Council Meeting: 02/03/2009
Agenda: Public Hearings
* Item #: 9. a.

CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033 425.587-3225
www.ci.kirkland.wa.us

MEMORANDUM

To: David Ramsay, City Manager **QUASI JUDICIAL**

From: Eric Shields, AICP, Planning Director
Tony Leavitt, Associate Planner

Date: January 21, 2009

Subject: APPEAL OF HEARING EXAMINER DECISION ON PUGET SOUND ENERGY JUANITA SUBSTATION VARIANCE PERMIT (PCD FILE NO. ZON08-00010)

RECOMMENDATION

Hold a closed record appeal and direct staff to return to the February 17, 2009 Council meeting with a resolution for a Council decision to:

1. Affirm the decision of the Hearing Examiner if the disputed findings of fact and conclusions are correct;

2. Modify or reverse the decision of the Hearing Examiner if the disputed findings of fact and conclusions are not correct and the correct findings of fact and conclusions do not support the decision; or

3. Direct the Hearing Examiner to hold a rehearing on specified matters.

Under Council Rules of Procedure, Section 25, the City Council shall consider a Process IIA appeal at one meeting and shall vote on the appeal at the next or a subsequent meeting. The City Council may, by a vote of at least five members, suspend the rule and vote on the appeal at this meeting. A resolution affirming the decision of the Hearing Examiner is enclosed.

RULES FOR CITY COUNCIL CONSIDERATION

Kirkland Municipal Code Section 150.80 establishes that appeals from the decision of the Hearing Examiner will be considered and decided upon by the City Council. Procedures for these appeals are set forth in Zoning Code Sections 150.80 through 150.125 and are summarized below.

The City Council shall consider the specific findings and conclusions disputed in the letter of appeal, based on the record of the hearing before the Hearing Examiner, the letter of appeal, the Staff Report on Appeal and the written response submitted by the applicant.

The City Council shall consider oral arguments of the appellant and applicant, or their representatives, on the disputed findings and conclusions. The City Council shall allow each side (proponents and opponents) to speak for a maximum of 10 minutes each.

The appellant has the responsibility of convincing the City Council that the Hearing Examiner made an incorrect decision because of erroneous findings of fact or conclusions.

BACKGROUND DISCUSSION

1. Location: 10910 NE 132nd Street (see Enclosure 1)

2. Application: Roque Bamba of Puget Sound Energy (PSE) applied for Process IIA Zoning Permit and a Variance Permit to expand and rebuild the existing PSE Juanita electric distribution substation on the subject property near NE 132nd Street. The existing substation is located at the southern end of the subject property near NE 128th Street. The expanded and rebuilt substation will be located within the northern portion of the subject property near the NE 132nd Street right-of-way. As part of the variance permit application, the applicant is proposing to reduce the required east and west side yard setbacks from the required 20 feet to 13 feet, reduce the required east and west landscape buffers from 15 feet to 13 feet, and exceed the maximum allowable height of 30 feet by 5 feet to accommodate two termination structures.

3. Hearing Examiner Decision: A public hearing was held for the project by the Hearing Examiner on December 4, 2008. On December 12, 2008, after considering all of the information, testimony and comments submitted on the matter, the Hearing Examiner approved the application for a zoning and variance permit (see Enclosure 2).

4. Appeal of the Hearing Examiner Decision: One appeal of the Hearing Examiner decision was filed in a timely manner. Steve Ryan, a Party of Record, filed an appeal on December 30, 2008 (See Enclosure 3). A summary of the nature and scope of the appeal and a brief staff analysis are provided in subsequent sections.

NATURE AND SCOPE OF THE APPEAL

An appeal of the Hearing Examiner's decision to approve the variance permit was filed by Steve Ryan on December 30, 2008. He asks that the City Council reverse the Hearing Examiner's decision and deny the variance application.

It should be noted that the letter of appeal does not include an appeal of the Hearing Examiner's Decision to approve the Process IIA Zoning Permit to allow the proposed Public Utility Use on the subject property. The appeal only covers the proposed variances including the reduction of required side yard setbacks, the reduction of the required landscape buffers, and the height increase to accommodate the termination structures.

REQUIRED ITEMS (PER KZC SECTION 150.100)

The following required items can be found in this advisory report:

1. The staff report prepared for the public hearing before the Hearing Examiner is included as Enclosure 2, Exhibit A.
2. The written decision of the Hearing Examiner is included as Enclosure 2.
3. All written testimony and comments submitted to the Hearing Examiner are included as exhibits to Enclosure 2.
4. A summary of the testimony, comments and discussion at the hearing of the Hearing Examiner is included as Enclosure 4. A complete electronic sound recording of the public hearing can be found at the City's website, by following the link to the recording of the December 4, 2008 Hearing Examiner meeting
5. The letter of appeal is included as Enclosure 3.
6. The applicant's appeal response is included as Enclosure 5.
7. Staff's Analysis of the specific factual findings and conclusions disputed in the letter of appeal are in the following section.

STAFF ANALYSIS

The following is a brief analysis of the specific factual findings and conclusions disputed in the letter of appeal. In considering the appeal, the key issues to be decided are as follows:

1. Does the project qualify for variance approval under Washington State law?

    a. Chapter 35A.63 of the Revised Code of Washington governs Planning and Zoning in Code Cities. RCW 35A.63.110 contains detailed standards for the granting of variances. RCW 35A.63.170 authorizes the grant of a variance by a hearing examiner.

    b. The criteria in Kirkland Zoning Code 120.20 for granting a variance are essentially the same as the standards in State law. As noted in the cases and treatise relied upon by the appellant, the Washington courts look to the language of the local ordinance to determine if variances were properly granted or denied.

    c. The Hearing Examiner concluded that the proposal complied with the variance criteria in the Kirkland Zoning Code.

2. Do the facts show that the variances will be materially detrimental to the property or improvements in the area or the City as a part or as a whole?

    a. The proposed variances would reduce the required side yard setbacks by seven feet along the east and west property lines, reduce the width of the required landscape buffer by two feet, and allow the two proposed termination structures to exceed the height limit by five feet.

    b. The side yard setback and landscape buffer variances are being requested to accommodate the proposed sound walls and substation equipment. The applicant and representatives stated in their application packet and during testimony at the public hearing that the width of the proposed substation is the minimum possible, based on electrical code requirements and PSE design standards. The site is 89 feet wide and the proposed substation is 62 feet in width.

    c. To mitigate potential noise impacts along the east and west property lines, the applicant is proposing to install sound walls (11 feet tall on the west and 18 feet tall on the east side) 13 feet from the side property lines. It should be noted that KZC Section 95.40.6 would require a 6 foot high fence or wall as part of the landscape buffer, so the proposed sound walls exceed this requirement.

    d. The height variance is being requested as existing electrical safety codes require the termination structures to be at a greater height than the ones constructed for the existing substation. Electrical safely codes also require that the existing transmission poles and lines, currently nonconforming as to height, remain at their present heights.

    e. The applicant and representatives stated in their application packet and during testimony at the public hearing that the proposed facility would have less of an impact than a building constructed 20 feet back from the property line and 30 feet in height (which would be allowed by current zoning regulations).

    f. Based on the record established at the Public Hearing, the Hearing Examiner concluded that the variances would not be materially detrimental to neighboring properties or the City as a part or as a whole. Furthermore, she found no evidence in the record of any detrimental impact to the City from the requested variances.

    g. The appellant contends that the applicant has not proven that the project will not be materially detrimental to the neighboring properties.

3. Do the facts show that there are no special circumstances present to support the variances?

    a. KZC Section 120.20.2 states the City may grant a variance only if it finds that the variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a preexisting improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed.

    b. The applicant stated that the variances were necessary due to the shape, specifically the width, of the subject property and the location of existing high voltage overhead transmission lines that serve the substation.

    c. The Hearing Examiner concluded that the application met the requirements of this section due to these special circumstances.

    d. The appellant contends that "there is nothing unique about this property that could be termed as a hardship or special circumstance as defined under case law in Washington State".

4. Do the facts show that the variances would constitute a grant of special privilege?

    a. The applicant testified that the existing substation was built in 1960 and that the substation serves a critical function at this location in the area's electrical power grid, transforming power from the higher voltage transmission lines to the lower voltage distribution lines that serve the community.

    b. The applicant contends that other property owners within the RSX 7.2 zoning district are not in a similar position of being required to expand their use over time in response to growth. Other properties are also not part of an interconnected utility system.

    c. The Hearing Examiner concluded that, unlike other properties in the area and zone, the subject property is part of an interconnected utility transmission and distribution system that has been operated as such for almost 50 years. The requested variances will not constitute a grant of special privilege to the subject property inconsistent with the general rights allowed to other property in the same area and zone.

    d. The appellant states in his appeal letter that "there is not one relevant fact to base the conclusions on in this section."

5. Did the City of Kirkland Planning Department err in not requiring that the information submitted by the applicant be verified by an independent third party?

    a. As part of any zoning permit submittal, an applicant is required to sign a statement that: "The undersigned in making this application certifies under penalty of perjury, the truth and/or accuracy of all statements, designs, plans and/or specifications submitted with said application."

    For the subject application, Mr. Roque Bamba of Puget Sound Energy signed the application form certifying the accuracy of the application materials.

    b. Kirkland Zoning Code Chapters 120 (Variances) and 150 (Process IIA) do not require that the information submitted by the applicant be verified by an independent third party. Staff is not aware of any circumstances where the City has retained a third party to review a variance application.

ENCLOSURES

1. Vicinity Map
2. Hearing Examiner Decision and Exhibits
3. Letter of Appeal
4. Minutes from December 4, 2008 Public Hearing
5. Appeal Response Letter from Robert Heller representing Puget Sound Energy

PSE Juanita Substation Rebuild
ZON08-00010

CITY OF KIRKLAND
HEARING EXAMINER FINDINGS, CONCLUSIONS AND DECISION

APPLICANT: Roque Bamba of Puget Sound Energy

FILES: ZON08-00010 & APL08-00010

APPLICATION:

1. Site Location: 10910 NE 132nd Street

2. Request: Zoning approval to build an expanded, unstaffed Puget Sound Energy Juanita electric distribution substation on the northern portion of a utility corridor located in a single-family zone near NE 132nd Street, and variances to reduce east and west side yard setbacks from 20 feet to 13 feet, reduce east and west landscape buffers from 15 feet to 13 feet, and exceed the maximum allowable height of 30 feet by 5 feet. The existing substation, located at the southern end of the property near NE 128th Street, will be removed.

3. SEPA: Pursuant to the State Environmental Policy Act, the Department issued a Determination of Nonsignificance for the proposal on July 11, 2008, which was appealed. (*See* Attachment 7 to Exhibit A, the Staff Advisory Report.)

4. Review Process: Process IIA, Hearing Examiner conducts a public hearing and makes a final decision on the applications. Under KMC 24.02.105, the Hearing Examiner hears an appeal of the Director's SEPA determination at the hearing on the underlying project permit and makes a final decision on the appeal.

5. Key Issues: Whether the proposal complies with applicable development regulations, Process IIA approval criteria, and variance approval criteria, and whether the Director's SEPA Determination of Nonsignificance is clearly erroneous.

RECOMMENDATION:

Department of Planning and Development: Approve variances and application with conditions and affirm the Department's SEPA determination.

PUBLIC HEARING:

The Hearing Examiner held a hearing on the application, variances and SEPA appeal on December 4, 2008, in the Council Chambers, City Hall, 123 Fifth Avenue, Kirkland, Washington. A verbatim recording of the hearing is available at the City Clerk's office. The minutes of the hearing and the exhibits are available for public inspection in the Department of Planning and Community Development. A list of the exhibits and a list of those who testified at the hearing are included at the end of this decision. The testimony is summarized in the hearing minutes. The Examiner visited the site prior to the hearing.

FINDINGS AND CONCLUSIONS AND DECISION:

Having considered the evidence in the record and inspected the site, the Hearing Examiner enters the following Findings of Fact and Conclusions:

Findings of Fact:

Site and Vicinity

1. The site is a long, rectangular parcel that is approximately 1,270 feet long by 80 feet wide at the southern end and 89 feet wide at the northern end. It covers 2.61 acres and is located in the North Juanita neighborhood.

2. The site is zoned RSX 7.2, a single-family residential zone, and is developed with an existing electrical substation on the southern portion of the property, near NE 128th Street.

3. The northern portion of the site is nearly flat, while the southern portion slopes down to NE 128th Street. The site includes numerous significant trees, primarily along the east and west boundaries, but no environmentally sensitive areas.

4. The applicant acquired the site in 1958 as a utility corridor between 109th and 110th Avenues NE and constructed the existing substation on the south portion of the site in 1960 under King County zoning. The substation does not meet current City zoning regulations for setbacks, landscape buffering, and maximum height.

5. High voltage overhead transmission lines come into the substation, where the voltage is stepped down and sent through distribution lines. The voltage is again stepped down and sent into service lines to deliver electric power to users. Overhead transmission and distribution lines currently exist along the length of the site.

6. The area to the north of the site, in unincorporated King County, is zoned for and developed with single-family residences. To the south is RM 3.6 zoning and duplex development. To the east and west is RSX 7.2 zoning and single-family

residential development. The rear yards of these residences adjoin the side yards of the subject site.

7. The site is accessed via a gravel driveway off NE 132nd Street. Access is also available from the south on NE 128th Street.

Proposal

8. The proposed substation will include a second transformer that will create a "looped" configuration, which will allow the substation to continue operating even if a transmission line to the north or south is disrupted. The substation will also provide increased service capacity.

9. The new substation will be built in accordance with the National Electric Safety Code published by the Institute of Electronic and Electrical Engineers, and PSE design standards.

10. The proposed substation will be approximately 62 feet wide to allow for required vertical and horizontal separation between electrical components within it, and for access for the equipment used in installation and maintenance work. The substation will be located in the center of the widest part of the site (89 feet).

11. The proposed termination structures (steel supports with cross-arms) will be located at the north and south ends of the substation, midway between the side property lines. They will be 35 feet above average building elevation. Other equipment within the substation will not exceed 24 feet in height.

12. The applicant proposes to remove four above-ground distribution poles and all distribution wires from the site. Transmission poles and wires will remain at their existing height due to electrical safety standards.

13. The applicant proposes to construct sound-absorptive walls along the east and west sides of the new substation to reduce noise generated by the substation's transformers. The walls would be approximately one-foot thick, and would be 18 feet high along the east side of the property and 11 feet high along the west side. The walls would be textured to resemble bricks and screened from adjacent properties by the required landscape buffer which, over time, would obscure the wall and the substation equipment that exceeds the height of the walls. Noise generating sources at the substation will be located below the height of the walls.

14. The applicant submitted an acoustical analysis from a professional engineer. The analysis indicated that with the sound barriers in place, sound levels produced by the substation equipment would meet all applicable daytime and nighttime noise limits. (Attachment 13 to Exhibit A)

15. The applicant proposes to install a 13-foot-wide landscape buffer at the north edge of the property, between the substation and the NE 132nd Street right-of-way, and between the substation and adjacent properties to the east and west for the length of the substation, which is approximately 300 feet. The rest of the length of the utility corridor is to remain as open space.

16. The applicant prepared graphics that compare the proposed substation enclosure and sound walls with a building 30 feet high and set back from the property line 20 feet, i.e., a building that could be constructed on the subject property without variances. (Figure 1 to Attachment 4 to Exhibit A)

17. The applicant submitted a geotechnical report for the site from a consulting engineer stating that soil and groundwater conditions are suitable for the intended development so long as the report's geotechnical recommendations are followed. (Attachment 14 to Exhibit A)

18. The applicant submitted a Tree Plan II, which was prepared by a certified arborist and reviewed by the City's Urban Forester. The arborist's report (Attachment 10 to Exhibit A) identified 10 significant trees on the site and concluded that all but one would be required to be removed for the proposed construction. The report identified 11 significant trees on adjacent properties with canopies that overhang the site. The arborist's report concluded that some limbing would likely be required for construction, but that with specified tree protection measures in place, all 11 trees could be adequately protected.

19. A further assessment of certain off-site trees was done in response to the SEPA appeal filed in this case (Exhibit N). The arborist examined appellant Troy Freeman's Douglas Fir tree (#197) and Weeping Birch tree (#198) that overhang the site. The report concluded that the Douglas Fir "appears to have the size, health, vigor, and stored energy reserves to withstand [the required] amount of canopy loss." The report notes that the Birch tree is in very poor condition, apparently suffering from severe drought stress, and that "removal of foliage from the west side may hasten the decline of the tree but not substantially." The arborist included instructions on pruning these two trees, including a recommendation that the project consulting arborist be present to ensure proper standards are followed. Exhibit N at 4-6.

20. Exhibit N included the arborist's analysis of construction impacts on the appellant's trees' root systems and concluded that with recommended protection measures, there should be minimal impact on the trees. Exhibit N at 8.

21. Exhibit N also included enhanced tree protection measures which the report indicated should be applied to all trees within the construction zone, not just those on Mr. Freeman's property.

22. Stan Hardson, a Certified Arborist and Forester, affirmed the applicant's arborist's conclusion that Douglas Fir trees are disposed to drop limbs during high wind events, and that removing some of a Douglas Fir tree's lower limbs would not affect this tendency.

23. The applicant's engineer testified that the tree protection measures recommended by the arborist can be incorporated into the construction of the substation. He also stated that the substation would include safety equipment that eliminates the risk of a fire if a tree limb were to land on the substation or associated power lines.

24. The City's Urban Forester has provided recommendations on tree protection in Attachment 14 to Exhibit A and standard requirements on tree installation and landscape maintenance in Attachment 5 to Exhibit A, "Development Standards".

25. The applicant did not submit a detailed lighting plan showing the location, height, fixture type and wattage of proposed lights.

26. Electrical and magnetic fields are produced by transmission and distribution lines and other sources of electric current. There is no information in the record indicating that substations are a substantial source of these fields, and the Director's research found no federal, state or local regulations on such fields.

Comprehensive Plan

27. The North Juanita Neighborhood Land Use Map designates the subject property for low density residential uses. (Attachment 18 to Exhibit A)

28. The Utilities Element of the Comprehensive Plan acknowledges that for "non-City-managed utilities, the City faces the challenge of facilitating system improvements and new technologies while minimizing the impacts associated with above-ground utility installations," and that "PSE's long-range plans through the year 2022 indicate the need for three new distribution substations in Kirkland …." Comprehensive Plan at XI-11.

29. The Goals and Policies section of the Comprehensive Plan's Utilities Element states as a general community value, that "Kirkland is accustomed to a high level of utility service. These services accommodate the lifestyles of Kirkland residents and the success of Kirkland businesses. To maintain these community values, Kirkland must balance the quality of the service provided with the costs and community impacts." Comprehensive Plan at XI-13.

30. Comprehensive Plan Policy U-14 reads, "Ensure that utility services are provided in a manner that is environmentally sensitive, safe and aesthetically compatible with surrounding land uses." Comprehensive Plan at XI-14.

Public Comment

31. The Department received ten public comment letters on the proposal, which are included as Attachment 8 to Exhibit A. The letters expressed concerns about the removal of trees on the subject property and the impacts on trees on adjacent properties, a belief that the proposal is not allowed on the subject property and that a rezone has been requested, an objection to the substation's being relocated from the south to the north portion of the property and about overall facility size, concern about long-term maintenance of proposed landscaping, concerns with the impacts of noise and electrical and magnetic fields, and concerns with the second driveway access to the site from NE 132nd Street and a belief that a second access is not allowed under the Code.

32. At the hearing, members of the public expressed concerns similar to those included in the written comments. In addition, several people noted that the applicant should have pursued alternative locations for the new substation and stated concerns about the potential impact on their property value. One person provided an analysis that concluded that the proposal fails to meet the criteria for a variance.

Applicable Law

33. KZC 510.745 defines a "public utility" as including a private business organization that performs a public service subject to government regulations.

34. Under KZC 17.10, a public utility is allowed in an RSX zone, so long as the site design minimizes adverse impacts on surrounding residential neighborhoods. This Code section requires a 20-foot side yard setback, a height limit of 30 feet above average building elevation, and a Type A landscape buffer. Public utility structures are not included in the list of height exceptions in KZC 115.60.2

35. KZC 95.40.4 states that a use that requires a Type A buffer and adjoins a low density residential use must meet the buffer requirements of KZC 95.40.6.a, which requires a 15-foot-wide landscape strip composed of specified trees, shrubs and ground cover. Trees are to be planted one tree per 20 linear feet of landscape buffer.

36. KZC 95.40.6.d requires that the landscape buffer be placed along the entire common border between the property being developed and adjoining property.

37. KZC 95.50 states that required landscaping elements must be maintained throughout the life of the development.

38. KZC 120.20 sets out the criteria for obtaining a variance from Zoning Code requirements:

1. The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole; and

2. The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of preexisting improvements on the subject property that conformed to the Zoning Code in effect when the improvement was constructed; and

3. The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.

39. KZC 115.85 includes lighting regulations for new development.

40. Attachment 5 to Exhibit A, “Development Standards,” includes other development standards and requirements for the proposal.

41. KZC 150.65.3 provides that the Hearing Examiner may approve a Process IIA application only if it is "consistent with all applicable development regulations, and to the extent there is no applicable development regulation, the Comprehensive Plan,” and is “consistent with the public health, safety and welfare.”

42. Under Process IIA, the applicant bears the burden of convincing the Hearing Examiner that the applicant is entitled to the requested decisions. KZC 150.50.

43. In making a threshold determination, the Director was required to determine if the proposal was likely to have a "probable significant adverse environmental impact”. WAC 197-11-330(1)(b). “Probable” is defined as “likely or reasonably likely to occur”. WAC 197-11-782. “Significant” is defined as “a reasonable likelihood of more than a moderate adverse impact on environmental quality.” WAC 197-11-794.

44. RCW 43.21C.240 provides that when a project's impacts are adequately addressed by City or other applicable development regulations, the proper threshold determination is a Determination of Nonsignificance.

45. Under state law and KMC 24.02.105(i)(2), the Examiner is to give the Director's SEPA threshold determination "substantial weight". A person appealing the determination has the burden of demonstrating that the DNS is “clearly erroneous”. Under this standard of review, the decision of the Director may be reversed only if the Examiner is left with the definite and firm conviction that a mistake has been made. *Cougar Mt. Assoc. v. King County*, 111 Wn. 2d 742, 747, 765 P.2d 264 (1988).

Conclusions:

SEPA Appeal

1. Mr. Freeman contends that the proposal threatens the health of the trees on his property that overhang the site. He asserts that the required pruning and potential damage to and undermining of the root systems from construction will render the trees a hazard to his home, and that limbs may fall into the proposed substation, thereby creating a fire hazard to his home. (Attachment 7 to Exhibit A) However, in light of the arborist's report and supplemental report, and the expert testimony in the record on Douglas Fir trees and the proposal substation's safety features, these claims were not shown to be probable, significant adverse impacts of the proposed substation. All probable adverse impacts to Mr. Freeman's trees are adequately addressed in the applicant's structure design and it's response to the City's regulations on tree protection and retention. The Director's DNS was not shown to be clearly erroneous.

Variances

2. The substation equipment visible above the proposed noise walls 13 feet from the east and west property lines would present a different view to residents on adjacent lots who have likely become accustomed to seeing vegetated open space beneath the transmission lines beyond their rear yards. The walls could also have some impact on light and air flow. On the other hand, a 30-foot-high solid structure could be built 20 feet from these common property lines without a zoning variance. From a subjective standpoint, both might be considered detrimental to property and improvements in the area. However, because of the design of the proposed structures and sound walls, they will likely present less mass and bulk at 13 feet from the common lot line than would a 30-foot-high structure permitted outright at 20 feet away. The same can be said for the termination structures at 5 feet above the permitted 30-foot height limit.

3. Because the substation is unstaffed, and the side yard setback area adjoins the rear yards of adjacent lots, and will be used only for the landscaped buffer rather than storage or activities, the proposed reduction will not impact the privacy and noise reduction functions of the side yard.

4. The side yard and height variances will not be materially detrimental to the property or improvements in the area of the subject property.

5. There is no evidence in the record of any detrimental impact to the City from the requested side yard and height variances.

6. The proposed two-foot reduction in the buffer width will not impair buffer functions of screening and noise reduction. Use of the noise walls in combination with the 13-foot buffers will provide screening and noise reduction superior to what would be provided by 15-foot buffers alone. Further, the applicant's landscape designer testified that the reduction of the buffer did not impair his ability to comply with the Code's screening requirements. The applicant will comply with all landscaped buffer requirements of KZC 95.40.6.a, and the buffer will be extended across the north edge of the property adjacent to the Northeast 132nd Street right-of-way.

7. The variance for buffer reduction will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole.

8. Unlike adjacent residential lots, the subject property is a long, narrow utility corridor, 89 feet wide at its widest point. It has been in utility use, and improved with a substation and electric transmission lines, for approximately 48 years. The need for increased reliability and additional service capacity require that the substation be replaced, and it needs to be co-located with transmission lines. Enhanced safety requirements dictate the minimum width and height requirements of a new substation, and variances would be necessary to build it anywhere on the subject property. The proposed variances are necessary because of special circumstances concerning the shape of the subject property and the location of existing transmission lines across it.

9. Unlike other properties in the area and zone, the subject property is part of an interconnected utility transmission and distribution system that has been operated as such for almost 50 years. The requested variances will not constitute a grant of special privilege to the subject property inconsistent with the general rights allowed to other property in the same area and zone.

<u>Zoning Permit</u>

10. The applicant qualifies as a "public utility under the Code, and the proposed substation is therefore an allowed use in the RSX zone under KZC 17.10.

11. The proposal is consistent with all applicable development regulations for this stage of the project, as modified through the variance process, including KZC 115.95 noise requirements, Tree Plan requirements of KZC 95.35.2.b.2, and landscaping requirements.

12. Extension of the landscape buffer beyond the south edge of the substation is not necessary, as there is to be no development in that area.

13. The requirement for a lighting plan may be fulfilled as part of the building permit application.

14. The requirements of KZC 95.50 for maintenance of landscaping will be met through a maintenance and retention agreement.

15. The proposed design for the site minimizes adverse noise and visual/aesthetic impacts on the surrounding residential neighborhood and therefore meets the requirement of KZC 17.10.070 Special Regulation 1.

16. The Zoning Code does not restrict a property to one access driveway.

17. The Examiner has found no regulations governing production of electric and magnetic fields. Further, on this record. Such fields appear to be more of a concern with electric transmission lines than with substations.

18. The Examiner has found no legal basis for the City to require the applicant to consider alternative sites for the proposal.

19. The proposal will increase electrical service capacity and improve reliability. It is also anticipated by the Comprehensive Plan. As conditioned, the proposal is consistent with the public health, safety and welfare.

Based on the foregoing findings and conclusions, the Examiner enters the following Decision:

DECISION:

1. The SEPA appeal is denied, and the Director's DNS is affirmed;
2. The requested variances are approved; and
3. The zoning permit to rebuild the PSE Juanita electric distribution substation is approved, subject to the following conditions:

   1. Attachment 5, "Development Standards," is provided by the Planning and Community Development Department to familiarize the applicant with some of the development regulations that supplement these conditions of approval. The applicant shall comply with all requirements and recommendations included in Attachment 5. The applicant shall also ensure that the proposal complies with all applicable requirements of the Kirkland Municipal Code, Kirkland Zoning Code, and Kirkland Building and Fire Code. When a condition of approval conflicts with a development regulation included in Attachment 5, the condition of approval shall be followed.

   2. The applicant shall follow the recommendations of the geotechnical report during all phases of development on the site.

3. As part of the building permit application, the applicant shall:

   a. Submit a final tree retention plan that incorporates the final recommendations of the City's Urban Forester and the applicant's Arborist.

   b. Provide a lighting plan showing the location, height, fixture type and wattage of all proposed exterior lights. The lighting plan shall be consistent with the requirements in KZC Section 115.85.

4. Prior to final inspection of the building permit, the applicant shall:

   a. Provide a final as-built landscape plan and a signed agreement to maintain and replace all landscaping that is required by the City.

   b. Provide certification from a qualified acoustical consultant that the facility complies with the noise regulations of KZC Section 115.95.

Entered this 12th day of December, 2008, pursuant to authority granted by KZC 150.65, KZC 145.10 and KMC 24.02.105.

Sue A. Tanner
Hearing Examiner

TESTIMONY:
The following persons testified at the public hearing:

From the City	From the Applicant
Tony Leavitt,	Roque Bamba,
Associate Planner	Project Manager
Jeremy McMann,	Jens Nedrud,
Planning Supervisor	Project Engineer
	Robert I. Heller,
	Attorney-at-law
From the Public	Leah Alcyon,
Steve Ryan	Industrial Hygienist
Pat McClusky	Ioana Park,
Troy Freeman	Professional Engineer
Michael Heslop	Gregory King,
Keven Corbett	Landscape Designer
Michelle McClusky	

The following persons offered testimony on the SEPA appeal:

From the Appellant	From the Applicant
Troy Freeman	Stan Hardson, Certified Arborist
From the City	Jens Nedrud, Project Engineer
Tony Leavitt	Robert Heller, Attorney-at-law

EXHIBITS:
The following exhibits were entered into the record:

Exhibit A	Department's Advisory Report with Attachments 1 through 19
Exhibit B	"How Power Gets To You" PSE Handout
Exhibit C	Photograph of Noise Wall materials
Exhibit D	Four Photographs – "Before" and "After" showing distribution lines and poles
Exhibit E	Copy of Steve Ryan testimony
Exhibit F	Letter to Tony Leavitt from William M. Ryan, Windermere Real Estate
Exhibit G	Copy of variance section from Washington Practice, Chapter 4
Exhibit H	Decision in *Lewis v. Medina*, 87 Wn.2d 19, 548 P.2d 1093 (1976)
Exhibit I	Selections from Chapters 120 and 150 KZC
Exhibit J	Copy of Patrick McClusky testimony
Exhibit K	Copy of Troy Freeman testimony
Exhibit L	Letter from Robert Heller on behalf of PSE applications
Exhibit M	National Institute of Environmental Health Sciences on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields (1999)
Exhibit N	SEPA Appeal Review of Trees 197-199 at the PSE Juanita Sub-Station
Exhibit O	Letter from Robert Heller on behalf of PSE in response to SEPA appeal

PARTIES OF RECORD:
Roque Bamba, Puget Sound Energy, 355 110th Avenue NE, EST 05-E, Bellevue, WA 98047
Jens Nedrud, Puget Sound Energy, 355 110th Avenue NE, EST ____, Bellevue, WA 98047
Robert I. Heller, Riddell Williams P.S., 1001 Fourth Avenue, Suite 4500, Seattle, WA 98154
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Stan Hardson, 1101 Lake Washington Blvd. N., Renton, WA 98056
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Steve Ryan, 13044 109th Avenue NE, Kirkland, WA 98034
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Barbara Ross, 13012 109th Avenue NE, Kirkland, WA 98034
Troy Freeman, 13045 110th Avenue NE, Kirkland, WA 98034
Carolina Ayala de Freeman, 13045 110th Avenue NE, Kirkland, WA 98034
James Herbold, 13043 109th Avenue NE, Kirkland, WA 98034
Kevin Corbett, 13036 109th Avenue NE, Kirkland, WA 98034
Peg Corbett, 13036 109th Avenue NE, Kirkland, WA 98034
Stephen and Denise Lybeck, 13052 109th Avenue NE, Kirkland, WA 98034
Patrick McClusky, 13035 110th Avenue NE, Kirkland, WA 98034
Michelle McClusky, 13035 110th Avenue NE, Kirkland, WA 98034
Department of Planning and Community Development
Department of Public Works
Department of Building and Fire Services

APPEALS AND JUDICIAL REVIEW

The following is a summary of the deadlines and procedures for appeals. Any person wishing to file or respond to an appeal should contact the Planning Department for further procedural information.

APPEAL TO THE CITY COUNCIL – Zoning Permit and Variance

Section 150.80 of the Zoning Code allows the Hearing Examiner's decision to be appealed by the applicant and any person who submitted written or oral testimony or comments to the Hearing Examiner. A party who signed a petition may not appeal unless such party also submitted independent written comments or information. The appeal must be in writing and must be delivered, along with any fees set by ordinance, to the Planning Department by 5:00 p.m., _____, twenty-one (21) calendar days following the postmarked date of distribution of the Hearing Examiner's decision on the application.

SEPA Decision

The Hearing Examiner’s decision on an appeal of a SEPA determination is the final decision for the City and may not be appealed to the City Council.

JUDICIAL REVIEW

Section 150.130 of the Zoning Code allows the action of the City in granting or denying this zoning permit to be reviewed in King County Superior Court. The petition for review must be filed within 21 calendar days of the issuance of the final land use decision by the City.

LAPSE OF APPROVAL

Under Section 150.135 of the Zoning Code, the applicant must submit to the City a complete building permit application approved under Chapter 150, within four (4) years after the final approval on the matter, or the decision becomes void; provided, however, that in the event judicial review is initiated per Section 150.130, the running of the four years is tolled for any period of time during which a court order in said judicial review proceeding prohibits the required development activity, use of land, or other actions. Furthermore, the applicant must substantially complete construction approved under Chapter 150 and complete the applicable conditions listed on the Notice of Approval within six (6) years after the final approval on the matter, or the decision becomes void.

CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033 425.587-3225
www.ci.kirkland.wa.us

ADVISORY REPORT
FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

To: Eric R. Shields, AICP, Planning Director

From: _____ Tony Leavitt, Associate Planner

_____ Eric R. Shields, AICP, Planning Director

Date: November 25, 2008

File: PUGET SOUND ENERGY JUANITA SUBSTATION REBUILD AND VARIANCE (ZON08-00010) AND SEPA APPEAL (APL08-00010)

Hearing Date and Place: December 4, 2008
City Hall Council Chamber
123 Fifth Avenue, Kirkland

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I. INTRODUCTION

A. APPLICATION

1. Applicant: Roque Bamba of Puget Sound Energy
2. Site Location: 10910 NE 132nd Street (see Attachment 1)
3. Request: Puget Sound Energy proposes to expand and rebuild the existing PSE Juanita electric distribution substation on the subject property near NE 132nd Street. The existing substation is located at the southern end of the subject property near NE 128th Street. The expanded and rebuilt substation will be located within the northern portion of the subject property near the NE 132nd Street right-of-way. As part of the zoning and variance permit application, the applicant is proposing to reduce the required east and west side yard setbacks from the required 20 feet to 13 feet, reduce the required east and west landscape buffers from 15 feet to 13 feet, and exceed the maximum allowable height of 30 feet by 5 feet to accommodate termination structures (see Attachment 2).
4. Review Process:
   a. Zoning Permit and Variance: Process IIA, Hearing Examiner conducts public hearing and makes final decision.
   b. SEPA Appeal: Pursuant to Kirkland Municipal Code Section 24.02.105 the SEPA appeal hearing will be conducted by the Hearing Examiner and combined with the public hearing for the Process IIA variance and zoning permit. The Hearing Examiner will make the final decision on the SEPA appeal.
5. Summary of Key Issues:
   - SEPA Determination of Nonsignificance Appeal Consideration (see Section II.D).
   - Compliance with Process IIA Zoning Permit Approval Criteria (see Section II.E.1)
   - Compliance with Variance Approval Criteria (see Section II.E.2)

B. RECOMMENDATIONS

Based on Statements of Fact and Conclusions (Section II), and Attachments in this report we recommend approval of this application subject to the following conditions:

1. This application is subject to the applicable requirements contained in the Kirkland Municipal Code, Zoning Code, and Building and Fire Code. It is the responsibility of the applicant to ensure compliance with the various provisions contained in these ordinances. Attachment 5, Development Standards, is provided in this report to familiarize the applicant with some of the additional development regulations. This attachment does not include all of the additional regulations. When a condition of approval conflicts with a development regulation in Attachment 5, the condition of approval shall be followed.
2. As part of the building permit application, the applicant shall:
   a. Submit a final tree retention plan that incorporates the recommendations of the City's Urban Forester and the applicant's Arborist (see Conclusion II.F.2).
   b. Provide a lighting plan showing the location, height, fixture type and wattage of all proposed exterior lights. The lighting plan shall be consistent with the requirements in KZC Section 115.85 (see Conclusion II.F.3).

3. Prior to final inspection of the building permit, the applicant shall

   a. Provide a final as-built landscape plan and an agreement to maintain and replace all landscaping that is required by the City (see Conclusion II.F.1).

   b. Provide certification from a qualified acoustical consultant that the facility complies with the noise regulations of KZC Section 115.95 (see Conclusion II.F.4).

II. FINDINGS OF FACT AND CONCLUSIONS

A. SITE DESCRIPTION

1. Site Development and Zoning:

   a. Facts:

      (1) Size: 2.61 acres. Property is approximately 89 feet wide by 1270 feet long.

      (2) Land Use: The subject property contains the existing PSE Juanita Substation on the southern portion of the property near NE 128th Street.

      (3) Zoning: The subject property is zoned RSX 7.2 (Residential Single-family). A Public Utility Use is an allowed use within this zone, subject to approval of a Process IIA Zoning Permit (see Attachment 15).

      (4) Terrain: The subject property is relatively flat on the northern portion of the lot and slopes down significantly on the southern portion near NE 128th Street.

      (5) Vegetation: The subject property contains numerous significant trees. The applicant's arborist identified a total of 10 trees on the site and 11 offsite trees that could potentially be impacted by the proposed redevelopment (see Section II.F.2).

   b. Conclusions:

      (1) Size and land use are not relevant factors in the review of this application. However, the width of the property is a factor in the review of this application.

      (2) The terrain of the property is a relevant factor in the review of this application. The proposed substation is being relocated from steeper southern portion to the flatter northern portion to allow for expansion (see Section II.E.2.d).

      (3) Zoning is a relevant factor in the review of this application, due to the fact that a Public Utility Use in a RSX 7.2 Zone must be approved through a Process IIA Review Process (see Section II.E.1).

      (4) Tree protection is a factor in the review of the proposed development (see Section II.F.2).

2. Neighboring Development and Zoning:

   a. Facts: The neighboring properties are zoned as follows and contain the following uses:

      North: Zoned R6 (located in Unincorporated King County). Developed with single-family residences

      West and East: Zoned RSX 7.2. Developed with single-family residences

      South: Zoned RM 3.6 (Residential Multi-family). Developed with duplex units.

b. Conclusion: The neighboring development and zoning are factors in the review of the application.

B. HISTORY

1. Facts:

   a. The existing PSE Substation, located on the southern portion of the property near NE 128th Street, was constructed in 1958.

   b. The existing substation does not comply with current zoning regulations for setbacks, landscape buffering, and maximum height.

2. Conclusion: The history of the site is a relevant factor in the review of the application.

C. PUBLIC COMMENT

1. Facts: The initial public comment period ran from July 25 to August 22, 2008. The Planning Department received a total of 10 comment emails and letters (see Attachment 8) during this comment period. The issues raised in the letters along with staff responses are below. Additionally, the applicant responded to these comment letters with a response letter (see Attachment 9).

   - Tree Impacts

     Multiple neighbors are concerned about the impacts to their trees and the removal of trees on the subject property.

     Staff Response: Tree Retention requirements are discussed in Section II.F.2.

   - Zoning

     Some of the neighbors expressed concerns that the proposed substation is not allowed on the subject property and a rezone if being requested.

     Staff Response: A Public Utility Use is an allowed use in the RSX 7.2 Zone. Approval of a new facility does require approval of a Process IIA Zoning Permit, but a rezone is not being requested.

   - Proposed Location and Size

     Many of the letters expressed an objection to the relocation of the substation from the south portion of the property to the north and the overall size of the facility.

     Staff Response: The applicant addresses these issues in their approval criteria response (see Attachments 3 & 4) and response letter. Staff addresses this issue in Section II.E.2.d.

   - Landscape Maintenance

     One letter expressed concern about the long term maintenance of the proposed landscaping.

     Staff Response: The applicant will be required to submit a perpetual landscape maintenance agreement that will require maintenance of all onsite landscaping for the life of the facility. See Section II.F.1 for additional discussion.

   - Noise Impacts

     One neighbor is concerned about potential noise impacts from the facility.

     Staff Response: The applicant is proposing the installation of sound walls to mitigate potential noise impacts from the facility. See Section II.F.4 for additional discussion.

- Electric and Magnetic Fields (EMF) Impacts

  Multiple neighbors are concerned about potential impacts from electric and magnetic fields associated with the power substation.

  Staff Response: The applicant states in their Environmental Checklist and project proposal that "substations are not a predominant source of magnetic fields for surrounding properties". Staff reviewed current regulations and found no federal, state, or local regulations regarding exposure to electric and magnetic fields.

- Driveway Access

  One neighbor was concerned about allowing a second driveway access from NE 132nd Street and that City codes do not allow a second access.

  Staff Response: The Public Works Department has reviewed the proposed access from NE 132nd Street and found no issues with the proposed design. Additionally the Public Works Department found no issues with keeping access driveway from NE 128th Street.

  The Kirkland Zoning Code does not restrict a property from having two access driveways. KZC Section 105.35 states that the City may restrict the location of driveways along the frontage of the subject property to improve vehicle circulation, public safety, or to enhance pedestrian movement.

D. STATE ENVIRONMENTAL POLICY ACT (SEPA)

1. SEPA THRESHOLD DETERMINATION

   a. Facts:

      (1) A Determination of Nonsignificance (DNS) was issued on October 2, 2008. The Environmental Checklist, Determination, and additional environmental information are included as Attachment 6.

      (2) A timely appeal of the SEPA Determination was filed on October 16, 2008 by the Troy Freeman (see Attachment 7).

      (3) The Hearing Examiner will conduct a public hearing on the SEPA appeal concurrently with the public hearing for this permit application on December 4, 2008.

      (4) The Hearing Examiner will consider the appeal and the testimony received during the public hearing in making her decision to either: affirm the decision being appealed; reverse the decision being appealed; or modify the decision being appealed. Within eight calendar days after the public hearing, the Hearing Examiner will issue a written decision on the appeal.

   b. Conclusion: The procedural requirements of SEPA are being met.

2. SEPA APPEAL

a. Facts:

(1) KMC Section 24.02.105.b establishes the following parties as able to appeal the SEPA determination: The applicant or proponent; any agency with jurisdiction, any individual or other entity who is specifically and directly affected by the proposed action.

(2) KMC Section 24.02.105.g.2 states that only those persons entitled to appeal the threshold determination may participate in the appeal.

(3) KMC Section 24.02.105.i of the Kirkland Municipal Code relating to SEPA states that:

- The matters to be considered and decided upon in the appeal are limited to the matters raised in the notice of appeal.
- The decision of the responsible official shall be accorded substantial weight.
- All testimony will be taken under oath.
- The decision of the hearing body hearing the appeal shall be the final decision on any appeal of a threshold determination including a Determination of Nonsignificance.

(4) The appellant claims in his letter of appeal that the SEPA Determination did not give adequate consideration to the effects and potential destruction of trees on the appellant's property as a result of the project.

(5) State law specifies that this environmental review under the State Environmental Policy Act (SEPA) is to focus only on potential significant impacts to the environment that could not be adequately mitigated through the Kirkland regulations and Comprehensive Plan.

(6) KZC Chapter 95 contains the Tree Management requirements for the City of Kirkland (see Section II.F.2).

(7) The applicant submitted the required Tree Plan II and, as conditioned, will meet the requirements of KZC Section 95.35 (see Section II.F.2).

(8) The Tree Plan II addressed potential impacts to offsite trees and recommendations are identified in the applicant's arborist report and the City's Urban Forester comments.

b. Conclusions:

(1) State law does not allow the City to impose SEPA requirements when there are city codes in place that guide the decision maker in approving or denying a proposal. In this case, Chapter 95 regulates tree retention and protection in the City.

(2) Staff recommends that the SEPA determination be affirmed and that the Determination of Nonsignificance (DNS) be upheld.

E. APPROVAL CRITERIA

1. PROCESS IIA ZONING PERMIT

a. Facts:

(1) Zoning Code section 150.65.3 states that a Process IIA application may be approved if:

- It is consistent with all applicable development regulations and, to the extent there is no applicable development regulation, the Comprehensive Plan; and
- It is consistent with the public health, safety, and welfare.

(2) KZC Section 17.10.070 Special Regulation 1 states that the "site design must minimize adverse impacts on surrounding residential neighborhoods".

(3) The applicant's response to these criteria can be found in Attachment 3.

(4) The proposed substation will replace an existing substation and add an additional transformer that will create a "looped" configuration. A "looped" configuration will allow the substation to continue operating even if a transmission line to the north or south is disrupted. Additionally, the substation is needed to meet the increased demand in the Totem Lake and Juanita areas.

(5) The subject property is bordered by single-family residences to the east and west. Potential impacts to the neighboring properties from the proposed substation include noise impacts, aesthetic/visual impacts, and access to the site.

(6) To mitigate potential noise impacts consistent with Zoning Code standards, the applicant is proposing the installation of sound walls adjacent to the east and west landscape buffers.

(7) To mitigate potential aesthetic/ visual impacts of the proposed substation, the proposed sound walls will be textured to resemble bricks or rocks. Additionally the applicant will be installing a required landscape buffer to screen the visibility of the facility from adjoining properties.

(8) The PSE substation is an unstaffed facility so access to the site will be limited. Additionally, the Public Works Department found no issues with the proposed access driveways from NE 128th and NE 132ND Streets.

b. Conclusion:

(1) The proposal complies with the Process IIA Zoning Permit Approval criteria in KZC Sections 150.65.3. It is consistent with all applicable development regulations (see Sections II.E & II.F) and the Comprehensive Plan (see Section II.G).

(2) In addition, it is consistent with the public health, safety, and welfare because it will allow a Public Utility Use to replace an existing substation with a new substation that will increase electrical service capacity and improve reliability, benefiting property owners and electrical customers.

(3) The proposed substation site design, including the textured sound walls and required landscaping, will help to minimize adverse impacts on surrounding residential neighborhoods.

2. VARIANCE PERMIT

a. Proposed Variances

(1) Setbacks

(a) KZC Section 17.10.070 requires a 20 foot setback yard for a Public Utility Use.

(b) The applicant proposes to reduce the requirement setback yard from the east and west property lines from 20 feet to 13 feet to accommodate the substation (see Attachment 2).

(2) Landscape Buffer

(a) KZC Section 17.10.070 Special Regulation 3 requires a Public Utility Use to comply with Landscape Category A.

(b) KZC Section 95.40.4 requires a landscape buffer for a use adjoining low density residential uses to comply with KZC Section 95.40.6.a.

(c) KZC Section 95.40.6.a (Buffering Standard 1) requires a 15 foot wide landscape strip along the east and west property lines.

(d) The applicant is proposing to install a 13 foot wide landscape buffer along the east and west side of the proposed substation (see Attachment 2, Page 2).

(3) Height Variance

(a) KZC Section 17.10.070 allows a maximum height of 30 feet above average building elevation.

(b) KZC Section 115.60 does not exempt utility structures from applicable height requirements.

(c) At the north and south ends of the substation enclosure, termination structures will extend approximately 35 feet above ground elevation (see Attachment 2, Page 5).

b. KZC Chapter 120 Requirements

(1) Facts:

(a) Zoning Code Chapter 120 sets forth the mechanism whereby a provision of the Code may be varied on a case-by-case basis if the application of the provision would result in an unusual and unreasonable hardship.

(b) Zoning Code section 120.20 establishes three decisional criteria with which a variance request must comply in order to be granted.

(c) The applicant's response to these criteria can be found in Attachment 4. Sections II.D.2.c through II.D.2.e contain the staff's findings of fact and conclusions based on these three criteria.

(2) Conclusions: Based on the following analysis, the application meets the established criteria for a variance.

c. Variance Criterion 1: The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City, in part or as a whole.

(1) Facts:

(a) As noted above the applicant is proposing to reduce the required east and west setbacks, reduce the required landscape buffer, and increase the allowable height to accommodate termination structures.

(b) Potential adverse impacts associated with the proposed variances include visuals impacts to neighboring properties, the reduction of a "buffer zone" between the proposed substation and neighboring properties, a reduction in the amount of vegetation within the landscape buffer, and structures that are out of scale with the neighboring properties.

(c) The applicant prepared graphics that compare the proposed substation enclosure with a building that could be constructed on the subject property without variances (see Attachment 4, Figure 1). The applicant concludes that the proposed substation will have less visual impact on neighboring properties when compared to what could be built on the subject property. Additionally, the sound walls will be textured to resemble brick walls to help mitigate visual impacts.

(d) According to the applicant, due to the nature of this project, the setback variance will not impair setback functions of preserving privacy from neighboring uses and reducing impacts of noise and activity on adjoining properties. The PSE substation is an unstaffed facility; there are no potential impacts on privacy which might occur if a staffed facility was proposed here. Also, no activity will take place within the side yard setbacks, such as driveways or parking. The setback areas will be used only as landscaped buffer areas.

(e) KZC Section 95.40.6.a requires that the landscape buffer be planted with a mixture of trees, shrubs, and ground cover. Trees are to be planted 1 tree per 20 linear feet of landscape buffer. The applicant is proposing to comply with the planting requirements of this section.

(f) The proposed termination structures will be 35 feet above average building elevation and located on the north and south edges of the substation. The structures will be located mid-way between the side property lines of the subject property and will consist of steel support with cross-arms.

(g) The applicant is proposing to removal of all the above-ground distribution poles and distribution wires from the substation property. The existing transmission poles and transmission wires will remain at their current heights, as they are necessary to serve the substation, and electrical safety codes require greater ground clearance for the high-voltage transmission lines.

(2) Conclusions:

(a) The project site design (including the proposed sound walls, proposed landscaping, placement of the termination structures) will help to mitigate the potential adverse impacts of the project.

(b) Staff concludes that the proposed variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City, in part or as a whole.

d. Variance Criterion 2: The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of preexisting improvements on the subject property that conformed to the Zoning Code in effect when the improvement was constructed.

(1) Facts:

(a) The subject property is approximately 89 feet wide along the north property line, adjacent to NE 132nd Street. The property gradually narrows down to a width of 80 feet along the south property line. The rebuilt substation is being located in the wider northern portion of the property.

(b) According to the applicant, given the size of the necessary electrical equipment, and minimum electrical clearance requirements established in the National Electric Safety Code (NESC) and PSE Design Standards, 60-feet is the minimum width necessary between the sound walls to provide clearance for equipment and driveway access required for the crane used in installation and maintenance activities. Each of the proposed sound walls will be approximately 1 foot in width, so the total width of the new facility will be 62 feet.

(c) As noted previously, the existing substation is located near the southern property line and does not conform to current zoning regulations including required setbacks, landscape buffering, and maximum allowable height.

(d) The applicant states that reconstruction of the substation at its current location is not feasible due to the existing topography and the location of existing high voltage transmission lines (see Attachment 3, Page 4).

(e) According to the applicant, existing electrical safety codes require the termination structures to be at a greater height than the ones constructed for the existing substation. Electrical safely codes also require that the existing transmission poles and lines, currently nonconforming as to height, remain at their present heights.

(2) Conclusion:

(a) Based on the information provided by the applicant in regards to the required width of the facility, any substation redevelopment proposal for the site would require a variance from setback and landscape buffer requirements.

(b) Staff concludes that the setback and landscape buffer variances are necessary because of special circumstances regarding the width, or shape, of the subject property and the location of preexisting improvements.

(c) Staff concludes that the height variance is necessary because of a special circumstance regarding the location of preexisting improvements, specifically the transmission lines that serve the

facility. Additionally the requirements of the current electrical safety codes are a relevant factor in the review of this variance request.

e. Variance Criterion 3: The variance would not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this Code allows for other properties in the same area and zone as the subject property.

(1) Facts:

(a) As noted previously, the existing substation does not comply with current zoning regulations for setbacks, landscape buffering, and maximum height.

(b) The applicant states that the proposed substation is the minimum size necessary to meet growing demand for electricity within its service area.

(c) The subject property is a relatively narrow property and any expansion or rebuild of the existing facility would require a variance from applicable requirements.

(2) Conclusion: The granting of this variance would not constitute a special privilege to the subject property. As noted in Criteria 1 and 2, the variance is responding to unique site limitations and facility design requirements associated with this type of public utility use. The proposed variances are the minimum necessary to provide relief from zoning code requirements.

F. DEVELOPMENT REGULATIONS

1. Landscaping Requirements

a. Facts:

(1) KZC Section 17.10.070 requires a Public Utility Use in a RSX zone to comply with Landscape Category A.

(2) KZC Section 95.40.4 requires a landscape buffer for a use adjoining low density residential uses to comply with KZC Section 95.40.6.a.

(3) KZC Section 95.40.6.a (Buffering Standard 1) requires a 15 foot wide landscape buffer that is planted with a mixture of trees, shrubs, and ground cover. Trees are to be planted 1 tree per 20 linear feet of landscape buffer.

(4) KZC Section 95.40.6.d requires that the applicant provide the required buffer along the entire common border between the subject property and the adjoining property.

(5) The existing substation does not comply with these landscape buffer requirements.

(6) KZC Section 95.40.8.b states that landscape buffers must be brought into conformance with subsection (6) of section 95.40 in either of the following situations:

- An increase in gross floor area of any structure (the requirement to provide conforming buffers applies only where new gross floor area impacts adjoining property); or
- A change in use on the subject property and the new use requires larger buffer than the former use.

(7) The applicant is proposing to install a 13 foot wide landscape buffer between the substation and the neighboring properties to the east and west. The landscape buffer will also extend between the north edge of the substation and the NE 132nd Street right-of-way

(8) KZC Section 95.50.1 requires that all required trees and vegetation, fences, walls, and other landscape elements be considered as elements of the project in the same manner as parking, building materials, and other site details. The applicant, landowner, or successors in interest shall be responsible for the regular maintenance of required landscaping elements. Plants that die must be replaced in kind.

(9) KZC Section 95.50.2 states that all required landscaping shall be maintained throughout the life of the development.

b. Conclusions:

(1) Per KZC Section 95.40.8.b, the existing nonconforming landscape buffer is not required to come into conformance with the requirements of KZC Section 95.40.6.d. Requiring the installation of the landscape buffer south of the proposed substation is not necessary as this portion of the property will open space.

(2) The applicant is proposing to install a landscape buffer along the entire common border between the substation and the adjoining properties. This landscape buffer shall be subject to the requirements of KZC Section 95.40.

(3) Prior to final inspection of the building permit, the applicant should provide a final as-built landscape plan and an agreement to maintain and replace all landscaping that is required by the City (see Attachment 16).

2. Natural Features - Significant Vegetation

a. Facts:

(1) Pursuant to KZC Section 95.35.2.b.2, the applicant submitted a Tree Plan II for the subject property (see Attachments 10 and 11) that focused on trees on the subject property and on neighboring properties that could be potentially impacted by development activities.

(2) The applicant's arborist identified 10 significant trees on the subject property and 11 significant trees on neighboring properties with canopies that overhang onto the subject property.

(3) The applicant's arborist concluded that all but one onsite tree would be impacted by the proposed development and be required to be removed. A final determination will be made during the building permit review process.

(4) KZC Section 95.35.2 requires that any trees with canopies that overhang the subject property to be included in the inventory, evaluation, and tree protection measures as part of the Tree Plan II.

(5) According to the applicant's arborist, there are 3 trees east of the east property line and eight trees west of the west property line. All 11 trees can be adequately protected as described in the Tree Protection Measures section of his report. This will include tree protection fencing and 12 inches of wood chips to protect the critical root zone and allow equipment to travel over the roots during construction. Some tree pruning may be required to safely construct and install the elements of the substation. Those can be dealt with on a tree by tree basis once the project is under way.

(6) The City's Urban Forester reviewed the Tree Plan II and submitted comments (see Attachment 12).

b. Conclusions:

(1) The applicant complied with the requirements of KZC Section 95.35.2.b.2.

(2) As part of the building permit application, the applicant should submit a final tree retention plan that incorporates the recommendations of the City's Urban Forester and the applicant's Arborist.

3. Site Lighting

a. Facts: KZC Section 115.85 requires that the applicant use energy efficient light sources, comply with the Washington Energy Code with respect to the selection and regulation of light sources, and select, place, and direct light sources both directable and nondirectable so that glare produced by any light source, to the maximum extent possible, does not extend to adjacent properties or to the right-of-way. The current submittal does not contain a detailed lighting plan that would show the location, height, fixture type, and wattage of proposed lights.

b. Conclusion: As part of its building permit application, the applicant should provide a lighting plan showing the location, height, fixture type and wattage of all proposed exterior lights. The lighting plan shall be consistent with the requirements in KZC Section 115.85.

4. Noise Impacts

a. Facts:

(1) KZC Section 115.95 states that the maximum environmental noise levels in the City of Kirkland are established pursuant to the Noise Control Act of 1974 (WAC 173-60). WAC 173-60 states that no person shall cause or permit noise to intrude into the property of another person which noise exceeds the maximum permissible noise levels set forth in this section.

(2) The applicant is proposing sound walls to mitigate potential noise impacts from the substation equipment (see Attachment 13).

b. Conclusion: To ensure compliance with applicable regulations, prior to final inspection of the building permit, the applicant should provide certification from a qualified acoustical consultant that the facility complies with the noise regulations of KZC Section 115.95.

5. Horizontal Façade Requirement

a. Facts:

(1) KZC Section 17.08.02 requires that If any portion of a structure is adjoining a low density zone, then either the height of that portion of the structure shall not exceed 15 feet above average building elevation, or the horizontal length of any facade of that portion of the structure which is parallel to the boundary of the low density zone shall not exceed 50 feet (see Attachment 15).

(2) KZC Section 115.30 regulates maximum horizontal façade. Maximum horizontal façade is defined as "the widest cross-section of the building in the area adjoining the low density zone or within 100 feet of the adjoining lot containing the detached dwelling unit or low density use. The cross-section width is measured parallel to the zone or lots".

(3) The KZC defines a building as "a roofed structure used for or intended for human occupancy."

b. Conclusion: KZC Section 17.08.02 does not apply to the proposed substation as the facility does not meet the KZC definition of a building.

G. COMPREHENSIVE PLAN

1. Facts:

a. The subject property is located within the North Juanita Neighborhood. The North Juanita Neighborhood Land Use Map designates the subject property as a public facility use (see Attachment 18).

b. The Comprehensive Plan states on Page XI.1 (see Attachment 19) that the primary focus of the City in the coming years will be to continue to update existing systems to increase efficiency and to avoid maintenance problems associated with older facilities.

c. The Comprehensive Plan states in the Utilities Goals and Policies Section (see page XI.13) that the Kirkland is accustomed to a high level of utility services and these services accommodate the lifestyles of Kirkland residents and the success of Kirkland businesses. Kirkland must balance the quality of services provided with the costs and community impacts.

d. Policy U-1.4 (see page XI.14) states the following: Ensure environmentally sensitive, safe, and reliable utility service that is aesthetically compatible with the surrounding land uses and results in reasonable economic costs.

e. The applicants states that the proposed substation expansion/ rebuild will increase electrical service capacity and improve reliability.

2. Conclusion: The City should consider the balances as noted in the Comprehensive Plan. The proposed substation will provide a higher level of electricity service to the area by replacing an outdated power substation. At the same time, the design of the facility should be compatible with the existing neighborhood.

H. DEVELOPMENT STANDARDS

1. Fact: Additional comments and requirements placed on the project are found on the Development Standards, Attachment 5.

2. Conclusion: The applicant should follow the requirements set forth in Attachment 5.

III. SUBSEQUENT MODIFICATIONS

Modifications to the approval may be requested and reviewed pursuant to the applicable modification procedures and criteria in effect at the time of the requested modification.

IV. APPEALS AND JUDICIAL REVIEW

The following is a summary of the deadlines and procedures for appeals. Any person wishing to file or respond to an appeal should contact the Planning Department for further procedural information.

A. APPEALS

Appeal to City Council:

Section 150.80 of the Zoning Code allows the Hearing Examiner's decision to be appealed by the applicant and any person who submitted written or oral testimony or comments to the Hearing Examiner. A party who signed a petition may not appeal unless such party also submitted independent written comments or information. The appeal must be in writing and must be delivered, along with any fees set by ordinance, to the Planning Department by 5:00 p.m., _____ twenty-one (21) calendar days following the postmarked date of distribution of the Hearing Examiner's decision on the application.

B. JUDICIAL REVIEW

Section 150.130 of the Zoning Code allows the action of the City in granting or denying this zoning permit to be reviewed in King County Superior Court. The petition for review must be filed within 21 calendar days of the issuance of the final land use decision by the City.

V. LAPSE OF APPROVAL

Under Section 150.135 of the Zoning Code, the applicant must submit to the City a complete building permit application approved under Chapter 150, within four (4) years after the final approval on the matter, or the decision becomes void; provided, however, that in the event judicial review is initiated per Section 150.130, the running of the four years is tolled for any period of time during which a court order in said judicial review proceeding prohibits the required development activity, use of land, or other actions. Furthermore, the applicant must substantially complete construction approved under Chapter 150 and complete the applicable conditions listed on the Notice of Approval within six (6) years after the final approval on the matter, or the decision becomes void.

VI. APPENDICES

Attachments 1 through 19 are attached.

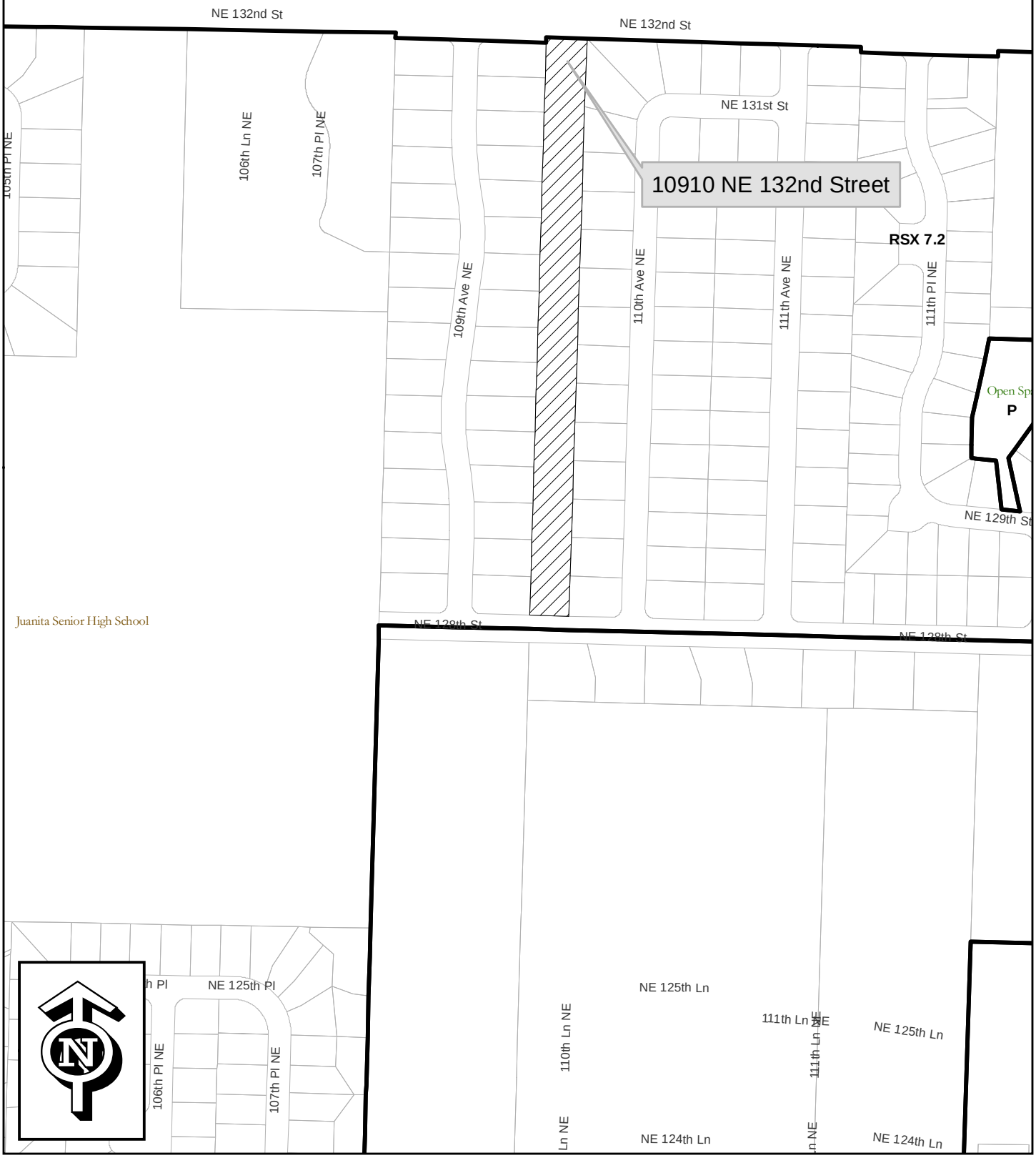
1. Vicinity Map
2. Development Plans
3. Applicant's Response to Process IIA Approval Criteria
4. Applicant's Response to Variance Approval Criteria
5. Development Standards
6. SEPA Determination, Memo, and Enclosures
7. SEPA Appeal Letter from Troy Freeman
8. Initial Public Comments
9. Applicant's Response to Initial Public Comments
10. Arborist Report prepared by Gilles Consulting dated October 7, 2008
11. Revised Tree Site Plan
12. Memo from Deborah Powers, City of Kirkland Urban Forester
13. Sound Analysis prepared by BRC Acoustics and Technology Consulting dated April 25, 2008
14. Geotechnical Engineering Services Report prepared by GeoEngineers Inc. dated February 29, 2007
15. RSX Use Zone Chart
16. Landscape Maintenance Agreement
17. Tree Plan II Requirements
18. North Juanita Neighborhood Land Use Map
19. City of Kirkland Comprehensive Plan Utilities Chapter (excluding non relevant maps)

VII. PARTIES OF RECORD

Applicant: Roque Bamba, Puget Sound Energy, 355 110th Avenue NE, EST 05-E, Bellevue, WA 98047
Party of Record: Michael Heslop, 13055 110th Avenue NE, Kirkland, WA 98034
Party of Record: Steve Ryan, 13044 109th Avenue NE, Kirkland, WA 98034
Party of Record: Barbara Ross, 13012 109th Avenue NE, Kirkland, WA 98034
Party of Record: Troy Freeman, 13045 110th Avenue NE, Kirkland, WA 98034
Party of Record: Carolina Ayala de Freeman, 13045 110th Avenue NE, Kirkland, WA 98034
Party of Record: James Herbold, 13043 109th Avenue NE, Kirkland, WA 98034
Party of Record: Kevin Corbett, 13036 109th Avenue NE , Kirkland, WA 98034
Party of Record: Peg Corbett, 13036 109th Avenue NE, Kirkland, WA 98034
Party of Record: Nora Ryan, 13044 109th Avenue NE, Kirkland, WA 98034
Party of Record: Stephen and Denise Lybeck, 13052 109th Avenue NE, Kirkland, WA 98034
Department of Planning and Community Development
Department of Public Works
Department of Building and Fire Services

A written decision will be issued by the Hearing Examiner within eight calendar days of the date of the open record hearing.

PSE Juanita Substation Rebuild
ZON08-00010



NOTES

1. PURPOSE OF THIS SURVEY THIS BOUNDARY AND TOPOGRAPHIC SURVEY WAS PERFORMED DURING APRIL, 2007 IN SUPPORT OF A PUGET SOUND ENERGY SUBSTATION IMPROVEMENT PROJECT AND WAS INTENDED TO 1.) DETERMINE AND STAKE THE FOUR PROPERTY CORNERS, 2.) DETERMINE THE LOCATION OF PHYSICAL FEATURES ON OR NEAR SAID PROPERTY LINES AND 3.) PERFORM TOPOGRAPHIC MAPPING OF THE SUBJECT PARCEL AND ADJOINING ROADWAYS.

2 BASIS OF BEARING WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NAD-83/91. NOTE: DISTANCES SHOWN HEREON ARE STATE PLANE GRID DISTANCES BASED ON A COMBINED SCALE FACTOR OF 0.999959. TO CONVERT GRID DISTANCES TO GROUND VALUES, MULTIPLY DISTANCES SHOWN BY 1.000041.

3. VERTICAL DATUM NAVD-88
NOTE: NGVD 29 - NAVD 88 MINUS 3.6'. SOURCE - CORPSCON FOR WINDOWS CONVERSION SOFTWARE VER 5.11.00

4. METHODOLOGY FIELD MEASUREMENT FOR THIS SURVEY WERE PERFORMED USING A LEICA TCRP 1201. THIS SURVEY COMPLIES WITH THE MINIMUM REQUIRED 'ERROR OF CLOSURE' OF 1:10,000 FOR WASHINGTON STATE PLANE COORDINATES AS SET FORTH PER W.A.C. 332-130-090 (AND POSITIONAL TOLERANCE LEVELS OF LESS THAN 0.011 METERS)

5. PROPERTY LINES SHOWN HEREON ARE BASED ON FIELD LOCATED SURVEY MONUMENTS AND PUBLIC RECORDS. SEE SHEET 2 OF 2 FOR SECTION BREAKDOWN AND PROPERTY DETAILS.

PROPERTY CORNERS WERE STAKED IN CONJUNCTION WITH THIS SURVEY.

6. MONUMENTATION VISITATION ALL SURVEY MONUMENTS AND OTHER SURVEY MARKERS SHOWN HEREON WERE VISITED DURING APRIL, 2007 UNLESS OTHERWISE INDICATED.

7. ENCUMBRANCES PACIFIC NORTHWEST TITLE COMPANY OF WASHINGTON INC. TITLE ORDER NO. 651223, DATED APRIL 12, 2007 USED FOR LAND DESCRIPTION AND EASEMENTS OF RECORD. NO FURTHER SEARCH INTO THE RECORD WAS REQUESTED OR PERFORMED. NOTE: SAID TITLE REPORT REVEALED SEVERAL SLOPE EASEMENTS THAT CONTAINED DESCRIPTIONS THAT WERE INSUFFICIENT TO DETERMINE THE LOCATION OF SAID EASEMENTS. OTHER ENCUMBRANCES LISTED IN SAID TITLE REPORT RELATE TO TAXES AND MORTGAGE TERMS AND CONDITIONS, NONE OF WHICH PERTAIN TO MATTERS DISCLOSED BY THIS SURVEY.

8. UNDERGROUND UTILITIES SHOWN REPRESENT FIELD SURVEYED PAINT MARKS AS PLACED ON THE GROUND BY A UTILITY LOCATE SERVICE. NO GUARANTEE IS MADE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED OR THAT THE UNDERGROUND UTILITIES ARE SHOWN IN THIER EXACT LOCATION. THE UTILITIES ARE SHOWN AS ACCURATELY AS POSSIBLE FROM AVAILABLE INFORMATION.

9. CONTOUR INTERVAL 2 FOOT

10. SUBSURFACE CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY.

11. LOCATIONS OF HOUSES SHOWN HEREON WERE DERVIED FROM AERIAL PHOTOGRAMMETRY AND ARE RELIABLE TO PLUS OR MINUS 5 FEET.

12. 1-800-424-5555 MUST BE CALLED NOT LESS THAN 48 HOURS BEFORE BEGINNING EXCAVATION WHERE ANY UNDERGROUND UTILITIES MAY BE LOCATED. FAILURE TO DO SO COULD MEAN BEARING SUBSTANTIAL REPAIR COSTS. (UP TO THREE TIMES THE COST OF REPAIRS TO THE SERVICE).

BENCH MARKS

1. PROJECT BM POINT DESIGNATION DEA #3003 A COPPER PIN IN SQUARE CONCRETE MONUMENT LOCATED AT SOUTH QUARTER CORNER 29 AND AS SHOWN HEREON - ELEV - 256.528 FEET (NAVD 88)

2 TEMPORARY SITE BM'S POINT DESIGNATION DEA #6 A 1/2" IRON WITH 'DEA CONTROL' CAP AND AS SHOWN HEREON - ELEV - 179.74 FEET (NAVD 88)

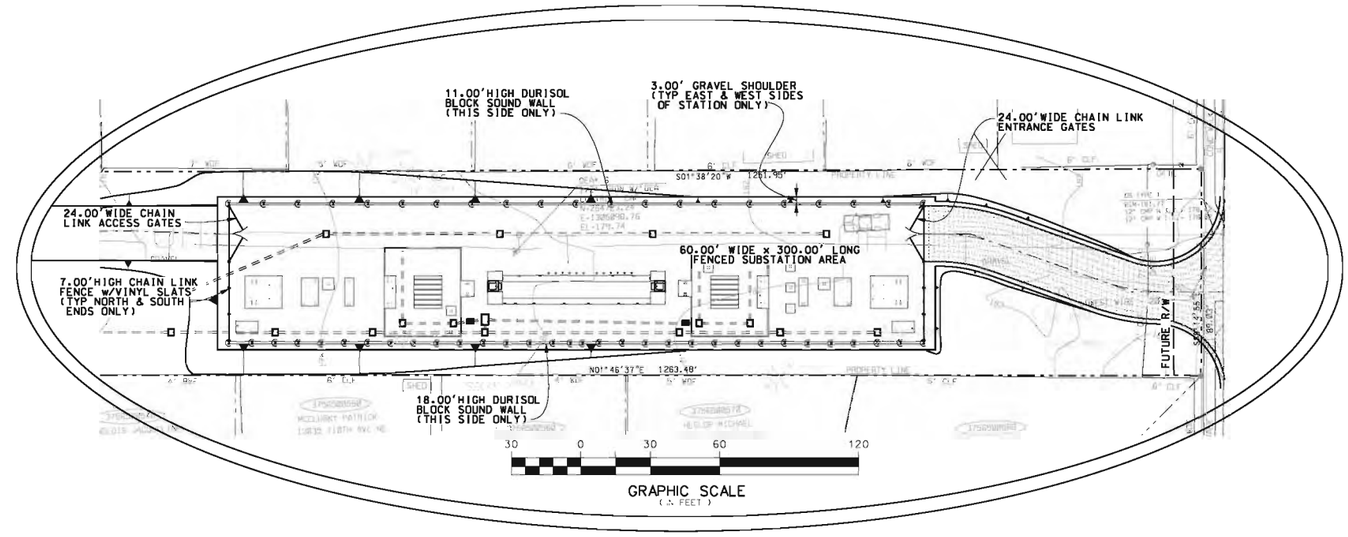
POINT DESIGNATION DEA #7 A 1/2" IRON WITH 'DEA CONTROL' CAP AND AS SHOWN HEREON - ELEV - 165.58 FEET (NAVD 88)

LEGAL DESCRIPTION

PER PACIFIC NORTHWEST TITLE COMPANY OF WASHINGTON INC., TITLE ORDER NO. 651223, DATED APRIL 12, 2007

THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 26 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON;
EXCEPT THE WEST QUARTER;
EXCEPT THE EAST 900 FEET THEREOF;
EXCEPT THE NORTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR NORTHEAST 132ND STREET BY RECORDING NUMBER 2125699;
AND ALSO EXCEPT THE SOUTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR NORTHEAST 128TH STREET BY RECORDING NUMBER 5554777.

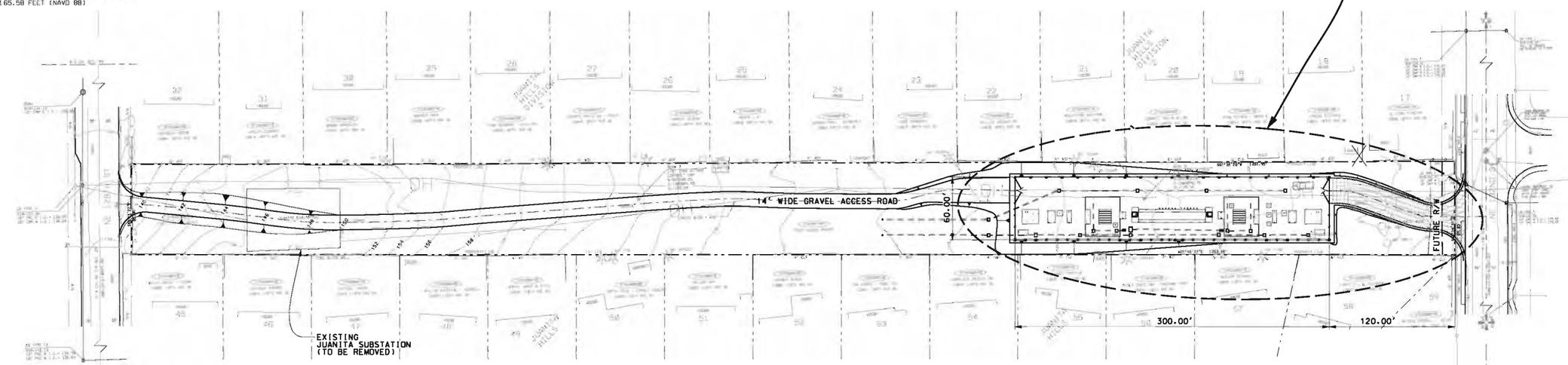
ADDRESS:
10910 NE 132nd ST.
KIRKLAND, WA.



STATION DETAIL

SCALE: 1"=30'

NW 1/4, NE 1/4, SEC. 29, TWP 26N., RNG. 5E., W.M.



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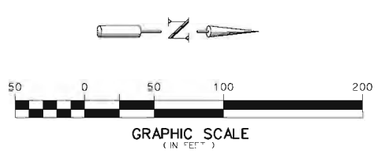
TOPOG LEGEND

SECTION LINE	
QUARTER SECTION LINE	
EXISTING RIGHT-OF-WAY LINE	
PROPERTY LINE	
FENCE LINE (TYPE AS NOTED)	—X—X—X—
UTILITY POLE	
WATER VALVE	WV
WATER METER	WM
CATCH BASIN	
STORM DRAIN MANHOLE	
TELEPHONE MANHOLE	
TELEPHONE VAULT	
CONIFEROUS TREE	
DECIDUOUS TREE	
SHRUB	
SET REBAR AND CAP "DEA 38017"	
KING COUNTY TAX PARCEL NUMBER	



VICINITY MAP
NO SCALE

REFERENCE DRAWINGS:

D-14342	EROSION AND SEDIMENT CONTROL PLAN
D-14343	GRADING AND FENCING PLAN
D-14344	DRAINAGE PLAN
D-14345	FOUNDATION PLAN
D-14346	LANDSCAPE PLAN
D-14347	STRUCTURAL PLAN (REF ONLY)

JOHN D RORABACHER — STATE OF WASHINGTON — 44464 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES: Jan. 27,

PSE ENGINEERING CONTACTS 355 NE 110TH AVE NE, BELLEVUE WA. 98009-0868		
GROUP	NAME	PHONE
PROJECT MANAGEMENT	R. BAMBA	425-462-3774
CIVIL	J. RORABACHER	425-456-2446
ELECTRICAL	J. NEDRUD	425-462-3818
CONSTRUCTION MANAGEMENT	D. MOHN	425-456-2830
PERMITTING	A. MARKOS	253-476-6295

REVISION DESCRIPTION:
ISSUED FOR PERMITTING

	APPROVAL	DATE (M/D/Y)
CADD	M TURNER	4 / 30 / 08
CIVIL ENGR		/ /
		/ /
REVIEW		/ /
		/ /

SITE PLAN
JUANITA SUBSTATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-14341 — SHEET 1 OF 1 — REV NO: 0

SCALE: 1"= 50'-0" — CLASS: SITE — FILE NO

CADD NO: ...\D14341\D14341 SITE.DGN

M D TURNER — 5/20/2008

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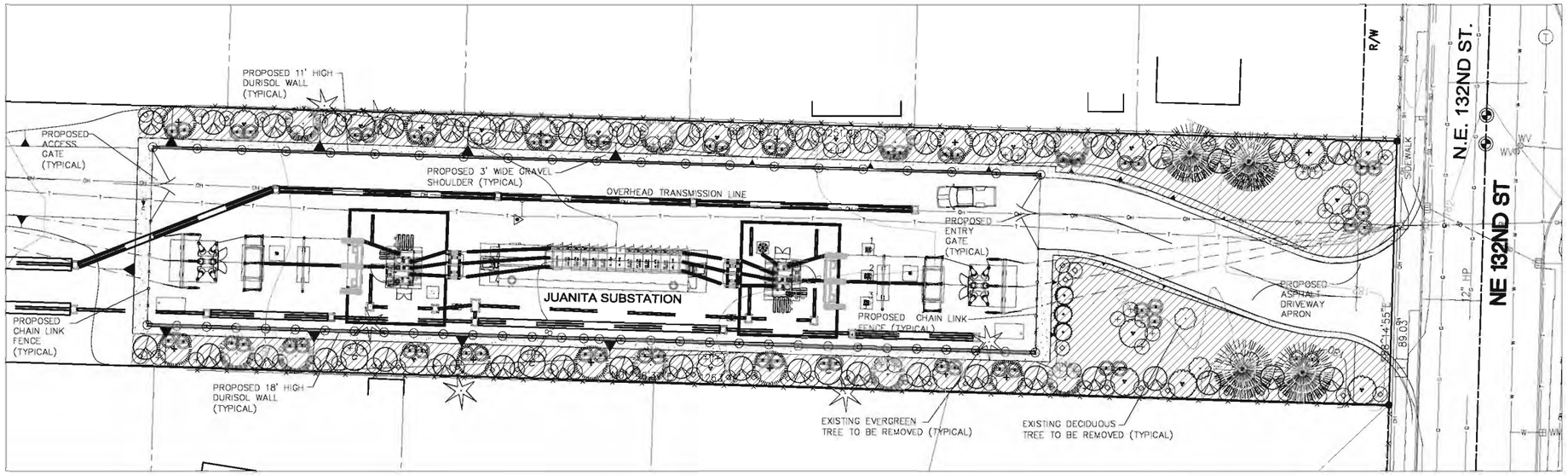

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PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	QNTY	SIZE	REMARKS
TREES					
	ACER CIRCINATUM	VINE MAPLE	17	5'-6' HT.	B&B MULTI-STEMMED
	CALOCEDRUS DECURRENS	INCENSE CEDAR	11	6'-8' HT	B&B, SPACED PER PLAN
	PINUS NIGRA	AUSTRIAN BLACK PINE	4	6'-8' HT	B&B, WELL-BRANCHED FROM ROOT CROWN TO TOP
	THUJA PLICATA 'ATROVIRENS'	WESTERN RED CEDAR	9	6'-8' HT	B& B, SPACED PER PLAN
	RHAMNUS PURSHIANA	CASCARA	3	6'-8' HT	B&B, WELL-BRANCHED FROM ROOT CROWN TO TOP
	THUJA OCCIDENTALIS 'FASTIGIATA'	AMERICAN ARBORVITAE	3	6'-8' HT	B&B, SPACED PER PLAN
SHRUBS					
	AMELANCHIER ANIFOLIA	SERVICEBERRY	42	5 GAL.	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE	54	5 GAL.	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	60	5 GAL.	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
	SYMPHORICARPOS ALBUS	SNOWBERRY	70	5 GAL.	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
SURFACE MATERIALS					
	MEDIUM BARK MULCH	MEDIUM BARK MULCH	125 CY		3" DEPTH - CONTRACTOR TO VERIFY QUANTITY

LANDSCAPE NOTES

GENERAL

1. ALL WORK SHALL BE DONE AS SHOWN IN THE DRAWINGS AND IN CONFORMANCE WITH THE PUGET SOUND ENERGY (PSE) PROJECT GENERAL PROVISIONS AND SPECIFICATIONS FOR THIS PROJECT. THE DRAWINGS SHALL TAKE PRECEDENCE OVER THE SPECIFICATIONS SHOULD THERE BE ANY CONFLICT.

2. SITE BASE INFORMATION PROVIDED BY BOUNDARY AND TOPOGRAPHIC SURVEY, JUANITA SUBSTATION, (DAVID EVANS AND ASSOCIATES, INC. (DEA)), MAY 8, 2007.

SITE PREPARATION

1. CLEAR AND GRUB EXISTING VEGETATION IN AREAS TO BE PLANTED.

PLANTING

1. ALL TREES, SHRUBS AND SEEDING SHALL BE INSTALLED PER THE LANDSCAPE PLAN AND AS SHOWN IN THE PLANTING DETAILS.

2. PLANTING BED SHALL BE AMENDED WITH 4" CEDAR GROVE 2-WAY TOPSOIL (OR APPROVED EQUIVALENT) ROTOTILLED INTO 12" OF EXISTING SOIL.

3. PLANT PIT BACKFILL SHALL BE CEDAR GROVE 2-WAY TOPSOIL (OR APPROVED EQUIVALENT)

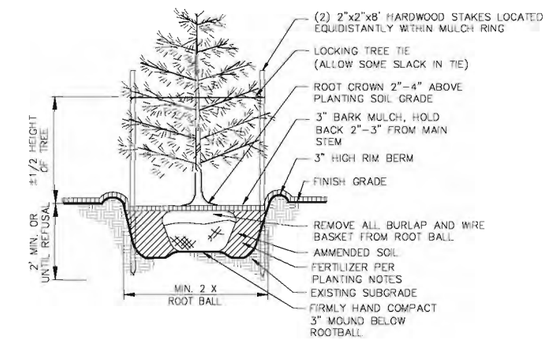
4. IMMEDIATELY AFTER PLANTING, PLACE MEDIUM BARK MULCH TO A UNIFORM 3" DEPTH THROUGHOUT PLANTING AREAS.

5. CONTRACTOR SHALL APPLY TIME RELEASE FERTILIZER TO PLANT PITS (OSMOCOTE TM OR APPROVED EQIVALENT) PER MANUFACTURER'S INSTRUCTIONS.

6. AFTER INSTALLATION APPLY SNAPSHOT PRE-EMERGENT HERBICIDE (OR APPROVED EQUIVALENT) FOR WEED CONTROL PER MANUFACTURER'S RECOMMENDATIONS.

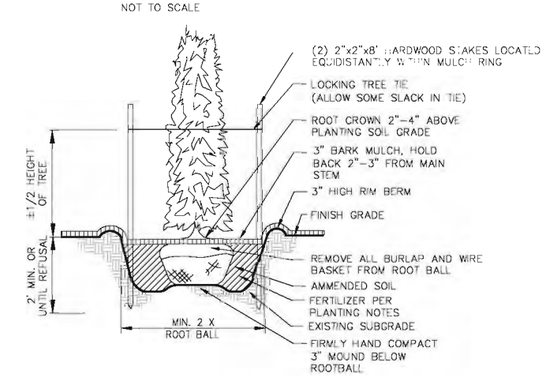
7. ALL PLANT MATERIALS SHALL BE IRRIGATED BY THE CONTRACTOR THOROUGHLY WHEN PLANTED AND UP TO FINAL ACCEPTANCE. PLANTING AREAS SHALL RECEIVE 1" OF WATER PER WEEK DURING MAY 15-OCTOBER 15 EXCLUDING MAJOR STORM EVENTS. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR IRRIGATION DURING THE WARRANTY PERIOD.

8. PERMANENT IRRIGATION SYSTEM SHALL BE INSTALLED PER THE IRRIGATION PLAN AND MAINTAINED BY THE CONTRACTOR DURING THE WARRANTY PERIOD.



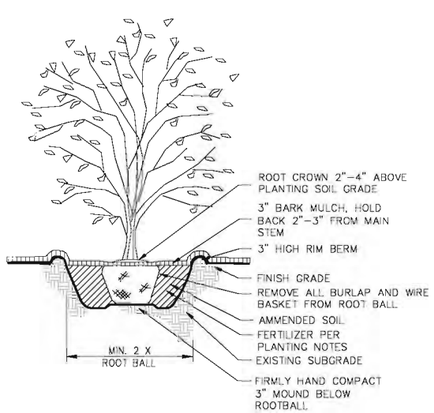
ORNAMENTAL EVERGREEN TREE PLANTING

NOT TO SCALE



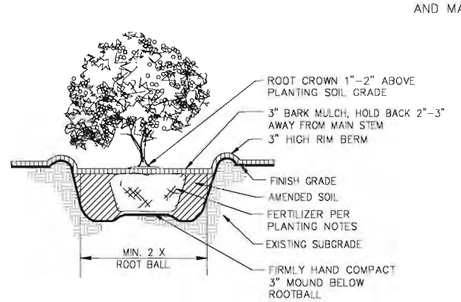
COLUMNAR EVERGREEN TREE PLANTING

NOT TO SCALE



DECIDUOUS MULTI- STEM TREE PLANTING

NOT TO SCALE



SHRUB PLANTING

NOT TO SCALE

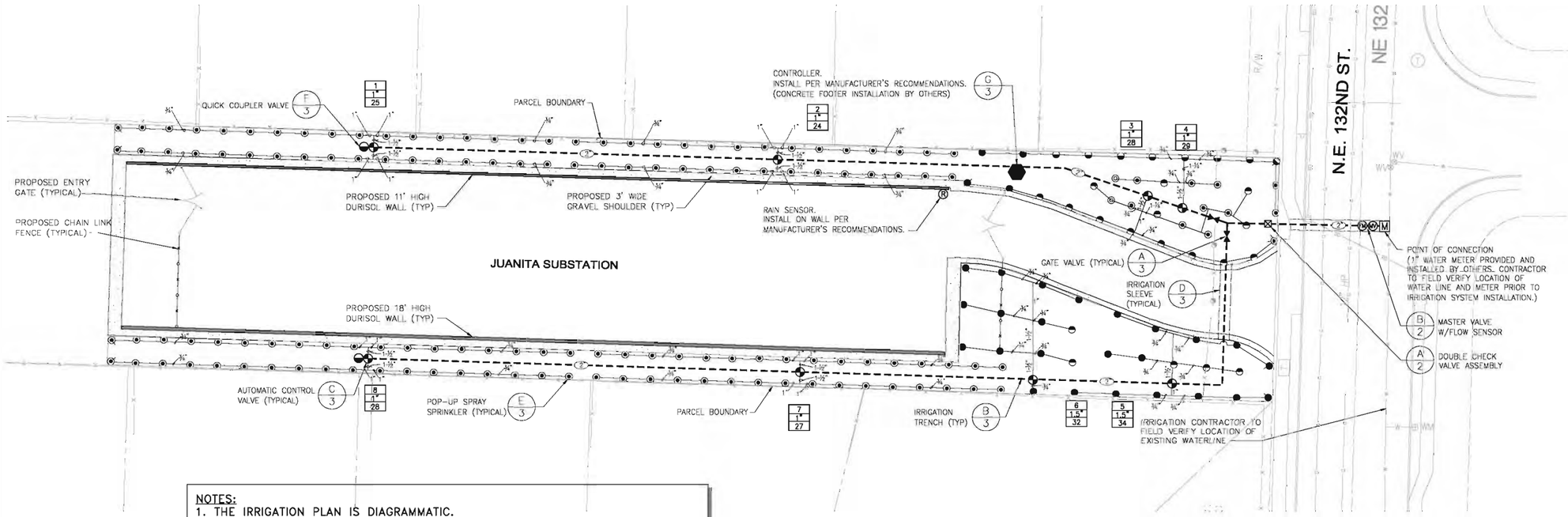
STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
JONATHAN C. GAGE
CERTIFICATE NO. 852

0 20 40 60
SCALE: 1"=20

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

PRELIMINARY- NOT FOR CONSTRUCTION

REVISION DESCRIPTION: ORIGINAL ISSUE			JUANITA SUBSTATION LANDSCAPE PLAN		
	APPROVAL	DATE (M/D/Y)	PUGET SOUND ENERGY	SUBSTATION ENGINEERING DEPARTMENT	DRAWING NO D-14346 / REV NO 1
CADD	GBK	5 / 18 / 08			SHEET 1 OF 5
		/ /			
LAND ARCH	JCGA	5 / 18 / 08			
		/ /			
REVIEW		/ /	SCALE: 1" = 20'- 0"	CLASS: SITE	SCANNED / FILE NO
LOG OUT		/ /	CADD NO: D 14346 01_ L1.DWG		



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NOTES:
1. THE IRRIGATION PLAN IS DIAGRAMMATIC.

2. SEE SHEET 3 FOR IRRIGATION NOTES AND DETAILS. INSTALL MAINLINE, VALVES, PIPE, AND ASSOCIATED EQUIPMENT IN PLANTER BEDS OR GRASS AREAS.

IRRIGATION EQUIPMENT LEGEND

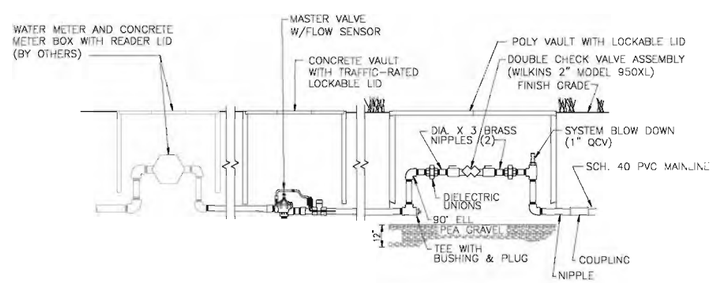
	RAIN BIRD	FS-200-B FLOW SENSOR
	RAIN BIRD	MASTER VALVE PEB SERIES
		GATE VALVE
	RAIN BIRD	AUTOMATIC CONTROL VALVE PLB SERIES
	RAIN BIRD	QUICK COUPLING VALVE #44-RC
	RAIN BIRD	RAIN SENSOR RSD-CEx
	DCVA ASSEMBLY	
M	WATER METER (SUPPLIED AND INSTALLED BY OTHERS)	
	RAIN BIRD ESP-LX MODULAR OUTDOOR 12-STATION ELECTRONIC CONTROLLER (INSTALL IN WYNCKIER POLYSAFE MODEL PS3020A ENCLOSURE. CONCRETE FOOTER FOR PEDESTAL BY OTHERS)	

VALVE LEGEND

1 / 1" / 8	STATION NUMBER VALVE SIZE GALLONS PER MINUTE
- - - - - - - -	SCHEDULE 40 PVC MAINLINE (SIZED AS SHOWN ON PLANS) (MINIMUM 18" BURY)
————	SCHEDULE 40 PVC LATERAL (1" SIZE UNLESS SHOWN OTHERWISE ON PLANS)
═══	SCHEDULE 40 PVC SLEEVES (SIZED AT DOUBLE WORKING PIPE DIAMETER)

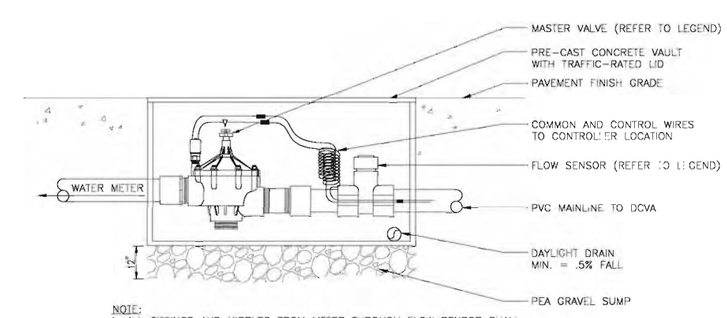
IRRIGATION EQUIPMENT LEGEND

QTHF	NOZ.	MANF.	MODEL NO.	RAD.	PATTERN	PSI				FLOW	
	8'	RAINBIRD	1806-SAM-PRS	8'	QTR, THRD, HLF, FULL	30	.26	.35	.52	1.05	VAR
	10'	RAINBIRD	1806-SAM-PRS	10'	QTR, THRD, HLF, FULL	30	.39	.53	.79	1.58	VAR
	12'	RAINBIRD	1806-SAM-PRS	12'	QTR, THRD, HLF, FULL	30	.65	.87	1.3	2.60	VAR



NOTE:
1. ALL FITTINGS AND NIPPLES FROM METER THROUGH FLOW SENSOR (SEE DETAIL B, THIS SHEET) SHALL BE SCH. 80 PVC OR BRASS; SIZE AND LENGTH AS REQUIRED OR AS NOTED.

A DOUBLE CHECK VALVE ASSEMBLY
NOT TO SCALE



NOTE:
1. ALL FITTINGS AND NIPPLES FROM METER THROUGH FLOW SENSOR SHALL BE SCH. 80 PVC OR BRASS; SIZE AND LENGTH AS REQUIRED OR AS NOTED.

B MASTER VALVE WITH FLOW SENSOR
NOT TO SCALE

0 20 40 60
SCALE: 1"=20

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
JONATHAN C. GAGE
CERTIFICATE NO. 852

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

PRELIMINARY- NOT FOR CONSTRUCTION

REVISION DESCRIPTION: ORIGINAL ISSUE

	APPROVAL	DATE (M/D/Y)
CADD	CCK	5 / 18 / 08
		/ /
LAND ARCH	JCGA	5 / 18 / 08
		/ /
REVIEW		/ /
LOG OUT		/ /

JUANITA SUBSTATION
IRRIGATION PLAN

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-14346
REV NO 0
SHEET 2 OF 5
SCANNED
FILE NO

SCALE: 1" = 20'- 0"
CLASS: SITE
CADD NO: D-14346 B2_IRI.DWG

$USER$
$DATE$

IRRIGATION NOTES

1. ALL NEW LANDSCAPE AREAS SHALL HAVE AN AUTOMATICALLY CONTROLLED IRRIGATION SYSTEM. SYSTEM SHALL BE DESIGNED TO CONSERVE WATER AND MINIMIZE OVERSPRAY ON, WALKS, VEHICLES AND OTHER SURFACES. IRRIGATION SYSTEM WORK INCLUDES EXCAVATING, BACKFILLING, SUPPLYING AND INSTALLING VALVES AND FITTINGS, PIPING AND FITTINGS, QUICK COUPLER VALVES, VALVE BOXES, AND ACCESSORIES, TESTING, AND WINTERIZING AND SPRING START UP.

2. THE IRRIGATION SYSTEM HAS BEEN DESIGNED FOR A MAXIMUM FLOW OF 35 GPM AT A STATIC PRESSURE OF 66 PSI. IF AVAILABLE PSI IS SIGNIFICANTLY LOWER THAN 66 PSI, CONTRACTOR SHALL CONTACT LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION FOR SYSTEM DESIGN ADJUSTMENT.

3. THE IRRIGATION PLAN IS DIAGRAMMATIC. INSTALL MAINLINE, VALVES, PIPE, AND ASSOCIATED EQUIPMENT IN PLANTER BEDS.

4. LOCATE ALL ABOVE AND BELOW GROUND UTILITIES AND PROTECT THEM FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE INCURRED DURING, OR AS A RESULT OF, CONSTRUCTION OF IRRIGATION SYSTEM.

5. IT SHALL BE THE LANDSCAPE CONTRACTOR'S RESPONSIBILITY TO COORDINATE INSTALLATION OF IRRIGATION SLEEVES WITH THE GENERAL CONTRACTOR.

6. INSTALL SYSTEM TO MEET ALL APPLICABLE CODES AND INSPECTIONS AND OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.

7. INSTALL ALL MATERIALS AND EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND RECOMMENDATIONS.

8. PROVIDE ONLY NEW MATERIALS, WITHOUT FLAWS OR DEFECTS AND OF THE HIGHEST QUALITY OF THEIR SPECIFIED CLASS AND KIND FOR COMMERCIAL USE.

A. PVC MAINLINE AND LATERAL PIPE SHALL BE CONSTRUCTED OF SCH. 40 PVC. ALL PIPES SHALL BE PERMANENTLY PRINTED WITH STANDARD PERTINENT INFORMATION.

B. PVC FITTINGS SHALL BE SCHEDULE 80 RATED FOR MAINLINE AND SCHEDULE 40 RATED FOR LATERALS AND MEET ASTM D2466 STANDARDS AND SPECIFICATIONS.

C. PVC NIPPLES SHALL BE SCHEDULE 80 RATED AND MEET ASTM D1785 REQUIREMENTS AND SPECIFICATIONS. ALL NIPPLES WILL HAVE TAPERED THREADS.

D. JOINING MATERIALS USED SHALL BE MANUFACTURED BY I.P.S. OR APPROVED EQUIVALENT, AND SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN SPECIFICATIONS AND SAFETY RECOMMENDATIONS.

E. THREADED CONNECTIONS (PVC) SHALL BE SEALED WITH TEFLON TAPE OR TEFLON PASTE.

F. IRRIGATION SLEEVES SHALL BE SCHEDULE 40 PVC AND SIZED DOUBLE THE DIAMETER OF THE PIPE RUNNING THROUGH IT.

G. CONTROLLER SHALL BE RAINBIRD ESP-LX MODULAR OUTDOOR 12-STATION OR APPROVED EQUIVALENT AND CABINET-MOUNTED IN A VYNCKIER POLYSAFE MODEL PS3020A ENCLOSURE OR APPROVED EQUIVALENT AS SHOWN ON PLANS. INSTALLATION SHALL BE ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COORDINATE LOCATION WITH OWNER.

H. ALL IRRIGATION WIRING TO BE "MULTISTRAND" WIRING.

I. INSTALL A RAINBIRD PEB-SERIES MASTER VALVE AT THE WATER METER. COORDINATE WITH OWNER.

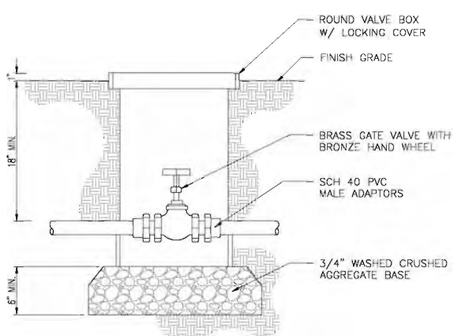
J. INSTALL A RAINBIRD FLOW SENSOR, MODEL FS-200-B, FLOW SENSOR DOWNSTREAM FROM MASTER VALVE.

9. CONTRACTOR SHALL PROVIDE IRRIGATION SYSTEM RECORD DRAWINGS LEGIBLY MARKED TO RECORD ACTUAL INSTALLATION. DRAWINGS SHALL INDICATE HORIZONTAL AND VERTICAL LOCATIONS, REFERENCED TO PERMANENT SURFACE IMPROVEMENTS. IDENTIFY FIELD CHANGES OF DIMENSION AND DETAIL INCLUDING CHANGES MADE BY CHANGE ORDER. AN 11"X17" PLAN SHALL BE LAMINATED AND PLACED AT THE CONTROLLER LOCATION LEGIBLY SHOWING COLOR-CODED ZONES.

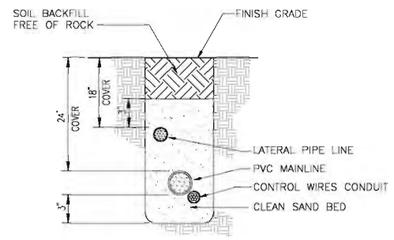
10. CONTRACTOR SHALL REVIEW ENTIRE SYSTEM WITH OWNER'S REPRESENTATIVE AND SUPPLY OPERATIONS MANUAL AND WARRANTIES.

11. WINTERIZATION: CONTRACTOR SHALL INSPECT SYSTEM, SHUTOFF AND DRAIN PIPE BETWEEN SHUTOFFS AND DOUBLE-CHECK VALVE AND BLOW OUT SYSTEM COMPLETELY BETWEEN OCTOBER 1 AND OCTOBER 15 DURING THE WARRANTY PERIOD FOR WINTERIZATION.

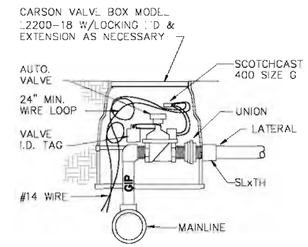
12. SPRING STARTUP: CONTRACTOR SHALL INSPECT, PRESSURIZE SYSTEM, REPAIR LEAKS AND ANY FAULTY WORK, ADJUST AND PROGRAM CONTROLLERS AS NECESSARY BEFORE MARCH 31 FOR SPRING STARTUP.



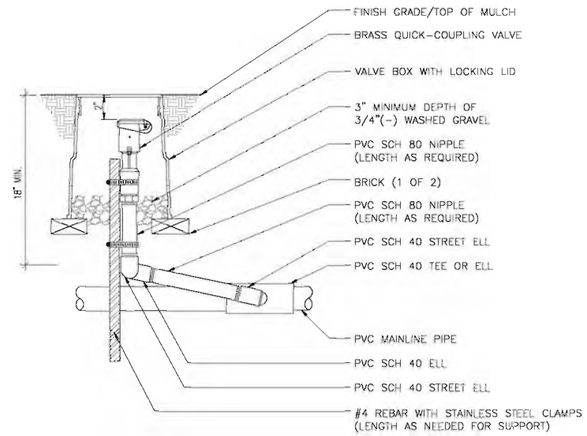
A GATE VALVE
NOT TO SCALE



B TRENCH DETAIL
NOT TO SCALE

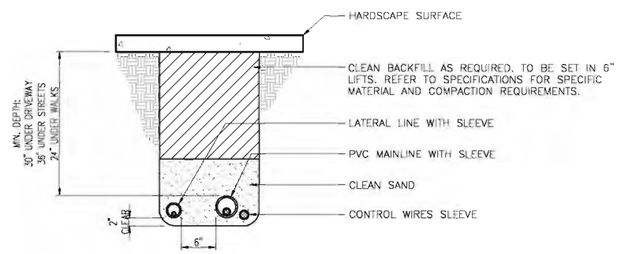


C AUTOMATIC CONTROL VALVE
NOT TO SCALE



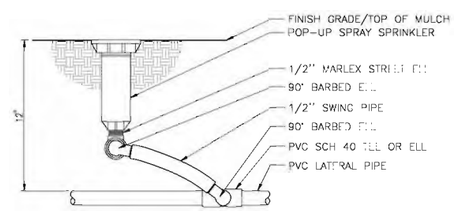
NOTE:
1. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.

F QUICK COUPLER VALVE
NOT TO SCALE

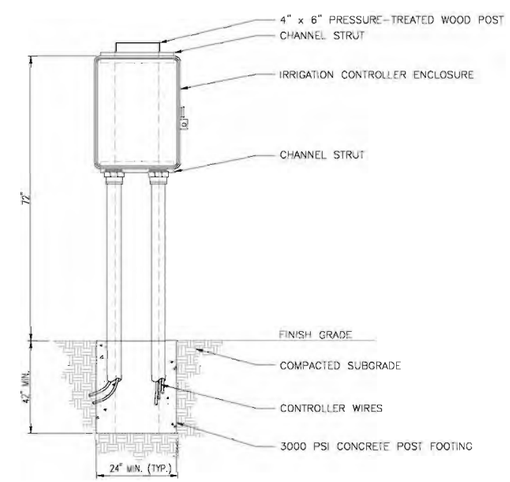


NOTES:
1. ALL SLEEVES TO BE PVC. SCH. 40 AND TWICE THE DIAMETER OF THE WORKING PIPE.
2. ALL SLEEVES TO RUN A MIN. OF 12" BEYOND HARDSCAPE EDGES.
3. CLEAN BACKFILL MAY BE SUBSTITUTED FOR SAND UNDER WALKS AND DRIVES.

D IRRIGATION SLEEVING
NOT TO SCALE



E POP-UP SPRAY SPRINKLER
NOT TO SCALE



G CONTROLLER INSTALLATION
NOT TO SCALE

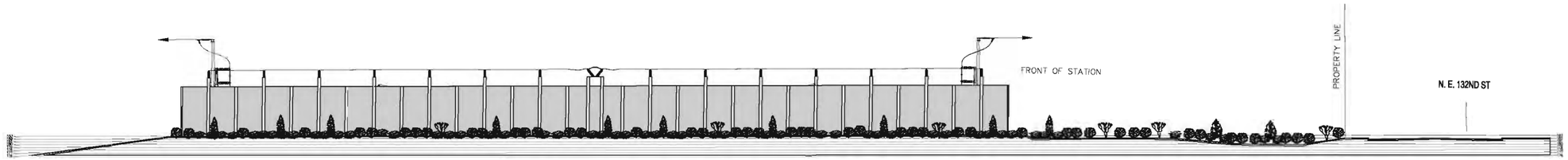
STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
JONATHAN C. GAGE
CERTIFICATE NO. 992

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

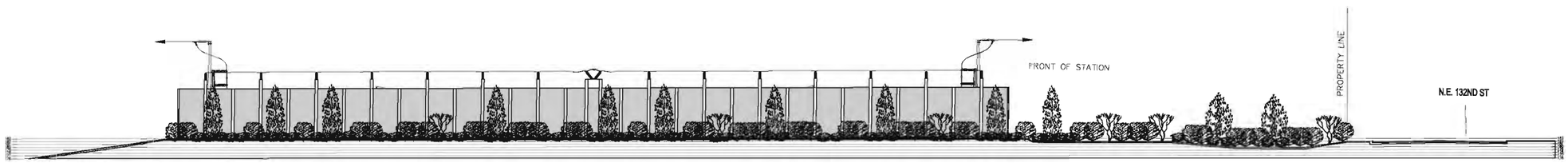
PRELIMINARY- NOT FOR CONSTRUCTION

REVISION DESCRIPTION: ORIGINAL ISSUE			JUANITA SUBSTATION IRRIGATION NOTES & DETAILS			
	APPROVAL	DATE (M/D/Y)				
CADD	CCK	5 / 18 / 08				
		/ /				
LAND ARCH	JCGA	5 / 18 / 08	PUGET SOUND ENERGY	SUBSTATION ENGINEERING DEPARTMENT	DRAWING NO D-14346	REV NO 0
		/ /			SHEET 3 OF 5	
REVIEW		/ /	SCALE:	CLASS: SITE	SCANNED	FILE NO
LOG OUT		/ /	CADD NO: D 14346 02. IRI. DWG			

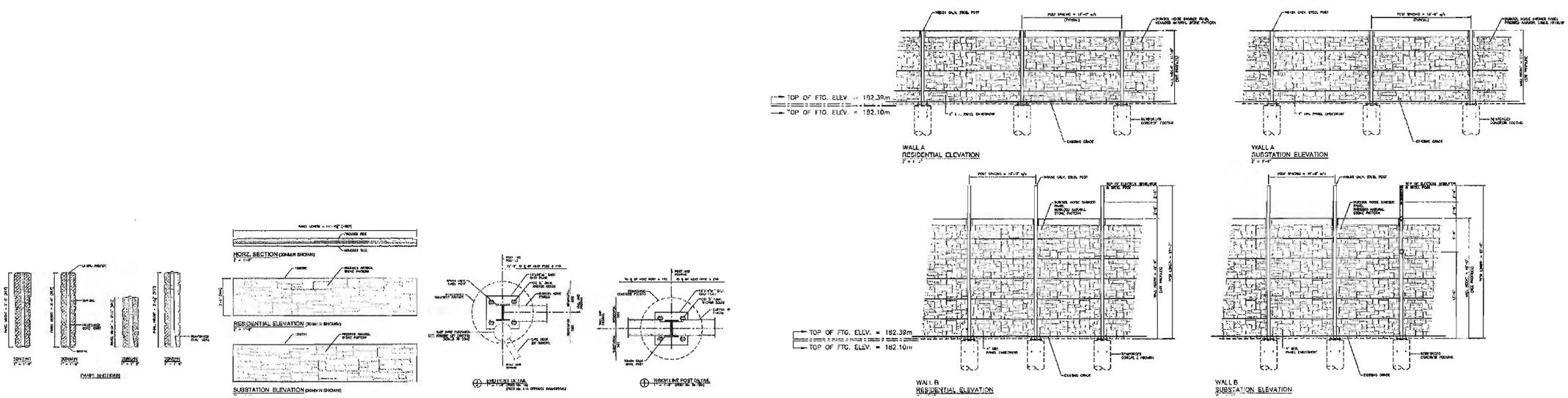
$USER$
$DATE$



PLANT SIZE AT INSTALLATION
EAST ELEVATION



PLANT SIZE AT 10 YEARS GROWTH
EAST ELEVATION



ELEVATION &
TYPICAL DETAILS

0 20 40 60
SCALE: 1"=20'

DAVID EVANS
AND ASSOCIATES INC.
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Bellevue Washington 98005-3518
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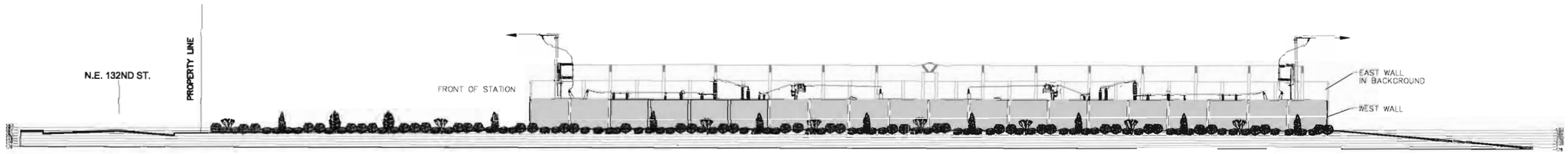
Durisol.
DURISOL INC.

REVISION DESCRIPTION: ORIGINAL ISSUE		
	APPROVAL	DATE (M/D/Y)
CADD	GBK	5 / 18 / 08
		/ /
LAND ARCH	JCGA	5 / 18 / 08
		/ /
REVIEW		/ /
LOG OUT		/ /

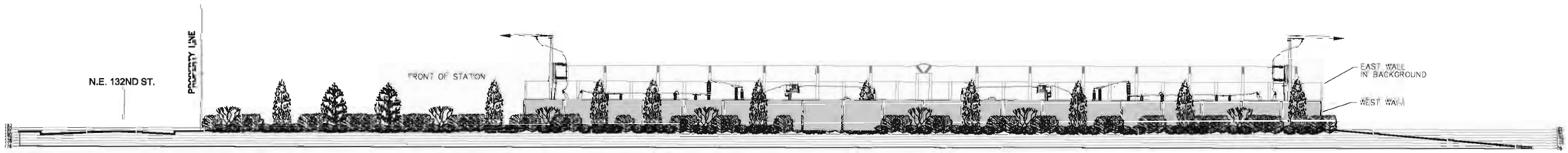
JUANITA SUBSTATION
EAST LANDSCAPE ELEVATION

PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-14346 — REV NO: 0
SHEET 4 OF 5
SCALE: — CLASS: SITE — SCANNED — FILE NO
CADD NO: D 14346 04_ELI.DWG



PLANT SIZE AT INSTALLATION
WEST ELEVATION



PLANT SIZE AT 10 YEARS GROWTH
WEST ELEVATION

DAVID EVANS
AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

0 20 40 60
SCALE: 1"=20'

REVISION DESCRIPTION: ORIGINAL ISSUE		
	APPROVAL	DATE (M/D/Y)
CADD	GBK	5 / 18 / 08
		/ /
LAND ARCH	JCGA	5 / 18 / 08
		/ /
REVIEW		/ /
LOG OUT		/ /

JUANITA SUBSTATION
WEST LANDSCAPE ELEVATION

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-14346
REV NO 0
SHEET 5 OF 5
SCANNED
FILE NO

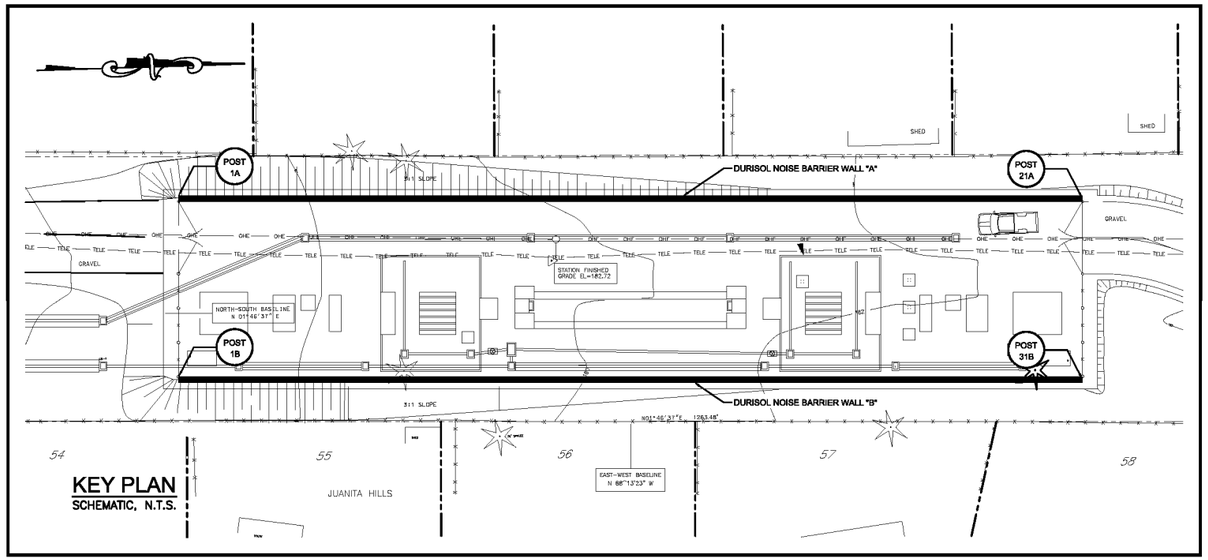
SCALE:
CLASS: SITE
CADD NO: D 14346 B5_ EL2.DWG

$USER$
$DATE$

Durisol® NOISE BARRIER WALL SYSTEM

JUANITA SUBSTATION

WASHINGTON STATE



GENERAL NOTES

1. DESIGN

1.1 The structure and its components have been designed in accordance with the following:
AISC Manual of Steel Construction - LRFD 2001.
AASHTO - LRFD Bridge Design Specifications- Latest Edition
AASHTO - Guide Specifications for Structural Design of Sound Barriers, 1989
1992 Revisions - 2002 interims
BOCA - 1999

1.2 All dimensions and sizes are given in feet and inches unless noted otherwise

2. LOADING

2.1 Design Wind Pressure = 25.0 psf

3. CONCRETE

3.1 All concrete work shall conform to ACI 318.
3.2 Concrete cylinder strength at 28 days shall not be less than:
Durisol Panels (Core).....5000 psi
Non-shrink Grout (by others).....5000 psi
Concrete in Footing (by others).....4350 psi

4. FOUNDATIONS

4.1 Foundation design based on geotechnical information provided by GeoEngineers Inc., prepared for Puget Sound Energy, report File No. 0186-750-00
4.2 Footing concrete to be cast entirely against undisturbed soil, compacted soil to 95% Standard proctor Density, or rock.

5. REINFORCING STEEL

5.1 All reinforcing steel shall be deformed bars and have a minimum yield strength of 60 ksi conforming to ASTM A615.
5.2 Welded wire reinforcement shall conform to ASTM A185.
5.3 Post and Panel steel to be Hot Dip Galvanized.

6. STRUCTURAL STEEL

6.1 All structural steel work to comply with AASHTO M270 (ASTM A709), grade 345 W (50 ksi).
6.2 All plates shall conform to AASHTO M270 (ASTM A709)
Minimum yield strength = 345 MPa (50 ksi)
6.3 All fasteners/Anchor Bolts to be hot-dip galvanized to comply with ASTM A449.
Minimum ultimate strength = 725 MPa (105 ksi).
6.4 All components shall be hot dip galvanized after fabrication and comply with ASTM A123.
6.5 Galvanized surfaces which are abraded shall be cleaned and painted with two coats of zinc-rich paint.

7. WELDING

7.1 All welding and the preparation and assembly of materials for welding shall conform to the Standard Specifications for Highway and Bridge Welding Code (ANSI / AASHTO / AWSD1.5) and all interim revisions published by AASHTO as of 2000.

8. ACOUSTIC PROPERTIES

8.1 Noise Reduction Coefficient (NRC)
8.1.1 Minimum NRC for Absorptive Classification ≥ 0.70.
8.1.2 Durisol panels when tested in accordance with ASTM Standard C423-81, free standing, in accordance with ASTM Standard E795-81, record a minimum NRC ≥ 0.70 (both faces).
8.2 Sound Transmission Coefficient (STC)
8.2.1 The Durisol wall meets the minimum STC ≥ 42 when measured in accordance with ASTM Standard E90-75.

9. INSTALLATION

9.1 Posts identified by numbers shown on elevation drawings.
9.1.1 Posts shall be installed plumb to within a tolerance of ± 1/4" in 10'-0" and on lines and spacings specified within ± 3/8", or as per contract.
9.2 Bay of panels identified by post number to left of bay.
9.3 Each panel in bay identified by code showing type, size and orientation.
9.4 All panels to be level horizontally unless noted otherwise.
9.5 The Contractor shall verify all dimensions on site and correlate with construction drawings. The Engineer shall be notified of any discrepancies prior to commencing with construction.

Durisol®
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UNITED STATES OFFICE
Durisol USA Inc. 8270 Greensboro Drive, Suite 630
McLean, Virginia, U.S.A. 22102
Phone: 866-801-0999 * Fax: 877-268-8813

000.00 = TOP OF CONCRETE FOUNDATION ELEVATION (ft)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.08	CLG	ISSUED FOR APPROVAL

REVISIONS

PROJECT TITLE: JUANITA SUBSTATION

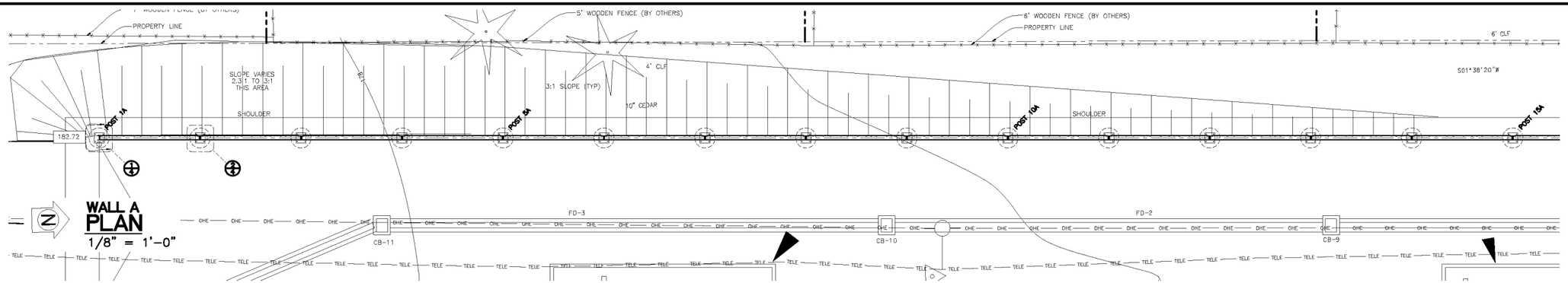
LOCATION: WASHINGTON, USA

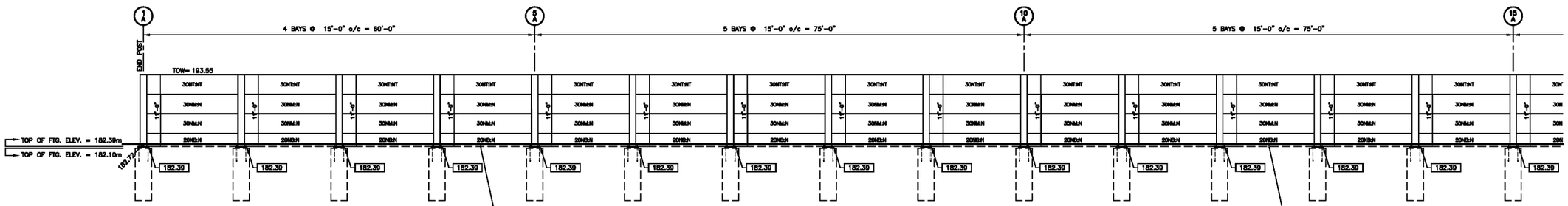
DRAWING TITLE: TITLE SHEET

FEDERAL PROJECT No:

STATE PROJECT No:

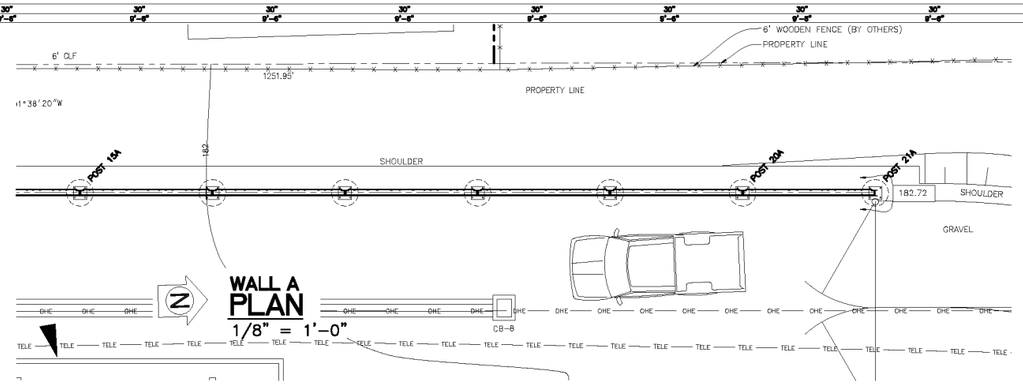
SCALE: NOTED	ACAD FILE: 08rc025-01.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
CHECKED BY: GJS	
DATE: MAY 5, 2008	SHEET No: 1 of 6
DATE of PRINT: MAY 9, 2008	

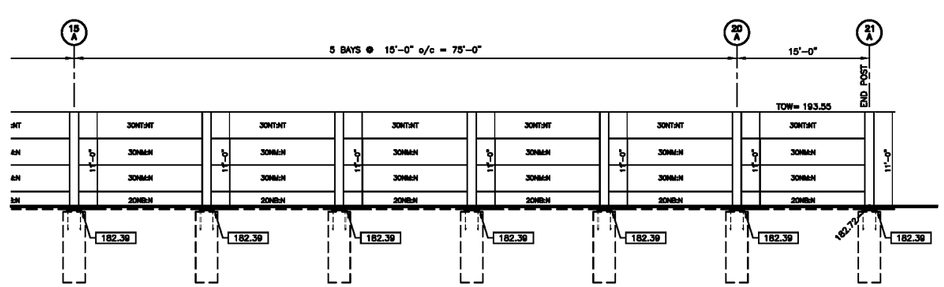




NOISE BARRIER WALL A ELEVATION
1/8" = 1'-0" (VIEW FROM SUBSTATION SIDE)

POST TYPE	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	POST TYPE
PLATE THICKNESS	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	PLATE THICKNESS
ANCHOR BOLT DIA.	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	ANCHOR BOLT DIA.
FAB. POST TYPE																	FAB. POST TYPE
FTG. DIAMETER	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	FTG. DIAMETER
FTG. DEPTH	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	FTG. DEPTH





NOISE BARRIER WALL A ELEVATION
1/8" = 1'-0" (VIEW FROM SUBSTATION SIDE)
(CONTINUED...)

POST TYPE	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	W8x24x11'-0"	POST TYPE
PLATE THICKNESS	1"	1"	1"	1"	1"	1"	1"	PLATE THICKNESS
ANCHOR BOLT DIA.	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	7/8"	ANCHOR BOLT DIA.
FAB. POST TYPE								FAB. POST TYPE
FTG. DIAMETER	30"	30"	30"	30"	30"	30"	30"	FTG. DIAMETER
FTG. DEPTH	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	9'-6"	FTG. DEPTH

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Phone: 866-801-0999 * Fax: 877-268-8813

000.00 = TOP OF CONCRETE FOUNDATION ELEVATION (R)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.08	CLG	ISSUED FOR APPROVAL

REVISIONS

PROJECT TITLE:
JUANITA SUBSTATION

LOCATION:
WASHINGTON, USA

DRAWING TITLE:
WALL A PLAN & PROFILE

FEDERAL PROJECT No:

STATE PROJECT No:

SCALE: NOTED	ACAD FILE: 08rc025-02.dwg
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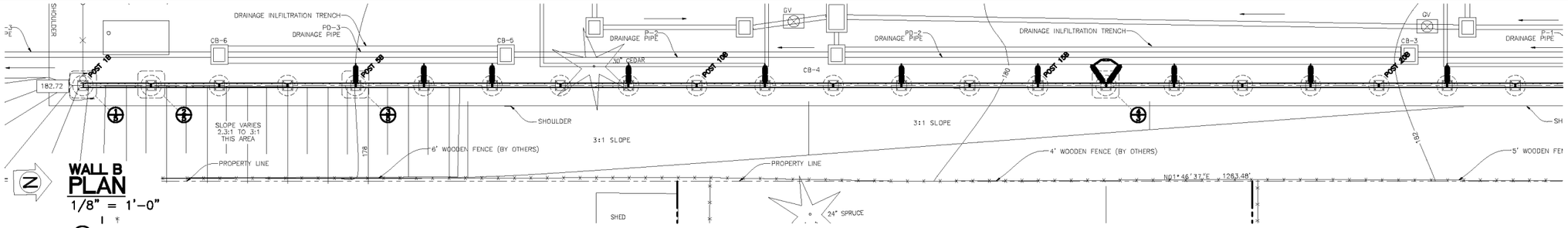
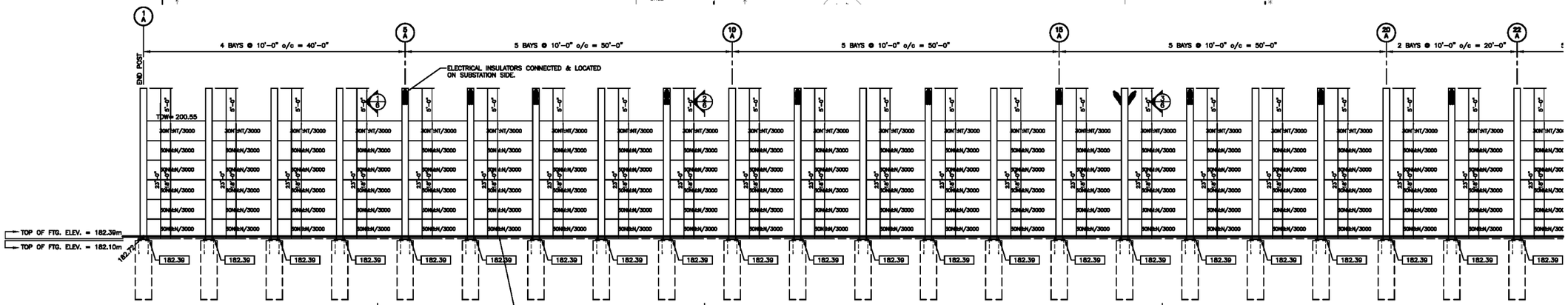
CHECKED BY: GJS	
DATE: MAY 5, 2008	SHEET No: 2 of 6
DATE of PRINT: MAY 9, 2008	



WALL B PLAN

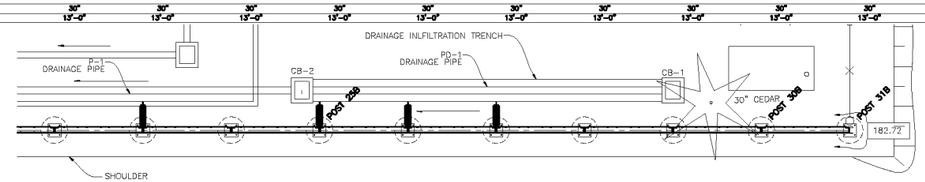
1/8" = 1'-0"

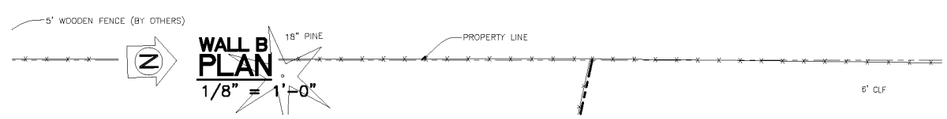


NOISE BARRIER WALL B ELEVATION

1/8" = 1'-0" (VIEW FROM RESIDENTIAL SIDE)

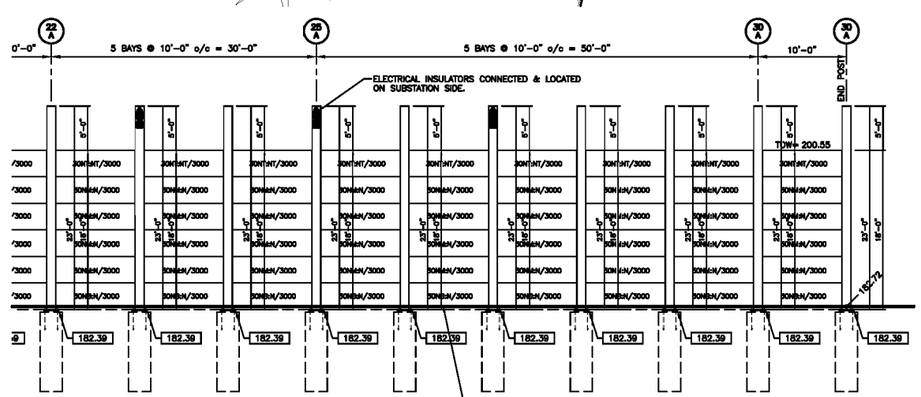
POST TYPE	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	POST TYPE
PLATE THICKNESS	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	PLATE THICKNESS
ANCHOR BOLT DIA.	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	ANCHOR BOLT DIA.
FAB. POST TYPE																														FAB. POST TYPE
FTG. DIAMETER	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"	FTG. DIAMETER
FTG. DEPTH	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	FTG. DEPTH





WALL B PLAN

1/8" = 1'-0"



NOISE BARRIER WALL B ELEVATION

1/8" = 1'-0" (VIEW FROM RESIDENTIAL SIDE)

POST TYPE	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"	WB-58x23'-0"
PLATE THICKNESS	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"
ANCHOR BOLT DIA.	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"
FAB. POST TYPE										
FTG. DIAMETER	30"	30"	30"	30"	30"	30"	30"	30"	30"	30"
FTG. DEPTH	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"	13'-0"

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No.	DATE:	BY:	DESCRIPTION:
1	05.09.08	CLG	ISSUED FOR APPROVAL

REVISIONS

PROJECT TITLE:

JUANITA SUBSTATION

LOCATION:

WASHINGTON, USA

DRAWING TITLE:

WALL B PLAN & PROFILE

FEDERAL PROJECT No:

STATE PROJECT No:

SCALE: NOTED	ACAD FILE: 08rc025-03.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
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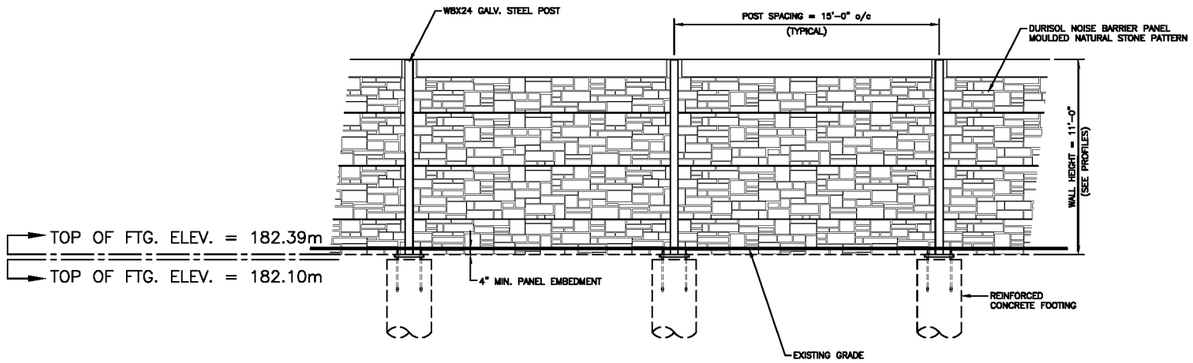
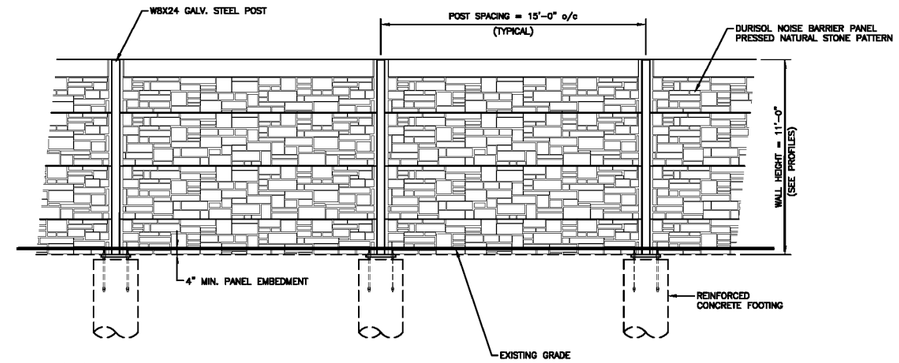
DATE: MAY 5, 2008	SHEET No: 3 of 6
DATE of PRINT: MAY 9, 2008	



WALL A
RESIDENTIAL ELEVATION
$\frac{3}{8}$" = 1'-0"



WALL A
SUBSTATION ELEVATION
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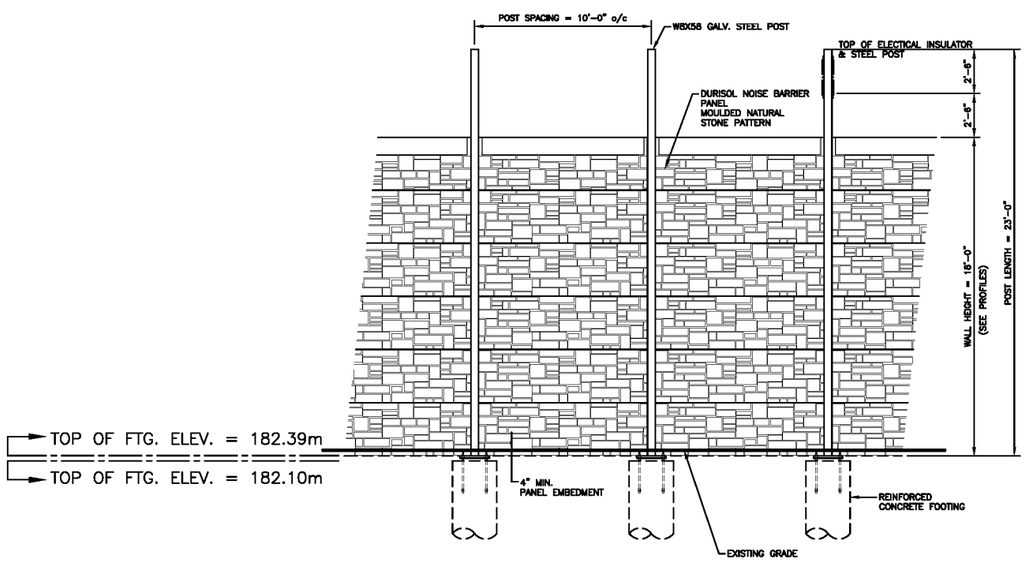

WALL B
RESIDENTIAL ELEVATION
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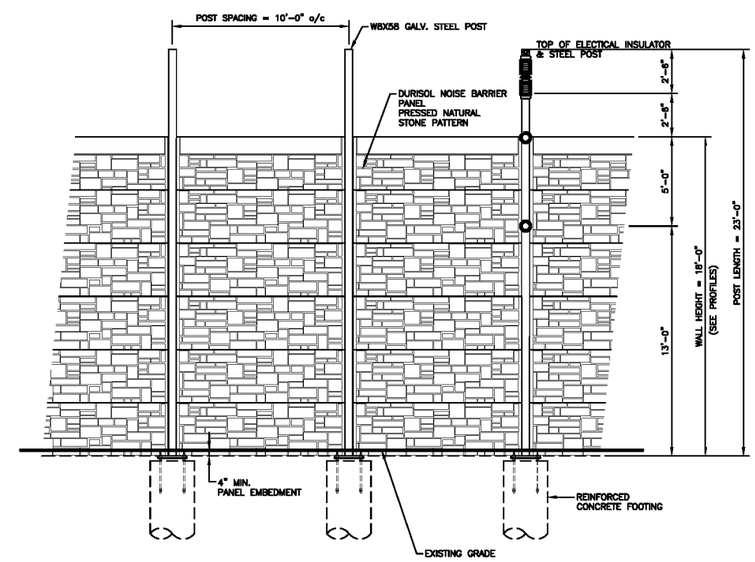

WALL B
SUBSTATION ELEVATION
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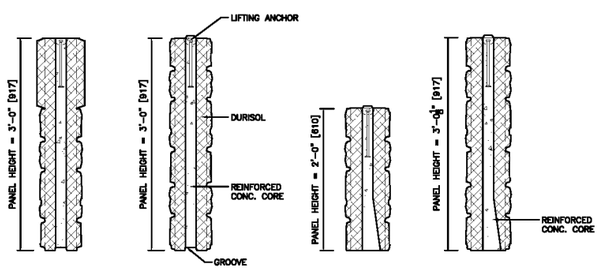


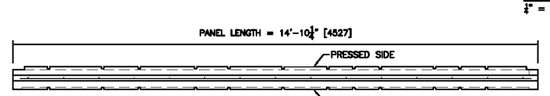
30NT:NT
1" = 1'-0"

30NM:N
1" = 1'-0"

20NB:N
1" = 1'-0"

30NB:N
1" = 1'-0"

PANEL SECTIONS



HORZ. SECTION (30NM:N SHOWN)
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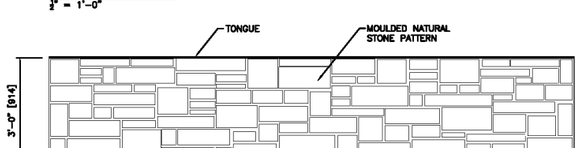
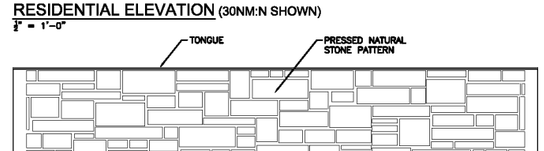
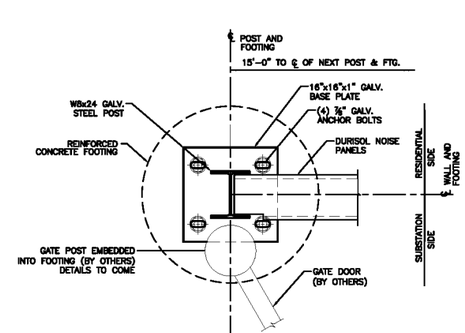


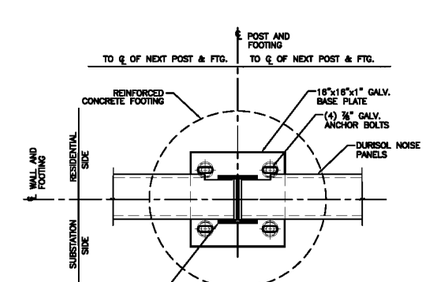
RESIDENTIAL ELEVATION (30NM:N SHOWN)
$\frac{3}{8}$" = 1'-0"



SUBSTATION ELEVATION (30NM:N SHOWN)
$\frac{3}{8}$" = 1'-0"



1/4 END POST DETAIL
1" = 1'-0" (POST No. 1A)
(POST No. 21A OPPOSITE SYMMETRICAL)



2/4 W8x24 LINE POST DETAIL
1" = 1'-0" (POST No. 2A–20A)

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(000.00) = TOP OF CONCRETE FOUNDATION ELEVATION (R)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.08	CLG	ISSUED FOR APPROVAL

REVISIONS

PROJECT TITLE:
JUANITA SUBSTATION

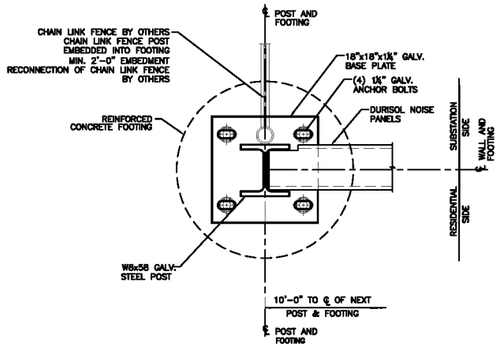
LOCATION:
WASHINGTON, USA

DRAWING TITLE:
ELEVATION & TYPICAL DETAILS

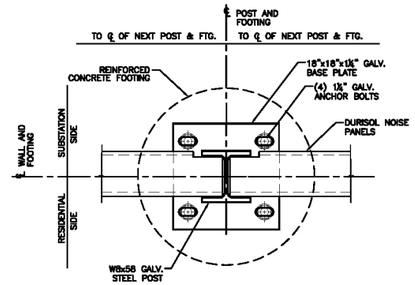
FEDERAL PROJECT No:

STATE PROJECT No:

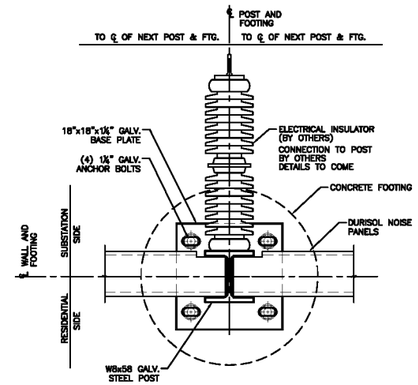
SCALE: NOTED	ACAD FILE: 08rc025-04.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
CHECKED BY: GJS	
DATE: MAY 5, 2008	SHEET No: 4 of 6
DATE of PRINT: MAY 9, 2008	



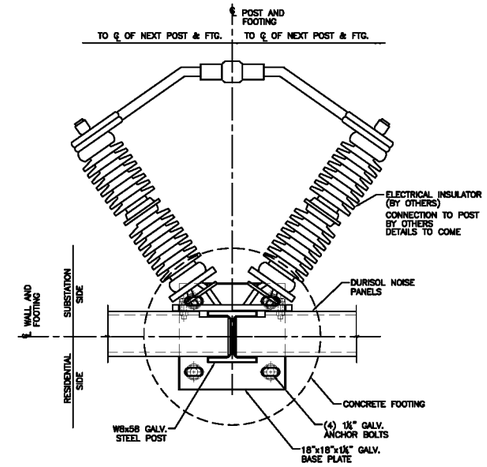
1/5 END POST DETAIL
1" = 1'-0" (POST No. 1B)
(POST No. 31B OPPOSITE SYMMETRICAL)



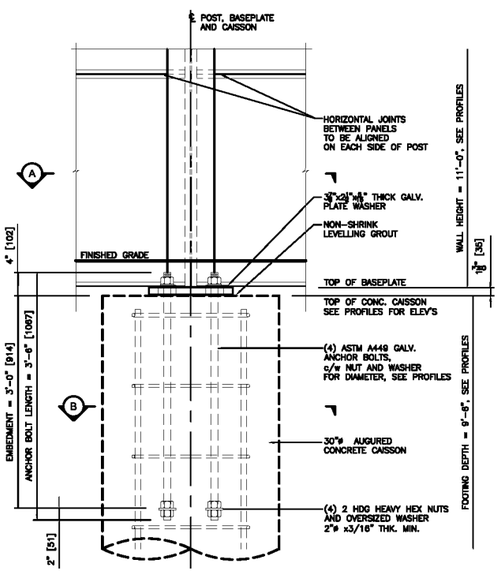
2/5 W8x58 LINE POST DETAIL
1" = 1'-0" (POST No. 2B-4B, 6B, 10B, 12B, 14B, 18B, 20B, 22B, 24B, 28B-31B)



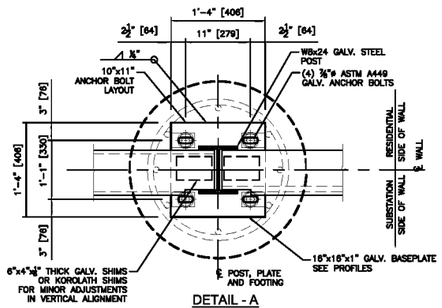
3/5 LINE POST DETAIL
1" = 1'-0"



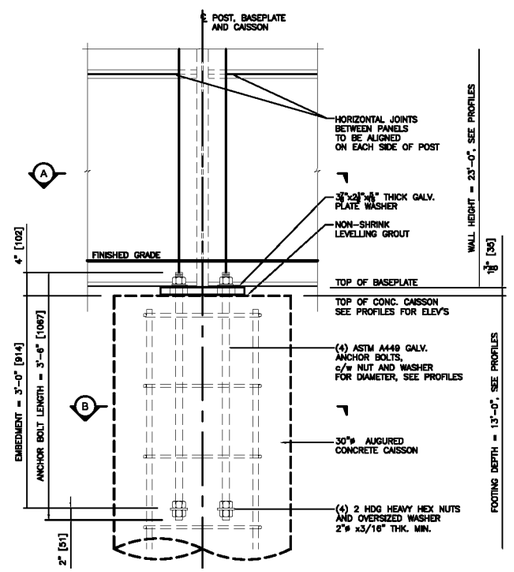
4/5 LINE POST DETAIL
1" = 1'-0"



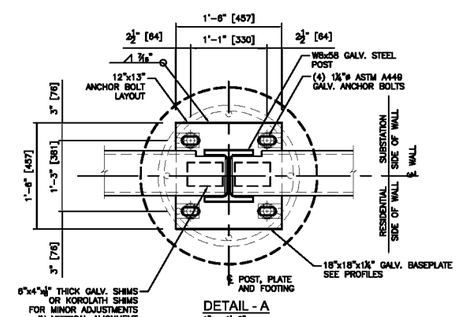
POST DETAIL- WALL A
1" = 1'-0" (TYPICAL)



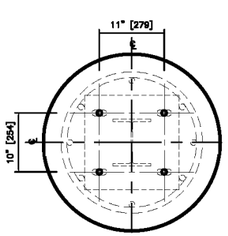
DETAIL - A
1" = 1'-0"



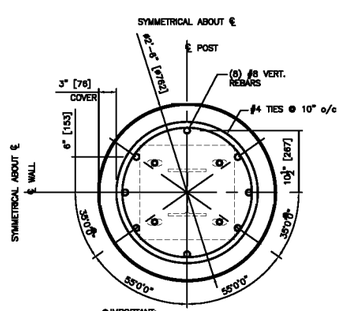
POST DETAIL- WALL B
1" = 1'-0" (TYPICAL)



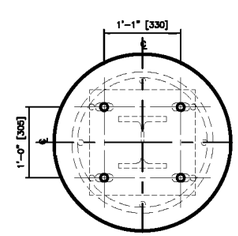
DETAIL - A
1" = 1'-0"



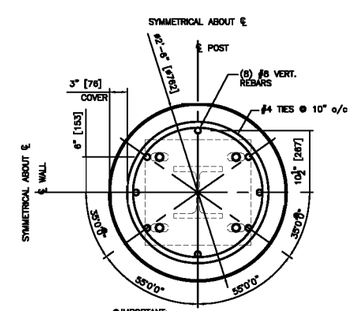
ANCHOR BOLT TEMPLATE DETAIL
1" = 1'-0"



DETAIL - B
1" = 1'-0"



ANCHOR BOLT TEMPLATE DETAIL
1" = 1'-0"



DETAIL - B
1" = 1'-0"

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No.	DATE:	BY:	DESCRIPTION:
1	05.09.08	CLG	ISSUED FOR APPROVAL

REVISIONS

PROJECT TITLE:
JUANITA SUBSTATION

LOCATION:
WASHINGTON, USA

DRAWING TITLE:
TYPICAL DETAILS

FEDERAL PROJECT No:
STATE PROJECT No:

SCALE: NOTED	ACAD FILE: 08rc025-05.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
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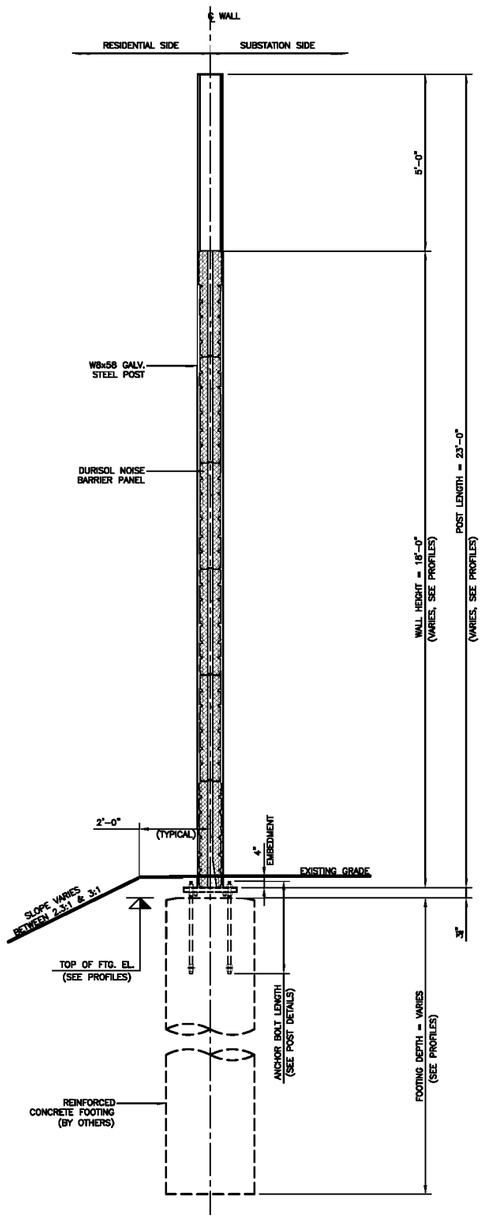
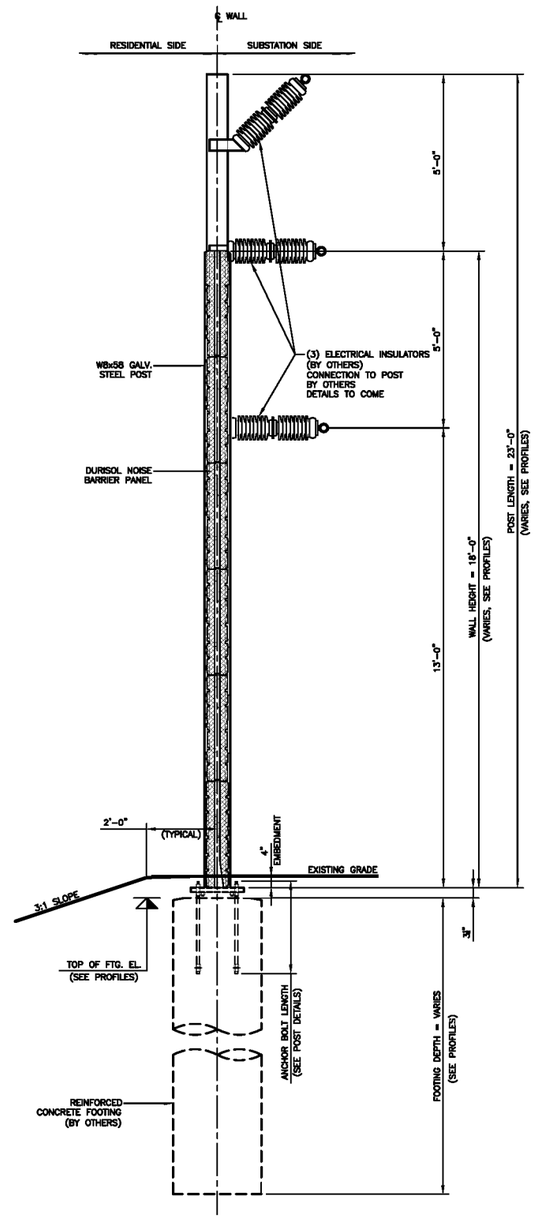
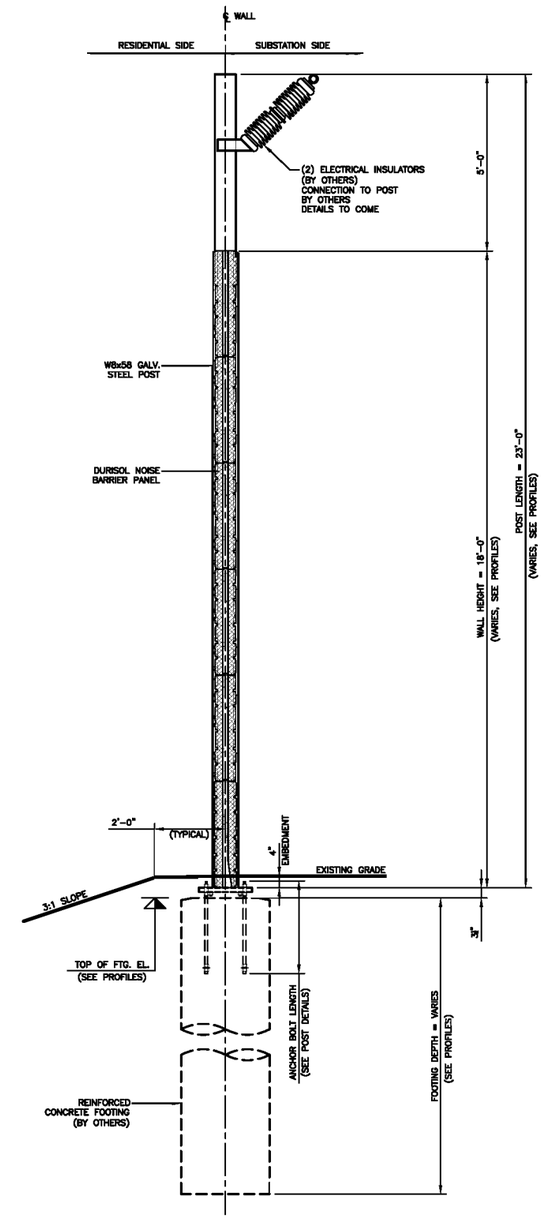
DATE: MAY 5, 2008	SHEET No: 5 of 6
DATE of PRINT: MAY 9, 2008	



1/6 SECTION "WALL B"
1/2" = 1'-0"



2/6 SECTION "WALL B"
1/2" = 1'-0"



3/6 SECTION "WALL B"
1/2" = 1'-0"

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REVISIONS

PROJECT TITLE:
JUANITA SUBSTATION

LOCATION:
WASHINGTON, USA

DRAWING TITLE:
SECTIONS

FEDERAL PROJECT No:

STATE PROJECT No:

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RESPONSE TO CITY OF KIRKLAND TYPE IIA DECISION CRITERIA
PSE – JUANITA SUBSTATION

City of Kirkland Zoning Code 17.10.070 Public Utility Special Regulations:

- *Site design must minimize adverse impacts on surrounding residential neighborhoods.*

  The PSE utility corridor is bordered by single family development for the length of corridor. Potential impacts to residences adjacent to that portion of the corridor containing the rebuilt and expanded substation include operational noise impacts, aesthetic/visual impacts and impacts from electric and magnetic fields (EMF).

  Noise. A Sound Analysis was prepared for this project in order to evaluate future sound levels from the new electrical transformers proposed for this substation on the adjacent residential properties. Existing City of Kirkland/State of Washington noise regulations limit sound levels produced at the substation and received at nearby residences to 55 dBA during all hours. Most residential properties are subject to a nighttime noise limitation of 45 dBA; substations are exempt from this standard (WAC 173-60).

  The Sound Analysis concluded that, without mitigation, "*…A-weighted sound levels produced by the proposed transformers would meet the State of Washington daytime and nighttime noise limit of 55 dBA at all Analysis Locations.*" The analysis also concluded that at the property-line locations closest to the two transformers, "*…the predicted sound levels are higher than existing nighttime sound levels by 5 to 9 dBA. These sound-level increases would be considered a significant noise impact according to EPA guidelines, and would be noticeable.*"

  To address this noticeable increase, 300-foot long Durisol sound walls have been added to the east and west sides of the substation. With the addition of these sound walls (18 feet and 11 feet in height, respectively), the sound levels produced by the transformers "*…would be in the range of or lower than existing nighttime sound levels at the nearest Monitoring Locations, and would be below the nighttime noise limit of 45 dBA…*" that would apply to residential receiver properties if the substation was not exempt. Details regarding the specifications for the sound walls are contained in the attached Sound Analysis.

  It should also be noted that because the substation is an unoccupied structure, the substation will not generate the noise and activity typically associated with occupied structures.

  Aesthetics/Visual Impact. Both the east and west side yards of the rebuilt substation will abut the rear yards of adjacent residences. Potential visual impacts will be minimized by the presence of the two sound walls and 13-foot landscape buffers located between the sound walls and the side property lines.

  That side of the sound wall facing residential lots will be textured, similar to brick or rocks. Periodic columns will divide the horizontal space; smooth vertical accents will also be

located between columns. PSE will consult with adjoining property owners regarding the color of the walls.

The adjoining 13-foot wide landscape buffers will include a total of 45 evergreen and deciduous shrubs trees, 5 to 8- feet in height at initial installation, and shrubs.

Two termination structures (pole with cross-arms), that have a small foot print and are located at the far north and far south ends of the substation, will extend to a height of thirty five (35) feet. The Durisol sound walls at eleven (11) feet and eighteen (18) feet in height are the tallest solid structures on the site. Some electrical equipment mounted on the inside of the eighteen foot Durisol sound wall will extend approximately six feet above that wall. For purposes of comparison, existing zoning regulations allow a solid structure 30-feet in height to be located 20-feet back from the side lot line.

Four existing electrical distribution poles, approximately forth-five (45) feet in height, will be removed, and all above-ground distribution lines will be removed, as part of the substation rebuild project.

EMF. The project will not create any known environmental health hazards. PSE's substations, transmission and distribution facilities are designed, constructed, and operated in accordance with all applicable federal, state, and local regulations and safety codes.

Electrical transmission lines, distribution lines, and substations create electric and magnetic fields (EMF). EMF also exists in nature and around all types of electrical devices and appliances. Electric fields are produced by the presence of electrical charges (voltage); the movement of these charges (current) produces magnetic fields. The electrical and magnetic fields around electrical appliances and utility facilities are referred to as extremely low frequency EMF. They have a significantly lower frequency (60 cycles per second, or Hz), than radio broadcast waves (0.5 to 100 million cycles per second) or electromagnetic energy from sunshine (1,000 trillion cycles per second). Extremely low frequency EMF does not have sufficient energy to break molecular bonds or damage DNA.

Substations are not a predominant source of magnetic fields for surrounding properties. The incoming transmission lines and the outgoing distribution lines mostly influence the magnetic fields associated with substations. These power lines exist and are located throughout the region and pass through the neighborhoods that the substation serves. The construction of the Juanita Substation will not significantly change the existing EMF conditions at the project site or the surrounding properties. The substation will be located adjacent to the existing transmission line already located on the property.

PSE relies on the independent scientific research community for information regarding EMF and potential health effects. The consensus of the scientific community is described in a number of reports that have been released by respected independent scientific groups representing a variety of disciplines including physics, epidemiology, and cellular biology. A review of these sources has found no causal relationship between exposure to extremely low frequency EMF associated with 60 Hz electrical facilities and adverse effects to human

health. Currently the EPA or any other health agency of the state or federal government does not regulate electric and magnetic fields. This is consistent with the consensus of the scientific community that there is no basis from which to conclude the exposures to EMF cause adverse health effects.

150.65 3. Hearing Examiner Decisional Criteria:

a. It is consistent with all applicable development regulations and, to the extent there is no applicable development regulation, the Comprehensive Plan; and

Consistency with all Applicable Development Regulations. The proposal is consistent with development regulations, either as permitted outright or in compliance with all criteria for variance from development regulations, as set forth in Section 120.20 of the Kirkland Zoning Code. Variance from development standards is justified based on the property's shape and its current location as a utility substation served by existing transmission lines that are part of the community's overall electrical service grid.

Consistency with Comprehensive Plan. Rebuilding the Juanita Substation is consistent with and anticipated by the City of Kirkland Comprehensive Plan. The proposed substation expansion will increase electrical service capacity and improve reliability, consistent with the level of urban growth proposed in the Plan, and utility objectives. Section XI, Utilities of the Comprehensive Plan states:
"The primary focus of the City in the coming years will be to continue to increase efficiency and to avoid maintenance problems associated with older facilities."

Further, as also noted in the *Comprehensive Plan: "PSE's long-range plans through the year 2022 indicate the need for three new distribution substations in Kirkland and a new 115 kV line along the eastern and northern City boundaries to connect to the Sammamish substation in Redmond.*"

The expansion of the Juanita substation may delay the need for one of the three new substations.

b. *It is consistent with the public health, safety and welfare.*

Rebuilding and expanding the Juanita substation is consistent with the public health, safety and welfare. Expansion of the substation is required to meet the increased demand for electricity in the Juanita/Totem Lake area and to increase the reliability of the electrical system in the immediate service area. After the rebuild is complete, the substation will have a "looped" configuration due to the addition of a second transformer. This means that the substation can continue to function even if a transmission line to the north or to the south of the substation is disrupted. Rebuilding and expanding the substation will benefit persons and properties using electrical power in the community.

RESPONSE TO CITY OF KIRKLAND VARIANCE CRITERIA
PSE—JUANITA SUBSTATION

Requested Variances

Side Yard Setback Variance:

- For a distance of approximately 300 feet along the 1270 foot length of the parcel, side yard setbacks for the substation structure are proposed to be 13-feet each, rather than 20-feet each as specified in KZC 17.10.070. The setback area will be occupied by landscape plantings, including trees and shrubs, and sound walls will be placed at the inner edge of the setback areas, 13 feet from the side lot lines. The remaining 970 foot length of the parcel is largely undeveloped, and does not require a side yard variance.

Landscape Buffer Variance:

- Related to the distance from the substation to the side property lines, a variance is requested for reduction of the landscape buffer requirement (KZC 95.40(6)(a), Buffering Standard 1), from 15-feet to 13-feet along the east and west side yards of the substation.

Height Variance:

- At the north and south ends of the substation enclosure, termination structures, consisting of a steel support with cross-arms, will extend approximately 35 feet above ground elevation. A variance to KZC 17.10.070 (height limit of 30 feet above average building elevation) will be required for these two termination structures. No other element of the proposed substation structure exceeds the 30 foot height limit. Existing transmission poles and distribution poles between 128th St. and the new substation location currently exceed 30 feet in height and are legally nonconforming. The existing transmission poles and transmission lines (poles approximately 70 feet in height and lines between approximately 50 to 65 feet in height) will remain in place to serve the new substation location, but four (4) existing distribution poles, approximately forty-five (45) feet in height, will be removed, and all above-ground distribution lines will be removed. New transmission poles exceeding 30 feet in height will be installed between the substation and 132nd Street when a Juanita to Redmond transmission line is constructed at some time in the future.

Background:

The requested variances are essential for expansion of the existing Juanita electrical substation within the existing PSE-owned utility corridor. The substation serves a critical function at this location in the area's electrical power grid, transforming power from the higher voltage transmission lines to the lower voltage distribution lines that serve the community.

For the area served by Juanita substation and the City as a whole, the substation rebuild will increase electrical service capacity and improve reliability, benefiting property owners and electrical customers. In the current condition, a break in any transmission line serving the

substation, as sometimes occurs during severe weather, results in an electrical outage to all customers served by the substation. After the rebuild is complete, the substation will have a "looped" configuration, meaning that the substation can continue to function even if a transmission line to the north or to the south of the substation is disrupted. The proposed substation rebuild project is consistent with the City's Comprehensive Plan. Section XI, Utilities, in the Kirkland Comprehensive Plan states that "The primary focus of the City in the coming years will be to continue to increase efficiency and to avoid maintenance problems associated with older facilities."

Existing Nonconformities:

The current substation is legally nonconforming as to setback and landscape buffer requirements, as it was developed under prior code provisions. The current substation is set back by only about 4 feet from the east property boundary, and no landscape buffer is provided. Outside the substation itself, a number of power poles supporting distribution lines and transmission lines currently exceed the 30 foot height limit.

Substation Design:

Variances are required because electrical safety code standards require certain vertical and horizontal separation distances between the electrical components within the substation in order to provide for proper operation of the equipment and for worker safety. The narrow site, which varies from approximately 80 to 89 feet in width, does not allow the required separation distances between electrical components if 20 foot side yards are provided. Also, electrical safety code standards cannot be met if the poles and termination structures are limited to 30 feet in height.

The rebuilt substation will be centered within the utility corridor, on the widest portion of the corridor. The substation will be bordered by sound walls (i.e., noise mitigation walls) on both the east and west sides, with substantial landscape plantings facing the adjoining residential properties in order to minimize potential impacts. The 13-foot wide landscape plantings , located in both side yards, will include a total of 45 evergreen and deciduous trees (Vine Maple, Incense Cedar, Austrian Black Pine, Western Red Cedar, Cascara, and American Aborvitae) 5- to 8-feet in height at initial installation, and shrubs (Serviceberry, Pacific Wax Myrtle, Tall Oregon Grape, and Snowberry). A landscape plan is attached to this application.

Noise Mitigation:

A Sound Analysis was prepared for this project by BRC Acoustics & Technology Consulting, in order to evaluate future sound levels from the new electrical transformers on adjacent residential properties. Existing City of Kirkland/State of Washington noise regulations limit sound levels produced at the substation and received at nearby residences to 55 dBA during all hours. This analysis concluded that, without mitigation, the sound levels produced by the proposed transformers would meet the State of Washington daytime and nighttime noise limit of 55 dBA at all the Analysis Locations in the report. However, the analysis also concluded that, without mitigation, the predicted sound levels at the property line locations closest to the two

transformers would be higher than existing nighttime sound levels by 5 to 9 dBA, which would be a noticeable increase.

To address this, Durisol sound walls, 300 feet in length, have been added to the east and west sides of the substation, as recommended in the Sound Analysis report. Both the east and west sound walls will be constructed without gaps, including along the ground. A photograph of a similar sound wall is attached to this application. PSE will consult with the adjacent property owners regarding the color of the sound walls.

With the addition of these sound walls (18-feet and 11-feet in height, respectively), the Sound Analysis report concluded that the sound levels produced by the transformers would be in the range of or lower than existing nighttime sound levels at the nearest Monitoring Locations. The mitigated sound levels would also be below the nighttime noise limit of 45 dBA that would apply to residential receiver properties if utility substations were not an exempted noise source. Specifications for the sound walls are contained in the attached Sound Analysis report.

Variance Analysis:

For SIDE YARD SETBACK VARIANCE; compliance with variance criteria:

1. *The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole.*

To better understand the effect of the requested variances, the substation proposal, with variances, can be compared to the bulk and scale of a structure that would be permitted outright on this site, without variances. A solid structure thirty (30) feet in height could be located 20 feet from the side property lines without variances. However, for the proposed substation, the highest solid structures are considerably lower. The substation sound walls are 11 feet in height for the westerly wall and 18 feet in height for the easterly wall, and except for termination structure poles at the far north and south ends, the equipment within the substation does not exceed 24 feet in height. Although the termination structure poles are slightly higher than 30 feet, they do not have the bulk or scale of solid structures, and occupy only a small footprint at the extreme north and south ends of the substation enclosure.

Also, as shown in the graphic attached as Figure 1, the viewing angles from the adjacent property line demonstrate less apparent bulk and scale impact from that location than would result from a building 30 feet in height constructed without variances, i.e., with setbacks of twenty (20) feet from the side property lines.

In addition, other characteristics of this project further demonstrate that the requested setback variances do not cause material detriment to neighboring properties. Due to the nature of this project, the setback variances do not impair setback functions of preserving privacy from neighboring uses and reducing impacts of noise and activity on adjoining properties. The PSE substation is an unstaffed facility; there are no potential impacts on privacy which might occur if a staffed facility was proposed here. Also, no activity will take place within the side yard setbacks, such as driveways or parking. The setback areas will be used only as landscaped buffer areas.

The reduced setback areas do not impair PSE's ability to install landscaping to mitigate the visual impact of the substation. The 13-foot depth of the setback is sufficient to install a large number of trees and shrubs between the property lines and the substation sound walls, and does not affect the spacing between the landscape elements as they are viewed from the adjoining residential properties.

Also, the side yard setback of the substation is adjacent to the rear yards, not the side yards of the adjoining residences. This is different from the usual land use pattern where the side yard of one property abuts the side yard of the adjoining property. A typical residential side yard is only 5 feet, and in that situation a 20-foot side yard for a utility use is more important to buffer a neighboring residence from the noise and activity of a utility use. In this situation, however, the utility's side yard abuts the residential rear yards and the residences themselves are much further than 5 feet from the utility's property lines. This, together with the fact that the substation, as mitigated, adds no noticeable noise or activity, contributes to the lack of material detriment for the requested setback variance.

Many of the properties that border the substation site have hedges, trees, and/or fences that will block, to varying extents, the views of the substation from those properties. Also, removal of all the above-ground distribution poles and distribution wires from the substation property will mitigate visual impact of the substation project. Four distribution poles will be removed, as well as two sets of triple distribution wires, now arrayed vertically on the existing transmission poles below the transmission wires. Although the existing transmission poles and transmission wires will remain, the removal of the distribution poles and distribution wires will reduce visual clutter in the area above thirty feet in height, which is more visible from adjoining properties.

2. *The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a pre-existing improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed.*

The long, narrow configuration of the property parcel and the physical requirements of electrical substation equipment are special circumstances which necessitate the variance to side yard setback and land use buffer requirements.

The existing PSE utility corridor is only 80-feet in width at the southern end, adjacent to NE 128th Street (the area of the existing substation), and approximately 89-feet in width at the northern end, adjacent to NE 132nd Street. The existing substation, a legal use constructed in 1958, prior to current side yard setback and buffer requirements, is a single-bank (one transformer) substation located within a PSE owned utility corridor. Although new PSE substations are now designed as double-bank substations so that a second transformer can be added when warranted by demand, the existing substation, due to its age, was not designed to accommodate a second transformer.

Reconstruction of the substation at its current location at the southern (narrowest) end of the corridor would not only require additional variances, but is infeasible due to existing topography. The rebuilt substation at the south end of the parcel would still be 60-feet in width (62 feet including sound walls) and 300-feet in length, and would still border residential uses. While the

northern portion of the utility corridor is flat, the southern portion of the corridor is not; NE 128th Street is 12-feet lower than the existing substation. This grade differential would require that the existing substation be rebuilt as a tiered substation, with retaining walls in excess of 6-feet. The driveway slope would be approximately 12 percent, (vs. a standard maximum slope of 5 – 6 percent), compromising access for semi-trailers delivering equipment required for maintenance and operation. A tiered substation is also considered a potential safety concern for crews working to restore power during a storm.

The rebuilt substation is being located in the northern portion of the corridor, at the widest point of the substation parcel, and has been designed to be the minimum possible substation width, but still requires a variance to side yard setback and land use buffer requirements. The substation width cannot be reduced below 60-feet due to electrical safety code requirements. Given the size of the necessary electrical equipment, and minimum electrical clearance requirements established in the National Electric Safety Code (NESC) and PSE Design Standards, 60-feet is the minimum width necessary between the sound walls to provide clearance for equipment and driveway access required for the crane used in installation and maintenance activities.

A variance from the 20-foot side yard and 15-foot land use buffer requirements would be necessary in order to rebuild a substation anywhere within this utility corridor. Locating the substation at the north end of the corridor, which is four feet wider than the south end, allows the substation to be set back the farthest from adjacent residential properties, and does not increase the number of residential properties that would be adjacent to a rebuilt substation anywhere within substation parcel.

Another important special circumstance of the property location is that it is already served by existing high-voltage transmission lines. These transmission lines, which bring electrical power into the existing substation at 115,000 volts, cannot readily be relocated. Existing transmission lines are a key determinant of substation location, and are therefore a special circumstance of the property location that justifies issuance of variances that are necessary for the property to continue operating effectively as part of the area's electrical power grid.

3. *The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.*

PSE is obligated to provide reliable electrical service to its customers and respond to a growing demand for electricity resulting from growth within its service area. This growth is planned for by both by the City of Kirkland and King County through their adopted Comprehensive Plans. This planned growth assumes a concomitant increase in necessary infrastructure.

The Juanita substation is part of an interconnected transmission and distribution network. In responding to the increased demand for service, PSE attempts to fully utilize existing facilities and properties before locating new facilities on new sites. This approach minimizes reconstruction and relocation of the transmission lines serving the substations. The existing substation and utility corridor at this location were legally established in 1958, prior to adoption of current zoning regulations.

Other property owners within the RSX 7.2 zoning district are not in a similar position of being required to expand their use over time in response to growth. Other properties are also not part of an interconnected utility system. Thus, approval of the requested variances is not a grant of special privileges inconsistent with the general rights allowed to other properties in the area and zone under the Kirkland Zoning Code.

For LANDSCAPE BUFFER VARIANCE; Compliance with Variance Criteria:

1. *The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole.*

See the Response to this criteria for the Side Yard Setback Variance as set forth above.

Most of the compliance analysis set forth above for the setback variance also applies to the requested variance to the 15-foot landscape buffer (13-foot landscape buffers proposed):

- Since bulk and scale of the substation is much below that permitted outright by the Zoning Code, the minor reduction proposed in the landscape buffer depth does not cause material detriment.

- Substation is an unstaffed facility with noise mitigated below existing levels.

- Reduced landscape buffer depth will not impair ability to install large number of trees and shrubs.

- Substation adjoins rear yards of neighboring properties, not narrow side yards, and is therefore further from the adjoining residences.

- For many adjoining properties, their rear yard property line is already heavily vegetated.

- Visible façade of Durisol noise walls has a better finish quality than plain block walls, and PSE will consult with adjoining owners regarding wall color.

2. *The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a pre-existing improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed.*

See the Response to this criteria for the Side Yard Setback Variance as set forth above. (As with the requested side yard variance, the long, narrow configuration of the property parcel and the physical requirements of electrical substation equipment are special circumstances which necessitate the variance to landscape buffer requirements.)

3. *The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.*

See the Response to this criteria for the Side Yard Setback Variance as set forth above.

For HEIGHT VARIANCE; compliance with variance criteria:

1. *The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole.*

As shown in the Project Elevation drawing (Exhibit A, attached), the two termination structures (consisting of a steel support with cross-arms) at the extreme north and south ends of the substation are the only new elements above 30 feet, and they exceed the height limit by only about 5 feet. These termination structures comprise only a small fraction of the 300-foot length of the substation, and an even smaller fraction of the 1,270-foot length of the property parcel. All other new construction for the substation rebuild well below the 30-foot height limit that is permitted outright.

Also, these termination structures are located at approximately the midpoint of the property width, which is the point furthest from adjoining residences to the east and west. Another mitigating aspect of the project is the removal of all the above-ground distribution poles and distribution wires from the substation property. As described above, four distribution poles will be removed, as well as two sets of triple distribution wires, now arrayed vertically on the existing transmission poles below the transmission wires.

The existing transmission poles and transmission wires will remain at their current heights, as they are necessary to serve the substation, and electrical safety codes require greater ground clearance for the high-voltage transmission lines. However, the removal of the distribution poles and distribution wires will reduce visual clutter in the area above thirty feet in height, which is more visible from adjoining properties.

The placement of the new termination structures, their minimal bulk, and the small increment over the height allowed outright, results in lack of material detriment to area properties or to the City in part or as a whole.

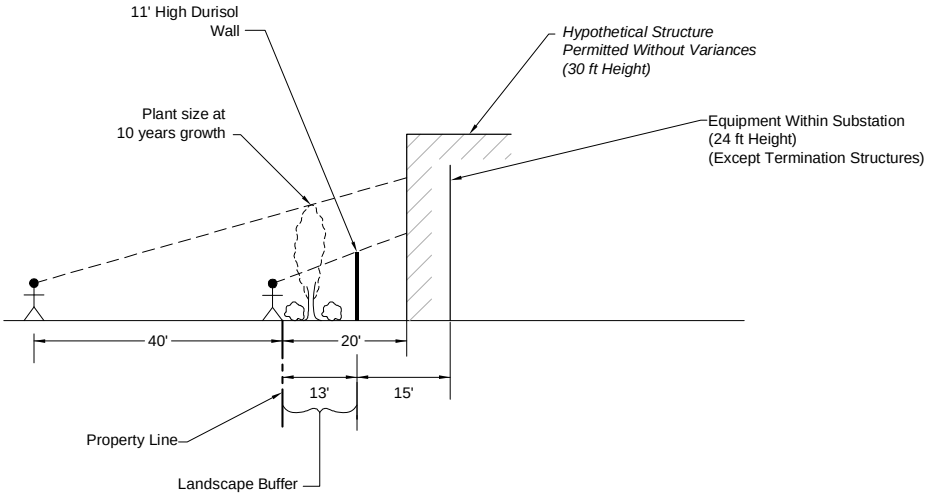
2. *The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a pre-existing improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed.*

As explained in the Background statement and in the preceding variance criteria analysis, this property is already developed with a utility substation that is an essential component of the area's electrical power grid at this location. Due to change in electrical safety code requirements, an essential rebuild to this facility requires the substation's termination structure poles to be installed at a greater height than the similar structures on the current substation, which was developed under prior electrical safety codes as well as prior zoning codes. Electrical safely code requirements also require that the existing transmission poles and lines, currently nonconforming as to height, remain at their present heights.

3. *The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.*

See the Response to this criteria for the Side Yard Setback Variance as set forth above.

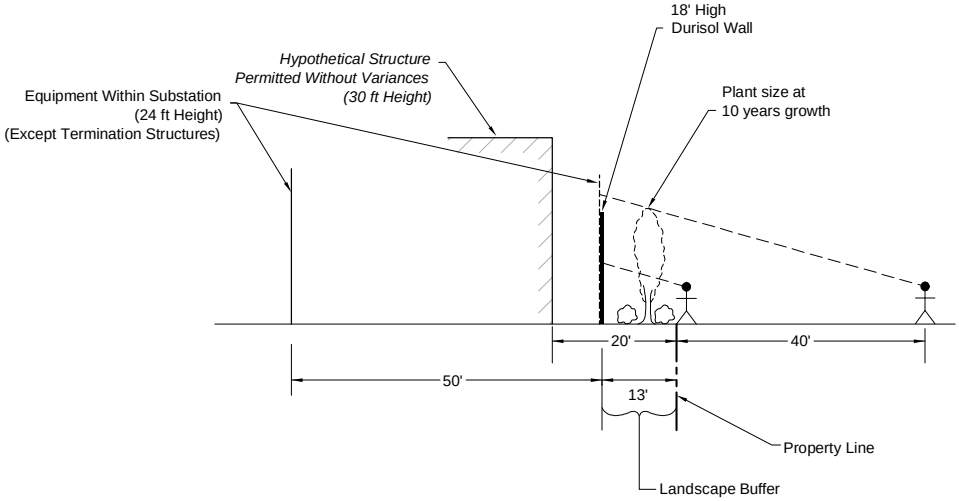
CROSS - SECTION AT WEST PROPERTY LINE
COMPARING FACILITY AS PROPOSED TO
HYPOTHETICAL STRUCTURE PERMITTED
WITHOUT VARIANCES



WEST SIDE VARIANCE

20 0 20
FEET

CROSS - SECTION AT EAST PROPERTY LINE
COMPARING FACILITY AS PROPOSED TO
HYPOTHETICAL STRUCTURE PERMITTED
WITHOUT VARIANCES



EAST SIDE VARIANCE

20 0 20
FEET

EXAMPLE OF DURISOL SOUND WALL

Profile **Illustration of Side Yard Variance Request**	
Juanita Substation Rebuild Kirkland, Washington	
GEOENGINEERS	**Figure 1** 5/28/08

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CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033 425.587-3225
www.ci.kirkland.wa.us

DEVELOPMENT STANDARDS LIST
FILE: PSE SUBSTATION REBUILD AND VARIANCE (ZON08-00010)

ZONING CODE STANDARDS

85.25.1 Geotechnical Report Recommendations. The geotechnical recommendations contained in the report by GeoEngineers dated February 29, 2007 shall be implemented.

85.25.3 Geotechnical Professional On-Site. A qualified geotechnical professional shall be present on site during land surface modification and foundation installation activities.

95.50.2.a Required Landscaping. All required landscaping shall be maintained throughout the life of the development. The applicant shall submit an agreement to the city to be recorded with King County which will perpetually maintain required landscaping. Prior to issuance of a certificate of occupancy, the proponent shall provide a final as-built landscape plan and an agreement to maintain and replace all landscaping that is required by the City.

95.45 Tree Installation Standards. All supplemental trees to be planted shall conform to the Kirkland Plant List. All installation standards shall conform to Kirkland Zoning Code Section 95.45.

95.52 Prohibited Vegetation. Plants listed as prohibited in the Kirkland Plant List shall not be planted in the City.

110.60.5 Street Trees. All trees planted in the right-of-way must be approved as to species by the City. All trees must be two inches in diameter at the time of planting as measured using the standards of the American Association of Nurserymen with a canopy that starts at least six feet above finished grade and does not obstruct any adjoining sidewalks or driving lanes.

115.25 Work Hours. It is a violation of this Code to engage in any development activity or to operate any heavy equipment before 7:00 am. or after 8:00 pm Monday through Friday, or before 9:00 am or after 6:00 pm Saturday. No development activity or use of heavy equipment may occur on Sundays or on the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas Day. The applicant will be required to comply with these regulations and any violation of this section will result in enforcement action, unless written permission is obtained from the Planning official.

115.75.2 Fill Material. All materials used as fill must be non-dissolving and non-decomposing. Fill material must not contain organic or inorganic material that would be detrimental to the water quality, or existing habitat, or create any other significant adverse impacts to the environment.

115.90 Calculating Lot Coverage. The total area of all structures and pavement and any other impervious surface on the subject property is limited to a maximum percentage of total lot area. See the Use Zone charts for maximum lot coverage percentages allowed. Section 115.90 lists exceptions to total lot coverage calculations See Section 115.90 for a more detailed explanation of these exceptions.

115.95 Noise Standards. The City of Kirkland adopts by reference the Maximum Environmental Noise Levels established pursuant to the Noise Control Act of 1974, RCW 70.107. See Chapter 173-60 WAC. Any noise, which injures, endangers the comfort, repose, health or safety of persons, or in any way renders persons insecure in life, or in the use of property is a violation of this Code.

115.115 Required Setback Yards. This section establishes what structures, improvements and activities may be within required setback yards as established for each use in each zone.

115.115.d Driveway Setbacks. Parking areas and driveways for uses other than detached dwelling units, attached and stacked dwelling units in residential zones, or schools and day-cares with more than 12 students, may be located within required setback yards, but, except for the portion of any driveway which connects with an adjacent

street, not closer than 5 feet to any property line.

115.135 <u>Sight Distance at Intersection</u>. Areas around all intersections, including the entrance of driveways onto streets, must be kept clear of sight obstruction as described in this section.

150.22.2 <u>Public Notice Signs</u>. Within seven (7) calendar days after the end of the 21-day period following the City's final decision on the permit, the applicant shall remove all public notice signs.

Prior to issuance of a grading or building permit:

85.25.1 <u>Geotechnical Report Recommendations</u>. A written acknowledgment must be added to the face of the plans signed by the architect, engineer, and/or designer that he/she has reviewed the geotechnical recommendations and incorporated these recommendations into the plans.

95.35.2.b.(3)(b)i <u>Tree Protection Techniques</u>. A description and location of tree protection measures during construction for trees to be retained must be shown on demolition and grading plans.

95.35.6 <u>Tree Protection</u>. Prior to development activity or initiating tree removal on the site, vegetated areas and individual trees to be preserved shall be protected from potentially damaging activities. Protection measures for trees to be retained shall include (1) placing no construction material or equipment within the protected area of any tree to be retained; (2) providing a visible temporary protective chain link fence at least 4 feet in height around the protected area of retained trees or groups of trees until the Planning Official authorizes their removal; (3) installing visible signs spaced no further apart than 15 feet along the protective fence stating "Tree Protection Area, Entrance Prohibited" with the City code enforcement phone number; (4) prohibiting excavation or compaction of earth or other damaging activities within the barriers unless approved by the Planning Official and supervised by a qualified professional; and (5) ensuring that approved landscaping in a protected zone shall be done with light machinery or by hand.

Prior to occupancy:

95.50.2.a <u>Required Landscaping</u>. All required landscaping shall be maintained throughout the life of the development. The applicant shall submit an agreement to the city to be recorded with King County which will perpetually maintain required landscaping. Prior to issuance of a certificate of occupancy, the proponent shall provide a final as-built landscape plan and an agreement to maintain and replace all landscaping that is required by the City

CITY OF KIRKLAND
123 FIFTH AVENUE, KIRKLAND, WASHINGTON 98033-6189 (425) 587-3225

Date: 11/5/2008

DEVELOPMENT STANDARDS
CASE NO.: ZON08-00010
PCD FILE NO.:ZON08-00010

FIRE DEPARTMENT CONDITIONS
The Fire Department has no specific comments on this project.

You can review your permit status and conditions at www.kirklandpermits.net

PUBLIC WORKS CONDITIONS

Permit #: ZON08-00010
Project Name: PSE Juanita Sub Station
Project Address: 10910 NE 132nd St
Date: July 10, 2008

Public Works Staff Contacts
Land Use and Pre-Submittal Process:
Rob Jammerman, Development Engineering Manager
Phone: 425-587-3845 Fax: 425-587-3807
E-mail: rjammer@ci.kirkland.wa.us

Building and Land Surface Modification (Grading) Permit Process:
Philip Vartanian, Development Engineer
Phone: 425-587-3853 Fax: 425-587-3807
E-mail: pvartanian@ci.kirkland.wa.us

General Conditions:

1. All public improvements associated with this project including street and utility improvements, must meet the City of Kirkland Public Works Pre-Approved Plans and Policies Manual. A Public Works Pre-Approved Plans and Policies manual can be purchased from the Public Works Department, or it may be retrieved from the Public Works Department's page at the City of Kirkland's web site at www.ci.kirkland.wa.us.

2. This project will be subject to Public Works Permit and Connection Fees. At the pre-application stage, the fees can only be estimated. It is the applicant's responsibility to contact the Public Works Department by phone or in person to determine the fees. The fees can also be review the City of Kirkland web site at www.ci.kirkland.wa.us. The applicant should anticipate the following fees:
- Surface Water Connection fees (paid with the issuance of a Building Permit)
- Right-of-way Fee
- Review and Inspection Fee (for utilities and street improvements).
- Traffic Impact Fee - if necessary (paid with the issuance of Building Permit).

3. This project is exempt from concurrency review.

4. All civil engineering plans which are submitted in conjunction with a building, grading, or

right-of-way permit must conform to the Public Works Policy titled ENGINEERING PLAN REQUIREMENTS. This policy is contained in the Public Works Pre-Approved Plans and Policies manual.

5. All street improvements and underground utility improvements (storm, sewer, and water) must be designed by a Washington State Licensed Engineer; all drawings shall bear the engineers stamp.

6. All plans submitted in conjunction with a building, grading or right-of-way permit must have elevations which are based on the King County datum only (NAVD 88).

7. A completeness check meeting is required prior to submittal of any Building Permit applications.

8. The required tree plan shall include any significant tree in the public right-of-way along the property frontage.

Sanitary Sewer and Water Conditions:

1. Northshore Utility District approval required for water and/or sewer service.

Surface Water Conditions:

1. Provide temporary and permanent storm water control per the 1998 King County Surface Water Design Manual. Contact City of Kirkland Surface Water Staff at (425) 587-3800 for help in determining drainage review requirements.

Small Site Drainage Review
The drainage design for projects that create less than 5,000 square feet of new impervious surface area and clear less than 2 acres or 35% of the site, whichever is greater, should follow Policy D-3 of the Department of Public Works Pre-Approved Plans. Projects this size may require Targeted Drainage Review per Section 1.1.2 of the 1998 King County Surface Water Design Manual, depending on site conditions.

2. The gravel access road and gravel within the substation facility shall be considered in the impervious area calculations. The final drainage system shall insure that none of the gravel areas drain onto adjacent property.

3. It doesn't appear that any work within an existing ditch will be required, however the developer has been given notice that the Army Corps of Engineers (COE) has asserted jurisdiction over upland ditches draining to streams. Either an existing Nationwide COE permit or an Individual COE permit may be necessary for work within ditches, depending on the project activities.
Applicants should obtain the applicable COE permit; information about COE permits can be found at:
U.S. Army Corps of Engineers, Seattle District Regulatory Branch
http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=REG&pagename=mainpage_NWPs
Specific questions can be directed to: Seattle District, Corps of Engineers, Regulatory Branch, CENWS-OD-RG, Post Office Box 3755, Seattle, WA 98124-3755, Phone: (206) 764-3495

4. If this project disturbs greater than one acre, the applicant is responsible to apply for a Construction Stormwater General Permit from Washington State Dept. of Ecology. Specific permit information can be found at the following website:
http://www.ecy.wa.gov/programs/wq/stormwater/construction/
Among other requirements, this permit requires the applicant to prepare a Storm Water Pollution Prevention Plan (SWPPP) and identify a Certified Erosion and Sediment Control Lead (CESCL) prior to the start of construction. The CESCL shall attend the City of Kirkland Public Works Department pre-construction meeting with a completed SWPPP.

5. Provide an erosion control plan with Building or Land Surface Modification Permit application. The plan shall be in accordance with the 1998 King County Surface Water Design Manual.

6. Construction drainage control shall be maintained by the contractor and will be subject to periodic inspections. During the period from April 1 to October 31, all denuded soils must be covered within 15 days; between November 1 and March 31, all denuded soils must be covered within 12 hours. If an erosion problem already exists on the site, other cover protection and erosion control will be required.

Street and Pedestrian Improvement Conditions:

1. The subject property abuts NE 132nd Street (an Arterial type street under King County jurisdiction) and NE 128th St (a neighborhood access type street). Zoning Code sections 110.10 and 110.25 require the applicant to make half-street improvements in rights-of-way abutting the subject property. Section 110.30-110.50 establishes that this street must be improved with the following:

NE 132nd St.
A. Remove and replace any cracked sidewalk or curb and gutter and install a new driveway apron if necessary.
B. Dedicate 12 ft of property for future widening of NE 132nd Street by the City.
C. Any work in this right-of-way will require a Street Use Permit from King County.

NE 128th Ave. NE
No street improvements are required along NE 128th Street due to the following reasons:
" Because the project is being constructed near the NE 132nd St right-of-way frontage on the uniquely sized property (1270 ft in length by 90 ft in width)
" The existing street improvements are adequate and any new or additional improvements would not match the adjacent street improvements. This waiver and/or modification is allowed per KZC 110.70.3.c and 110.70.5.d

2. A 2-inch asphalt street overlay will be required where three or more utility trench crossings occur within 150 lineal ft. of street length or where utility trenches parallel the street centerline. Grinding of the existing asphalt to blend in the overlay will be required along all match lines.

3. It shall be the responsibility of the applicant to relocate any above-ground or below-ground utilities which conflict with the project associated street or utility improvements.

4. Zoning Code Section 110.60.9 establishes the requirement that existing utility and transmission (power, telephone, etc.) lines on-site and in rights-of-way adjacent to the site must be underground. The Public Works Director may determine if undergrounding transmission lines in the adjacent right-of-way is not feasible and defer the undergrounding by signing an agreement to participate in an undergrounding project, if one is ever proposed. In this case, the Public Works Director has determined that undergrounding of existing overhead utility on the NE 132nd St and NE 128th St. frontages is not feasible at this time and the undergrounding of off-site/frontage transmission lines should be deferred with a Local Improvement District (LID) No Protest Agreement. The final recorded subdivision mylar shall include a condition requiring all associated lots to sign a LID No Protest Agreement prior to the issuance of a building permit for said lot. In addition, if a house is to be saved on one of the lots within the subdivision, a LID No Protest Agreement shall be recorded against this lot at the time of subdivision recording.

BUILDING DEPARTMENT CONDITIONS

Buildings must comply with current editions of the International Building, Mechanical and Fire Codes and the Uniform Plumbing Code as adopted and amended by the State of Washington and the City of Kirkland.

Structures must be designed for seismic design category D, wind speed of 85 miles per hour and exposure B. Provide details and calculations for Durisol walls stamped by a structural engineer registered in WA state.

CITY OF KIRKLAND
123 FIFTH AVENUE, KIRKLAND, WASHINGTON 98033-6189
(425) 587-3225

DETERMINATION OF NONSIGNIFICANCE (DNS) .

CASE #: SEP08-00025 DATE ISSUED: 10/2/2008

DESCRIPTION OF PROPOSAL

Puget Sound Energy proposes to expand and rebuild the existing PSE Juanita electric distribution substation on the subject property. The existing substation is located at the southern end of the existing utility corridor (subject property) near NE 128th Street. The expanded and rebuilt substation will be located in the northern 400 feet of the corridor near the NE 132nd Street right-of-way. As part of the zoning and variance permit application, the applicant is proposing to reduce the required east and west side yard setbacks, reduce the required east and west landscape buffers, and exceed the maximum allowable height to accommodate termination structures.

PROPONENT:

LOCATION OF PROPOSAL

10910 NE 132ND AVENUE NE

LEAD AGENCY IS THE CITY OF KIRKLAND

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21.030 (2) (c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

Responsible official: 10/1/08

Eric Shields, Director Date
Department of Planning and Community Development
425-587-3225

Address: City of Kirkland
123 Fifth Avenue
Kirkland, WA 98033-6189

You may appeal this determination to the Planning Department at Kirkland City Hall, 123 Fifth Avenue, Kirkland, WA 98033 no later than 5:00 p.m., October 16, 2008 by WRITTEN NOTICE OF APPEAL.

CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033 425.587-3225
www.ci.kirkland.wa.us

MEMORANDUM

To: Eric R. Shields, AICP, Planning Director

From: Tony Leavitt, Associate Planner

Date: September 30, 2008

File: ZON08-00010, SEP08-00025

Subject: **ENVIRONMENTAL DETERMINATION FOR PUGET SOUND ENEGRY (PSE) JUANITA SUBSTATION REBUILD PROJECT**

PROPOSAL

Puget Sound Energy proposes to expand and rebuild the existing PSE Juanita electric distribution substation on the subject property located 10910 NE 132nd Street (see Enclosure 1). The existing substation is located at the southern end of the existing utility corridor (subject property) near NE 128th Street. The expanded and rebuilt substation will be located in the northern 400 feet of the corridor near the NE 132nd Street right-of-way. As part of the zoning and variance permit application, the applicant is proposing to reduce the required east and west side yard setbacks from the required 20 feet to 13 feet, reduce the required east and west landscape buffers from 15 feet to 13 feet, and exceed the maximum allowable height of 30 feet by 5 feet to accommodate termination structures (see Enclosure 2).

ENVIRONMENTAL ISSUES

I have had an opportunity to visit the site and review the environmental checklist (Enclosure 3) and the following reports:

- Geotechnical Engineering Services Report prepared by GeoEngineers Inc. dated February 29, 2007 (Enclosure 4)
- Sound Analysis prepared by BRC Acoustics and Technology Consulting dated April 25, 2008 (Enclosure 5)

Based on a review of these materials, the main environmental issues related to the development of this project are potential soil and noise impacts. Additionally, during the initial comment period for the zoning and variance permit application, the City received a total of 10 letters from neighboring property owners (see Enclosure 6). Most of the issues raised in the comment letters (including size of facility, land use, trees, etc.) will be addressed during Staff's review of the zoning and variance permit application. Concerns regarding potential noise impacts and exposure to electric and magnetic fields (EMF) were expressed in some of the letters.

Soil Impacts

The Geotechnical Evaluation prepared by GeoEngineers Inc concludes that the project is "geotechnically viable" when constructed in accordance with the recommendations of the evaluation. The City has the authority (per Kirkland Zoning Code Chapter 85) to require, as part of any development permit for the project, that the development plans be reviewed by the geotechnical engineer to ensure compliance with all recommendations. This requirement will be addressed as part of Staff's review of the zoning and variance permit application.

Noise Impacts

The Sound Analysis prepared by BRC Acoustics and Technology Consulting concludes that the proposed substation transformers will exceed City of Kirkland Noise Regulations. To mitigate potential noise impacts, the report recommends construction of the sound walls that Puget Sound Energy is proposing. This requirement will be addressed as part of Staff's review of the zoning and variance permit application.

Electric and Magnetic Fields (EMF) Impacts

The applicant states in their Environmental Checklist that the "substations are not a predominant source of magnetic fields for surrounding properties". Staff reviewed current regulations and found no federal, state, or local regulations regarding exposure to electric and magnetic fields.

CONCLUSIONS AND RECOMMENDATION

It will be necessary to further analyze certain aspects of the proposal to determine if the project complies with all the applicable City codes and policies. That analysis is most appropriately addressed within the review of the zoning and variance permit application. In contrast, State law specifies that this environmental review under the State Environmental Policy Act (SEPA) is to focus only on potential significant impacts to the environment that could not be adequately mitigated through the Kirkland regulations and Comprehensive Plan.[1]

Based on my review of all available information, I have not identified any significant adverse environmental impacts. Therefore, I recommend that a Determination of Non-Significance be issued for this proposed action.

SEPA ENCLOSURES

1. Vicinity Map
2. Development Plans
3. Environmental Checklist
4. Geotechnical Engineering Services Report prepared by GeoEngineers Inc. dated February 29, 2007
5. Sound Analysis prepared by BRC Acoustics and Technology Consulting dated April 25, 2008
6. Initial Public Comment Letters

[1] ESHB 1724, adopted April 23, 1995

Review by Responsible Official:

I concur

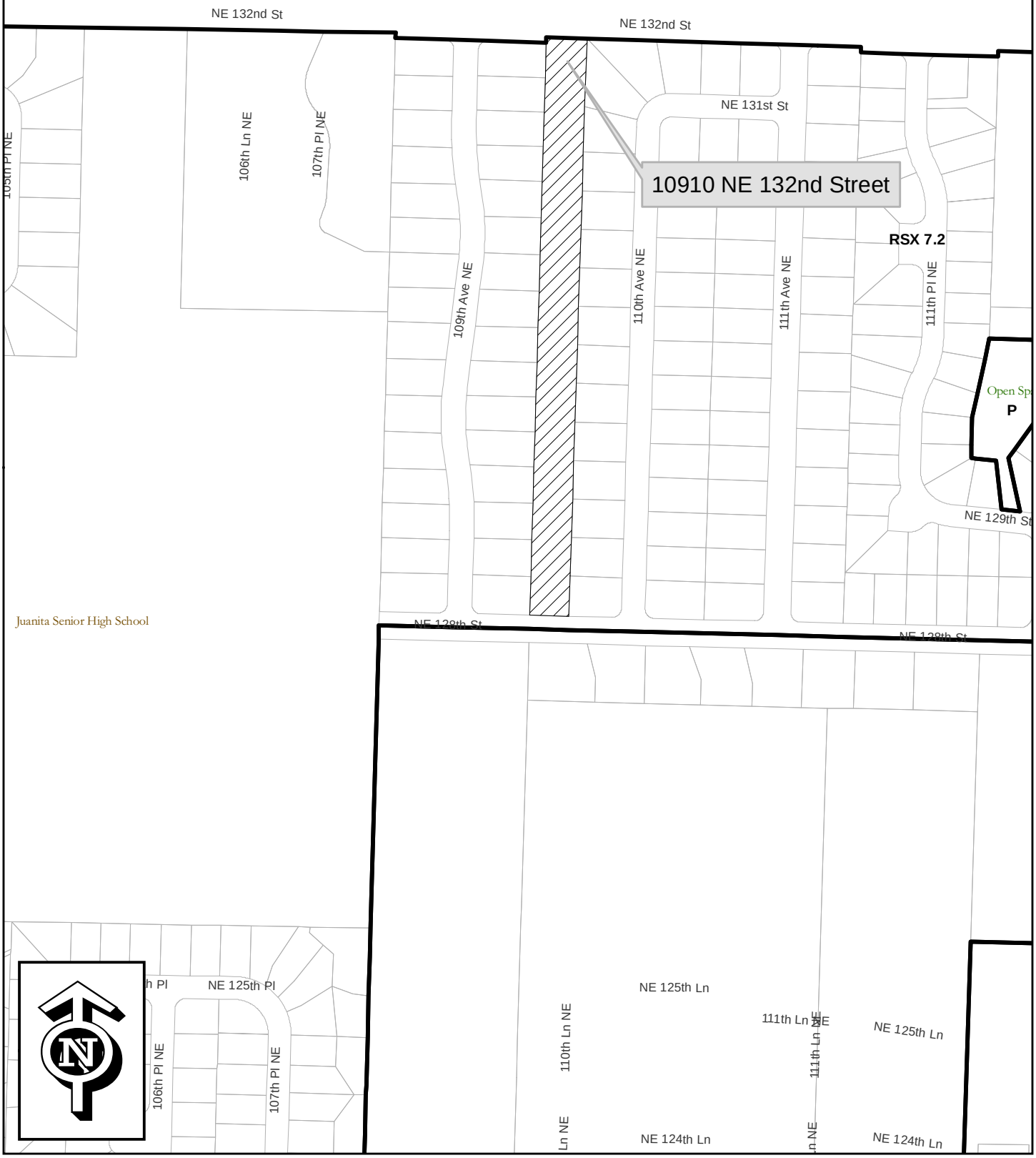
I do not concur

Comments:

Eric R. Shields, AICP
Planning Director

Date

PSE Juanita Substation Rebuild
ZON08-00010



NOTES

1. PURPOSE OF THIS SURVEY: FULL BOUNDARY AND TOPOGRAPHIC SURVEY WAS PERFORMED DURING APRIL, 2007 IN SUPPORT OF A PUGET SOUND ENERGY SUBSTATION IMPROVEMENT PROJECT THAT WAS INTENDED TO: 1.) OBTAIN AND GRADE THE FULL PROPERTY CORRIDOR, 2.) DETERMINE THE LOCATION OF PROVIDED FEATURES ON OR NEAR THIS PROPERTY LINES AND 3.) PERFORM TOPOGRAPHIC MAPPING OF THE SUBJECT PARCEL AND ADJOINING ROADWAYS.

2. BASIS OF BEARING: WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NAD 83/91. NOTE: DISTANCES SHOWN HEREON ARE STATE PLANE GRID DISTANCES BASED ON A COMBINED SCALE FACTOR OF 0.99989. TO CONVERT GRID DISTANCES TO GROUND VALUES, MULTIPLY DISTANCES SHOWN BY 1.00011.

3. VERTICAL DATUM: NAVD 88
NOTE: NGVD 29 - NAVD 88 RANGE: 3.8'. SOURCE - CORPSCON FOR WINDOWS CONVERSION SOFTWARE VER. 5.11.06

4. METHODOLOGY: FIELD MEASUREMENT FOR THIS SURVEY WERE PERFORMED USING A LEICA TCRP 1201. THIS SURVEY COMPLIES WITH THE MINIMUM REQUIRED "TRIMBLE OF CLOSURE" OF 1:10,000 FOR WASHINGTON STATE PLANE COORDINATES AS SET FORTH PER W.A.C. 332-130-090 (AND POSITIONAL TOLERANCE LEVELS OF LESS THAN 0.01 METERS)

5. PROPERTY LINES SHOWN HEREON ARE BASED ON FIELD LOCATED SURVEY MONUMENTS AND PUBLIC RECORDS. SEE SHEET 2 OF 2 FOR SECTION BREAKDOWN AND PROPERTY DETAILS.

PROPERTY CORNERS WERE STAKED IN CONJUNCTION WITH THIS SURVEY.

6. MONUMENTATION LOCATION: ALL SURVEY MONUMENTS AND OTHER SURVEY MARKERS SHOWN HEREON WERE VISITED DURING APRIL, 2007 UNLESS OTHERWISE INDICATED.

7. ENCUMBRANCES: PACIFIC NORTHWEST TITLE COMPANY OF WASHINGTON INC. TITLE ORDER NO. 691C224 DATED APRIL 12, 2007 USED FOR LAND DESCRIPTION AND EASEMENTS OF RECORD. NO FURTHER SEARCH WITH THE RECORD WAS REQUESTED OR PERFORMED. NOTE: SAID TITLE REPORT REVEALED SEVERAL BLANKET EASEMENTS THAT CONTAINED DESCRIPTIONS THAT WERE INSUFFICIENT TO DETERMINE THE LOCATION OF SAID EASEMENTS. OTHER ENCUMBRANCES LISTED IN SAID TITLE REPORT RELATE TO TAXES AND MORTGAGE TERMS AND CONDITIONS, NONE OF WHICH PERTAIN TO MATTERS DISCLOSED BY THIS SURVEY.

8. UNDERGROUND UTILITIES SHOWN REPRESENT FIELD SURVEYED PAINT MARKS AS PLACED ON THE GROUND BY A UTILITY LOCATE SERVICE. NO GUARANTEE IS MADE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED OR THAT THE UNDERGROUND UTILITIES ARE SHOWN IN THEIR EXACT LOCATION. THE UTILITIES ARE SHOWN AS ACCURATELY AS POSSIBLE FROM AVAILABLE INFORMATION.

9. CONTOUR INTERVAL: 2 FOOT

10. SUBSURFACE CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY.

11. LOCATIONS OF HOUSES SHOWN HEREON WERE DERIVED FROM AERIAL PHOTOGRAMMETRY AND ARE RELIABLE TO PLUS OR MINUS 5 FEET.

12. 1-800-424-5555 MUST BE CALLED NOT LESS THAN 48 HOURS BEFORE BEGINNING EXCAVATION WHERE ANY UNDERGROUND UTILITIES MAY BE LOCATED. FAILURE TO DO SO COULD MEAN SERVING SUBSTANTIAL REPAIR COSTS, UP TO THREE TIMES THE COST OF REPAIRS TO THE SERVICES.

BENCH MARKS

1. PRIMARY BM POINT DESIGNATION DEA #3883 A COPPER PIN IN SQUARE CONCRETE MONUMENT LOCATED AT EAST QUARTER CORNER 29 AND AS SHOWN HEREON - ELEV - 356.539 FEET (NAVD 88)

2. TEMPORARY SITE BM'S POINT DESIGNATION DEA #6 A 1/2" IRON WITH "DEA CONTROL" CAP AND AS SHOWN HEREON ELEV - 139.74 FEET (NAVD 88)

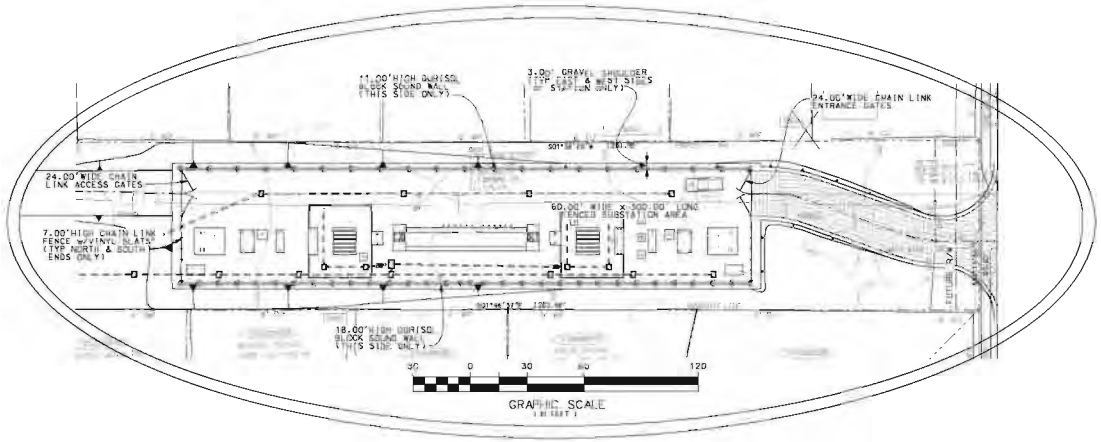
POINT DESIGNATION DEA #7 A 1/2" IRON WITH "DEA CONTROL" CAP AND AS SHOWN HEREON ELEV - 169.88 FEET (NAVD 88)

LEGAL DESCRIPTION

PER PACIFIC NORTHWEST TITLE COMPANY OF WASHINGTON INC. TITLE ORDER NO. 691C224 DATED APRIL 12, 2007

THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 26 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON;
EXCEPT THE WEST QUARTER
EXCEPT THE EAST 1000 FEET THEREOF;
EXCEPT THE NORTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR NORTHEAST 132ND STREET BY RECORDING NUMBER 2120879;
AND ALSO EXCEPT THE SOUTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR NORTHEAST 128TH STREET BY RECORDING NUMBER 6004797.

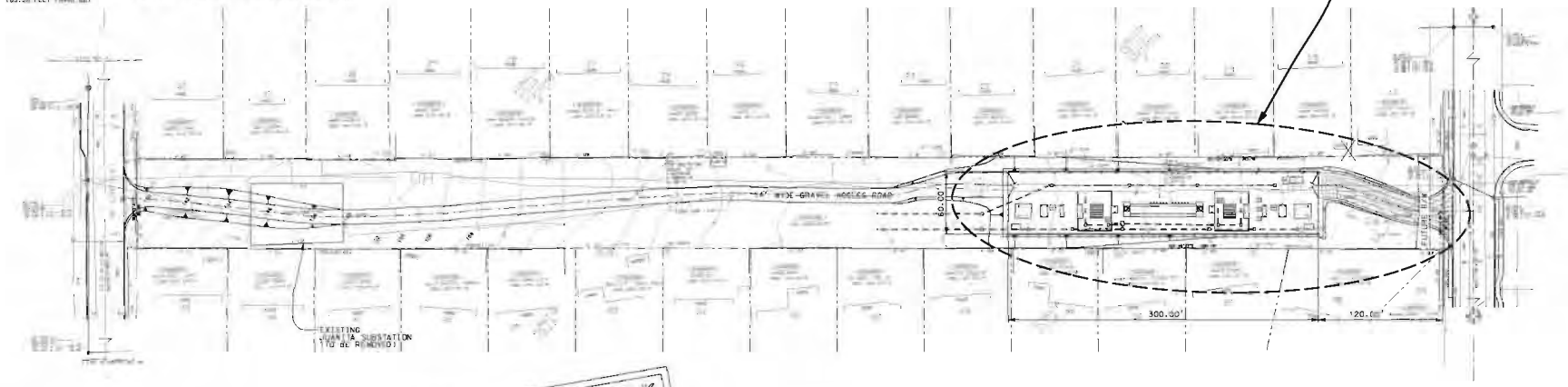
ADDRESS:
12815 NE 124nd ST.
KIRKLAND, WA.



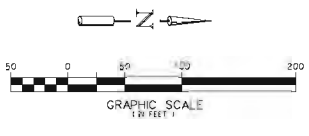
STATION DETAIL

SCALE: 1"=30'

NW 1/4, NE 1/4, SEC. 29, TWP 26N., RNG. 5E., W.M.



PRELIMINARY ONLY
NOT FOR CONSTRUCTION



VICINITY MAP
NO SCALE

REFERENCE DRAWINGS:

D-14342	EROSION AND SEDIMENT CONTROL PLAN
D-14343	GRADING AND FENCING PLAN
D-14344	DRAINAGE PLAN
D-14345	FOUNDATION PLAN
D-14346	LANDSCAPE PLAN
D-14347	STRUCTURAL PLAN (REF ONLY)

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-CUT-SRVC

PSE ENGINEERING CONTACTS
355 NE 110TH AVE NE, BELLEVUE WA. 98009-0868

GROUP	NAME	PHONE
PROJECT MANAGEMENT	R. RAMIA	425-462-3774
CIVIL	J. KORABACHER	425-456-2446
ELECTRICAL	J. NEURUD	425-462-3616
CONSTRUCTION MANAGEMENT	D. MOHR	425-456-2830
PERMITTING	A. MARKUS	253-476-6295

JOHN D. KORABACHER
STATE OF WASHINGTON
44484
REGISTERED PROFESSIONAL ENGINEER
EXPIRES: Jan 27,

REVISION DESCRIPTION:
ISSUED FOR PERMITTING

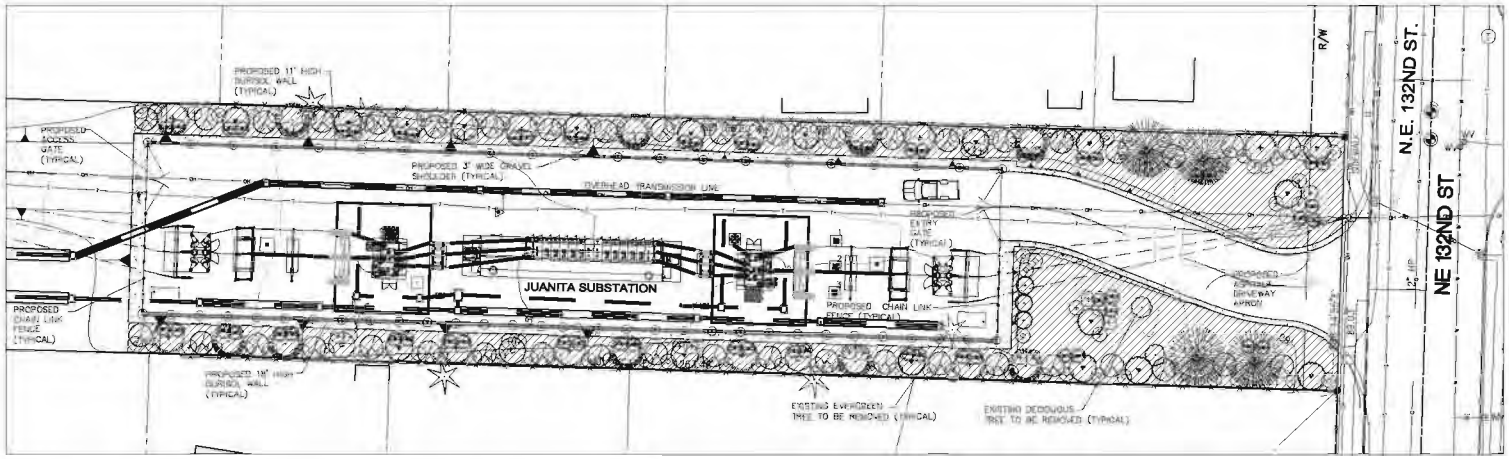
	APPROVAL	DATE (M/D/YY)
CADD	[illegible]	4 / 30 /08
CIVIL ENGR		/ /
		/ /
REVIEW		/ /
		/ /

SITE PLAN
JUANITA SUBSTATION

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO: D-14341
REV NO: 0
SHEET 1 OF 1
FILE NO

SCALE: 1"= 30'-0" CLASS: SITE
CADD NO: ...\D14341R 30.30.DWG



CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-424-5555

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	QNTY	SIZE	REMARKS
TREES					
	ACER CIRCINATUM	VINE MAPLE	17	5'-6' HT	B&B MULTI-STEMMED
	CALOCEDRUS DECURRENS	INCENSE CEDAR	11	6'-8' HT	B&B, SPACED PER PLAN
	PINUS NIGRA	AUSTRIAN BLACK PINE	4	6'-8' HT	B&B WELL-BRANCHED FROM ROOT CROWN TO TOP
	THUJA PLICATA 'SUNSPARKS'	WESTERN RED CEDAR	9	6'-8' HT	B& B SPACED PER PLAN
	PRUNUS PURSHANA	OREGON	3	6'-8' HT	B&B WELL-BRANCHED FROM ROOT CROWN TO TOP
	THUJA OCCIDENTALIS 'FASTIGIATA'	AMERICAN ARBORVITAE	3	6'-8' HT	B&B, SPACED PER PLAN
SHRUBS					
	AMELANCHIER ALNIFOLIA	SERVICEBERRY	42	5 GAL	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
	MYRICA CALIFORNICA	PACIFIC WAX MYRTLE	54	5 GAL	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	60	5 GAL	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
	SYMPHORICARPOS ALBUS	SNOWBERRY	70	5 GAL	CONTAINER, FULL, WELL BRANCHED, SPACED PER PLAN
SURFACE MATERIALS					
	MEDIUM BARK MULCH	MEDIUM BARK MULCH	125 CY		3" DEPTH - CONTRACTOR TO VERIFY QUANTITY

LANDSCAPE NOTES

GENERAL

1. ALL WORK SHALL BE DONE AS SHOWN IN THE DRAWINGS AND IN CONFORMANCE WITH THE PUGET SOUND ENERGY (PSE) PROJECT GENERAL PROVISIONS AND SPECIFICATIONS FOR THIS PROJECT. THE DRAWINGS SHALL TAKE PRECEDENCE OVER THE SPECIFICATIONS SHOULD THERE BE ANY CONFLICT.

2. SITE BASE INFORMATION PROVIDED BY BOUNDARY AND TOPOGRAPHIC SURVEY, JUANITA SUBSTATION, (DAVID EVANS AND ASSOCIATES, INC. (DEA)), MAY 8, 2007.

SITE PREPARATION

1. CLEAR AND GRUB EXISTING VEGETATION IN AREAS TO BE PLANTED.

PLANTING

1. ALL TREES, SHRUBS AND SEEDING SHALL BE INSTALLED PER THE LANDSCAPE PLAN AND AS SHOWN IN THE PLANTING DETAILS.

2. PLANTING BED SHALL BE AMENDED WITH 4" CEDAR GROVE 2-WAY TOPSOIL (OR APPROVED EQUIVALENT) ROTOTILLED INTO 12" OF EXISTING SOIL.

3. PLANT PIT BACKFILL SHALL BE CEDAR GROVE 2-WAY TOPSOIL (OR APPROVED EQUIVALENT)

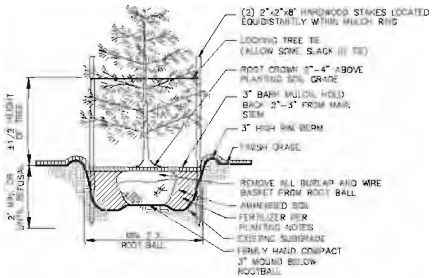
4. IMMEDIATELY AFTER PLANTING, PLACE MEDIUM BARK MULCH TO A UNIFORM 3" DEPTH THROUGHOUT PLANTING AREAS.

5. CONTRACTOR SHALL APPLY TIME RELEASE FERTILIZER TO PLANT PITS (OSMOCOTE TM OR APPROVED EQVALENT) PER MANUFACTURER'S INSTRUCTIONS.

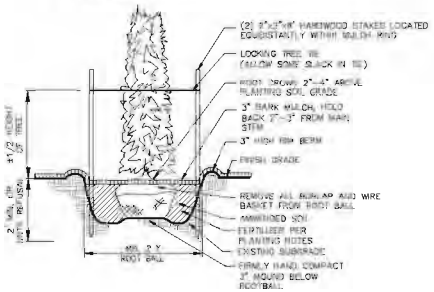
6. AFTER INSTALLATION APPLY SNAPSHOT PRE-EMERGENT HERBICIDE (OR APPROVED EQUIVALENT) FOR WEED CONTROL PER MANUFACTURER'S RECOMMENDATIONS.

7. ALL PLANT MATERIALS SHALL BE IRRIGATED BY THE CONTRACTOR THOROUGHLY WHEN PLANTED AND UP TO FINAL ACCEPTANCE. PLANTING AREAS SHALL RECEIVE 1" OF WATER PER WEEK DURING MAY 15-OCTOBER 15 EXCLUDING MAJOR STORM EVENTS. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR IRRIGATION DURING THE WARRANTY PERIOD.

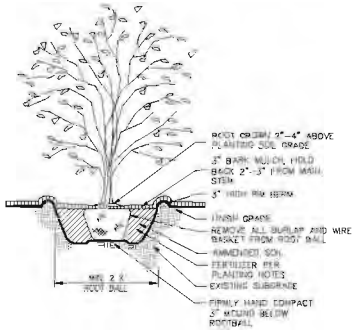
8. PERMANENT IRRIGATION SYSTEM SHALL BE INSTALLED PER THE IRRIGATION PLAN AND MAINTAINED BY THE CONTRACTOR DURING THE WARRANTY PERIOD.



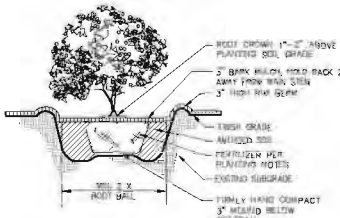
ORNAMENTAL EVERGREEN TREE PLANTING
NOT TO SCALE



COLUMNAR EVERGREEN TREE PLANTING
NOT TO SCALE



DECIDUOUS MULTI- STEM TREE PLANTING
NOT TO SCALE



SHRUB PLANTING
NOT TO SCALE

0 20 40 60
SCALE: 1"=20

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

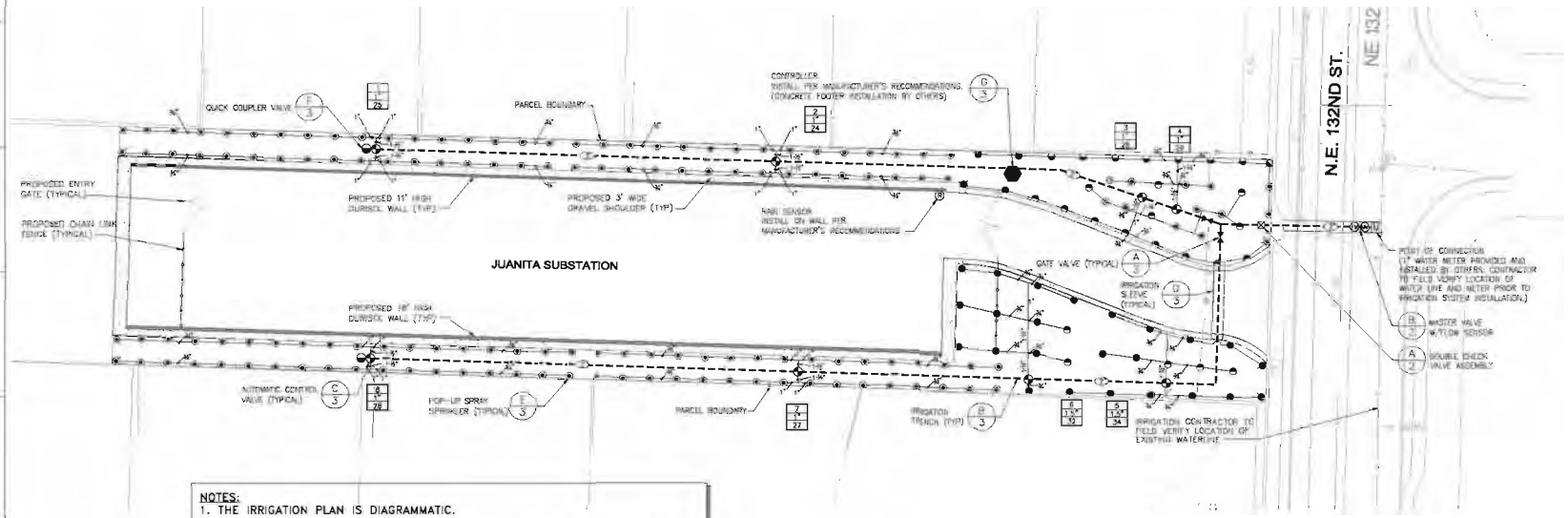
PRELIMINARY- NOT FOR CONSTRUCTION

	APPROVAL	DATE (M/D/Y)
ORIGINAL ISSUE		
CADD	DRN	5 / 15 / 09
		/ /
LAND ARCH	JGGA	5 / 18 / 09
		/ /
REVIEW		/ /
LOG OUT		/ /

JUANITA SUBSTATION
LANDSCAPE PLAN

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-14346 REV NO 1
SHEET OF 5
SCALE 1" = 20' - 0" CLASS SITE
CADD NO D-14346_BL.DWG
SCANNED FILE NO



NOTES:
1. THE IRRIGATION PLAN IS DIAGRAMMATIC.

2. SEE SHEET 3 FOR IRRIGATION NOTES AND DETAILS. INSTALL MAINLINE, VALVES, PIPE, AND ASSOCIATED EQUIPMENT IN PLANTER BEDS OR GRASS AREAS.

IRRIGATION EQUIPMENT LEGEND

- RAIN BIRD FS-200-B FLOW SENSOR
- RAIN BIRD MASTER VALVE PEB SERIES
- GATE VALVE
- RAIN BIRD AUTOMATIC CONTROL VALVE PEB SERIES
- RAIN BIRD QUICK COUPLING VALVE #44LRC
- RAIN BIRD RAIN SENSOR RSD-CEX
- DCVA ASSEMBLY
- M WATER METER (SUPPLIED AND INSTALLED BY OTHERS)
- RAIN BIRD ESP-LX MODULAR OUTDOOR 12-STATION ELECTRONIC CONTROLLER (INSTALL IN VANDEN POLYGARD MODEL PEDESTAL ENCLOSURE. CONCRETE FOOTER FOR PEDESTAL BY OTHERS)

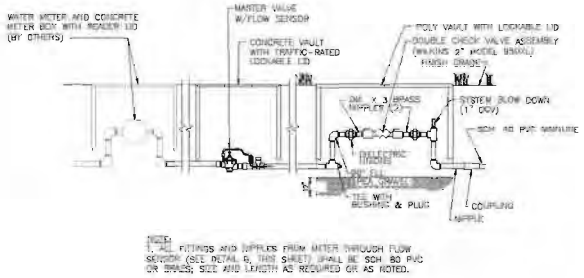
VALVE LEGEND

- STATION NUMBER
- VALVE SIZE
- GALLONS PER MINUTE

- SCHEDULE 40 PVC MAINLINE (SIZED AS SHOWN ON PLANS) (MINIMUM 18" BURY)
- SCHEDULE 40 PVC LATERAL (1" SIZE UNLESS SHOWN OTHERWISE ON PLANS)
- SCHEDULE 40 PVC SLEEVES (SIZED AT DOUBLE NOMINAL PIPE DIAMETER)

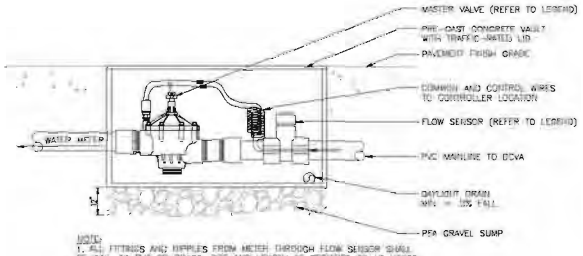
IRRIGATION EQUIPMENT LEGEND

QTY	HDZ.	MANF.	MODEL NO.	RAD.	PATTERN	PSI	FLOW				
	6'	RAINBIRD	1806-SAM-PRS	6'	QTR, THRD, H.F, FULL	30	.28	.32	.92	1.03	VAR
	10'	RAINBIRD	1806-SAM-PRS	10'	QTR, THRD, H.F, FULL	30	.39	.53	.79	1.58	VAR
	12'	RAINBIRD	1806-SAM-PRS	12'	QTR, THRD, H.F, FULL	30	.60	.87	1.3	2.60	VAR



NOTE:
1. ALL FITTINGS AND NIPPLES FROM METER THROUGH FLOW SENSOR (SEE DETAIL B, THIS SHEET) SHALL BE SCH. 80 PVC OR BRASS; SIZE AND LENGTH AS REQUIRED OR AS NOTED.

A DOUBLE CHECK VALVE ASSEMBLY
NOT TO SCALE



NOTE:
1. ALL FITTINGS AND NIPPLES FROM METER THROUGH FLOW SENSOR SHALL BE SCH. 80 PVC OR BRASS; SIZE AND LENGTH AS REQUIRED OR AS NOTED.

B MASTER VALVE WITH FLOW SENSOR
NOT TO SCALE

0 20 40 60
SCALE: 1"=20

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

PRELIMINARY- NOT FOR CONSTRUCTION

	APPROVAL	DATE (M/D/Y)
ORIGINAL ISSUE		
CADD	DCK	5 / 15 / 09
LAND ARCH	JGGA	5 / 18 / 09
REVIEW		/ /
LOG OUT		/ /

JUANITA SUBSTATION
IRRIGATION PLAN

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-14346 REV NO 0
SHEET 2 OF 5
SCANNED
FILE NO

SCALE: 1" = 20' - 0"
CLASS: SITE
CADD NO D-14346 S2 ITN.DWG

IRRIGATION NOTES

1. ALL NEW LANDSCAPE AREAS SHALL HAVE AN AUTOMATICALLY CONTROLLED IRRIGATION SYSTEM. SYSTEM SHALL BE DESIGNED TO CONSERVE WATER AND MINIMIZE OVERSPRAY ON WALKS, VEHICLES AND OTHER SURFACES. IRRIGATION SYSTEM WORK INCLUDES EXCAVATING, BACKFILLING, SUPPLYING AND INSTALLING VALVES AND FITTINGS, PIPING AND FITTINGS, QUICK COUPLER VALVES, VALVE BOXES, AND ACCESSORIES, TESTING, AND WINTERIZING AND SPRING START UP.

2. THE IRRIGATION SYSTEM HAS BEEN DESIGNED FOR A MAXIMUM FLOW OF 35 GPM AT A STATIC PRESSURE OF 66 PSI. IF AVAILABLE PSI IS SIGNIFICANTLY LOWER THAN 66 PSI, CONTRACTOR SHALL CONTACT LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION FOR SYSTEM DESIGN ADJUSTMENT.

3. THE IRRIGATION PLAN IS DIAGRAMMATIC. INSTALL MAINLINE, VALVES, PIPE, AND ASSOCIATED EQUIPMENT IN PLANTER BEDS.

4. LOCATE ALL ABOVE AND BELOW GROUND UTILITIES AND PROTECT THEM FROM DAMAGE DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE INCURRED DURING OR AS A RESULT OF, CONSTRUCTION OF IRRIGATION SYSTEM.

5. IT SHALL BE THE LANDSCAPE CONTRACTOR'S RESPONSIBILITY TO COORDINATE INSTALLATION OF IRRIGATION SLEEVES WITH THE GENERAL CONTRACTOR.

6. INSTALL SYSTEM TO MEET ALL APPLICABLE CODES AND INSPECTIONS AND OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.

7. INSTALL ALL MATERIALS AND EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN SPECIFICATIONS AND RECOMMENDATIONS.

8. PROVIDE ONLY NEW MATERIALS, WITHOUT FLAWS OR DEFECTS AND OF THE HIGHEST QUALITY OF THEIR SPECIFIED CLASS AND KIND FOR COMMERCIAL USE.

A. PVC MAINLINE AND LATERAL PIPE SHALL BE CONSTRUCTED OF SCH. 40 PVC. ALL PIPES SHALL BE PERMANENTLY MARKED WITH STANDARD PERTINENT INFORMATION.

B. PVC FITTINGS SHALL BE SCHEDULE 80 RATED FOR MAINLINE AND SCHEDULE 40 RATED FOR LATERALS AND MEET ASTM D2466 STANDARDS AND SPECIFICATIONS.

C. PVC NIPPLES SHALL BE SCHEDULE 80 RATED AND MEET ASTM D2785 REQUIREMENTS AND SPECIFICATIONS. ALL NIPPLES WILL HAVE TAPERED THREADS.

D. JOINING MATERIALS USED SHALL BE MANUFACTURED BY I.P.S. OR APPROVED EQUIVALENT, AND SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN SPECIFICATIONS AND SAFETY RECOMMENDATIONS.

E. THREADED CONNECTIONS (PVC) SHALL BE SEALED WITH TEFLON TAPE OR TEFLON PASTE.

F. IRRIGATION SLEEVES SHALL BE SCHEDULE 40 PVC AND SIZED DOUBLE THE DIAMETER OF THE PIPE RUNNING THROUGH IT.

G. CONTROLLER SHALL BE RAINBIRD ESP-LX MODULAR OUTDOOR 12-STATION OR APPROVED EQUIVALENT AND CABINET-MOUNTED IN A VYNCKER POLYSAFE MODEL PS3020A ENCLOSURE OR APPROVED EQUIVALENT AS SHOWN ON PLANS. INSTALLATION SHALL BE ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COORDINATE LOCATION WITH OWNER.

H. ALL IRRIGATION WIRING TO BE "MULTISTRAND" WIRING.

I. INSTALL A RAINBIRD PEB-SERIES MASTER VALVE AT THE WATER METER. COORDINATE WITH OWNER.

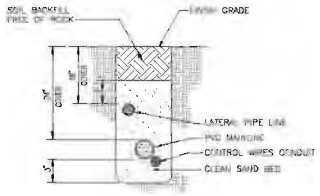
J. INSTALL A RAINBIRD FLOW SENSOR, MODEL FS-300-B, FLOW SENSER DOWNSTREAM FROM MASTER VALVE.

9. CONTRACTOR SHALL PROVIDE IRRIGATION SYSTEM RECORD DRAWINGS LEGIBLY MARKED TO RECORD ACTUAL INSTALLATION. DRAWINGS SHALL INDICATE HORIZONTAL AND VERTICAL LOCATIONS, REFERENCED TO PERMANENT SURFACE IMPROVEMENTS, IDENTIFY FIELD CHANGES OF DIMENSION AND DETAIL, INCLUDING CHANGES MADE BY CHANGE ORDER. AN 11"X17" PLAN SHALL BE LAMINATED AND PLACED AT THE CONTROLLER LOCATION LEGIBLY SHOWING COLOR-CODED ZONES.

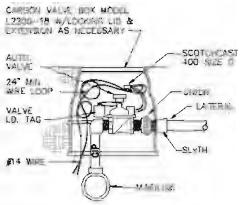
10. CONTRACTOR SHALL REVIEW ENTIRE SYSTEM WITH OWNER'S REPRESENTATIVE AND SUPPLY OPERATIONS MANUAL AND WARRANTIES.

11. WINTERIZATION: CONTRACTOR SHALL INSPECT SYSTEM, SHUTOFF AND DRAIN PIPE BETWEEN SHUTOFFS AND DOUBLE-CHECK VALVE AND BLOW OUT SYSTEM COMPLETELY BETWEEN OCTOBER 1 AND OCTOBER 15 DURING THE WARRANTY PERIOD FOR WINTERIZATION.

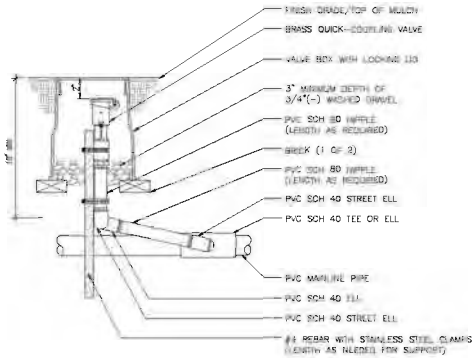
12. SPRING STARTUP: CONTRACTOR SHALL INSPECT, PRESSURIZE SYSTEM, REPAIR LEAKS AND ANY FAULTY WORK, ADJUST AND PROGRAM CONTROLLERS AS NECESSARY BEFORE MARCH 31 FOR SPRING STARTUP.



B TRENCH DETAIL
NOT TO SCALE

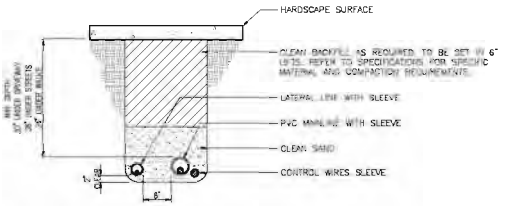


C AUTOMATIC CONTROL VALVE
NOT TO SCALE



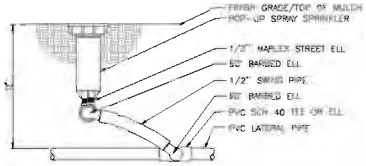
NOTE:
1. FURNISH FITTINGS AND PIPING NORMALLY SEED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.

F QUICK COUPLER VALVE
NOT TO SCALE

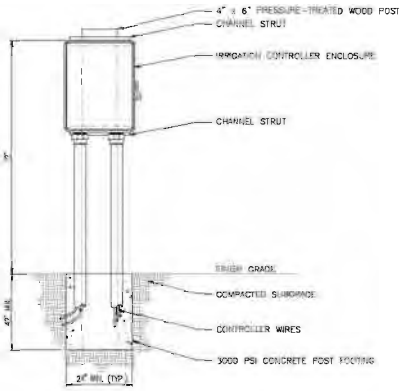


NOTES:
1. ALL SLEEVES TO BE PVC, SCH. 40 AND TWICE THE DIAMETER OF THE WORKING PIPE.
2. ALL SLEEVES TO RUN A MIN. OF 12" BEYOND HARDSCAPE EDGES.
3. CLEAN BACKFILL MAY BE SUBSTITUTED FOR SAND UNDER WALKS AND DRIVES.

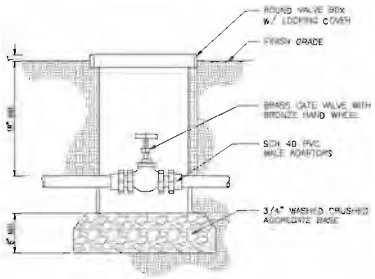
D IRRIGATION SLEEVING
NOT TO SCALE



E POP-UP SPRAY SPRINKLER
NOT TO SCALE



G CONTROLLER INSTALLATION
NOT TO SCALE



A GATE VALVE
NOT TO SCALE

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

PRELIMINARY- NOT FOR CONSTRUCTION

	APPROVAL	DATE (M/D/Y)
ORIGINAL ISSUE		
CADD	SCK	5 / 15 / 09
		/ /
LAND ARCH	JGGA	5 / 18 / 09
		/ /
REVIEW		/ /
LOG OUT		/ /

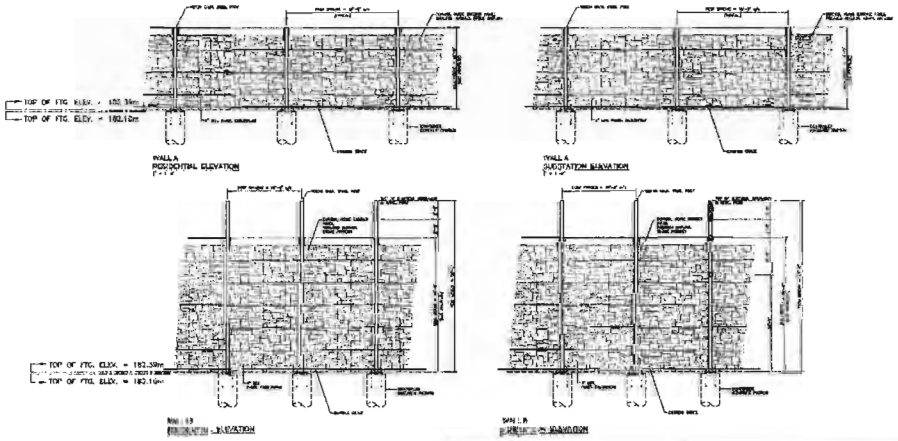
JUANITA SUBSTATION
IRRIGATION NOTES & DETAILS

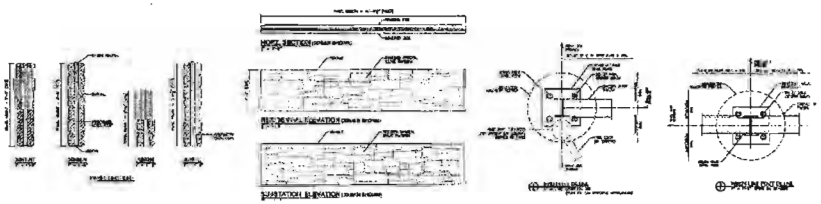
PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-14346 — REV NO 0
SHEET 3 OF 5
SCALE — CLASS SITE — SCANNED — FILE NO
CADD NO D-14346 B2 ITR. DWG

PLANT SIZE AT INSTALLATION
EAST ELEVATION

PLANT SIZE AT 10 YEARS GROWTH
EAST ELEVATION





ELEVATION &
TYPICAL DETAILS

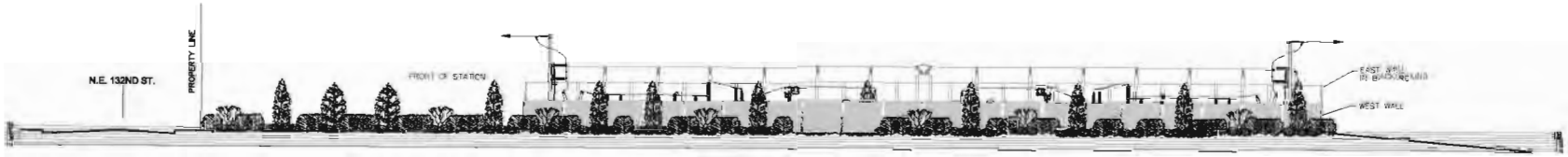
0 20 40 60
SCALE: 1"=20'

DAVID EVANS
AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

Durisol.
DURISOL INC.

ORIGINAL ISSUE			
	APPROVAL	DATE (M/D/Y)	JUANITA SUBSTATION EAST LANDSCAPE ELEVATION
DARD	DRN	/ /	
LAND ARCH	DSGN	/ /	PUGET SOUND ENERGY — SUBSTATION ENGINEERING DEPARTMENT — DRAWING NO D-14316 — REV NO 0
REVIEW		/ /	SCALE: — CLASS: SITE — SHEET 4 OF 5 — SCANNED — FILE NO
LAND PLT		/ /	

PLANT SIZE AT INSTALLATION
WEST ELEVATION



PLANT SIZE AT 10 YEARS GROWTH
WEST ELEVATION

DAVID EVANS AND ASSOCIATES INC.
415 - 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

0 20 40 60
SCALE: 1" = 20'

ORIGINAL ISSUE	APPROVAL	DATE (M/D/Y)
DRAWN	DSE	/ /
LAND ARCH	JCM	/ /
REVIEW		/ /
LOC OUT		/ /

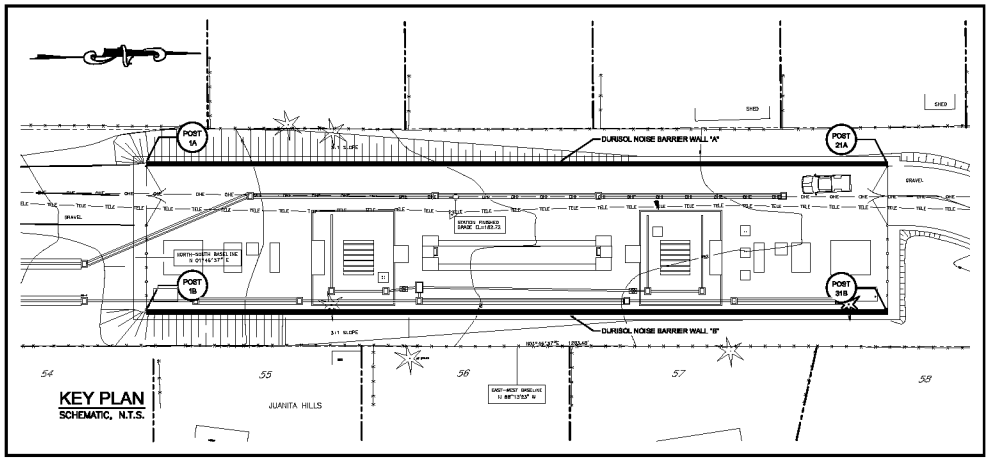
JUANITA SUBSTATION
WEST LANDSCAPE ELEVATION

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT
DRAWING NO D-14346
REV NO 0
SHEET
SCALE
DATE
SCANNED
FILE NO

Durisol. NOISE BARRIER WALL SYSTEM

JUANITA SUBSTATION

WASHINGTON STATE



GENERAL NOTES

1. DESIGN

1.1 The structure and its components have been designed in accordance with the following:
AISC Manual of Steel Construction - LRFD 2001.
AASHTO - LRFD Bridge Design Specifications- Latest Edition
AASHTO - Guide Specifications for Structural Design of Sound Barriers, 1989
1992 Revisions - 2002 Interims
BOCA - 1999

1.2 All dimensions and sizes are given in feet and inches unless noted otherwise

2. LOADING

2.1 Design Wind Pressure = 25.0 psf

3. CONCRETE

3.1 All concrete work shall conform to ACI 318.
3.2 Concrete cylinder strength at 28 days shall not be less than:
Durisol Panels (Core).....5000 psi
Non-shrink Grout (by others).....5000 psi
Concrete in Footing (by others).....4350 psi

4. FOUNDATIONS

4.1 Foundation design based on geotechnical information provided by GeoEngineers Inc., prepared for Puget Sound Energy, report File No. 0188-780-00
4.2 Footing concrete to be cast entirely against undisturbed soil, compacted soil to 95% Standard proctor Density, or rock.

5. REINFORCING STEEL

5.1 All reinforcing steel shall be deformed bars and have a minimum yield strength of 60 ksi conforming to ASTM A615.
5.2 Welded wire reinforcement shall conform to ASTM A185.
5.3 Post and Panel steel to be Hot Dip Galvanized.

6. STRUCTURAL STEEL

6.1 All structural steel work to comply with AASHTO M270 (ASTM A709), grade 345 W (50 ksi).
6.2 All plates shall conform to AAS-ITO M270 (ASTM A709) Minimum yield strength = 345 MPa (50 ksi)
6.3 All fasteners/Anchor Bolts to be hot-dip galvanized to comply with ASTM A449. Minimum ultimate strength = 725 MPa (105 ksi).
6.4 All components shall be hot dip galvanized after fabrication and comply with ASTM A123.
6.5 Galvanized surfaces which are abraded shall be cleaned and painted with two coats of zinc-rich paint.

7. WELDING

7.1 All welding and the preparation and assembly of materials for welding shall conform to the Standard Specifications for Highway and Bridge Welding Code (ANSI / AASHTO / AWS01.5) and all interim revisions published by AASHTO as of 2000.

8. ACOUSTIC PROPERTIES

8.1 Noise Reduction Coefficient (NRC)
8.1.1 Minimum NRC for Absorptive Classification ≥ 0.70.
8.1.2 Durisol panels when tested in accordance with ASTM Standard C423-81, free standing, in accordance with ASTM Standard E795-81, record a minimum NRC ≥ 0.70 (both faces).
8.2 Sound Transmission Coefficient (STC)
8.2.1 The Durisol wall meets the minimum STC ≥ 42 when measured in accordance with ASTM Standard E90-75.

9. INSTALLATION

9.1 Posts identified by numbers shown on elevation drawings.
9.1.1 Posts shall be installed plumb to within a tolerance of a 1/4" in 10'-0" and on lines and spacings specified within ± 3/8", or as per contract.
9.2 Bay of panels identified by post number to left of bay.
9.3 Each panel in bay identified by code showing type, size and orientation.
9.4 All panels to be level horizontally unless noted otherwise.
9.5 The Contractor shall verify all dimensions on site and correlate with construction drawings. The Engineer shall be notified of any discrepancies prior to commencing with construction.

Durisol.
DURISOL INC.
CANADIAN OFFICE
Durisol Inc. 87 Fifth Street
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UNITED STATES OFFICE
Durisol USA Inc. 6270 Greenabean Drive, Suite 830
McLean, Virginia, U.S.A. 22102
Phone: 888-801-0999 * Fax: 877-288-8613

000.00 = TOP OF CONCRETE FOUNDATION ELEVATION (ft)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.06	CLG	ISSUED FOR APPROVAL

REVISIONS

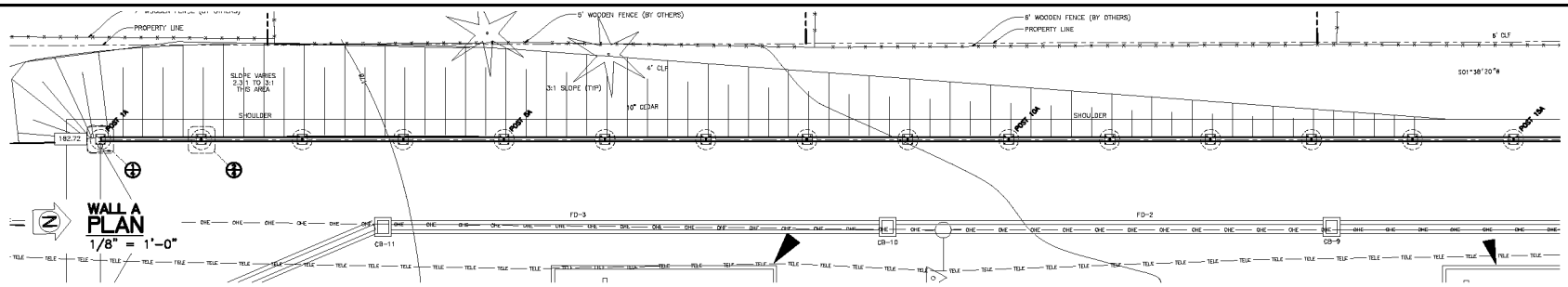
PROJECT TITLE:
JUANITA SUBSTATION

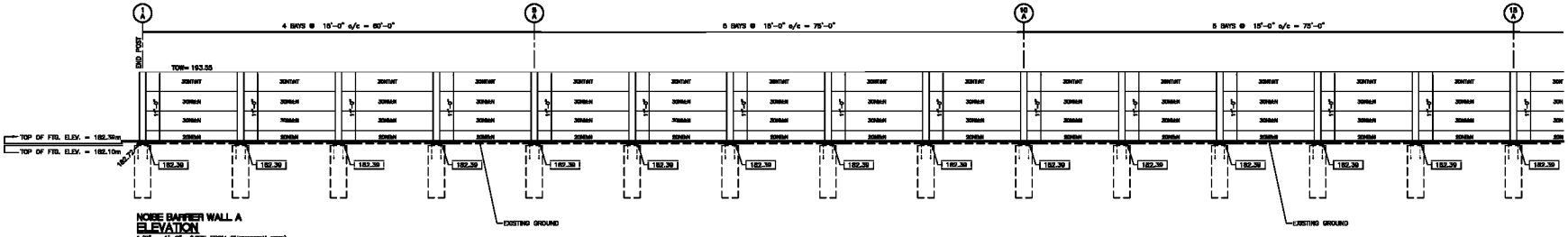
LOCATION:
WASHINGTON, USA

DRAWING TITLE:
TITLE SHEET

FEDERAL PROJECT No:
STATE PROJECT No:

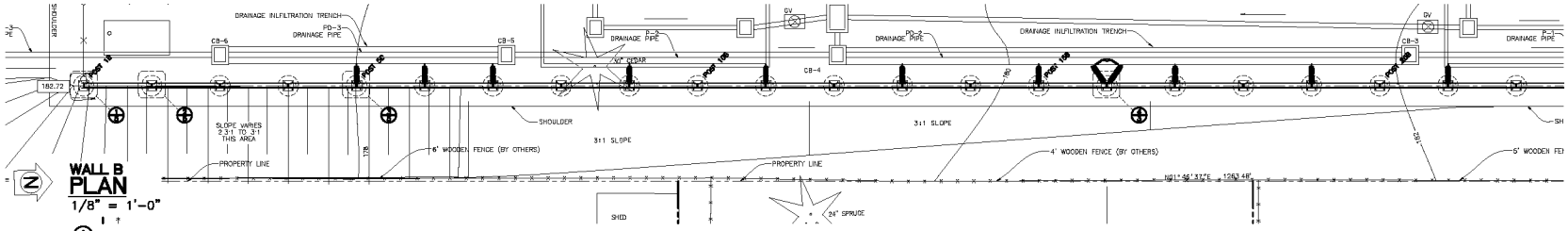
SCALE: NOTED	ACAD FILE: 08rc025-01.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
CHECKED BY: GJS	
DATE: MAY 5, 2006	SHEET No: 1 of 6
DATE of PRINT: MAY 8, 2006	



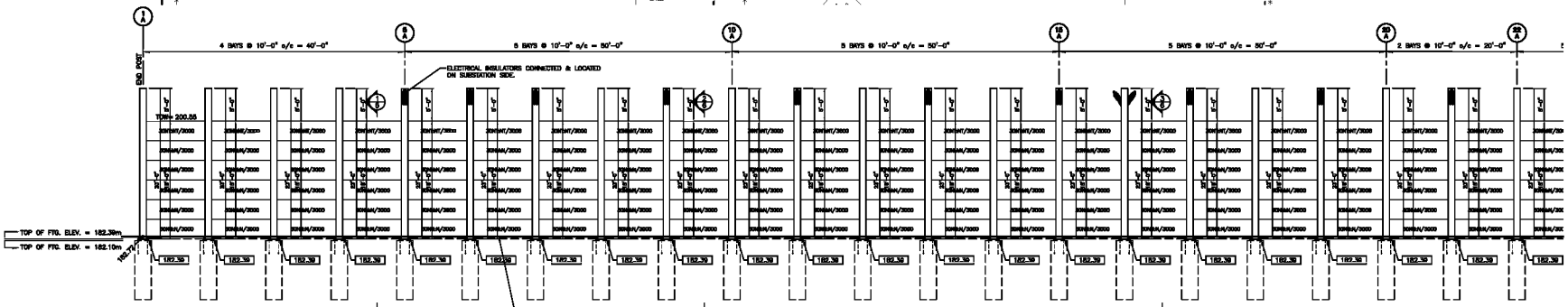


NOISE BARRIER WALL A
ELEVATION
1/8" = 1'-0" (VIEW FROM SUBSTATION SIDE)

| | | |

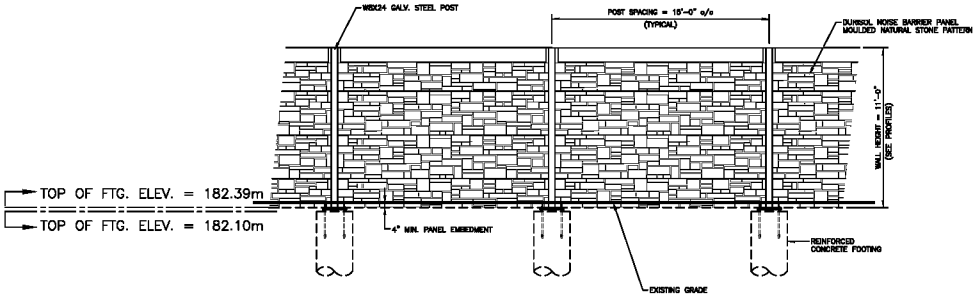


WALL B
PLAN
1/8" = 1'-0"

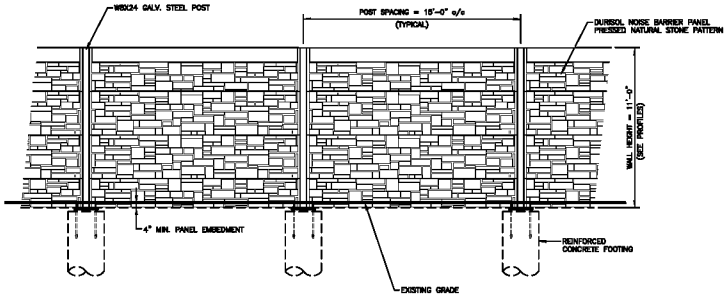


NOISE BARRIER WALL B
ELEVATION
1/8" = 1'-0" (VIEW FROM RESIDENTIAL SIDE)

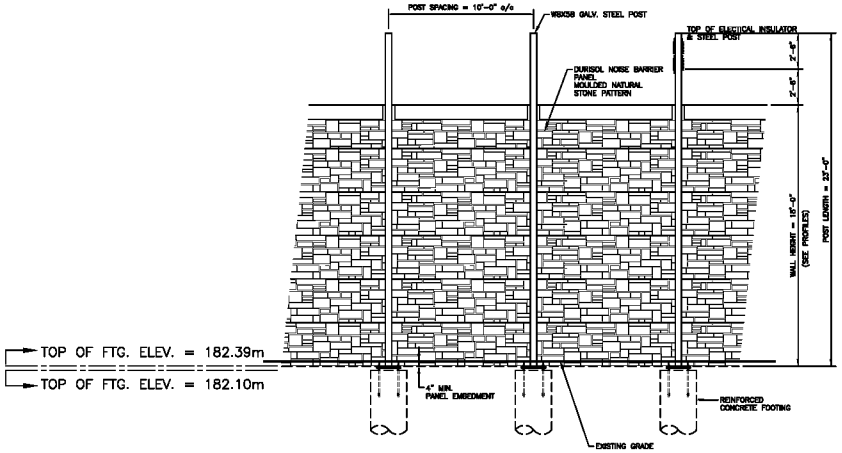
| | | |



WALL A
RESIDENTIAL ELEVATION
3/8" = 1'-0"



WALL A
SUBSTATION ELEVATION
3/8" = 1'-0"



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RESIDENTIAL ELEVATION
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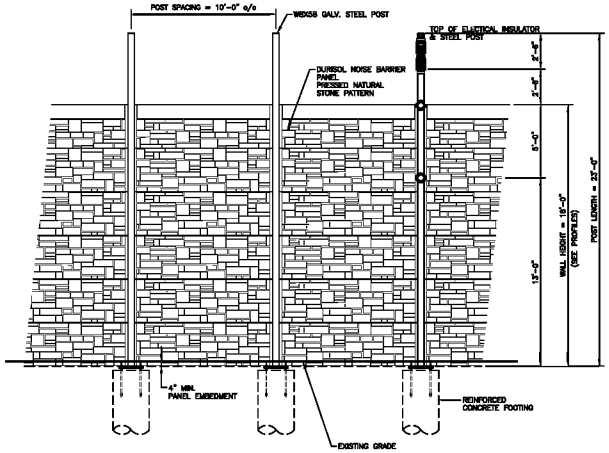
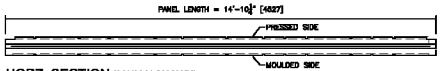
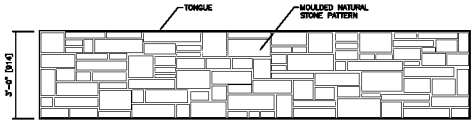


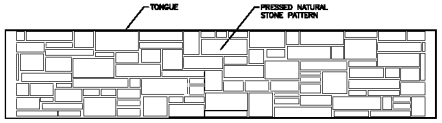
WALL B
SUBSTATION ELEVATION
3/8" = 1'-0"



HORZ. SECTION (30NM:N SHOWN)
3/8" = 1'-0"



RESIDENTIAL ELEVATION (30NM:N SHOWN)
3/8" = 1'-0"



SUBSTATION ELEVATION (30NM:N SHOWN)
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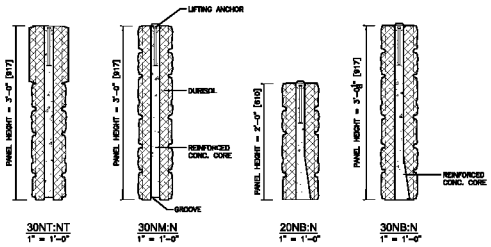
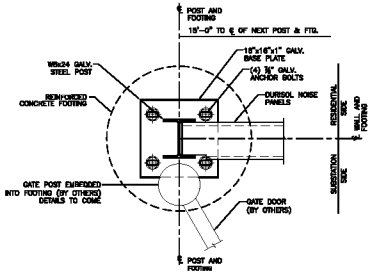


PANEL SECTIONS



END POST DETAIL
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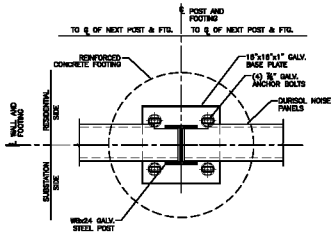
(POST No. 21A OPPOSITE SYMMETRICAL)



W8x24 LINE POST DETAIL
1" = 1'-0" (POST No. 2A-20A)

Durisol®
DURISOL INC.
CANADIAN OFFICE
Durisol Inc. 87 Fifth Street
Hamilton, Ontario, CANADA L8F 4M3
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UNITED STATES OFFICE
Durisol USA Inc. 6270 Greenwboro Drive, Suite 830
McLean, Virginia, U.S.A. 22102
Phone: 888-801-0999 * Fax: 877-288-8613

(000.00) = TOP OF CONCRETE FOUNDATION ELEVATION (m)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.06	CLG	ISSUED FOR APPROVAL

REVISIONS

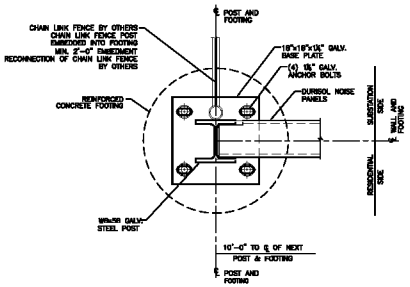
PROJECT TITLE: JUANITA SUBSTATION

LOCATION: WASHINGTON, USA

DRAWING TITLE: ELEVATION & TYPICAL DETAILS

FEDERAL PROJECT No:
STATE PROJECT No:

SCALE: NOTED	ACAD FILE: 08rc025-04.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
CHECKED BY: GJS	
DATE: MAY 5, 2006	SHEET No: 4 of 6
DATE of PRINT: MAY 5, 2006	



1/5 END POST DETAIL
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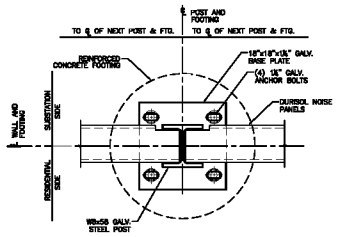
(POST No. 31B OPPOSITE SYMMETRICAL)



2/5 W8x58 LINE POST DETAIL
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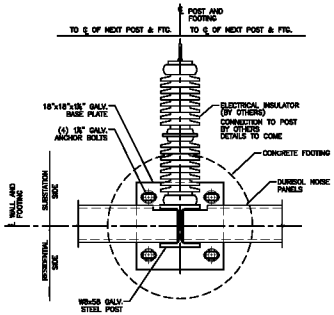
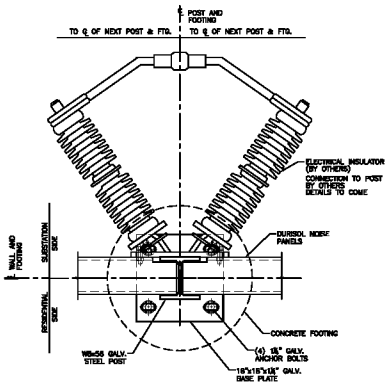
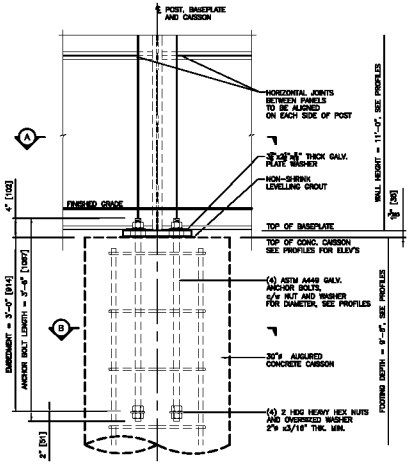


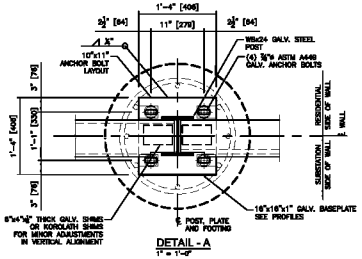
3/5 LINE POST DETAIL
1" = 1'-0"



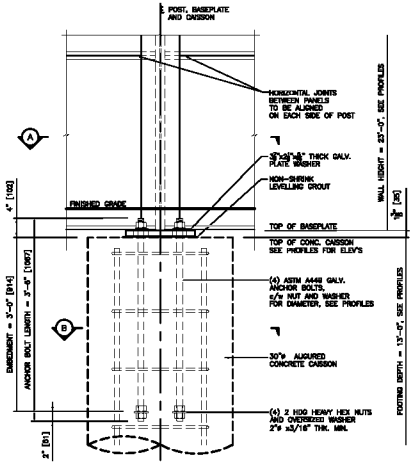
4/5 LINE POST DETAIL
1" = 1'-0"



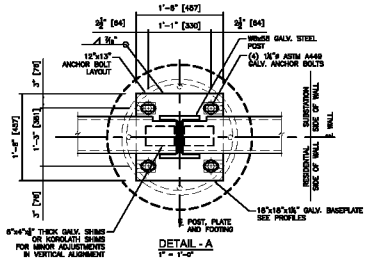
POST DETAIL- WALL A
1" = 1'-0" (TYPICAL)



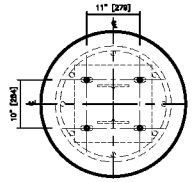
DETAIL - A
1" = 1'-0"



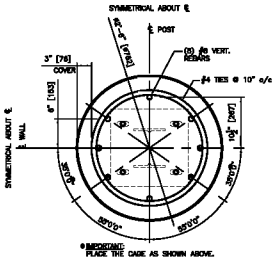
POST DETAIL- WALL B
1" = 1'-0" (TYPICAL)



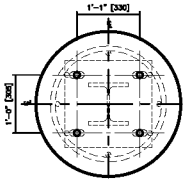
DETAIL - A
1" = 1'-0"



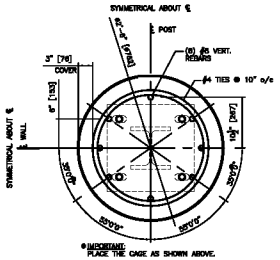
ANCHOR BOLT TEMPLATE DETAIL
1" = 1'-0"



DETAIL - B
1" = 1'-0"



ANCHOR BOLT TEMPLATE DETAIL
1" = 1'-0"



DETAIL - B
1" = 1'-0"

Durisol®
DURISOL INC.
CANADIAN OFFICE
Durisol Inc. 67 Fitz Street
Hamilton, Ontario, CANADA L8P 4M3
Phone: 905-521-0999 * Fax: 905-521-8858
UNITED STATES OFFICE
Durisol USA Inc. 8270 Greensboro Drive, Suite 830
McLean, Virginia, U.S.A. 22102
Phone: 888-801-0999 * Fax: 877-285-8513

XXX.XX = TOP OF CONCRETE FOUNDATION ELEVATION (FT)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.06	CLG	ISSUED FOR APPROVAL

REVISIONS

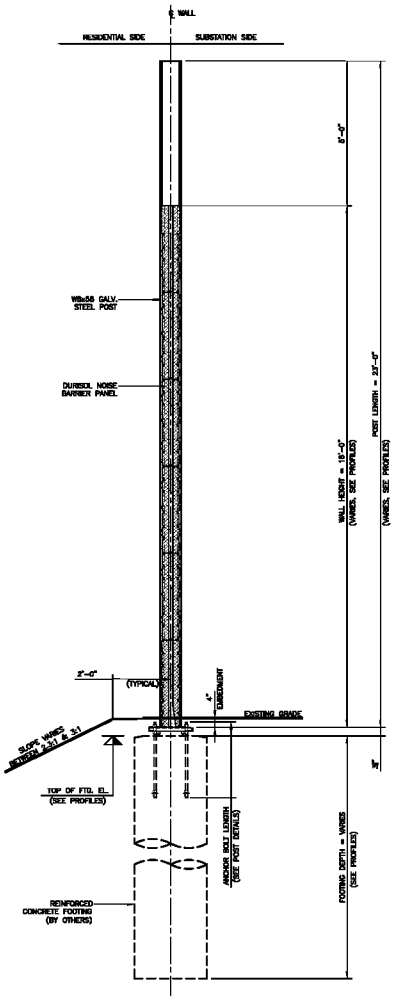
PROJECT TITLE: JUANITA SUBSTATION

LOCATION: WASHINGTON, USA

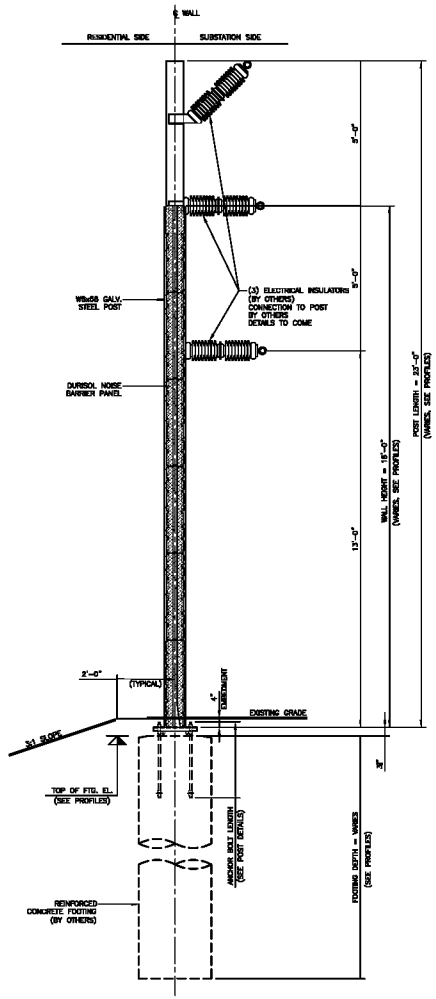
DRAWING TITLE: TYPICAL DETAILS

FEDERAL PROJECT No:
STATE PROJECT No:

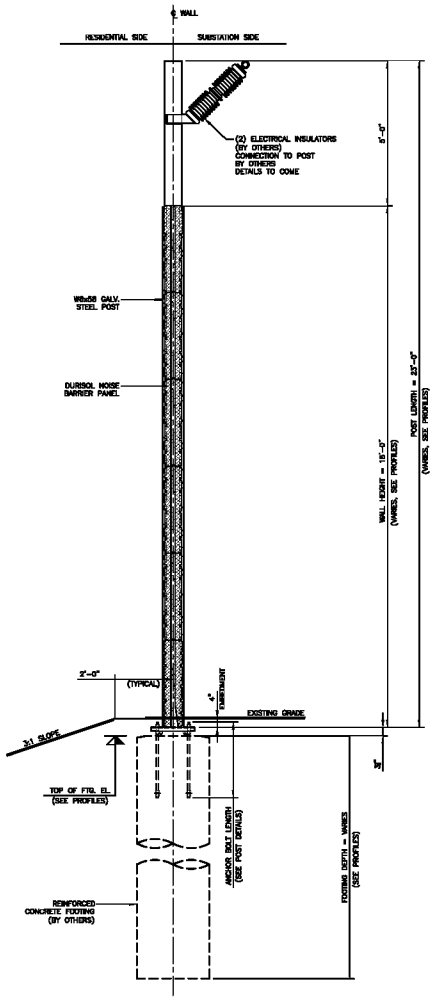
SCALE: NOTED	ACAD FILE: 08rc025-05.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
CHECKED BY: GJS	
DATE: MAY 5, 2006	SHEET No: 5 of 6
DATE of PRINT: MAY 5, 2006	



1/6 SECTION "WALL B"
1/2" = 1'-0"



2/6 SECTION "WALL B"
1/2" = 1'-0"



3/6 SECTION "WALL B"
1/2" = 1'-0"

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McLean, Virginia, U.S.A. 22102
Phone: 888-801-0999 * Fax: 877-288-8613

XXX.XX = TOP OF CONCRETE FOUNDATION ELEVATION (FT)

No.	DATE:	BY:	DESCRIPTION:
1	05.09.06	CLG	ISSUED FOR APPROVAL

REVISIONS

PROJECT TITLE:
JUANITA SUBSTATION

LOCATION:
WASHINGTON, USA

DRAWING TITLE:
SECTIONS

FEDERAL PROJECT No:
STATE PROJECT No:

SCALE: NOTED	ACAD FILE: 08rc025-06.dwg
DRAWN BY: CLG	DURISOL PROJECT No: 08RC25
CHECKED BY: GJS	
DATE: MAY 5, 2006	SHEET No: 6 of 6
DATE of PRINT: MAY 8, 2006	

CITY OF KIRKLAND
ENVIRONMENTAL CHECKLIST

Purpose of Checklist:

The State Environmental Policy Act (SEPA), Chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the City identify impacts from your proposal, and to reduce or avoid impacts from the proposal, whenever possible

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Answer the questions briefly with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the City staff can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The City may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impacts.

Use of Checklist for Non-project Proposals:

Complete this checklist for non-project proposals also, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NON-PROJECT ACTIONS (Part D).

For non-project actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable: Juanita Substation Rebuild

2. Name of applicant: Puget Sound Energy (PSE)

SEP08-00025 Memo
Enclosure 3

3. Tax parcel number: 2926059007

4. Address and phone number of applicant and contact person: (Please see Attachment)

5. Date checklist prepared: May 30, 2008

6. Agency requesting checklist: City of Kirkland Department of Planning and Community Development

7. Proposed timing or schedule (including phasing, if applicable): Construction of new substation-Early Spring 2009

8. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal?

(Please see Attachment)

9. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

(Please see Attachment)

10. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No other such applications are known.

11. List any government approvals or permits that will be needed for your proposal, if known.

(Please see Attachment)

12. Give brief, complete description of your proposal, including the proposed uses, the size and scope of the project and site including dimensions and use of all proposed improvements. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

(Please see Attachment)

13. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

(Please see Attachment)

City of Kirkland Environmental Checklist
Attachment

Section A – Background

Item 4
Address and phone number of applicant and contact person.

Roque Bamba, 355 110th Avenue NE, EST-05E, Bellevue, Washington 98004, 425-462-3774

Item 8
Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal?

At some time in the future, two new transmission poles are expected to be located at the north end of the new substation. These poles would provide a connection to the substation from a new Juanita to Redmond transmission line that is expected to be separately permitted in the future. The substation rebuild is not dependent upon or required for the future Juanita to Redmond transmission line.

Item 9
List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Sound Analysis Juanita Substation Kirkland, Washington, BRC Acoustics & Technology Consulting, September 26, 2007.
Geotechnical Engineering Services, Juanita Substation Improvements, GeoEngineers, Inc., February 29, 2007.

Item 11
List any government approvals or permits that will be needed for your proposal, if known.

City of Kirkland: Zoning Permit – Type 11A Use
Variance from Side Yard Setback Requirements
Variance from Landscape Buffer Requirements
Variance from Height Requirements
Clearing and Grading Permit
Building Permit
Right of Way Use Permit
Tree Removal Permit

City of Kirkland Environmental Checklist Attachment
Section A - Background

Item 12

Give brief, complete description of your proposal, including the proposed uses, size and scope of the project and site including dimensions and use of all proposed improvements. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

The proposed project is expanding and rebuilding the PSE Juanita electric distribution substation. The existing substation is located at the southern end of an existing long, narrow PSE-owned utility corridor measuring approximately 1,270 feet by 80 – 89 feet. The expanded and rebuilt substation will be located in the northern 400 feet of the corridor. Expansion of the substation is required to meet increased demand for electricity in the Juanita/Totem Lake area and to increase the reliability of the electrical system in the immediate service area. After the rebuild is complete, the substation will have a "looped" configuration due to the addition of a second transformer. These means that the substation can continue to function even if a transmission line to the north or to the south of the substation is disrupted.

The fenced area for the new substation will be 300 feet in length and 60 feet in width. An 18-foot high Durisol block sound wall will be constructed on the east side of the substation, and an 11-foot high Durisol block sound wall on the west side. A 12-foot landscaping strip, including trees and shrubs, will be located between the sound walls and the east and west property lines.

Vehicular access to the new substation will be via driveway to NE 132nd Street; an additional 12 feet of right of way will be dedicated along the property frontage. An existing 14-foot gravel road provides internal access within the PSE ownership.

Upon completion of the new substation, the existing substation will be dismantled and removed, and that portion of the site restored.

Item 13

Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map if reasonably available. While you submit any plans required by the agency, you are not required to duplicate maps or detail plans submitted with any permit applications related to this checklist.

The new substation will be located within the existing PSE utility corridor (10910 NE 132nd Street), within the City of Kirkland, Washington. The ownership lies between NE 132nd Street and NE 128th Street, between 109th Avenue NE and 110th Avenue NE. King County Parcel No. 2926059007. A vicinity map is included in the attached application.

TO BE COMPLETED BY APPLICANT

EVALUATION FOR AGENCY USE ONLY
REVIEWED BY:

Tony Leavitt,
Associate Planner

B. ENVIRONMENTAL ELEMENTS

1. EARTH

a. General description of the site (circle one): Flat, rolling, hilly, steep, slopes, mountainous, other
(Please see Attachment)

b. What is the steepest slope on the site (approximate percent slope)?
The steepest slope on this site is approximately 6%.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.
(Please see attachment)

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.
No unstable soils are known at the project site or in the immediate vicinity.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
Construction of the south driveway will require a cut and fill totalling approximately 350 cubic yards.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
(Please see Attachment)

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt, buildings)?
Approximately 16.6% of the site will be covered with impervious surfaces upon completion of the project.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
(Please see Attachment)

Comply with Geotech Report Recommendations

2. AIR

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.
(Please see Attachment)

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
No off-site sources of emissions or odors will affect the project.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
Dust management will be included in the required Temporary Erosion and Sedimentation Control Plan.

3. WATER

a. Surface

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.
No surface water body is present either on the site or within the immediate vicinity.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

The project will not require any work to take place over, in, or adjacent to any surface water body.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Not applicable

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

(Please see Attachment)

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

The proposed project does not lie within a 100-year floodplain.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

The proposed project does not involve any discharges of waste materials to surface waters.

b. Ground

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

(Please see Attachment)

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable

c. Water Runoff (including storm water):

1) Describe the source of runoff (include storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Stormwater runoff will be collected and infiltrated per an approved storm water management plan.

2) Could waste materials enter ground or surface waters? If so, generally describe.

It is not anticipated that waste materials will enter ground or surface waters.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

The storm drainage system will be designed and constructed per City of Kirkland requirements.

4. PLANTS

a. Check or circle types of vegetation found on the site:

- x deciduous tree: alder, maple, aspen, other
- x evergreen tree: fir, cedar, pine, other
- x shrubs
- x grass
- ___ pasture
- ___ crop or grain

____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
____ water plants: water lily, eelgrass, milfoil, other
X other types of vegetation

b. What kind and amount of vegetation will be removed or altered?
(Please see Attachment)

c. List threatened or endangered species known to be on or near the site.
(Please see Attachment)

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
(Please see Attachment)

5. ANIMALS

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other (hawk and songbirds)
mammals: deer, bear, elk, beaver, other
fish: bass, salmon, trout, herring, shellfish, other

b. List any threatened or endangered species known to be on or near the site.
(Please see Attachment)

c. Is the site part of a migration route? If so, explain.
Site is not known to be part of a migration route.

d. Proposed measures to preserve or enhance wildlife, if any:
(Please see Attachment)

6. ENERGY AND NATURAL RESOURCES

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

(Please see Attachment)

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

(Please see Attachment)

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

(Please see Attachment)

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

(Please see Attachment)

1) Describe special emergency services that might be required.

No special emergency services will be required.

2) Proposed measures to reduce or control environmental health hazards, if any:

(Please see Attachment)

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Existing noise in the project area will not affect the new substation.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

(Please see Attachment)

3) Proposed measures to reduce or control noise impacts, if any:

No additional noise mitigation is required.

Sound Analysis Recomendations

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties?

(Please see Attachment)

b. Has the site been used for agriculture? If so, describe.

The project site has not been used for agriculture.

c. Describe any structures on the site.

(Please see Attachment)

d. Will any structures be demolished? If so, what?

(Please see Attachment)

e. What is the current zoning classification of the site?

(Please see Attachment)

f. If applicable, what is the current shoreline master program designation of the site?

Not applicable

g. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

No portion of the project site has been classified as "environmentally sensitive."

h. Approximately how many people would reside or work in the completed project.

(Please see Attachment)

i. Approximately how many people would the completed project displace?

Not applicable

j. Proposed measures to avoid or reduce displacement impacts, if any:

No such measures are required.

k. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

(Please see Attachment)

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

No housing units will be provided.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

No housing units will be eliminated.

c. Proposed measures to reduce or control housing impacts, if any:

No such measures are required.

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

(Please see Attachment)

b. What views in the immediate vicinity would be altered or obstructed?
(Please see Attachment)

c. Proposed measures to reduce or control aesthetic impacts, if any:
(Please see Attachment)

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
(Please see Attachment)

b. Could light or glare from the finished project be a safety hazard or interfere with views?
Light and glare from the completed project would not be a safety hazard or interfere with views.

c. What existing off-site sources of light or glare may affect your proposal?
No off-site sources of light or glare will affect the proposal.

d. Proposed measures to reduce or control light and glare impacts, if any:
(Please see Attachment)

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?
(Please see Attachment)

b. Would the proposed project displace any existing recreational uses? If so, describe.
No existing recreational uses will be displaced.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
No such measures are required.

13. HISTORICAL AND CULTURAL PRESERVATION

a. Are there any places or objects listed in, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

(Please see Attachment)

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

(Please see Attachment)

c. Proposed measures to reduce or control impacts, if any:

(Please see Attachment)

14. TRANSPORTATION

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on-site plans, if any.

(Please see Attachment)

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Yes, the site is located on a Metro Transit route.

c. How many parking spaces would the completed project have? How many would the project eliminate?

(Please see Attachment)

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

The proposed project will not require any new roads or streets; however, a private access road will be maintained from city streets to the substation.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
The project will not use or occur in the immediate vicinity of water, rail, or air transportation.

f. How many vehicular trips per day would be generated by the completed project? If know, indicate when peak volumes would occur.
(Please see Attachment)

g. Proposed measures to reduce or control transportation impacts, if any:
A plan for traffic control during construction will be approved by King County.

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.
The project would not result in an increased need for public services.

b. Proposed measures to reduce or control direct impacts on public services, if any.
No proposed measures to reduce or control public service impacts will be necessary.

16. UTILITIES

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other. **Electricity**
Telephone

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
See project description in Section A, Background.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____ Tony Leavitt

Date Submitted: 6.6.2008 9/29/2008

Section B – Environmental Elements

Section B.1 – Earth

Item 1.a
General description of the site (circle one): Flat, rolling, hilly, steep, slope, mountainous, other

The northern portion of the project site is relatively flat; the southern portion slopes down approximately 12 feet from the existing substation to NE 128th Street.

Item 1.c
What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Subsurface conditions consist of topsoil overlying loose to medium dense recessional outwash overlying dense to very dense glacial till.

Item 1.f
Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Construction activities typically increase the potential for erosion, although the relatively flat nature of new substation site and the fact that much of the area has already been cleared will reduce this potential.

Item 1.h
Proposed measures to reduce or control erosion, or other impacts to the earth, if any.

A temporary erosion and sedimentation control plan (TESCP) will be prepared consistent with City of Kirkland requirements. The TESCP will be submitted at the time of application for a Building Permit.

Section B – Environmental Elements

Section B.2 – Air

Item 2.a

What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.

Construction equipment will generate short-term dust, vehicle exhaust, and odors in the immediate work area, but these emissions will be temporary.

Section B – Environmental Elements

Section B.3 – Water

Item 3.a.(4)
Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities, if known.

No surface water withdrawal or diversions are needed for this project.

Item 4.b.(1)
Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities, if known.

No ground water will be withdrawn. Storm drainage will be infiltrated consistent with an approved surface water management plan.

Section B – Environmental Elements

Section B.4 – Plants

Item 4.b
What kind and amount of vegetation will be removed or altered?

Existing vegetation on the northern portion of the site will be cleared. This vegetation includes blackberries, grasses, two cedar trees, and two maple trees.

Item 4.c
List threatened or endangered species known to be on or near the site.

No threatened or endangered species are known to be on our near the site.

Item 4.d
Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.

A 13-foot landscaping strip, including trees and shrubs, will be located along the east and west property lines in the vicinity of the new substation. A preliminary landscaping plan is attached to this application.

Section B – Environmental Elements

Section B.5 – Animals

Item 5.b
List any threatened or endangered species know to be on or near the site.

No threatened or endangered species are known to be on or near the site.

Item 5.d
Proposed measures to preserve or enhance wildlife, if any.

Landscaping strips, including trees and shrubs, will be located on the east and west sides of the substation. No additional measures to enhance or preserve wildlife are proposed because these enhancements are not typically encouraged in substation facilities.

Section B – Environmental Elements

Section B.6 – Energy

Item 6.a

What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The proposed project is designed to respond to the demand for electrical service and improved reliability for the surrounding area. The new substation will be approximately three times larger than the existing substation, and will have two transformers to increase electric service capacity and improve reliability.

Item 6.b

Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

The project will not affect the use of solar energy by adjacent properties.

Item 6.c

What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts.

PSE provides a broad array of services and programs to encourage energy conservation and efficient use of energy. Current energy conservation standards are incorporated into PSE construction projects.

Section B – Environmental Elements

Section B.7 – Environmental Health

Item 7.a

Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, please describe.

The project will not create any known environmental health hazards. PSE's substations, transmission and distribution facilities are designed, constructed, and operated in accordance with all applicable federal, state, and local regulations and safety codes.

Electrical transmission lines, distribution lines, and substations create electric and magnetic fields (EMF). EMF also exists in nature and around all types of electrical devices and appliances. Electric fields are produced by the presence of electrical charges (voltage); the movement of these charges (current) produces magnetic fields. The electrical and magnetic fields around electrical appliances and utility facilities are referred to as extremely low frequency EMF. They have a significantly lower frequency (60 cycles per second, or Hz), than radio broadcast waves (0.5 to 100 million cycles per second) or electromagnetic energy from sunshine (1,000 trillion cycles per second). Extremely low frequency EMF does not have sufficient energy to break molecular bonds or damage DNA.

Substations are not a predominant source of magnetic fields for surrounding properties. The incoming transmission lines and the outgoing distribution lines mostly influence the magnetic fields associated with substations. These power lines exist and are located throughout the region and pass through the neighborhoods that the substation serves. The construction of the Juanita Substation will not significantly change the existing EMF conditions at the project site or the surrounding properties. The substation will be located adjacent to the existing transmission line already located on the property.

PSE relies on the independent scientific research community for information regarding EMF and potential health effects. The consensus of the scientific community is described in a number of reports that have been released by respected independent scientific groups representing a variety of disciplines including physics, epidemiology, and cellular biology. A review of these sources has found no causal relationship between exposure to extremely low frequency EMF associated with 60 Hz electrical facilities and adverse effects to human health. Currently the EPA or any other health agency of the state or federal government does not regulate electric and magnetic fields. This is consistent with the consensus of the scientific community that there is no basis from which to conclude the exposures to EMF cause adverse health effects.

The substation transformer contains synthetic or mineral oil for cooling. A Spill Prevention Concrete Curb (SPCC) facility system will be installed around the transformer to contain oil, in the unlikely event that a transformer leaked or spilled oil. SPCC facilities consist of a concrete curb, bentonite clay-lined bottom, crush rock fill, an oil stop float valve and manual gate valve. The containment is sized to hold the entire oil content of the transformer.

Section B – Environmental Elements

Section B.7 – Environmental Health (continued)

Item 7.a.(2)
Proposed measures to reduce or control environmental hazards, if any.

A spill prevention, countermeasure, and control (SPCC) plan will be prepared for the substation site. Additionally, secondary equipment will be installed at the substation with the capacity for containing transformer oil.

Item 7.b.(2)
What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

A short-term increase in noise will result from the construction process which will include the use of track hoes, bulldozers, trucks and cranes. Construction will be confined to normal daytime weekday hours, with the possibility of some work on Saturdays.

A Sound Analysis was prepared for this project in order to evaluate future sound levels from the new electrical transformers proposed for this substation on adjacent residential properties. A copy of the Sound Analysis is attached to this application. Existing City of Kirkland/State of Washington noise regulations limit sound levels produced at the substation and received at nearby residences to 55 dBA during all hours. Most residential properties are subject to a nighttime noise limitation of 45 dBA; substations are exempt from this standard (WAC 173-60)

The Sound Analysis concluded that, without mitigation, "*...A-weighted sound levels produced by the proposed transformers would meet the State of Washington daytime and nighttime noise limit of 55 dBA at all Analysis Locations.*" The analysis also concluded that at the property-line locations closest to the two transformers, "*...the predicted sound levels are higher than existing nighttime sound levels by 5 to 9 dBA. These sound-level increases would be considered a significant noise impact according to EPA guidelines, and would be noticeable.*"

To address this noticeable increase, 300-foot long Durisol sound walls have been added to the east and west sides of the substation. With the addition of these sound walls (18 feet and 11 feet in height, respectively), the sound levels produced by the transformers "*...would be in the range of or lower than existing nighttime sound levels at the nearest Monitoring Locations, and would be below the nighttime noise limit of 45 dBA...*" that would apply to residential receiver properties if the substation was not exempt. Details regarding the specifications for the sound walls are contained in the attached Sound Analysis.

Section B – Environmental Elements

Section B.8 – Land and Shoreline Use

Item 8.a
What is the current use of the site and adjacent properties?

The project site is currently occupied by an approximate 60-foot by 100-foot PSE single-bank electrical substation, located within the southern portion of the utility corridor. The remainder of the property is undeveloped except for an internal gravel access road which extends north to NE 132nd Street. The existing substation is accessed via the internal gravel access road to NE 132nd Street.

Properties to the east and west of the PSE corridor are developed with single-family detached homes, within the Juanita Hills subdivision. NE 132nd Street borders the property on the north, and NE 128th Street borders the property on the south.

Item 8.c
Describe any structures on the site.

The utility corridor is currently occupied by an existing approximate 100-foot by 60-foot, fenced PSE single-bank electrical substation. The substation is connected to transmission lines entering the substation from NE 128th Street and NE 132nd Street.

Item 8.d
Will any structures be demolished? If so, what?

After construction of the new substation is complete, the existing substation will be removed and that portion of the site restored.

Item 8.e
What is the current zoning classification of the site?

Both the project site and the adjacent residential properties are zoned Low Density Residential – RSX-7.2.

Item 8.h
Approximately how many people would reside or work in the completed project?

None. Routine visits by PSE personnel will be needed for inspections and maintenance.

Section B – Environmental Elements

Section B.8 – Land and Shoreline Use (continued)

Item 8.k

Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

The proposed substation expansion will increase electrical service capacity and improve reliability, consistent with the objectives of the *City of Kirkland Comprehensive Plan*. Section XI, Utilities, in the *Comprehensive Plan* states that *"The primary focus of the City in the coming years will be to continue to increase efficiency and to avoid maintenance problems associated with older facilities."* As also noted in the *Comprehensive Plan,* "*PSE's long-range plans through the year 2022 indicate the need for three new distribution substations in Kirkland and a new 115 kV line along the eastern and northern City boundaries to connect to the Sammamish substation in Redmond.*"

The expansion of the Juanita substation may delay the need for one of the three new substations.

Section B – Environmental Elements

Section B.10 – Aesthetics

Item 10.a

What is the tallest height of any proposed structure(s), not including antennas? What is the principal exterior building material(s) proposed?

The transmission line termination structures are the tallest element at approximately 35 feet. The sound wall along the east side of the substation will be 18 feet in height, and the sound wall along the western side will be 11 feet in height. Existing transmission poles and transmission lines, at heights of approximately 70 feet and below, will remain.

The side of the sound wall facing residential lots will be textured, similar to brick or rocks. Periodic columns will divide the horizontal space; smooth vertical accents will also be located between columns.

Item 10.b

What views in the immediate vicinity would be altered or constructed?

Residents adjacent to the new substation in the northern portion of the site will view a landscaping planting, backed by an 11-foot or 18-foot sound wall, and the tops of electrical equipment as shown on the attached plans.

Approximately four residences each are located adjacent to the east and west sides of the new substation; the residences are oriented such that the rear yards face the substation.

Item 10.c

Proposed measures to reduce or control aesthetic impacts, if any.

A 400-foot long landscaping strip, including 45 evergreen and deciduous trees (Vine Maple, Incense Cedar, Austrian Black Pine, Western Red Cedar, Cascara, and American Aborvitae) 5 to 8 feet in height, and shrubs (Serviceberry, Pacific Wax Myrtle, Tall Oregon Grape, and Snowberry) will be located along the east and west sides of the new substation. A conceptual landscaping plan is attached to the substation application.

The color of the new sound wall will be agreed upon with the adjacent property owners.

Four existing electric distribution poles, approximately 45 feet in height, will be removed, plus all above-ground electric distribution lines.

Section B – Environmental Elements

Section B.11 – Light and Glare

Item 11.a

What type of light or glare will the proposal produce? What time of day would it mainly occur?

The substation will be lighted for security purposes. Substation lighting is typically limited to two lights near the doors of the switchgear cabinet. The metal electrical equipment within substations typically has a matte finish in order to absorb, rather than reflect light.

Item 11.d

Proposed measures to reduce or control light and glare impacts, if any.

Security lighting will be shielded and directed downward to the extent feasible. The lighting will also be mounted below the level of the surrounding wall and landscaping, if possible.

Section B – Environmental Elements

Section B.12 – Recreation

Item 12.a

What designated and informal recreational opportunities are in the immediate vicinity?

Juanita High School, with its associated sport and recreations facilities, is located in the vicinity of the project site. Construction of the new substation will not impact these facilities.

Section B – Environmental Elements

Section B.13 – Historical and Cultural Preservation

Item 13.a

Are there any places or objects listed in, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

No places or objects listed in or proposed for national, state, or local preservation registers are known to be on or next to the site.

Item 13.b

Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

No landmarks or evidence of historic, archaeological, scientific, or cultural importance are known to be on or next to the site.

Item 13.c

Proposed measures to reduce or control impacts, if any.

Should historic, archaeological, scientific, or cultural items be uncovered during construction activities, the site would be isolated and the State Historic Preservation Office contacted for appropriate next steps.

City of Kirkland Environmental Checklist Attachment
Section B – Environmental Elements

Section B.14 – Transportation

Item 14.a

Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on-site plans, if any.

The existing substation is accessed via a driveway to NE 132nd Street. The new substation will be accessed via driveway to NE 132nd and NE 128th Street.

Item 14.c

How many parking spaces would the completed project have? How many would the project eliminate?

Parking within the rebuilt substation will be limited to four service vehicles used to maintain the facility on a monthly basis. Parking spaces within the existing substation will be eliminated.

Item 14.f

How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

The project will not generate a great number of vehicle trips during construction as only daily commuting trips by the construction crew and delivery of materials would occur. When the substation is built, routine trips to the substation for inspection and maintenance would occur approximately once per week.

The following Enclosures are attachments to the Staff Advisory Report:

Enclosure 4:
Geotechnical Engineering Services Report prepared by GeoEngineers Inc. dated February 29, 2007 (See Attachment 14)

Enclosure 5:
Sound Analysis prepared by BRC Acoustics and Technology Consulting dated April 25, 2008 (See Attachment 13)

Enclosure 6:
Initial Public Comment Letters (See Attachment 8)

To the City of Kirkland and or whom it may concern

We the residents of: 13045 110th AVE. NE, Kirkland, WA. 98034 are hereby appealing the City of Kikland's determination of nonsignificance with regard to SEPA on the grounds that adequate consideration was not given to the effects and potential destruction of tress on our property as a result of this purposed project.

I have standing to appeal on the following grounds: 1.) This Proposed expansion and rebuilding of the existing PSE Juanita electric distribution substation threatens the Health of the trees on my property and several of my neighbor's trees on their property. These trees overhang the proposed setback variances by at least 10 feet. They would require extensive trimming to not fall with in the proposed setback variances. This trimming would result in serious detriment to the tree's health and ability to withstand wind and therefore present a toppling hazard. 2.) The trimming necessary to make these tree's limbs fall outside of the proposed setback variances for the substation's sound wall would create a hazard to my home with the potential for the tree or it's limbs to penetrate my house. 3.) The root systems of these trees are also within the setback variances proposed and would require cutting and containment. Because it would be necessary to cut or contain the root system of these three to four trees, ground erosion as a result of water runoff could undermined these root systems presenting a toppling hazard to my home. 4.) These trees also present a fire ignition source from wind blown limbs falling into the proposed substations boundaries which could threaten my home with fire.

Troy Freeman
10/16/2008
13045 110th AVE NE
Kirkand, WA. 98034

RECEIVED
OCT 16 2008
AM 4:30 PM
PLANNING DEPARTMENT
BY TL

Tony Leavitt

From: Michael H. [mrh2001@comcast.net]
Sent: Sunday, August 10, 2008 2:27 PM
To: Tony Leavitt
Subject: Opposed to Permit No. ZON08-00010

Importance: High

Tony Leavitt
City of Kirkland
Planning and Community Development Department
123 5th Ave
Kirkland, WA 98033
425-587-3253

RE: Permit No. ZON08-00010

Dear Tony Leavitt and the City of Kirkland,

I am extremely opposed to the installation of a substation at the proposed location. Please note that I also expressed this opposition in writing to PSE on 10-25-2007 with absolutely no response from PSE.

I am also extremely opposed to the request for a zoning variance. It is bad enough they want to place this noisy dangerous eyesore behind my property but now they want to have it closer and higher than the Kirkland zoning currently permits. This is completely unacceptable. They are requesting more zoning variances on this proposed substation than they have ever done before on any other residential substation that they have ever built (This was confirmed by PSE). Not only that, but percentage wise the amount of variance they are asking for is HUGE (30% in one case). The current proposed location is obviously a bad fit for this substation but they are trying to push it though and cram it in the proposed space since it is easiest and cheapest for them. Does the city of Kirkland really want to set this president by approving this?

In talking with PSE this is the only location they looked even though it is the worst location for their customers surrounding this proposed substation, all of whom are opposed to it. At the community meeting they even admitted that there were other possible locations but they didn't look at these locations because the current proposed one is easiest and cheapest for them.

One of the locations that we all brought up with PSE was the green space south of 128th where there are NO houses, etc and their answer was it wasn't looked at more than likely due to cost, even though the location was much better and larger than the current proposed one. There are other options for PSE they just don't want to look due to the fact that those options will cost more money to implement. I speak for everyone involved that if our electricity costs a bit more every month but we don't have a substation located in our backyard we all would be fine with this.

In addition to the visual impacts there are also going to be substantial environmental impacts with placing the substation at the proposed location.
The current plan is to remove a substantial amount of trees from the property as well as cut trees/limbs located on our private property. This impact is not only limited to the trees but also the animals (raccoons, squirrels, birds, etc) residing in tress and greenery. Also the amount of noise, particulate material, and traffic that is going to be generated for 8-12 months is completely unacceptable.

I implore you to not only reject the proposed variances but reject the overall permit for the substation at the proposed location as PSE has other options that would be much better for the community and City of Kirkland.

Thank you,

Michael Heslop

13055 110th Ave NE
Kirkland, WA 98034
Email: mrh2001@comcast.net
Phone: 206-383-7279

Kirkland Permits Comment
Comments for Permit # ZON08-00010, PSE Juanita Substation

Mr. Leavitt,
This proposed site for the new PSE Juanita substation is adjacent to my property on 109th Ave NE in Kirkland. I am opposed to the project both as a resident of the neighborhood and as a Kirkland resident.

As a neighborhood resident I am mostly concerned with the fact that although this project represents the easiest, quickest and cheapest way for PSE to attain their goals of increasing distribution, it is not their only option. PSE has chosen to build what they admit is the largest substation they have ever attempted to put into a residential neighborhood and in two separate meetings, one last October and another on Wednesday August 6, 2008 the PSE Project Manager (Roque Bamba) admitted that this was the only option PSE has truly explored because it is far easier and cheaper than the alternatives. I also discussed some of the alternatives with him and there are other viable solutions such as rebuilding the current substation in place. It would be more expensive to rebuild in place but it is possible and the South end of the property is zoned for a substation. While I understand the need for more power distribution due to hospital expansions, rebuilding Totem Lake Mall and residential expansion I do believe PSE should expend all other options before putting a blight like this in the middle of a Kirkland neighborhood and feel that the City of Kirkland should demand as much. This is far different than building a structure that is within zoning requirements in an area properly zoned for the project. PSE wants Kirkland to change zoning requirements which will degrade the neighborhood and potentially cost the area residents hundreds of thousands of dollars in equity so they can save on construction and maintenance costs. Not a compelling argument in my opinion. These rules are in place for a reason and should not be changed solely so a private company can cut costs.

As a Kirkland resident, I am concerned by the precedent this would set for future development. The propose site (North end of property) is not zoned for this type of use. It has been used for access only and should remain as such. Zoning restrictions and setbacks are in place because as a community we have decided that we do not want tightly packed or industrial structures in our residential neighborhoods. This is very important to the character of our town. People have lived here and continue to purchase homes here for that reason. If the PSE application is approved, there is a very real chance that these setback changes as well as re-zoning of residential areas could, by the way of challenge and argument, become the new baseline for development and be eroded even further down the road. To prevent this, I feel that it is necessary for Kirkland to draw a line in the sand and reaffirm that zoning requirements are in place for a reason, it is the law and anyone who wishes to live or work within City limits must adhere to the rules.

Above all else, the burden for this project should not be on the City of Kirkland to change the rules for a private company, it should be on PSE to work within the rules every resident and business owner works within.

Kirkland is an exceptional community and we need to look after it. We are depending on you to look out for the best interests of our town, residents and homeowners.

Thank you,

Steve Ryan
13044 109th Ave
Kirkland, WA 98034
(425) 823-6799
steve-ryan@comcast.net

RECEIVED
AUG 15 2008
AM PLANNING DEPARTMENT PM
BY

August 13, 2008

To: Tony Leavitt
Kirkland Planning Department

Re: ZON08-00010

Dear Sirs,

I am writing in request that the above noted zoning variance request be denied.

As a Kirkland citizen and homeowner along the Puget Power right of ways (ROW) just off of NE 132nd Ave., I have seen how much Puget Power's power lines and access road have disrupted the neighborhood. At all hours of the day there can be loud noises, explosions and trucks and cars driving up and down the right of ways. I knew of these disruptions when I bought the house so I have not complained. However, I am worried about what any new development (the proposed upgraded sub-station and upgrading of power lines) would do to our neighborhood and property values.

I don't believe it is any surprise that power lines have long been studied for their impact on the health of those living close to them. We closest to these lines are at the greatest risk. Any development to the substation and any increase in wattage carried on the lines is likely to pose more health concerns and is likely to make the houses along the ROW more difficult to sell because of these health concerns. These substations are also an unattractive addition to the neighborhood and make properties located near them less desirable. A prospective buyer can not be blamed for not wanting to purchase a property located next to or right in front of a substation.

Please take the above concerns into consider when evaluating ZON08-00010 and deny the request for the sake of those most highly impacted by the decision.

Barbara Ross

Barbara Ross
13012 109th Ave NE
Kirkland, WA 98034

Tony Leavitt
City of Kirkland
Planning and Community Development Department
123 5th Ave
Kirkland, WA 98033
425-587-3253

RECEIVED
AUG 18 2008
AM PM
PLANNING DEPARTMENT
BY

RE: Permit No. ZON08-00010

Dear Tony Leavitt and the City of Kirkland

I am opposed to the installation of a Sub Station at the proposed location.
I am herby making this know in writing thereby reserving my right to appeal any decision favorable to the proposed location and requested zoning variances. My neighbors, the surrounding community, and my self are fully prepared to utilize the media, and bring substantial legal, financial and environmental advocacies resources to bear on stopping this zoning transgression from taking place. Please stand with this community against a clear case of a large utility company doing what is best for its own financial gain at the expense of a beautiful, quiet, local community. The proposed Sub Station far exceeds acceptable parameters for the proposed location and should not be allowed to proceed. Please help us to force PSE to look at other options as they have clearly gone with the fastest, cheapest, easiest location for them, without consideration for this community.

I am also opposed to the requested zoning variances. It is clearly not an acceptable location for such a large industrial installation. Aside from the fact that it does not fit within the existing area's zoning - both in size and height, it is a dangerous eye sore of epic proportions very near multiple family residences and a high school. It is destined to seriously negatively affect property values in all surrounding residential homes as well as have substantial negative effects to the environment.

It is PSE's intention to remove several trees on their own property as well as substantially jeopardize the root systems and branches of the old growth trees on my property. There is no way they can proceed with this proposed Sub Station project without cutting into the root system of four trees located on my property. This Sub Station project would also require them to cut off a substantial amount of my Evergreen trees' branches to work on and place their proposed retaining wall. This root degradation and defoliation could at best, cause this tree to die, and at worst, up root and topple onto my house causing extreme financial and potentially fatal consequences. In either case I am already documenting the trees current condition and status in preparation for future litigation.

When I applied for a permit to build an addition onto my existing house, (Permit # BLD06-00428) I was forced to build within the height and boundary zoning set forth by the City of Kirkland. I was given by the City of Kirkland documentation stating the necessary precautions to safeguard existing trees on my property along with substantial restrictions on the removal of existing trees. I was forced by the City of Kirkland to build

a very expensive metal fence around the drip line of the trees on my property protecting them from my own construction. Am I to understand that PSE is going to be allowed to not only NOT protect them, but DAMAGE THEM or KILL THEM, as they see fit? Do these laws only apply to middle income residents of this community? Are they not applicable to large businesses with limitless financial resources? When I applied for my building permit from the City of Kirkland I was forced to look at the space I had available and build within the zoning parameters. I was forced to consider my structures' impact on my neighbors in terms of fire hazard, boundary, foliage, operating noise, and water run off. Do these zoning parameters not apply to PSE's proposed Sub Station? Are the same considerations not applicable to PSE's proposed Sub Station?

Please show that you care about us, our families, and this community. Please hold PSE to the same high standards that the City of Kirkland holds its residents to. This new larger Sub Station at its proposed location has PSE's best interest in mind, not this communities'. We need you to ask PSE to look at a location without respect to their cost, but rather a location that does have this community's best interests in mind.

Sincerely

Troy Freeman 8/8/08

Troy Freeman
13045 110th AVE. NE
Kirkland, WA. 98034

RECEIVED
AUG 18 2008
_____AM_____PM
PLANNING DEPARTMENT
BY_____

August 12, 2008

Tony Leavitt
City of Kirkland
Planning and Community Development Department
123 5th Ave
Kirkland, WA
98033

RE: Permit No. ZON08-00010. Juanita Substation.

Dear Mr. Leavitt:

I am very concerned about a permit filed by PSE (Roque Bamba) that proposes to build a transmission station of considerable width and height in the north end of the green belt located between 110th and 109th Ave NE. This proposed station would not only stand in an area that is not zoned for such structures but it would also be too tall, too close and too wide to be allowed, as it is specified by Kirkland building code.

I am also highly concerned about the magnitude of the construction that would have to take place in order for this substation to be built in such tight space. As a mother of a newborn who is very susceptible to air quality, and the wife of a cancer patient; I hope you can understand how concerning it is for me to have big amounts of dirt and noisy machinery right on my back yard. Not to mention how unpleasant the final product would be and the impact that it would have on the value of my property.

In order for PSE to be able to build this transmission station they would also be cutting down several trees and practically shaving in half a 45 year old tree that is in my property and that I had to protect when I did some remodel work at my house. I just don't believe the proposed space is the best location for the community; nowhere in the city or in King County is a substation of such size that is completely surrounded by houses. Transmission stations are not designed to be located so close (13 feet), to people's homes.

I respectfully urge you to not allow PSE to build this substation were proposed. PSE can look at other options that would be far more appropriate and that would not affect me and my neighbors so dramatically.

Sincerely,

Carolina Ayala de Freeman
13045 110th Ave NE
Kirkland, WA 98034

Tony Leavitt

From: James Byrd [byrdguitars@yahoo.com]
Sent: Tuesday, August 19, 2008 8:09 PM
To: Tony Leavitt
Subject: Regarding the North Jaunita PSE substation expansion permit

Dear Mr. Leavitt

While we can all appreciate the desire of PSE to provide increased capacity to meet demand, as is almost always the case, that desire also appears to coincide with a desire to increase capacity as cheaply as possible, while minimizing the risks and/or damages to others for political purposes, to the end goal of reduced costs and increased profits.

At a time when the dangers of non-ionizing radiation to human health are today finally being recognized, rather than acting in accord with the evidence of increased risk by moving away from us, PSE is attempting to actually increase the public proximity to high level electromagnetic radiation fields. This is completely unacceptable.
Recent revelations:

Risk of explosion:

As it stands, the PSE substation is a serious threat to public safety were a fire and explosion to take place. Such a risk is not abstract. Video of the consequences can be found here:
http://video.google.com/videoplay?docid=-7110228179038150 72&q=explosion

Would you want this 13 feet from your house?
Were this the North Jaunita substation, there is little doubt that people living on the east side of 109th Ave NE, would be injured or dead.

Increased risk of cancers:
Excerpted from Midwest Today, April/May 1996 “Though it received scant attention from the mainstream press, a report leaked last October from the U.S. National Council on Radiation Protection said there is a powerful body of impressive evidence showing that even very low exposure to electromagnetic radiation has long-term effects on health.

The report cited studies that show EMFs can disturb the production of the hormone melatonin, which is linked with sleep patterns. It said there was strong evidence that children exposed to EMFs had a higher risk of leukemia.....

.....At the heart of the matter is a relatively simple and well-understood physical phenomenon: When an electric current passes through a wire, it generates an electromagnetic field that exerts forces on surrounding objects. Electric fields arise from the strength of an electric charge; magnetic fields, from the charge's motion.

Unlike ionizing radiations such as x-rays -- which pack sufficient wallop to knock electrons out of the molecules that make up the human body -- EMFs do not produce charged particles, so experts always believed they posed no danger. Therefore, the Federal government has never regulated EMFs, and the electric industry was allowed to set its own standards.

But other recent experimental studies have shown that even weak magnetic fields can change the chemistry of the brain, impair the immune system, and inhibit the synthesis of melatonin, a hormone known to suppress several types of tumors and to be present in reduced amounts in men as well as women who develop breast cancer.

“The EPA Raises Questions

Concerns about so-called non-ionizing radiation began to mount in 1979, when a study of cancer rates among Colorado school children determined that those who lived near power lines had two or three times as much chance to develop cancer. The link seemed so improbable that power companies eagerly paid to have the study replicated. To their surprise, the subsequent scientific inquiry supported the original findings, which have since been buttressed by a variety of additional studies and reports of increased cancer rates among workers employed in the electric industry.

One such study, conducted by the Fred Hutchinson Cancer Research Center in Seattle, WA. confirmed that telephone linemen, electricians and electric-power workmen are developing breast cancer at six times the expected rate.

But it was the Environmental Protection Agency's scientific review that has had an explosive impact, lending the most credence to those who have been warning of EMF health hazards.

The report -- a 367-page document entitled "Evaluation of the Potential Carcinogenicity of Electromagnetic Fields" -- came to light in 1990, when someone in the agency leaked a draft version of it to Louis Slesin, editor of an influential newsletter called Microwave News.

Chief among the conclusions was one specifying that power line electromagnetic fields should be classified as a "probable human carcinogen." William Farland, then-director of the EPA's Office of Health and Environmental Assessment ordered this conclusion deleted from the report.

Then the Associated Press reported that the Bush administration tried to delay release of the EPA's findings. Robert E. McGaughy, the project manager and chief author of the report, was quoted as saying that the White House "was concerned not about the accuracy of the report...[but] about how people would react to the news and how it would affect the electric power industry."

Ultimately, after two major TV networks and newspapers throughout the country exposed the Bush administration's efforts at censorship, the report was released. It contained a disclaimer that asserted "the controversial and uncertain nature of the scientific findings of this report" and declared that it should not be construed as "representing Agency policy or position."

Recent reports regarding the long suspected link between cell phone use, and brain tumors, have confirmed that a causal relationship to cell phone use, and brain cancer exists:

Excerpted from The New York Times, June 3, 2008:

“The American Journal of Epidemiology published data from Israel finding a 58 percent higher risk of parotid gland tumors among heavy cellphone users. Also last year, a Swedish analysis of 16 studies in the journal Occupational and Environmental Medicine showed a doubling of risk for acoustic neuroma and glioma after 10 years of heavy cellphone use.”

While cell phones are not electrical substations, what is important to note in these findings is that the radiation in question, is also non-ionizing. Just like the substation. While the specific mechanism for cellular damage from non-ionizing radiation has yet to be identified, but given recent findings, the fact of it’s existence can no longer be in doubt.

The current 20 foot offset of the current substation was an arbitrary distance established at a time when public health concerns regarding electromagnetic fields were in their infancy. It's already an unsafe distance with regard to the risk of fire and explosion. Today, we know that these EMF poses a statistically demonstrable threat to people, especially children, yet PSE is attempting to actually move the threat closer to people. Given the current evidence showing direct relationships between non-ionizing radiation from magnetic fields and its clear implication in a number of human health problems and cancers, I believe PSE has the considerable burden of proof to demonstrate it’s safe. I don't believe they can.

With all due respect, there is no reason for anyone residing in this neighborhood to believe the proposed expansion of the North Jaunita substation is anything but an extremely reckless imposition, which places at risk our health, the health of children in the neighborhood, our immediate safety, and yes, our property values. PSE needs to step up and purchase new property away from this neighborhood. I do not want this monstrosity an inch closer or a watt bigger than it already is.

Sincerely,

James F. Herbold PKA James Byrd

13043 109th AVE NE
Kirkland, WA 98034

Kevin Corbett
13036 109th Avenue NE
Kirkland, WA 98034

RECEIVED
AUG 20 2008
AM PLANNING DEPARTMENT PM
BY

To: Mr. Tony Leavitt
City of Kirkland Project Planner
123 5th Avenue
Kirkland WA 98033

REGARDING: ZON08-00010- Zoning and Variance Permit Applications to expand and rebuild the existing PSE Juanita electric distribution substation.

Dear City of Kirkland & Mr. Tony Leavitt,

The purpose of this letter is to request that you reject the request for rezoning and variances by Puget Sound Energy to build a new "super-substation" in the Juanita area.

I attended the August 5th meeting at Kingsgate Library and was surprised to hear from Mr. Bamba and Mr. Swayne that this was going to be the largest PSE substation project to date.

I was angered to learn that the proposed 300 foot long, by 100 foot wide, by 35 foot tall electrical building was going to be not only directly behind our home but, that PSE is requesting that you and the City of Kirkland approve their ability to build it CLOSER to family and residential properties, then current set-backs allow by law.

To top it all off, I'm incensed to learn from PSE that this substation will be to supply electrical need/growth in UNINCORPORATED Kirkland, namely the Kingsgate area and beyond.

Please REJECT the rezoning of this area for construction of the PSE substation.

- Mr Swayne & Mr. Bamba admitted that PSE has NOT explored other options for alternative sites that would not require rezoning and variances.
- Please don't allow private businesses to change our neighborhoods with such drastic super-projects.

Please REJECT the variances PSE is requesting.

- Protect the children and families that live in our neighborhoods.
- Preserve the quality of living and beauty of our Kirkland neighborhoods in spite of pressures of growth.

Thank you for representing the citizens of Kirkland.

Respectfully,

Kevin Corbett

Kevin Corbett

Mr. Tony Leavitt
City of Kirkland Project Planner
123 5th Avenue, Kirkland WA 98033

RECEIVED
AUG 20 2008
_____AM _____PM
PLANNING DEPARTMENT
BY_____

Dear Mr. Leavitt,

I am writing in opposition to the proposed building of the PSE substation behind our home.

When we moved into our home nearly a decade ago, we knew we bordered on PSE property but were told that we'd never have to worry about anything more then "a few annoying power lines" because the area was an easement for the existing substation at the south end of the property at end of the block.

Now, with PSE asking the City of Kirkland for rezoning, we risk having a huge substation built behind our home.

I'm worried about the reduction of property values when realtor's are telling us we'll lose 10% valuation on our property with a substation behind our house.

Despite PSE's EMF literature, I'm concerned about the effects of electrical fields surrounding such a large structure and the related health risks to the families in the area. More so with a larger substation even CLOSER to homes!

In a time when the world community is embracing a Green Planet and living harmoniously with nature--preserving green areas for the health of all--the City of Kirkland does NOT need to rezone and grant variances that would allow an electrical substation to be crammed into a neighborhood.

Please protect our neighborhood and all the neighborhoods in Kirkland.

Please stop PSE's requests for rezoning and variances.

Thank you in advance for your consideration,

Peg Corbett

Tony Leavitt

From: Steve and Nora [steveandnora@comcast.net]
Sent: Thursday, August 21, 2008 7:52 PM
To: Tony Leavitt
Subject: Juanita Substation Rebuild ZON08-00010

Mr. Leavitt,

I am writing regarding the proposed substation rebuild by PSE at 10910 NE 132nd Street. I am strongly opposed to this project for many reasons. This new substation will be directly behind my house. The current building plans call for an 11 foot wall to be placed 7 feet from my back property line and an 18 foot wall will be on the other side of the substation and still visible from my back yard. It is my understanding that PSE is trying to get a variance to decrease the set back from 10 feet to 7 feet. The view of these walls from my back yard will certainly decrease my enjoyment of my property as well as my resale value. When we bought our home it was with the understanding that we had a PSE access way behind our property. If PSE is going to rebuild the substation it should be built in the same space it occupies now. The houses at the South end of both 109th Ave and 110th Ave were all purchased with the knowledge and view of the PSE substation. They paid less for their houses because of the placement of the substation. By relocating the substation, PSE is devaluing our property and raising the value of the South end properties. One seller is already using the information about the substation move to help sell his house on the South end of 110th Ave NE.

The other variance PSE is asking for is a height variance. Again, to have to look at a pole 35ft in the air from my back yard is unacceptable. Kirkland is a desirable city to live in because the city has made a commitment to keep building under control. We have building codes for a reason and a big company should not be able to do what they want because it is the cheapest and easiest way. The PSE group said the grading at the South end of the property would make it more difficult and expensive to rebuild there. I don't feel I should have to pay the price for that. PSE should have to build on the current site that is zoned for a substation or find a more suitable site that does not hurt the current residents. As I have sat on my patio this summer I have looked at our backyard and envisioned what it would be like to be staring at an 11 foot wall just feet away and an 18 foot wall just beyond. It will certainly change the love for my house and yard.

I am asking the city not to approve the variances for height, set backs or zoning. These building codes were put in place to protect residents and should not be changed to make a large company have to spend less time and money to provide adequate service they are being paid generously for.

Thank you,

Nora Ryan
13044 109th Ave NE
Kirkland, WA 98034
425 823-6799

RECEIVED
AUG 22 2008
AM PM
PLANNING DEPARTMENT
BY

8/21/2008

Tony Leavitt
Project Planner
123 5th AVE
Kirkland, WA 98033

PSE Juanita Substation Rebuild and Variance
File number ZON08-00010

This letter serves as our opposition to the above project and the Zoning and Variance Permit asked for by PSE.

We have lived at 13052 109th AVE NE Kirkland, WA 98034 for the past 35 years. We feel that if the City of Kirkland grants these variances, it will grant special privilege to the subject property.

The variance for the setbacks should not be granted because this would move an 11 foot wall within 13 feet of my property. PSE states that they will install landscape buffers in that 13 feet but when asked in the past to do this, PSE has not been willing to put them in. At this time, there is a very large Blackberry patch in that area. PSE has previously been asked to remove that patch because it infringes on to my property but they have failed to do so.

PSE has said it will put into place sound walls to reduce the noise coming from the Proposed Sub Station, 18 feet tall on the East side and 11 feet tall on the west side. This is zoned for single family homes, with fence heights at a maximum of 6 feet tall. This would also fail the zoning under 120.20.3 and would grant PSE special privilege to the subject property, which is inconsistent with the general rights of other property owners in this Single Family Zoning area.

The variance for height should be denied for the same reason. On the West side where we live, there would be an 11 foot high wall and another 24 feet of material above that, for a total of 35 feet. When you look at this area, the Single Family homes are one or two stories high. This variance would turn this Single Family area into a Commercial area which is not consistent with the City of Kirkland Master Plan. This would also grant PSE special privilege to the subject property.

In a meeting with PSE on Aug. 6, 2008, at the Kingsgate Library, I asked Roque Bamba the applicant about access that has been granted to residents along the PSE property for the past 35 years. Roque Bamba told me that a new road would be built at the South end of the property for access. This entrance would require another variance because it would be a second entrance to the property. Why has this not been addressed and applied for by the applicant? Does this action not give some property owners special privilege to the applicant's property and deny the access to other property owners?

In conclusion we feel that this project violates the City of Kirkland Codes section 120.20 and 120.25. For these reasons and to retain the Zoning as a Single Family neighborhood, the Application must be denied.

Thank you,

Stephen and Denise Lybeck
13052 109th AVE NE
Kirkland, WA 98034

Denise Lybeck

www.pse.com

PUGET SOUND ENERGY

Puget Sound Energy, Inc
P.O. Box 90868
Bellevue WA 98009-0868

September 30, 2008

Mr. Tony Leavitt
Project Planner
City of Kirkland
123 5th Avenue
Kirkland, WA 98033

Re: Application ZON 08-0010; PSE Response to Comments Received by City

Dear Mr. Leavitt:

On behalf of PSE, I'm responding to the comments submitted to the City by mail and e-mail during the comment period on this application. The comments are addressed by general subject area.

Zoning Compliance

Some comments state that the substation rebuild project involves a rezone, or is not allowed by the current zoning. This is not correct. The proposed substation rebuild does not involve a rezone. The zoning classification, RSX 7.2 remains the same. This zone explicitly provides a procedure for siting of public utility facilities, which is Type IIA Review. PSE's application narrative addresses compliance of the proposal with all of the review criteria of this permit procedure.

Substation Location

Many of the comments submitted to the City objected to relocation of the substation from the south part of the parcel to the proposed location at the north. As explained in our application materials, PSE decided to relocate the substation because the north area is wider and level and can better accommodate the required substation configuration. The variances are required because electrical safety codes require clearance between electrical components, and access is needed for the equipment used in repair and replacement. More extensive variances would be needed on the south location due to the narrower parcel width in that area.

As noted in the application, NE 128th Street is 12 feet lower than the existing substation. Due to the grade differential, a rebuilt substation at the southern location would require substantial retaining walls and a driveway slope of approximately 12% that would be problematic for access by the large vehicles needed to deliver equipment required for operation and maintenance. A tiered substation configuration would be required, which is considered a potential safety concern for crews working to restore power during storm conditions. The application materials contain additional narrative describing the National Electric Safety Code (NESC) and PSE Design Standards that require a minimum width for equipment and access clearance. Rebuilding the substation at the existing southerly location is not a viable option.

Some commenters stated that the substation should be moved to a different location entirely. Some have suggested other properties that are not owned by PSE, that include critical areas, or that would require demolition of existing housing. The comments do not recognize that a major consideration in substation placement is the location of existing transmission lines. Because the current PSE substation parcel is now served by existing transmission lines, no extension of transmission lines into new neighborhoods is required for rebuilding of the substation on the current parcel. Thus, impacts associated with development/extension of new transmission lines are avoided.

Aesthetic/View Impacts

Some comments state that the substation would be an unsightly structure visible from neighboring properties. Aesthetic/visual impacts is an area specifically addressed in the PSE application materials. As described in the application, the substation will be located behind sound mitigation walls which will shield most of the substation equipment from view, and a landscaped buffer area will be located between the sound walls and the property lines. Landscape materials consisting of 45 evergreen and deciduous plantings will be located in the buffer areas. The tree plantings will be five to eight feet in height at initial installation and will grow considerably over time, as shown in the landscape elevations included in the application.

The sound walls have a textured surface, similar to brick or stone facing, and can be painted to further mitigate visual impacts. PSE has offered to meet with adjoining property owners to discuss color treatment of the noise walls as well as additional mitigation which may be possible on individual properties, such as landscaping and/or fencing that would best address each property's situation.

Although the requested side yard variances reduce somewhat the distance of the substation from neighboring property lines, it must be noted that the configuration of the PSE parcel means that its side yards adjoin the rear yards of neighboring homes. This means that the substation is much further from the actual residences than would be the case if the substation were built without variances on a typical lot where side setbacks were directly adjoining. Also, as noted in Figure 1 of the application materials, "Profile Illustration Of Side Yard Variance Request", the noise walls and equipment within the

substation are lower than a utility structure that could be built without variances at a 30-foot height limit, 20 feet from the side property line.

In addition, the application notes that this utility infrastructure project will be an unstaffed passive facility with virtually no activity, traffic, or noise impacts affecting neighboring property owners. This should be taken into account in recognizing that the standard 20-foot setback established for public utility facilities is intended to include all utility facilities, including staffed facilities with activity, traffic and noise impacts that would be heard and seen from adjacent residential properties.

Substation Fires or Explosions

One comment message included an internet video of what appears to be a fire at an electrical substation, date and location not identified. PSE rarely experiences substation fires or explosions, PSE operates its substations safely with well maintained equipment. As such, the likelihood of a substation fire or explosion in the PSE electrical distribution system is negligible.

In the rare instance that a fire occurs at an electrical substation, circuit breaker failure is a likely cause. The Juanita Substation will utilize circuit breakers insulated with an inert gas (Sulphur Hexafluoride – SF6) instead of oil. This greatly reduces the risk of fire associated with a circuit breaker failure. Additionally, the Juanita Substation will be equipped with a Supervisory Controls and Data Acquisition (SCADA) system that provides real-time monitoring and reporting of equipment conditions, which allows PSE to quickly respond to problems or malfunctions. Note also that the substation will have solid barriers (18' and 11' tall) separating substation equipment from the adjacent properties to the west and east, and substantial separation distances from residences.

Electrical and Magnetic Fields (EMF)

Some commenters expressed a concern about EMF in connection with the substation rebuild. As noted in the application materials, this substation rebuild is at a location where electrical transmission lines are already located. The construction of an electrical substation at this location will not significantly change the existing EMF conditions at the project site or the surrounding properties. The substation project will not create any known environmental health hazard.

Damage to Trees

PSE's construction work will remove a minimum number of trees necessary for the substation project, as described in the application materials. PSE's construction work may require trimming of some overhanging branches from neighboring properties, but will not result in permanent damage or loss of trees on neighboring properties. PSE's arborist is available for consultation with any adjoining property owner who is concerned about how the construction may affect trees on a specific property.

CONCLUSION

PSE's application materials and application Narrative, which specifically addresses each of the decision criteria for the Type IIA process and the variance decision, demonstrate that the substation project is an essential utility infrastructure improvement that is designed to mitigate adverse impacts on neighboring properties and complies with all of the decision criteria for approval as set forth in the Kirkland Municipal Code.

Please let me know if you have any questions or require any additional information from PSE.

Sincerely,

Roque Bamba
Project Manager
Puget Sound Energy

EVALUATION OF SELECTED TREES AT THE PSE JUANITA SUB-STATION

109TH AVENUE NE BETWEEN NE 128TH & 132ND STREETS KIRKLAND, WA 98033

July 14, 2008
REVISED: October 7, 2008

PREPARED FOR:

Lyn Keenan, Senior Planner
GeoEngineers
Plaza 600 Building
600 Steward Street, Suite 1700
Seattle, WA 98101

PREPARED BY:

GILLES CONSULTING
Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

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EXECUTIVE SUMMARY

23	**Trees were evaluated:**
- Off Property Trees:	
	- 11 trees are presumed to be off the property with canopies that overhang the subject property:
	- There are 3 trees, #'s 197, 198, & 199, are east of the east property line approximately centered on the proposed project.
	- There are 8 trees west of the west property line. They are #'s 300 to 307.
	- All 11 trees can be adequately protected as described in the Tree Protection Measures section below. This will include tree protection fencing and 12 inches of wood chips to protect the critical root zone and allow equipment to travel over the roots during construction.
- Subject Property Trees:	
	- 12 trees were evaluated on the subject property:
	- Status:
	- All 12 trees were found to be in Fair, Good, or Very Good health, vigor, structure, or a combination of factors.
	- Therefore, all 12 trees are *Viable.*
	- 2 trees were found to be *Non-Significant* because they are less than the required 6.0 inches in Diameter.
	- They are #'s 1299 & 226.
	- 10 Trees were found to be greater than 6.0 inches in diameter and are, therefore, *Significant.*
	They are #'s 1296, 1297, 1298, 1300, 460, 146, 216, 227, 195, & 196.
- Tree Retention requirements:	
	- In a Tree Plan II, the **City of Kirkland** does not require a specific minimum tree density; however, the code does say that the property "shall comply with the required landscaping pursuant to KZC 95.40 Required Landscaping." The code does allow for retained trees to be counted towards the landscaping requirements.

ASSIGNMENT

Lyn Keenan, Senior planner with GeoEngineers of Seattle, Washington, contracted with Gilles Consulting to evaluate the trees at the Juanita Sub-station located on NE 109th Avenue between NE 128th and NE 132nd Streets in Kirkland, Washington. The property

is being re-developed and a new sub-station is being proposed for construction at the northern end of the property. The City of Kirkland requires an analysis of the trees as part of the permit process. This report provides the analysis. The information in this report can be utilized to create a Tree Plan II as required by Chapter 95 of the Kirkland Code. The information required for the Tree Plan II can be found in section 95.35.2.B.2.a on Page 7 of 29 of the Code.

METHODOLOGY

To evaluate the trees and to prepare the report, I drew upon my 25+ years of experience in the field of arboriculture and my formal education in natural resources management, dendrology, forest ecology, plant identification, and plant physiology. I also followed the protocol of the International Society of Arboriculture (ISA) for Visual Tree Assessment (VTA) that includes looking at the overall health of the trees as well as the site conditions. This is a scientifically based process to look at the entire site, surrounding land and soil, as well as a complete look at the trees themselves.

In examining each tree, I looked at such factors as: size, vigor, canopy and foliage condition, density of needles, injury, insect activity, root damage and root collar health, crown health, evidence of disease-causing bacteria, fungi or virus, dead wood and hanging limbs. While no one can predict with absolute certainty which trees will or will not fail, we can, by using this scientific process, assess which trees are most likely to fail and take appropriate action to minimize injury and damage.

Tree Tags

The trees were tagged and randomly numbered. The tags are made of shiny aluminum approximately one inch by three inches in size and are attached to the tree with staples and a one foot strip of brightly colored survey tape. The tags were placed as high as possible to minimize their removal and were generally placed on the backsides of the trees on the subject property as inconspicuously as possible. The tags for the trees on adjacent properties were placed on the fences near the trunks. Please refer to *Attachment 1, Site Plan* for an orientation to the site and the approximate location of the trees.

Missing Trees

There were a few trees that were not included on the survey--both on and off the subject property. They were labeled their approximate location was indicated on the included site plan. Tags for the off site trees were attached to the property line fences near the trunks of the trees--also with a piece of brightly colored ribbon. These trees may need to be surveyed to determine their exact location in relation to the proposed site improvements and their retainability.

OBSERVATIONS

The location of the proposed sub-station is accessed from NE 132nd Street. There is a chain-link fence with a gate at the entrance. The proposed station is to be constructed along the northern 300 feet of the towards the northern property line. The current proposal is for a facility that is approximately 13 feet from the east and west property lines.

In an effort to present the information and conclusions for each tree in a manner that is clear and easy to understand, I have included a detailed spreadsheet, *Attachment 2, Tree Inventory/Condition Spreadsheet*. The descriptions on the spreadsheet were left brief in order to include as much pertinent information as possible and to make the report manageable. A detailed description of the terms used in the spreadsheet and in this report can be found in *Attachment 3, Glossary*. A brief review of these terms and descriptions will enable the reader to rapidly move through the spreadsheet and better understand the information.

Additional Testing

None of the trees presented symptoms or signs that would indicate internal decay or structural defects. Therefore, no additional tests were performed during this site visit.

DISCUSSION AND RECOMMENDATIONS

Trees on Adjacent Properties

The City of Kirkland requires that any trees with canopies that over-hang the subject property to be included in the inventory, evaluation, and tree protection measures as part of the Tree Plan II. In this case, there are 3 trees east of the east property line and eight trees west of the west property line.

All 11 trees can be adequately protected as described in the Tree Protection Measures section below. This will include tree protection fencing and 12 inches of wood chips to protect the critical root zone and allow equipment to travel over the roots during construction. Some limbing may be required to safely construct and install the elements of the sub-station. Those can be dealt with on a tree by tree basis once the project is under way.

Trees on the Subject Property

- There are 12 trees on the subject property.
- 10 Trees, numbers 1296 to 1300, 130, 420, 216, 146, 226 & 227 are located near the northeast corner of the property.
    - The line feeding the sub station will be coming in from the northeast property corner and these trees will likely be removed in the construction process.

- Trees # 195 and 196 are located inside the proposed facility.
    - They will need to be removed.

Right-of-Way Trees

Trees 1296 - 1299 may actually be in the right of way. I was not able to find property corner stakes. This may need to be verified, however; these four trees can be adequately protected during construction. Therefore, this may or may not be an important fact to verify.

Tree Protection Measures

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The minimum Tree Protection Measures in *Attachment 4, Tree Protection Measures* are on three separate sheets that can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

WAIVER OF LIABILITY

There are many conditions affecting a treeôs health and stability, which may be present and cannot be ascertained, such as, root rot, previous or unexposed construction damage, internal cracks, stem rot and more which may be hidden. Changes in circumstances and conditions can also cause a rapid deterioration of a treeôs health and stability. Adverse weather conditions can dramatically affect the health and safety of a tree in a very short amount of time. While I have used every reasonable means to examine these trees, this evaluation represents my opinion of the tree health at this point in time. These findings do not guarantee future safety nor are they predictions of future events.

The tree evaluation consists of an external visual inspection of an individual treeôs root flare, trunk, and canopy from the ground only unless otherwise specified. The inspection may also consist of taking trunk or root soundings for sound comparisons to aid the evaluator in determining the possible extent of decay within a tree. Soundings are only

an aid to the evaluation process and do not replace the use of other more sophisticated diagnostic tools for determining the extent of decay within a tree.

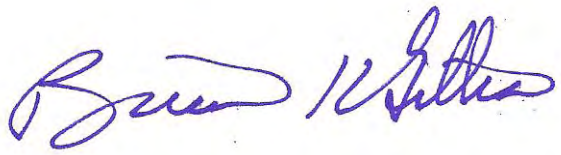
As conditions change, it is the responsibility of the property owners to schedule additional site visits by the necessary professionals to ensure that the long-term success of the project is ensured. It is the responsibility of the property owner to obtain all required permits from city, county, state, or federal agencies. It is the responsibility of the property owner to comply with all applicable laws, regulations, and permit conditions. If there is a homeowners association, it is the responsibility of the property owner to comply with all Codes, Covenants, and Restrictions (CC&Rôs) that apply to tree pruning and tree removal.

This tree evaluation is to be used to inform and guide the client in the management of their trees. This in no way implies that the evaluator is responsible for performing recommended actions or using other methods or tools to further determine the extent of internal tree problems without written authorization from the client. Furthermore, the evaluator in no way holds that the opinions and recommendations are the only actions required to insure that the tree will not fail. A second opinion is recommended. The client shall hold the evaluator harmless for any and all injuries or damages incurred if the evaluatorôs recommendations are not followed or for acts of nature beyond the evaluatorôs reasonable expectations, such as severe winds, excessive rains, heavy snow loads, etc.

This report and all attachments, enclosures, and references, are confidential and are for the use of the client concerned. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned and Gilles Consulting.

Thank you for calling Gilles Consulting for your arboricultural needs.

Sincerely,



Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

ATTACHMENTS

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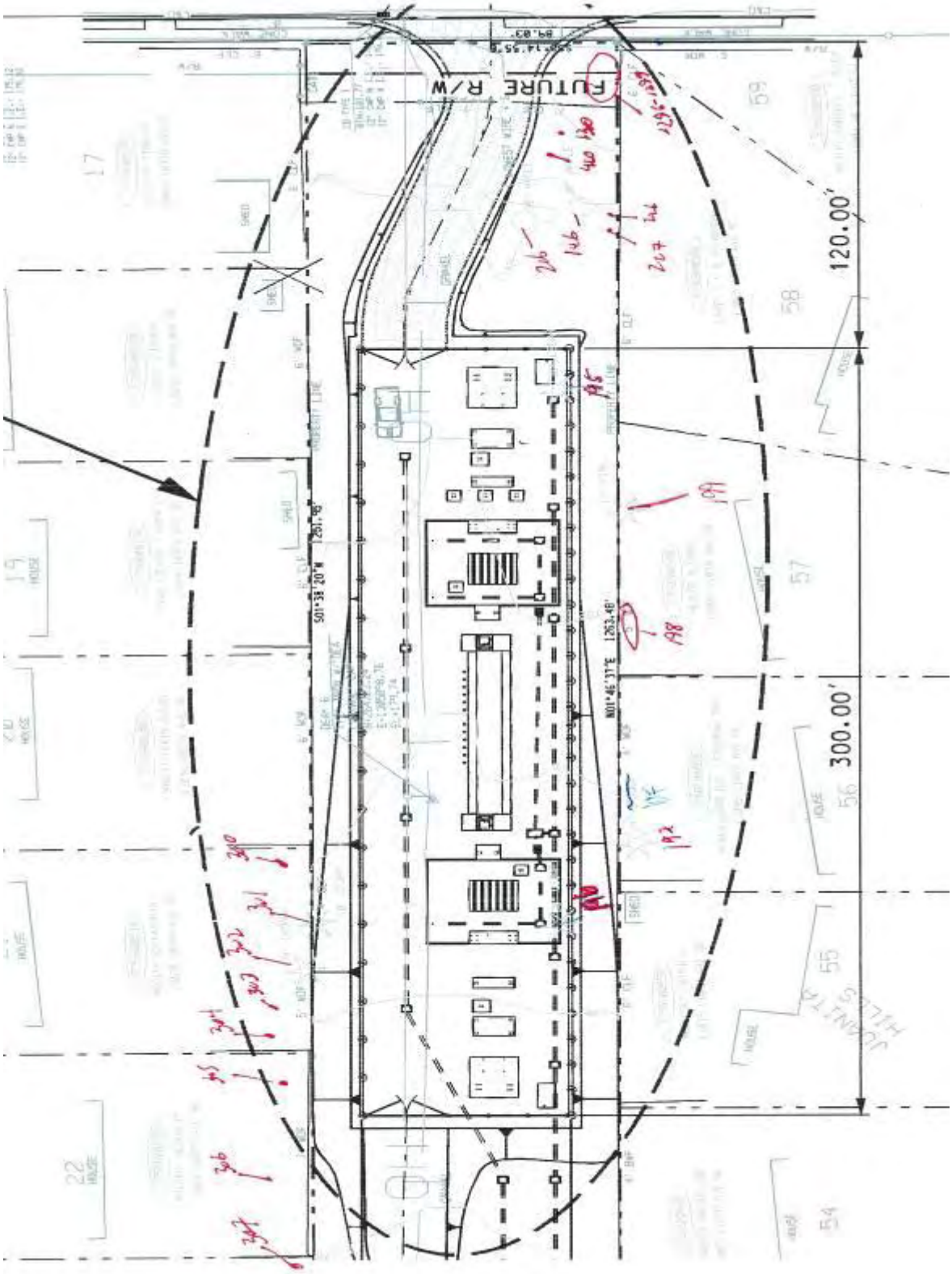
ATTACHMENT 1 - SITE PLAN



ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET

SITE: PSE Juanita Substation
At 109th Ave NE, Betwen NE 128th & NE 132nd Streets, Kirkland, WA 98033

Date of Inspection: July 2, 2008

#1 ***Tree Location:*** General location of tree on site, or whether tree is Off Project property.
#2 ***Tree #:*** Individual tree number.
#3 ***Species:***

AYC/Cn	Alaska Yellow Cedar, *Chamaecyparis nootkatensis*	
BCh/Pe	Bitter Cherry, *Prunus emarginata*	
BLM/Am	Big Leaf Maple, *Acer macrophyllum*	
DF/Pm	Douglas Fir, *Pseudotsuga menziesii*	
EWB/Bp	European Weeping Birch, *Betula pendula*	
NS/Pa	Norway Spruce, *Picea abies*	
PP/Pp	Ponderosa Pine, *Pinus ponderosa*	
WRC/Tp	Western Red Cedar, *Thuja plicata*	

#4 ***DBH:*** Trunk diameter @ 4.5' above average ground level.
#5 ***Tree Credit:*** This is based upon Table 95.35.1, Page 12, Chapter 95 of the Kirkland Municipal Code.
#6 ***Drip Line:*** The radius, the distance from the trunk to the furthest branch tips.

#7 ***Limits of Disturbance:*** The boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a quilified professior
#8 ***LCR:*** *Live Crown Ratio* - the amount of live canopy expressed as a % of the entire tree height
#9 ***Symmetry:*** General shape of canopy and weight distribution of the tree around the trunk.
#10 ***Foliage:*** General description of foliage density that indicates tree health and vigor.
#11 ***Crown Condition:*** The most important external indication of tree health and vigor.
#12 ***Trunk:*** Description of trunk condition or abnormalities if any.
#13 ***Root Collar:*** The base of the tree where the trunk flares into the roots--deformities or problems are noted here.
#14 ***Roots:*** Root problems are noted here.
#15 ***Comments:*** Additional observations about the tree's condition.
#16 ***Significance:*** A "significant" tree is at least 6" in diameter measured at 4.5' above the average ground level.
#17 ***Current Health Rating:*** A description of general health ranging from dead, dying, hazard, poor, suppressed, fair, good, very good, to excellent.
#18 ***Viability*** : A significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
#19 ***Recommendation:*** This is an estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.

1	2	3	4	5	6	7 -- LIMITS OF DISTURBANCE				8	9	10	11	12	13	14	15	16	17	18	19
TREE LOCATION	**TREE #**	**SPECIES**	**DBH**	**TREE CREDIT**	**DRIP LINE**	**North**	**South**	**East**	**West**	**LCR**	**SYMMETRY**	**FOLIAGE**	**CROWN CONDITION**	**TRUNK**	**ROOT COLLAR**	**ROOTS**	**COMMENTS**	**SIGNIFICANCE**	**CURRENT HEALTH RATING**	**VIABILITY**	**STATUS / RECOMMENDATION**
North of north gate	1296	AYC/Cn	19.3"	5.0	16'	to Sidewalk	16'	to property line	16'	98%	Gen. sym.	Dense	Utility Pruned	fork at 18"	NAD	Restricted	Diameters are 15.2", 10.0" & 6.4" = single trunk of 19.3". Base is 6.5 feet south of raised sideewalk.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
North of north gate	1297	AYC/Cn	17.3"	4.0	17'	to Sidewalk	16'	to property line	16'	90%	Min. asym.	Dense	Utility Pruned	Straight	NAD	Restricted	Base is 5 feet west of east property line fence	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
North of north gate	1298	BCh/Pe	11.3"	1.0	14'	14'	14'	to property line	14'	70%	Min. asym.	Dense	Healthy	fork at 1' with included bark to base	NAD	-	Trunk diameters are 7.3", 6.4" & 5.8" = single trunk of 11.3". Base is 8 feet west of the east property line fence and 2 feet north of entry gate fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
North of north gate	1299	BLM/Am	4.9"	0.5	12'	to Sidewalk	12'	to property line	12'	70%	Min. asym.	Dense	Average	Typical	Girdled	Girdling Root	Girdling root affects 50% of vascular cambium.	Not Significant	Fair	Viable	Potential to Retain with Tree Protection Measures
East Prop line	1300	NS/Pa	20.6"	6.0	16'	16'	16'	to property line	to edge of gravel drive way	95%	Min. asym.	Dense	Healthy	Straight	NAD	-		Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
East Prop line	460	NS/Pa	17.4"	4.0	14'	14'	14'	to property line	to edge of gravel drive way	95%	Min. asym.	Dense	Healthy	Straight	NAD	-		Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
East Prop line	146	BLM/Am	24.5"	8.0	22'	22'	24'	to property line	to edge of gravel drive way	65%	Min. asym.	Dense	Healthy	Typical	NAD	-	Base is 11 feet west of East property line fence.	Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
East Prop line	216	BLM/Am	22.7"	7.0	22'	22'	22'	to property line	to edge of gravel drive way	95%	Min. asym.	Dense	Healthy	Typical	NAD	-		Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
East Prop line	226	BCh/Pe	5.9"	0.5	12'	12'	12'	to property line	to edge of gravel drive way	35%	Maj. asym.	Dense	Healthy	Serpentine	NAD	-		Not Significant	Good	Viable	Potential to Retain with Tree Protection Measures
East Prop line	227	BCh/Pe	11.0"	1.0	10'	10'	10'	to property line	10'	60%	Min. asym.	Dense	Healthy	Typical	NAD	-	clump of 4 trees grwoing in a line 7 feet south of # 226 next to the east property line fence. Combined they total 3 tree credits.	Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
East Prop line	195	WRC/Tp	31.9"	11.0	16'	16'	16'	to property line	to edge of gravel drive way	98%	Gen. sym.	Dense	Healthy	Fork at 22' with Included bark down 3'	NAD	-	Base is approximately 18 feet west of east property line fence and 21 feet west of gravel drive	Significant	Very good	Viable	Inside proposed sub-station facility - Remove
East Prop line	196	WRC/Tp	36.1"	14.0	17'	17'	17'	to property line	to edge of gravel drive way	98%	Gen. sym.	Dense	Healthy	Straight	NAD	-		Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
Off Property, East of East Property Line	197	DF/Pm	est. 36"	0.0	26'	26'	26'	to property line	12' W of E PL	95%	Gen. sym.	Dense	Healthy	Straight	NAD	-	Canopy overhangs subject property by 22'. Advanced bark beetle infestation. Base is 4 feet east of the east property line fence.	Significant	Very good	Viable	Potential to Retain with Tree Protection Measures

SITE: PSE Juanita Substation
At 109th Ave NE, Betwen NE 128th & NE 132nd Streets, Kirkland, WA 98033

Date of Inspection: July 2, 2008

1	2	3	4	5	6	7 -- LIMITS OF DISTURBANCE				8	9	10	11	12	13	14	15	16	17	18	19
TREE LOCATION	**TREE #**	**SPECIES**	**DBH**	**TREE CREDIT**	**DRIP LINE**	**North**	**South**	**East**	**West**	**LCR**	**SYMMETRY**	**FOLIAGE**	**CROWN CONDITION**	**TRUNK**	**ROOT COLLAR**	**ROOTS**	**COMMENTS**	**SIGNIFICANCE**	**CURRENT HEALTH RATING**	**VIABILITY**	**STATUS / RECOMMENDATION**
Off Property, East of East Property Line	198	EWB/Bp	3 trunks, 2 trees, est. 10-11"	0.0	16'	12'	12'	to property line	12' W of E PL	45%	Min. asym.	Average	Dead	Typical	NAD	-	Canopy overhangs subject property by 10 feet. Base is approximately 3 feet east of East property line fence.	Significant	Poor	Non-viable	Potential to Retain with Tree Protection Measures
Off Property, East of East Property Line	199	PP/Pp	est. 24"	0.0	18'	18'	18'	to property line	12' W of E PL	85%	Gen. sym.	Dense	Healthy	fork at 9'	NAD	-	Canopy overhangs subject property by 16 feet. Base is approximately 18-24 inches east of the east property line fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	200	WRC/Tp	est. 12"	0.0	16'	16'	16'	12'	to W property line	90%	Min. asym.	Thin	Average	Bowed at base	NAD	-	Canopy overhangs subject property by 10 feet. Base is approximately 3 feet east of East property line fence.	Significant	Fair	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	301	WRC/Tp	est. 12"	0.0	12'	12'	12'	12'	to W property line	90%	Min. asym.	Thin	Average	Straight	NAD	-	Canopy overhangs subject property by 8 feet. Base is just west of west property line fence.	Significant	Fair	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	302	DF/Pm	est. 14"	0.0	14'	14'	14'	12'	to W property line	90%	Min. asym.	Average	Healthy	Straight	NAD	-	Canopy overhangs subject property by 10 feet. Base is approximately 4 feet west of the west property line fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	303	WRC/Tp	est. 24"	0.0		16'	16'	12'	to W property line	95%	Min. asym.	Average	Average	Straight	NAD	-	Canopy overhangs subject property by 12 feet. Base is approximately 4 feet west of the wet property line fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	304	WRC/Tp	est. 22"	0.0		20'	12'	12'	to W property line	85%	Min. asym.	Average	Average	Straight	NAD	-	Canopy overhangs subject property by 4 feet. Base is approximately 16 fet west of west property line fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	305	BLM/Am	est. 28"	0.0		32'	20'	12'	to W property line	60%	Gen. sym.	Dense	Healthy	Typical	NAD	-	Canopy overhangs subject property by 8 feet. Base is approximately 26 feet west of the west proprty line fence. Recently crown raised.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	306	DF/Pm	est. 16"	0.0		19'	18'	12'	to W property line	50%	Gen. sym.	Dense	Healthy	kik at 16' to 20'	NAD	-	Canopy overhangs subject property by 6 feet. Base is approximately 13 feet west of the west property line fence.	Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
Off Property, West of West Property Line	307	DF/Pm	est. 21"	0.0		16'	16'	12'	to W property line	95%	Gen. sym.	Dense	Healthy	Straight	NAD	-	Canopy overhangs subject property by 5 feet. Base is approximately 5 feet wes of the west property line fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures
				62.0	**Total number of tree credits present on the northern property where the new substation is to be built.**																

SUMMARY:

23 **Trees were evaluated:**

- Off Property Trees:

- 11 trees are presumed to be off the property with canopies that overhang the subject property:
  - There are 3 trees, #'s 197, 198, & 199 are east of the east property line approximately centered on the proposed project.
  - There are 8 trees west of the west property line.. They are #'s 300 to 307.
  - All 11 trees can be adequately protected with a fence placed 12 feet west of the east property line.

- Subject Property Trees:

- 12 trees were evaluated on the subject property:
- **Status:**
  - All 12 trees were found to be in Fair, Good, or Very Good health, vigor, structure, or a combination of factors.
    - Therefore, all 12 trees are *Viable.*
  - 2 trees were found to be *Non-Significant* because they are less than the required 6.0 inches in Diameter.
    - They are #'s 1299 & 226.
  - 10 Trees were found to be greater than 6.0 inches in diameter and are, therefore, *Significant.*
    - They are #'s 1296, 1297, 1298, 1300, 460, 146, 216, 227, 195, & 196.

- Tree Retention requirements:

- In a Tree Plan II, the **City of Kirkland** does not require a specific minimum tree density, however, the code does say that the property "shall comply with the required landscaping pursuant to KZC 95.40 Required Landscaping." The code does allow for retained trees to be counted towards the landscaping requirements.

ATTACHMENT 3 - GLOSSARY

Terms Used in This Report, on the Tree Condition / Inventory Spreadsheet, and Their Significance

In an effort to clearly present the information for each tree in a manner that facilitates the readerôs ability to understand the conclusions I have drawn for each tree, I have collected the information onto a spreadsheet format. This spreadsheet was developed by Gilles Consulting based upon the *Hazard Tree Evaluation Form* from the book, *The Evaluation of Hazard Trees in Urban Areas*, by Matheney and Clarke. The descriptions were left brief on the spreadsheet in an effort to include as much pertinent information as possible, to make the report manageable, and, to not bore the reader with infinite levels of detail. A review of these terms and descriptions will allow the reader to rapidly move through the report and understand the information.

1) **TREE LOCATION--**indicates what general area of the site the tree is on, or whether the tree is Off the Project property.
2) **TREE #**ð the individual number of each tree.
3) **SPECIES**ð this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
4) **DBH**ð Diameter Breast Height. This is the standard measurement of trees taken at 4.5 feet above the average ground level of the tree base.
    i) Occasionally it is not practical to measure a tree at 4.5 feet above the ground. The most representative area of the trunk near 4.5 feet is then measured and noted on the spreadsheet. For instance, a tree that forks at 4.5 feet can have an unusually large swelling at that point. The measurement is taken below the swelling and noted as, ó28.4ò at 36òô
    ii) Trees with multiple stems are listed as a ñclump of x,ò with x being the number of trunks in the clump. Measurements may be given as an average of all the trunks, or individual measurements for each trunk may be listed.
        (1) Every effort is made to distinguish between a single tree with multiple stems and several trees growing close together at the bases.
5) **TREE CREDIT**ð Tree Credit based on Trunk Diameter
6) **DRIP LINE**ð the radius, the distance from the trunk to the furthest branch tips.
7) **LIMITS OF DISTURBANCE**ð the boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a qualified professional.
8) **% LCR**ð Percentage of Live Crown Ratio. The relative proportion of green crown to overall tree height. This is an important indication of a treeôs health. If a tree has a high percentage of Live Crown Ratio, it is likely producing enough photosynthetic activity to support the tree. If a tree has less than 30 to 40% LCR it can create a shortage of needed energy and can indicate poor health and vigor.

9) **SYMMETRY**ð is the description of the form of the canopy. That is, the balance or overall shape of the canopy and crown. This is the place I list any major defects in the tree shapeð does the tree have all its foliage on one side or in one unusual area. Symmetry can be important if there are additional defects in the tree such as rot pockets, cracks, loose roots, weak crown etc. Symmetry is generally categorized as Generally Symmetrical, Minor Asymmetry or Major Asymmetry:
    i) Gen. Sym.ð Generally Symmetrical. The canopy/foliage is generally even on all sides with spacing of scaffold branches typical for the species, both vertically and radially.
    ii) Min. Asym.ð Minor Asymmetry. The canopy/foliage has a slightly irregular shape with more weight on one side but appears to be no problem for the tree.
    iii) Maj. Asym.ð Major Asymmetry. The canopy/foliage has a highly irregular shape for the species with the majority of the weight on one side of the tree. This can have a significant impact on the treeôs stability, health and hazard potentialð especially if other defects are noted such as cracks, rot, root defects.
10) **FOLIAGE/BRANCH**ð describes the foliage of the tree in relation to a perfect specimen of that particular species. First the branch growth and foliage density is described, and then any signs or symptoms of stress and/or disease are noted. The condition of the foliage, or the branches and buds for deciduous trees in the dormant season, are important indications of a treeôs health and vigor.
    i) For Deciduous trees in the dormant season:
        (1) The structure of the tree is visible,
        (2) The quantity and quality of buds indicates health, and is described as good bud set, average bud set, or poor bud set. These are abbreviated in the spreadsheet as: gbs, abs, or pbs.
        (3) The amount of annual shoot elongation is visible and is another major indication of tree health and vigor. This is described as:
            a) Excellent, Good, Average, or Short Shoot Elongation. These are abbreviated in the spreadsheet as ESE, GSE, ASE, OR SSE.
    ii) For evergreen trees year round and deciduous trees in leaf, the color and density of the foliage indicates if the tree is healthy or stressed, or if an insect infestation, a bacterial, fungal, or viral infection is present. Foliage is categorized on a scale from:
        (1) Denseð extremely thick foliage, an indication of healthy vigorous growth,
        (2) Goodð thick foliage, thicker than average for the species,
        (3) Normal/Averageð thick foliage, average for the species, an indication of healthy growth,
        (4) Thin or Thinningð needles and leaves becoming less dense so that sunlight readily passes through; an indication that the tree is under

serious stress that could impact the long-term survivability and safety of the tree,

(5) Sparseð few leaves or needles on the twigs, an indication that the tree is under extreme stress and could indicate the future death of the tree

(6) Necrosisð the presence of dead twigs and branchlets. This is another significant indication of tree health. A few dead twigs and branches are reasonably typical in most trees of size. However, if there are dead twigs and branchlets all over a certain portion of the tree, or all over the tree, these are indications of stress or attack that can have an impact on the treeôs long-term health.

(7) Hangersð A term to describe a large branch or limb that has broken off but is still hanging up in the tree. These can be particularly dangerous in adverse weather conditions.

11) **CROWN CONDITION**ð the crown is uppermost portion of the tree, generally considered the top 10 to 20% of the canopy or that part of the canopy above the main trunk in deciduous trees and above the secondary bark in evergreen trees.

i) The condition of the treeôs crown is a reflection of the overall health and vigor of the entire tree. The crown is one of the first places a tree will demonstrate stress and pathogenic attack such as root rot.

ii) If the **Crown Condition** is healthy and strong, this is a good sign. If the crown condition is weak, broken out, or shows other signs of decline, it is an indication that the tree is under stress. It is such an important indication of health and vigor that this is the first place a trained forester or arborist looks to begin the evaluation of a tree. Current research reveals that, by the time trees with root rot show significant signs of decline in the crown, fully 50% or more of the roots have already rotted away. **Crown Condition** can be described as:

(1) Healthy Crownð exceptional growth for the species.

(2) Average Crownð typical for the species.

(3) Weak Crownð thin spindly growth with thin or sparse needles.

(4) Flagging Crownð describes a tree crown that is weak and unable to grow straight up.

(5) Dying Crownð describes obvious decline that is nearing death.

(6) Dead Crownð the crown has died due to pathological or physical injury. The tree is considered to have significant stress and/or weakness if the crown is dead.

(7) Broken outð a formerly weak crown condition that has been broken off by adverse weather conditions or other mechanical means.

(8) Regenerated or Regeneratingð formerly broken out crowns that are now growing back, Regenerating crowns may appear healthy, average, or weak and indicate current health of the tree.

(9) Suppressedð a term used to describe poor condition of an entire tree or just the crown. Suppressed crowns are those that are entirely below

the general level of the canopy of surrounding trees which receive no direct sunlight. They are generally in poor health and vigor. Suppressed trees are generally trees that are smaller and growing in the shade of larger trees around them. They generally have thin or sparse needles, weak or missing crowns, are prone to insect attack as well as bacterial and fungal infections.

12) **TRUNK**ð this is the area to note any defects that can have an impact on the treeôs stability or hazard potential. Typical things noted are:
    i) FORKEDð bifurcation of branches or trunks that often occur at a narrow angle.
    ii) INCLUDED BARKð a pattern of development at branch or trunk junctions where bark is turned inward rather than pushed out. This can be a serious structural defect in a tree that can and often does lead to failure of one or more of the branches or trunks especially during severe adverse weather conditions.
    iii) EPICORMIC GROWTHð this is generally seen as dense thick growth near the trunk of a tree. Although this looks like a healthy condition, it is in fact the opposite. Trees with Epicormic Growth have used their reserve stores of energy in a last ditch effort to produce enough additional photosynthetic surface area to produce more sugars, starches and carbohydrates to support the continued growth of the tree. Generally speaking, when conifers in the Pacific Northwest exhibit heavy amounts of Epicormic Growth, they are not producing enough food to support their current mass and are already in serious decline.
    iv) INTERNAL STRUCTURAL WEAKNESSð a physical characteristic of the tree trunk, such as a **kink, crack, rot pocket, or rot column** that predisposes the tree trunk to failure at the point of greatest weakness.
    v) BOWEDð a gradual curve of the trunk. This can indicate an Internal Structural Weakness or an overall weak tree. It can also indicate slow movement of soils or historic damage of the tree that has been corrected by the curved growth.
    vi) KINKEDð a sharp angle in the tree trunk that indicates that the normal growth pattern is disrupted. Generally this means that the internal fibers and annual rings are weaker than straight trunks and prone to failure, especially in adverse weather conditions.
    vii) GROUND FLOWERð an area of deformed bark near the base of a tree trunk that indicates long-term root rot.
13) **ROOT COLLAR**ð this is the area where the trunk enters the soil and the buttress roots flare out away from the trunk into the soil. It is here that signs of rot, decay, insect infestation, fungal or bacterial infection are noted. **NAD** stands for **N**o **A**pparent **D**efects.
14) **ROOTS**ð any abnormalities such as girdling roots, roots that wrap around the tree itself that strangle the cambium layer and kill the tree, are noted here.

15) **COMMENTS**ð this is the area to note any additional information that would not fit in the previous boxes or attributes about the tree that have bearing on the health and structure of the tree.
16) **SIGNIFICANCE**ð a ñsignificantò tree is at least 6ò in diameter measured at 4.5ô above the average ground level.
17) **CURRENT HEALTH RATING**ð a description of general health ranging from dead, dying, poor, senescent, suppressed, fair, good, very good, to excellent.
18) **VIABILITY—** a significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
    (1) Please note that many trees may be listed as ñNon-Viableò due to poor health, poor structure, or the tree may be below the size threshold for a ñViable Tree.ò However, it is worth examining the Non-Viable Trees to determine if any or all of them can be left on the property. They can add significant benefit to the landscape and contribute to wildlife habitat.
19) **RECOMMENDATION**ð this is an estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.

NOTE: TREES WITH THE SAME DESCRIPTION AND DIFFERENT RATINGS: Two trees may have the same descriptions in the matrix boxes, one may be marked ñSignificant,ò while another may be marked ñNon-Significant.ò The difference is in the degree of the descriptionð early necrosis versus advanced necrosis for instance. Again, these descriptions were left brief in an effort to include as much pertinent information as possible, to make the report manageable, and, not to bore the reader with infinite levels of detail.

ATTACHMENT 4 - TREE PROTECTION MEASURES

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and will possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The following minimum Tree Protection Measures are included on three separate sheets so that they can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

TREE PROTECTION MEASURES:

1. Tree Protection Fences will need to be placed around each tree or group of trees to be retained.
    a. Tree Protection Fences are to be placed according to the attached drawing and as noted in the attached Tree Inventory/Conditions Spreadsheet, Column 6 - Limits of Disturbance.
    b. Tree Protection Fences must be inspected prior to the beginning of any construction work/activities.
    c. Nothing must be parked or stored within the Tree Protection Fencesð no equipment, vehicles, soil, debris, or construction supplies of any sorts.

2. Cement trucks must not be allowed to deposit waste or wash out materials from their trucks within the Tree Protection Fences.

3. The Tree Protection Fences need to be clearly marked with the following or similar text in four inch or larger letters:

TREE PROTECTION AREA, ENTRANCE PROHIBITED
To report violations contact
City Code Enforcement
at 425-587-3225

4. The area within the Tree Protection Fencing must be covered with wood chips, hog fuel, or similar materials to a depth of 8 to 10 inches. The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.

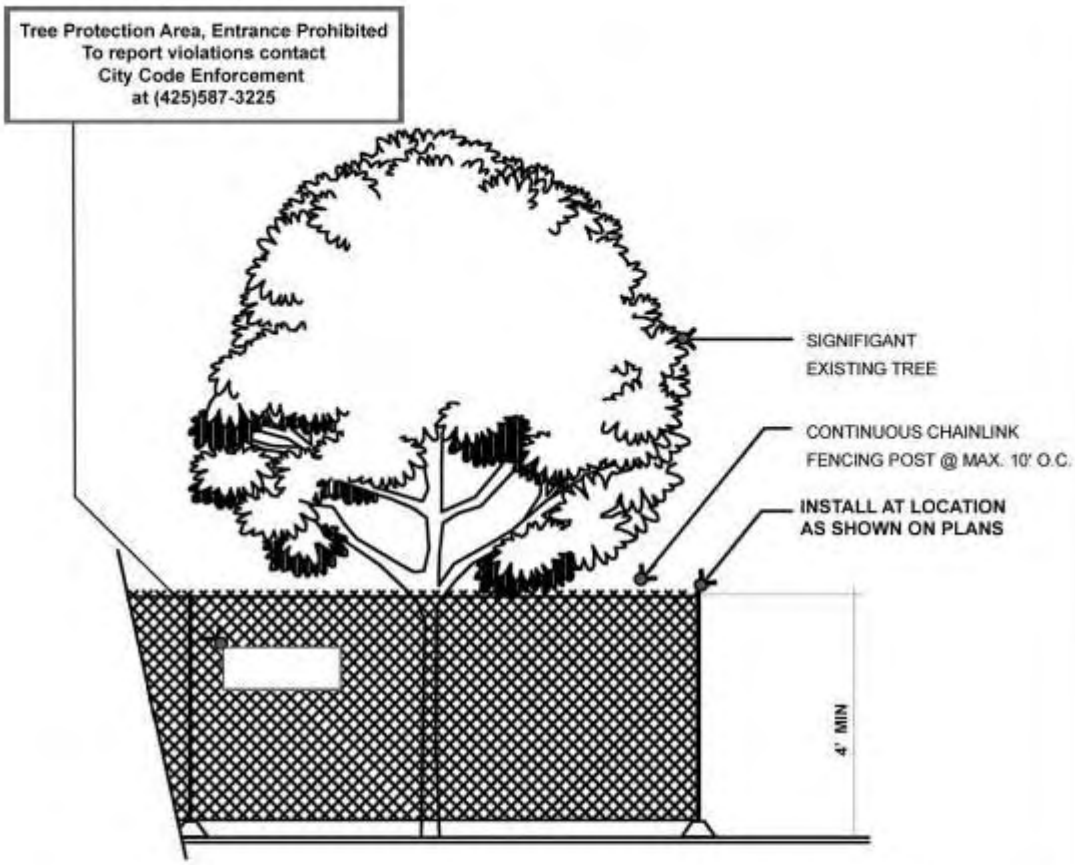
5. When excavation occurs near trees that are scheduled for retention, the following procedure must be followed to protect the long term survivability of the tree:
    a. An International Society of Arboriculture, (ISA) Certified Arborist must be working with all equipment operators.
        i. The Certified Arborist should be outfitted with a shovel, hand pruners, a pair of loppers, a handsaw, and a power saw (a ñsawsallò is recommended).
    b. The hoe must be placed to ñcombò the material directly away from the trunk as opposed to cutting across the roots.
        i. Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
    c. When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the Certified Arborist should stop the equipment operator.

d. The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.
    i. The Certified Arborist should then instruct the equipment operator to continue.

6. Putting Utilities Under the Root Zone:
    a. Boring under the root systems of trees (and other vegetation) shall be done under the supervision of an ISA Certified Arborist. This is to be accomplished by excavating a limited trench or pit on each side of the critical root zone of the tree and then hand digging or pushing the pipe through the soil under the tree. The closest pit walls shall be a minimum of 7 feet from the center of the tree and shall be sufficient depth to lay the pipe at the grade as shown on the plan and profile.
    b. Tunneling under the roots of trees shall be done under the supervision of an ISA Certified Arborist in an open trench by carefully excavating and hand digging around areas where large roots are exposed. No roots 1 inch in diameter or larger shall be cut.
    c. The contractor shall verify the vertical and horizontal location of existing utilities to avoid conflicts and maintain minimum clearances; adjustment shall be made to the grade of the new utility as required.

7. Watering:
    a. The trees will require significant watering throughout the summer and early fall in order to survive long-term. An easy and economical watering can be done using soaker hoses placed three feet from the trunk of the tree and spiraled around the tree. One 75-foot soaker hose per tree is adequate. It is best to place the soakers using landscape staples, (available from HD Fowler in Bellevue for pennies apiece) then cover the area with two to three inches composed materials. The composted material will act as a mulch to minimize evaporation and will also stimulate the microbial activity of the soil which is another benefit to the health of the tree.
    b. Water the tree to a depth of 18 to 20 inches. I recommended leaving the water on the soaker hoses for six to eight hours and then digging down to determine how deep your water is penetrating. Then adjust accordingly. It may take a good two days of watering to reach the proper depth.
    c. Once the water reaches the proper depth, turn off the hoses for four weeks and then water again. Water more often when temperatures increaseð every three weeks when temperatures exceed 80 degrees and every two weeks when temperatures exceed 90 degrees. This drying out of the soil in between watering is important to prevent soil pathogens from attacking the trees.

FENCING SIGN DETAIL



1. MINIMUM FOUR (4) FOOT HIGH TEMPORARY CHAINLINK FENCE SHALL BE PLACED AT THE CRITICAL ROOT ZONE OR DESIGNATED LIMIT OF DISTURBANCE OF THE TREE TO BE SAVED. FENCE SHALL COMPLETELY ENCIRCLE TREE (S). INSTALL FENCE POSTS USING PIER BLOCK ONLY. AVOID POST OR STAKES INTO MAJOR ROOTS. MODIFICATIONS TO FENCING MATERIAL AND LOCATION MUST BE APPROVED BY PLANNING OFFICIAL.

2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND COVERED WITH SOIL AS SOON AS POSSIBLE.

3. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.

4. FENCING SIGNAGE AS DETAILED ABOVE MUST BE POSTED EVERY FIFTEEN (15) FEET ALONG THE FENCE.

CITY OF KIRKLAND WASHINGTON

TREE PROTECTION FENCING DETAIL

ATTACHMENT 5 - REFERENCES

1. Dirr, Michael A. *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses.* Champaign: Stipes Publishing Company, 1990.

2. Harris, Richard W. et al. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines.* 4th ed. Upper Saddle River: Prentice Hall, 2004.

3. Matheney, Nelda P. and Clark, James R. *Evaluation of Hazard Trees.* 2nd ed. Savoy: The International Society of Arboriculture Press, 1994

4. Matheney, Nelda P. and Clark, James R. *Trees & Development, A Technical Guide to Preservation of Trees During Land Development.* Savoy: The International Society of Arboriculture Press, 1998.

5. Mattheck, Claus and Breloer, Helge. *The Body Language of Trees, A Handbook for Failure Analysis.* London: HMSO, 1994.

6. Pacific Northwest Chapter, ISA 2008. Tree Risk Assessment in Urban Areas and the Urban/Rural Interface. Course Manual. Release 1.2. PNW-ISA: Silverton, Oregon.

7. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites.* Savoy: The International Society of Arboriculture Press, 1995.

NOTES

1. PURPOSE OF THIS SURVEY THIS BOUNDARY AND TOPOGRAPHIC SURVEY WAS PERFORMED DURING APRIL, 2007 IN SUPPORT OF A PUGET SOUND ENERGY SUBSTATION IMPROVEMENT PROJECT AND WAS INTENDED TO 1.) DETERMINE AND STAKE THE FOUR PROPERTY CORNERS, 2.) DETERMINE THE LOCATION OF PHYSICAL FEATURES ON OR NEAR SAID PROPERTY LINES AND; 3.) PERFORM TOPOGRAPHIC MAPPING OF THE SUBJECT PARCEL AND ADJOINING ROADWAYS.

2. BASIS OF BEARING WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NAD-83/91. NOTE: DISTANCES SHOWN HEREON ARE STATE PLANE GRID DISTANCES BASED ON A COMBINED SCALE FACTOR OF 0.999959. TO CONVERT GRID DISTANCES TO GROUND VALUES, MULTIPLY DISTANCES SHOWN BY 1.000041.

3. VERTICAL DATUM NAVD-88
NOTE: NGVD 29 = NAVD 88 MINUS 3.6' SOURCE - CORPSCON FOR WINDOWS CONVERSION SOFTWARE VER 5.11.08

4. METHODOLOGY FIELD MEASUREMENT FOR THIS SURVEY WERE PERFORMED USING A LEICA TCRP 1201. THIS SURVEY COMPLIES WITH THE MINIMUM REQUIRED "ERROR OF CLOSURE" OF 1:10,000 FOR WASHINGTON STATE PLANE COORDINATES AS SET FORTH PER W.A.C. 332-130-090 (AND POSITIONAL TOLERANCE LEVELS OF LESS THAN 0.011 METERS)

5. PROPERTY LINES SHOWN HEREON ARE BASED ON FIELD LOCATED SURVEY MONUMENTS AND PUBLIC RECORDS SEE SHEET 2 OF 2 FOR SECTION BREAKDOWN AND PROPERTY DETAILS.

PROPERTY CORNERS WERE STAKED IN CONJUNCTION WITH THIS SURVEY.

6. MONUMENTATION VISITATION ALL SURVEY MONUMENTS AND OTHER SURVEY MARKERS SHOWN HEREON WERE VISITED DURING APRIL, 2007 UNLESS OTHERWISE INDICATED.

7. ENCUMBRANCES PACIFIC NORTHWEST TITLE COMPANY OF WASHINGTON INC. TITLE ORDER NO. 651223, DATED APRIL 12, 2007 USED FOR LAND DESCRIPTION AND EASEMENTS OF RECORD. NO FURTHER SEARCH INTO THE RECORD WAS REQUESTED OR PERFORMED. NOTE: SAID TITLE REPORT REVEALED SEVERAL SLOPE EASEMENTS THAT CONTAINED DESCRIPTIONS THAT WERE INSUFFICIENT TO DETERMINE THE LOCATION OF SAID EASEMENTS. OTHER ENCUMBRANCES LISTED IN SAID TITLE REPORT RELATE TO TAXES AND MORTGAGE TERMS AND CONDITIONS, NONE OF WHICH PERTAIN TO MATTERS DISCLOSED BY THIS SURVEY.

8. UNDERGROUND UTILITIES SHOWN REPRESENT FIELD SURVEYED PAINT MARKS AS PLACED ON THE GROUND BY A UTILITY LOCATE SERVICE. NO GUARANTEE IS MADE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED OR THAT THE UNDERGROUND UTILITIES ARE SHOWN IN THIER EXACT LOCATION. THE UTILITIES ARE SHOWN AS ACCURATELY AS POSSIBLE FROM AVAILABLE INFORMATION.

9. CONTOUR INTERVAL 2 FOOT

10. SUBSURFACE CONDITIONS WERE NOT EXAMINED OR CONSIDERED AS PART OF THIS SURVEY.

11. LOCATIONS OF HOUSES SHOWN HEREON WERE DERIVED FROM AERIAL PHOTOGRAMMETRY AND ARE RELIABLE TO PLUS OR MINUS 5 FEET.

12. 1-800-424-5555 MUST BE CALLED NOT LESS THAN 48 HOURS BEFORE BEGINNING EXCAVATION WHERE ANY UNDERGROUND UTILITIES MAY BE LOCATED. FAILURE TO DO SO COULD MEAN BEARING SUBSTANTIAL REPAIR COSTS. (UP TO THREE TIMES THE COST OF REPAIRS TO THE SERVICE).

BENCH MARKS

1 PROJECT BM POINT DESIGNATION DEA #3003 A COPPER PIN IN SQUARE CONCRETE MONUMENT LOCATED AT SOUTH QUARTER CORNER 29 AND AS SHOWN HEREON - ELEV = 256.528 FEET (NAVD 88)

2 TEMPORARY SITE BM'S POINT DESIGNATION DEA #6 A 1/2" IRON WITH "DEA CONTROL" CAP AND AS SHOWN HEREON - ELEV = 179.74 FEET (NAVD 88)

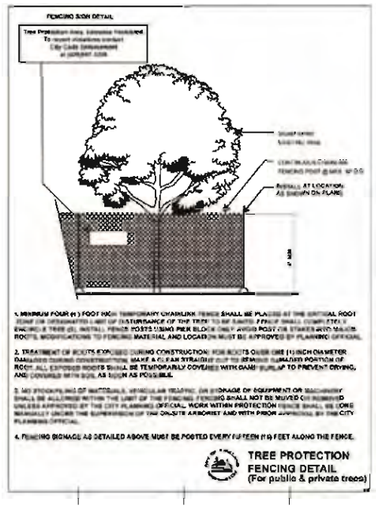
POINT DESIGNATION DEA #7 A 1/2" IRON WITH "DEA CONTROL" CAP AND AS SHOWN HEREON - ELEV = 185.58 FEET (NAVD 88)

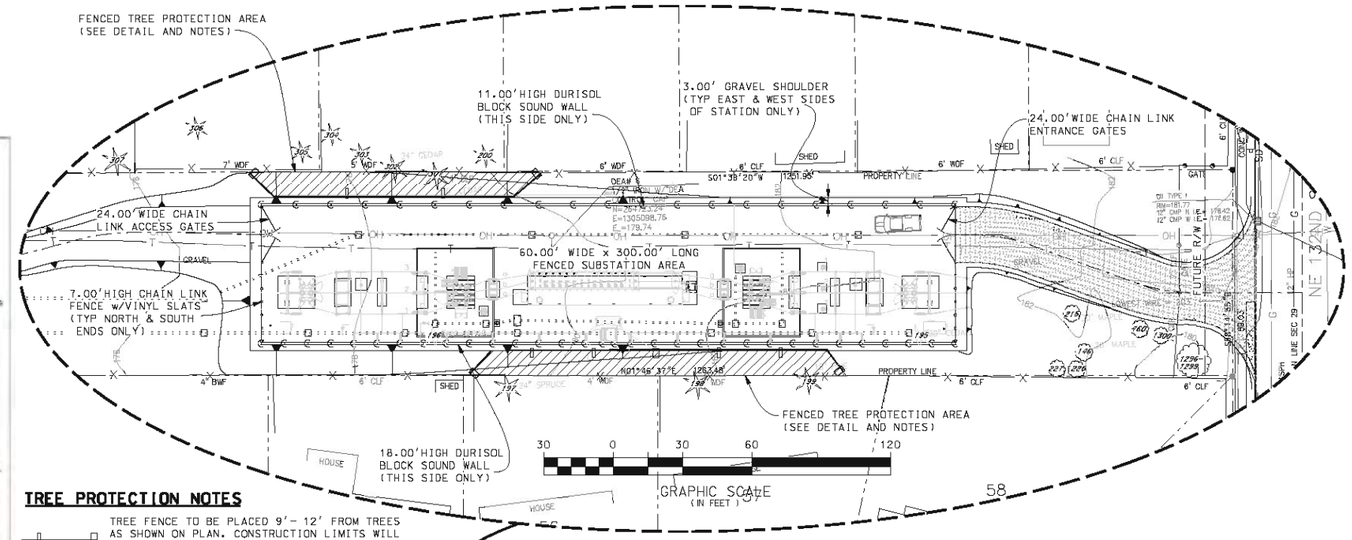
ADDRESS:
10910 NE 132nd ST.
KIRKLAND, WA.

LEGAL DESCRIPTION

PER PACIFIC NORTHWEST TITLE COMPANY OF WASHINGTON INC., TITLE ORDER NO. 651223, DATED APRIL 12, 2007

THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 26 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON;
EXCEPT THE WEST QUARTER;
EXCEPT THE EAST 900 FEET THEREOF;
EXCEPT THE NORTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR NORTHEAST 132ND STREET BY RECORDING NUMBER 2125699;
AND ALSO EXCEPT THE SOUTH 30 FEET THEREOF CONVEYED TO KING COUNTY FOR NORTHEAST 128TH STREET BY RECORDING NUMBER 5554777.





STATION DETAIL

SCALE: 1"=30'

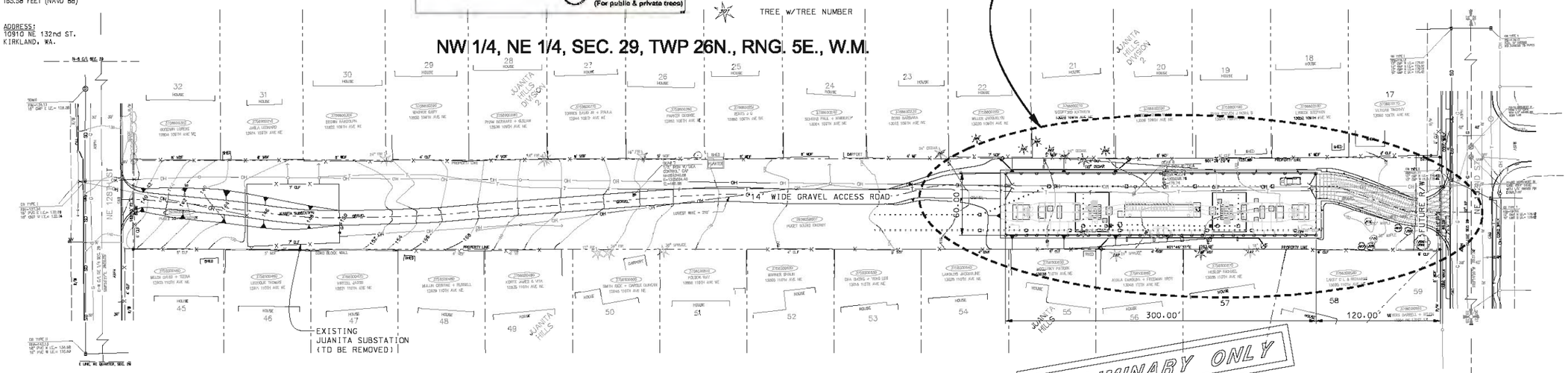
TREE PROTECTION NOTES

TREE FENCE TO BE PLACED 9'- 12' FROM TREES AS SHOWN ON PLAN. CONSTRUCTION LIMITS WILL DECTATE LOCATION OF FENCE.

12" OF WOOD CHIPS TO BE PLACED WITHIN BOUNDARY OF TREE FENCE AREA.

TREE w/TREE NUMBER

NW 1/4, NE 1/4, SEC. 29, TWP 26N., RNG. 5E., W.M.



PRELIMINARY ONLY
NOT FOR CONSTRUCTION

CALL BEFORE YOU DIG
Call: TOLL FREE
1-800-CUT-SRVC

REFERENCE DRAWINGS:

D-14342	EROSION AND SEDIMENT CONTROL PLAN
D-14343	GRADING AND FENCING PLAN
D-14344	DRAINAGE PLAN
D-14345	FOUNDATION PLAN
D-14346	LANDSCAPE PLAN
D-14347	STRUCTURAL PLAN (REF ONLY)

PSE ENGINEERING CONTACTS

355 NE 110TH AVE NE, BELLEVUE WA. 98009-0868

GROUP	NAME	PHONE
PROJECT MANAGEMENT	R. BAMBA	425-462-3774
CIVIL	J. RORABACHER	425-456-2446
ELECTRICAL	J. NEDRUD	425-462-3818
CONSTRUCTION MANAGEMENT	D. MOHN	425-456-2830
PERMITTING	A. MARKOS	253-476-6295

TOPOG LEGEND

SECTION LINE
QUARTER SECTION LINE
EXISTING RIGHT-OF-WAY LINE
PROPERTY LINE
FENCE LINE (TYPE AS NOTED)
UTILITY POLE
WATER VALVE
WATER METER
CATCH BASIN
STORM DRAIN MANHOLE
TELEPHONE MANHOLE
TELEPHONE VAULT
CONIFEROUS TREE
DECIDUOUS TREE
SHRUB
SET REBAR AND CAP "DEA 38017"
KING COUNTY TAX PARCEL NUMBER

GRAPHIC SCALE
(IN FEET)

VICINITY MAP
NO SCALE

JOHN D. RORABACHER
STATE OF WASHINGTON
44464
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES: Jan. 27.

REVISION DESCRIPTION: ISSUED FOR PERMITTING			
	APPROVAL	DATE (M/D/Y)	
CADD	M TURNER	10 / 7 /08	
		/ /	
CIVIL ENGR		/ /	
		/ /	
REVIEW		/ /	
		/ /	

SITE PLAN
JUANITA SUBSTATION

PUGET SOUND ENERGY
SUBSTATION ENGINEERING DEPARTMENT

DRAWING NO D-14341
REV NO 0
SHEET 1 OF 1
FILE NO
SCALE: 1"= 50'-0"
CLASS: SITE
CADD NO: ...40\14341 01 Site.dgn

M D TURNER
10/8/2008

\\electric\work\cadd\Juanita (John, Jens) 10103744\40\14341 01 Site.dgn

CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033 425.587-3225
www.ci.kirkland.wa.us

MEMORANDUM

To: Tony Leavitt, Associate Planner

From: Deborah Powers, Urban Forester

Date: November 5, 2008

Subject: PSE Juanita Substation (ZON08-00010) Tree Plan II Review

Below are my comments in response to the revisions submitted for this project:

Type 1 Trees:
146, 216, 460, 1300 and the Norway maple located near the NE 132 Ave right-of-way.

Type 2 Trees:
1298, 1299, and 195

Type 2 Trees:
1296, 1297, 227, and 196.

Notes:

- Applicant shall incorporate Type 1 trees into landscape plan.
- Applicant to place steel plates on remaining Limits of Disturbance per arborist report to protect Type 1 tree roots from heavy equipment traffic.
- Tree Fencing per Arborist Recommendation for all onsite and offsite trees
- Fencing for all onsite and offsite trees with overhanging driplines to remain in place for the duration of the project.

Let me know if you have any questions regarding this review.

SOUND ANALYSIS
JUANITA SUBSTATION
KIRKLAND, WASHINGTON

Submitted to:

Puget Sound Energy
355 – 110th Avenue NE, EST-05E
Bellevue, Washington 98004

Prepared by:

Ioana Park, P.E.
BRC Acoustics & Technology Consulting
1741 1st Avenue S.
Seattle, Washington 98134

April 25, 2008

CONTENTS

1. INTRODUCTION.....1

2. PROJECT SITE AND NEARBY LAND USES 1

3. SOUND LEVEL DESCRIPTORS.....1

4. EXISTING SOUND LEVELS.....4

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6. PREDICTED SOUND LEVELS FROM THE PROPOSED TRANSFORMERS.....6

7. SOUND MITIGATION MEASURES.....8

APPENDIX A A-1

1. INTRODUCTION

This report is a sound analysis for the proposed replacement of the Puget Sound Energy Juanita Substation located at 10910 NE 132nd Street in Kirkland, Washington. The report evaluates future sound levels from two new electrical transformers proposed for the site.

2. PROJECT SITE AND NEARBY LAND USES

Figure 1-1 shows the location of the existing Juanita Substation, a plan of the future proposed substation, surrounding properties, and sound measurement and analysis locations. The existing substation is located near the south end of the Puget Sound Energy property. The proposed, future substation would be located near the north end of the property. The project site's east and west boundaries adjoin single-family residential properties in the Juanita Hills subdivision.

The PSE property and neighboring residential properties are zoned RSX 7.2 (Single-Family Residential) by the City of Kirkland.

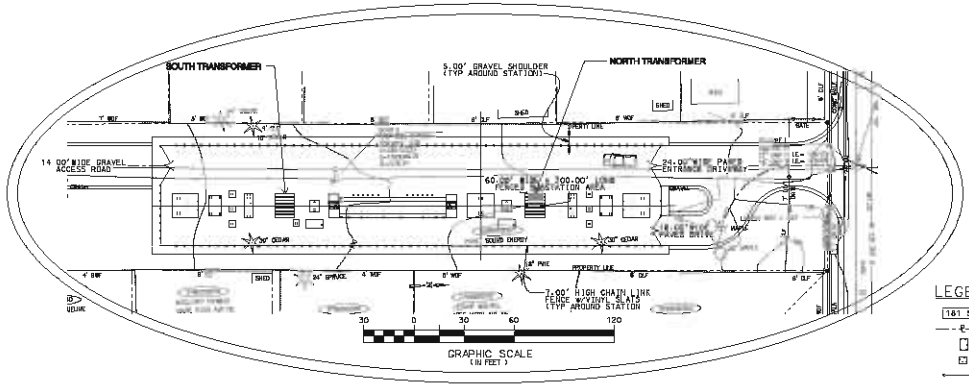
3. SOUND LEVEL DESCRIPTORS

Sound is measured as sound level in units of decibels, dB. Environmental sound is often measured as A-weighted sound level in dBA. The A-weighting is a specific weighting filter in a sound level meter that corresponds to human hearing sensitivity at the various sound frequencies. People normally experience sound levels between about 30 and 90 dBA, depending on their activity. For example, a loud nearby vehicle, radio or power tool may produce 80 to 90 dBA, normal conversation is about 50 to 60 dBA, and a bedroom or quiet office is about 30 to 40 dBA.

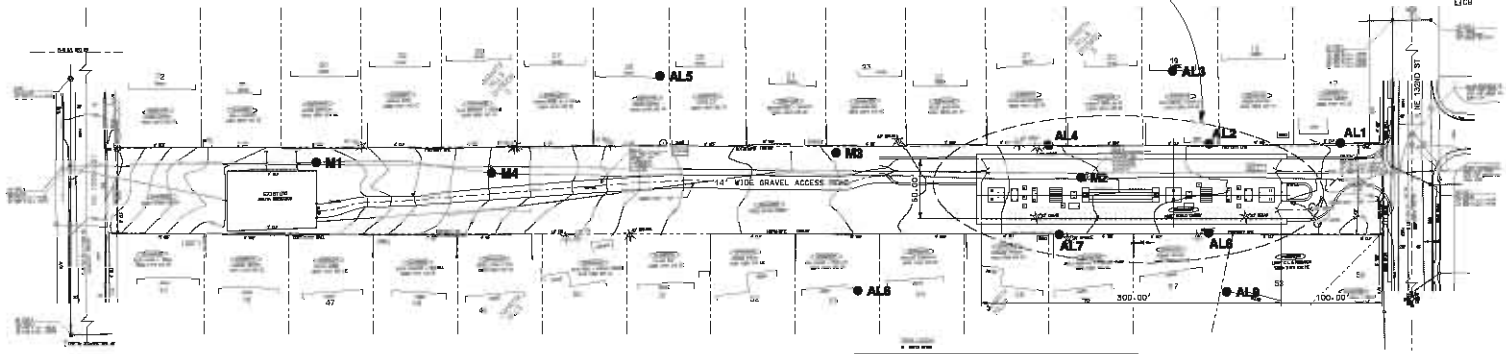
Each 10-dB increase in sound level corresponds to a tenfold increase of sound energy, but is judged by a listener as only a doubling of loudness. The smallest changes in sound level considered clearly noticeable are about 3 to 5 dBA.

Sound levels from two or more sources are combined using logarithms, not by adding the levels. When two levels are combined, the louder level predominates, and the combined level is the louder level plus 0 to 3 dBA. Some examples: 50 dBA combined with 50 dBA is 53 dBA, and 50 dBA combined with 40 dBA results in 50.4 dBA.

Because sound levels fluctuate over time, several A-weighted sound level descriptors are used to characterize the sound. In this report, the following descriptors are used:



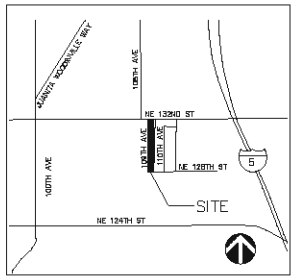
STATION DETAIL



LEGEND

161.50	FINISHED GRADE ELEVATION
—P—	PROPERTY LINE
	GRATE INLET (SEE DRAINAGE PLAN)
	CATCH BASIN (SEE DRAINAGE PLAN)
	STATION FENCE
	SLOPE AND FLOW DIRECTION
	FOUNDATIONS (PET ONLY)
WH	CATCH BASIN W/WATER TOP VALVE (SEE DRAINAGE PLAN)
CB	CATCH BASIN (SEE DRAINAGE PLAN)

GRAPHIC SCALE (IN FEET)



VICINITY MAP
NO SCALE

CALL 1-800-424-5555 FOR LOCATES NOT LESS THAN 48 HOURS PRIOR TO DIGGING.
HOURS OF CONSTRUCTION: 7AM TO 8PM WEEKDAYS AND 9AM TO 6PM ON SATURDAY.

REVISION DESCRIPTION:
ISSUED FOR PERMITTING

	APPROVAL	DATE (M/D/Y)
CADD	M. FURNER	8 / 2 / 07
CIVIL ENGR		/ /
		/ /
REVIEW		/ /
		/ /

SITE PLAN, SOUND MEASUREMENT AND ANALYSIS LOCATIONS

PUGET SOUND ENERGY — BRC

DRAWING NO: FIG 1-1 — REV NO: 0
SHEET 1 OF 1
SCALE: 1"= 50'-0" — CLASS: SITE
CADD NO: ...\JOB-JUNCTA\DL43418 SITE.DGN
FILE NO

08/16/2007

Leq	**Equivalent sound level, Leq**, is the most commonly used descriptor for measuring fluctuating sound. The Leq is the level of a constant sound that, over a given time period, contains the same amount of sound energy as the measured fluctuating sound.
Ldn	**Day-night average sound level, Ldn**, is the Leq over 24 hours with a 10 dBA penalty added during the nighttime hours of 10 p.m. to 7 a.m. The Ldn is often used to measure the overall 24-hour sound to determine land use compatibility and overall impacts. The Ldn is usually close to the same level as the daytime Leq.
Lmax	**Maximum sound level, Lmax**, is the highest instantaneous sound level for a given sound source, event or time period. Because the Lmax in a neighborhood will, unlike Leq, typically have large fluctuations from hour to hour and day to day, Lmax is seldom used to measure noise impact, except in cases where brief high-level sound is causing an impact such as sleep disturbance.
Lmin	**Minimum Sound Level** is the lowest instantaneous sound level and is typically the level of background noise that may be expected if all the fluctuating noise sources were removed.

When considering sounds with a frequency spectrum such as the hum of a transformer, which is characterized by a large portion of the sound energy being concentrated in the 60-Hz and 120-Hz bands, the sound pressure levels at the different frequencies are also measured. These sound pressure levels are usually measured for frequency bands of one octave centered at frequencies of 31, 63, 125, 250, 500, 1000 (1k), 2000 (2k), 4000 (4k), and 8000 (8k) Hz. The most important of these octave bands in terms of potential annoyance is the 125 Hz octave band, because transformer hum occurs primarily at 120 Hz.

4. EXISTING SOUND LEVELS

Sound levels were measured from 2 p.m. on Tuesday, July 10 to 4 p.m. on Thursday, July 12, 2007 at four locations near the substation site, shown in Figure 1-1 as Locations M1 to M4. The continuous monitoring was conducting using two Bruel & Kjaer 2238 and two Larson Davis 870 Integrating Sound Level Meters. All instruments conform to ANSI S1.4 requirements for Type I measurement systems. All measurements were conducted at the first-story elevation of five feet above ground. The locations of the measurements were selected to represent existing sound levels at nearby residential properties and are listed in Table 4-1.

TABLE 4-1
SOUND MONITORING LOCATIONS

Location	Description
M1	Near the east property line of Parcel 30
M2	Near the east property line of Parcel 20
M3	Near the east property line of Parcel 23
M4	Near the east property line of Parcel 28

Results of the long-term measurements are shown in Figures A-1 to A-12 in Appendix A. The A-weighted sound levels are shown as hourly Leq, Lmax, Lmin, and 24-hour Ldn on days when 24 hours of data were recorded.

Existing sound levels at the monitoring locations are caused predominantly by traffic on NE 128th and NE 132nd Streets, occasional aircraft overflights, and local residential noise sources. The measured hourly Leq sound levels are fairly steady in the upper 40s to mid 50s dBA during the monitoring period.

The existing hourly Leq measured during the quietest nighttime hours are shown in Table 4-2.

TABLE 4-2
EXISTING QUIETEST-HOUR EQUIVALENT SOUND LEVELS

	MONITORING LOCATION			
	1	**2**	**3**	**4**
A-weighted sound level, dBA	45	42	43	42

5. PERMITTED SOUND LEVELS

The project is subject to noise regulations contained in Chapter 115.95, *Noise Regulations,* of the City of Kirkland Zoning Code. In Section 1 of this regulation, the City adopts by reference the Maximum Environmental Noise Levels contained in Chapter 173-60 of the Washington Administrative Code (WAC).

Guidelines for evaluating noise increases over existing sound levels are provided by the Environmental Protection Agency (EPA).

Permissible sound levels in 173-60 WAC are based on the Environmental Designation for Noise Abatement (EDNA) of source and receiving properties. The EDNA is determined based on land-use criteria, with residential use being Class A EDNA, commercial use Class B EDNA, and industrial use being Class C EDNA. In areas covered by a local zoning ordinance, the EDNA conforms to the zoning ordinance.

The site of the Juanita Substation and residential properties within Juanita Hills, to the east and west of the substation, are considered Class A EDNA.

The State of Washington noise limits for EDNA A source and receiver properties are shown in Table 5-1.

TABLE 5-1
STATE OF WASHINGTON PERMITTED SOUND LEVELS FOR EDNA CLASS B SOURCES AND CLASS A RECEIVERS

Daytime*	Nighttime
55 dBA	45 dBA

*Daytime is defined as 7 a.m. to 10 p.m.;
Nighttime is defined as 10 p.m. to 7 a.m.

The Washington Administrative Code exempts electrical substations from the nighttime reduction in noise limits. Therefore, the limit for sound levels produced at the Juanita Substation and received at nearby residences is 55 dBA during all hours.

Adverse environmental impacts associated with noise increases can be evaluated using the U.S. Environmental Protection Agency *Noise Guidelines for Environmental Impact Statements* (EPA, 1975). Noise increases of 0-5 dBA at residences are considered a slight impact, 5-10 dBA a significant impact, and over 10 dBA a serious impact. These criteria are presented as guidelines only, and have no statutory authority. However, they are appropriate for assessing the impact of environmental noise.

6. PREDICTED SOUND LEVELS FROM THE PROPOSED TRANSFORMERS

The transformer type proposed for the two units at the Juanita Substation is a 25-MVA model. In order to quantify the expected noise emissions of the proposed transformers, measurements of reference sound levels were conducted at another PSE transformer reported to be similar to the proposed units. The reference transformer is located at the PSE Pickering Substation in Issaquah.

Sound levels produced by the transformer were measured in one-octave bands at reference distances of 10 to 20 feet in four directions surrounding the transformer. The measurement results were normalized to sound levels at a reference distance of 50 feet, summarized in Table 6-1. The four directions are defined with respect to the principal features of the transformer and also to the proposed orientation of the north transformer at the Juanita site. For the south transformer at the Juanita Substation, the four directions are rotated by 180 degrees compared to Table 6-1.

TABLE 6-1
TRANSFORMER REFERENCE SOUND LEVELS
DERIVED FROM MEASUREMENTS AT PICKERING SUBSTATION

Direction for North Transformer		**Sound Level at 50 Feet, dBA**
1	(East)	**52**
2	High-voltage bushings (North)	**53**
3	(West)	**46**
4	Low-voltage bushings (South)	**47**

The sound levels received at surrounding properties from the two 25-MVA transformers located as shown in Figure 1-1 at the Juanita Substation were computed using the Environmental Noise Model program. The sound predictions were executed for nine Analysis Locations, listed in Table 6-2 and shown in Figure 1-1.

TABLE 6-2 SOUND ANALYSIS LOCATIONS	
AL #	**Description**
1	East property line of Parcel 17
2	East property line of Parcel 19, directly west of the north transformer
3	Second story of residence on Parcel 19
4	East property line of Parcel 21, directly west of the south transformer
5	Second story of residence on Parcel 26
6	Second story of residence on Parcel 53
7	West property line of Parcel 56, directly east of the south transformer
8	West property line of Parcel 57, directly east of the north transformer
9	Second story of residence on Parcel 58

The computed A-weighted sound levels at the Analysis Locations without additional noise mitigation are shown in Table 6-3. The table also shows State of Washington noise limits and existing measured quietest-hour Leq at the nearest monitoring location.

TABLE 6-3 CALCULATED TRANSFORMER SOUND LEVELS WITHOUT MITIGATION A-WEIGHTED DECIBELS (dBA)									
	Analysis Location								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Proposed 25-MVA transformers	42	51	44	50	29	33	47	48	41
State of Washington Permitted Sound Level	55	55	55	55	55	55	55	55	55
Existing quietest-hour Leq	--	42	42	42	42	43	42	42	42

The calculations indicate that, without mitigation, A-weighted sound levels produced by the proposed transformers would meet the State of Washington daytime and nighttime noise limit of 55 dBA at all Analysis Locations.

At the Analysis Locations that represent actual residences (AL3, AL5, AL6, and AL9), the predicted sound levels are substantially lower than the noise limits and are in the range of or lower than existing measured sound levels at the nearest Monitoring Locations. At the same Analysis Locations, the predicted sound levels shown in Table 6-3 are also below the nighttime noise limit of 45 dBA that applies to EDNA Class A source and receiver properties. As stated previously, electrical substations are exempt from the nighttime reduction in the noise limit.

7. SOUND MITIGATION MEASURES

The predicted sound levels presented in Table 6-3 indicate that the new transformers proposed for the Juanita Substation without noise mitigation would comply with applicable noise limits and would be in the range of or lower than existing sound levels at most Analysis Locations and at all actual residences.

At the property-line locations closest to the two transformers (Analysis Locations 2, 4, 7, and 8) the predicted sound levels are higher than existing nighttime sound levels by 5 to 9 dBA. These sound-level increases would be considered a significant noise impact according to EPA guidelines and would be noticeable.

Puget Sound Energy proposes to construct an 18-foot high, 300-foot long wall along the fence line on the east side of the transformers. In order to minimize sound reflections, the barrier surface facing the transformers would be sound-absorptive. The minimum construction of the barrier panels shall be a 1-3/4 inch concrete core faced on the transformer side with Model RDNBP panels by Durisol Inc. or equivalent. The face panels on the transformer side shall have minimum NRC 0.85 and minimum absorption coefficient 0.30 in the 125-hertz one-third octave band.

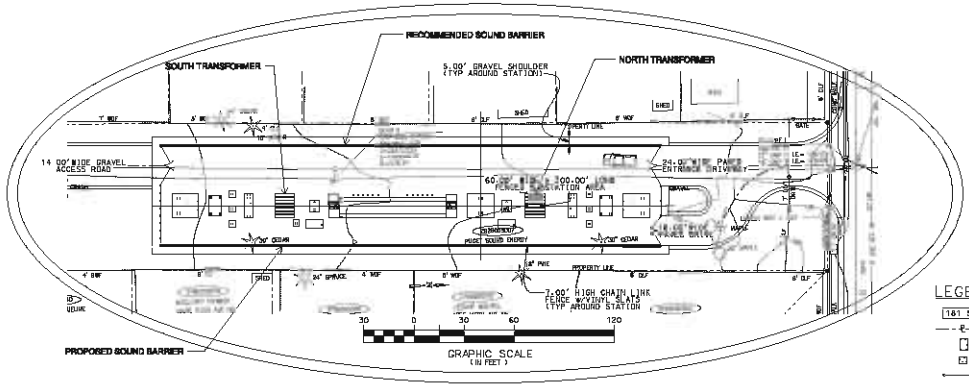
It is recommended that a similar sound barrier be constructed along the west fence line. The height of the barrier west of the transformers shall be equal to the height of the transformers (excluding the top bushings). Both barriers shall be constructed without gaps, including along the ground. The locations of the sound barriers are shown in Figure 7-1. Table 7-1 shows predicted sound levels from the transformers with the recommended sound barriers in place.

TABLE 7-1
CALCULATED TRANSFORMER SOUND LEVELS WITH SOUND BARRIERS
A-WEIGHTED DECIBELS (dBA)

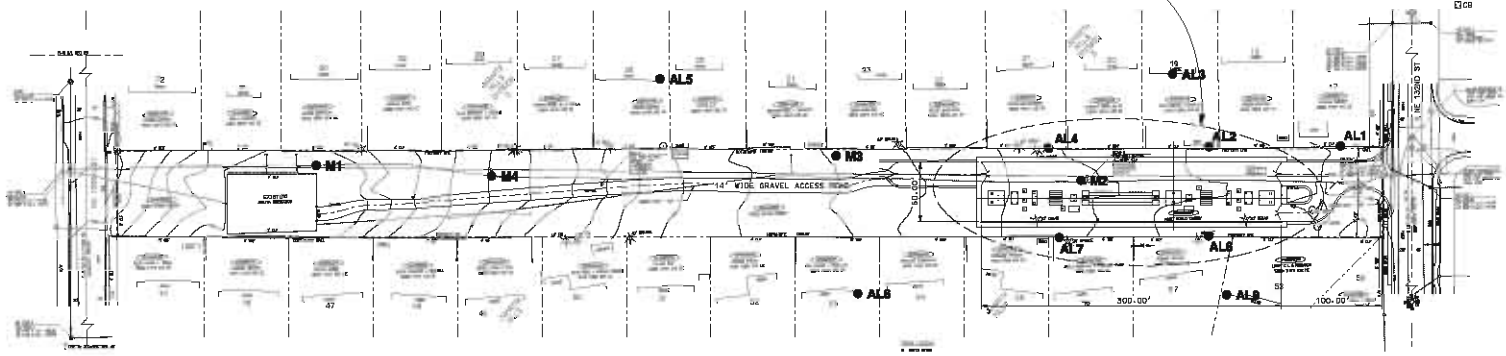
	Analysis Location								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Proposed 25-MVA transformers	40	34	36	38	32	25	30	31	31
State of Washington Permitted Sound Level	55	55	55	55	55	55	55	55	55
Existing quietest-hour Leq	--	42	42	42	42	43	42	42	42

The results in Table 7-1 indicate that, with the recommended sound barriers in place, A-weighted sound levels produced by the proposed transformers at all Analysis Locations would meet the State of Washington daytime and nighttime noise limit of 55 dBA by a wide margin, would be in the range of or lower than existing nighttime sound levels at the nearest Monitoring Locations, and would be below the nighttime noise limit of 45 dBA that applies to EDNA Class A source and receiver properties. As stated previously, electrical substations are exempt from the nighttime reduction in the noise limit.

---End of Report---

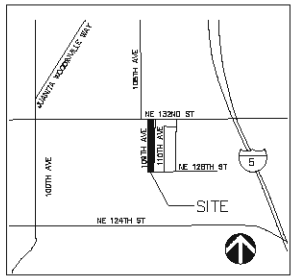


STATION DETAIL



LEGEND

161.50	FINISHED GRADE ELEVATION
	PROPERTY LINE
	GRATE INLET (SEE DRAINAGE PLAN)
	CATCH BASIN (SEE DRAINAGE PLAN)
	STATION FENCE
	SLOPE AND FLOW DIRECTION
	FOUNDATIONS (PET ONLY)
NH	CATCH BASIN W/ NEW TOP VALVE (SEE DRAINAGE PLAN)
CB	CATCH BASIN (SEE DRAINAGE PLAN)



VICINITY MAP
NO SCALE

GRAPHIC SCALE (IN FEET)

CALL 1-800-424-5555 FOR LOCATES NOT LESS THAN 48 HOURS PRIOR TO DIGGING.
HOURS OF CONSTRUCTION: 7AM TO 8PM WEEKDAYS AND 9AM TO 6PM ON SATURDAY.

REVISION DESCRIPTION: ISSUED FOR PERMITTING			POSSIBLE SOUND MITIGATION		
	APPROVAL	DATE (M/D/Y)	PUGET SOUND ENERGY / BRC	DRAWING NO	REV NO
CADD	M. FURNER	8 / 2 /07		RG 7-1	0
CIVIL ENGR		/ /		SHEET 1 OF 1	
		/ /			
REVIEW		/ /	SCALE: 1"= 50'-0" CLASS: SITE		FILE NO
		/ /	CADD NO: ...\JOB-JUNGETA-01434(B) SITE.DGN		

APPENDIX A

Results of Long-Term Sound Monitoring

FIGURE A-1
EXISTING SOUND LEVELS

LOCATION M1
DATE: 7/10/07

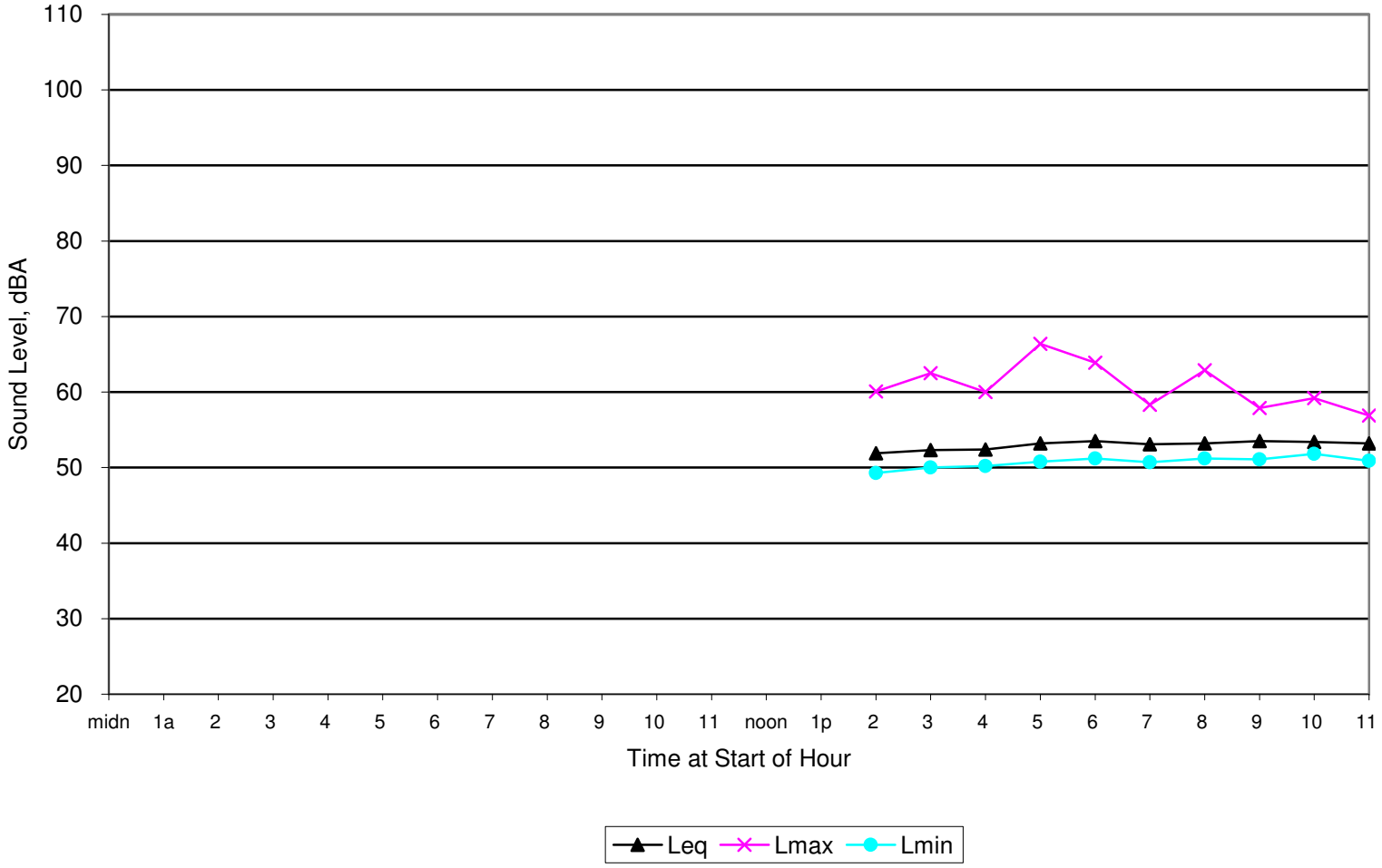


FIGURE A-2
EXISTING SOUND LEVELS

LOCATION M1
DATE: 7/11/07

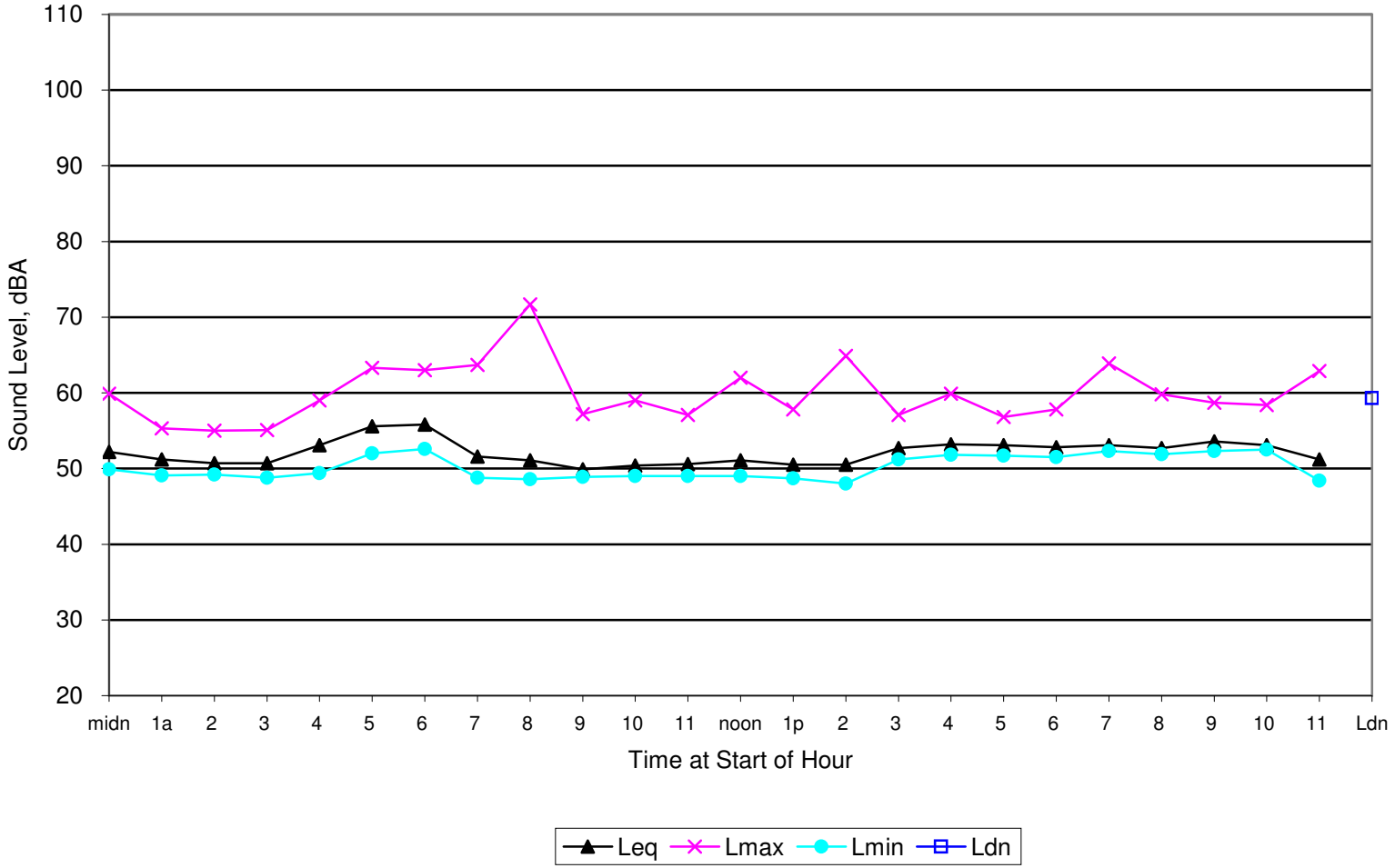


FIGURE A-3
EXISTING SOUND LEVELS

LOCATION M1
DATE: 7/12/07

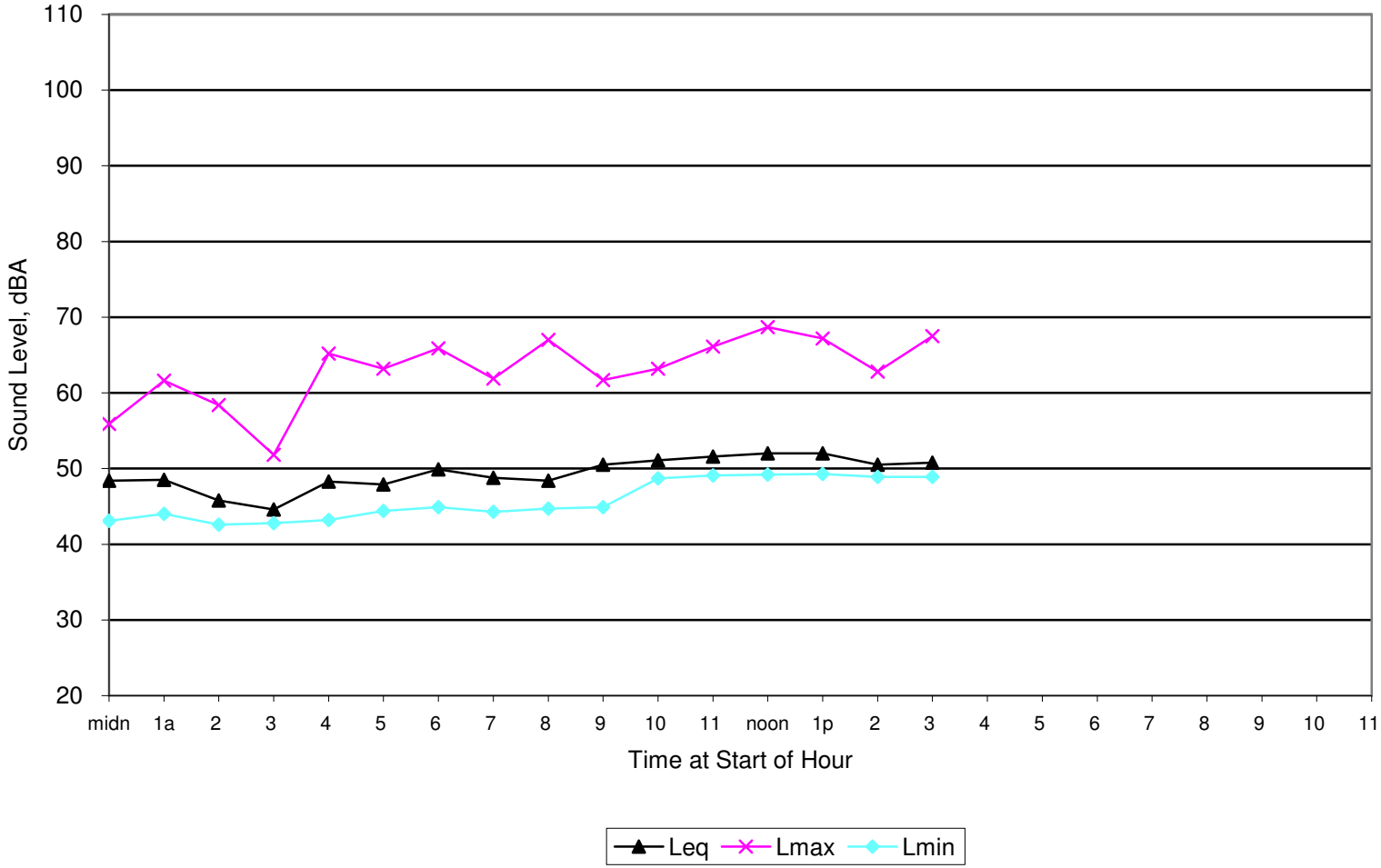


FIGURE A-4
EXISTING SOUND LEVELS

LOCATION M2
DATE: 7/10/07

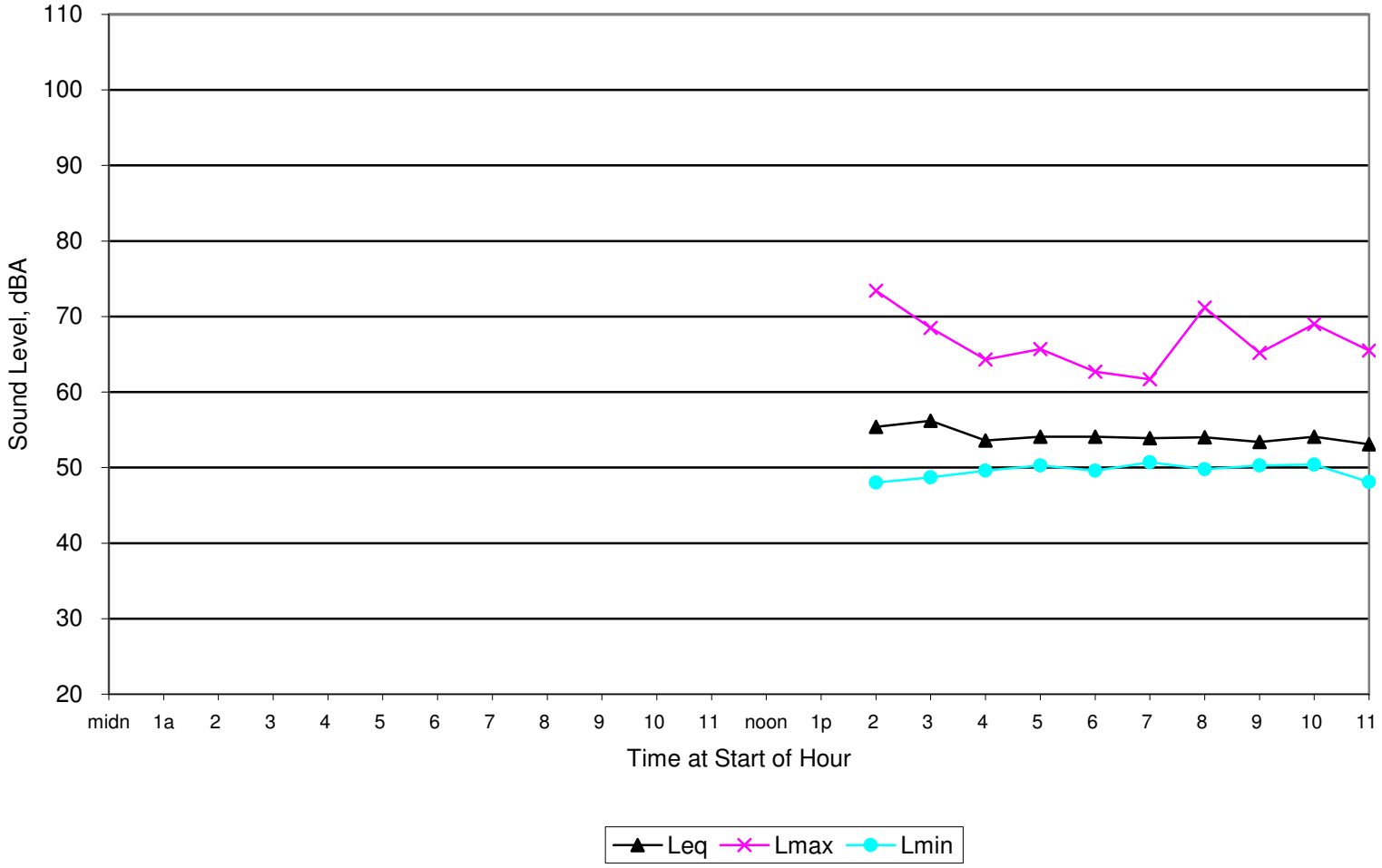


FIGURE A-5
EXISTING SOUND LEVELS

LOCATION M2
DATE: 7/11/07

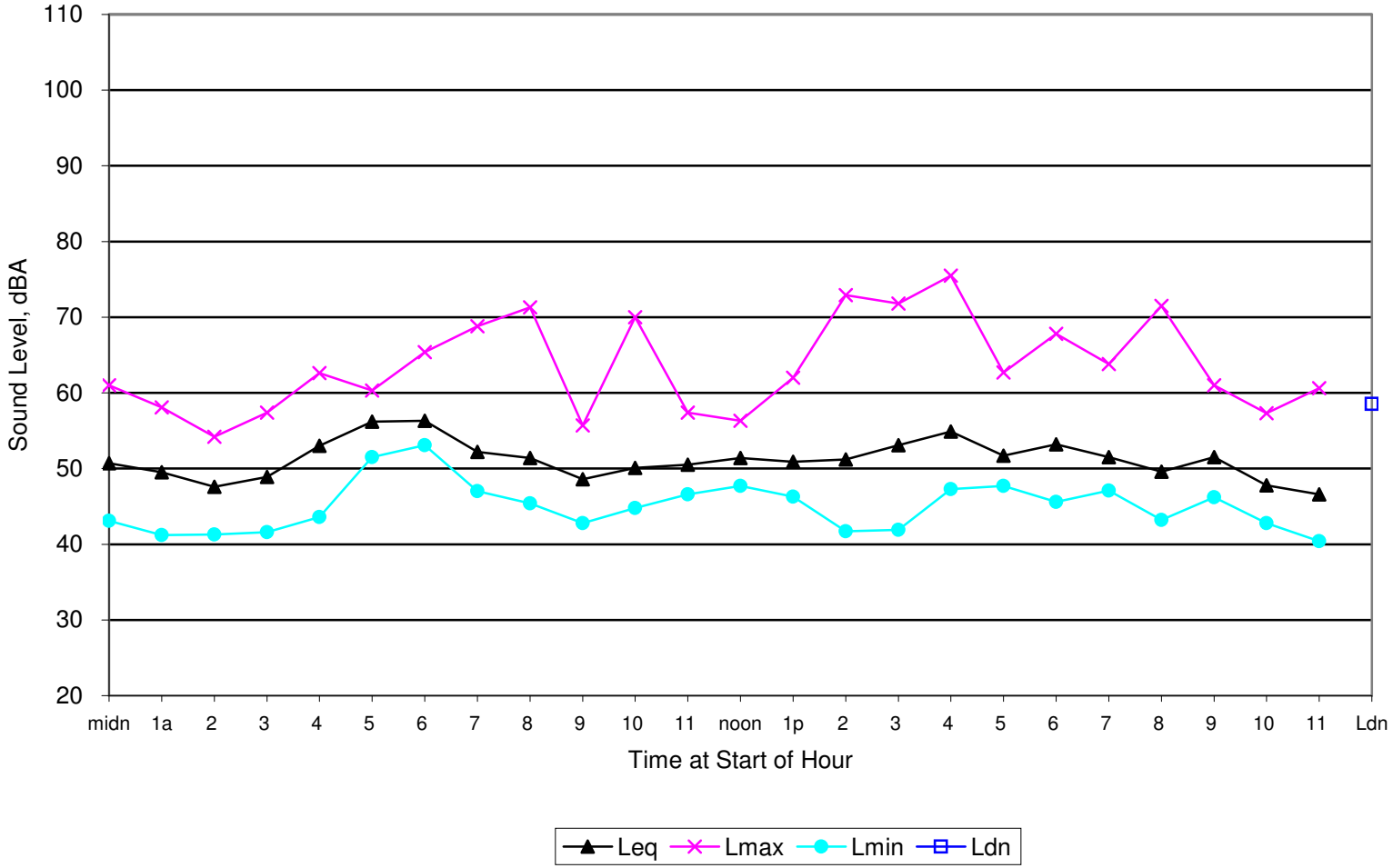


FIGURE A-6
EXISTING SOUND LEVELS

LOCATION M2
DATE: 7/12/07

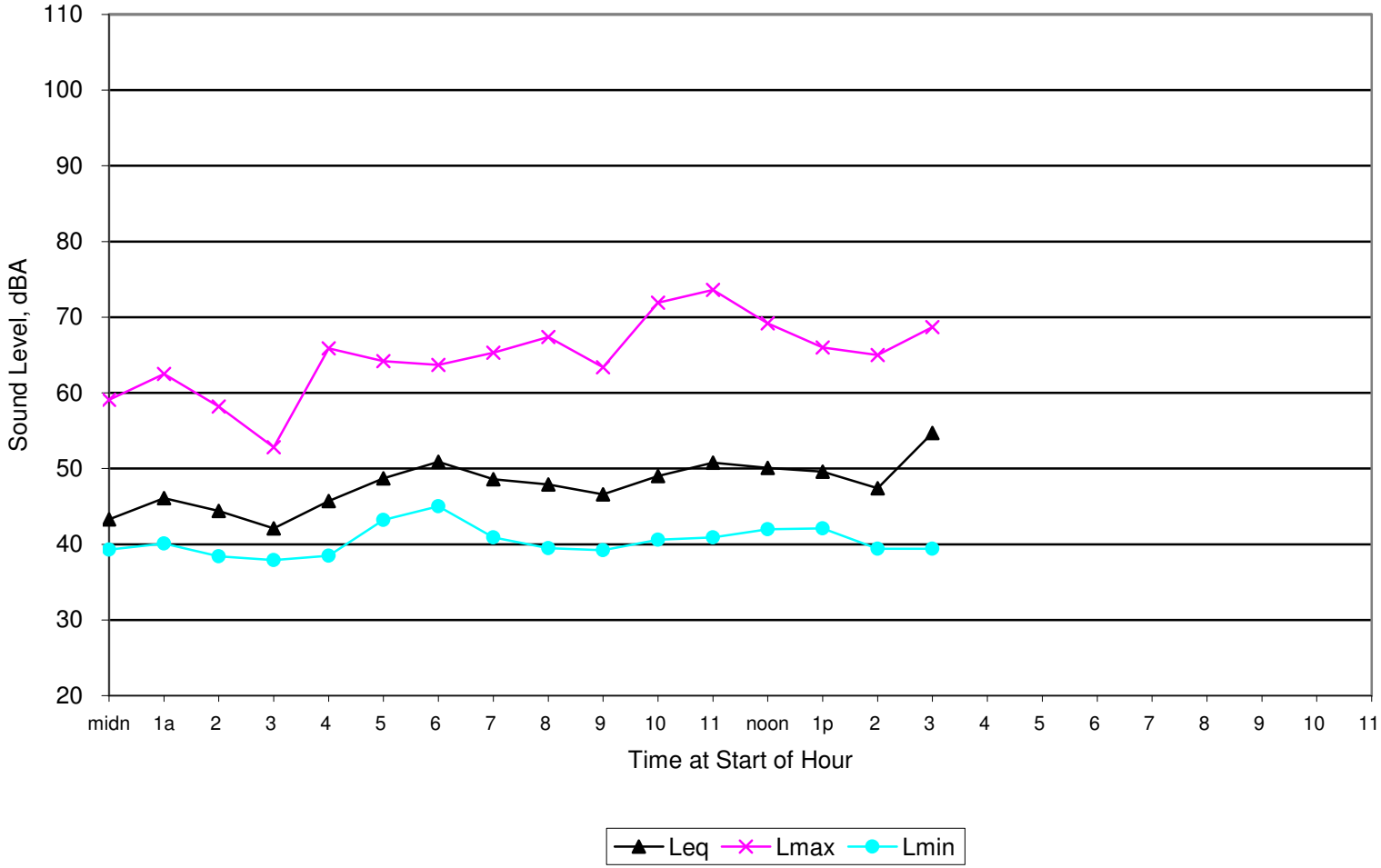


FIGURE A-7
EXISTING SOUND LEVELS

LOCATION M3
DATE: 7/10/07

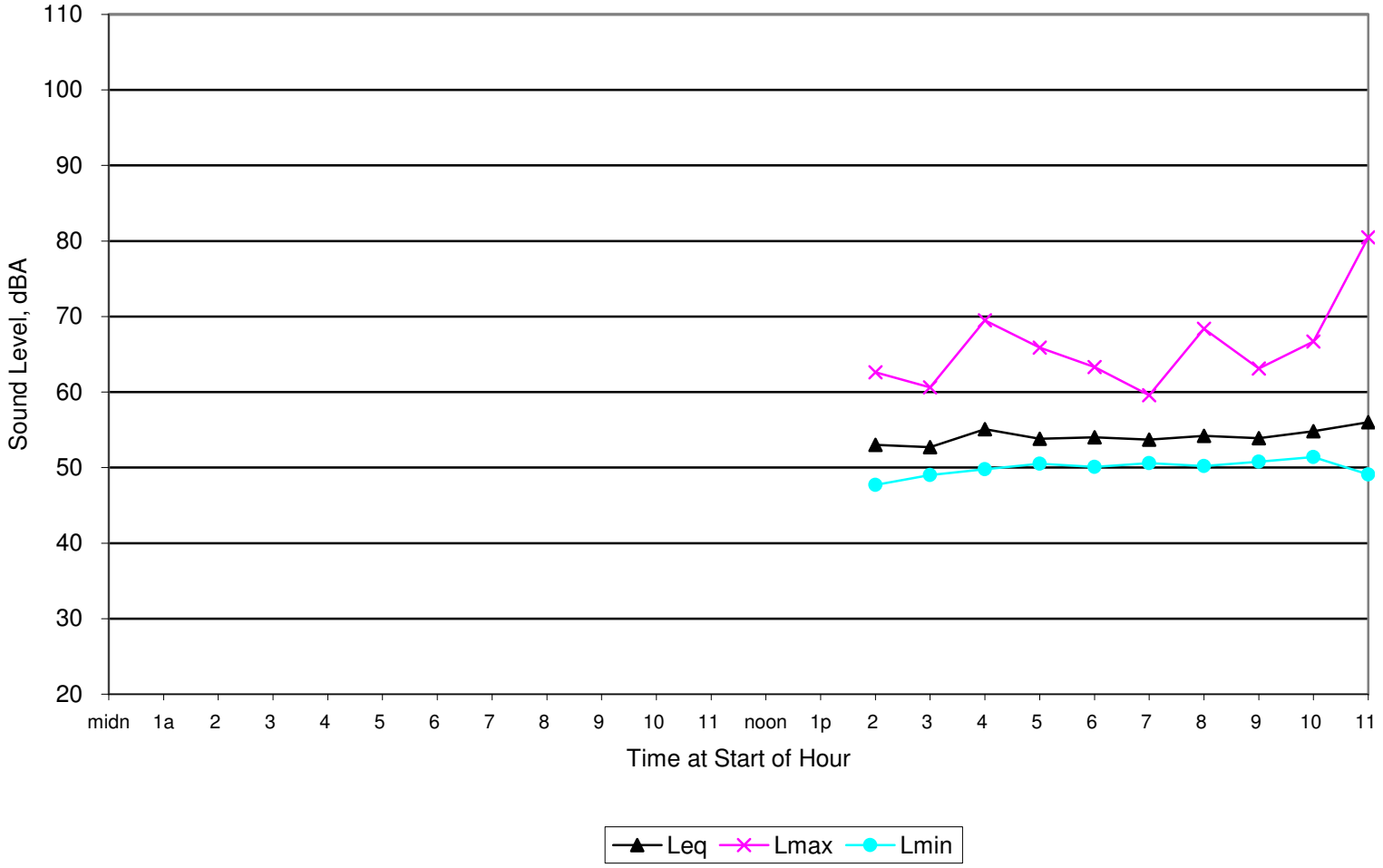


FIGURE A-8
EXISTING SOUND LEVELS

LOCATION M3
DATE: 7/11/07

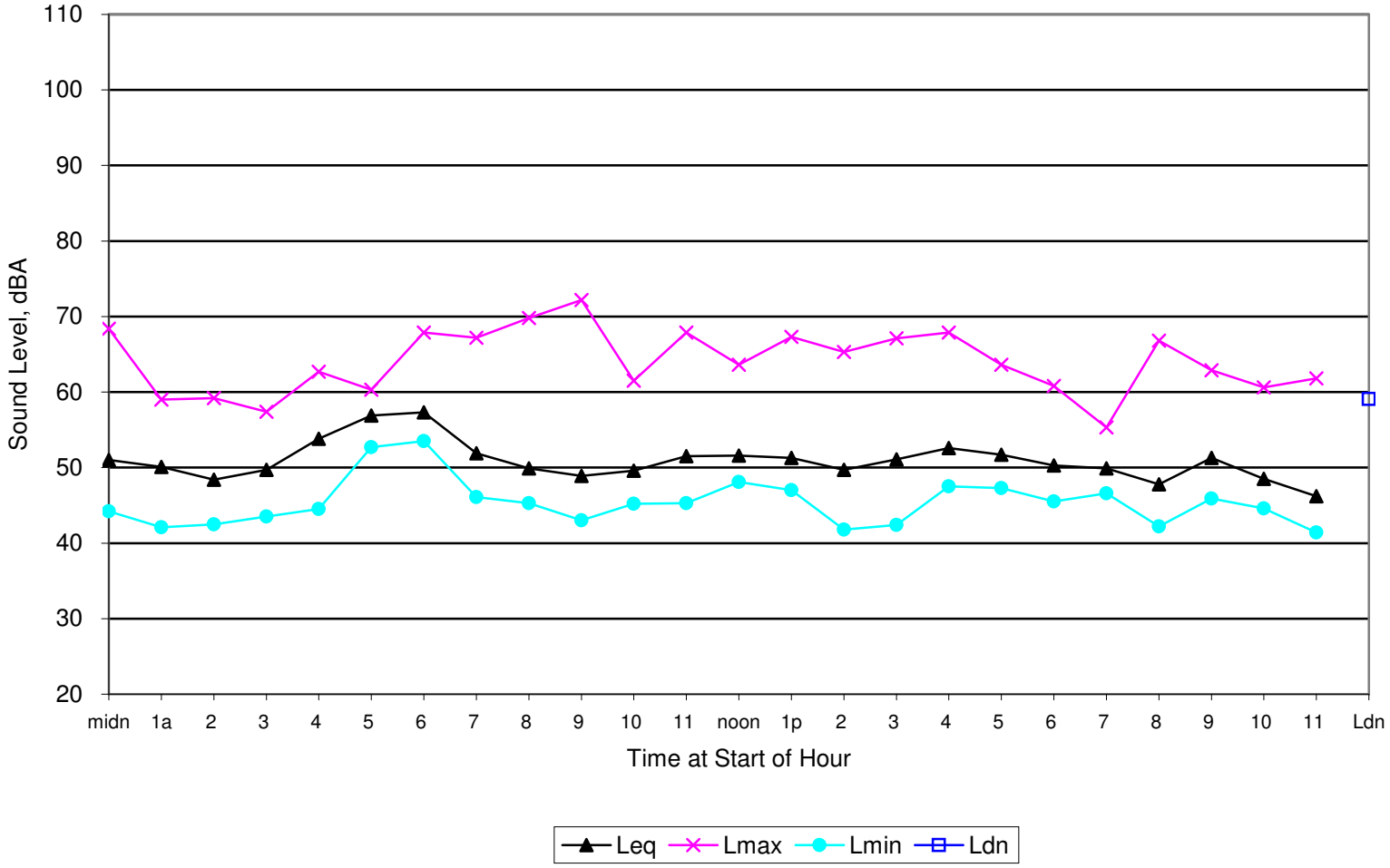


FIGURE A-9
EXISTING SOUND LEVELS

LOCATION M3
DATE: 7/12/07

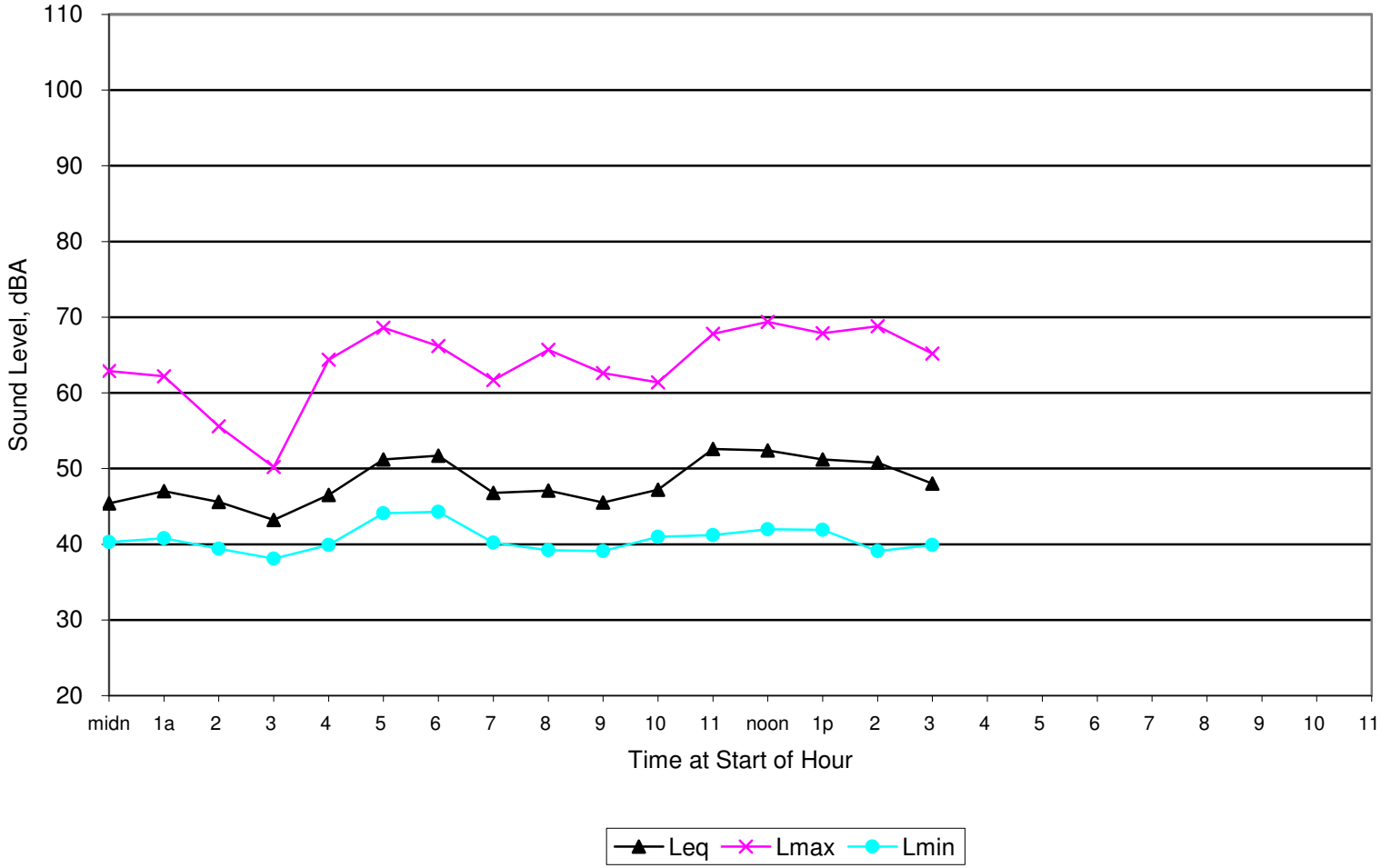


FIGURE A-10
EXISTING SOUND LEVELS

LOCATION M4
DATE: 7/10/07

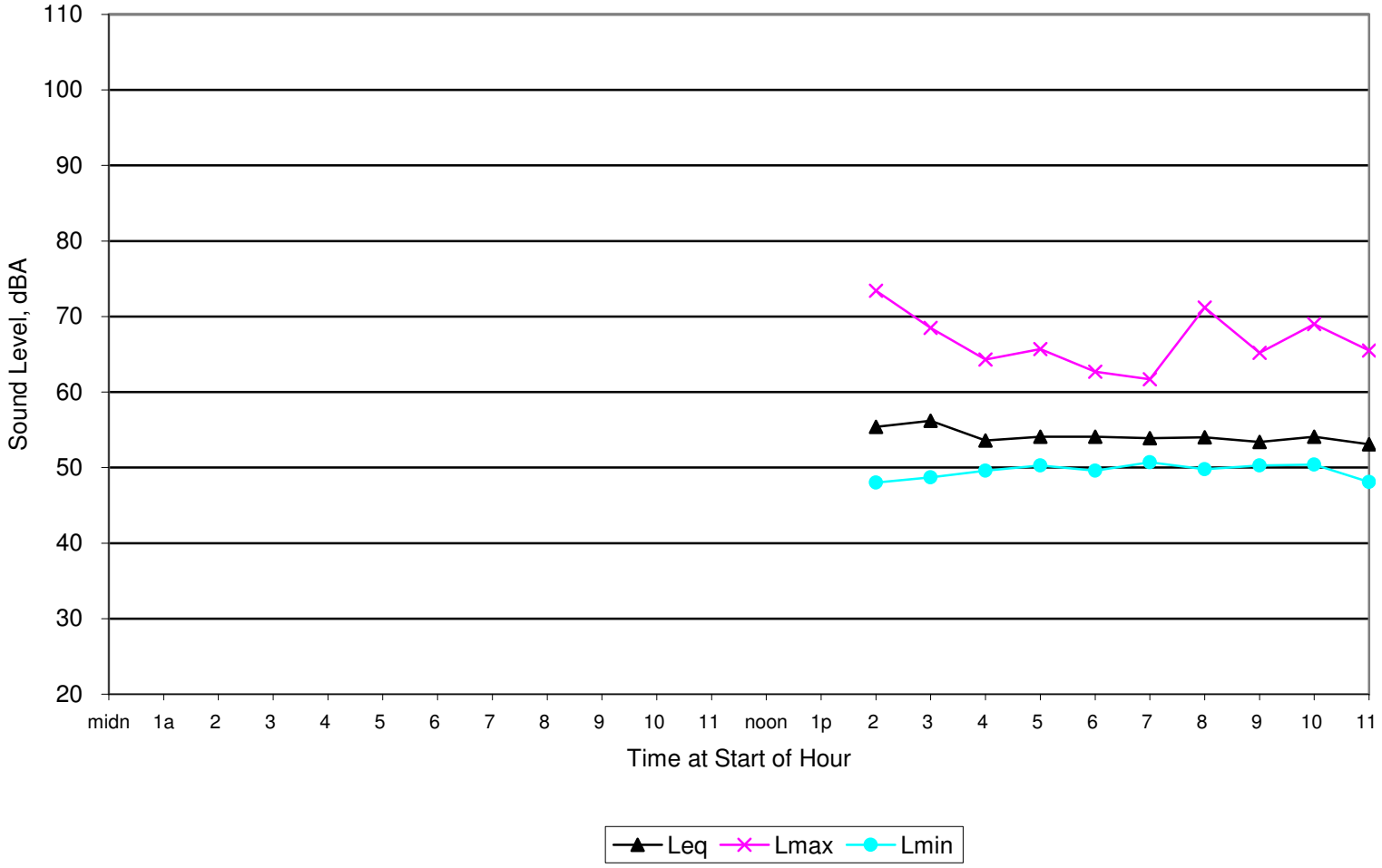


FIGURE A-11
EXISTING SOUND LEVELS

LOCATION M4
DATE: 7/11/07

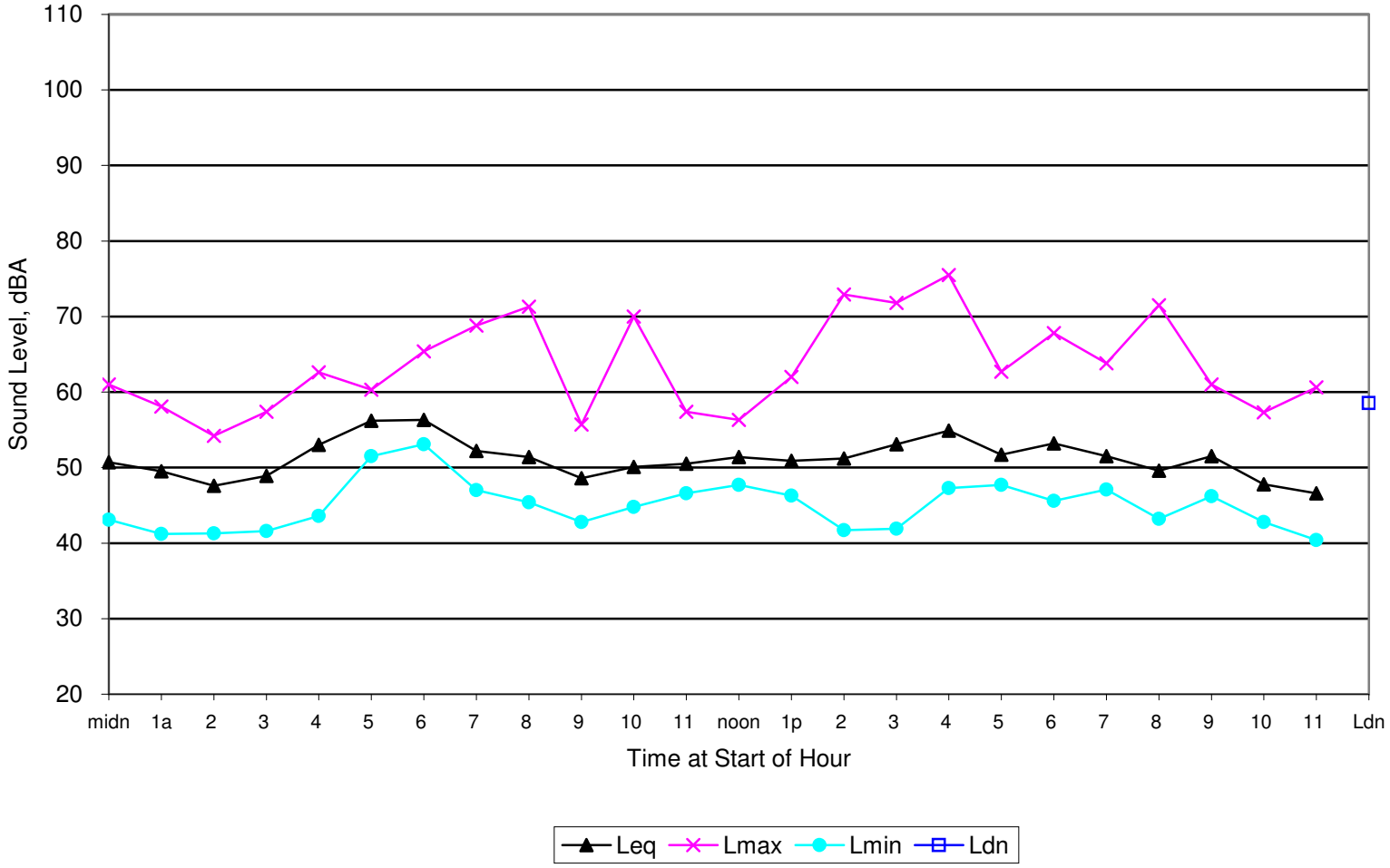
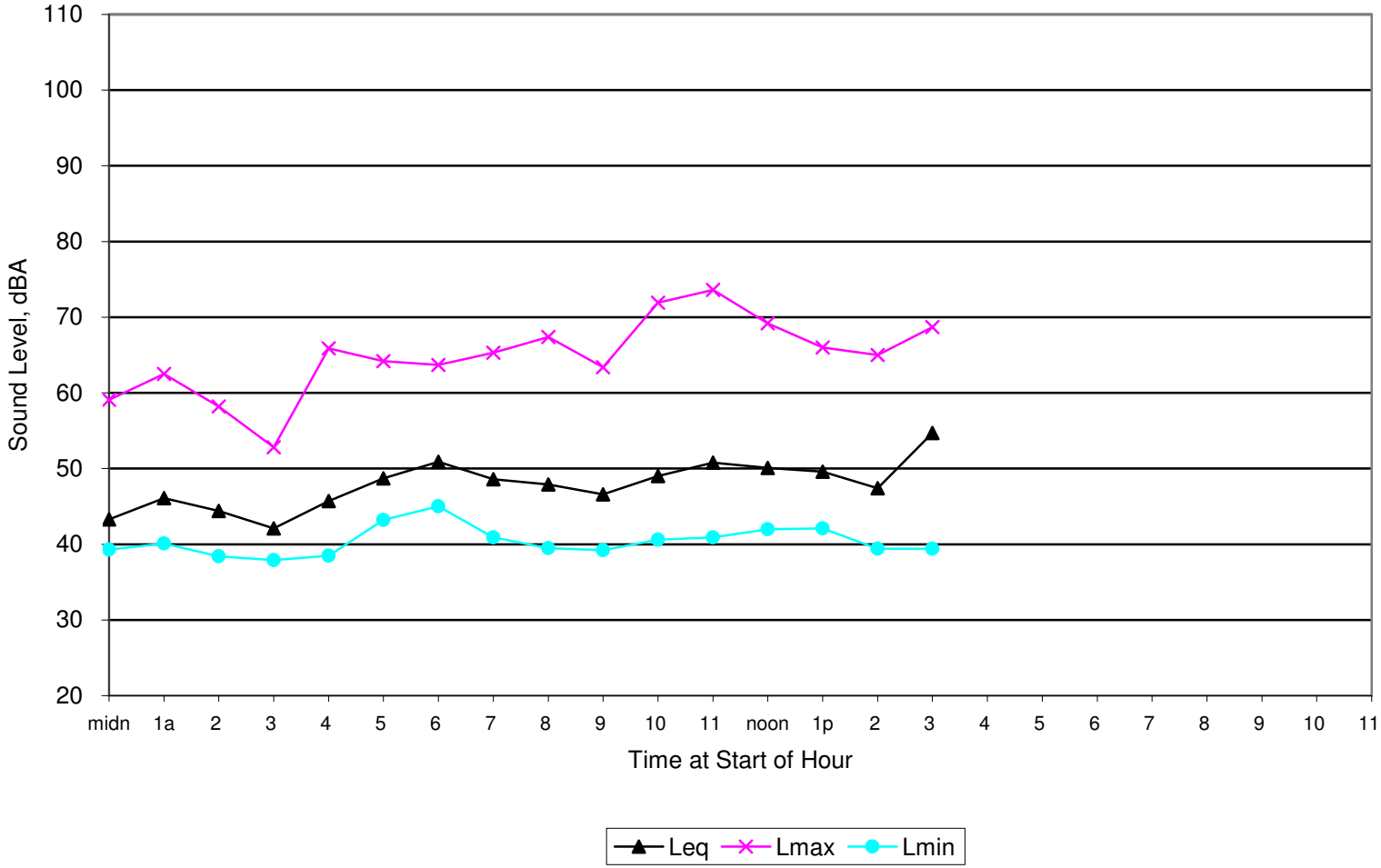


FIGURE A-12
EXISTING SOUND LEVELS

LOCATION M4
DATE: 7/12/07



GEOTECHNICAL ENGINEERING SERVICES
JUANITA SUBSTATION IMPROVEMENTS
KIRKLAND, WASHINGTON

FEBRUARY 29, 2007

FOR
PUGET SOUND ENERGY

GEOENGINEERS

File No. 0186-760-00

Geotechnical Engineering Services
Juanita Substation Improvements
Kirkland, Washington
File No. 0186-760-00

February 29, 2007

Prepared for:

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Appendix B – Laboratory Testing

Appendix B Figures

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GEOTECHNICAL ENGINEERING SERVICES
JUANITA SUBSTATION IMPROVEMENTS
KIRKLAND, WASHINGTON
FOR
PUGET SOUND ENERGY

INTRODUCTION

This report summarizes the results of our geotechnical engineering services for the proposed improvements to the existing Puget Sound Energy (PSE) Juanita substation. The site is located at 10910 Northeast 132nd Street in Kirkland, Washington. The site is shown in relation to the surrounding improvements on the Vicinity Map, Figure 1, and the Site Plan, Figures 2A and 2B. We previously provided a draft version of this report dated February 27, 2008; this version of the report incorporates comments we received.

Our geotechnical engineering services were completed in general accordance with our proposal dated February 6, 2008. Our scope of work includes:

- Completing eight test pits and three infiltration tests at the site;
- Completing laboratory testing on selected soil samples from the test pits;
- Providing geotechnical conclusions and recommendations for the proposed improvements; and
- Preparing this report.

PROJECT DESCRIPTION

Our understanding of the project is based on our discussion with John Rorabacher of PSE. We visited the site on February 8, 2008 to evaluate access considerations and develop an appropriate exploration plan.

We understand that the existing substation at the south end of the site will be removed and that a new, larger substation will be constructed at the north end of the site. The proposed 115 kV substation equipment will include dead end towers, buses, transformers, metal-clad switchgear and gas breakers. A stormwater infiltration facility is also planned just south of the new substation to manage stormwater from the substation. The layout of these features is shown on the Site Plan, Figures 2A and 2B.

FIELD EXPLORATION AND LABORATORY TESTING

FIELD EXPLORATIONS

The subsurface conditions at the site were evaluated by completing eight test pits (TP-1 through TP-8) to depths of 5 to 10 feet below existing site grades. The approximate locations of the test pits are shown on the Site Plan, Figures 2A and 2B. A detailed description of the field exploration program is presented in Appendix A.

INFILTRATION TESTING

We also completed three infiltration tests at the location of the proposed stormwater facility. The tests were completed in accordance with the procedure outlined in Reference 6-A in the King County, Washington, Surface Water Design Manual. The infiltration test holes were completed in test pits TP-4, TP-5 and TP-6, as shown in Figure 2B. Details of the infiltration testing procedure are presented in Appendix A. The results of the infiltration rate tests are presented in Table 1, together with the approximate elevations of each test.

Table 1. Infiltration Test Results

Location	Approximate Elevation of Test (feet)	Measured Infiltration Rate (inches/hour)	D_{10} Size from Sieve Analysis (mm)
TP-4	175.5	72	NA
TP-5	175.5	66	1
TP-6	175.5	69	1

LABORATORY TESTING

Soil samples were obtained during the exploration program and taken to GeoEngineers' laboratory for further evaluation. Selected samples were tested for the determination of moisture content, fines content (material passing the U.S. No. 200 sieve) and grain size distribution (sieve analysis). A description of the laboratory testing and the test results are presented in Appendix B or on the exploration logs in Appendix A, as appropriate.

SITE CONDITIONS

SURFACE CONDITIONS

The site is a long, rectangular parcel approximately 85 feet wide from east to west and 1,250 feet long from north to south. The site is accessed via a gravel driveway off NE 132nd Street on the north. The existing substation is located near the south end of the site. Overhead power lines come in from the north and south. The substation is connected to Northeast 132nd Street through the gravel driveway that runs centrally along the site in the north-south direction. The site slopes gently down from north to south, with a total change in elevation of approximately 40 feet across the length of the site. Vegetation on the site includes bushes and trees (primarily on the east and west boundaries of the site) outside the existing substation fence.

GEOLOGY

Geologic information for the project area (Minard, 1983) indicates that native surficial soils at the site are composed of recessional outwash sand and gravel overlying very dense glacial till. Outwash sand generally consists of sand with gravel and occasional cobbles and boulders, and glacial till generally consists of a very compact, poorly sorted, nonstratified mixture of clay, silt, sand, gravel and cobbles.

SUBSURFACE CONDITIONS

Based on the explorations performed at the site, the subsurface conditions generally consist of topsoil overlying loose to medium dense recessional outwash overlying dense to very dense glacial till.

We encountered approximately 6 to 12 inches of topsoil in the test pits. The topsoil is generally underlain by recessional outwash consisting of loose to dense gravel and sand with varying silt content. The recessional outwash extended to the depth explored (10 feet) in test pits TP-1 through TP-6. The recessional outwash extended to 4½ feet and 2 feet in test pits TP-7 and TP-8, respectively. In test pits TP-7 and TP-8, the recessional outwash was underlain by glacial till consisting of very dense silty sand with gravel.

Groundwater was not encountered in any of our explorations.

CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

A summary of the primary geotechnical considerations is provided below. The summary is presented for introductory purposes only and should be used in conjunction with the complete recommendations presented in this report.

- The site is designated as seismic Site Class C per the 2006 International Building Code (IBC).
- On-site soils are suitable for reuse as structural fill during periods of dry weather and may be suitable during wet weather as well, provided they can be moisture-conditioned to meet compaction requirements. If on-site soils cannot be adequately compacted during wet weather, imported gravel borrow should be used.
- Substation equipment can be supported on shallow foundations with an allowable bearing pressure of 3,500 pounds per square foot (psf), a passive resistance of 250 psf and a base friction value of 0.4. We estimate total settlement on the order of ½ to 1 inch.
- Dead-end structures can be supported on mat foundations or drilled shaft foundations; allowable bearing pressures for mat foundations and parameters for drilled shaft design are included in later sections of this report.
- Some on-site soils are suitable for reuse as structural fill during periods of dry weather and may be suitable during wet weather as well, provided they can be moisture-conditioned to meet compaction requirements. If on-site soils cannot be adequately compacted during wet weather, imported gravel borrow should be used.
- Stormwater can be infiltrated into recessional outwash using a long-term design infiltration rate of 9 inches per hour.

Our specific geotechnical recommendations are presented in the following sections of this report.

EARTHQUAKE ENGINEERING

We recommend the 2006 IBC parameters for Site Class, short period spectral response acceleration (S_S), 1-second period spectral response acceleration (S_1) and Seismic Coefficients F_A and F_V presented in Table 2.

Table 2. 2006 IBC Seismic Parameters

2006 IBC Parameter	Recommended Value
Site Class	C
Short Period Spectral Response Acceleration, S_S (percent g)	119.5
1-Second Period Spectral Response Acceleration, S_1 (percent g)	40.9
Seismic Coefficient, F_A	1.00
Seismic Coefficient, F_V	1.39

We evaluated the site for seismic hazards including liquefaction, lateral spreading and fault rupture. Our evaluation indicates that the site does not have liquefiable soils present and therefore also has no risk of liquefaction-induced lateral spreading. In addition, the site has a low risk of fault rupture, based on the distance from mapped faults.

SHALLOW FOUNDATIONS AND MAT FOUNDATIONS

Allowable Bearing Pressure

We recommend that the substation equipment be supported on conventional shallow spread footings or mat foundations bearing either on the native soils or on properly compacted structural fill placed over the native soils. The mat foundations and spread footings, where required, may be designed using an allowable soil bearing pressure of 3,500 psf. An allowable edge pressure of 4,000 psf may be used in the design of dead-end tower foundations. The allowable soil bearing values apply to the total of dead and long-term live loads and may be increased by up to one-third for transient loads such as wind or seismic forces. A subgrade modulus of 200 pounds per cubic inch (pci) may be used for the design of mat foundations.

Embedment

In general, we recommend that the bottom of foundations be embedded at least 18 inches below the lowest adjacent grade for frost protection. The foundation embedment depth may be reduced to 12 inches for small, lightly loaded footings where frost action will not affect equipment performance, or an additional 6-inch-thick layer of gravel that is not susceptible to frost may be placed below the foundations to achieve an embedment of 18 inches. The gravel should meet the requirements of "yard course" surfacing material presented in the "Structural Fill" section of this report.

Settlement

Provided all loose soil is removed and the subgrade is prepared as recommended below in the "Construction Considerations" section, we estimate that the total settlement of shallow foundations will be on the order of ½ to 1 inch. Differential settlements are expected to be less than ½ inch.

Lateral Resistance

Lateral foundation loads can be resisted by passive resistance on the sides of foundations and by friction on the base of the foundations. For foundations supported on native soils or on structural fill placed and compacted in accordance with our recommendations, the allowable frictional resistance can be computed using a coefficient of friction of 0.4 applied to vertical dead-load forces.

The allowable passive resistance can be computed using an equivalent fluid density of 250 pounds per cubic foot (pcf) (triangular distribution) if these elements are poured directly against compacted native soils or surrounded by structural fill. The structural fill should extend out from the face of the foundation element for a distance at least equal to three times the height of the element and be compacted to at least 95 percent of the maximum dry density (MDD) estimated in general accordance with American Society for Testing and Materials (ASTM) D 1557.

The above coefficient of friction and passive equivalent fluid density values incorporate a factor of safety of about 1.5.

Construction Considerations

If soft soil areas are present at the foundation subgrade elevation, the soft areas should be removed and replaced with structural fill. In such instances, the zone of structural fill should extend laterally beyond the footing edges for a horizontal distance that is at least equal to the thickness of the fill.

We recommend that a representative from our firm observe the condition of all footing excavations to evaluate whether the work is completed in accordance with our recommendations and whether the subsurface conditions are as anticipated.

DRILLED SHAFTS

General

The dead-end towers may be supported on shallow mat foundations as discussed above or drilled shafts, which may be preferable to shallow mat foundations because of space limitations. We recommend that the drilled shafts extend to a depth of at least 15 feet below the existing ground surface.

Axial Capacity

The applied axial loads on the drilled shafts are generally very small in comparison to the applied overturning moments, resulting from the tension in the wires along with possible ice and wind loading. The axial capacity of the drilled shafts in compression will be developed primarily from friction in the medium dense to dense recessional outwash and end bearing in the very dense recessional outwash or glacial till. Provided the drilled shafts are embedded at least 15 feet below the existing ground surface, we anticipate that the allowable axial capacity for shafts at least 3 feet in diameter will be greater than 100 kips.

Lateral Capacity

The design of the drilled shafts will be governed by the lateral loads on the structures. The lateral capacity of the drilled shafts will develop from the stiffness of the drilled shaft and the lateral resistance of the soil surrounding the drilled shaft.

We understand that the shafts will be designed using the LPILE™ program. For evaluation of the lateral load behavior of the drilled shafts, the parameters in Table 3 can be used as input soil parameters for the LPILE™ program. Based on our evaluation, the soil profile can be divided into two soil layers as shown in Table 3.

Table 3. Lateral Pile Analysis Input Parameters

Soil Parameter	Layer 1	Layer 2
Depth (in)	0-150	150-600
Soil Type (p-y curve model)	Sand (Reese)	Sand (Reese)
Effective Unit Weight (lb/in^3)	0.0723	0.0752
Friction Angle (degrees)	34	38
p-y Modulus, k (lb/in^3)	90	150

Drilled Shaft Settlement

We estimate that postconstruction settlement of drilled shaft foundations, designed and installed as recommended, will be on the order of ½ inch or less. Maximum differential settlement should be less than about one-half the postconstruction settlement. Most of this settlement will occur rapidly as loads are applied.

Construction Considerations

Temporary casing will not likely be required to keep the drilled holes open. However, the contractor should have temporary casing available for use if sloughing and caving of the site walls is encountered because of perched groundwater seepage. We recommend that the drilled shaft foundation excavations be observed by GeoEngineers.

EARTHWORK

Excavation Considerations

Recessional outwash and glacial till were observed in the explorations. We anticipate that these soils can be excavated with conventional excavation equipment, such as trackhoes or dozers. Cobbles and boulders were encountered in the soils at the site, and the contractor should be prepared to remove them where necessary.

Clearing and Grubbing

Removal and demolition of existing substation structures should include removal of foundation elements. Existing voids or new depressions created during site preparation should be cleaned of loose soil or debris and backfilled with structural fill.

Trees, brush and other vegetation, including topsoil with roots, should be stripped and removed from areas where structural fill will be placed. The stripped material should be placed in landscaping areas or transported off-site for disposal.

Subgrade Preparation

In areas where structural fill is to be placed, the upper 8 to 12 inches of existing subgrade soils should be compacted and evaluated prior to fill placement. This can be done either by probing or by proof-rolling with heavy, rubber-tired construction equipment. Likewise, the exposed subgrade in the proposed foundation areas for structures should be evaluated after site grading is complete. Probing should be used to evaluate the subgrades where proof-rolling is not possible or if site grading takes place during wet weather. Soft zones noted during proof-rolling or probing should be excavated and replaced with compacted structural fill.

Erosion and Sedimentation Control

Potential sources or causes of erosion and sedimentation depend upon construction methods, slope length and gradient, amount of soil exposed and/or disturbed, soil type, construction sequencing and weather. The project impact on erosion-prone areas can be reduced by implementing an erosion and sedimentation control plan. The plan should be designed in accordance with applicable city and/or county standards. The plan should incorporate basic planning principles, including:

- Scheduling grading and construction to reduce soil exposure;
- Retaining existing vegetation whenever feasible;
- Revegetating or mulching denuded areas;
- Directing runoff away from denuded areas;
- Minimizing the length and steepness of slopes with exposed soils;
- Decreasing runoff velocities;
- Confining sediment to the project site; and
- Inspecting and maintaining control measures frequently.

We recommend that graded and disturbed slopes be tracked in place with the equipment running perpendicular to the slope contours so that the track marks provide a texture to help resist erosion and channeling. Some sloughing and raveling of slopes with exposed or disturbed soil should be expected.

Temporary erosion protection should be used and maintained in areas with exposed or disturbed soils to help reduce the potential for erosion and reduce transport of sediment to adjacent areas. Temporary erosion protection should include the construction of a silt fence around the perimeter of the work area prior to the commencement of grading activities. Permanent erosion protection should be provided by reestablishing vegetation using hydroseeding and/or landscape planting.

Until the permanent erosion protection is established and the site is stabilized, site monitoring should be performed by qualified personnel to evaluate the effectiveness of the erosion control measures and repair and/or modify them as appropriate. Provisions for modifications to the erosion control system based on monitoring observations should be included in the erosion and sedimentation control plan.

Structural Fill

Materials. Materials used to raise site grades, placed to support structures or pavements, or used for utility trench backfill are classified as structural fill for the purpose of this report. Structural fill material quality varies depending upon its use as described below:

1. On-site soils may be used as structural fill during dry weather. On-site soils may also be used during wet weather provided that they can be moisture-conditioned to meet compaction specifications. If on-site soils cannot be moisture-conditioned, imported gravel borrow should conform to Puget Sound Energy Base Course Aggregate Specification 1275.1310 as described in the following table:

US Standard Sieve Size	Percent Passing (by weight)
3 inch	100
¾ inch	> 90
¼ inch	50-65
U.S. No. 200	< 5

2. Structural fill placed as "yard course crushed aggregate" surfacing material should be angular crushed rock conforming to Puget Sound Energy Specification 1275.1330 as described in the following table:

US Standard Sieve Size	Percent Passing (by weight)
1½ inches	100
1 inch	60 to 100
¾ or ⅝ inch	0 to 35
⅜ inch	0 to 5

Fill Placement and Compaction Criteria. Structural fill should be mechanically compacted to a firm, non-yielding condition. In general, structural fill should be placed in loose lifts not exceeding 8 to 10 inches in thickness. Each lift should be conditioned to the proper moisture content and compacted to the specified density before placing subsequent lifts. Structural fill should be compacted to the following criteria:

1. Structural fill placed below foundations or to establish yard grades should be compacted to at least 95 percent of the MDD estimated in general accordance with ASTM D 1557. Structural fill placed to form finished slopes should also be compacted to at least 95 percent of the MDD.

2. Structural fill (including utility trench backfill) placed outside of areas where foundations, roadways, parking and yard areas are to be located should be compacted to at least 90 percent of the MDD estimated in general accordance with ASTM D 1557.

We recommend that a representative from our firm be present during proof-rolling and/or probing of the exposed subgrade soils in structure areas prior to the placement of structural fill and also during the placement of structural fill. Our representative will evaluate the adequacy of the subgrade soils and identify areas needing further work, perform in-place moisture-density tests in the fill to evaluate whether the work is being done in accordance with the compaction specifications, and advise on any modifications to procedures that may be appropriate for the prevailing conditions.

Weather Considerations

The native soils contain a sufficient percentage of fines (silt) and are moisture-sensitive. When the moisture content of these soils is appreciably above the optimum moisture content, these soils become muddy and unstable, operation of equipment on these soils will be difficult, and it will be difficult to meet the required compaction criteria. Additionally, disturbance of these near-surface soils should be expected if earthwork is completed during periods of wet weather.

The wet weather season in the Puget Sound region generally begins in October and continues through May; however, periods of wet weather may occur during any month of the year. The optimum earthwork period for these types of soils is typically June through September. If wet weather earthwork is unavoidable, we recommend that:

- Stockpiles of on-site soils that will be used as structural fill during wet weather should be covered with plastic sheeting to protect them from rain.
- If on-site soils cannot be moisture-conditioned to meet compaction requirements during wet weather, imported gravel borrow should be used as discussed previously in the "Structural Fill" section of this report.
- The ground surface in and around the work area should be sloped so that surface water is directed away from the work area. The ground surface should be graded such that areas of ponded water do not develop. The contractor should take measures to prevent surface water from collecting in excavations and trenches. Measures should be implemented to remove surface water from the work area.

Temporary Slopes

The soils encountered at the site are classified as Type C soil in accordance with the provisions of Title 296-155 of the Washington Administrative Code (WAC), Part N, "Excavation, Trenching, and Shoring." We recommend that temporary slopes in excess of 4 feet in height be inclined no steeper than 1½H:1V (horizontal to vertical). Flatter slopes may be necessary if localized sloughing occurs. For open cuts at the site, we recommend that:

- No traffic, construction equipment, stockpiles or building supplies be allowed at the top of cut slopes within a distance of at least 5 feet from the top of the cut.
- Exposed soil along the slope be protected from surface erosion using waterproof tarps or plastic sheeting.
- Construction activities be scheduled so that the length of time that the temporary cut is left open is kept as short as possible.
- Erosion control measures be implemented as appropriate such that runoff from the site is reduced to the extent practicable.
- Surface water be diverted away from the excavation.
- The general condition of the slopes be observed periodically by a geotechnical engineer to confirm adequate stability.

Because the contractor has control of the construction operations, the contractor should be made responsible for the stability of cut slopes, as well as the safety of the excavations. All shoring and temporary slopes must conform to applicable local, state and federal safety regulations.

Permanent Slopes

We recommend that permanent cut and fill slopes be constructed no steeper than 2H:1V. To achieve uniform compaction, we recommend that fill slopes be overbuilt slightly and subsequently cut back to expose properly compacted fill.

To reduce erosion, newly constructed slopes should be planted or hydroseeded shortly after completion of grading. Until the vegetation is established, some sloughing and raveling of the slopes should be expected. This may require localized repairs and reseeding. Temporary covering, such as clear heavy plastic sheeting, jute fabric, loose straw or excelsior matting should be used to protect the slopes during periods of rainfall.

SITE DRAINAGE AND INFILTRATION

We recommend that the ground surface be sloped to drain away from the proposed substation. Pavement surfaces should be sloped such that surface water runoff is collected and routed to suitable discharge points. We understand that stormwater at the site will be infiltrated using a stormwater pond that will be located south of the substation.

Using the simplified method from the King County Surface Water Design Manual, the maximum design infiltration rate based on the infiltration testing is 22 inches per hour. Based on the sieve analysis results and long-term studies (Ecology, 2001), we recommend a long-term design infiltration rate of 9 inches per hour.

LIMITATIONS

We have prepared this report for the exclusive use of Puget Sound Energy and their authorized agents for the proposed Juanita Substation Improvements in Kirkland, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix C, Report Limitations and Guidelines for Use, for additional information pertaining to use of this report.

REFERENCES

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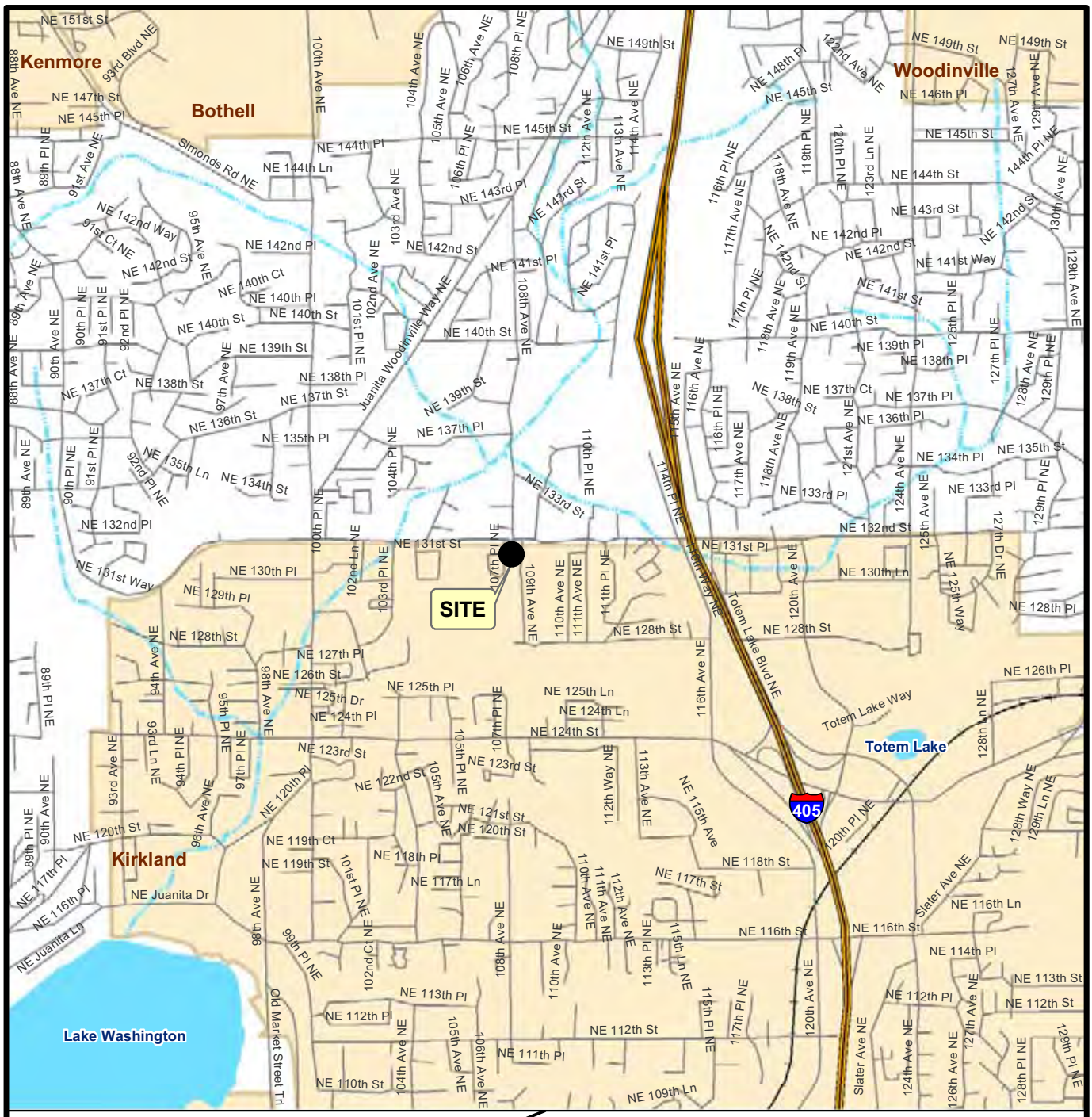

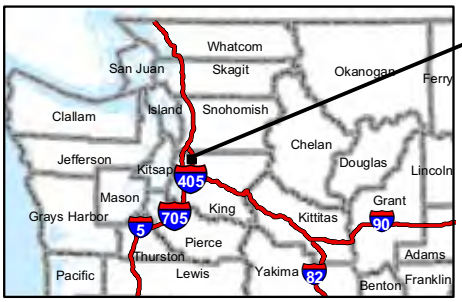

Lambert Conformal Conic
Washington State Plane North
North American Datum 1983

Data Sources: Interstates, state routes, and roads from TIGER 2000.
County boundaries, cities, and waterbodies from Department of Ecology.

Note: This drawing is for informational purposes.
It is intended to assist in showing features discussed in an attached document.

All locations are approximate.

0 1,000 2,000 Feet

N

VICINITY MAP

Juanita Substation Improvements
Kirkland, Washington

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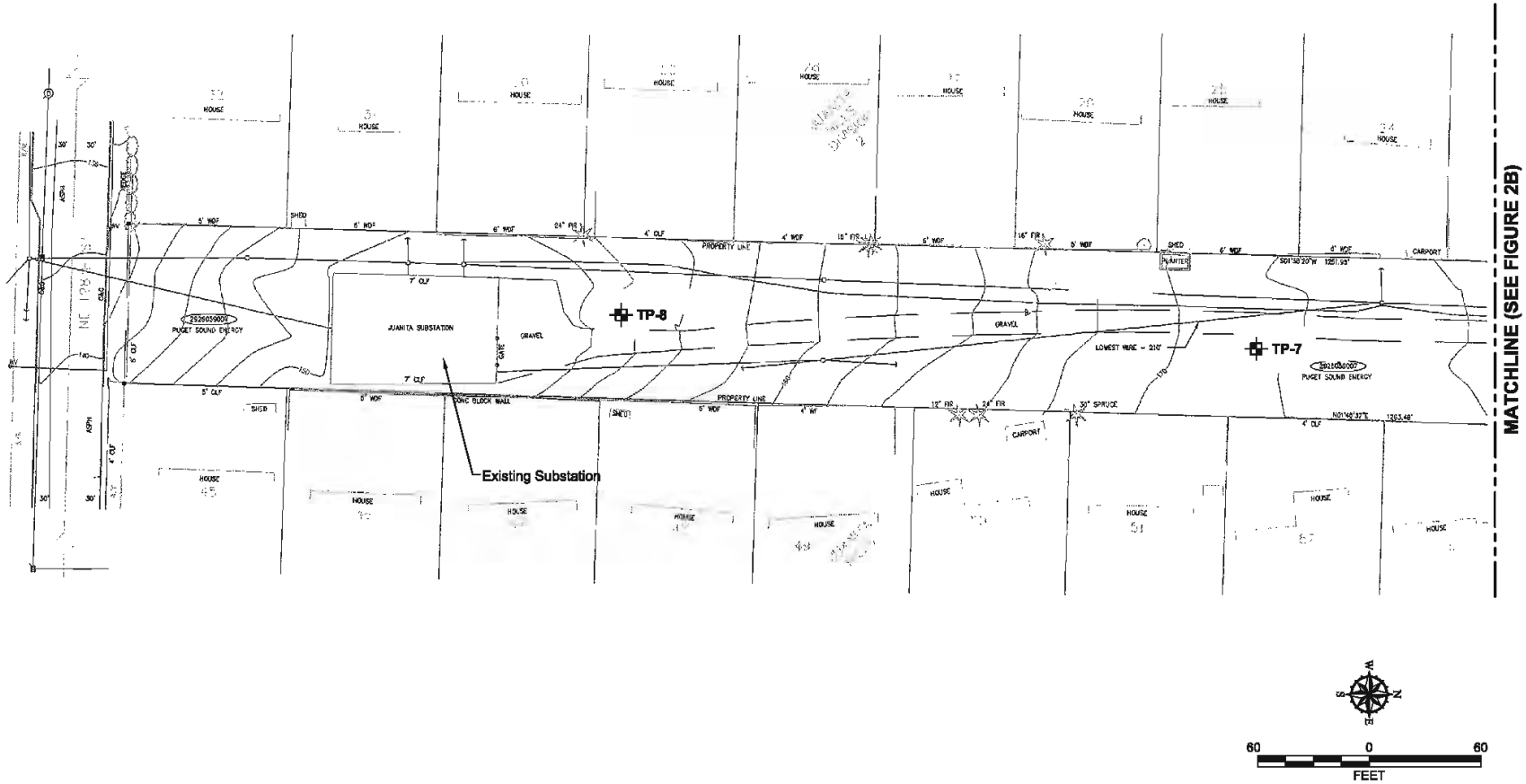
FIGURE 1

Office: REDM Path: P:\0\0186760\00\Working\018676000_F1.mxd Map Revised: February 27, 2008 ETB



Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: PDF of drawing file "SVTPXPSEN00000114.dwg", provided by David Evans and Associates, dated May 8, 2007.

Legend

TP-1 Test Pit Location

Site Plan

Juanita Substation Improvements
Kirkland, Washington

GEOENGINEERS

Figure 2A

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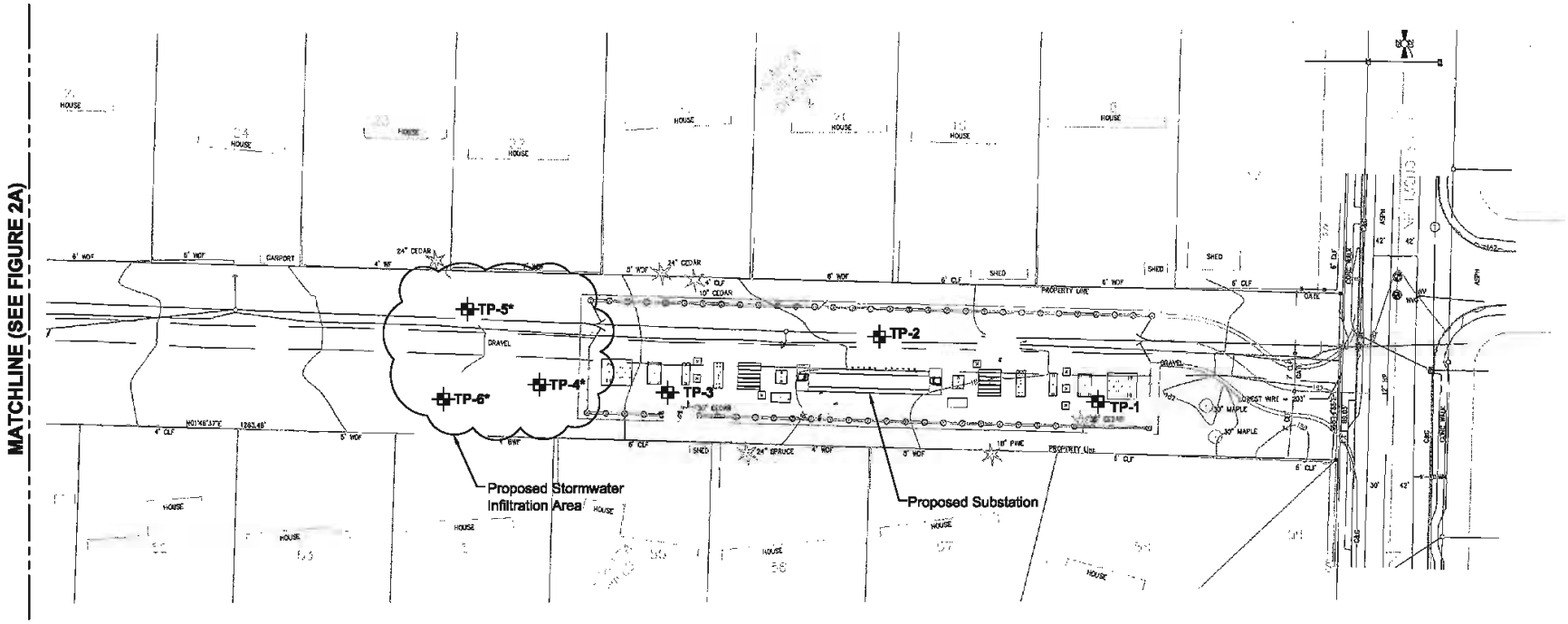

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: PDF of drawing file "SVTPXPSEN00000114.dwg", provided by David Evans and Associates, dated May 8, 2007.

Legend

TP-1 Test Pit Location (*Indicates Infiltration Test)

Site Plan

Juanita Substation Improvements
Kirkland, Washington

GEOENGINEERS

Figure 2B

W:\REDMOND\PROJECTS\01\0186760100\CAD\0186760002F2.DWG\TAB:F2B MODIFIED BY LMOWLTON ON Feb 27, 2008 - 15:09

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Appendix A
Field Explorations

APPENDIX A
FIELD EXPLORATIONS

GENERAL

Subsurface conditions were explored at the site by completing eight test pits (TP-1 through TP-8). The test pits were completed by Kelly's Excavating, Inc. of Pacific, Washington, on February 11, 2008. We also completed three infiltration tests (at test pit locations TP-4 through TP-6) at the location of the proposed stormwater facility. The locations of the explorations were estimated in the field by measuring distances from site features through taping and pacing. The approximate exploration locations are shown on the Site Plan, Figures 2A and 2B. Exploration elevations were estimated based on a topographic map provided by Puget Sound Energy dated May 8, 2007.

TEST PITS

The test pits were excavated using a rubber-tired backhoe. The test pits were continuously observed by a geotechnical engineer from our firm who examined and classified the soils encountered, obtained representative soil samples, observed groundwater conditions and prepared a detailed log of each test pit.

Soils encountered in the test pits were visually classified in general accordance with the classification system described in Figure A-1. A key to the exploration log symbols is also presented in Figure A-1. The logs of the test pits are presented in Figures A-2 through A-9. The logs reflect our interpretation of the field conditions and the results of laboratory testing and evaluation of samples. They also indicate the depths at which the soil types or their characteristics change, although the change might actually be gradual.

The test pits were backfilled with the excavated soils and compacted to the extent practicable with the bucket of the excavator. The fill will not behave as structural fill and will likely need to be recompacted during construction of the substation.

INFILTRATION TESTS

Three infiltration tests were performed on February 11, 2008, and completed in accordance with the procedure outline in Reference 6-A in the King County, Washington, Surface Water Design Manual. The tests were conducted in tests pits TP-4 through TP-6 after excavating to a depth of approximately 4 to 4½ feet below the existing ground surface. The infiltration tests were conducted at a depth of approximately 4½ to 5 feet below the existing ground surface. Our geotechnical engineer extended the hole to the desired depth using 6-inch-diameter hand auger.

To prevent caving of the poorly-graded sand, the hand-augered boring was cased with 6-inch-diameter polyvinyl chloride (PVC) pipe. Approximately 2 inches of ½- to ¾-inch rock was placed on the bottom of the hole. The hole was then filled with water to a depth of at least 12 inches and allowed to saturate for at least 30 minutes. After the saturation period, the hole was filled with 6 inches of water. Water level drop was measured for a known period. The last water level drop was used to calculate the percolation rate.

GROUNDWATER CONDITIONS

No groundwater was observed during our explorations. Groundwater conditions observed during the explorations represent a short-term condition and may or may not be representative of the long-term groundwater conditions at the site.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Stratigraphic Contact

Distinct contact between soil strata or geologic units

Gradual change between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GEOENGINEERS

FIGURE A-1

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 182

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand with gravel and tree roots (topsoil)		
					GP-GM	Brown fine to coarse gravel with silt, sand and cobbles (medium dense to dense, moist)		
		X	1					
	5							
						Becomes dense		
		X	2				8	SA; %F = 11
	10					Test pit completed at 10 feet No groundwater seepage observed Minor caving observed at 7 to 9 feet		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-1

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-2
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 182

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand with tree roots (topsoil)		
					SP-SM	Dark brown silty fine to medium sand with gravel with trace roots (loose, moist)		
					GP-GM	Brown fine to coarse gravel with sand, cobbles and silt (medium dense to dense, moist)		
	5	X	1					
	10					Test pit completed at 10 feet No groundwater seepage observed No caving observed		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-2

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-3
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 180

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand (topsoil)		
					GP-GM	Brown fine to coarse gravel with sand, cobbles and silt (medium dense to medium dense, moist)		
	5							
					SP	Gray medium to coarse sand with gravel (dense, moist)		
		X	1				6	SA; %F = 2
	10					Test pit completed at 10 feet No groundwater seepage observed Minor caving observed at 6 feet		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-3

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-4
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 180

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand with tree roots (topsoil)		
					SP-SM	Brown silty fine to medium sand with gravel (medium dense, moist)		
					ML	Brown silt with sand and gravel (medium stiff, moist)		
		X	1				19	SA; %F = 54
					GP-GM	Brown fine to coarse gravel with silt, sand and cobbles (medium dense to dense, moist)		Infiltration test
	5							
	10					Test pit completed at 10 feet No groundwater seepage observed Minor caving observed at 6 feet		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-4

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-5
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 180

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand with tree roots (topsoil)		
					GM	Brown silty fine to coarse gravel with sand (medium dense to dense, moist)		
		X	1				8	SA; %F = 15 Infiltration test
	5							
	10					Test pit completed at 10 feet No groundwater seepage observed Moderate caving observed at 6 feet		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-5

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-6
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 180

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Topsoil		
					GP-GM	Brown fine to coarse gravel with silt and sand (medium dense to dense, moist)		
		X	1				6	SA; %F = 7 Infiltration test
	5							
	10					Test pit completed at 10 feet No groundwater seepage observed No caving observed		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-6

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-7
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 172

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand with gravel and tree roots (topsoil)		
					SP-SM	Dark brown sand with silt and gravel and tree roots (loose to medium dense, moist)		
					GP-GM	Brown gravel with silt and sand (medium dense, moist)		
	5	X	1		SM	Gray silty fine to medium sand with gravel (very dense, moist)		
	10					Test pit completed at 10 feet No groundwater seepage observed No caving observed		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-7

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-8
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

Date Excavated: 02/11/08

Logged by: ASR

Equipment: Komastu PC 75

Surface Elevation (ft): Approximately 156

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0				TS	Brown silty fine to medium sand with gravel and tree roots (topsoil)		
					GP-GM	Brown gravel with silt and sand (loose to medium dense, moist)		
					SM	Gray silty fine to medium sand with gravel (very dense, moist)		
		X	1				13	%F = 33
	5					Test pit completed at 5 feet No groundwater seepage observed No caving observed		
	10							
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-8

GEOENGINEERS

Project: Juanita Substation Improvements
Project Location: Kirkland, Washington
Project Number: 0186-760-00

Figure A-9
Sheet 1 of 1

V6_GTTPIT P:\0\0186760\00\FINALS\018676000.GPJ GEIV6_1.GDT 2/27/08

GeoEngineers

APPENDIX B
LABORATORY TESTING

APPENDIX B
LABORATORY TESTING

GENERAL

Soil samples obtained from the field explorations were transported to our laboratory and examined to confirm or modify field classifications, as well as to evaluate index properties of the soil samples. Representative samples were selected for laboratory testing consisting of the determination of the moisture content, percent fines (material passing the U.S. No. 200 sieve) and grain size distribution (sieve analysis). The tests were performed in general accordance with test methods of the American Society for Testing and Materials (ASTM) or other applicable procedures.

The sieve analysis results are presented in Figures B-1 and B-2. The results of the moisture content and percent passing the U.S. No. 200 sieve determinations are presented at the respective sample depths on the exploration logs in Appendix A.

MOISTURE CONTENT TESTING

Moisture content tests were completed in general accordance with ASTM D 2216 for representative samples obtained from the explorations. The results of these tests are presented on the exploration logs in Appendix A at the depths at which the samples were obtained.

PERCENT PASSING U.S. NO. 200 SIEVE

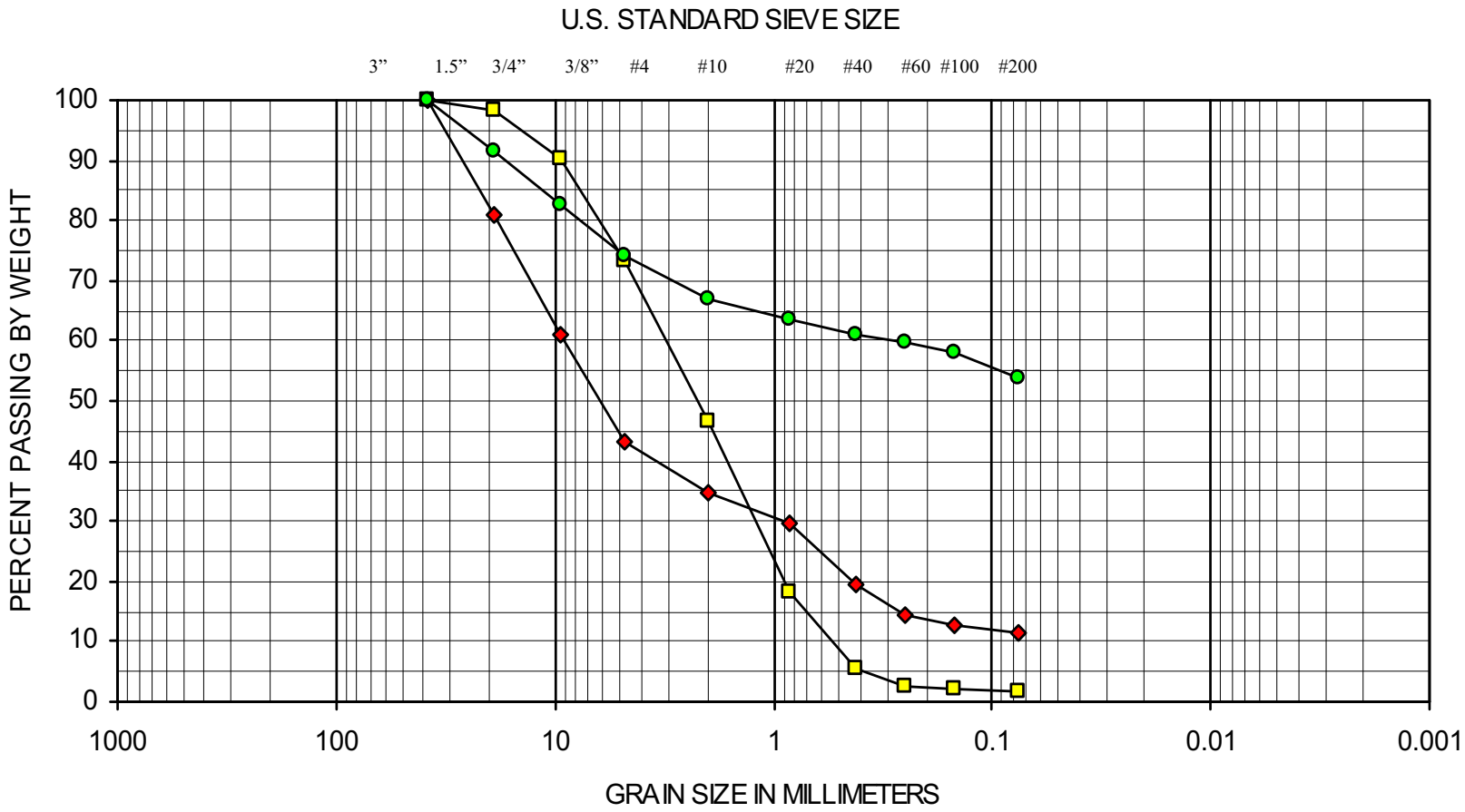
Selected samples were "washed" through the U.S. No. 200 mesh sieve to determine the relative percentages of coarse- and fine-grained particles in the soil. The percent passing value represents the percentage by weight of the sample finer than the U.S. No. 200 sieve. These tests were conducted to verify field descriptions and to determine the fines content for analysis purposes. The tests were conducted in general accordance with ASTM D 1140, and the results are shown on the exploration logs in Appendix A at the respective sample depths.

SIEVE ANALYSES

Sieve analyses were performed on selected samples in general accordance with ASTM D 422 to determine the sample grain size distribution. The wet sieve analysis method was used to determine the percentage of soil greater than the U.S. No. 200 mesh sieve. The results of the sieve analyses were plotted, were classified in general accordance with the Unified Soil Classification System (USCS), and are presented in Figures B-1 and B-2.

0186-760-00 AHS : CTS : cts 2-19-08 (Sieve.ppt)

GEOENGINEERS



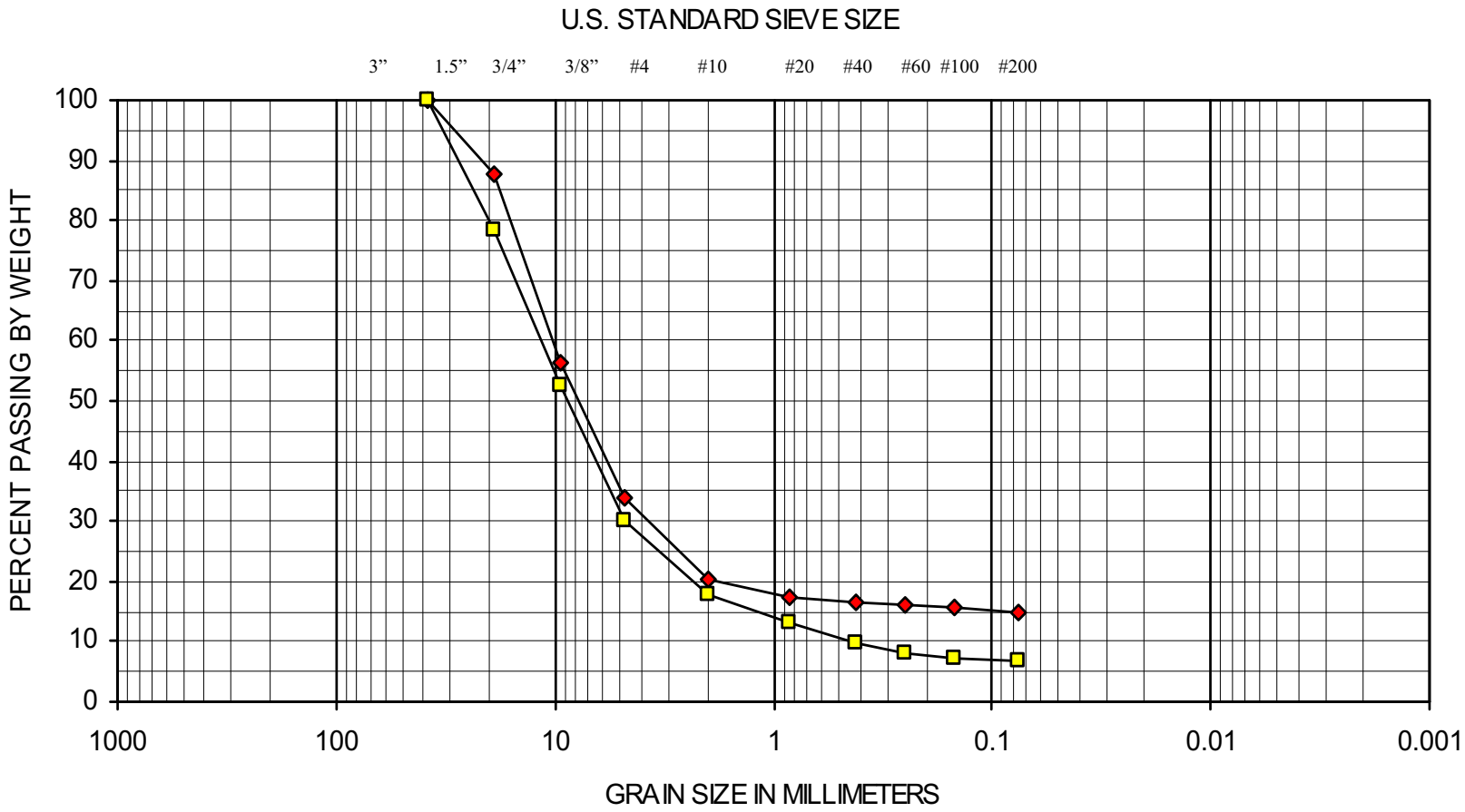
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
◆	TP-1	8	Gray medium sand with gravel (SP)
□	TP-3	4	Brown silty medium to coarse gravel with sand (GM)
●	TP-4	4	Brown silt with sand and gravel (ML)

SIEVE ANALYSIS RESULTS

FIGURE B-1

GEOENGINEERS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
◆	TP-5	8	Brown silty fine to coarse gravel with sand (GM)
■	TP-6	4	Brown fine to coarse gravel with silt and sand (GP-GM)

SIEVE ANALYSIS RESULTS

FIGURE B-2

GeoEngineers

Appendix C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for the exclusive use of Puget Sound Energy (PSE) and their authorized agents. This report may be made available to other members of the design and construction team for review. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of Puget Sound Energy and their authorized agents. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with Puget Sound Energy and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the Juanita Substation Improvements in Kirkland, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structures;
- elevation, configuration, location, orientation or weight of the proposed structures;
- composition of the design team; or
- project ownership.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

SUBSURFACE CONDITIONS CAN CHANGE

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

MOST GEOTECHNICAL AND GEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GEOTECHNICAL ENGINEERING REPORT RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

DO NOT REDRAW THE EXPLORATION LOGS

Geotechnical engineers and geologists prepare final boring and test pit logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

CONTRACTORS ARE RESPONSIBLE FOR SITE SAFETY ON THEIR OWN CONSTRUCTION PROJECTS

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

GEOTECHNICAL, GEOLOGIC AND ENVIRONMENTAL REPORTS SHOULD NOT BE INTERCHANGED

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

BIOLOGICAL POLLUTANTS

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

CHAPTER 17 – SINGLE-FAMILY RESIDENTIAL ANNEXATION (RSX) ZONES

17.05 User Guide.

The charts in KZC 17.10 contain the basic zoning regulations that apply in each RSX 35, RSX 12.5, RSX 8.5, RSX 7.2 and RX 5.0 zones of the City. Use these charts by reading down the left hand column entitled Use. Once you locate the use in which you are interested, read across to find the regulations that apply to that use.

Section 17.08 Zone RSX	Section 17.08 – GENERAL REGULATIONS The following regulations apply to all uses in this zone unless otherwise noted:
	1. Refer to Chapter 1 KZC to determine what other provisions of this code may apply to the subject property.
	2. If any portion of a structure is adjoining a low density zone, then either: a. The height of that portion of the structure shall not exceed 15 feet above average building elevation, or b. The horizontal length of any facade of that portion of the structure which is parallel to the boundary of the low density zone shall not exceed 50 feet. See KZC 115.30, Distance Between Structures/Adjacency to Institutional Use, for further details. (Does not apply to Detached Dwelling Unit and Mini-School or Mini-Day-Care Center uses).

link to Section 17.10 table

Code Publishing Company
Code Publishing's website
Voice: (206) 527-6831
Fax: (206) 527-8411
E-mail Code Publishing

Section 17.10	USE ⇩ / REGULATIONS ⇨	DIRECTIONS: FIRST, read down to find use...THEN, across for REGULATIONS										
		Required Review Process	MINIMUMS				MAXIMUMS		Landscape Category (See Ch. 95)	Sign Category (See Ch. 100)	Required Parking Spaces (See Ch. 105)	Special Regulations (See also General Regulations)
			Lot Size	REQUIRED YARDS (See Ch. 115)			Lot Coverage	Height of Structure				
				Front	Side	Rear						
.040	Mini-School or Mini-Day-Care Center (continued)											REGULATIONS CONTINUED FROM PREVIOUS PAGE 5. Structured play areas must be setback from all property lines by five feet. 6. An on-site passenger loading area may be required depending on the number of attendees and the extent of the abutting right-of-way improvements. 7. The location of parking and passenger loading areas shall be designed to reduce impacts on nearby residential uses. 8. Electrical signs shall not be permitted. Size of signs may be limited to be compatible with nearby residential uses. 9. May include accessory living facilities for staff persons. 10. These uses are subject to the requirements established by the Department of Social and Health Services (WAC Title 388).
.050	(Reserved)											
.060	Golf Course	Process IIA, Chapter 150 KZC.	1 acre	50′	50′ on each side	50′	50%	30′ above average building elevation.	E	B	See KZC 105.25.	1. Site design must minimize adverse impacts on surrounding residential neighborhoods. 2. May not include miniature golf. 3. The following accessory uses are specifically permitted as part of this use. a. Equipment storage facilities. b. Retail sales and rental of golf equipment and accessories. c. A restaurant.
.070	Public Utility	See Spec. Reg. 2.	None	20′	20′ on each side	20′	70%	30′ above average building elevation.	A			1. Site design must minimize adverse impacts on surrounding residential neighborhoods. 2. The required review process is as follows: a. If the subject property, including all contiguous property owned by the applicant and held by others for future use by the applicant, is less than five acres, the required review process is Process IIA, Chapter 150 KZC. b. If the subject property, including all contiguous property owned by the applicant and held by others for future use by the applicant, is five or more acres, a Master Plan, approved through Process IIB, Chapter 152 KZC, is required. The Master Plan must show building placement, building dimensions, roadways, utility locations, land uses within the Master Plan area, parking location, buffering, and landscaping. 3. Landscape Category A or B may be required depending on the type of use on the subject property and the impacts associated with the use on the nearby uses.
.080	Government Facility Community Facility				10′ on each side	10′			C See Spec. Reg. 3.			

MAINTENANCE AND RETENTION AGREEMENT FOR TREES AND REQUIRED LANDSCAPING

Project Name:

Address:

Parcel No:

This agreement is entered into between each undersigned owner of the real property and the City of Kirkland, in consideration of approval by the City of a permit under City of Kirkland File/Permit No. for the hereinafter described real property in Kirkland, King County, Washington.

Each undersigned owner jointly and severally hereby agrees to maintain and retain the trees and other vegetation required by the City to be planted or retained on the real property described below, in accordance with the final approved landscaping plan/site plan (on file in the Kirkland Department of Planning and Community Development) throughout the life of the project, pursuant to Chapter 95 of the KZC unless written approval for removal is granted by the Kirkland Department of Planning and Community Development.

Each of the undersigned agree to defend, pay, and save harmless the City of Kirkland, its officers, agents, and employees from any and all claims of every nature whatsoever, real or imaginary, which may be made against the City, its officers, agents, or employees for any damage to property or injury to any person arising out of the maintenance of said trees and other said vegetation on said owner's property or out of the actions of the undersigned in carrying out the responsibilities under this agreement, excepting therefrom only such claims as may arise solely out of the negligence of the City of Kirkland, its officers, agents, or employees.

This Agreement shall be binding upon the heirs, successors and assigns of each of the undersigned and shall run with the land. This Agreement shall, at the expense of the undersigned, be recorded by the City of Kirkland with the King County Department of Elections and Records.

<u>Failure to maintain and retain said trees and other said vegetation in accordance with this agreement may subject the undersigned to civil penalties as authorized by Chapter 95 of the KZC.</u>

The real property owned by the undersigned and the subject property of this Agreement is situated in Kirkland, King County, Washington and described as follows:

DATED at Kirkland, Washington, this _____ day of _____, _____

CITY OF KIRKLAND
PLANNING & COMMUNITY DEVELOPMENT
123 5th Avenue, Kirkland, WA 98033 425.587.3225
www.ci.kirkland.wa.us

Tree Plan II – Multi-Family, Commercial, Land Surface Modification, and Other Non-Residential Uses

Trees and other vegetation are important elements of the physical environment which protect public health, safety and general welfare in a variety of ways. These regulations establish a process and standards to provide for the protection, preservation, replacement, proper maintenance and use of significant trees, associated vegetation and woodlands located in the City of Kirkland. **For Multi-Family, Commercial and other non-residential uses, the regulations require retention of viable trees within the required setbacks and landscape buffers. These requirements are discussed in Section 95.35.2.B.2 of the Kirkland Zoning Code (KZC) and are summarized below.**

Helpful terms to complete the tree plans described below:

1. **Significant Tree**: A tree that is at least 6 inches in diameter at breast height (DBH) (The diameter or thickness of a tree trunk measured at 4.5 feet from the ground).
2. **Dripline**: The distance from the tree trunk that is equal to the furthest extent of the tree's crown.
3. **Impact:** A condition or activity that affects a part of a tree, including the trunk, branches, and critical root zone.
4. **Qualified Professional**: An individual that possesses and demonstrates the ability to perform tree risk assessments and prescribe appropriate measures necessary for the preservation of trees during development; must at a minimum be certified by the International Society of Arboriculture (ISA).
5. A **Type 1 Tree** is a viable tree that meets at least one of the following criteria:
    i. Landmark tree (pre-designated);
    ii. Specimen tree (very good to excellent condition and free of major defects);
    iii. Tree groves and associated vegetation to be set aside as preserved groves;
    iv. Trees on slopes of at least 10%; or
    v. Trees that are a part of a grove that extends into adjacent property.

Permit Submittal Requirements - Multi-Family, Commercial and Non-Residential

The following information is required for all permits in order for the application to be deemed complete. Incomplete applications will not be accepted.

Tree Plan II is required for a development permit or land surface modification resulting in site disturbance and impact to a significant tree in required yards and areas for required landscaping for:

- Three or more detached, attached, or stacked dwelling units
- Any use other than residential

A. The following general information must be incorporated on the site plan:
    1. Accurate location of all public trees (i.e. street trees) and private significant trees and their driplines measured relative to visible site features. Please number all trees (tag in field and label on plan) for reference purposes. *If the trees are not accurately located on a site plan, the Planning Official may require that their locations be surveyed.*
    2. Size (DBH) and species (or at least type) of the significant trees;
    3. General health of these trees; and
    4. Approximate trunk location and dripline of significant trees that are on adjacent property with driplines extending over the subject property line.

B. If there are significant trees in the right-of-way, required yards (setbacks) or areas for required landscaping or potential areas for required landscaping (i.e. parking lots), the tree plan must include a report from a qualified professional containing the following information:
   1. Size and species of these trees (located in these areas);
   2. A complete description of each tree's health and viability. If a tree is not viable for retention, the reason(s) must be soundly based on health, high risk of failure due to structure, defects, unavoidable isolation (windfirmness), or suitability of species and for which no reasonable alternative action is possible (pruning, cabling, etc.). The impact of necessary tree removal to remaining trees, including those in a grove or on adjacent properties, must also be discussed.
   3. The location of limits of disturbance around all trees potentially impacted by site disturbances and any special instructions for work within that protection area (hand-digging, tunneling, root pruning, maximum grade change).
   4. A discussion of timing and installation of tree protection measures that must include fencing and be in accordance with the Tree Protection Standards as outlined in KZC 95.35.6.

C. Site Design and Retention Requirements
   1. The applicant shall pursue applicable variations to development, as outlined in KZC 95.35.4.A.2 and 95.35.4.A.3, for the retention of Type 1 trees where feasible in required yards and landscaping areas.
   2. If removal of a Type 1 tree in required landscaping areas is proposed, the applicant shall provide reasons for the proposed removal that may require assistance from a qualified professional.
   3. Sites shall comply with required landscaping pursuant to KZC 95.40. Preserved trees in required landscaping areas shall apply toward required landscaping requirements.

D. Final Plan Requirements
   1. Demolition and grading plans shall depict tree protection measures, as recommended by a qualified professional, if existing trees are to be retained and their driplines are within the area of disturbance.
   2. Landscape Plans shall show all retained trees.
   3. The applicant shall enter into all required tree preservation and maintenance agreements pursuant to KZC 95.50.

Note: This is an overview of tree requirements, for more details and information visit our website at http://www.ci.kirkland.wa.us/depart/planning/trees.htm or request a copy of Ordinance 4010.

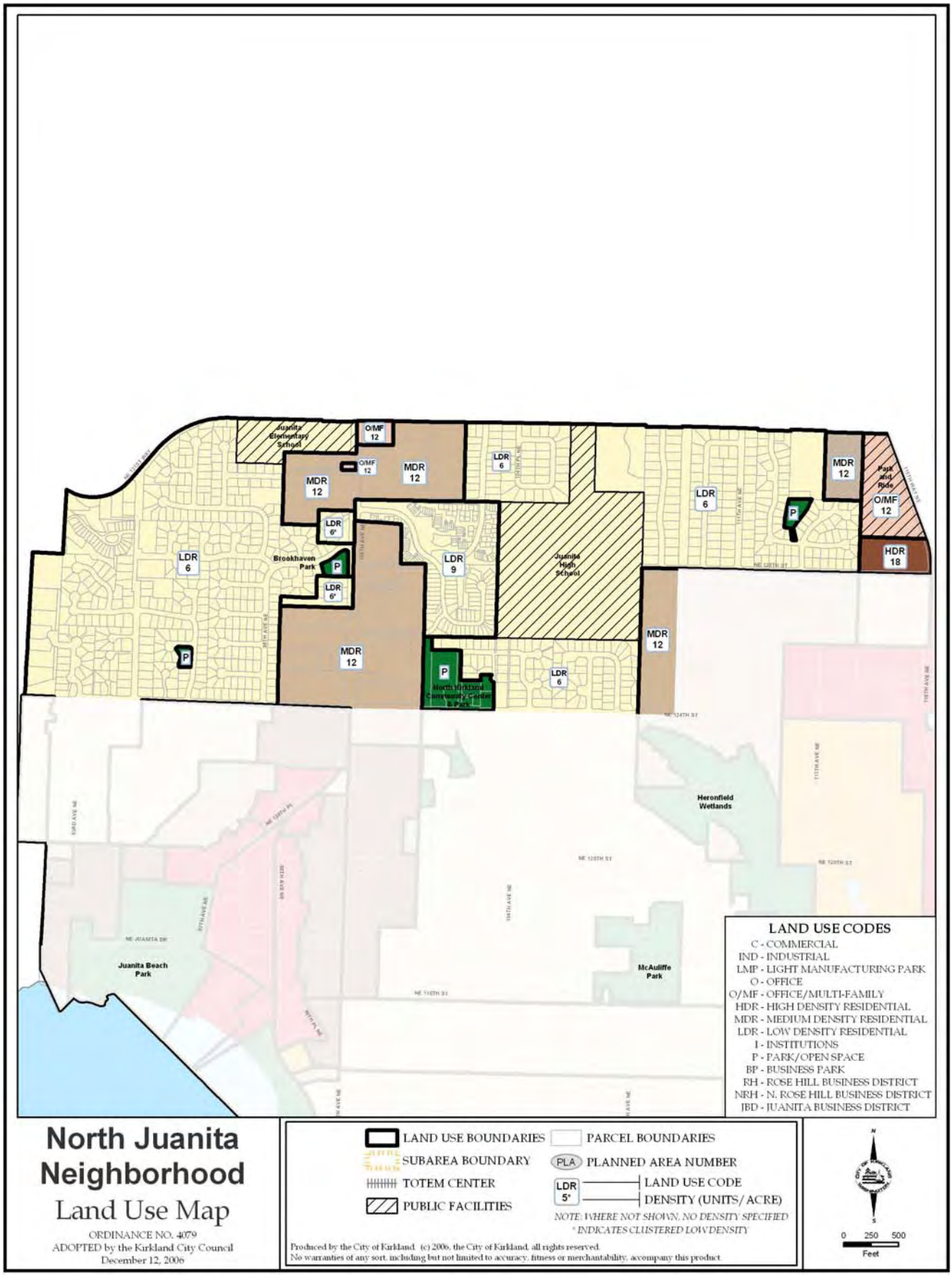


Figure J-2a: North Juanita Land Use

XI. Utilities

Charting a Future Course

(December 2004 Revision)

◆ RELATIONSHIP TO THE FRAMEWORK GOALS ◆

The **Utilities Element** highlights the following Framework Goals:

FG-1 Maintain and enhance Kirkland's unique character.

FG-2 Support a strong sense of community.

FG-3 Maintain vibrant and stable residential neighborhoods and mixed-use development, with housing for diverse incomes, ages, and lifestyles.

✓ **FG-4 Promote a strong and diverse economy.**

FG-5 Protect and preserve environmentally sensitive areas, and a healthy environment.

FG-6 Identify, protect and preserve the City's historic resources, and enhance the identity of those areas and neighborhoods in which they exist.

✓ **FG-7 Encourage low impact development and sustainable building practices.**

FG-8 Maintain and enhance Kirkland's strong physical, visual, and perceptual linkages to Lake Washington.

FG-9 Provide accessibility to pedestrians, bicyclists, and alternative mode users within and between neighborhoods, public spaces, and business districts and to regional facilities.

FG-10 Create a transportation system that allows the mobility of people and goods by providing a variety of transportation options.

FG-11 Maintain existing park facilities, while seeking opportunities to expand and enhance the current range and quality of facilities.

✓ **FG-12 Ensure public safety.**

✓ **FG-13 Maintain existing adopted levels of service for important public facilities.**

FG-14 Plan for a fair share of regional growth, consistent with State and regional goals to minimize low-density sprawl and direct growth to urban areas.

✓ **FG-15 Solve regional problems that affect Kirkland through regional coordination and partnerships.**

FG-16 Promote active citizen involvement and outreach education in development decisions and planning for Kirkland's future.

FG-17 Establish development regulations that are fair and predictable.

XI. UTILITIES

A. INTRODUCTION

The Utilities Element addresses water, sewer, surface water, electric power, natural gas and telecommunications.

Kirkland's existing utility infrastructure is generally adequate to meet the growth needs of the City for many years. The primary focus of the City in the coming years will be to continue to update existing systems to increase efficiency and to avoid maintenance problems associated with older facilities. Each utility function presents a unique problem. For water, Kirkland faces regional supply issues that require regional solutions. For sewer, the City must consider how to service areas on septic systems as those areas become more urbanized. For surface water, the City is challenged to manage a growing system to handle increased urbanization while maintaining and enhancing water quality. For telecommunications, the City must find economical ways to install its fiber-optic network to meet the City's needs and respond to changes in technology and, where possible, utilize its telecommunications investments and partnerships to benefit citizens, businesses and public institutions.

For non-City-managed utilities, the City faces the challenge of facilitating system improvements and new technologies while minimizing the impacts associated with above-ground utility installations.

EXISTING CONDITIONS

The City of Kirkland currently provides the following utility services:

- **Water** – All areas of the City except those north of NE 116th Street who are served by the Northshore Utility District. Figure U-1 shows the City's water system.

- **Sewer** – All areas of the City south of NE 116th Street. The Northshore Utility District provides sewer service to most areas north of NE 116th Street. Figure U-2 shows the City's sewer system.

- **Surface Water** – All areas of the City. Figure U-3 shows the City's surface water system.

The following non-City-managed utilities provide additional services:

- **Northshore Utility District** – provides water and sewer services to the northern portions of the City and Kirkland's growth areas. Figures U-4 and U-5 show the water and sewer systems.

- **Puget Sound Energy** – transmits and distributes electric power and natural gas in a nine-county area, including Kirkland and much of King County. Figures showing the location of electrical and gas facilities are not available from PSE.

- **Telecommunications** – Kirkland has both wired and wireless telephone services, cable TV service and high speed cable internet services all provided by a variety of non-managed providers.

CITY MANAGED FACILITIES

Water

The City of Kirkland provides water service to all of its residents, except those north of NE 116th Street who are served by the Northshore Utility District (see Figure U-1). One multifamily complex in the NE corner of the City, south of NE 132nd Street between 124th Avenue NE and 128th Avenue NE, is served by the Woodinville Water District.

The City's water system is primarily a gravity system consisting of 181 miles of water lines and 19.5 million gallons of storage capacity. Projected costs associated with the water system are primarily maintenance and replacement costs. The system generally has sufficient capacity to serve growth anticipated through the land use plan and no capacity costs are anticipated through 2022.

Seattle Public Utilities supplies the City's drinking water and is contracted to do so into the near future. The City, as a member of the Cascade Water Alliance, is also planning to secure and develop water supplies

from other areas in the long-term. Cascade collects regional capital facilities charges to fund planning and development of future water sources. The City is part of a regional solution to address water needs.

Sewer

The City of Kirkland provides sanitary sewer service to all of its residents south of NE 116th Street (see Figure U-2). The Northshore Utility District provides sewer service to most residents north of NE 116th Street.

The collection system consists of 35 wastewater collection basins, 88 miles of sewer pipe, nine lift stations and force mains, and approximately 2200 manholes. Approximately five to 10 percent of Kirkland residents use septic systems. Sewer extensions have typically been funded by developers and local homeowners through the City-managed Emergency Sewer Program. The system's most serious deficiency is the age of some of the pipelines. The 45-year-old concrete pipes allow inflow/infiltration and root intrusions which reduce capacity of the system and increase operation and maintenance costs. The primary costs anticipated to maintain existing levels of service are related to replacement and rehabilitation of older pipelines, improvement of pumping capacity, and system expansions in the Lake Plaza Basin, Central Way Basin, and Juanita Basin. These improvements will provide adequate capacity to serve growth anticipated through the land use plan through 2022.

The King County Department of Metropolitan Services (METRO) provides the City's service area with sanitary sewer treatment services at a capacity of 100 gallons per day per capita under the terms of an intergovernmental agreement. Northshore Utility District and City sewage are treated at Metro's West Point and Renton treatment plants.

Surface Water

The City maintains conveyance, detention and water quality treatment systems in public rights-of-way. These systems accept stormwater runoff and surface water from private property within the City and from neighboring jurisdictions. As of 2004, the City system contains 364 public and private detention systems which include vaults and ponds, 9,867 public and private catch basins and 170.4 miles of public and private pipes. Figure U-3 shows the City surface management water system.

A watershed approach has been used for managing the surface water utility by dividing the City into nine drainage basins. The largest and most important streams are Juanita and Forbes Creek. The size of their drainage basins makes them especially important for receipt of stormwaters and discharge into Lake Washington. Yarrow Creek also has a large basin area within the City and is significant because it provides salmonid fish habitat and productive associated wetlands. Smaller critical drainages include Carillon Creek, Cochran Springs Creek and Everest Creek. More information on the watershed and drainage basins can be found in the Natural Environment Element.

City Telecommunications

Over time, the City is installing a fiber-optic network to service its governmental facilities and traffic control system. In addition, the City is partnering with other cities and schools to lay the foundation for a regional telecommunication system. Figure U-6 shows the fiber-optic network in Kirkland, which includes partnerships with the City, Lake Washington School District, the University of Washington and the City of Bellevue to install publicly owned fiber-optic in major rights-of-way.

NON-CITY-MANAGED UTILITIES

Northshore Utility District: Water and Sewer

The Northshore Utility District provides water and sewer services to northern portions of the City and Kirkland's growth areas. Figure U-4 illustrates the existing Northshore water system and proposed improvements. Figure U-5 illustrates the existing Northshore sewer system. Northshore wastewaters are treated at King County's Department of Natural Resources West Point and Renton treatment plants. The water system has five reservoir sites with a 29-million-gallon capacity. The District is in the process of developing a sewer system capital improvement plan for replacement and repair of the older, damaged sections of the system. Repair and maintenance of the system occur when needed and extensions necessitated by future development will be provided by the developer.

Northshore can provide service to accommodate Kirkland's future growth.

Puget Sound Energy: Electricity and Natural Gas

Puget Sound Energy (PSE) is a public service company regulated by the Washington Utilities and Transportation Commission (WUTC), which provides the Kirkland area with electricity and natural gas. PSE distributes power transmitted by Bonneville Power Administration (BPA), and generates, transmits, and distributes power as part of the interconnected Northwest power grid. Although there has historically been a net surplus in electricity supply in the Northwest, in recent years there has been a balance between supply and demand. Future forecasts indicate some scenarios where deficits may emerge, requiring additional power purchases, new generation, and further conservation.

Kirkland is a part of the Eastside and Northshore Electrical Subareas. Power is delivered on 230 kV transmission lines to substations in Redmond and Renton, where the voltage is transformed to 115 kV. Several distribution stations in Kirkland further transform the voltage to 12.5 kV which is then distributed to customers. A double-circuit 230 kV Seattle City Light transmission line runs through Kirkland near 124th Avenue NE, but does not directly serve the Eastside subarea.

PSE's long-range plans through the year 2022 indicate the need for three new distribution substations in Kirkland and a new 115 kV line along the eastern and northern City boundaries to connect to the Sammamish substation in Redmond.

PSE provides natural gas to five Washington counties, including King County. PSE has not historically planned for gas main and service extensions, but reacts to customer demand. The gas industry is regulated by the Washington Utilities and Transportation Commission, which requires gas companies to demonstrate that existing ratepayers will not subsidize new customers.

The Northwest distribution pipeline and gas station are located east of the Kirkland City limits. Existing four-inch to eight-inch gas lines in Kirkland, as well as extensions currently anticipated, will service Kirkland's growth.

Telecommunication Service Providers

Wired telephone service and certain related special services are available in the City. System facilities within Kirkland include switching stations, trunk lines, and distributions lines. There are four switching stations in Kirkland at 101 Market Street, 10020 133rd Place NE, NE 95th Street/128th Avenue NE, and NE 43rd Street/Lake Washington Boulevard. Trunk lines connecting the switching stations are concrete-encased four-inch conduit, and distribution lines are either pole-mounted or underground. Service and facility expansions are driven by customer demand.

Several companies provide wireless telephone service. Cellular telecommunication permits wireless transmission of messages on a network of strategically placed receivers (i.e., mobile telephone communications). Receivers may be placed on tall poles, lattice-type towers, or buildings. The cellular tele-

phone industry does not plan facilities far into the future, but uses market demand to determine expansion into new service areas.

Cable TV and internet services are also available in Kirkland. The Kirkland system is fed from a microwave receiving site in Bellevue. The majority of trunk and distribution lines are overhead lines rather than underground. The local provider has the technical capacity to serve any new development in the City by simply adding new trunk or distribution lines. High speed DSL services are available in the community.

Many telecommunication vendors own optic fiber in Kirkland rights-of-way for commercial use. The City of Kirkland has access to some of these strands through franchise agreements.

RELATIONSHIP TO OTHER ELEMENTS

The Utilities Element supports other elements of the Comprehensive Plan by establishing policies for provision of efficient urban services to serve anticipated growth and development. This Element supports an infrastructure for servicing existing development and areas targeted for growth by the Land Use Element. The telecommunications policies will help implement the policies of the Land Use, Economic Development, Transportation, and Public Services Elements by facilitating the movement of information as an alternative to the historic commuter/work relationship. Finally, utility policies provide direction to the goals and policies of the Capital Facilities Element.

Policies for public services such as emergency services, schools, and libraries are contained in the Public Services Element.

RELATIONSHIP TO OTHER PLANS

In preparing this Element, the City has reviewed and considered the following documents:

- City of Kirkland Comprehensive Water Plan;
- City of Kirkland Comprehensive Sewer Plan;
- City of Kirkland Surface Water Master Plan;
- Northshore Utility District Comprehensive Water Plan;
- Northshore Utility District Sewer and Water Plan Maps;
- Puget Sound Energy GMA Electrical Facilities Plan.

B. UTILITIES CONCEPT

The Utilities Element supports the continued provision of adequate utility services to support existing and future development. Levels of service are established for City-managed utilities and levels of service are established for non-City purveyors of water and sewer. In addition, concurrency requirements are established for new development.

The Utilities Element provides policies for regional coordination of utility needs. A basis for coordination with regional and local providers is established to ensure fair and consistent review of system expansions and enhancements while providing appropriate public input. The environmental and aesthetic concerns of the community are balanced with the need to provide affordable and reliable utility service.

The importance of efficiency and conservation is stressed as a cost-effective means of accommodating the growing demand for services.

C. UTILITIES GOALS AND POLICIES

Goal U-1: Maintain the quality of life in Kirkland through the planned provision of public and private utilities.

Goal U-2: Provide an efficient system to deliver high quality water.

Goal U-3: Protect public health and environmental quality through appropriate and efficient design, installation, and maintenance of sanitary sewer facilities.

Goal U-4: Provide surface water management facilities programs and services that provide adequate drainage and minimize flooding while protecting and enhancing the water quality and habitat value of streams, lakes, and wetlands.

Goal U-5: Ensure adequate and competitively priced telecommunication infrastructure, facilities and services.

Goal U-6: Facilitate the development and maintenance of non-City-managed utilities at the appropriate levels of service.

GENERAL

Community Values

As an urban area, Kirkland is accustomed to a high level of utility service. These services accommodate the lifestyles of Kirkland residents and the success of Kirkland businesses. To maintain these community values, Kirkland must balance the quality of the service provided with the costs and community impacts.

Goal U-1: Maintain the quality of life in Kirkland through the planned provision of public and private utilities.

Policy U-1.1: Maintain an inventory of existing capital facilities and utilities, including locations and capacities of such systems and facilities.

An accurate inventory of existing utility locations and capacities will ensure that the City can plan for new growth in a manner that reflects the ability to service that growth with adequate services.

Policy U-1.2: Provide for needed capital facilities and utilities based on adopted levels of service and forecasted growth in accordance with the Land Use Element of this Plan.

This policy is intended to ensure that the Capital Facilities, Land Use, and Utilities Elements are functioning in concert. This systematic planning allows the City to make accurate land use projections based on utility plans and allows utility providers to plan for utilities in a manner that reflects expected land use patterns and densities.

Policy U-1.3: Use the following level of service standards for determining the need for public sewer, water, and surface water facilities:

Table U-1
Water, Sewer and Surface Water Level of Service

Facility	Standard
Water distribution:	112 gallons/day/capita
Water storage:	362 gallons/capita plus 3.2 million gallons for fire storage
Sanitary sewer collection:	100 gallons/day/capita
Surface water management:	Convey, detain and treat stormwater runoff in a manner that provides adequate drainage for the appropriate storm to ensure safety, welfare, and convenience in developed areas while protecting the hydrologic regime and quality of water and fish/ wildlife habitat in streams, lakes and wetland.

Policy U-1.4: Ensure that utility services are provided in a manner that is environmentally sensitive, safe and aesthetically compatible with surrounding land uses.

A variety of factors are at stake in the consideration of any proposed utility expansion. Mitigating environmental and aesthetic impacts can have implications on cost and efficiency of the system. Therefore, it is appropriate to weigh costs against a full consideration of benefits that will be derived. Individual implementation issues arising under this policy should be resolved on a case-by-case basis in light of all these considerations.

Policy U-1.5: Facilitate and encourage the conservation of utility resources.

The demand for utilities, such as water and electricity, may be met by either increasing the supply or reducing the demand. As the region continues to face challenges to the supply of these resources, conservation measures can be employed to delay need for new supplies.

Policy U-1.6: Minimize impacts of personal wireless services, telecommunication facilities, and towers on adjacent land uses through careful siting and design. Facilitate the approval of facilities that meet certain standards relating to location and configuration.

In order to minimize potential impacts, personal wireless services facilities should be located to the extent possible in nonresidential areas. They should be encouraged to be located in areas where the impact of the facilities will be minimal on residential areas such as in industrial or some commercial areas. In general, there should be a preference for more, smaller facilities located on existing structures, such as buildings or electrical transmission towers, or for co-locating on existing towers. When new facilities are required, carriers should be required to use techniques to disguise or camouflage the facilities and associated equipment shelters, so that they fit in with the surroundings.

In recognition of the important role telecommunications plays in facilitating business and personal communication, the City should enable carriers to quickly and efficiently site and configure facilities in ways that meet our standards. One of the best ways is to provide faster permit review for the locations and types of facilities the City wants to encourage.

Also recognizing changing technology and flux in the industry, the City should ensure that abandoned facilities are removed promptly. The burden of removing the facilities should fall to the property owner or operator of the facility and not the City.

Policy U-1.7: Install new and, where feasible, existing utility distribution lines underground.

Undergrounding of utility lines will visually enhance the area in which it occurs. In addition, undergrounding can reduce the potential for power outages associated with wind damage and eliminate unsightly pruning of vegetation. The complexities of undergrounding could increase as new utility lines are added to existing poles (i.e., new franchises).

Undergrounding utilities can be especially effective along major routes with good regional views. The City should explore prioritizing the undergrounding of utility lines in these areas.

Kirkland should acknowledge the disproportionate costs of undergrounding existing lines for smaller developments by allowing owners to defer until undergrounding occurs as part of a larger project where economies of scale can be realized. The City will need to consider the rates and tariffs of the WUTC in deciding where to underground existing distribution lines.

Policy U-1.8: Encourage the joint use of utility corridors and facilities consistent with prudent utility practice.

Additional efficiencies may be achieved by coordinating utility corridors. Examples include sharing right-of-way acquisition costs and joint use of rights-of-way for utility and pedestrian trails.

Policy U-1.9: Coordinate with other jurisdictions when utility additions and improvements cross jurisdictional boundaries to ensure that decisions are consistent with regional demand and resources and consistency in timing of permit review.

Where utility improvements are planned to serve regional demand, it is imperative that affected jurisdictions and utilities work together from the early planning stage. This will help reduce delays and a lower quality of regional service.

CITY-MANAGED UTILITIES

Water

Goal U-2: Provide an efficient system to deliver high quality water.

Policy U-2.1: Work in coordination with other jurisdictions and purveyors in the region to ensure a reliable, economic source of water and to address the long-term regional water demand needs of all agencies and purveyors.

Water tank in North Rose Hill Neighborhood

To accomplish this, Kirkland needs to participate in and facilitate the development of a regional water supply system that effectively balances regional water resources and regional water supply needs and provides equitable participation in ownership and management.

Policy U-2.2: Implement system rehabilitation and improvements in order to manage water resources.

Increasing system efficiencies by taking such measures as replacement of older pipes can delay the need for new and more costly supply solutions.

Policy U-2.3: Protect public health and safety, through the appropriate design, installation, and maintenance of water facilities.

The primary concerns with water supply are quantity and quality. The quantity of water has health and safety implications, particularly related to fire suppression. Water quality has obvious public health implications regulated by different levels of government.

Sewer

Goal U-3: Protect public health and environmental quality through appropriate and efficient design, installation, and maintenance of sanitary sewer facilities.

Policy U-3.1: Work with King County, adjoining jurisdictions, and local purveyors to manage, regulate, and maintain the regional sewer system.

The existing regional sewage system has the capacity to handle Kirkland's future growth. The system will require maintenance and improvements to increase efficiencies.

Policy U-3.2: Ensure that all new development proposals are served by adequate sanitary sewer systems.

In general, new development should not be permitted on property that is served only by septic tanks. However, in limited situations, septic systems should be considered for low-density residential development where no reasonable alternatives exist upon demonstration that soil conditions will permit proper functioning of a septic system.

Policy U-3.3: Connect areas that are on septic systems to sanitary sewer.

Some older, less urbanized areas of the City are served only by septic systems. As these systems age and fail, they present health and environmental risks. The City should facilitate sewer extensions to these areas by prioritizing City-funded extensions and facilitating innovative privately funded solutions such as Local Improvement Districts and latecomer agreements.

Policy U-3.4: Correct deficiencies and increase system efficiency. Emphasis should be placed on correcting deficiencies that present sewage overflow risks.

The greatest system deficiencies in Kirkland's sanitary sewer system are related to the age and reliability of parts of the system. Infiltration and inflow of stormwater into the older pipes decreases system capacity and exfiltration of effluent from older pipes presents environmental and health risks. The focus should continue to be on updating older portions of the systems, with an emphasis on areas where overflows could occur near water bodies.

Surface Water

Goal U-4: Provide surface water management facilities programs and services that provide adequate drainage and minimize flooding while protecting and enhancing the water quality and habitat value of streams, lakes, and wetlands.

Policy U-4.1: Adopt surface water design standards for new development and redevelopment that incorporate best available research and technology in protecting water resources in an economical and feasible manner.

The goal of surface water design for new development and redevelopment projects is to provide adequate drainage and to provide post-construction controls that mimic predevelopment hydrologic patterns and protect water quality to the degree that is economically feasible. Such facilities may include low impact development techniques and/or structural controls such as detention vaults or ponds, infiltration facilities, biofiltration swales, or wetvaults.

Policy U-4.2: Adopt and implement standards for control of runoff and erosion from construction sites.

In order to reduce erosion from construction, use of erosion control techniques should be required at all sites where significant clearing and grading will take place.

Policy U-4.3: Minimize the surface water impacts of development through the use of environmentally "low impact development" techniques.

Low impact development techniques include the following:

- Minimize creation of impervious surfaces;
- Use site soils and vegetation to soak up and filter stormwater runoff;
- Use green roofs to minimize runoff from impervious surfaces; and
- Collect and store water for landscaping or other nonpotable water uses.

The City should respond to new low impact technologies and evaluate techniques that may be feasible in Kirkland, and to evaluate possible incentives for use of such techniques.

Policy U-4.4: Minimize environmental damage from spilling and/or dumping of pollutants into the storm drainage system.

The City should respond to instances of spilling and dumping of materials into the storm drainage system through activities such as the following:

- Identify and where appropriate take enforcement action against those responsible for nonstormwa-

ter discharges, including requiring cleanup or conducting abatement;

- Maintain and periodically update inter-City and intraagency spill coordination and response procedures; and

- Conduct surveys to identify and eliminate illicit connections to the storm drainage system.

Policy U-4.5: Require businesses and residents to take steps to prevent stormwater pollution.

It is much easier to prevent pollution than to clean up polluted waters. Businesses and residents should be required to use both nonstructural and structural "best management practices" (BMPs) to prevent discharge of pollutants from everyday activities. BMPs range from covering materials stored outdoors, sweeping rather than using water to clean parking lots, and installation of oil/water separators to connecting car washing areas to sanitary sewers.

Policy U-4.6: Assess the quality of water and habitat in local streams and lakes to evaluate the effectiveness of utility standards and programs and to focus future efforts.

Identification of specific water quality and habitat concerns and the tracking of changes over time should help to improve the efficiency and cost-effectiveness of programs and projects. Such assessment is a recommended element of several State and federal programs.

Policy U-4.7: Ensure that privately owned stormwater facilities are operated and maintained in a manner that maximizes their quantity and quality control benefits.

When well-maintained detention and water quality facilities on private property serve to protect downstream resources, City programs should be continued to ensure that privately owned stormwater facilities are operated and maintained so that downstream systems are not affected.

Policy U-4.8: Educate the public on protecting and enhancing the quality of our water resources.

The City should strive to raise awareness of the impact that everyday business and residential activities can have on water quality and fish habitat and populations, and to provide information on practices, such as natural yard care, proper storage of materials, and washing practices, that can prevent the discharge of pollutants. Citizen volunteers should be involved in activities that increase stewardship of our water resources. The City should also explore new techniques for engaging the public and effecting positive changes in behavior.

Policy U-4.9: Coordinate basin planning, pollution prevention, and restoration activities with neighboring jurisdictions.

Watersheds do not stop at jurisdictional boundaries, and must be analyzed and restored as whole entities. The City should coordinate activities with King County, Bellevue and Redmond and other jurisdictions as appropriate to maximize the positive impact of projects and programs.

Policy U-4.10: Participate in regional surface water resources and fish resource conservation planning efforts.

The City should continue in the participation of the WRIA 8 salmon conservation planning effort and the Puget Sound Shared Strategy. The purpose of this project is to develop a plan for recovery of salmon habitat functions of the greater Lake Washington Watershed. Habitat is the only one of the four "H's," Habitat, Hydropower, Hatcheries, and Harvest, which is under local government control. Recovery of salmon stocks listed as threatened under the Federal Endangered Species Act would reduce the regulatory and liability burden for local jurisdictions, help to protect a vital part of our regional economy, and protect a species that has great cultural significance in the Pacific Northwest.

Policy U-4.11: Ensure compliance with State and federal regulations related to surface water quality and fisheries resources.

The City should coordinate surface water management requirements and programs with a variety of State and federal programs and regulations, including but not limited to the following:

- National Pollutant Discharge Elimination System, Phase II;
- Puget Sound Water Quality Management Plan; and
- Federal Endangered Species Act listing of Chinook salmon as a threatened species.

This policy is intended to acknowledge and accommodate future regulatory changes.

Telecommunications

Goal U-5: Ensure adequate and competitively priced telecommunication infrastructure, facilities and services.

Policy U-5.1: Manage the City's existing and planned telecommunication improvements to optimize service delivery opportunities in Kirkland.

The City should plan and install sufficient capacity into its telecommunication system to meet future City needs.

Policy U-5.2: Use partnerships to achieve cooperation and cost-sharing in building telecommunication systems and providing service.

The City should establish partnerships with other public agencies and private sector organizations to achieve cooperation and cost-sharing in building telecommunication systems and providing services. Partnerships may include the use of shared telecommunication space, such as towers, buildings and fiber-optic lines.

Policy U-5.3: Review and update City policies, procedures and regulations to facilitate the installation and maintenance of telecommunication systems.

The City should review and update its policies, procedures and practices to ensure that they facilitate the installation of new telecommunication systems and support existing systems. In addition, the City's development regulations need to be flexible or revised on a regular basis to respond to changes in technology and consumer needs.

Policy U-5.4: Seek opportunities to enhance the number of service providers in the community to increase choice and encourage competitive pricing and high quality customer service.

Choice, availability and price are important factors to telecommunication consumers. The City should look for opportunities to increase the number of high quality service providers to have competitively priced and high quality telecommunication systems in Kirkland.

Policy U-5.5: Involve community stakeholders and service providers in telecommunication decisions.

The City should involve consumers, service providers and other public entities with telecommunication systems in Kirkland when reviewing its policies, practices and development regulations to ensure that consumer needs are being met and that providers and other public entities can install the facilities.

NON-CITY-MANAGED UTILITIES

The Washington Utilities and Transportation Commission (WUTC) has traditionally been the primary regulatory agency for private utilities. The WUTC has the authority to define the costs that a utility can recover, and consequently has the oversight to ensure that the utility acts prudently and responsibly. Under the Growth Management Act, local jurisdictions now have the obligation and requirement to plan for utilities including the identification of utility corridors.

Kirkland will need to consider the obligations of the utilities to WUTC regulation when considering policies and regulation affecting their operations.

Coordination

Goal U-6: Facilitate the development and maintenance of non-City-managed utilities at the appropriate levels of service.

Policy U-6.1: Work with non-City-managed utilities and review facility plans to ensure that they reflect and support Kirkland's land use plan. Likewise, the City should work with providers to ensure that utilities are available to support land uses and to maintain appropriate levels of service.

This policy is intended to ensure that non-City providers are in compliance with the City's Comprehensive Plan as mandated by the Growth Management Act. This systematic planning allows the City to make accurate land use projections based on utility plans and allows utility providers to plan for utilities in a manner that reflects expected land use patterns and densities.

Policy U-6.2: Coordinate with non-City providers of water and sewer on a joint program for maintaining adopted levels of service, concurrency requirements, funding, and construction of shared public facilities.

Under the provisions of this Comprehensive Plan, the City is establishing specific utility requirements for itself and utilities serving the Kirkland area consistent with the requirements of the Growth Management Act.

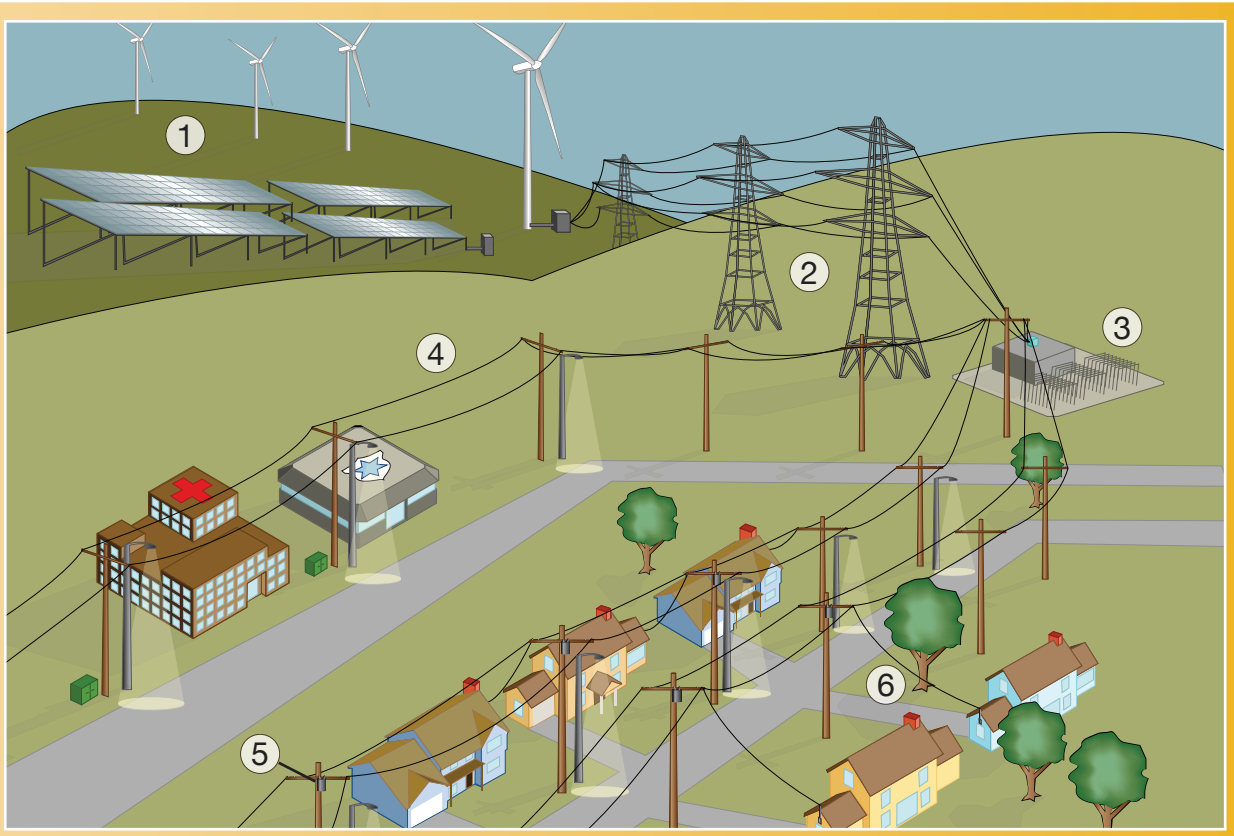
Policy U-6.3: Coordinate with the appropriate utility provider when considering land use decisions in the vicinity of proposed facility locations to ensure land use compatibility.

Working with utilities in advance of key land use decisions has the potential to eliminate potential conflicts and ensure that utility considerations are factored into the development review process.

Policy U-6.4: Provide timely and effective notice to utilities of the construction, maintenance, or repair of streets, roads, or other facilities and coordinate such work with the serving utilities.

Providing utilities the opportunity to coordinate construction projects with City projects has two distinct advantages: it could save the utility money by reducing construction expenditures and it can help the City to avoid multiple roadcuts for various utility installations.

HOW POWER GETS TO YOU



GENERATION SOURCE 1

Puget Sound Energy's (PSE) electric system starts at a generation source. Examples of our power generation facilities include hydroelectric dams, wind facilities and solar energy systems. Combustion turbines fueled by natural gas are also used to support times of peak load. Electric energy from generation sources is carried to substations by transmission lines.

TRANSMISSION LINE 2

A transmission line is a high-voltage (55 – 230 kilovolt (kV)) overhead line that transports power from generation plants to substations.

SUBSTATION 3

A substation is a power distribution center with transformers that step down transmission voltages (55 – 230 kV) to our primary distribution voltage (12.5 kV).

DISTRIBUTION LINE 4

A distribution line is an overhead or underground medium-voltage (12.5 kV) line that carries power from a substation to customers. Roughly half of PSE's distribution lines are underground. Distribution voltage is stepped down to service voltage through smaller transformers located along distribution lines.

TRANSFORMER 5

A transformer is a device that steps voltage *down* from a higher voltage, or steps it *up* to a higher voltage, depending on use. Typically it steps voltage down from a distribution voltage to 120/240 volts for customers' residential use. Transformers are the green boxes in some residences' front yard or the barrel-like canisters on utility poles.

SERVICE LINE 6

A service line is a lower-voltage (120 to 480 volts) overhead or underground line that is the last connection from PSE to the meter on customer homes or businesses.

1.888.225.5773

PSE.com

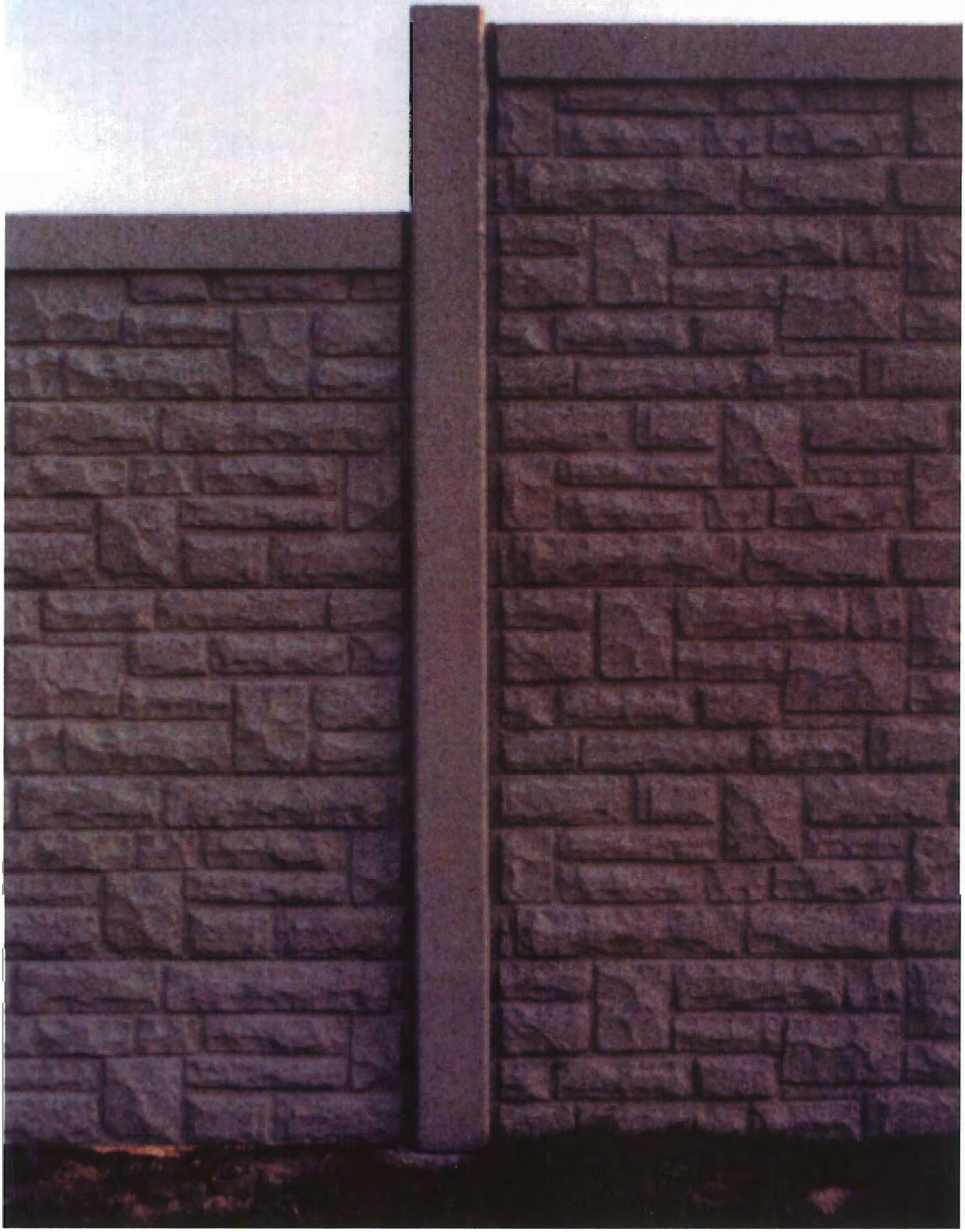
PSE Substation (ZON08-00010)
Hearing Examiner Decision
Exhibit B

PUGET SOUND ENERGY
The Energy To Do Great Things

CITY OF KIRKLAND
Hearing Examiner Exhibit

Applicant ✓
Department ____
Public ____
FILE # ZON08-00010

C



DISTRIBUTION LINES - BEFORE

CITY OF KIRKLAND
Hearing Examiner Exhibit
Applicant ✓
Department ____
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AFTER

BEFORE

AFTER

CITY OF KIRKLAND
Hearing Examiner Exhibit
Applicant ____
Department ____
Public ✓
FILE # ZON08-00010
E

Steve Ryan
Resident & Homeowner
13044 109th Ave NE
Kirkland, WA 98034
Property adjacent on Northwest side of subject property

Topics concerning Variances requested by Puget Sound Energy (PSE) for the Juanita Substation Project (ZON08-00010):

1) Subject project does not qualify for a variance under Washington State law
2) Applicant has not proven that they have or can meet any of the requirements under section 120.20 in the Kirkland Zoning Code (KZC) titled 'Criteria for Granting a Variance'. In addition, The City of Kirkland has not required the applicant to provide this proof or sought the advice of an independent third party. The City of Kirkland has based its decision, in some cases on information solely supported by statements made by the applicant.

Subject project does not qualify for a variance under Washington State law
According to Washington State law and supported by precedence a variance permit may be lawfully granted only within the guidelines set forth in the zoning ordinance. Orion Corp. v. State, 103 Wash.2d 441, 458-59, 693 P.2d 1369 (1985); Lewis v. City of Medina, 87 Wash.2d 19, 22, 548 P.2d 1093 (1976).

Paraphrasing these two decisions it has been determined that a "hardship" or "special circumstance" must be limited to the size, shape, topography, location or surroundings and that the "hardship" must be peculiar to the property. Considering the fact that the subject property is flat and has no topographical constraints, the constraints are manufactured by the applicant. Quite simply PSE designed a project that can't fit within its own property and is seeking to maximize its own benefit at the expense of the sensitive single family residences around it. The design, not the property is the issue and under Washington State law, that does not qualify to be eligible for a variance. There are variances granted for similar cases but these only stand because they are not appealed not because they conform to the law. In addition, an applicant for a variance, again under Washington State law, is not entitled to a variance to relieve a hardship of his own making and a variance should not be granted simply because an owner cannot make a particular use of (the property). (Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983).). This means that a variance cannot be granted for a project where the owner cannot build unless the "hardship" is due only to the topography.

PSE submitted a design that both increases distribution, primarily for unincorporated King County, and adds a backup 'loop' system to increase reliability for the area residents. The community is growing and I understand the need for additional distribution as well as wanting to improve reliability but these goals are not only reachable by building this project as designed. It was PSE that decided that in order to save on construction and maintenance costs it would accomplish both of these goals by building a 'double' substation instead of looking into alternatives. These projects could be separated and accomplished without building the project as designed. There are a number of ways this could be done and the City of Kirkland has not required PSE to provide any proof or sought advice from any independent sources to verify that this cannot be done. However, even if this were the case this still does not qualify for a variance.

The only topographical issue that PSE could cite is that the South end of the property is not completely flat. There is a slope to this portion of the property but not enough to prevent building on it. Other than the fact that there is currently a substation built on the sloped portion of the property, upgrades to this station up to and including a complete rebuild could be accomplished with additional site work and grading to level the site or perhaps a tiered station. It is a fact that there are work-arounds to any site issues PSE has encountered on the South end of the property. These might be more costly than or not as convenient as the proposed project, but neither cost nor convenience is relevant to this discussion. It was decided and upheld in appeal in Lewis v. City of Medina that economic hardship would not invalidate an otherwise valid state ordinance enacted under the Police power. The applicant can still use the entire property and even build on it, just not this design. Remember, it's the topography that matters not the use, design or intent of the owner. As long as uses permitted in the zone can generally be made, PSE does not qualify for a variance under Washington State law.

Applicant has not proven that they have or can meet any of the requirements under section 120.20 in the Kirkland Zoning Code (KZC) titled 'Criteria for Granting a Variance'.

The criteria for granting a variance under section 120.20 of the KZC states that The City may grant a variance only if it finds that:

1. The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole; and
2. The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a preexisting improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed; and
3. The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.

1) Will not be materially detrimental to surrounding properties

Both the applicant and the City, as evident in the 'Findings Report' have completely ignored this requirement. I have read through the 'Facts' section of the findings report and have only found explanations of how the Applicant will add walls, finishes and landscaping to lessen the impact. However, the code is clear on two areas. The first is that the variance "will not be materially detrimental to the surrounding properties" and the second from chapter 150 of the KZC Titled 'Process 11A' section 150.50 Burden of proof lies with the applicant. The real question is will this impact the value of the surrounding properties or make it difficult for the owners to sell. Nowhere has the applicant proven that this will not negatively impact the surrounding properties. I called the King County Tax Assessors Office and was told that "External Negative Impacts" such as an electrical substation encroaching on a setback would be considered when assessing the value of a property. I have also spoken to a Real Estate appraiser at Windermere Real Estate. This appraiser reviewed the project as well as our properties, spoke to a number of his colleagues who have each been in the real estate and appraisal industry for twenty or more years and sought the advice of another colleague who specializes in appraisals where utilities are concerned. The feedback he received without hesitation was that there is no doubt that this project will have a negative impact on the values of the homes adjacent to the project and their owners' ability to sell. I am also submitting a written statement by the appraiser I spoke with stating there will be a negative impact to the value of the surrounding properties due to this variance.

The 'Fact' section also notes that the applicant prepared graphics of the proposed substation compared with a building that they could build without variances. How is this in any way relative to the issue of whether the proposed project will or will not have a negative material impact on the surrounding properties? A different project is the subject of a separate discussion when and if it is proposed to The City. Above all else, the code states that the variance "Will not be materially detrimental to surrounding properties". This is not stated as should not or should endeavor not to but specifically states that it "will not". This is a finite statement that requires proof and the burden of proof lies entirely on the applicant. Considering the evidence I have to the contrary, it will be impossible for PSE to ever prove this. This requirement is not only in the KZC, it is also in Washington State law.

2) The Variance in necessary because of special circumstances

The special circumstances called 'hardships' under state law, as stated earlier only pertain to the topography. The land use attorney I consulted with on this issue agreed that this project does not have any real 'special circumstances' that would merit a variance. The typical case taught in law school to illustrate a 'special circumstance' would be if there is a height restriction of 30'. One property on the street sits in a hole. In order for the property owner to build a house where the ridge line is equal to that of the rest of the neighborhood he would need to build a 35' house. This is an example of a 'special circumstance' because it relates directly to the topography. Lot size, project design or intended use do not even enter the picture.

In addition, several of the conclusions in the Advisory Report regarding this requirement are based solely on statements made by the applicant. Items listed as "according to the Applicant" and "Applicant states" should not be listed as fact to support conclusions. I don't see any supporting evidence or corroboration from an independent source. In fact, there is only one of the five 'facts' listed that is relevant and marginally substantiated.

3) The variance will not constitute a special privilege

Not one of the three 'facts' listed under this section of the advisory report are substantiated or relevant. Fact #1 states that the existing substation on the South end of the property does not comply with current zoning requirements. This is in no way relevant to the discussion of the proposed project. Fact #2 notes that "the applicant states that the proposed substation is the minimum size necessary to meet the growing demand". Not only is this untrue, it is not backed up with any actual facts or studies done by third party design firms. Lastly, Fact #3 states that the subject property is narrow and rebuilding the existing substation would require a variance. It is interesting that this was listed as a fact. One of the earlier arguments was that the existing substation could not be rebuilt. Not only is this 'fact' not at all relevant to the variance in question, it refutes an earlier statement by PSE. In all, there is not one relevant fact to base the conclusion on in this section.

If I as a homeowner requested a variance to build a house on my property that exceeded the size limitations of the lot or height restrictions, I would be rejected. Even though PSE has not proven, or been required to that this project has to be built as designed, I would be required to. Granting this variance will constitute a special privilege.

In conclusion, there is nothing unique about this property that could be termed as a 'hardship' or 'special circumstance' as defined under case law in Washington State. The plans examiner who

prepared the Advisory report has concluded that these 'special circumstances' do exist but this is only because it is a misinterpretation of the term. The conclusions in the report are based on unsubstantiated and in some cases irrelevant information. Neither the City of Kirkland nor the applicant has performed their due diligence to prove or substantiate any of the information presented as fact.

Granting this variance will not be in line with Washington State law or the requirements laid out in the KZC. Although the burden of proof lies with the applicant, The City of Kirkland is responsible for making sure this is done before recommending approval of a variance. No facts were checked, information presented in the report is incorrect and approval was still recommended. I feel that that this is an irresponsible and possibly illegal act that I am counting on this hearing to rectify.

As a footnote, PSE is named several times as a public utility in the Advisory report. They are actually a privately held company. They want to keep their customers on line and add new customers not as a public service but because that is the business they are in. They will find a way to accomplish these goals without this variance.

The above statements above are based on:

- My experience in Construction Management, (I am currently a Project Manager in the Safeway Construction/Real Estate Dept.)
- Conversations with a representative of the King County Tax Assessors office
- Conversations with a Real Estate Appraiser at Windermere and written statement from same
- Conversations and information from the Land Use Attorney that does the majority of this work for the Safeway Real Estate Dept in Washington State

Attachments:

- Letter from William Rynd Windermere Real Estate
- Washington Practice Series for Real Estate: Property Law, Chapter 4. Planning and Zoning F. Variances. Westlaw document WAPRAC 4.25
- Court of Appeals Judgment in Lewis v. City of Medina
- Kirkland Zoning Code, Chapter 120 – Variances
- Kirkland Zoning Code, Chapter 150 – Process 11A, Section 150.50

Windermere

Bill Rynd

PSE Substation (ZON08-00010)
Hearing Examiner Decision
Exhibit F

Tony Leavitt
City of Kirkland
Planning Department
123 Fifth Avenue
Kirkland, WA 98033

Dear Mr Leavitt,

This letter is regarding the planned change of location, expansion, zoning variance, and rebuild request from Puget Sound Energy for the Juanita Electric Distribution Substation, Permit No. ZON08-00010.

At the request of Mr. Steven Ryan, who owns the property at 13044 109th Ave NE Kirkland WA 98034, I have been doing some research on this project. Mr. Ryan and his neighbors adjacent to the proposed new and expanded substation have many concerns that should be addressed.

One of these would be the significance of this projects impact on the current and future value of their homes. I have discussed this project with a large number of veteran local real estate professionals and four licensed real estate appraisers. I polled them for their opinions on the impact this substation would have concerning the neighboring home values. There was a 100% consensus that this project will have a significant negative impact on the neighboring homes values. It will also increase the market time for the owners when they attempt to sell their homes which will bring on additional burden and expense. With our current market conditions the negative impact on the homes values will be even greater

Having the Substation moved north of its current location will have a strong negative impact on the properties adjoining this structure. The impact will be even magnified if the current variance regulations to protect the homeowners are reduced so PSE can expand to a larger structure on this new site.

I am sure the City of Kirkland Planning Department has and will address the concerns of the property owners adjacent to this proposed Substation. Hopefully the decision will balance out our needs for increased energy demand and reliability of the electrical system with the economic loss and other potential harm that this project will have on the neighboring property owners.

Sincerely,

William M. Rynd

William M. Rynd
Windermere Real Estate NE

CITY OF KIRKLAND
Hearing Examiner Exhibit
Applicant ____
Department ____
Public ✓
FILE # ZON08-00010

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Windermere Real Estate/Northeast, Inc.
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Washington Practice Series TM
Real Estate: Property Law
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William B. Stoebuck [FNa0], John W. Weaver [FNa1]

Chapter 4. Planning and Zoning
F. Variances

§ 4.25. Grounds for variance

West's Key Number Digest

West's Key Number Digest, Zoning and Planning ⚷481 to 518

Legal Encyclopedias

C.J.S., Zoning and Land Planning § 191

C.J.S., Zoning and Land Planning §§ 228 to 232

C.J.S., Zoning and Land Planning §§ 234 to 249

C.J.S., Zoning and Land Planning § 257

Variances and conditional uses were distinguished in section 4.22; the beginning of that section should be read with the present material. Whereas a conditional use is a permitted use, one listed in the zoning ordinance as permitted upon a special permit, a variance permit allows the applicant to do something the zoning ordinance would otherwise forbid. Since the early days of zoning, variances have been a standard feature, one of the flexibility devices. Traditionally, variance permits are granted by boards of adjustment, though other granting agencies are possible in Washington, as we will see.

The classic ground for granting a variance, contained in section 7 of the Standard Zoning Enabling Act, is that, "owing to special conditions, a literal enforcement of the provisions of the ordinance will result in unnecessary hardship" to the applicant as landowner. Some state enabling acts speak of "unnecessary hardship or practical difficulties," and courts may or may not assign different meanings to those phrases.[FN1] In Washington a different formulation is generally used, not involving the word "hardship," but the effect is similar; we will come to that in a moment. Most judicial decisions on variances turn upon what is a "hardship." Use of that word suggests that, without a variance, the zoning restrictions would impermissibly deprive the owner of rights in the

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land. Indeed, one view of a variance, shared by early planners, was that if variances had not been allowed, zoning ordinances, though perhaps valid on their faces, would be chewed up piecemeal by being unconstitutional as applied to particular parcels of land.[FN2]

Another distinction we should make is between "use" variances and "bulk," sometimes called "area," variances. A use variance permits a use not among those listed as either a regularly permitted or conditionally permitted use in a given zone. A bulk variance permits a variation from area, setback, front yard, side yard, backyard, or height restrictions. The distinction can be important. Use variances are much less common than bulk variances, are tested by a tighter legal standard, and are entirely forbidden by some local zoning codes.[FN3]

In Washington the grounds for a variance are stated in both RCWA Chapter 35A.63 and Chapter 36.70, but not in RCWA Chapter 35.63. The language of the first two chapters is essentially, though not verbatim, the same. Paraphrasing them, with language common to both statutes in quotation marks, the elements that must be satisfied to grant a variance are: (1) that the variance shall not confer on the applicant a "special privilege" not shared by other properties in the same vicinity and zone; (2) that the variance is necessary because of "special circumstances" affecting the subject property, including "size, shape, topography, location, or surroundings," that deprive it of "rights and privileges" enjoyed by other properties in the vicinity and zone; and (3) that the variance "will not be materially detrimental to the public welfare or injurious to the property or improvements in the vicinity and zone."[FN4] Local ordinances in Washington may use similar language or may contain other formulations, sometimes requiring that the applicant show a "hardship" or that he show the land cannot yield a reasonable return.[FN5]

Though none of the statutes contains the classic word "hardship," the Washington Supreme Court seems to equate "hardship" with the statutory language.[FN6] In none of the decisions in which local ordinances established grounds for variances in language different from the enabling act language did the courts suggest that the enabling acts did not authorize such different language. Indeed, in all those decisions the courts looked to the language of the local ordinances to determine if variances were properly granted or denied.[FN7] Washington decisions cite variance decisions from other jurisdictions, where enabling acts may use the word "hardship." Therefore, Washington's standard grounds for variances, "special circumstances," etc., should be considered an elaboration of the classic "unnecessary hardship" formulation. Perhaps the Washington language is broad enough to include the standard phrase "practical difficulties" also. In practice it usually will not make much difference, because any of the rhetorical formulas poses a mixed question of fact and law that allows much discretion in application.

Some subsidiary rules can be stated, to help determine when applicants do or do not deserve variances. The hardship (used here to include the various rhetorical formulations) must relate to the particular land, not to the owner personally or the owner's affairs apart from the land. The enabling acts cited above require that the "special circumstances" relate "to the size, shape, topography, location, or surroundings" of the "*subject property*." For instance, a variance would not be justified simply because a particular owner was disabled and could not care for it, but it

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would be justified if the land had such odd physical features that no one could manage it.[FN8] A variance should not be granted simply because an owner cannot make a particular use of it, as long as uses permitted in the zone can generally be made; the concept embodied in the enabling acts is that the land cannot be used as other land in the same vicinity and zone is generally used.[FN9]

The cited enabling acts require that the hardship be peculiar to the particular parcel of land and not to other land in the area generally. Perhaps the hardship need not be literally unique--perhaps it could affect a few parcels of land--but it may not be a general condition. If it is a general condition in the zone, that would be grounds for a rezoning, not for a variance. An applicant is not entitled to a variance to relieve a hardship of his own making; in the vernacular, a variance should not be granted to "get an owner out of his own box." For instance, an owner who has voluntarily sold off part of a lot, thereby reducing its size below the minimum required by zoning, should not be granted a variance to allow a house to be built on it.[FN10] Tolerant local officials may frequently grant variances out of pity for applicants who have created their own hardships, but such variances stand up because they are not appealed, not because they conform to the law.

Use variances are more problematic than bulk variances. Though Washington's zoning enabling acts do not forbid them, some local ordinances do.[FN11] Where they are possible, they are granted much less frequently than bulk variances, and there must be a showing of greater hardship than for bulk variances.[FN12] When they are granted, the hardship generally is caused by some off-premises situation that affects the applicant's land.[FN13] Sherwood v. Grant County[FN14] provides an example. The court of appeals, division one, affirmed the granting of a use variance for a mobile home in a residential zone when the owner's land was surrounded by mobile homes in an adjacent zone where they were permitted. However, a later decision from division two of the court of appeals, St. Clair v. Skagit County,[FN15] is critical of Sherwood and may be contrary to it, though there is some difference in their facts.

[FNa0] Judson Falknor Professor of Law Emeritus, University of Washington, Of Counsel, Karr Tuttle Campbell, Member of the Washington Bar.

[FNa1] Professor of Law, Seattle University, Member of the Washington Bar.

[FN1] See D. Mandelker, Land Use Law § 6.48 (3d ed. 1993). In some states where both phrases are used, courts apply "unnecessary hardship" to use variances and "practical difficulties" to bulk variances.

[FN2] See D. Mandelker, Land Use Law §§ 6.39 to 6.41 (3d ed. 1993), for discussion of the matters contained in the first two paragraphs of this section.

[FN3] See D. Mandelker, Land Use Law §§ 6.42, 6.43, 6.46 (3d ed. 1993).

[FN4] RCWA 35A.63.110(2); RCWA 36.70.810(2).

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[FN5] See, e.g., Lewis v. City of Medina, 87 Wn.2d 19, 548 P.2d 1093 (1976) ("cannot yield a reasonable return"); Lange v. Town of Woodway, 79 Wn.2d 45, 483 P.2d 116 (1971) ("unnecessary hardships"); Sherwood v. Grant County, 40 Wn.App. 496, 699 P.2d 243 (1985) (similar to statutory language); Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983) ("unnecessary hardships or practical difficulties"); Coughlin v. City of Seattle, 18 Wn.App. 285, 567 P.2d 262 (1977) ("unnecessary hardship").

[FN6] See Lange v. Town of Woodway, 79 Wn.2d 45, 483 P.2d 116 (1971) (one who challenges validity of zoning does not admit there is not a "hardship" that would justify variance). But see Sherwood v. Grant County, 40 Wn.App. 496, 699 P.2d 243 (1985), which suggests there is a difference between "hardship" and special circumstances.

[FN7]
See Lewis v. City of Medina, 87 Wash. 2d 19, 548 P.2d 1093 (1976); Lange v. Town of Woodway, 79 Wash. 2d 45, 483 P.2d 116 (1971); Martel v. City of Vancouver (Wash.) Bd. of Adjustment, 35 Wash. App. 250, 666 P.2d 916 (Div. 2 1983); Douglass v. City of Spokane, 25 Wash. App. 823, 609 P.2d 979 (Div. 3 1980); Coughlin v. City of Seattle, 18 Wash. App. 285, 567 P.2d 262 (Div. 1 1977).

Settlement agreement between landowner and county provided that, as condition of county's granting owner permit to build on undersized lot, owner would "meet all requirements" in regulations other than lot size. *Held*, county could deny permit when owner had received five waivers and setbacks. Griffin v. Thurston County, 137 Wash. App. 609, 154 P.3d 296 (Div. 2 2007).

[FN8] See Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983).

[FN9] This principle may have been violated in Coughlin v. City of Seattle, 18 Wn.App. 285, 567 P.2d 262 (1977), which approved a variance to enlarge a nursing home, so that the owner would not be cut off from state programs.

[FN10] Lewis v. City of Medina, 87 Wn.2d 19, 548 P.2d 1093 (1976). But the fact that an owner purchased land with knowledge that grounds for variance existed did not bar the granting of a variance (as it does in some states) in **Hoberg v. City of Bellevue, 76 Wn.App. 357, 884 P.2d 1339 (1994)**.

[FN11] E.g., see Coughlin v. City of Seattle, 18 Wn.App. 285, 567 P.2d 262 (1977), which contains a quotation from a Seattle ordinance that forbids use variances.

[FN12] Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983) (dictum).

[FN13] For years the writer, in preparing examination questions for his classes in land-use planning, has tried to construct a use-variance question that does not involve an off-premises

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condition--but without success.

[FN14] Sherwood v. Grant County, 40 Wn.App. 496, 699 P.2d 243 (1985).

[FN15] St. Clair v. Skagit County, 43 Wn.App. 122, 715 P.2d 165 (1986).

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Supreme Court of Washington, En Banc.
G. Harlan LEWIS and Harry G. Lewis,
Appellants,
v.
CITY OF MEDINA, a Municipal
Corporation, Respondent.
No. 43965.

April 15, 1976.

Proceeding was brought by lot owners against city for writ of mandate to require city to issue building permit. The Superior Court, King County, Charles R. Denney, J., issued writ, and city appealed. The Court of Appeals, 13 Wash.App. 501, 535 P.2d 150, reversed, and lot owners appealed. The Supreme Court, Wright, J., held that where size of lot, which was too small to comply with minimum lot size for single-family residence established by either city zoning ordinance or previous county requirement, was result of lot owners' own action in participating in sale of adjacent land, lot owners failed to meet one of essential criteria under city zoning ordinance for variance.

Judgment of Court of Appeals offirmed.

West Headnotes

[1] Zoning and Planning 414 ⚷6

414 Zoning and Planning
414I In General
414k5 Source and Scope of Power
414k6 k. Police Power. Most Cited Cases
Zoning is constitutionally permissible exercise of police power.

[2] Zoning and Planning 414 ⚷38

414 Zoning and Planning
414II Validity of Zoning Regulations
414II(A) In General
414k38 k. Hardship, Loss, or Benefit to Particular Persons. Most Cited Cases
Fact that lot owners might suffer considerable financial loss if they were not allowed to build house on lot which did not meet city zoning ordinance minimum lot size requirement did not render zoning ordinance invalid.

[3] Zoning and Planning 414 ⚷605

414 Zoning and Planning
414X Judicial Review or Relief
414X(C) Scope of Review
414X(C)1 In General
414k605 k. Decisions of Boards or Officers in General. Most Cited Cases

Zoning and Planning 414 ⚷610

414 Zoning and Planning
414X Judicial Review or Relief
414X(C) Scope of Review
414X(C)1 In General
414k608 Arbitrary, Capricious, or Unreasonable Action
414k610 k. Decisions of Boards or Officers. Most Cited Cases
Judicial review of action of city board of adjustment is limited to inquiry whether

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action of board is arbitrary, capricious or contrary to law.

[4] Zoning and Planning 414 ⚷497

414 Zoning and Planning
414IX Variances or Exceptions
414IX(A) In General
414k492 Hardship, Loss, or Injury
414k497 k. Self-Created Hardship; Prior Knowledge. Most Cited Cases
Where size of lot, which was too small to comply with either minimum lot size requirement established by city zoning ordinance or previous county requirement, was result of lot owners' own action in participating in sale of adjacent land, lot owners, who wanted to construct residence on lot, failed to meet essential city zoning ordinance criterion for variance that plight of owner not be result of owner's action.

[5] Zoning and Planning 414 ⚷463

414 Zoning and Planning
414VIII Permits, Certificates and Approvals
414VIII(D) Effect of Determination; Revocation
414k463 k. Form, Requisites, and Validity of Permission or Certificate in General. Most Cited Cases
Lot owners, who sought to construct residence on lot which did not meet minimum lot size requirement for construction of residence under city zoning ordinance, could claim no right under 1962 building permit which was issued under mutual mistake of fact.

[6] Zoning and Planning 414 ⚷235

414 Zoning and Planning
414V Construction, Operation and Effect
414V(A) In General
414k235 k. Time of Taking Effect; Retroactive Operation. Most Cited Cases
Where lot on which owners sought to construct residence would not have qualified under county standards that required minimum of 6,000 square feet for construction of residence, lot owners could claim no right under city zoning ordinance grandfather clause which allowed construction without necessity of variance on lots which were in separate ownership at time of adoption of land use density regulations and which would have qualified as building sites under county standards.

***19 **1094** Philip P. Malone, Poulsbo, for appellants.
Benson, Chadwick, Stege & Wines, Stephen F. Chadwick, Jr., Kirk R. Wines, Seattle, for respondent.

WRIGHT, Associate Justice.
This action involves the refusal of the City of Medina to issue a building permit. The Superior Court issued a writ of mandamus requiring the city to issue the permit. The Court of Appeals reversed and the property owners have appealed.

Due to the changing positions of the parties as to being appellants or respondents, we find it more clear and convenient to refer to G. Harlan Lewis and Harry G. Lewis as 'plaintiffs' and the City of Medina as 'defendant'.

Plaintiffs' parents owned all of tract G of DeVries Lake ***20** Washington Tracts in 1942. Some time thereafter they sold the

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northerly 75 feet of tract G, which was triangular in shape. The parents had built a home near the center of the tract. Later the father died and his widow, Melita G. Lewis, with the cooperation of her sons, plaintiffs herein, sold the home. In the sale there was conveyed, for a consideration of $45,000, not only the land on which the house was located, but also a triangular-shaped tract bounded on the east by 84th Avenue N.E. with a 75-foot frontage on said avenue. The conveyance of that tract left Mrs. Lewis owning an oddshaped tract, sometimes referred to as a trapezoid, with an area of approximately 5,150 square feet.

Mrs. Lewis desired a small house on the land which remained in her ownership. She employed an architect, Roland W. Wilson, who prepared plans for such a house. Through some misunderstanding, Mr. Wilson did not know of the conveyance of the triangular tract, but thought it was merely an easement. The plans which he prepared called for a substantial part of the house to be on the land which had been conveyed. The City of Medina had not been formed at that time and Mr. Wilson went to the King County, Engineer's Office to get a building permit.

The employee in the engineer's office relied upon the plans presented by Mr. Wilson, including the statement that the area which in fact had been conveyed was only an easement. In such reliance the building permit was issued in April 1952, although no construction was undertaken.

In 1955 the City of Medina was incorporated. Mrs. Lewis died, leaving the plaintiffs herein as the owners of the 5,150 square feet of property.

In February 1972, plaintiffs applied to the City of Medina for a building permit. The matter was referred to the Board of Adjustment. The board held two hearings, received reports from the planning commission and members of the board personally made an inspection. After that, the Board of Adjustment made extensive findings of fact and supplemental findings of fact and entered a detailed decision.***21** The Board of Adjustment denied the application for a building permit.

Prior to the incorporation of the City of Medina, the King County requirement for a single family residence was 6,000 square feet (minimum lot size). After the city was incorporated, ordinances were adopted calling for sizes of lots for single family residences to be at least 16,000 square feet.

After incorporation, the City of Medina adopted certain ordinances relative to zoning.****1095** One of those ordinances contained what has been referred to as a 'grandfather clause.' It reads:

5-1.15 Separate Ownership Exception: Lot Size and Frontage.

Where a parcel of land was in separate ownership at the time of the adoption of the City's applicable residential land use density regulations and such parcel would have qualified as a building site under minimum lot size and frontage regulations applicable at the time of its acquisition by such owner, said parcel shall, without the necessity of a variance, when possessed of frontage equal to at least 85% Of that otherwise required, qualify as a single building site notwithstanding otherwise applicable lot

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size and frontage regulations, but shall in all other respects be subject to land use regulations of the district of its location.
City of Medina ordinance No. 148, s 1-1963.

Plaintiffs base their claim upon that ordinance, upon the 1952 building permit, and upon the constitutional prohibitions against the taking of property without due process of law. The constitutional argument rests upon the undisputed fact that without a building permit plaintiffs' land had little, if any, value.

[1][2] First, we shall discuss the constitutional question. It is a well-settled law that zoning is a constitutionally permissible exercise of the police power. State ex rel. Wenatchee Congregation of Jehovah's Witnesses v. Wenatchee, 50 Wash.2d 378, 312 P.2d 195 (1957). State ex rel. Miller v. Cain, 40 Wash.2d 216, 242 P.2d 505 (1952). Although the plaintiffs herein might suffer considerable financial loss-a ***22** frequent situation in zoning matters-that would not render the zoning ordinances invalid. We said in Bitts, Inc. v. Seattle, 86 Wash.2d 395, at 400, 544 P.2d 1242 at 1245 (1976):

Economic hardship cannot usually be urged as a reason for the invalidity of an otherwise valid statute or ordinance enacted under the police power. Wiegardt v. Brennan, 192 Wash. 529, 73 P.2d 1330 (1937); State v. Dexter, 32 Wash.2d 551, 202 P.2d 906, 13 A.L.R.2d 1081 (1949).

[3] Second, we shall consider the scope of review of the decision of the Board of Adjustment. The rule is well established that a judicial review of the action of a Board of Adjustment is limited to an inquiry of whether the action of the board is 'arbitrary, capricious, or contrary to law.' Reiger v. Seattle, 57 Wash.2d 651, 359 P.2d 151 (1961); Household Finance Corp. v. State, 40 Wash.2d 451, 244 P.2d 260 (1952); Durocher v. King County, 80 Wash.2d 139, 492 P.2d 547 (1972); Lillions v. Gibbs, 47 Wash.2d 629, 289 P.2d 203 (1955), Overruled on other grounds in Fleming v. Tacoma, 81 Wash.2d 292, 502 P.2d 327 (1972).

The rule is stated in L. M. Pike & Son, Inc. v. Waterford, 130 Vt. 432, 434, 296 A.2d 262, (1972):

A board of adjustment is only permitted to grant a variance from a zoning ordinance within the guidelines set forth in that zoning ordinance. Thomson Methodist Church v. Zoning Board of Review, 99 R.I. 675, 210 A.2d 138 (1965).

The action of the Board of the Adjustment herein was in accordance with the ordinance of the City of Medina. The ordinance provides:

(T)he Board shall not vary any of the rules, regulations, or provisions of the zoning ordinances unless it shall find, after public hearing, that All of the following conditions exist in each case of an application for a variance:

1. That the land and/or structure in question cannot be reasonably used, and cannot yield a reasonable return, if used only for the purposes permitted****1096** and in accordance with other requirements in the land use district in which the land and/or structure is located:

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2. That the plight of the owner is due to unique circumstances***23** which are not the general condition of the neighborhood, and Are not the result of the owner's action;

3. That the use requested by the applicant, if established, will not be of a general classification differing from the essential use provisions of the land use district in which the land and/or structure is located.

(Italics ours.) City of Medina Ordinance No. 159 (covering use of land, s 1-21.05).

[4] The present owners of the land, plaintiffs herein, had participated in the sale of the home and the tracts of land which went with the home. They had joined with their mother in the conveyance. The situation in which they found themselves, therefore, was the result of their own action, they had failed, thereby, to meet one of the essential criteria for the granting of a variance. That reason alone is adequate to support the action of the Board of Adjustment.

We will, however, state briefly a number of other reasons which support the action of the board and clearly demonstrate such action was not arbitrary and capricious, nor was it contrary to law.

[5] The plaintiffs can claim no right under the 1952 building permit. It was issued under a mutual mistake of fact. There is no reason to believe the architect, Roland W. Wilson, acted other than in the utmost good faith. He did, however, act under an erroneous understanding of the facts and so did the county engineer's office in issuing the permit. The permit went unused for 20 years. Actually plaintiffs appear not to have relied on the 1952 permit; they applied to the City of Medina for another permit which clearly indicates that they recognized they could not proceed under the old county permit.

[6] The plaintiffs can claim no right under the grandfather clause. The relevant provision contains the words 'would have qualified as a building site.'The subject property would Not have qualified under King County standards which required a minimum of 6,000 square feet. The subject***24** property contained 5,150 square feet, more or less. The subject property never 'would have qualified' to gain benefit from the grandfather clause.

We find it wholly unnecessary to discuss set-back requirements and a number of other requirements. Such a discussion would only be cumulative and would needlessly extend the length of this opinion.

We express no opinion on matters not before the court. Herein we deal with an application for a permit to construct a building which would encroach upon the land of another, and which also failed to meet other requirements. An application without the faults of the application considered herein would present new questions upon which we are not now passing.

For the reasons stated, we affirm the majority opinion of the Court of Appeals, reverse the trial court, and reinstate the decision of the Board of Adjustment.

STAFFORD, C.J., and ROSELLINI, HUNTER, HAMILTON, UTTER, BRACHTENBACH and HOROWITZ, JJ., concur.
WASH 1976.

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Lewis v. City of Medina
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Chapter 120 – VARIANCES

Sections:

120.05 User Guide
120.10 Process for Deciding Upon a Proposed Variance
120.12 Expansion or Modification of an Existing Structure
120.15 Application Information
120.20 Criteria for Granting a Variance
120.25 What May Not Be Varied

120.05 User Guide

This chapter establishes a mechanism whereby the provisions of this code can be varied on a case-by-case basis if the application of these provisions would result in an unreasonable and unusual hardship. While almost any provision may be varied, there are some limitations.

If you are interested in applying to see if a provision of this code can be varied in a particular case, or if you wish to participate in the City's decision on a proposed variance, you should read this chapter.

120.10 Process for Deciding Upon a Proposed Variance

The following subsection is not effective within the disapproval jurisdiction of the Houghton Community Council:

1. The City will use Process IIA, described in Chapter 150 KZC, to review and decide upon an application for a variance except as to property located within an RS or RSX Zone or for a detached dwelling unit in any zone. For variance applications as to property located within an RS or RSX Zone or for a detached dwelling unit in any zone, the City will use Process I described in Chapter 145 KZC; provided, however, that while the content of the notice shall be per KZC 145.22(1), the distribution of the notice shall be per KZC 150.30(2).

The following subsection is effective only within the disapproval jurisdiction of the Houghton Community Council:

2. The City will use Process IIA, described in Chapter 150 KZC, to review and decide upon an application for a variance except as to property located within an RS or RSX Zone. For variance applications as to property located within an RS or RSX Zone, the City will use Process I described in Chapter 145 KZC; provided, however, that while the content of the notice shall be per KZC 145.22(1), the distribution of the notice shall be per KZC 150.30(2).

120.12 Expansion or Modification of an Existing Structure

The following section is not effective within the disapproval jurisdiction of the Houghton Community Council.

If the expansion or modification of an existing structure requires a variance under this chapter, the Planning Director may approve such expansion or modification without requiring the variance process if all of the following criteria are met:

1. The request complies with the criteria in KZC 120.20; and

2. The gross floor area of the structure is expanded by less than five percent; and

3. The Planning Director determines that the change or alteration will not have significantly more or different impact on the surrounding area than does the present development.

An approval granted pursuant to this subsection shall be valid for a period of four years following the date of approval, during which time a complete building permit application for the expansion or modification shall be submitted to the City. Within six years following the date of approval granted pursuant to this subsection, the applicant shall substantially complete construction of the expansion or modification and any permit conditions applicable thereto, or the approval becomes null and void.

120.15 Application Information

In addition to the application materials required in Chapter 150 KZC, the applicant shall submit a completed application on the form provided by the Planning Department, along with all the information listed on that form.

120.20 Criteria for Granting a Variance

The City may grant a variance only if it finds that:

1. The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole; and

2. The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a preexisting improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed; and

3. The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.

120.25 What May Not Be Varied

The City may grant a variance to any of the provisions of this code except:

1. The City may not grant a variance to any provision establishing the uses that are permitted to locate or that may continue to operate in any zone; and

c. An analysis of the application in relation to the applicable provisions of this code and the Comprehensive Plan.

d. A statement of the facts found by the Planning Official and the conclusions drawn from those facts.

e. A recommendation on the matter.

2. Distribution – At least seven calendar days before the hearing, the Planning Official shall distribute the staff report as follows:

a. A copy will be sent to the Hearing Examiner.

b. A copy will be sent to the applicant.

150.40 Open Record Hearing

1. General – The Hearing Examiner shall hold an open record hearing on each application.

2. Hearing Declared Open – The hearings of the Hearing Examiner are open to the public.

150.45 Electronic Sound Recording

The Hearing Examiner shall make a complete electronic sound recording of each public hearing.

150.50 Burden of Proof

The applicant has the responsibility of convincing the Hearing Examiner that, under the provisions of this chapter, the applicant is entitled to the requested decision.

150.55 Participation at the Hearing

Any person may participate in the hearing in either or both of the following ways:

1. By submitting written testimony or comments to the Hearing Examiner, either by delivering the testimony or comments to the Planning Department prior to the hearing or by giving it directly to the Hearing Examiner at the hearing.

2. By appearing in person, or through a representative, at the hearing and providing oral testimony or comments directly to the Hearing Examiner. The Hearing Examiner may reasonably limit the extent of oral testimony and comments to facilitate the orderly and timely conduct of the hearing.

150.60 Continuation of the Hearing

The Hearing Examiner may continue the hearing if, for any reason, he/she is unable to hear all of the public comments on the matter or if the Hearing Examiner determines that he/she needs more information on the matter. However, if the continuation of the hearing would result in the Hearing Examiner not complying with the time limit for issuing his/her decision consistent with KZC 150.65, the Hearing

Patrick & Michelle McClusky
13035 110th Ave NE
Kirkland, WA 98034
425-821-4106
Pat.stuff@verizon.net

I oppose the moving of the substation to its new location behind my home!!
Reasons:

1. I deliberately chose the home I am in after looking at another house down the street that had the substation in question behind it, and I paid more money for my home to NOT have a substation behind it, that was in 1979. I WAS hoping to live here the rest of my life, but that is now in question.

2. Noise: The man from PSE admitted that there was a fair amount of noise coming from the substation but the wall will defuse most of it. (I think he said 45 decibels). That's a lot of noise, more than ½ the sound of a vacuum cleaner (80 decibels) ALL the time!! I doubt if the wall will defuse very much.

3. Set back variances: I totally reject the idea that you can just change the 20 foot setback to 13 feet setback, and with an 18 foot high wall. I measured it, so do you know what an 18 foot wall looks like at 13 feet??? I grow blueberries, grapevines and various other crops along my back fence and with a wall like that they will be shadowed early in the afternoon. This will greatly diminish my crop, if not prevent it from ripening. I use my backyard a lot, we have spent 10's of thousands of dollars to improve it so we can sit and enjoy our yard, the wall will destroy all that. 20 feet is the code, no substation behind us is preferred.

4. I've seen the wall material they will use (in a Bellevue application) and it is ugly with no aesthetic value (looks better in the picture than in person), very plastic looking. With a wall 18 feet high and almost 1,000 feet long it magnifies its unsightly appearance (especially at 13 feet away).

5. Electromagnetic fields: We asked at one of the initial meetings and they said they had not thought about that. I find that hard to believe in this day and age. I did notice the statement on the PDF file online with a typical brush off statement that had NO facts or data to it and basically said it didn't matter. It does matter to our health and we have to live with it day and night!!

6. There is a property by Juanita High School, across the street from the current substation that would NOT offend anyone or encroach on anyone's property. It is said to be wetlands but that has been changed before (Aegis and apartments built in the same wet lands), and the stream can be diverted. Besides it's more of a high school drinking area than a wet land. <u>That is a perfect location for a substation</u> and it would eliminate a hang-out for high school drinking.

CITY OF KIRKLAND
Hearing Examiner Exhibit
Applicant ____
Department ____
Public ✓
FILE # ZON08-00010
J

7. I am in favor of improvements to the substation; I just think they need to place it in a less offensive and a more proper location. The people who bought a house with the substation behind it did so knowing it was there and they accepted that, now you are changing that scenario, and it will lower my property value significantly (I already have secured a lawyer who WILL sue for the loss of property value if the project continues) and will reduce the use value of my property and personal value to me, ruining something I have built over the years at great cost to me. If they put it across the street by the school the people who already have the substation in their backyard will benefit from the move, instead of devaluing many homes with a poor placement of a new substation at the currently proposed site.

CITY OF KIRKLAND
Hearing Examiner Exhibit
Applicant ____
Department ____
Public ✓
FILE # ZON 08-00010

K

December 4th 2008

Tony Leavitt
Project Planner – City of Kirkland
123 5th Avenue
Kirkland, WA
98033

Re: Permit No. ZON08-00010 – Juanita Substation

As a resident of the Juanita neighborhood in Kirkland I oppose the construction of PSE Substation located in the residential area between 110th and 109th Ave NE adjacent to 132nd ST, for several reasons:

1. The substation will be detrimental to the properties and improvements made in the immediate residential area. A construction of such magnitude is completely out of scale for the neighborhood and it will negatively affect the value of our homes.
2. There are other viable areas available for the construction of such structure that are not so close to residencies.
3. The proposed substation will be too tall (35 feet), and too noisy to be located in a residential area.
4. The proposed substation will be too close (13 feet) to the property line of the adjacent homes.
5. In order to build the substation, at least 11 trees located in <u>our properties</u> will have to be shaved in half, removed or their root system ultimately affected. These are trees that some home owners had to protect before performing construction work on their homes and backyards, as it was required by City of Kirkland officials and regulations. For the City to allow PSE to affect these trees is a double standard.
6. The risk represented by an electromagnetic field of such magnitude is still in question. There is no proof that such structure would be safe, in fact recent studies reveal the non-ionizing radiation is detrimental to human health and is related to cancer.

For City of Kirkland to grant this permit to PSE will be considered a special privilege, inconsistent with the general rights the code allows for home owners in the same area and zone as the proposed location.

I oppose the approval of the variances, as they exist for a reason. The specifications and the design of the proposed substation does not constitute a special circumstance and if the substation simple has to have those specifications then it should be build on a bigger lot where no variances would be needed and where it would not be detrimental to the area. After all it is the project that is subject to the law and not the other way around.

As a resident of Kirkland I urge you to not approve this proposal, and I reserve my right to take further legal action if the permit is approved.

Troy Freeman (Homeowner)
13045 110th Ave. NE
Kirkland, WA. 98034
(206) 948-2355

RIDDELL WILLIAMS P.S.

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December 4, 2008

Hearing Examiner, City of Kirkland
c/o Planning and Community Development Department
123 5th Avenue
Kirkland, WA 98033

Re: Puget Sound Energy Electrical Substation; File No. ZON08-00010

Dear Hearing Examiner:

I am submitting this letter on behalf of Puget Sound Energy in support of its application to rebuild an electric power distribution substation on property containing an existing substation, Parcel #292605-9007, between NE 128th St. and NE 132nd St. in the City of Kirkland.

Consistency of the proposal with the decision criteria for Process IIA and for the requested variances is discussed and well documented in the Advisory Report Findings, Conclusions and Recommendations to the Kirkland Hearing Examiner ("Staff Report"), and also in PSE's application materials (Attachments 3 and 4 to the Staff Report).

This letter is not intended to duplicate all of the analysis in the Staff Report and the application materials. Instead it is intended to provide additional discussion to supplement the analysis already in the record as to some of the decision criteria for Process IIA and the variances.

I. COMPLIANCE WITH PROCESS IIA CRITERION: CONSISTENT WITH PUBLIC HEALTH, SAFETY AND WELFARE

Kirkland Zoning Code ("KZC") Section 150.65.3 sets forth the decision criteria concerning a Process IIA application, and KZC Section 17.10.070, Use Zone Chart for Zone RSX, states an additional Special Regulation concerning site design and adverse impacts on surrounding residential neighborhoods.

Impact on surrounding properties is addressed at length in the Staff Report and the PSE application materials (and also in this letter) concerning compliance with the variance criteria. One of the other Process IIA criteria is consistency with public health, safety and welfare. The discussion below provides supplemental information about compliance with this criterion.

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Department
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FILE # ZON08-00010
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A. Land Use Element of Comprehensive Plan Projects Growth

PSE is obligated to provide reliable electrical service to its customers and respond to a growing demand for electricity resulting from growth within its service area. Adequate utility service is essential to public health, safety and welfare, and certain utility infrastructure that is essential to support residential communities must be located in proximity to the City's residential communities. According to population data set forth in the Kirkland Comprehensive Plan, Section I-3, Table I-1,, the City's population has increased from about 6,000 in 1960 (about the time the Juanita Substation was constructed) to more than 45,000 in 2000, and a population of 58,000 is anticipated by the year 2030.

B. Utilities Element of Comprehensive Plan References Need for Distribution Substations

The Kirkland Utilities Element of the Comprehensive Plan specifically identifies need for new distribution substations within the City:

> ***Puget Sound Energy: Electricity and Natural Gas***
>
> *PSE's long-range plans through the year 2022 indicate the need for three new distribution substations in Kirkland . . . .*

City of Kirkland Comprehensive Plan, XI-11 (p. 223 of Staff Report). Although it is rebuilding an existing substation and increasing its capability by adding an additional transformer at this existing location, rather than developing a fully new substation site, PSE's rebuild of the Juanita substation is in compliance with the Comprehensive Plan.

II. COMPLIANCE WITH VARIANCE CRITERIA

A. Parcel Orientation Helps Maintain the Function of Side Yard Setback and Mitigates the Effect of the Variance

An additional factor supporting compliance with the "not materially detrimental" variance criterion is that the subject parcel is located at a 90 degree orientation (i.e., perpendicular) to the long dimension (sideyard) of the adjoining residential properties. Thus, the side yards of the substation property adjoins the rear yards of the residential properties, unlike in a typical configuration where the substation side yards would adjoin the side yard of the residential properties.

This means that the residences themselves are separated from the substation by their deeper rear yards, resulting in greater separation between the homes and the substation than would be the case in a typical configuration of side-by-side lots. Because of this greater separation, together with the passive nature of the

particular utility use, discussed in the subsection below, the function of side yard setback for utility uses is not significantly compromised by the variances requested in this situation. The requested variances do not cause any additional noise or any noticeable activity to be brought close to the residences. Also, the maximum height of the substation, except for the new transmission pole, is considerably lower than the 30 foot height that would be allowed on the site without any variances.

B. Passive Nature of the Infrastructure is Relevant to the "Not Materially Detrimental" Criterion

Unlike some utility installations such as transfer stations, treatment plants, or repair/maintenance facilities, an electrical distribution substation is basically a passive element of utility infrastructure. This further enhances its compatibility with neighboring properties. The PSE substation is an unstaffed facility; there are no traffic or parking impacts; there are no potential impacts on privacy which might occur if a staffed facility were proposed here. Also, no activity will take place within the sideyard setbacks, such as driveways or parking. The setback areas will used only as landscaped buffer areas.

C. Obligation to Provide Reliable Electrical Service is Relevant to the "No Special Privilege" Criterion

An additional factor demonstrating compliance with this application with variance criterion 3 (i.e., not a grant of special privilege inconsistent with rights of other properties in the area and zone) is that PSE is required to provide reliable electrical power to the Kirkland community. Other properties in the same zone and area do not have the same duty to serve the public health, safety and welfare as is imposed upon PSE by state law and the WUTC (Washington Utilities and Transportation Commission).

D. Lengthy Use of the Property for Utility Infrastructure is Relevant to both the "Special Circumstances" Criterion and the "No Special Privilege" Criterion

PSE acquired the subject property by Statutory Warranty Deed dated May 12, 1958 (King County Recording No. 4900411). The substation was in operation by the mid-1960's. An electrical transmission line traversing the length of the property has been operation from at least that time to the present. This factor should be taken into account concerning compliance with Variance Criterion 2, which references, among other factors "the location of preexisting improvements on the subject property that conformed to the Zoning Code in effect when the improvement was constructed." It should also be noted that PSE purchased this property for utility use at about the same time that this area of Kirkland was being developed into residential subdivisions. The

King County Assessor's website show that all of the homes adjoining the PSE property were constructed in 1962 or 1963.

III. GENERALIZED COMMUNITY OPPOSITION IS NOT A PROPER BASIS FOR PERMIT DENIAL

During the course of permit review, some neighboring property owners have indicated opposition to the substation proposal. As noted in the Staff Report, the issues identified in opposition to the project focus primarily on aesthetics, noise and health concerns. These are appropriate factors are consideration in a discretionary land use decision, and as noted in the Staff Report, each of these concerns has been properly addressed by either the imposition of mitigating conditions or provision of additional information about the project characteristics.

However, Washington law is clear that generalized community opposition, or unsubstantiated fears, in contrast to specific adverse impacts, is not an appropriate basis for permit denial. For example, in *Marantha Mining v. Pierce County,* 59 Wn. App. 795 (1990), the County Council denied a permit for a unclassified use, even though the applicant was able to mitigate all adverse impact issues that the project opponents raised, and the Hearing Examiner had found that the proposed use complied with all land use regulations and would not cause adverse impacts. In overturning the permit denial, the Court noted that the Council "based its decision on community displeasure and not on reasons backed by policies and standards as the law requires." *Marantha Mining,* 59 Wn. App. at 805. *See also Dep't of Corrections v. City of Kennewick,* 86 Wn. App. 521, 533-34, 937 P.2d 1119 (1997) ("neighborhood fears that are not substantiated are not relevant"), *review denied*, 134 Wn.2d 1002, 953 P.2d 95 (1998).

Here, as is well documented in the record, adverse impacts have been mitigated and the project meets the legal criteria for approval set forth in the City's code. Further, the only SEPA appeal that was filed to challenge the mitigation conditions required by the City was limited to whether substation construction would adversely affect a particular tree. The City's environmental determination on other issues, or adequacy of mitigation measures, has not been appealed.

IV. CONCLUSION

The proposed electrical distribution substation is an essential part of an interconnected transmission and distribution grid providing electricity to the local community. The Kirkland Comprehensive Plan anticipates growth in population and households, and specifically mentions need for new distribution substations within the Kirkland area.

This property has been a utility corridor for almost 50 years. The existing substation was built there in 1960, and transmission lines have traversed the length of the parcel during that entire time, prior to construction of the adjoining homes.

Project modifications and mitigation measures required by the City through its permit review process ensure that the substation responds appropriately to the existing site conditions and the surrounding properties, and will not be materially detrimental to uses or properties in the vicinity. Potential noise impacts have been mitigated through use of the sound barrier walls, and visual impacts are mitigated by landscaping, architectural treatment of the wall surfaces, and removal of electrical distribution poles and distribution wires. Although a SEPA appeal was filed, it was limited to a very specific tree impact and did not challenge the analysis of any other project impacts or the adequacy of other mitigation conditions.

The proposed project complies with applicable criteria for approval in the Kirkland Zoning Code and is consistent with the Kirkland Comprehensive Plan. Pursuant to the City's decision criteria, the project should be approved.

Very truly yours,

Robert I. Heller

Robert I. Heller
of
RIDDELL WILLIAMS P.S.

RIH/ap
Our File: 44901.118

NIEHS REPORT on

Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields

Prepared in Response to the 1992 Energy Policy Act (PL 102-486, Section 2118)

NIEHS

National Institute of Environmental Health Sciences
National Institutes of Health

Supported by the NIEHS/DOE

EMF RAPID

NIH Publication No. 99-4493

NIEHS REPORT on

Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields

Prepared in Response to the 1992 Energy Policy Act
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National Institute of Environmental Health Sciences
National Institutes of Health

Dr. Kenneth Olden, Director

Prepared by the
NIEHS EMF-RAPID Program Staff

NIH Publication No. 99-4493

Supported by the NIEHS/DOE

DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

National Institutes of Health
National Institute of
Environmental Health Sciences
P. O. Box 12233
Research Triangle Park, NC 27709

May 4, 1999

Dear Reader:

In 1992, the U.S. Congress authorized the Electric and Magnetic Fields Research and Public Information Dissemination Program (EMF-RAPID Program) in the Energy Policy Act. The Congress instructed the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health and the U.S. Department of Energy (DOE) to direct and manage a program of research and analysis aimed at providing scientific evidence to clarify the potential for health risks from exposure to extremely low frequency electric and magnetic fields (ELF-EMF). The EMF-RAPID Program had three basic components: 1) a research program focusing on health effects research, 2) information compilation and public outreach and 3) a health assessment for evaluation of any potential hazards arising from exposure to ELF-EMF. The NIEHS was directed to oversee the health effects research and evaluation, and the DOE was given the responsibility for overall administration of funding and engineering research aimed at characterizing and mitigating these fields. The Director of the NIEHS was mandated upon completion of the Program to provide this report outlining the possible human health risks associated with exposure to ELF-EMF. The scientific evidence used in preparation of this report has undergone extensive scientific and public review. The entire process was open and transparent. Anyone who wanted “to have a say” was provided the opportunity.

The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects have been reported. No indication of increased leukemias in experimental animals has been observed.

The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the "right" species, are tied to "real life" exposures and show some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor or common source of error could explain these findings. However, no consistent explanation other than exposure to ELF-EMF has been identified.

Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.

The NIEHS concludes that ELF-EMF exposure cannot be recognized at this time as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In my opinion, the conclusion of this report is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

The interaction of humans with ELF-EMF is complicated and will undoubtedly continue to be an area of public concern. The EMF-RAPID Program successfully contributed to the scientific knowledge on ELF-EMF through its support of high quality, hypothesis-based research. While some questions were answered, others remain. Building upon the knowledge base developed under the EMF-RAPID Program, meritorious research on ELF-EMF through carefully designed, hypothesis-driven studies should continue for areas warranting fundamental study including leukemia. Recent research in two areas, neurodegenerative diseases and cardiac diseases associated with heart rate variability, have identified some interesting and novel findings for which further study is ongoing.

Advocacy groups have opposing views concerning the health effects of ELF-EMF. Some advocacy groups want complete exoneration and others want a more serious indictment. Our conclusions are prudent and consistent with the scientific data. I am satisfied with the report and believe it provides a pragmatic, scientifically-driven basis for any further regulatory review.

I am pleased to transmit this report to the U.S. Congress.

Sincerely,

Kenneth Olden, Ph.D.
Director

NIEHS EMF-RAPID PROGRAM STAFF

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Mary S. Wolfe, Ph.D., Associate Coordinator, EMF Hazard Evaluation, Environmental Toxicology Program

ACKNOWLEDGEMENTS

This report would not have been possible without the concerted and generous help of literally hundreds of research scientists. Many of the scientists who wrote the articles, which are cited in this report, attended our science review symposia where their research was carefully evaluated and critiqued. Their patience with our questions and their professional attitude in evaluating their own work was extraordinary and is greatly appreciated. We are also indebted to the many scientists from outside of the electric and magnetic fields (EMF) research community who participated in our symposia and spent time and effort evaluating these data on our behalf; this provides a clear example of the dedication of scientists concerned about health issues.

Special thanks are extended to the 30 scientists who attended the Working Group Meeting in June 1998. Their hard work and conscientious effort led to one of the most concise and clear reviews of the extremely low frequency (ELF) EMF literature ever developed. The thousands of man-hours extended by this group in such a short period of time provided us with a background document on ELF-EMF health risks that made this report a much simpler task. We wish especially to thank Dr. Arnold Brown for attending our public meetings on the Working Group Report; his extensive experience and insightful comments helped to make these meetings a great success. We would also like to thank Dr. Brown and Dr. Paul Gailey for reviewing this report prior to its release and Mr. Fred Dietrich for advising us on exposure issues during the preparation of this document. Finally we would like to acknowledge the U.S. Department of Energy as our partner in the EMF-RAPID Program and its EMF program officer, Dr. Imre Gyuk.

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EXECUTIVE SUMMARY

Introduction

Electrical energy has been used to great advantage for over 100 years. Associated with the generation, transmission, and use of electrical energy is the production of weak electric and magnetic fields (EMF). In the United States, electricity is usually delivered as alternating current that oscillates at 60 cycles per second (Hertz, Hz) putting fields generated by this electrical energy in the extremely low frequency (ELF) range.

Prior to 1979 there was limited awareness of any potential adverse effects from the use of electricity aside from possible electrocution associated with direct contact or fire from faulty wiring. Interest in this area was catalyzed with the report of a possible association between childhood cancer mortality and proximity of homes to power distribution lines. Over the next dozen years, the U.S. Department of Energy (DOE) and others conducted numerous studies on the effects of ELF-EMF on biological systems that helped to clarify the risks and provide increased understanding. Despite much study in this area, considerable debate remained over what, if any, health effects could be attributed to ELF-EMF exposure.

In 1992, the U.S. Congress authorized the Electric and Magnetic Fields Research and Public Information Dissemination Program (EMF-RAPID Program) in the Energy Policy Act (PL 102-486, Section 2118). The Congress instructed the National Institute of Environmental Health Sciences (NIEHS), National Institutes of Health and the DOE to direct and manage a program of research and analysis aimed at providing scientific evidence to clarify the potential for health risks from exposure to ELF-EMF. The EMF-RAPID Program had three basic components: 1) a research program focusing on health effects research, 2) information compilation and public outreach and 3) a health assessment for evaluation of any potential hazards arising from exposure to ELF-EMF. The NIEHS was directed to oversee the health effects research and evaluation and the DOE was given the responsibility for overall administration of funding and engineering research aimed at characterizing and mitigating these fields. The Director of the NIEHS was mandated upon completion of the Program to provide a report outlining the

possible human health risks associated with exposure to ELF-EMF. This document responds to this requirement of the law.

This five-year effort was signed into law in October 1992 and provisions of this Act were extended for one year in 1997. The Program ended December 31, 1998. The EMF-RAPID Program was funded jointly by Federal and matching private funds and has been an extremely successful Federal/private partnership with substantial financial support from the utility industry. The NIEHS received $30.1 million from this program for research, public outreach, administration and the health assessment evaluation of ELF-EMF. In addition to EMF-RAPID Program funds from the DOE, the NIEHS contributed $14.5 million for support of extramural and intramural research including long-term toxicity studies conducted by the National Toxicology Program.

NIEHS Conclusion

The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects (including increased cancers in animals) have been reported. No indication of increased leukemias in experimental animals has been observed.

The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the “right” species, are tied to “real-life” exposures and show some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor or common source of error could explain these findings. However, no consistent explanation other than exposure to ELF-EMF has been identified.

Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this

association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.

The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

The interaction of humans with ELF-EMF is complicated and will undoubtedly continue to be an area of public concern. The EMF-RAPID Program successfully contributed to the scientific knowledge on ELF-EMF through its support of high quality, hypothesis-based research. While some questions were answered, others remain. Building upon the knowledge base developed under the EMF-RAPID Program, meritorious research on ELF-EMF through carefully designed, hypothesis-driven studies should continue for areas warranting fundamental study including leukemia. Recent research in two areas, neurodegenerative diseases and cardiac diseases associated with heart rate variability, have identified some interesting and novel findings for which further study is ongoing.

Background

Program Oversight and Management

The 1992 Energy Policy Act created two committees to provide guidance and direction to this program. The first, the Interagency Committee (IAC), was established by the President of the United States and composed of representatives from the NIEHS, the DOE and seven other Federal agencies with responsibilities related to ELF-EMF. This group receives the report from the NIEHS Director and must prepare its own report for Congress. The IAC had responsibility for developing a strategic research agenda for the EMF-RAPID Program, facilitating interagency coordination of Federal research activities and communication to the public and monitoring and evaluating the Program.

The second committee, the National EMF Advisory Committee (NEMFAC), consisted of representatives from public interest groups, organized labor, state governments and industry. This group was involved in all aspects of the EMF-RAPID Program providing advice and critical review to the DOE and the NIEHS on the design and implementation of the EMF-RAPID Program's activities.

ELF-EMF Health Effects Research

The EMF-RAPID Program's health effects research initiative relied upon accepted principles of hazard identification and risk assessment to establish priorities. All studies supported by the NIEHS and the DOE under this program were selected for their potential to provide solid, scientific data on whether ELF-EMF exposure represents a human health hazard, and if so, whether risks are increased under exposure conditions in the general population. Research efforts did not focus on epidemiological studies (i.e. those in the human population) because of time constraints and the number of ongoing, well-conducted studies. The NIEHS health effects research program focused on mechanistic, cellular and laboratory studies in the areas of neurophysiology, behavior, reproduction, development, cellular research, genetic research, cancer and melatonin. Mechanistic, cellular and laboratory studies are part of the overall criteria used to determine causality in interpreting epidemiological studies. In this situation, the most cost-effective and efficient use of the EMF-RAPID Program's research funds was clearly for trying to clarify existing associations identified from population studies. The DOE research initiatives focused on assessment of exposure and techniques of mitigation.

The EMF-RAPID Program through the combined efforts of the NIEHS and the DOE radically changed and markedly improved the quality of ELF-EMF research. This was accomplished by providing biological and engineering expertise to investigators and emphasizing hypothesis-driven, peer-reviewed research. Four regional facilities were also set-up where state-of-the-art magnetic field exposure systems were available for in-house and outside investigators to conduct mechanistic research. The EMF-RAPID Program through rigorous review and use of multi-disciplinary research teams greatly enhanced the understanding of the interaction of biological systems with ELF-EMF.

Information Dissemination and Public Outreach

The EMF-RAPID Program provided the public, regulated industry and scientists with useful, targeted information that addressed the issue of uncertainty regarding ELF-EMF health effects. Two booklets, a question and answer booklet on ELF-EMF and a layman's booklet addressing ELF-EMF in the workplace, were published. A telephone information line for ELF-EMF was available where callers could request copies of ELF-EMF documents and receive answers to standard questions from operators. The NIEHS also developed a web-site for the EMF-RAPID Program where all of the Program's documents are on-line and links are available to other useful sites on ELF-EMF. Efforts were made to include the public in EMF-RAPID Program activities through sponsorship of scholarships to meetings; holding open, scientific workshops; and setting aside a two-month period for public comment and review on ELF-EMF and the workshop reports. In addition, the NIEHS sponsored attendance of NEMFAC

members at relevant scientific meetings and at each of the public comment meetings.

Health Risk Assessment of ELF-EMF Exposure

In preparation of the NIEHS Director's Report, the NIEHS developed a process to evaluate the potential health hazards of ELF-EMF exposure that was designed to be open, transparent, objective, scholarly and timely under the mandate of the 1992 Energy Policy Act. The NIEHS used a three-tiered strategy for collection and evaluation of the scientific information on ELF-EMF that included: 1) three science review symposia for targeted ELF-EMF research areas, 2) a working group meeting and 3) a period of public review and comment. Each of the three symposia focused on a different, broad area of ELF-EMF research: mechanistic and cellular research (24-27 March 1997, Durham, NC), human population studies (12-14 January 1998, San Antonio, TX) and laboratory human and clinical work (6-9 April 1998, Phoenix, AZ). These meetings were aimed at including a broad spectrum of the research community and the public in the evaluation of ELF-EMF health hazards, identifying key research findings and providing opinion on the quality of this research. Discussion reports from small discussion groups held for specific topics were prepared for each meeting.

Following the symposia, a working group meeting (16-24 June 1998, Brooklyn Park, MN) was held where a scientific panel reviewed historical and novel evidence on ELF-EMF and determined the strength of the evidence for human health and biological effects. Stakeholders and the public attended this meeting and were given the opportunity to comment during the process. The Working Group conducted a formal, comprehensive review of the literature for research areas identified from the symposia as being important to the assessment of ELF-EMF-related biological or health effects. Separate draft documents covering areas of animal carcinogenicity, animal non-cancer findings, physiological effects, cellular effects, theories and human population studies (epidemiology studies) in children and adults for both occupational and residential ELF-EMF exposures were rewritten into a single book. The Working Group characterized the strength of the evidence for a causative link between ELF-EMF exposure and disease in each category of research using the criteria developed by the International Agency for Research on Cancer (IARC).

The IARC criteria fall into four basic categories: sufficient, limited, inadequate and evidence suggesting the lack of an effect. After critical review and discussion, members of the Working Group were asked to determine the categorization for each research area; the range of responses reflected the scientific uncertainty in each area. A majority of the Working Group members concluded that childhood leukemia and adult chronic lymphocytic leukemia from occupational exposure were areas of concern. For other cancers and for non-cancer health endpoints, the Working Group categorized the experimental data as

providing much weaker evidence or no support for effects from exposure to ELF-EMF.

Following the Working Group Meeting, the NIEHS established a formal review period for solicitation of comments on the symposia and Working Group reports. The NIEHS hosted four public meetings (14-15 September 1998, Tucson, AZ; 28 September, Washington, DC; 1 October 1998, San Francisco, CA; and 5 October 1998, Chicago, IL) where individuals and groups could voice their opinions; the meetings were recorded and transcripts prepared. In addition, the NIEHS received 178 written comments that were also reviewed in preparation of this report. The remarks that NIEHS received covered many areas related to ELF-EMF and provided insight about areas of concern on behalf of the public, researchers, regulatory agencies and industry.

INTRODUCTION

Electricity is used to the benefit of people all over the world. Wherever electricity is generated, transmitted or used, electric fields and magnetic fields are created. These fields are a direct consequence of the presence and/or motion of electric charges. It is impossible to generate and use electrical energy without creating these fields; hence they are an inevitable consequence of our reliance on this form of energy. Electrical energy is generally supplied as alternating current where the electricity flows in one direction and then in the other to complete a cycle. The number of cycles completed in a fixed period of time (such as a second) is known as the frequency and is generally measured in units of Hertz (Hz), which are cycles per second. In the United States, electricity is usually delivered as 60 Hz alternating current; 50 to 60 Hz cycles are generally referred to as the power-line frequency of alternating current electricity. Just as alternating current electricity has a frequency, so do the associated electric and magnetic fields (EMF). Thus, 60 Hz alternating current electricity will generate a 60 Hz electric field and a 60 Hz magnetic field. EMF with cycle frequencies of greater than 3 Hz and less that 3000 Hz is generally referred to as extremely low frequency (ELF) EMF. In addition to magnetic fields associated with electricity, the earth also has a static magnetic field (frequency of 0 Hz) that varies by location from approximately 30 to 50 μT.

Electricity has been used, to great advantage, for 100 years and with this widespread use, there has been limited awareness of any potential adverse health effects other than effects caused by direct contact such as electrocution or by faulty wiring such as fire. Research into potential health effects caused by the ELF-EMF resulting from indirect exposure to electrical energy has been underway for several decades. The catalyst that sparked increased study in this area of research was the 1979 report by Wertheimer and Leeper (*1*) that children living near power lines had an increased risk for developing cancer. Since that initial finding, there have been numerous studies of human populations, animals and isolated cells aimed at clarification of the observations of Wertheimer and Leeper and others. Despite this multitude of research, considerable debate remains over what, if any, health effects can be attributed to ELF-EMF exposure.

In 1992, under the Energy Policy Act (PL 102-486, Section 2118), the U.S. Congress instructed the National Institute of Environmental Health Sciences

(NIEHS), National Institutes of Health and the U.S. Department of Energy (DOE) to direct and manage a program of research and analysis aimed at providing scientific evidence to clarify the potential for health risks from exposure to ELF-EMF. This resulted in formation of the EMF Research and Public Information Dissemination Program (EMF-RAPID Program). The EMF-RAPID Program had three basic components: 1) a research program focusing on health effects research primarily through mechanistic studies of ELF-EMF and engineering research targeting measurement, characterization and management of ELF-EMF; 2) information compilation and dissemination through brochures, public outreach and an ELF-EMF information line for communicating with the public; and 3) a health assessment including an analysis of the research data aimed at summarizing the strength of the evidence for evaluation of any hazard possibly arising from exposure to ELF-EMF. The NIEHS was directed to oversee the health effects research and evaluation and the DOE was given responsibility for engineering research aimed at characterizing and mitigating these fields. Under the Energy Policy Act, the Director of the NIEHS is mandated upon completion of the EMF-RAPID Program to provide a report outlining the possible human health risks associated with exposure to ELF-EMF. This document responds to this requirement of the law.

Funding

The EMF-RAPID Program was funded jointly by Federal and matching private funds; through fiscal year 1998, authorized funding for this program was approximately $46 million. Administration of funding for the EMF-RAPID Program was the responsibility of the DOE with funds for NIEHS-sponsored program activities transferred from the DOE to the NIEHS. The EMF-RAPID Program has been an extremely successful Federal/private partnership with substantial financial support from the utility industry. The NIEHS received $30.1 million from this program for research, public outreach, administration and the health assessment evaluation of ELF-EMF. Of the funds received, the NIEHS spent the majority (89%) for research through grants and contracts. The remainder was used for public outreach/administration (2%) and the health risk evaluation (9%). In addition to EMF-RAPID Program funds from the DOE, the NIEHS contributed $14.5 million for support of extramural grants and contracts and intramural research as well as long-term toxicity studies conducted by the National Toxicology Program.

Oversight and Program Management

The 1992 Energy Policy Act created two committees that have provided guidance and direction to the EMF-RAPID Program. One committee is the Interagency Committee (IAC) and is composed of representatives from NIEHS, DOE and the seven Federal agencies (listed below) with responsibilities related to ELF-EMF:

- Department of Defense
- Department of Transportation
- Environmental Protection Agency
- Federal Energy Regulatory Commission
- National Institute of Standards and Technology
- Occupational Safety and Health Administration
- Rural Electrification Administration

The IAC, which was established by the President of the United States, will receive the report from the NIEHS Director, and must prepare its own report for Congress. The IAC had responsibility for developing a strategic research agenda for the Program, making recommendations for coordination of Federal research activities and communication to the public and monitoring and evaluating the EMF-RAPID Program.

The second committee is the National Electric and Magnetic Fields Advisory Committee (NEMFAC) that consists of representatives from public interest groups, organized labor, state governments and industry. This group advised DOE and NIEHS on design and implementation of the EMF-RAPID Program and provided input and recommendations to the IAC. The NEMFAC was involved in all aspects of the EMF-RAPID Program, providing critical public review throughout the process of evaluating evidence for potential health effects.

ELF-EMF Health Effects Research

The research initiative sponsored under the EMF-RAPID Program's health effects research program relied on the accepted principles of hazard identification and risk assessment to establish priorities. All studies supported by the NIEHS and the DOE under this program were selected for their potential to provide solid, scientific data on whether ELF-EMF exposure represents a human health hazard, and if so, whether risks are increased under exposure conditions in the general population.

Research efforts did not focus on epidemiological studies (i.e. those in the human population) because of time constraints and the number of ongoing, well-conducted studies. The NIEHS health effects research program focused on

mechanistic, cellular and laboratory studies in the areas of neurophysiology, behavior, reproduction, development, cellular research, genetic research, cancer and melatonin. Information about the health effects research projects that were supported by the NIEHS is compiled into a booklet (*2*). Mechanistic, cellular and laboratory studies are part of the overall criteria used to determine causality in interpreting epidemiological studies. In this situation, the most cost-effective and efficient use of the EMF-RAPID Program's research funds was clearly for trying to clarify existing associations identified from population studies. The DOE research initiatives focused on assessment of exposure and techniques of mitigation. Presentation of the DOE-sponsored research was presented at an engineering review symposium in April 1998 (*3*).

The EMF-RAPID Program through the combined efforts of the NIEHS and the DOE radically changed and markedly improved the quality of ELF-EMF research. This was accomplished by providing biological and engineering expertise to investigators and emphasizing hypothesis-driven, peer-reviewed research. These efforts resulted in better exposure systems, better documentation of the exposure systems and more complete reporting of the exposures in the literature. The EMF-RAPID Program through rigorous review and use of multi-disciplinary research teams greatly enhanced the understanding of the interaction of biological systems with ELF-EMF.

The EMF-RAPID Program, in a collaborative effort between the DOE and NIEHS, established four regional ELF-EMF exposure facilities where state-of-the-art magnetic field exposures could be conducted. Two facilities were located in DOE laboratories (Pacific Northwest Laboratories, Richland, WA and Oak Ridge National Laboratories, Oak Ridge, TN) while NIEHS oversaw ELF-EMF exposure facilities at the Food and Drug Administration (FDA, Rockville, MD) and at the National Institute for Occupational Safety and Health (NIOSH, Cincinnati, OH). During the course of the EMF-RAPID Program, these facilities focused on in-house mechanistic studies, and advances were made in conducting studies that have minimal bias. These centers also served as sites for investigators who wanted to conduct preliminary investigations without the expense of having to build their own exposure facilities.

Information Dissemination and Public Outreach

One of the three major components of the EMF-RAPID Program is dissemination of information on ELF-EMF. Both NIEHS and DOE share responsibility for the communication aspects of the program and jointly developed an outreach plan and oversaw its implementation. Both the IAC and NEMFAC reviewed information materials developed under this program.

The EMF-RAPID Program provided information to any interested parties about possible human health effects of ELF-EMF, the types and extent of human

exposure, technologies for measuring and characterizing fields, methods for assessing and managing exposure and other topics specified in the legislation. The Program strove to provide the public, regulated industry and scientists with useful, targeted information based upon established risk communication principles (*4, 5*). The communication program candidly addressed the issue of scientific uncertainty regarding ELF-EMF health effects and the overall complexity of the ELF-EMF issue, while providing information in a format appropriate for a variety of audiences.

The EMF-RAPID Program developed a question and answer booklet on ELF-EMF that was published in January 1995. This booklet is easy to read and has become very popular with more than 100,000 copies distributed nationwide. Because of the diversity of the U.S. population and the needs of the Spanish speaking community, a Spanish version of this booklet was also developed and more than 10,000 copies have been distributed. The EMF-RAPID Program, in conjunction with NIOSH, also developed and published a booklet entitled "EMF in the Workplace" in September 1996. This publication provides basic information in lay terms about ELF-EMF exposures in the workplace.

The EMF-RAPID Program made available an ELF-EMF public information line where interested parties could call with questions about ELF-EMF and request information. The U.S. Environmental Protection Agency (EPA) initiated this telephone line with funds from the EMF-RAPID Program in 1995 and transferred its oversight to the NIEHS in August 1997. The information line was open 10 hours a day for five days a week and received approximately 380 calls per month. Callers were provided copies of the ELF-EMF public information documents, and the operators were trained to give accurate responses to standard questions.

The NIEHS took the lead in developing the EMF-RAPID Program web-site (www.niehs.nih.gov/emfrapid/home.htm) that began operation on October 1, 1996. All of the EMF-RAPID Program's documents are available online in their entirety including the public information booklets described earlier, research information, the NIEHS Science Review Symposia reports (described below), the NIEHS Working Group Report (described below) and the public meeting comments received on these reports. There are links to other useful sites relating to ELF-EMF including the four regional exposure facilities. This site receives an average of 500 visits per day from approximately 21 countries. The requests come from individuals as well as commercial, educational, government, military and non-profit organizations.

The NIEHS actively recruited the inclusion of concerned citizens into the EMF-RAPID Program in several ways. Two scholarships were created to allow representatives from two citizen groups to attend an annual research review meeting conducted by the DOE. All EMF-RAPID Program sponsored meetings

were open to any interested parties and public comments at them were welcome. The NIEHS also set aside a two-month period for public comment and review on ELF-EMF and the meeting reports. In addition, costs for NEMFAC members to attend the Science Review Symposia, the chair of NEMFAC to attend the Working Group Meeting and one member of the NEMFAC to attend each of the public meetings were also provided. Finally, in cooperation with the EPA, a workshop was held in May 1995 to give policymakers current information on ELF-EMF and provide them with access to experts knowledgeable in communicating information on this topic.

After the EMF-RAPID Program ends, the documents from this program will continue to be publicly available through the National Technical Information Service. Also, copies of these materials are located in the Library of Congress and libraries of the EPA regional offices, the NIEHS and the National Academy of Sciences.

Literature Review and Health Risk Assessment

Recent scientific panels on methods for health risk assessment (*4-6*) have advocated open, participatory processes for the evaluation of health risks from environmental exposures. The strategy developed by the NIEHS for collecting and evaluating research information in preparation of the Director's report followed many of the recommendations of these recent panels. The resulting program, reviewed and accepted by both the IAC and NEMFAC, provides a blueprint for future risk assessments and is novel in the risk assessment community (*7, 8*). The program focused on a broad-based, scientific debate covering all of the diverse fields represented in ELF-EMF research and included scientists from both within and outside the EMF community. In addition, an aggressive outreach program was used to invite and include all interested parties in the debate. This program consisted of three basic tiers:

- A series of three science review symposia focused on 1) mechanistic research, 2) epidemiological research and 3) laboratory research (animals and humans). At each meeting participants considered the quality and reproducibility of the scientific evidence, suggested what literature provides the strongest scientific evidence for making a decision, suggested additional avenues for research and provided opinions on whether or not there is support for a causal linkage between exposure to ELF-EMF and an associated biological or health effect.
- A working group meeting where a select panel of scientists critically evaluated the entirety of research evidence on ELF-EMF health effects and determined the strength of the evidence for human health effects.
- A period of public review and comment on the reports from the symposia and working group prior to their use by NIEHS in preparing this report.

The Science Review Symposia were designed as open, public workshops aimed at including a broad spectrum of the research community in evaluating ELF-EMF health hazards. To minimize bias, outstanding research scientists from outside of the ELF-EMF research community were included in all reviews; these scientists provided an objective evaluation of the experimental methods used and the hypotheses underlying many of the studies. These EMF and non-EMF scientists were given the task of identifying key research findings and providing opinion on the quality of the research. The workshops were held 24-27 March 1997 in Durham, NC; 12-14 January 1998 in San Antonio, TX; and 6-9 April 1998 in Phoenix, AZ. Over 100 individuals attended each meeting and included representatives from the public, stakeholders, regulatory agencies, NEMFAC and IAC as well as scientists from varied disciplines including, but not limited to, medicine, epidemiology, molecular and cellular biology, physics, engineering, statistics, toxicology, pathology and neurobiology. The format for these meetings included plenary sessions with overview lectures to familiarize attendees about research findings and issues for specific ELF-EMF topics and small breakout discussion groups. The breakout group sessions (composed of 25-30 attendees per group) provided time for in-depth discussions on the quality and reproducibility of ELF-EMF research findings and possible linkages with health effects. The rapporteurs and facilitator for each session prepared a short report that was reviewed by attendees of that breakout group. The breakout group reports from each science review symposium are available as printed documents (*9-11*) or on the EMF-RAPID Program web-site.

The Working Group Meeting was held 16-24 June 1998 in Brooklyn Park, MN. Prior to this meeting, a group of select scientists was given the task of conducting a formal, comprehensive review of the literature for research areas identified from the symposia as being important to the assessment of ELF-EMF-related biological or health effects. At the Working Group Meeting, the panel of 30 international scientists, both from within and outside the field of ELF-EMF research, critically evaluated and rewrote the draft chapters into a single book (*12*). In addition to reviewing the literature, the Working Group also characterized the strength of the evidence in each category of research using the criteria developed by the International Agency for Research on Cancer (IARC). These criteria are given in Appendix A of the Working Group Report. The literature included in the report was limited to published, cited findings or novel work being prepared for publication that could be peer-reviewed by the Working Group members.

Following the Working Group Meeting, the NIEHS established a formal review period of 10 August – 9 October 1998 to receive comments on the Working Group Report and symposia reports. During this period, the NIEHS hosted four public meetings (14-15 September 1998, Tucson, AZ; 28 September 1998, Washington, DC; 1 October 1998, San Francisco, CA; and 5 October 1998, Chicago, IL) where individuals and groups could voice their comments orally and/or in writing to NIEHS officials and other scientists involved with preparation of this report. The meetings were recorded and a transcript was prepared.

Attendance at the public meetings varied from 32 to 101 attendees per meeting. Formal comments (8 to 21 per meeting) were provided by various groups including the general public, researchers, utility industry, advocacy groups and state governmental agencies. Written comments, independent of oral presentations, were also solicited during the comment period; 178 entries from individuals and groups were received. These transcripts and written comments were used by the NIEHS in preparing this report.

DO ELECTRIC AND MAGNETIC FIELDS POSE A HEALTH RISK?

The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increased risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than for childhood leukemia. In contrast, the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects (including increased cancers in animals) have been reported. No indication of increased leukemias in experimental animals has been observed.

The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the "right" species, are tied to "real-life" exposures and show some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor or common source of error could explain these findings. However, no consistent explanation other than exposure to ELF-EMF has been identified.

Epidemiological studies have serious limitations in their ability to demonstrate a cause and effect relationship whereas laboratory studies, by design, can clearly show that cause and effect are possible. Virtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but it cannot completely discount the epidemiological findings.

The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. This is described in greater detail in the section, *Recommended Actions*. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

Scientific Evidence Supporting This Conclusion

The reports from the Science Review Symposia (*9-11*) and the Working Group (*12*) provide detailed reviews of the literature in this area of science. What follows is a brief synopsis of this evidence. The reader should refer to the individual reports for greater detail.

Background on the Limitations of Epidemiology Studies

Epidemiological studies are used to investigate the associations between health effects and exposure to a presumed disease agent. A well-designed and conducted epidemiological study involves several steps including identification of a study population, definition of the exposure to be studied, choice of the type of study to conduct (e.g. cohort study versus case-control study) and description of the period over which the exposure is relevant. All of these factors influence the quality of a study and the limits that must be placed on interpretation of a study's findings.

In carefully controlled laboratory and clinical investigations, study subjects are typically assigned to a treatment or exposure regimen. In epidemiological investigations, the inability to randomly assign exposures means that investigators must design their study so that the individuals who develop the disease of interest (cases) resemble the individuals who are disease-free (controls) in all aspects except for exposure; this is intended to limit possible bias. Bias due to improper selection of cases and controls is introduced if exposure is related to characteristics that would make cases more or less likely to be sampled than controls, or once sampled, to participate.

In the Nordic countries, comprehensive national population registries are generally used for selecting controls. If all persons are listed in these population registries and participation rates are high, bias due to selection of improper controls is unlikely even if exposure is related to participation. In countries such as the United States where population registries do not exist, other methods must be used to study rare diseases like leukemia for which existing cohort studies are

inadequate. These methods lead to difficulties in identifying, contacting and recruiting controls that match the cases in all aspects other than exposure. For example, controls are sometimes identified through stratified random sampling of individual telephone numbers (random-digit dialing). Random-digit dialing may not properly identify controls of low socioeconomic status that do not have telephones; this could bias the results found in studies of childhood leukemias (*13*).

It is also possible to introduce bias through the selection of cases. For example, case selection bias may occur in studies that are based on mortality records (death certificates) if the survival rates of the exposed and unexposed subjects differ. This may occur if, for example, the exposure is related to socioeconomic status, and different socioeconomic groups have different survival rates for the studied disease (this might be due to a difference in the ability of cases to receive medical care). In addition, for diseases that are easily cured or allow patients to survive with the disease for a long period of time, persons who contract the disease and are treated properly may die of other causes and not appear as cases.

The inability to randomly assign exposures also introduces the possibility of confounding. Confounding occurs when the exposure of interest is associated with another factor that can increase (or decrease) the risk of getting the disease of interest (*14*). For example, smoking increases the risk of oral cancer; smoking is also associated with alcohol consumption, and there is a greater proportion of smokers among alcohol drinkers than among non-drinkers. Because smoking increases the risk of oral cancer and alcohol drinkers are more likely to smoke than non-drinkers are, alcohol drinkers will have a greater risk of oral cancer simply as a consequence of the greater percentage of smokers among alcohol drinkers. Thus, any study showing an increased risk of oral cancer associated with alcohol drinking will overstate that risk (resulting in a positive bias) if the effect of smoking is not carefully evaluated. Confounding can produce bias in either direction, artificially increasing or decreasing risks, depending on the direction of the association between the exposure, the disease and the confounder. When known, confounding can be controlled through statistical methods. Because there are very few known causes of childhood leukemias and chronic lymphocytic leukemia, it is difficult to identify and control potential confounders in these studies.

Another limitation of epidemiological studies is that exposure occurs through the natural course of events rather than being assigned and controlled by the investigator. Thus, a determination of the degree of exposure can be incorrect leading to what is known as “exposure misclassification.” Exposure misclassification may distort measures of association observed in a study. For example, in epidemiological studies aimed at exposures received on the job (occupational studies), it is common to define exposures by the type of job a person performs. Errors may occur in assigning job titles or the jobs themselves may have markedly different exposures for different individuals. It is also

possible that the exposure assignment may differ for diseased and non-diseased subjects. Information on exposure can be obtained either prospectively (before the disease has occurred) or retrospectively (after the disease has occurred). In the case where exposure is determined prior to disease onset, there is a reduced potential for misclassification of the exposure. In the case where exposure is determined after the onset of the disease, especially where it is obtained from questioning individuals with the disease, the recall of exposure may be influenced by the fact that the patient has a disease and is influenced by previous descriptions of potential causes of that disease.

Epidemiological studies have used various methods for estimating past ELF-EMF exposure to provide scientific evidence concerning the possibility of health effects from exposure to ELF-EMF. Residential exposures to ELF-EMF have been conducted in five basic ways: wire codes that are essentially based upon distance to major structures used for delivering electrical energy (e.g. high tension power lines and transformers); calculated magnetic fields that are based upon a theoretical calculation of the magnetic field emitted by certain types of power lines using historical electrical loads on those lines; spot measurements that generally give a single, instantaneous measurement of the magnitude of the magnetic field in one or more spots in a residence; average measured fields that are essentially spot measurements taken repeatedly every few seconds for 24 hours and averaged over time; and personal average measured fields where the subject wears a monitor and measurements are taken repeatedly every few seconds for 48 hours and averaged over time.

The validity of individual exposure assessment methods has been examined and each has its limitations (*12, 15-20*). Wire codes and calculated fields have the advantage of remaining fairly consistent over time making them more likely to be correctly determined during the time of cancer onset. However, their main disadvantage over measured fields is a lack of consideration of all possible sources of exposure, in particular fields from in-home appliances and ground currents. The relationship of wire codes to direct magnetic field measurements has been examined; the reliability of wire codes as a quantitative measure of magnetic field exposure is variable (*15, 17, 19, 20*).

Childhood Cancers

The hypothesis generated by the seminal study of Wertheimer and Leeper (*1*) used wire codes to evaluate residential exposures in children. Four additional epidemiological studies in which wire codes were used to assess exposure to ELF-EMF are of sufficient quality to be used in the evaluation of a causal association between the risk of childhood leukemia and exposure to magnetic fields. Two of the studies reported an association (*21, 22*), and two studies reported no association with the risk for childhood leukemia (*23, 24*). A trend of increasing risk with wire codes classification implying increased fields was

observed in the two positive studies (*21, 22*). All of these studies, including the seminal study, could have been affected by the types of biases described earlier including exposure bias (*1*), control selection (all five studies), and confounding from other risk factors (all five studies). In addition, the seminal study and the four subsequent studies differed in their groupings of leukemias ranging from evaluating all types of leukemias (*1, 21, 22, 24*) to evaluating only acute lymphoblastic leukemia (*23, 24*), the most common form of the disease in children. The most recent U.S. study (*23*) is the largest of the four subsequent studies for evaluating ELF-EMF exposure. Even though this study (*23*) shows a negative association when comparing Wertheimer-Leeper wire codes with leukemia risks, when combined with the remaining studies (*21, 22, 24*) in a meta-analysis (a form of statistical analysis in which like studies are combined to get a single answer), the results indicate a marginal association for the highest exposure group versus the lowest exposure groups. Removal of any of the three remaining studies (*21, 22, 24*) diminishes this association substantially. After removal of the one follow-up study with the most severe design limitations (*21*), the association is no longer present. Another study (*25*) was not included in the meta-analysis due to study limitations; this study showed no effect of wire codes.

Four epidemiological studies (*26-29*) assessed exposure using calculated fields; all four studies were conducted in Nordic countries. Three of the studies observed an increased leukemia risk in one or more exposure group (*26-28*) although only one (*26*) achieved statistical significance. All four studies were population-based, with minimal potential for selection bias both in terms of control selection and participation rates. The main limitations of all four studies are the small number of cases overall and the small number of cases and controls in the high exposure group. The general trend of these studies provides marginal support for a small, increased risk (*30*).

Four studies in which spot measurements were used to assess exposure to magnetic fields are clearly of greater quality than the remaining studies (*21, 22, 26, 31*). Two of these studies (*21, 22*) observed increased risks of marginal significance in one or more exposure groups and the other two (*26, 31*) showed no risk. Overall, spot measurements do not show an appreciable excess risk for leukemia when the four studies are combined (*30*).

Four studies used 24-hour measured magnetic fields to assess exposure (*22-24, 31*)[1]. The studies examined three different classifications of childhood leukemias: acute lymphocytic leukemia (*23, 24*), acute leukemia (*31*) and leukemia including nonlymphocytic leukemia (*22, 24*). The results of three of the studies showed an increased risk for children in higher exposure class(es); in two studies there were no statistically significant differences (*22, 24*), in the largest study only one experimental category out of many was statistically significant

[1] This publication (24) only provides a single odds ratio from their analysis of the 24-hour measurements. Additional information was obtained from the principal author.

(*23*), and depending on the grouping, the fourth study achieved statistical significance (*31*). The data reported for the largest study (*23*) suggest an exposure–response relationship that the original authors did not consider important. The pattern of dose versus response in this study was considerably different from the pattern in the other two studies with multiple dose groups (*22, 24*). The results of these studies, when combined, provide weak evidence for an association between exposure based on 24-hour measured magnetic fields and a small, increased incidence of childhood leukemia (*30*).

One study (*24*) assessed exposure using 48-hour personal monitors that measured both magnetic fields and electric fields. Analyses were done for all childhood leukemias and separately for acute lymphocytic leukemia. The general trend in the data indicated a negative association for both magnetic fields (current or predicted two years prior to diagnosis) and electric fields. No statistically significant positive associations were observed. This study, using personal exposure meters, does not support an association between ELF-EMF exposure and childhood leukemia.

Several of the same studies described earlier also looked at electrical appliance use and the risk of childhood leukemia (*22, 32, 33*). The results do not fit a coherent pattern.

None of the individual epidemiological studies provides convincing evidence linking magnetic field exposure with childhood leukemia. Hence, in making an assessment, one must rely upon the evaluation of the data as a whole using expert judgment and the meta-analyses as a guide. The pattern of response, for some methods of measuring exposure, suggests a weak association between increasing exposure and increasing risk. The small number of cases in these studies makes it impossible to firmly demonstrate this association. This level of evidence, while weak, is still sufficient to warrant limited concern.

Two other childhood cancers have been sufficiently studied to warrant comment. Two early studies observed an increased risk of brain cancers using wire codes as the exposure measure (*1, 21*). Later studies using wire codes (*34, 35*), calculated fields (*26-28, 36*) and measured fields (*35*) failed to support this finding. The association between exposure to ELF-EMF and childhood lymphomas was considered in several epidemiological investigations (*1, 21, 26-28, 36*). In all studies, the number of cases of lymphoma in the high exposure groups was too small for any reliable inference to be drawn. In general, these data do not support the concern that exposure to magnetic fields may increase the risk of brain cancers or lymphomas in children.

Adult Cancers

Epidemiological reports of diseases associated with occupational exposure to ELF-EMF preceded concerns about residential exposure. Reports of various health problems in high-voltage substations in the former USSR initially focused attention on ELF electric fields (*37*). Initial studies in the United States (*38, 39*) led to over 100 epidemiological investigations of workplace exposure to ELF-EMF and various diseases. The early studies were based on workers in jobs assumed to entail exposure, and more recent studies used measured fields.

Recent studies evaluating the association between exposure to magnetic fields and chronic lymphocytic leukemia (*40-44*) show mixed results. The two studies in the United States (*43, 44*) reported no association, but one (*44*) used death certificates to identify the cases (chronic lymphocytic leukemia has a rather long survival time that can confound the diagnosis of the cases). One of the remaining studies (*42*) indicated increased risk, which did not achieve statistical significance, and the two Scandinavian studies (*40, 41*) showed significantly elevated risks in one or more exposure groups. Both of the Scandinavian studies had consistently increasing risks with increasing exposure. Each of these studies has its limitations and the limitations are different across studies, as are the designs and exposure assessment methods. Taken together, the studies provide weak evidence for an association between occupational exposure to magnetic fields and chronic lymphocytic leukemia.

Acute myelogenous leukemia was considered in these same epidemiological studies. The results, which were observed from these studies, are not sufficiently compelling to support an association.

The association between exposure to magnetic fields and a variety of other cancers has also been considered in occupational settings. Included are brain cancers, breast cancers (in both males and females), testicular cancers, cancers in offspring of workers, lymphoma, multiple myeloma, melanoma, non-Hodgkin's lymphoma, thyroid cancers and many others. Some evidence exists for an association between brain cancers and exposure to ELF-EMF and between female breast cancers and ELF-EMF exposure; however, the studies evaluating these associations are inconsistent and have limits to their interpretation making them inadequate for supporting or refuting an effect. In the remaining cases, the evidence supporting an association is negative or too weak to warrant concern.

The risks of adult cancer based on residential exposure to ELF-EMF have been evaluated in a number of studies. Risks of leukemia (of all types and of specific sub-types) from residential exposures were evaluated in several recent studies (*40, 45-50*). The calculated field studies (*40, 47-50*) showed mixed results for the different sub-types of leukemia studied and for changes in the definition of the exposure category. Specifically, when chronic lymphocytic leukemias was

examined separately (this was done in only two of the studies), the results were inconsistent with one study (*40, 48*) showing no increased risk and with the other (*49*) showing fairly consistent dose-response with increasing cumulative exposure. The remaining studies, using wire codes (*46*) and measured fields (*46, 48*), demonstrated no increased risk. These data are inadequate for evaluating the association between exposure to ELF-EMF and leukemias. Specifically, for chronic lymphocytic leukemia, which demonstrated a weak association in the occupational studies, there are mixed results for adults in the residential studies.

The risk for leukemia associated with use of electrical appliances was also considered in two studies (*45, 51*). These studies resulted in inconsistent findings and generally do not support an association between appliance use and increased leukemia risk.

Limited data are available on risks of male and female breast cancer associated with residential exposure to ELF-EMF. A small, non-significant association between use of electric blankets and the risk for breast cancer was observed in one, large U.S. study (*52*) but not in another (*53*). Both found no evidence for an association with duration of exposure. Three studies, using exposure measured by calculated fields (*50, 54, 55*), identified no association between exposure to magnetic fields and the risk of breast cancer. These same scientists (*40, 47, 48, 50, 55*) also looked at exposures to ELF-EMF and cancers of the central nervous system (such as brain cancers); no associations were found.

None of the associations between cancer and residential exposure to magnetic fields in adults were indicative of a positive association. However, the specific adult cancer showing weak evidence of a positive association with occupational exposure to ELF-EMF, chronic lymphocytic leukemia, was inadequately studied in residential settings. It cannot, therefore, be concluded that there is no association.

Non-Cancer Findings in Humans

The relationship between spontaneous abortion and exposure to ELF-EMF has been considered in several studies. Recent occupational and residential studies were the focus of this assessment. In the first occupational study (*56*), no association was observed. In a second occupational study (*57*), a significant association was found with exposure to high ELF-EMF; however, the response rate was very poor, particularly among controls, which could have biased this result upward. Pregnancy loss was investigated in two residential cohort studies (*58, 59*). In one study (*58*), an increased risk was observed in the highest exposure category but not in the intermediate category. In the other (*59*), no association was observed for any measure of exposure. In a carefully designed prospective study in the United States (*60*), no association was reported between

measured fields (including personal exposure monitoring) and intrauterine growth, birth weight or gestational age.

Low birth weight (*60, 61*), intrauterine growth retardation (*60*), preterm birth (*61*) and congenital anomalies arising from the father's exposure (*62*) were not associated with occupational exposures to ELF-EMF. The risk for congenital anomalies in relation to the mother's use of heated waterbeds and electric blankets around the time of conception was evaluated in three studies (*63-65*); no association was observed for heated waterbeds in any study, and inconsistent results were reported for electric blanket use.

The association between occupational exposure to ELF-EMF and Alzheimer's disease was considered in five studies (*66-70*). All five studies showed increases in one or more exposure groups with four studies (*66-69*) showing statistically significant increases and one (*70*) showing non-statistically significant increases. All of these studies suffer from design limitations that make it inappropriate to use them for addressing a causal association between ELF-EMF exposure and Alzheimer's disease. Two of these (*66, 67*) are based on diagnoses from death certificates (Alzheimer's disease is not consistently noted on death certificates). Two studies (*68, 69*) used different groups of cases and controls; some of the control groups included persons with other types of dementia, and proxy information was used to define the exposure of cases. The one remaining study (*70*) was evaluated using data for twins and also suffered many limitations. These data are inadequate for interpreting the possibility of an association.

The association between exposure to magnetic fields and amyotrophic lateral sclerosis was assessed in three studies (*66, 71, 72*). One study (*71*) showed an increased risk in the highest exposure group and the other two studies were negative. Adequate adjustment could not be made for known risk factors (electric shocks or a family history of amyotrophic lateral sclerosis) making these studies difficult to interpret.

Suicide and depression were studied in three occupational epidemiological studies (*72-74*). These studies do not support an association with ELF-EMF exposure.

Two occupational studies (*75, 76*) assessed possible adverse cardiovascular outcomes that may result from exposure to magnetic fields. In the first study (*75*), a significant decrease in risk using a broadly defined cardiovascular grouping was observed. In the second (*76*), data from five utilities were examined. This study was motivated *a priori* by a biological hypothesis based on the results of human clinical studies on heart rate variability (*77*) for increased numbers of deaths due to arrhythmia and acute myocardial infarct. Significant, exposure-dependent associations were reported. Lacking additional epidemiological studies to

collaborate these results, these data are inconclusive regarding an association between cardiovascular disease and exposure to ELF-EMF.

Human clinical studies of ELF-EMF exposures were carried out mainly through three major research initiatives. These include a long series of studies of utility workers begun in the 1960s in the former USSR (*37*), human laboratory research conducted in the 1970s in Germany (*78, 79*) and the human laboratory research program started in 1982 at the Midwest Research Institute in the United States (*80*). Dedicated facilities for human exposure testing were designed and constructed in Australia (*81*), Canada (*82*), England (*83*), France (*84*), Germany (*78*), New Zealand (*85*), the Russian Federation (*86*) and the United States (*87, 88*). Research with human volunteers is currently under way in many of these facilities.

A large number of clinical end-points were evaluated in these laboratories. Several effects reported at high exposures warrant little concern as health dangers such as hair standing on end in very strong electric fields and flickering visual sensations in very strong magnetic fields. However, a number of measurements potentially linked to health effects have been studied. The central nervous system was one of the first areas investigated as a potential site of interaction with ELF-EMF. Studies of changes in brain wave patterns (electroencephalography) during waking hours were generally negative showing little or no effect of ELF-EMF, especially in the range of power-line frequencies (*79, 80, 86, 89-94*). Several studies (*95-97*) showed decreased sleep and reduced sleep efficiency during ELF-EMF exposure. These studies all had deficiencies (e.g. disturbance of subjects by drawing blood and incomplete adaptation of study subjects to the laboratory environment) making them inconclusive.

Changes in human pulse as a function of exposure to ELF-EMF fall into two categories: changes in the number of beats per minute (pulse rate) and changes in the variability of the electro-chemical signals going to the heart (heart-rate variability). Two research groups examined changes in pulse rate following exposure to ELF-EMF (*80, 91-93, 98, 99*). All five clinical studies (*80, 91-93, 99*) from the same laboratory showed a decrease in pulse rate in at least one exposure group; however, all exposures represented rather large, combined electric and magnetic fields (6 to 12 kV/m and 10 to 30 μT, respectively). The remaining study (*98*) was a field trial under a high-tension power line and no effect was observed. The biological mechanism is unknown, and the general effect is very small making it unlikely that this is a health risk at lower doses.

Changes in heart-rate variability were evaluated in a retrospective analysis of three previous studies (*77*). Some changes in heart-rate variability were observed, which according to the authors, could indicate a potential for increased risk of sudden cardiovascular death. However, even though decreased heart-rate

variability is associated with increased risk of cardiovascular death, it is not clear that transiently induced changes in healthy individuals will carry any risk. While these findings are inconclusive, the recent epidemiological result (*76*) discussed earlier suggests this area may warrant additional study.

Two possible mechanistic explanations for cancer findings from exposure to ELF-EMF, changes in melatonin (a hormone associated with sleep) and changes in the immune system, have been studied. The potential for ELF-EMF exposure to alter nighttime melatonin levels was addressed in 11 studies (*81, 84, 96, 100-106*). The clinical studies (*81, 84, 96, 102, 103*) demonstrated no consistent pattern of melatonin reduction (one study saw a marginal effect in men with already reduced melatonin levels and one saw a reduction in onset of the nightly increase in melatonin). In the occupational studies (*100, 101, 105, 106*), some changes were reported in urinary excretion of melatonin metabolites (the result of degradation of melatonin in the body) following workplace exposure (when melatonin levels are generally low), but not in evening melatonin levels. In the one residential study (*104*), significant dose-related reductions were associated with measured fields in bedrooms, but not with other measures (e.g. wire codes and total 72-hour exposure). All combined, these studies provide little support that exposure to ELF-EMF is altering melatonin levels in humans. A number of other hormones were also studied such as testosterone, thyroid hormones and several stress hormones; no effects of ELF-EMF exposure on these levels were observed.

Few laboratories studied the effects of ELF-EMF on the immune system. Three studies investigated effects of ELF-EMF exposure on the immune system (*80, 107, 108*) and all were negative.

Finally, there have been a number of case reports of mood changes and hypersensitivity thought attributable to ELF-EMF exposure (manifested as physiological reactions, disturbed sleep, fatigue, headaches, loss of concentration, dizziness, eye strain and skin problems). These symptoms generally seem to be intermittent and difficult to study clinically. Several carefully designed studies (*109-113*) were performed to evaluate the response of persons with these symptoms to ELF-EMF. In general, these studies were negative with the exception of one (*112*) that reported an increased incidence of skin rashes in persons exposed to high ambient electric fields (>31 V/m) relative to control fields (<10 V/m). These data are insufficient to support an association between ELF-EMF and hypersensitivity.

Animal Cancer Data

Animal carcinogenicity studies are routinely used to identify environmental agents that may increase cancer risk in humans. Many areas of biological investigation are more efficiently studied in animal models than in human beings,

because the agent can be studied invasively and under carefully controlled environmental conditions. The use of animal models in studying effects of ELF-EMF exposure is limited by two problems: extrapolation of experimental findings across species and extrapolation of laboratory exposure patterns to environmental exposure patterns. Animal carcinogenic studies of ELF-EMF were done at levels of exposure generally much higher and having greater uniformity in frequency and intensity than would appear in environmental settings. These experimental conditions were chosen to maximize the ability of a researcher to detect an effect, if one exists, for a clearly defined exposure.

The laboratory data in animal models are inadequate to conclude that exposure to ELF-EMF alters the rate or pattern of cancer. There are some sporadic findings (including increased cancers) with no clear interpretation; however, it is noteworthy that these data provide no support for the reported epidemiological findings (discussed earlier) of increased risk for leukemia from ELF-EMF exposure.

Only a few lifetime bioassay studies (*114-116*) have been performed for ELF-EMF exposure. These studies exposed large groups of animals generally for periods of up to two years at magnetic field intensities considerably higher than elevated residential exposures. No consistent effects of ELF-EMF exposure on cancer rates in bioassay animals were found. The most comprehensive study conducted through the National Toxicology Program (*115*) used four exposure groups (control, 2, 200 and 1000 µT continuous exposure for 18.5 hours per day and 1000 µT intermittent exposure) and four gender/species groups. There were no exposure-related clinical findings for rats or mice. The two-year study found no evidence of carcinogenicity in female rats and male or female mice at any exposure level and equivocal evidence for carcinogenicity in male rats based upon an increased incidence of thyroid gland C-cell tumors.

A similar study (*114*) was conducted in female rats where exposure to 60 Hz linearly polarized magnetic fields (control, 2, 20, 200 and 2000 µT continuous exposure) began *in utero* two days before birth and continued for 20 hours per day for two years. No consistent, exposure-related clinical findings or evidence of carcinogenic activity from 60 Hz magnetic fields were reported. In another study (*116*) male and female rats were exposed to control, 500 or 5000 µT 50 Hz magnetic fields for 22.6 hours per day for two years. No differences in cancer rates between field-exposed and sham-exposed animals were found.

Epidemiological findings have suggested a possible association between magnetic field exposure and breast cancer in men (*117, 118*) or women (*119*). In addition, a hypothesis was proposed that magnetic field exposure might lower nocturnal melatonin levels that could increase risk for breast cancer (*120*). Animal studies using chemically induced mammary cancer followed by magnetic field promotion

of carcinogenesis were undertaken to test whether mammary cancer was affected by ELF-EMF exposure.

Following an initial report that magnetic fields promoted mammary tumor development in rodents (*121*), a comprehensive series of studies on ELF-EMF exposure and mammary tumor initiation and promotion in the rodent model was conducted (*122-124*). In these studies, female Sprague-Dawley rats were used and cancer was initiated by intragastric administration of four weekly doses of 7,12-dimethylbenz[a]anthracene (DMBA) followed by promotion with 50 Hz ELF magnetic fields, 24 hours per day for 13 weeks. One of the early studies in this series (*122*), where the data were subsequently examined histologically (*125*), provided evidence that magnetic fields of low flux density (100 µT) promoted increased growth and size of mammary tumors but did not affect tumor incidence. The same laboratory repeated this work, and in additional studies testing different magnetic flux densities, examined the question of whether a dose-response relationship exists with field intensity (*126-128*). Over the range of 10 to100 µT magnetic fields (50 Hz), a higher (not statistically significant) number of total tumors was found in the field-exposed groups. Magnetic field exposure was not associated with more tumors per tumor-bearing animal. Effects on tumor latency and size were not consistent across the studies.

The National Toxicology Program (*129*) conducted similar studies. Animals were exposed to magnetic fields at both European frequency (50 Hz, 100 or 500 µT) and American frequency (60 Hz, 100 µT) 18.5 hours per day, seven days per week for 13 weeks following intragastric administration of four weekly doses of DMBA as the initiator. There was no difference in size or incidence of mammary gland tumors between control and exposed groups. However, the tumor incidence was high in all groups, and sensitivity was reduced for detecting a promoting effect of magnetic fields. The study was repeated at a lower dose of DMBA. Tumor incidence, latency and size, total number of tumors and number of tumors per tumor-bearing animal were not affected by magnetic field exposure; in the exposure groups there were slightly fewer total mammary neoplasms (not statistically significant) than in controls. A 26-week study, where animals received a single initiating dose of DMBA, gave similar results (*129*); there were significantly fewer tumors for the two exposed groups. However, the tumor incidence was high in all groups, and sensitivity was reduced for detecting promoting effects of magnetic fields. This collection of studies (*129*) provides strong evidence of no effect of magnetic fields on the promotional development of mammary cancer.

Another laboratory (*130*) also examined the effects of magnetic field exposure, which included transients, on mammary tumor development in female Sprague-Dawley rats. This study differed slightly in experimental design from the ones described earlier, but used DMBA as initiator and examined similar magnetic fields, 250 and 500 µT, at 50 Hz. No effects of magnetic fields were observed.

The explanation for the observed difference among these studies is not readily apparent. However, within the limits of the experimental rodent model of multistage mammary carcinogenesis, the findings do not provide consistent evidence for a promoting effect of ELF-EMF on chemically induced mammary cancer.

Animal models of skin carcinogenesis are well established for the study of the initiation, promotion and progression of cancer (*131*). Several laboratories examined whether 50 and 60 Hz magnetic fields promoted or co-promoted development of cancer using this model (*132-137*). Skin tumors were initiated by topical treatment of the animals with a known chemical carcinogen (e.g. DMBA) followed by exposure to various intensities of magnetic fields or combinations of magnetic fields plus a known chemical promoter (e.g. 12-*O*-tetradecanoyl phorbol 13-acetate, TPA). The findings from these studies demonstrated no significant promotional effect of magnetic fields on skin tumor development.

Rat liver is a most commonly used experimental model for investigating multistage carcinogenesis in tissues other than the skin (*138*). Several experiments from a single laboratory used this model to investigate ELF-EMF exposure effects and reported no evidence of a promotional or co-promotional role of magnetic fields in cancer development (*139, 140*).

Several epidemiological studies have suggested a possible association between ELF-EMF exposure and an increased risk for leukemia. Two types of animal models were used for determining whether magnetic fields can alter the time of onset or incidence of leukemia: 1) initiation with X-rays or chemical carcinogen followed by ELF-EMF exposure and 2) progression of leukemia by injection of leukemia cells into the animal followed by ELF-EMF exposure.

The largest ELF-EMF study using an agent to initiate disease involved over 2000 mice with different doses of ionizing radiation to initiate lymphoma followed by either exposure to 1400 µT magnetic fields or no exposure for up to 30 months. Exposure to magnetic fields did not affect the incidence or time of onset of leukemia/lymphoma, the rate of death among animals with leukemia/lymphoma or the leukemia sub-types (*141*). In another study (*142*), no promotional effects of a 1000 µT 50 Hz magnetic field in mice were found following initiation of lymphoma/leukemia with DMBA.

A study of leukemia progression was conducted in Fischer rats inoculated with large granular lymphocytic leukemia cells (*143, 144*). In the first study (*144*), treatment with a 1000 µT continuous 60 Hz magnetic field did not significantly alter the clinical progression of the disease in exposed versus ambient-field controls. In the second study (*143*), an additional, lower inoculum of leukemia cells was included to increase sensitivity as well as intermittent magnetic field presentation (3 min on, 3 min off). No significant effects were observed for the

continuous field exposure at either inoculum; however, with intermittent fields at the higher inoculum, latency to disease was slightly decreased.

The findings from the lifetime bioassay study ((*115*), discussed earlier) with ELF-EMF exposure are also consistent with the absence of an effect on leukemia/lymphoma. When animals exposed to a range of magnetic fields for up to two years were examined, no increases in leukemias or lymphomas were found in the 16 gender/species groups.

Two studies were conducted in genetically altered mice that are prone to leukemia (*145, 146*). These studies showed no evidence of magnetic field effects on lymphoma incidence.

Based upon some evidence from occupational and residential studies suggesting an increased risk for brain cancer with ELF-EMF exposure, several animal studies examined this question. Rodent models are relatively insensitive to the induction of brain cancer by chemicals, and as such, caution should be used in interpreting the findings from studies with ELF-EMF exposure. The lifetime studies in rodents (*114-116*) demonstrated no effect of magnetic field exposure on brain cancer. In the large initiation/promotion leukemia study in female mice ((*141*), discussed earlier), sections of the brain were prepared and reviewed for primary proliferative lesions (*147*). No evidence of an effect of magnetic field exposure on primary brain tumors was found.

Non-Cancer Health Effects in Experimental Animals

A number of non-cancer end-points were investigated for possible adverse effects of ELF-EMF exposure. In general, the experimental models used to study interactions with ELF-EMF have been guided by methods and end-points that were developed to assay the effects of other physical and chemical agents such as drugs, chemicals and ionizing radiation.

The effects of ELF-EMF exposure on the immune system were investigated in multiple animal models including baboons and rodents, and there is no consistent evidence in experimental animals for effects from ELF-EMF exposure. Reports of effects in baboons (*148*) were not confirmed when the study was repeated. Some studies had methodological difficulties making interpretation of the findings difficult (*127, 149*). Other studies found no or inconsistent effects of ELF-EMF exposure on immune system indices and function (*150, 151*).

Seven studies examined standard measurements of hematological and clinical chemistry indices following ELF-EMF exposure (*152-158*); several included a limited number of animals and were of short duration. These studies provide no

evidence that exposure to ELF-EMF affects hematological or clinical chemistry parameters in rodents.

A variety of animal models including non-human primates, pigeons and rodents were exposed to high intensity electric or magnetic fields to study the behavior and physiology of the nervous system. Detection of electric fields by animals is a well-established phenomenon, and the sensitivity thresholds for animals appear to be similar.

Various neuro-behavioral responses including avoidance and aversion and learning and performance were tested for effects from exposure to ELF-EMF. The data from studies including baboons and rodents suggest that exposure to strong electric fields can be perceived (*159-162*), but there is no evidence that these fields are harmful at environmental intensities. The addition of a magnetic field to the electric field appears to modulate the acute behavioral response of animals to perceptible electric fields (*163, 164*).

Relatively little evidence is available for evaluating whether exposure to ELF electric fields can affect performance of learned behavior. The studies in baboons (*160, 161*) suggest that any effects are minimal. In contrast, exposure to ELF magnetic fields was associated with several effects: adverse (*165, 166*), beneficial (*167*) or absent (*168, 169*) depending upon the task being performed and the timing of the magnetic field exposure. Studies in non-human primates with combined exposure to electric fields and magnetic fields detected no impact on operant performance (*164, 170*).

Epidemiological studies have addressed the question of whether ELF-EMF exposure affects reproduction and development. Studies using avian species were conducted, but their relevance to mammalian systems is not clear. Studies examining teratogenic and reproductive end-points were also done in mammalian systems. An extensive evaluation of magnetic field exposure (control, 2, 200 and 1000 µT continuous exposure and 1000 µT intermittent exposure) on fetal development and reproductive toxicity in the rodent was conducted (*171*). There was no evidence of any maternal or fetal toxicity or malformation. A further study examined multi-generational reproductive toxicity using a continuous breeding experiment. The results suggested no evidence of altered reproductive performance or developmental toxicity in the rat (*172*).

At the onset of the EMF-RAPID Program, one hypothesis was that magnetic fields acting through the retina as a sensitive receptor reduce melatonin levels. It was thought that this depression might act as a risk factor for cancer (*120, 173*). Studies examining effects of ELF-EMF exposure on circulating melatonin levels were conducted in a variety of mammalian species. Overall, the experimental evidence is lacking in consistency and quality across the studies. The data in rodents is weak, but suggests that when effects do occur, the result is a decrease in

melatonin concentration. There is no evidence for ELF-EMF effects on melatonin in sheep and baboons. These findings parallel those reported from clinical investigations in humans and population studies (discussed earlier).

Long-term exposure to electric fields decreases melatonin concentrations slightly in rats (*174-177*); the biological significance of this effect is not understood. In a series of studies of acute magnetic field exposure in hamsters (*178-180*), a suppression of pineal and plasma melatonin levels reported in the earliest study was not replicated in later studies. Studies in rats with different magnetic field exposures, field intensities and times of exposure relative to the dark cycle have not shown consistent effects of magnetic fields on melatonin levels. Some laboratories reported that long-term exposure to magnetic fields in rats can reduce nocturnal pineal or blood concentrations of melatonin (*123, 181-184*), but other laboratories did not find similar results (*127, 129, 185, 186*). Interpretation of the findings from this large data set is complicated by variability across studies in confounding factors such as species, strain, gender, co-exposure to chemicals, field characteristics and measured outcomes. Long-term studies of ELF-EMF exposure in lambs (*187, 188*) and baboons (*189*) showed no effects on melatonin levels.

Studies of Cellular Effects of ELF-EMF

The number of cellular components, processes and systems that can possibly be affected by ELF-EMF is large. Historically, testing of potentially toxic substances has relied on the use of carefully controlled *in vitro* experimental systems. In an attempt to identify potentially carcinogenic or toxic effects of an agent, these studies have typically exposed cells to the agent over a range of doses including levels above those encountered in the environment. Measurements are then made of cellular end-points as a means to detect alterations in processes such as differentiation, proliferation, gene expression and signal transduction pathways. This toxicological approach was applied to ELF-EMF in general through exposure of cultured cells over a range of doses. Because nothing is known about the potential mechanistic action of ELF-EMF on biological end-points, careful consideration must be given to the range over which the experimental doses of ELF-EMF is varied. The extrapolation of observed effects to lower field intensities may be inappropriate as ELF-EMF may have different mechanistic actions over different patterns of field intensity. Likewise, the actual agents responsible for the ELF-EMF “dose” to which individuals are exposed are not clear. Environmental ELF-EMF exposure is complex being composed of not only pure 60 Hz electric fields and magnetic fields, but also possibly transients (intermittent spikes and changes in the frequency of the field) and harmonics (multiples of the pure 60 Hz exposure: 120, 180, 240, etc.). To understand this complexity, careful control of laboratory exposure conditions also becomes important to ensure that the exposure being tested is known.

The breadth of *in vitro* data on ELF-EMF produced over the last two decades is enormous. Many of these investigations were done using unique experimental protocols in single laboratories. Under the EMF-RAPID Program, a major focus was research that targeted examination of *in vitro* effects that might clarify potential mechanistic actions of ELF-EMF in order to explain reported epidemiological associations with magnetic fields. Because of the noted complexity of ELF-EMF exposures, efforts were also made to standardize the exposure systems used in these studies to allow for comparability of findings across laboratories. Through oversight by the DOE, on-site quality assurance evaluations were made of laboratories funded by this program. In addition, four regional ELF-EMF exposure facilities were established and made available for use by investigators (discussed earlier).

Through the EMF-RAPID Program, considerable progress was made in the area of *in vitro* research on ELF-EMF. Many of these studies of ELF-EMF exposure focused on end-points commonly associated with cancer (e.g. cell proliferation, disruption of signal transduction pathways and inhibition of differentiation). Convincing evidence for causing effects is only available for magnetic flux densities greater than 100 µT or internal electric field strengths greater than approximately 1 mV/m. To date, there is no generally accepted biophysical mechanism by which actions of lower intensity ELF-EMF exposures, including those reported to be of concern in epidemiological studies, might be explained.

Given the concern about whether ELF-EMF exposure is carcinogenic, considerable effort was undertaken to investigate whether ELF-EMF exposures can damage DNA or induce mutations. It has been generally believed that the energy associated with ELF-EMF is not sufficient to cause direct damage to DNA; however, it has been postulated that indirect effects might be possible by ELF-EMF altering processes within cells that could subsequently lead to changes in DNA structure. Overall, there was considerable variability in experimental design and methodology used in these studies resulting in no conclusive evidence that genotoxic effects result from ELF-EMF exposures.

Studies also examined the potential cytogenetic effects of power-frequency sine wave or pulsed magnetic fields using model systems of human cells isolated directly from peripheral blood and amniotic fluid or cultured human lymphocytes and leukemia cells. Overall, the studies varied considerably, and in general, there is no evidence of chromosomal damage even when cells were exposed to relatively strong magnetic fields (*190*, *191*). Chromosomal aberrations were reported in one study (*192*) using pulsed magnetic fields; however, the exposures tested were within the range of exposures reported in other studies to have no effect.

Relatively few studies have addressed the question of whether ELF-EMF exposures cause genetic mutations (*193*). Studies using bacteria or yeast cells

(*194, 195*) to investigate possible mutational changes in DNA reported no damage from ELF-EMF exposure at levels less than 1000 µT. However, at higher field strength (400,000 µT, 50 Hz), well above environmental field intensities, enhanced mutagenicity was reported in two cell lines (*196, 197*). Exposure to ELF-EMF (magnetic field strengths ≥500 µT) following exposure to ionizing radiation was reported to produce significant enhancement of mutagenicity (*197, 198*); ELF-EMF exposure alone had no effect. Several investigators examined the ability of ELF-EMF to alter the repair of DNA strand breaks caused by hydrogen peroxide or radiation; no effects with exposure to either magnetic or electric fields were observed (*199-201*).

The concept that ELF-EMF might be carcinogenic through effects on gene transcription was stimulated by an extensive series of studies in human leukemia cells (*202, 203*). It was initially reported that high-intensity ELF-EMF exposure increased expression of several genes important in carcinogenesis. The presence of this effect was later reported to occur at field intensities more characteristic of environmental levels (*204*) and in three types of human cell lines (*203, 205, 206*). Because some of these genes may have a central role in controlling cancer, these findings were of great significance. Intense efforts by several laboratories failed to confirm the reported findings (*207-210*). Follow-up studies by the original investigators demonstrated strain-specific responsiveness to ELF-EMF of the cell line (*211*), although this does not appear to explain the inability of other laboratories to confirm the reported findings (*209*).

Several investigations were undertaken to determine whether cells might respond to ELF-EMF with transcriptional or translational changes of heat-shock proteins, which are important in control of stress within a cell. Exposure of cells to ELF-EMF was reported from a single laboratory to result in increases in some of these proteins (*212-214*).

Signal transduction processes aid cells in receiving signals from their environment and from other cells. These signals help to regulate cellular processes such as gene expression, metabolic activity, differentiation and proliferation. Signals received by the cell membrane, which control processes within the cell, have been proposed as a means by which ELF-EMF might affect cellular function. In the case of electrical signals, these are not expected to penetrate the cell's outer membrane but may signal release of proteins on the cell membrane that could alter cellular function.

Numerous laboratories performed studies to evaluate potential ELF-EMF effects on cellular end-points related to signal transduction pathways, which if altered, might be carcinogenic. Overall the body of evidence suggests that ELF-EMF exposures at magnetic field intensities greater than 100 µT and electric fields greater than 1 mV/m have shown effects on signal transduction pathways. Studies at lower exposures are inconclusive.

Recent studies investigated whether ELF-EMF exposure might play a role in B-cell leukemogenesis (the major form of childhood leukemia) through signaling pathways. A series of studies, which focused on one particular signal (the protein kinase C-linked signaling cascade), provided preliminary evidence that *in vitro* exposure to ELF-EMF (100 µT) can affect this pathway (*215-217*). This finding was not reproduced by a second independent laboratory (*218*).

Because of concern about ELF-EMF possibly being carcinogenic, studies were initiated to investigate whether there were effects on ornithine decarboxylase (ODC), an enzyme activated during carcinogenesis. An early study (*219*) reported increased ODC activity in three cell lines in response to a sinusoidal 60 Hz electric field (10 mV/cm). Subsequent work by others demonstrated effects of ELF magnetic fields (field strengths ≤ 100 µT) on ODC although the experimental conditions (e.g. cell line/tissue, field intensity, time of exposure) varied among laboratories (*220-222*). One study reported increased ODC activity in mouse lymphoma cells exposed to 10 µT 60 Hz magnetic fields (*220*). Attempts to reproduce this finding were not successful (*223, 224*).

Abnormal cellular proliferation is a hallmark of carcinogenesis. This complex process is under control of numerous signal transduction pathways. Several laboratories studied *in vitro* cellular proliferation as an end-point for ELF-EMF effects. Alterations in proliferation were observed in a number of laboratories using a variety of exposure conditions (magnetic fields strengths of 1000 to 5000 µT) and cell lines (*225-227*). Two studies (*228, 229*) did not confirm an earlier report (*227*) of increased colony growth for cells exposed to 60 Hz magnetic fields, although one study (*229*) used a similar experimental protocol. Another study, which used several methods for independently assessing proliferation, reported increased growth over an exposure range of 50 to100 Hz and 100 to 700 µT (*230*).

Disruption of the normal circadian rhythm of melatonin, a hormone produced by the pineal gland, has been postulated as a possible mechanism whereby ELF-EMF exposure might increase risk for breast cancer (*120*). Studies in a human breast cancer cell line (*231*) showed that cellular proliferation *in vitro* was decreased by treatment with physiological levels of melatonin; exposure to a sinusoidal ELF magnetic field (1.2 µT) could overcome this effect. These studies were extended and the anti-proliferative effects of tamoxifen (an anti-cancer therapy) were also reported to be reversed by a 1.2 µT field (*232*). Another laboratory presented similar findings (*233*). The original laboratory also reported finding comparable effects using a second human breast cancer cell line (*234*) and a human glioma cell line (*235*). There is some concern about the experimental design of these studies and further work is underway. In addition, because the observed effect is small, the importance of these findings for human health is not clear (*236*).

Numerous investigations have examined ELF-EMF exposure effects on markers characteristics of cellular differentiation (e.g. matrix protein synthesis; cell surface characteristics; cell morphology, size and orientation). Several of these studies demonstrated a role of electric fields in affecting cellular behavior. Two investigations of alterations in matrix protein production studied effects of electric fields (*237, 238*) and found a positive correlation between dose and the differentiated state of the cells. Studies examining ELF-EMF effects on alterations of cell surface markers used a variety of cell types. In two of these investigations, the observed cellular effects were attributed to the induced electric fields (*239, 240*). Exposure to 60 Hz electric fields was also found to suppress formation of osteoclast-like cells in marrow culture (*241*).

Biophysical Theory

The physics governing the interactions of ELF-EMF with matter were elucidated over a century ago and succinctly stated in the Maxwell equations. Years of successful application of these principles for practical advances have left little doubt about our ability to understand and predict electromagnetic biophysical phenomena when details of the system and fields are completely described. Given the complexity, dynamics and organization in living organisms, it is difficult to apply this knowledge. Living organisms function through the use of biochemical and electrical signals carefully controlled by the organism's structure. Early attempts to explain the biological effects of ELF-EMF focused on simple application of electromagnetic theory to calculate the forces on biological molecules and the energies transferred to them by weak ELF-EMF. The extremely small magnitude of these interactions led many investigators to conclude that they would not occur at normally encountered field strengths. This has not fundamentally changed; calculations still strongly suggest that the small electric fields and magnetic fields associated with ELF-EMF in environmental settings cannot be expected to supply, by themselves, the energies necessary for chemical changes.

The complexity and structure of biological systems make uniform application of these findings difficult. For example, even very small fields might act as control signals to modify processes that depend on metabolically supplied energy. This would be analogous to extremely weak radio signals, such as those transmitted over thousands of miles, that control locally supplied energy or power a loud-speaker or a large-screen television set. The exact nature of biological signal processing systems and their susceptibility to control by time-varying ELF-EMF is of continuing interest. Biological systems contain complex feedback loops and amplification sequences in which very small changes at one point may ultimately lead to very large changes further along the communication chain. In considering ELF-EMF changes on the nature of biological signals, it is essential to recognize that all aspects of a field (frequency, amplitude and pattern) may be involved. These considerations make definitive statements based upon biophysical theory difficult to apply to living organisms.

Several mechanisms for explaining ELF-EMF effects on biological systems have been proposed. One set of theories (*242-248*) predicts effects of ELF-EMF on chemical reactions due to resonances that depend on complex interactions between constant and oscillating magnetic fields. There is limited experimental support for these theories (*12*); the validity of the assumptions used in the theories has been questioned (*249*).

Modification of the transfer of electrons from one molecule to another has also been suggested as a theoretical mechanism for the effects of ELF-EMF (*250-255*). However, the energies involved in electron binding are many orders of magnitude larger than those contained in weak, externally applied electric fields or magnetic fields (*256-260*) making these theories difficult to accept.

It is also possible that ELF-EMF could interact with magnetic particles in human cells (*261-264*). However, work with this theory (*263-265*) would suggest that such effects can occur only with large magnetic fields and are not applicable to the normal human environment; these conclusions may be premature (*12, 266*).

Magnetic fields are capable of altering specific types (e.g. radical pair formation) of chemical reactions (*267-273*). Potential effects of ELF-EMF have been predicted by analytical work (*274-278*). Such reaction effects have been shown for strong fields (*279*), but there are few studies of the effects in biological systems with moderate to low field intensities.

Biochemical and biomechanical processes are generally dynamic. It has been suggested that rather than causing changes in the usual state of the system, ELF-EMF may induce slight changes in the frequency of events that trigger other processes, especially for effects on chemicals that oscillate within cells and between cells and their environments (*250, 277, 280-286*). Both theoretical (*287-291*) and biological (*292-294*) studies exist that support this suggestion. However, there is open debate about whether this phenomenon is applicable for ELF-EMF exposures that are generally found in the human environment.

All of the theories for biological effects of ELF-EMF suffer from a lack of detailed, quantitative knowledge about the processes to be modeled. Nevertheless, theoretical models are useful, even in the absence of critical data, because they can indicate what data are needed, suggest previously uncontemplated experiments, suggest bounds on risks under defined situations and provide nonlinear methods of analysis of critical data based upon presumed mechanisms. The current biophysical theories for ELF-EMF would suggest little possibility for biological effects below exposures of 100 µT. However, considering the complexity of biological systems and the limitations required by the assumptions used to mathematically model these theories, this finding has to be viewed with caution.

HOW HIGH ARE EXPOSURES IN THE U.S. POPULATION?

An evaluation of the importance of any environmental agent requires knowledge of both the potential health impacts associated with exposure and the exposure levels encountered by the population. For any environmental exposure, a clear estimate of risk is made more difficult by the lack of a well-defined measure of dose. For ELF-EMF, it is unknown whether time-averaged fields, time above a threshold, the electric current induced by the field, the magnetic field itself, or specific temporal characteristics of the field (e.g. frequency, waveform, or intermittency) are relevant to human health.

Recognizing this uncertainty and faced with practical limitations, investigators have employed several different methods to estimate human exposure to ELF-EMF. Most of these approaches provide an estimate of the 24-hour time-average of the 60 Hz magnetic field. The first ELF-EMF epidemiological study, as well as several subsequent studies, estimated exposure by developing a code to describe power-line wiring near homes. More recent studies performed actual measurements of magnetic fields using either survey instruments in homes or miniature monitors worn by an individual for periods of up to 24 hours or more (personal exposure measurements). Another approach was to calculate time-average magnetic field exposures based on electric current in nearby power lines and distance of homes to the lines. This report focuses entirely on recent studies that measured magnetic fields, and highlights single spot measurements and 24-hour, time-weighted averages.

Several studies measured magnetic fields in either homes (*22, 26, 295-298*) or personal exposures (*297, 299*). These studies and others (*16, 18, 20, 300-309*) compared different types of measurements in an attempt to relate the results across various epidemiological studies. Two of the studies (*297, 299*) attempted to evaluate nationwide exposures in the U.S. population. One study (*297*) measured magnetic fields in various locations within homes using fixed meters. This survey, although not designed to describe individual exposures, provides a snapshot of residential fields, and the results are probably reasonably representative of residential conditions. An extensive measurement protocol (*297*) was used including spot measurements inside rooms, field recordings in the

home, measurements of field profiles from wiring outside the home, measurements of household appliances and measurement of fields from currents in the electrical grounding system. The other study (*299*) relied entirely upon personal monitors mailed to participants along with a questionnaire that addressed characteristics of the individual wearing the monitor. These two studies form the basis for most of the discussion that follows.

Measured magnetic field exposures to individuals and measurements in homes tend to have an asymmetric distribution with the bulk of their values in the low range with fewer values in the range of higher exposures. Therefore, the central tendency of the values is better represented as a geometric mean (log-weighted average) and the variation around that mean given as a geometric standard deviation. Another measure commonly used is the median, which denotes the estimate of exposure for which 50% of the population have smaller exposures and 50% have larger exposures. In addition, estimates are also presented for the portion of the population in the upper range of exposure. This report presents averages as geometric means with geometric standard deviations given in parenthesis beside the average estimate.

Average 24-hour personal magnetic field exposure for individuals in the U.S. population (*299*) is about 0.09 µT (geometric standard deviation of approximately 2.2). About 44% of the population have 24-hour exposures above 0.1 µT, about 14% above 0.2 µT, about 2.5% above 0.5 µT and less than 1% above 0.75 µT. The median measured fields using monitors located for 24 hours in several places in the homes (*297*) was 0.06 µT with about 28% of the homes exceeding 0.1 µT, about 11% of the homes exceeding 0.2 µT and about 2% exceeding 0.5 µT. The main difference between the home and personal exposure measurements pertains to exposures incurred outside of the home and the movement of individuals within the home near ELF-EMF sources.

Personal exposures measured within the home (*299*) averaged 0.08 µT (2.5) for time not in bed and 0.05 µT (3.52) for time spent in bed. In comparison, personal exposures at work averaged 0.1 µT (2.57), exposure at school averaged 0.06 µT (2.1) and exposure during travel measured 0.1 µT (2.0). Approximately 38% of the personal measurements in the home (not in bed) were above 0.1 µT, about 14% were above 0.2 µT and about 3.5% were above 0.5µT. Personal measurements at home and in bed were slightly different in the low exposure range with approximately 30% of the measurements above 0.1 µT, but similar in the high exposure region with about 14% above 0.2 µT and about 4% above 0.5 µT. It is clear from these numbers that personal exposures tend to be somewhat larger than those observed by fixed measurement of fields in homes.

Personal exposures do not appear to differ by gender, but do differ by age (*299*) with young children (less than five years of age) having an average exposure of 0.08 µT (2.1), school-aged children (five to 17 years of age) having an average

exposure of 0.08 µT (2.2), working-aged adults (18 to 64 years of age) having an average exposure of 0.1 µT (2.2) and retirement-aged adults (greater than 64 years of age) having an average exposure of 0.09 µT (2.2). There are some regional differences in exposure across the United States, but these are differences that are likely to change based upon the seasons and are not likely to have a major impact upon exposure considerations. Residents of apartments and duplexes seem to have higher average exposures (approximately 0.1 µT) compared to residents of other dwelling types (0.05 to 0.07 µT) (*297*).

The presence of overhead power lines near homes contributes to both personal exposures and fixed home measurements. In a large study using fixed monitors in homes (*297*), estimates of fields due to power-line fields were determined independent of exposures measured in the homes. Both the power-line and grounding system fields were combined and compared to the short-term field levels measured in the centers of rooms. Combined, the two sources add up to much of the spot residential fields in homes having higher than usual magnetic field levels.

A comparison was made between different types of power lines to determine which ones produced the greatest fields. Transmission lines and certain types of distribution lines produced the greatest fields (medians ranging from 0.09 to 0.38 µT, although the number of residences exposed to these fields was small), and several types of primary distribution lines produced the lowest median fields (medians ranging from 0.01 to 0.02 µT). The majority of homes were associated with underground distribution lines that still generated fields with a median of 0.03 µT and with 5% exceeding 0.13 µT (roughly 75% of the median for all homes).

The effect of power lines on personal exposures was also assessed (*299*), but in contrast to the previous discussion, self-reporting was used to classify the types of power lines. Persons reporting three-phase primary distribution lines (average exposure at home 0.083 µT), multiple three-phase primary distribution lines (average exposure at home 0.1 µT) and transmission lines (average exposure at home 0.1 µT) had the highest average exposures, while those reporting single phase (average exposure of 0.07 µT) and two-phase primary distribution lines (average exposure of 0.05 µT) had the lowest exposure. For all types of lines, 25% of the population had exposures greater than 0.1 to 0.2 µT and 5% had exposures greater than 0.3 to 0.5 µT. At distances of greater than 50 feet, the type of power lines appeared to have little impact on the average exposure and only a minor impact on the number of individuals with the highest exposures.

Several other factors contributed to increased personal exposure and/or increased residential exposure. These included type of home (single family homes had smaller average exposures than multi-family homes), size of the home (smaller homes had higher fields), age of the home (older homes had higher fields), water-

line type inside the home (homes with metal pipes tended to have higher fields) and location of the home (urban and suburban homes had higher fields than rural homes).

Magnetic fields generated by appliances were also studied (*297*). Exposures tend to vary greatly by distance to the appliance and type of appliance. In general, microwave ovens, toaster ovens, ceiling heat and refrigerators generated the highest fields. However, the contributions of these fields to personal exposure will depend upon placement of the appliance, distance from the appliance, frequency of use, manufacturer, etc. Any observations on exposures from appliances are not easily generalized.

Occupational exposures have been evaluated in a large number of studies (see Table 2.4 (*12*)). The list of occupations with ELF-EMF exposure is quite large and will not be repeated here. In general, electrical workers, persons working near machines with electric motors and welders tend to have the highest exposures with time-weighted average magnetic field exposure levels in the range of 0.1 to 4.0 μT.

CONCLUSIONS AND RECOMMENDATIONS

Previous Panel Reviews

Since 1990, more than 60 reports and literature reviews written by various expert panels, individual researchers or governmental officials have examined the ELF-EMF scientific evidence worldwide. While most of these documents are one-time assessments, some U.S. states (including Connecticut, Maryland, Virginia) have recognized public concern for this topic and monitored this issue on a yearly or periodic basis (*310*). A number of national reviews of ELF-EMF research have also been prepared.

The most recent panel reviews (*19, 311-316*) used a variety of evaluation criteria and differing types of information to evaluate potential health effects from ELF-EMF exposures. Several groups concluded that the epidemiological evidence for childhood and adult cancers was inconsistent and inconclusive and was insufficient to address risks (*19, 311, 312, 315, 316*). Several noted that there existed some associations between exposures and cancers, but without mechanistic and animal evidence to support the effect, concluded it was still basically a hypothesis to be studied further (*19, 313-315*). For all of these reviews, the conduct of additional research was suggested.

NIEHS Conclusion

As part of the EMF-RAPID Program's assessment of ELF-EMF-related health effects, an international panel of 30 scientists met in June 1998 to review and evaluate the weight of the ELF-EMF scientific evidence (*12*). Using criteria developed by the International Agency for Research on Cancer, none of the Working Group considered the evidence strong enough to label ELF-EMF exposure as a "known human carcinogen" or "probable human carcinogen." However, a majority of the members of this Working Group (19/28 voting members) concluded that exposure to power-line frequency ELF-EMF is a "possible" human carcinogen. This decision was based largely on "limited evidence of an increased risk for childhood leukemias with residential exposure

and an increased occurrence of CLL (chronic lymphocytic leukemia) associated with occupational exposure." For other cancers and for non-cancer health endpoints, the Working Group categorized the experimental data as providing much weaker evidence or no support for effects from exposure to ELF-EMF.

The NIEHS agrees that the associations reported for childhood leukemia and adult chronic lymphocytic leukemia cannot be dismissed easily as random or negative findings. The lack of positive findings in animals or in mechanistic studies weakens the belief that this association is actually due to ELF-EMF, but cannot completely discount the finding. The NIEHS also agrees with the conclusion that no other cancers or non-cancer health outcomes provide sufficient evidence of a risk to warrant concern.

The ultimate goal of any risk assessment is to estimate the probability of disease in an exposed population. In general, this involves the combination of three basic pieces of information: the probability that the agent causes the disease, the response as a function of exposure given that the exposure does cause disease and the distribution of exposures in the population being studied. The NIEHS believes that the probability that ELF-EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal, scientific support that exposure to this agent is causing any degree of harm.

The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

Several groups have attempted to determine the risk of childhood leukemia in the general population under the unproven assumption that ELF-EMF is truly causing this disease (*317-319*). If this assumption were correct, these calculations generally suggest, on average, that between 5% and 15% of childhood leukemias could be caused by exposures to ELF-EMF with confidence intervals including 0%. Based upon this assumption, our own evaluations using the most current data and several different methods of analysis do not disagree with these percentages. The risk of getting leukemia prior to age 15 in the United States is about 0.05% (5/10,000 people) (*320*). This would make the lifetime risk of childhood leukemia attributable to ELF-EMF (again, conditional on the risk being real) between 2.5 to 7.5 per 100,000 people. On a yearly basis, this conditional risk is

approximately 15 times less than the lifetime risk or 2 to 6 additional cases per million children per year.

The National Toxicology Program routinely examines environmental exposures to determine the degree to which they constitute a human cancer risk and produces the "Report on Carcinogens" listing agents that are "known human carcinogens" or "reasonably anticipated to be human carcinogens." It is our opinion that based on evidence to date, ELF-EMF exposure would not be listed in the "Report on Carcinogens" as an agent "reasonably anticipated to be a human carcinogen." This is based on the limited epidemiological evidence and the findings from the EMF-RAPID Program that did not indicate an effect of ELF-EMF exposure in experimental animals or a mechanistic basis for carcinogenicity.

Recommended Actions

Regulatory action on any environmental exposure can be multifaceted and proceed by any of a number of options. In general, if regulatory action is to be taken, the types of controls can be broken down into restrictions placed on the production of the hazard and those placed on individuals who might come in contact with the hazard. In the case of ELF-EMF, there are several issues that complicate any regulatory action. First, there is only marginal, scientific support that exposure to ELF-EMF is a health hazard. Second, it is unclear what aspect of the exposure, if any, may be the active component of the field resulting in the increased cancer risk. While the association observed is with average magnetic field measures, controls resulting in reductions in these field levels may not alleviate the risk. Third, it is impossible to remove all ELF-EMF exposure and remain a modern, technologically advanced society. Finally, considering the weak degree of evidence involved, it is critical that the potential risks from any alternatives to our current methods of using electricity be carefully evaluated.

Regulatory actions prompted by this review of ELF-EMF are not the purview of the NIEHS. The Interagency Committee (IAC, described earlier) has been involved in all aspects of both our research program and the process of reviewing these data. The agencies that compose the IAC employ experts who have greater experience and knowledge concerning mitigation of ELF-EMF exposure than the NIEHS. However, it is important that the strength of the evidence reported here be placed in a context that is clear to the regulatory authorities. Therefore, the NIEHS is providing the following suggestions that are intended to give scope for future regulatory actions.

The NIEHS suggests that the level and strength of evidence supporting ELF-EMF exposure as a human health hazard are insufficient to warrant aggressive regulatory actions; thus, we do not recommend actions such as stringent standards on electric appliances and a national program to bury all transmission and distribution lines. Instead, the evidence suggests passive measures such as a

continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. NIEHS suggests that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards. We also encourage technologies that lower exposures from neighborhood distribution lines provided that they do not increase other risks, such as those from accidental electrocution or fire.

Exposures in individual residences are linked to certain characteristics. Their chief causes are improper grounding and improper wiring, which if addressed by properly following current electrical codes, can be mitigated and exposures reduced. Older homes may also have higher ambient exposures, but these must be assessed on a case-by-case basis. Many of the U.S. electric utility companies will measure fields in their customers' homes and help them to identify sources of high fields; we encourage continuation of this practice. Finally, the NIEHS would encourage the manufacturers of household and office appliances to consider alternatives that reduce magnetic fields at a minimal cost. We feel that the risks do not warrant major and expensive redesign of modern electrical appliances, but inexpensive modifications should be sought to reduce exposures.

Certain occupations result in high field exposures. The NIEHS encourages the National Institute for Occupational Safety and Health and the Occupational Safety and Health Administration to review these findings and carefully evaluate if current occupational exposure standards are adequate.

In summary, the NIEHS believes that there is weak evidence for possible health effects from ELF-EMF exposures, and until stronger evidence changes this opinion, inexpensive and safe reductions in exposure should be encouraged.

Future Research

The NIEHS is committed to the support of hypothesis-driven research on any environmental exposure that is of concern for human beings. Exposure to ELF-EMF is no different. These exposures warrant continued monitoring because ELF-EMF exposure is ubiquitous and the use of electromagnetic technology is growing in our society.

The characteristics of ELF-EMF and their possible interactions with biological systems have been investigated for several decades. The EMF-RAPID Program successfully contributed to the scientific knowledge on ELF-EMF through its support of high quality, hypothesis-based research. While some questions were answered, others remain. Building upon the knowledge base developed under the EMF-RAPID Program, meritorious research on ELF-EMF through carefully designed, hypothesis-driven studies should continue for areas warranting

fundamental study including leukemia. The NIEHS will continue to support research in this area. Certain areas of research, however, warrant noting.

There are several epidemiological studies of ELF-EMF exposures and childhood leukemia underway that may help clarify this issue. Any new epidemiological studies of ELF-EMF exposure are not warranted unless, in some unique manner, the studies differ from existing ones and can test new hypotheses. Very little is known about the mechanisms and causes of childhood leukemias and chronic lymphocytic leukemia in adults. Many agencies, including the National Institutes of Health, have ongoing programs in these areas aimed at improving our understanding of these diseases. As risk factors are identified, we strongly recommend re-analysis of the existing ELF-EMF epidemiology data to determine if these risk factors reduce or strengthen the reported findings of concern expressed in this document. Where currently available studies cannot adequately address newly discovered risk factors, the NIEHS encourages new studies.

Several non-cancer health areas including neurodegenerative and cardiovascular diseases have been identified as being of national concern, but for which there are few, high quality studies to evaluate adequately whether ELF-EMF exposure might have effects. Preliminary work suggests that ELF-EMF exposure may be linked to cardiovascular deaths resulting from arrhythmia and acute myocardial infarction. The mechanism for such an effect, if true, is not known, but possibly occurs through exposure-related effects on autonomic nervous system control of cardiac function. Also, several exploratory studies have suggested possible associations between occupational ELF-EMF exposure and neurodegenerative diseases specifically amyotrophic lateral sclerosis and Alzheimer's disease. The data on these end-points are inadequate for interpreting the possibility of an association. Research in these areas should cover all aspects of scientific investigation including epidemiology, laboratory and mechanistic studies.

Preliminary studies in transformed breast cancer cells suggest that ELF-EMF exposures can overcome effects of melatonin and tamoxifen in regulating cell growth. This effect of ELF-EMF appears to occur at magnetic field exposures that may be encountered in the environment. Several other laboratories have presented similar, unpublished findings at national meetings. The importance of this finding for human health is unclear, but considering the magnitude of the incidence of breast cancer, this area warrants further investigation.

There is a continued need for more biologically realistic mathematical models to evaluate the biophysics of ELF-EMF and for biological systems specifically developed to evaluate the validity and utility of these mathematical models. While it is clearly established that certain animals can sense weak magnetic fields for navigation and homing, the physical basis for these processes is unknown. More remains to be learned about the physics of magnetic field interactions with biological systems.

The interaction of humans with ELF-EMF is complicated and will undoubtedly continue to be an area of public concern. The World Health Organization through its own international program on ELF-EMF will review this field in the year 2003. The NIEHS is a partner in this process.

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PNW-ISA Certified Tree Risk Assessor #148

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EXECUTIVE SUMMARY

It is my judgment that trees 197 and 199 are healthy and have the ability to withstand the required canopy pruning and wall construction augers to allow safe clearance of the new facility. They will not suffer significant long-term damage as a result if the tree protection measures outlined in the original report, and expanded upon here, are adequately followed. In addition, the amount of root damage and canopy loss will not significantly increase the failure potential of the trees.

However, tree # 198 is a Weeping Birch in very poor condition. The required canopy pruning and wall construction may contribute to a faster decline of the tree but not significantly.

ASSIGNMENT

Lyn Keenan, Senior planner with GeoEngineers of Seattle, Washington, requested that Gilles Consulting return to the Juanita Sub-station located on NE 109th Avenue between NE 128th and NE 132nd Streets in Kirkland, Washington. One of the neighbors filed a SEPA Appeal with concerns that the construction of the facility may predispose the large Fir tree, # 197, to failure. Ms. Keenan requested that the tree be re-evaluated in light of the proposed construction and the proposed construction techniques, and respond to the appeal. In addition, there are two additional trees-#ôs 198 and 199 just north of # 197 that will be similarly impacted. PSE staff requested that those trees be included in this report.

METHODOLOGY

To evaluate the trees and to prepare the report, I drew upon my 25+ years of experience in the field of arboriculture and my formal education in natural resources management, dendrology, forest ecology, plant identification, and plant physiology. I also followed the protocol of the International Society of Arboriculture (ISA) for Visual Tree Assessment (VTA) that includes looking at the overall health of the trees as well as the site conditions. This is a scientifically based process to look at the entire site, surrounding land and soil, as well as a complete look at the trees themselves.

In examining each tree, I looked at such factors as: size, vigor, canopy and foliage condition, density of needles, injury, insect activity, root damage and root collar health, crown health, evidence of disease-causing bacteria, fungi or virus, dead wood and hanging limbs. While no one can predict with absolute certainty which trees will or will not fail, we can, by using this scientific process, assess which trees are most likely to fail and take appropriate action to minimize injury and damage.

In addition, I met on site with the Construction Manager, John Rorabacher and Associate Engineer Jens Nedrud, both of Puget Sound Energy, to review the proposed construction and the impact the required construction will have on the trees. While on site we discussed the proposed facility, what elements it entailed, where they will be located on the property and in relation to the three trees, the required canopy clearances for safe construction and operation of the facility, construction techniques, and how these issues will or will not impact the three trees.

Tree Tags

The trees were numbered as part of the July 14, 2008 Gilles Consulting report. The tags are made of shiny aluminum approximately one inch by three inches in size and are attached to the east side of the property line fence with staples and a one foot strip of brightly colored survey tape. The tags were placed on the fence near the trunks. Please refer to *Attachment 1, Site Plan* for an orientation to the site and the approximate location of the trees. Blow this up to show just the section with these 3 trees.

OBSERVATIONS

The location of the proposed sub-station is accessed from NE 132nd Street. There is a chain-link fence with a gate at the entrance. The proposed station is to be constructed along the northern 300 feet of the towards the northern property line. The current proposal is for a facility that is approximately 13 feet from the east and west property lines.

In an effort to present the information and conclusions for each tree in a manner that is clear and easy to understand, I have included a detailed spreadsheet, *Attachment 2, Tree Inventory/Condition Spreadsheet*. The descriptions on the spreadsheet were left brief in order to include as much pertinent information as possible and to make the report manageable. A legend is provided at the top of the sheet to guide the reader through the tree descriptions and what they mean. A brief review of these terms and descriptions will enable the reader to rapidly move through the spreadsheet and better understand the information.

Additional Testing

None of the trees presented symptoms or signs that would indicate internal decay or structural defects. Therefore, no additional tests were performed during this site visit.

DISCUSSION AND RECOMMENDATIONS

The three trees are located two separate properties east of the east property line fence with canopies that overhang the substation property and roots that grow into the soil of the substation property. Trees 197 and 198 are on 13045 110th Avenue NE. Tree 199 is on the property at 13055 110th Avenue NE.

Tree # 197, Douglas Fir Canopy:

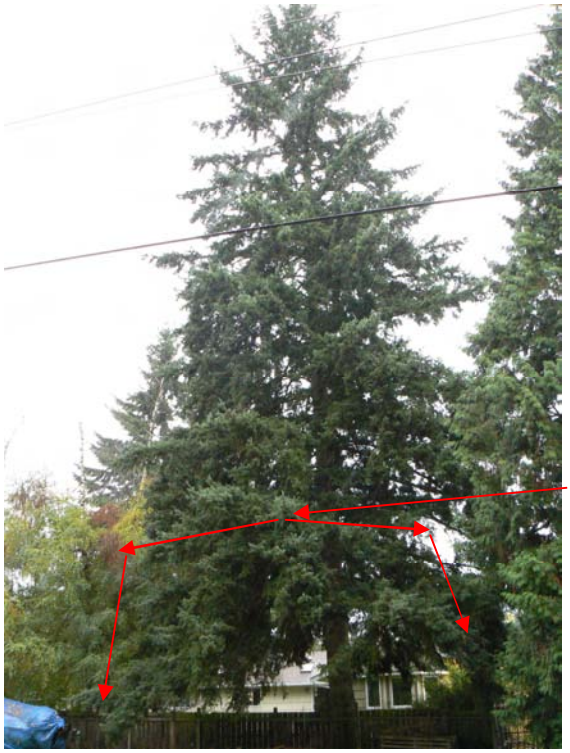


Photo # 1: Tree # 197

The approximate amount of canopy removal required to provide room for the construction of the wall and the clearance to safely operate the facility.

Note: pruning of canopy is only on the west side of the trunk. Limbs on the east, northeast, and southeast sides of the trunk do not need to be removed.

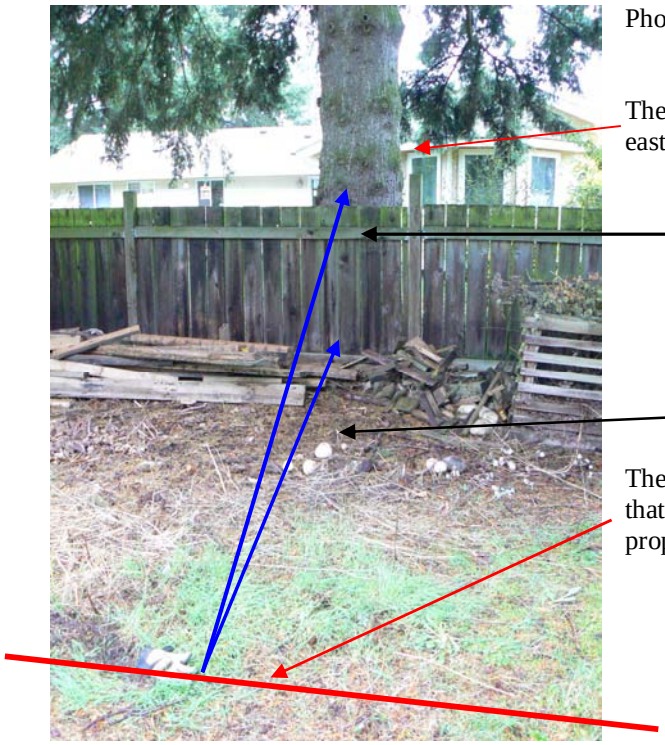


Photo # 2: the base of # 197

The base of the tree is approximately 4 feet east of the east property line fence.

17 feet

North

13 feet

The wall will be built on 3-foot diameter pillars/piers that are 10-foot on center and 13 feet west of the east property line fence, or 17 feet west of the trunk.

The canopy of the fir overhangs the substation property by approximately 22 feet at the furthest point. The wall with all attachments will be 24 feet above ground level. This means that the canopy of the tree will need to be pruned up to 30 feet to allow safe construction and operation of the facility. The canopy will need to be trimmed back at least six feet east of the proposed wallð that is approximately 7 feet west of the east property line.

When 50% or more of the foliage on an individual branch is removed the entire limb should be cut back to the branch collar according to current pruning standards. As the pruning moves up the canopy and further away from the wall, it will likely mean less removal required and, therefore, some of the branches will only need tip pruning and not complete removal.

The tree appears to have the size, health, vigor, and stored energy reserves to withstand this amount of canopy loss. The project consulting arborist should be present during the pruning to ensure that the pruning is done according current American National Institute (ANSI) standards and that adequate clearance is being achieved without over-pruning the tree.

Tree # 198, Weeping Birch Canopy:
Photo # 3: The Dying Birch Tree

The canopy of this tree overhangs the substation property by 10 feet at the widest point.

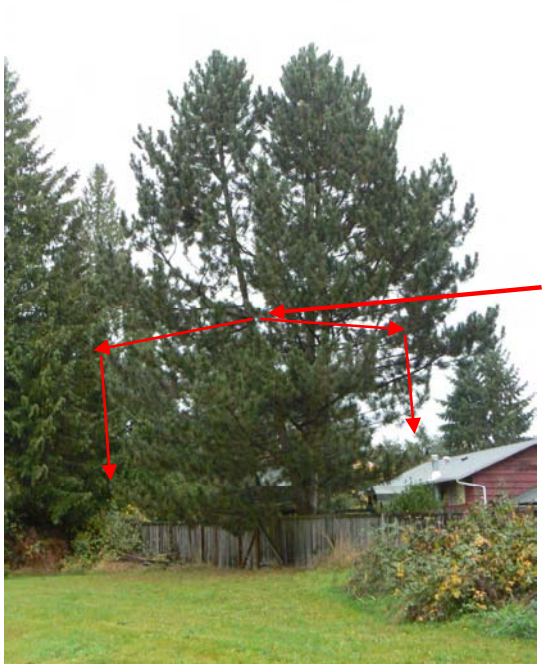
This tree is in very poor condition with all of the tops dying out. The tree appears to be suffering from severe drought stress.

The removal of foliage from the west side may hasten the decline of the tree but not substantially.

The project consulting arborist should be present during the pruning to ensure that the pruning is done according current American National Institute (ANSI) standards and that adequate clearance is being achieved without over-pruning the tree.

Tree 199, Ponderosa Pine Canopy:

Photo # 4, Tree # 199, Pine



The approximate amount of canopy removal required to provide room for the construction of the wall and the clearance to safely operate the facility.

The proposed wall will be 13 feet east of and parallel to the east property line fence. It will extend a few yards north of the pine tree.

The canopy of the fir overhangs the substation property by approximately 16 feet at the furthest point. The wall with all attachments will be 24 feet above ground level. This means that the canopy of the tree will need to be pruned up to 30 feet to allow safe construction and operation of the facility. The canopy will need to be trimmed back at least six feet east of the proposed wallð that is approximately 7 feet west of the east property line.

When 50% or more of the foliage on an individual branch is removed the entire limb should be cut back to the branch collar according to current pruning standards. As the pruning moves up the canopy and further away from the wall, it will likely mean less removal required and, therefore, some of the branches will only need tip pruning and not complete removal.

The tree appears to have the size, health, vigor, and stored energy reserves to withstand this amount of canopy loss. The project consulting arborist should be present during the pruning to ensure that the pruning is done according current American National Institute

(ANSI) standards and that adequate clearance is being achieved without over-pruning the tree.

Root System Effects

1. The proposed wall construction is to use a large auger to drill three-foot diameter holes that are 10 feet apart. The wall will be built on top of the piers built inside the holes.
    a. The auger holes will be approximately 17 feet from the base of # 197, 16 feet from the base of 198, and approximately 14.5 feet from the base of # 199. At those distances the chances of an auger hitting a significant root are going to be minimal.
        i. I predict that the impact will be much less than 5% of the critical root system. Current industry belief is that a healthy tree can lose up to 20% of the root system and survive with no long-term significant decline.
    b. Therefore, there should be minimal impact on the trees from the auguring of the wall support pillars.

2. There will be the need for the contractor to drive and operate in the tree protection area between the east property line and the wall.
    a. This can be mitigated by placing a layer of wood chips, hog fuel, or similar materials to a depth of 10 to 12 inches. **(Please note:** this is an increase in depth from the original report to provide a greater level of soil and root protection.) The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.
    b. The tree protection area with the chips can be utilized by the contractor on a limited basis.
    c. All access must be approved by the project consulting arborist in advance.

Tree Protection Measures

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The minimum Tree Protection Measures in *Attachment 3, Tree Protection Measures* are on three separate sheets that can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so

that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

> **Please Note:** Additional details have been included in *Attachment 3, Tree Protection Measures* to specify how the tree canopy pruning shall be done and how the wall construction shall be done in ways that minimize damage to the trees and provide the highest potential long-term survival for each tree.

CONCLUSIONS

The SEPA appeal listed four issues of concern about the trees. These four issues and responses are listed below.

1. The project ñthreatens the Health of the trees on my property. . .ò The required pruning ñwould result in serious detriment to the treeôs health and ability to withstand wind and therefore present a toppling hazard.
    a. **Response:**
        i. The amount of canopy removal is less than the annual foliage removal recommended by current ANSI pruning standards. The tree appears to have the health, vigor, and stored reserves to handle this level of pruning/foliage loss.
        ii. The pruning will expose some of the lower trunk. However, the trees on the properties west of the substation provide buffering for these trees. In addition, the substation wall itself will provide buffering from the wind. The removal of the required foliage for construction and operational safety of the proposed substation will not likely increase the potential failure of the trees.
2. ñThe trimming necessary to make these treeôs limbs fall outside of the proposed setback variances for the substationôs sound wall would create a hazard to my home with the potential for the tree or itôs limbs to penetrate my house.ò
    a. **Response:** Douglas Fir trees as a species are known to lose large limbs in storms. It is assumed by forest ecologists to be a self preservation mechanism where the under wind loads a tree will shed a limb to reduce the strain of the wind force and therefore, increase the survival potential of the entire tree. The pruning of canopy to build the substation will not significantly alter that basic characteristic of this species.
3. ñThe root systems of these trees are also within the setback variances proposed and would require cutting and containment. Because it would be necessary to cut or contain the root system of these three to four trees, ground erosion as a result of water runoff could undermine these root systems presenting a toppling hazard to my home.ò

a. **Response:** The wall is proposed to be 13 feet west of the east property line and 14.5 to 17 feet west of the bases of the three trees. The proposed construction is to use an auger machine to drill 3-foot diameter holes every 10 feet from north to south. There are not likely going to be any large roots hit from the auger drilling the holes.
    i. When the holes are complete the project consulting arborist should be on site to document the number and size of roots encountered as well as cleanly cutting the roots.

4. ñThese trees also present a fire ignition source from wind blown limbs falling into the proposed substations boundaries which could threaten my home with fire.ò
    a. This response will need to be verified by the project manager or another appropriate person from the project design team. Given that caveat, I understand proposed facility and its operation, if there is a 6-foot vertical and horizontal clearance from the wall that a fire hazard does not exist.

WAIVER OF LIABILITY

There are many conditions affecting a treeôs health and stability, which may be present and cannot be ascertained, such as, root rot, previous or unexposed construction damage, internal cracks, stem rot and more which may be hidden. Changes in circumstances and conditions can also cause a rapid deterioration of a treeôs health and stability. Adverse weather conditions can dramatically affect the health and safety of a tree in a very short amount of time. While I have used every reasonable means to examine these trees, this evaluation represents my opinion of the tree health at this point in time. These findings do not guarantee future safety nor are they predictions of future events.

The tree evaluation consists of an external visual inspection of an individual treeôs root flare, trunk, and canopy from the ground only unless otherwise specified. The inspection may also consist of taking trunk or root soundings for sound comparisons to aid the evaluator in determining the possible extent of decay within a tree. Soundings are only an aid to the evaluation process and do not replace the use of other more sophisticated diagnostic tools for determining the extent of decay within a tree.

As conditions change, it is the responsibility of the property owners to schedule additional site visits by the necessary professionals to ensure that the long-term success of the project is ensured. It is the responsibility of the property owner to obtain all required permits from city, county, state, or federal agencies. It is the responsibility of the property owner to comply with all applicable laws, regulations, and permit conditions. If there is a homeowners association, it is the responsibility of the property owner to comply with all Codes, Covenants, and Restrictions (CC&Rôs) that apply to tree pruning and tree removal.

This tree evaluation is to be used to inform and guide the client in the management of their trees. This in no way implies that the evaluator is responsible for performing recommended actions or using other methods or tools to further determine the extent of internal tree problems without written authorization from the client. Furthermore, the evaluator in no way holds that the opinions and recommendations are the only actions required to insure that the tree will not fail. A second opinion is recommended. The client shall hold the evaluator harmless for any and all injuries or damages incurred if the evaluatorôs recommendations are not followed or for acts of nature beyond the evaluatorôs reasonable expectations, such as severe winds, excessive rains, heavy snow loads, etc.

This report and all attachments, enclosures, and references, are confidential and are for the use of the client concerned. They may not be reproduced, used in any way, or disseminated in any form without the prior consent of the client concerned and Gilles Consulting.

Thank you for calling Gilles Consulting for your arboricultural needs.

Sincerely,

Brian K. Gilles, Consulting Arborist
ISA Certified Arborist # PN-0260A
ASCA Registered Consulting Arborist # RCA-418
PNW-ISA Certified Tree Risk Assessor #148

ATTACHMENTS

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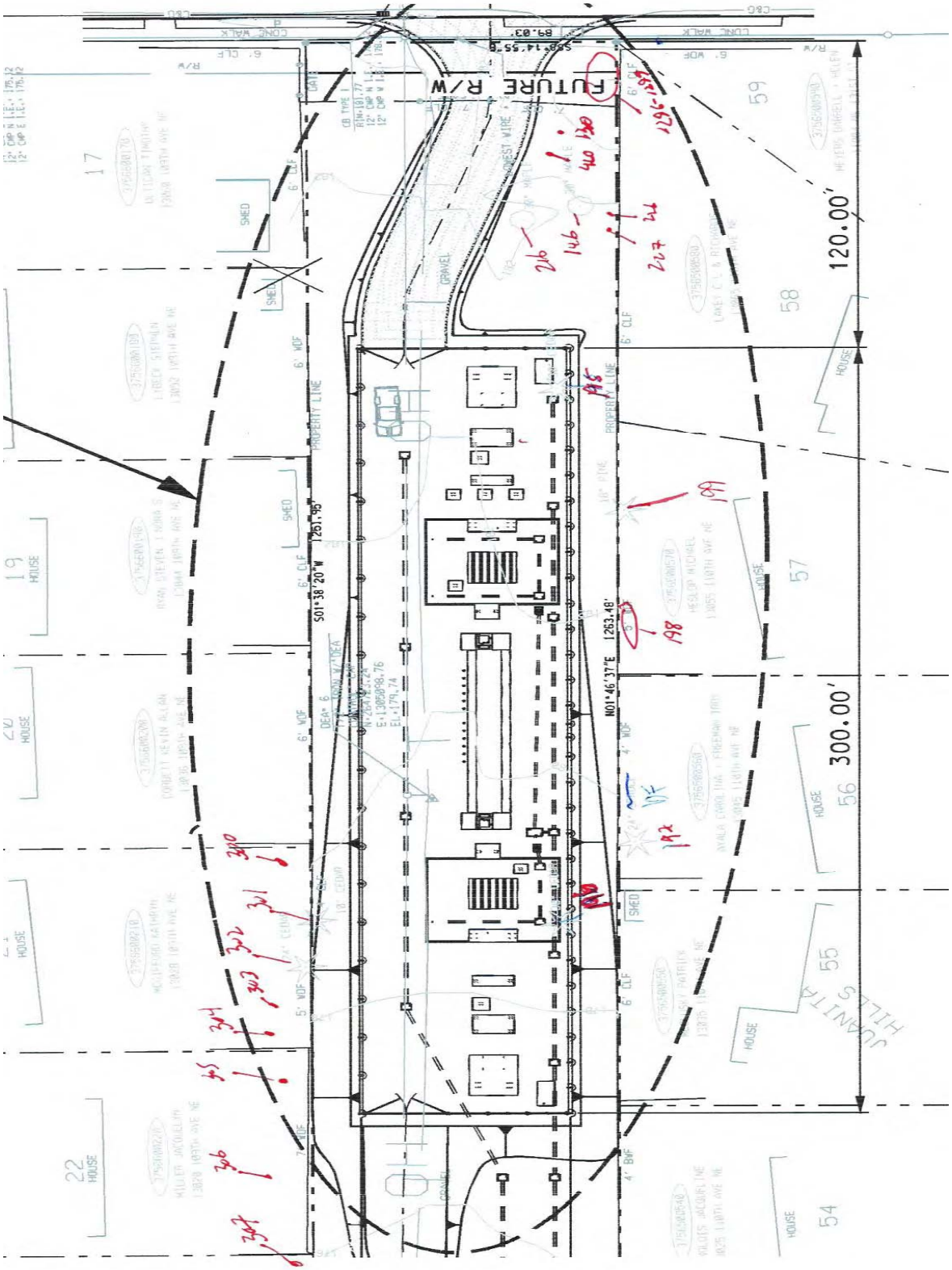
ATTACHMENT 3 - TREE PROTECTION MEASURES 15
ATTACHMENT 4 - REFERENCES 20

ATTACHMENT 1 - SITE PLAN



ATTACHMENT 2 - TREE INVENTORY/CONDITIONS SPREADSHEET

ATTACHMENT 3 - TREE PROTECTION MEASURES

In order for trees to survive the stresses placed upon them in the construction process, tree protection must be planned in advance of equipment arrival on site. If tree protection is not planned integral with the design and layout of the project, the trees will suffer needlessly and will possibly die. With proper preparation, often costing little, or nothing extra to the project budget, trees can survive and thrive after construction. This is critical for tree survival because damage prevention is the single most effective treatment for trees on construction sites. Once trees are damaged, the treatment options available are limited.

The following minimum Tree Protection Measures are included on three separate sheets so that they can be copied and introduced into all relevant documents such as site plans, permit applications and conditions of approval, and bid documents so that everyone involved is aware of the requirements. These Tree Protection Measures are intended to be generic in nature. They will need to be adjusted to the specific circumstances of your site that takes into account the location of improvements and the locations of the trees.

TREE PROTECTION MEASURES:

1. Tree Protection Fences will need to be placed around each tree or group of trees to be retained.
    a. Tree Protection Fences are to be placed according to the attached drawing and as noted in the attached Tree Inventory/Conditions Spreadsheet, Column 6 - Limits of Disturbance.
    b. Tree Protection Fences must be inspected prior to the beginning of any construction work/activities.
    c. Nothing must be parked or stored within the Tree Protection Fencesð no equipment, vehicles, soil, debris, or construction supplies of any sorts.

2. The canopy pruning will be done by a qualified International Society of Arboriculture (ISA) Certified Arborist using either a bucket/lift truck or clean climbing techniques. The trees shall not be climbed with spikes, spurs, or gaffs.
    a. All pruning must conform to current American National Standards Institute (ANSI) for pruning and safety.
    b. The canopies will need to be trimmed to a point that is 7 feet west of the east property line fence.
        i. Consistent with ANSI pruning standards, when more than 50% of the foliage of a single limb has been removed at the proper distance from the east property line fence, the entire limb shall be cut back to the branch collar using proper pruning cuts.

3. Cement trucks must not be allowed to deposit waste or wash out materials from their trucks within the Tree Protection Fences.

4. The Tree Protection Fences need to be clearly marked with the following or similar text in four inch or larger letters:

TREE PROTECTION AREA, ENTRANCE PROHIBITED
To report violations contact
City Code Enforcement
at 425-587-3225

4. The area within the Tree Protection Fencing must be covered with wood chips, hog fuel, or similar materials to a depth of 10 to 12 inches. (Please note: this is an increase in depth from the original report to provide a greater level of soil and root protection.) The materials should be placed prior to beginning construction and remain until the Tree Protection Fencing is taken down.
    a. The tree protection area with the chips can be utilized by the contractor on a limited basis.

i. All access must be approved by the project consulting arborist in advance.

5. When excavation occurs near trees that are scheduled for retention, the following procedure must be followed to protect the long term survivability of the tree:
    a. An International Society of Arboriculture, (ISA) Certified Arborist must be working with all equipment operators.
        i. The Certified Arborist should be outfitted with a shovel, hand pruners, a pair of loppers, a handsaw, and a power saw (a ñsawsallò is recommended).
    b. The hoe must be placed to ñcombò the material directly away from the trunk as opposed to cutting across the roots.
        i. Combing is the gradual excavation of the ground cover plants and soil in depths that only extend as deep as the tines of the hoe.
    c. When any roots of one inch diameter or greater, of the tree to be retained, is struck by the equipment, the Certified Arborist should stop the equipment operator.
    d. The Certified Arborist should then excavate around the tree root by hand/shovel and cleanly cut the tree root.
        i. The Certified Arborist should then instruct the equipment operator to continue.
    e. The work will be documented in a report to Puget Sound Energy and to the City of Kirkland upon completion of the excavation.

6. When the piles for the east wall are excavated a qualified ISA Certified Arborist should be on site.
    a. The role of the arborist in the case of the auger/pile holes will be to document the number and size of roots affected and cleanly cut the roots when the holes have been completed.
    b. These will be documented in a report to Puget Sound Energy and to the City of Kirkland upon completion of the excavation.

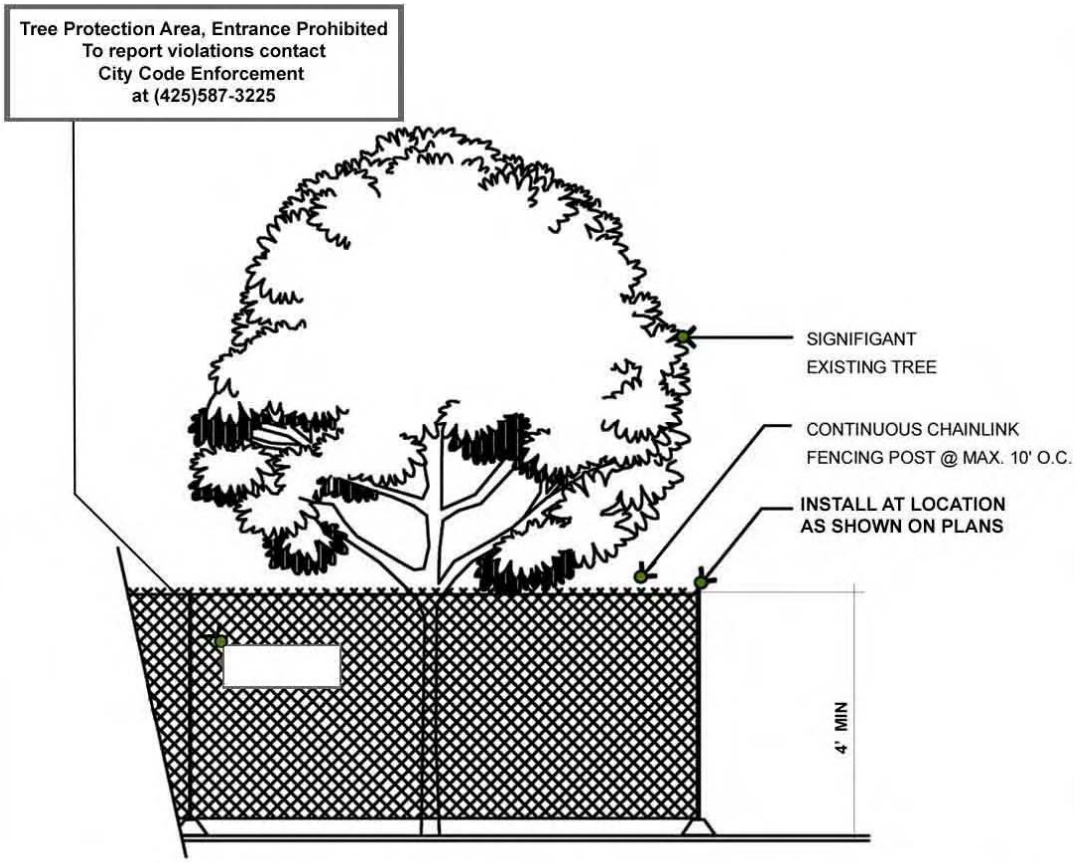
7. Putting Utilities Under the Root Zone:
    a. Boring under the root systems of trees (and other vegetation) shall be done under the supervision of an ISA Certified Arborist. This is to be accomplished by excavating a limited trench or pit on each side of the critical root zone of the tree and then hand digging or pushing the pipe through the soil under the tree. The closest pit walls shall be a minimum of 7 feet from the center of the tree and shall be sufficient depth to lay the pipe at the grade as shown on the plan and profile.
    b. Tunneling under the roots of trees shall be done under the supervision of an ISA Certified Arborist in an open trench by carefully excavating and

hand digging around areas where large roots are exposed. No roots 1 inch in diameter or larger shall be cut.

c. The contractor shall verify the vertical and horizontal location of existing utilities to avoid conflicts and maintain minimum clearances; adjustment shall be made to the grade of the new utility as required.

8. Watering:
    a. The trees will benefit from significant watering throughout the summer and early fall of 2009 in order to survive long-term. It would be wise to inform the adjacent property owners of an easy and economical watering that they can do that will benefit the long-term health of their trees.
        i. This can be done using soaker hoses placed three feet from the trunk of the tree and spiraled around the tree. One 75-foot soaker hose for one to three trees is adequate.
        ii. It is best to place the soakers using landscape staples, (available from HD Fowler in Bellevue for pennies apiece) then cover the area with two to three inches composed materials.
        iii. If the homeowners want, the trees will benefit from a layer of mulch. The composted material will act to minimize evaporation and will also stimulate the microbial activity of the soil which is another benefit to the health of the tree.
    b. Recommend that the homeowners water the tree(s) to a depth of 18 to 20 inches.
        i. I recommended leaving the water on the soaker hoses for several hours, depending upon the type of soil and the infiltration rate of the water.
        ii. Then digging down to determine how deep the water is penetrating. Adjust watering time according to the results achieved in order to manage the water to the 18 to 20 inch depth.
        iii. Once the water reaches the proper depth, turn off the hoses for four weeks and then water again.
        iv. Water more often when temperatures increase:
            1. Every three weeks when temperatures exceed 80 degrees and every two weeks when temperatures exceed 90 degrees.
    c. The drying out of the soil in between watering is important to prevent soil pathogens from attacking the trees.

FENCING SIGN DETAIL



1. MINIMUM FOUR (4) FOOT HIGH TEMPORARY CHAINLINK FENCE SHALL BE PLACED AT THE CRITICAL ROOT ZONE OR DESIGNATED LIMIT OF DISTURBANCE OF THE TREE TO BE SAVED. FENCE SHALL COMPLETELY ENCIRCLE TREE (S). INSTALL FENCE POSTS USING PIER BLOCK ONLY. AVOID POST OR STAKES INTO MAJOR ROOTS. MODIFICATIONS TO FENCING MATERIAL AND LOCATION MUST BE APPROVED BY PLANNING OFFICIAL.

2. TREATMENT OF ROOTS EXPOSED DURING CONSTRUCTION: FOR ROOTS OVER ONE (1) INCH DIAMETER DAMAGED DURING CONSTRUCTION, MAKE A CLEAN STRAIGHT CUT TO REMOVE DAMAGED PORTION OF ROOT. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND COVERED WITH SOIL AS SOON AS POSSIBLE.

3. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING. FENCING SHALL NOT BE MOVED OR REMOVED UNLESS APPROVED BY THE CITY PLANNING OFFICIAL. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY UNDER THE SUPERVISION OF THE ON-SITE ARBORIST AND WITH PRIOR APPROVAL BY THE CITY PLANNING OFFICIAL.

4. FENCING SIGNAGE AS DETAILED ABOVE MUST BE POSTED EVERY FIFTEEN (15) FEET ALONG THE FENCE.

CITY OF KIRKLAND WASHINGTON

TREE PROTECTION FENCING DETAIL

ATTACHMENT 4 - REFERENCES

1. Dirr, Michael A. *Manual of Woody Landscape Plants, Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses.* Champaign: Stipes Publishing Company, 1990.

2. Harris, Richard W. et al. *Arboriculture, Integrated Management of Landscape Trees, Shrubs, and Vines.* 4th ed. Upper Saddle River: Prentice Hall, 2004.

3. Matheney, Nelda P. and Clark, James R. *Evaluation of Hazard Trees.* 2nd ed. Savoy: The International Society of Arboriculture Press, 1994

4. Matheney, Nelda P. and Clark, James R. *Trees & Development, A Technical Guide to Preservation of Trees During Land Development.* Savoy: The International Society of Arboriculture Press, 1998.

5. Mattheck, Claus and Breloer, Helge. *The Body Language of Trees, A Handbook for Failure Analysis.* London: HMSO, 1994.

6. Pacific Northwest Chapter, ISA 2008. Tree Risk Assessment in Urban Areas and the Urban/Rural Interface. Course Manual. Release 1.2. PNW-ISA: Silverton, Oregon.

7. Watson, Gary W., and Neely, Dan, eds. *Trees & Building Sites.* Savoy: The International Society of Arboriculture Press, 1995.

SITE: PSE Juanita Substation
At 109th Ave NE, Betwen NE 128th & NE 132nd Streets, Kirkland, WA 98033

Date of Inspection: July 2, 2008

#1 *Tree Location:* General location of tree on site, or whether tree is Off Project property.
#2 *Tree #:* Individual tree number.
#3 *Species:*

AYC/Cn	Alaska Yellow Cedar, *Chamaecyparis nootkatensis*
BCh/Pe	Bitter Cherry, *Prunus emarginata*
BLM/Am	Big Leaf Maple, *Acer macrophyllum*
DF/Pm	Douglas Fir, *Pseudotsuga menziesii*
EWB/Bp	European Weeping Birch, *Betula pendula*
NS/Pa	Norway Spruce, *Picea abies*
PP/Pp	Ponderosa Pine, *Pinus ponderosa*
WRC/Tp	Western Red Cedar, *Thuja plicata*

#4 *DBH:* Trunk diameter @ 4.5' above average ground level.
#5 *Tree Credit:* This is based upon Table 95.35.1, Page 12, Chapter 95 of the Kirkland Municipal Code.
#6 *Drip Line:* The radius, the distance from the trunk to the furthest branch tips.

#7 *Limits of Disturbance:* The boundary between the area of minimum protection around a tree and the allowable site disturbance as determined by a quilified professional
#8 *LCR:* *Live Crown Ratio* - the amount of live canopy expressed as a % of the entire tree height
#9 *Symmetry:* General shape of canopy and weight distribution of the tree around the trunk.
#10 *Foliage:* General description of foliage density that indicates tree health and vigor.
#11 *Crown Condition:* The most important external indication of tree health and vigor.
#12 *Trunk:* Description of trunk condition or abnormalities if any.
#13 *Root Collar:* The base of the tree where the trunk flares into the roots--deformities or problems are noted here.
#14 *Roots:* Root problems are noted here.
#15 *Comments:* Additional observations about the tree's condition.
#16 *Significance:* A ñsignificantó tree is at least 6ó in diameter measured at 4.5ó above the average ground level.
#17 *Current Health Rating:* A description of general health ranging from dead, dying, hazard, poor, suppressed, fair, good, very good, to excellent.
#18 *Viability* : A significant tree that is in good health with a low risk of failure due to structural defects, is relatively wind firm if isolated or remains as part of a grove, and is a species that is suitable for its location.
#19 *Recommendation:* This is an estimate of whether or not the tree is of sufficient health, vigor, and structure to consider retaining.

1	2	3	4	5	6	7 -- LIMITS OF DISTURBANCE				8	9	10	11	12	13	14	15	16	17	18	19
TREE LOCATION	**TREE #**	**SPECIES**	**DBH**	**TREE CREDIT**	**DRIP LINE**	**North**	**South**	**East**	**West**	**LCR**	**SYMMETRY**	**FOLIAGE**	**CROWN CONDITION**	**TRUNK**	**ROOT COLLAR**	**ROOTS**	**COMMENTS**	**SIGNIFICANCE**	**CURRENT HEALTH RATING**	**VIABILITY**	**STATUS / RECOMMENDATION**
Off Property, East of East Property Line	197	DF/Pm	est. 36"	0.0	26'	26'	26'	to property line	9' W of E PL	95%	Gen. sym.	Dense	Healthy	Straight	NAD	-	Canopy overhangs subject property by 22'. Advanced bark beetle infestation. Base is 4 feet east of the east property line fence.	Significant	Very good	Viable	Potential to Retain with Tree Protection Measures
Off Property, East of East Property Line	198	EWB/Bp	3 trunks, 2 trees, est. 10-11"	0.0	16'	12'	12'	to property line	9' W of E PL	45%	Min. asym.	Average	Dead	Typical	NAD	-	Canopy overhangs subject property by 10 feet. Base is approximately 3 feet east of East property line fence.	Significant	Poor	Non-viable	Potential to Retain with Tree Protection Measures
Off Property, East of East Property Line	199	PP/Pp	est. 24"	0.0	18'	18'	18'	to property line	9' W of E PL	85%	Gen. sym.	Dense	Healthy	fork at 9'	NAD	-	Canopy overhangs subject property by 16 feet. Base is approximately 18-24 inches east of the east property line fence.	Significant	Good	Viable	Potential to Retain with Tree Protection Measures

RIDDELL WILLIAMS P.S.

1001 FOURTH AVENUE, SUITE 4500 I SEATTLE, WASHINGTON 98154-1192
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December 4, 2008

Hearing Examiner, City of Kirkland
c/o Planning and Community Development Department
123 5th Avenue
Kirkland, WA 98033

Re: Puget Sound Energy Electrical Substation; SEPA Appeal

Dear Hearing Examiner:

I am submitting this letter on behalf of Puget Sound Energy ("PSE") in response to the SEPA appeal filed by Troy Freeman concerning PSE's proposal to rebuild an electric power distribution substation on property containing an existing substation, Parcel #292605-9007, between NE 128th St. and NE 132nd St. in the City of Kirkland.

Per Section 24.02.105(i) of the Kirkland Municipal Code ("KMC"), the Hearing Examiner is to consider only the matters raised in the notice of appeal, and is to give "substantial weight" to the decision of the City's SEPA responsible official. Under this standard of review, the appellant has the burden of proving that the City's SEPA threshold determination is "clearly erroneous". Brown v. City of Tacoma, 30 Wn. App. 762, 766, 637 P.2d 1005 (1981)). A finding is "clearly erroneous" when, although there is evidence to support it, the reviewing authority is left with the definite and firm conviction that a mistake has been committed. Norway Hill Preservation & Protection Ass'n v. King County Council, 87 Wn.2d 267, 274, 552 P.2d 674 (1976) (quoting Ancheta v. Daly, 77 Wn.2d 255, 259-60, 461 P.2d 531 (1969)).

Pursuant to regulatory reform provisions adopted in state law as set forth in RCW 43.21C.240, a SEPA Determination of Nonsignificance is considered the proper threshold determination when project impacts are adequately addressed by development regulations of the City or other applicable requirements. In this case, as noted in the Staff Report, the issues raised in Mr. Freeman's SEPA appeal are either adequately addressed under the City's tree management requirements in Chapter 95 of the Kirkland Zoning Code, or have been addressed by the SEPA Appeal Response of PSE prepared by Gilles Consulting, Brian K. Gilles, Consulting Arborist.

CITY OF KIRKLAND
Hearing Examiner Exhibit
Appellant ___
Respondent ✓ ADMITTED ✓
Department ___ DENIED ___
FILE # APL08-00010
O

4817-3286-9123.01
120408/1153/44901.00118

PSE requests that the Hearing Examiner deny the SEPA appeal and affirm the City's Determination of Nonsignificance.

Very truly yours,

Robert I. Heller

Robert I. Heller
of
RIDDELL WILLIAMS P.S.

RIH/ap
Our File: 44901.118

RECEIVED
DEC 30 2008
_____AM_____PM
PLANNING DEPARTMENT
BY_____

Steve Ryan
Resident & Homeowner
13044 109th Ave NE
Kirkland, WA 98034
Property adjacent to Northwest side of subject property

Home # (425) 823-6797

Regarding: **Appeal of Variance decision by Hearing Examiner regarding the Juanita Substation Project (ZON08-00010):**

On December 4, 2008, I testified on the following items;

1. The Juanita substation project does not qualify under Washington state law for a variance
2. The Applicant has not proven that they have or can meet any of the requirements under section 120.20 in the Kirkland Zoning Code (KZC) titled 'Criteria for Granting a Variance'.
3. The City of Kirkland has not required the applicant to provide this proof even though by code, the burden of proof rests solely on the applicant. In its report recommending approval of the variances, The City of Kirkland based many of its decisions on information solely supported by statements made by the applicant without seeking the advice of an independent third party. This is very important because if you are going to devalue my home you had better make sure the information you are presenting as fact is just that.

I knew I had all of the facts on my side. I supported my arguments with case references, case law and quotes directly out of Washington State Law. After I testified and neither the applicant nor the City Plans Examiner would under oath argue **ANY** of my contentions, I naively considered this a closed case. Even afterwards I had people telling me to not get my hopes up. I was told that at the end of the day, PSE was going to get what they wanted whether they were in the right or not the City would cave and give in to them. Even though during the hearing there was not one argument or shred of evidence to discredit any of my contentions it appears that I was ignored and PSE has been given the green light.

Following is a summary of the information presented last time as well as the responses or lack of response from the Applicant so that the record is completely clear for when this goes to litigation. At this point my faith in the system is severely lacking. So far this process has been a farce. The plans examiner who failed to substantiate or require the applicant to substantiate **ANY** of the information presented as fact in his report should have been reprimanded for such irresponsible and sloppy work. Instead, he was supported by his immediate superior, the Planning Supervisor.

At the hearing I presented arguments supported by facts, documents and independent third party advice even though the burden of proof was never mine. After not one of my arguments were discredited or even responded to during the rebuttal phase I, as mentioned before, assumed this would go no further. Again I was proven wrong. The

Examiner without one response to my statements or one fact to back up the ruling approved the variance.

Finally, I knew I could at least rely on the meeting minutes to prove what really happened during the hearing but have found that they have been abbreviated to the point where they are not much more use than a sign-in sheet and outline of the discussion.

As a Kirkland resident I feel that I am perfectly within my rights to expect and demand that my representatives in City Government whether elected or hired look after my best interests ahead of PSE. This is not a 'common good' argument or any attempt to stand in the way of goals in line with the Comprehensive plan. In fact, requiring PSE to meet the goals laid out in the Comprehensive plan without damaging sensitive single family residence surrounding their property is not only possible, the plan requires it.

Subject project does not qualify for a variance under Washington State law
According to Washington State law and supported by precedence a variance permit may be lawfully granted only within the guidelines set forth in the zoning ordinance, (Orion Corp. v. State, 103 Wash.2d 441, 458-59, 693 P.2d 1369 (1985); Lewis v. City of Medina, 87 Wash.2d 19, 22, 548 P.2d 1093 (1976).).

Paraphrasing these two decisions it has been determined that a "hardship" or "special circumstance" must be limited to the size, shape, topography, location or surroundings and that the "hardship" must be peculiar to the property. Considering the fact that the subject property is flat and has no topographical constraints, the constraints are manufactured by the applicant. Quite simply PSE designed a project that can't fit within its own property and is seeking to maximize its own benefit at the expense of the sensitive single family residences around it. The design, not the property is the issue and under Washington State law, that does not qualify to be eligible for a variance. There are variances granted for similar cases but these only stand because they are not appealed not because they conform to the law. In addition, an applicant for a variance, again under Washington State law, is not entitled to a variance to relieve a hardship of his own making and a variance should not be granted simply because an owner cannot make a particular use of (the property), (Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983).). This means that a variance cannot be granted for a project where the owner cannot build unless the "hardship" is due only to the topography.

PSE submitted a design that both increases distribution, primarily for unincorporated King County, and adds a backup 'loop' system to increase reliability for the area residents. The community is growing and I understand the need for additional distribution as well as wanting to improve reliability but these goals are not only reachable by building this project as designed. It was PSE that decided that in order to save on construction and maintenance costs it would accomplish both of these goals by building a 'double' substation instead of looking into alternatives. These projects could be separated and accomplished without building the project as designed. There are a number of ways this could be done and the City of Kirkland has not required PSE to provide any proof or sought advice from any independent sources to verify that this

cannot be done. However, even if this were the case this still does not qualify for a variance. The only topographical issue that PSE could cite is that the South end of the property is not completely flat. There is a slope to this portion of the property but not enough to prevent building on it. Other than the fact that there is currently a substation built on the sloped portion of the property, upgrades to this station up to and including a complete rebuild could be accomplished with additional site work and grading to level the site or perhaps a tiered station. It is a fact that there are work-arounds to any site issues PSE has encountered on the South end of the property. These might be more costly than or not as convenient as the proposed project, but neither cost nor convenience is relevant to this discussion. It was decided and upheld in appeal in Lewis v. City of Medina that economic hardship would not invalidate an otherwise valid state ordinance enacted under the Police power. The applicant can still use the entire property and even build on it, just not this design. It's the topography that matters not the use, design or intent of the owner. As long as uses permitted in the zone can generally be made, PSE does not qualify for a variance under Washington State law.

There are two very important items that I need to point out here. At the hearing I made all of the above points and during the response phase PSE could not under oath dispute that the goals of this project could be reached with an alternate project or projects. The only response was from their attorney, Mr. Hiller. Mr. Hiller wanted to point out that property size could be considered a topographical constraint. I understand this but need everyone to understand how property size could be considered a topographical constraint and why it does not apply here.

A variance is intended to prevent the Constitutional taking of property

- Remember, it's the topography that matters not the use, design or intent of the owner. As long as uses permitted in the zone can generally be made, PSE does not qualify for a variance under Washington State law. Can PSE build on the property? Yes. Has PSE already built on the property? Yes.
- PSE purchased the property in 1958 with the purpose of building an electrical substation and then DID build an electrical substation. This does not mean that 50 years later when PSE decides that the current station does not meet their needs anymore, it is a taking of property to not allow the construction of a much larger station due to the fact that the size of the property does not support a project of that size. Say I built a house in 1958 that fitted the needs of my family but now that my three children are still living at home with their spouses and children, the house in no way still fits our needs. The house I would need to build to contain all of these occupants would need to be 4 times as large as the current home. In 1958 I could have built the larger house but since there have been zoning changes; my current house is the largest house I could build. In fact, the current house doesn't meet the current code. Just because I want to have everyone under the same roof, it does not qualify me for a variance. The same is true with PSE. Just because they want to build a new substation to increase distribution and provide a backup system, it doesn't qualify them

either. I understand the need for additional distribution and backup systems. But these goals can be reached in different ways than building one double substation. Any site, safety and code issues the applicant has raised can be designed around. However, as my representative, The City of Kirkland Planning Department did not require PSE to provide any proof that this cannot be done. The goals of PSE will benefit the community, I get that. However, even if this was the only way they could accomplish these goals, which it isn't they still do not qualify for a variance. Back to my fist point, as long as uses permitted in the zone can generally be made, which they already have been with the current substation, PSE does not qualify for a variance under Washington State law. **This is not a judgment call. It is law and can be enforced in court.**

Applicant has not proven that they have or can meet any of the requirements under section 120.20 in the Kirkland Zoning Code (KZC) titled 'Criteria for Granting a Variance'.

The criteria for granting a variance under section 120.20 of the KZC states that The City may grant a variance **only** if it finds that:

1. The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole; **and**
2. The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a preexisting improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed; **and**
3. The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.

1) Will not be materially detrimental to surrounding properties

Both the applicant and the City, as evident in the 'Findings Report' have completely ignored this requirement. I have read through the 'Facts' section of the findings report and have only found explanations of how the Applicant will add walls, finishes and landscaping to lessen the impact. However, the code is clear on two areas. The first is that the variance "will not be materially detrimental to the surrounding properties" and the second from chapter 150 of the KZC Titled 'Process 11A' section 150.50 Burden of proof lies with the applicant. The real question is will this impact the value of the surrounding properties or make it difficult for the owners to sell. Nowhere has the applicant proven that this will not negatively impact the surrounding properties. I called the King County Tax Assessors Office and was told that "External Negative Impacts" such as an electrical substation encroaching on a setback would be considered when assessing the value of a property. I have also spoken to a Real Estate appraiser at Windermere Real Estate. This appraiser reviewed the project as well as our properties, spoke to a number of his colleagues who have each been in the real estate and appraisal industry for twenty or more years and sought the advice of another colleague who specializes in appraisals where utilities are concerned. The feedback he received without

hesitation was that there is no doubt that this project will have a negative impact on the values of the homes adjacent to the project and their owners' ability to sell. I am also submitting a written statement by the appraiser I spoke with stating there will be a negative impact to the value of the surrounding properties due to this variance.

The 'Fact' section of the City's report as well as the Hearing examiner's decision note that the applicant prepared graphics of the proposed substation compared with a building that they could build without variances. How is this in any way relative to the issue of whether the proposed project will or will not have a negative material impact on the surrounding properties? A different project is the subject of a separate discussion when and if it is proposed to The City. I couldn't believe it when the Plans Examiner gave credence to this argument much less the Hearing Examiner. We are discussing whether this project will have negative material impacts, not what the impact would be compared to another project. Above all else, the code states that the variance "Will not be materially detrimental to surrounding properties". This is not stated as should not or should endeavor not to but specifically states that it "will not". This is a finite statement that requires proof and the burden of proof lies entirely on the applicant. Considering the evidence I have to the contrary, it will be impossible for PSE to ever prove this. This requirement is not only in the KZC, it is also in Washington State law.

2) The Variance in necessary because of special circumstances

The special circumstances called 'hardships' under state law, as stated earlier only pertain to the topography. The land use attorney I consulted with on this issue agreed that this project does not have any 'special circumstances' that would merit a variance. The typical case taught in law school to illustrate a 'special circumstance' would be if there is a height restriction of 30'. One property on the street sits in a hole. In order for the property owner to build a house where the ridge line is equal to that of the rest of the neighborhood he would need to build a 35' house. This is an example of a 'special circumstance' because it relates directly to the topography. Project design or intended uses do not even enter the picture.

In addition, several of the conclusions in the Advisory Report regarding this requirement are based solely on statements made by the applicant. Items listed as "according to the Applicant" and "Applicant states" should not be listed as fact to support conclusions. I don't see any supporting evidence or corroboration from an independent source. In fact, there is only one of the five 'facts' listed that is relevant and marginally substantiated. At the Hearing, the Planning Supervisor admitted that the City took the Applicant at their word and never checked any of the submitted information before listing it as fact.

3) The variance will not constitute a special privilege

Not one of the three 'facts' listed under this section of the advisory report are substantiated or relevant. Fact #1 states that the existing substation on the South end of the property does not comply with current zoning requirements. This is in no way relevant to the discussion of the proposed project. Fact #2 notes that "the applicant states that the proposed substation is the minimum size necessary to meet the growing

demand". Not only is this untrue, it is not backed up with any actual facts or studies done by third party design firms. Lastly, Fact #3 states that the subject property is narrow and rebuilding the existing substation would require a variance. It is interesting that this was listed as a fact. One of the earlier arguments was that the existing substation could not be rebuilt. Not only is this 'fact' not at all relevant to the variance in question, it refutes an earlier statement by PSE. In all, there is not one relevant fact to base the conclusions on in this section.

If I as a homeowner requested a variance to build a house on my property that exceeded the size limitations of the lot or height restrictions, I would be rejected. Even though PSE has not proven, or been required to that this project has to be built as designed, I would be required to. Granting this variance will constitute a special privilege.

In conclusion, there is nothing unique about this property that could be termed as a 'hardship' or 'special circumstance' as defined under case law in Washington State. The plans examiner who prepared the Advisory report has concluded that these 'special circumstances' do exist but this is only because it is a misinterpretation of the term. The conclusions in the report are based on unsubstantiated and in some cases irrelevant information. Neither the City of Kirkland nor the applicant has performed their due diligence to prove or substantiate any of the information presented as fact.

Granting this variance will not be in line with Washington State law or the requirements laid out in the KZC. Although the burden of proof lies with the applicant, The City of Kirkland is responsible for making sure this is done before recommending approval of a variance. No facts were checked, information presented in the report is incorrect and approval was still recommended. I feel that that this is an irresponsible and possibly illegal act that I am counting on this council to rectify.

I presented overwhelming evidence at the initial hearing proving that the variance could not be granted. Neither the applicant nor the City provided any evidence or even argued mine and still somehow were granted the variance. My best advice is to have the City Attorney review this statement, my statement from the hearing, all of the documents I submitted as well as the full transcript of the response period from the hearing. What you are going to find is that I have my facts straight and approval of this project is going to make the City of Kirkland liable for damages after it is thrown out in court. You need to do the right thing and turn these variances down. Don't look at this as the only way PSE can supply more power to Kirkland and King County. They can do this in a way that is in line with Washington State law and not harmful to Kirkland residents. PSE will find a way to accomplish these goals without these variances.

The above statements above are based on:

- My experience in Construction Management, (I am currently a Project Manager in the Safeway Construction/Real Estate Dept.)
- Conversations with a representative of the King County Tax Assessors office
- Conversations with a Real Estate Appraiser at Windermere and written statement from same

- Conversations and information from the Land Use Attorney that does the majority of this work for the Safeway Real Estate Dept in Washington State

Attachments:

- Letter from William Rynd Windermere Real Estate
- Washington Practice Series for Real Estate: Property Law, Chapter 4. Planning and Zoning F. Variances. Westlaw document WAPRAC 4.25
- Court of Appeals Judgment in Lewis v. City of Medina
- Kirkland Zoning Code, Chapter 120 – Variances
- Kirkland Zoning Code, Chapter 150 – Process 11A, Section 150.50

Windermere

Bill Rynd

Tony Leavitt
City of Kirkland
Planning Department
123 Fifth Avenue
Kirkland, WA 98033

Dear Mr Leavitt,

This letter is regarding the planned change of location, expansion, zoning variance, and rebuild request from Puget Sound Energy for the Juanita Electric Distribution Substation, Permit No. ZON08-00010.

At the request of Mr. Steven Ryan, who owns the property at 13044 109th Ave NE Kirkland WA 98034, I have been doing some research on this project. Mr. Ryan and his neighbors adjacent to the proposed new and expanded substation have many concerns that should be addressed.

One of these would be the significance of this projects impact on the current and future value of their homes. I have discussed this project with a large number of veteran local real estate professionals and four licensed real estate appraisers. I polled them for their opinions on the impact this substation would have concerning the neighboring home values. There was a 100% consensus that this project will have a significant negative impact on the neighboring homes values. It will also increase the market time for the owners when they attempt to sell their homes which will bring on additional burden and expense. With our current market conditions the negative impact on the homes values will be even greater

Having the Substation moved north of its current location will have a strong negative impact on the properties adjoining this structure. The impact will be even magnified if the current variance regulations to protect the homeowners are reduced so PSE can expand to a larger structure on this new site.

I am sure the City of Kirkland Planning Department has and will address the concerns of the property owners adjacent to this proposed Substation. Hopefully the decision will balance out our needs for increased energy demand and reliability of the electrical system with the economic loss and other potential harm that this project will have on the neighboring property owners.

Sincerely,

William M. Rynd

William M. Rynd
Windermere Real Estate NE

Windermere Real Estate/Northeast, Inc.
11411 NE 124th Street, Suite 110 • Kirkland, WA 98034 • 425/820-5151 • Fax 425/821-9483

Washington Practice Series TM
Real Estate: Property Law
Current Through the 2008 Pocket Parts
William B. Stoebuck [FNa0], John W. Weaver [FNa1]

Chapter 4. Planning and Zoning
F. Variances

§ 4.25. Grounds for variance

West's Key Number Digest

West's Key Number Digest, Zoning and Planning ⚷481 to 518

Legal Encyclopedias

C.J.S., Zoning and Land Planning § 191

C.J.S., Zoning and Land Planning §§ 228 to 232

C.J.S., Zoning and Land Planning §§ 234 to 249

C.J.S., Zoning and Land Planning § 257

Variances and conditional uses were distinguished in section 4.22; the beginning of that section should be read with the present material. Whereas a conditional use is a permitted use, one listed in the zoning ordinance as permitted upon a special permit, a variance permit allows the applicant to do something the zoning ordinance would otherwise forbid. Since the early days of zoning, variances have been a standard feature, one of the flexibility devices. Traditionally, variance permits are granted by boards of adjustment, though other granting agencies are possible in Washington, as we will see.

The classic ground for granting a variance, contained in section 7 of the Standard Zoning Enabling Act, is that, "owing to special conditions, a literal enforcement of the provisions of the ordinance will result in unnecessary hardship" to the applicant as landowner. Some state enabling acts speak of "unnecessary hardship or practical difficulties," and courts may or may not assign different meanings to those phrases.[FN1] In Washington a different formulation is generally used, not involving the word "hardship," but the effect is similar; we will come to that in a moment. Most judicial decisions on variances turn upon what is a "hardship." Use of that word suggests that, without a variance, the zoning restrictions would impermissibly deprive the owner of rights in the

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land. Indeed, one view of a variance, shared by early planners, was that if variances had not been allowed, zoning ordinances, though perhaps valid on their faces, would be chewed up piecemeal by being unconstitutional as applied to particular parcels of land.[FN2]

Another distinction we should make is between "use" variances and "bulk," sometimes called "area," variances. A use variance permits a use not among those listed as either a regularly permitted or conditionally permitted use in a given zone. A bulk variance permits a variation from area, setback, front yard, side yard, backyard, or height restrictions. The distinction can be important. Use variances are much less common than bulk variances, are tested by a tighter legal standard, and are entirely forbidden by some local zoning codes.[FN3]

In Washington the grounds for a variance are stated in both RCWA Chapter 35A.63 and Chapter 36.70, but not in RCWA Chapter 35.63. The language of the first two chapters is essentially, though not verbatim, the same. Paraphrasing them, with language common to both statutes in quotation marks, the elements that must be satisfied to grant a variance are: (1) that the variance shall not confer on the applicant a "special privilege" not shared by other properties in the same vicinity and zone; (2) that the variance is necessary because of "special circumstances" affecting the subject property, including "size, shape, topography, location, or surroundings," that deprive it of "rights and privileges" enjoyed by other properties in the vicinity and zone; and (3) that the variance "will not be materially detrimental to the public welfare or injurious to the property or improvements in the vicinity and zone."[FN4] Local ordinances in Washington may use similar language or may contain other formulations, sometimes requiring that the applicant show a "hardship" or that he show the land cannot yield a reasonable return.[FN5]

Though none of the statutes contains the classic word "hardship," the Washington Supreme Court seems to equate "hardship" with the statutory language.[FN6] In none of the decisions in which local ordinances established grounds for variances in language different from the enabling act language did the courts suggest that the enabling acts did not authorize such different language. Indeed, in all those decisions the courts looked to the language of the local ordinances to determine if variances were properly granted or denied.[FN7] Washington decisions cite variance decisions from other jurisdictions, where enabling acts may use the word "hardship." Therefore, Washington's standard grounds for variances, "special circumstances," etc., should be considered an elaboration of the classic "unnecessary hardship" formulation. Perhaps the Washington language is broad enough to include the standard phrase "practical difficulties" also. In practice it usually will not make much difference, because any of the rhetorical formulas poses a mixed question of fact and law that allows much discretion in application.

Some subsidiary rules can be stated, to help determine when applicants do or do not deserve variances. The hardship (used here to include the various rhetorical formulations) must relate to the particular land, not to the owner personally or the owner's affairs apart from the land. The enabling acts cited above require that the "special circumstances" relate "to the size, shape, topography, location, or surroundings" of the "*subject property*." For instance, a variance would not be justified simply because a particular owner was disabled and could not care for it, but it

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would be justified if the land had such odd physical features that no one could manage it.[FN8] A variance should not be granted simply because an owner cannot make a particular use of it, as long as uses permitted in the zone can generally be made; the concept embodied in the enabling acts is that the land cannot be used as other land in the same vicinity and zone is generally used.[FN9]

The cited enabling acts require that the hardship be peculiar to the particular parcel of land and not to other land in the area generally. Perhaps the hardship need not be literally unique--perhaps it could affect a few parcels of land--but it may not be a general condition. If it is a general condition in the zone, that would be grounds for a rezoning, not for a variance. An applicant is not entitled to a variance to relieve a hardship of his own making; in the vernacular, a variance should not be granted to "get an owner out of his own box." For instance, an owner who has voluntarily sold off part of a lot, thereby reducing its size below the minimum required by zoning, should not be granted a variance to allow a house to be built on it.[FN10] Tolerant local officials may frequently grant variances out of pity for applicants who have created their own hardships, but such variances stand up because they are not appealed, not because they conform to the law.

Use variances are more problematic than bulk variances. Though Washington's zoning enabling acts do not forbid them, some local ordinances do.[FN11] Where they are possible, they are granted much less frequently than bulk variances, and there must be a showing of greater hardship than for bulk variances.[FN12] When they are granted, the hardship generally is caused by some off-premises situation that affects the applicant's land.[FN13] Sherwood v. Grant County[FN14] provides an example. The court of appeals, division one, affirmed the granting of a use variance for a mobile home in a residential zone when the owner's land was surrounded by mobile homes in an adjacent zone where they were permitted. However, a later decision from division two of the court of appeals, St. Clair v. Skagit County,[FN15] is critical of Sherwood and may be contrary to it, though there is some difference in their facts.

[FNa0] Judson Falknor Professor of Law Emeritus, University of Washington, Of Counsel, Karr Tuttle Campbell, Member of the Washington Bar.

[FNa1] Professor of Law, Seattle University, Member of the Washington Bar.

[FN1] See D. Mandelker, Land Use Law § 6.48 (3d ed. 1993). In some states where both phrases are used, courts apply "unnecessary hardship" to use variances and "practical difficulties" to bulk variances.

[FN2] See D. Mandelker, Land Use Law §§ 6.39 to 6.41 (3d ed. 1993), for discussion of the matters contained in the first two paragraphs of this section.

[FN3] See D. Mandelker, Land Use Law §§ 6.42, 6.43, 6.46 (3d ed. 1993).

[FN4] RCWA 35A.63.110(2); RCWA 36.70.810(2).

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[FN5] See, e.g., Lewis v. City of Medina, 87 Wn.2d 19, 548 P.2d 1093 (1976) ("cannot yield a reasonable return"); Lange v. Town of Woodway, 79 Wn.2d 45, 483 P.2d 116 (1971) ("unnecessary hardships"); Sherwood v. Grant County, 40 Wn.App. 496, 699 P.2d 243 (1985) (similar to statutory language); Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983) ("unnecessary hardships or practical difficulties"); Coughlin v. City of Seattle, 18 Wn.App. 285, 567 P.2d 262 (1977) ("unnecessary hardship").

[FN6] See Lange v. Town of Woodway, 79 Wn.2d 45, 483 P.2d 116 (1971) (one who challenges validity of zoning does not admit there is not a "hardship" that would justify variance). But see Sherwood v. Grant County, 40 Wn.App. 496, 699 P.2d 243 (1985), which suggests there is a difference between "hardship" and special circumstances.

[FN7]
See Lewis v. City of Medina, 87 Wash. 2d 19, 548 P.2d 1093 (1976); Lange v. Town of Woodway, 79 Wash. 2d 45, 483 P.2d 116 (1971); Martel v. City of Vancouver (Wash.) Bd. of Adjustment, 35 Wash. App. 250, 666 P.2d 916 (Div. 2 1983); Douglass v. City of Spokane, 25 Wash. App. 823, 609 P.2d 979 (Div. 3 1980); Coughlin v. City of Seattle, 18 Wash. App. 285, 567 P.2d 262 (Div. 1 1977).

Settlement agreement between landowner and county provided that, as condition of county's granting owner permit to build on undersized lot, owner would "meet all requirements" in regulations other than lot size. *Held*, county could deny permit when owner had received five waivers and setbacks. Griffin v. Thurston County, 137 Wash. App. 609, 154 P.3d 296 (Div. 2 2007).

[FN8] See Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983).

[FN9] This principle may have been violated in Coughlin v. City of Seattle, 18 Wn.App. 285, 567 P.2d 262 (1977), which approved a variance to enlarge a nursing home, so that the owner would not be cut off from state programs.

[FN10] Lewis v. City of Medina, 87 Wn.2d 19, 548 P.2d 1093 (1976). But the fact that an owner purchased land with knowledge that grounds for variance existed did not bar the granting of a variance (as it does in some states) in **Hoberg v. City of Bellevue, 76 Wn.App. 357, 884 P.2d 1339 (1994)**.

[FN11] E.g., see Coughlin v. City of Seattle, 18 Wn.App. 285, 567 P.2d 262 (1977), which contains a quotation from a Seattle ordinance that forbids use variances.

[FN12] Martel v. City of Vancouver, 35 Wn.App. 250, 666 P.2d 916 (1983) (dictum).

[FN13] For years the writer, in preparing examination questions for his classes in land-use planning, has tried to construct a use-variance question that does not involve an off-premises

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condition--but without success.

[FN14] Sherwood v. Grant County, 40 Wn.App. 496, 699 P.2d 243 (1985).

[FN15] St. Clair v. Skagit County, 43 Wn.App. 122, 715 P.2d 165 (1986).

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17 WAPRAC § 4.25
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Supreme Court of Washington, En Banc.
G. Harlan LEWIS and Harry G. Lewis,
Appellants,
v.
CITY OF MEDINA, a Municipal
Corporation, Respondent.
No. 43965.

April 15, 1976.

Proceeding was brought by lot owners against city for writ of mandate to require city to issue building permit. The Superior Court, King County, Charles R. Denney, J., issued writ, and city appealed. The Court of Appeals, 13 Wash.App. 501, 535 P.2d 150, reversed, and lot owners appealed. The Supreme Court, Wright, J., held that where size of lot, which was too small to comply with minimum lot size for single-family residence established by either city zoning ordinance or previous county requirement, was result of lot owners' own action in participating in sale of adjacent land, lot owners failed to meet one of essential criteria under city zoning ordinance for variance.

Judgment of Court of Appeals offirmed.

West Headnotes

[1] Zoning and Planning 414 ⚷6

414 Zoning and Planning
414I In General
414k5 Source and Scope of Power
414k6 k. Police Power. Most Cited Cases
Zoning is constitutionally permissible exercise of police power.

[2] Zoning and Planning 414 ⚷38

414 Zoning and Planning
414II Validity of Zoning Regulations
414II(A) In General
414k38 k. Hardship, Loss, or Benefit to Particular Persons. Most Cited Cases
Fact that lot owners might suffer considerable financial loss if they were not allowed to build house on lot which did not meet city zoning ordinance minimum lot size requirement did not render zoning ordinance invalid.

[3] Zoning and Planning 414 ⚷605

414 Zoning and Planning
414X Judicial Review or Relief
414X(C) Scope of Review
414X(C)1 In General
414k605 k. Decisions of Boards or Officers in General. Most Cited Cases

Zoning and Planning 414 ⚷610

414 Zoning and Planning
414X Judicial Review or Relief
414X(C) Scope of Review
414X(C)1 In General
414k608 Arbitrary, Capricious, or Unreasonable Action
414k610 k. Decisions of Boards or Officers. Most Cited Cases
Judicial review of action of city board of adjustment is limited to inquiry whether

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action of board is arbitrary, capricious or contrary to law.

[4] Zoning and Planning 414 ⚷497

414 Zoning and Planning
414IX Variances or Exceptions
414IX(A) In General
414k492 Hardship, Loss, or Injury
414k497 k. Self-Created Hardship; Prior Knowledge. Most Cited Cases
Where size of lot, which was too small to comply with either minimum lot size requirement established by city zoning ordinance or previous county requirement, was result of lot owners' own action in participating in sale of adjacent land, lot owners, who wanted to construct residence on lot, failed to meet essential city zoning ordinance criterion for variance that plight of owner not be result of owner's action.

[5] Zoning and Planning 414 ⚷463

414 Zoning and Planning
414VIII Permits, Certificates and Approvals
414VIII(D) Effect of Determination; Revocation
414k463 k. Form, Requisites, and Validity of Permission or Certificate in General. Most Cited Cases
Lot owners, who sought to construct residence on lot which did not meet minimum lot size requirement for construction of residence under city zoning ordinance, could claim no right under 1962 building permit which was issued under mutual mistake of fact.

[6] Zoning and Planning 414 ⚷235

414 Zoning and Planning
414V Construction, Operation and Effect
414V(A) In General
414k235 k. Time of Taking Effect; Retroactive Operation. Most Cited Cases
Where lot on which owners sought to construct residence would not have qualified under county standards that required minimum of 6,000 square feet for construction of residence, lot owners could claim no right under city zoning ordinance grandfather clause which allowed construction without necessity of variance on lots which were in separate ownership at time of adoption of land use density regulations and which would have qualified as building sites under county standards.

***19 **1094** Philip P. Malone, Poulsbo, for appellants.
Benson, Chadwick, Stege & Wines, Stephen F. Chadwick, Jr., Kirk R. Wines, Seattle, for respondent.

WRIGHT, Associate Justice.
This action involves the refusal of the City of Medina to issue a building permit. The Superior Court issued a writ of mandamus requiring the city to issue the permit. The Court of Appeals reversed and the property owners have appealed.

Due to the changing positions of the parties as to being appellants or respondents, we find it more clear and convenient to refer to G. Harlan Lewis and Harry G. Lewis as 'plaintiffs' and the City of Medina as 'defendant'.

Plaintiffs' parents owned all of tract G of DeVries Lake ***20** Washington Tracts in 1942. Some time thereafter they sold the

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northerly 75 feet of tract G, which was triangular in shape. The parents had built a home near the center of the tract. Later the father died and his widow, Melita G. Lewis, with the cooperation of her sons, plaintiffs herein, sold the home. In the sale there was conveyed, for a consideration of $45,000, not only the land on which the house was located, but also a triangular-shaped tract bounded on the east by 84th Avenue N.E. with a 75-foot frontage on said avenue. The conveyance of that tract left Mrs. Lewis owning an oddshaped tract, sometimes referred to as a trapezoid, with an area of approximately 5,150 square feet.

Mrs. Lewis desired a small house on the land which remained in her ownership. She employed an architect, Roland W. Wilson, who prepared plans for such a house. Through some misunderstanding, Mr. Wilson did not know of the conveyance of the triangular tract, but thought it was merely an easement. The plans which he prepared called for a substantial part of the house to be on the land which had been conveyed. The City of Medina had not been formed at that time and Mr. Wilson went to the King County, Engineer's Office to get a building permit.

The employee in the engineer's office relied upon the plans presented by Mr. Wilson, including the statement that the area which in fact had been conveyed was only an easement. In such reliance the building permit was issued in April 1952, although no construction was undertaken.

In 1955 the City of Medina was incorporated. Mrs. Lewis died, leaving the plaintiffs herein as the owners of the 5,150 square feet of property.

In February 1972, plaintiffs applied to the City of Medina for a building permit. The matter was referred to the Board of Adjustment. The board held two hearings, received reports from the planning commission and members of the board personally made an inspection. After that, the Board of Adjustment made extensive findings of fact and supplemental findings of fact and entered a detailed decision.***21** The Board of Adjustment denied the application for a building permit.

Prior to the incorporation of the City of Medina, the King County requirement for a single family residence was 6,000 square feet (minimum lot size). After the city was incorporated, ordinances were adopted calling for sizes of lots for single family residences to be at least 16,000 square feet.

After incorporation, the City of Medina adopted certain ordinances relative to zoning.****1095** One of those ordinances contained what has been referred to as a 'grandfather clause.' It reads:

5-1.15 Separate Ownership Exception: Lot Size and Frontage.

Where a parcel of land was in separate ownership at the time of the adoption of the City's applicable residential land use density regulations and such parcel would have qualified as a building site under minimum lot size and frontage regulations applicable at the time of its acquisition by such owner, said parcel shall, without the necessity of a variance, when possessed of frontage equal to at least 85% Of that otherwise required, qualify as a single building site notwithstanding otherwise applicable lot

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size and frontage regulations, but shall in all other respects be subject to land use regulations of the district of its location.
City of Medina ordinance No. 148, s 1-1963.

Plaintiffs base their claim upon that ordinance, upon the 1952 building permit, and upon the constitutional prohibitions against the taking of property without due process of law. The constitutional argument rests upon the undisputed fact that without a building permit plaintiffs' land had little, if any, value.

[1][2] First, we shall discuss the constitutional question. It is a well-settled law that zoning is a constitutionally permissible exercise of the police power. State ex rel. Wenatchee Congregation of Jehovah's Witnesses v. Wenatchee, 50 Wash.2d 378, 312 P.2d 195 (1957). State ex rel. Miller v. Cain, 40 Wash.2d 216, 242 P.2d 505 (1952). Although the plaintiffs herein might suffer considerable financial loss-a ***22** frequent situation in zoning matters-that would not render the zoning ordinances invalid. We said in Bitts, Inc. v. Seattle, 86 Wash.2d 395, at 400, 544 P.2d 1242 at 1245 (1976):

Economic hardship cannot usually be urged as a reason for the invalidity of an otherwise valid statute or ordinance enacted under the police power. Wiegardt v. Brennan, 192 Wash. 529, 73 P.2d 1330 (1937); State v. Dexter, 32 Wash.2d 551, 202 P.2d 906, 13 A.L.R.2d 1081 (1949).

[3] Second, we shall consider the scope of review of the decision of the Board of Adjustment. The rule is well established that a judicial review of the action of a Board of Adjustment is limited to an inquiry of whether the action of the board is 'arbitrary, capricious, or contrary to law.' Reiger v. Seattle, 57 Wash.2d 651, 359 P.2d 151 (1961); Household Finance Corp. v. State, 40 Wash.2d 451, 244 P.2d 260 (1952); Durocher v. King County, 80 Wash.2d 139, 492 P.2d 547 (1972); Lillions v. Gibbs, 47 Wash.2d 629, 289 P.2d 203 (1955), Overruled on other grounds in Fleming v. Tacoma, 81 Wash.2d 292, 502 P.2d 327 (1972).

The rule is stated in L. M. Pike & Son, Inc. v. Waterford, 130 Vt. 432, 434, 296 A.2d 262, (1972):

A board of adjustment is only permitted to grant a variance from a zoning ordinance within the guidelines set forth in that zoning ordinance. Thomson Methodist Church v. Zoning Board of Review, 99 R.I. 675, 210 A.2d 138 (1965).

The action of the Board of the Adjustment herein was in accordance with the ordinance of the City of Medina. The ordinance provides:

(T)he Board shall not vary any of the rules, regulations, or provisions of the zoning ordinances unless it shall find, after public hearing, that All of the following conditions exist in each case of an application for a variance:

1. That the land and/or structure in question cannot be reasonably used, and cannot yield a reasonable return, if used only for the purposes permitted****1096** and in accordance with other requirements in the land use district in which the land and/or structure is located:

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2. That the plight of the owner is due to unique circumstances***23** which are not the general condition of the neighborhood, and Are not the result of the owner's action;

3. That the use requested by the applicant, if established, will not be of a general classification differing from the essential use provisions of the land use district in which the land and/or structure is located.

(Italics ours.) City of Medina Ordinance No. 159 (covering use of land, s 1-21.05).

[4] The present owners of the land, plaintiffs herein, had participated in the sale of the home and the tracts of land which went with the home. They had joined with their mother in the conveyance. The situation in which they found themselves, therefore, was the result of their own action, they had failed, thereby, to meet one of the essential criteria for the granting of a variance. That reason alone is adequate to support the action of the Board of Adjustment.

We will, however, state briefly a number of other reasons which support the action of the board and clearly demonstrate such action was not arbitrary and capricious, nor was it contrary to law.

[5] The plaintiffs can claim no right under the 1952 building permit. It was issued under a mutual mistake of fact. There is no reason to believe the architect, Roland W. Wilson, acted other than in the utmost good faith. He did, however, act under an erroneous understanding of the facts and so did the county engineer's office in issuing the permit. The permit went unused for 20 years. Actually plaintiffs appear not to have relied on the 1952 permit; they applied to the City of Medina for another permit which clearly indicates that they recognized they could not proceed under the old county permit.

[6] The plaintiffs can claim no right under the grandfather clause. The relevant provision contains the words 'would have qualified as a building site.'The subject property would Not have qualified under King County standards which required a minimum of 6,000 square feet. The subject***24** property contained 5,150 square feet, more or less. The subject property never 'would have qualified' to gain benefit from the grandfather clause.

We find it wholly unnecessary to discuss set-back requirements and a number of other requirements. Such a discussion would only be cumulative and would needlessly extend the length of this opinion.

We express no opinion on matters not before the court. Herein we deal with an application for a permit to construct a building which would encroach upon the land of another, and which also failed to meet other requirements. An application without the faults of the application considered herein would present new questions upon which we are not now passing.

For the reasons stated, we affirm the majority opinion of the Court of Appeals, reverse the trial court, and reinstate the decision of the Board of Adjustment.

STAFFORD, C.J., and ROSELLINI, HUNTER, HAMILTON, UTTER, BRACHTENBACH and HOROWITZ, JJ., concur.
WASH 1976.

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Lewis v. City of Medina
87 Wash.2d 19, 548 P.2d 1093

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Chapter 120 – VARIANCES

Sections:

120.05 User Guide
120.10 Process for Deciding Upon a Proposed Variance
120.12 Expansion or Modification of an Existing Structure
120.15 Application Information
120.20 Criteria for Granting a Variance
120.25 What May Not Be Varied

120.05 User Guide

This chapter establishes a mechanism whereby the provisions of this code can be varied on a case-by-case basis if the application of these provisions would result in an unreasonable and unusual hardship. While almost any provision may be varied, there are some limitations.

If you are interested in applying to see if a provision of this code can be varied in a particular case, or if you wish to participate in the City's decision on a proposed variance, you should read this chapter.

120.10 Process for Deciding Upon a Proposed Variance

The following subsection is not effective within the disapproval jurisdiction of the Houghton Community Council:

1. The City will use Process IIA, described in Chapter 150 KZC, to review and decide upon an application for a variance except as to property located within an RS or RSX Zone or for a detached dwelling unit in any zone. For variance applications as to property located within an RS or RSX Zone or for a detached dwelling unit in any zone, the City will use Process I described in Chapter 145 KZC; provided, however, that while the content of the notice shall be per KZC 145.22(1), the distribution of the notice shall be per KZC 150.30(2).

The following subsection is effective only within the disapproval jurisdiction of the Houghton Community Council:

2. The City will use Process IIA, described in Chapter 150 KZC, to review and decide upon an application for a variance except as to property located within an RS or RSX Zone. For variance applications as to property located within an RS or RSX Zone, the City will use Process I described in Chapter 145 KZC; provided, however, that while the content of the notice shall be per KZC 145.22(1), the distribution of the notice shall be per KZC 150.30(2).

120.12 Expansion or Modification of an Existing Structure

The following section is not effective within the disapproval jurisdiction of the Houghton Community Council.

If the expansion or modification of an existing structure requires a variance under this chapter, the Planning Director may approve such expansion or modification without requiring the variance process if all of the following criteria are met:

1. The request complies with the criteria in KZC 120.20; and

2. The gross floor area of the structure is expanded by less than five percent; and

3. The Planning Director determines that the change or alteration will not have significantly more or different impact on the surrounding area than does the present development.

   An approval granted pursuant to this subsection shall be valid for a period of four years following the date of approval, during which time a complete building permit application for the expansion or modification shall be submitted to the City. Within six years following the date of approval granted pursuant to this subsection, the applicant shall substantially complete construction of the expansion or modification and any permit conditions applicable thereto, or the approval becomes null and void.

120.15 Application Information

In addition to the application materials required in Chapter 150 KZC, the applicant shall submit a completed application on the form provided by the Planning Department, along with all the information listed on that form.

120.20 Criteria for Granting a Variance

The City may grant a variance only if it finds that:

1. The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole; and

2. The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a preexisting improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed; and

3. The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.

120.25 What May Not Be Varied

The City may grant a variance to any of the provisions of this code except:

1. The City may not grant a variance to any provision establishing the uses that are permitted to locate or that may continue to operate in any zone; and

c. An analysis of the application in relation to the applicable provisions of this code and the Comprehensive Plan.

d. A statement of the facts found by the Planning Official and the conclusions drawn from those facts.

e. A recommendation on the matter.

2. Distribution – At least seven calendar days before the hearing, the Planning Official shall distribute the staff report as follows:

a. A copy will be sent to the Hearing Examiner.

b. A copy will be sent to the applicant.

150.40 Open Record Hearing

1. General – The Hearing Examiner shall hold an open record hearing on each application.

2. Hearing Declared Open – The hearings of the Hearing Examiner are open to the public.

150.45 Electronic Sound Recording

The Hearing Examiner shall make a complete electronic sound recording of each public hearing.

150.50 Burden of Proof

The applicant has the responsibility of convincing the Hearing Examiner that, under the provisions of this chapter, the applicant is entitled to the requested decision.

150.55 Participation at the Hearing

Any person may participate in the hearing in either or both of the following ways:

1. By submitting written testimony or comments to the Hearing Examiner, either by delivering the testimony or comments to the Planning Department prior to the hearing or by giving it directly to the Hearing Examiner at the hearing.

2. By appearing in person, or through a representative, at the hearing and providing oral testimony or comments directly to the Hearing Examiner. The Hearing Examiner may reasonably limit the extent of oral testimony and comments to facilitate the orderly and timely conduct of the hearing.

150.60 Continuation of the Hearing

The Hearing Examiner may continue the hearing if, for any reason, he/she is unable to hear all of the public comments on the matter or if the Hearing Examiner determines that he/she needs more information on the matter. However, if the continuation of the hearing would result in the Hearing Examiner not complying with the time limit for issuing his/her decision consistent with KZC 150.65, the Hearing

KIRKLAND HEARING EXAMINER
December 04, 2008

1. **CALL TO ORDER (7:00 PM)**

Members Present: Sue Tanner - Hearing Examiner.

Members Absent: None.

Staff Present: Jeremy McMahan, Tony Leavitt, and Susan Hayden ~ Recording Secretary.

2. **PUBLIC HEARINGS (7:00 PM)**

A. **Puget Sound Energy Substation - FILE NO. ZON08-00010**

Sue Tanner, Hearing Examiner, opened the hearing and explained the project and the agenda. She stated that she will make a decision on the project within 8 days from tonight. She added that a hearing will also take place tonight for APL08-00010 which is an appeal of the SEPA determination filed by Troy Freeman.

Mr. Leavitt was sworn in at this time and he presented an overview of the Applicant's project. His presentation topics included the city review process, proposal, site plan, elevations, public comments, approval criteria, staff' conclusions and staff's recommendation.

Roque Bamba, PSE Project Manager, 355 110th Avenue NE, Est 05, Bellevue, was sworn in at this time. Mr. Bamba presented an overview of the project. His presentation topics included power and PSE communication practices. He submitted a Power Distribution handout prepared by PSE.

Mr. Leavitt and Mr. Bamba responded to the Hearing Examiner's questions regarding the age of the substations.

Mr. Bamba continued his presentation, speaking about the architectural treatment of the proposed sound wall, sound mitigation, sound levels, landscaping, photos of distribution lines, and electronic and magnetic fields (EMF).

Jens Nedrud, PSE Project Engineer, 355 110th Avenue NE Est 04W, Bellevue, was sworn in and presented at this time. His presentation topics included technical issues on variances on the project, design process, substation design, public safety mitigation, clearance width and wall heights.

The Hearing Examiner invited audience members to speak at this time.

Steve Ryan, 13044 109th Avenue NE, Kirkland, was sworn in at this time. He stated that PSE does not qualify for variance under Washington state law and does not meet any of the requirements in section 120.20, Criteria for Granting a Variance, in the Kirkland zoning code. The property does not have special circumstances to warrant a variance and the facts that the staff conclusion is based on were provided by the applicant. Any special circumstances the applicant is claiming are based on unsubstantiated or irrelavent information. The current design will have a negative material impact on surrounding

properties. No design alternatives for the project have been explored by the applicant nor required by the city. He submitted information to the Hearing Examiner.

Pat McClusky, 13035 110th Avenue NE, Kirkland, was sworn in at this time. He stated that the substation is planned to go right behind his home. In 1979, he deliberatley purchased the home he lives in to avoid living next to a substation. Because the 18 foot cheap plastic wall PSE intends to build is tall and will be set at a 13 foot variance, it will block evening sun to his yard, have a negative impact on crops and box him in. In addition, he is concerned about the level of the noise the substation will produce. These negative impacts will cause him to lose property value. He is in favor of the substation itself, but not its location. He submitted a written copy of his testimony to the Hearing Examiner.

Troy Freeman, 13045 110th Avenue NE, Kirkland, was sworn in at this time. He stated that PSE's project only benefits PSE and although there could have been other options for the project, PSE did not explore them. He feels the city is giving preferential treatment to PSE and is not considering the needs of the citizens. PSE is planning on building a large and dangerous substation in a residential area. He feels the information presented by PSE tonight is misleading. He agreed with Mr. McClusky on the impact on property values. He stated that a citizen would not be granted the same building privileges that PSE is being granted. He submitted a written copy of his testimony to the Hearing Examiner.

Michael Heslop, 12055 110th Avenue NE, Kirkland, was sworn in at this time. Mr. Heslop is a chemical engineer and used to work for PSE. He feels that PSE is doing the bare minimum of requirements to make a project pass and that PSE is not concerned about the safety impacts the substation may have on his and surrounding properties. Like Mr. McClusky, he purchased his house deliberately so that he would not have to live next to a substation. No one including PSE employees would want to live behind a substation. PSE did not consider any other locations for the substation.

Kevin Corbett, 13036 109th Avenue NE, Kirkland, was sworn in at this time. For his talk, he referred to the PowerPoint slide depicting elevations. He stated per Mr. Bamba that this project is the largest substation of its kind, that no other sites were considered the project and that the substation is being built primarily for unincorporated areas of the city. The substation will be the size of a football field with 18 foot walls and will stand close and tall next to houses. He believes that PSE should not be granted the variance they are requesting for width, height and setbacks.

Michelle McClusky, 13035 110th Avenue NE, Kirkland, agreed with the previous speakers regarding loss of property value and added that if the substation project goes forward, her husband and her have retained a lawyer to sue for the loss of property value.

Mr. Leavitt responded to Mr. Ryan's comments regarding the Kirkland zoning code.

Mr. Leavitt responded to citizen's concerns about location of the substation and the data provided by the Applicant.

Mr. Leavitt and Mr. McMahan responded to the Hearing Examiner's questions regarding non-conforming use and code criteria.

There were no further comments from staff. The Applicant was invited to respond at this time.

Robert Heller, 1001 4th Avenue Ste 4500, Seattle, is the attorning representing PSE. He was sworn in at this time. He addressed the variance criteria and general process for the project. He also submitted a letter to the Hearing Examiner. He stated that the substation and utility corridor property was purchased to provide power to the community and changes being proposed are improvements that will help mitigate power outages. He also addressed citizens' concerns about material detriment, noise level and EMF.

Jens Nedrud returned to address current design guidelines, safety issues, transmission towers and the improved substation technology.

Mr. Heller returned to address EMF concerns.

Leah Alcyon, GEO Engineers, 600 Stewart Street, was sworn in at this time. She spoke about health studies surrounding the safety of magnetic field measurements and set backs of transmission lines. She provided her study to the Hearing Examiner as part of the record.

Ioana Park, Noise Consultant, DRC Acoustics, 1740 1st Avenue S, Ste 401, Seattle, 98134, was sworn in at this time. She spoke about the measurement of environmental sound and resulting sound levels, stating that the levels are well below city of Kirkland noise limits.

Mr. Heller returned to call forward a landscape designer from David Evans and Associates.

Gregory King, Landscape Designer, David Evans and Associates, 415 118th Avenue SE, Bellevue, WA spoke about the landscaping on the east, west and front sides of the project, specifically, the 13 foot wide buffer.

Mr. King responded to the Hearing Examiner's questions regarding the dense buffer.

Mr. Heller concluded his statements regarding the concerns surrounding the project at this time.

The Hearing Examiner closed the public hearing for Puget Sound Energy Substation - FILE NO. ZON08-00010 at this time.

The Hearing Examiner opened the public hearing for File No. APL08-00010, the SEPA appeal.

Troy Freeman came forward to speak about the SEPA report, specifically Evergreen trees on properties surrounding the proposed substation that were not included in the report. He stated that the water run off caused be the project will likely result in root damage to a tree on his own property, kill the tree and cause it to be dangerous. He would like to hire an arborist of his own to measure the damage that will potentially be caused by the project. He is also concerned about tree limbs falling onto the PSE property and causing a fire. He asked the Hearing Examiner to consider the impact of removing the of trees. He also said it is unfair for him to be required to build a fence at his own expense, but PSE is allowed to put a retaining wall around the tree and jeopardize the health of existing trees.

Mr. Leavitt returned to address Mr. Freeman's concerns regarding the SEPA requirements. He maintained staff's recommendations per the arborist's report and permit and code requirements.

The Hearing Examiner invited the Applicant to comment on the SEPA appeal.

Mr. Heller returned at this time and asked the Applicant's arborist to speak.

Stan Haralson, Certified Arborist, 1101 Lake Washington Blvd North, Renton, spoke at this time. He provided the arborist's report prepared by Brian Gillis, to the Hearing Examiner, Exhibit N. Mr. Haralson spoke about tree risk assessment, arborist credentials and responded to Mr. Freeman's concerns about the tree on his property, specifically root issues and pruning.

Jens Nedrud, responded to Mr. Freeman's concerns fire hazards caused by blowing limbs.

Mr. Heller returned to speak about proposed risk mitigation. Mr. Heller submitted a letter to the Hearing Examiner, Exhibit O.

Mr. Heller asked Mr. Bamba to return to speak about mitigation measures.

Roque Bamba spoke at this time.

There was no further rebuttal or testimony on the SEPA appeal.

There were no closing statements from either party.

3. **ADJOURNMENT (9:09 PM)**

BEFORE THE CITY COUNCIL
OF THE CITY OF KIRKLAND

Appeal by Steve Ryan of Variance Approvals in Matter ZON 08-00010	**Response of Puget Sound Energy (PSE), Applicant**

I.

SCOPE OF THE APPEAL

This quasi-judicial appeal considers whether the Hearing Examiner properly approved the dimensional variances required for PSE's proposed rebuild of its Juanita substation. The City Council reviews the Hearing Examiner's findings and conclusions in an appellate capacity on the closed record developed through the Hearing Examiner's proceeding.

For the Juanita substation project, three permit decisions were made by the Hearing Examiner:

1) SEPA decision — an appeal of the SEPA Determination of Nonsignificance issued by the Planning Department;

2) Zoning Permit decision — whether the project met the criteria in Kirkland Zoning Code (KZC) 17.10 for approval of a Public Utility in an RSX Zone; and

3) Variance decision — whether the requested dimensional variances met the approval criteria in KZC 120.20.

Only one of these three approvals has been appealed by Mr. Ryan -- the Hearing Examiner's approval of the dimensional variances. The scope of the appeal is limited by KZC 150.95, which provides that "*The scope of the appeal is limited to the specific*

factual findings and conclusions disputed in the letter of appeal . . . ." The findings and conclusions disputed in Mr. Ryan's letter of appeal pertain to compliance with the criteria for granting a variance under Section 120.20 of the KZC. Mr. Ryan has not appealed the portion of the Hearing Examiner's decision approving the Zoning Permit as meeting the requirements of KZC 17.10.070. He has also not appealed the portion of the Hearing Examiner's decision affirming the Planning Director's Determination of Nonsignificance under SEPA, which is appealable to the King County Superior Court under the Washington Land Use and Petition Act (LUPA).

II.

BACKGROUND

Fifty years ago, in 1958, PSE purchased the subject property for the purpose of meeting the electricity needs of the Juanita community as it was being developed with residential subdivisions. Electrical transmission lines were installed to run the full length of the PSE property from NE 132nd St. to NE 128th St. An electrical substation was built on the property a few years later, about the same time in the early 1960s that the adjoining houses in this subdivision were being constructed.

Kirkland's population was about 6,000 in 1960. Residential development and electricity demand have grown tremendously since that time. The 1960s-era substation on this property does not meet service capacity and reliability needs of the community today. Its equipment and configuration do not meet current electrical code standards, and any disruption to the transmission lines, either north or south of the substation, causes total loss of service.[1] In addition, the existing substation has no noise mitigation or landscape screening and is as close as four feet to adjoining residential properties, with only a chain link fence serving as a barrier.

[1] At the public hearing, one of the neighboring property owners described a 5-day power outage in this neighborhood that occurred in last year's storms.

The new substation will be a great improvement. It will have substantially improved service capacity and reliability. Its "looped through" design means that the substation -- and electrical service to the area – will continue to function even if one of the transmission lines into the substation is taken out by a tree or other disruption. It will have all new equipment, configured to meet current electrical safety standards. Unlike the current substation, it will have noise mitigation walls, landscape buffers and more separation from neighboring properties. Also, all distribution lines from the new substation will be underground, removing four existing distribution poles and two sets of triple distribution wires from area views.

By their nature and function, electrical substations served by high-voltage transmission lines must be dispersed throughout the neighborhoods they serve. But the service improvements described above can be achieved without the impacts of extending new transmission lines into new locations. Because the subject property is already a transmission line corridor (and has been one for 50 years), this utility infrastructure improvement to this area of Kirkland will not require transmission line extension.

However, this rebuild can only be accomplished with approval of three dimensional variances (side yard setback of 13 feet rather than 20 feet; landscape buffer of 13 feet rather than 15 feet; and height for two new poles of 35 feet rather than 30 feet). Although the substation equipment has been squeezed together as much as possible, rebuilding the substation <u>anywhere</u> on the property would require variance from these dimensional standards. As explained below, and as found by the Hearing Examiner, these requested variances comply with the criteria for approval in the Kirkland Zoning Code.

III.

THE HEARING EXAMINER CORRECTLY FOUND THE PROJECT TO MEET THE CRITERIA FOR VARIANCE APPROVAL

A. Compliance with the "Not Materially Detrimental" Criteria

KZC Section 120.20.1 states as a criteria for granting a variance: "*The variance will not be materially detrimental to the property or improvements in the area of the subject property or to the City in part or as a whole.*"

Mr. Ryan's appeal does not demonstrate that the dimensional variances cause material detriment. His principal objection is to the substation use itself. However, the approval of the substation use itself was not appealed. There was no appeal taken to the Hearing Examiner's Conclusion No. 15 ("*The proposed design for the site minimizes adverse noise and visual/aesthetic impacts on the surrounding residential neighborhood and therefore meets the requirement of KZC 17.10.070 Special Regulation 1*"). It is uncontested that the Examiner found that the design minimizes adverse impacts on the surrounding neighborhood, and decided that the Zoning Permit should be approved.

Since there is no challenge to the Hearing Examiner's determination that impacts have been minimized and that the substation use is approved at this location, the only question is whether the dimensional variances themselves cause material detriment. Mr. Ryan has not met his burden of proof to overturn the Hearing Examiner's variance approval decision.

Mr. Ryan presented a letter from a real estate agent, William Rynd, that references discussions with other people in the real estate business, and concludes that the substation property will negatively impact home values. But the substance of this letter is predominantly about the substation itself, not the dimensional variances. The letter gives no indication that its author was familiar with the project's specific

conditions and mitigation measures. It does not indicate any awareness of impact mitigation. And it does not separate approval of the Public Utility use approval at this location, which has not been appealed, from the effect of the specific dimensional variances requested, which is the only appeal issue before the City Council.

Also, William Rynd did not come to the hearing, so he had no opportunity to hear the detailed presentation about the project or to explain and be questioned about the statements in his letter in relation to the specific variances requested. Likewise, the unnamed person in the King County Assessor's office who was contacted by Mr. Ryan was not at the hearing. There is no information in the record establishing what that person was told about the project, the site and the mitigation, or the details of the requested variances. The description of his comments in the record makes no reference to the variances at all.

In considering compliance with this variance criterion, it is also helpful to consider the meaning of the term "material", and to examine the policies of the Kirkland Comprehensive Plan regarding the need for balance in case-by-case land use decisions involving utility infrastructure.

1. Meaning of the term "Material"

The "material detriment" variance criterion does not require that a variance have no effect or impact whatsoever. The term "material," as used in the sense of material detriment, means "significant" or "essential," according to Black's Law Dictionary (8th ed. 2004), or "having real importance or great consequences" (Merriam Webster's Third New International Dictionary (1986)). Similar concepts appear in uses of the term "material" in other legal contexts. For example, the term material evidence in law means evidence of sufficient importance that if withheld the result of the proceeding would have been different. *See e.g. State v. Benn*, 120 Wn.2d 631 (1993). The Hearing Examiner properly weighed the information in the record in finding that the

variances complied with KZC 120.20.1.

2. Guidance from the Kirkland Comprehensive Plan

Reference to Kirkland's Comprehensive Plan is also useful guidance here. A balance between utility service needs and community impacts is specifically addressed in the Comprehensive Plan:

> "*The Utilities Elements supports the continued provision of adequate utility services to support existing and future development. . . . The environmental and aesthetic concerns of the community are balanced with the need to provide affordable and reliable utility service.*"

Utilities Concept, page XI-12, Kirkland Comprehensive Plan. This need for balance in decision making concerning utility service is stated again in the Utilities Goals and Policies section of the Comprehensive Plan:

> "*As an urban area, Kirkland is accustomed to a high level of utility service. These services accommodate the lifestyles of Kirkland residents and the successive Kirkland businesses. To maintain these community values, Kirkland must balance the quality of the service provided with the cost and community impacts.*"

Page XI-13, Kirkland Comprehensive Plan. This theme about the need for balance[2] is again set forth in the discussion under Policy U-1.4, concerning compatibility of utility services with surrounding land uses:

> "*A variety of factors are at stake in the consideration of any proposed utility expansion. Mitigating environmental and aesthetic impacts can have implications on cost and efficiency of the system. Therefore, it is appropriate to weigh costs against a full consideration of benefits that will be derived. Individual implementation issues arising under this policy should be resolved on a case-by-case basis in light of all these considerations.*"

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[2] Interestingly, the need for balance in land use decisions concerning siting of utility infrastructure was acknowledged even in the letter by real estate agent William Rynd, submitted in support of Mr. Ryan's appeal. In that letter, real estate agent William Rynd stated "Hopefully the decision will balance out our needs for increased energy demand and reliability of the electrical system with the economic loss and other potential harm that this project will have on the neighboring property owners."

Page XI-14, Kirkland Comprehensive Plan (emphasis added).

The Comprehensive Plan reference to resolving utility expansion issues on a case-by-case basis also appears in the KZC Chapter 120 section describing the purpose of dimensional variances in the Zoning Code:

> "*This chapter establishes a mechanism whereby the provisions of this code can be varied on a case-by-case basis if the application of these provisions would result in an unreasonable and unusual hardship . . .*"

KZC 120.05 (emphasis added).

The Comprehensive Plan's discussion on Essential Public Facilities is also instructive. Regarding the location of such facilities in Kirkland communities, the Comprehensive Plan states:

> *"The possible negative impacts of citing these facilities in the City should be mitigated to the maximum extent possible, but mitigation should not be unreasonable to the point of precluding the facilities."*

Kirkland Comprehensive Plan, p.VI-21

As noted above, the Hearing Examiner found that the project design minimizes adverse impacts on surrounding residences, and this conclusion has not been contested in the appeal proceeding. As set forth by Chapter 120 of the Zoning Code and as guided by the Kirkland Comprehensive Plan policies on utility infrastructure, the impacts of maintaining and improving utility service to the Kirkland community have been addressed on a case-by-case basis in PSE's application for rebuilding of its Juanita substation.

3. Mitigation of Project Impacts

It is also important to note that the Hearing Examiner found, as did the planning staff also, that due to the project characteristics, as well as mitigation measures to be employed (architectural noise walls, landscape buffer, removal of distribution poles and

wires), no material detriment to adjacent properties will result from the minor dimensional reductions in setback distances, buffer depth or electrical pole height.

These were correct findings. Landscape architect Gregory King testified that reducing the buffer depth by two feet would not reduce at all the number or spacing of plantings that create the visual buffer. Noise consultant Ioanna Park testified that a thorough noise analysis study showed that, with the proposed mitigation measures, noise levels in the vicinity would be well below the applicable City of Kirkland noise limits and in the range of or lower than ambient existing sound levels. Industrial hygienist Leah Alcyon testified that substations are not a prominent source of electrical and magnetic fields (EMF), and that, with an existing transmission line already running the full length of the property, the relocation of the substation would not cause any substantial change in EMF levels. Detailed plans, study documents and research materials relied on by landscape architect King, noise consultant Park and industrial hygienist Alcyon are contained in the record reviewed by the staff and by the Hearing Examiner.

In addition to the relevant witness testimony concerning mitigation and lack of impacts, other documents, facts and circumstances established in the record demonstrate lack of material detriment from the dimensional variances requested. Among these:

- Unlike a typical facility siting, the side yard of the substation is not adjacent to the side yard of the residences; instead, it adjoins the deeper rear yard setback of the residences.
- Unlike other utility facilities, the substation is a passive use; there is no activity, noise, odor, traffic, lighting or privacy impacts to adjacent properties.
- A clearly visible transmission line already runs along the full length of the substation property, and has for almost 50 years.

- The substation is considerably lower than a utility facility that could be built on the site without any variances.
- Visual impacts will be reduced by removal of four distribution poles and two sets of triple distribution wires in the vicinity of the substation.

As the City Council reviews the entire record concerning the project characteristics, the mitigation proposed by PSE and required by the City, and the lack of impacts associated with this passive infrastructure use, it is clear that Mr. Ryan has not met his burden of proving that the Hearing Examiner erred in concluding that the dimensional variances do not cause material detriment to adjoining properties.

4. Function of a Sideyard Setback is Preserved

Both the Planning Department Staff and the Hearing Examiner noted several factors justifying the variance in this case, including the long and narrow shape of the parcel, which is very different from the shapes of the surrounding properties, and the presence on the property of the electrical transmission lines and the existing substation, which are preexisting improvements built prior to annexation of this area into Kirkland.

The different shape and orientation of the substation parcel also contribute to the finding that the dimensional variances do not cause material detriment to the neighboring properties. The Kirkland Zoning Code calls for a 20-foot side yard setback for Public Utility facilities in an RSX zone. This is a greater side yard setback than, for example, the side yard setback required for a Government Facility[3] or a Community Facility[4] in the same zone, which is only 10 feet. (KZC 17.10.070.)

This can be understood by recognizing that the zoning category "Public Utility" is

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[3] "Government Facility" is defined in the Kirkland Zoning Code as "*a use consisting of services and facilities operated by any level of government, excluding those uses listed separately in this code.*"

[4] "Community Facility" is defined in the Kirkland Zoning Code as "*a use which serves the public and is generally of a public service, noncommercial nature. Such use shall include food banks, clothing banks, and other nonprofit social service organizations; nonprofit recreational facilities; and nonprofit performing arts centers.*"

intended to apply to all utility facilities, a broad category which could include sewage pump stations, treatment plants, maintenance yards, solid waste facilities and many utility infrastructure projects that have very high impacts on neighboring properties through noise, odor, traffic, lighting and loss of privacy. This potential for substantial noise, odor, traffic and other impacts from some Public Utilities gives insight into why the Zoning Code calls for a 20-foot side yard setback for that category, while requiring only a 10-foot side yard setback for other nonresidential uses, even a "Community Facility" which might be a food bank or a youth recreation center.

However, in contrast to high impact utility uses which fall within the Public Utility category, the record in this matter has established that the proposed electrical substation is a passive unstaffed element of electrical infrastructure that will have no noise, no activity, no lighting, no traffic or parking, no odor and no privacy impacts on adjoining properties. Also, the structure height is much lower than a 30 foot Public Utility use that would be allowed without variances if only 7 feet farther from adjoining property lines. (It is also much lower than a residence which could be built without variances only 5 feet from a side property line).

Furthermore, the shape, orientation and location of the subject property places it at a 90° angle to the adjoining residential properties, meaning that the side yard of the substation is adjacent to the deeper rear yards of the residential properties, rather than side-by-side with the narrow side yards of the residential properties, which would be the typical situation anticipated for the location and function of a side yard setback.

The facts in this record clearly establish that the minor dimensional variances required for this Public Utility use do not create impacts on adjoining properties that would contravene the intent of the setback standards in the Kirkland Zoning Code. The separation purposes intended for the side yard setback of Public Utilities are preserved in this case.

B. Compliance with the "Special Circumstances" Criteria

KZC Section 120.20.2 states as a criterion for granting a variance: "*The variance is necessary because of special circumstances regarding the size, shape, topography, or location of the subject property, or the location of a preexisting improvement on the subject property that conformed to the Zoning Code in effect when the improvement was constructed.*"

Kirkland Associate Planner Tony Leavitt well summarized the basis for the variance application in his statement at the public hearing: "The variance is responding to unique site limitations and facility design requirements associated with this type of public utility use and, finally, the proposed variances are the minimum necessary to provide relief from the Zoning Code." These are some of the special circumstances that are documented in the record and/or are specifically set forth in the Hearing Examiner Decision:

- The property has been in utility use for almost 50 years as part of an interconnected electrical transmission and distribution system
- Need for increased reliability and additional service capacity requires that the substation be replaced, and it needs to be co-located with transmission lines.
- The property is long and narrow, 89 feet wide at its widest point.
- Enhanced electrical safety requirements dictate the minimum width of the substation and the minimum height of the poles bringing power into it.
- Sloping terrain at the south end of the property makes that location unfeasible for an expanded substation meeting current electrical safety codes.
- Equal or greater variances would be necessary to rebuild the substation

anywhere on the property.

- Locating the substation at the property's widest point minimizes the variances required.

Based on the information in the record regarding the size, shape, location and topography of the subject property, and the "preexisting improvement" on it of transmission lines already linked to the interconnected electrical service system – all of which are factors set forth in variance criterion KZC 120.20.2 -- the Hearing Examiner properly concluded that special circumstances concerning the property justified approval of the requested variances.

C. Compliance with the "Not a Grant of Special Privilege" Criteria

KZC Section 120.20.3 provides the following criteria for grant of a variance: "*The variance will not constitute a grant of special privilege to the subject property which is inconsistent with the general rights that this code allows to other property in the same area and zone as the subject property.*"

The information set forth in the record clearly establishes that approval of the requested variances would not constitute a grant of special privilege. A fundamental difference between the subject property and the other properties in the vicinity is that the subject property "*is part of an interconnected utility transmission and distribution system that has been operated as such for almost 50 years.*" (Hearing Examiner Conclusion No. 9.)

Unlike the uses on adjoining properties, the use of the subject property is required to serve the public interest of the City and the community under the mandate of the Washington Utilities and Transportation Commission (WUTC), which has regulatory authority over the provision of electricity to Washington citizens. The mandate of PSE to serve the public interest through its interconnected system of

electrical transmission and distribution facilities is also referenced in the City of Kirkland's Comprehensive Plan. The Utilities section of the Comprehensive Plan states that "*the primary focus of the City in the coming years will be to continue to update existing systems to increase efficiency and to avoid maintenance problems associated with older facilities.*" Comprehensive Plan, Section XI. Utilities, p. XI-1. Regarding PSE substations specifically, Kirkland's Comprehensive Plan describes the function of distribution substations and notes the need for construction of additional distribution substations in Kirkland. Comprehensive Plan, Section XI. Utilities, p. XI-11.

Approval of dimensional variances needed to allow continuation of Public Utility use of this property, which has been in use as a transmission corridor and substation location for almost 50 years (a condition that applies to no other property in the area), is not a grant of special privilege inconsistent with the rights of other properties.

IV.

LEGAL ANALYSIS IN THE APPEAL IS INCORRECT

A. No Self-imposed Hardship

In his appeal, Mr. Ryan relies on the case of *Lewis v. Medina*, 87 Wn.2d 19 (1976), which he has attached to his appeal. The *Lewis* case stands for the proposition that a variance won't be granted if the project's "hardship" was caused by the applicants themselves. In that case, a family sold off part of their property and then asked for variances to build a home on the very small remaining portion.

The *Lewis* case has no applicability to the Juanita substation variance request. PSE purchased the subject property 50 years ago for the purpose of serving the electrical needs of the Juanita community. The current need to improve the substation results from the growth of the community and its increased demand for reliable energy. PSE is obligated by state law (and this is recognized in the Kirkland Comprehensive Plan) to provide sufficient and reliable power, and must do so while meeting electrical

safety codes for all of its infrastructure facilities. There is no element of self-imposed hardship creating the need for the small dimensional variances necessary to allow this property to continue serving the needs of the community.

B. Topography is Only One of Many Factors that Can Justify a Variance

Mr. Ryan's appeal alleges that topography is the only site characteristic that can justify a variance. This is clearly wrong. Kirkland's Code specifically identifies the following characteristics as justifying need for a Zoning Variance:

- size of the subject property
- shape of the subject property
- topography of the subject property
- location of the subject property
- location on the subject property of a preexisting improvement that conformed to the Zoning Code in effect when the improvement was constructed

KZC 120.20.2. As explained in Section III.B above, the Hearing Examiner correctly found that the variance requests met the "special circumstances" criterion in KZC 120.20.2.

V.

GENERALIZED COMMUNITY OPPOSITION IS NOT A PROPER BASIS FOR PERMIT DENIAL

Some neighboring property owners raised objections to the substation proposal. As indicated in the Staff Report, the Hearing Examiner decision, and other materials in the record, concerns raised about the Public Utility use have been addressed by either the imposition of mitigating conditions or by provision of additional information about the project characteristics. And, no appeal of the Public Utility Zoning Permit has been filed and the Hearing Examiner's conclusion that adverse impacts have been minimized is

therefore uncontested.

Regarding opposition to the dimensional variances, Washington law is clear that generalized community opposition or unsubstantiated fears, in contrast to specific adverse impacts, is not an appropriate basis for permit denial. For example, in *Marantha Mining v. Pierce County*, 59 Wn. App. 795 (1990), the County Council denied a permit for a unclassified use, even though the applicant was able to mitigate the project's adverse impacts, and the Hearing Examiner had found that the proposed use complied with the applicable regulations and would not cause adverse impacts. The Court reversed the Council and reinstated the Hearing Examiner's approval, noting that the Council "based its decision on community displeasure and not on reasons backed by policies and standards as the law requires." *Marantha Mining*, 59 Wn. App. at 805. *See also Dep't of Corrections v. City of Kennewick*, 86 Wn. App. 521, 533-34, 937 P.2d 1119 (1997) ("neighborhood fears that are not substantiated are not relevant"), *review denied*, 134 Wn.2d 1002, 953 P.2d 95 (1998).

Here, as is documented in the record and the Hearing Examiner's decision, adverse impacts have been mitigated and the project meets the legal criteria for approval of dimensional variances set forth in the Kirkland code for approval

VI.

CONCLUSION

The proposed electrical distribution substation is an essential part of an interconnected transmission and distribution grid providing electricity to the community. The Kirkland Comprehensive Plan anticipates growth in population and households, and specifically mentions need for new distribution substations within the Kirkland area.

This property has been a utility corridor for almost 50 years. The existing substation was built there in 1960, and transmission lines have traversed the length of the parcel during that entire time, prior to construction of the adjoining homes.

Project modifications and mitigation measures required by the City through its permit review process ensure that the substation responds appropriately to the existing site conditions and the surrounding properties, and will not be materially detrimental to uses or properties in the vicinity. Potential noise impacts have been mitigated through use of the sound barrier walls, and visual impacts are mitigated by extensive landscaping, architectural treatment of the wall surfaces, and removal of electrical distribution poles and distribution wires.

The findings and conclusions of the Hearing Examiner were based on her review and analysis of the entire record. She examined all the documents in the record, including the extensive application materials and SEPA submittals. She heard the testimony and had the opportunity to question the persons testifying at the hearing. She conducted a site visit to view the specific effects of the requested variances on the actual property site itself. Her decision should not be overturned unless there is substantial evidence that she made an error, which there is not.

Pursuant to the City's decision criteria and rules of appeal, the appeal should be denied.

Respectfully submitted January 20, 2009.

Robert I. Heller
of
RIDDELL WILLIAMS P.S.
Attorneys for Puget Sound Energy

Council Meeting: 02/03/2009
Agenda: Public Hearings
* Item #: 9. a.

RESOLUTION R-4741

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KIRKLAND AFFIRMING THE HEARING EXAMINER DECISION APPROVING VARIANCES FOR THE PUGET SOUND ENERGY JUANITA SUBSTATION IN DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT FILE NO. ZON08-00010.

WHEREAS, Roque Bamba of Puget Sound Energy (PSE) filed an application with the Department of Planning and Community Development for a Process IIA zoning permit and approval of variances to expand and rebuild the existing PSE Juanita electric distribution substation located within a RSX 7.2 zone; and

WHEREAS, the Hearing Examiner held an open record hearing on the application on December 4, 2008; and

WHEREAS, after considering all of the documents, testimony, and comments submitted at the hearing, the Hearing Examiner entered her Findings, Conclusions, and, Decision approving the requested variances and zoning permit; and

WHEREAS, Steve Ryan filed a timely appeal of the Hearing Examiner decision to approve the variances on December 30, 2008; and

WHEREAS, the City Council, in a closed record appeal hearing held during the February 3, 2009, regular meeting, having carefully considered the appeal, the staff report on the appeal, the record developed in the hearing before the Hearing Examiner, and the oral and written arguments of the persons entitled to participate in the appeal hearing.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Kirkland:

The Hearing Examiner decision approving variances for the Puget Sound Energy Juanita Substation is affirmed and the Findings, Conclusions, and Decision of the Hearing Examiner entered December 12, 2008, and filed in the Department of Planning and Community Development File No. ZON08-00010 are adopted by the City Council..

Passed by majority vote of the Kirkland City Council in regular open meeting this _____ day of February, 2009.

_____
Mayor

ATTEST:

_____
City Clerk