3.14 UTILITIES

This section analyzes potential impacts to water, sanitary sewer, electrical and natural gas service under the EIS Alternatives and identifies utility requirements to serve the New Whatcom redevelopment. Stormwater management system impacts are not included in this section; they are discussed in Section 3.3, **Water Resources**. Background information for this section is contained in **Appendix O**, *Utilities Technical Report*, prepared by David Evans and Associates (DEA).

3.14.1 Affected Environment

Water

The City of Bellingham Public Works (Public Works) Department provides water service to customers in the City of Bellingham (City). Public Works supplies drinking water from Lake Whatcom, located on the east side of the City. In order to augment water supplies in Lake Whatcom, a dam, tunnel and pipeline were constructed on the Middle Fork of the Nooksack River in 1960. The City has a Certificate of Water Right for withdrawal of 125 cubic feet per second (cfs) from the Middle Fork of the Nooksack River and a Certificate of Water Right for storage of approximately 20,000 acre feet of water in Lake Whatcom. The water system is separated into 11 pressure zones served by 14 reservoirs and 12 pump stations. The distribution system consists of approximately 377 miles of City-maintained pipeline. The 2006 Bellingham Capital Facilities Plan (part of the City's adopted 2006 Comprehensive Plan) indicates that the City has adopted and will implement a long-term improvement program designed to adequately accommodate the City's projected population increase to approximately 113,000 and an increase water demand of 17.0 million gallons per day (MGD) by 2022[1]. The average daily water demand in 2002 was 11 MGD and serviced a population of 81,454 people.

The Pressure Zone for the New Whatcom site is elevation 276 feet. The site is at one of the lowest elevations in the zone and thereby receives the maximum water pressure in the zone. Two separate water systems (potable water and untreated or raw water) exist and provide service to the site. The untreated water was used by Georgia-Pacific for pulp mill operations and is currently used by the Puget Sound Energy Encogen (Encogen) facility for industrial process water.

Redevelopment Area 1

Two 16-inch mains along C and F Street, east of Roeder Avenue, provide potable water service to Area 1. The F Street main crosses to the west side of Roeder Avenue and tees to a 10-inch main and a 16-inch main. The 16-inch main continues north to Hilton Avenue. At Hilton Avenue, an 8-inch pipe ties into the Roeder Avenue main and extends the full length of Hilton Avenue. The 10-inch main at the F Street and Roeder Avenue intersection continues east to the end of F Street. The F Street and Hilton Avenue mains currently provide potable water and fire flow to Georgia-Pacific's Tissue Warehouse, Bornstein Seafood, and other businesses located along Hilton Avenue, F Street, and the portion of Roeder Avenue between these two streets. The F Street water system is looped to C Street utilizing the 10-inch Tissue Warehouse main and an eight-inch main connecting to C Street's eight-inch main.

[1] City of Bellingham Capital Facilities Planning Year Horizon

The C Street 16-inch main east of Roeder Avenue continues to the west side of Roeder Avenue then turns south across the Roeder Avenue bridge. At the west side of Roeder Avenue at C Street, an eight-inch pipe continues west approximately 300 feet where it ties into the eight-inch main from the Tissue Warehouse. West of this tie-in point, a six-inch water main provides potable water and fire flow to the businesses along the west end of C Street.

Redevelopment Areas 2-9

Two mains provide potable and raw water service to the east side of this area (Areas 2, 3, 4, 5 and 6). The raw water previously used by Georgia-Pacific and currently used by the Encogen facilities is chlorinated by the City to prevent fouling but is not treated to drinking water standards. This water is supplied by a 48-inch main extending along the east side of Chestnut Street entering the site at Bay Street. Upon entering the site, the main is split, sending water to both the Georgia-Pacific (Area 2, 3) and the Encogen (Area 6) sites. The Encogen main continues to Cornwall Avenue where a 16-inch diameter pipe re-enters the Georgia-Pacific site at Laurel Street to provide fire flow to Georgia-Pacific operations (Areas 2, 3, 4 and 5).

A 24-inch potable water main extends north-south along the east side of the site on Chestnut Street and connects with a 16-inch diameter pipe that extends southwest along Cornwall Avenue. At the Laurel Street intersection the main tees and enters the Georgia-Pacific facility providing potable water to this area. The Cornwall main reduces down to a 12-inch diameter and continues west to the Bellingham Shipping Terminal (BST). Two 12-inch mains enter the BST along Beal Memorial Way (east side) and Pine Street (west side) providing both potable water and fire flow to Areas 8 and 9.

Redevelopment Area 10

Water service in this area is limited to a water line that extends to the building at 100 West Pine Street in the northern portion of this area. Historically there was water service to other buildings in Area 10, provided by a water main on the west side of the railroad tracks. This main has since been abandoned after being damaged by a freeze condition in the past.

Sanitary Sewer

The City of Bellingham Public Works Department also provides sewer service to customers in the City. This sewer system consists of 250 miles of sewer mains and 25 miles of sewer trunks using 25 pump stations which then transport sanitary sewer to the City's wastewater treatment facility. The Post Point Pollution Control Plant has a capacity to provide primary treatment for up to 18 MGD. In 1993, a secondary high purity oxygen treatment facility was added to the City's sewer infrastructure. The 1993 expansion provided the City with an overall treatment capacity of 55 MGD. In 2004, the average flow generated was about 12 MGD or 150 gallons per person per day and served a population of 71,080 people[2]. The 2006 Capital Facilities Plan indicates that the sewer capacity is projected to adequately support the City's projected population of 113,055 in the year 2022. All treated water is discharged from the plant through a deep water pipe to an outfall in Bellingham Bay.

[2] Washington State Office of Financial Management

Redevelopment Area 1

Sewer service is provided at the north portion of the site by a gravity pipe installed in 1973 along Hilton Avenue which discharges east into a small pump station at the intersection of Roeder Avenue and Hilton Avenue. The 8-inch PVC pipe along the south side of Hilton Avenue currently provides sewer service to 12 on-site domestic users. A 10-inch concrete pipe along the north side of C Street currently provides sewer service for 11 on-site domestic users and also discharges into the pump station. The pump station discharges through a six-inch diameter force main into the City's sewer interceptor line at the Roeder Avenue intersection.

The C Street Combined Sewer Overflow (CSO) is a wastewater gravity pipe that conveys both sewage and stormwater in Area 1 and the surrounding vicinity to the City's treatment facility. However, in the event of a severe rainfall, the CSO can release wastewater directly to the Bay through the stormwater outfall at the west end of C Street. If the influent rate at the City's Oak Street Pump Station exceeds the station's hydraulic lift capacity of 58-60 MGD, the sanitary sewer can overflow to Bellingham Bay. According to the City's NPDES permit with the Washington State Department of Ecology, the City is allowed one overflow event per year.

Redevelopment Areas 2-9

Sanitary sewage from on-site buildings in Areas 2, 3, 4, and 5 is routed through small gravity systems to onsite pump stations. The collective discharge from these pump stations is believed to be a force main that discharges to the manhole along the City interceptor trunk line located at the intersection of Cornwall Avenue and Laurel Street. Sanitary service to the BST (Areas 8 and 9) is provided by a 10-inch concrete pipe installed in 1968 on the west side of Beal Memorial Way. This pipe currently provides service to two on-site domestic users and gravity flows to the Pine Street Pump Station and then on to the Oak Street Pump Station.

The City's interceptor trunk line conveys sanitary flow south along Roeder Avenue to Cornwall Avenue (along the east and south boundary of the site) to the City's Oak Street Pump Station near the southwest end of the site area. The 60-inch concrete pipe was installed in 1973 and can become pressurized under high flow conditions. Due to the size and operating condition of the pipe, the City carefully regulates connections to the interceptor and limits them to existing 8-inch diameter tie-in tees installed at 200 ft. to 300 ft. intervals.

Industrial wastewater from the Encogen facility is pumped to the Georgia Pacific portion of the site where it is combined with GP industrial effluent and is pumped to the Aerated Stabilization Basin (ASB) on the north side of the waterway. The ASB was built by Georgia-Pacific to provide secondary treatment of pulp and tissue mill wastewaters in compliance with the Clean Water Act. The *Whatcom Waterway Cleanup Action Plan* identified cleanup actions for various areas in or near the Whatcom Waterway, including the ASB. Discharge to the ASB will be terminated in the near future as part of the Port's agreement with Georgia-Pacific and will be remediated per the *Whatcom Waterway Cleanup Action Plan (2007)*.

Redevelopment Area 10

Sanitary sewer in this area is limited to a sewer line that extends to the building at 100 West Pine Street in the northern portion of this area. There is no other known public sanitary sewer service in this area of the site.

Electricity

Puget Sound Energy (PSE) provides electricity to the City via 14 distribution substations (<55,000 volts) and two transmission substations (>55 Kv). The site contains three electrical substations: the first is located in Area 1 on Roeder Avenue between F Street and E Street; the second is in the middle of Area 3, adjacent to Laurel Street; and the third is located in Area 6 at the Encogen power plant. The Area 3 substation is utilized to provide power to the Georgia-Pacific processing equipment, and the Encogen switch yard is used to transfer power generated at the plant to the PSE electrical grid.

Electrical service to the portion of the site south of the Whatcom Waterway is provided by two 115 Kv transmission lines located on utility poles along each side of Laurel Street. Electrical service to the portion of the site north of the Waterway is provided by a 55 Kv transmission line entering the site on utility poles located along F Street.

Natural Gas

Natural gas service to the New Whatcom site is provided by Cascade Natural Gas. A 16-inch high-pressure natural gas distribution line traverses the perimeter of the site along Roeder Avenue, Chestnut Street and Cornwall Avenue. A regulator station is located at the west end of Cornwall Avenue.

3.14.2 Impacts

EIS Alternatives 1 through 3 would result in increased demands on all utility systems. The overall water, sewer, electrical, and natural gas system improvements needed to serve the New Whatcom redevelopment would be similar among all EIS Alternatives; level of demand/consumption would vary by alternative.

Under the No Action Alternative, it is assumed that approximately 1 million sq. ft. of new light/marine industrial development would occur by 2026 consistent with existing zoning. The existing utility infrastructure would need to be updated and expanded to meet this future industrial development. In addition, it is assumed that 1.1 million sq. ft. of existing industrial building space would be reused, for a total of approximately 2.1 million sq. ft. of industrial uses. Based on this assumed level of industrial use and similar buildout time period, the required future utility infrastructure for the No Action Alternative would be similar to the Redevelopment Alternatives. Differences among the EIS Alternatives, therefore, relate to the actual demand/consumption levels, rather than the required utility infrastructure. The discussion below provides analysis of all of the EIS Alternatives. Demands for Alternative 2A would be the same as for Alternative 2, given the similar level of assumed redevelopment and is not discussed further herein.

Under Alternatives 1 through 3, most existing onsite utilities, including water, sanitary sewer, electrical, and natural gas lines would be removed, replaced, or abandoned in place. It is assumed that the existing utilities would continue to serve the site until required to be removed for redevelopment activities. Underground utilities could be abandoned as part of site preparation and/or environmental cleanup activities. Based on the soil remediation requirements for designated areas of the site, abandoned-in-place pipes may be required to be filled with

clean material and capped (refer to Section 3.5, **Environmental Health**, for more information on site remediation).

Water

Construction Impacts

No substantial interruption of water service to current users would be anticipated during the ongoing construction phase. The existing water distribution system would continue to serve the site until new water mains are required and become operational. Existing infrastructure would be used to meet water demands during initial construction activities.

Operation Impacts

Under Alternatives 1 through 3, water distribution throughout the site would be comprised of a network of new water mains placed within the right-of-way (ROW) of the new roadway network, with the exception of Area 1. The existing roadway network and water mains in Area 1 would continue to serve the redeveloped site with some upgrades to pipes and fire hydrants. Portions of the new water utility corridors in the eastern portion of the site (portions of Areas 2, 3, 4, 5 and 8) would be pre-excavated and backfilled with clean materials as part of initial utility/roadway installation, consistent with anticipated institutional control requirements associated with the environmental cleanup of the site (refer to Section 3.5, **Environmental Health** for more information on site cleanup activities and institutional controls).

Estimated water demands reflect the total projected employment, permanent resident population and marina moorage associated with assumed New Whatcom land uses at both the 2016 and 2026 time periods (see **Tables 3.14-1** through **3.14-5**). Residential water demand is projected based on the number of assumed dwelling units multiplied by a ratio of persons per household[3] and a standard water demand criteria of 50 gallons per day (gpd) per capita[4]. Total residential water demand for each EIS Alternative is estimated as follows:

Table 3.14-1
PROJECTED WATER DEMAND FOR RESIDENTIAL USES IN 2016

Alternative	Average Daily Demand (mgd)*	Peak Hour Demand (gpm)**
1. Higher Density	.326	622
2. Medium Density	.250	477
3. Lower Density	.133	254

Source: DEA, 2007
*****Million gallons per day
Note: ** Gallons per minute

[3] Derived ratio of 1.91 persons per unit. U.S. Census Bureau, American Survey, Whatcom County, 2005
[4] City of Bellingham, Department of Public Works

Table 3.14-2
PROJECTED WATER DEMAND FOR
RESIDENTIAL USES IN 2026

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. Higher Density	.623	1189
2. Medium Density	.476	909
3. Lower Density	.268	512

Source: DEA, 2007

Light industrial, commercial and office/institutional (non-residential) water demand is projected based on the assumed number of employees multiplied by a standard water demand criterion of 75 gpd per capita[5]. Total non-residential water demand is estimated as follows:

Table 3.14-3
PROJECTED WATER DEMAND FOR
INDUSTRIAL, COMMERCIAL AND OFFICE/INSTITUTIONAL USES IN 2016

Non- Residential Water Demand 2016	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density	.158	303
2. Mid Density	.131	250
3. Low Density	.099	189
4. No Action	.040	76.5

Source: DEA, 2007

Table 3.14-4
PROJECTED WATER DEMAND FOR
INDUSTRIAL, COMMERCIAL AND OFFICE/INSTITUTIONAL USES IN 2026

Alternative	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
1. Higher Density	.436	833
2. Medium Density	.360	688
3. Lower Density	.269	513
4. No Action	.080	153

Source: DEA, 2007

[5] ibid

The highest water demand would be generated under Alternative 1 at .484 MGD total and the lowest demand is generated under the No Action Alternative at .04 MGD total at 2016; at 2026, Alternative 1 would also have the highest demand and the No Action Alternative would have the lowest demand.

The combined total water demand for Alternatives 1-4 would be as follows:

Table 3.14-5
PROJECTED AVERAGE DAILY WATER DEMAND AND HOURLY PEAK DEMAND

Alternative	AVERAGE DAILY DEMAND*		PEAK HOURLY DEMAND*	
	Buildout 2016 (mgd)	Buildout 2026 (mgd)	Buildout 2016 (gpm)	Buildout 2026 (gpm)
1. Higher Density	.484	1.06	925	2022
2. Medium Density	.381	.836	727	1597
3. Lower Density	.232	.537	444	1026
4. No Action	.040	.080	76.5	153

Source: DEA, 2007

Irrigation of park and landscaped open space area would require large amounts of water in the summer months (it is assumed that irrigation water would only be required during the summer season.) This demand is calculated using the standard water demand criterion of 600 gpd per 1000 square feet of landscaped area and park[6]. For purposes of this analysis, park area requirements are assumed to be the same for both phases of redevelopment (2016 and 2026). **Table 3.14-6** describes the projected irrigation water demand for Alternatives 1-3. No park amenities or landscaped open space requiring irrigation are assumed to be provided in the No Action Alternative.

Table 3.14-6
PROJECTED IRRIGATION WATER DEMAND FOR PARK USES IN 2016 AND 2026

Alternative	Average Daily Demand	Peak Flow
	(mgd)	(gpm)
1. Higher Density	.680	1299
2. Medium Density	.338	645
3. Lower Density	.129	246

Source: DEA, 2007

[6] Washington State Department of Health, Water Design Manual, 2001

For the summer season, the combined potable and irrigation water demand is shown in **Table 3.14-7.**

Table 3.14-7
PROJECTED AVERAGE DAILY WATER DEMAND AND HOURLY PEAK DEMAND
SUMMER SEASON

Alternative	AVERAGE DAILY DEMAND		PEAK HOURLY DEMAND	
	Buildout 2016 (mgd)	Buildout 2026 (mgd)	Buildout 2016 (gpm)	Buildout 2026 (gpm)
1. Higher Density	1.16	1.74	2224	3321
2. Medium Density	.719	1.17	1372	2242
3. Lower Density	.361	.666	690	1272
4. No Action	.04	.08	76.5	153

Source: DEA, 2007

Fire Flow

The current City of Bellingham municipal water system has capacity to provide 3,500 gpm to buildings up to 10 stories and 30 psi for buildings up to 170 feet[7] in the site area. Buildings above these heights would need additional booster pumps to provide adequate fire protection and pressures above 30 psi.

Based on the total water demand projections, the City of Bellingham would have adequate water system capacity to serve the site under all EIS Alternatives. No significant impacts to the City of Bellingham's Public Works Department Water System would be anticipated.

Sanitary Sewer

Construction Impacts

No substantial interruption of sanitary sewer service to existing users would be anticipated during the ongoing construction phase. However, due to the limited size and capacity of the existing sewer infrastructure, maintenance and/or upgrades to portions of the existing system could be required should contractors wish to utilize and/or connect to the City sewer system during construction. Maintenance of the sanitary sewer system could include connections between new and existing collector lines or pumping in order to meet demands during construction; such demands would be expected to be limited.

Operation Impacts

Most of the existing onsite sanitary sewer system is undersized, out-dated and/or conflicts with the assumed road network under redevelopment. Therefore, it is assumed that the majority of the site's existing gravity sewer system, especially the area south of the Whatcom Waterway, would be reconstructed and relocated within the site's new roadway network under Alternatives

[7] City of Bellingham, Department of Public Works

1-3. The new sewer utility corridors in Area 1 and portions of sewer utility corridors in Areas 2, 3, 4, 5 and 8 would be assumed to be pre-excavated and backfilled with clean materials during the initial phase of utility and roadway installation, consistent with anticipated institutional control requirements for site cleanup in these areas (refer to Section 3.5, **Environmental Health** for more information on site cleanup activities and institutional controls).

The existing 60-inch sewer interceptor along Roeder Avenue, Chestnut Street and Cornwall Avenue would continue to serve as a major transmission line to the Oak Street Pump Station. Due to the size and the operating condition of this pipe, the City will continue to carefully monitor and limit connections to the interceptor. Therefore, it is assumed that a new sanitary sewer system would be built to serve New Whatcom redevelopment, independent of the interceptor line. The new system would be located in the new roadways and would gravity flow to an onsite new pump station which would discharge directly into the Oak Street Pump Station.

Currently, PSE planning for the Encogen facility is to maintain operations, and to use the facility as a "peaking" station during times of high energy use[8]. The station's industrial waste, which is currently pumped to the ASB for treatment and disposal, will be redirected to the City's sanitary sewer system.

Estimated sanitary sewer demands reflect the total projected employment, permanent resident capacity and marina moorage associated with assumed New Whatcom land uses at both 2016 and 2026 (see **Tables 3.14-8** through **3.14-12).** Residential sanitary sewer collection is projected based on the number of assumed dwelling units multiplied by a ratio of persons per household[9] and a standard sanitary sewer collection criterion of 150 gallons per day (gpd) per capita[10]. Total residential sanitary sewer collection for each EIS Alternative would be as follows:

Table 3.14-8
PROJECTED SEWER DEMAND FOR RESIDENTIAL USES IN 2016

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density	.461	881
2. Mid Density	.354	675
3. Low Density	.189	360

Source: DEA, 2007

[8] Personal communication with PSE Encogen staff
[9] Derived Ratio of 1.91 persons per unit. U.S. Census Bureau, American Survey, Whatcom County, 2005
[10] City of Bellingham, Department of Public Works

Table 3.14-9
PROJECTED SEWER DEMAND FOR RESIDENTIAL USES IN 2026

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density	.881	1682
2. Mid Density	.673	1286
3. Low Density	.48	725
4. No Action	0	0

Source: DEA, 2007

Non-residential sanitary sewer collection is projected based on the number of assumed employees multiplied by a standard sanitary sewer collection criterion of 25 gpd per capita[11]. Total non-residential sanitary sewer collection would be as follows:

Table 3.14-10
PROJECTED SEWER DEMAND FOR
INDUSTRIAL, COMMERCIAL AND OFFICE/INSTITUTIONAL USES IN 2016

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density	.792	151
2. Mid Density	.655	125
3. Low Density	.0495	95
4. No Action	.02	38

Source: DEA, 2007

[11] ibid

Table 3.14-11
PROJECTED SEWER DEMAND FOR
INDUSTRIAL, COMMERCIAL AND OFFICE/INSTITUTIONAL USES IN 2026

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density	.218	416
2. Mid Density	.180	344
3. Low Density	.134	257
4. No Action	.04	76

Source: DEA, 2007

Combined total sanitary sewer demand for all Alternatives is shown in **Table 3.14-12**.

Table 3.14-12
TOTAL AVERAGE DAILY SANITARY SEWER DEMAND AND HOURLY PEAK DEMAND

	AVERAGE DAILY DEMAND		PEAK HOURLY DEMAND	
	Buildout 2016 (mgd)	Buildout 2026 (mgd)	Buildout 2016 (gpm)	Buildout 2026 (gpm)
Alternative				
1. High Density	.540	1.10	1032	2099
2. Mid Density	.419	.853	800	1630
3. Low Density	.238	.514	455	982
4. No Action	.02	.04	38	76

Source: DEA, 2007

The highest sanitary sewer demand would be generated under Alternative 1 at .54 MGD and the lowest demand would be generated under the No Action Alternative at .02 MGD in 2016. Alternative 1 would also have the highest demand in 2026 and the No Action Alternative would have the lowest demand.

The Oak Street pump station and Post Point Pollution Control Plant would have adequate capacity to handle the sewer demands from New Whatcom redevelopment. The City is currently conducting a Sewer Comprehensive Plan update to address the future capacity of the Post Point Plant lift stations to accommodate future long-term growth in the surrounding vicinity. No significant impacts to the City of Bellingham Public Works Department sewer system would be anticipated.

Electricity

It is assumed that most of the site's existing electrical lines would be removed or replaced during redevelopment. The new electrical infrastructure would be anticipated to be located in

underground conduit. According to PSE, existing transmission lines and the current Area 1 substation onsite would not be relocated. PSE anticipates that the Area 3 substation would be replaced with a new substation that would be designed to accommodate the new range of uses as part of New Whatcom redevelopment. The specific timing of the substation replacement is not presently known and is contingent upon the specific energy demands and schedule of future site redevelopment, as well as based on long range planning for overall energy service in the area by PSE.

Currently, PSE planning for the Encogen station is to maintain operations, and to use the facility as a "peaking" station during times of high energy use[12]. The Encogen plant will need to obtain a new NPDES permit for discharge of its wastewater once the ASB facility is closed for remediation and redevelopment as a marina. However, for purposes of this EIS analysis, it is assumed that the Encogen plant would not be located at the site in 2026 under Alternatives 1-3.

The required capacity of PSE's electrical utility system to serve the site, including marina operations is based on estimated power demands. Estimated electric power peak demand by land uses associated with New Whatcom redevelopment is shown in **Table 3.14-13** and would be as follows:

Table 3.14-13
ESTIMATED ANNUAL ELECTRICAL DEMAND PER SQUARE FOOT BY LAND USE TYPE

Land-Use Type	Estimated Peak Electric Power Demand (Watts per Square Foot)[13]
Office/ Institutional	7.00
Light/Marine Industrial	5.80
Commercial	5.20
Restaurant	12.50
Residential	3.80

Source: DEA, 2007

These values are then used to calculate the peak electric power demand for all EIS Alternatives, as shown in **Table 3.14-14** below at full buildout.

Table 3.14-14
NEW PEAK ELECTRICAL DEMAND FOR EACH EIS ALTERNATIVE IN 2026

Alternative	Peak Electric Power Demand (Mega Watts)
1	39.2
2	32.4
3	22.3
No Action	6.03

Source: DEA, 2007

[12] Personal communication with PSE Encogen staff
[13] Puget Sound Energy planning demand factor for electricity, 2007

Alternative 1 would have the highest demand and the No Action Alternative would have the lowest demand. With construction of a new substation onsite, PSE would have adequate capacity to serve the estimated electrical demands under all EIS Alternatives. No significant impacts to the PSE electrical system would be anticipated.

As part of the Port's participation in the LEED Neighborhood Development Pilot Program, the Master Development Plan for New Whatcom could incorporate "green" building principles related to future energy features. The use of "green" or low-impact design features as part of New Whatcom redevelopment would reduce the demand for energy, relative to traditional building practices. Where possible, construction and operation activities would promote the use of recycled materials, eco-friendly building techniques, and energy conservation.

Natural Gas

It is assumed that most of the on-site existing gas lines would be removed or replaced during redevelopment. The existing high pressure gas line that runs along Cornwall Avenue would serve the southern areas of the site (Areas 2-10) with some upgrades to the regulator station at the west end of Cornwall Avenue. The existing gas lines in Roeder Avenue and Hilton Street would serve the northern portion of the site (Area 1).

The capacity of the natural gas system to serve the site would be based on combined peak load demands. Demand can vary widely depending on the natural gas needs of specific uses. For example, natural gas demands from office use are typically considerably more than from light industrial uses. **Table 3.14-15** shows the estimated peak gas demand by land uses.

Redevelopment under the EIS Alternatives would result in new demands for natural gas, with the highest demand generated under Alternative 1 and the lowest demand generated under the No Action Alternative at 2026. **Table 3.14-16** shows the estimated new peak natural gas demand for each EIS Alternative at full buildout in 2026.

Table 3.14-15
ESTIMATED ANNUAL NATURAL GAS DEMAND PER SQUARE FOOT BY LAND USE TYPE

Land-Use Type	Annual Natural Gas Demand per Square Foot[14] (British Thermal Units)
Office/Institutional	30,000 BTU
Light/Marine Industrial	16,000 BTU
Retail	33,000 BTU
Residential	27,000 BTU

Source: DEA, 2007

[14] Puget Sound Energy planning demand factor for natural gas

Table 3.14-16
NEW PEAK NATURAL GAS DEMAND FOR EACH EIS ALTERNATIVE IN 2026

Alternative	Annual Natural Gas Demand (Millions British Thermal Units)
1	203,550 MMBTU
2	172,665 MMBTU
3	116,010 MMBTU
No Action	5079 MMBTU

Source: DEA, 2007

New uses on the site under all EIS Alternatives would be served by the Cascade Natural Gas system. It is anticipated that the existing Cascade Natural Gas system would be extended to new development via underground lines within the new roadways. New lines and gas line extensions would be sized to assure adequate gas pressure for new as well as existing uses. Adequate capacity would exist to serve future redevelopment under all of the EIS Alternatives. No significant impacts to Cascade Natural Gas infrastructure are anticipated.

Indirect/Cumulative Impacts

Added demands to water, sewer, electrical and natural gas systems would be generated by planned off-site projects in the vicinity of the New Whatcom site including the Bellwether on the Bay Phase II, 1010 Morse Square and Bayview Tower. It is assumed that necessary improvements, extensions or connections to existing utilities associated with these projects would be designed and constructed in compliance with City, PSE and Cascade Natural Gas requirements. No significant cumulative impacts would be anticipated.

A planned project that is separate from New Whatcom redevelopment, but located within the site boundary (Redevelopment Area 9), is the construction of two new piers at the Bellingham Shipping Terminal by the Port. The new piers could potentially be utilized as a research docking facility for the National Oceanic and Atmospheric Administration (NOAA). As part of the operations of this docking facility, four home-ported vessels, additional transient vessels or other research vessels may be housed and serviced at the site. The Port would coordinate with PSE to ensure that adequate electrical capacity is available to meet the demand of any large vessels at the new piers. As part of the permitting process for this separate project, the Port would also coordinate with other utilities including City of Bellingham Public Works and Cascade Natural Gas to ensure that capacity of other utilities is available to the new uses at the BST.

3.14.3 Mitigation Measures

Water

- The Port would coordinate with the City of Bellingham Public Works Department regarding the redevelopment of the New Whatcom site and necessary water system infrastructure improvements to ensure consistency with the City's overall water system.

- The design and construction of all water distribution facilities would comply with applicable City of Bellingham water utility standards for extensions and improvements to the City's water system.

- Water mains would be located within the site's new roadway network, consistent with the City of Bellingham's water regulations and design standards.

- As part of the Port's participation in the LEED Neighborhood Development Pilot Program, the New Whatcom Master Development Plan could include provisions to encourage water conservation during building construction and long-term operation of the redevelopment.

Sanitary Sewer

- The Port would coordinate with the City of Bellingham Public Works Department regarding the redevelopment of the New Whatcom site and necessary sanitary sewer system infrastructure improvements to ensure consistency with the City's overall sewer system.

- The design of all sanitary sewer collection facilities would comply with applicable City of Bellingham sanitary sewer collection standards for extensions and improvements to the City's sewer system.

- Sanitary sewer collector pipes would be located within the site's new roadway network, consistent with the City of Bellingham's sanitary sewer regulations and design standards.

Electric Power

- The Port would coordinate with PSE during the design and construction stage for new electrical lines onsite in order to ensure that all electrical facilities (including a new substation) are adequately sized to meet long-term demand.

- All new buildings on the site would meet all applicable City of Bellingham and Washington State energy requirements, including the potential construction of temporary service lines to avoid any impacts to existing customers during construction.

- Most of the new on-site electrical lines would be installed underground to minimize disruption to the onsite and surrounding environment.

- As part of the Port's participation in the LEED Neighborhood Development Pilot Program, the New Whatcom Master Development Plan could include provisions to encourage energy efficiency and conservation during building construction and long-term operation of the redevelopment.

Natural Gas

- The Port would coordinate with Cascade Natural Gas during the design and construction stage for new gas lines onsite in order to ensure that all natural gas facilities are adequately sized to meet long-term demand.

- All new buildings on the site would meet all applicable City of Bellingham and Washington State energy requirements.

- As part of the Port's participation in the LEED Neighborhood Development Pilot Program, the New Whatcom Master Development Plan could include provisions to encourage energy efficiency and conservation during building construction and long-term operation.

3.14.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to utilities would result under any of the EIS Alternatives.