

3.6 ENERGY AND NATURAL RESOURCES

Documents referenced in this section include: *Master Development Plan for the Boeing Commercial Airplane Group, DEIS 1991*; *Everett Growth Management Comprehensive Plan*; *Snohomish County PUD's 20 Year Electric System Plan and draft update*; *City of Everett Design and Construction Standards and Specifications, 1993 Edition*.

3.6.1 ELECTRIC ENERGY

3.6.1.1 Existing Conditions

Snohomish County Public Utility District No. 1 (PUD) provides electrical power to the Everett planning area. The PUD is the largest ~~publicly owned utility~~ public utility district in the Pacific Northwest and serves more than 230,000 customers.

PUD
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Electricity distributed to the area by the PUD is primarily ~~generated~~ provided by the Bonneville Power Administration (BPA). The PUD also owns and operates the Jackson hydroelectric project located east of Snohomish and north of Sultan, and owns a share of the Centralia coal plant. Transmission of electricity is provided through cooperation of the BPA, Snohomish County Public Utility District, Seattle City Light, and Puget Sound Power & Light. The PUD plans to use a combination of conservation programs/techniques and improvements in system operation to ~~assure~~ ensure adequate service to growing populations in the Everett area.

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PUD's transmission system includes transmission switching stations, transmission lines (115kV), and in the future, transmission substations (230-115kV). The distribution system includes distribution substations (115kV-12kV) and distribution lines (12 kV). The distribution system is used to provide service to the ultimate customer.

Major transmission lines feed into the Beverly Park area, located west of I-5 and north of SR 526, and lead to the Subarea from there. Existing transmission lines and substations in the vicinity of the Subarea are shown on Figure 3.6-1. Existing District substations near and in the SW Everett/Paine Field Subarea include the Casino, Paine Field, Boeing, 20th Ave., Glenwood, and Mukilteo substations.

The transmission line shown in Figure 3.6-1 that runs from the Glenwood Ave. substation to Merrill Creek Parkway and Hardsen Road is in a temporary location. An agreement was reached between the City, PUD, Associated Sand and Gravel, Seaway Center and Merrill Creek Associates that the line will eventually be relocated across the Associated Sand and Gravel property, rather than running along Hardsen Road and Merrill Creek Parkway.

Distribution Service to specific sites is generally built when a project is proposed. The PUD works with project proponents to meet the project's existing and future electrical demand and reliability needs. Costs of providing electrical service are negotiated with the specific customer. The PUD's policy regarding payment for electric overhead and underground line extensions is currently being reviewed. Under the current policy, developers pay for the underground or overhead facilities that will serve their sites. The cost varies, depending on the individual

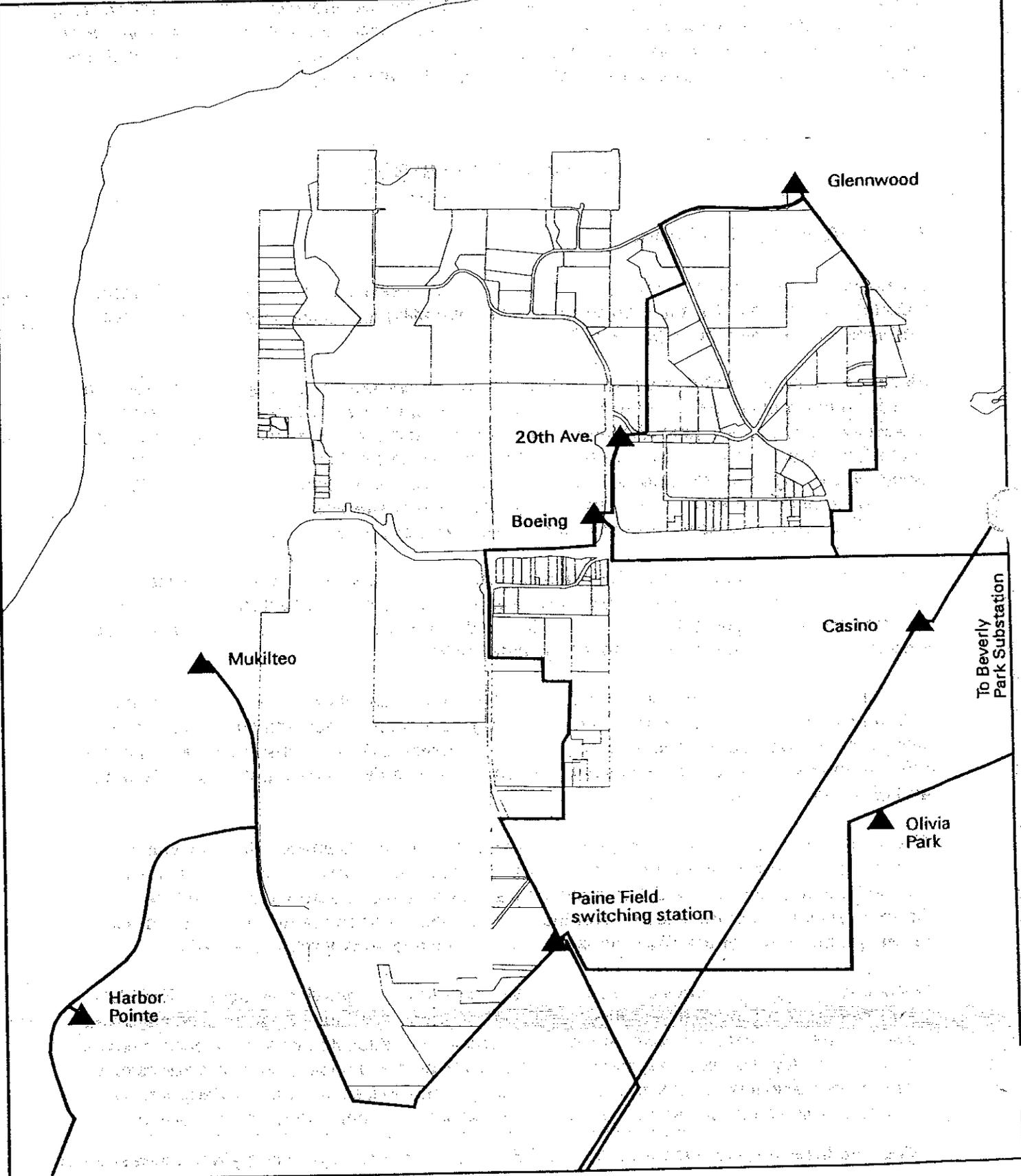
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Electrical System

 Transmission Lines  District Substations & Switching Stations

Fig. 3.6-1


1" = 3000'



requirements of the site and the service provided. The PUD coordinates individual customer requirements with future facilities and long range plans.

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3.6.1.2 Regulatory Overview

Snohomish County PUD No. 1

The PUD is the lead agency for SEPA reviews of their facilities. The following electrical facilities are exempt from SEPA review (WAC 197-11-800):

- All electric facilities, lines or appurtenances, not including substations, with an associated voltage of 55,000 volts or less.
- The overbuilding of existing distribution lines (55,000 volts or less) with transmission lines (more than 55,000 volts).
- The undergrounding of all electric facilities, lines, equipment or appurtenances.

City of Everett

Public Works Design and Construction Standards and Specifications: Permits must be obtained from the Public Works Department for all utilities constructed in the City right-of-way. The Public Works Standards Manual requires compliance with the WSDOT and APWA Standards and Specifications when locating underground utilities, in addition to the standards in the manual. The manual includes standards for trenching methods and patching, use of materials, equipment, timing and backfill.

Subdivision and Binding Site Plan Ordinances: The City's Subdivision and Binding Site Plan Ordinances (EMC Title 18) require that underground wiring be provided for all power lines carrying a voltage of less than 15 kV.

Zoning Code: The City's Zoning Code requires that aboveground utility facilities be approved by the Planning Director, with public notice provided to contiguous property owners in the C-2, M-M, M-1, and M-2 zones. A public hearing is required for facilities in the R-S and B-1 zones. The code establishes general criteria and specific criteria that must be met by aboveground utilities. These include requirements for landscaping or screening, and a requirement that facilities be installed underground or in buildings to the extent practical.

GMA Comprehensive Plan: The Comprehensive Plan includes implementation measures under the Capital Facilities and Utilities sections which state: "The City shall minimize to the extent practical encroachment on view and solar access of existing residences by new utility facilities (capital facilities) or expansion of existing facilities or improvements."

3.6.1.3 Impacts of Development

The Snohomish County PUD #1 is currently updating their 20-year Capital Plan. In the preliminary draft plan, they identify capacities and general locations of planned major electric facilities, transmission lines, transmission substations, and distribution substations for the 20-year period ending in 2016. A specific analysis of the SW Everett/Paine Field Subarea was also completed.

In forecasting load growth, the PUD uses population and employment forecasts supplied by the PSRC, county and city planning agencies, the state Office of Financial Management (OFM), and commercial and industrial forecasts. Forecasted energy use is also based upon zoning.

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For forecasting commercial and industrial energy needs, the PUD uses an average peak demand of 65 kW per acre. Existing electrical loading (peak demand) in and adjacent to the Subarea is 103 MW. The PUD estimates that ultimate loading (peak demand) for the Subarea will be 384.3 MW. Table 3.6-1 shows existing and ultimate loading for the Subarea, broken down by area.

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**Table 3.6-1
Electrical Loading by Areas Defined by the PUD**

Area	Existing Loading	Ultimate Loading
Hardeson Area	11 MW	78 MW
Highland Area	15 MW	46 MW
Twentieth Area	18 MW	63 MW
Paine Field Area	59 MW	197 MW
Total	103 MW	384 MW

Note that Boeing is served by a separate substation, and is not included in the above analysis. It is not anticipated that Boeing's substation will need additional capacity during the planning period, unless cogeneration or other expansions occur.

The types of businesses that locate in the Subarea will affect the demand for energy. Some industrial processes are very electric load intensive, while others are not; for example, an aluminum smelter is very load intensive while warehouses typically are not. Reliability of the electrical service is also an issue with commercial and industrial users. Additional facilities may be needed for users that require back-up power. For example, Boeing has a peak demand of less than 70 MW. However, because of the need for back-up power, facilities with 120 MW have been constructed to serve Boeing. Other factors that may affect future demand for electrical energy include use of electric cars, mass transit, burning bans, and fuel switching.

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Figure 3.6-2 shows the improvements that will/may be needed to serve the Subarea. Transmission system expansions in and near the Subarea that will/may be needed to serve the Subarea include:

- Expansion of the Paine Field switching station to provide 2 breaker positions for a new 115 kV transmission circuit from the Swamp Creek switching station. Since this site is at capacity, a new site will be needed for expansion in an area near the existing site. The project is planned for 2004.
- Installation of a 115 kV transmission circuit to connect the Swamp Creek switching station to the Paine Field substation. This will be needed by 2015.
- Installation of a 115 kV transmission circuit through the Highland Area to connect the Mukilteo and Glenwood - Boeing circuit. This circuit is expected to have a distribution substation connected to it. Depending upon load demands, these improvements may not be required until after 2016.
- Transmission line improvements will be needed from the Beverly Park substation. A 115kV line running from Beverly Park to Glenwood is planned for 2010. Additional improvements at Beverly Park are planned in 2000.

Distribution substation improvements that will/may be needed include:

- Construction of a new 28 - 40 MVA substation in the Highland area.
- Construction of a new substation in the Hardeson/Glenwood area with a capacity of two 28 or 40 MVA. This could be an expansion of the existing substation on at Glenwood, or construction of a new substation in the area shown on Figure 3.6-2, or both.

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Planned Electrical System Improvements

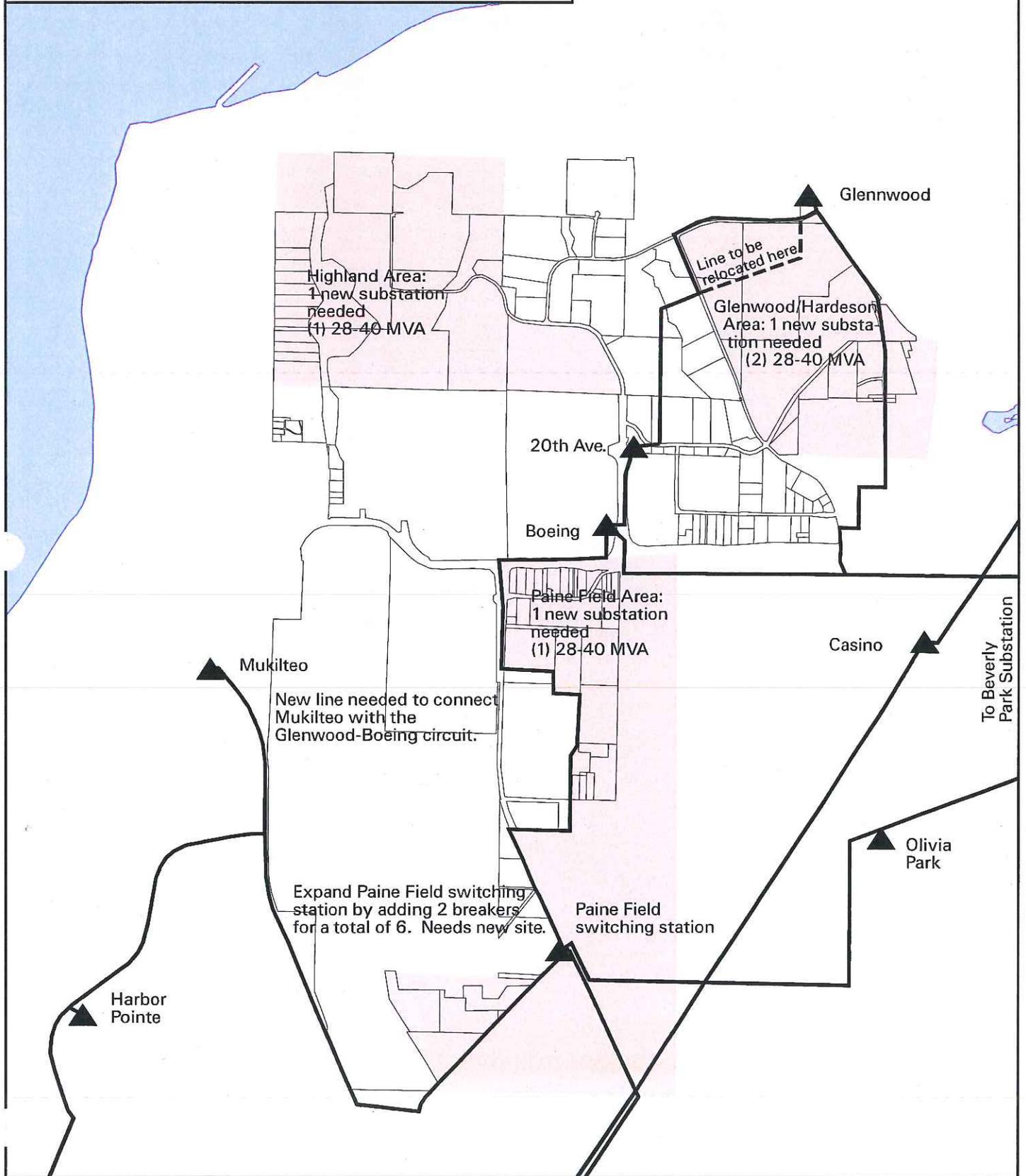


Existing Transmission Lines
New Transmission Lines



District Substations
& Switching Stations
Fig. 3.6-2

1" = 3000'



- Construction of a new substation in the Paine Field area with a capacity of 28-40 MVA.
- Replacement of Transformer #2 at the 20th Ave. substation to 40 MVA in 2013.
- Upgrading the Mukilteo substation transformer to 28 MVA in 1999.
- Adding a second 28 MVA transformer to the Harbour Point substation in 1999.
- Rebuilding and adding a second 28 MVA transformer to the Casino substation in 2008 to 2010.

Every new substation will require an associated transmission line or lines to provide service, along with new or reconfigured distribution lines.

The timing of specific improvements will change, depending upon the energy and reliability demands of businesses that locate in the Subarea and the feasibility of constructing planned facilities. The PUD evaluates many alternatives for specific improvements. In some cases, short-term expansions to existing facilities or other measures can be taken to postpone major improvements.

Additional land will be needed for future facilities. The area needed for additional substations is based upon the ultimate transformer capacity, the number of power circuit breakers, and access to equipment for operations and maintenance.

The PUD typically sites transmission lines in existing corridors, if feasible, such as roads, highways, and other utility corridors. This can minimize construction impacts, but can also make the lines more visible and can impact views from public view corridors. Transmission lines must also be coordinated with substation locations.

Specific sites have not been selected for location of transmission lines or substations. Siting of transmission lines and substations can impact properties by affecting views and creation of noise. Electric utilities often have difficulty obtaining transmission line easements or substation sites due to perceived health and safety concerns, aesthetic concerns, and environmental and geographical difficulties. The proposed transmission line connecting the Mukilteo and Glenwood substations is expected to be located outside the subarea to the west and north and will likely impact views from residential areas.

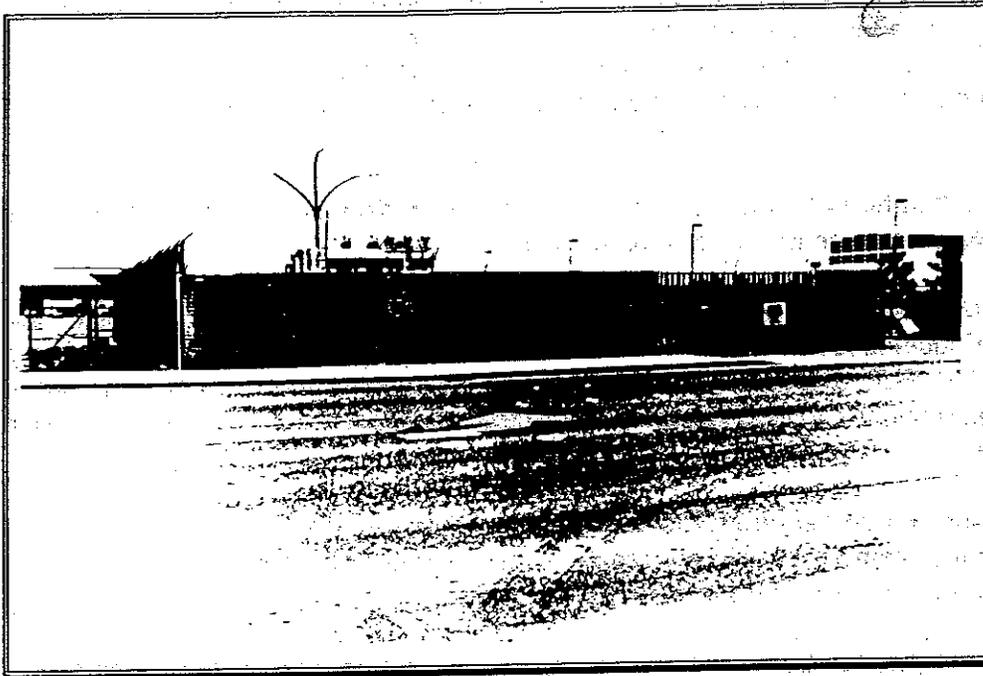
Special property use permits are required for aboveground utility facilities in the City of Everett. Screening and view issues for projects within Everett will be addressed in that process. Public notice is required. Photo 3.5.1 shows an example of screening of a substation.

When aboveground electrical wires are located near environmentally sensitive areas, maintenance activities can potentially result in significant impacts to the resource. The desire to keep trees from falling onto lines often results in clearing or topping trees within a large swath adjacent to the lines.

3.6.1.4 Thresholds

The PUD No. 1 forecasts an adequate supply of electricity for the SW Everett/Paine Field Subarea. Special Property Use permits are required for aboveground utility facilities. These reviews will address landscaping and screening, view and compatibility issues.

Photo 3.6-2
Example of Screening of a Substation



3.6.1.5 Potential Measures to Reduce the Impacts of Development

Measures to reduce the impacts of future development on electrical energy sources include:

1. Conservation programs can reduce the existing or projected energy load on the electric system, thereby delaying the need for construction of new or expanded facilities to serve this load. The PUD plans to use a combination of conservation programs/techniques, system improvements to system operation, and resource options such as non-utility providers and independent power producers to assure adequate service to the growing Everett area. Power demand generated by development and growth could be altered slightly due to conservation efforts.
2. Demand side management programs are used by PUD No. 1 to change the customer's energy demand patterns. Large consumers, such as commercial and industrial businesses, are often the focus of demand side management programs. Usually, these programs encourage the customers to reduce usage during peak times and consume at off-peak times.
3. Changing from electricity to an alternative, less consumptive form of energy is another method of conservation referred to as fuel switching. The PUD also can partner with customers who have standby generation and/or co-generation potential.
4. Co-location of lines and facilities in existing utility corridors and rights-of-way can minimize construction impacts.
5. The energy requirements of the Uniform Building Code must be satisfied in the construction and renovation of new buildings. Energy conserving materials are encouraged in all new construction.

PUD
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6. The PUD could purchase larger sites to improve aesthetics and other concerns in site development.
7. Undergrounding lines can reduce visual impacts.
8. When maintaining corridors for aboveground lines near environmentally sensitive areas, cut trees stumps could be left as snags for wildlife and the corridors could be replanted with native species that will not grow high enough to impact the lines.
9. All aboveground utility facilities in Everett must meet the criteria in Section 41.150 of the Zoning Code. This includes requirements for conformance with the Comprehensive Plan. View issues should be addressed in the Review Process II or III application for aboveground utilities.

3.6.2 NATURAL GAS

3.6.2.1 Existing Conditions

British Columbia and Alberta provide the Pacific Northwest (Idaho, Washington and Oregon) with 60% of the region's natural gas. The San Juan Basin in New Mexico/Texas supplies the region with the remaining 40%. Currently, Washington Natural Gas (WNG) supplies gas to more than 460,000 customers in Snohomish, King, Lewis and Thurston Counties in Western Washington.

The Northwest Pipeline Corporation operates two north-south pipelines east of Highway 9 and an east-west lateral south of the planning area at approximately 180th Street S.W. Maximum rate of use is estimated at 234,000 cubic feet per hour. Available capacity is 375,000 pounds per hour.

The Washington State Utilities and Transportation Commission has granted a franchise to WNG to serve the Everett planning area, which includes the SW Everett/Paine Field Subarea. Natural gas in the Everett planning area is supplied to the WNG by Northwest Pipeline Corporation. WNG currently serves approximately 150 customers in the SW Everett/Paine Field Subarea. Service and extensions are approved on a cost analysis basis, when the cost of construction is less than revenues generated.

Existing gas lines are located along:

- the western portion of State Route 526;
- the northern portion of Mukilteo Speedway;
- Airport Road;
- north of 100 Street West; and
- Holly Drive.

In south Everett, there are six District Regulators (DR) which reduce the pressure to typical distribution operating pressures of 45 to 60 psi. The distribution lines are commonly known as intermediate pressures (IP) supply lines. High pressure (HP) supply lines transport gas from the gate stations to the district regulators. Pipes are usually made from steel wrap (STW) with diameters of 4", 6", 8", 12" and 16". Within the SW Everett/Paine Field Subarea there is approximately 2,680' of 4", 17,030' of 8", and 5,960' of 12" HP supply lines. Commercial and

industrial individual IP service lines are usually 1-1/4" or 2" in diameter, with 2" or greater steel wrap HP service lines.

The North Seattle Town Border Station supplies the South Everett area. The capacity of the station is approximately 11 million cubic feet per hour (cfh), which is reduced to 150 psi at the Everett Limiting Station. Currently, WNG is serving approximately 16,739 customers in the Everett-Mukilteo area and is running at 40-50% of capacity. Based on analysis of growth trends and revenue reports by the year 2005, WNG predicts to serve approximately 45,885 customers. An estimate of commercial/industrial use is difficult to determine due to the variety of uses and rate of consumption. Natural gas service is driven by demand and the distance between users. Currently, the system is growing due to its relative cost in comparison to its alternatives.

WNG requires a contribution by the developer to extend a gas main to a site, and WNG takes the responsibility for the extension.

3.6.2.2 Regulatory Overview

The Federal Energy Regulatory Commission, the National Office of Pipeline Safety and the City of Everett franchise agreement, which expires in April 23, 2001, regulate the delivery of natural gas. WNG is regulated by the Washington State Utilities and Transportation Commission.

City of Everett

Public Works Design and Construction Standards and Specifications: Permits must be obtained from the Public Works Department for all utilities constructed in the City right-of-way. The Public Works Standards Manual requires compliance with the WSDOT and APWA Standards and Specifications when locating underground utilities, in addition to the standards in the manual. The manual includes standards for trenching methods and patching, use of materials, equipment, timing and backfill.

Zoning Code: The City's Zoning Code requires that aboveground utility facilities be approved by the Planning Director, with public notice provided to contiguous property owners in the C-2, M-M, M-1, and M-2 zones. A public hearing is required for facilities in the R-S and B-1 zones. The code establishes general criteria and specific criteria that must be met by aboveground utilities. These include requirements for landscaping or screening, and a requirement that facilities be installed underground or in buildings to the extent practical.

SEPA: All natural gas distribution (as opposed to transmission) lines and necessary appurtenant facilities and hookups are categorically exempt from SEPA review.

3.6.2.3 Environmental Impacts

The need for future improvements is continually assessed. To reduce costs and time, and minimize disruptions, new private and public distribution facility/lines are co-located when possible. Implementation of projects is dependent on budgets and commission cooperation.

WNG has anticipated an increase of 29,146 additional customers by the year 2005 and has identified major projects which are planned to occur before the year 2000. These improvements include:

- Various IP ties in residential and commercial areas are planned for 1995.

- Upgrading the existing 150# high pressure to 250# to tie into the existing high pressure main in Marysville.

Increasing capacity and pressure (minimum of 10 psi) to a growing service area can be done by:

- Installing lines parallel to existing lines to increase the level of service;
- Replacing existing pipelines to increase the volume;
- Looping the distribution or supply lines to create an alternative route for the gas to areas which need additional supply. Often these methods include the installation of HP lines, DR, and IP lines.

3.6.2.4 Thresholds

WNG forecasts an adequate supply of natural gas for the SW Everett/Paine Field Subarea.

3.6.2.5 Potential Measures to Reduce the Impacts of Development

Measures to reduce the impacts of future development within the SW Everett/Paine Field Subarea on energy sources include:

1. Peak season and peak hour surcharges could be used to alter or reduce energy use.
2. Co-location of lines and facilities.
3. The energy requirements of the Uniform Building Code should be satisfied in the construction and renovation of new buildings. Energy conserving materials are encouraged in all new construction.
4. All aboveground utility facilities in Everett must meet the criteria in Section 41.150 of the Zoning Code.

3.6.3 NONRENEWABLE RESOURCES

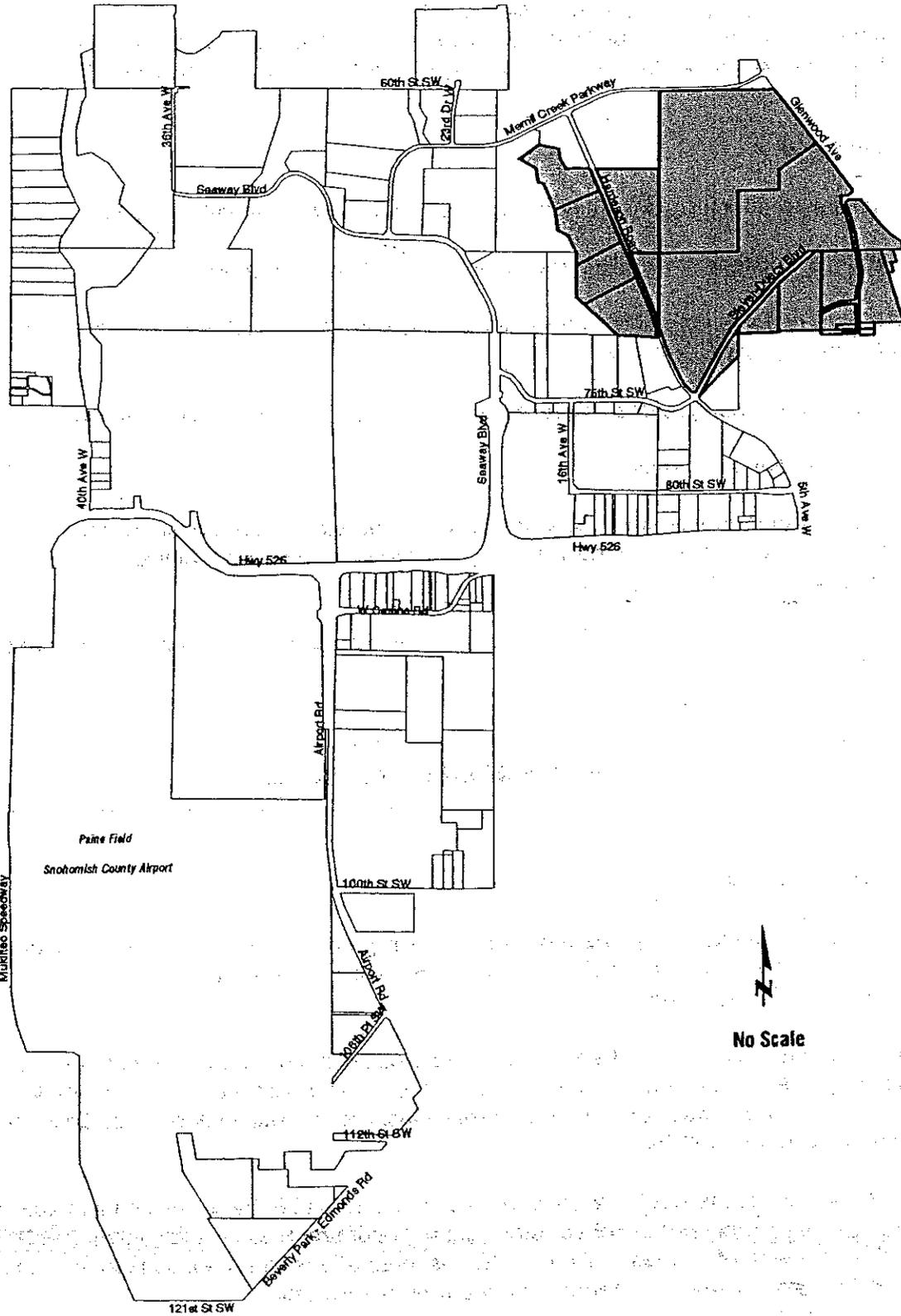
3.6.3.1 Existing Conditions

Within the Subarea, sand and gravel deposits are being (or have been) mined in two locations - these mining sites are mapped in Figure 3.6-3. Both sites operate under Department of Natural Resource (DNR) permits.

Associated Sand and Gravel has been mining and processing sand and gravel at their Everett site for over 50 years, and expects to mine on the site for approximately four to five additional years. Portions of the Associated site are currently undergoing reclamation to stabilize slopes and re-establish vegetative cover.

Merrill Creek Associates is located west of Associated Sand and Gravel. No mining activity is currently occurring on this portion of the site west of Hardeson Road. Additional mining can occur on the east side of Hardeson Road. The reserves at this site are also projected to be depleted within several years, depending on the rate of excavation.

Mining Sites



Eventually both sites will be reclaimed and developed with other land uses. Some processing may still occur on the Associated Sand and Gravel site, with material trucked in from other sites.

There are no forestry lands within the Subarea.

3.6.3.2 Regulatory Framework

Department of Natural Resources (DNR)

Both Associated Sand and Gravel and Merrill Creek Associates operate under DNR mining permits. See Section 2.4 for additional information regarding the permits. The permits include requirements for reclamation of the sites following completion of mining activities.

City of Everett

Mining activity is not permitted on properties in the Subarea, except on the sites with existing permits.

3.6.3.3 Environmental Impacts

Developments constructed in the Subarea will utilize natural resources in construction and production activities.

3.6.3.4 Thresholds

New mining activities are not addressed in this SEPA review.

3.6.3.5 Potential Measures to Reduce the Impacts of Development

1. During construction, clean construction debris should be sorted from other waste materials for recycling.
2. Manufacturing businesses could reduce use of packaging materials in their finished products and in their purchase of products.