Habitat Management Plan

White River to Alderton 230-kV Transmission Line Project
Sumner, Washington

for

Puget Sound Energy

February 3, 2015

GeoEngineers
Earth Science + Technology

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File No. 0186-743-06

February 3, 2015

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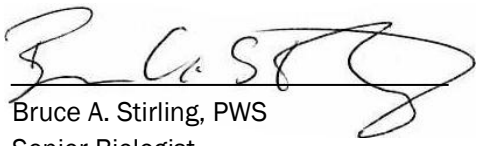

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INTRODUCTION

GeoEngineers, Inc. (GeoEngineers) was contracted by Puget Sound Energy (PSE) to prepare a Habitat Management Plan (HMP) for the White River to Alderton 230-kV Transmission Line Project (project). The project involves constructing an approximate 8-mile-long transmission line between the White River Transmission Station and the Alderton Transmission Station and is located in the Cities of Sumner and Puyallup and in unincorporated Pierce County, Washington (Figure 1). This HMP report specifically addresses the City of Sumner Critical Area code requirements. A floodplain analysis was conducted for the project (GeoEngineers 2015a) and is included in Appendix A.

This habitat management plan has been prepared in accordance with Sumner Municipal Code (SMC) 16.56.080. The SMC requires a HMP for any proposed development within 1,000 feet of fish and wildlife habitat areas. According to SMC 16.56.050, these fish and wildlife habitat include:

- Areas with federally- or state-listed endangered, threatened or sensitive species of fish, wildlife or plants have a primary association;
- Areas with habitats and species of local importance, including the following:
    - Areas with which state listed monitor or candidate species or federally listed candidate species have a primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term;
    - Special habitat areas which may provide specific habitats which certain animals and plants require such as breeding habitat, winter range, and movement corridors.
- Naturally occurring ponds under 20 acres and their submerged aquatic beds that provide fish and wildlife habitat;
- Waters of the state, including all water bodies classified by the Washington State Department of Natural Resources water typing classification system as detailed in WAC 222-16-031;
- Lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity; and
- State natural area preserves and natural resource conservation areas.

As depicted in Figure 1, within the City of Sumner, the project will involve crossing the White/Stuck River at 24th Street East, paralleling the White/Stuck River on the west side between Fryar Avenue and Highway (HWY) 167, crossing the White/Stuck River near the Houston Road East and Valley Avenue East intersection, crossing Sotain Creek between Fryar Avenue and HWY 167 and crossing the Puyallup River near the HWY 410 and East Main Avenue intersection. Because these waterbodies (White/Stuck River, Sotain Creek and Puyallup River) are waters of the state and/or contain federally listed fish species, a habitat management plan is required.

PROJECT DESCRIPTION

The White River to Alderton 230-kV transmission line project involves constructing an approximate 8-mile-long transmission line between the White River Transmission Station and the Alderton Transmission Station. A portion of the proposed alignment passes through the City of Sumner as depicted in Figure 1. The line construction will be single circuit 230-kV construction on steel monopoles.

The project is driven by the need to add bulk power transmission capacity to support growth in Pierce County.

The proposed system, once installed, will not change the current land uses. No new roads will be constructed as a result of this project. The transmission lines will only be patrolled once a year and vegetation management activities will occur approximately once every three years. The proposed activity includes relatively minor permanent impervious surfaces at the new pole sites and does not include light, glare, noise or other human-related impacts (i.e. pets, landscaping, on-site septic systems, etc.) to wetlands and associated buffers.

Initial Vegetation Removal and Routine Vegetation Maintenance

PSE will perform vegetation removal within the ROW for the construction of the 230-kV transmission line system. Tree clearing will be pursuant to SMC 13.48.460 and forest practice application (FPA) as applicable. This work will be conducted in accordance with standard PSE practices. All vegetation that exceeds a mature height of 15 feet will be removed during the initial project clearing activities; this will include removing tree species such as: Douglas fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), big leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*) and black cottonwood (*Populus balsamifera*). It is anticipated that future vegetation management activities and natural conditions will create an evolution to lower-growing transmission line compatible species.

Installation of Erosion and Sediment Control Measures

Erosion, stormwater, and sediment control techniques will be detailed in the project Stormwater Pollution Prevention Plan (SWPPP) and project temporary erosion and sedimentation control (TESC) plan. These measures include marking of critical areas prior to clearing or construction activities, establishment of proper construction access, control of surface flow within the work areas and containment of sediment within the work areas. An environmental monitor/inspector who is a Certified Erosion and Sediment Control Lead will be responsible for on-site compliance with the SWPPP. In addition, the SWPPP and TESC Best Management Practices (BMPs) will include measures to restore temporarily impacted aquatic habitat and associated buffer areas and measures to re-vegetate soils disturbed in the construction areas.

Access Route Improvement

Existing access routes within the project corridor will be used to access pole sites as necessary. If needed, required maintenance to existing roadways may include the addition of quarry spall rock or similar material to be located specifically within the existing road prism. Brushing will be completed in areas to allow equipment access to specific pole sites, but will be limited to areas where vegetation conditions will not allow construction equipment to track over vegetation without removal (that is, low-growing plants; supple, bendable vegetation; etc.). The most common types of vegetation that will be removed are shrub species such as Himalayan blackberry (*Rubus armeniacus*). Trimming of vegetation in wetlands, streams and related buffers will be minimized and limited as feasible.

Pole and Wire Installation

Within the City of Sumner, there will be 35 poles installed and the pole foundations will have a diameter that ranges from 3.5 feet to 10 feet. If a separate foundation is required, the foundation will be installed

in advance of the placement of the pole. All poles will be set with a crane or similar type of equipment. Once the poles are set, stringing travelers are hung in place on the structure and sock line pulled into the travelers using a helicopter.

Restoration and Cleanup

Restoration will begin as soon as construction of the line is complete at a site and will be conducted in compliance with City of Sumner code requirements. Unused soil that cannot be spread at the pole site will be removed for off-site disposal. Disturbed areas will be stabilized (that is, soil piles will be leveled, compacted soils loosened, mulch applied, etc.) as needed, and re-vegetated with the appropriate seed mix. Erosion and sediment control devices will be left in place until stabilization has been established.

METHODOLOGY

Data Review

GeoEngineers first researched existing information on wetlands and streams documented within the project area vicinity. Our search for pertinent and applicable data and maps consisted of a review of the United States Geological Survey (USGS) topographic map, the Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) maps and database (WDFW 2014), the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps (USFWS 2013), and the United States Department of Agriculture – National Resource Conservation Service (USDA-NRCS) Web Soil Survey (USDA-NRCS 2013). Additional information was obtained from Washington State Department of Natural Resources (DNR) Forest Practices Application Review System (FPARS) and WDFW SalmonScape mapping application (DNR, 2007; WDFW, 2013).

Field Investigation

Field investigations characterized and delineated, where appropriate, the wetland and stream conditions within the City of Sumner. GeoEngineers biologists conducted field assessments over an extended period of time:

- February 17, 2012 – Investigation around the White River Substation to the White/Stuck River crossing on 24th Street in Sumner;
- March 19, 20 and 21, 2012 – Investigation began on the west side of the White/Stuck River, on 24th Street and extended south towards the Alderton Station;
- May 1, 2012 – Investigation on parcels not accessed during the March field investigation;
- October 17, 2014 – Investigation on property north of 24th Street, east of White River; and
- November 14, 2014 – Investigation on a parcel located north of the 24th Street and East Valley Highway intersection.

Special consideration was given to areas where project activities may come within close proximity to forested areas, to fish and wildlife habitat conservation areas, to wetlands or streams, or their buffers. GeoEngineers biologists took geographic coordinates of the wetland and stream boundaries and each tree within the proposed PSE corridor using a hand-held Trimble® GeoXT™ global positioning system (GPS) device.

EXISTING ENVIRONMENTAL CONDITIONS

As depicted in Figure 1, within the City of Sumner, the project will involve crossing the White/Stuck River at 24th Street East, paralleling the White/Stuck River on the west side between Fryar Avenue and HWY 167, crossing the White/Stuck River near the Houston Road East and Valley Avenue East intersection, crossing Sotain Creek between Fryar Avenue and HWY 167 and crossing the Puyallup River near the HWY 410 and East Main Avenue intersection.

White/Stuck River

The project crosses the White River near River Mile (RM) 0.5 (Houston Road crossing) and near RM 3.4 (24th Street Crossing). The project also parallels the river from approximately RMs 1.2 through 1.4. The White/Stuck River is mapped as a riverine waterbody (USFWS 2013). DNR FPARS maps the White/Stuck River as a Shoreline of the State (Type S) (DNR, 2007). The areas within the project area that are adjacent to the White/Stuck River are relatively flat and soils consist of Pilchuck fine sandy loam, Puyallup fine sandy loam, and Riverwash. The river runs in a general south direction through the project area. The area around White/Stuck River is zoned as Light Industrial at the 24th Street Crossing, and Light Industrial and General Commercial at the area between Fryar Avenue and HWY 167 according to the City of Sumner zoning map (City of Sumner, 2013). The crossing near the Houston Road East and Valley Avenue East intersection is within Pierce County jurisdiction, but the 200 foot shoreline jurisdiction does extend into the City of Sumner where it is zoned low density residential (City of Sumner 2013).

Photo 1. Proposed White River crossing at 24th Street, looking east.

Photo 2. White River between Fryar Avenue and HWY 167.

The buffer of the White/Stuck River near the project area is disturbed with roads, agricultural activities and other development such as commercial buildings and single family homes. The buffer consists of small forested strips and consists mainly of Pacific willow (*Salix lasiandra*), black cottonwood (*Populus balsamifera*), salmonberry (*Rubus spectabilis*), red elderberry (*Sambucus racemosa*), Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass (*Phalarus arundinacea*).

Sotain Creek

The project crosses Sotain Creek near the mouth of the Creek at the White River, RM 1.3. DNR FPARS maps Sotain Creek as a Fishbearing waterbody (Type F) (DNR 2007). The areas within the project area that are adjacent to Sotain Creek are relatively flat and soils consist of mainly of Puyallup fine sandy loam. The Creek runs southeast through the project area and discharges into the White River. The immediate area at the Sotain Creek crossing is zoned as Light Industrial according to the City of Sumner zoning map (City of Sumner 2013).

Photo 3. Vegetation along Sotain Creek.

The buffer is highly disturbed within the upstream portion of the stream consisting of the HWY 167 median. Within the project corridor, the vegetated strip of forest consists of Pacific willow, black cottonwood, salmonberry, red elderberry, Himalayan blackberry and reed canarygrass.

Puyallup River

The project crosses the Puyallup River near RM 10. The Puyallup River is mapped as a riverine waterbody (USFWS 2013). DNR FPARS maps the Puyallup River as a Shoreline of the State (Type S) (DNR 2007). The areas within the project area that are adjacent to the Puyallup River are relatively flat and soils consist of Riverwash and Xerorthents, fill areas. The river runs west through the project area near the confluence of the White/Stuck River and Puyallup River. The immediate area at the Puyallup River crossing is zoned as low density residential according to the City of Sumner zoning map (City of Sumner 2013).

The buffer consists of narrow strips of forested vegetation with paved walking trails within the buffer on both sides of the river. The forest is dominated by black cottonwood with some red alder, western hemlock (*Tsuga heterophylla*), Douglas fir (*Pseudotsuga menziesii*) and western red cedar. The understory on the north bank is dominated by Himalayan blackberry and snowberry (*Symphoricarpos albus*) with some hazelnut (*Corylus cornuta*) and sword fern (*Polystichum munitum*). The understory on the south bank is dominated by snowberry and hazelnut with lower amounts of salmonberry, scouring rush (*Equisetum hyemale*), English ivy (*Hedera helix*), sword fern and California blackberry (*Rubus ursinus*).

Photo 3. Vegetation along the Puyallup River near the proposed river crossing.

SPECIES AND HABITAT PRESENCE

Habitat within 1,000 feet of the White/Stuck River, Sotain Creek and the Puyallup River within the transmission line corridor consists of developed and residential properties. The buffers of these waterbodies consist, in general, of narrow strips of forested vegetation.

White/Stuck River

The White/Stuck River flows 68 miles to the Puyallup River, from the Emmons and Fryingpan glaciers on Mt. Rainier and drains a 494-square-mile area (Kerwin 1999). Within the project area the White/Stuck River flows in a southeastern direction. The White/Stuck River is on the 303(d) list for temperature and pH with the closest mapped area approximately 0.5 mile from the 24th street crossing (Ecology 2012). Water flows within the White/Stuck River are affected by the United States Army Corps of Engineers (USACE) Mud Mountain Dam at RM 29.6 and Lake Tapps Diversion dam at RM 24.3 (Kerwin 1999). The Lake Tapps diversion dam directs water into Lake Tapps and flows are discharged back to the White/Stuck River at RM 3.6 which is located approximately 0.25 mile upstream (north) of the 24th Street Crossing (Kerwin 1999).

Currently the White/Stuck River subbasin produces Chinook, pink, chum, coho, winter steelhead, cutthroat trout and bull trout (Kerwin 1999). Identified limiting factors for these fish within the White/Stuck River include: fish passage, floodplain connectivity, bank stability, large woody debris (LWD), Pools, Side Channel Habitat, riparian habitat, water quality and water quantity (Kerwin 1999). These limiting factors are largely due to efforts to redirect and control the river from flooding, barriers to migration and development in the area.

Sotain Creek

Sotain Creek is a small and highly disturbed creek within the City of Sumner. It is mapped along HWY 167 and crosses the highway twice within the City of Sumner. Within the project area Sotain Creeks flows in a southeastern direction and discharges at the project area, into the White/Stuck River. The Creek is approximately 4.5 miles long in its entirety and there is no information regarding water quality. Currently Sotain Creek is mapped by WDFW as having coho salmon, chum salmon and steelhead. Identified limiting factors for these fish include: floodplain connectivity, bank stability, LWD, pools, side channel habitat, substrate fines, riparian habitat, water quality and water quantity (Kerwin 1999). These limiting factors are largely due to efforts to redirect and control the creek, barriers to migration and development in the area.

Puyallup River

The project area at the Puyallup River crossing is in the lower Puyallup River Subbasin which is defined as the area between Commencement Bay and the Electron Powerhouse (RM 0.0 to RM 31.2) (Kerwin 1999). The Puyallup River is listed as a Category 5 impaired waterbody for mercury levels approximately 1.8 miles downstream of the project and for bacteria levels approximately 4 miles downstream (Ecology 2012). Development on the Lower Puyallup River began with dredging, channel realignment and diking in the early 1900s. Channelization has straightened, confined and simplified the river channel (Kerwin 1999). Presently, the lower Puyallup River mainly serves as a transportation corridor and has low values for spawning and rearing (Kerwin 1999).

Currently the Lower Puyallup River subbasin produces Chinook, pink, chum, coho, winter steelhead, cutthroat trout and bull trout (Kerwin 1999). Due to the loss of riparian habitat, limited spawning and rearing habitat salmonid presences is limited in this section of the river (Kerwin 1999). The limiting factors for this subbasin have been identified as: fish passage, floodplain connectivity, bank stability, LWD, pools, side channel habitat, substrate fines, riparian habitat, water quality, water quantity and estuarine habitat (Kerwin 1999).

Priority Habitat and Species Data

The WDFW PHS maps depict locations of threatened and endangered and priority species and priority habitats. According to the WDFW PHS maps, there are no terrestrial threatened and endangered species located in or within 1,000 feet of the project corridor in Sumner. However, several species of listed threatened and endangered fish are mapped within the fish bearing streams: Chinook (*Oncorhynchus tshawytscha*), bull trout (*Salvelinus confluentus*) and steelhead (*Oncorhynchus mykiss*) (WDFW, 2013). In addition, the White/Stuck River and Puyallup River is mapped as critical habitat and the project corridor is adjacent to priority wetland habitat (WDFW, 2014).

The White/Stuck River and the Puyallup River have critical habitat for bull trout and Chinook salmon (75 FR 63897 and NOAA 2014). Critical habitat for Steelhead is also proposed within the Puyallup and White/Stuck River (78 FR 2726). There is no critical habitat mapped within Sotain Creek.

A total of four wetlands and three streams/rivers were identified and delineated within and adjacent to the project corridor within the City of Sumner. However, the delineated wetlands are not located adjacent to the White River Sotain Creek or Puyallup River areas (Figure 1). For more information on the identified wetlands see the Wetland and Stream Delineation Report prepared by GeoEngineers (2015b).

PROJECT EFFECTS ON FISH AND WILDLIFE HABITAT

This section describes anticipated permanent and temporary impacts associated with project construction and the proposed minimization measures to address these impacts. It is important to note that measures were taken to avoid, reduce, and minimize impacts associated with this project; however, some impact to streams are unavoidable due to the linear nature of the project. Impact avoidance and minimization was practiced to the extent possible. Stream and buffer impacts likely to result from the project are listed here and are discussed in the following paragraphs.

- Vegetation Management, and
- Pole Installation.

Vegetation Management

GeoEngineers biologists met with tree surveyors in 2012 and used a Trimble GPS unit to locate each tree that would need to be removed within the identified wetlands, streams and associated buffers. Tree removal activities will occur within the buffers of the White/Stuck River, Sotain Creek and Puyallup River. The majority of trees to be removed within the stream buffers consist of black cottonwood (*Populus balsamifera*). The remaining vegetation consists of existing shrub and herbaceous layers that will remain undisturbed. Trees to be removed will be cut near ground surface; all stumps and root systems will be left in place.

A portion of the trees within stream buffers will be girdled and cut to a height of 15 feet. It is intended that some trees will remain as LWD, snags or root wads for additional habitat and that some limbs will be scattered to cover exposed soils. Trees to be removed will be felled toward the edges of the buffer, picked up and not skidded out using mechanized equipment. Debris and log removal efforts, when needed, will be ground-based utilizing mechanized equipment, with the exception of stream buffers, or other areas which will be logged by hand. Some trees along the edge of the corridor may only require trimming. The vegetation management team will make these decisions prior to commencement of work. The stream buffer limits will be flagged in the field prior to trimming activities.

Tree removal will affect shading currently provided by the tree canopy. However, it is assumed these impacts will be minor as native vegetation less than 15 feet tall will be encouraged to grow within the riparian buffers of the rivers.

The potential impacts are expected to be minimal due to the relatively small footprint of the corridor at the water's edge as the corridor crosses the water in a perpendicular fashion. Water quality, hydrologic and habitat functions of the stream buffers may be affected by the tree removal which will change the dominant vegetation structure from forested to shrub. However, impacts to water quality, hydrologic and habitat functions are expected to be minimal because of the proposed snag and LWD retention, hand clearing of trees within critical areas and associated buffers, and implementation of SWPPP and TESC plans.

Pole Installation Activities

There will be 2 new pole structures installed within the White/Stuck River buffer and one new pole structure within the buffer of the Puyallup River (a total of 3 poles installed within stream buffers; no poles within Sotain Creek Buffer). Pole locations were designed by the PSE project engineer to meet safety and height requirements for the transmission lines. Where possible, adjustments to pole locations were made to avoid or minimize wetland, stream and buffer impacts. The project will therefore result in a net area of approximately 150 square feet (50 square feet for each pole) of stream buffer fill for the installation of three poles. There will be no additional fill within wetland or stream buffers. The pole foundation is the only new permanent fill material that will be placed within stream buffer habitat.

Disturbance areas created during pole installation will avoid and minimize impacts to buffers to maximum extent possible. These disturbance areas are considered temporary impacts because there will be no vegetation clearing and no fill related activities. Temporary impacts from the disturbance areas will be mitigated as part of the TESC BMPs which includes stabilization of exposed soil areas through mulch seeding.

Efforts will be made to reduce the level of impact that results from pole installation and removal activities. The project will reduce the potential for impacts to water quality and hydrologic functions by implementing appropriate BMPs and limiting vegetation removal and brushing activities. In general habitat conditions will not change considerably as a result of this project because land use will not change.

Project Effects Summary

The proposed project will not require in-water-work. All structures will be above the ordinary high water mark (OHWM) of the White/Stuck and Puyallup Rivers, and Sotain Creek. The project involves installation of a new transmission line corridor which will involve pole installation and tree vegetation management

activities within the proposed corridor. The poles proposed within stream buffer habitat may need to be installed with a foundation in order to be self-supporting. The vegetation management activities will be conducted in accordance with standard PSE practices which has been described in the above sections of this report.

Based on preliminary designs for the project, anticipated impacts at the fish and wildlife conservation areas include White/Stuck River, Sotain Creek and Puyallup River buffer impacts. At the White/Stuck River, potential impacts will include tree removal activities and buffer fill impacts due to installation of pole foundations. At Sotain Creek, potential impacts will include tree removal activities only. At the Puyallup River, potential impacts will include tree removal activities and buffer fill impacts due to installation of the pole foundation. Table 1 below lists the buffer associated with the type and area of impact. Numbers listed in this table are conservative estimates and are likely to be smaller once designs have been finalized. Figures 2 through 4 depict impact locations that will result from the proposed project.

TABLE 1. AREA OF BUFFER IMPACT BY ACTIVITY

Type of Impact	Buffer Impacted	Area Impacted / Trees Removed
Tree Removal	White/Stuck River at the 24th Street Crossing	16,705.73 square feet (ft^2) / 23 Trees
Tree Removal	White/Stuck River between Fryar Avenue and HWY 167	16,080.40 ft^2 / 47 Trees (Does not include Sotain Creek Buffer area)
Tree Removal	White/Stuck River near the Houston Road East and Valley Avenue East intersection (Trees to be removed at this crossing are in Pierce County Jurisdiction. There will be no trees removed within the Sumner Shoreline jurisdiction at this crossing)	0 ft^2 / 0 Trees
Tree Removal	Sotain Creek Crossing	2,440.00 ft^2 / 27 Trees
Tree Removal	Puyallup River	9,638.82 ft^2 / 44 Trees
Pole Installation	White/Stuck River	100 ft^2 (2 poles)
Pole Installation	Puyallup River	50 ft^2 (1 pole)
	Totals	**45,014.95 ft^2 / 141 Trees**

MINIMIZATION AND MITIGATION MEASURES

Minimization/Avoidance for Temporary Impacts

Minimization measures and BMPs will be utilized during project activities to avoid impacts to listed species and their habitat. Conservation measures will focus on minimizing construction noise and the possibility of spills, preventing soil erosion, and minimizing impacts to riparian vegetation. Special measures will be taken to ensure that all waste materials will be disposed of off-site and in accordance with applicable regulations, adequate materials and procedures are readily available on the site to respond to unanticipated weather conditions or accidental releases of materials, and that a protocol for contacting WDFW is readily available in the event that activities are observed to result in water quality problems.

General Conservation Measures

- TESC plan will be fully implemented as part of a SWPPP. Construction techniques will utilize BMPs such as those described in Ecology's Stormwater Management Manual for Western Washington (Ecology, 2012). Appropriate erosion control measures will be erected at appropriate locations.
- The contractor will prepare a Spill Prevention, Control and Countermeasures (SPCC) Plan for this project. Any potential spills will be handled and disposed of in a manner that does not contaminate the surrounding area. Adequate materials and procedures to respond to unanticipated weather conditions or accidental releases of materials (sediment, petroleum hydrocarbons, etc.) will be available on site. The SPCC Plan will also ensure the proper management of oil, gasoline and solvents used in the operation and maintenance of construction equipment and that equipment remains free of external petroleum-based products prior to entering the work area and during the work, and for making any necessary repairs prior to returning the equipment to operation in the work area.
- An emergency spill containment kit must be located on site along with a pollution prevention plan detailing planned fueling, materials storage and equipment storage. Waste storage areas must be prepared to address prevention and cleanup of accidental spills.
- All construction-related debris will be cleaned up on a daily basis. Proper conservation measures will be taken to ensure that debris will not contaminate the stream waters.
- Waste materials, including any concrete, riprap, miscellaneous garbage and/or other debris removed from the project site, will be transported off site for disposal in accordance with applicable regulations.
- Work will be in compliance with all other local, state and federal regulations and restrictions.
- Excavation will be limited to those areas necessary for access to the work areas and construction activities. The construction limits will be marked in the field and equipment will not be allowed outside the work area.
- Adequate materials will be maintained on-site to respond to weather conditions and modify the construction plan as needed to accommodate unanticipated events.
- Routine inspections of the erosion control measures will be conducted daily during construction to ensure the effectiveness of the measures and to determine the need for maintenance or additional control measures.
- Silt fences will be constructed around excavation areas.
- Disturbance will be limited to the smallest area feasible for each phase of the project and element under construction and will stay within the limits of construction as identified on the site plans.
- Fueling areas will be distinctly identified and established outside of sensitive areas, but within the construction area. These areas will be equipped with spill prevention and control devices.

Measures to Reduce Impacts to Species and Habitats

- The project will obtain and comply with conditions that will be outlined in agency permit applications.
- All debris resulting from construction shall be removed from the project area and prevented from entering the stream.

- Construction procedures have been designed to minimize the opportunity for erosion to occur or sediment-laden water to enter downstream areas.
- Depending on slope and weather conditions, filter fences will be installed along the perimeter of the work areas to help confine sediment and runoff. Additional flow control measures will be implemented as necessary, and described in the SWPPP if surface water flow is observed.
- Excavation equipment and other machinery for placing large structures from the landward side of the project will be used to avoid direct disturbance to stream.

Mitigation for Permanent Impacts

PSE is proposing an innovative concept for out-of-kind mitigation that would include purchasing property that would provide high potential for fish habitat improvements and additional flood storage capacity. PSE will then work with resource partners that are capable of taking on fish enhancement and flood storage enhancement efforts at the property purchased by PSE. The City of Sumner has provided initial feedback that was positive for this out-of-kind mitigation and provided three potential private parcels for purchase and conservation. PSE has conducted initial assessments of these parcels and determined that two of the three parcels have shoreline conditions and should be considered for purchase. The two shoreline parcels total 1.44 acres and are located within Sumner City limits along the Puyallup River shoreline, immediately upstream of the project area Puyallup River crossing.

To minimize impacts that result from loss of vegetation, all unimproved disturbed areas will be seeded, and mulched within the regulated buffers of the White/Stuck River, Sotain Creek and Puyallup River. This is considered a minimization measure.

There will be no new impervious surfaces as a result of this project and so there will be no impact for stormwater. Therefore there is no mitigation actions proposed for stormwater treatment.

Standing Snags and Large Woody Debris

Some of the trees that will be removed will be cut to a height of 15 feet and will be retained as snags and root wads. Trees that appear to have potential to serve as snags will be marked prior to vegetation management and then retained. Additionally some of the trees will be retained as downed LWD to provide habitat enhancement. The location of all snags and LWD will be determined during vegetation management activities. These actions will promote long-term recruitment of LWD within the stream buffer habitats.

Monitoring, Performance Standards, Maintenance and Contingency Plan

No monitoring, performance standards or maintenance is proposed as a result of the out-of-kind mitigation. There will be no plant installation because PSE is proposing to purchase property along the shoreline of the Puyallup River to ensure conservation. In addition, there is no contingency plan because of the proposed mitigation plan will not include a planting or design that may fail. The proposed mitigation strategy will ensure the conservation of property that has productive fish habitat and a high potential for flood storage capacity.

CONCLUSION

The proposed project is not anticipated to have an adverse impact on fish and wildlife habitat or any sensitive species. No in-water work will occur as no structures will be placed water ward of the OHWM. There are no sensitive terrestrial species known to occupy the area within 1,000 feet of the project. Appropriate temporary sediment and erosion control BMPs and construction measures will be implemented and maintained throughout construction to minimize/prevent direct impacts to the White/Stuck River, Sotain Creek and the Puyallup River. Disturbed areas will be improved with the installation of snags and woody debris. The project as proposed has been designed to comply with the applicable T&C and RPM as provided in the previous Biological Opinions issued by the USFWS and NOAA Fisheries.

In addition, PSE is proposing an innovative out-of-kind mitigation concept that will include purchasing two parcels along the Puyallup River and working with resource partners that are capable of completing fish enhancements and flood storage improvements.

REFERENCES

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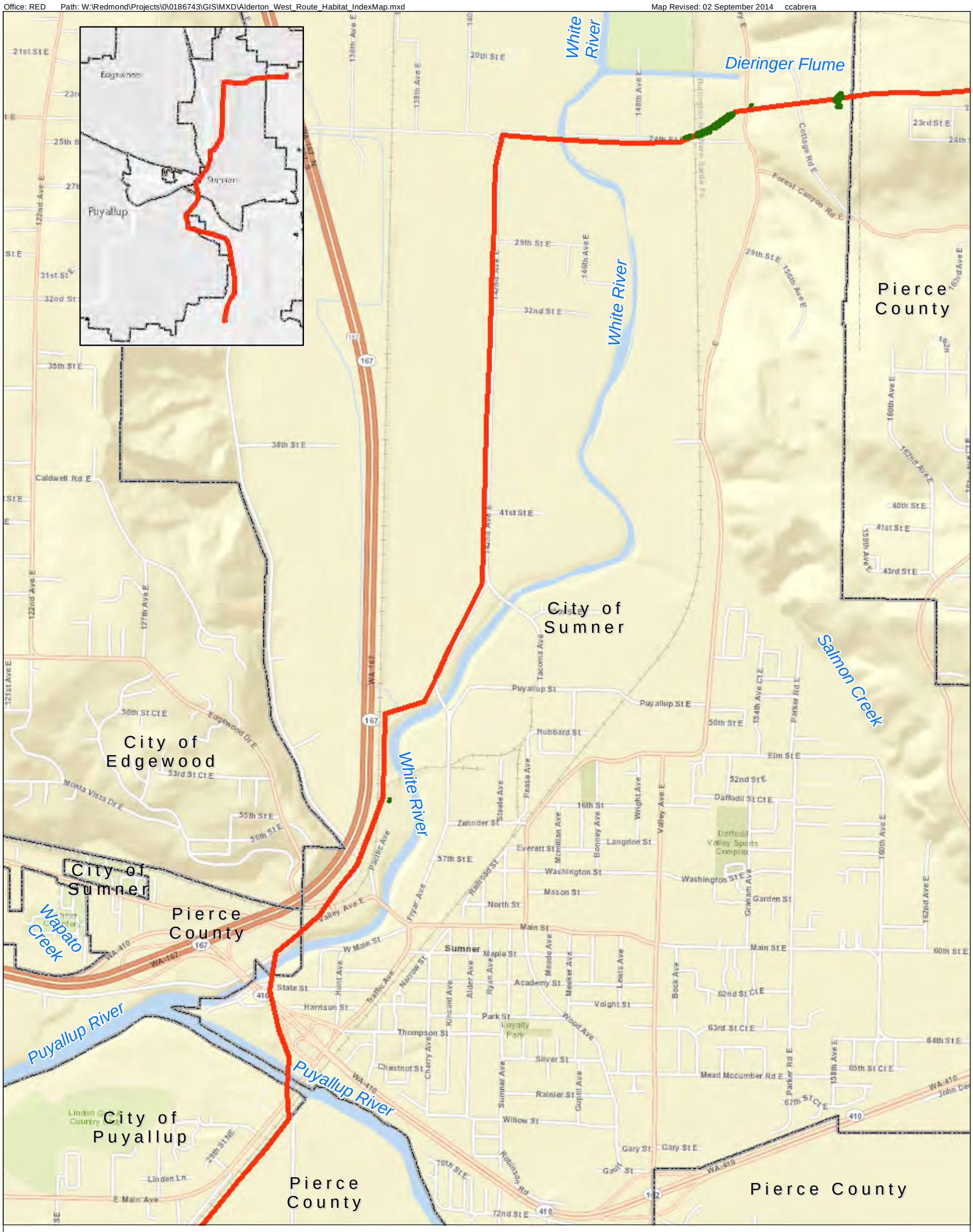
FIGURES

GeoEngineers

Office: RED Path: W:\Redmond\Projects\0\0186743\GIS\MXD\Alderton_West_Route_Habitat_IndexMap.mxd Map Revised: 02 September 2014 ccabrera



Legend

- Alderton Westline Transmission Line
- Jurisdictional Boundary
- Delineated Wetland Area

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Reference: Bing Maps Aerial Imagery, 2010
Pierce County GIS
NAD 1983 HARN Washington State Plane South, Feet

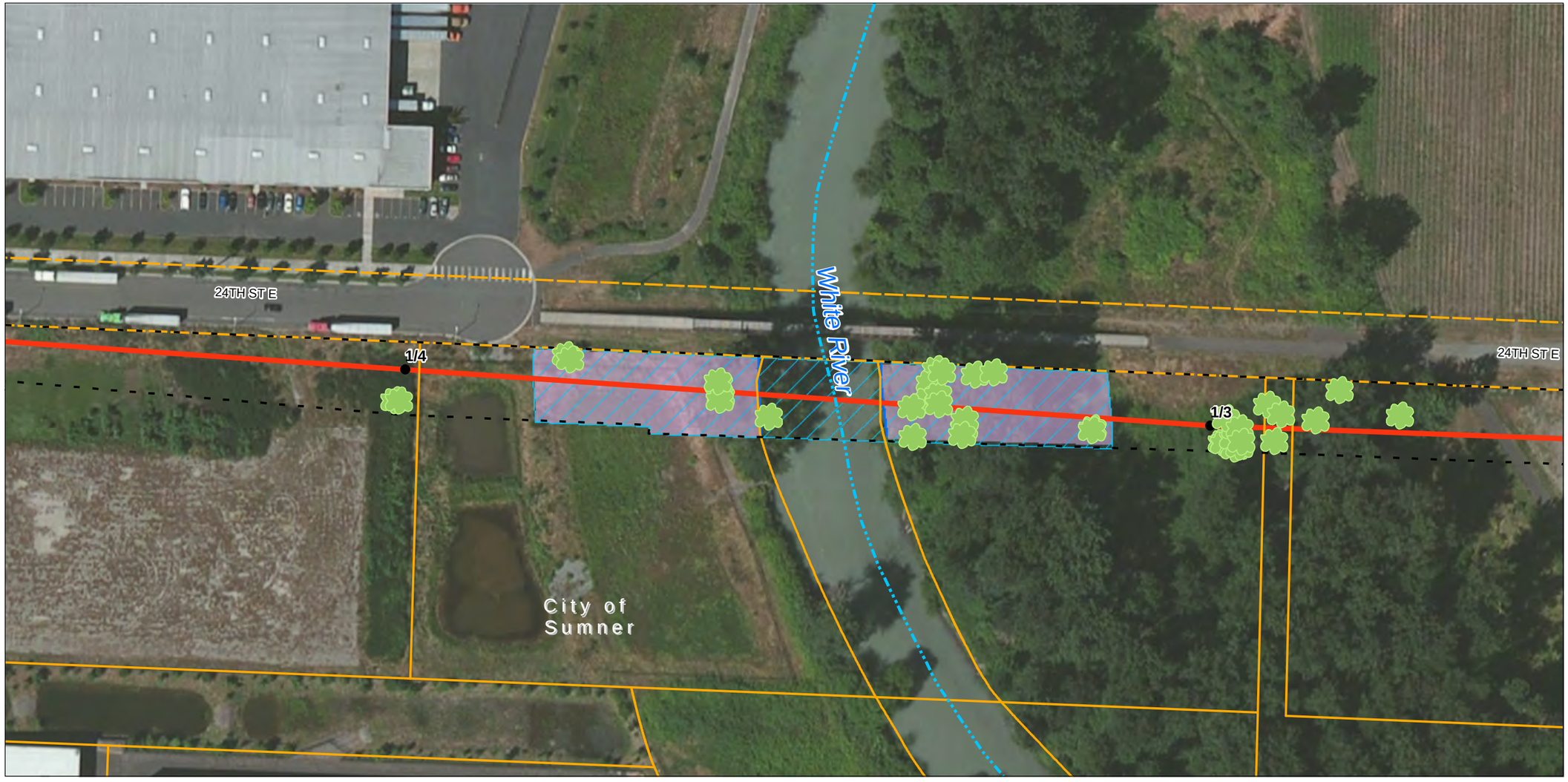
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Index and Vicinity Map
Habitat Management Plan

White River to Alderton 230 kV Transmission Line
Sumner and Pierce County, Washington

GeoEngineers

Figure 1



Poles (June, 2014)

Trees to be Removed

Alderton Westline Transmission Line

Proposed Easement

Pierce County Mapped Stream

Stream Buffer

Shoreline Management Jurisdiction Buffer (200ft)

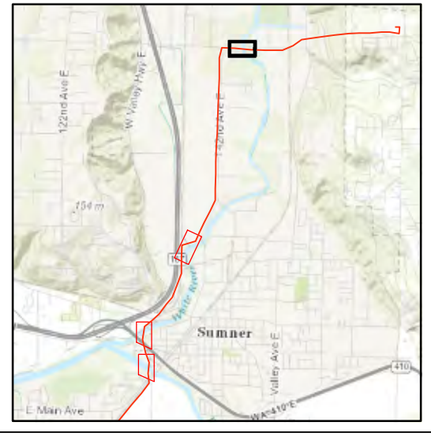
Property Line

Right-of-Way

Foothills Trail

Railroad

Jurisdictional Boundary (WSDOT)



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Data Source: ESRI Aerial Imagery
Mapped streams from Pierce County
Property Lines, Right-of-Way, Easements from PACE Engineers

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Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Fish and Wildlife Habitat Conservation Area Impacts

White River to Alderton 230 kV Transmission Line
Sumner and Pierce County, Washington

GeoEngineers

Figure 2

Map Revised: 07 January 2015 ccabrera

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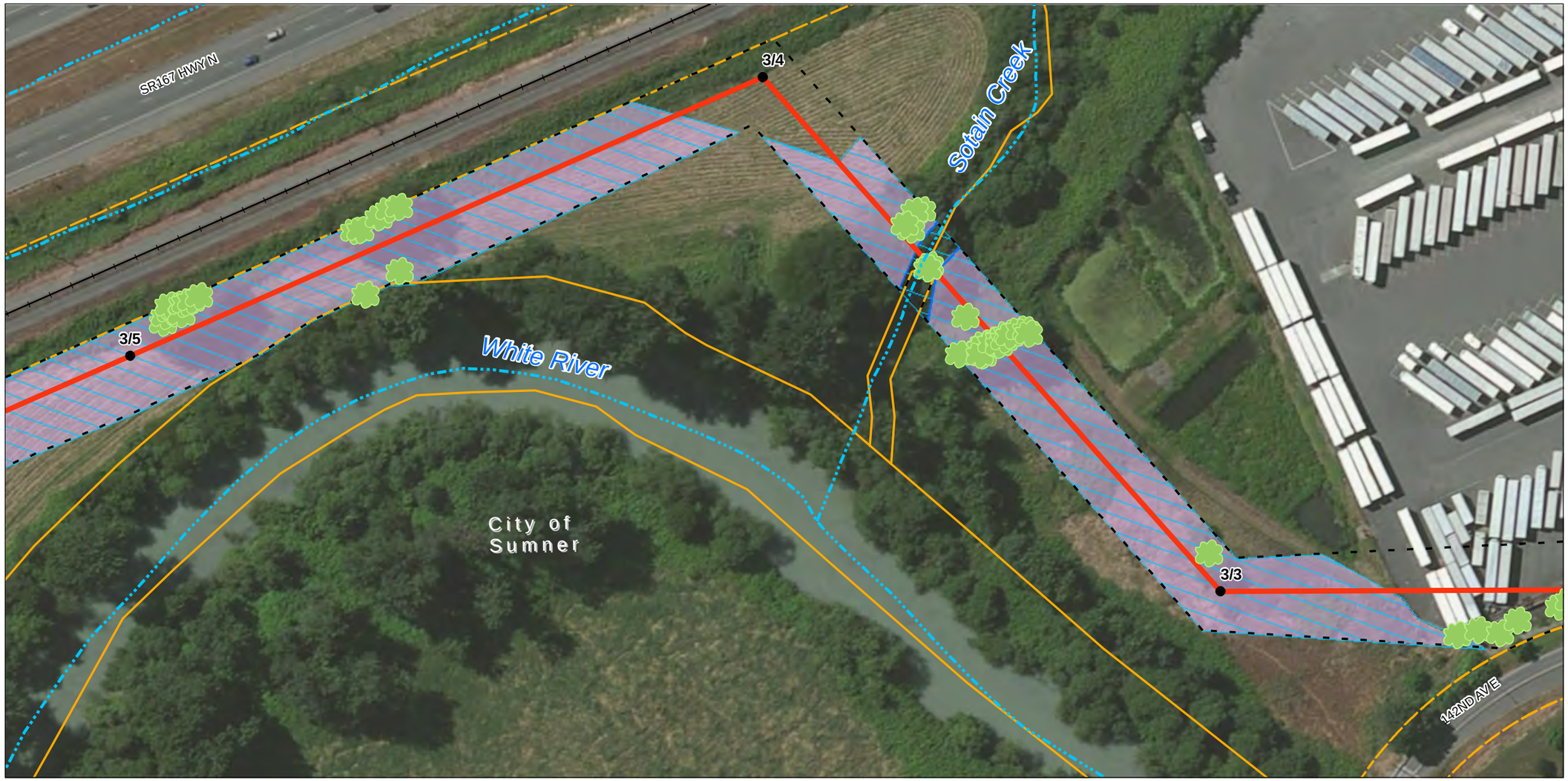

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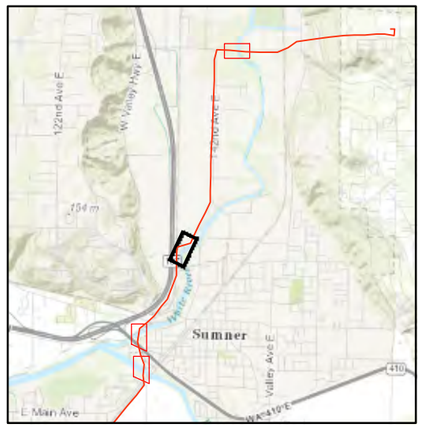
Right-of-Way

Foothills Trail

Railroad

Jurisdictional Boundary (WSDOT)



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Feet

Data Source: ESRI Aerial Imagery
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Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Fish and Wildlife Habitat Conservation Area Impacts

White River to Alderton 230 kV Transmission Line
Sumner and Pierce County, Washington

GeoEngineers

Figure 3

Map Revised: 07 January 2015 ccabrera

Office: Redmond Path: Y:\0018674\3\GIS\MXD\Alderton_West_Route_Habitat_Maps.mxd

Poles (June, 2014)

Trees to be Removed

Alderton Westline Transmission Line

Proposed Easement

Pierce County Mapped Stream

Stream Buffer

Shoreline Management Jurisdiction Buffer (200ft)

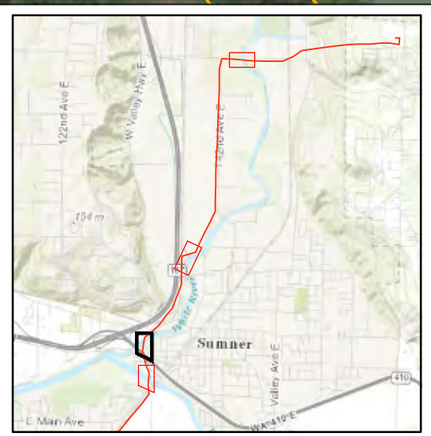
Property Line

Right-of-Way

Foothills Trail

Railroad

Jurisdictional Boundary (WSDOT)



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Data Source: ESRI Aerial Imagery
Mapped streams from Pierce County
Property Lines, Right-of-Way, Easements from PACE Engineers

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Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Fish and Wildlife Habitat Conservation Area Impacts

White River to Alderton 230 kV Transmission Line
Sumner and Pierce County, Washington

GeoEngineers

Figure 4

Map Revised: 07 January 2015 ccabrera

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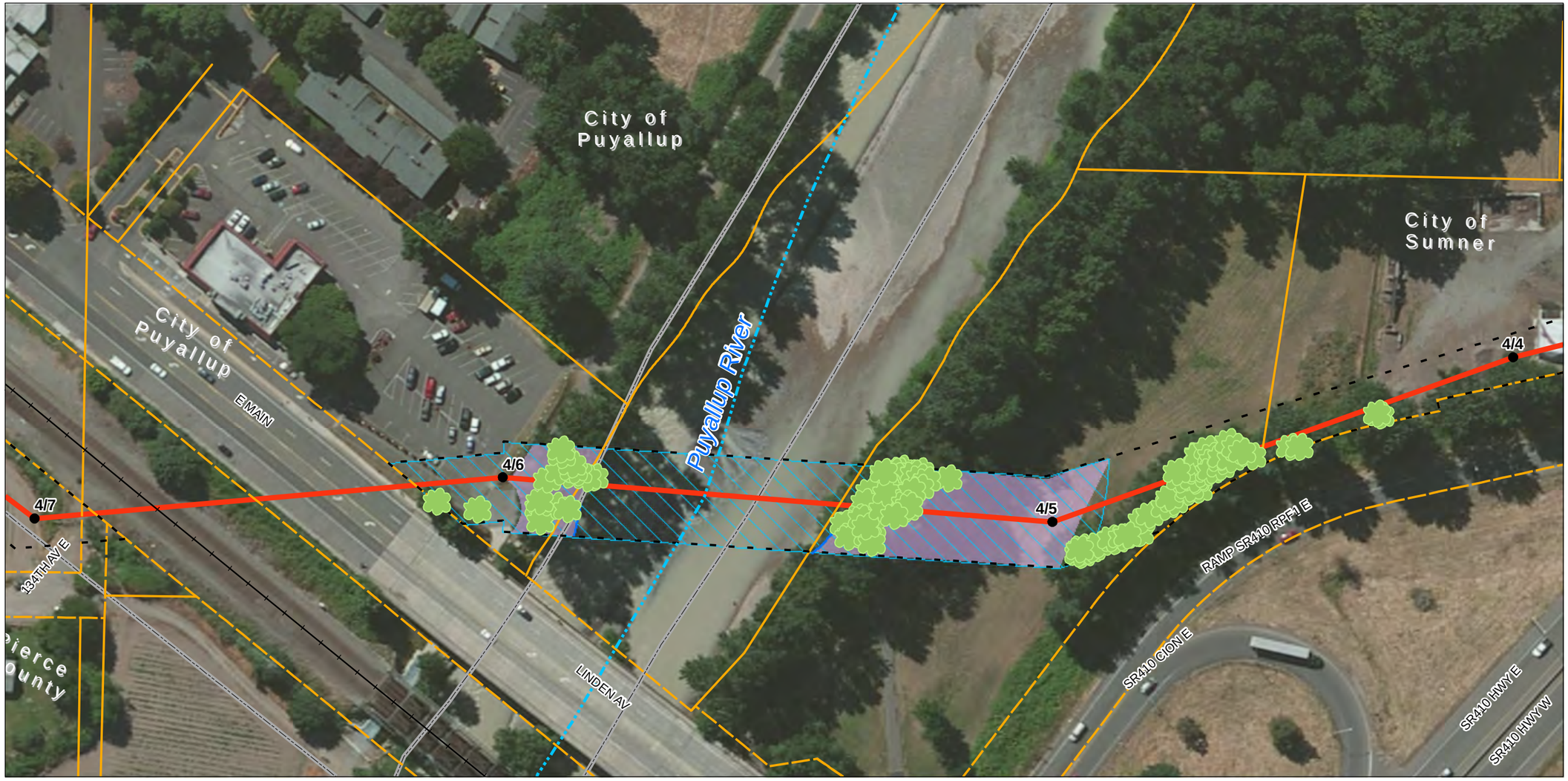
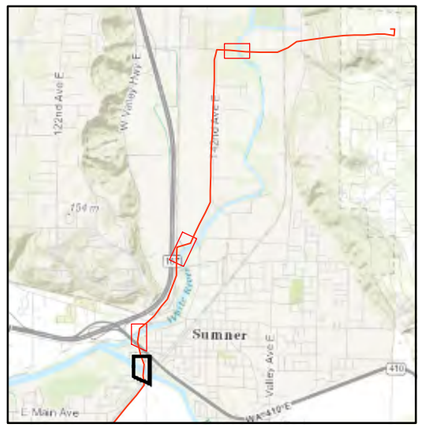
Map Revised: 07 January 2015 ccabrera

Office: Redmond Path: Y:\00\0186743\GIS\MXD\Alderton_West_Route_Habitat_Maps.mxd



- Poles (June, 2014)
- Trees to be Removed
- Alderton Westline Transmission Line
- Proposed Easement
- Pierce County Mapped Stream
- Stream Buffer
- Shoreline Management Jurisdiction Buffer (200ft)
- Property Line
- Right-of-Way
- Foothills Trail
- Railroad
- Jurisdictional Boundary (WSDOT)



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Data Source: ESRI Aerial Imagery
Mapped streams from Pierce County
Property Lines, Right-of-Way, Easements from PACE Engineers

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Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Fish and Wildlife Habitat Conservation Area Impacts

White River to Alderton 230 kV Transmission Line
Sumner and Pierce County, Washington

GeoEngineers

Figure 5

APPENDICES

GeoEngineers

APPENDIX A
Floodplain Analysis Letter

GeoEngineers
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

January 29, 2015

Puget Sound Energy
3130 South 38th Street, MS/TACLL
Tacoma, Washington 98409

Attention: Andy Markos, AICP, CEP

Subject: Alderton to White River Floodplain Analysis
Proposed Alderton 230kV Transmission Line
Sumner, Washington
File No. 0186-743-06

INTRODUCTION AND PROJECT UNDERSTANDING

GeoEngineers, Inc. (GeoEngineers) has prepared this floodplain analysis for Puget Sound Energy (PSE) to document compliance of the Alderton to White River 230kV Transmission Line (Project) with the City of Sumner (City) and Washington's Flood Damage Prevention regulations (SMC 15.52). The Project proposes the placement of 82 power poles, some of which are to be located in the White River and Puyallup River 100-year floodplains. Of a total 82 poles assessed, five were identified as requiring a detailed hydraulic assessment to evaluate any change in base flood elevations within the regulatory floodplain.

Regulatory and Hydraulic Modeling Background

SMC 15.52.255 requires that developments within areas of special flood hazards shall not increase the base flood elevation by more than one foot. Special flood hazard areas are defined as areas subject to a one percent chance of flooding in any given year. The one percent chance flood is also referred to as the "100-year flood". Based on metadata provided by the City, this inundation boundary is the City's preliminary Digital Flood Insurance Rate Map (DFIRM) and was developed by the Federal Emergency Management Agency (FEMA) (Sumner 2015). FEMA hired Northwest Hydraulic Consultants Inc. (NHC) to study and map major river systems in Pierce County to update and replace the 1980's FIRMs and these maps are in the process of becoming certified by FEMA.

The City hired WEST Consultants Inc. (WEST) to develop two, one-dimensional, steady-state hydraulic models of the White River. WEST used the US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) software of the Lower White River and WEST described the development and results of each model in the "Lower White River Hydraulic Investigation Memorandum" dated January 22, 2014 (WEST 2014). WEST developed an existing conditions model to reflect the conditions of the Lower White River channel and adjacent floodplain at that time. WEST modified the existing conditions

model to reflect several anticipated projects within the City to create a future conditions model (WEST 2014). Those future conditions analyzed include a levee setback project proposed by King County, a new crossing of the White River at 24th Street and fill placed in the floodway fringe on the east overbank downstream of Stewart Road (WEST 2014). The future conditions model developed by WEST has been accepted by the City as the best available data and is currently being used for planning purposes. The WEST model supersedes the outdated FEMA model from 1987 and is used within this hydraulic assessment. Therefore, the WEST future conditions hydraulic model was used as a basis of comparison for potential base flood elevation impacts associated with the installation of power poles within the White River floodplain.

One of the power poles is within the Puyallup River floodplain and required use of a Puyallup River hydraulic model for analysis. The proposed power pole is located in the northern floodplain of the Puyallup River within the City. As part of a previous project, GeoEngineers prepared a HEC-RAS hydraulic model of the Puyallup River for Pierce County (County) and published the results in "Levee Setback Feasibility Analysis Puyallup River Watershed" dated June 18, 2008. After discussions with the County, it was determined that the County considers that study as being the most current hydraulic model of the Puyallup River (Dennis Dixon, personal communication). Therefore, GeoEngineers considers that model to be the Effective Model of the Puyallup River and used it as a basis of comparison for potential flood elevation impacts associated with the installation of power pole 4/5.

Hydraulic Analysis

GeoEngineers obtained the Effective Models from WEST for the White River and from internal files for the Puyallup River to evaluate the effects of the Alderton to White River Project on the White River and Puyallup River floodplains, respectively. GeoEngineers obtained the base flood inundation boundary in geographic information system (GIS) format from the City of Sumner and the 82 proposed pole locations in GIS format from PSE. The objective of this study was to evaluate the potential flood impact of power pole placement within the regulatory floodplain, as such our modeling efforts were limited to poles located within the 100-year flood inundation boundary provided by the City.

There are a total of five poles proposed for the Alderton to White River 230kV Transmission Line Project within effective flood boundaries and the City of Sumner jurisdictional boundaries. Four poles (1/1, 1/2, 3/4, 4/3) are proposed within the White River Floodplain and one pole (4/5) within the Puyallup River floodplain. Refer to Figure 1 for pole locations, floodplain boundaries, City boundaries and ineffective flow areas.

Poles 1/3, 3/5, 4/2 and 4/4 are located close to the floodplain inundation boundary provided by the City. Upon closer hydraulic evaluation, these poles lie either outside the floodplain or within ineffective flow areas and as such and do not require modeling (See Figure 1).

Pole dimensions were provided by PSE, and are presented in Table 1.

TABLE 1. PROPOSED POLES AND DIMENSIONS

Pole Number	Diameter (feet)
1/1	7.5
1/2	7
3/4	7.5
4/3	7
4/5	7.5

GeoEngineers created two Corrected Effective Models by modifying the Effective Models to include three new cross sections for each of the modeled pole locations. These additional cross sections were generated through cross section interpolation within the HEC-RAS program utilizing the nearest Effective Model cross sections as upstream and downstream bounding cross sections. One cross section was located directly upstream of each pole by a distance equal to the diameter of the modeled pole, one was located through the center of the pole, and one was located directly downstream by a distance equal to twice the diameter of the modeled pole. These distances upstream and downstream of the pole coincide with the points that flow would start contracting to go around the pole and then fully expanding after going past the pole, while the section at the center of the pole would represent the full obstruction of the pole (Post Project Model only). The additional three cross sections added to the Puyallup River model incorporate additional geographic elevation data originating from 2010 Pierce County light detection and ranging (LiDAR) data, obtained by GeoEngineers. GeoEngineers ran the Corrected Effective and Post Project models in a subcritical flow regime to match FEMA modeling requirements.

GeoEngineers developed two Post Project ("with poles") Models by modifying the Corrected Effective Models to include the proposed poles as hydraulic obstructions. Obstruction widths were set equal to the diameter of the proposed poles (diameters provided by PSE). The model was run in a subcritical flow regime to match FEMA modeling requirements.

Results

The floodplain analysis compares the estimated base flood water surface elevations between the Corrected Effective Model (no poles) and Post Project Model (with poles) conditions. GeoEngineers calculated the water surface elevations (WSELs) at the interpolated cross sections and the WEST bounding cross sections and compared at each pole location to evaluate the change in WSEL. Results are summarized in Tables 2 and 3 below.

TABLE 2. WHITE RIVER WSEL COMPARISON OF CORRECTED EFFECTIVE AND POST PROJECT CONDITIONS

Pole Identification	HEC-RAS Station	Corrected Effective WSEL	Post Project WSEL	WSEL Change	Description
1/1	5003	57.81	57.81	0.00	WEST Cross Section
	4889.69	57.81	57.81	0.00	Upstream Cross Section
	4882.68	57.81	57.81	0.00	Cross Section Containing Pole
	4867.64	57.81	57.81	0.00	Downstream Cross Section
1/2	4851.59	57.81	57.81	0.00	Upstream Cross Section
	4844.58	57.84	57.84	0.00	Cross Section Containing Pole
	4830.54	57.81	57.81	0.00	Downstream Cross Section
	4813	57.81	57.81	0.00	WEST Cross Section
3/4	7483	54.13	54.13	0.00	WEST Cross Section
	6793.54	53.86	53.86	0.00	Upstream Cross Section
	6786.05	53.86	53.86	0.00	Cross Section Containing Pole
	6772.05	53.85	53.85	0.00	Downstream Cross Section
	6764	53.80	53.80	0.00	WEST Cross Section
4/3	1578	50.80	50.80	0.00	WEST Cross Section
	1565	50.79	50.79	0.00	Upstream Cross Section
	1558	50.79	50.79	0.00	Cross Section Containing Pole
	1544	50.78	50.78	0.00	WEST Cross Section

TABLE 3. PUYALLUP RIVER WSEL COMPARISON OF CORRECTED EFFECTIVE AND POST PROJECT CONDITIONS

Pole Identification	HEC-RAS Station	Corrected Effective WSEL	Post Project WSEL	WSEL Change	Description
4/5	56561	56.47	56.47	0.00	GeoEngineers Cross Section
	56238.5	56.22	56.22	0.00	Upstream Cross Section
	56231	56.22	56.22	0.00	Cross Section Containing Pole
	56216	56.22	56.22	0.00	Downstream Cross Section
	55640	55.90	55.90	0.00	GeoEngineers Cross Section

CONCLUSION

The results of the hydraulic modeling efforts demonstrate no rise in the 100-year flood elevation between the Post Project Model and the Corrected Effective Model. Therefore, the proposed PSE Alderton to White River 230kV Transmission Line project is not anticipated to affect base flood elevations or flood inundation boundaries and is in compliance with City and federal regulations.

LIMITATIONS

GeoEngineers has prepared this letter report for Puget Sound Energy and their authorized agents for the Alderton to White River 230kV Transmission Line Project. The conclusions presented in this report are limited to the project impacts described herein to base flood elevations within the City of Sumner.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of hydraulic engineering and hydraulic modeling in this area at the time this report was prepared. The conclusions, recommendations and opinions, presented in this report, are based on our professional knowledge, judgment and experience. No warranty or other conditions, expressed or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

REFERENCES

Federal Emergency Management Agency, "Flood Insurance Study, City of Sumner, Washington. Pierce County." June 18, 1987

GeoEngineers. 2008. Levee Setback Feasibility Analysis Puyallup River Watershed, Pierce County, Washington. June 18, 2008 Redmond, Washington.

United States Army Corps of Engineers. Hydraulic Engineering Center – River Analysis System (HEC-RAS). Version 4.1.0. 2010.

WEST Consultants, Inc., "Lower White River Hydraulic Investigation Memorandum." January 22, 2014

Sincerely,
GeoEngineers, Inc.

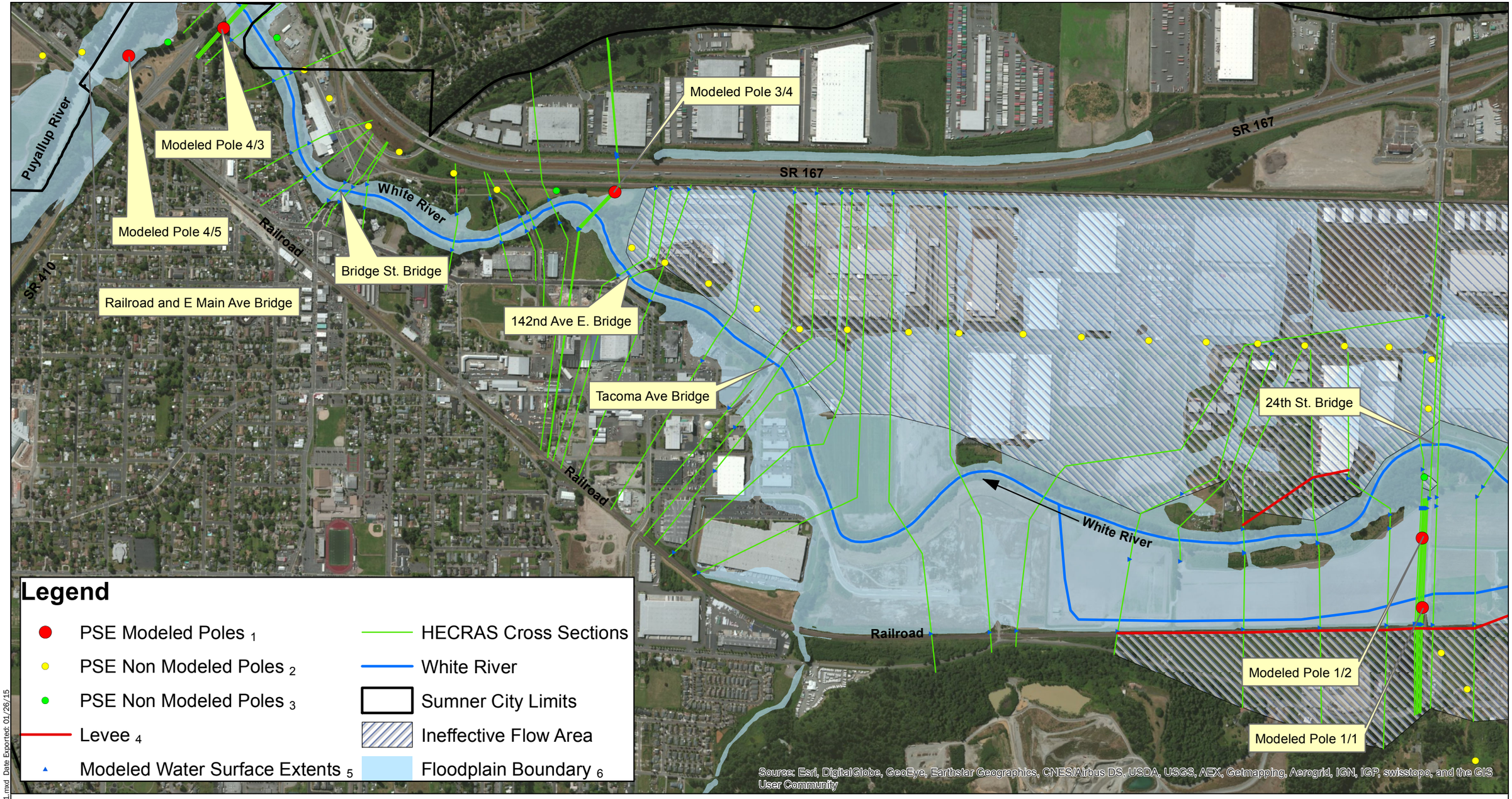
Jonathan Ambrose
Senior Hydrologist

Jeff Fealko, PE
Senior Water Resources Engineer

JMA:JF:leh

Attachments:
Figure 1. Project Overview
Appendix A. Report Limitations and Guidelines for Use

One copy submitted electronically



Legend

- PSE Modeled Poles 1
- PSE Non Modeled Poles 2
- PSE Non Modeled Poles 3
- Levee 4
- Modeled Water Surface Extents 5
- HECRAS Cross Sections
- White River
- Sumner City Limits
- Ineffective Flow Area
- Floodplain Boundary 6

Data Source:

Notes:
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- GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

Key Notes:
1. Puget Sound Energy (PSE)
2. Poles located outside floodplain or within ineffective flow areas
3. Poles located outside floodplain or within ineffective flow areas further evaluated by hydraulic cross section.
4. Location of levee as modeled by WEST Consultants Inc.
5. Water surface extents as modeled by WEST Consultants Inc.
6. FEMA Zone AE, 100 year floodplain innundation boundary obtained from City of Sumner.

W N S E

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Feet

Project Overview

Puget Sound Energy Alderton to White River
Sumner, Washington

GeoEngineers

Figure 1

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APPENDIX A
Report Limitations and Guidelines for Use

APPENDIX A
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Geomorphic Services Are Performed For Specific Purposes, Persons And Projects

This report has been prepared for the exclusive use of Puget Sound Energy and their authorized agents. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each study is unique, each report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted hydraulic engineering and hydraulic modeling practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A Hydraulic Engineering Report Is Based On A Unique Set Of Project-Specific Factors

This report has been prepared to evaluate potential flood impacts for a portion of the White River through the City of Sumner. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored.

Hydraulic Conditions Can Change

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

A Hydraulic Engineering Report Could Be Subject To Misinterpretation

Misinterpretation of this report by others can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate stakeholders or members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a hydraulic engineering report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, hydraulic engineering, or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Have we delivered World Class Client Service?

Please let us know by visiting **www.geoengineers.com/feedback**.

GeoEngineers