PUGET SOUND ENERGY

energizeEASTSIDE

Eastside 230 kV Project Constraint and Opportunity Study for Linear Site Selection

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Energize Eastside Constraint and Opportunity Study Summary

PSE's System Planning evaluated a variety of options for addressing the Eastside's growing energy needs including conservation, local generation, and infrastructure improvements (e.g., transmission lines and substations). They found that even with aggressive conservation efforts, demand will outstrip supply in a few years. Additionally, local generation would be difficult to execute in a timely manner and ultimately would not meet long-term needs.

Solution and Route Development

Based on PSE's technical evaluation of potential solutions the most effective way to ensure the Eastside's power system will meet growing demand is to add a new 230 kV transmission line to connect PSE's Sammamish (Redmond) and Talbot Hill substations (Renton). With these endpoints in mind, PSE contracted with Tetra Tech, Inc. to employ a graphical information system (GIS)-based Linear Routing Tool (LRT) to conduct a broad evaluation of possible transmission line routes.

The LRT is a tool developed by Tetra Tech based on commercially available geospatial technology and Tetra Tech's linear routing experience. It is a collaborative process that combines powerful analytical software with project experience, system planning, engineering, land use and local knowledge considerations. The LRT's innovative geospatial tool identifies the most suitable route alternatives based on modeled environmental and infrastructure factors.

PSE and Tetra Tech began this process by identifying an approximately 255 square mile study area that encompasses the Sammamish Substation in the north and Talbot Hill Substation in the south. The study area is bounded on the west by the eastern shore of Lake Washington and extending far enough east to include the BPA corridor near Soaring Eagle Regional Park (located north east of the City of Sammamish). Any new transmission line route must connect to a new 230 kV to 115 kV transformation site within this area in order to solve the problem. Potential transformation sites within the study area include Lakeside, Westminster, and Vernell substations, which are all located in the City of Bellevue.

Tetra Tech staff collected existing available data and GIS files for land ownership, land use, public and private rights-of-way (ROW), wildlife, vegetation, threatened and endangered (T&E) species, environmentally critical areas, topography, historical resources, and other factors that would influence the location of the proposed transmission line, such as visual aesthetic based on the presence of existing lines. The data collection process was designed to provide geospatial information on criteria that could represent credible baseline opportunities and/or constraints for the location of an above-ground transmission line.

A team of LRT experts, system planners, engineers, land use planners and environmental professionals individually weighted various data layers of the model to reflect the varying degree of constraints or opportunities for each data set. The team assigned values to the data layers using a progressive scale of values ranging from the greatest constraint, such as endangered species, residences and safety hazards, to the greatest opportunity, such as existing PSE transmission lines. A value of zero was assigned to data layers that were considered neutral.

The LRT combined these data layers and created an output file called the suitability grid, which represents a summation of all the constraints and opportunities for every point (grid cell) across the entire study area. The LRT processed and combined the data layers to model preferred corridors across the suitability grid, while still connecting the corridors to one of the transformation site options within the study area. These preferred corridors were used to develop alternative routes.

To provide for more flexibility in the route analysis, each route was partitioned at the crossing points, or nodes, to create unique segments. Each unique LRT segment was validated using professional engineering judgment and available ancillary resources such as aerial photographs, to help assess whether they were feasible options. Once the segments were generated and validated, a composite score was calculated for each segment from the underlying suitability grid. A deterministic model was used that considered more than 500 combinations of segments and transformation sites. If parallel segments (i.e., typically less than a block apart) were identified during the model evaluation, LRT scores were compared to determine which segment would be used to develop routes.

Preliminary Routes

The LRT scores for the potential routes were considered and many routes were eliminated from further consideration as they were not considered viable options. The remaining routes were then mapped to facilitate further discussion and evaluation, with the segment combinations for these routes provided in Table 1-1, below.

Table 1-1. Route Segment Composition

Vernell 248	Vernell 249	Westminster 217	Lakeside 155	Lakeside 160	Lakeside 166
A	A	A	A	A	A
B	B	C	C	C	C
F	F	D	E	E	E
H	H	F	G2	G2	J
K1	L	H	G1	I	M
K2	N	L	H	K1	N
M		N	L	L	
N			N	N	

The mapping exercise revealed that there are four general subareas, which when combined, formed a "ladder" of route alternatives. The "leg" components of the ladder comprised the north-south running routes connecting Sammamish, Talbot Hill, and one of the new transformation substations. Moving east to west between the "legs" could be accomplished by using one of the three cross-over segments or "rungs." The only exception to this being an additional north-south segment situated in the central part of the study area, south of I-90. To simplify future discussion, each of the fourteen legs and rungs were given a unique identifier (Figure 1-1). All of the mapped segment combinations can be used to develop a route that meets the goal of connecting the Sammamish with the Talbot Hill substation, while connecting to any one of the three intermediary substations. Further route refinement will continue during the on-the-ground data collection phase and public process, culminating in the selection of a preferred route.

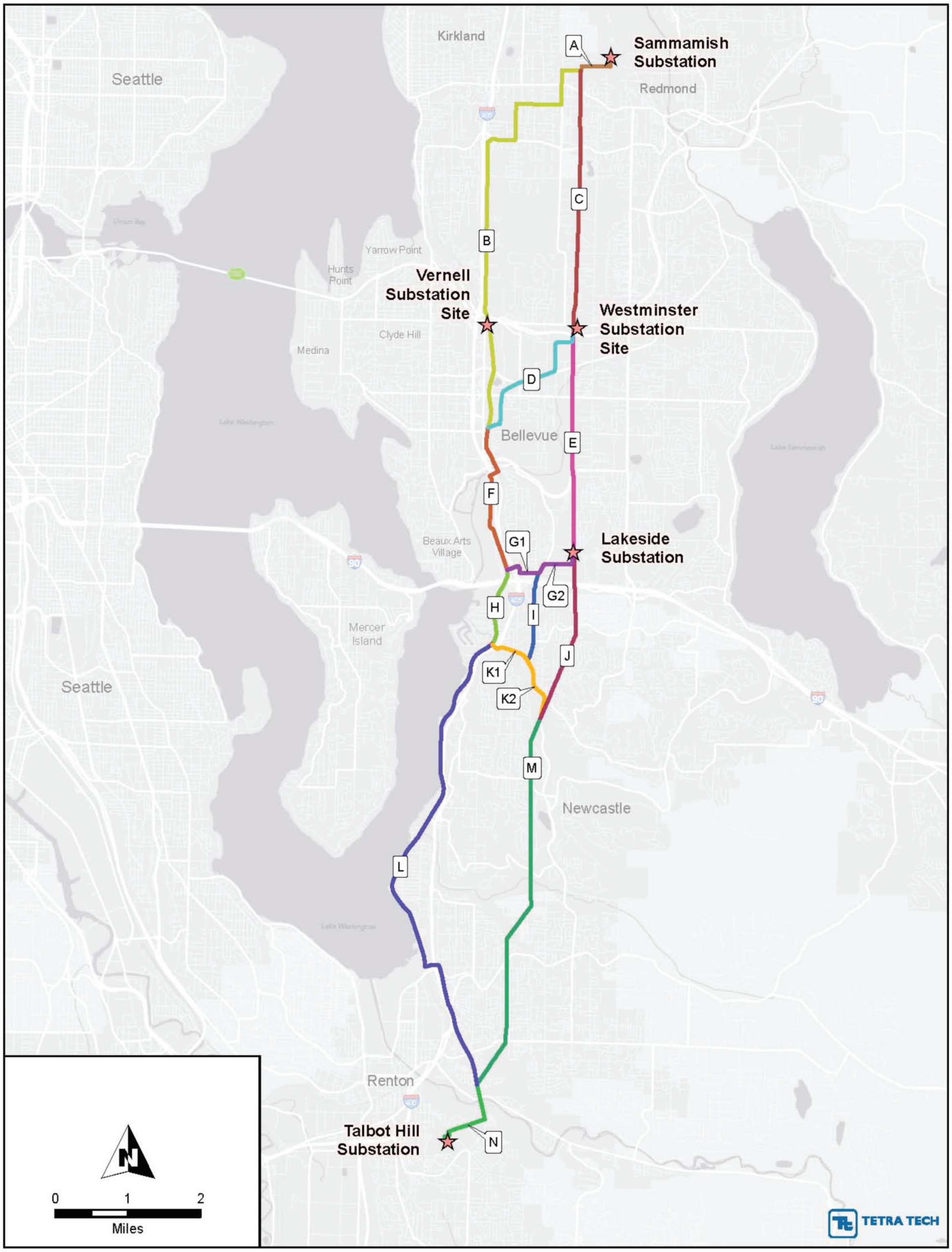

Figure 1-1: Route Segments