4.0 BUILT ENVIRONMENT

SECTION 4.1 ENVIRONMENTAL HEALTH (WAC 463-60-352)

4.1.1 NOISE

In support of the permitting effort for the addition of Units 3 and 4 to the Grays Harbor Energy Center, an assessment was conducted to examine potential noise impacts. The assessment consisted of: (1) identifying all sensitive receivers in the vicinity of the Grays Harbor Energy Center site potentially impacted by noise; (2) monitoring existing ambient noise levels at these locations; (3) predicting project noise levels at the property boundary and at off-site receivers using three-dimensional computer modeling techniques; (4) comparing projected noise levels to various impact criteria including State of Washington performance standards; and (5) incorporating appropriate noise controls into the design of the plant to minimize any potential impact.

Results of the analysis showed that facility noise levels are expected to fully comply with requirements established by the State of Washington (70 dBA at adjacent industrial properties; 50 dBA at nearby residences), given the proposed acoustical design of Units 3 and 4, which includes combustion turbine generator (CTG) air intake silencers, high-performance CTG acoustical enclosures, CTG ventilation system silencers, CTG exhaust silencers, and acoustical barriers. Moreover, noise levels are not expected to cause pure tones or annoyance due to low-frequencies. [1]

The acoustical terminology and concepts used in this analysis are included in Appendix B.

4.1.1.1 Regulatory Controls

The Washington Administrative Code, Chapter 173-60, which EFSEC has adopted as the noise standards for facilities under its jurisdiction (WAC 463-62-030), limits environmental noise according to the land use classifications of both the noise emitting property and the receiving property, as presented in Table 4.1-1. Classes A, B, and C generally correspond to residential, commercial, and industrial or agricultural areas, respectively. Furthermore, between the hours of 10 pm and 7 am, the noise limitations for Class A receiving properties are reduced by 10 decibels.

[1] Initial results of recent noise monitoring of existing Units 1 and 2 indicate that noise levels comply with WAC standards. A separate assessment report documenting these results will be prepared and submitted for EFSEC review.

TABLE 4.1-1
MAXIMUM PERMISSIBLE ENVIRONMENTAL SOUND LEVELS

EDNA of Noise Source	Maximum Permitted Sound Level by EDNA of Receiving Source (dBA)		
	Class A	Class B	Class C
Class A	55	57	60
Class B	57	60	65
Class C	60	65	70

Source: Washington State Department of Ecology Noise Regulations, Chapter 173-60.
EDNA – Environmental Designation for Noise Abatement
Class A: Residential areas or lands where human beings reside and sleep; such as residential areas, multiple family living areas, recreational and entertainment areas (e.g., camps, parks, resorts), community service areas (e.g., retirement homes, hospitals, health and correctional facilities).
Class B: Commercial areas or land uses requiring protection against noise interference with speech; such as commercial living and dining areas, motor vehicle services, retail services, banks, office buildings, and commercial and recreational areas not used for human habitation (e.g., theaters, stadiums, fairgrounds, amusement parks, and educational, religious, governmental, and cultural facilities).
Class C: Industrial areas or lands involving economic activities; such as agricultural, storage, warehouse, production, and distribution facilities.

4.1.1.2 Existing Conditions

The Grays Harbor Energy Center is sited along Keys Road, between the Chehalis River and Fuller Creek, in Grays Harbor County in the State of Washington, as depicted in Figure 2.1-1. The land immediately adjacent to the site includes wooded areas, and industrial and commercial uses, including a transmission line easement to the south. Units 3 and 4 would be constructed entirely within the boundaries of the approximately 22-acre Grays Harbor Energy Center site. A 10-acre site immediately east of the project site would be used for construction laydown and access and would become part of the overall site boundary. The 10-acre site is covered with approximately 5-acres of thinned conifers and 5-acres of grassland/agriculture that is mowed every year. For noise assessment purposes, the eastern property boundary will include this 10-acre expansion area.

Nearby residences exist approximately 2,200 feet west of the site along Keys Road West, and approximately 1,900 feet northeast of the site along Fuller Road. These residences are identified in Table 4.1-2 and shown in Figure 4.1-1.

TABLE 4.1-2
NEAREST NOISE-SENSITIVE RECEIVERS

Location	Distance from Project Site	Description
R1	2,250 Feet	20 Keys Road South
R2	2,200 Feet	Southeast Corner of Keys Road West and Keys Road South
R3	2,200 Feet	North of Access Road Gate
R4	1,900 Feet	Southeast Corner of Fuller Road and Keys Road

Source: Michael Theriault Acoustics Inc.

Figure 4.1-1
Noise Sensitive Receivers

Ambient Survey Instrumentation

Noise measurements were taken at four locations as shown in Figure 4.1-2. All measurements were conducted using precision real time sound analyzers and microphones conforming to Type 1 tolerance requirements of the American National Standards institute (ANSI S1.4 – General Purpose Sound Level Meters). All instrumentation was within its laboratory calibration period, and appropriate calibration settings were verified in the field.

Ambient Monitoring Results

Daytime ambient noise levels (7 am to 10 pm) were generally controlled by vehicle traffic on Keys Road, Keys Road West, Keys Road South, Irwin Lane, and Fuller Road, as well as by wood processing activity, and residential activity. Ambient levels were influenced to a lesser degree by intermittent sources including dog barks, bird song, and aircraft flyovers. Nighttime noise levels (10 pm to 7 am) did not appear to be significantly influenced by man-made sources.

As shown in Table 4.1-3, daytime ambient noise levels (L_{EQ}) ranged from 32 dBA to 60 dBA at nearby residences, whereas nighttime ambient noise levels (L_{EQ}) ranged from 26 dBA to 45 dBA.

4.1.1.3 Impacts

Noise levels from the project will be relatively steady and continuous. Because the WAC noise limits apply to the total noise levels from both the existing Units 1 and 2 and the additional Units 3 and 4, noise levels from the entire facility (Units 1 through 4) were used for this analysis.

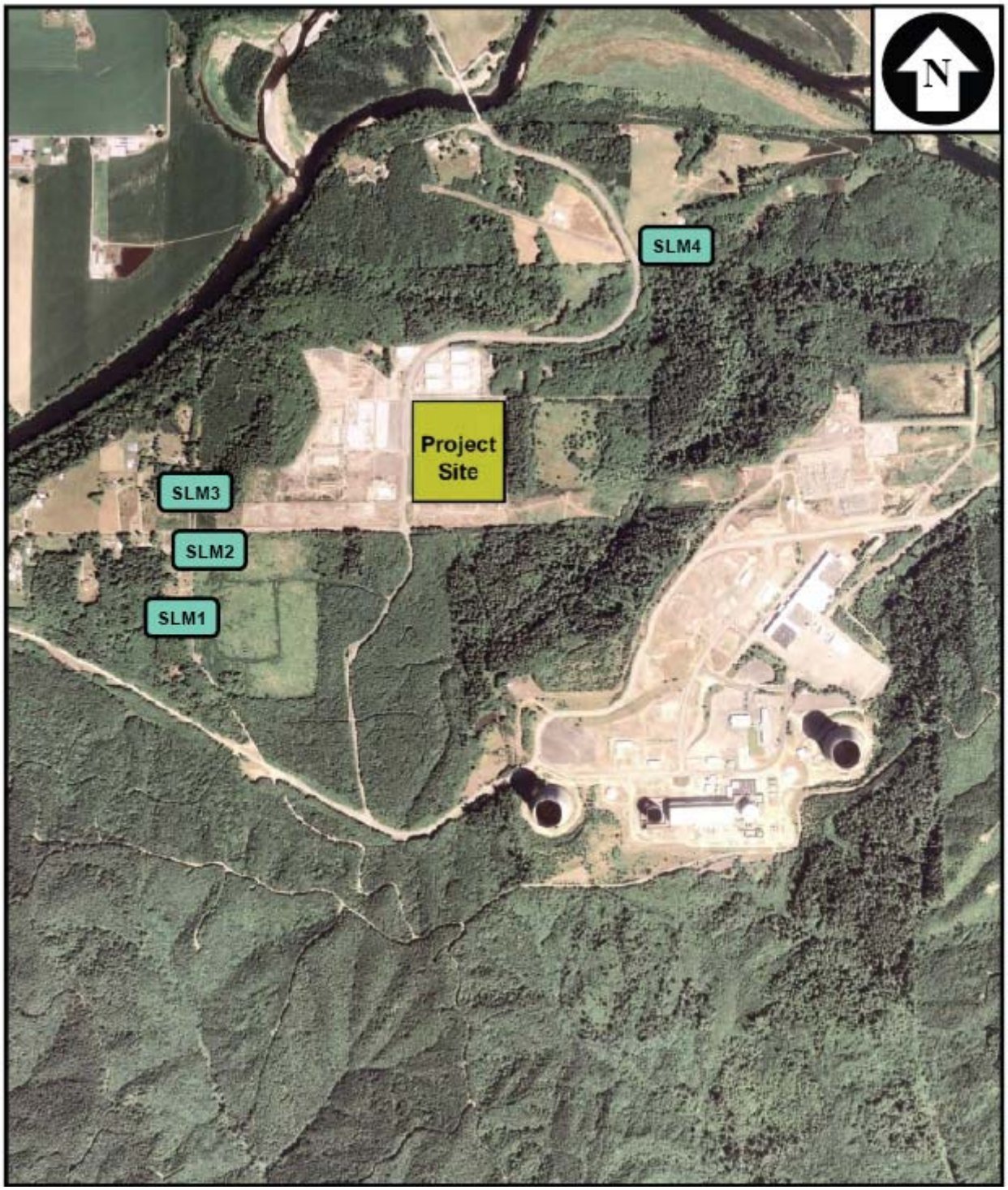
The Grays Harbor Energy Center is considered a Class C emitter. Since it may operate 24-hours per day, Units 3 and 4 will be designed to achieve more stringent nighttime limits (50 dBA) at Class A (residential) receivers. Since land uses adjacent to the facility site are industrial and agricultural, a limit of 70 dBA will apply at the property boundaries, which includes the additional 10-acre site on the east.

Additional Impact Criteria

Grays Harbor Energy Center noise levels were also evaluated in terms of low-frequency noise impact, and potential for tonality, as described below.

Low-Frequency Noise Impact: The State of Washington has not established specific guidelines for low-frequency noise impacts. For purposes of assessing potential impacts, American National Standards Institute (ANSI) Standard B133.8-2, "Gas Turbine Installation Sound Emissions", was used to evaluate project noise levels. To address low frequency noise, Annex B of this standard recommends that noise levels not exceed 75-80 dBC.[2]

[2] C-weighted levels (dBC) are generally considered a better indicator of perceived low-frequency noise, as compared to only A-weighted levels which emphasize mid- to high-frequencies.



Source: Michael Theriault Acoustics Inc.

Figure 4.1-2
Noise Monitoring Locations

Table 4.1-3
PRE-EXISTING AMBIENT SOUND LEVELS (dBA)

Location	Description	Time Period	Range of Hourly L_{EQ} Levels
SLM1	20 Keys Road South	Daytime	35-54
		Nighttime	27-37
SLM2	Intersection of Keys Road West and Keys Road South	Daytime	45-60
		Nighttime	26-45
SLM3	Access Road Gate	Daytime	32-44
		Nighttime	26-36
SLM4	Intersection of Fuller Road and Keys Road	Daytime	40-48
		Nightime	37-44

Note: Daytime is 7 am – 10 pm; Nighttime is 10 pm to 7 am

Tonality: For purposes of this assessment, pure tones exist when any octave-band noise level exceeds that of its adjacent octave-bands by more than three decibels.

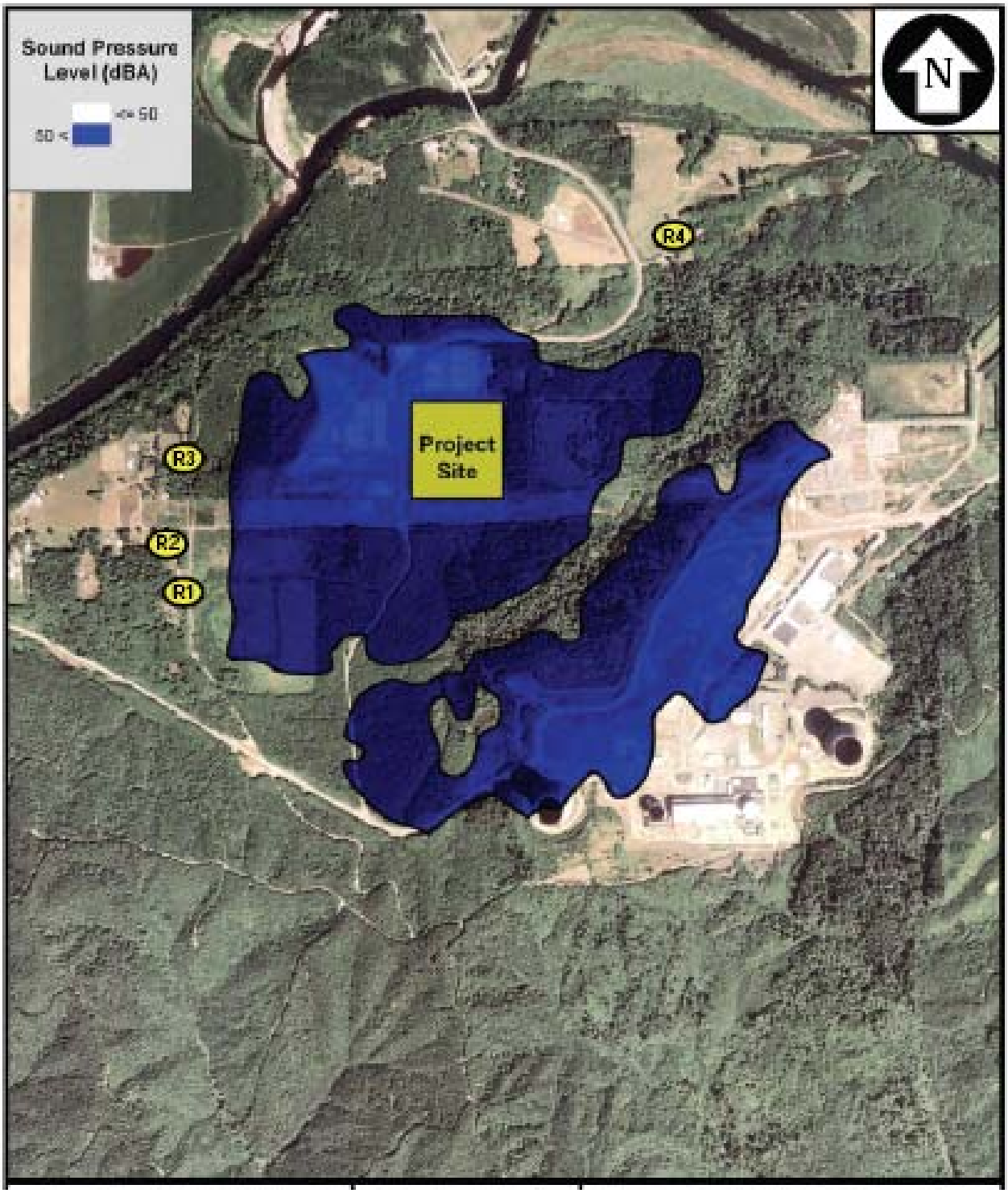
Operational Noise Levels

Total project A-weighted noise levels (Units 1 through 4) at nearby receivers are expected to range from 45 dBA to 49 dBA, and C-weighted noise levels are expected to range from 62 dBC to 65 dBC (Table 4.1-4). Predicted off-site noise levels also are shown in Figure 4.1-3.

TABLE 4.1-4
PREDICTED TOTAL PROJECT NOISE LEVELS AT NEARBY RESIDENCES

Location	A-Weighted dBA	C-Weighted dBC
Receiver 01	48	65
Receiver 02	49	65
Receiver 03	48	64
Receiver 04	45	62

Total project noise levels (Units 1 through 4) are expected to range from 56 dBA to 70 dBA at the property boundary (Table 4.1-5). Predicted property boundary noise levels also are shown in Figure 4.1-4.

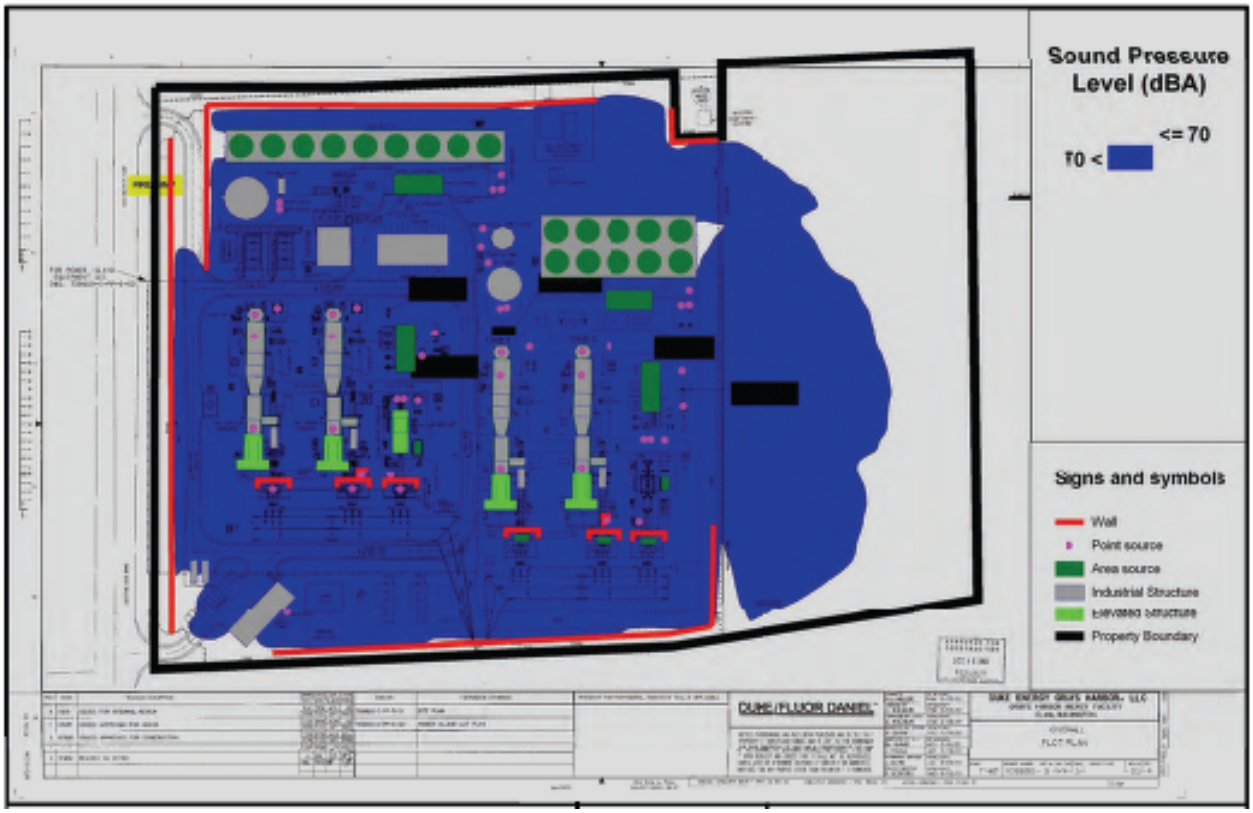


Source: Michael Theriault Acoustics Inc.

Figure 4.1-3
Predicted Off-Site Noise Level Contours

TABLE 4.1-5
PREDICED TOTAL PROJECT NOISE LEVELS AT SITE PROPERTY BOUNDARY

Location	Range of A-Weighted Levels
Property Line – North	59 - 70
Property Line – East	65 - 68
Property Line – South	65 - 70
Property Line – West	56 - 65



Source: Michael Theriault Acoustics Inc.

Figure 4.1-4
Predicted On-Site Noise Level Contours and Conceptual Barrier Layout

Operational Noise Impact Assessment

Table 4.1-6 compares the predicted noise levels at nearby residences and at the project property lines with the WAC permissible noise level.

TABLE 4.1-6
WAC NOISE ASSESSMENT (dBA)

Location	Predicted Project Noise Level	WAC Permissible Noise Level	Complies with WAC?
Receiver 01	48	50	Yes
Receiver 02	49	50	Yes
Receiver 03	48	50	Yes
Receiver 04	45	50	Yes
Property Line – North	70	70	Yes
Property Line – East	68	70	Yes
Property Line – South	70	70	Yes
Property Line – West	65	70	Yes

The maximum predicted noise level at nearby residences is 49 dBA, as presented in Table 4.1-6, or one decibel below the permissible level of 50 dBA. As such, noise levels are expected to fully comply with WAC requirements at the nearest residential receivers during operation of the existing Units 1 and 2 combined with the proposed Units 3 and 4.

The maximum predicted noise level at the property boundary is 70 dBA (Table 4.1-6). As such, noise levels are expected to fully comply with WAC requirements at adjacent industrial properties during operation of the existing Units 1 and 2 combined with the proposed Units 3 and 4.

Low-Frequency Noise Annoyance

As shown in Table 4.1-4, the maximum predicted C-weighted level at the nearest noise-sensitive receivers is 65 dBC, or ten decibels lower than the recommended maximum level (75 dBC). Given this, no significant impact is expected due to low-frequency noise levels from the project.

Tonal Assessment

Although it is difficult to predict with certainty whether pure tones will be perceptible at the nearest residential points of reception, at no receiver location is any octave-band noise level expected to exceed that of its adjacent octave-bands by more than three dB. Based on this finding, no pure tones are expected.

4.1.1.4 Construction Noise Impact Assessment

Like most projects, construction of Units 3 and 4 would result in increased noise levels for a limited period of time. Noise levels would vary widely, depending on the phase of construction and specific tasks being performed. For example, during site preparation, heavy equipment for grading, excavation and pad construction would be required, including shovels, front-end loaders, dump trucks and concrete trucks. Alternately, on-site fabrication during the equipment installation phase would require portable generators, air compressors, welding machines, etc.

Typical noise levels of construction equipment that may be employed during the construction process are given in Table 4.1-7.

TABLE 4.1-7
TYPICAL NOISE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment Item	Noise Level at 50 Feet (dBA)	Equipment Item	Noise Level at 50 Feet (dBA)
Air Compressors	76 – 89	Generators (Portable)	71 – 87
Backhoes	81 – 90	Jackhammers	69 – 85
Concrete Batch Plant	80 – 85	Rock Drills	83 – 99
Concrete Pumps	74 – 84	Pile Drivers	81 – 107
Concrete Vibrators	68 – 81	Pumps	68 – 80
Cranes (Derrick)	79 – 86	Steel Rollers	75 – 82
Cranes (Mobil)	80 – 85	Shovels	77 – 90
Dozers	77 – 90	Trucks	81 – 87
Front-End Loaders	77 – 90	Vibratory Conveyors	70 – 80
Graders	79 – 89	Welders	66 – 75

Source: Bolt, Beranek, and Newman, Inc. (1997)

Power plant construction generally occurs in phases, namely: 1) initial grading and excavation; 2) concrete pouring; 3) steel erection; 4) equipment installation; and 5) exterior finish and cleanup. Construction is expected to be completed within an 22-month period, and would likely occur over the course of single daytime shifts, although it is possible that extensions of the basic workday, or moderate amounts of evening or weekend work would occur. However, construction activities associated with higher increases in ambient noise levels would typically take place only during weekday daytime hours.

Construction Noise Levels

An acoustical model of construction operations and equipment was developed using SoundPLAN 6.5 to predict property line and off-site noise levels. Equivalent energy levels (L_{EQ}) were estimated for each of five major construction phases, including: 1) grading and excavation; 2) concrete pouring; 3) steel erection; 4) equipment installation; and 5) finishing and clean-up. Adjustments for hemispherical divergence, atmospheric absorption and ground effect were included. As shown in Table 4.1-8, L_{EQ} levels are predicted to range from 33 dBA to 46 dBA at nearby residential receivers. Note that noise levels presented in Table 4.1-8 are those expected outdoors and that a building or home would provide significant attenuation of these levels. Specifically, noise levels within homes and dwellings would be up to 27 dBA lower (with windows closed). Even in homes with open windows, indoor noise levels would be up to 17 dBA lower. [3]

[3] Environmental Protection Agency, Report No. EPA-550/9-74-004, March 1974.

TABLE 4.1-8
PREDICTED CONSTRUCTION NOISE LEVELS (dBA - L_{EQ})

Position	Construction Phase				
	Grading and Excavation	Concrete Pouring	Steel Erection	Equipment Installation	Finishing*
Receiver 01	46	42	46	41	36
Receiver 02	46	42	46	41	36
Receiver 03	46	42	46	41	36
Receiver 04	43	39	43	38	33
Property Line – North	70	66	70	65	60
Property Line – East	69	65	69	64	59
Property Line – South	73	69	73	68	63
Property Line - West	67	63	67	62	57

Note: Assumes mitigated steam-blows.

Any nighttime or weekend construction activities will likely be similar to the "finishing phase" of construction, which is typically ten decibels quieter than for other phases. Also, the size of a nighttime work force would be significantly smaller than during typical daytime, weekday hours, further reducing noise levels.

Plant Cleanout

At the conclusion of construction, but prior to commercial operation of Units 3 and 4, steam blows will be used to clear any accumulated dirt or debris from steam piping. This usually involves releasing high-pressure steam through the piping system and venting it to atmosphere. Steam blow sound levels are typically substantially louder than other construction activities, and may be disruptive to nearby residents. In order to minimize these short-term impacts, specially designed silencers will be installed on piping vents during plant clean-out, and nearby residents will be notified when this activity is set to begin.

4.1.1.5 Mitigation Measures

The proposed acoustical design of Units 3 and 4 will include silencers placed within the air intake ductwork of the combustion turbines to reduce high-frequency compressor and turbine blade noise levels. In addition, acoustical enclosures will reduce casing radiated noise from the combustion turbines, generators, gearing and other auxiliary support equipment. Turbine exhaust noise will be attenuated via the heat recovery steam generators (HRSGs) as well as by absorptive silencers placed either in the HRSG ductwork leading to the stacks or hung within the stacks themselves.

Moreover, the proposed expansion will take advantage of the existing acoustical barriers along the northern and western property boundaries. Additional acoustical barriers may be erected along the northern and southern property boundary to control property line noise levels (see conceptual barrier layout in Figure 4.1-4). Noise level measurements would be collected during performance testing (prior to commercial operation) and used to determine whether acoustical

barriers along the property boundaries are necessary, and if so, the optimal height, length and placement of any barriers. Note that additional barriers are not required to achieve predicted levels at the residences.

Acoustical modeling indicates that based on this design, noise levels from the project are expected to fully comply with applicable limits at residential receivers and industrial properties. The precise details and extent of any noise control measures needed for the plant will be refined, if necessary, during the detailed engineering phase of the project, at a time when additional noise level data can be obtained from vendors, and when additional design details for Units 3 and 4 have been completed.

4.1.2 RISK OF FIRE OR EXPLOSION

The discussion of the risk of a fire or an explosion at the Grays Harbor Energy Center is organized in three parts: risk during construction, risk during operation, and mitigation of risk.

4.1.2.1 Risk During Construction

The risk of a fire or explosion during construction of Units 3 and 4 is considered to be extremely low. During construction, small quantities of flammable liquids and compressed gases will be stored and used. Liquids will include fuels, paints, and cleaning solvents. Compressed gases will include acetylene, oxygen, helium, hydrogen, and argon for welding. The potential hazards associated with use of these materials will be mitigated by following WAC 296-155 and Federal Occupational Safety and Health Administration (OSHA) Safety Standards listed in 29 CFR 1910, General Industry, and 29 CFR 1926, Construction Industry. The following is a list of applicable standards:

- OSHA training programs such as Hazard Communication 1910.1200, Confined Space Entry 1910.146, Lockout/Tagout 1910.147, and other OSHA mandated programs

- OSHA Standards such as Fire Prevention 1910.39, Traffic Control, Excavations 1926.650, Scaffolding 1926.451, Ladders 1926.1051, Use of Cranes and Crane inspections 1926.550, Storage of flammable and combustible liquids and gasses 1926.152, Fall Protection 1910.128, Welding and Burning 1910.252, 1910.255, Housekeeping 1926.25, Emergency Action Plans 1910.38, First Aid/Bloodborne Pathogens 1910.1030, Electrical Hazards 1910.332, Personal Protective Equipment. 1926.28, .100 -.106

4.1.2.2 Risk During Operation

Operation of the Grays Harbor Energy Center requires the use of two materials that can be explosive under certain conditions: natural gas and hydrogen gas. Natural gas will be the only fuel for the combustion turbines. The natural gas will be piped into the site; none will be stored on site. Hydrogen will be used as a coolant for the electrical generator for the combustion turbines and a maximum of approximately 110,000 cubic feet will be stored.

For many years, industry has stored and used natural gas, hydrogen, and fuel oil in large quantities with little history of explosions or fire. When explosions occurred, they resulted from

equipment malfunctions or operator errors. During these incidents, flammable gases were released in an unsafe manner, either inside equipment or to the work area. The combination of flammable gases, ignition sources, and oxygen resulted in explosions. As a result of these incidents, codes, regulations, and consensus standards have been upgraded to reduce the likelihood of recurrences. All phases of construction and operation of Units 3 and 4 will be conducted in compliance with these codes and regulations, as applicable.

Aqueous ammonia will be used for injection into the SCR system for NO_x control and will be stored on site. However, aqueous ammonia is not considered a risk in terms of explosion potential or flammability, as it is composed of 70 percent water and will be stored separately from non-compatible materials in compliance with fire safety regulations.

4.1.2.3 Mitigation of Risk

The risk of an explosion at the Grays Harbor Energy Center will be mitigated by designing, constructing, and operating the facility as required in the latest versions of the applicable codes, regulations, and consensus standards.

As with the existing Grays Harbor Energy Center, Units 3 and 4 will be operated by qualified personnel using written procedures. Procedures provide clear instructions for safely conducting activities involved in the initial startup, normal operations, temporary operations, normal shutdowns, emergency shutdowns, and subsequent startups. The procedures for emergency shutdowns include the conditions under which emergency shutdowns are required, and the assignment of shutdown responsibilities to qualified operators to ensure that shutdowns are done in a safe and timely manner. Also covered in the procedures are the consequences of operational deviations and the steps required to correct or avoid the deviations.

Before being involved in operating the facility, employees will be presented with a facility plan, including a Health and Safety Plan, and will receive training regarding the operating procedures and other requirements of safe operation of the plant. In addition, employees will receive annual refresher training, which will include testing of their understanding of the procedures. Training and testing records will be maintained.

The existing hazardous materials emergency response program will continue to be used. Grays Harbor Energy emergency responders trained and equipped to the technician level will be available at all times when the project is in operation. The emergency responders will use a written emergency response plan developed for the Grays Harbor Energy Center and revised, if needed, to include the addition of Units 3 and 4.

4.1.3 RELEASES OR POTENTIAL RELEASES TO THE ENVIRONMENT

4.1.3.1 Handling, Storage, and Disposal of Hazardous Materials

No new hazardous materials will be used for the construction or operation of Units 3 and 4. Handling, storage, and disposal of toxic and hazardous materials used in construction and operation of the project will be in accordance with applicable state and federal regulations. The

handling procedures for wastes produced by the operation of Units 3 and 4 will be similar to those currently approved for the Grays Harbor Energy Center and will not result in a threat to public health and safety. However, only minor amounts of hazardous wastes will be generated by Units 3 and 4, primarily small quantities of materials such as used paints, thinners, and solvents.

4.1.3.2 Hazardous Waste Management

Any dangerous wastes generated by the Grays Harbor Energy Center will be managed by project personnel to ensure compliance with the Washington Dangerous Waste Regulation (WAC 173-303). The dangerous wastes will be limited to solvents and paint wastes generated during maintenance activities. Grays Harbor Energy has been assigned generator identification number WAD 980188510. A comprehensive dangerous waste management program fulfilling all requirements of the regulation is in place for the Grays Harbor Energy Center. This includes waste designation, labeling, storage, handling and disposal procedures; record keeping; inspection; contingency planning; and management oversight elements. This program will apply to Units 3 and 4, and will include requirements for training of owner and contractor personnel in proper handling, storage, and disposal of hazardous materials.

4.1.3.3 Hazardous Substances

Title III of the Superfund Amendments and Reauthorization Act and OSHA's Hazard Communication Standard mandate communication of information to local agencies to assist in their response to emergency situations. Material safety data sheets (MSDS), which provide specified information on each toxic or hazardous material stored and used on site, will be maintained on file. A list of MSDS will be provided to local emergency response agencies, including the Elma Fire Department. The MSDS describe the potential health effects of each substance under different types of exposure and appropriate safety and treatment measures. The Certificate Holder will provide an annual inventory of the toxic and hazardous materials used on site (in accordance with Tier 2 reporting requirements).

4.1.3.4 Hazardous Substance Release

If during the operation of the facility any substance listed in 40 CFR 302 is released to the environment, the Certificate Holder will notify EFSEC, the National Response Center, the Environmental Protection Agency, and Ecology as required under Section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act. Grays Harbor Energy's response to any accidental release will be guided by its SPCC Plan, which will be updated if needed to include Units 3 and 4 (see Section 2.9, Spillage Prevention and Control, WAC 463-60-205), and any additional measures required by EFSEC or Ecology.

In addition, the state Dangerous Waste Regulations, as codified at WAC 173-303, enforce the federal Resource Conservation and Recovery Act in Washington state. The existing SCA for the Grays Harbor Energy Center stipulates waste management procedures in accordance with the state regulations and these will be followed for Units 3 and 4.

4.1.4 SAFETY STANDARDS COMPLIANCE

The contractor and its subcontractors will be required to comply with applicable local, state, and federal safety, health, and environmental regulations. The primary standards to be used in the design, construction and operation of Units 3 and 4 are the same as approved for the existing Grays Harbor Energy Center.

4.1.5 RADIATION LEVELS

The proposed addition of Units 3 and 4 is not expected to use or release any radioactive materials during operation. During construction, there will be a minor, controlled use of radiation. This will consist of X-rays of some plant equipment welds.

Minor controlled use of radiation during construction will be in accordance with state and federal standards and project-specific permit conditions covering these materials.

4.1.6 EMERGENCY PLANS

Grays Harbor Energy, the Certificate Holder, has prepared and implemented a series of emergency plans for the Grays Harbor Energy site, and the plans are applicable to the construction and operation of Units 3 and 4. These plans have been prepared to ensure public safety and environmental protection on and off the Grays Harbor Energy property in the event of a natural disaster or other major incident relating to or affecting the Grays Harbor Energy Center. The plans describe the emergency response procedures that are to be implemented during emergency situations. The plans were approved by EFSEC on November 1, 2005

SECTION 4.2 LAND AND SHORELINE USE (WAC 463-60-362)

This section addresses the land and shoreline use issues applicable to the proposed Units 3 and 4, including the following sections:

- Relationship to Existing Land Use, Land Use Plans, and Estimated Population (Section 4.2.1)
- Housing (Section 4.2.2)
- Light and Glare (Section 4.2.3)
- Aesthetics (Section 4.2.4)
- Recreation (Section 4.2.5)
- Historic and Cultural Preservation (Section 4.2.6)
- Agricultural Crops/Animals (Section 4.2.7)

4.2.1 RELATIONSHIP TO EXISTING LAND USE, LAND USE PLANS, AND ESTIMATED POPULATION

4.2.1.1 Existing Conditions

Land Uses

Units 3 and 4 will be located within the approved 22-acre Grays Harbor Energy Center site. Construction of the Grays Harbor Energy Center was completed in the second quarter of 2008 and it began commercial operation on April 25, 2008. The site is located in Grays Harbor County in western Washington. Adjacent development varies, generally characterized by office, industrial, rural, rural residential, and agricultural land uses. This section describes of existing land uses adjacent to the site and the plans and policies that guide development on this site, and discusses the impact of the project on these elements. Detailed discussion of the relationship of the project to estimated population can be found in Section 4.4, Socioeconomic Impacts, WAC 463-60-535.

Plant Site. The Grays Harbor Energy Center site is located near the town of Elma in Grays Harbor County, and is surrounded on all sides by the property boundary of the Satsop Development Park (Figure 2.1-1 in Section 2.1). The Satsop Development Park is owned by the Grays Harbor PDA. The approximately 22-acre site was previously developed for and used as a laydown area during construction of now-discontinued nuclear plants WNP-3 and WNP-5 located at the Satsop Development Park. Prior to the start of site work for the Grays Harbor Energy Center, most of the site was covered by a layer of graded gravel several feet deep and surrounded by a chainlike fence topped with barbed wire. The western portions of the site adjacent to Keys Road have been paved with asphalt.

Keys Road provides vehicular access to the site. This is a two-lane county road that runs along the western site perimeter in a generally north-south direction that connects with State Route (SR) 12 north of the proposed site. To the south of the site, the BPA maintains a transmission corridor as part of its Olympia-to-Aberdeen grid connection. Most of the other areas surrounding the site are forested. About a quarter mile southwest of the site, the Weyerhaeuser Timber Company manages an experimental forest that is approximately 50 acres in size. On the north side of this forest, about two-thirds of a mile west-southwest of the site, are about a dozen single-family houses (these appear as small black dots on Figure 2.1-1). Southeast of the site is the Fuller Creek preservation area. The discontinued nuclear power plant facilities (WNP-3 and WNP-5) lie beyond this area, approximately 1 mile south and southeast of the project site. Forested areas are located north of the site, beyond which the grade drops rapidly down toward the Chehalis River, which is approximately 0.5 mile from the project site.

Ten-Acre Construction Laydown and Access Area. The Satsop Development Park is the site of an unfinished and unfueled former nuclear power plant. Construction of the site began in 1977 by WPPSS and BPA, and was halted in 1983. Though construction ceased, a Wildlife Mitigation Agreement associated with the power plant project continued to be developed, and was approved in 1990. The Wildlife Mitigation Agreement imposed restrictions on activities throughout the Satsop Development Park and limited the developable area to what had already

been disturbed, approximately 450 acres. The 10 acres proposed for construction laydown and access were originally included within the area set aside for wildlife mitigation; however, they have since been designated for intensive development in the Satsop Development Park's Master Plan.

The Satsop nuclear site was left unused for over a decade until the project was formally terminated in 1995. Subsequently, leaders of Grays Harbor County, the Port of Grays Harbor, Grays Harbor Public Utility District, and the Grays Harbor Council of Governments collaborated to evaluate the redevelopment potential of the site to bring jobs and provide an economic stimulus to Grays Harbor County. In 1999, the Washington State Legislature formed the Grays Harbor PDA and allocated seed capital to develop the site as a business and technology park to attract diverse technological and manufacturing companies. The Satsop Development Park is now a business and industrial park with industries ranging from data centers to energy production.

In October 2007, the Grays Harbor PDA published the Satsop Development Park Master Plan, which is intended to guide and direct the future infill and build-out of the site to realize its full potential. A number of State of Washington staff members participated in creation of the Master Plan, including Stephan A. Kalinowski of Washington Department of Fish and Wildlife and Rich Scrivner of Washington State DNR.

The Master Plan identifies seven planning areas. The Grays Harbor Energy Center site and the proposed 10-acre construction laydown and access area are located within Area 2: West Park (see Figure 3.1 in the Satsop Development Park Master Plan.). The Satsop Development Park Master Plan establishes two primary land use designations: developable and multi-use areas. Page 35 states, "*Developable areas are where development in the form of buildings, roads, parking, and other infrastructure will occur or already exists. Developed areas are generally those that have already been cleared and graded, and have infrastructure in place, or are immediately adjacent to existing development. Multiuse areas encompass a variety of non-development uses, including passive recreation, forest management, wildlife habitat, infrastructure corridors, and education and research. In some areas, habitat restoration or enhancement could be achieved in order to improve natural functions and conditions. Areas 1 and 2 are designated for intensive development and Areas 3 through 7 are designated as multi-use.*"

Area 2: West Park, the planning area in which the combined 32-acre site is located, is designated for intensive development, and not for wildlife habitat. The West Park Planning Area is further described on page 53 of the Master Plan: "*The West Park Planning Area is a key component of the Park's economic development goals. West Park is approximately 170 acres, much of which is currently undeveloped. It is a secondary 'gateway' into the Park, accessed from State Route 12 via Keys Road.*"

The West Park area's direct access to the highway, separation from the Main Campus, and the character of existing uses make it most suitable for more intense industrial uses. Current tenants include Livingston Boats, Simpson Door Company, L&L Machinery Company, Northwest Pipeline, and Invenergy, which owns its 32-acre parcel where it houses a combustion turbine

facility. The siting of this power plant creates a restriction on residential development within a 200-foot buffer. The BPA right-of-way cuts through the southern portion of the area. Due to its remote location within the park and heavy industrial uses, the West Park area will have restricted public access. It is estimated that West Park has capacity for 30,000 square feet of office and 690,000 square feet of light and heavy industrial at full-build-out.

Existing Plans and Policies

The plant site is located in unincorporated Grays Harbor County near the town of Elma and surrounded by the property boundary of the Satsop Development Park (Figure 2.1-1).

As described above, the continued use of the Grays Harbor Energy Center site and the use of the adjacent 10-acre site for construction access and laydown is consistent with the Satsop Development Park Master Plan.

The plant site is located in areas zoned as Industrial District 2, or I-2, under Grays Harbor County Comprehensive Zoning Ordinance No. 241 (Title 17). According to Grays Harbor Zoning Ordinance 17.52.010, *"The purpose and intent of the industrial district is to provide areas where industrial activities and uses involving the processing, fabrication and storage of products may be located. The district also allows such commercial uses that serve primarily the industrial district."* Uses permitted outright include industrial uses and industrial development facilities as defined by RCW 39.84.020 Part 6. Energy facilities are included within this definition and are permitted outright.

In passing the rezone at a Grays Harbor Planning Commission meeting on November 2, 1998, the Planning Commission found that the utilization of the infrastructure originally built for the Satsop Nuclear Plant and the reuse of existing sites for industrial purposes will promote job creation and economic diversification, which are expressed purposes of the Grays Harbor County Comprehensive Plan.

In connection with the application for the original Grays Harbor Energy Center, EFSEC found that the project was *"consistent with applicable land use laws and regulations"* (EFSEC Order No. 694 *as modified*, April 15, 1996). In 2002, the Council considered a propose for an expansion of the Satsop CT Project that was very similar to the current proposal for Units 3 and 4, and EFSEC found that the proposed project *"is consistent and in compliance with Grays Harbor County and regional land use plans and zoning ordinances"* (EFSEC Order No. 766, March 27, 2002).

4.2.1.2 Impacts

During construction of Units 3 and 4, adjacent land uses may be affected by noise, dust, and construction-related traffic. Mainly due to the nature of the construction activities, impacts near the project site are expected to be temporary and minor. Further discussion of these impacts and measures that will be taken to mitigate them can be found in Section 3.2.4 Dust ; Section 4.1.1 Noise, and Section 4.3 Traffic.

In terms of land use, the presence of Units 3 and 4 at the project site will be compatible with the existing Grays Harbor Energy Center plant and adjacent industrial structures and facilities. Nearby residents may perceive the expanded plant as an intensified land use. However, this perception would be lessened as views into the project site become increasingly screened by maturing vegetation along Keys Road (see Section 4.2.4).

4.2.2 HOUSING

The existing housing stock and potential impacts are discussed in Section 4.4, Socioeconomic Impacts, WAC 463-60-535.

4.2.3 LIGHT AND GLARE

4.2.3.1 Existing Conditions

Units 3 and 4 would be added to the existing Grays Harbor Energy Center. The Grays Harbor Energy Center plant is illuminated at night for facility operations under normal conditions and for means of egress under emergency conditions. Illumination levels were designed in accordance with the Illuminating Engineering Society standards recommended by the following guidance:

- ANSI/IES RP-7, 1983, Industrial Lighting
- ANSI/EIS RP-8, 1983, Roadway Lighting
- Federal Aviation Administration guidance
- OSHA guidance

In addition, existing high-mast lights in the adjacent industrial yards provide wide-area illumination. Other lights in the immediate area include entry and yard lights around a small group of residences located within approximately two-thirds of a mile of the project site. Evergreen trees screen the project site on the east. Additional forested areas are located north of Keys Road, and these trees as well as a 25-foot-high wall with a vegetated berm along Keys Road screen lights originating from the Grays Harbor Energy Center, the Satsop Development Park and other adjacent land uses.

4.2.3.2 Impacts

The construction and operation of Units 3 and 4 would not significantly increase the existing light and glare conditions. The additional two units would be illuminated at the same times and illumination levels as the existing Grays Harbor Energy Center plant. Table 4.2-1 summarizes the illumination levels expected for Units 3 and 4.

Lighting would be provided for the purposes of general operator access and safety under regular operating conditions. Precise and detailed placement of lighting fixtures has not yet been determined, but light poles will likely be standard street light height, in the range of 20 to 50

feet. Outside lighting around the exterior of buildings and ancillary equipment would likely be attached to walls.

TABLE 4.2-1
EXPECTED ILLUMINATION LEVELS FOR EXTERIOR FACILITY AREAS

Exterior Location	Maintained Foot-Candles
Boiler platforms	10
Emergency lighting	3
Hydrogen manifold area	20
Electrical switchyard	5
Exterior walkways and platforms	2
Roadway	1
Security fence	0.5
Outdoor areas containing equipment that requires periodic inspection	5
Cooling tower	5

Source: N. DeRidder, personal communication

Spot lighting (up to 20 foot-candles) would be provided for localized area illumination for specific work activities such as the hydrogen manifold area. This lighting would be of higher intensity than wide-area lighting, but will be limited to specific areas and occasional usage. Emergency lighting would be provided for personnel egress and continuance of critical activities during emergency conditions. These instances are anticipated to be infrequent.

During construction, there would be some lighting associated with construction machinery. During operation, the most visible points of illumination would be small, high-intensity anti-collision lights on the emission stacks to warn aircraft. These lights are intermittent and would be similar to warning lights present on the nearby WNP-3 and WNP-5 cooling towers and on the existing cooling towers for the Grays Harbor Energy Center.

Light and glare impacts upon nearby residents and travelers along Keys Road are expected to be insignificant. Prior to the start of construction of the Grays Harbor Energy Center, there were existing high-mast lights providing wide-area illumination of the industrial yards. Local residents are already used to this local light source and the separation distance of approximately 3,375 feet provides a buffer zone for light falloff. The existing 25-foot-high wall and vegetated berm located along Keys Road will reduce the light from Units 3 and 4. Vegetation located on the berm and scattered existing vegetation between the project site and residences would screen most of the lights. Additional screening is provided by high trees located along the residential road since the residences are set back an estimated 50 to 75 feet.

4.2.3.3 Mitigation Measures

In specific locations where glare or light spillover could impact Keys Road or be obtrusive to nearby residences, lighting angles could be adjusted to minimize glare impacts, or supplemental light shields/vegetation could be used for extra screening.

4.2.4 AESTHETICS

4.2.4.1 Assessment Methodology

This section describes existing visual conditions of the proposed project setting. The visual inventory study consisted of the following:

- Setting criteria for rating levels of visual quality and viewer sensitivity
- Assessing existing visual quality levels
- Identifying viewer types, estimating their view of the facility (general visibility and distance range), and their visual sensitivity
- Selecting key representative viewpoints

Regional topography and site context information were reviewed using US Geological Survey topographic maps. Detailed topography and layout for the project site were analyzed by reviewing project plans provided by the Certificate Holder and its engineering and design contractor. Field work was conducted by driving and hiking the area to qualitatively determine general visibility of the project site from residences, major roads, and other potentially sensitive viewpoints. Based on visibility, representative viewpoints were photodocumented and two key viewpoints were selected for visual simulation (Figure 4.2-1).

Assessment methods were based on a combination of visual assessment techniques that characterize visual impact in terms of changes in visual quality, character, and viewer sensitivity. Visual quality levels were estimated for both regional and immediate project area settings. The regional landscape setting is defined as those areas north of the Chehalis River, typically at a distance of 1 mile or greater. Levels of visual quality and viewer sensitivity were qualitatively estimated based upon general criteria that establish ratings of "high," "moderate," or "low."

Levels of visual quality consist of three primary components: *vividness*, the memorability of the landscape resulting from distinctive landmark features or visual patterns; *intactness*, the visual integrity between natural and modified landscape components and the absence of encroaching disturbances; and *unity*, the visual coherence, composition, and harmony of landscape elements. Visual quality was evaluated using the following general criteria:

- ***Low –*** Landscape is common to the region and exhibits few, if any, memorable features or patterns which provide visual diversity. A prevalence of encroaching human elements or landscape modifications exist that do not compatibly blend with the natural surroundings (low visual intactness and unity). Human alterations (such as roads and power lines) exhibit low maintenance or siting sensitivity (such as grading and alignment).

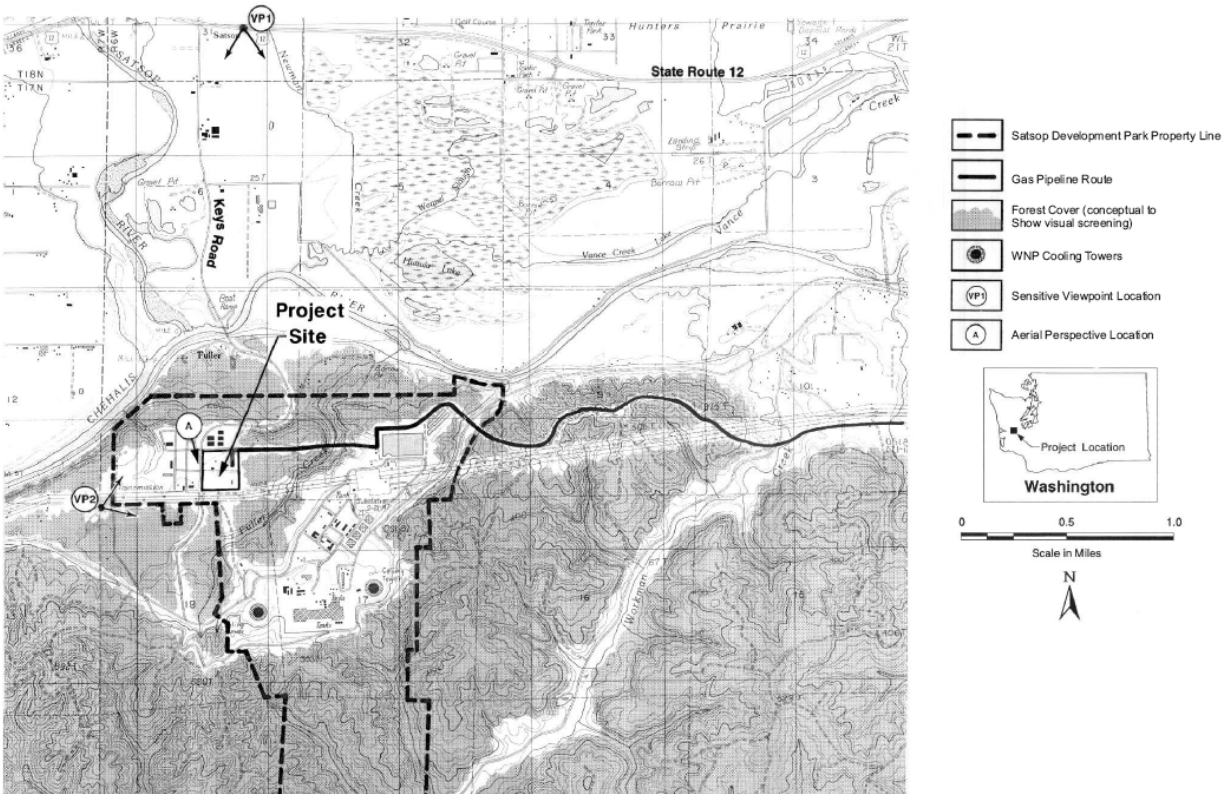


Figure 4.2-1
Sensitive Viewpoint Locations Map

- ***Moderate*** **–** Landscape exhibits reasonably attractive natural and human-made features/ patterns, although they are not visually distinctive or unusual within the region. The landscape integrity of the area provides some positive visual experiences such as natural open space with some existing disturbance (farm fields, etc.), or well-maintained industrial parks and residential areas.

- ***High*** **–** Landscape exhibits distinctive and memorable visual features (such as landforms and rock outcrops) and patterns (vegetation/open space) which are largely undisturbed—usually a rural or open space setting. Development or visual disturbances, if present, are exceptionally well-planned to integrate with the natural landscape materials and character.

Viewer sensitivity depends on viewer types and exposure (number of viewers and view frequency), view orientation and duration, and viewer awareness and sensitivity to visual changes. Levels of viewer sensitivity were evaluated using the following criteria:

- ***Low*** **–** Viewer types in the project vicinity representing low visual sensitivity include agricultural and power plant workers. Compared with other viewer types, the number of viewers is generally considered small, and the duration of view is short. Viewer activities typically limit awareness and sensitivity to the visual setting immediately outside the workplace, which are often screened by vegetation or adjacent buildings.

- ***Moderate*** **–** Viewer types representing moderate visual sensitivity consist of highway and local travelers. The number of viewers varies depending on location; however, in the vicinity of the proposed plant, viewer numbers tend to be moderately large since they include travelers using SR 12 and other roads throughout the Chehalis River Valley. Viewer awareness and sensitivity also are considered moderate because destination travelers often have a focused orientation.

- ***High*** **–** Residential and recreational viewers and those congregating in public gathering places (such as churches and schools) are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to specific building orientation or the enjoyment of the experience. Views may be of long duration and high frequency.

4.2.4.2 Existing Conditions

Visual Quality

Regional Setting. The Grays Harbor Energy Center site is within the property boundaries of the Satsop Development Park, which includes the cooling towers remaining from discontinued nuclear power projects WNP-3 and WNP-5. The Satsop Development Park is located in hilly terrain on the south side of the Chehalis River Valley. The two 496-foot-high cooling towers, associated with the nuclear facility, are dominating visual elements within the existing landscape.

The Chehalis River Valley is bounded by tree-covered hills rising approximately 540 feet from the elevation of the valley floor and is dissected by secondary water courses, including the

Satsop River, Fuller Creek, Newman Creek, and Vance Creek. Agriculture is the primary activity in the valley, and the landscape is a patchwork of fields whose textures and colors change with the season. Farm buildings, surrounded by groupings of trees, are located throughout the valley. Other elements in the valley that contribute to the visual character of the region include a golf course, trailer park, and gravel pits.

Overall visual quality of the regional landscape setting is classified as "moderate." The regional landscape exhibits moderate vividness because the natural and agricultural features, which are reasonably attractive, are not visually distinctive or unusual within the region. Visual intactness is also moderate because agricultural activities are visually compatible with the colors, textures, and patterns of the river valley, but other elements such as roads, farm buildings, and the cooling towers are not visually integrated with the surrounding landscape. Many farm buildings, for example, are light colored and have reflective metal roofs. Regional visual unity is rated moderate to high. Most scene elements seem to complement a rural/agricultural setting. With the exception of the cooling towers, constructed roads and utility corridors blend with the landform or are not visible.

Plant Site. From SR 12, the site is accessed by traveling south on Keys Road, which passes agricultural fields and then crosses the Chehalis River. The road then ascends a wooded hillside and emerges into a clearing on both sites of Keys Road that was formerly used as an equipment laydown area during construction of WNP-3 and WNP-5. The portion of the former laydown area located east of Keys Road is now occupied by the existing Grays Harbor Energy Center.

Visually, this area can be characterized as industrial. The existing Grays Harbor Energy Centergives the site an industrial appearance with block building forms ranging from 20 to 64 feet in height. Ancillary elements include enclosed combustion turbines and steam turbines, liquid storage tanks, electrical switchyards, two 48- to 52-foot-high cooling towers, fencing, two heat recovery steam generators, and two 180-foot-high emission stacks. Figure 2.3-1 in Section 2 shows an isometric view of the existing Grays Harbor Energy Center without the surrounding existing vegetation or topographic features.

During certain seasons or weather conditions, water vapor and combustion products are visible from the cooling towers and emission stack of the Grays Harbor Energy Center. In addition, transmission poles extending along the northern portion of the existing BPA Olympia-to-Aberdeen right-of-way were replaced as part of the Grays Harbor Energy Center construction. The former wooden poles in the right-of-way were replaced with steel towers similar to the two rows of steel towers currently in the right-of-way. These towers carry existing transmission lines from the plant to the Satsop substation located approximately 4,000 feet east of the project.

A composite visual quality rating of "low" for the immediate project area is a result of low ratings of vividness, intactness, and unity. Although the hilly terrain of the area provides some visual variety, the flat landscape of the project site is fairly monotonous. There are no long-range penetrating views. Surrounded by a uniform stand of trees around the periphery of the cleared laydown area, there is limited color, texture, or pattern variety. Visual intactness is low because elements of the existing storage yard are not visually integrated with the landscape. No screening is provided, and visually contrasting materials consist of asphalt, cinders, and steel.

Visual unity is also low because layout configuration of the storage yards is rectilinear (contrasts with native forms), piles of stored materials are scattered across the site, and the transmission line corridor passes through a linear swath of cleared vegetation.

Viewer Types and Sensitivity

Primary viewer types in the vicinity of the Grays Harbor Energy Center site are residents, travelers along SR 12 and local roads, agricultural workers, and workers at businesses located in the Satsop Development Park..

The nearest communities are Montesano, Satsop, and Elma, which are located along SR 12. Residents along the edges of these communities generally have open views across the Chehalis River Valley. These views are bounded by tree-covered hillsides seen in the distance. The WNP-3 and WNP-5 cooling towers and the upper portion of the discontinued nuclear facility building are widely visible. Community residents represent the highest concentration of viewers in the region, and would be potentially sensitive to visual changes. Typical viewing range to the plant site from the closest community of Satsop would be approximately 2 miles. Similar viewing conditions would exist for scattered farmstead residences throughout the valley between SR 12 and the Chehalis River where the minimum viewing distance would be approximately 1 mile.

The closest and most sensitive residential views are in the vicinity of several houses located on a rural road paralleling the BPA transmission line right-of-way (the houses appear as small black dots on Figure 2.1-1). These viewers are located approximately 2,300 feet from the project area. Existing views from this location consist of the existing Grays Harbor Energy Center plant, electrical equipment, including transmission lines and towers, and laydown yards containing concrete forms, steel reinforcing bars, and other remnants of WNP-3 construction. The number of viewers at this location is small, estimated to be 8 to 15. But because the plant site will be relatively close, the residential viewers could be sensitive to visual changes.

SR 12 is the main east-west travel route through the Chehalis River Valley. The attention of travelers is drawn to the open agricultural fields south of the highway. Views are open for approximately 2 miles and are terminated by tree-covered hillsides. Again, the existing cooling towers and the nuclear facilities are dominant visual elements. Visual sensitivity for travelers along SR 12 and local streets within nearby communities is considered “moderate.”

Views from local roads within the immediate plant site area are generally short-range and are typically blocked by vegetation and topography. A few elevated dirt roads located in the hills south of the site have open, overlooking views of the discontinued Satsop nuclear facilities, and the Chehalis River Valley can be seen in the distance. Since these roads are not considered destinations for scenic driving and traffic volumes are estimated to be low, overall visual sensitivity is considered “moderate” to “low.”

The project site is located approximately 2.5 miles south of the intersection of SR 12 and Keys Road. Keys Road continues to the south, and passes immediately adjacent to west side of the plant site. The primary travelers along this section of Keys Road are power plant employees and a few local residents. In general, local residents who travel this road are expected to be more

sensitive to visual impacts than industrial workers, but the overall visual sensitivity of travelers using Keys Road is considered "low" because of the short view duration and the presence of existing industrial yards, which has desensitized viewers over time. The higher visual sensitivity of residential travelers, compared to other types of travelers, is reflected in the higher sensitivity rating already given to residential viewers.

Agricultural workers throughout the Chehalis River Valley have views comparable to those of travelers along SR 12. Workers at the Satsop Development Park have short-range views that are predominately blocked by dense evergreen trees and hilly topography around the facility. The visual sensitivity of agricultural and power plant workers will generally be low because attention is focused on work activities with limited awareness of peripheral visual conditions.

Visual Changes Introduced by the Proposed Project

Prior to construction of the Grays Harbor Energy Center, materials stored on the plant site were relocated and the foundations of former buildings were removed. The site was regraded. A 25-foot-high noise wall with a 12-foot high vegetated berm has been constructed to screen views along Keys Road. This berm is vegetated with native shrubs, grasses, and other appropriate vegetation in a random arrangement to simulate native patterns.

The purpose of this berm is primarily to provide partial visual screening for nearby residents and travelers along Keys Road. The relationship of the berm to the existing Grays Harbor Energy Center and proposed Units 3 and 4 is shown in Figure 2.3-2**.**

Project Visibility

A field visit was conducted to qualitatively note or photograph potential views of the project site from a variety of surrounding land use areas, located both near (less than 1/8-mile) and distant (up to 4 miles). These represent residential, traveler, and industrial/agricultural viewer types. Since topography limits most views from the south and east, field work was concentrated to the north and west of the project site. Areas checked included:

- Peripheral edge of the community of Satsop
- SR 12 corridor (east/west)
- Keys Road corridor (north/south)
- Agricultural fields in the Chehalis River Valley
- Elevated dirt roads in the hills south of the project site near WNP-3
- Area immediately surrounding the project site within a 0.5-mile radius

Other surrounding areas were visited, but views were blocked either by topography or vegetation.

Based on the number of viewers, viewer types/sensitivities, and viewing distance, two viewpoints were selected from the general areas having project visibility. These two viewpoints, shown on Figure 4.2-1, were used to prepare two photo simulations depicting proposed conditions of adding Units 3 and 4. Viewpoint 1 (Figure 4.2-2) looks south from SR 12 approximately 0.25 mile east of the Keys Road junction. It represents the mid-to-distant viewing range (1 to 2 miles) seen by the largest number of viewers including SR 12 travelers, residents of nearby communities, and agricultural workers.

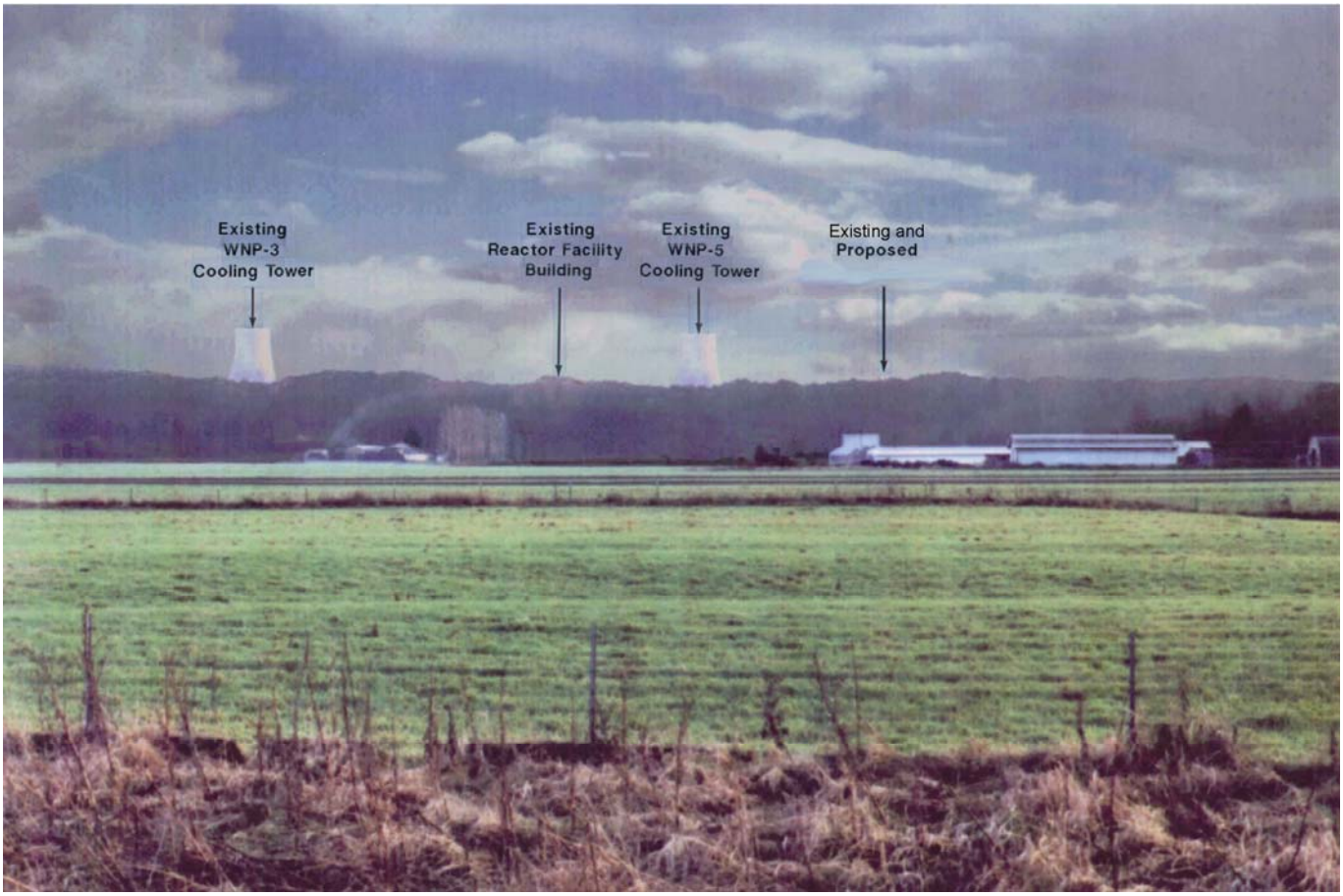


Figure 4.2-2
Simulated View of the Proposed Units 3 and 4 Stacks

Figure 4.2-2 shows the existing nuclear facility buildings protruding above the treeline. The cooling towers for WNP-3 and WNP-5 dominate the existing view. The emission stacks of the proposed Units 3 and 4, if visible above the treeline, will be located west of the existing cooling towers. Based on available project and topographic data, the tops of the Unit 3 and 4 stacks, like the Unit 1 and 2 stacks, will likely be at or just below the treeline elevations from this viewpoint. Since visibility versus no visibility is close to the threshold of model accuracy based on available data, the tops of the stacks protruding above the treeline are shown as a conservative graphic depiction.

If flashing airplane warning lights are required on the emission stacks, the lights also may be visible at night, as are the lights on the existing WNP-3 and 5 cooling towers. Generally, the project buildings and ancillary facilities would not be visible from this viewpoint because the site is screened by topography and vegetation.

The second viewpoint (VP2 on Figure 4.2-1) was chosen because the view is sensitive due to close residences that are within about 2/3 of a mile of the proposed additional two units. This view shows the existing power transmission lines as well as portions of the proposed facility, including the emission stacks (Figure 4.2-3). The vegetated berms adjacent to and west of the plants partially block the view towards the facility, as well as the view of some of the existing buildings on other portions of the laydown area.

Figure 4.2-3
Simulated View of the Proposed Grays Harbor Energy Center (Viewpoint 2)

The vegetated screening berms along Keys Road will block views of the lower portion of the facility, but the tops of the turbine buildings, cooling towers, emission stacks, and electrical switchyards will be visible. The most visible portion of the plant from this location will be the electrical switchyards, which are the closest elements. Visibility will decrease somewhat as screening vegetation reaches maturity. After vegetation is established, views of the project site

area may be improved compared to current conditions. Again, the facility's higher components will protrude above the screen.

In addition to the views selected for visual simulation representing travelers and residents who have higher visual sensitivity, views were selected for less sensitive viewer types, including agricultural and industrial workers.

General visibility of the enlarged Grays Harbor Energy Center by agricultural workers in the Chehalis River Valley will be similar to that of travelers on SR 12 represented by Viewpoint 1. As from most other viewpoints, it is possible that agricultural workers could see a small portion of the emission stacks protruding above the treeline in the distance.

Satsop Development Park workers will have views of the facility when using Keys Road, but once inside the Development Park, views of the facility will be blocked by intervening trees.

4.2.4.3 Impacts

The assessment of impacts of the addition of Units 3 and 4 on visual quality included consideration of contrasts between current and proposed conditions for high or moderate levels of visual quality and high or moderate levels of viewer sensitivity as shown in Table 4.2-2. Following these guidelines, high sensitivity and a moderate change in visual quality could be considered potentially significant. Where sensitivity and visual change were both judged to be moderate, impacts are not considered potentially significant.

TABLE 4.2-2
VISUAL IMPACT ASSESSMENT MATRIX

Sensitivity Level	Level of Change in Visual Quality		
	High	**Moderate**	**Low**
High	PS	PS	A/N
Moderate	PS	A/N	N
Low	A/N	N	N

A/N – minor adverse, not significant
N – not significant
PS – adverse, potentially significant (without mitigation)

Visual impacts of Units 3 and 4 construction activities would be "not significant" regarding the overall landscape setting. Viewers throughout the Chehalis River Valley would not observe construction of the buildings or ancillary facilities, with the possible exception of a small portion of the emission stacks. For nearby residents and travelers on Keys Road passing adjacent to the site, construction of Units 3 and 4 would be seen less and less as the planting on the berm matures and screens views.

The wall and vegetated berm located adjacent to the project site along Keys Road would provide some degree of visual screening of construction activities. Equipment enclosure buildings and exterior tanks would be painted earth-tone beige and gray to reduce contrasts. The emission stacks would be painted to blend with the sky as seen from distant viewpoints.

Visual impacts of the operation of Units 3 and 4 in combination with Units 1 and 2 upon the existing regional landscape (Figure 4.2-3) are expected to be "minor adverse, not significant." Even though project buildings and ancillary facilities would not be seen, a small portion of the emission stacks may be visible from some viewpoints in the Chehalis River Valley. The cooling towers, juxtaposed against the horizontal profile of the background hills, are objects of attention for viewers looking across the open plain of the Chehalis River Valley. If visible, the presence of small portions of the emission stacks will be an additional, but minor, element to the west of the existing and taller cooling towers of WNP-3 and WNP-5. Depending on the time of year and weather conditions, attention to the stacks could be more pronounced when a vapor plume is present.

The impact to local residents adjacent to the site (Figure 4.2-3) is expected to be "minor adverse, not significant" due to overall visual compatibility of the project with the existing conditions. Even though the emission stacks and the higher plant structures would be visible, the proposed Units 3 and 4 would be screened by the 25-foot-high wall with vegetated berm along Keys Road. The buildings enclosing the turbine equipment would also reduce visual impacts. The screening berm is primarily intended to reduce the visual impacts to nearby residents, and would reduce the visual impacts for travelers using Keys Road, even though the visual sensitivity for travelers is comparatively lower than other viewer types.

4.2.4.4 Mitigation Measures

Equipment enclosure buildings and exterior tanks would be painted earth-tone beige and gray to reduce contrasts. The emission stacks would be painted to blend with the sky as seen from distant viewpoints.

4.2.5 RECREATION

The addition of Units 3 and 4 to the existing Grays Harbor Energy Center would be entirely within the previously-studied project vicinity. No recreational activities exist on the 10-acre construction laydown and access area and conversion from forest and pasture land would have no recreation impacts. During construction, there may be temporary indirect impacts due to the possible the use of recreational facilities by construction workers during the 22-month construction period.

No mitigation measures are required.

4.2.6 HISTORIC AND CULTURAL PRESERVATION

Previous studies for historic and cultural resources were performed for both the existing 22-acre site and the surrounding area, including the 10-acre site proposed for construction laydown and access. No historic or cultural resources were found. The addition of Units 3 and 4 to the existing Grays Harbor Energy Center would be entirely within the previously disturbed area. The 10-acre construction laydown and access site is within the studied project vicinity; as a result, the addition of Units 3 and 4 would have no anticipated historic and cultural preservation impacts.

No mitigation measures are required.

4.2.7 AGRICULTURAL CROPS/ANIMALS

The 10-acre site proposed for construction laydown and access includes approximately 5 acres of forest and 5 acres of grassland/agriculture that is mowed every year. The loss of the 5 acres of grassland is considered a minor impact.

No mitigation measures are required.

SECTION 4.3 TRANSPORTATION (WAC 463-60-372)

This section presents information on existing traffic conditions and impacts related to transportation, including the following sections:

- Transportation Systems and Vehicular Traffic (Section 4.3.1)
- Waterborne, Rail, and Air Traffic (Section 4.3.2)
- Parking (Section 4.3.3)
- Movement/Circulation of People or Goods (Section 4.3.4)
- Hazards (Section 4.3.5)
- Conclusions and Recommendations (Section 4.3.6)

4.3.1 TRANSPORTATION SYSTEMS AND VEHICULAR TRAFFIC

This section identifies existing transportation facilities and traffic volumes in the vicinity of the proposed project and describes the potential traffic impacts due to construction and operation of the Units 3 and 4, in conjunction with the operations of Units 1 and 2.

4.3.1.1 Existing Conditions

Street Highway System

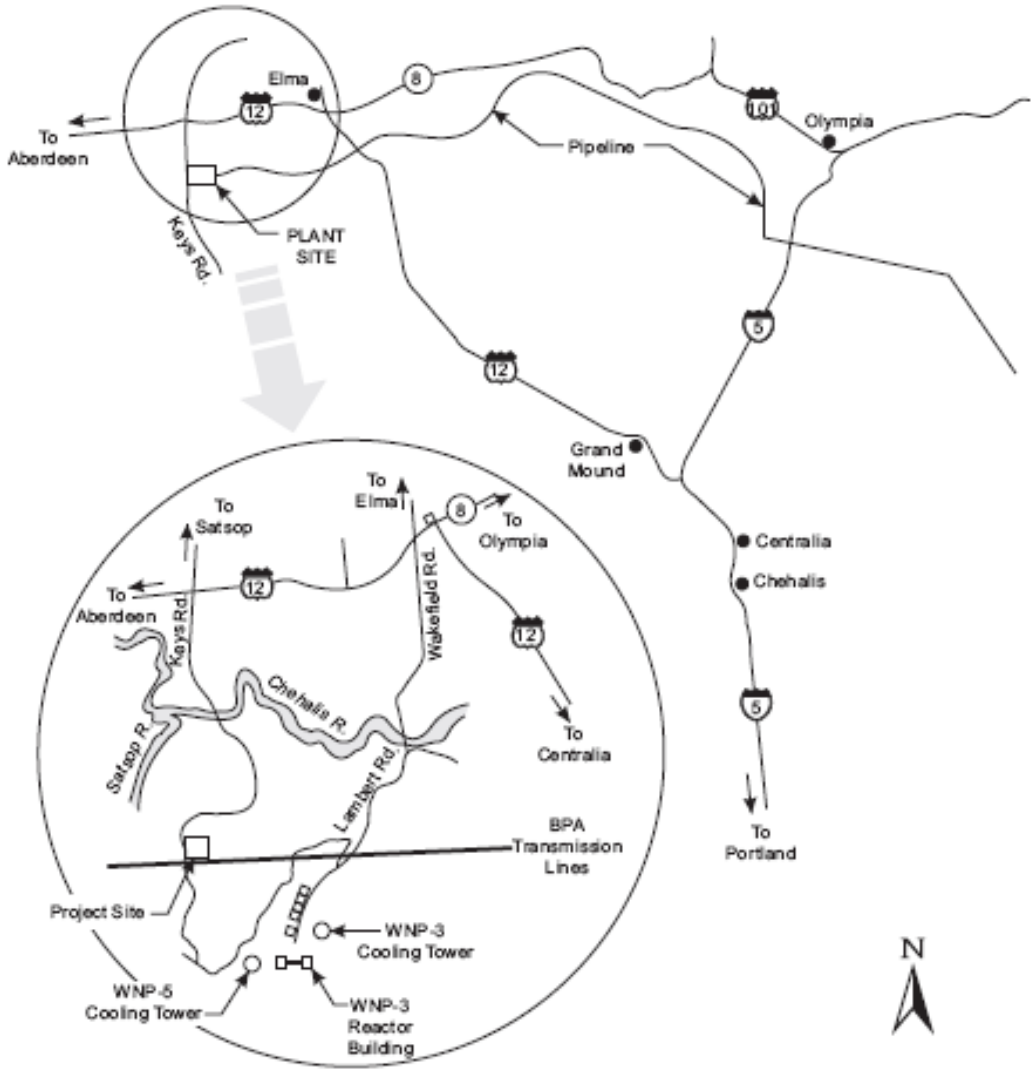
Figure 4.3-1 shows the major roadways in the area. SR 12 is the predominant highway serving the plant site. SR 12 is a four-lane divided highway providing east-west access that extends from Aberdeen on the west to its intersection with SR 8 near Elma, then southeasterly to connect with Interstate 5 (I-5) north of Centralia. SR 8 continues east from Elma until it becomes US Highway 101 and connects to I-5. South of SR 8, SR 12 continues as a two-lane highway with shoulders of varying widths. The posted speed limit on SR 12 is 60 mph in the Elma to Montesano area. SR 12 at the intersection with Keys Road provides dedicated left and right turn lanes in the eastbound direction, and a dedicated left turn lane in the westbound direction.

Keys Road is a two-lane minor collector county arterial providing direct connection to the plant site and proposed project site. Keys Road is 24 feet in width with shoulders of varying widths

(paved or gravel) and is stop sign controlled (two-way on Keys Road) at its intersection with SR 12. Keys Road at the intersection with SR 12 provides a dedicated right turn lane in the northbound direction, and a flared approach for right-turning southbound vehicles.

Access to the site is provided directly from Keys Road by an access driveway constructed within the site boundaries as part of the Grays Harbor Energy Center. The asphalt surface of Keys Road is in good condition, and the posted speed limit is 35 mph. The proposed plant site is located approximately 2.5 miles south of SR 12 along Keys Road.

Figure 4.3-1
Primary Roadways in the Project Area



The Wakefield Road corridor provides access to/from the project site from the east. Wakefield Road connects SR 12 to Keys Road via Lambert Road and is rated for heavy vehicles. Wakefield/Lambert Road is two lanes and the speed limit is 45 mph.

Review of existing traffic volumes at the intersection of SR 12 and Keys Road indicates that approximately 94 percent of the total entering traffic on SR 12 remains on SR 12, four percent exits to northbound Keys Road, and two percent exits to southbound Keys Road. Traffic on Keys Road approaching SR 12 distributes evenly to the east and west from either the north or south approaches.

Existing Traffic Volumes

Traffic volumes for the primary roadways in the project area for 2006 were obtained from the Washington State Department of Transportation *2006 Annual Traffic Report* (WSDOT 2006) and are presented on Figure 4.3-2. Forecasted 2008 volumes are based on historic average growth rates of approximately two percent per year between 1996 and 2006. Estimated 2008 pm peak traffic volumes for the intersection of SR 12 and Keys Road are presented in Figure 4.3-3. Traffic distributions were obtained from previous counts. Estimated 2008 volumes at this intersection are based on historic average growth rates of approximately one percent per year between 1993 and 2006 on SR 12 west of the interchange with SR 8.

Existing Levels of Service

The greatest delay to motorists in the project vicinity occurs during the pm peak hour. Delay for motorists at intersections is determined through calculation of level of service (LOS). Traffic operations at SR 12 and Keys Road were analyzed using *Highway Capacity Software Plus* (HCS+). HCS+ methodologies are based on the *Highway Capacity Manual* (TRB 2000). Level of service as defined in the *Highway Capacity Manual* is broken into several categories using a letter scale from A to F. LOS A represents little or no delay, whereas LOS F represents extreme delay. LOS E represents "capacity conditions" and LOS C or D represents the threshold for rural highway operations.

The LOS for unsignalized intersections is determined by the control delay experienced per vehicle. Control delay is defined as only that delay that is attributed to control measures such as traffic signals or stop signs. Table 4.3-1 presents LOS criteria for two-way stop controlled intersections as defined in the *Highway Capacity Manual*.

Using HCS+, LOS was determined for operations at the intersection of SR 12 and Keys Road for estimated 2008 traffic volumes (Table 4.3-2). All movements on SR 12 and the northbound right turn on Keys Road operate at LOS B or better.

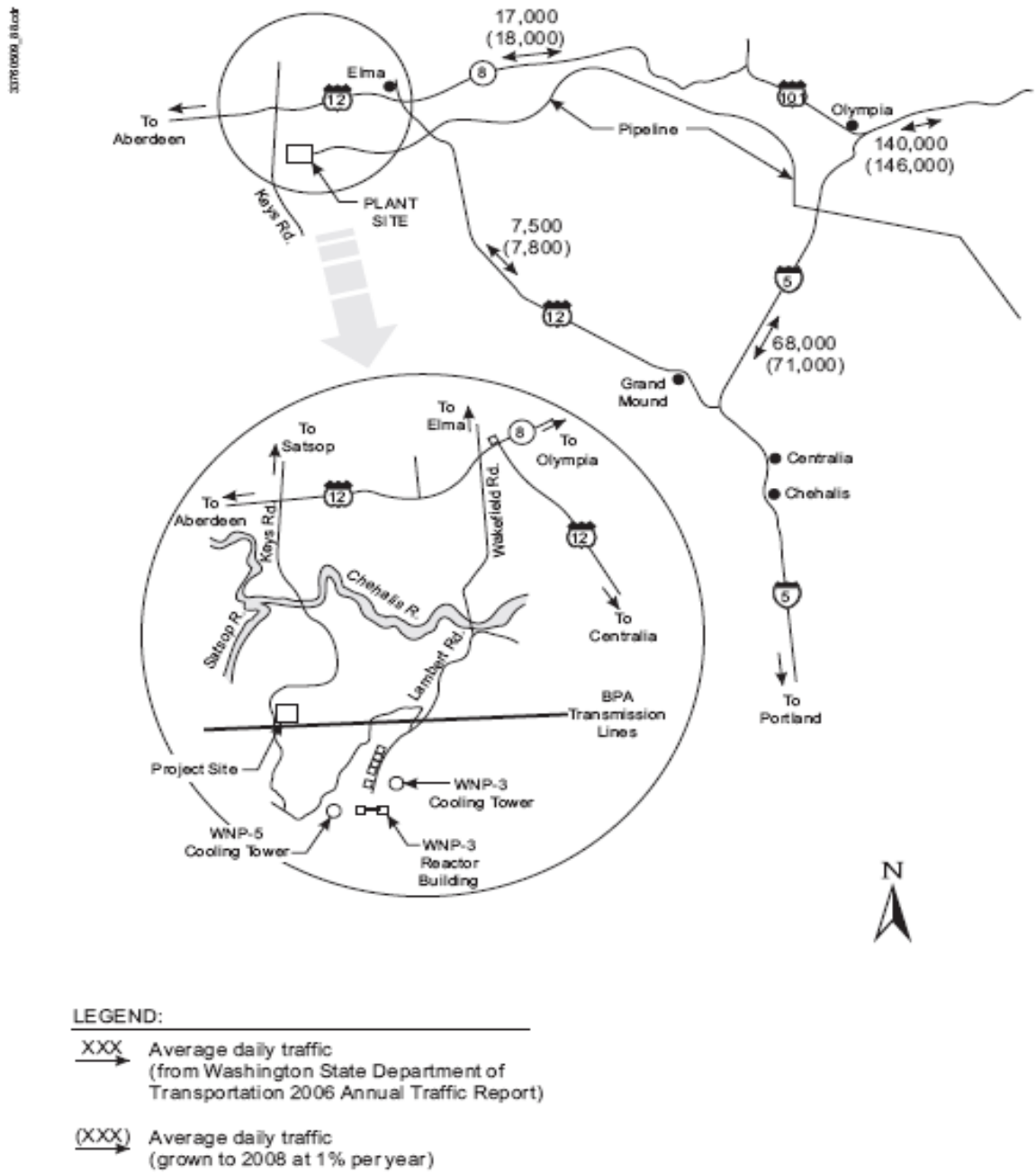
2008 traffic volumes during the pm peak hour at the intersection of SR 12 and Keys Road were already at or were approaching the operational threshold for LOS E on the northbound and southbound approaches to SR 12 on Keys Road.

The overall northbound approach is just above the minimum control delay operationally for LOS D, with approximately 29 seconds of control delay per vehicle. The northbound left turn is near

the maximum control delay, operating at LOS E with approximately 47 seconds of control delay per vehicle.

The southbound approach on Keys Road operates at LOS D with approximately 34 seconds of control delay per vehicle.

Figure 4.3-2 Existing Traffic Volumes

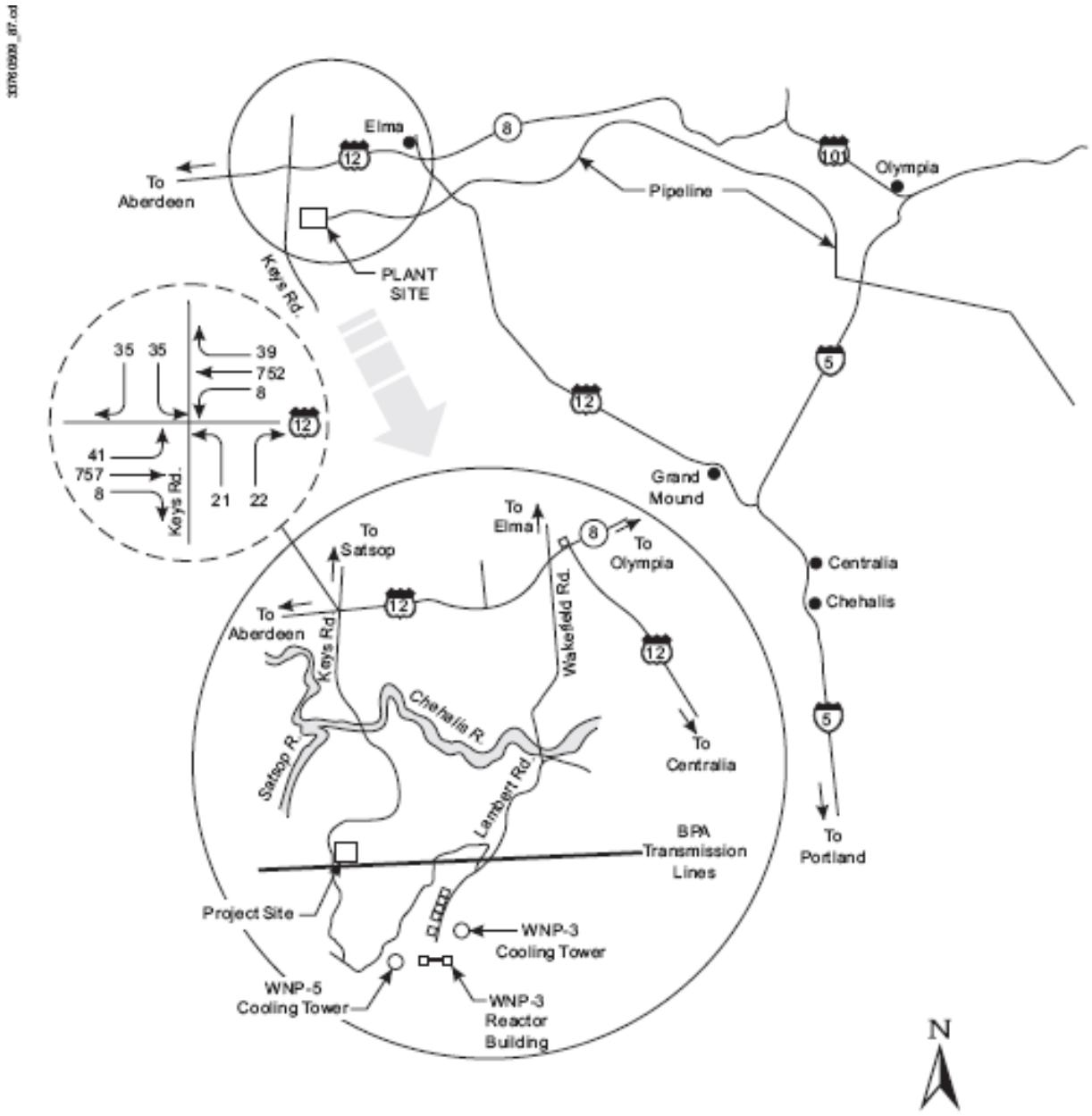


LEGEND:

XXX → Average daily traffic (from Washington State Department of Transportation 2006 Annual Traffic Report)

(XXX) → Average daily traffic (grown to 2008 at 1% per year)

Figure 4.3-3 Estimated 2008 PM Peak Traffic Volumes – SR 12 and Keys Road



LEGEND:

XXX → Estimated 2008 traffic volumes

Note: Estimated 2008 traffic volumes based on 1% per year growth over 2006 volumes.

TABLE 4.3-1
LEVEL OF SERVICE CRITERIA FOR TWO-WAY STOP-CONTROLLED INTERSECTIONS

Level of Service	Delay per Vehicle (seconds)	Expected Delay to Minor Street Traffic
A	< 10	Little or no delay
B	>10 and < 15	Short delay
C	>15 and < 25	Average delay
D	>25 and < 35	Long delay
E	>35 and < 50	Very long delay
F	>50	Extreme delay

Source: TRB (2000)

TABLE 4.3-2
EXISTING LOS AND CONTROL DELAY FOR SR 12 AND KEYS ROAD

Condition	Eastbound		Westbound		Northbound				Southbound			
	Left turn		Left turn		Left-turn		Right-turn		Left-turn		Right-turn	
	Control Delay[a]	LOS[b]	Control Delay[a]	LOS[b]	Control Delay[(b)]	LOS[b]	Control Delay[a]	LOS[b]	Control Delay[a]	LOS[b]	Control Delay[a]	LOS[b]
Existing 2008 (with Grays Harbor Energy Center operation)	10.1	B	9.6	A	47.3	E	11.2	B	33.9	D	33.9	D

a. Control Delay is measured in seconds per vehicle.
b. See Table 4.3-1 for LOS criteria.

Pedestrian Bicycle Facilities and Transit

The streets and highways serving the plant site have neither pedestrian nor bicycle facilities. Grays Harbor Transit Bus route 40 currently operates along SR 12, providing service between Hoquiam and Olympia. This route operates between 5:10 am and 8:25 pm in the eastbound direction, and between 6:15 am and 9:30 pm in the westbound direction on weekdays. Route 40 also operates between 8:00 am and 6:30 pm in the eastbound direction, and between 9:55 am and 8:20 pm in the westbound direction on weekends.

Intersection Improvements

Intersection improvements at SR 12 and Keys Road were implemented prior to construction of the Grays Harbor Energy Center. These improvements included dedicated left and right turn lanes on SR 12 in the eastbound direction, and a dedicated left turn lane on SR 12 in the westbound direction. The improvements also included a dedicated right turn lane on Keys Road in the northbound direction, and a flared approach for right turning vehicles in the southbound direction. These improvements were required prior to construction of the Grays Harbor Energy Center in an effort to reduce the number of accidents, and the delay to vehicles at the intersection of SR 12 and Keys Road.

Future Plans and Project

There is one project proposed in the project vicinity: a fish barrier is to be removed along SR 12 near Montesano (Nancy Thompson, personal communication). This project is proposed for the summer of 2011.

4.3.1.2 Impacts

Construction

Traffic estimates during construction of the additional two units include an approximate increase of 270 vehicles in the project vicinity during the pm peak hour. It is conservatively assumed for the purpose of analyses that all 270 vehicles would use the northbound approach to SR 12 on Keys Road. Under this assumption, operational analyses for the intersection of SR 12 and Keys Road indicate that LOS would degrade from D to F during the pm peak hour for both the northbound and southbound approaches to SR 12 on Keys Road. Without mitigation, unacceptable delays would result for left-turning vehicles at the northbound approach to SR 12 on Keys Road during the approximately two-year construction period.

The eastbound and westbound approaches to Keys Road on SR 12 and the northbound right turn movement would continue to operate at LOS B or better during construction of Units 3 and 4.

Operation

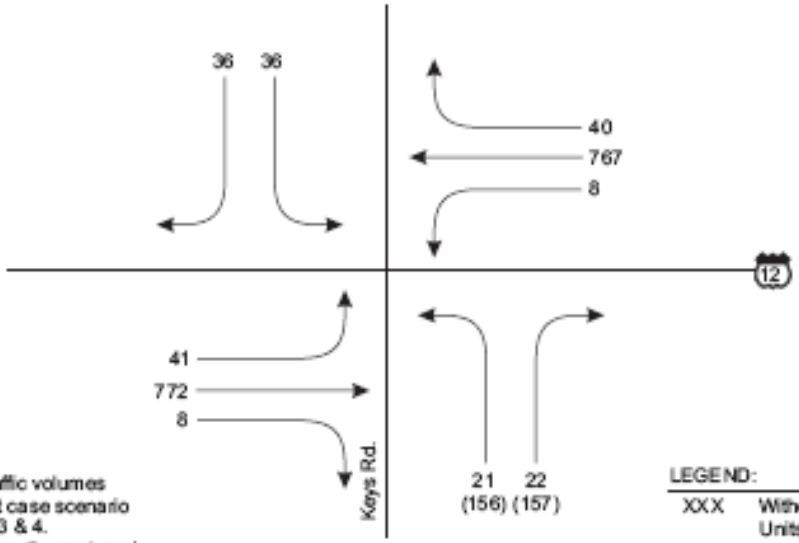
Traffic analyses for the operation of Units 3 and 4 only include those additional trips assumed to be associated with plant employees, and other services associated with the plant.

During operation of Units 3 and 4, an additional eight full-time employees will be required to be added to the existing staff of 23, for a total of 31 employees needed to operate all four units. Operation will involve two 12-hour shifts. For the purpose of determining a worst-case scenario, the operational analyses assumed that all trips would use the northbound approach to SR 12 on Keys Road. Estimated pm peak hour traffic volumes are shown on Figure 4.3-4.

Vehicles traveling on SR 12 on the approaches to Keys Road and northbound right turning vehicles on Keys Road would not experience noticeable changes in delay, or a change in LOS as a result of the operation of the Grays Harbor Energy Center. The eastbound and westbound approaches to Keys Road on SR 12 and the northbound right turn movement would continue to operate at LOS B or better (Table 4.3-3).

During project operation, estimated 2012 traffic volumes (including the eight additional employees) during the pm peak hour at the intersection of SR 12 and Keys Road would cause operations to degrade from 2008 existing conditions. Northbound left turning vehicles on Keys Road would experience an increase of approximately eight seconds of control delay per vehicle, and degradation in LOS from E to F. The overall northbound approach control delay would increase by approximately four seconds, with LOS remaining at D. Vehicles on the southbound approach to SR 12 on Keys Road would experience an increase of approximately four seconds of control delay per vehicle, and a degradation in LOS from D to E.

Estimated 2010 PM Peak Traffic Volumes During Construction of Units 3 & 4

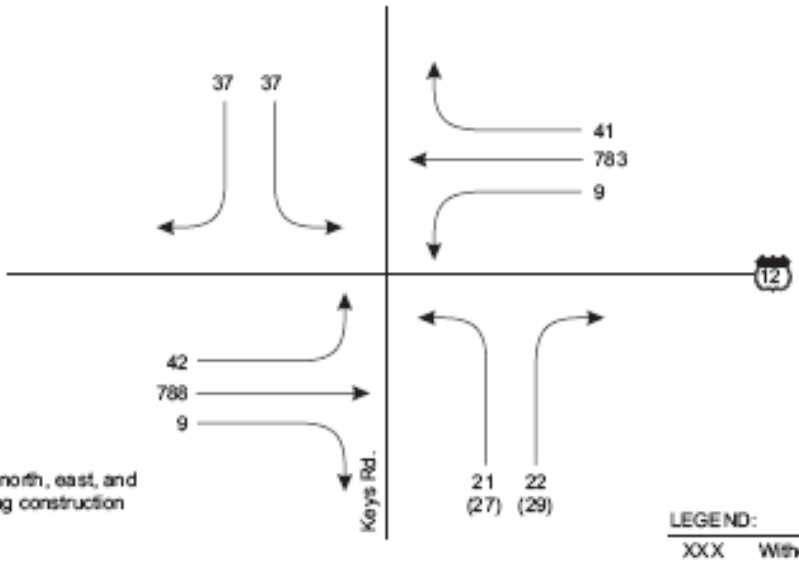


NOTE:
Estimated 2010 PM peak traffic volumes were used to show the worst case scenario during construction of Units 3 & 4. Approach volumes from the north, east, and west would not change during construction of Units 3 & 4.

LEGEND:

XXX	Without construction of Units 3 & 4
(XXX)	With construction of Units 3 & 4

Estimated 2012 PM Peak Traffic Volumes During Normal Operation of Units 3 & 4



NOTE:
Approach volumes from the north, east, and west would not change during construction of Units 3 & 4.

LEGEND:

XXX	Without traffic from normal operation of Units 3 & 4
(XXX)	During normal operation of Units 3 & 4

Figure 4.3-4
Estimated PM Peak Traffic Volumes – SR 12 and Keys Road

TABLE 4.3-3
EXISTING AND FUTURE LOS – SR 12 AND KEYS ROAD

Condition	Eastbound		Westbound		Northbound				Southbound			
	Left turn		Left turn		Left-turn		Right-turn		Left-turn		Right-turn	
	Control Delay[b]	LOS[a]	Control Delay[b]	LOS	Control Delay[b]	LOS	Control Delay[b]	LOS	Control Delay[b]	LOS	Control Delay[b]	LOS
Existing 2008 (with Grays Harbor Energy Center operation)	10.1	B	9.6	A	47.3	E	11.2	B	33.9	D	33.9	D
2010 During Construction of the additional two units (with Grays Harbor Energy Center operation)	10.1	B	9.7	A	1221.0	F	13.4	B	52.4	F	52.4	F
2012 During Operation of all 4 Units	10.2	B	9.8	A	57.0	F	11.5	B	39.2		39.2	E

a. See Table 4.3-1 for LOS criteria.
b. Control Delay is measured in seconds per vehicle.

During major maintenance projected to be required for the additional two units, an additional 50 people will be on site for approximately 28 days during the day shift. Maintenance-related traffic will not result in a reduction in LOS for the roads serving the site, provided that the majority of the maintenance staff does not leave the site and use the northbound approach to SR 12 on Keys Road during the pm peak hour. Adequate parking will be provided for both operations and major maintenance staff.

4.3.1.3 Mitigation Measures

Vehicular traffic during construction of the Units 3 and 4 will cause a degradation in LOS at the intersection of SR 12 and Keys Road during the pm peak hour. Prior to construction of the Grays Harbor Energy Center, a traffic management plan was submitted to EFSEC for review and was approved.

The traffic management plan approved for the Grays Harbor Energy Center also applies to construction of the additional two units. The main component of the traffic management plan included a recommendation to encourage the use of the Wakefield/Lambert corridor for site access and egress. It is recommended that vehicles traveling to/from the project site during construction of the additional two units and operation of the project use the Wakefield/Lambert corridor primarily, and avoid the intersection of SR 12 and Keys Road.

4.3.2 WATERBORNE, RAIL, AND AIR

4.3.2.1 Transport by Rail

The following description of planned rail and truck transport is based on known rail and roadway facilities and on estimates of the volume and number of shipments. The Certificate Holder will provide EFSEC with appropriate additional information as final transportation plans are developed.

A combination of rail and truck transport will be used to ship project-related equipment and materials from the manufacturers to the site. The equipment shipped by rail will include the CTG, STG, transformers, and the HRSG. The heaviest single load will be the HRSG modules, which will weigh approximately 221 tons each.

Items shipped by rail will be delivered to the existing Elma rail siding located approximately three miles northeast of the site. The existing facilities are adequate for project-related needs, and there is no need to develop additional rail access or rail facilities for the project. Shipment by rail will require approximately 25 to 30 railcars over a three- to six-month period (for materials to construct the additional two units). From the rail siding at Elma, heavy haulers will be contracted to deliver the items to the laydown area at the plant site using a route that follows SR 12 from Elma to Keys Road to the plant site, or using the Wakefield/Lambert corridor. These roads have the capacity to handle the size and weight of the trucked equipment and materials.

Trucks used for this transport will have the required number of axles to ensure compliance with highway and bridge design loading. The contracted hauling firms will be licensed to operate in the State of Washington and will be responsible for obtaining applicable permits and licenses.

4.3.2.2 Waterborne and Air Transport

Some construction materials or equipment may be delivered using the existing barge slip on the Chehalis River, and then trucked to the site. Construction of Units 3 and 4 will not require the use of air transport during construction or operation, with the possible exception of personnel transport on commercial flights and the use of commercial couriers that would use existing private or commercial flights for occasional small deliveries.

4.3.3 PARKING

4.3.3.1 Construction of Units 3 and 4

No parking will be permitted on the streets and roads serving the plant site. During construction of Units 3 and 4, parking will be made available on the 10-acre construction laydown area, or possibly through arrangements with the Satsop PDA to use the former construction laydown area located west of Keys Road. This large area was graveled and graded for use as a construction laydown area for nuclear projects WNP-3 and WNP-5. Approximately half of the area currently contains asphalt overlays. The laydown area has graveled internal roadways and access to and

from Keys Road. Assuming an occupancy rate of 1.1 workers per vehicle, and approximately 270 additional vehicles during construction of Units 3 and 4, the work force would require approximately 300 parking spaces. The existing construction laydown area is adequate to provide parking for construction vehicles, and laydown space for Units 3 and 4 construction.

4.3.3.2 Operation of Units 3 and 4

Parking will be provided at the plant site for the additional eight employees, totaling 31 employees needed to operate all four units of the Grays Harbor Energy Center.

4.3.4 MOVEMENT/CIRCULATION OF PEOPLE OR GOODS

Construction of the proposed project will result in temporary and minor delays in traffic movement during delivery of oversized or heavy loads. During operation, the project will not have a significant impact on the movement or circulation of people or goods.

During construction and operation, the public will not be permitted in the areas associated with the power plants, including the transmission line right-of-way.

4.3.5 HAZARDS

4.3.5.1 Hazards to Traffic

Contractors will prepare a traffic control and parking plan that describes procedures to be followed during construction of Units 3 and 4 and associated facilities. This document will outline standard procedures that will allow for a safe working environment during construction activities such as transporting heavy equipment along roadways, establishing detours, and the use of flaggers. Implementation of the procedures in this plan will ensure that construction will not cause hazards to existing traffic.

Intersection improvements at SR 12 and Keys Road were implemented prior to construction of the Grays Harbor Energy Center in an effort to reduce the number of accidents, and the delay to vehicles at the intersection of SR 12 and Keys Road. These improvements included dedicated left and right turn lanes on SR 12 in the eastbound direction, and a dedicated left turn lane on SR 12 in the westbound direction. The improvements also included a dedicated right turn lane on Keys Road in the northbound direction, and a flared approach for right turning vehicles in the southbound direction.

4.3.5.2 Fuel and Waste

Fuel Oil

The Grays Harbor Energy Center will continue to use natural gas only. Small amounts of fuel oil will be used for the backup generators and fire-water pumps.

Waste Products

The SCA for the Grays Harbor Energy Center stipulates waste management procedures in accordance with Washington State regulations. A Comprehensive Dangerous Waste Management Program fulfilling all applicable regulatory requirements is in place for the Grays Harbor Energy Center site. This includes procedures for waste designation, labeling, storage, handling and disposal procedures, record keeping, inspection, contingency planning, management oversight, and transportation. This program will be applied to Units 3 and 4.

Hazardous materials will be transported by a licensed hazardous waste transporter, and when appropriate, hazardous materials will be disposed of at an approved and licensed disposal facility.

SECTION 4.4 SOCIOECONOMIC IMPACTS (WAC 463-60-535)

This section analyzes the impact of the construction and operation of Units 3 and 4 on local socioeconomic resources. The section analyzes impacts to local population, work force, property values, housing, the local economy, health and safety facilities and services, and education facilities and services.

4.4.1 EXISTING CONDITIONS

The Grays Harbor Energy Center is located in Grays Harbor County in southwestern Washington.

4.4.1.1 Population

Demographic Characteristics

The project site is located in Grays Harbor County, Washington. In 2000, the population of Grays Harbor County was approximately 67,200 individuals, 1.1 percent of the statewide population of approximately 5.9 million (WSOFM 2001a). In 2009, the estimated population of Grays Harbor County remained approximately 1.1 percent of the statewide population; with Grays Harbor County and Washington State population estimates at approximately 71,200 and 6.7 million, respectively (WSOFM 2009). Table 4.4-1 shows the population distribution in Grays Harbor County, its incorporated and unincorporated communities, and in Washington State.

In 2000, approximately 62 percent of the Grays Harbor County population lived in incorporated areas and approximately 40 percent of the population was located within the County's central population area; which includes Aberdeen, Hoquiam, and Cosmopolis (Table 4.4-1). In 2009, it is estimated that approximately 60 percent of the Grays Harbor County population was located within incorporated areas and the Aberdeen/Hoquiam/Cosmoplis area consisted of approximately 38 percent of the Grays Harbor County population (WSOFM 2009).

Growth Trends

Washington State's population grew approximately 13 percent from 2000 to 2009. In comparison, the population of Grays Harbor County grew by approximately 6 percent. The Grays Harbor County population declined in the 1980s, largely due to a timber industry downturn and related economic slowing and has continued to lag behind the growth of the state overall.

TABLE 4.4-1
POPULATION DISTRIBUTION IN THE PROJECT VICINITY

Jurisdiction	2000 Population[a]	2007 Population[b]
Grays Harbor County	67,194	71,200
Unincorporated	25,578	28,205
Incorporated	41,616	42,995
Aberdeen	16,461	16,440
Cosmopolis	1,595	1,640
Elma	3,049	3,110
Hoquiam	9,097	8,765
McCleary	1,454	1,555
Montesano	3,312	3,565
Oakville	675	715
Ocean Shores	3,836	4,860
Westport	2,137	2,345
Washington State	5,894,121	6,668,200
Unincorporated	2,379,012	2,552,500
Incorporated	3,515,109	4,115,700

a. Source: WSOFM (2001a)
b. Source: WSOFM (2009)

Between 2009 and 2020, the state's population is expected to grow by an additional 15 percent (1,030,739 individuals). The Grays Harbor County projected growth rate for the same period (2009 to 2020) is was expected to be 9 percent (6,350 individuals).

4.4.1.2 Housing

In 2000, Grays Harbor County had over 32,000 housing units (1.3 percent of Washington State's housing units). The vacancy rate in Grays Harbor County (17 percent) was 10 percentage points higher than the State's rate of 7 percent (Table 4.4-2). More recent housing data will not be available until the completion of the 2010 census. An analysis of existing housing stock based on age and value was not performed because the project is not expected to have a significant impact on housing in the project area.

TABLE 4.4-2
HOUSING CHARACTERISTICS IN THE PROJECT VICINITY, 2000

Jurisdiction	Total Housing Units	Total Occupied Units	Vacancy Rates	Owner Occupied	Renter Occupied	Average Household Size
Grays Harbor County	32,489	26,808	17%	18,495	8,313	2.48
Washington State	2,451,075	2,271,398	7%	1,467,009	804,389	2.53

Source: WSOFM (2001a)

4.4.1.3 Employment and Income

Employment and income in Grays Harbor County indicate the health, character, and direction of the local economy and, to an extent, are a determining factor in the welfare and quality of life of area residents.

In 2008, non-agricultural employment was 23,812 in Grays Harbor County (Grays Harbor Economic Development Council 2009). In 2008, Grays Harbor County's employment was highest in government (25 percent of total employment), manufacturing (15 percent of total employment), and retail trade (11.5 percent of total employment). Approximately 17% of the jobs in Grays Harbor County are associated with the travel and tourism industry.

For 2008, the unemployment rate in Grays Harbor County averaged 8.3% in comparison to Washington's average of 5.5% (Grays Harbor Economic Development Council 2009).

In 2008, the median household income in Grays Harbor County of $43,199 was approximately 72 percent of Washington State's median household income of $60,010. According to the Grays Harbor Demographic Profile, published in May 2009 by the Grays Harbor Economic Development Council, the average wage for all industries for 2008 was $32,520 per year. The highest wages were in manufacturing ($43,611) and wholesale trade ($41, 697).

4.4.1.4 Public Services and Utilties

Fire

The plant site lies within the boundaries of Grays Harbor County Fire Prevention District #5 - Porter/Bush Creek/Satsop. These fire stations are relatively small, and are staffed by volunteer fire fighters. Table 4.4-3 presents data on the fire protection districts and departments that exist in the project vicinity. The existing emergency response plans will continue to be implemented during operation to protect plant employees and structures in emergency situations. (See Section 4.1.6, Emergency Plans).

Police

Five separate law enforcement agencies provide police protection to communities in the project vicinity. Unincorporated regions in Grays Harbor County are served by the Grays Harbor County Sheriff's Department. The nearby cities of Montesano, Elma, and McCleary are each served by separate municipal police departments. The nearby community of Satsop does not have its own police department, and is served by the Grays Harbor County Sheriff's Department. District #8 of the Washington State Patrol provides police services along SR 8, SR 12, and other state highways in the project vicinity. In addition, security will be provided by contract service during construction of the project.

Emergency Medical Services

Emergency medical services are provided in the project vicinity by primary response ambulance units and area hospitals. In most cases, ambulance units are operated through local fire departments. Ambulance service providers in the vicinity of the project are listed in Table 4.4-4.

TABLE 4.4-3
FIRE DEPARTMENTS IN THE PROJECT VICINITY

Fire Department	Paid Full-Time Personnel	Volunteer Personnel	Equipment	Protection Class[a]
Grays Harbor County FPD #5 - Porter/Elma/Satsop	55	47	2 - 1,000 gal. Pumper 1 - 750 gal. Pumper 1 - 3,000 gal. Tanker 1 - 2,000 gal. Tanker 1 - 1,500 gal. Tanker 1 - Utility Van	8
Montesano Fire Department	5	38	2 - 750 gal. Pumpers 1 - 75' Aerial with 500 g tank 1 - 2,500 gal. Tanker with 500 g pumps 1 - Rescue Vehicle 2 - Ambulances 1 - Aid Car 1 - Staff Vehicle	5
Elma Fire Department	0	25	1 - 750 gal. Pumper 1 - 500 gal. Pumper 1 - 2,000 gal. Tender 1 - Rescue Vehicle 1 - Command Vehicle	6
Grays Harbor County FPD #12 - McCleary/McCleary Fire Department	0	25	1 - 850 gal. Pumper 1 - 500 gal. Pumper 1 - 1,500 gal. Tanker 1 - 1,250 gal. Tankers	8

Fire Department	Paid Full-Time Personnel	Volunteer Personnel	Equipment	Protection Class[a]
Grays Harbor County FPD #2 - Wynochee/Central Park/Brady/outlying Montesano area	3?	45	3 - 1,000 gal. Pumpers 1 - 2,850 gal. Tender 1 - 2,500 gal. Tender 1 - 1,500 gal. Pumper 2 - Aid Car 1 - Utility Van 1 - Command Vehicle 1 – Water Rescue Trailer	8

Sources: Larry Willis, Steve Crass, Chris Brown, Tom Wilder, personal communications

a. As rated by the Washington Surveying and Rating Bureau in 2001. Fire district protection class ratings are used to evaluate fire protection availability for insurance purposes and are assessed to all municipal and rural areas by the Washington Surveying and Rating Bureau. Ratings range from 1 to 10, with class 1 representing the highest level of fire protection and class 10 the lowest level. A class 1 rating is rarely achieved. Ratings are based on the available water supply; the logistical characteristics and makeup of the district fire department; the available communications systems; and the fire control/safety measures taken and ordinances in effect in the particular fire district. Adequacy of fire protection indicated by the rating depends on the type of area rated. A rating of 8 or 9 is typical for a rural area. This low rating is usually due to the fact that standard fire hydrant service, required in more urban areas, is not available, and rural volunteer fire departments do not have full-time staff or formally equipped fire stations and facilities. The situation is further aggravated by access problems and reliance on volunteers who often must travel long distances to respond to calls, which leads to long response times and limited fire-fighting ability. A rating of 8 or above does not necessarily mean that fire protection is inadequate. It indicates that according to the standards of fire protection services, set up primarily for municipalities, an area lacks some of the conventional means of fire protection.

TABLE 4.4-4
AMBULANCE SERVICE PROVIDERS
IN THE PROJECT VICINITY

Name	Ownership	Level of Care
Montesano Ambulance Service	Public	ALS and BLS
East Grays Harbor Medic One	Public	ALS and BLS

Source: Jean Jones, personal communication
ALS – Advanced Life Support
BLS – Basic Life Support

Hospitals near the project area are located in Aberdeen, McCleary, and Olympia. Mark Reed Hospital in McCleary and Grays Harbor Community Hospital in Aberdeen are the closest hospitals to the Grays Harbor Energy Center site. Mark Reed Hospital is approximately 12 miles northeast of the Grays Harbor Energy Center. Grays Harbor Community Hospital is approximately 17 miles west of the Grays Harbor Energy Center site. Capitol Medical Center and Saint Peter Hospital, both in Olympia, are approximately 29 miles east of the Grays Harbor Energy Center site. Further information on these hospitals is presented in Table 4.4-5.

TABLE 4.4-5
HOSPITALS IN THE PROJECT VICINITY

County	Name	Location	No. of Beds
Grays Harbor	Grays Harbor Community Hospital	915 Anderson Dr., Aberdeen	150
	Mark Reed Hospital	322 S. Birch St., McCleary	24
Thurston	Capital Medical Center	3900 Capital Mall Dr. S.W., Olympia	119
	Providence Saint Peter Hospital	413 N. Lilly Road N.E., Olympia	390

Data from personal communications with hospital desk clerks or hospital web sites, October 31, 2001.

4.4.1.5 Schools

There are several schools and educational facilities in the project vicinity. Information on public school districts located close to the project is presented in Table 4.4-6. None of the individual school buildings in these districts is located directly adjacent to the proposed project. In addition to these public schools, there are also several private elementary and secondary schools in the project vicinity. Many of these private schools are affiliated with church or religious organizations. Higher education is available in the project corridor vicinity from Grays Harbor Community College in Aberdeen, and from South Puget Sound Community College, Evergreen State College, and Saint Martin's College in Thurston County. The closest schools to the Grays Harbor Energy Center site are in the Montesano, Satsop, Elma, and McCleary School Districts. Existing capacity for these districts is shown in Table 4.4-6.

4.4.1.6 Parks and Recreational

Parks and other recreational facilities are described in Section 4.2, Land and Shoreline Use, WAC 463-60-362.

TABLE 4.4-6
SCHOOL DISTRICTS IN THE PROJECT VICINITY

County	School District	2008–2009 Enrollment[a]	Capacity[b]	Excess Capacity
Grays Harbor	Montesano #66	1,360	1,819	459
	Satsop #104	52	104	52
	Elma #68	1,779	1,845	66
	McCleary #65	268	325	57

a. Source: WOSPI (2008)
b. Data from personal communications with individual school districts (November 5 to 7, 2001)

4.4.1.7 Maintenance

For the purposes of this document, maintenance is defined as the costs, in money and manpower, required for the upkeep of public facilities. This upkeep is often necessary for these facilities to continue providing services to the public into the future. Facilities such as roads, sidewalks, water and sewer mains, bicycle paths, and park benches, all come under the umbrella of public facilities that would require periodic maintenance. Many public agencies, such as counties and cities, have established plans that dictate when, for instance, a road should be resurfaced, or playground facilities should be replaced. These plans often tie into public budgets, thereby allocating funds obtained from taxpayers for the necessary public facility maintenance or improvements. Such plans are sometimes enforced with varying degrees of rigidity, being influenced by a variety of factors, some of which could be the actual need for facility improvement, budget and economic fluctuations, and changing public needs and interests. To facilitate the prudent handling of public funds, several layers of administrative review are often involved in the maintenance planning process. During this planning stage, public agencies generally inspect the facilities over which they have jurisdiction, determine the relative maintenance needs, and then rank these facility maintenance needs with other potential uses for public funds based on an established list of criteria. Maintenance projects determined to have the highest priority would then receive the necessary funding and administrative go ahead. Other projects, deemed less critical, could then receive consideration after high priority projects are completed.

Maintenance plans and schedules are frequently influenced by outside forces, which may damage or in some way render inadequate certain public facilities. Such forces could be sudden population growth, new facility construction, and even natural disasters. In order to fairly assign the payment responsibility for maintenance beyond regular periodic upkeep, public agencies use a variety of widely accepted methods. Obviously, as in the case of natural disasters, there can be times when no party can be deemed as being responsible. However, when such a responsible party can be determined, some agencies might choose to assess mitigation fees to that party. Other agencies opt to make an agreement with such a responsible party, to grant a permit for their action only if the facility that would be damaged or rendered inadequate were replaced or reproduced in another location, at the responsible party's expense. Whichever method is used, the justification is usually the same: the responsible party caused the situation requiring the additional cost, and they should therefore be responsible for covering that cost.

The Public Works department has, as part of regular operations, maintenance programs for the public facilities for which they are responsible. These programs provide for regular inspection of public facilities in general, and maintenance and repair on an as-needed basis.

4.4.1.8 Communications

Telephone service to the Grays Harbor Energy site, Satsop Development Park, and adjacent residential neighborhoods is provided by CenturyTel.

4.4.1.9 Water/Stormwater

The existing water system and the existing stormwater control systems are discussed in Section 2.5, Water Supply System, WAC 463-60-165; Section 2.10, Surface Water Runoff, WAC 463-60-215; and Section 3.3, Water, WAC 463-60-322.

4.4.1.10 Sewer/Solid Waste

The Grays Harbor Energy Center site is not served by a sewer system. The Grays Harbor Energy Center will continue to use septic systems and leach fields for sanitary waste.

A solid waste contractor removes solid waste from the site for disposal at an approved and regulated landfill.

4.4.2 IMPACTS

Impacts to the local socioeconomic environment attributable to Units 3 and 4 would include increased local employment and associated income, spending for local services and materials, and tax revenues. Impacts were estimated by reviewing the components of the construction and operation of Units 3 and 4 and comparing the impacts to existing conditions.

Potential socioeconomic impacts on population, housing, and property values that would be attributable to the additional two units are broken down between the construction impacts and operation impacts.

4.4.2.1 Construction

Local Economy

The construction of Units 3 and 4 would have beneficial impacts on the local socioeconomic environment of Grays Harbor and Thurston Counties, including additional employment and associated income and spending at local merchants' establishments.

The construction period would potentially begin in August 2010, depending on acquisition of permitting approvals and power offtake contracts, and would last approximately 22 months (through June 2012). Peak construction employment would occur from August 2010 through March 2012, assuming an August 2010 construction start date. The construction work force would consist of boilermakers, carpenters, cement masons, electricians, insulators, ironworkers,

laborers, millwrights, operating engineers, painters, and pipefitters, in addition to non-craft staff. Table 2.12-1 in Section 2.12 shows the breakdown between the craft and non-craft work force. Figure 2.12-2 in Section 2.12 shows the total construction work force on site by month.

To ensure that the construction work force originates from the local labor pool to the extent possible, the Certificate Holder would require construction contractors to advertise positions locally and to hire local workers where practicable and possible. Although some construction skills are specialized and might not be available within the local or state labor pools, hiring priority for construction would be given to qualified local and in-state construction workers. Therefore, most of the construction work force would probably come from inside the state of Washington

The influx of the out-of-area construction workers into communities near the project site would generate additional spending and business activity for temporary housing establishments such as hotels and motels, recreational vehicle parks, and campgrounds. Other service providers and retailers such as gas stations and food stores/restaurants would experience an increase in revenues during the construction phase due to construction workers' spending during the day. Many of the purchases and rental of required construction materials and equipment also would be made locally, thus generating additional revenue for local suppliers.

Total construction employment would account for approximately $22 million in pre-tax wages and salaries (labor income). With much of the construction labor expected to come from local sources, it is expected that a large portion of the wages and salaries earned during construction would be spent locally, or in other parts of the state.

Local non-salary expenditures associated with construction are expected to total about $28 million, with about $20 million for materials and supplies and about $8 million for subcontracted services. These expenditures would likely occur within a radius of approximately 50 miles from the site. The remainder of the construction cost would likely be spent outside the state on high capital cost items such as turbine generators, HRSGs, and civil and mechanical structures. Project-related expenditures would generate sales taxes during construction, with a portion paid as Washington State and local sales taxes. These positive impacts to Grays Harbor County would be temporary, lasting until construction is complete.

Population and Housing

Up to 20 percent of the construction work force (approximately 100 workers, measured during the peak month) would be from outside of the local area. The presence of 100 workers is a "worst-case" scenario because the number 100 is based on the peak number of workers, and some percentage of the 100 non-local workers would likely continue to reside in their permanent residence and commute daily throughout the construction period. A small percentage of these 100 workers could bring their families with them while working on the project, and would commute daily from their new, temporary residence. However, most of these workers are expected to live in western Washington and would likely commute on a weekly basis.[4] A

[4] Weekly commuters would drive to the job site on Monday morning, stay in nearby temporary housing during the week, and return home on Friday evening.

temporary increase in population would occur in the local area during the week due to the construction work force.

As described in the recreation portion of Section 4.2, Land and Shoreline Use, WAC 463-60-362, the use of recreation facilities by construction workers would be temporary and is not expected to result in a significant impact. Housing vacancy rates in Grays Harbor County are 17 percent, indicating that sufficient housing is available in the general area for the portion of the non-local construction work force that could choose to live in permanent housing. Workers could find temporary housing in Montesano, Satsop, Elma, and McCleary, as well as in the Aberdeen-Hoquiam area and the Olympia-Tumwater area. Due to 1) the large number of recreational facilities and the availability of sufficient housing in the general area, 2) the relatively low number of construction workers from outside the local area that would seek temporary housing, and 3) the relatively short seven-month period of peak construction, construction of the proposed project is not expected to result in a significant impact on housing. Furthermore, Units 3 and 4 would be constructed on an existing plant site and would not displace or directly affect surrounding residences.

Property Values

The potential for long-term impacts on property values is addressed below in Section 4.4.2.2, Operation. Construction activities may result in a temporary and minor impact on property values for property owners attempting to sell property located in the vicinity of the plant site during the peak periods of construction. However, the impact on property values in the area would be temporary and is expected to be minor.

Public Services and Utilities

Because no extensive demand on any public service or utility is anticipated, and a traffic control plan will be implemented, the overall impact to the public services and utilities is expected to be minor and short-term. Impacts were determined through a detailed review of the proposed additional units against existing conditions and a subjective assessment based on professional experience with other similar projects.

A portion of the construction work crew is expected to come from out-of-state areas, and the influx of construction workers into neighboring communities will result in a minor and temporary increase in the demand placed on local public service providers. This demand increase will have a minor and temporary effect on local police departments, providers of emergency medical services, and local fire departments. The impact of project construction on local schools would be at most minor and temporary, as few out-of-state construction workers are expected to be accompanied by families.

Construction is not expected to create any additional maintenance needs for public facilities. During construction, trucks would use county roads to reach the site and pipeline corridor locations. Grays Harbor County does not have a specific schedule for making repairs to local roads. Repairs are done on an as-needed basis determined by local inspections. Construction traffic is not expected to damage the local road system. If such damage occurs, the applicant

would either repair the damage or provide funds to the local Public Works Department to repair the damage.

Section 4.2, Land and Shoreline Use, WAC 463-60-362, addresses the potential for impacts on parks and other recreational facilities. As described in that section, construction and operation of Units 3 and 4 will not result in a significant impact on recreational facilities.

No significant adverse impacts to local communication, potable water, sanitary sewer, or solid waste collection systems are anticipated.

In summary, due to the short duration of the project's construction phase and the relatively small size of the proposed construction crew, the overall adverse impact on local public services and utilities caused by construction is not expected to be significant.

4.4.2.2 Operation

Local Economy

Operation of the proposed Units 3 and 4 would result in a positive economic impact to Grays Harbor County and the state due to increased tax revenues, employment, and local expenditures. The Grays Harbor Energy Center is currently assessed at approximately $337 million. After completion of construction of Units 3 and 4, the value of the Grays Harbor Energy Center would be over $500 million. Operation of the proposed Units 3 and 4 would involve approximately eight additional employees working two 12-hour shifts, with a maximum of 31 employees working on site at any time. The operational labor force would include the following positions: plant manager, operations supervisor/engineer, control operators, auxiliary operators, maintenance supervisor, mechanical and electrical technicians, and clerks. Efforts would be made to hire local individuals to staff the project as much as practicable.

The plant would require periodic maintenance and a scheduled major maintenance outage during the sixth year of operation. During maintenance outage, 20 to 50 additional workers would be on site for 28 days during the day shift. Thus, the presence of additional on-site daytime employment (maintenance crews) would increase local spending during this period.

Total operating and maintenance costs for the four units would be approximately $40 million per year. Of this, about $3 million per year would be in salaries and wages. Generating and Business and Occupation taxes are expected to total approximately $2 million per year.

Population and Housing

Operation of Units 3 and 4 would require adding approximately eight employees to the existing Grays Harbor Energy Center staff of 23, for a total of 31 employees. Efforts would be made to hire local individuals to staff the project as much as practicable. Operation employees would likely choose to reside in various areas from Aberdeen to Olympia, based on an approximately 40-minute drive to work. Even if all eight additional employees come from outside of the local area, and they all bring families (8×2.5 persons per household = 20), the potential impact area is sufficiently large (with a population of over 67,200 and over 5,500 estimated available housing

units) that the operation of Units 3 and 4 would not have an adverse impact on population or housing in the area (WSOFM 2001c). The number of vacant housing units was estimated by applying the vacancy rate (1 – occupancy rate = vacancy rate) to the number of housing units.

Property Values

The values of homes near the Satsop Development Park property have been affected by the nearby nuclear power plants and related facilities. The values of homes nearest the proposed plant site have been affected by three major conditions: 1) the presence of the BPA transmission line right-of-way, which is adjacent to many of the residences and includes two rows of steel transmission towers and a row of wooden power poles; 2) the presence of the construction laydown area for the nuclear plants—an area that includes steel buildings, graveled storage areas, chain link fencing, and stockpiled materials; and 3) the presence of the nuclear plants, cooling towers, and associated facilities approximately 1 mile southeast. In addition, property values have been influenced by Grays Harbor County's growth plans that include use of the Satsop Development Park property for commercial and industrial development.

As a result of the existing influences on the value of homes and property in the vicinity of the Grays Harbor Energy Center site, it is unlikely that adding two units would result in a significant impact on property values.

Public Services and Utilities

Operation of the Grays Harbor Energy Center will not have a significant adverse impact on existing public services in the project vicinity. Grays Harbor Energy staff will receive appropriate training in handling on-site emergencies, including fire and medical, and will provide the first line of response. As part of the Grays Harbor Energy Center construction, the Certificate Holder initiated consultation with the local fire departments concerning training, equipment and plant familiarity. This consultation will be expanded to include Units 3 and 4.

Because there will be a relatively small staff operating the Grays Harbor Energy facility, no effect on schools in the project vicinity is expected.

The Grays Harbor Energy Center will include a septic system and leach field for each plant. These will be constructed and operated in accordance with applicable regulations and will not affect the existing septic systems.

Operation of the proposed project would result in a positive economic impact to Grays Harbor County and the state due to increased tax revenues, employment, and local expenditures. A portion of these funds may be used to upgrade existing public services and utilities.