TESTIMONY OF BRAD STRAUCH
IN SUPPORT OF ENERGIZE EASTSIDE
REDMOND CONDITIONAL USE PERMIT
FILE NO. LAND-2021-00487 & LAND-2021-00521

June 6, 2022

Ms. Hearing Examiner, my name is Brad Strauch, and I am the Program Manager for the Energize Eastside project. I have a Bachelor of Science degree in environmental and systematic biology and have been working at PSE for more than 15 years. Additionally, I have more than 25 years of experience performing environmental analysis, siting, and permitting for utility projects. This includes not only electrical transmission lines and substations, but also pipelines, and power plants.

I want to start our presentation by briefly describing our transmission system in the Eastside and why we are here today. I am going to put a slide up on my screen. Please let me know if you cannot see it.

Solving the Missing Link

On the Eastside of Lake Washington, electricity is currently delivered through two 230 kilovolt (kV) bulk electric substations—the Sammamish substation in Redmond and the Talbot Hill substation in Renton. From these two primary delivery points, electricity is then distributed to neighborhood distribution substations using 115 kV transmission lines.

While Energize Eastside between Sammamish and Talbot Hill substations is only 16 miles long within our existing corridor—which was established in the late 1920s and 1930s—the planning for this project was complicated by the extensive urbanization of the area that has occurred over the last 50 years. A positive aspect of planning this project is that we have benefitted from the modern pole and wire configurations now available. Our witnesses will describe several ways how this project is an improvement over the existing system.

We are here today because under federally mandated transmission system reliability standards, PSE must have sufficient infrastructure to meet existing and foreseeable demand. Over a decade ago, PSE's electricity demand forecasting projected that the demand for electricity would exceed the capacity of the Eastside's transmission system as early as winter 2017–2018 and summer 2018 under various scenarios. Since then, that demand has been confirmed not only through multiple studies over the years, but also by the actual data from recent years. To put it simply, the need for this project is no longer a question of forecasting—the project is needed to address peak loads ***today***.

The Energize Eastside project will provide the necessary infrastructure to address that transmission deficiency in the form of (1) a new substation known as Richards Creek in Bellevue, (2) upgrading transmission lines within the existing corridor in Redmond, Bellevue, Newcastle, and Renton to supply this new substation, and (3) continued aggressive conservation. The increased demand for electricity on the Eastside, including Redmond, drove the need for this new substation and associated lines. As assessed in the project's two-phase EIS, the addition of the Richards Creek substation and associated transmission lines, using the existing corridor, is the least impactful way to meet the increased demand.

PSE has worked extensively on this project with its team of experts and with the Eastside cities. We worked closely with Redmond and the other Partner Cities as they drafted the phased EIS documents, participated in public meetings during the environmental and permitting processes, and addressed the questions and information requests we received from the City. We appreciate and agree with the City's review, and we are pleased to have our team of experts here tonight to present on this project.

I will be focusing on the management and replacement of vegetation for this project. Since Energize Eastside was rolled out in late 2013, the public has expressed concern about the number of trees that PSE is required to remove to construct and operate the proposed 230 kV transmission lines. Listening to this feedback, PSE created a new project goal—to make sure that there are more trees on the Eastside at the completion of the project, not fewer.

While PSE does have to remove trees as part of the project, and is committed to replacing them, it is important to understand why tree removal is necessary. Utilities, like PSE, are required by the National Electric Reliability Corporation, or NERC, to have a plan to manage and maintain trees located in transmission line corridors that are operated above 200 kV. This requirement, known as FAC-003-4, seeks to prevent trees from growing into or falling on power lines, which can cause power outages. Since the existing 115 kV lines are to be upgraded to 230 kV, in order to meet the NERC standard, certain trees along the existing corridor need to be trimmed or removed.

1936 Redmond Aerial

A key factor for PSE in selecting the existing corridor for the Energize Eastside project is that it has the fewest impacts to trees when compared to the other routes that were considered. The existing corridor was created specifically for electrical transmission lines in the late 1920s and early 1930s. As a result, the majority of the trees that PSE is proposing to remove as part of this project have been regularly managed by either trimming or topping over the years with the last vegetation maintenance cycle occurring last year (2021). Based on certified arborists' assessments, over 90 percent of the regulated trees that are expected to be removed in Redmond have been classified as being in either fair or poor condition. This again is because they have been topped or trimmed over the years causing them to decline in health.

Tree Removal Concentrations

Along the 2-mile Redmond segment, the majority of trees in the corridor are located in three principal areas—southwest of the Sammamish substation, between Redmond Way and NE 80th Street, and between Old Redmond Road and SE 60th Street. This can be seen on this slide and is also shown in the FEIS at 4.4-17. In the Redmond segment, we have identified approximately 460 regulated trees that are expected to be removed to meet electrical safety clearances. Around half of the trees that have been inventoried in the Redmond project area will be retained, which exceeds the City's code requirements.

As I have previously said, PSE has been rigorous in responding to the public's concern regarding trees and is committed to providing more trees than are removed as part of the project. To accomplish this, we will use the approach provided in our May 27, 2021, Vegetation Replacement Approach, which is part of the Vegetation Inventory and Tree Health Assessment Report prepared for the Project (*see* Attachment 11 to the staff report). Although utility projects are exempt from permit requirements for removing trees outside of critical areas, as provided for in RZC 21.72.030.A.3, PSE has proposed replacement trees which exceeds the number that will need to be removed. PSE's Vegetation Replacement Approach specifies replacement tree ratios ranging from 1:1 to 3:1, depending on the diameter of the tree that will be removed. This means that PSE's proposal—which has been consistently applied through all of the cities impacted by the Energize Eastside project—goes beyond the City's requirements in mitigating for tree impacts. Additionally, PSE will meet the replacement requirements for those trees that need to be removed from critical areas as allowed for under RZC 21.72.090.

Example Landscape Plan

To implement our vegetation plan, we have worked diligently with the property owners over a series of years to understand their tree replacement preferences, identify trees that can remain, and develop replacement landscaping plans. An example of these plans is included in the Vegetation Replacement Approach (which is attached to the Staff Report at Attachment 11 (page 67) and is shown on the screen. To date, we have invited and offered to meet with all property owners who are expected to have vegetation changes along the route in Redmond, with ten of the fourteen property owners electing to meet with PSE. During these meetings, PSE shares proposed landscape plans that have been developed for each property with the owners. The property owner and PSE then work together to make changes to the plans based on the owner's input. To date, PSE's work with Redmond private property owners has resulted in more than 250 transmission line compatible trees being proposed on the draft landscape plans. Additionally, more than 1,500 additional trees are being proposed on PSE property near the Sammamish substation. This is more than three times the number of regulated trees that are expected to be removed and more than three times the number of replacement trees required based on the proposed replacement ratios.

We expect that future meetings with the remaining four property owners will provide opportunities for additional new transmission line compatible trees along the corridor. PSE is fully committed to fulfilling all of the tree planting and critical area conditions proposed by the City.

In conclusion, PSE has demonstrated that with appropriate mitigation and voluntary planting efforts, we can effectively meet the City's code requirements as well as improve tree health and coverage within the City. At the close of our presentation, I and our other witnesses will provide written copies of our testimony for the record.

TESTIMONY OF JACK MIDDLETON
IN SUPPORT OF ENERGIZE EASTSIDE
REDMOND CONDITIONAL USE PERMIT
FILE NO. LAND-2021-00487 & LAND-2021-00521

June 6, 2022

My CV has been provided as an exhibit, so I will provide just a brief overview of my background. I am currently a Senior Project Manager for Tetra Tech, and I have over twenty years of experience as a project manager and environmental scientist. As you can see from my CV, I have extensive experience conducting technical environmental review and analysis services, including the assessment of visual resource impacts for a wide range of private and public sector clients.

The City's provisions for conditional use permits require a demonstration of compatibility with character, appearance and physical characteristics of the subject property and the immediate vicinity, and consistency with the City of Redmond Zoning Code and the Comprehensive Plan, consistent with RZC 21.76.070.K.4.a and b. My work was focused on looking at these permit requirements. As part of my analysis, I have reviewed background documents developed for the Project, and I conducted a site-visit to the Project on August 20-22, 2021. During the site visit, I inspected the Energize Eastside Project corridor in multiple locations along the proposed line, including in Redmond, and viewed the Project from multiple viewpoints within and adjacent to the corridor. Following the site visit, I conducted meetings with my technical staff, including landscape architects and GIS analysts, to discuss the Project's compatibility and potential impacts to visual resources from the Project.

Discussion of FEIS

I'd like to begin by discussing the FEIS's analysis of this project. The FEIS analyzed impacts to scenic views and aesthetics for each of the segments, including Redmond. The FEIS concluded that the visual impacts in Redmond would be less-than-significant, stating, "The segment is located within PSE's existing corridor, and the degree of contrast with the existing environment would be minimal. Impacts to

scenic views are unlikely due to the presence of dense vegetation and tall tree stands."[1] As the FEIS also noted, Redmond does not have regulations that directly address mitigation of impacts to scenic views or the aesthetic environment that could be produced by this project.[2] The FEIS concluded the project is consistent with existing plans and policies. As I'll describe in more detail, I agree with the FEIS's conclusions.

Discussion of Existing Conditions

As the FEIS noted, looking at the existing conditions of the utility corridor provides important context for understanding how PSE's proposed transmission line upgrade is consistent with the City of Redmond's conditional use permit requirements.

Aerials Exhibit

The Energize Eastside Project uses the existing utility corridor that was developed in the late 1920s and has been utilized as such since its inception. The use and general size of this existing utility corridor has not changed since its original creation in the late 1920s. This 1938 aerial photo shows where the Energize Eastside Project is located in Redmond, with the utility corridor outlined in yellow. I would note the absence of residential or municipal development in the area in and around the proposed Project, or the entire utility corridor.

This aerial from 1968 shows early development, particularly south of what was referred to then as SR 908 and now recognized as Redmond Way. Around this time, in the 1960s, Olympic Pipeline Company acquired easements within the corridor and began installation of the two underground petroleum pipelines that remain within the shared utility corridor. The aerial from 1981 shows further development surrounding this portion of the existing utility corridor, particularly south of what was then SR 908. The aerials from 1990 and 2004 show continuing residential and commercial development throughout this portion of Redmond. Together, these historic aerials show that the "existing or intended character, appearance, quality of development, and physical characteristics of the subject property and

[1] FEIS at p. 4.2-15.
[2] FEIS p. 4.2-50.

immediate vicinity," as stated in Redmond Zoning Code 21.76.070.K.4.b, is one of a utility corridor, designated as such and utilized in the same manner for decades before the residential and commercial development of the surrounding areas of Redmond.

I also want to emphasize that use of the existing corridor for the Project minimizes visual and other potential impacts to sensitive resources. Constructing new transmission lines in areas that do not have utility infrastructure represents a much higher level of impact to most sensitive resources compared to using existing corridors. Creating a new corridor that would connect to the Project termini would require condemning approximately 18 miles of property in this area of King County and could cross or be required to avoid wetlands, sensitive species habitat, schools, recreational facilities, and residences. It would also introduce a new utility corridor where one does not currently exist, potentially located in neighborhoods that may have never contemplated such a use. As noted on page 3 in the City of Redmond's Staff Report for this Project, "(u)se of the existing corridor [which has housed transmission lines since the 1920s and 30s] minimizes potential impacts to the environment and to adjacent uses to the fullest extent feasible." Using the existing corridor is consistent with Redmond's Comprehensive Plan Policy UT-12, which calls for minimizing impacts of utility facilities by "locating utility corridors in existing cleared areas." The Project's location would also be consistent with Redmond's Comprehensive Plan Policy UT-9, which promotes efficiency of utility placement by locating the upgrade within a co-located utility corridor.

PSE's Proposed Design is Informed by Safety Criteria and Minimizes Impacts

To provide further context for understanding how the Project is compatible with the subject property and the immediate vicinity, we should also look at the specific changes being proposed as part of the Project. Here, numerous studies have confirmed the need to update the existing 115 kV lines to 230 kV, as discussed in greater detail in the testimony of Brad Strauch, PSE's Program Manager for the Energize Eastside Project. Once specific transmission upgrade necessities are identified, the specified voltage of the line determines the available structure design necessary to carry the voltage. To meet the National Electric Safety Code (NESC), FERC, and North American Electric Reliability Corporation

(NERC) requirements for the safe operation of a 230 kV transmission line, the pole heights, spans, and clearances of the proposed transmission lines and structures are designed to facilitate the safe operation of the line, taking into account the site conditions. Indeed, as the City of Redmond's Staff Report notes on page 34 , "The conversion from 115kV to a 230kV line requires PSE to maintain trees at a lower height of 15 feet than is required for the existing 115kV line at 25 feet." I understand that PSE has designed both 230 kV lines according to these requirements, and the final design minimizes structure and conductor height and clearances to the extent practicable for this specific transmission line and transmission line corridor.

Simulation KOP Central 39

Reducing the height of the proposed structures would not be possible without a commensurate increase in corridor width or additional poles. For example, PSE examined the potential for reducing the height of the poles for the Project to approximately 65 feet within the existing corridor in Bellevue. This slide is a simulation that shows the results of that analysis. As the Exhibit shows, to reduce the pole height in the existing corridor width, which is limited by the presence of the two Olympic pipelines, PSE would need to increase the number of poles as well as site the poles on properties that do not currently have poles. As you can see from the exhibit, this increase in poles would also require additional vegetation removal and would create greater visual impacts compared to the design that PSE selected.

SCL Tower

The proposed transmission structures design itself has also been developed to reduce the footprint within the corridor compared to the existing H-frame structures. For transmission lines in general, lattice steel towers are a more commonly used design for higher voltages such as 230 kV.

Monopole Designs

This photograph depicts an existing 230 kV Seattle City Light pole with the steel lattice design. Rather than using that design, PSE is proposing tubular steel single and double circuit monopoles. The current slide shows the four pole types that will be present in the Redmond segment, with C-1 being the most predominant. These proposed structures are narrower designs that require less vegetation removal and

have a narrower visual profile compared to other designs, including lattice steel towers. An additional benefit is that the new structures can support additional weight, resulting in a reduction in the total number of required structures. In this case, the Energize Eastside Project would reduce the total number of structures from 41 to 28 in Redmond. As the FEIS concluded, the project reduces visual clutter in the corridor. Also, as noted in the City of Redmond's Staff Report on page 31, "(t)he new transmission line would have consistent form and height throughout the segment and would reduce visual clutter by reducing the number of poles."

Finally, although the individual diameter of the proposed monopoles is greater than the existing H-frame wooden structures, the footprint type associated with monopoles is generally considered to be reduced compared to H-frame structures, as the single pole takes up less total space compared to two smaller wooden poles combined with the area in between the poles. No structures or mature vegetation may be placed within the area between the outer poles of the H-frame, resulting in a wider total footprint compared to a monopole design.

To summarize, my review of PSE's proposed facility design confirmed that there are several actions proposed for the Project that minimize aesthetic impacts to the extent practicable when building a high voltage transmission line of this voltage and within this specific corridor.

Discussion of Visual Simulations

To further develop our analysis, my team and I also carefully examined the visual simulations that have been prepared for this project, and we developed additional visual assessments, which I will now discuss.

Chapter 4 of the FEIS includes over 30 viewpoints selected at specific locations along the proposed alignment to show different ways the Energize Eastside project could impact the natural and built environments, including two viewpoints in Redmond. To fully consider the magnitude and context of potential impacts to the aesthetic environment, it is helpful to provide a more complete visual inventory of the project with additional viewpoints. To that end, ten additional visual simulations have been submitted as part of PSE's exhibits.

Renton Photo Simulation and Finished Project Comparison

Before getting into the simulations developed for the Redmond segment, I want to briefly explain why visual simulations are a standard component of visual impact analysis. When correctly done, a visual simulation represents a project's appearance and context as it would appear in real life, without either embellishing or minimizing potential aesthetic impacts. Visual simulations require technical accuracy, including precise 3D modeling, photo-editing, and engineering-level detail, as well as an understanding and incorporation of aesthetics considerations such as visual quality, height and scale, and selection of specific viewpoint locations. The top visual on this slide is a visual simulation of the project in Renton, while the bottom visual is a photograph of the final, installed poles in Renton. As you can see, the simulation and the finished project are nearly identical, meaning the simulations allow viewers to accurately "see" the project before it is built.

These simulations accurately depict the proposed Project across the landscape as they use the pole heights, locations, and structure types from the actual engineering design. The simulations also depict potential vegetation removal and regrowth at each location. The utility corridor was initially cleared during the original transmission line construction in the 1920s, and vegetation maintenance within the corridor is regular and ongoing. However, the upgrade from 115 kV to 230 kV requires PSE to maintain trees at a lower height (15 feet) than is required for the existing 115 kV line (25 feet), to comply with the North American Electric Reliability Corporation standard. As part of the mitigation for the required tree removal to meet this standard, PSE has developed draft landscape plans that propose replacement trees and vegetation for each property along the transmission corridor, as Brad Strauch just described. These simulations show vegetation regrowth under PSE's landscape plans five years after planting, which is a common way of depicting the near-term screening benefits of regrowth before full maturity.

The simulations confirm that the project's aesthetic impacts are less-than-significant, as the FEIS described. For example, Viewpoint 2 shows the reduction of visual clutter through reducing the number of poles from existing conditions. It also shows an area along Redmond Way where the existing evergreen trees would exceed the maximum height allowed by the North American Electric Reliability

Corporation standard. The 'Proposed Conditions' depicted in the simulation depict the required existing tree removal that would occur within the existing corridor, as well as regrowth at 5 years under PSE's proposed landscaping plans that would mitigate the degree of contrast from existing to proposed conditions. The next viewpoint, Viewpoint 3, also shows the reduction of poles within the corridor. Along with Viewpoint 2 above, this simulation also illustrates how the upgrade to 230 kV requires maintaining trees at a lower height within the existing corridor compared to the existing 115 kV lines. As you can see in the 'Proposed Condition', the evergreen trees in the center of the corridor have been removed to comply with the North American Electric Reliability Corporation standard for 230kV lines.

Viewpoint 4 provides a good example of an area where no vegetation removal or planting is planned; however, as shown in the simulation, the removal of the two 115 kV lines reduces the visual clutter found in the existing conditions viewshed.

Viewpoint 5 similarly shows the reduction of poles and vegetation within the corridor. As shown here, the existing corridor is already cleared, while the areas near the corridor feature dense vegetation. The required removal of vegetation within the already-cleared corridor at this location will not affect the overall appearance of the surrounding tree stands and woodland views. In addition, as shown on Viewpoint 6, while the corridor is visible from the surrounding neighborhoods at some locations, the views are largely screened by dense, mature vegetation around the corridor that will not be affected by the project. Potential impacts to viewers at these types of locations along the corridor would be short term and located at breaks in the surrounding mature vegetation. Viewpoints 7 and 8 provide good examples of the change in structure type and the associated required removal of underlying vegetation to meet the North American Electric Reliability Corporation standard. We have provided additional photo simulations, and I'm happy to answer questions about any of the viewpoints.

In conclusion, based on my site visit, review of project documents, and the development of additional simulations, I agree with the FEIS's conclusions that the project will have less-than-significant aesthetic impacts in Redmond. I also agree with the FEIS's conclusion that the Project is consistent with Redmond's Comprehensive Plan policies. For example, the project ensures adequacy of public utilities

(consistent with Policy UT-1) by providing a necessary upgrade; promotes efficiency of utility placement by locating the upgrade within a co-located utility corridor, consistent with Policy UT-9; minimizes impacts by using the existing corridor, consistent with Policy UT-12; and ensures necessary vegetation management consistent with federal clearance requirements while mitigating through vegetation replacement measures, consistent with Policy UT-65.

Before I conclude my testimony, are there any questions I can answer for you?

Thank you.

TESTIMONY OF LOWELL ROGERS
IN SUPPORT OF ENERGIZE EASTSIDE
REDMOND CONDITIONAL USE PERMIT AND SITE PLAN ENTITLEMENT
FILE NO. LAND-2021-00487 & LAND-2021-00521

June 6, 2022

Good evening, Your Honor. My name is Lowell Rogers, and I am a licensed Professional Engineer in Washington and California. I have 25 years of experience in transmission line siting, design, and construction. As a result, I have worked on the design or siting of over 1,700 miles of transmission lines in a variety of settings such as suburban, industrial, and dense urban settings like that in which the Energize Eastside Project is located. Since shared utility corridors are often promoted by municipalities, which is the case in Redmond as reflected in the City's Comprehensive Plan policy UT-9, throughout my career I have worked on a considerable number of transmission lines that are designed, built, and operated in the corridors shared with fuel pipelines.

SPECIFIC PROJECT REPONSIBLITIES

I have performed several roles regarding Energize Eastside including project manager for the preliminary design and routing alternatives analysis and then advisor in the detailed design, permitting, and construction services contracting phases of the project. Through those roles on the project, I have been part of the planning process to ensure that the Energize Eastside transmission facility is designed and constructed safely in accordance with all applicable safety regulations for transmission line construction. In this capacity, I can confirm that the project has been designed to be constructed and operated in a manner consistent with applicable federal, state, and regional statutes and regulatory frameworks pertinent to high voltage transmission lines in accordance with Redmond Zoning Code Section 21.76.070.K.4.d. Further, the facility

will be constructed in a manner to protect the public's health, safety, and welfare—including in regard to the safely co-locating this electric transmission line with and Olympic Pipeline Company's pipelines, provided the designs, specifications, and permit requirements are executed as planned, which I have no reason to believe will not be the case.

Construction of a transmission facility occurs in the following order:

- Pre-construction surveying;
- Site preparation and access;
- Construction of the new foundations and poles;
- Removal of old poles;
- Stringing the conductors (wires); and
- Demobilization, clean-up and restoration.

SAFETY ISSUES

Pole Design Optimization

There are several safety considerations I would like to briefly address. On Energize Eastside, I contribute to and review studies and reports required for the design of the project. I also evaluate future construction contractor plans to ensure they meet the applicable safety and building standards that address safety considerations.

The Energize Eastside Transmission Project is about 2 miles long in the City of Redmond and located in an existing energy corridor and will replace two existing 115 kilovolt (kV) transmission lines. This existing PSE electrical corridor in Redmond is shared with petroleum pipelines operated by Olympic Pipeline Company, or OPL.

PSE's existing transmission corridor was established in the 1920's and 30's and the transmission lines that Energize Eastside will replace were built in the 1960's using the technology and safety requirements that existing in the 1960's. OPL completed construction of its pipelines about a decade later. Like most things, safety codes and available

technologies have advanced considerably over the last 50 to 60 years. Current codes, including the National Electric Safety Code, will apply to Energize Eastside. Other codes that guide the project design include the Washington Administrative Code for clearances, wire tensions, and load cases, and ASCE-16, which is referenced within the NESC for weather cases. PSE's standards for structural loads were reviewed and conform with the industry practices of ASCE-74. Steel structures have been designed in accordance with ASCE-48, and the foundations with ACI-318. Within Redmond, PSE intends to predominantly utilize the C-1 structure type while also using the C-1B, C-16, and C-18 structure type in some specific locations.

These codes provide for the safe design, construction and operation of all high voltage transmission lines, including those co-located with fuel pipelines. These codes and standards are far better-informed than those used in the 1960's for how transmission lines perform under extreme weather and seismic events and interaction with other utilities that share the same corridor.

The design of the Energize Eastside project considered 54 different physical loading cases that modeled the range of forces that act on the structures. By this, I mean wind effects, weight from extreme ice, seismic loads, and other forces that act on the transmission line. We have designed the lines for a safe operating envelope that prevents them from getting too close to the ground, vegetation and adjacent structures.

The line is designed for a maximum conductor operating temperature of 200 Celsius. The maximum operating temperature is the actual temperature of the conductor. This is a critical design aspect. As the conductor heats up, it expands, which causes it to lengthen, which in turn causes the conductor (the line) to sag more, thus getting closer to the ground. We design

transmission conductors to account for this maximum sag.

Designing for Line Sag

The need for a safe electrical clearance envelope around each conductor is a factor in the minimum height above the ground. In this case, we need to make sure that we keep 27.4 feet above the ground under all conditions, 10 feet from any vegetation, and 11.4 feet from the edge of the right-of-way under the maximum operating temperature condition. The minimum clearance to trees is 10 feet, which is the driving requirement for tree removal. This design also avoids impeding development outside the right-of-way.

The information that I just described regarding the design parameters of the transmission line is important to the outcome of this proceeding because it forms the basis for a safe and reliable transmission line. This is the principle that guides where the structures are positioned, how tall they are, and how the conductors are arranged. I employ all of these factors in the transmission lines that I work on. These design factors inform me and high voltage transmission engineers like me on how the line safely interacts with its surroundings.

Now, I'll describe the process that PSE has applied in Bellevue, Renton, and Newcastle, and which will be applied here in Redmond, for design and construction of the transmission line in places where the OPL pipeline is in the same corridor.

First, I want to be clear that co-location of utilities is a common practice in the U.S. and around the world. In Redmond, co-location is not only urged upon by the City's Comprehensive Plan policy UT-9, but it is also a practice long in place within Redmond. The OPL pipelines have coexisted with PSE's existing transmission lines in this shared utility corridor for decades without incident, and PSE has a thorough plan to incorporate safety requirements for the project's design and construction as described in the report by

DNV, a leading national pipeline safety consulting firm. I have been directly involved in preparing such plans for the Energize Eastside work done in Bellevue, Renton, and Newcastle and will do so in Redmond as well.

To begin, rather than relying on the recorded depiction of OPL's easement and assuming that OPL's pipelines run squarely down the center, PSE conducted a land survey along the project route and identified pipeline markers and incorporated those features into the preliminary project design. This design then was used in order to confirm OPL's original land survey data. After that, PSE performed an underground survey through the 811 location service. Then, in 2017, the company used ground penetrating radar technology to further confirm the location of all underground utilities that are located within a 50-ft radius of each pole's proposed location.

Using this information, PSE has developed a plan to work with OPL to jointly develop the construction access plan for the Project. This plan addresses all ingress and egress and work locations of all construction equipment and their bearing weights, including the use of different methods of protection, where appropriate.

Steel Plating

These protective measures include the use of wood matting, steel plates, or gravel "air" bridges to allow equipment to safely cross over the pipeline and work in the general area near the pipeline.

For each proposed crossing, and well before construction in the Redmond segment, OPL will be provided with a detailed engineering analysis of how PSE's construction equipment will pass over their pipeline, which is the same process that has been used in other sections of the project where construction has started. OPL has worked with PSE to develop

access on each site and marked their lines and provided depths at each location. OPL has used and will continue to utilize a third-party engineering firm who studies the plans; then OPL reviews each site again with internal engineering staff. OPL will provide PSE with a letter confirming OPL's concurrence with the plan for each crossing. Please refer to the slide that I have put up on my screen for pictures of these pipeline crossing measures.

These methods that PSE will be using are applied safely every day across the country when equipment needs to drive over pipelines. In advance of construction, PSE will confirm the locations of the pipelines using either hand-digging or vacuum excavation methods to visually confirm the ***exact*** location of OPL's pipelines and depths, as well as other utilities in the corridor. Additionally, OPL will have Damage Protection personnel on site and PSE will have a third-party pipeline inspector to assure access plans are followed and construction methods are completed safely. Again, please refer to the slide on the screen for examples of these activities.

Vacuum Truck and Vacuum Excavation

This approach confirms the construction plans in a measured, methodical, and safe way and provides PSE with the maximum confidence in the location of the pipeline and its protection.

In Redmond, the poles will require excavation of a hole from 5 to 9 feet wide and 15.5 to 46 feet deep. In the 2-mile length of the project within the City of Redmond, there is sufficient separation between the edge of the foundations and the pipelines to allow for safe construction. Following visual confirmation of pipeline locations, the locations of excavations for each pole will be initially excavated using the soft-dig vacuum system to a depth deeper than OPL's pipelines. This is a method that is very conservative and not often employed in

typical transmission foundation construction. When the top portion of the excavation is clear, as necessary, a temporary steel casing will be inserted into the shallow excavated hole, which is done to prevent sloughing of the surrounding soil, preventing impacts to the pipeline. Final excavation is then completed and the installation of the poles into the excavation occurs or the foundations are installed. Cranes will typically be used to set the poles in place.

As you have heard, construction of the Energize Eastside project is ongoing in the cities where permitting has been completed, with construction nearly complete in Renton and beginning in Bellevue. I have regular meetings with the construction team and have personally observed the ongoing construction work, and I can confirm that all of the methods and measures that I have described are being implemented during construction.

SPECIFIC PLANS

Finally, I'd like to discuss the variety of plans that will be developed and implemented before and during construction. Plans for this project include the following:

- Final Site and Construction Plan;
- Traffic Control Plan;
- Civil Engineering Plans; and a
- Construction Management and Access Plan, developed in coordination with OPL, to outline the specific actions that PSE will take to protect OPL's pipelines from construction activities.

I have already contributed to and reviewed a previous Construction Management and Access Plan in coordination with OPL to satisfy the conditions placed by the Cities of Bellevue and Renton on the construction of portions of Energize Eastside in those respective cities. The information and experience therefrom will inform the plans to be prepared by PSE for the City of Redmond, which will also address 811 utility locater service, verification of distances between transmission pole grounds and OPL's pipelines, and defining contractor responsibilities so that

the project is constructed consistent with the plans approved by the City of Redmond.

The Staff Report also requires a complete submittal package which must include materials regarding storm drainage design, temporary erosion and sediment control plans, and a construction route and traffic channelization plan, among other items. With my review and input, PSE will prepare and submit all these plans required by the final Conditions of Approval entered by the Hearing Examiner in this case and will deliver all plan materials necessary to be issued construction permits for the project. I'm available to answer questions regarding these requirements.

In short, the Staff Report's proposes extensive conditions that require PSE to track, document and disclose the many safety protocols that I have described today. PSE supports this notable level of conditioning and stands by the stringent protocols it has put in place for this project.

As I indicated, I personally have been involved in the routing and/or design of over 1,700 miles of transmission lines, a substantial portion of which are co-located with petroleum or natural gas pipelines. In my experience, the planning and design of the Energize Eastside project requires, and in fact employs, informed planning and rigorous safety protocols, and I'm confident that the project will be brought online safely and without incident. Furthermore, this new line that utilizes steel poles that are designed to the most modern, current codes and engineering standards will provide significantly improved safety and reliability over the existing wood poles that are in place today, which benefits the communities that Energize Eastside serves.

I am happy to answer any questions you may have about my testimony or my work on Energize Eastside.

TESTIMONY OF DAVID KEMP
IN SUPPORT OF ENERGIZE EASTSIDE
REDMOND CONDITIONAL USE PERMIT AND SITE PLAN ENTITLEMENT
FILE NO. LAND-2021-00487 & LAND-2021-00521

June 6, 2022

Good evening, Your Honor. My name is David Kemp, and I am a senior engineer at DNV. I am a licensed Professional Engineer in the state of Ohio, and I have an extensive background using advanced computational methods to solve a variety of complex engineering problems and phenomena.

One of the physical phenomena I work with on a regular basis is AC interference and interactions between high voltage AC transmission lines and pipelines—which I will delve into in more detail in a minute. AC interference is of concern because it can increase the risk of shock hazards and pipeline corrosion, if not properly assessed. I have worked on over 100 projects where I have examined the likelihood of AC interference on pipelines that are co-located with transmission lines in shared utility corridors. Through these projects, I have assessed more than 2,200 miles of pipeline segments co-located with electrical facilities in various regions throughout the country. Many of these projects involve the analysis of utility corridors with multiple co-located transmission line and pipeline facilities. Through these engineering analyses we can assess if mitigation measures may be necessary to create conditions under which these shared utility corridors can continue to operate in a safe and responsible manner.

Having both high voltage transmission lines and pipelines in a shared utility corridor can be common, safe, and exists across the country and around the world. The corridor that is being proposed for use by Energize Eastside is an example of such a shared corridor. The 2-mile section of the PSE corridor that runs through Redmond was established almost 100 years ago, and it has operated as a shared corridor with Olympic Pipeline, or OPL, for over 50 years without incident.

I understand that pipeline safety is a concern for members of the public, and I hope that my testimony can help address and contextualize those concerns. There are certain risks associated with utilities like pipelines and transmission lines. Those risks are present today in the existing co-located corridor and will remain even if the Project is not built. Every risk that I discuss, such as AC corrosion and touch potential, is a risk that already exists today. However, as confirmed in the Project EIS, those risks are thankfully low, in large part due to the mandatory safety standards and design measures that operators must comply with. The fact that this corridor has safely operated for decades without incident is consistent with the low level of risk and the effectiveness of safety standards. As I will explain today, because of the optimized design work and the extensive analysis done for this Project, it is my professional opinion that the Project can be operated safely in Redmond without any increased attendant risk.

Case Study – Design Optimization

With that background, I want to go into more detail and describe our study of AC interference in this shared utility corridor. This topic is technical and even dry, so please interrupt me if you have any questions for me or want a clearer explanation.

For our study purposes, the phrase "AC interference" is the adverse impacts that can occur on pipelines because of the electrical interaction with overhead high voltage transmission lines, specifically when they are located in proximity (typically within shared utility corridors). DNV evaluated two different types of AC interference in relation to PSE's Energize Eastside project. These are *electromagnetic induction* and *conductive interference*. Generally speaking, electromagnetic induction can create a potential shock hazard to pipeline workers and can, over time, contribute to the accelerated AC corrosion of the pipelines. Whereas the analysis of

conductive interference examined the potential for AC interference on the pipelines during an electrical system fault condition.

In my experience, engineers like myself are most often hired by pipeline operators to assess a pipeline's susceptibility to AC interference from co-located transmission lines, and often ***after*** the utility facilities are built. This is done to determine whether the pipeline operator needs to install mitigation on their facilities to limit AC interference effects to address the personnel safety risks and/or accelerated AC corrosion. These effects are not new phenomena. AC interference is well-documented, and there is an entire industry that studies and develops mitigation plans to reduce these risks.

In the cases that I have worked on, all but a small handful have involved pipelines and transmission lines that were already operational in the same corridor, a retroactive approach if you will. Because the facilities in these cases were already in place, the range of optimization or mitigation measures that can actually be implemented to reduce AC interference are generally limited to mitigative measures installed in the ground, adjacent to, and connected to the pipeline.

Case Study – Design Optimization

PSE approached the Energize Eastside project differently. PSE engaged DNV in 2015, well ***before*** the design of Energize Eastside was finalized, to build a model of the shared utility corridor and to assess the likelihood of adverse AC interference effects on OPL's pipelines and means of reducing any effects. This approach allowed DNV to make recommendations related to the transmission lines that minimized and mitigated for AC interference ***before*** the upgraded design and route were finalized. Although not always practicable for a utility, this is the ideal approach because it most efficiently mitigates the potential for AC interference effects on co-located utilities.

I also want to emphasize the commendable level of proactive design and coordination that PSE undertook with Olympic Pipeline for this project. PSE facilitated DNV coordinating directly with OPL on data exchanges. This allowed us to get actual data about OPL's pipelines under real world conditions, including real world data on the existing interactions between PSE's 115 kilovolt (kV) transmission lines and OPL's pipelines. In other words, we were able to confirm that our model of the corridor was consistent with the actual conditions at the existing facilities. This gave us significant confidence that we had developed the model with realistic operational and conditional parameters. Because this coordination allowed us to confirm and improve the accuracy of our modeling, we have great confidence in our assessment of what will occur with PSE's proposed transmission line upgrade.

We also met regularly with OPL to provide them with opportunities to share data, review our analysis, provide input on the methodology, and discuss the results. After we completed our assessments and prepared a draft of our findings, we met with OPL to discuss the methodology and results before finalizing our analysis. Then, after we finalized and published our final reports and memos, we again provided those documents to OPL for further review and input. PSE also provided OPL with memos and analyses prepared by other consultants, such as the 2017 Stantec technical review prepared for the Cities' EIS, which has been provided as an exhibit. In short, OPL had an important review role in all our pipeline safety modeling and analysis. As part of prior permitting hearings for the Energize Eastside project, OPL has submitted comment letters documenting OPL's continuous and active involvement, as well as their support for this project. These letters have also been provided as an exhibit.

To evaluate the potential for the Energize Eastside project to interact with OPL's pipelines, DNV intentionally applied conservative screening metrics for touch potential and accelerated AC

corrosion. Our model also applied highly conservative assumptions on the amount of electricity running through the proposed transmission lines which intentionally overestimates interactions as compared to foreseeable real-world conditions. And by conservative, I mean that PSE requested that we assume maximum electrical line loadings 24 hours a day, 365 days a year. By assuming these maximum electrical loads were a constant, we assessed the ***maximum*** potential interaction that PSE's proposed transmission lines would have on OPLs pipelines as a worst-case scenario for designing and optimizing the layout along the corridor. It is highly unlikely that this sustained load level would occur under real world conditions as maximum loads are generally only realized a couple hours a day for a few days a year. Here, even short duration maximums are unlikely to occur for many years in the future. By assessing the maximum operational loads on the HVAC transmission lines, we could assess the ***worst-case*** AC interference levels on OPL's pipelines for both touch potential and accelerated AC corrosion to determine conformance with applicable industry standards. This approach is made more conservative when assessing for accelerated AC corrosion as this assumes the maximum levels of AC interference for the entire year and AC corrosion is dependent upon not only the level of AC interference, but the levels sustained over time.

In sum, building layers of conservatism into DNV's modelling provided additional assurances that support our conclusion that, in Redmond, PSE's proposed final configuration results in AC potentials well below industry standards and is actually projected to decrease relative to existing conditions.

Willow 1 Route/Optimized Tower Configurations

I am now going to go through how our analysis informed the design of Energize Eastside and minimized AC interference in the corridor. In our original 2016 assessment, we studied two

different operating scenarios for the circuits, as voltage ratings and operating loads play a role in AC interference effects on adjacent pipelines. The first scenario was PSE's originally proposed arrangement of one circuit operating at 230 kV and the other operating at 115 kV, which would be upgraded to 230 kV in the future. The second scenario would have both circuits energized to 230 kV from inception. Additionally, we modeled six different transmission line pole designs within the shared corridor.

Using these variables, we ran calculations for two of the preferred routes to compare the likelihood for AC interference for each of them. Based on the results, we made specific operational recommendations and recommended that the company use a specific pole design and a delta wire configuration to maximize the reduction in AC interference on the co-located pipelines. PSE has implemented these measures in the final design for the Energize Eastside transmission lines in the shared corridor. This work also identified which route would enjoy the greatest minimization of potential for interference, which became the company's final route.

Because the height, transmission line configuration, and pole locations all influence the potential for AC interference, more recently, we undertook a secondary analysis of the final design in Redmond, incorporating data specific to this shared utility corridor. This analysis confirmed that PSE's final design was well within industry accepted levels for both pipeline safety and pipeline integrity in shared corridors even under conservatively modelled parameters.

Summary

Because AC interference is such a dry and technical subject, I want to close by briefly summarizing my main points. PSE and DNV took an unusually proactive approach to assessing AC interference, which allowed PSE to optimize the final design. We have a high degree of confidence in our analysis because of our coordination with OPL, and because we applied

conservative assumptions throughout our analysis. And finally, the analysis of the final design in Redmond indicates that the project will result in an improvement in AC potentials over existing conditions. I understand that one of the considerations for a conditional use permit for this project is whether the use gives rise to unusual hazards or characteristics, and for the reasons I just described, I do not believe this project creates any unusual hazards associated with AC interference.

In conclusion, as this Project illustrates, cooperation between electric utility and pipeline operators is beneficial to both parties during the design phase, but this requires early communication and information exchange. Following this coordination, it is my professional judgment that the upgraded transmission lines project, as proposed and conditioned can be built and operated safely in the City of Redmond and without any increased attendant risk or need to mitigate for AC interference.

I am happy to answer any questions you may have.

TESTIMONY OF DAN KOCH
IN SUPPORT OF ENERGIZE EASTSIDE
REDMOND CONDITIONAL USE PERMIT AND SITE PLAN ENTITLEMENT
FILE NO. LAND-2021-00487 & LAND-2021-00521

June 6, 2022

Good evening, Madame Hearing Examiner. I am Dan Koch, Vice President of Operations at Puget Sound Energy. In that role, I am responsible for the 24/7 operation of PSE's electric grid to ensure safe and reliable delivery of electricity to PSE's customers. I am a licensed professional engineer in the states of Washington and California, and I have worked in large facility development for my entire career, now nearly 32 years. I have overseen the Energize Eastside project's development since I was PSE's Director of Operations, and I have testified at every public hearing on PSE's applications for this project.

Given my role in this project, I want to close PSE's presentation with an overview of what processes we followed to understand and meet various requirements, and why we believe our record clearly shows that PSE went above and beyond mere due diligence for this project and proposed the best possible solution for all.

To date, we have obtained permits from Bellevue, Renton, and most recently from Newcastle, which issued a decision approving the project just a month ago. We are wrapping up transmission line construction in Renton and are beginning in south Bellevue now, and we are excited to continue moving this project forward. To get where we are today required the individual and collective talents of a team of dedicated PSE professionals in the fields of transmission planning, load management, project management, real estate, construction, permitting, legal, community outreach, communications, and government affairs.

First, though, I want to highlight this project's importance to our Eastside customers and why we are here today.

Studies of Eastside Need (1993–2014)

The simple explanation is that under federally mandated transmission system reliability standards, PSE must have sufficient infrastructure to meet existing and foreseeable demand. Multiple studies projected that the demand for electricity would exceed the capacity of the Eastside's transmission system as early as winter 2017–18 and the summer of 2018. These studies include PSE's internal studies, as well as multiple studies prepared throughout the years by multiple experts engaged by the permitting jurisdictions, beginning with a 2012 study commissioned by the City of Bellevue, up to the 2020 study commissioned by the City of Newcastle.

Studies of Eastside Need (2015–2021)

Independent of these studies, the fact is, the foreseeable demand was exceeded a year earlier than expected. Our actual summer system peak demand in 2017 was what we had projected for 2018. And again, in August 2018 the actual summer peak demand exceeded the demand that was forecasted for 2020. In 2020, the City of Newcastle's independent consultants confirmed that the existing system "has already triggered an operational need," and Newcastle's Hearing Examiner recently issued a decision that confirmed the consultants' findings of project need and approved the project in Newcastle.

Furthermore, the unprecedented heat dome event in June 2021 resulted in our summer peak load blowing past all projections of summer peak, and our system was operating well beyond its assessed reliable operating capacity for a substantial period. During that event, we

were one event away from having to take drastic action of shutting power off and executing rolling blackouts to substantial areas on the Eastside.

As peak summer electrical demand has exceeded the level at which our system is at risk of potential outages, in four of the last five years, the need for the Energize Eastside project is no longer a question of forecasting. The project is needed to address regularly occurring loads **today**.

If the status quo continues and no action is taken to upgrade this backbone of the Eastside's transmission system, PSE is required under federal law to continue using Corrective Action Plans under certain conditions outlined by FERC and NERC. PSE's Corrective Action Plans now include the use of intentional load shedding, or rolling blackouts, under certain constrained conditions for the grid supplying the Eastside, including Redmond. This means this project will directly improve reliability for Redmond residents and businesses.

It is a credit to our transmission planning team that PSE has not experienced intentional load shedding. This is because we conduct transmission reliability planning correctly, projecting what infrastructure will be needed well in advance of the deficiency becoming a reality. When our transmission reliability planners identify the need for an improvement, we design a solution and seek land use approvals so that the transmission improvement can be built before the deficiency impacts service. However, we have reached the point in time where that is a distinct possibility.

Although PSE has made many system improvements on the Eastside over the years, the primary 115 kilovolt (kV) lines that currently connect the Sammamish and Talbot Hill substations—which form the spine of the Eastside electrical system—have not been upgraded in capacity since the 1960s. Since that time, the Eastside's population has grown from

approximately 50,000 to nearly 400,000. A record-breaking number of high-tech businesses are booming today, industries are thriving, and the area is home to some of the best medical facilities in the country. Not only has all this growth already occurred, it is expected to continue.

We believe our record clearly shows that PSE thoroughly evaluated this project and worked to understand municipal permitting issues to meet all criteria and provide the least impactful solution. Keeping the transmission lines in the existing corridor reflects our commitment to limit impacts. New poles will typically be located in the same or similar locations as the existing poles. The project will upgrade the existing sets of H-frame poles (which have 2-3 poles each) to steel monopoles which, when completed, will result in a significant reduction in the number of poles.

Safety has been a constant focus for both PSE and the public, including focusing on how our new line will relate to the fuel pipelines that share the corridor. As you heard from Lowell Rogers and David Kemp, PSE has a long and successful history of close coordination with Olympic Pipe Line Company, or OPL. The fact is that PSE's existing high voltage transmission lines have safely coexisted with OPL's pipelines in this corridor for decades, even with periodic construction to replace poles and add fiber optic cables. Both companies have a strong mutual interest in the protection and safe operation of facilities in the corridor.

However, beyond our history of successful coordination, PSE also took on a first-of-its-kind proactive analysis to evaluate the potential impact of co-locating with the pipelines. As David Kemp explained, he and his team studied and confirmed that Energize Eastside can be safely co-located with OPL's pipelines throughout the existing corridor and in Redmond. PSE took design mitigation recommendations from DNV and incorporated them into the design. And as Mr. Rogers explained, PSE has also shared its design and construction plans with OPL and

regularly meets with the company to coordinate on the Energize Eastside project. The project will be built and operated to the highest safety and engineering standards.

In closing, our studies clearly show, and the City of Redmond Staff Report confirms, that combined with continued aggressive conservation Energize Eastside will improve reliability for Redmond and other Eastside communities and supply the needed electrical capacity for anticipated growth and development for years to come.

Please let me know if there are any questions you have for me, or for any of our team of experts.

Thank you.