from a comparison of existing conditions and proposed conditions, for each of the cross-sections. This is also directly attributable to development in the floodplain but not attributable to manipulation of mathematical variables such as roughness factors, coefficients, discharge, and other hydraulic parameters.
2. The analysis must provide calculations of the reduction in conveyance caused by the proposed development encroachment, assuming no change in the water surface elevation, and using the roughness coefficient value(s) appropriate for the proposed development.
3. The analysis must then provide calculations for the increase in conveyance of the proposed compensatory measure, using the roughness coefficient value(s) appropriate for the proposed development.
4. Include a comparison analysis and discussion from No. 2 and 3 above. The comparison must adequately show that the conveyance capacity has not measurably decreased between the existing condition and proposed development condition.

Floodplain/Floodway Zero-Rise Certification

This is to certify that I am a duly qualified professional engineer licensed to practice in the State of Washington.

This is to further certify it is my professional opinion that the attached floodplain/floodway Zero-Rise Analysis conclusively shows that the proposed development of:

_____ _____
(Name of Development) Parcel Number

will not increase the 100-yr base flood elevation(s) and widths nor reduce the conveyance capacity of the floodplain/floodway and its associated channel to the _____
(Name of River, Stream, Pothole or other Watercourse)

Supporting Data

Base Flood Elevation (Pre-Development) = _____ FT (NGVD 1929)

Base Flood Elevation (Post-Development) = _____ FT (NGVD 1929)

Conveyance Capacity (Pre-Development) = _____ CFS

Conveyance Capacity (Post-Development with compensatory storage) = _____ CFS

_____
Signature Date

_____
Title

_____
Firm Name

_____
Address

_____
City State ZIP Code

Seal, Signature, and Date

(Ord. 2004-57s § 2 (part), 2004)

Chapter 18E.80

LANDSLIDE HAZARD AREAS

Sections:

18E.80.010 Purpose.

The following statements describe the purpose of this Chapter:

A. Protect human life and health.
B. Regulate uses of land in order to avoid damage to structures and property being developed and damage to neighboring land and structures.
C. Identify and map active landslide hazard areas.
D. Minimize the ill effects on wetlands and critical fish and wildlife habitat that can result from landslides.
E. Establish a permit requirement and review procedures for development proposals in areas with potential landslides.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.020 Landslide Hazard Areas.

A. **Landslide Hazard Areas Indicators.** Landslide hazard areas are areas potentially subject to mass movement due to a combination of geologic, seismic, topographic, hydrologic, or manmade factors. Landslide hazard areas can be identified by the presence of any of the following indicators:
    1. Areas of historic failures, including areas of unstable, old and recent landslides or landslide debris within a head scarp.
    2. Areas with active bluff retreat that exhibit continuing sloughing or calving of bluff sediments, resulting in a vertical or steep bluff face with little or no vegetation.
    3. Areas with both of the following characteristics:
        a. Slopes steeper than 20 percent with a vertical relief of 20 feet or more (see 18E.80-1 in Chapter 18E.120); and
        b. Hillsides that intersect geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock.
    4. Slopes that are parallel or sub-parallel to planes of weakness, such as bedding planes, joint systems, and fault planes in subsurface materials.
    5. Areas exhibiting geomorphological features indicative of past slope failure, such as hummocky ground, back-rotated benches on slopes, etc.
    6. Areas with tension cracks or ground fractures along and/or near the edge of the top of a bluff or ravine.

7. Areas with structures that exhibit structural damage such as settling and cracking of building foundations or separation of steps or porch from a main structure that is located near the edge of a bluff or ravine.
8. The occurrence of toppling, leaning, bowed, or jackstrawed trees that are caused by disruption of ground surface by active movement.
9. Areas with slopes containing soft or liquifiable soils.
10. Areas where gullying and surface erosion have caused dissection of the bluff edge or slope face as a result of drainage or discharge from pipes, culverts, ditches, and natural drainage courses.
11. Areas where seeps or springs or indicators (e.g., vegetation type) of a shallow groundwater table are observed on or adjacent to the face of the slope.
12. Any area with a slope of 40 percent or steeper and with a vertical relief of 15 or more feet, except those manmade slopes created under the design and inspection of a geotechnical professional or slopes composed of competent bedrock. For the purposes of determining whether a slope is considered to be a landslide hazard area, the horizontal and vertical distance between the top and toe of slope are utilized. (See Figure 18E.80-1 in Chapter 18E.120.)
13. Areas that are at risk of mass movement due to seismic events.
14. Areas that include alluvial or colluvial fans located at the base of steep slopes and drainages.

B. **Potential Landslide Hazard Areas.** Potential landslide hazard areas, as depicted on the Critical Areas Atlas-Landslide Hazard Areas Map, are those areas where the suspected risk of slope instability and landslide is sufficient to require a geological assessment to assess the potential for active landslide activity. Potential landslide hazard areas are determined using the following criteria:
1. Areas identified on the Coastal Zone Atlas of Washington, Volume VII, Pierce County as either U (unstable), Urs (unstable recent slide), Uos (unstable old slide), I (intermediate), or M (modified), and any adjacent areas within 300 feet. (See Figure 18E.80-2 in Chapter 18E.120.)
2. Areas identified on the Pierce County topographic maps as having slopes greater than 20 percent with a vertical relief of greater than 20 feet and any adjacent areas within a distance of 65 feet (See Figure 18E.80-3 in Chapter 18E.120.)
3. Areas that possess one or more of the landslide hazard area indicators (stratigraphy, groundwater conditions, etc.) as set forth in Section 18E.80.020 A. and any adjacent area within a distance of 65 feet.
4. Areas not reflected on the Coastal Zone Atlas that have been determined to be active through a geological assessment process.
5. Areas identified on the Pierce County topographic maps as having slopes greater than 50 percent with a vertical relief of greater than 100 feet and any adjacent areas within a distance of 300 feet.

C. **Landslide Hazard Area Categories.** Landslide hazard areas shall be classified into categories which reflect each landslide hazard areas past landslide activity and the potential for future landslide activity based on an analysis of slope instability. Landslide hazard areas shall be designated as follows:

1. **Active Landslide Areas.** A composite of the active landslides and/or unstable areas, including that portion of the top of slope and slope face subject to failure and sliding as well as toe of slope areas subject to impact from down slope run-out, identified and mapped during a geological assessment of a site. An active landslide hazard area exhibits one or more of the following:
   a. Areas of historical landslide movement on a site which have occurred in the past century including areas identified on the Coastal Zone Atlas of Washington, Volume VII, Pierce County as Urs (unstable recent slide).
   b. Unstable areas that exhibit geological and geomorphologic evidence of past slope instability or landsliding or possess geological indicators (stratigraphy, ground water conditions, etc.), as set forth in 18E.80.020 A., that have been determined through a geological assessment process to be presently failing or may be subject to future landslide activity. The impact of the proposed development activities must be considered in defining the extent of the active areas.
   c. Interim areas are located between areas identified through the geological assessment process as an active landslide hazard area. Interim areas will be considered part of the active landslide hazard area if the required top of slope or toe of slope landslide hazard area buffer encompasses the area. (See Figure 18E.80-4 in Chapter 18E.120.)
2. **Stable Areas.** Areas that have been identified as potential landslide hazard areas, but, through the geological assessment process, meet one of the following conditions:
   a. No indicators as set forth in 18E.80.020 A. actually exist that indicate the potential for future landslide activity to occur.
   b. A slope stability analysis has indicated that there is no apparent landslide potential.
   c. Adequate engineering or structural measures have been provided in a geological assessment - geotechnical report that mitigates the potential for a future landslide to occur as a result of current or past development activity. The engineering or structural measures must provide a minimum factor of safety of 1.5 static conditions and 1.1 for dynamic conditions. Analysis of dynamic (seismic) conditions shall be based on a minimum horizontal acceleration as established by the current version of the Pierce County Building Code. The engineering or structural measures must be completed, inspected and accepted for the area to be deemed stable. Construction sequencing recommendations must be provided by the geotechnical professional when a proposed development will be constructed concurrently with the engineering or structural measures.
   d. A geological assessment has been performed and the results of that assessment indicate that an area is not an active landslide hazard area.

   Areas that have been determined to be stable or are converted into a stable area by the implementation of engineering or structural measures are not considered a landslide hazard critical area.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.030 Landslide Hazard Area Review Procedures.

A. **General Requirements.**

1. The Pierce County Critical Area Atlas provides an indication of where active and potential landslide hazard areas are located within the County. The actual presence or location of an active landslide hazard area and/or additional potential landslide hazard areas that have not been mapped, but may be present on or adjacent to a site, shall be evaluated using the geological assessment procedures established in this Chapter.
2. The Department will complete a review of the Critical Areas Atlas – Landslide Hazard Area Map and other source documents for any proposed regulated activity to evaluate whether the site is or may be located within an active or potential landslide hazard area. Identification of an active or potential landslide hazard area may also occur as a result of field investigations conducted by Department staff.
3. When the Department's maps or sources indicate that the site for a proposed regulated activity is or may be located within an active or potential landslide hazard area, the Department shall require the submittal of a geological assessment as outlined in 18E.80.030 B. below. (See Figure 18E.80-5 in Chapter 18E.120.)
4. Unless otherwise stated in this Chapter, the critical area protective measure provisions contained in Section 18E.10.080 shall apply.

B. **Geological Assessment.** A geological assessment is a site investigation process to evaluate the on-site geology affecting a subject property.

1. Geological assessments shall be submitted to the Department for review and approval together with a landslide hazard area application and associated fee.
2. A geological assessment shall include a field investigation and may include the use of historical air photo analysis, review of public records and documentation, and interviews with adjacent property owners, etc.
3. The geological assessment shall include the following information and analysis:
   a. An evaluation of which areas on the site or within the vicinity of the site meet the criteria for an active landslide hazard area and stable area as set forth in Section 18E.80.020 C.1. and 2.
   b. Consider the run-out hazard of landslide debris to the proposed development that starts upslope (whether part of the subject property or on a neighboring property) and/or the impacts of landslide run-out on down slope properties.
   c. The geological assessment shall include a detailed review of the field investigations, published data and references, data and conclusions from past geological assessments, or geotechnical investigations of the site, site-specific measurements, tests, investigations, or studies, as well as the methods of data analysis and calculations that support the results, conclusions, and recommendations.
4. Geological assessments shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s), and signed, sealed and dated by the geotechnical professional(s) (as defined in Section 18.25.030 and established in this Chapter) and the format shall be pre-approved by the Department.
5. A field investigation and geological assessment shall be completed under the responsible charge of an appropriately licensed geotechnical professional(s) to evaluate whether or not an active landslide hazard area exists within 300 feet of the site. (See Figure 18E.80-5 in Chapter 18E.120.)

a. The geological assessment shall be submitted in the form of a geotechnical letter when the geotechnical professional finds that no active landslide hazard area exists within 300 feet of the site. The geotechnical letter shall meet the requirements contained in 18E.80.060 - Appendix A.
b. The geological assessment shall be submitted in the form of geotechnical evaluation when the geotechnical professional finds that an active landslide hazard area exists, but is located more than 300 feet away from the proposed project area. The geotechnical evaluation shall meet the requirements contained in 18E.80.060 - Appendix B.
c. The geological assessment shall be submitted in the form of a geotechnical report when the geotechnical professional finds that an active landslide hazard area exists within 300 feet of the proposed project area or when a geotechnical professional indicates that mitigation measures are necessary in order to construct or develop within a potential landslide hazard area. The geotechnical report shall meet the requirements contained in 18E.80.060 - Appendix C.

6. Geological assessments that do not contain the minimum required information or comply with the landslide hazard area standards set forth in 18E.80.040 will be returned to the geotechnical professional for revision.
7. The Department shall review the geological assessment and either:
   a. Accept the geological assessment; or
   b. Reject the geological assessment and require revisions or additional information.
8. When the geological assessment has been accepted, the Department shall issue a decision on the landslide hazard area application.
9. A geological assessment for a specific site may be valid for a period of up to five years when the proposed land use activity and site conditions affecting the site are unchanged. However, if any surface and subsurface conditions associated with the site change during that five-year period, the applicant may be required to submit an amendment to the geological assessment.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.040 Landslide and Erosion Hazard Area Standards.

A. **Active Landslide Hazard Areas.** Any development, encroachment, filling, clearing or grading, building structures, impervious surfaces, and vegetation removal shall be prohibited within active landslide hazard areas and associated buffers except as specified in the following standards:
   1. **Stormwater Conveyance.** Stormwater conveyance shall be allowed when it is conveyed through a high-density polyethylene stormwater pipe with fuse-welded joints and when no other stormwater conveyance alternative is available. The pipe shall be located on the surface of the ground and be properly anchored so that it will continue to function in the event of an underlying slide.
   2. **Utility Lines.** Utility lines will be permitted when no other conveyance alternative is available. The line shall be located above ground and properly anchored and/or designed so that it will continue to function in the event of an underlying slide. Utility lines may be permitted when it can be shown that no other route alternative is available. It must be demonstrated by the applicant that a utility line within a landslide hazard area has been designed in a manner that: does not impact the

stability of the slope, minimizes or eliminates the potential for rupture or failure, and assures that in the event of failure there will not be a life/safety risk. Appropriate design features such as above ground installation, restrained joint ductile pipe, welded steel pipe, pile supports, the use of high density polyethylene pipe with fuse welded joints, increased wall thickness, special coating, or other measures shall be employed. Automatic shutoff valves shall be provided on fluid or gas transmission lines.

3. **Trails.** Trails shall be allowed when all of the following conditions have been met:
   a. The removal or disturbance of vegetation, clearing or grading shall be prohibited during the wet season (November 1 to May 1).
   b. The proposed trail shall not decrease the existing factor of safety within the active landslide hazard area, or any required buffer.
   c. The proposed trail shall not create the need for larger landslide hazard area buffers and setbacks on neighboring properties unless approved through a notarized written and recorded agreement with the affected property owners.
   d. The proposed trail cannot be located outside the active landslide hazard area or its associated buffer due to topographic constraints of the parcel or size and/or location of the parcel in relation to the limits of the active landslide hazard area and /or its associated buffer.
   e. The proposed trail is for non-vehicular use only, and is a maximum of four feet in width.
   f. Trails shall not be sited within active landslide hazards or their associated buffers when there is such a high risk of landslide activity that the use of the trail would be hazardous.
   g. Trails shall be designed and constructed using an engineered drainage system or other methods to prevent the trail surface from becoming a drainage course.
4. Lots may be created that contain an active landslide hazard area as long as the lot is designed in such a way that future development of the lot will not impact the active landslide hazard area or its associated buffer. The created lot(s) shall be designed in such a manner that a sufficient buildable area is provided after all setbacks, pertinent critical area standards, critical area protection measures, and other County regulations are applied.

B. **Landslide Hazard Management Areas.** All regulated activities may be allowed in areas located within 300 feet of an active landslide hazard area subject to the following standards:
1. The Department reviews and approves a Geological Assessment - geotechnical report and the Department's evaluation indicates that the potential landslide hazard area is stable.
2. The proposed development is located outside of an active landslide hazard area and any required buffer, as set forth in 18E.80.050.
3. The proposed recommendations and mitigation measures contained within the geotechnical report are adequate to reduce or mitigate risks to health and safety.
4. The proposed development shall not cause a decrease in the existing factor of safety within the neighboring active landslide hazard areas or associated buffers. The proposed development shall not decrease the factor of safety within the Landslide Hazard Management area below the limits of 1.5 for static conditions and 1.2 for

dynamic conditions. Analysis of dynamic (seismic) conditions shall be based on a minimum horizontal acceleration as established by the current version of the Washington State Building Code.

5. The removal and disturbance of vegetation, clearing or grading shall be limited to the area of the approved development and shall not be allowed during the wet season (November 1 through May 1) unless adequate provisions for wet season erosion have been addressed in the Geotechnical Report and approved by the Department.
6. Surface drainage from developed areas, including downspouts and runoff from paved or unpaved surfaces up slope, shall not be directed through an active landslide hazard area or its associated buffer unless it is conveyed in conformance with the provisions in 18E.80.040 A.1. above.
7. Stormwater retention facilities, including infiltration systems utilizing perforated pipe, are prohibited unless the slope stability impacts of such systems have been analyzed and mitigated by a geotechnical professional and appropriate analysis indicates that the impacts are negligible.
8. The proposed development shall not create a need for larger landslide hazard area buffers and setbacks on neighboring properties unless approved through a notarized written agreement with the affected property owner(s).
9. The proposed development shall be sited far enough from regressing slope faces to ensure 120 years of useful life for the proposed structure(s) or infrastructure.
10. Lots may be created that are located within or contain a landslide hazard management area as long as the lot is designed in such a way that future development of the lot will not impact the active landslide hazard area or its associated buffer. The created lot shall contain a sufficient buildable area after all setbacks, pertinent critical area standards, critical area protection measures, and other County regulations are applied.
11. Sites that are directly adjacent to any riparian area, wetlands, tidal marshes, and estuaries may be subject to additional buffer requirements and standards as set forth in Chapter 18E.40 Critical Fish and Wildlife Habitat Areas or wetlands as set forth in Chapter 18E.30 Wetlands.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.050 Buffer Requirements.

A. **Determining Buffer Widths.**
   1. The buffer width shall be measured on a horizontal plane from a perpendicular line established at the edge of the active landslide hazard area limits (both from the top and toe of the slope). (See Figure 18E.80-6 in Chapter 18E.120.)
   2. A buffer of undisturbed vegetation shall be required for an active landslide hazard area. The required buffer width is the greater amount of the following distances:
      a. Fifty feet from all edges of the active landslide hazard area limits;
      b. A distance of one-third the height of the slope if the regulated activity is at the top of the active landslide hazard area and a distance of one-half the height of the slope if the regulated activity is at the bottom of an active landslide hazard area, or the distance recommended by the geotechnical professional.

B. **Modification of Buffer Widths.** The Department may require a larger buffer width than the buffer distance, as determined in A. above, if any of the following are identified:
   1. The adjacent land is susceptible to severe erosion and erosion control measures will not effectively prevent adverse impacts.

2. The area has a severe risk of slope failure or downslope stormwater drainage impacts.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.060 Appendices.

A. Geological Assessment-Landslide Hazard Geotechnical Letter.

B. Geological Assessment-Landslide Hazard Geotechnical Evaluation.

C. Geological Assessment-Landslide Hazard Geotechnical Report.

18E.80.060 - Appendix A
Geological Assessment -
Landslide Hazard Geotechnical Letter

A. A geotechnical letter shall include the following:
   1. The letter shall be labeled identifying the submittal as a "Landslide Hazard Geotechnical Letter."
   2. The dates when the geological assessment was performed. The date when the letter was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A brief description of the project (including the proposed land use) and a description of the area to be developed.
   6. A paragraph that states the following specific language:
      "The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Title 18E, Section 18E.80.030 to prepare a landslide hazard geological assessment. (Individual's Name) understands the requirements of the current Landslide Hazard Area Chapter 18E.80 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under the responsible charge of (Individual's Name) have performed a landslide hazard geological assessment, conducted a field investigation, and researched historic records on or in the vicinity of the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department and it does not appear that an active landslide hazard area exists within 300 feet of the site."
   7. The name, mailing address, and telephone number of geotechnical professional who performed the geological assessment and prepared the letter.
   8. The name, mailing address, and telephone number of the property owner.

B. The geotechnical letter shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s).

C. Geotechnical letters shall be in conformance with a format that is pre-approved by the Department.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.060 - Appendix B
Geological Assessment -
Landslide Hazard Geotechnical Evaluation

A. A Geotechnical evaluation shall include the following:
   1. The first page of the document shall be labeled identifying the submittal as a "Landslide Hazard Geotechnical Evaluation."
   2. The dates when the geological assessment was performed. The date when the verification document was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A detailed description of the project (including the proposed land use) and a description of the area to be developed.
   6. A description of the surface and subsurface geology, hydrology, soils, and vegetation at the site and a list of the landslide hazard area indicators, as set forth in Section 18E.80.020 A., that were found on or in the vicinity of the site.
   7. A summary of the results, conclusions, and recommendations resulting from the geological assessment of the landslide hazards on or in the vicinity of the site. This summary shall address all of the information required in Section 18E.80.030 B.
   8. An accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information listed below be based on a field survey by a licensed surveyor. The site plan shall include:
      a. The limits/location of the active landslide hazard area(s) set forth in Section 18E.80.020 C.1.
      b. The limits/location of the required landslide hazard buffer based upon the requirements set forth in Section 18E.80.050 A.
      c. The location of any existing and proposed structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      d. The full geographical limits of the proposed project area (area to be developed).
      e. Dimension the closest distance between the identified active landslide hazard area boundary and the project area.
      f. Existing topography on the site presented in two-foot contours.
      g. Property lines for the site.
      h. North arrow and plan scale.
   9. A paragraph that states the following specific language:

      "The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Title 18E, Section 18E.80.030 to prepare a landslide hazard geological assessment. (Individual's Name) understands the requirements of the current Landslide Hazard Area Chapter 18E.80 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under the responsible charge of (Individual's Name) have performed a landslide hazard geological assessment, conducted a field investigation, and researched historic records on or in the vicinity of the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department and it does not appear that an active landslide hazard area exists within 300 feet of the proposed project area."

10. The name, mailing address, and telephone number of geotechnical professional who performed the geological assessment and prepared the geotechnical evaluation document.
11. The name, mailing address, and telephone number of the property owner.

B. The geotechnical evaluation shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s) and the format shall be pre-approved by the Department.

C. Geotechnical evaluation documents shall be in conformance with a format that is pre-approved by the Department.

(Ord. 2004-57s § 2 (part), 2004)

18E.80.060 - Appendix C
Geological Assessment - Landslide Hazard Geotechnical Report

A. At a minimum, a geotechnical report shall include the following:
   1. The first page of the document shall clearly identify the submittal as a "Landslide Hazard Geotechnical Report."
   2. The dates when the geological assessment was performed. The date when the geotechnical report was prepared.
   3. The parcel number(s) of the site.
   4. Site address if one has been assigned by the County.
   5. A detailed description of the project (including the proposed land use) and a description of the area to be developed.
   6. A description of the surface and subsurface geology, hydrology, soils, and vegetation of the site and a list of the landslide hazard area indicators, as set forth in Section 18E.80.020 A., that were found on or in the vicinity of the site.
   7. A summary of the results, conclusions, and recommendations resulting from the geological assessment of the landslide hazards on or in the vicinity of the site. This summary shall address all of the information required in Section 18E.80.030 B.
   8. An accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information listed below be based on a field survey by a licensed surveyor. The site plan shall include:
      a. The limits/location of the active landslide hazard area(s) set forth in Section 18E.80.020 C.1. Delineation of the active landslide hazard area limits shall differentiate between areas of historic landslide activity and adjacent unstable areas.
      b. The limits/location of the required landslide hazard buffer based upon the requirements set forth in Section 18E.80.050 A.
      c. The limits/location of any potential landslide hazard areas that have been designated as stable areas in accordance with Section 18E.80.020 C.2.c.
      d. The location of any existing and proposed structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      e. The full geographical limits of the proposed project area (area to be developed).
      f. Location and unique identifier of geotechnical borings, CPT soundings, or other surveys or explorations used to characterize subsurface conditions.
      g. Extent of cross-section(s) used to evaluate the three-dimensional subsurface geologic and groundwater conditions at the site.
      h. Extent of cross-section(s) used in the evaluation of slope instability.
      i. Existing topography on the site presented in two-foot contours.
      j. Property lines for the site.
      k. North arrow and plan scale.
   9. Subsurface characterization data must be provided. The data shall be based on both existing and new information that may include soil borings (SPT or other appropriate driven sample collection methods), test pits, geophysical surveys, or other appropriate subsurface exploration methods, development of site-specific soil and/or rock stratigraphy, and measurement of groundwater levels including variability resulting from seasonal changes, alterations to the site, etc.

a. Conventional geotechnical boring data shall be reported as a graphic log utilizing the following standards:
   (1) The vertical scale of the graphic log shall be such that 5 feet of drilled depth is scaled to range of 1" to 2" (1:60- or 1:30-scale), and shall include vertical columns that record depth in 1 foot increments, SPT value or equivalent value, and incremental blow counts, a graphic pattern representation of the soil type encountered during drilling, and sample descriptions and other comments regarding drilling.
   (2) The graphic log shall have a header on the first page that includes a unique identifier for the boring, the times and dates of the start and completion of drilling, the manufacturer and model of the drilling rig, the company name of the drilling contractor, the name(s) of the site geologist(s) or engineer(s) overseeing the drilling activities, the details of the method used to advance the borehole (e.g., 4" i.d. hollow-stem auger), and the type of drilling fluid used to stabilize the borehole. In addition, the boring data/graphic log shall include an indication that the SPT was completed in accordance with applicable ASTM standards or other appropriate driven sample collection methods, which are specified, completed in general accordance with applicable ASTM standards. This information shall include a description of the sampler, hammer weight, drop height, the type of hammer used to drive the sampler performing the STP, number of turns of rope if a cathead is used to raise the hammer, condition of rope (i.e., new, used, frayed, oily, etc.), and the depth of static groundwater measured immediately prior to abandonment of the boring and the time and date of this measurement.
   (3) All subsequent pages of the graphic log shall have the unique identifier for the boring, the times and dates of the start and completion of drilling, and the number of the page and the total number of pages comprising the log.
   (4) Each SPT value or equivalent value will be reported in the appropriate column showing the blow counts recorded at each 6" interval, and the sum of the blow counts between penetration distances of 6" to 18," unless refusal conditions (50 or more blows with less than 6" of sampler penetration) are met anywhere in this interval. At refusal, the blow count shall be recorded as the number of blows with the corresponding sampler penetration, in inches.
   (5) SPT tests or other sample collection methods shall be performed every 5 feet during drilling, at a minimum.
   (6) The soil sample descriptions will include the total length of the recovered sample, the soil color, odor, the density or consistency (loose to very dense, very soft to very stiff), degree of water saturation (dry, moist, wet, saturated), and dilatancy. For granular (sand and gravel) soils, the description shall include a physical description of the soil sample, including size distribution (poorly or well graded), angularity, composition, amount and plasticity of the fines fraction. For fine soils (silt and clay), the description shall include a qualitative estimate of the proportion of the silt and clay size particles (e.g., silty clay, clay with some silt, etc.), plasticity, and amount and type of organic material. The sample description shall include a description of any bedding, laminations, slickensides, or other

textural or deposition features, including contact between dissimilar soil types. The sample description shall also include a field classification of the soil sample using the Unified Soil Classification System where the classification is expressed in lower case letters (e.g., sp, ml, etc.). The sample classification shall be expressed in upper case letters (e.g., SP, ML, etc.) where subsequent laboratory testing has been performed. This column of the graphic log will also include any other information relevant to the subsurface investigation, such as loss of drilling fluid, heaving, churning of the drill in gravelly soils, etc.

b. CPT sounding data shall be reported as a graphic log utilizing the following standards:
   (1) The vertical scale of the graphic log shall be such that 5 feet of penetrated depth is scaled to range of 1" to 2" (1:60- or 1:30-scale), and shall include vertical columns that record depth in 1 foot increments.
   (2) The graphic log shall have a header on the first page that includes a unique identifier for the boring, the times and dates of the start and completion of the CPT sounding, the manufacturer and model of the CPT system, the company name of the CPT service contractor, the name(s) of the site geologist(s) or engineer(s) overseeing the CPT sounding, and any comments regarding the conduct of the testing, reaction of the CPT system during sounding, etc.
   (3) All subsequent pages of the graphic log shall have the unique identifier for the boring, the times and dates of the start and completion of drilling, and the number of the page and the total number of pages comprising the log.
   (4) The graphic log shall display, at a minimum, a continuous depth plot of the uncorrected tip resistance, the friction (sleeve) resistance, the friction ratio, and the measured pore pressure with an overlay of the calculated hydrostatic pore pressure. These curves shall be plotted so as to show the full variation of the measured quantities within the depth range of the sounding, and each curve shall have a visible scale with the minimum and maximum ranges labeled.
   (5) All of the CPT data recorded for each sounding shall also be provided in either electronic or hardcopy format. Electronic data will be presented in an ASCII text file format.
c. Geotechnical borings or CPT soundings will be advanced to a depth sufficient to characterize geologic conditions the existing or potential landslide mass.
d. Other methods used for subsurface characterization shall be assigned a unique identifier, and the basic data presented in appropriate graphical and/or tabular format.
e. The three-dimensional subsurface conditions at the site shall be presented using one or more cross-sections showing location and depth penetration of geotechnical borings, CPT soundings, or other subsurface characterization methods, interpretation of the geometry of major soil units, and projected location of the static groundwater surface determined from the subsurface exploration. The cross-sections shall be presented at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department). Each cross-section shall have a legend with a description of the various major soil units.

10. Soil strength and index properties (i.e., unit weight, cohesion, etc.) shall be provided for each soil unit interpreted from the subsurface characterization of the site, and shall be presented in tabular format. Justification for the presented values of these soil parameters shall be based on one or more of the following approaches:
    a. Back analysis based on pre-landslide stability conditions.
    b. Laboratory measurement of strength or other index properties made on soil samples.
    c. Correlation of soil strength index properties to other geotechnical indices (e.g., SPT blow counts, etc.), where the correlation relations are documented (e.g., published literatures, in-house empirical data set, etc.).
    d. Soil strength and indices based on generic values must provide a clear justification for their use.
11. A detailed description of any prior grading activity, soil instability, or slope failure.
12. Assessments and conclusions regarding slope stability for both the existing and developed conditions shall be presented and documented. These assessments and conclusions shall include:
    a. Evaluation of the potential types of landslide failure mechanisms (e.g., debris flow, rotational slump, translational slip, etc.) that may affect the site.
    b. Quantitative stability evaluation of slope conditions of the various failure mechanisms using state-of-the-practice modeling techniques. Limiting equilibrium methods of analysis shall state the stability conditions as a factor of safety. The most unstable failure geometry(ies) shall be presented in the form of a cross-section(s), with the least stable failure geometry for each failure mechanism clearly indicated. The stability evaluation shall also consider dynamic (earthquake) loading, and shall use a minimum horizontal acceleration as established by the current version of the Washington State Building Code.
    c. An analysis of slope regression rate shall be presented in those cases where stability is impacted or influenced by erosional processes (e.g., wave cutting, stream meandering, etc.) acting on the toe of the slope.
13. Mitigation recommendations using engineered measures to protect the proposed structure(s) and any adjacent structures, infrastructure, adjacent wetlands, or critical fish and wildlife habitat from damage or destruction as a result of proposed construction activities shall be designed by a professional engineer. The Geotechnical Report shall contain:
    a. Design plans and associated design calculations for engineered structures or drainage systems (e.g., structural foundation requirements, retaining wall design, etc.).
    b. Recommendations and requirements pertaining to the handling of surface and subsurface runoff in the developed condition.
    c. Identification of necessary geotechnical inspections to assure conformance with the report mitigation and recommendations.
    d. Proposed angles of cut and fill slopes, site grading requirements, final site topography (shown as 2' contours), and the location of any proposed structures, on-site septic systems, wells, and stormwater management features or facilities associated with the development detailed within the body of the report and shown on a site map at the same scale as that required in Section A-7 of this Appendix.

e. Soil compaction criteria and compaction inspection requirements.
f. An analysis that indicates how the proposal meets the standards outlined in Section 18E.80.040.
g. Structural foundation requirements and estimated foundation settlement shall be provided if structures are proposed.
h. Lateral earth pressures.
i. Suitability of onsite soil for use as fill.
j. Mitigation measures for building construction on each lot for short plats, large lots, or formal plats such that additional geotechnical professional involvement is minimized during building construction.
k. Construction sequencing recommendations shall be provided when an applicant intends to convert an active landslide hazard area to a stable area, concurrently with the construction of the proposed development (reference section 18E.80.020.C.2).

14. The Geotechnical Report shall contain a paragraph that states the following specific language:

"The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Title 18E, Section 18E.80.030 to prepare a landslide hazard geological assessment. (Individual's Name) understands the requirements of the current Landslide Hazard Area Chapter 18E.80 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under the responsible charge of (Individual's Name) have performed a landslide hazard geological assessment, conducted a field investigation, and researched historic records on or in the vicinity of the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department.

B. The Geotechnical Report shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s) and the format shall be pre-approved by the Department.
C. The Department may request a geotechnical professional to provide additional information in the geotechnical report based upon existing conditions, changed conditions, or unique circumstances occurring on a case by case basis.
D. Geotechnical reports shall be in conformance with a format that is pre-approved by the Department.

(Ord. 2004-57s § 2 (part), 2004)

Chapter 18E.90

SEISMIC (EARTHQUAKE) HAZARD AREAS

Sections:

18E.90.010 Purpose.

Earthquakes have historically occurred throughout the Puget Sound region. Large earthquakes have caused loss of life and over a billion dollars in property damage. The purpose of this Chapter is to protect public health, safety, and general welfare of the citizens of Pierce County from the damaging effects of earthquakes. This Chapter provides standards to ensure life safety and minimize public and private losses that may occur within a seismic hazard area. (Ord. 2004-57s § 2 (part), 2004)

18E.90.020 Seismic Hazard Areas.

A. **General.** Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake-induced landsliding, seismic ground shaking, dynamic settlement, fault rupture, soil liquefaction, or flooding caused by tsunamis and seiches.

B. **Potential Seismic Hazard Areas.** Potential seismic hazard areas, as depicted on the Critical Areas Atlas-Seismic Hazard Areas map, are those areas where the suspected risk of earthquake induced landsliding, dynamic settlement, fault rupture, ground deformation caused by soil liquefaction, or flooding is sufficient to require a further seismic hazard area review as set forth in Section 18E.90.030. These potential seismic hazard areas are determined using the following criteria:

1. **Earthquake Induced Landslide Hazard Areas.** Areas identified as potential landslide hazard areas in Chapter 18E.80, Section 18E.80.020.
2. **Liquefaction and/or Dynamic Settlement Hazard Areas.** Areas identified as high and moderate liquefaction and dynamic settlement hazard areas on the Washington Department of Natural Resources, Division of Geology and Earth Resources liquefaction and dynamic settlement hazard area table.
3. **Fault Rupture Hazard Areas.** [Reserved]
4. **Tsunami and Seiche Hazard Areas.** Areas that are adjacent to Puget Sound marine waters, lakes, and ponds that are designated as "A" or "V" zones as defined by FEMA and depicted on the FEMA maps or other maps adopted by Pierce County.

C. **Seismic Hazard Area Categories.**

1. **Earthquake Induced Landslide Hazard Areas.** Earthquake induced landslide hazard areas include slopes that can become unstable as a result of strong ground shaking, even though these areas may be stable under non-seismic conditions.
2. **Liquefaction and/or Dynamic Settlement Hazard Areas.**
   a. Liquefaction hazard areas are areas underlain by unconsolidated (corrected Standard Penetration Test blow counts, $[(N_1)_{60}]$ less than 30) sandy or silt soils (Unified Soil Classification System S or M soil-types) and a shallow groundwater table (static groundwater depth < 30 feet) capable of liquefying in response to earthquake shaking.
   b. Dynamic settlement hazard areas are areas underlain by a significant thickness (more than 10 feet) of loose or soft soil not susceptible to liquefaction (e.g., peats or organic silts and clays, unsaturated loose sands or silts), but that could result in vertical settlement of the ground surface in response to earthquake shaking.
3. **Fault Rupture Hazard Areas.** Fault rupture hazard areas include:
   a. Active fault rupture hazard areas are areas where displacement (movement up, down, or laterally) of the ground surface has occurred during past earthquake(s) in the Holocene Epoch; and
   b. Areas adjacent to the active fault rupture hazard area that may be potentially subject to ground surface displacement in a future earthquake. (See Figure 18E.90-1 in Chapter 18E.120.)
4. **Tsunami and Seiche Hazard Areas.**
   a. Tsunami hazard areas are areas of high-energy waves along a Puget Sound marine shoreline which may be generated by earthquakes, volcanic activity, or landslides (both submarine and sub-aerial).
   b. Seiche hazard areas are areas of high wave action in a lake or pond which may be generated by earthquakes, volcanic activity, or landslides (both submarine and sub-aerial).

(Ord. 2004-57s § 2 (part), 2004)

18E.90.030 Seismic Hazard Area Review Procedures.

A. **General Requirements.**

1. The Pierce County Critical Areas Atlas-Seismic Hazard Area Map provides an indication of where potential seismic hazard areas are located within the County.
2. The Department will complete a review of the Critical Areas Atlas-Seismic Hazard Area Map for any regulated activity to determine whether the site for a proposed regulated activity is located within a seismic hazard area.
3. When the Department's maps indicate that the site for a proposed regulated activity is located within a potential liquefaction or dynamic settlement hazard area, the Department shall require the submittal of a geological assessment as outlined in Section 18E.90.030 B. below. (See Figure 18E.90-2 in Chapter 18E.120.)
4. When the Department's maps indicate that the site for a proposed regulated activity is located within a potential fault rupture hazard area, the Department shall require the submittal of a geological assessment as outlined in Section 18E.90.030 B. below. The requirement to submit a geological assessment may be waived at the Departments discretion when it is determined that the proposed project area for the regulated activity is located outside the potential fault rupture hazard area.

5. When the Department's maps indicate that the site for a proposed regulated activity is or may be located within a potential tsunami or seiche hazard area, the Department shall conduct a review pursuant to the requirements set forth in Section 18E.70.030.
6. When the Department's maps indicate that the site for a proposed regulated activity is or may be located within a potential earthquake-induced landslide hazard area, the Department shall conduct a review pursuant to the requirements set forth in Section 18E.80.030.
7. Unless otherwise stated in this Chapter, the critical area protective measure provisions contained in Section 18E.10.080 shall apply.

B. **Geological Assessments.** A geological assessment is a site investigation process to evaluate the on-site geology affecting a subject property and define the extent and severity of potential seismic hazards.
   1. A geological assessment shall be required when the Department's maps, sources, or field investigation indicate a site contains a potential liquefaction, dynamic settlement, or fault rupture hazard area. Geological assessments shall be submitted to the Department for review and approval together with a seismic hazard area application.
   2. A geotechnical professional(s) shall complete a field investigation and geological assessment to determine whether or not the site for a proposed regulated activity is located within a liquefaction or dynamic settlement hazard area. (See Figure 18E.90-2 in Chapter 18E.120.)
      a. The geological assessment shall be submitted in the form of a geotechnical letter when the geotechnical professional(s) finds that no liquefaction or dynamic settlement hazard areas exist within the site. The geotechnical letter shall meet the requirements contained in 18E.90.060 - Appendix A.
      b. The geological assessment shall be submitted in the form of a geotechnical evaluation when the geotechnical professional(s) finds that a liquefaction or dynamic settlement hazard area exists on the site but is located outside the proposed project area. The geotechnical verification shall meet the requirements contained in 18E.90.060 - Appendix A.
      c. The geological assessment shall be submitted in the form of a geotechnical report when the geotechnical professional(s) finds that liquefaction or dynamic settlement hazard area exists within the proposed project area. The geotechnical report shall meet the requirements contained in 18E.90.060 - Appendix A.
   3. A geotechnical professional shall complete a field investigation and geological assessment shall be completed under the responsible charge of an appropriately licensed geotechnical professional and presented in the form of a geotechnical report to determine evaluate whether or not the site for a proposed regulated activity is located within a fault rupture hazard area. The geological assessment shall meet the requirements contained in 18E.90.060 - Appendix B. Any structural recommendations proposed to mitigate the fault rupture hazard that are included in the geotechnical report shall be prepared under the responsible charge of an appropriately licensed professional engineer.
   4. All geological assessments for seismic hazards submitted under this Chapter shall include at a minimum the following:
      a. The dates when the geological assessment was conducted and when the assessment was prepared.

b. The parcel number(s) of the subject property.
c. Site address, if one has been assigned by the County.
d. A brief description of the project (including the proposed land use) and the area to be developed.
e. A map showing the property lines for the site, existing two-foot contours of the existing site topography, and the location of any existing structures, utilities, wells, stormwater or septic systems, or other developments.
f. A site plan delineating the limits of the proposed development and the location of all areas of the site subject to potential seismic hazards based on the Critical Areas Atlas-Seismic Hazard Areas Map and, if applicable, limits of associated buffers.
g. A description of the surface and subsurface geology, hydrology, soils, and vegetation of the site.
h. A detailed overview of the field investigations, published data and references, data and conclusions from past geological assessments or geotechnical investigations of the site, site-specific measurements, tests, investigations, or studies, as well as the methods of data analysis and calculations that support the determination regarding whether liquefaction and/or dynamic settlement hazards are present on the site.
i. The results, conclusions, and recommendations resulting from the geological assessment of the liquefaction and/or dynamic settlement hazards on the subject property as prepared by a geotechnical professional(s).

5. Geological assessments shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and , signed, sealed, and dated by the appropriate geotechnical professional(s) (as defined in Chapter 18.25 and established in this Chapter) and the format shall be pre-approved by the Department.
6. Geological assessments that do not contain the minimum required information will be returned to the geotechnical professional(s) for revision.
7. The Department shall review the geological assessment and either:
   a. Accept the geological assessment and approve the application; or
   b. Reject the geological assessment and require revisions or additional information.
8. A geological assessment for a specific site may be valid for a period of up to five years when the proposed land use activity and surrounding site conditions are unchanged. However, if any environmental surface or subsurface conditions associated with the site change during that five-year period, the applicant may be required to submit an amendment to the geological assessment.

(Ord. 2004-57s § 2 (part), 2004)

18E.90.040 Seismic Hazard Area Standards.

A. **Earthquake Induced Landslide Hazard Areas.** All standards set forth in Chapter 18E.80 shall apply to earthquake induced landslide hazard areas.

B. **Liquefaction and/or Dynamic Settlement Hazard Areas.**
   1. All building structures shall conform to the standards set forth in Title 17C, Construction and Infrastructure Standards - Building and Fire Codes.
   2. **Utility Lines.** Utility lines, except for gas pipelines which are prohibited, will may be permitted when no other conveyance alternative is available. The applicant must demonstrate that a utility line within a liquefaction or dynamic settlement area has been designed in a safe manner and the potential for rupture or failure has been

minimized. Appropriate design feature such as above ground installation, restrained joint ductile pipe, welded steel pipe, pile supports, the use of high density polyethylene pipe with fuse welded joints, increased wall thickness, special coating or other measures shall be employed. Automatic shutoff valves shall be provided on fluid or gas transmission lines when failure would create significate environmental or life/safety impacts. The line shall be located above ground and properly anchored and/or designed so that it will continue to function in the event of seismically induced ground deformation. Provision for automatic shut-off of utilities in a ground-rupturing event will be required.

3. **Roads, Bridges, and Trails.** Roads, bridges, and trails shall be allowed when mitigation measures are provided that ensure the roadway prism and/or bridge structure will not be susceptible to damage from seismic induced ground deformation. Mitigation measures shall be designed for static and seismic loading conditions in accordance with the most recent version of the American Association of State Highway and Transportation Officials (AASHTO) Manual and also for an estimated range of ground surface offset presented in the geotechnical report.

C. **Fault Rupture Hazard Areas.**

1. **Buildings.** Buildings shall be prohibited within fault rupture hazard areas and associated buffers.
2. **Utility Lines.** Utility lines, except for gas pipelines which are prohibited, may be permitted when it can be shown no other conveyance route alternative is available. The applicant must demonstrate that a utility line within fault rupture hazard area has been designed in a safe manner and the potential for rupture or failure has been minimized. Appropriate design features such as above ground installation, special layout, crossing angle, restrained joint ductile pipe, welded steel pipe, pile supports, the use of high density polyethylene pipe with fuse welded joints, increased wall thickness, special coatings or other measures shall be employed. Automatic shutoff valves shall be provided on fluid transmission lines when failure would create significant environmental or life/safety impacts. The line shall be located above ground and properly anchored and/or designed so that it will continue to function in the event of seismically-induced ground deformation. Provision for automatic shut-off of utilities in a ground-rupturing event will be required.
3. **Roads and Bridges.** Roads and bridges shall be allowed when all of the following conditions have been met:
    a. Mitigation measures are provided that ensure the roadway prism and/or bridge structure will not be susceptible to damage from seismically-induced ground deformation. Mitigation measures shall be designed for static and seismic loading conditions in accordance with the most recent version of the American Association of State Highway and Transportation Officials (AASHTO) Manual and also for an estimated range of ground surface offset presented in the geotechnical report.
    b. The road is not a sole access for a development.

D. **Tsunamis and Seiche Hazard Areas.** All standards set forth in Chapter 18E.70 shall apply to tsunamis or seiche hazard areas.

(Ord. 2004-57s § 2 (part), 2004)

18E.90.050 Buffer Requirements.

A. **Determining Buffer Widths.**

1. The buffer width shall be measured on a horizontal plane from a perpendicular line established at the edge of the fault rupture hazard area limits. (See Figure 18E.90-3 in Chapter 18E.120.)
2. A buffer is an area that is adjacent to a fault rupture hazard area that may be potentially subject to ground surface displacement in a future earthquake. No development shall be permitted within a fault rupture hazard area and its associated buffer. The required buffer width is the greater amount of the following distances:
   a. Fifty feet from all edges of a fault rupture hazard area, except for high occupancy or essential facilities, where the minimum buffer distance shall be 100 feet; or
   b. The required buffer width is the minimum distance recommended by the geotechnical professional(s).

B. **Modification of Buffer Widths.** The Department may require a larger buffer width than the buffer distance, as determined in A. above, if the Department determines the standard or proposed buffer is not adequate to protect the health, safety, or welfare of any proposed development.

(Ord. 2004-57s § 2 (part), 2004)

18E.90.060 Appendices.

A. Geological Assessments - Liquefaction or Dynamic Settlement Hazard Areas.

B. Geological Assessments - Fault Rupture Hazard Area Geotechnical Report.

18E.90.060 - Appendix A
Geological Assessments -
Liquefaction or Dynamic Settlement Hazard Areas

I. GEOTECHNICAL LETTER

A. A geotechnical letter shall, at a minimum, include the following:
   1. The letter shall be labeled identifying the submittal as a "Liquefaction or Dynamic Settlement Hazard Geotechnical Letter," and will include all mandatory items listed in Section 18E.90.030 B.4.
   2. The geological assessment must include a determination an evaluation that no portion of the subject property [site] includes a liquefaction and/or dynamic settlement hazard.
   3. A paragraph that states the following specific language:
      "The services described in this report were completed under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Section 18E.90.030 to prepare this geological assessment. (Individual's Name) understands the requirements of the current Seismic (Earthquake) Hazard Areas Chapter 18E.90 and the definitions of the applicable terms contained within Chapter 18.25 and Title 18E. Individuals under my responsible charge have conducted an investigation in general accordance 18E.90.060 - Appendix A. Geotechnical Letter - Liquefaction or Dynamic Settlement Hazard Areas. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department and it does not appear that a liquefaction and/or dynamic settlement hazard area exists within the boundaries of the proposed site.
   4. The name, mailing address and telephone number of geotechnical professional(s) who prepared the letter.
   5. The name, mailing address, and telephone number of the property owner.

B. The Geotechnical Letter shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s) (as defined in Section 18.25) and the format shall be pre-approved by the Department.

II. GEOTECHNICAL VERIFICATION EVALUATION

A. A geotechnical evaluation verification shall, at a minimum, include the following:
   1. The first page of the document shall be labeled identifying the submittal as a "Liquefaction or Dynamic Settlement Hazard Geotechnical Verification Evaluation," and will include all mandatory items listed in Section 18E.90.030 B.4.
   2. The geological assessment must include a determination an evaluation that a liquefaction and/or dynamic settlement hazard exists on the site, but is located outside the proposed project area.
   3. The verification Geotechnical Evaluation shall include an accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information be based on a field survey by a licensed surveyor. The site plan shall include:

a. Property lines for the site, and the location of any existing structures.
b. The existing site topography presented in two-foot contours.
c. The limits/location of any liquefaction and/or dynamic settlement hazard area(s) as set forth in Section 18E.90.020 C.2.
d. The full geographical limits of the proposed project area (i.e., area to be developed) and the location of any proposed structures, on-site septic systems, wells, and stormwater management features or facilities associated with the development.
e. The limits of any setbacks from the defined locations of the liquefaction and/or dynamic settlement hazard areas determined by the geotechnical professional(s) as necessary to protect any portion of the proposed development activity from damage caused by liquefaction-induced ground displacement.

4. A paragraph that states the following specific language:
"The services described in this report were completed under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Section 18E.90.030 to prepare this geological assessment. (Individual's Name) understands the requirements of the current Seismic (Earthquake) Hazard Areas Chapter 18E.90 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under my responsible charge have conducted an investigation in general accordance 18E.90.060 - Appendix A. Geotechnical Evaluation - Liquefaction or Dynamic Settlement Hazard Areas. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department and it does not appear that a liquefaction and/or dynamic settlement hazard area exists within the boundaries of the proposed site."
5. The name, mailing address, and telephone number of geotechnical professional(s) who prepared the letter.
6. The name, mailing address, and telephone number of the property owner.

B. The geotechnical report shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s) and the format shall be pre-approved by the Department.
C. Hold harmless clauses, disclaimers, and limitations are not allowed within a geotechnical verification.

III. GEOTECHNICAL REPORT

A. A geotechnical report shall, at a minimum, include the following:
1. The first page of the document shall be labeled identifying the submittal as a "Liquefaction or Dynamic Settlement Hazard Geotechnical Report," and will include all mandatory items listed in Section 18E.90.030 B.4. The report shall be prepared by an engineer and shall be co-written by a geotechnical professional where geological interpretations and conclusions critical to the assessment of liquefaction and/or dynamic settlement hazard and potential effects are necessary or prudent. appropriately licensed geotechnical professional(s). The introductory Section of the report shall specify the desired performance level of the structures and other development facilities (e.g., safety to building occupants, minimal damage to structure, post-earthquake serviceability for pre-earthquake operations, no damage, etc.).

2. The results, conclusions, and recommendations resulting from the geological assessment of the liquefaction and/or dynamic settlement hazards on the subject property as prepared by the geotechnical professional(s).
3. The geological assessment-geotechnical report shall include:
   a. A statement that the proposed project area falls within a liquefaction and/or dynamic settlement hazard area.
   b. A detailed engineering evaluation of expected ground displacements or other liquefaction and/or dynamic settlement effects (e.g., bearing failures, floatation of buried tanks, etc.) and proposed mitigation measures to ensure an acceptable level of risk for the proposed structure type or other development facilities, as well as, the proposed land use type (i.e., occupancy category). The minimum level of acceptable risk for any proposed structure or development facility shall ensure be the life safety of any occupant. Designs shall evaluate the range of alternatives for achieving limited structural damage to no structural damage based on the proposed use intended for the structure.
4. The report shall include an accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information be based on a field survey by a licensed surveyor. The site plan shall include:
   a. Property lines for the site and the location of any existing structures.
   b. The existing site topography presented in two-foot contours.
   c. The limits/location of any liquefaction and/or dynamic settlement hazard area(s) as set forth in Section 18E.90.020 C.2.
   d. The full geographical limits of the proposed project area (i.e. area to be developed) and the location of any proposed structures, on-site septic systems, wells, and stormwater management features or facilities associated with the development.
   e. The limits of any set-backs from the defined locations of the liquefaction and/or dynamic settlement hazard areas determined by the geotechnical professional(s) as necessary to protect any portion of the proposed development activity from damage caused by liquefaction-induced ground displacement.
   f. Location and unique identifier of geotechnical borings and/or CPT soundings used to characterize subsurface conditions.
5. The field investigation shall require the following elements:
   a. Subsurface characterization using conventional geotechnical borings and Standard Penetration Testing (SPT) or using Cone Penetration Testing (CPT).
   b. Conventional geotechnical boring data shall be reported as a graphic log utilizing the following standards:
      (1) The vertical scale of the graphic log shall be such that 5 feet of drilled depth is scaled to range of 1" to 2" (1:60- or 1:30-scale), and shall include vertical columns that record depth in 1 foot increments, SPT value and incremental blow counts, a graphic pattern representation of the soil type encountered during drilling, and sample descriptions and other comments regarding drilling.
      (2) The graphic log shall have a header on the first page that includes a unique identifier for the boring, the times and dates of the start and completion of drilling, the manufacturer and model of the drilling rig, the company name of the drilling contractor, the name(s) of the site geologist(s) or engineer(s)

overseeing the drilling activities, the details of the method used to advance the borehole (e.g., 4" i.d. hollow-stem auger), the type of drilling fluid used to stabilize the borehole, verification that the SPT followed all applicable ASTM standards including a description of the sampler, hammer weight, drop height, the type of hammer used to perform the SPT, number of turns of rope if a cathead is used to raise the hammer, condition of rope (i.e., new, used, frayed, oily, etc.), and the depth of static groundwater measured immediately prior to abandonment of the boring and the time and date of this measurement.

(3) All subsequent pages of the graphic log shall have the unique identifier for the boring, the times and dates of the start and completion of drilling, and the number of the page and the total number of pages comprising the log.

(4) Each SPT value will be reported in the appropriate column showing the blow counts recorded at each 6" interval, and the sum of the blow counts between penetration distances of 6" to 18," unless refusal conditions (50 or more blows with less than 6" of sampler penetration) are met anywhere in this interval. At refusal, the blow count shall be recorded as the number of blows with the corresponding sampler penetration, in inches.

(5) SPT tests shall be performed every 5 feet during drilling, at a minimum. Additional undisturbed samples, collected following ASTM standards for undisturbed soil sampling, cannot be substituted for SPT testing.

(6) The soil sample descriptions will include the total length of the recovered sample, the soil color, odor, the density or consistency (loose to very dense, very soft to very stiff), degree of water saturation (dry, moist, wet, saturated), and dilatancy. For granular (sand and gravel) soils, the description shall include a physical description of the soil sample, including size distribution (poorly or well graded), angularity, composition, amount and plasticity of the fines fraction. For fine soils (silt and clay), the description shall include a qualitative estimate of the proportion of the silt and clay size particles (e.g., silty clay, clay with some silt, etc.), plasticity, and amount and type of organic material. The sample description shall include a description of any bedding, laminations, slickensides, or other textural or deposition features, including contact between dissimilar soil types. The sample description shall also include a field classification of the soil sample using the Unified Soil Classification System where the classification is expressed in lower case letters (e.g., sp, ml, etc.). The sample classification shall be expressed in upper case letters (e.g., SP, ML, etc.) where subsequent laboratory testing has been performed. This column of the graphic log will also include any other information relevant to the subsurface investigation, such as loss of drilling fluid, heaving, churning of the drill in gravelly soils, etc.

c. CPT sounding data shall be reported as a graphic log utilizing the following standards:

(1) The vertical scale of the graphic log shall be such that 5 feet of penetrated depth is scaled to range of 1" to 2" (1:60- or 1:30-scale), and shall include vertical columns that record depth in 1 foot increments.

(2) The graphic log shall have a header on the first page that includes a unique identifier for the boring, the times and dates of the start and completion of the CPT sounding, the manufacturer and model of the CPT system, the company name of the CPT service contractor, the name(s) of the site geologist(s) or engineer(s) overseeing the CPT sounding, and any comments regarding the conduct of the testing, reaction of the CPT system during sounding, etc.

(3) All subsequent pages of the graphic log shall have the unique identifier for the boring, the times and dates of the start and completion of drilling, and the number of the page and the total number of pages comprising the log.

(4) The graphic log shall display, at a minimum, a continuous depth plot of the uncorrected tip resistance, the friction (sleeve) resistance, the friction ratio, and the measured pore pressure with an overlay of the calculated hydrostatic pore pressure. These curves shall be plotted so as to show the full variation of the measured quantities within the depth range of the sounding, and each curve shall have a visible scale with the minimum and maximum ranges labeled.

(5) All of the CPT data recorded for each sounding shall also be provided in either electronic or hardcopy format. Electronic data will be presented in an ASCII text file format.

d. All SPT or CPT testing will be conducted to a minimum depth of 50 feet below the existing ground surface or lowest proposed finished grade, except where a minimum thickness of 10 feet of consolidated soils are encountered where the $(N_1)_{60}$ is greater than 30, or CPT corrected tip resistance (q_{c1N}) is greater than 175. In addition, SPT or CPT testing should extend a minimum of 20 feet below the lowest expected foundation level, including the lowest elevation of piling support.

6. The three-dimensional subsurface conditions at the site shall be presented using one or more cross-sections showing location and depth penetration of borings or CPT soundings, interpretation of the geometry of major soil units, and projected location of the static groundwater surface determined from the subsurface exploration. The cross-sections shall be presented at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department). Each cross-section shall have a legend with a description of the various major soil units.
7. All assessments of liquefaction and/or dynamic settlement hazards and effects will be based on a design earthquake using ground motion parameters consistent and equivalent to those specified in the Pierce County Building Code. The choice of moment magnitude used in the determination of the magnitude-scaling factor, as well as the scaling relations used in the analysis, shall be justified in the report narrative. These assessments shall use the shallowest groundwater table observed during or inferred from subsurface exploration and characterization (e.g., the measured depth of static groundwater immediately prior to abandonment of borings, observation of iron-oxide mottling of soils samples, etc.)
8. Results of laboratory testing of samples retrieved during drilling and sampling shall be presented in order to support the values of fines contents used in subsequent analysis of liquefaction and/or dynamic settlement hazard. Where only CPT methods are used in site assessment, the correlation between fines content and CPT

measurements will be discussed and documented. This documentation will require rigorous correlation of CPT and fines content measurements from similar geological deposits within the Puget Sound region.

9. The geotechnical report shall include a detailed assessment of the liquefaction and/or dynamic settlement hazard based on analysis of all available SPT or CPT data using state-of-the-practice methodologies, such as provided in Youd and Idriss (1997) or subsequent technical publications. The methodology used in the analysis shall be documented, and all results of intermediate and final calculations and results, including factors of safety, shall be included.
10. The geotechnical report shall contain an assessment of the potential for large lateral spreads or flow failures, bearing failures, settlement, limited lateral displacement, and floatation of buried facilities. The methodologies used must be, at a minimum, state-of-the-practice, and where applicable should employ more than one method of analysis. All results of intermediate and final calculations and conclusions regarding the potential and severity of the possible liquefaction- and/or dynamic settlement-induced failure modes shall be presented.
11. Alternative mitigative measures including structural and foundation design options and/or soil improvement techniques shall be evaluated and compared for their effectiveness in reaching the level of performance specified in the report introduction. Final designs and specifications and plans for structural and/or foundation design shall be included if applicable. Effectiveness of soil improvement techniques shall be specified in terms of post-treatment densification or strength improvement as measured by appropriate subsurface investigation and testing. The extent of the post-treatment verification testing shall be provided on a site map at the same scale as the map presented in subsection 4. above.
12. The name, mailing address, and telephone number of geotechnical professional(s) who prepared the letter.
13. The name, mailing address, and telephone number of the property owner.

B. The geotechnical report shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s) (as defined in Section 18E.10.060 and established in this Chapter) and the format shall be pre-approved by the Department.

(Ord. 2004-57s § 2 (part), 2004)

18E.90.060 - Appendix B
Geological Assessments -
Fault Rupture Hazard Area Geotechnical Report

A. A geotechnical report shall, at a minimum, include the following:
   1. The first page of the document shall be labeled identifying the submittal as a "Fault Rupture Hazard Geotechnical Report," and will include all mandatory items listed in Section 18E.90.030 B.4. The report shall be prepared under the responsible charge of an appropriately licensed geotechnical professional.by an engineer and shall be co-written by a geotechnical professional where geological interpretations and conclusions critical to the assessment of liquefaction and/or dynamic settlement hazard and potential effects are necessary or prudent.
   2. The geological assessment for fault rupture hazards shall include the minimum requirements specified in Section 18E.90.030 B.4.
   3. The following topics should be considered and addressed in detail where essential to support opinions, conclusions, and recommendations in any geologic report on faults. It is not expected that all the topics or investigative methods would be necessary in a single investigation. In specific cases, it may be necessary to extend some of the investigative methods well beyond the site or property being investigated.
      a. Purpose and scope of investigation; description of proposed development.
      b. Geologic and tectonic setting. Include seismicity and earthquake history.
      c. Site description and conditions, including dates of site visits and observations. Include information on geologic units, graded and filled areas, vegetation, existing structures, and other factors that may affect the choice of investigative methods and interpretation of data.
      d. Methods of investigation.
         (1) Review of published and unpublished literature, maps, and records concerning geologic units, faults, groundwater barriers, and other factors.
         (2) Stereoscopic interpretation of aerial photographs and other remotely sensed images to detect fault-related topography (geomorphic features), vegetation and soil contrasts, and other lineaments of possible fault origin. The area interpreted usually should extend beyond the site boundaries.
         (3) Surface observations, including mapping of geologic and soil units, geologic structures, geomorphic features and surfaces, springs, deformation of engineered structures due to fault creep, both on and beyond the site.
         (4) Subsurface investigations.
            (a) Trenching and other excavations to permit detailed and direct observation of continuously exposed geologic units, soils, and structures; must be of adequate depth and be carefully logged (Taylor and Cluff, 1973; Hatheway and Leighton, 1979; McCalpin, 1996b).
            (b) Borings and test pits to permit collection of data on geologic units and groundwater at specific locations. Data points must be sufficient in number and spaced adequately to permit valid correlations and interpretations.
            (c) Cone penetrometer testing (CPT) (Grant and others, 1997; Edelman and others, 1996). CPT must be done in conjunction with continuously logged borings to correlate CPT results with on-site materials. The

number of borings and spacing of CPT soundings should be sufficient to adequately image site stratigraphy. The existence and location of a fault based on CPT data are interpretative.

(5) Geophysical Investigations. These are indirect methods that require a knowledge of specific geologic conditions for reliable interpretations. They should seldom, if ever, be employed alone without knowledge of the geology (Chase and Chapman, 1976). Geophysical methods alone never prove the absence of a fault nor do they identify the recency of activity. The types of equipment and techniques used should be described and supporting data presented (California Board of Registration for Geologists and Geophysicists, 1993).
   (a) High resolution seismic reflection (Stephenson and others, 1995; McCalpin, 1996b).
   (b) Ground penetrating radar (Cai and others, 1996).
   (c) Other methods include: seismic refraction, magnetic profiling, electrical resistivity, and gravity (McCalpin, 1996b).

(6) Age-dating techniques are essential for determining the ages of geologic units, soils, and surfaces that bracket the time(s) of faulting (Pierce, 1986; Birkeland and other, 1991; Rutter and Catto, 1995; McCalpin, 1996a).
   (a) Radiometric dating (especially 14C).
   (b) Soil-profile development.
   (c) Rock and mineral weathering.
   (d) Landform development.
   (e) Stratigraphic correlation of rocks/minerals/fossils.
   (f) Other methods -- artifacts, historical records, tephrochronology, fault scarp modeling, thermoluminescence, lichenometery, paleomagnetism, dendrochronology, etc.

(7) Other methods should be included when special conditions permit or requirements for critical structures demand a more intensive investigation.
   (a) Aerial reconnaissance overflights.
   (b) Geodetic and strain measurements.
   (c) Microseismicity monitoring.

e. Conclusions.
   (1) Location and existence (or absence) of hazardous faults on or adjacent to the site; ages of past rupture events.
   (2) Type of faults and nature of anticipated offset, including sense and magnitude of displacement, if possible.
   (3) Distribution of primary and secondary faulting (fault zone width) and fault-related deformation.
   (4) Probability of or relative potential for future surface displacement. The likelihood of future ground rupture seldom can be stated mathematically, but may be stated in semiquantitative terms such as low, moderate, or high, or in terms of slip rates determined for specific fault segments.
   (5) Degree of confidence in and limitations of data and conclusions.

f. Recommendations.
   (1) The recommended increase from the standard buffer distance (50 feet) of proposed structures from fault rupture hazard areas. The recommended buffer distance generally will depend on the quality of data and type and

complexity of fault(s) encountered at the site and the proposed land use type (i.e. occupancy). In order to establish an appropriate buffer distance from a fault located by indirect or interpretative methods (e.g., borings or cone penetrometer testing), the area between data points also should be considered underlain by a fault unless additional data are used to more precisely locate the fault. Additional measures (e.g., strengthened foundations, engineering design, and flexible utility connections) to accommodate warping and distributive deformation associated with faulting (Lazarte and others, 1994).

(2) Risk evaluation relative to the proposed development.

(3) Limitations of the investigation; need for additional studies.

g. References.

(1) Literature and records cited or reviewed; citations should be complete.

(2) Aerial photographs or images interpreted -- list type, data, scale, source, and index numbers.

(3) Other sources of information, including well records, personal communications, and other data sources.

h. Illustrations. The following illustrations should be provided:

(1) A location map that identifies site locality, significant faults, geographic features, regional geology, seismic epicenters, and other pertinent data; 1:24,000 scale is recommended.

(2) A site development map that shows site boundaries, existing and proposed structures and limits of the proposed project area, graded areas, streets, exploratory trenches, borings geophysical traverses, locations of faults, and other data; recommended scale is 1:2,400 (1 inch equals 200 feet), or larger.

(3) A geologic map that shows the distribution of geologic units (if more than one), faults and other structures, geomorphic features, aerial photo graphic lineaments, and springs; on topographic map 1:24,000 scale or larger; can be combined with h(1) or (2).

(4) Geologic cross sections, if needed, to provide three-dimensional picture.

(5) Logs of exploratory trenches and borings that show details of observed features and conditions (note: these should not be generalized or diagrammatic). Trench logs should show topographic profile and geologic structure at a 1:1 horizontal to vertical scale; scale should be 1:60 (1 inch = 5 feet) or larger.

(6) Geophysical data and geologic interpretations.

i. Appendix. Attach any supporting data not included above (e.g., water well data, photographs, aerial photographs).

4. The geotechnical report shall be prepared under the responsible charge of an appropriately licensed geotechnical professional and be signed, sealed and dated by the geotechnical professional(s) (as defined in Section 18.25.030).

5. The Department may request a geotechnical professional to provide additional information in the geotechnical report based upon existing conditions, changed conditions, or unique circumstances occurring on a case by case basis.

(Ord. 2004-57s § 2 (part), 2004)

Chapter 18E.100

MINE HAZARD AREAS

Sections:

18E.100.010 Purpose.

There are 40 known and identified abandoned underground coal mines located throughout Pierce County. Land areas that lie over abandoned underground mines have the potential to spontaneously collapse, typically referred to as a subsidence event. The purpose of this Chapter is to promote and protect the public health, safety, and general welfare of the citizens of Pierce County by providing standards to minimize the public and private losses due to subsidence events that may occur to regulated activities located within a mine hazard area. (Ord. 2004-57s § 2 (part), 2004)

18E.100.020 Mine Hazard Areas.

A. **General.** Mine hazard areas are areas directly underlain by, adjacent to or abutting, or affected by old mine workings such as adits, tunnels, drifts, or airshafts that have the potential for subsidence.

B. **Mine Hazard Area Indicators.** Indicators of old mine workings underlying a site include:
   1. Remnants of old mine workings or excavations.
   2. Unusual depressions in the ground surface possibly related to plugged or bridged air shafts or adits, or collapse of underground working.
   3. Spoil or waste piles from exploration tunneling or glory holes.
   4. Any other abnormal topographic features that might indicate subsurface boring or tunneling.

C. **Potential Mine Hazard Areas.**
   1. Sections of land, identified on the Washington Department of Natural Resources, Division of Geology and Earth Resources, Washington State Coal Mine Map Collection (Open File Report 94-7, June 1994), that contain coal mine workings.
   2. Sections of land, identified on the Map of Mashell Coal and Coke Company Figure 1, Ashford Vicinity Map, that contain coal mine workings.

(Ord. 2004-57s § 2 (part), 2004)

18E.100.030 Mine Hazard Area Review Procedures.

A. **General Requirements.**

1. The Pierce County Critical Areas Atlas-Mine Hazard Area Map provides an indication of where potential mine hazard areas are located within the County.
2. The Department will complete a review of the Critical Areas Atlas-Mine Hazard Area Map to determine whether the site for a proposed regulated activity is located within a potential mine hazard area.
3. When the Department's maps indicate that the site for a proposed regulated activity is located within a potential mine hazard area, the Department shall require a geological assessment, as outlined in subsection B. below. (See Figure 18E.100-1 in Chapter 18E.120.)
4. Title and land division notification shall be required as set forth in Section 18E.10.110 C.

C. **Geological Assessments.** A geological assessment is a site investigation process to evaluate the on-site geology affecting a subject property and define the extent and severity of potential mine hazard areas.

1. A geological assessment shall be submitted to the Department for review and approval together with a mine hazard application and associated fee.
2. A geological assessment shall include a field investigation and may also include review of public records and documentation, analysis of historical air photos, published data and references, subsurface investigations, etc.
3. The geological assessment shall include, at a minimum, the following information and analysis:
   a. A discussion of the surface and subsurface geologic conditions of the site.
   b. A discussion of the potential for subsidence on the site.
   c. An evaluation of which portions of the site or within the vicinity of the site meet the criteria for a mine hazard area as set forth in Section 18E.100.020.
4. A geotechnical professional shall complete a field investigation and geological assessment to evaluate whether or not the site is subject to mine hazards shall be completed under the responsible charge of an appropriately licensed geotechnical professional. (See Figure 18E.100-1 in Chapter 18E.120.)
   a. The geological assessment shall be submitted in the form of a geotechnical letter when the geotechnical professional finds that no mine workings exist within 300 feet of the site. The geotechnical letter shall meet the requirements contained in 18E.100.040 - Appendix A.
   b. The geological assessment shall be submitted in the form of a geotechnical evaluation when the geotechnical professional finds that mine workings exist, but are located more than 300 feet away from the proposed project area. The geotechnical evaluation shall meet the requirements contained in 18E.100.040 - Appendix B.
   c. The geological assessment shall be submitted in the form of a geotechnical report when the geotechnical professional finds that mine workings exist within 300 feet of the proposed project area or when the services completed by the a geotechnical professional indicates that mitigation measures are necessary in order to construct or develop within a mine hazard area. The geotechnical report shall meet the requirements contained in 18E.100.040 - Appendix C.

5. Geological assessments shall be prepared, under the responsible charge of an appropriately licensed geotechnical professional and signed, sealed, and dated by the geotechnical.
6. Geological assessments that do not contain the minimum required information will be returned to the geotechnical professional for revision.
7. The Department shall review the geological assessment and either:
   a. Accept the geological assessment and approve the application; or
   b. Reject the geological assessment and require revisions or additional information.
8. A geological assessment for a specific site may be valid for a period of up to five years when the proposed land use activity and surrounding site conditions are unchanged. However, if any environmental surface or subsurface conditions associated with the site change during that five-year period, the applicant may be required to submit an amendment to the geological assessment.

(Ord. 2004-57s § 2 (part), 2004)

18E.100.040 Appendices.

A. Geological Assessment - Mine Hazard Geotechnical Letter.

B. Geological Assessment - Mine Hazard Geotechnical Evaluation.

C. Geological Assessment - Mine Hazard Geotechnical Report.

18E.100.040 - Appendix A
Geological Assessment -
Mine Hazard Geotechnical Letter

A. A geotechnical letter shall include the following:
   1. The letter shall be labeled identifying the submittal as a "Mine Hazard Geotechnical Letter."
   2. The date when the geological assessment was performed and the date when the letter was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A brief description of the project (including the proposed land use) and a description of the area to be developed. Also, all items required for a geological assessment found under Section 18E.100.030 B.
   6. A paragraph that states the following specific language:
      "The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meet the qualifications contained in Title 18E, Section 18E.100.030 to prepare a mine hazard geological assessment. (Individual's Name) understand the requirements of the current Mine Hazard Area Chapter 18E.100 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under my responsible charge have prepared a mine hazard geological assessment, conducted a field investigation, and researched historic records on or in the vicinity of the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department and it does not appear that a mine hazard area exists within 300 feet of the boundaries of the proposed site based on the scope of services completed for this project."
   6. The name, mailing address, and telephone number of geotechnical professional who performed the geological assessment and prepared the letter.
   7. The name, mailing address, and telephone number of the property owner.

B. The geotechnical letter shall be prepared under the responsible charge of an appropriately licensed geotechnical professional and be signed, sealed and dated by the geotechnical professional(s) (as defined in Section 18.25.030).

C. Geotechnical letter shall be in conformance with a format that is pre-approved by the Department.

(Ord. 2004-57s § 2 (part), 2004)

18E.100.040 - Appendix B
Geological Assessment - Mine Hazard Geotechnical Evaluation

A. A geotechnical evaluation shall include the following:
   1. The first page of the document shall be labeled identifying the submittal as a "Mine Hazard Geotechnical Evaluation."
   2. The date when the geological assessment was performed and the date when the verification was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A brief description of the project (including the proposed land use) and a description of the area to be developed.
   6. A description of the surface and subsurface geology, hydrology, soils, and vegetation on the site and a list of the mine hazard indicators, as set forth in Section 18E.100.020 B., that were found on or in the vicinity of the site.
   7. A summary of the results, conclusions, and recommendations resulting from the geological assessment of the mine hazards on or in the vicinity of the site. This summary shall address all of the information required in Section 18E.100.030 B.
   8. A discussion of the data and methods of analysis used to support the conclusions and recommendations presented in the geotechnical evaluation.
   9. An accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information listed below be based on a field survey by a licensed surveyor. The site plan shall include:
      a. The limits/location of the mine hazard area(s), as set forth in Section 18E.100.020 A. This shall include the estimated depth of any mine workings.
      b. The location of any existing and proposed structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      c. The full geographical limits of the proposed project area (area to be developed).
      d. Dimension the closest distance between the identified mine hazard area boundary and the project area.
      e. Existing topography on the site presented in two-foot contours.
      f. Property lines for the site.
      g. North arrow and plan scale.
   10. A paragraph that states the following specific language:

       "The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meet the qualifications contained in Title 18E, Section 18E.100.030 to prepare a mine hazard geological assessment. (Individual's Name) understand the requirements of the current Mine Hazard Area Chapter 18E.100 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under my responsible charge have prepared a mine hazard geological assessment, conducted a field investigation, and researched historic records on or in the vicinity of the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of the Department and it does not appear that a mine hazard area exists within 300 feet of the boundaries of the proposed project area based on the scope of services completed for this project."

11. The name, mailing address, and telephone number of geotechnical professional who performed the geological assessment and prepared the verification.
12. The name, mailing address, and telephone number of the property owner.

B. The geotechnical letter shall be prepared under the responsible charge of an appropriately licensed geotechnical professional and be signed, sealed and dated by the geotechnical professional(s).

C. Geotechnical evaluation shall be in conformance with a format that is pre-approved by the Department.

(Ord. 2004-57s § 2 (part), 2004)

18E.100.040 - Appendix C
Geological Assessment -
Mine Hazard Geotechnical Report

A. A geotechnical report shall include the following:
   1. The first page of the document shall be labeled identifying the submittal as a "Mine Hazard Geotechnical Report."
   2. The date when the geological assessment was performed and the date when the report was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A brief description of the project (including the proposed land use) and a description of the area to be developed.
   6. A description of the surface and subsurface geology, hydrology, soils, and vegetation on the site and a list of the mine hazard indicators, as set forth in Section 18E.100.020 B., that were found on or in the vicinity of the site.
   7. A description of the analytical tools and processes that were used to develop the report.
   8. Surface exploration data such as borings, drill holes, test pits, wells, geologic reports, and other relevant reports or site investigations that may be useful in making conclusions or recommendations about the site under investigation.
   9. A description of historical data and information used in the evaluation, together with sources. Such data and information shall include:
      a. Topographic maps at a scale and contour interval of sufficient detail to assess the site. The site boundaries and proposed site development shall be overlain with the mine plan view map.
      b. Copies of illustrative mine maps showing remnant mine conditions, if available.
      c. Aerial photography, as appropriate.
      d. Geological data including geologic cross-sections and other illustrative data as appropriate.
      e. Available historic mine records indicating:
         (1) The dates of operation.
         (2) The date of cessation of active mining.
         (3) The number of years since abandonment.
         (4) Mining methods used and shoring and timbering information.
         (5) The strength of the overlying rock strata.
         (6) The extracted seam thickness.
         (7) The dip or inclination of the strata, workings, and surface.
         (8) The projected surface location of the seam outcrop or subcrop.
         (9) The estimated depth of the seam outcrop or subcrop, if covered by glacial outwash, glacial till, or other materials at depth.
         (10) Total material tonnage produced, estimated mine by-product material produced, and the estimated extraction ratio.
   10. A summary of the results, conclusions, and recommendations resulting from the geological assessment of the mine hazards on or in the vicinity of the site. This summary shall address all of the information required in Section 18E.100.030 B.

11. An accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information listed below be based on a field survey by a licensed surveyor. The site plan shall include:
    a. The limits/location of the mine hazard area(s), as set forth in Section 18E.100.020 A. The mine plan view map shall be reproduced at the same scale as the topographic map, showing the location of the mine, the extent of the mining, the proposed site development, if applicable, and any remnant abandoned mine surface features. At a minimum this shall include:
        (1) The layout of the underground mine.
        (2) The location of any mine entries, portals, adits, mine shafts, air shafts, timber shafts, and other significant mine features.
        (3) The location of any known sinkholes, significant surface depressions, trough subsidence features, coal mine spoil piles, and other mine-related surface features.
        (4) The location of any prior site improvements that have been carried out to mitigate abandoned mine features.
        (5) Zones showing varying overburden-cover-to-seam-thickness ratios, when appropriate.
        (6) Cross-sections of the estimated depth of any mine workings.
    b. The location of any existing and proposed structures, utilities, on-site septic systems, wells, and stormwater management facilities.
    c. The full geographical limits of the proposed project area (area to be developed).
    d. The location and unique identifier of geotechnical borings, CPT soundings, or other survey or explorations used to characterize subsurface conditions.
    e. Extent of cross-section(s) used to evaluate the three-dimensional subsurface geologic and groundwater conditions at the site.
    f. Extent of cross-section(s) used in the evaluation of subsurface instability.
    g. Dimension the closest distance between the identified mine hazard area boundary and the project area.
    h. Existing topography on the site presented in two-foot contours.
    i. Property lines for the site.
    j. North arrow and plan scale.
12. A statement as to the relative degree of accuracy and completeness of the maps and information reviewed, especially regarding historic mine map accuracy, and reasons why such sources are considered reliable for the purposes of this report.
13. A detailed description of any prior grading activity, soil instability, or ground failure.
14. Analysis and recommendations, if any, of the potential for future trough subsidence and special mitigation.
15. Assessments and conclusions regarding ground stability for both the existing and developed conditions shall be presented and documented. These assessments and conclusions shall include:
    a. Evaluation of the potential types of ground failure mechanisms that may affect the site.
    b. Quantitative stability evaluation of conditions of the various failure mechanisms using state-of-the-practice modeling techniques. Limiting equilibrium methods of analysis shall state the stability conditions as a factor of safety. The most

unstable failure geometry(ies) shall be presented in the form of a cross-section(s), with the least stable failure geometry for each failure mechanism clearly indicated. The stability evaluation shall also consider dynamic (earthquake) loading, and shall use a minimum horizontal acceleration as established by the current version of the Washington State Building Code.

16. Mitigation recommendations using engineered measures to protect the structure(s) and any adjacent structures, infrastructure, or adjacent wetlands or critical fish and wildlife habitat from damage or destruction as a result of proposed construction activities shall be designed by a professional engineer. The geotechnical report shall contain:
    a. Design plans and associated design calculations for engineered structures or drainage systems (e.g., structural foundation requirements, retaining wall design, etc.).
    b. Recommendations and requirements pertaining to the handling of surface and subsurface runoff in the developed condition.
    c. Identification of necessary geotechnical inspections to assure conformance with the report mitigation and recommendations.
    d. Proposed angles of cut and fill slopes, site grading requirements, final site topography (shown as 2' contours), and the location of any proposed structures, on-site septic systems, wells, and stormwater management features or facilities associated with the development detailed within the body of the report and shown on a site map at the same scale as that required in Section A-8 of this Appendix.
    e. Soil compaction criteria and compaction inspection requirements.
17. A list of references utilized in preparation of the report.

B. The geotechnical report shall be prepared by an engineer with documentable experience in coal mine hazard investigation and mitigation and shall be co-written by a geotechnical professional where geological interpretations are necessary or prudent in the mitigation of the mine hazard. The geotechnical report shall be prepared under the responsible charge of an appropriately licensed geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s).

C. The geotechnical professional(s) who prepared the geotechnical report shall stamp the report with his or her license stamp/seal and provide a statement of qualifications.

D. The Department may request a geotechnical professional to provide additional information in the geotechnical report based upon existing conditions, changed conditions, or unique circumstances occurring on a case by case basis.

(Ord. 2004-57s § 2 (part), 2004)

Chapter 18E.110

EROSION HAZARD AREAS

Sections:

18E.110.010 Purpose.

The following statements describe the purpose of this Chapter:

A. Protect human life and health;
B. Regulate uses of land in order to avoid damage to structures and property being developed and damage to neighboring land and structures;
C. Identify and map erosion hazard areas;
D. Minimize impacts on wetlands and critical fish and wildlife species and their associated habitat that can result from erosion;
E. Establish a permit requirement and review procedures for development proposals in areas with potential erosion hazards;
F. Strike a balance between the need to maintain natural shoreline erosion/regression processes and the need to protect existing and proposed development.

(Ord. 2004-56s § 4 (part), 2004)

18E.110.020 Erosion Hazard Areas.

A. **Shoreline Erosion Hazard Indicators.** Shoreline erosion hazard areas are areas potentially subject to land regression or retreat due to a combination of geologic, seismic, tidally influenced, and/or hydrologic or manmade factors. Shoreline erosion hazard areas can be identified by the presence of any of the following indicators:
    1. Areas with active bluff retreat that exhibit continuing sloughing or calving of bluff sediments, resulting in a vertical or steep bluff face with little or no vegetation.
    2. Areas with active land retreat as a result of wave action.
B. **Erosion Hazard Area Categories.**
    1. **Potential Erosion Hazard Areas.** Potential erosion hazard areas, as depicted on the Critical Areas Atlas-Erosion Hazard Areas Map, are those areas where the suspected risk of erosion through either loss of soil, slope instability, or land regression is sufficient to require additional review to assess the potential for active erosion activity or apply additional standards. These potential erosion hazard areas are determined using the following criteria:

a. **Shoreline Erosion Hazard Areas.** Areas within 200 feet of a freshwater (lake or pond) or marine (Puget Sound, tidal marshes, and estuaries) shoreline, as measured landward perpendicularly from the edge of the ordinary high water mark. (See Figure 18E.110-1 in Chapter 18E.120.)
b. **Riverine Erosion Hazard Areas.** The rivers subject to regulation as a channel migration zone listed in Chapter 18E.70, Flood Hazard Areas, Section 18E.70.020 B.4.
c. **Soil Erosion Hazard Areas.** Areas identified as having slopes of 20 percent or greater and that are classified as having severe, or very severe erosion potential by the Soil Conservation Service, United States Department of Agriculture (USDA).

2. **Active Shoreline Erosion Hazard Areas.** Land areas located directly adjacent to freshwater or marine waters that, through the geological assessment process, are identified as regressing, retreating, or potentially unstable as a result of undercutting by wave action or bluff erosion. The limits of the active shoreline erosion hazard area shall extend landward to include that land area that is calculated, based on the rate of regression, to be subject to erosion processes within the next ten year time period.
3. **Stable Shoreline Erosion Hazard Areas**. Areas that have been identified as potential erosion hazard areas, but, through the geological assessment process, meet one of the following conditions:
   a. No indicators as set forth in 18E.110.020 A. actually exist that indicate the potential for future erosion activity to occur; or
   b. Adequate engineering or structural measures have been provided through the submittal of a geological assessment – shoreline erosion geotechnical report that stabilizes the erosion hazard. Such engineering or structural measures must be completed, inspected and accepted for the area to be deemed stable.
4. **Riverine Erosion Hazard Areas.** Riverine erosion hazard areas are located within the lateral extent of likely watercourse channel movement due to bank destabilization and erosion, rapid incision, and shifts in location of watercourse channels. Riverine erosion hazard areas are also referred to as channel migration zones (CMZs). Rivers and streams subject to erosion are regulated as a CMZ as listed in Section 18E.70.020 B.4.
5. **Soil Erosion Hazard Areas.** Soil erosion hazard areas are identified by the presence or absence of natural vegetative cover, soil texture condition, slope, and rainfall patterns, or man-induced changes to such characteristics that create site conditions which are vulnerable to erosion of the upper soil horizon. Soil erosion hazard areas are those areas with slopes of 20 percent or greater and that are classified as having severe, or very severe erosion potential by the Soil Conservation Service, United States Department of Agriculture (USDA).

(Ord. 2004-56s § 4 (part), 2004)

18E.110.030 Erosion Hazard Area Review Procedures.

A. **General Requirements.**
   1. The Pierce County Critical Areas Atlas-Erosion Hazard Area Map provides an indication of where potential erosion hazard areas are located within the County. The actual presence or location of an erosion hazard area and/or additional potential

erosion hazard area that have not been mapped, but may be present on or adjacent to a site, shall be determined using the procedures and criteria established in this Chapter.

2. The Department will complete a review of the Critical Areas Atlas-Erosion Hazard Area Map, and any other source documents for any proposed regulated activity to determine whether the site for the regulated activity is located within a potential erosion hazard area.
3. When the Department's maps, sources, or field investigations indicate that the site for a proposed regulated activity is located within a potential shoreline erosion hazard area, the Department shall require a geological assessment as outlined in Section 18E.110.030 B. below. (See Figure 18E.110-2 in Chapter 18E.120.)
4. When the Department's maps, sources, or field investigations indicate that the proposed project area for a regulated activity is located within a riverine erosion hazard area (channel migration zone). The standards set forth in Chapter 18E.70 shall apply to riverine erosion hazard areas (channel migration zones).
5. When the Department's maps, sources, or field investigations indicate that the proposed project area for a regulated activity is located within a potential soil erosion hazard area, the Department shall require submittal of an erosion control plan pursuant to the requirements set forth in Title 17A, Construction and Infrastructure Regulations - Site Development and Stormwater Drainage.
6. Applicants requesting to develop a bulkhead along a freshwater or marine shoreline shall be required to submit a geotechnical report. The geotechnical report shall comply with the requirements established in 18E.110.060 - Appendix C.
7. Unless otherwise stated in this Chapter the critical area protective measure provisions contained in Section 18E.10.080 shall apply.

B. **Geological Assessment.** A geological assessment is a site investigation process to evaluate the on-site geology affecting a subject property and proposed development.

1. Geological assessments shall be submitted to the Department for review and approval together with a shoreline erosion hazard area application.
2. The geological assessment shall include a field investigation and may also include review of public records and documentation, analysis of historical air photos, published data and references, etc.
3. The geological assessment shall include the following information and analysis:
   a. An analysis of the shoreline erosion processes on and in the vicinity of the site including an evaluation of erosion and bluff retreat that has occurred over the past decade and an estimated probable rate of erosion based upon the historic rate of erosion that has occurred on the site.
   b. An evaluation of which areas on the site meet the criteria for an active shoreline erosion hazard area as set forth in Section 18E.110.020 B.2.
   c. An evaluation of the area on the site or in the vicinity of the site that will experience regression in the next 120 years given natural processes.
4. Geological assessments shall be prepared, signed, and dated by a geotechnical professional (as defined in Section 18E.10.060 and established in this Chapter) and the format shall be pre-approved by the Department.
5. A geotechnical professional shall complete a field investigation and geological assessment to evaluate whether or not an active shoreline erosion hazard area exists within 200 feet of the site. (See Figure 18E.110-2 in Chapter 18E.120.)

a. The geological assessment shall be submitted in the form of a geotechnical letter when the geotechnical professional finds that no active shoreline erosion hazard area exists within 200 feet of the site. The geotechnical letter shall meet the requirements contained in 18E.110.060 – Appendix A.
b. The geological assessment shall be submitted in the form of geotechnical evaluation when the geotechnical professional finds that an active shoreline erosion hazard area exists but is located more than 200 feet away from the proposed project area, and in their opinion, will not impact the subject site. The geotechnical evaluation shall meet the requirements contained in 18E.110.060 – Appendix B.
c. The geological assessment shall be submitted in the form of a geotechnical report when the geotechnical professional finds that an active shoreline erosion hazard area exists within 200 feet of the proposed project area or when a geotechnical professional determines that mitigation measures, such as a bulkhead, are necessary in order to construct or develop within a potential shoreline erosion hazard area. The geotechnical report shall meet the requirements contained in 18E.110.060 – Appendix C.

6. The Department shall review the geological assessment and either:
   a. Accept the geological assessment and approve the application; or
   b. Reject the geological assessment and require revisions or additional information.
7. A geological assessment for a specific site may be valid for a period of up to five years when the proposed land use activity and site conditions are unchanged. However, if surface and/or subsurface conditions associated with the site change during that five-year period, the applicant may be required to submit an amendment to the geological assessment.

C. **Riverine Erosion Hazard Area (Channel Migration Zones) Review.** Riverine erosion hazard areas shall be reviewed pursuant to the requirements set forth in Chapter 18E.70 Flood Hazard Areas.

D. **Soil Erosion Hazard Area Review.** Soil erosion hazard areas shall be reviewed pursuant to the requirements set forth in Title 17A, Construction and Infrastructure Regulations – Site Development and Stormwater Drainage.

(Ord. 2004-56s § 4 (part), 2004)

18E.110.040 Erosion Hazard Area Standards.

A. **Active Shoreline Erosion Hazard Areas.** Any development, encroachment, filling, clearing, or grading, timber harvest, building structures, impervious surfaces, and vegetation removal shall be prohibited within active shoreline erosion hazard areas and associated buffers except as specified in the following standards:

1. **Shoreline Erosion Protection Measures.** Shoreline erosion protection measures located within or adjacent to freshwater or marine shorelines shall be allowed subject to the following:
   a. The proposed shoreline protection measure shall comply with the standards set forth in Section 18E.40.040.
   b. A geological assessment-shoreline erosion geotechnical report has been conducted in accordance with the provisions set forth in Section 18E.110.030 B. that indicates that the shoreline is currently experiencing active erosion (i.e., land retreat or regression).

c. The use of the shoreline erosion protection measure will not cause a significant adverse impact on adjacent properties (i.e., increase erosion on adjacent properties).
d. The use of the shoreline erosion protection measure will not cause a significant adverse impact on critical fish and wildlife species and their associated habitat (i.e., eliminate or reduce sediment supply from feeder bluffs).
e. The use of soft armoring techniques (soil bioengineering erosion control measures as identified in the State Department of Ecology and the Department of Fish and Wildlife guidance) is the preferred method for shoreline protection.
f. Hard armoring shoreline erosion control measures shall be approved only when a geological assessment-shoreline erosion geotechnical report, as set forth in Section 18E.110.030 B., has been completed and indicates the following:
   (1) The use of beach nourishment alone or in combination with soft armoring techniques is not adequate to protect the property from shoreline erosion processes; and
   (2) The property contains an existing structure(s) that will be threatened within the next 10 years or the buildability of an undeveloped site will be threatened within the next 10 years if a hard armoring method of shoreline erosion protection is not provided.
g. Hard armoring shoreline protection measures shall not be allowed for protection of proposed structures when it is determined that the proposed structures can be located landward of the 120-year regression area.

2. **Stormwater Conveyance.** Surface drainage into an active shoreline erosion hazard area should be avoided. If there are no other alternatives for discharge, then drainage must be collected upland of the top of the active shoreline erosion hazard area and directed downhill in a high density polyethylene stormwater pipe with fuse welded joints that includes an energy dissipating device at the base of the active shoreline erosion area. The pipe shall be located on the surface of the ground and be properly anchored so that it will continue to function under shoreline erosion conditions. The number of these pipes should be minimized along the slope frontage.
3. **Utility Lines.** Utility lines will be permitted when no other conveyance alternative is available. The line shall be located above ground and properly anchored and/or designed so that it will continue to function under shoreline erosion conditions.
4. **Roads, Bridges, and Trails.** Roads, bridges, and trails shall be allowed when all of the following conditions have been met:
   a. Mitigation measures are provided that ensure the roadway prism and/or bridge structure will not be susceptible to damage from active erosion.
   b. The road is not a sole access for a development.

B. **Shoreline Erosion Hazard Management Area.** All regulated activities such as but not limited to building structures, impervious surfaces, vegetation removal, timber harvest, and clearing or grading activities may be allowed in areas located within 200 feet of an active shoreline erosion hazard area subject to the following standards:
1. The Department reviews and approves a geological assessment-shoreline erosion hazard geotechnical report and concurs that the proposed project area is located outside an active shoreline hazard area and the required buffer, as set forth in 18E.110.050.

2. The proposed recommendations and mitigation measures contained within the geotechnical report are adequate to reduce or mitigate risks to the natural environment, health, and safety.
3. Surface drainage from the proposed project area, including downspouts, landscape irrigation systems, and runoff from paved or unpaved surfaces upland of the shoreline, shall not be directed through an active shoreline erosion hazard area or its associated buffer unless it is conveyed in conformance with the provisions in 18E.110.040 A.2. above.
4. Stormwater retention and detention systems, such as dry wells and infiltration systems utilizing buried pipe or french drains, shall not be permitted unless such systems are designed by a professional engineer and the geotechnical report indicates that such a system will not affect the stability of the shoreline.
5. Proposed developments, with the exception of shoreline erosion protection measures, shall be sited far enough from regressing shorelines to provide 120 years of useful life for any proposed structures or infrastructure.

C. **Riverine Erosion Hazard Area (Channel Migration Zones) Review.** Riverine erosion hazard areas shall be reviewed pursuant to the requirements set forth in Chapter 18E.70 Flood Hazard Areas.

D. **Soil Erosion Hazard Area Review.** Soil erosion hazard areas shall be reviewed pursuant to the requirements set forth in Title 17A, Construction and Infrastructure Regulations - Site Development and Stormwater Drainage.

(Ord. 2004-56s § 4 (part), 2004)

18E.110.050 Buffer Requirements.

A. **Determining Buffer Widths.**
1. The buffer width shall be measured on a horizontal plane from a perpendicular line established at the edge of the active shoreline erosion hazard area limits. (See Figure 18E.110-3 in Chapter 18E.120.)
2. An undisturbed buffer of existing vegetation shall be required for an active shoreline erosion hazard area. The required standard buffer width is the greatest amount of the following distances:
   a. Fifty feet from all edges of the active shoreline erosion hazard area limits;
   b. A distance of one-third the height of the slope if the regulated activity is at the top of the slope and a distance of one-half the height if the regulated activity is at the bottom of the slope; or
   c. The minimum distance recommended by the geotechnical professional measured from the edge of the active shoreline erosion hazard area.

B. **Modification of Buffer Widths.** The Department may require a larger buffer width than the standard buffer distance, as determined in A. above, if any of the following are identified through the geological assessment process:
1. The adjacent land is susceptible to severe erosion and erosion control measures will not effectively prevent adverse impacts.
2. The area has a severe risk of slope failure or downslope stormwater drainage impacts.

(Ord. 2004-56s § 4 (part), 2004)

18E.110.060 Appendices.

A. Geological Assessment - Shoreline Erosion Hazard Geotechnical Letter.

B. Geological Assessment - Shoreline Erosion Hazard Geotechnical Evaluation.

C. Geological Assessment - Shoreline Erosion Hazard Geotechnical Report.

18E.110.060 - Appendix A
Geological Assessment -
Shoreline Erosion Hazard Geotechnical Letter

A. A geotechnical letter shall, at a minimum, include the following:
   1. The letter shall be labeled identifying the submittal as a "Shoreline Erosion Hazard Geotechnical Letter."
   2. The dates when the geological assessment was conducted. The date when the letter was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A brief description of the project (including the proposed land use) and a description of the area to be developed.
   6. A paragraph that states the following specific language:
      "The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Section 18E.110.030 to prepare a geological assessment. (Individual's Name) understands the requirements of the current Erosion Hazard Area Chapter 18E.110 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under the responsible charge of (Individual's Name) have performed a shoreline erosion hazard geological assessment, conducted a field investigation, and researched available historic records on the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of this Title and it does not appear that an active shoreline erosion hazard area exists within 200 feet of the site."
   7. The name, mailing address, and telephone number of the geotechnical professional who prepared the letter.
   8. The name, mailing address, and telephone number of the property owner.

B. The geotechnical letter shall be prepared under the responsible charge of a geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s).

(Ord. 2004-56s § 4 (part), 2004)

18E.110.060 - Appendix B
Geological Assessment - Shoreline Erosion Hazard Geotechnical Evaluation

A. A geotechnical evaluation shall, at a minimum, include the following:
   1. The cover letter for the document shall clearly identify the submittal as a "Shoreline Erosion Hazard Geotechnical Evaluation."
   2. The dates when the geological assessment was conducted. The date when the evaluation was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A detailed description of the project (including the proposed land use) and a description of the area to be developed.
   6. A summary of the results, conclusions, and recommendations resulting from the geological assessment, as set forth in Section 18E.110.030 B.
   7. An accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information listed below be based on a field survey by a licensed surveyor. The site plan shall include:
      a. The limits/location of the active shoreline erosion hazard area(s) set forth in Section 18E.110.020 B.2.
      b. The limits of the required shoreline erosion hazard buffer based upon the requirements set forth in Section 18E.110.050 A.
      c. The limits/location of the Shoreline Erosion Hazard Management Area.
      d. The limits/location of the 120 year regression area.
      e. The location of any existing structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      f. The location of any proposed structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      g. The full geographical limits of the proposed project area (area to be developed).
      h. Dimension of the closest distance between the identified active shoreline hazard area boundary and the proposed project area.
      i. Dimension of the closest distance between the 120-year regression line and the proposed project area.
      j. Existing contours on the site at two-foot intervals.
      k. Property lines for the site.
      l. North arrow and scale.
   8. A paragraph that states the following specific language:

      "The services described in this report were prepared under the responsible charge of (Individual's Name). (Individual's Name) meets the qualifications contained in Section 18E.110.030 to prepare a geological assessment. (Individual's Name) understands the requirements of the current Erosion Hazard Area Chapter 18E.110 and the definitions of the applicable terms contained within Chapter 18.25. Individuals under the responsible charge of (Individual's Name) have performed a shoreline erosion hazard geological assessment, conducted a field investigation, and researched available historic records on the above referenced site. In my opinion, the scope of services completed for this project is adequate to meet the requirements of this Title and it does not appear that an active shoreline erosion hazard area exists within 200 feet of the proposed project area."

9. The name, mailing address, and telephone number of the geotechnical professional who prepared the evaluation.
10. The name, mailing address, and telephone number of the property owner.

B. The geotechnical evaluation shall be prepared under the responsible charge of a geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s).

(Ord. 2004-56s § 4 (part), 2004)

18E.110.060 - Appendix C
Geological Assessment - Shoreline Erosion Hazard Geotechnical Report

A. A geotechnical report shall, at a minimum, include the following:
   1. The cover letter for the document shall clearly identify the submittal as a "Shoreline Erosion Hazard Geotechnical Report."
   2. The dates when the geological assessment was conducted. The date when the report was prepared.
   3. The parcel number(s) of the site.
   4. Site address, if one has been assigned by the County.
   5. A detailed description of the project (including the proposed land use) and a description of the area to be developed.
   6. A summary of the results, conclusions, and recommendations resulting from the geological assessment, as set forth in Section 18E.110.030 B. The summary shall specifically address:
      a. In the case of proposed development, whether it is possible given the physical constraints of the property (size, shape, building setbacks, utility requirements, etc.) to locate the proposed development outside of the 120-year area of regression based on natural shoreline processes.
      b. In the case of proposed development, if it is not possible to locate the development outside of the 120-year area of regression (based on natural processes), evaluation whether beach nourishment and/or soft armoring techniques can be used to slow the rate of regression such that the proposed development is no longer within the 120-year regression area.
      c. Whether any existing structures will be threatened within the next ten years or whether the buildability of an undeveloped site will be threatened within the next ten years, if hard armoring is not provided.
      d. Evaluate whether any proposed shoreline erosion protection measures will cause an increase in the rate of regression on neighboring properties.
   7. An accurate site plan drawn at a scale of 1" = 20', 1" = 30', 1" = 50' (or other scale deemed appropriate by the Department) is required. The Department may require that the site plan information listed below be based on a field survey by a licensed surveyor. The site plan shall include:
      a. The limits/location of the active shoreline erosion hazard area(s) set forth in Section 18E.110.020 B.2.
      b. The limits of the required shoreline erosion hazard buffer based upon the requirements set forth in Section 18E.110.050 A.
      c. The limits/location of the Shoreline Erosion Hazard Management Area.
      d. The limits/location of the 120-year regression area based on natural shoreline processes and, if applicable, based upon proposed shoreline protection measures.
      e. The location of any existing structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      f. The location of any proposed structures, utilities, on-site septic systems, wells, and stormwater management facilities.
      g. The full geographical limits of the proposed project area (area to be developed).
      h. Dimension of the closest distance between the identified active shoreline hazard area boundary and the proposed project area.

i. Dimension of the closest distance between the 120-year regression line and the proposed project area.
j. Existing contours on the site at two-foot intervals.
k. Property lines for the site.
l North arrow and scale.

8. A discussion of any proposed shoreline protection measures including design and construction drawings is required.
9. A list of references utilized in preparation of the report.
10. The name, mailing address, and telephone number of the geotechnical professional(s) who prepared the report.
11. The name, mailing address, and telephone number of the property owner.

B. The geotechnical report shall be prepared under the responsible charge of a geotechnical professional(s) and be signed, sealed and dated by the geotechnical professional(s).
C. The Department may request a geotechnical professional to provide additional information in the geotechnical report based upon existing conditions, changed conditions, or unique circumstances occurring on a case by case basis.
D. Geotechnical reports shall be in conformance with a format that is pre-approved by the Department.

(Ord. 2004-56s § 4 (part), 2004)

Chapter 18E.120

GRAPHICS AND FIGURES FOR TITLE 18E

Figures:

Figure 18E.10-1

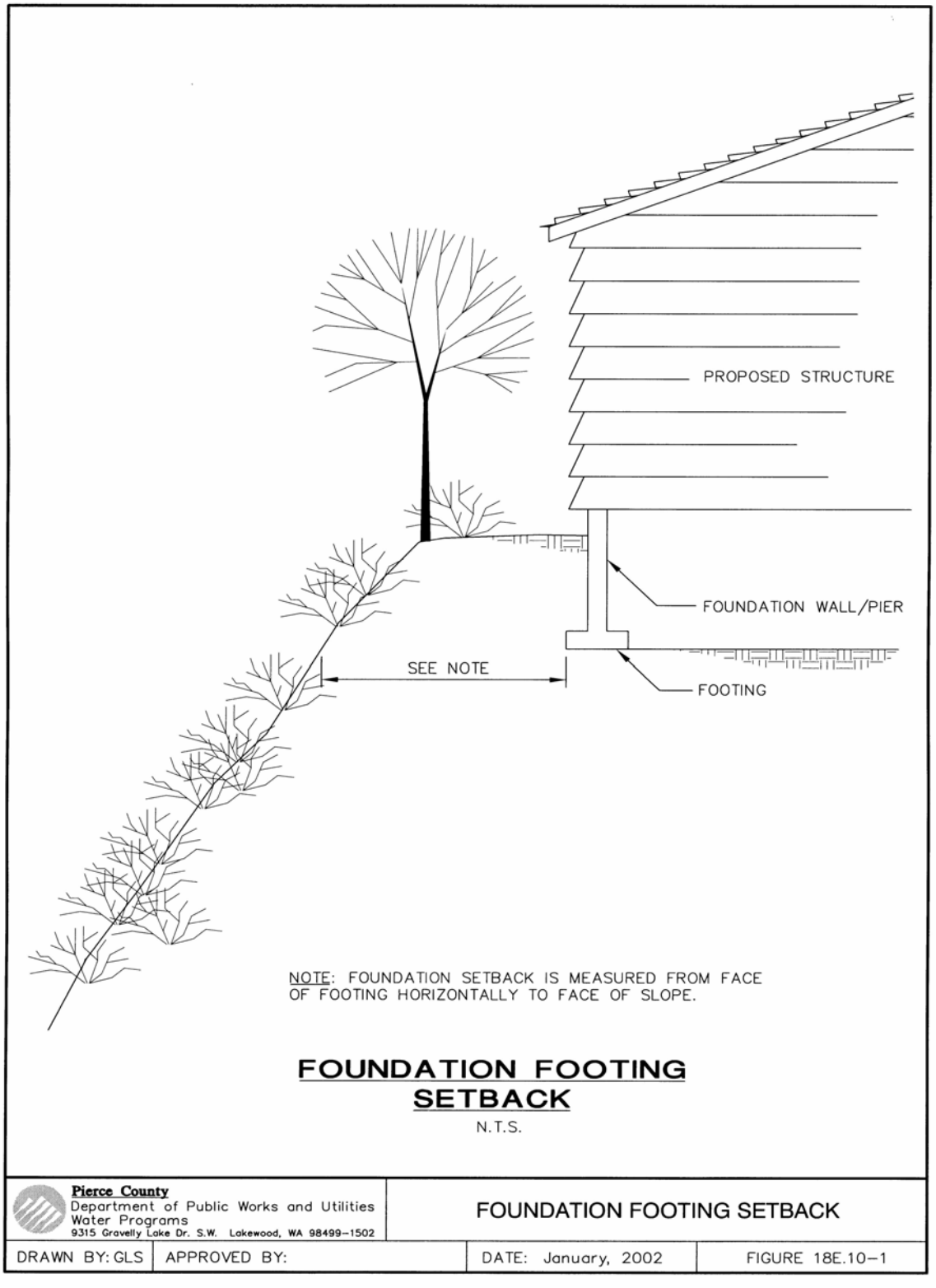


Figure 18E.10-2

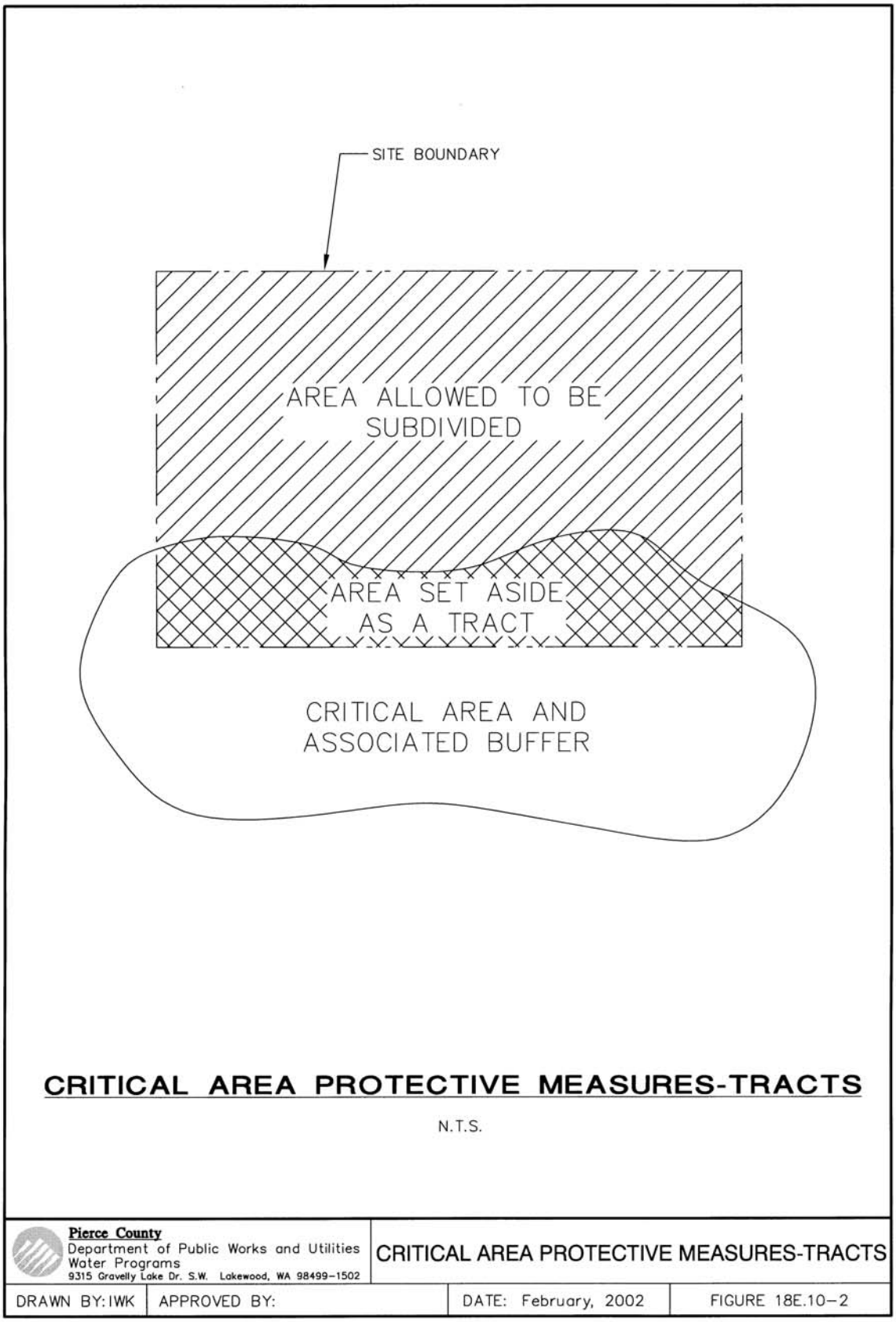
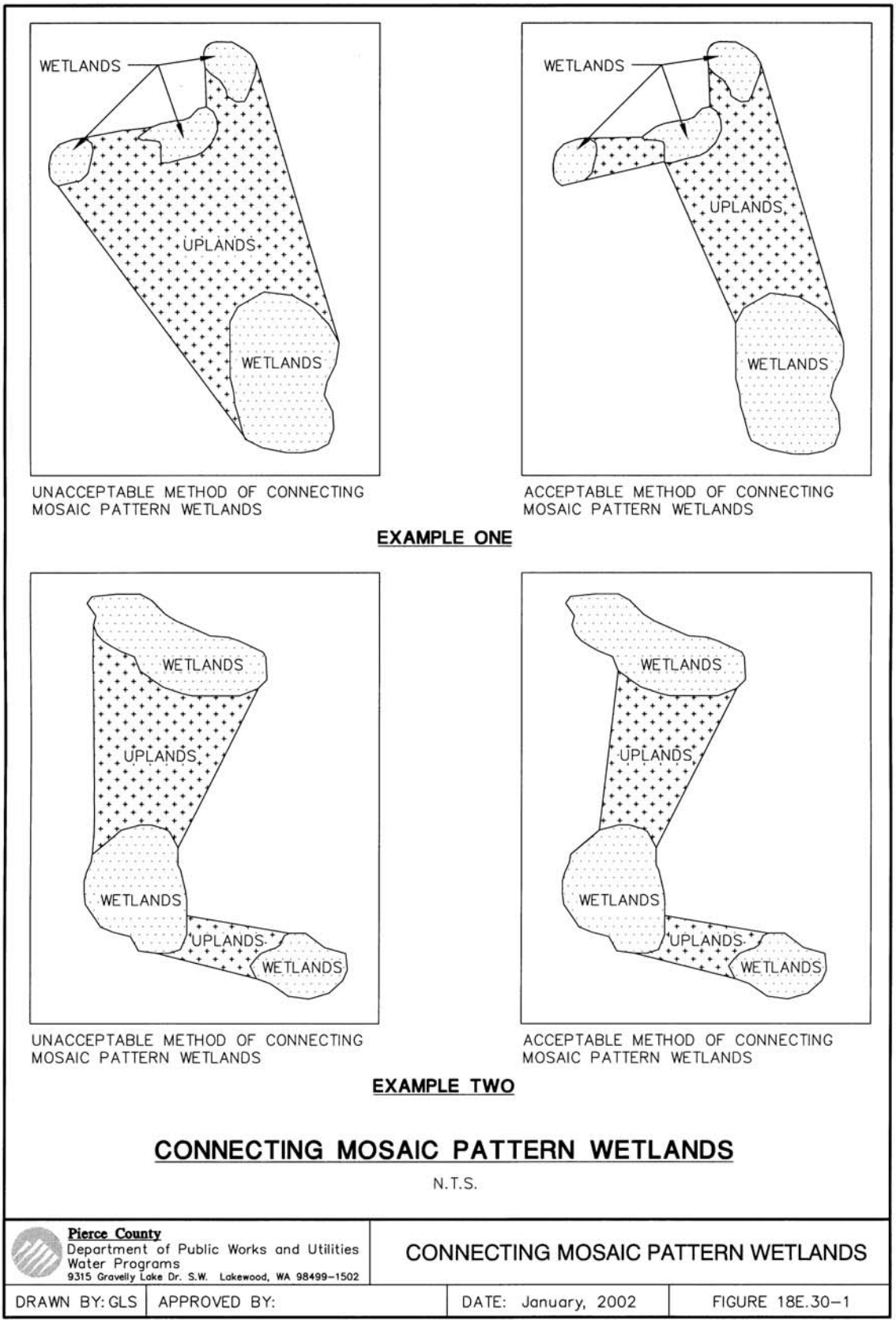


Figure 18E.30-1



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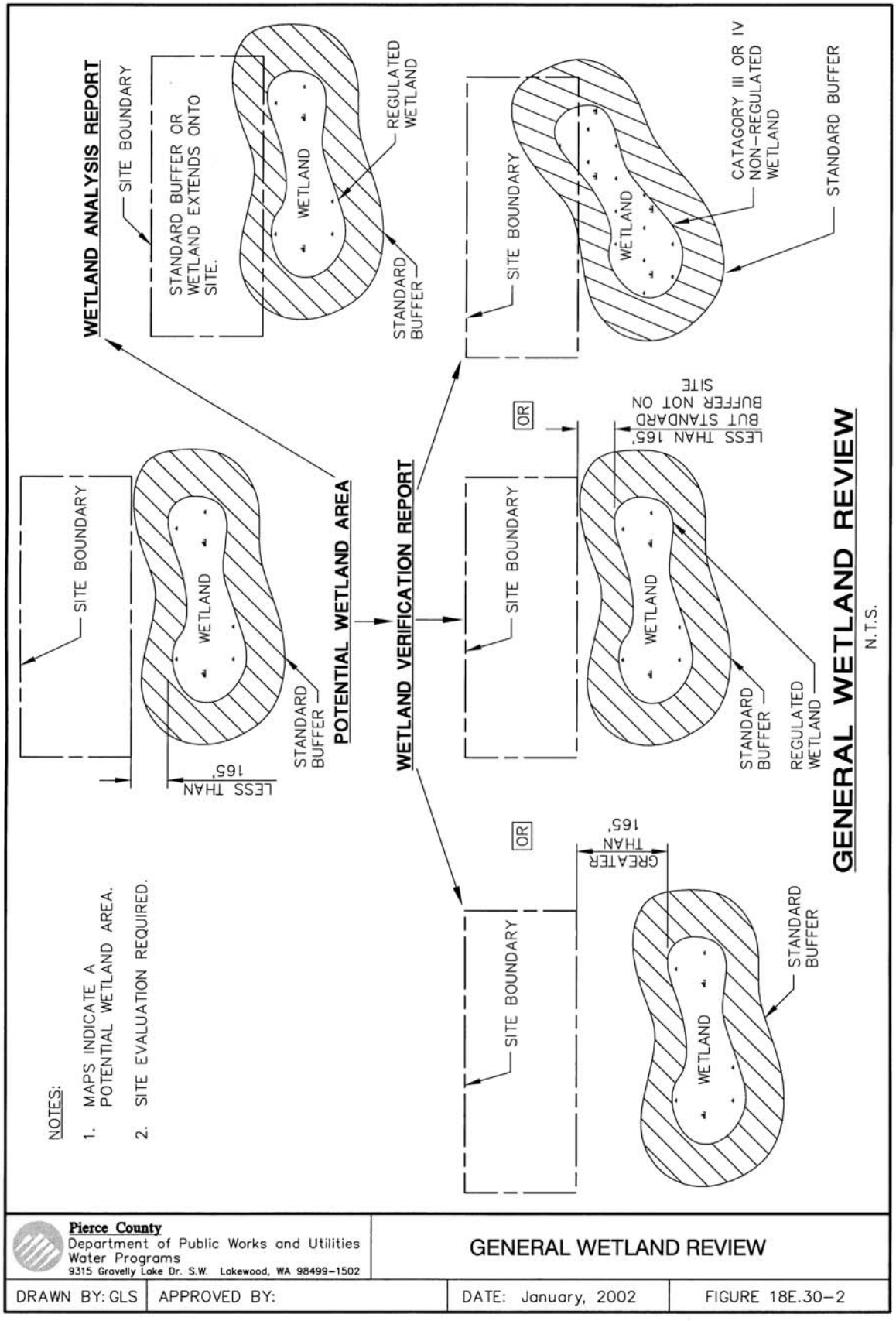

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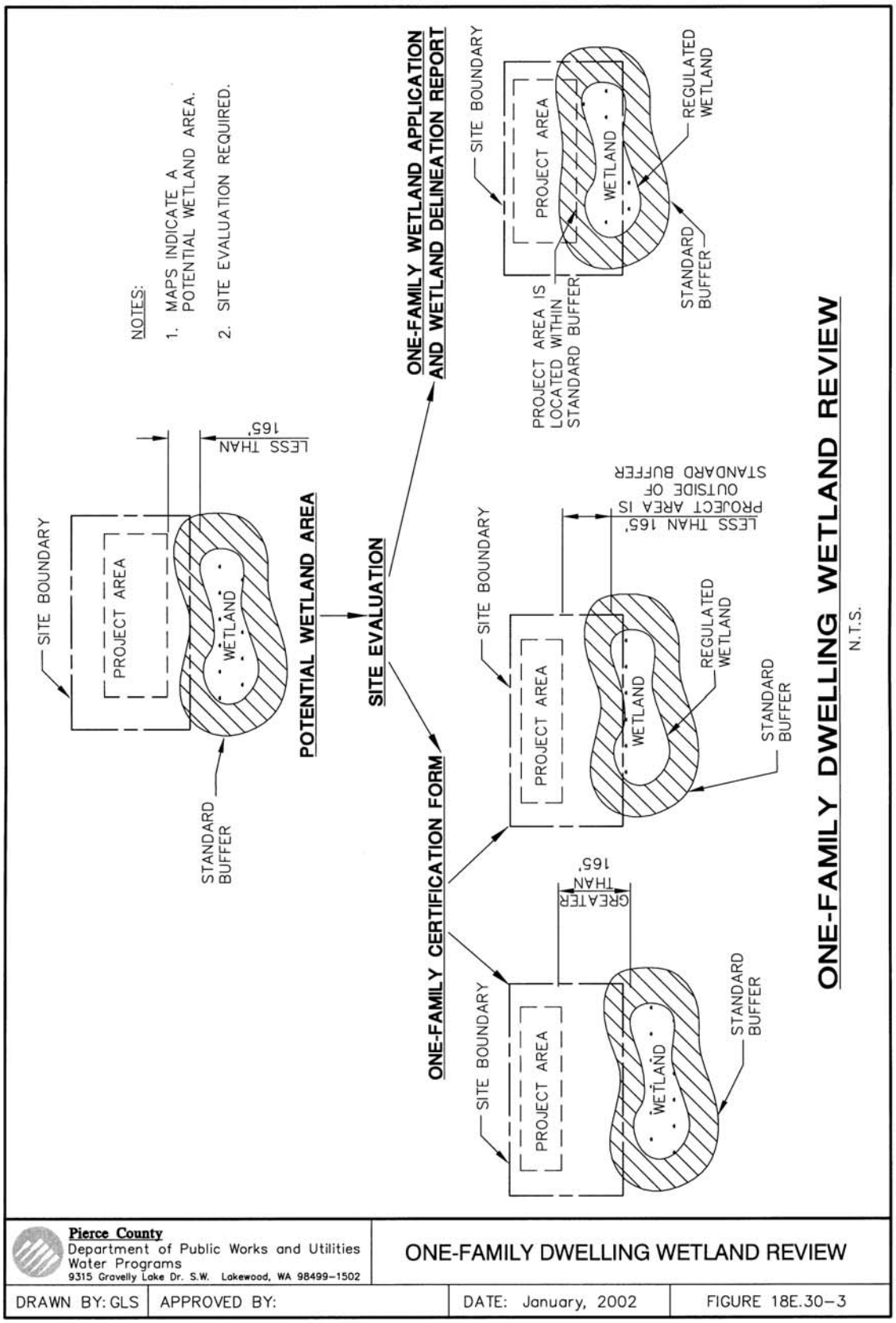

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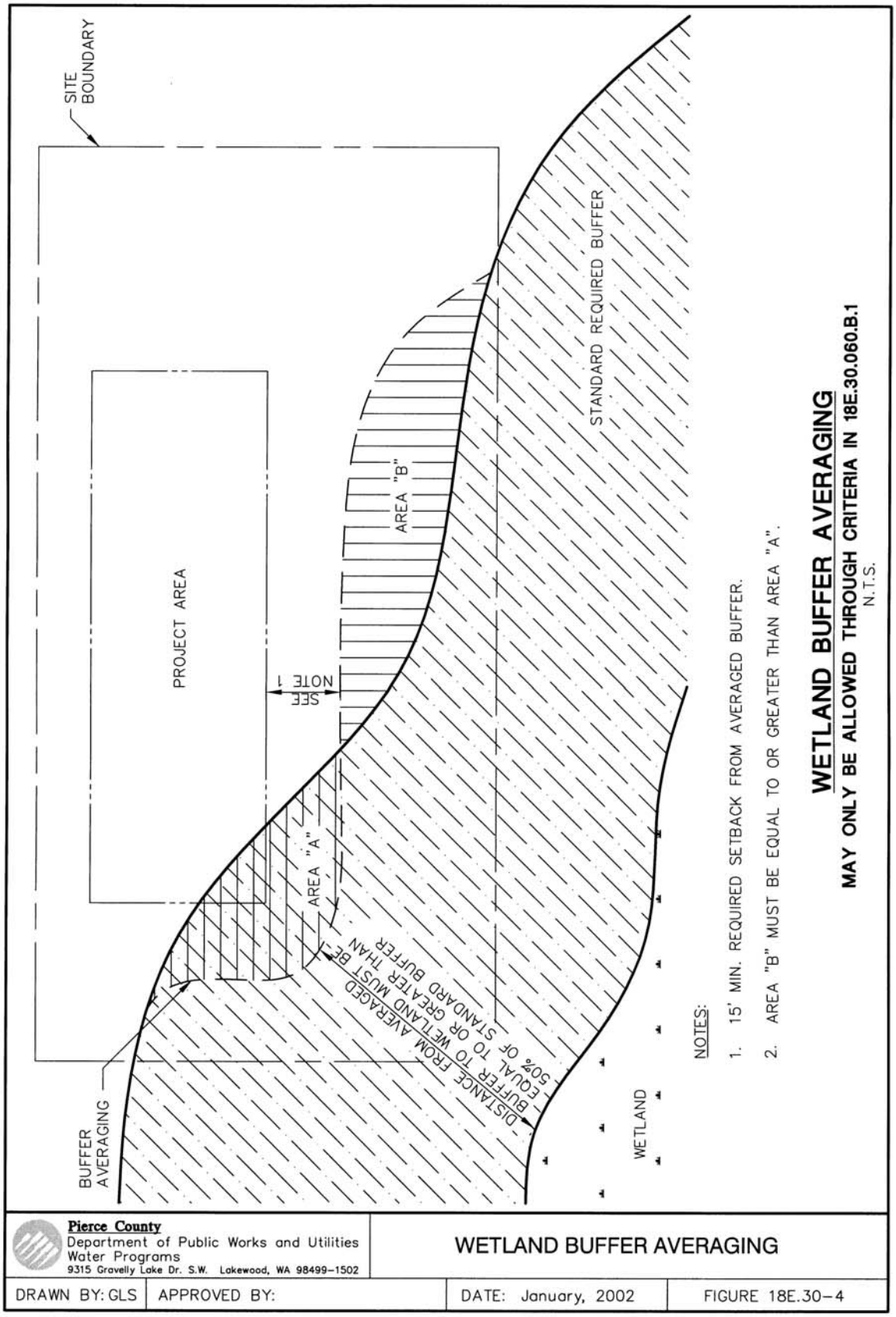
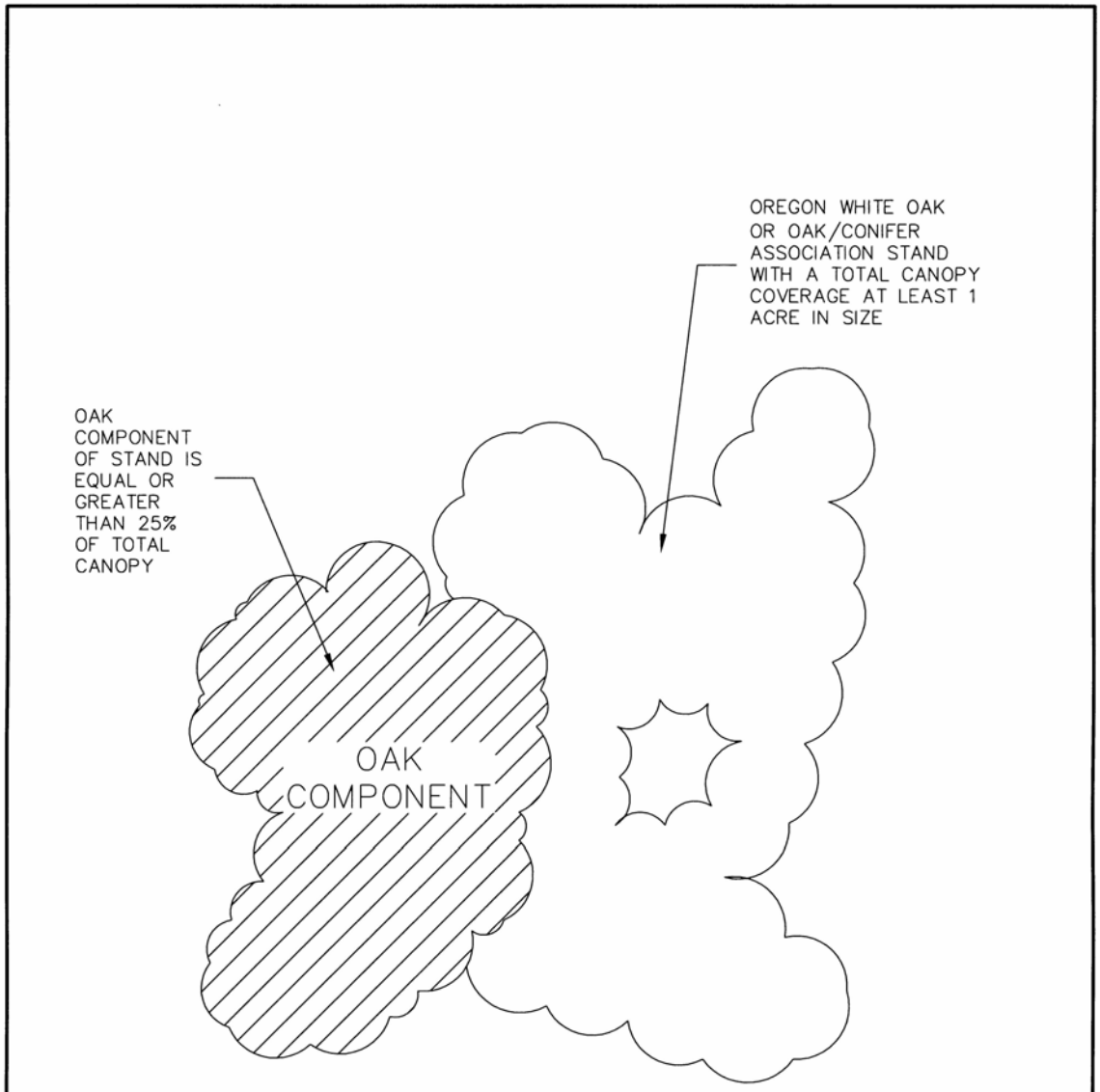


Figure 18E.40-1

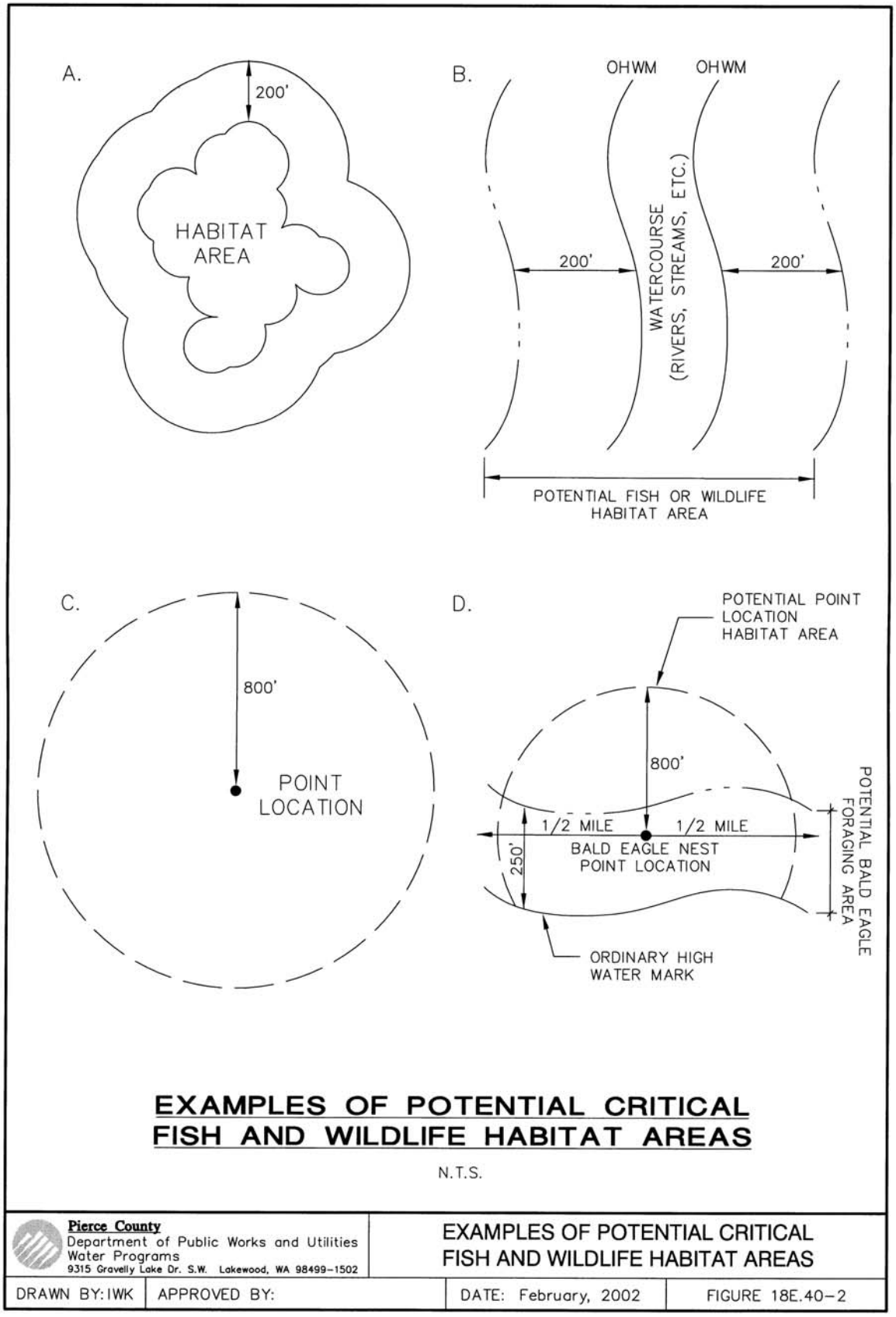


HABITATS OF LOCAL IMPORTANCE
PRIORITY OREGON WHITE OAK WOODLANDS

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502		HABITATS OF LOCAL IMPORTANCE PRIORITY OREGON WHITE OAK WOODLANDS	
DRAWN BY: IWK	APPROVED BY:	DATE: February, 2002	FIGURE 18E.40-1

Figure 18E.40-2



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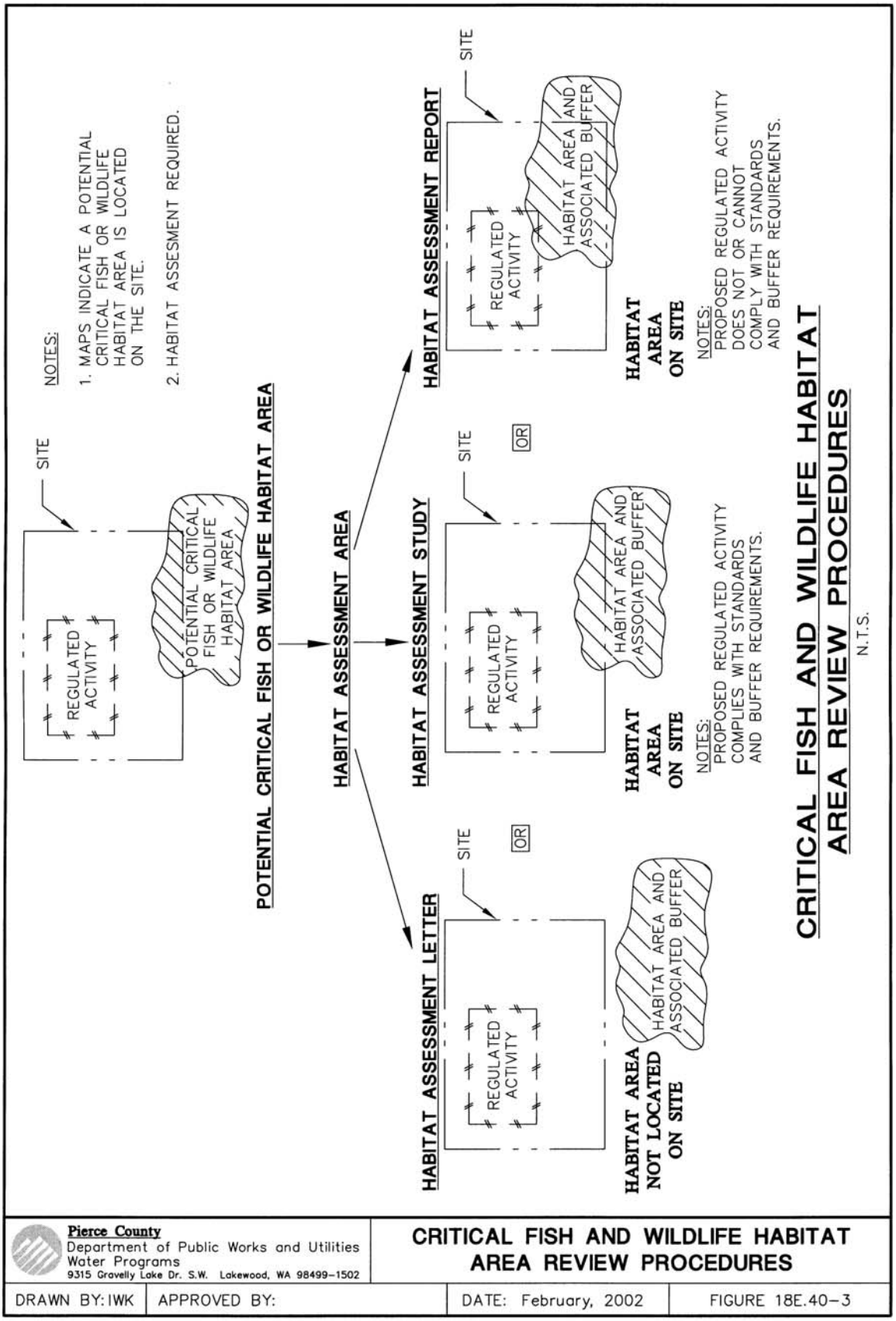

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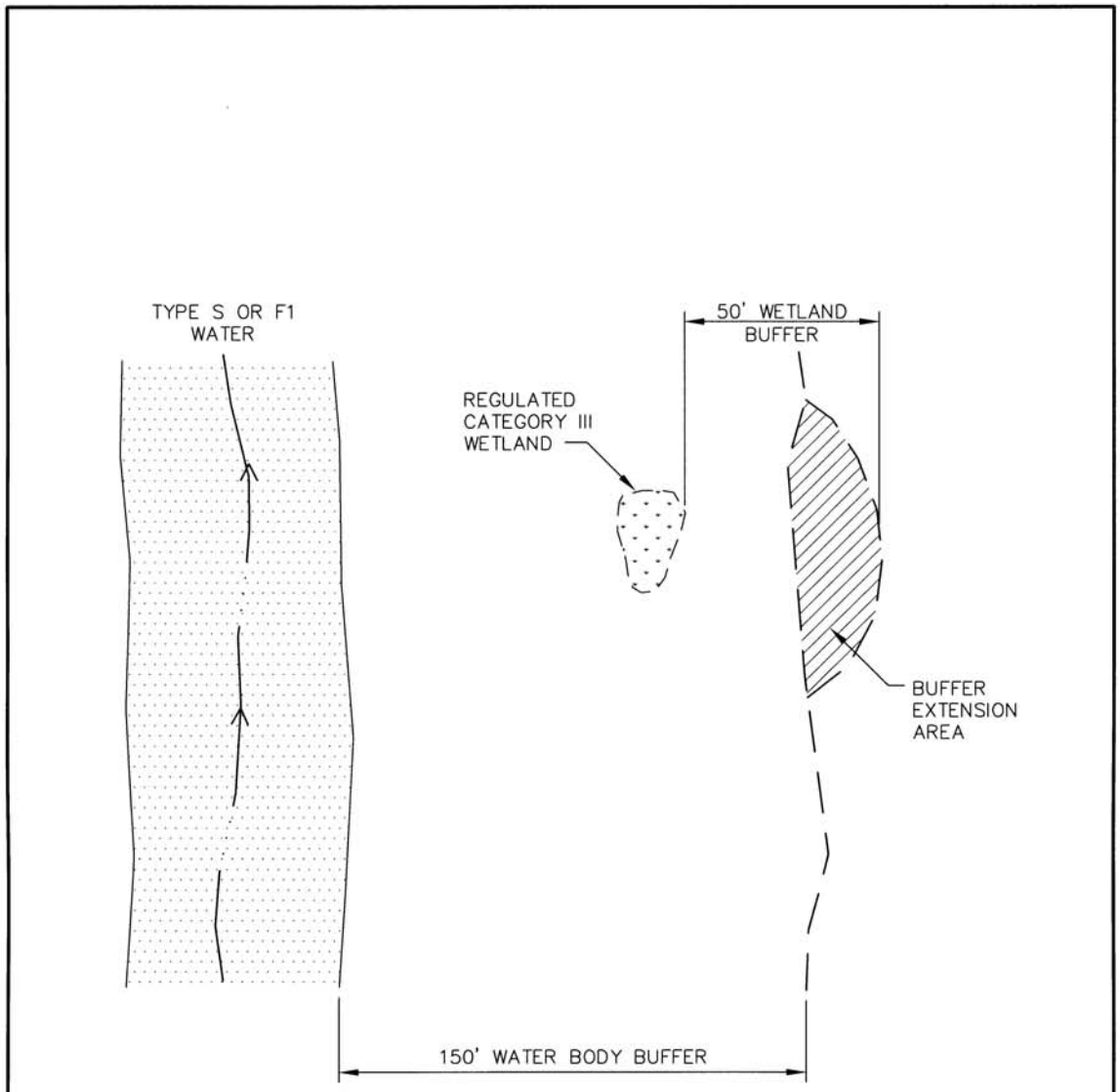
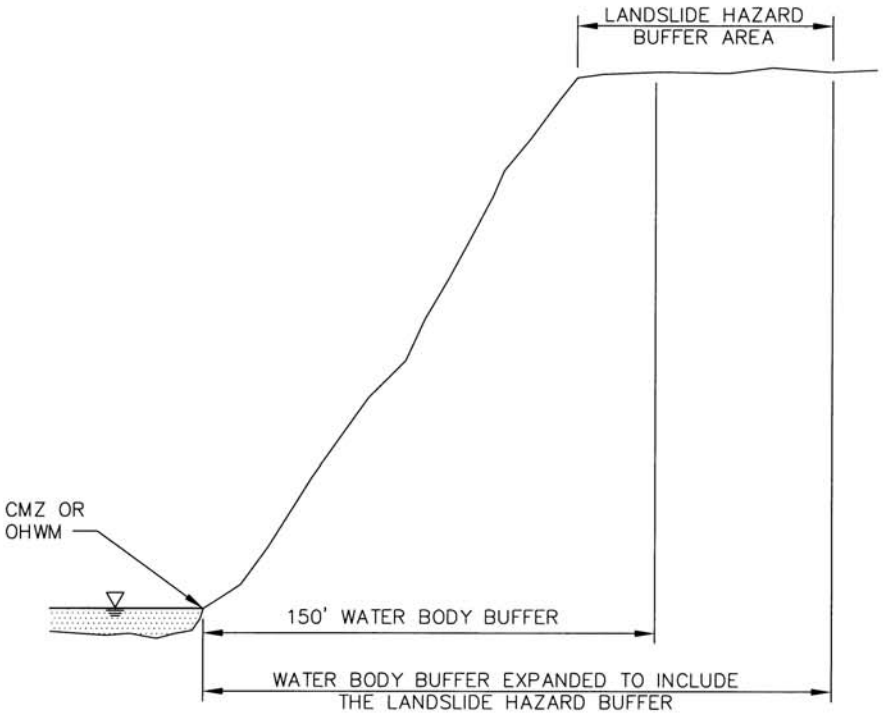


RIPARIAN BUFFER EXTENSION -
WATER BODY BUFFER EXPANDED TO INCLUDE THE BUFFER OF THE ADJACENT WETLAND

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502	RIPARIAN BUFFER EXTENSION - WATER BODY BUFFER EXPANDED TO INCLUDE THE BUFFER OF THE ADJACENT WETLAND		
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	FIGURE 18E.40-4

Figure 18E.40-5



RIPARIAN BUFFER EXTENSION -
WATER BODY BUFFER EXPANDED TO INCLUDE
LANDSLIDE HAZARD BUFFER AREA

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502	RIPARIAN BUFFER EXTENSION - WATER BODY BUFFER EXPANDED TO INCLUDE LANDSLIDE HAZARD BUFFER AREA		
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	FIGURE 18E.40-5

Figure 18E.40-6

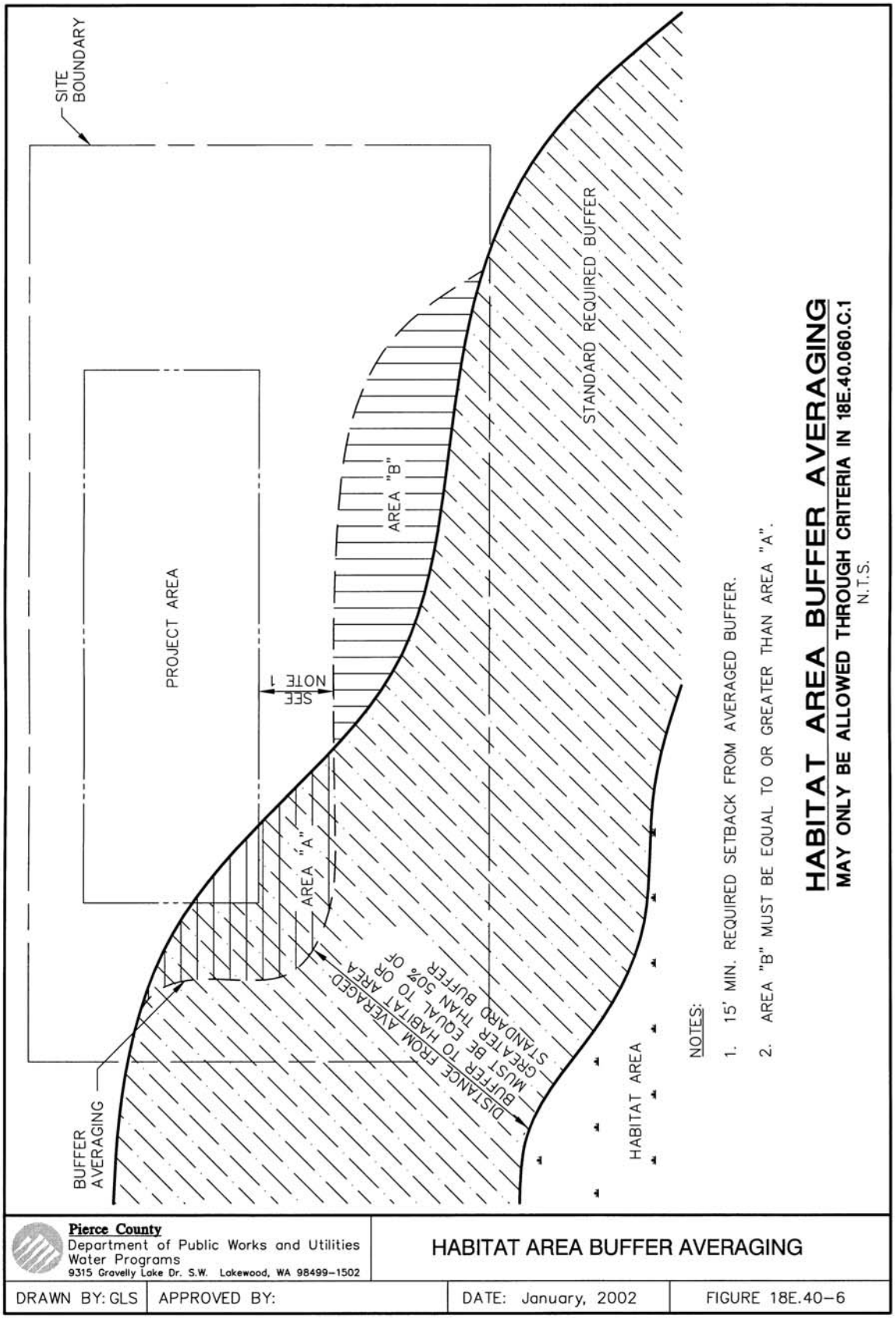
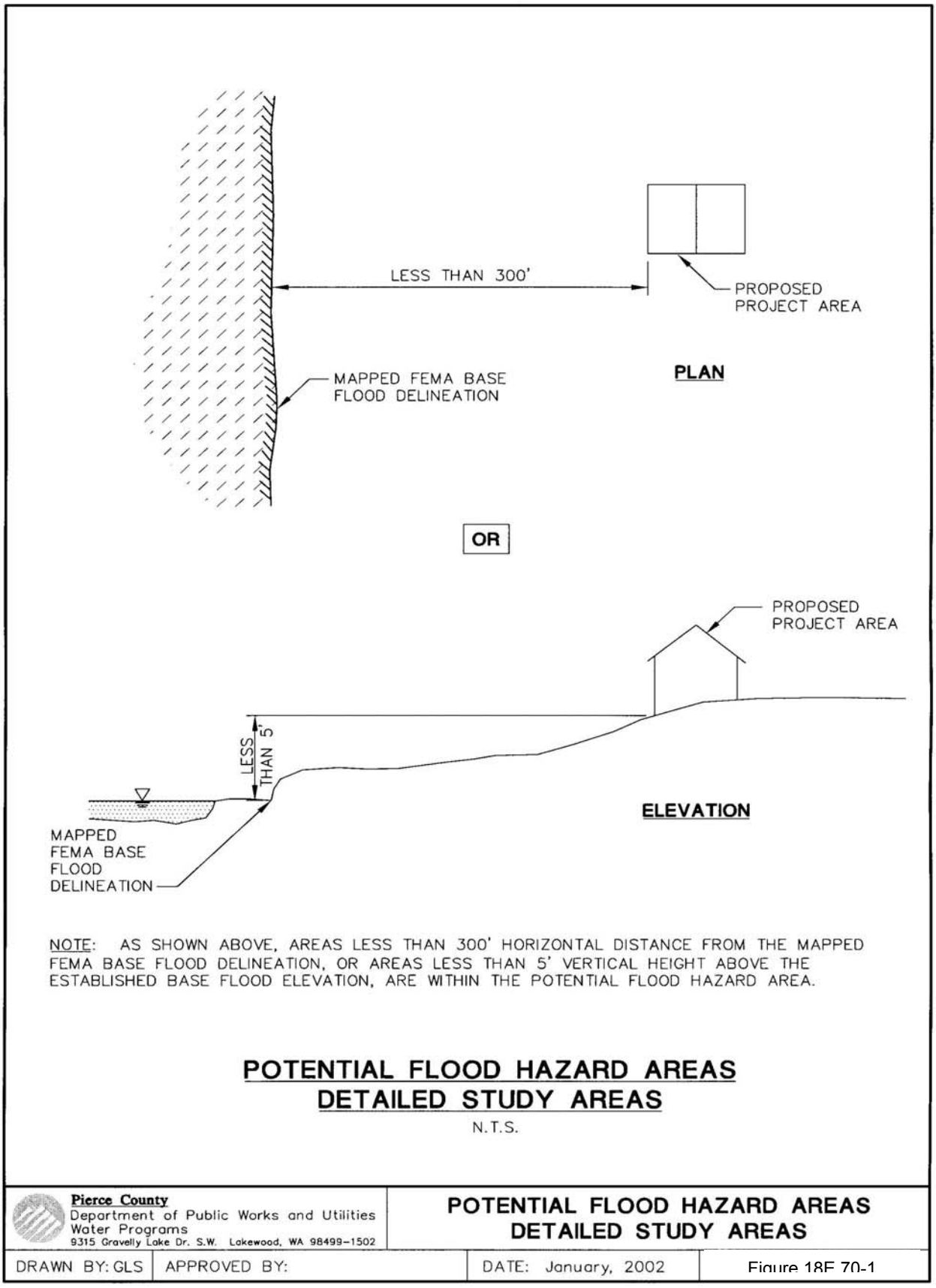


Figure 18E.70-1



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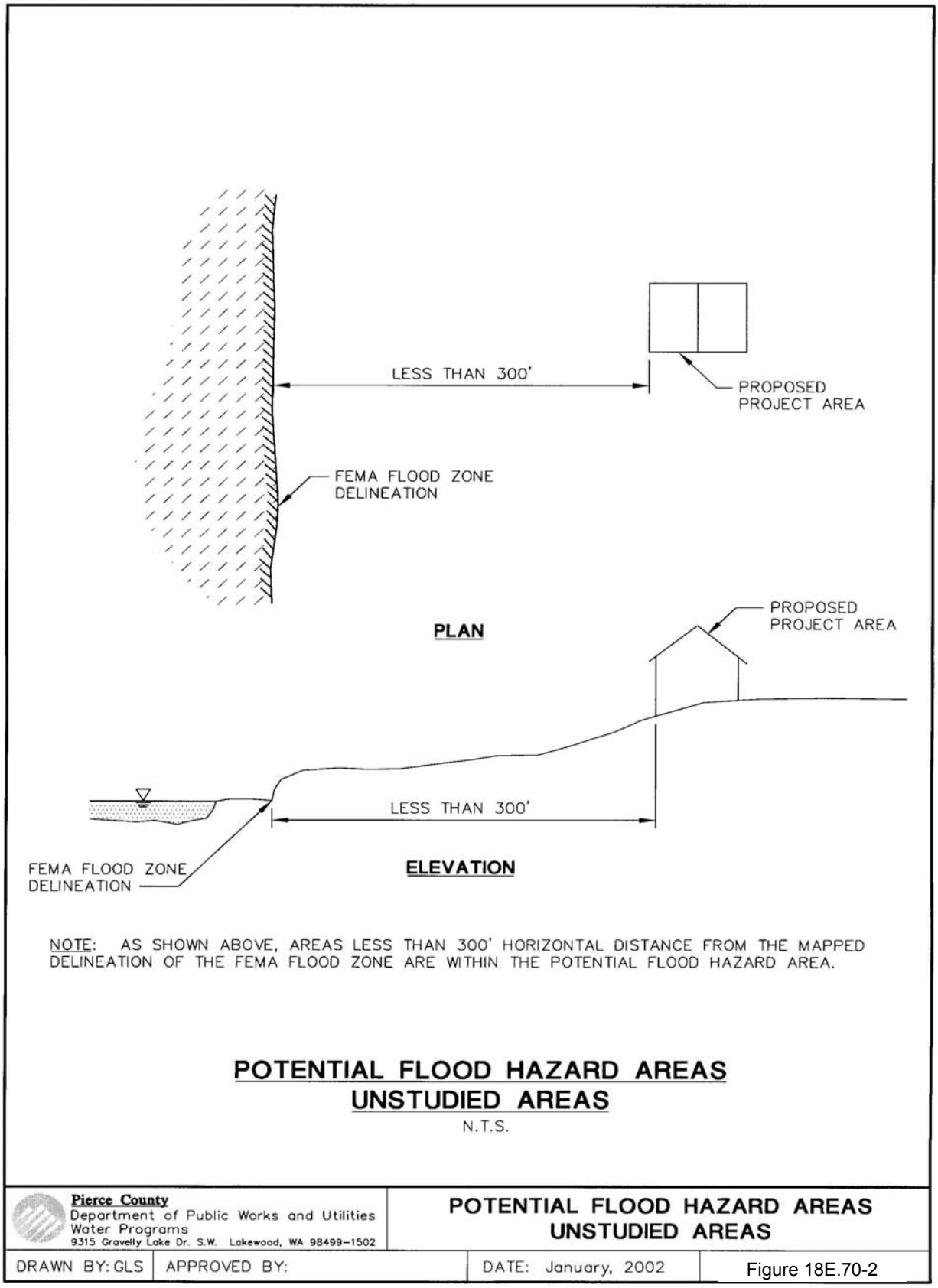

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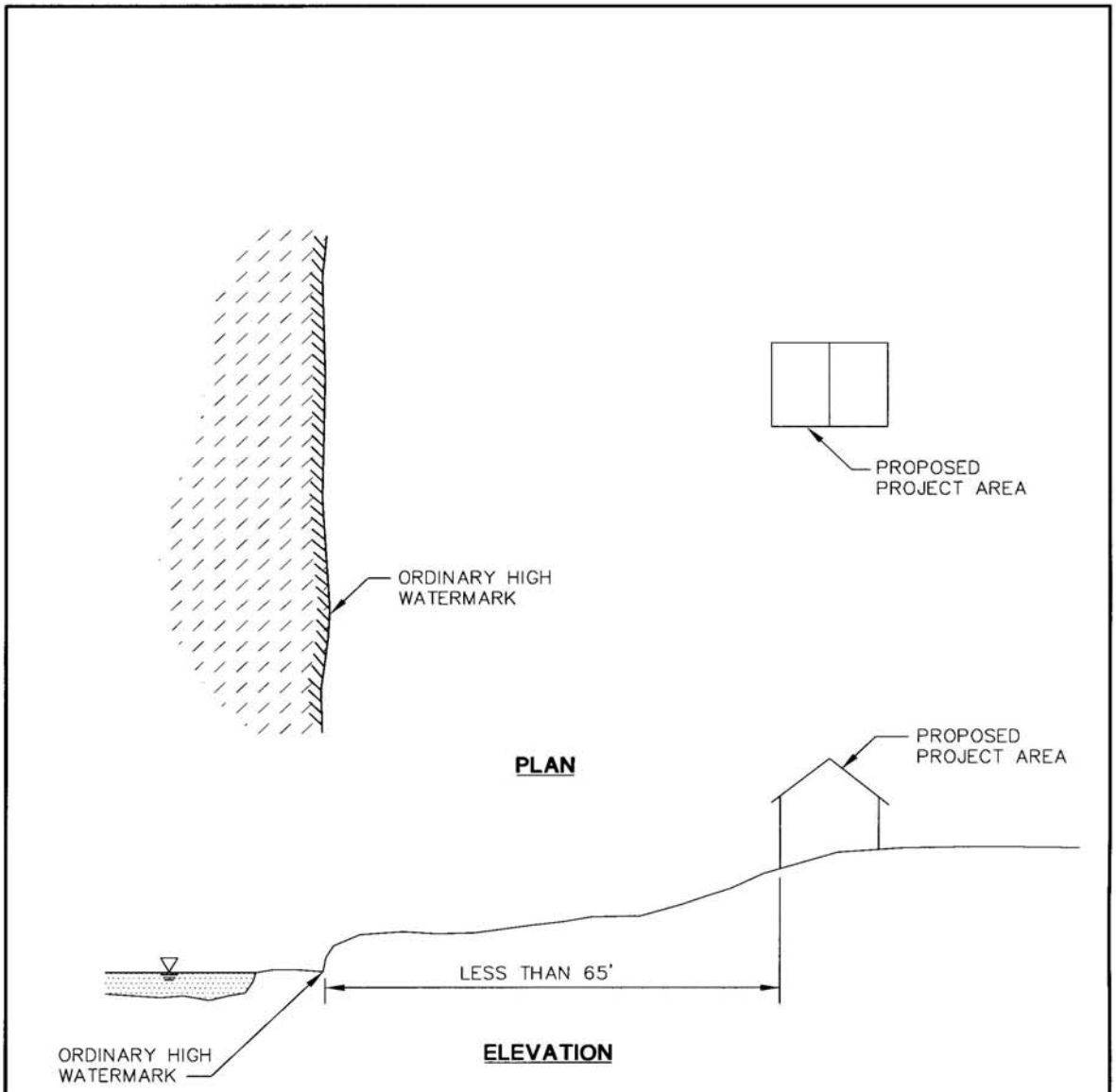


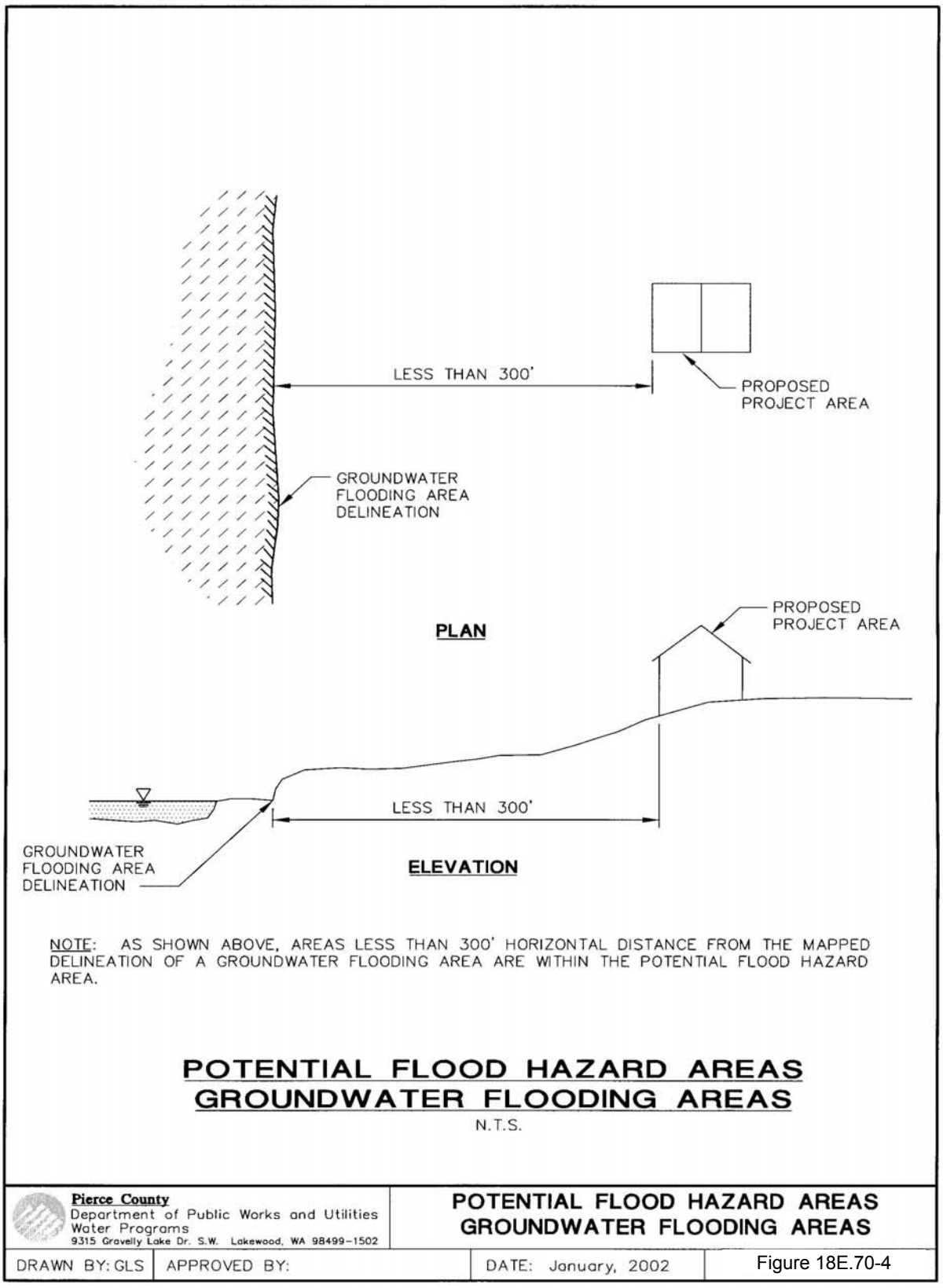
NOTE: AS SHOWN ABOVE, AREAS LESS THAN 65' HORIZONTAL DISTANCE FROM THE ORDINARY HIGH WATER MARK OF AN IDENTIFIED NATURAL WATER ARE WITHIN THE POTENTIAL FLOOD HAZARD AREA.

POTENTIAL FLOOD HAZARD AREAS
NATURAL WATERCOURSE

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502		**POTENTIAL FLOOD HAZARD AREAS** **NATURAL WATERCOURSE**	
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	Figure 18E.70-3

Figure 18E.70-4



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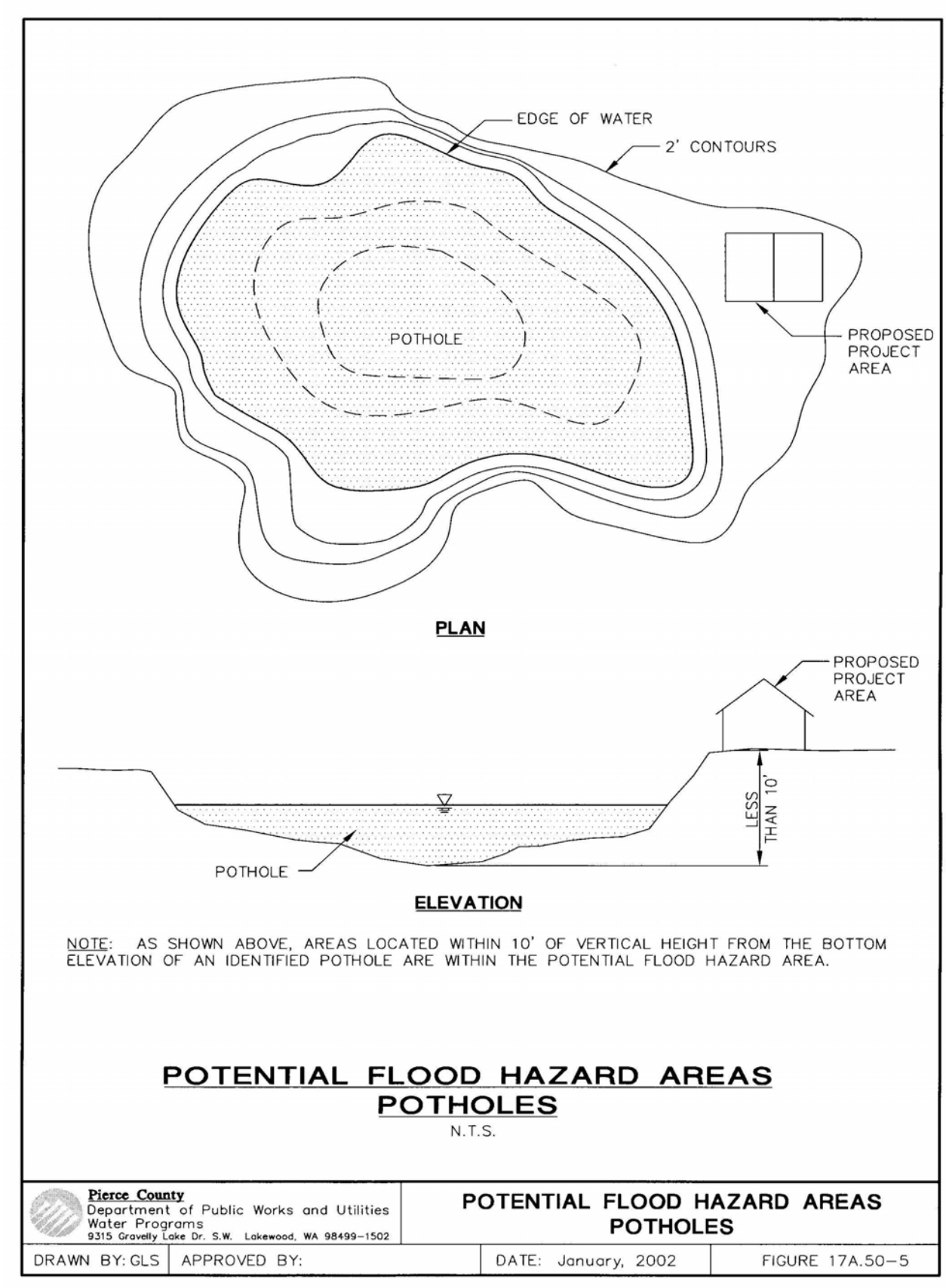

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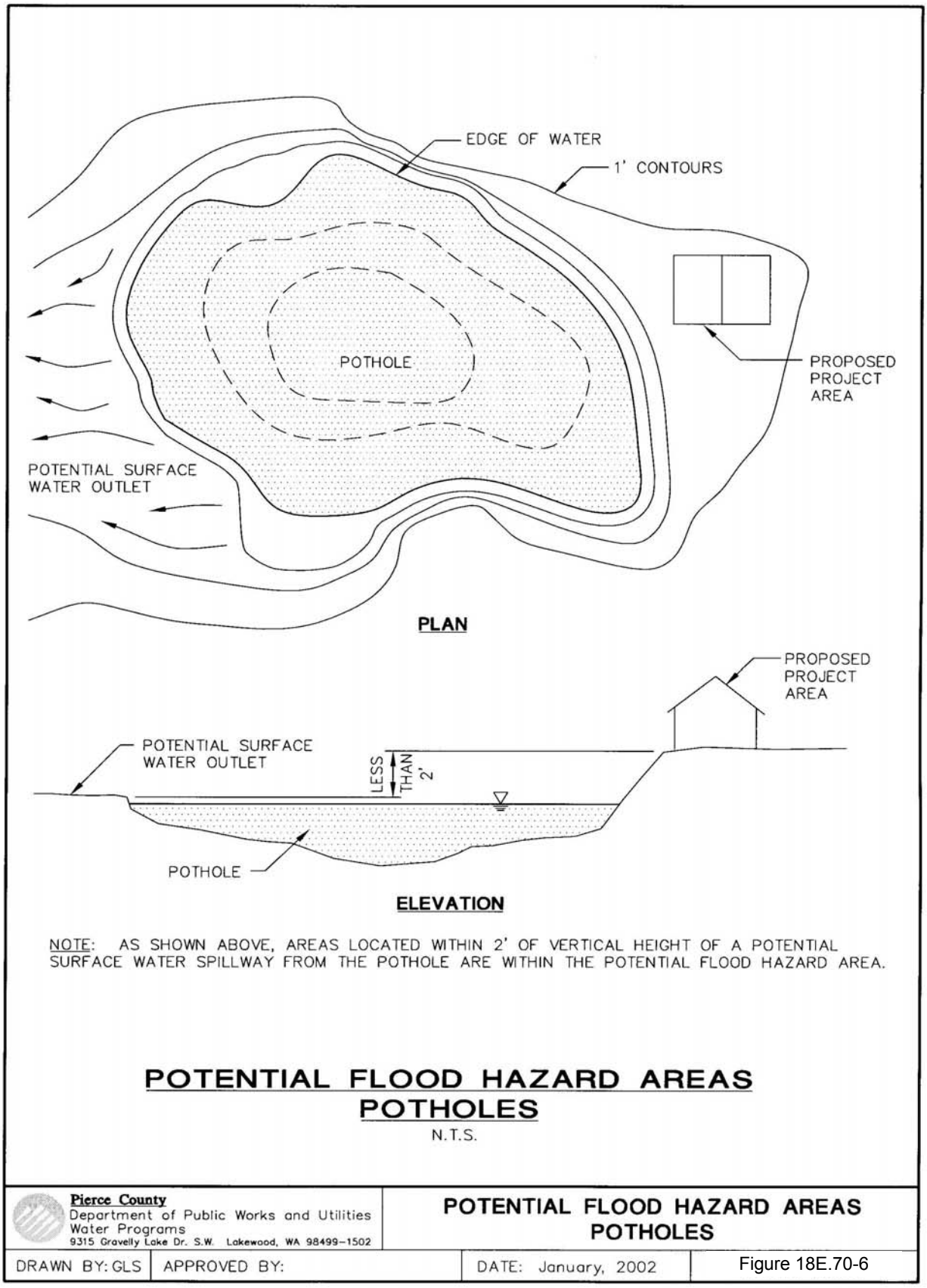
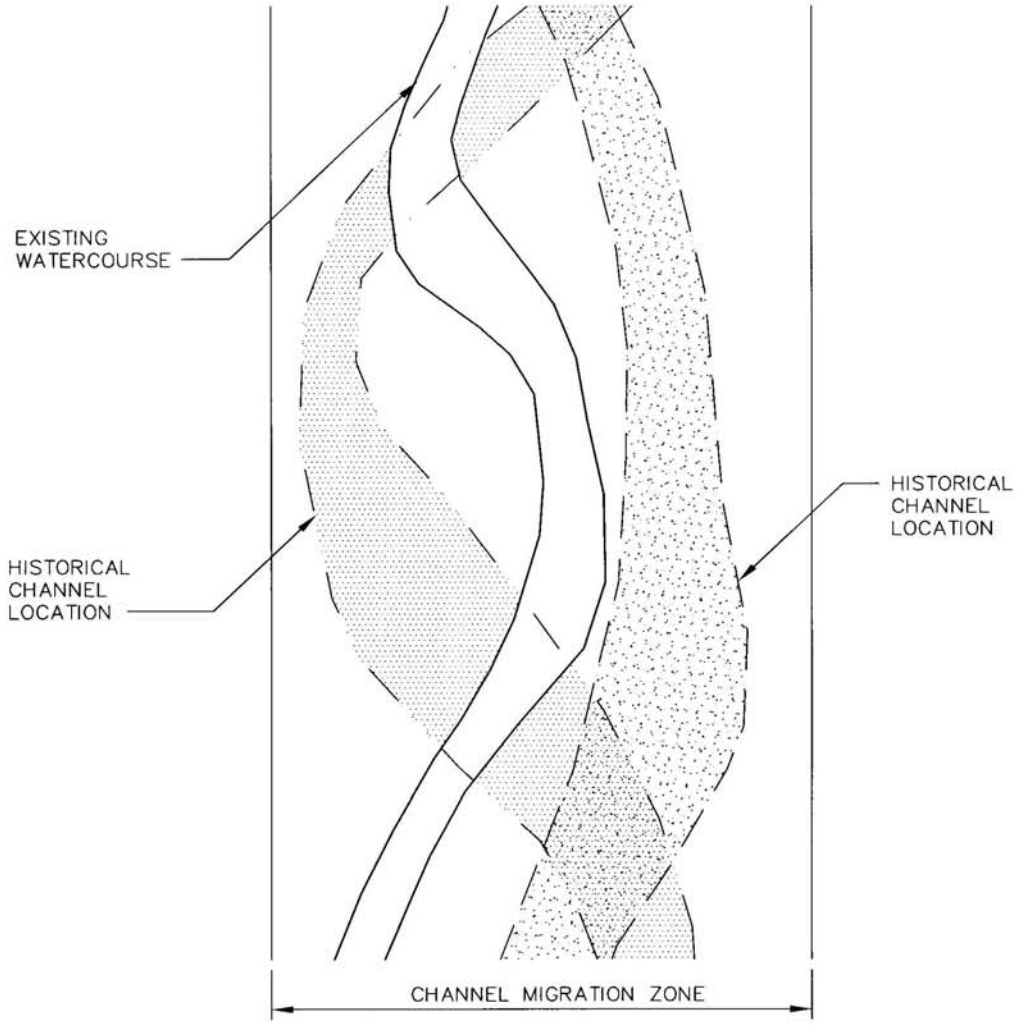


Figure 18E.70-7



MAPPING OF ALL HISTORICAL CHANNELS

NOTE: THE LOCATION OF MANY RIVER CHANNELS CHANGE OVER TIME. THE CHANNEL MIGRATION ZONE (CMZ) IS THAT AREA THAT CAN BE IDENTIFIED BY EVIDENCE OF PAST CHANNEL MOVEMENTS, INCLUDING THE PRESENT CHANNEL LOCATION. THE CMZ AREA IS CONSIDERED TO BE AT RISK FROM EROSION AND FLOODING, AND HAS SIMILAR TOPOGRAPHIC CHARACTERISTICS TO PRESENT AND HISTORIC STREAM CHANNELS.

POTENTIAL FLOOD HAZARD AREAS
CHANNEL MIGRATION ZONE

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499–1502		POTENTIAL FLOOD HAZARD AREAS CHANNEL MIGRATION ZONE	
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	Figure 18E.70-7

Figure 18E.70-8

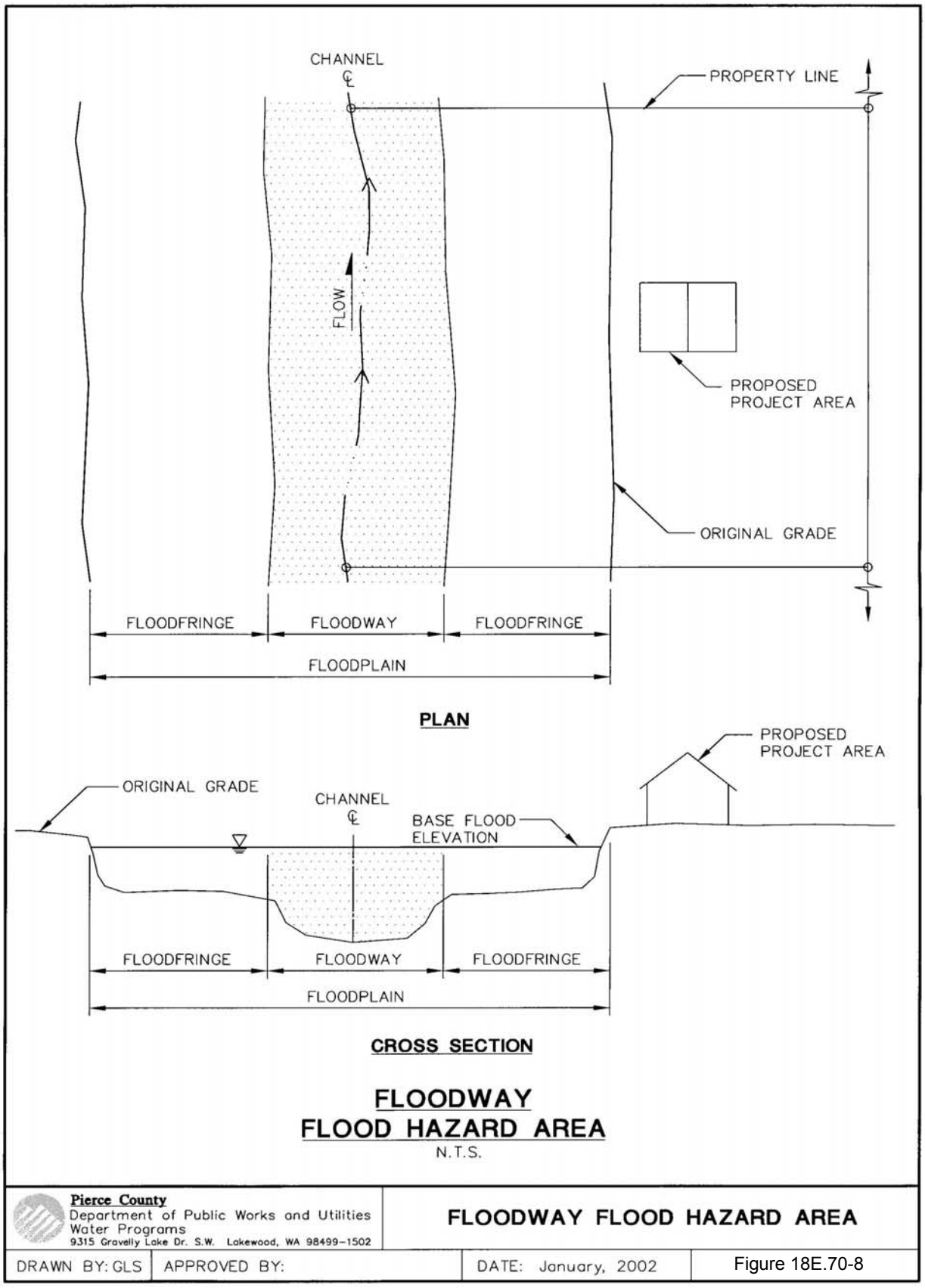
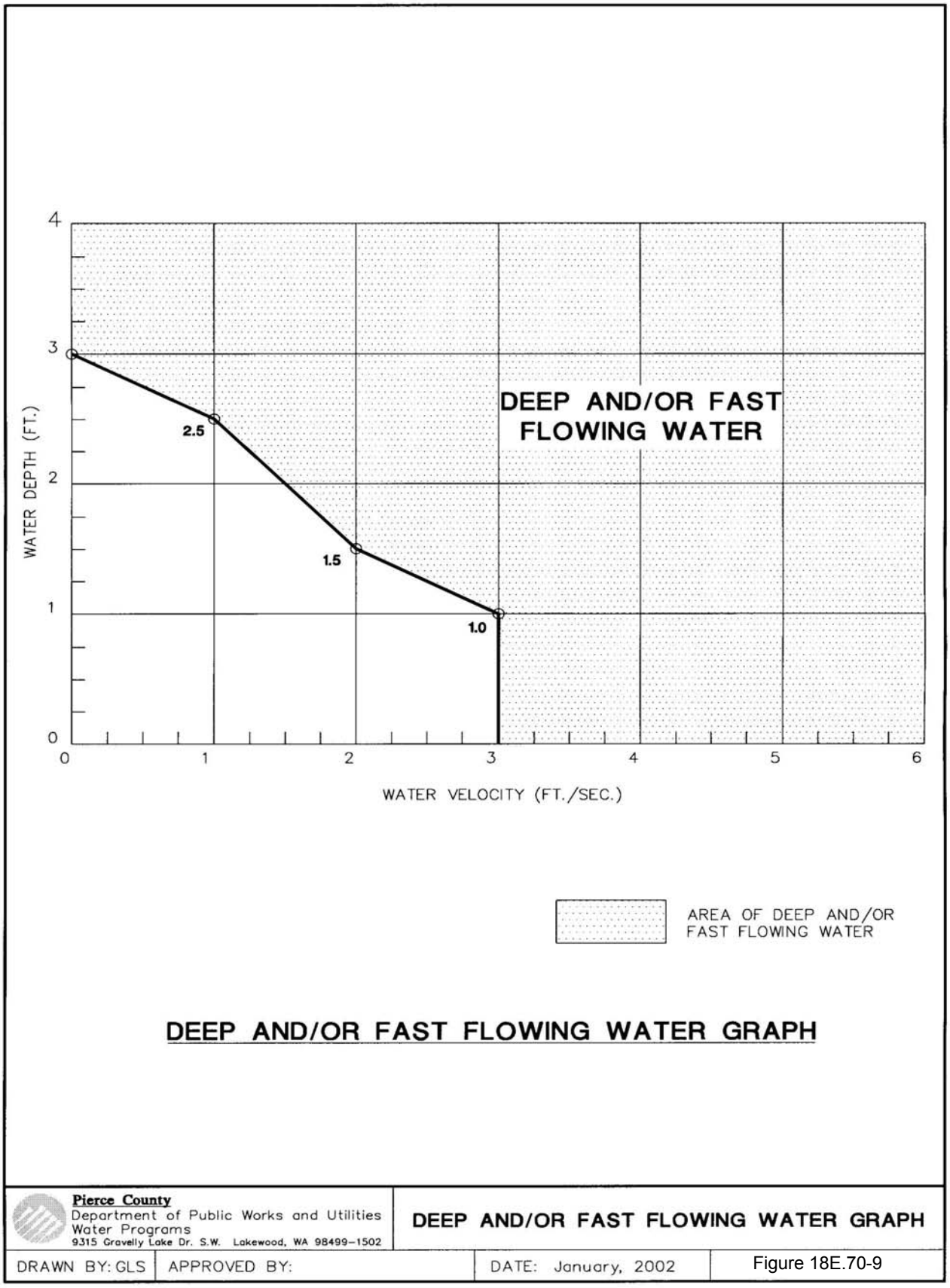


Figure 18E.70-9



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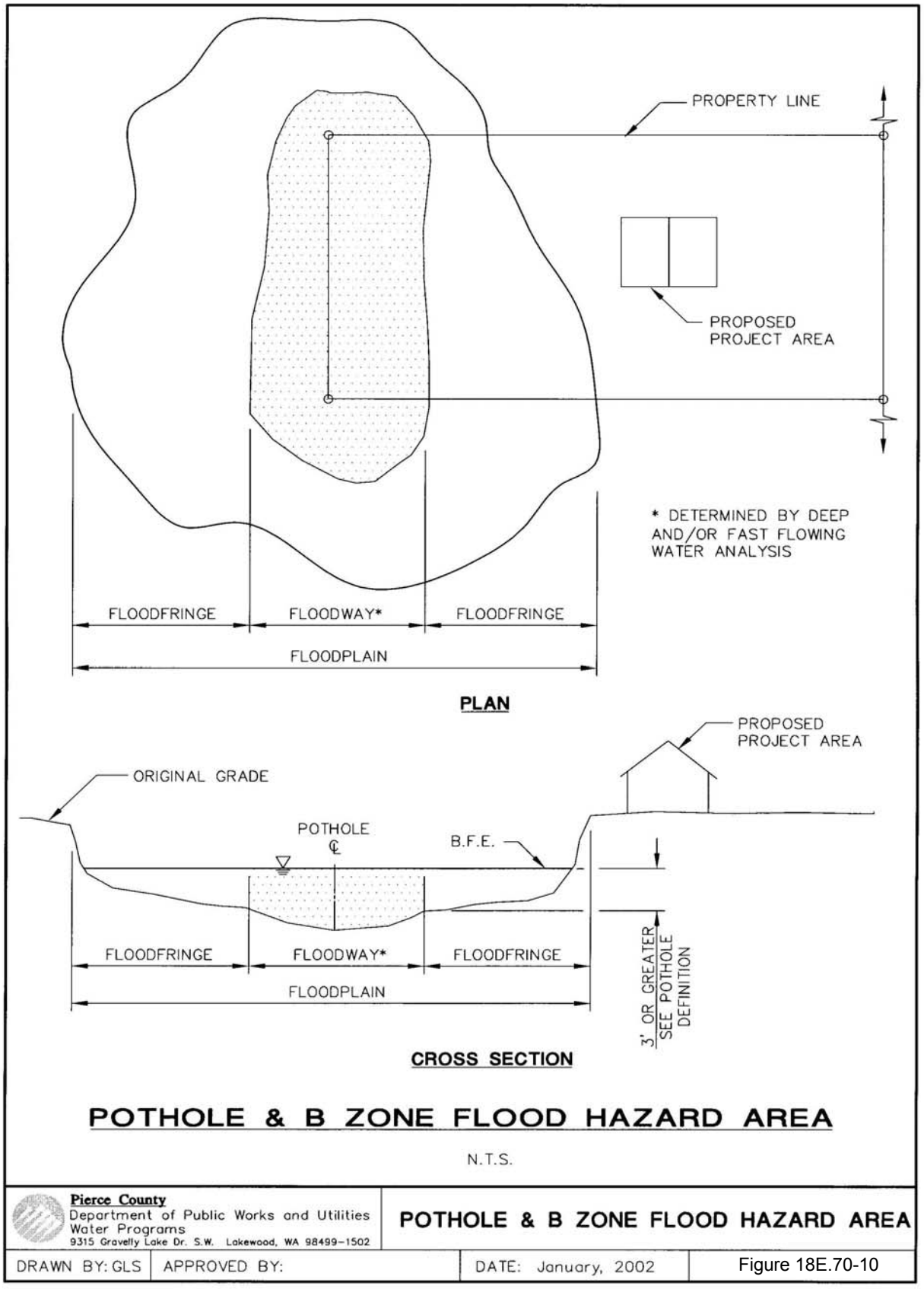
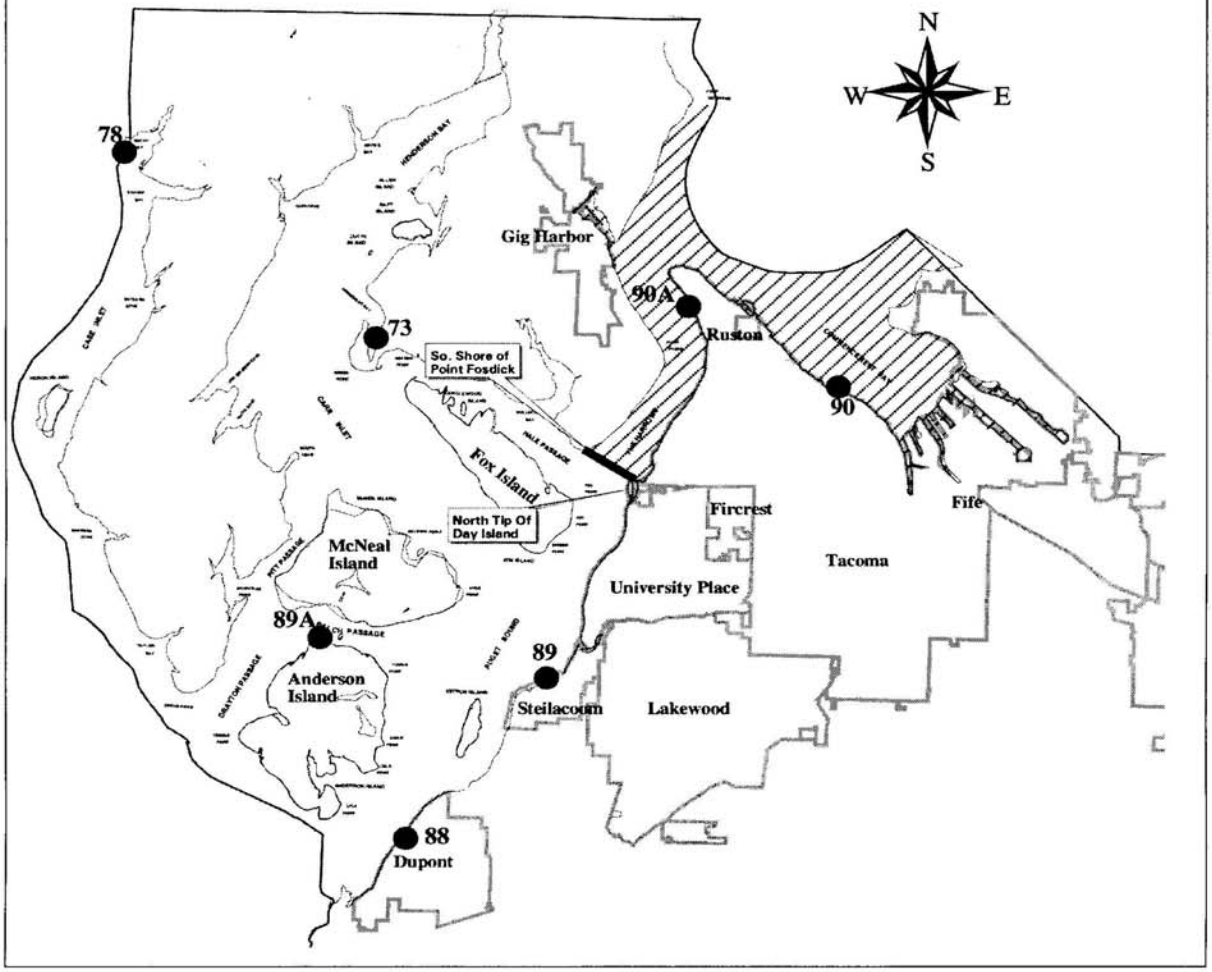


Figure 18E.70-11



LEGEND

Arletta = NOAA Tide Gage #73
Allyn = NOAA Tide Gage #78
Dupont Warf = NOAA Tide Gage #88
Steilacoom = NOAA Tide Gage #89
Yoman Point = NOAA Tide Gage #89A
Commencement = NOAA Tide Gage #Bay 90
Tacoma Narrows = NOAA Tide Gage #90A

Regulatory Tidal B.F.E. = 13.5 Ft. NGVD 1929

Regulatory Tidal B.F.E. = 12.5 Ft. NGVD 1929

COASTAL FLOOD HAZARD AREAS
REGULATORY TIDAL BASE FLOOD ELEVATIONS

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502		COASTAL FLOOD HAZARD AREAS REGULATORY TIDAL BASE FLOOD ELEVATIONS	
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	Figure 18E.70-11

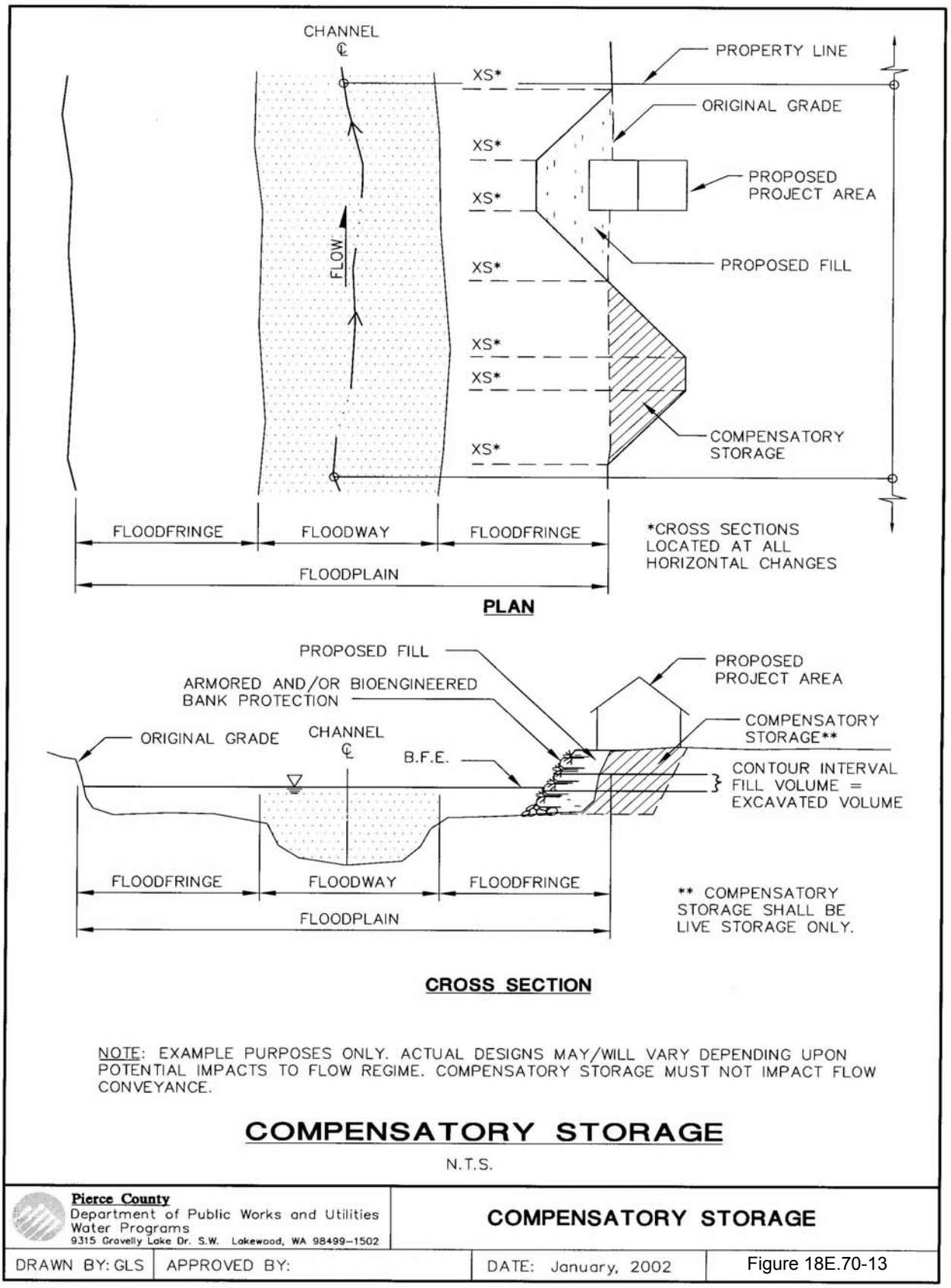
Figure 18E.70-12

TIDE GAGE NAME	DATA DESCRIPTION	NOAA/ USACE GAGE NO	COORDINATES (Latitude/Longitude)	REGULATORY TIDAL BFE (NGVD 1929)
ARLETTA		73	N47°16.8' / W122°39.1'	
	Highest Estimated Tide Plus 2-FT			12.5
ALLYN		78	N47°23' / W122°49.4'	
	Highest Estimated Tide Plus 2-FT			12.5
DUPONT WARF		88	N47°7.1' / W122°40'	
	Highest Estimated Tide Plus 2-FT			12.5
STEILACOOM		89	N47°8.5' / W122°54.2'	
	Highest Estimated Tide Plus 2-FT			12.5
YOMAN POINT		89A	N47°10.8' / W122°40.5'	
	Highest Estimated Tide Plus 2-FT			12.5
TACOMA, COMMENCEMENT BAY		90	N47°16.0' / W122°24.8'	
	Highest Estimated Tide Plus 2-FT			13.5
TACOMA NARROWS		90A	N47°16.3' / W122°33.1'	
	Highest Estimated Tide Plus 2-FT			13.5

COASTAL FLOOD HAZARD AREAS
PUGET SOUND MARINE TIDE GAGE BASE
FLOOD ELEVATION

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502	COASTAL FLOOD HAZARD AREAS PUGET SOUND MARINE TIDE GAGE BASE FLOOD ELEVATION		
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	Figure 18E.70-12

Figure 18E.70-13



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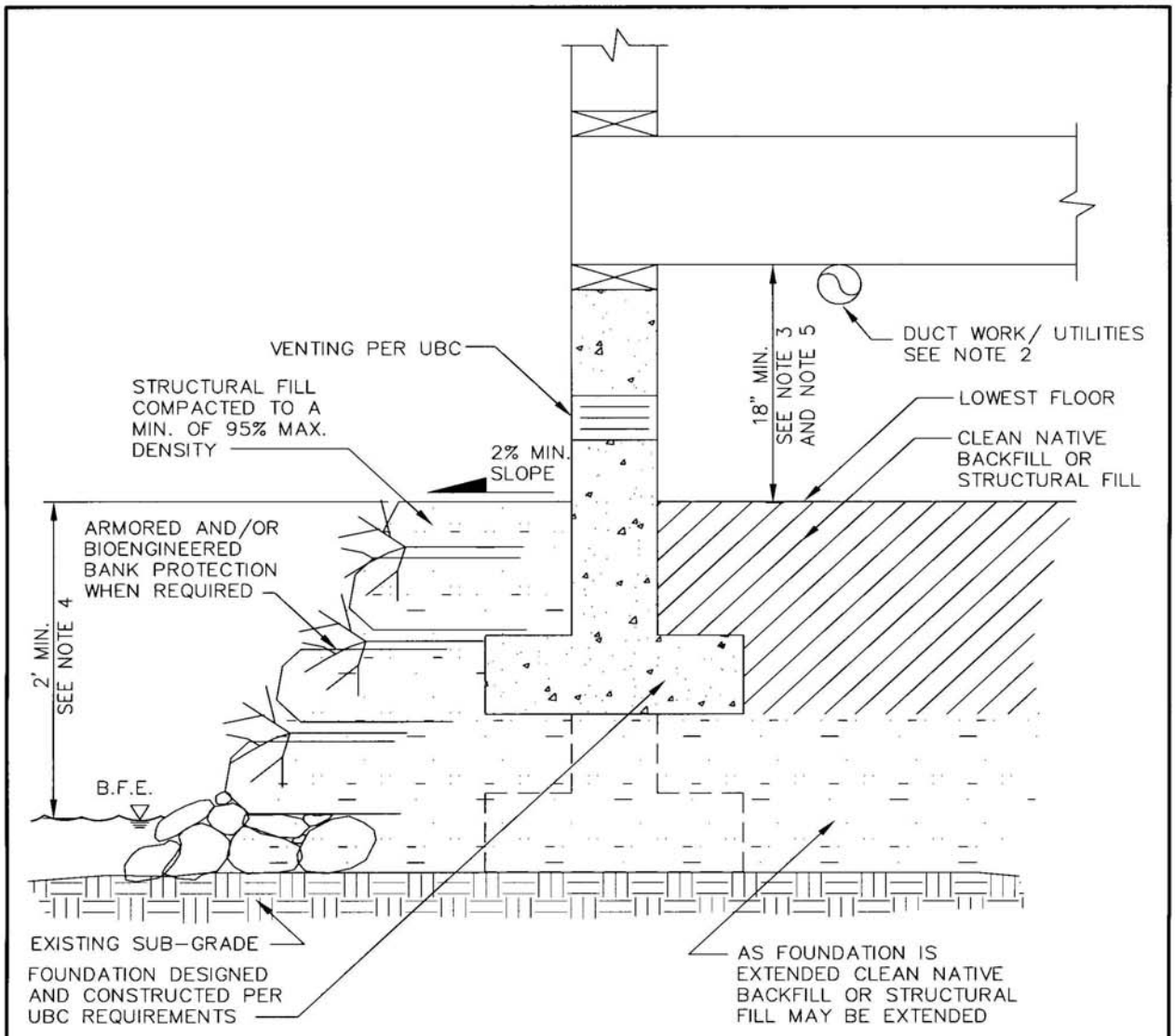


NOTES:

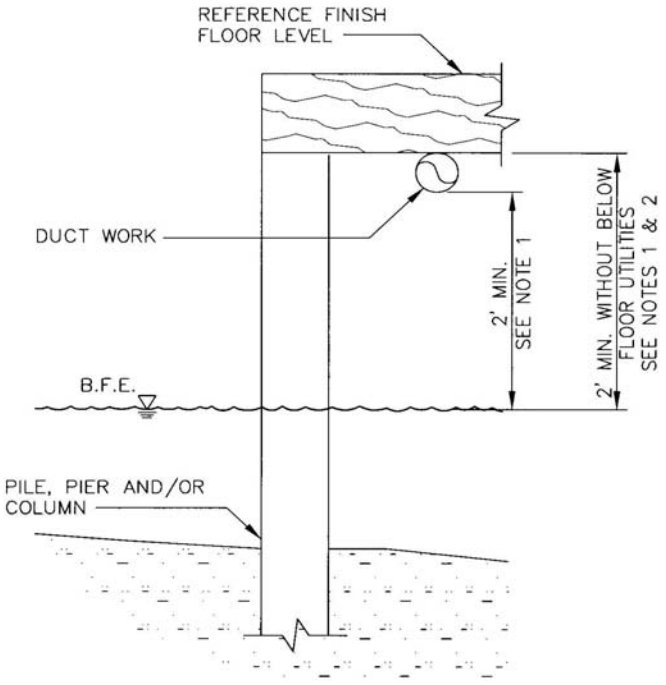
1. FILL MATERIAL SHALL MEET THE NO-RISE CRITERIA WITH SUPPORTING ANALYSIS
2. ALL BUILDING CONSTRUCTION MATERIALS (I.E. DUCT WORK, UTILITIES, SIDING, ETC.) SHALL HAVE 2' MIN. VERTICAL SEPARATION FROM THE B.F.E.
3. APPLIES TO NON-PRESSURE TREATED FLOOR JOISTS.
4. VERTICAL SEPARATION SHALL BE 3' MIN. FOR CRITICAL FACILITES.
5. LOWEST FLOOR ELEVATION WILL AFFECT FLOOD INSURANCE PREMIUMS.

STRUCTURE WITH CRAWLSPACE ELEVATION BY FILL

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502		**STRUCTURE WITH CRAWLSPACE ELEVATION BY FILL**	
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	Figure 18E.70-14

Figure 18E.70-15



A AND V - ZONE

NOTES:

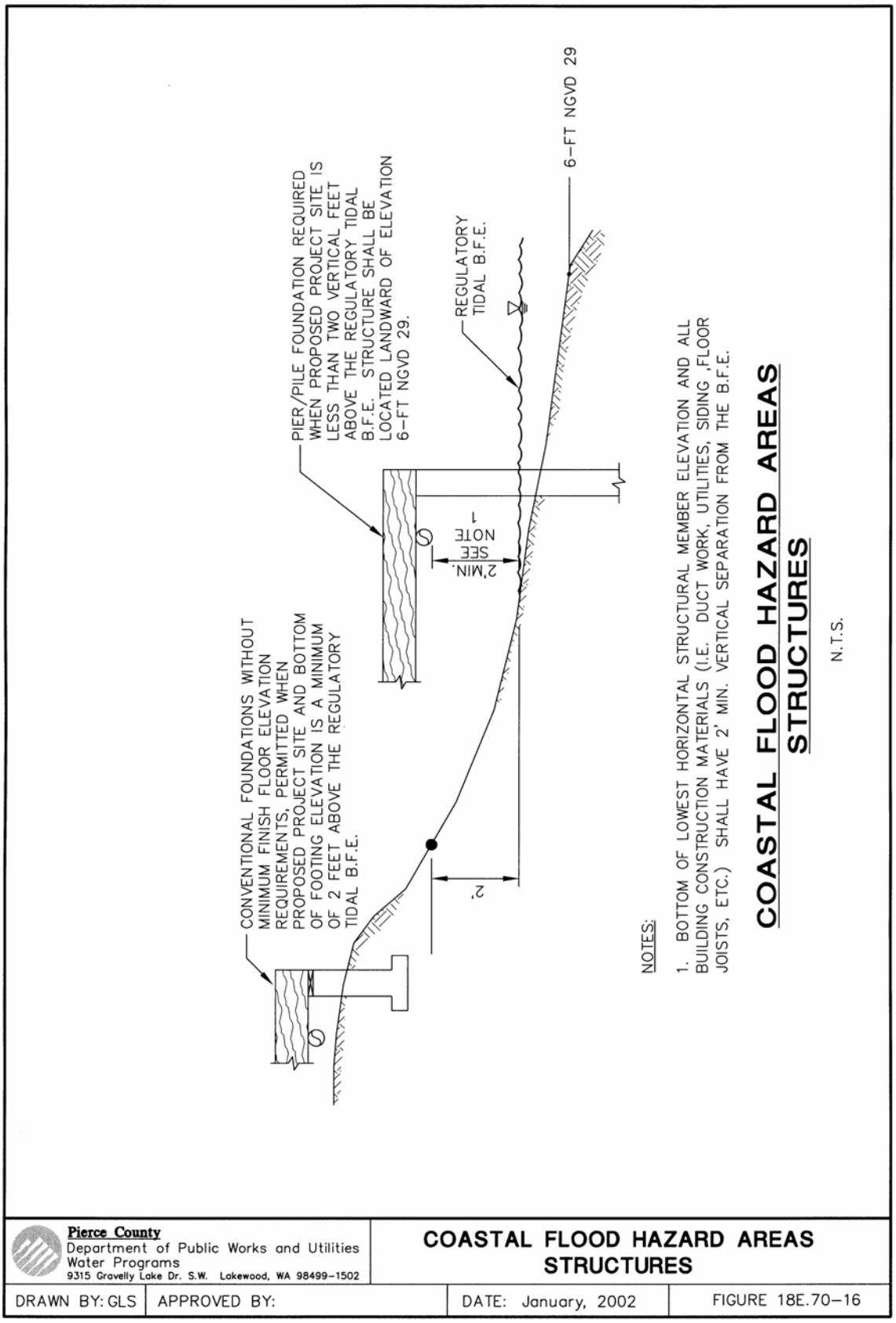
1. BOTTOM OF LOWEST HORIZONTAL STRUCTURAL MEMBER ELEVATION AND ALL BUILDING CONSTRUCTION MATERIALS (I.E. DUCT WORK, UTILITIES, SIDING, FLOOR JOISTS, ETC.) SHALL HAVE 2' MIN. VERTICAL SEPARATION FROM THE B.F.E.
2. BOTTOM OF LOWEST HORIZONTAL STRUCTURAL MEMEBER SHALL HAVE 3' MIN. VERTICAL SEPARATION FROM THE B.F.E. FOR CRITICAL FACILITIES IN A AND V ZONES.

BUILDING ON PILES, PIERS OR COLUMNS

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499–1502	BUILDING ON PILES, PIERS OR COLUMNS		
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	Figure 18E.70-15

Figure 18E.70-16



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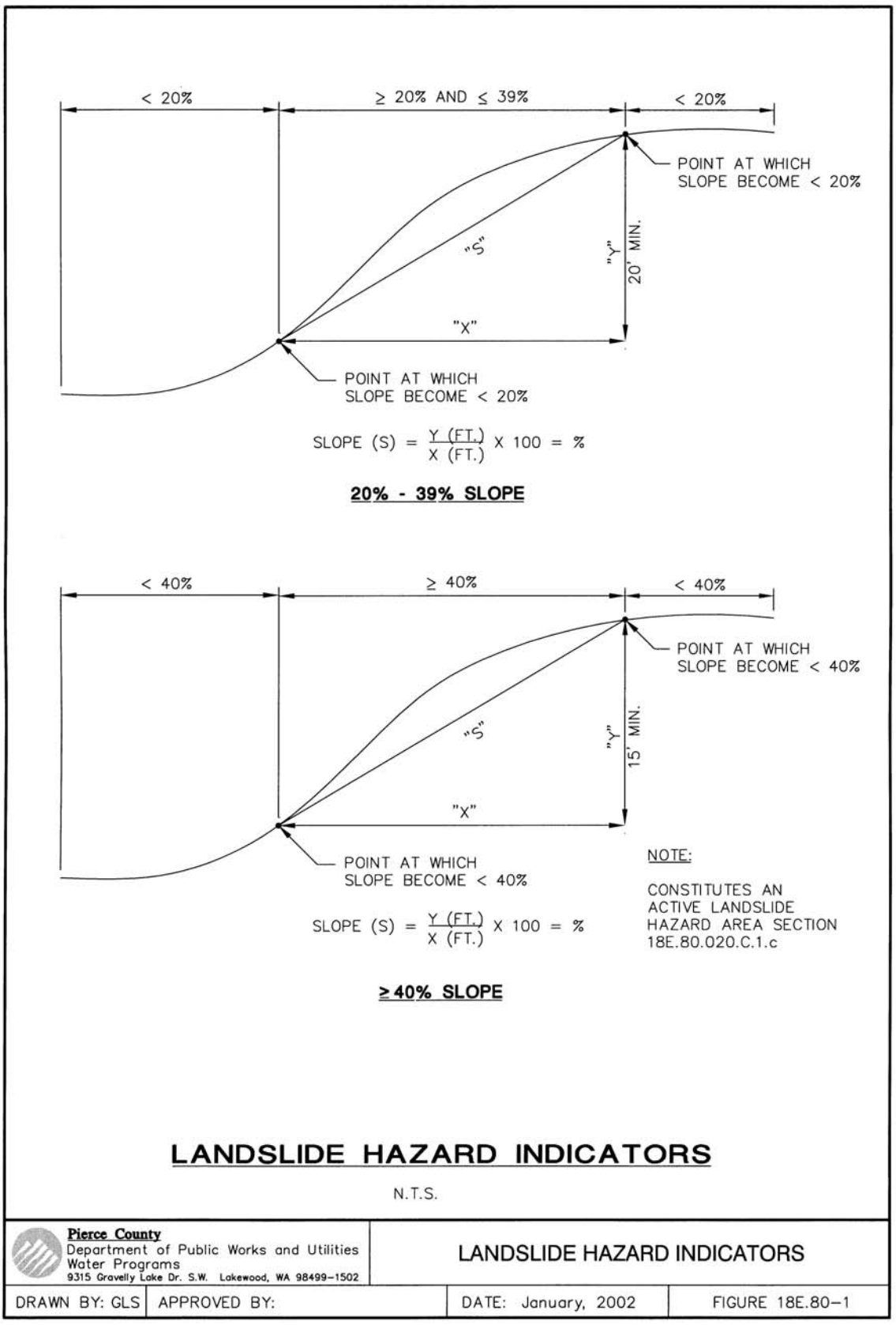
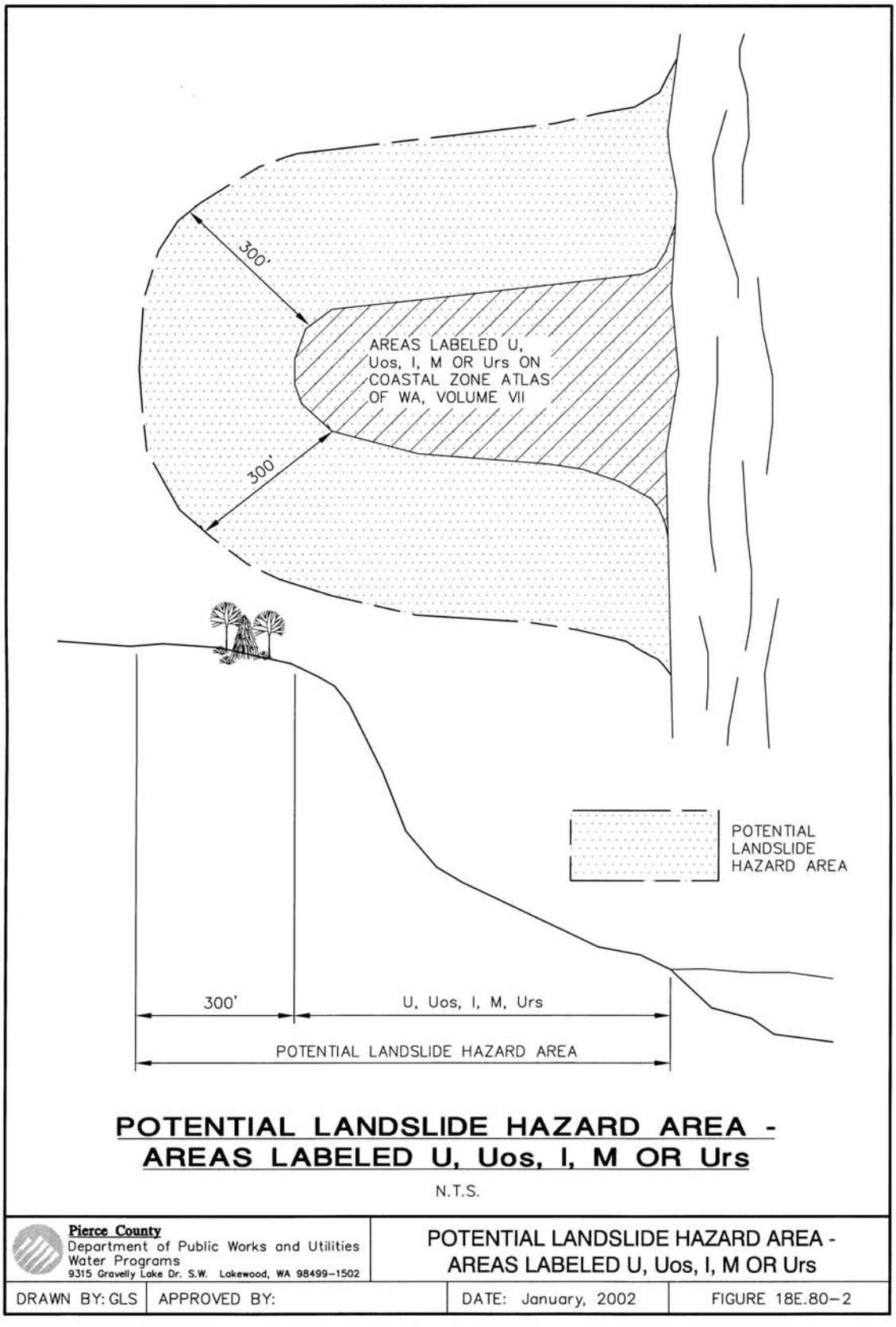


Figure 18E.80-2



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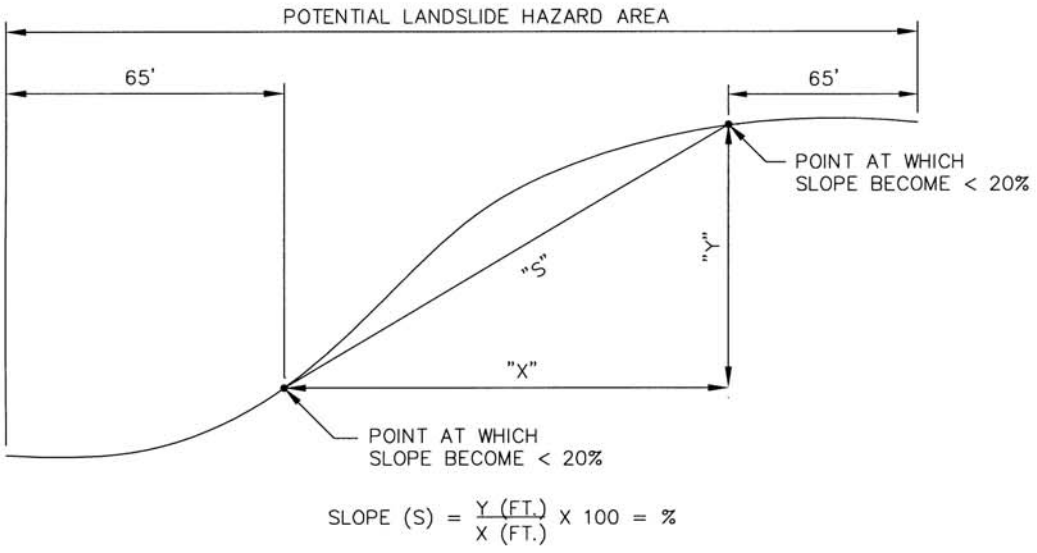
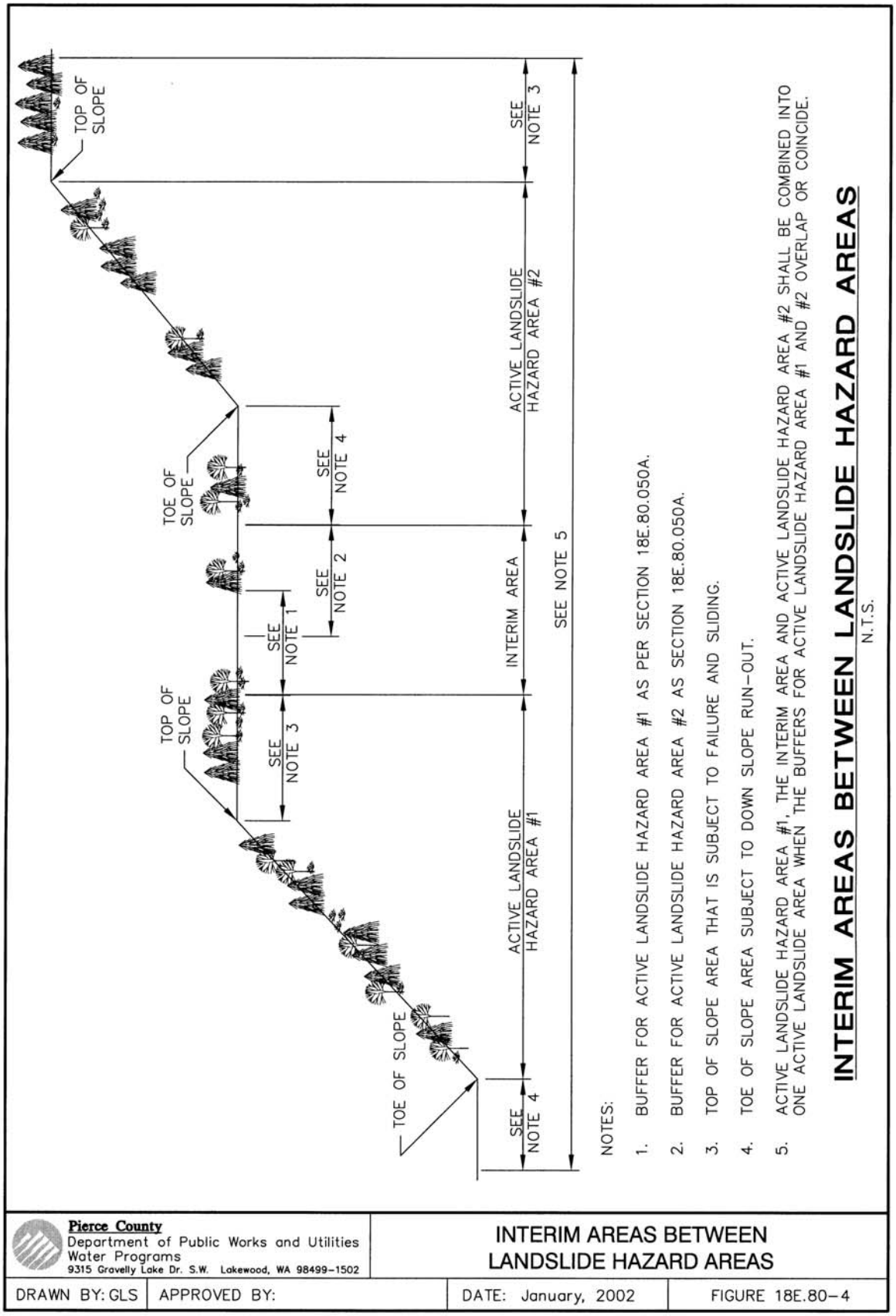


POTENTIAL LANDSLIDE HAZARD AREA - SLOPES GREATER THAN 20% WITH GREATER THAN 20' VERTICAL RELIEF

N.T.S.

Pierce County Department of Public Works and Utilities Water Programs 9315 Gravelly Lake Dr. S.W. Lakewood, WA 98499-1502		SLOPES GREATER THAN 20% WITH GREATER THAN 20' VERTICAL RELIEF	
DRAWN BY: GLS	APPROVED BY:	DATE: January, 2002	FIGURE 18E.80-3

Figure 18E.80-4



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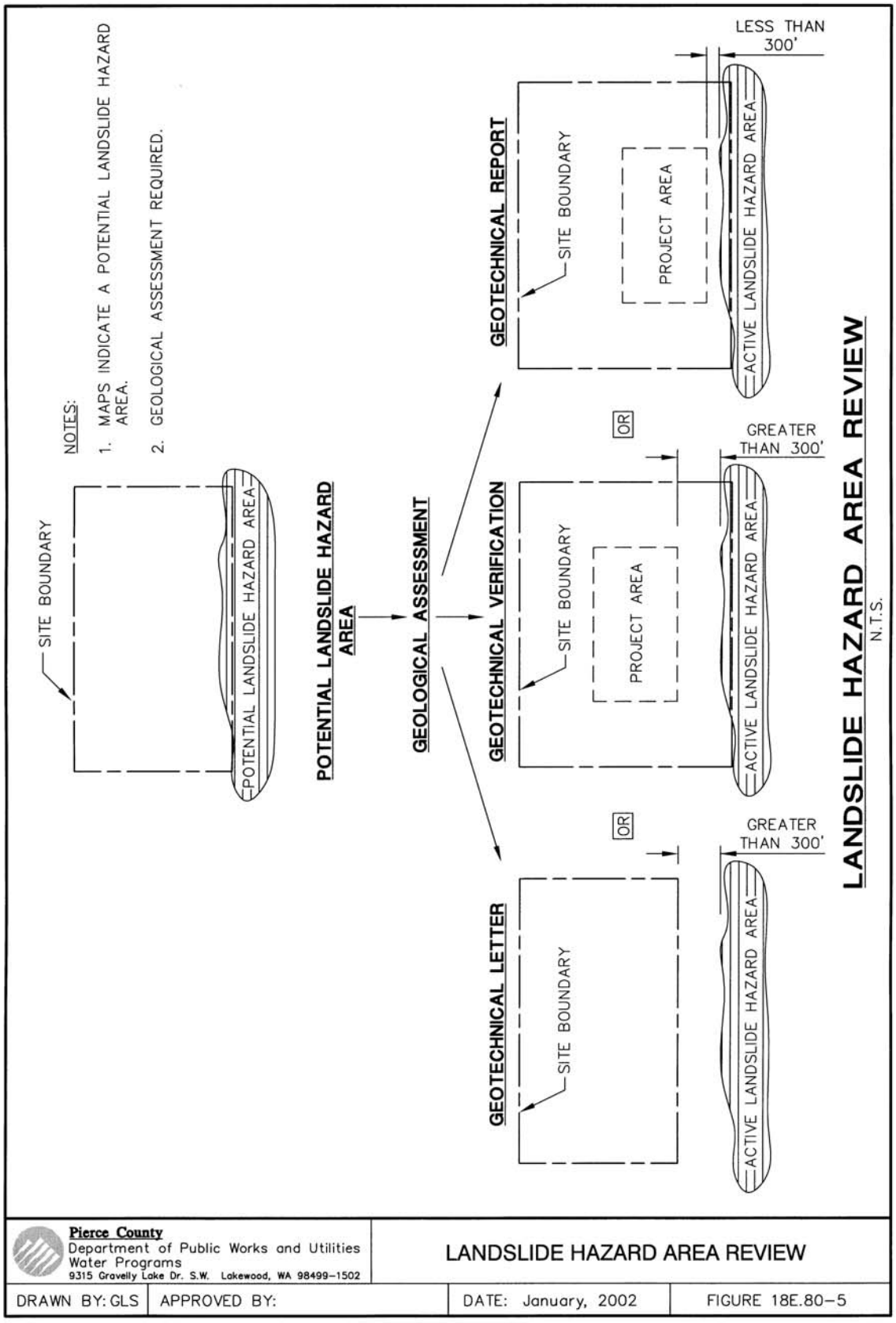

Figure 18E.80-6

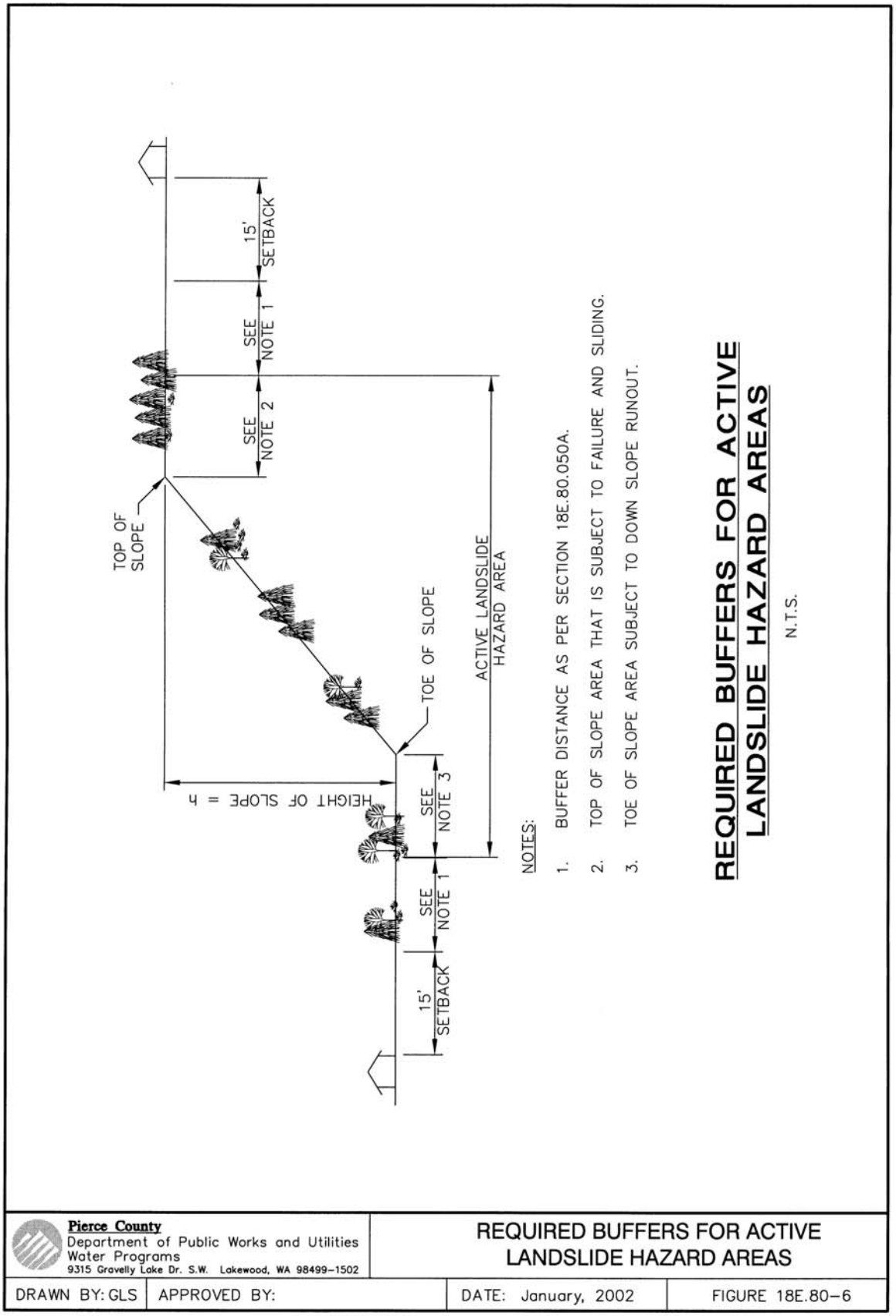

Figure 18E.80-7

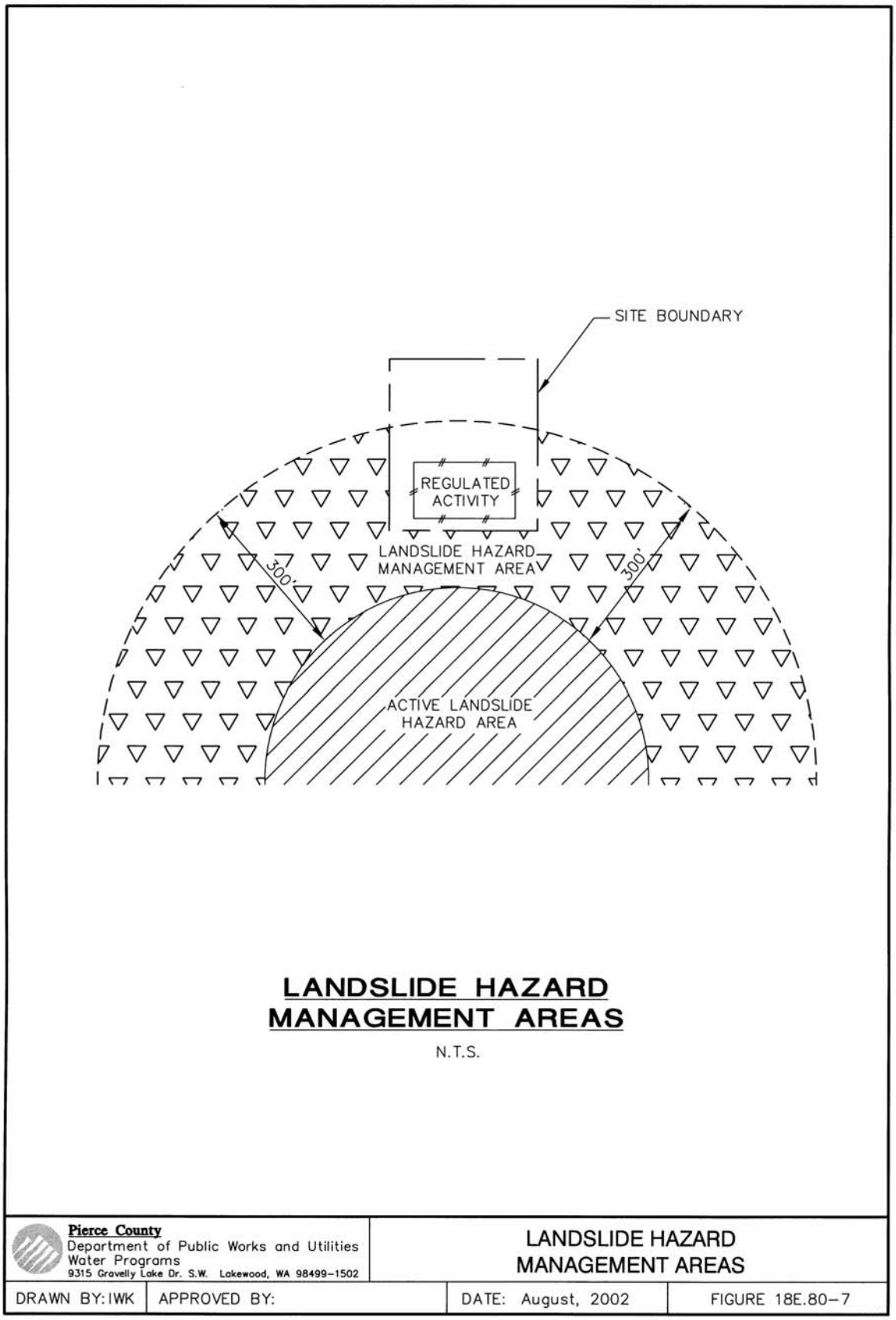

Figure 18E.90-1

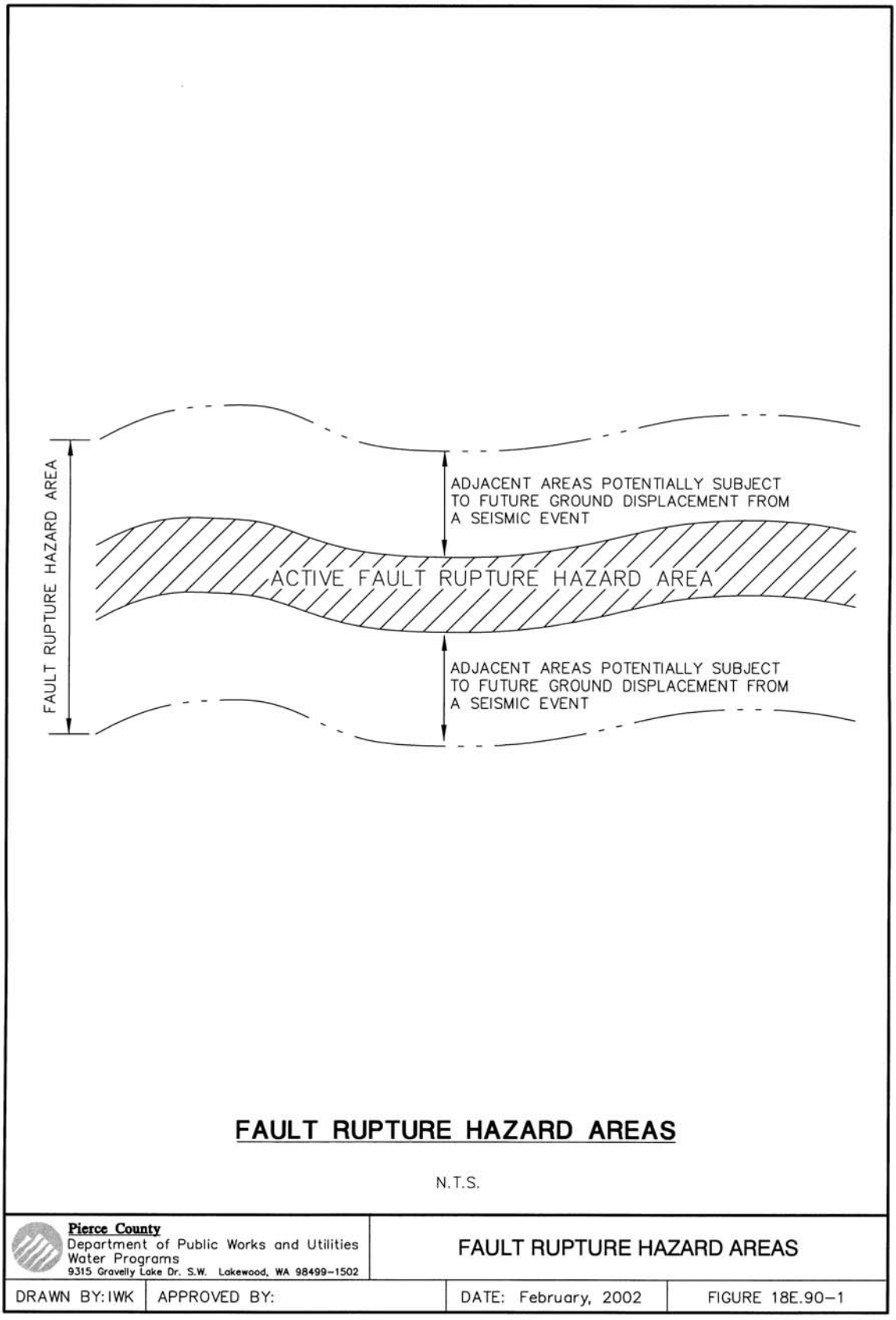

Figure 18E.90-2

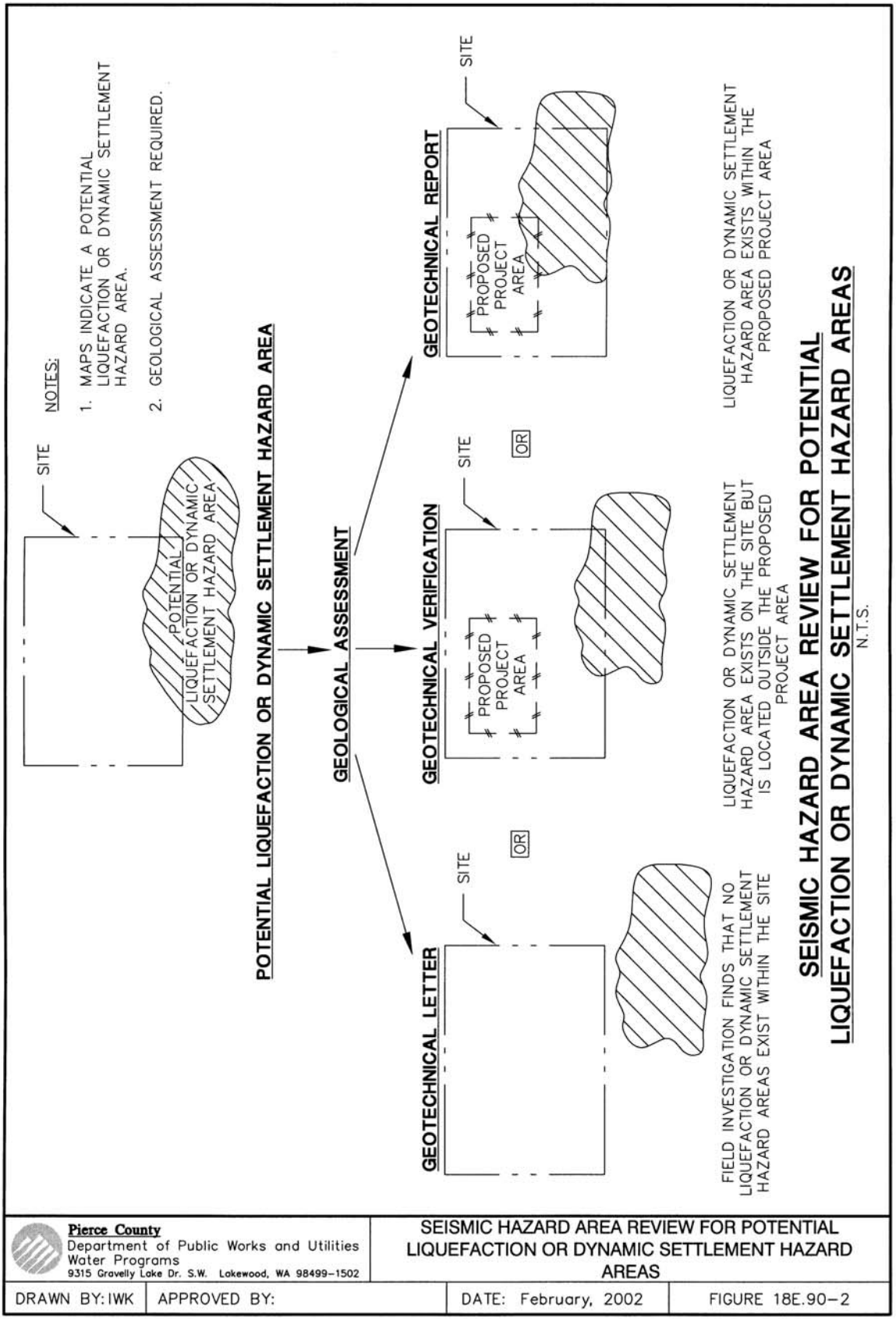

Figure 18E.90-3

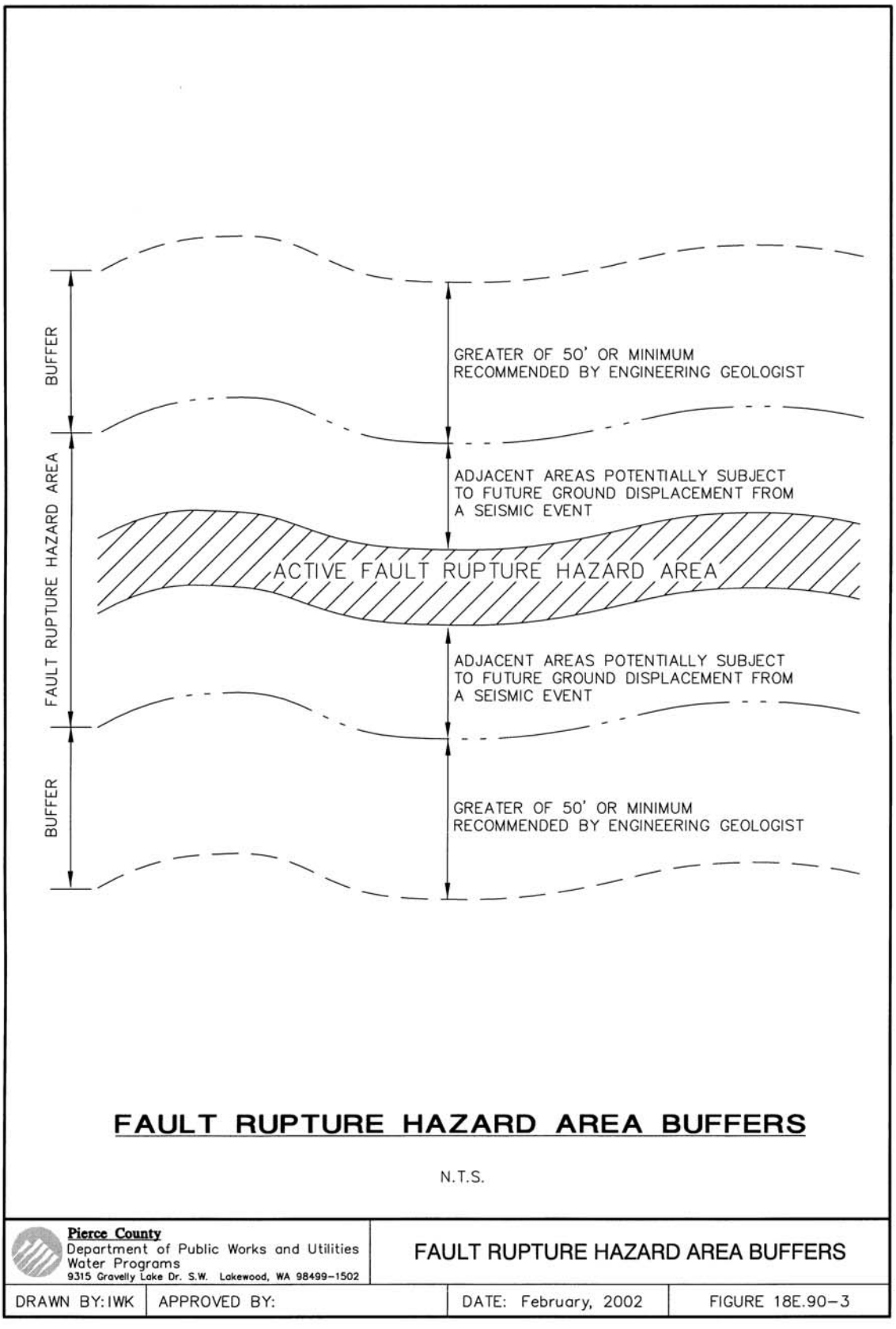

Figure 18E.100-1

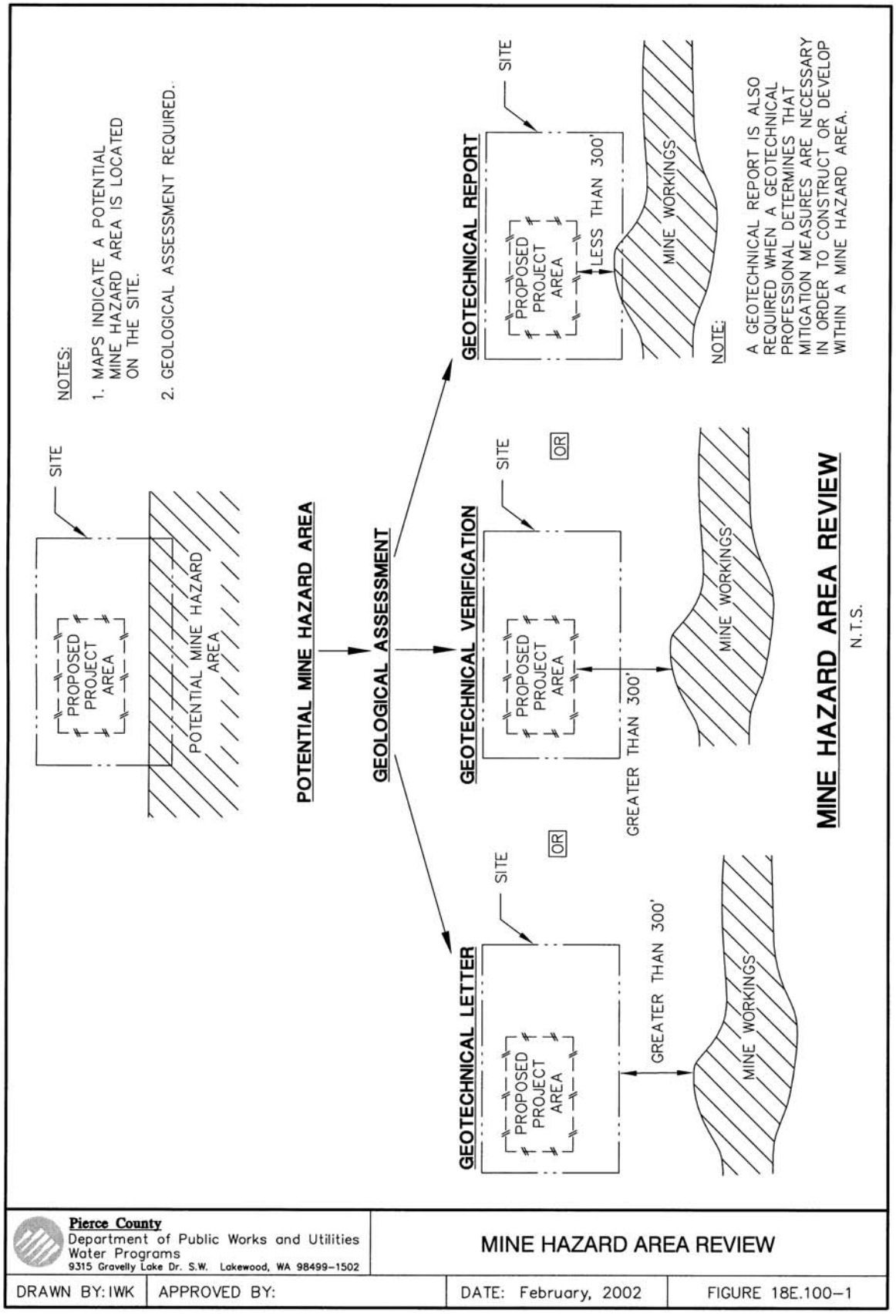

Figure 18E.110-1

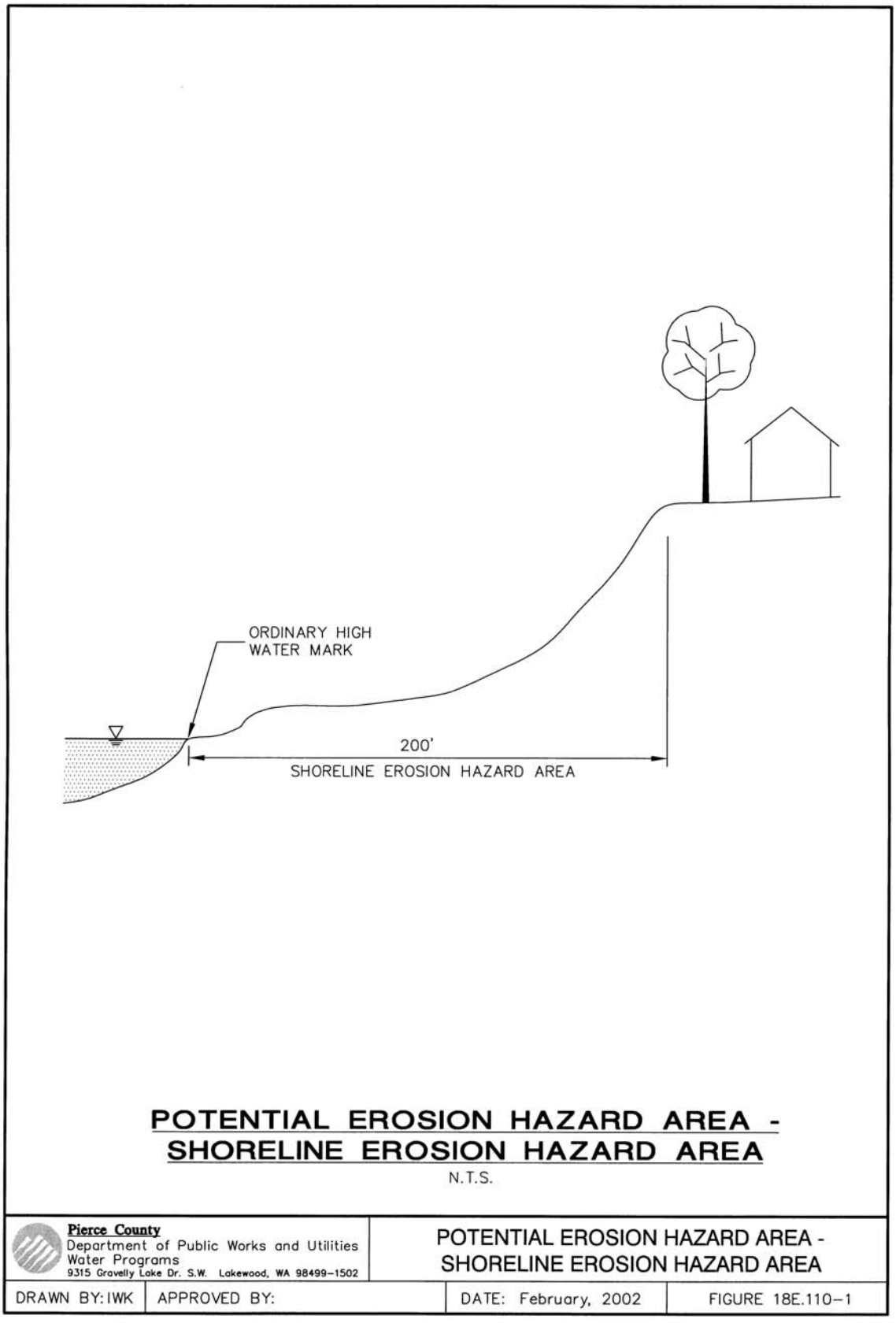

Figure 18E.110-2

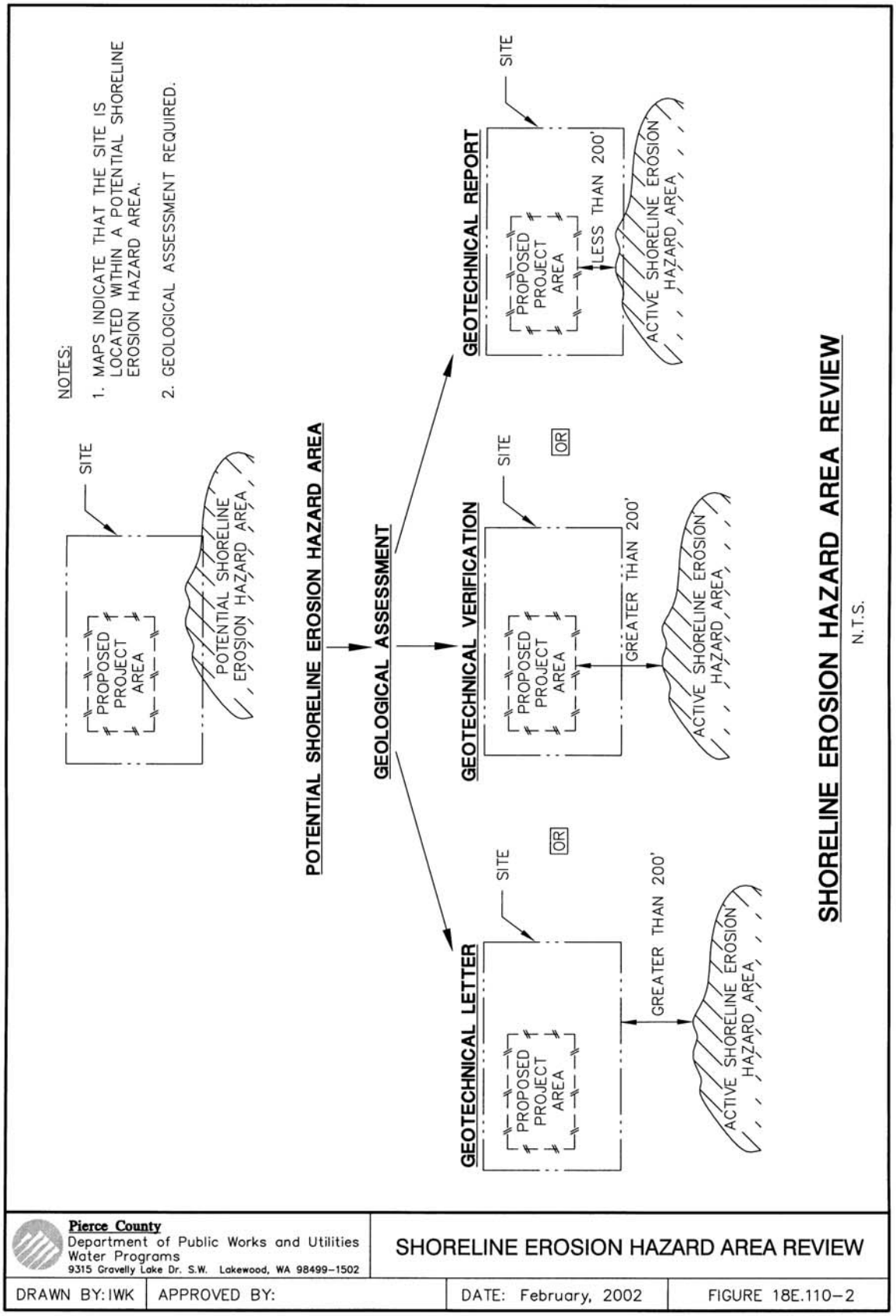

Figure 18E.110-3