

## **Future Sockeye Hatchery Domestic Water System**

The Cedar River Sockeye Hatchery domestic water system will use a previously constructed well. The well head is north of the 9 Road at the west side of the logged area that serves as a staging site for the hatchery construction. The well has been tested and produces at least 80 gallons of water per minute. The estimated (worst case) water demand from the hatchery and the associated two residences is 50 gallons per minute, so the system will have excess capacity. The hatchery building will be fed from the well by a 3-inch main that will generally run along the south side of the 9 Road. Each residence is fed from 1.5-inch lines branching from the main. The 3-inch line is oversized and capable of supporting increased demand for domestic water.

The well water system has been permitted through King County as a Group B System. Detailed water quality testing indicates that no treatment is needed. While the well pump has some excess capacity, it is unclear how much expansion King County will allow under the permitted Group B category, but the excess capacity of the well easily exceeds the projected needs of the dam/treatment site.

## **Future Sockeye Hatchery Process Water**

For operations and breeding, the hatchery will make use of water from two spring wells located on the opposite side of the river. Water from these two wells will be pumped to the hatchery through pipes located on the dam.

## **Future Sockeye Hatchery Fire Suppression Water Service**

The Cedar River Sockeye Hatchery buildings will incorporate fire sprinkler and alarm systems. The river will provide the water source for fire suppression. River water will be pumped from a wet well adjacent to the future hatchery adult holding area near the river. An electrical drive vertical turbine fire pump rated at 125-hp and 2,000 gallons per minute will supply a 10-inch fire main. The main will branch to serve all of the hatchery structures as well as two 6-inch fire hydrants. Fire suppression systems in the hatchery buildings will comply with National Fire Protection Association Standard 13 (NFPA 13). The adjacent two residences will have fire suppression systems complying with NFPA 13D. The sump chamber is large enough to support an additional fire pump should site development plans require additional capacity.

## **SITE SANITARY SEWER SYSTEMS**

Refer to Chapter 6 for an analysis of possible integration of Cedar River Sockeye Hatchery sanitary systems with the Landsburg Facilities Development Project.

## **Existing Treatment Building Sanitary System**

### ***System Description***

The treatment building's existing on-site sanitary system (OSS) is a pressure distribution trench system. The system consists of a 1,000-gallon, two-compartment septic tank located to the west of the building. Sewage from the building flows into this tank by gravity. The tank separates the solids from the waste by settling or floating of the solids. Clarified effluent from this tank flows by gravity into a 1,000-gallon, single-compartment pump chamber. The pump in the pump chamber is controlled by a demand float system to send doses of effluent through a 3-inch transport line to the drain field area. The drain field consists of 250 feet of 2-foot-wide gravel-filled trench. Each trench has a 1-1/4-inch-diameter lateral connected to the common manifold with 3/16-inch-diameter orifices spaced at 3-foot intervals. When the pump doses the drain field, equal distribution through all of the orifices is achieved through valves at the

start of each lateral. The system was installed in 2003. The as-built drawings were approved by the Seattle and King County Department of Public Health (DPH) on June 17, 2003.

**Designed Capacity and Use**

The existing treatment building OSS is sized for 150 gallons per day, based on as-built information on file with the DPH.

The design flow for an employee for this type of facility is 20 gallons per person per day (DPH Title 13 sizing tables). This is for employee restroom only use with lunchroom activities included. The system is sized for 7.5 employees.

A system inspection was completed by Northwest Cascade in July 2005 and the system was operating properly at that time. No known field investigation of the system has been done since that inspection. Operations staff at the site report that odors are present in the area of the drain field during times of high use. A portable toilet is provided near the treatment building to serve visitors, fish program staff and others during periods of high demand.

**Future Required Sanitary Sewer Capacity for Dam/Treatment Site**

Table 4-1 summarizes the program requirements used to establish projected future sanitary sewer system capacity for development of the dam/treatment site.

<b>TABLE 4-1. PROGRAM REQUIREMENTS FOR SANITARY SEWERS AT DAM/TREATMENT SITE</b>	
Hours of operation	24 hours/day, 365 days/year
Typical staffing (Operations):	Day shift: 2 operators, 1 operations supervisor Night shift: 1 operator only
Typical staffing (Fish Program):	Sept/Oct/Nov: 6 staff (8-12 hour shift) Dec—Aug: 2-3 staff—8 hour shift
Other:	Misc. daily visitors and during extreme fall storms up to eight additional workers may be present for 24 hours or more to remove debris from the river.
Fixture counts (all low flow):	Women’s Rest Room: 2 toilets, 2 lavatories, 1 shower Men’s Rest Room: 1 toilet, 1 urinal, 1 shower Unisex toilet: 1 toilet, 1 lavatory Water Quality Lab: 1 sink, shower/eyewash Kitchenette: 1 sink Misc: 1 water fountain

Using program information listed above, the required sanitary sewer system capacity for the future dam/treatment site is conservatively projected to be 273 gallons/day.

Assuming Type 4 soil and a loading rate of 0.6 gallons per square foot per day, the estimated total trench requirement is 152 feet (active) for a 3-foot-wide trench. Trench reserve should be of similar capacity.

## **Abandoned Park Restrooms Sanitary System**

The OSS associated with the now unused park restroom building has been abandoned and is no longer functional. Landsburg Park is currently served by portable toilets provided and maintained by a vendor.

## **Sanitary Sewer Systems at Cedar River Sockeye Hatchery**

### ***Hatchery Residences***

#### ***System Description***

Separate septic systems were designed for each of the two proposed residences. The approved OSS is a pressure distribution trench system. The system consists of a 1,000-gallon, two-compartment septic tank located to the west of the building. The sewage from the building flows into this tank by gravity. The tank separates the solids from the waste by settling or floating of the solids. The clarified effluent from this tank flows by gravity into a 1,000-gallon, single-compartment pump chamber. The pump in the chamber is controlled by a timer system in the control panel to send doses of effluent through a 2-inch transport line to the drain field area. The drain field consists of 375 feet of 2-foot-wide gravel-filled trench. Each trench has a 1-1/4-inch-diameter lateral connected to the common manifold with 3/16-inch-diameter orifices spaced at 3-foot intervals. When the pump doses the drain field, equal distribution through all of the orifices is achieved through valves at the start of each lateral. The timer distributes the doses evenly throughout the day. There is additional surge capacity in the pump chamber to store peak flows until they are time-dosed to the drain field. The system was approved by DPH on March 10, 2009. A DPH OSS design expires two years from the date of approval.

#### ***Designed Capacity***

The OSS for Residence No. 1 was designed and approved for 450 gallons per day. This is the required size for a three-bedroom house under DPH regulations.

### ***Hatchery Building***

#### ***System Description***

The approved OSS is a pressure distribution trench system. The system consists of a 1,000-gallon, two-compartment septic tank located to the west of the building. Due to location concerns associated with future development plans, the tanks are located downhill a greater than normal distance from the building. The sewage from the building flows into this tank by gravity. The tank separates the solids from the waste by settling or floating of the solids. The clarified effluent from this tank flows by gravity into a 1,000-gallon, single-compartment pump chamber. The pump in the pump chamber is controlled by a timer system in the control panel to send doses of effluent through a 2-inch transport line to the drain field area. The drain field consists of 167 feet of 2-foot-wide gravel-filled trench. Each trench has a 1-1/4-inch-diameter lateral connected to the common manifold with 3/16-inch-diameter orifices spaced at 3-foot intervals. When the pump doses the drain field, equal distribution through all of the orifices is achieved through valves at the start of each lateral. The timer distributes the doses evenly throughout the day. There is additional surge capacity in the pump chamber to store peak flows until they are time-dosed to the drain field. The system was approved by DPH on March 18, 2009. A DPH OSS design expires two years from the date of approval.

#### ***Designed Capacity***

The OSS for the Fish Hatchery Building was designed and approved for 200 gallons per day. This is the required size for 10 employees under DPH regulations at 20 gallons per person per day.

## **System Expandability**

There is some area in the drain field area that could be used for expanding the system. Current codes require 1,500-gallon minimum septic and pump tanks and also allow for 3-foot trenches, so the option of expanding the system is feasible. All three approved drain fields are in the same general area, so expansion of one system may affect expansion of the other two.

## **Recommendations for Future Sanitary System at Dam/Treatment Site**

Three potential approaches have been identified for providing adequate sanitary system capacity. Each is described below.

### ***Expand System Capacity***

The existing system could be expanded in capacity by increasing the existing trenches to meet the needs of the future demand. The total number of full time workers needs to be established, along with the number and duration of use of temporary workers and tour groups. A redesign may require a larger septic tank and pump chamber to meet current DPH regulations.

If part-time users are limited and of short duration, it may be possible to switch the system to a time-dosed system with additional surge capacity built into the pump chamber. This would require less drain field to be built for the part-time users, with their use being metered out to the drain field during the days following their use of the system. It may still be more economical to use portable toilets for large temporary use events.

### ***Construct New System in New Location (preferred option)***

A new system could be designed for the anticipated capacity of the upgraded treatment building. This would require a new design through the DPH offices, and a new location for the drain field would have to be located with suitable soils and site features, including setbacks from natural and constructed features. The drain field area required would likely be the same as that required in the approved Fish Hatchery OSS design.

### ***Expansion of Fish Hatchery OSS and Tie-In***

There is room in the area of the approved OSS for the Fish Hatchery to install more drain field. This would require a new design submittal to DPH. The existing area can also be utilized more efficiently with the use of 3-foot-wide trenches (now allowed under current regulations) in the same area. From preliminary calculations it appears that there is room for greater than 500 gallons in this area.

## **SITE STORM DRAINAGE SYSTEMS**

### **Existing Dam/Treatment Site Storm Drainage System**

At the lower part of the dam/treatment site, surface water is collected by a network of catch basins and 8-inch storm drains. Water that is collected in these storm drains, as well as surface flow from the unimproved areas of the site, flows west through a bioswale along the north side of the Park Road. Flow from the bioswale enters an 8-inch culvert and then passes through another bioswale before crossing the road in an 8-inch culvert and discharging to an infiltration trench. King County inspects this trench annually. There is a covered storm drain adjacent to the fish ladder. Surface water from the truck loading area adjacent to the fish ladder flows east through a 12-inch storm drain to a manhole. A 12-inch storm drain from the manhole discharges the collected water south, to the Cedar River. A sketch of the existing system is included at the end of this chapter.

At the upper part of the site near the 9 Road, stormwater flows north into a drainage ditch running along the south side of the 9 Road. Water that collects in the fluoride storage area also flows north via a storm drain before discharging into this ditch.

### **Existing Storm Drainage System West of the Dam/Treatment Site**

A series of ditches and culverts on the south side of the 9 Road channel stormwater to the west before crossing to the north side of the road in an 8-inch culvert approximately 200 feet inside the Landsburg Road gate. This 8-inch culvert joins the ditch on the south side of the 9 Road to the ditches on the north side of the 9 Road. Approximately 200 feet east of Landsburg Road SE, a 10-inch culvert drains the northern ditch to the Cedar River.

### **Future Storm System for Cedar River Sockeye Hatchery**

The Cedar River Sockeye Hatchery site will use infiltration and dispersion to minimize runoff. Infiltration trenches will be used to control roof runoff from the new structures on site. Much of the paved area of the site will be graded to sheet-flow to filter strips located on relatively level, vegetated areas. Gravel-filled dispersion trenches will be used to disperse flow from other portions of the site. Runoff that is not infiltrated or dispersed will be directed to the existing roadside swales.

### **Recommendations for Future Storm Drainage**

It is recommended that future storm drainage systems take advantage of the site's underlying geological structure, which favors solutions such as permeable paving, rain gardens and infiltration trenches. Water quality is a concern associated with paved areas. These areas either should use permeable paving and base to filter water as it flows through the paving system or should collect stormwater and direct it to rain gardens or infiltration trenches for treatment and absorption. Paved areas that naturally drain to the 9 Road ditch should be directed there for treatment. Roof rain leaders should be directed to structures and then to infiltration trenches or dry wells. It is recommended that no new flows be directed to the existing drainage system.

## **CHEMICAL DISTRIBUTION SYSTEMS**

### **Fluoride**

The fluoride facilities at the site include a concrete storage platform with tanks, concrete containment pad for chemical deliveries, a small compressor building, acid room (located in the treatment building) and injection pit at the aqueduct. Two 3/4-inch acid lines connect the fluoride tank facility to the treatment building and a 3/8-inch fluoride line runs from the treatment building to the injection pit.

### **Chlorine**

The current chlorination system is located in the treatment building. It uses chlorine gas, which is mixed with river water and added to the aqueduct at the injection pit. Two 3-inch lines carry chlorine solution from the treatment building to the injection pit.

## **SITE POWER SYSTEMS**

Refer to Chapter 6 for an analysis of possible integration of Cedar River Sockeye Hatchery power systems with the Landsburg Facilities Development Project.

## **Power Utility Service**

Puget Sound Energy (PSE) provides medium-voltage power to the site on overhead lines. PSE shares some utility poles at Landsburg with Seattle City Light regional distribution lines. The PSE lines and City Light lines enter the site off Landsburg Road SE adjacent to the Cedar River. The overhead lines cross the river just south of Landsburg Park, and continue north through the hatchery site. The PSE lines continue to the dam/treatment site and the City Light lines cross back over the river at a point near the old analyzer building. North of this point, the on-site electrical overhead lines are specifically dedicated to PSE and on-site communication services.

Over much of its path, the on-site overhead utility line runs through secondary-growth forest. According to staff, it is not unusual for trees or branches to fall against the overhead lines during wind storms, interrupting power to the site. Since this is PSE infrastructure, power is restored once PSE crews are capable of getting to the site and repairing the overhead lines. Power outages lasting several days following severe storms have been reported.

Buildings on site are served by several overhead pole-mounted utility transformers. Prior to the construction of the new Cedar River Sockeye Hatchery, three services were present: one to the generator building, one to the hatchery spring wells, and one to the fish trailer. The trailer service is connected to a dedicated 120/240-volt PSE pole-mounted transformer. The generator building serves the process loads from the site from the various buildings and structures. The pole-mounted transformers (3-phase bank) serving the generator building also serve the spring wells. The separate electrical power service lateral serving the spring wells is configured with a dedicated standby power engine-generator set.

## **Secondary Site Distribution**

### ***Main Service***

The generator building contains a 600-ampere Westinghouse dead-front switchboard. This 30-year-old equipment functions as the main service switchboard for the site. The switchboard's condition is generally fair, however some code violations were observed. These include a wide gap in the dead-front covers and modifications that separate the main and distribution sections. The automatic transfer switch load-side connections presently feed the distribution section "Panel D," while the utility normal service also passes through this same distribution section. Due to age and condition, this switchboard and associated distribution section are considered to be at the end of their useful life. If any major reconfiguration is proposed to this service in the future, replacement of this equipment should be considered.

Electrical power services within the generator building serve many other buildings throughout the site, directly and indirectly. It serves the screen building, the fluoride compressor building, the maintenance tool building, the treatment building, the fish screen building, the old analyzer building, the hatchery building and entry gates. All loads within these buildings are served by the on-site standby generator. The distribution feeders between buildings and structures are generally underground, except where the feeders cross the river at the dam.

### ***Standby Generator***

The on-site standby engine-generator has been recently upgraded. The original indoor engine generator has been replaced with an outdoor packaged diesel engine-generator set, which resides west of the generator building on a dedicated concrete pad. The fuel storage method was not observed, but is assumed to be a skid-mounted tank typical for this type of installation. Sufficiency of electrical load capacity and standby duration was not evaluated at the time of the visit.

### **Screen House**

The screen house is served directly from Panel D in the generator building. Dry-type transformers are wall-mounted within this building to serve the 120/208-volt branch circuit panel boards. The screen house houses a number of spillway gates that are electrically operated. The motorized screening equipment is no longer in use. The screen house also sub-feeds power to the old hatchery building located across the river.

### **Treatment Building**

The treatment building contains all the chlorine gas storage for the site, and also serves as the main control station for site processes. The control room contains the SCADA terminals for the site and a number of older analog chart-recorders for measuring and monitoring process parameters and for demonstrating environmental compliance. The branch circuit panel board in this building is mounted above a base cabinet near a sink, and does not comply with the NEC regarding dedicated equipment space (NEC Art. 110.26(F)(1)) and working space clearance (NEC Art. 110.26(A)). Communications terminal boards and associated equipment behind the instrumentation control panel are not readily serviceable due to cramped access. Exposed live parts are present on the back-side of the instrumentation control panel.

### **Fish Screen Building**

The fish screen building is fairly new, and electrical equipment is generally in good condition. This building houses a motor control center serving the V-screen structure and also contains the DVR terminal associated with automated documentation of passing fish species. Fish are identified and counted in this process. Electrical equipment in this building is served by a feeder originating in the generator building.

### **Old Analyzer Building**

The old analyzer building contains emergency response supplies, and is located approximately 200 yards south of the generator building (beyond the septic drain field.) Power for this building originates in Panel G at the generator building and is routed underground. The exact routing is unknown, but based on the hand-hole locations, is assumed to roughly follow the Park Road. A power sub-feed to the site-access gates originates in the analyzer building load center. This sub-feed is routed overhead to the south and is attached to the shared utility pole structures. A future hatchery building is proposed to occupy the area between the fish house and the analyzer building. It does not presently appear that the proposed building will impact the underground work serving the old analyzer building; however, a locate service should always be used to confirm the absence of underground utilities prior to excavation.

### **Green Garage**

The green garage is located south of the generator building. It is served by a 50-amp feeder originating in Panel D. The 480-to-120 transformer in this facility is presently running very hot and should be replaced.

### **New Cedar River Sockeye Hatchery**

Construction began on the new hatchery during the summer of 2010. The complex includes the new Hatchery Building, a garage building and two staff residences. Electrical services for hatchery facilities are indicated as separate utility services to be fed from the PSE overhead power lines. The hatchery power system is designed to power the domestic drinking water well located across the 9 Road, and new fire protection pumps at the river. The hatchery complex design includes a separate diesel-powered backup generator.

## Recommendations for Future Development

Future plans should include an upgrade to the site distribution system. Consideration for relocating the site electrical service to the new building is advised. The existing generator building and the emergency generator should remain in place throughout construction to allow for minimal disruption of operations.

## SITE TELECOM AND INFORMATION TECHNOLOGY SYSTEMS

Refer to Chapter 6 for an analysis of possible integration of Cedar River Sockeye Hatchery telecom and information technology systems with the Landsburg Facilities Development Project.

The current system includes a fiber optic link from the Landsburg site, which connects to the SPU I-net system via the Maple Valley Police Department. This link provides SCADA and business network connectivity. The fiber optic cable is installed both on overhead lines and underground along its route.

The treatment building operator's room is crowded, and the existing telecom equipment is forced to share space with the operators and other office equipment. Most of the control equipment is located in the control panel along the west wall of the control room. Dust and dirt cannot be prevented from reaching the equipment in this location and higher rates of failure are attributed to this condition. The site utility power is backed up by a generator that is tested weekly. Critical pieces of equipment (computers, control equipment, etc.) are also connected to small UPS's to provide power while the generator transfers from utility source to generator source and vice versa.

Currently the hatchery and residences are designed as a separate system, with four empty conduits (two power, two communications) ending in a hand-hole outside of the west wall of the treatment building for future use. Telecom service originates at the existing utility pole and enters the hatchery building and the residences. The project team identified conflicts between these new communication conduit locations and the planned development of the dam/treatment site.

Recommendations for future accommodation of IT, communications, SCADA and telemetry equipment are addressed in Chapter 5.

## BUILDING SYSTEMS DECONSTRUCTION

### Recycling

Preliminary recycling goals for the project's LEED certification were established at an internal project team meeting. It was proposed that 75 percent of job site waste should be recycled. This is the threshold for obtaining two credits. Proper decommissioning and recycling of decommissioned facilities at the site will contribute to achieving these credits:

- **Generator Building**—The generator building is constructed of steel framing and siding on a concrete foundation. The steel and concrete are 100-percent recyclable. The structure also is suitable for reuse off-site.
- **Old Park Restroom Building and Old Analyzer Building**—These stone-faced buildings with timber-framed roofs are suitable for recycling. Stone can be retained on site. Timber and concrete foundations can be recycled. Asphalt roofing will be waste.
- **Fish Trailer**—The Fish Trailer is suitable for reuse at other locations or for sale to others.
- **Green Fish Storage Shed and Yard Tool Shed**—These wood structures can be completely recycled, including concrete slabs on grade.

- **Stone Shelter Roof at Park**—Timber components are suitable for recycling. Asphalt roofing will be waste.

## Decommissioning

Table 4-2 lists recommendations for full or partial decommissioning under the Master Plan and under the current preliminary engineering work:

<b>TABLE 4-2. BUILDING DECOMMISSIONING RECOMMENDATIONS</b>		
Building	Master Plan Recommendation	Current Recommendation
Fish Trailer	Remove or reuse off site	Remove or reuse off site
Green Fish Storage Shed	Remove	Remove
Yard Tool Shed	Remove	Remove
Battery Shack	Remove	Remove
Old Men’s & Women’s Restrooms	Remove or rehab/relocate	Remove or rehab/relocate
Old Landsburg Park Restroom Building	Remove	Remove
Garage at Landsburg Park	Remove after service life	Remove
Sanican Shelter at Park	Remove	Remove
Old Analyzer Building	Maintain	Remove
Generator Building	Maintain	Remove
Stone Shelter @ Landsburg Park	Maintain	Remove roof structure only

## REVIEW OF SPU-PROVIDED HAZMAT INFORMATION

According to SPU, the existing water tank and water tank site are contaminated with lead-based paint. Because of the age of the facilities, it may be assumed that lead paint and/or asbestos may be present in any or all of the structures at the Landsburg site, with the exception of the following:

- New Cedar River Sockeye Hatchery Facilities
- Fish Passage Project Facilities
- Green Garage
- Green Fish Storage Shed
- Sanican Shelter
- Yard Tool Shed.

# CHAPTER 5. FUNCTIONAL REQUIREMENTS

## SCOPE

Tetra Tech reviewed the basic operational functions at the dam/treatment site to assess the physical accommodations supporting the chlorination, fluoridation, SCADA/IT and communications systems. Recommendations for improvements to resolve issues related to functional accommodations are included in this chapter. Suggested improvements to accommodations for power and water systems are included in Chapter 4.

## CHLORINATION SYSTEM

### Description of Current System

The purpose of adding chlorine to water diverted from the Cedar River is to reduce the potential for exotic/invasive species to enter Lake Youngs and to reduce the growth of biofilm on the walls of the water transmission pipeline that runs from Landsburg to SPU's Lake Youngs Reservoir. Treatment is accomplished by mixing chlorine gas with water under pressure.

The current chlorination system is housed in the 50-year-old treatment building, a single-story 1,170-square-foot wood-frame structure (see Photo 5-1). This facility consists of three major activity areas; gas cylinder load/unload and storage; treatment process area; and operators' facilities. The gas cylinder load/unload and storage area is a concrete platform covered by a light metal roof canopy. A light overhead rail crane and cylinder storage racks facilitate hand loading of the cylinders. The adjacent treatment process area houses equipment used to mix chlorine gas with water diverted from the river. The operations area provides office space and support spaces for staff who control the dam and treatment functions.



*Photo 5-1. Treatment Building*

The water that will be used to carry chlorine gas to the treatment injection point is pumped from a location at the V-screen to a water tower northeast of the treatment building (see Photo 5-2). The height of the tower provides the head required to infuse the chlorine gas into the diverted river water. This water tower also currently provides fire suppression water to a hydrant located near the treatment building.



*Photo 5-2. Water Tower*

Chlorine gas is a toxic and corrosive substance and on-site staff must follow safety protocols should a leak occur. SPU Security recently installed a chain-link fence enclosure with secure gates around the treatment building.

## **Planning for Future System**

The current installation does not meet present-day code requirements for facilities of this type but is permitted to operate as-is under a “grandfathered” status by the local King County Fire Marshal. According to SPU engineers Alex Chen and Bill Wells, renovations and improvements to the existing treatment building would likely result in the need to comply with current codes, requiring the addition of a containment enclosure and chemical scrubber to neutralize accidental releases of chlorine gas. SPU has a surplus scrubber available at Lake Youngs. SPU has said that these improvements would be made no sooner than 2012 because it will be coordinated with the Facilities Group space planning efforts at Landsburg.

SPU conducted an extensive study of the treatment process and in September 2010 recommended a change at the Landsburg facility from chlorine gas to sodium hypochlorite treatment. The sodium

hypochlorite (liquid bleach) process provides an inherently safer system. It also eliminates the need for some of the security features currently installed at the treatment building. In order to accommodate this change, Water Quality will need to construct a new tank facility for sodium hypochlorite that can accommodate tanker truck delivery and provide sufficient on-site storage capacity. Alex Chen recommended that an area behind (uphill) the existing treatment building gas cylinder storage area be reserved for this use, and that the current covered gas cylinder storage platform be retained as a possible future tank location. He also indicated that an area adjacent to the existing fluoridation facility may provide an appropriate site for the liquid chlorine tanks. This area already has a pumping station with spill protection used for fluoride chemical delivery. A separate fill station and spill containment system will need to be provided for the sodium hypochlorite system as chlorine is not compatible with fluoride.

Installation of the sodium hypochlorite treatment facility is intended to be performed in conjunction with the work associated with this preliminary engineering study. Both Water Quality and Facilities have agreed that whether this work precedes the site redevelopment work or is merged into a common project, an effort needs to be undertaken to coordinate the two bodies of work. According to Alex Chen, the adaptation of the existing treatment building for the use of hypochlorite is relatively straightforward, with little need to modify the basic building envelope and structure.

## FLUORIDATION SYSTEM

### Description of Current System

Fluoride is added to water after it is diverted by the Landsburg dam and before it enters the pipeline that continues to Lake Youngs and the water treatment facility. Seattle began adding fluoride to the water system at Landsburg after a public vote in 1968. The purpose of adding fluoride to the water system is to improve the dental health of the public. The current fluoridation facility is located off the 9 Road at the entry to the dam/treatment site (see Photo 5-3). This facility consists of a delivery truck fill station with concrete spill containment area, a concrete tank platform with spill apron, uncovered storage tank farm, adjacent small compressor building, acid room located in the treatment building, associated above- and below-grade piping systems, and injection pit. Chemical delivery to the fluoridation facility is by tanker truck.



Photo 5-3. Fluoridation System

## Planning for Future System

When this study began, SPU was considering an option to relocate the fluoridation process to Lake Youngs. Since that time, Water Quality has conducted an extensive study that ultimately recommended retention of the fluoridation process at Landsburg. This decision did not adversely affect the project team's planning effort for the dam/treatment site because Water Quality had originally expressed an interest in retaining the fluoride treatment site for possible future use as a sodium hypochlorite storage area. The continued use of the fluoride facility at Landsburg will require the retention of the system's acid room, which is located in the treatment building. An alternative to retaining this room would be to construct a similar facility in a new structure. This is currently not being considered.

## SCADA, IT AND COMMUNICATIONS

### Description of Current Systems

#### *SCADA for Treatment and Dam Operations*

Currently, SCADA equipment and other telemetry equipment is housed in the treatment building. As the use of SCADA has grown at the Landsburg site, workstation space for operators has been reduced to accommodate the increased presence of electronics. This conflict was identified as a significant problem in the Facilities Master Plan, and the consensus among representatives from both Operations and IT/SCADA is that the Operations and SCADA/IT are better served in separate spaces. Other problems associated with the sharing of space for these functions includes the build-up of heat, electronics failures from dust and dirt accumulation, and simple overcrowding (see Photo 5-4).



Photo 5-4. SCADA and Telemetry in Open Closet

### ***SCADA for Fish Operations and Hatchery***

The existing fisheries SCADA system is a stand-alone system with a computer terminal located in the treatment building to monitor equipment and alarms at the fish passage. There are no connections between this computer terminal and the SPU SCADA systems.

The Cedar River Sockeye Hatchery that is currently under construction will not require connections to the SPU SCADA system. All SCADA associated with the new hatchery will be contained within an isolated system specific to the hatchery facility.

### ***Uninterruptible Power Supply***

SPU currently has independent uninterruptible power supplies (UPS) installed at each of its critical computers. According to staff, these units have a high replacement frequency due to weekly generator testing and numerous site power outages during the course of the year. These units also produce heat that contributes to discomfort during warm weather.

### ***Networking Capacity***

Increased networking requirements at Landsburg have used up much of the current system's spare fiber capacity.

## **Planning for Future System**

### ***Dedicated SCADA/IT Server Room***

Many of the problems currently identified can be resolved by providing a secure, clean and fully conditioned dedicated room to house electronics including SCADA, communications, IT and a centralized UPS. Since Water Quality intends to retain the treatment building on site, it is recommended that the room currently occupied by the operators and the SCADA equipment be converted to a dedicated SCADA/IT/Server Room. Because this space is the current termination point for SCADA, future use of this room would facilitate distribution and connectivity to remote operator workstations and external points. There is more than adequate space for growth. The room should be made physically secure with limited card-reader access, secure door system and removal of existing windows. The space should incorporate an appropriate HVAC system to maintain a clean atmosphere and temperature range. The facility program allows 150 square feet minimum for this space.

### ***Control Panel and Equipment***

It has not been determined if SPU will want to replace the existing control panel. Currently, 19 analog inputs and five discrete inputs are being delivered to the existing control panel. The existing field equipment will be staying the same, meaning that new terminations will be necessary for the existing wiring. Should SPU elect to replace the existing control panel, it will need to be mounted and commissioned containing the following components:

- Back panel/swing panel
- Panel light with bulb
- Panel thermostat
- Panel heater
- Uninterruptible power supply: 750-VA, 120-VAC
- One 4-port Ethernet switch

- National Electrical Manufacturers Association (NEMA) Standard 12 industrial control panel
- Allen Bradley ControlLogix PLC
- Three 8-channel 1756 Series Allen Bradley analog input cards
- 16-channel 1756 Series Allen Bradley discrete input card
- 8-channel 1756 Series discrete output card
- One 7-slot PLC chassis
- Four 24-volt DC control relays
- Four 120-volt AC control relays
- One 24-volt DC power supply.

The following are recommended for the new SCADA/IT/server room:

- Provide three two-post 19-inch Chatsworth racks (86-inch-high) in the server room, complete with wire management between vertical sections and seismic bracing kit.
- Provide 12-inch-wide Chatsworth ladder tray ring at the perimeter of the server room and extend cross-trays above each rack.
- Mount one quad power outlet (normal power), and one quad outlet (UPS power) at the top of each equipment rack section.
- Line all walls, to 8 feet high, in the server room with FR treated plywood, painted white.
- Telephone system to be voice-over-Internet protocol per Seattle Department of Information Technology standards, using CAT-6 cabling system and power-over-Ethernet distribution.

### ***Communication Equipment***

In the communications room, the following equipment will need to be mounted and commissioned into equipment racks:

- Firewall
- Router
- Two 24-Port Managed 10/100/1000 Cat-6 Ethernet switches
- Two 24-Port Cat 6 Ethernet Patch Panels
- One Home run running from the communications room to the existing communication infrastructure junction box located approximately 50 feet outside the building. Home run shall contain eight Cat-6 cables.

### ***Backup Power***

It is recommended that the backup power needs for electronic systems be provided by a few larger, centralized UPS systems rather than in numerous independent units at computer stations. These units should be located in the secure SCADA/IT/Server room.

### ***Control Room***

For the control room and other workstation locations, the following are recommended:

- Provide one quad data outlet at each location where computer outlets are indicated (36).

- Provide 1-inch EMT (electrical metallic tubing) conduit to ceiling space and one two-gang deep device box for rough-in at each location.
- Home-run four CAT-6 cables (Yellow jacket) from each quad outlet using open cabling methods (CAT straps, and cable tray)
- Provide RJ-45 modular jacks wired to EIA/TIA 568A standard.



# **CHAPTER 6. HATCHERY INTEGRATION**

## **WATER SYSTEM INTEGRATION**

### **Domestic Water Service**

SPU has installed a domestic water well near the hatchery site. It is located in the northwest part of the logged area just north of the 9 Road. This well was designed to meet the domestic water needs of the hatchery and the adjacent two residences, which is estimated to be no more than 50 gallons per minute (gpm). Tests of the well's production capacity indicate that it produces 80 gpm. This represents a production surplus of 30 gpm. The water surplus should be adequate to provide the domestic water needs for facilities at the dam/treatment site. Currently the domestic water serving the dam/treatment site is not potable. Water provided to the dam/treatment site from the hatchery domestic water well should only be used for drinking water, lavatories and showers. Water for toilet and urinal flushing, service hose bibs and treatment operations should continue to be drawn from the current water source.

The hatchery processes will utilize spring water provided by two wells located south of the river. These were constructed prior to the start of the hatchery construction work. This water source will not be used by facilities at the dam/treatment site.

### **Fire Suppression Water Service**

The hatchery project design includes fire sprinkler systems for all proposed buildings, including the two residences. The fire suppression water service will be provided using water from the Cedar River. A fire pump will be located in a wet well adjacent to the planned adult holding area. Research indicates that there will be adequate space in the wet well for an additional fire pump should one be required to support development of the dam/treatment site in the future. An initial evaluation of the potential fire suppression water service needed for this area indicates that the hatchery fire pump will be adequate to serve pumping requirements for both the dam/treatment site and the hatchery site.

The contractor for the hatchery project will be required to provide fire suppression capabilities during construction. The sequence of construction should be analyzed to determine how best to maximize joint resources to ensure that the Landsburg site has fire suppression water service during hatchery construction and future site development.

## **SANITARY SYSTEM INTEGRATION**

The hatchery project will be constructing three distinct septic systems: one for each residence and one for the hatchery building. Each system includes its own pump vault, septic tank and drain field. The drain fields will be located immediately west of the two residences and space for reserve/replacement drain fields is identified to the west of that area. According to Jensen Engineering, designer of the systems, there is adequate space on site for additional drain fields should any new development require abandonment of the existing dam/treatment area drain field. Likely this is best provided as an independent system, without sharing of sanitary system components. No integration of sanitary systems is anticipated.

## **POWER SYSTEM INTEGRATION**

### **Power**

The hatchery complex will receive electrical power from the existing overhead Puget Sound Energy 12-KV distribution line. The plan calls for three PSE points of connection. Two are located southwest of the hatchery building—one serving the two residences and another serving the hatchery complex. The third connection is located at the PSE power pole nearest to the green garage. It will provide power to hatchery facilities on the south side of the river, including the spring well pumps. Distribution other than on the dam is underground. The hatchery power systems are designed to function independently of the power system serving the dam/treatment facilities. No integration of power services is considered.

### **Backup Power**

Backup power will be provided to the hatchery complex by a standby diesel-fuel generator. This generator is an independent power source designed to support the hatchery complex only. No integration of hatchery backup power services is considered. The dam/treatment site currently has its own backup power generator.

## **TELECOMMUNICATIONS, IT AND SCADA INTEGRATION**

All SCADA systems associated with the hatchery operation will be independent of existing SCADA systems at the dam/treatment site. Information provided by the systems is local and reports only to the hatchery. Hatchery IT and telecommunications will function independently of the dam/treatment site facilities.

## **HATCHERY CONSTRUCTION**

### **Schedule**

Construction of the Cedar River Sockeye Hatchery began in mid-2010 and will continue until the last quarter of 2011. The construction of the hatchery and residences will precede any construction activity resulting from this pre-engineering study. According to SPU project manager Carlos Sanabria, the earliest start date for any construction work related to this study is 2015. Therefore, scheduling conflicts exist between these two projects.

### **Impacts**

#### ***Transportation***

For safety and security reasons SPU anticipates closing Landsburg Park during the hatchery construction period. The dam/treatment area will experience transportation impacts during the construction. Employees and visitors traveling from Landsburg Road SE to the site will face some construction traffic on the 9 Road and will need to cross a construction site entry paved in cobbles. Impact will be greatest during the earliest stages of construction when clearing, grubbing and excavation occur. SPU may consider limiting tours of fish operations during the autumn 2010 sockeye run because of potential conflicts with construction activity. One known impact that has yet to be resolved involves the delivery route of vehicles that provide chemicals for the treatment process. Currently trucks making these deliveries enter the dam/treatment site from the 9 Road but exit through a manually operated chain link gate that provides access to the Park Road. Maneuvering trucks back out of the dam/treatment site to the 9 Road is challenging.

## **Drainage**

Stormwater from the dam/treatment site flows through a bioswale north of the Park Road gate, through a culvert into another bioswale on the hatchery site. This bioswale system and trench drain system on the hatchery site should remain operational and should be protected during construction and trucking activities. Any changes during construction that impact this system should be reflected in the construction stormwater pollution protection plan to ensure no upstream impacts on the dam/treatment site.

## **Excavations**

There will be some construction activity associated with the hatchery project at the dam/treatment site. Most of this work involves the installation of conduits, conductors and piping. A 12-inch water pipe will be installed across the dam and connected to an existing buried 12-inch line.

Two 4-inch underground power conduits will be installed between the new hatchery and the new combined power/communications hand-hole at the south side of the treatment building, with connection to the existing power pole south of the existing green garage. The conduit location may present issues for some site development options.

Two underground communications conduits will be installed running with above power conduits and having similar terminations. The conduit location may present issues for some site development options.

New fiber optic cables will be installed in new and existing raceways in the area from the green garage south parking area to the driveway area around the treatment building, and then to the south side of the dam.

## **Site Uses**

The hatchery's general contractor will be constrained by specific work area limits. These are shown in Sheet G4 "Project Plan and Key Map" in the project's construction drawings (refer to appendix). There are two major work areas. The primary area consists mostly of what will become the fenced site of the hatchery complex. This area is located between the 9 Road on the north, the river on the south, Landsburg Park on the west and the dam/treatment site on the east. The second area consists of the logged area north of the 9 Road directly across from the hatchery site and to the west. The logged area is provided to the contractor for staging and is the site of the hatchery domestic water well and a proposed sediment trap.

The work area limits extend into parts of the dam/treatment site. A long narrow work area approximately 25 feet wide extends along the south side of the existing septic drain field to the treatment building and then over the dam to the south shore of the river. Work in this area consists of adding a new electrical service adjacent to the PSE power pole by the green garage, installing underground power and communications conduits in the same area, near the treatment building and across the dam, and installing a 12-inch-diameter water pipe across the dam. This pipe will connect the hatchery to a fresh spring-fed water source on the south side of the river.

## **Site Issues**

Site issues related to the construction of the hatchery project have been identified as follows:

- Construction Phase:
  - **Site Access and Traffic Control**—Because vehicle access to the dam/treatment site will require passing through an active construction area, coordination with the general contractor to facilitate reasonable access will be essential.

- **Chemical Delivery Route**—Currently, chemical delivery vehicles enter the dam/treatment site from the 9 Road and exit via the Park Road. This is done to avoid the difficult turn and hill climb back to the 9 Road. SPU will need to determine whether this route can be retained during the hatchery construction.
- **Coordination of Hatchery Project Work at the Dam/Treatment Site**—Power, communications and spring well water piping improvements are planned as part of the hatchery project scope of work. Coordinating this work with the required daily functions at the dam/treatment site will be necessary.
- Coordination of Future Development:
  - **Location of Conduit and Power Equipment**—The planned location of the hatchery project power and communications conduits and equipment planned for the dam/treatment site may conflict with potential site development options. Potential relocation of the conduits and power equipment should be considered prior to their installation. This may necessitate a minor change order for the hatchery construction project.
  - **Hatchery Site Fencing and Gate Locations**—SPU Security is planning to isolate the hatchery complex from Landsburg Park and the dam/treatment site with security fencing and gates. The location of the fencing and gates needs to be coordinated with the site plan options being developed for the dam/treatment site. The Fisheries staff will require a direct pedestrian access to the hatchery site as well as seasonal access for trucks through the Park Road gates.

# CHAPTER 7. SECURITY ANALYSIS

## CURRENT SITE SECURITY ISSUES

### Chlorine Gas

One of the chief risks at the Landsburg facility is the safety of the chlorine gas cylinders at the site. Chlorine gas is injected into the diverted river water that is then piped to Lake Youngs, where SPU has a water treatment facility. The following are safety and security issues related the use of chlorine gas:

- Chlorine leaks during the delivery or handling of gas cylinders, endangering employees and visitors at the site
- Deliberate attacks on chlorine cylinders stored in a screened but open canopy structure attached to the treatment building
- Inadvertent damage to the chlorine tanks causing a leak
- Natural disasters, such as floods or earthquakes.

### Employee Safety

A secondary risk at the facility is the safety of employees. The site is manned at all hours by Operations personnel who monitor various facility alarms and conduct day-to-day operations. During weekdays, two staff members are present at the site; only one person is on shift evenings, weekends and holidays. In the current security setup, there are no formidable measures to prevent the general public from approaching any building on the site. This not only endangers the safety of SPU personnel, but also opens the site up to potential criminal activity.

### Potential Terrorist Target Site

The Landsburg site is one of two SPU facilities in the Cedar River watershed. The second facility is at Cedar Falls, about 10 miles northeast of the Landsburg facility. Each site individually presents an inviting target for terrorist attack, and a greater concern is the possibility of a coordinated attack against both facilities. Landsburg is the more likely target because it is one of two points of fresh water diversion for the Seattle water system (the other being at the Tolt River facility).

### No On-Site Security Staff

Although the SPU Protection Group monitors the Landsburg site electronically from Cedar Falls and Seattle, and site visits are made on occasion, no security officers are typically present at the site. SPU has an agreement with the King County Sherriff's Department to respond to emergencies within 30 minutes.

### Pedestrian Access

While vehicular access to the site is controlled by the use of access control card readers and automated gates at the perimeter of the Landsburg property line at two locations, pedestrian access is not controlled. Pedestrians have access to the site through the fence line at the entry gates, resulting in access to the entire site. Access to the site by vehicle is made by travelling down one of two roads. Both of these roads lead into the Cedar River Watershed and are accessible on foot:

- The 50 Road, which leads to and past the existing temporary Cedar River Sockeye Hatchery on the south side of the Cedar River
- The 9 Road, which leads to and past Landsburg Park and the Operations facilities on the north side of the Cedar River.

## **Access to Multiple Users**

Currently, a number of SPU employees, Washington State Fish and Wildlife employees, and the general public access the site on a daily basis. Users include, but are not limited to, the following:

- SPU employees and contractors (including deliveries, pick-ups, cleaning etc.)
- Washington State Department of Fish and Wildlife staff
- Washington State Department of Natural Resources staff
- University of Washington staff
- Muckleshoot Indian Tribe members
- The general public.

## **History of Open Access**

The site, which was built in the 1930s, was conceived as an open environment for the general public. This concept was later amended to restrict vehicle access to the site. The general public can access the site and has the freedom to roam the entire facility; however, most buildings at the site are controlled by access control readers or mechanical keys. Although the open environment and age of the facility present a challenge for security, enhancing and upgrading security could be achieved as a part of the overall construction project at the site. Due to the open environment, critical infrastructure systems such as flood gates and site generators are open to potential negligent or deliberate attacks. Although closed-circuit TV (CCTV) cameras are located at various points throughout the facility to observe activities, no restrictions exist to prevent pedestrians from access to essential machinery or the dam itself.

## **False Alarms**

Security systems at the Landsburg site generate a large number of electronic false alarms. These alarms are the result of the mismatch in security door hardware design and day-to-day operational use. Although these electronic alarms can be addressed in system software, an opportunity exists to adopt a security design that would negate the alarms from appearing as system faults or false alarms, which could also be utilized at Landsburg and other SPU sites.

## **Public Activities**

Most public activities take place at Landsburg Park, which is at the entrance to the watershed immediately northeast of where the Landsburg Road crosses the Cedar River. No public vehicle access to the park is permitted and visitors are required to walk to the site. In general, activities at the park or the immediate area do not affect daily operations in the watershed; however, criminal activities do take place in the area, including illegal hunting, shooting, theft, illegal dumping, and trespass into the watershed.

## **Tribal Access**

The Muckleshoot Indian Tribe has an agreement with SPU and the State of Washington for rights to access the Landsburg watershed at any time. Under the Indian Access Rights Agreement, the tribe does not need permission to enter the site and are allowed on the property in vehicles or on foot at any time.

The Tribe conducts various activities, which include ceremonial events, hunting and fishing. The Tribe coordinates with SPU for upcoming events, which are usually planned in advance, however some events are undertaken on short notice.

## **EXISTING SECURITY SYSTEMS, FEATURES AND PROCEDURES**

### **Control Systems**

SPU currently uses AMAG access control systems, Verint DVRs, and Commend intercoms as part of an integrated system approach. The Landsburg site has a number of card readers installed (including those installed at the vehicle entry gates). CCTV cameras are present around the site and those at the vehicle entry gates are accompanied by intercom systems. All of these systems are supported by an on-site backup generator.

### **Site Access**

Vehicles that need to visit the site for deliveries or for short durations are required to coordinate access with the SPU Protection Group. Although the Landsburg facility is monitored electronically by security staff at the SPU Cedar Falls facility during normal business hours, after-hours monitoring of the site and access to the site are controlled by the SPU Operations Control Center in Seattle.

Contractors who access the site on a temporary basis are issued a permit and a limited access card for use at automated gates (which are supported by CCTV for verification purposes) to allow deliveries or other visitors to converse with SPU personnel at Cedar Falls or Seattle. Although the SPU operations staff at Landsburg has the ability to monitor CCTV images at the site, they do not have the ability to engage with visitors at the vehicle entry gates over intercom, nor to open the automated gates.

## **SECURITY OBJECTIVES**

### **Legislative Compliance and Improvements**

The primary security goal for SPU at the Landsburg site (and all similar SPU facilities) is to meet the regulations called out in the Chemical Facility Anti-Terrorism Standards (CFATS) issued in 2007 by the Department of Homeland Security's Office of Infrastructure Protection. Three new or revised pieces of legislation, introduced in 2009, affected the SPU security program in achieving this goal:

- HR 2868.RH—Chemical Facility Anti-Terrorism Act of 2009
- HR 3258—Drinking Water System Security Act of 2009
- HR 2868.RS—Chemical and Water Security Act of 2009.

SPU intends to lower the Landsburg site profile as a CFATS problem by following the CFATS guidance document, *Risk-Based Performance Standards Guidance, Chemical Facility Anti-Terrorism Standards* issued by the Department of Homeland Security in October 2008. One of the main goals identified in this document is to reduce the level of dangerous chemicals used by water treatment facilities by converting to inherently safer technologies. As a result of this legislation, SPU aims to evaluate current and future water treatment processes and potentially move away from chlorine-gas-based solutions to an inherently safer technology such as a liquid form of chlorination, thus reducing safety and security concerns. Until SPU changes its water treatment processes, the overall objective at the site is to maintain the viability of the operation and increase the security and safety for on-site personnel and facility assets.

## Upgrades

As a goal for monitoring, assessing, and responding to security generated alarms from the site, SPU aims to upgrade the security hardware fitted on specific doors and enforce internal security operational practices with staff. By upgrading door locking hardware, the amount of electronic noise alarms from the site will decrease.

With the building of residential properties on the Landsburg site, SPU will require hatchery personnel to monitor their own environment and control access to the residences and hatchery.

## RECOMMENDATIONS

### Security Control Zones

The Landsburg site will be portioned into six zones of security control for the duration of the hatchery construction and for the foreseeable future. These zones, shown in Figure 7-1, will require a mixture of security hardware and operational controls to be implemented. General control of these zones during construction will be as follows:

- The park will be closed to the public during the construction of the new hatchery facilities. It will also be off-limits to construction personnel during construction.
- The new hatchery site and construction zone will be off-limits to SPU and Hatchery personnel (those that are conducting day-to-day business at the site) during construction. However, access to the SPU operational area and the 9 Road must be maintained during construction.
- The SPU operational area and the old hatchery area shall be off-limits to construction personnel during construction.

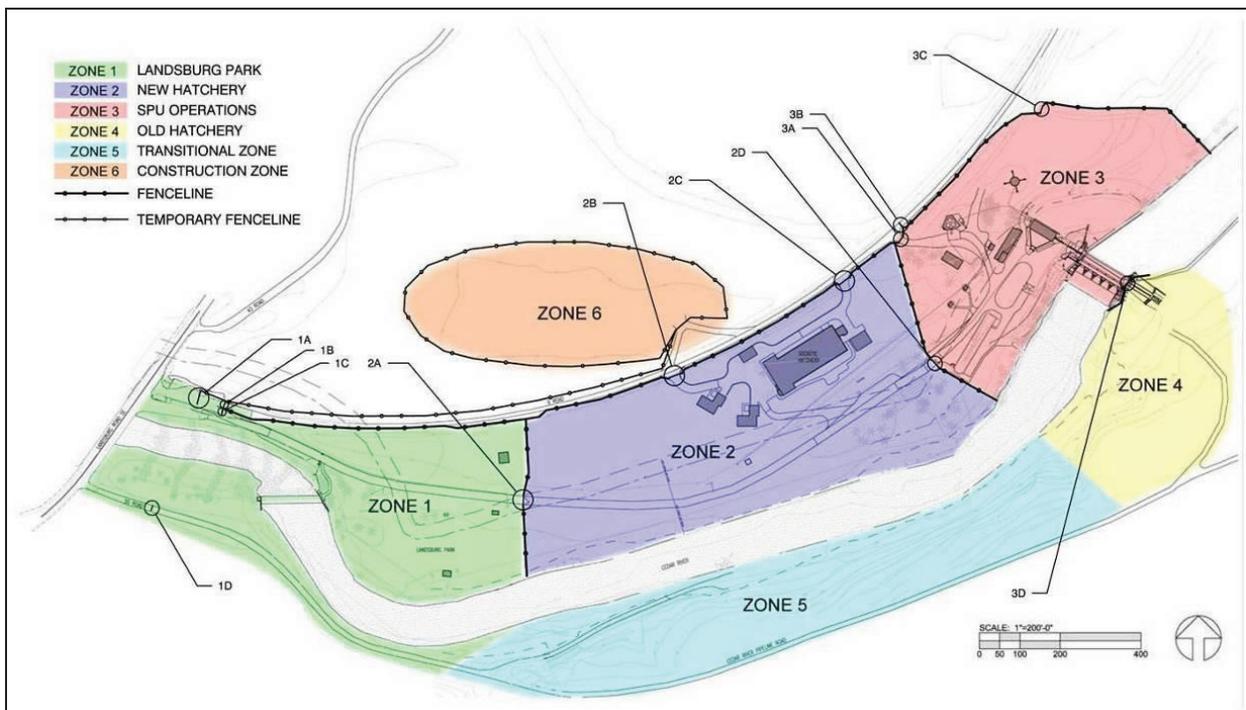


Figure 7-1. Landsburg Security Control Zones

For the security recommendations, each gate in each zone has been named and identified with a description of operation and required hardware. The following sections present recommended control requirements for the six zones and the gates in each zone. Unless otherwise stated, all security hardware will be controlled by SPU, with the possibility of either remote or local controls.

### **Zone 1: Park and Main Entries**

Zone 1 shall have as its eastern boundary the fence line currently installed, which separates Landsburg Park from the new hatchery. This fence line should be extended from the 9 Road in the north to the Cedar River in the south. This fence line will also include an automatic gate, details of which are listed in the Zone 2 criteria below.

The Cedar River will provide a natural barrier on the south side of Zone 1 and will not require a fence line for the park.

Zone 1 shall have as its northern boundary a temporary fence line that runs from the existing main entry gate (1A) along the north side of the 9 Road as far as the construction equipment area. On completion of construction at the site, this fence shall be replaced with a permanent fence that shall run from the relocated 1A gate (see below) to the start of Zone 2. Additionally, on completion of construction, a second permanent fence line shall be constructed on the south side of the 9 Road to form a corridor from the relocated 1A gate (now 1B) to the start of Zone 2.

Gates in Zone 1 are as follows:

- **1A Auto Gate, Existing Main Entry to 9 Road**—This gate and its security hardware shall remain in place during the construction phase of the new hatchery. It is recommended that the pedestrian access through this gate be closed off until Landsburg Park re-opens after construction. This gate shall remain operational and can be used in conjunction with the general construction company to allow access to the site. On completion of construction, this gate may be relocated further east along the 9 Road to control access to the watershed and the Landsburg site. The 1A Auto Gate will form the western edge boundary of Zone 1.
- **1B Auto Gate, New Gate to 9 Road and Watershed**—This gate and its security hardware shall be relocated from the 1A location upon completion of the construction project. This new location will be the permanent access point to the 9 Road, the Landsburg site and the watershed.
- **1C Auto Gate, New Gate to Park and Hatchery**—This gate shall be constructed as new and be located on the road leading to the park. This gate shall be constructed during the overall site construction phase, but will not be in operation until the 1A gate is relocated to its new position. The gate will be automated and fitted with intercoms, CCTV and permanent lighting. This gate shall be controlled by Hatchery staff (including residents) but not by SPU personnel at the site. Remote control of this gate may be made available to SPU security staff at Cedar Falls or Seattle.
- **1D Auto Gate, Existing Gate to 50 Road**—This gate and operation shall not change during or after the construction project.

### **Zone 2: New Hatchery**

Zone 2 will have as its eastern boundary a new fence line that will separate the new hatchery from SPU operations. This fence line will have a pedestrian gate installed.

The Cedar River will provide a natural barrier on the south side of Zone 2 and will not require a fence line for the new hatchery.

Zone 2 will have as its north boundary a new fence line that extends from the fence line separating Landsburg Park from the hatchery to the SPU operations area. Included in this north boundary fence will be two manual gates.

Gates in Zone 2 are as follows:

- **2A Auto Gate, New Gate to Hatchery**—This gate shall be constructed as new and be located on the road leading from Landsburg Park to the new hatchery. The gate will be automated and fitted with intercoms, CCTV cameras, and permanent lighting. This gate shall be controlled by Hatchery staff (including residents) but not SPU personnel at the site. Control of this gate may be possible remotely by SPU security staff at Cedar Falls or Seattle.
- **2B Manual Gate, New Gate Into Hatchery**—This new manual gate will be installed on the road that leads into the new hatchery from the 9 Road. This gate shall be controlled only by Hatchery staff. This gate (and Gate 2C) will have the option of being a single or double manual slide or swing gate (full height to match the fence line).
- **2C Manual Gate, New Gate Out of Hatchery**—This new manual gate will be installed on the road that leads out of the new hatchery to the 9 Road. Control options and design of gate as above.
- **2D Pedestrian Gate, New Gate to/from Hatchery**—This new pedestrian gate will be installed within the eastern fence line boundary. This gate will allow access to/from the Hatchery and SPU operations. This gate will have access control readers installed and be supported by CCTV cameras and permanent lighting.

### **Zone 3 SPU Operations**

Zone 3 will have as its northeastern boundary a new fence line that runs from the 9 Road in the north to the Cedar River in the south.

Although the majority of the southern edge of Zone 3 will be protected by the Cedar River as a natural boundary, a pedestrian gate will be required on the south side of the dam.

Zone 3 will have as its north boundary a new fence line that extends from the fence line separating the new hatchery from the SPU operations area. Included in this north boundary fence will be two automated gates and one manual gate, details of which are highlighted below.

Gates in Zone 3 are as follows:

- **3A Auto Gate, New Gate to SPU Operations**—This gate shall be constructed as new and be located on the road leading from the 9 Road to SPU operations. The gate will be automated and fitted with intercoms, CCTV cameras, and permanent lighting. This gate shall be controlled by SPU personnel at the site and/or remotely by SPU security staff at Cedar Falls or Seattle.
- **3B Auto Gate, New Gate to 9 Road and Watershed**—This gate shall be constructed as new and be located on the road leading from the 9 Road to the watershed. The gate will be automated and fitted with intercoms, CCTV cameras, and permanent lighting. This gate shall be controlled by SPU personnel at the site and/or remotely by SPU security staff at Cedar Falls or Seattle. To enable sharing of security technology, lighting and power, this gate should be located as close as possible to Gate 3A.

- **3C Manual Gate, New Gate to Rear of SPU Operations**—This new manual gate will be installed on the road leading to the rear of the SPU operations area. This gate has the option of being similar to Gates 2B and 2C.
- **3D Pedestrian Gate, New Gate to Dam from Old Hatchery**—This new pedestrian gate will be installed as part of the Zone 3 southern boundary. It will allow access to the dam and SPU operations. This gate will have access control readers and be supported by CCTV cameras and permanent lighting. It may be fitted with an intercom, however it is anticipated that the gate will be left open during normal business hours and closed in the evenings. This gate shall be controlled by SPU personnel at the site and/or remotely by SPU security staff at Cedar Falls or Seattle.

### **Zone 4 Old Hatchery**

Zone 4 does not require a fence line or gates to control access. It is recommended that a CCTV camera and permanent lighting be installed to observe activities during construction of the new hatchery and demolition of old infrastructure. This camera could be left in place for future use.

### **Zone 5 Transitional Zone**

Zone 5 does not require a fence line or gates to control access.

### **Zone 6 Construction Zone**

Zone 6 does not have a permanent fence line or gates to control access. However, it is recommended that a temporary fence be installed around the construction zone equipment area. This temporary fence line should be connected to the temporary fence line from the 1A Gate.

## **Hatchery Construction Period**

Security recommendations for the new hatchery construction period are as follows:

- The northern boundary of Zone 2 (new hatchery) shall have permanent fencing and gates to protect the area; however, this new fence and gate strategy should not be installed until the majority of construction is completed at the site. Electrical conduit containing power and data cables for security devices should be installed during the initial phase of construction for the new hatchery. This will include the laying of wire to the residences and the gates.
- Included in the overall security wire infrastructure for the site will be the continued use of fiber. The existing fiber connection (in conduit) between the main entry gate (1A) and the SPU treatment building should be identified and protected as necessary. Further use of fiber and conduit runs for gates, intercoms, access control, and CCTV should also be identified at the outset of the project.
- All new fencing (chain link) should adhere to the following criteria:
  - A minimum of 7 feet of fabric excluding top guard
  - 9-gauge or heavier wire
  - Galvanized mesh with openings of 2 inches
  - Twisted and barbed selvages on top and bottom of fence line
  - Securely fastened to rigid metal posts or reinforced concrete posts
  - All posts set in concrete deep enough to prevent effects of freeze/thaw cycle

- Fabric buried below surface on soft ground
- Fence top guard of barbed wire, three strands at a minimum, 6 inches apart and angled at 45 degrees facing toward non-restricted area.
- All new automated gates and supporting hardware shall follow same pattern as existing gate hardware unless otherwise directed by SPU Security.
- All new pedestrian gate design and operation will be coordinated with SPU Security.
- All new security systems such as card readers, field panels, cameras, intercoms, etc., will follow the same style as currently installed by SPU at the site.

## **Deconstruction of Existing Hatchery**

Security recommendations for the existing hatchery deconstruction period are as follows:

- Prior to the deconstruction of the existing hatchery, a new pedestrian gate controlling access to the dam and SPU operations should be installed. This gate will have permanent lighting and a camera installed in the vicinity to observe activities at the gate and the surrounding area, which will monitor the deconstruction.
- This new gate should remain closed during the deconstruction phase and only allow access to the dam and SPU operations. On completion of the deconstruction phase, this gate may be left open for general public activities during the day and closed in the evenings.

## **Server/Control Room and Data/Telecom**

To ensure the integrity of the data and telecom infrastructure, a card reader should be added to the server room that houses this equipment. This reader will create a layer of security around the network and it will provide an audit capability of those accessing the room.

## **Future Site Build-out**

### ***Operations Facilities***

As new perimeter fencing and gates are installed around the facility, the opportunity should be taken to increase and enhance the overall access control strategy for the entire site. This would include installing card readers on doors not only to critical infrastructure areas, but also those that are easily accessible by members of the public if the site is open for tours, etc. Areas to consider for new access control readers are the dam, the generator room, and the workshop. Additionally, enhancements to existing security hardware such as door locks could be made to create a more standard approach to overall facility security.

### ***New Hatchery***

Residential security is not addressed in these recommendations; however, there will be a need to install video intercoms in each house that control access to the new hatchery area. The same video intercom will need to be installed inside the hatchery building for staff use during the day.

The new hatchery building will require access control and CCTV cameras, the design of which shall be coordinated with SPU Security.

As both vehicle entry gates to and from the 9 Road will be manual, these gates should be locked by padlock when not in use. A central location for keys to the padlocks should be identified within the hatchery building.

***Cedar River Watershed***

Access to the watershed shall be made through either the 9 Road or the 50 Road. All access control processes for the watershed currently used by SPU Security should be followed for any new access control gates.

***Public Access Areas (Park)***

During the construction of the new hatchery, the public park will be closed. Signage and fencing should be erected to prevent members of the public from entering the site during this phase. Construction of the pedestrian gate at the dam should be made a priority to prevent the public from entering from that side. Consideration should be given to employing a security guard service for the main entry to the facility. This will have the dual purpose of controlling vehicle access to the site and informing the public that the area is closed.



# **CHAPTER 8. LEGAL AND REGULATORY REQUIREMENTS**

## **BUILDING CODES**

### **Applicable Codes**

The 2006 International Building Codes became effective in Washington State on July 1, 2007. This code family consists of the International Building Code (IBC), the International Residential Code (IRC), the International Mechanical Code (IMC), the International Fire Code (IFC) and the International Property Maintenance Code (IPMC). Washington State recently adopted the 2009 editions of these codes, which became effective in July 2010. The Washington State Building Code Council ([sbcc.wa.gov](http://sbcc.wa.gov)) has information about the adoption of codes and the Washington State amendments. King County's amendments to the codes are contained in Title 16 and Title 17 of the King County Code.

### **IBC Use and Occupancy Classification**

Table 8-1 summarizes IBC use and occupancy classifications as they apply to the existing facilities at the Landsburg site and to the new hatchery.

### **Building Code Impact on Future Development Plans**

#### ***Fire Protection***

Because of the Landsburg site's rural location, future significant habitable facilities will be likely be required by the King County Fire Marshal to incorporate fire suppression systems. This was a requirement in the design of the new Cedar River Sockeye Hatchery. Habitable buildings undergoing major renovations will likely also be subject to this requirement.

#### ***Occupancy Separations***

If future plans for the treatment building include renovations and additions to the office/laboratory areas, then it is likely that both a fire suppression system and a 1-hour occupancy separation between the H-4 (treatment) and B (office) occupancies would be required. If the treatment area using sodium hypochlorite is reclassified as F-1(factory-industrial low hazard), then a 2-hour fire separation would be required between the F-1 (treatment) and B (office) occupancies.

#### ***Hazardous Materials Issues***

The existing H-4 occupancy would be required to be brought up to current IBC standards associated with the presence of hazardous materials. SPU's plan to change water treatment methods from chlorine gas to liquid sodium hypochlorite changes the occupancy designation of the treatment building (see below).

#### ***Use and Occupancy Code Classifications***

Use and occupancy code classifications for facilities at Landsburg are indicated in Table 8-1. Planned future development envisions no changes in occupancy or use and no significant or unusual impact on facility planning, design or construction. With the decision to change from chlorine gas to liquid sodium hypochlorite, the H-4 High Hazard occupancy designation is most likely changed to F-1 Factory Industrial Moderate Hazard Occupancy because the sodium hypochlorite is not considered a hazardous material even though moderately toxic and moderately corrosive.

**TABLE 8-1.  
IBC USE AND OCCUPANCY CLASSIFICATION FOR LANDSBURG FACILITIES**

Facility	Occupancy Classification	Description of Use
Stone Shelter at Park	Business Group B	Assembly, less than 50 persons
Fish Trailer	Business Group B	Office
Cedar River Sockeye Hatchery	Business Group B	Office, lab, etc.
	Storage Group S-2	Maintenance & storage
	Factory Industrial Group F-2	Incubation, egg prep & chemical storage
Fish Screen Control Building	Business Group B	Office
Screen House	Factory Industrial Group F-2	Sluice gate control
Old Hatchery Building	Factory Industrial Group F-2	Fish handling and processing
New Hatchery Spawning Shed	Factory Industrial Group F-2	Fish handling and processing
Treatment Building	High Hazard Group H-4	Corrosive materials (chlorine gas)
	Factory-Industrial Group F-2	Low Hazard (liquid chlorine)
	Business Group B	Offices
Fluoride Storage Facility	High Hazard Group H-4	Toxic materials
New Sockeye Hatchery Residences	Residential Group R-3	Residences
Green Garage and Office	Storage Group S-2	Low hazard storage
	Business Group B	Office is accessory
Green Fish Storage Building	Storage Group S-2	Low hazard storage
Garage at Park	Storage Group S-2	Low hazard storage
Yard Tool Shed	Utility & Miscellaneous Group U	Shed
Old Hatchery Covered Areas for Fry and Sheds	Utility & Miscellaneous Group U	Shed
Old Men's Toilet Building	Utility & Miscellaneous Group U	Shed
Old Women's Toilet Building	Utility & Miscellaneous Group U	Shed
Old Park Restrooms	Utility & Miscellaneous Group U	Shed
Portable Toilet at Park	Utility & Miscellaneous Group U	Shed
Pump House on V Screen	Utility & Miscellaneous Group U	Shed
Generator Building	Utility & Miscellaneous Group U	Shed
Battery Shack	Utility & Miscellaneous Group U	Shed
Emergency Generator	Utility & Miscellaneous Group U	Shed
Old Analyzer Building	Utility & Miscellaneous Group U	Shed
New Hatchery Parking Canopy	Utility & Miscellaneous Group U	Shed
Water Tower	Utility & Miscellaneous Group U	Tank
Compressor Building	Utility & Miscellaneous Group U	Shed for fluoride system

## HEALTH CODES

Of the state and county health codes applicable to the Landsburg site, most significant are the following codes related to domestic water and on-site sewage disposal systems:

- King County Board of Health Code:
  - Title 10: Solid waste handling
  - Title 11: Hazardous chemicals
  - Title 12: Water
  - Title R12: Water
  - Title 13: On-site sewage
  - Title R20: Noise
  - Title R22: Buildings and construction
  - List of codified board rules and regulations
- Washington Title 70—Public Health and Safety:
  - 70.54 Miscellaneous health and safety provisions
  - 70.79 Boilers and unfired pressure vessels
  - 70.86 Earthquake standards for construction
  - 70.92 Provisions in buildings for aged and handicapped persons
  - 70.93 Waste reduction, recycling, and model litter control act
  - 70.94 Washington clean air act
  - 70.95 Solid waste management—Reduction and recycling
  - 70.102 Hazardous substance information
  - 70.103 Lead-based paint
  - 70.105 Hazardous waste management
  - 70.105D Hazardous waste cleanup—Model toxics control act
  - 70.107 Noise control
  - 70.116 Public water system coordination act of 1977
  - 70.118 On-site sewage disposal systems
  - 70.118A On-site sewage disposal systems—Marine recovery areas
  - 70.119 Public water supply systems—Operators
  - 70.119A Public water systems—Penalties and compliance
  - 70.136 Hazardous materials incidents
  - 70.142 Chemical contaminants and water quality
  - 70.150 Water quality joint development act
  - 70.160 Smoking in public places
  - 70.162 Indoor air quality in public buildings.

## LAND USE AND ZONING

### Land Use Designations

Figure 8-1 shows the Landsburg site within the King County zoning map.

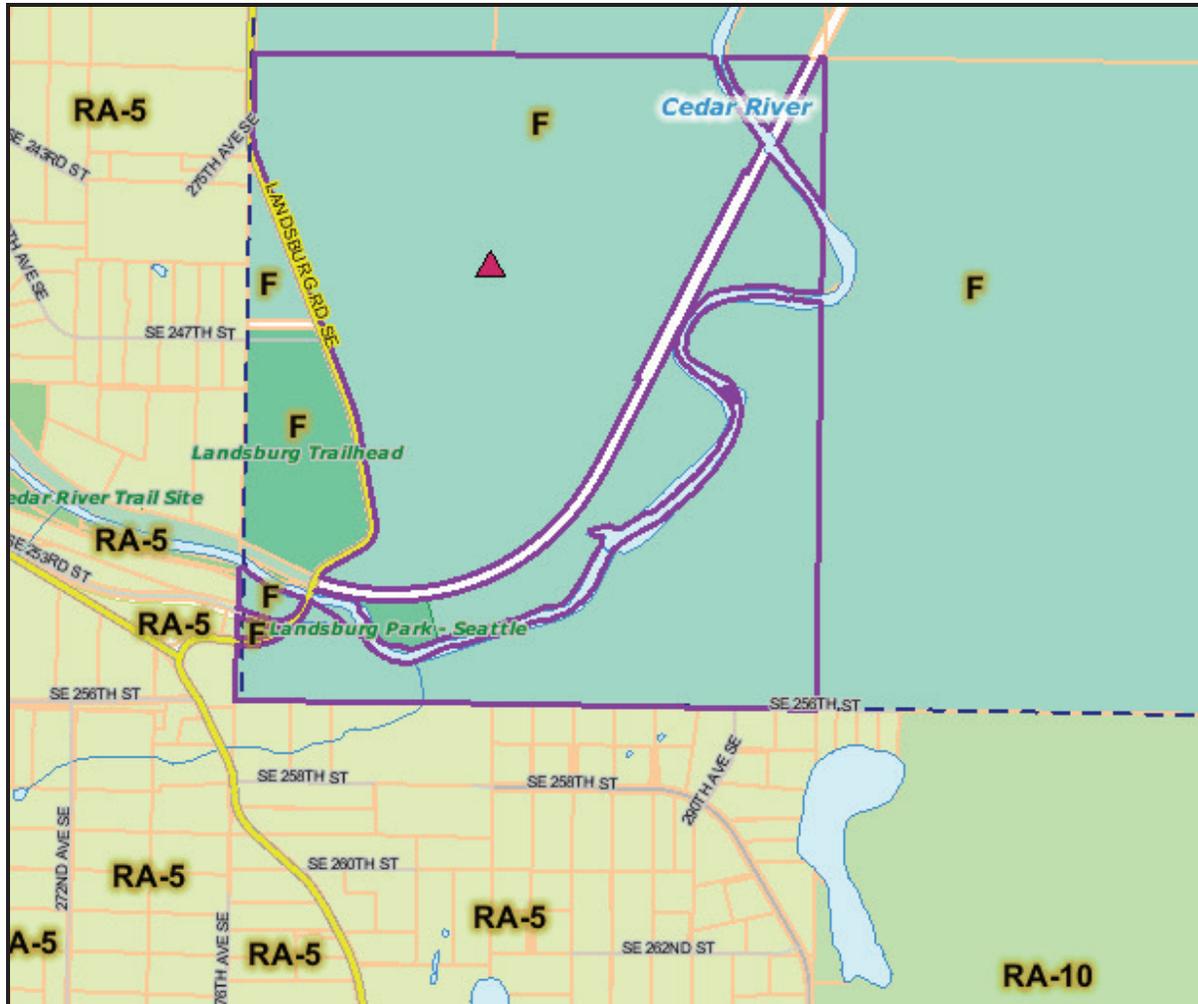


Figure 8-1. Site Land Use

Key land use designations are as follows:

- The entire project site is situated in one of King County's Resource Zones; the Forest Zone ("F"). The purpose of the F Zone is to preserve forest land base; to preserve and protect the long-term productivity of forest lands; and to restrict uses unrelated to or incompatible with forestry (King County Code 21A.04.040).
- There are no p-suffix or overlay zones applied to the site.
- The site is in the King County Comprehensive Plan Rural Area (RA) designation.
- The site is outside the urban growth boundary and is classified as a Rural Urban Growth Area.
- The site is not listed on the King County Historic Resource Inventory.

## Significant Zoning Elements

The Landsburg site is currently categorized by King County as a Utility Facility, which is defined as a facility for the distribution or transmission of services, including the following (Ord. 15051 § 109, 2004; Ord. 10870 § 310, 1993). (KC code 21A.06.1350):

- Telephone exchanges
- Water pipelines, pumping or treatment stations
- Electrical substations
- Water storage reservoirs or tanks
- Municipal groundwater well-fields
- Regional surface water flow control and water quality facilities
- Natural gas pipelines, gate stations and limiting stations
- Propane, compressed natural gas and liquefied natural gas storage tanks serving multiple lots or uses from which fuel is distributed directly to individual users
- Wastewater pipelines, lift stations, pump stations, regulator stations or odor control facilities
- Communication cables, electrical wires and associated structural supports.

Utility Facilities is a permitted use in the F zone, excluding the use of bulk gas storage tanks. Bulk gas storage tanks are allowed as a conditional use but limited to bulk gas storage tanks that pipe to individual residences, excluding liquefied natural gas storage tanks (KC Code 21A.08.060A and B28,29). All the current uses on the site are permitted outright. Any redevelopment of the site will not require a land use permit if all uses continue to fall within the categories stated above. Any redevelopment of the site will be required to adhere to any applicable development standards listed below.

## Development Standards for Density and Dimensions

The following King County development standards for density and dimensions are applicable to the site:

- Minimum Lot Area—80 acres
- Minimum Street Setback—50 feet; scaling stations may be 35 feet from the property lines. The street setback is measured from the street right-of-way or the edge of a surface improvement that extends beyond a right-of-way, whichever is closer to the proposed structure, to a line parallel to and measured perpendicularly from the street right-of-way or the edge of the surface improvement at the depth prescribed for each zone (Ord. 10870 § 348, 1993; King County Code (KCC) 21A.12.110A).
- Minimum Interior Setback—100 feet; scaling stations may be 35 feet from the property lines. The interior setback is measured from the interior lot line to a line parallel to and measured perpendicularly from the interior lot lines at the depth prescribed for each zone (KCC 21A.12.110B).
- Setbacks—Specific building or use. When a building or use is required to maintain a specific setback from a property line or other building, such setback shall apply only to the specified building or use (Ord. 10870 § 349, 1993; KCC 21A.12.120).
- Base Height—35 feet; Height limits may be increased if portions of the building that exceed the base height limit provide 1 additional foot of street and interior setback for each foot above the base height limit (KCC 21A.12.030-050).