

BEFORE THE PUBLIC UTILITY COMMISSION  
OF THE STATE OF OREGON

PCN 6

Petition for a Certificate of Public  
Convenience and Necessity

PORTLAND GENERAL ELECTRIC COMPANY

REDACTED Direct Testimony of

*Matt Gordanier*  
*Jordan Messinger*

*April 17, 2024*

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**I. Introduction**

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**Q. Please state your name, business address, and present position with Portland General Electric (PGE or the Company).**

A. My name is Matt Gordanier. My business address is 121 SW Salmon Street, Portland, OR 97204. My current position at PGE is Senior Principal Transmission Line Design Engineer in the Operations & Planning Engineering Department. My previous position, up until April of 2024, was as the Manager, Transmission Engineering/Line Design Engineering.

My name is Jordan Messinger. My business address is 121 SW Salmon Street, Portland, OR 97204. My current position at PGE is Principal Project Manager.

**Q. Mr. Gordanier, briefly describe your educational background and relevant licenses or certificates.**

A. I have a Bachelor of Science (BS) in Civil Engineering from Oregon State University, and I am a Registered Professional Civil Engineer in Oregon.

**Q. Mr. Gordanier, please describe your work experience.**

A. For a summary of my work experience, please refer to PGE/300, Putnam-Nuñez-Gordanier/4-5.

**Q. Mr. Messinger, briefly describe your educational background and relevant licenses or certificates.**

A. I have a Bachelor of Science (BS) in Civil Engineering from California Polytechnic State University in San Luis Obispo, California. I am a Licensed Professional Engineer and Licensed Structural Engineer in both Oregon and California.

**Q. Mr. Messinger, please describe your work experience.**

1 A. Prior to my career at PGE, from April 2007 to April 2015, I was a Design Engineer at  
2 KPF Consulting Engineers in Portland, OR where I performed engineering analysis  
3 and design for structural projects, including new construction, additions, and  
4 renovation/seismic retrofit of existing buildings.

5 From April 2015 to April 2017, I was employed by PacifiCorp as a Senior  
6 Project Manager and was responsible for managing the design and construction of large  
7 electric utility projects, including new transmission lines and substations; creating and  
8 tracking project budgets and schedules; coordinating engineering, procurement,  
9 bidding, and construction with internal and external resources; and managing the  
10 application process for permits or other jurisdictional approvals as required for each  
11 project.

12 From May 2017 to May 2018, I was employed by Inici Group, Inc. in Portland,  
13 OR as Project Manager and was responsible for managing full life of projects from  
14 initial concepts through design, construction, commissioning, and move-in;  
15 maintaining project budgets and schedules; and overseeing quality control measures,  
16 including construction oversight and progress verification.

17 In May 2018, I was employed by PGE as Principal Project Manager. In my  
18 current role, I am responsible for managing the design and construction of large capital  
19 electric utility projects, including new transmission lines, substations, and upgrades to  
20 generation facilities; creating and tracking project budgets and schedules; coordinating  
21 engineering, procurement, bidding, and construction with internal and external  
22 resources; and managing processes for land purchases, easement acquisition, permits,  
23 and other jurisdictional and regulatory approvals as required for each project.

1 **Q. What is the purpose of your testimony in this proceeding?**

2 A. The purpose of our testimony is to present the practicability and feasibility for the  
3 Company's proposed overhead, 115-kV transmission line totaling 7.4 miles in length  
4 and located in Clackamas and Washington Counties between the existing Rosemont  
5 and Wilsonville Substations (the Rosemont-Wilsonville Line). In particular, we will  
6 discuss PGE siting and assessment of alternate routes, estimated project costs and  
7 minimization of risks, and PGE's experience in constructing, operating, and  
8 maintaining transmission lines.

9 **Q. Is the proposed route for the Rosemont-Wilsonville 115-kV Line practicable and**  
10 **feasible?**

11 A. Yes, the proposed route for the Rosemont-Wilsonville Line is practicable and feasible  
12 for several reasons. First, as discussed in more detail below, PGE employed Power  
13 Engineers to perform a routing and feasibility study, which was completed in December  
14 2020 (attached as Exhibit PGE/401). PGE analyzed the practicability and feasibility  
15 of the proposed alignment for the Rosemont-Wilsonville Line and determined that the  
16 proposed route is the least costly and least impactful to landowners and the environment  
17 as compared to other alternative routes assessed to address the identified need.

18 Second, at the time of this filing, PGE has either obtained the necessary  
19 easements for or does not anticipate requiring easements because the facilities are  
20 located within rights-of-way for approximately 5.90 miles of the line, or about 80  
21 percent of the total line length. Of the portions of the route where PGE has identified a  
22 need to acquire a new easement, PGE has acquired **Begin Highly Protected/** [REDACTED]  
23 **/End Highly Protected** easements necessary to construct the Rosemont-

1 Wilsonville Line. Importantly, PGE has worked hard to minimize the size of the  
2 needed easements by maximizing use of available road rights-of-way. To put the  
3 easement area in context, for the 1.49 miles of needed easements along the proposed  
4 route, the total easement area amounts to approximately an acre and a half. PGE is still  
5 in the process of negotiating in good faith with landowners to obtain the remaining  
6 **Begin Highly Protected** [REDACTED] **End Highly Protected** easements.

7 Finally, as discussed in the testimony of Meredith Armstrong, although PGE  
8 has not yet obtained the outstanding Alteration of Non-Conforming Use Permit and  
9 pending Right-of-Way Permit from Clackamas County, the Company believes that it  
10 will obtain the required permits after County review is complete or confirm with the  
11 Planning and Zoning Department of Clackamas County that no land use permit is  
12 required.<sup>1</sup>

13 **Q. Will the Rosemont-Wilsonville Line be effectively and efficiently constructed in a**  
14 **commercially reasonable manner?**

15 **A.** Yes. As discussed in more detail below, PGE has extensive experience spanning more  
16 than 130 years constructing, operating, and maintaining transmission lines in Oregon  
17 in a safe and reliable manner.

18 In addition, the Company retained Henkels & McCoy West, LLC (HMW) as  
19 the construction contractor, which has over a century of experience in constructing  
20 reliable utility infrastructure networks, including overhead transmission projects, in the  
21 Western United States. HMW has a proven track record of delivering on-time, quality  
22 projects by employing highly trained and qualified workers and ensuring safe work

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<sup>1</sup> PGE/500, Armstrong/5-6.

1 practices. At the time of this filing, HMW has executed all material orders and all  
2 material necessary to construct the Rosemont-Wilsonville Line should be on hand at  
3 the commencement of construction for the proposed route. Accordingly, the Company  
4 will be able to effectively and efficiently construct the Rosemont-Wilsonville Line in  
5 a commercially reasonable manner.

## 6 **II. Practicability and Feasibility**

### 7 **A. Siting and Analysis of Alternative Routes**

8 **Q. Please describe the routing study process for the Rosemont-Wilsonville Line.**

9 A. In 2019, PGE performed an internal study to identify potentially viable routes to  
10 connect the existing Rosemont Substation to the existing Wilsonville Substation. The  
11 PGE-internal study identified three potentially viable routes, which from an  
12 engineering perspective appeared to be fairly similar and were expected to present the  
13 same types of siting challenges and opportunities.<sup>2</sup> In light of the similarities among  
14 the routes, PGE determined that additional analysis would be required to support  
15 selection of a preferred route to advance to detailed design and construction. For this  
16 reason, PGE commissioned Power Engineers to perform a routing and feasibility study,  
17 which was completed in December 2020.

18 **Q. Did PGE provide any specific direction to Power Engineers as to how the study  
19 should be conducted?**

20 A. PGE wanted Power Engineers to conduct an independent study and therefore the  
21 Company did not provide granular direction regarding routing opportunities, priorities,

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<sup>2</sup> The routes identified as viable by PGE were identical to the routes ultimately studied in depth by Power Engineers and are described below as the proposed route and the Childs Road and Schatz Road Alternatives.

1 and concerns. However, PGE did request that the study be based on best engineering  
2 practices and that Power Engineers prioritize routes where PGE already had existing  
3 transmission and/or distribution lines.

4 **Q. How did Power Engineers approach the routing study?**

5 A. Using available aerial imagery, Power Engineers created a study area boundary within  
6 which to identify and evaluate alternative routes. The study area boundary covered  
7 approximately 29 square miles in order to identify a range of reasonable and feasible  
8 alternative routes. After defining the study area boundary, Power Engineers collected  
9 transmission and distribution network data from PGE, municipal and county land use  
10 data from local governments, and environmental resource data including  
11 rivers/streams, floodplains, and wetlands from state and federal agencies. Power  
12 Engineers' data sources included: PGE; the Regional Land Information System for the  
13 Portland, Oregon metropolitan area; the Outdoor Recreation and Conservation Areas;  
14 the Federal Emergency Management Agency; the U.S. Fish and Wildlife Service; the  
15 U.S. Geological Survey; and Google Earth aerial imagery. Using these tools, Power  
16 Engineer's study provided a framework by which to score the identified routes using  
17 unbiased criteria.

18 **Q. What types of locations did Power Engineers identify as optimal routing  
19 opportunities for the Rosemont-Wilsonville Line?**

20 A. Consistent with PGE's request, Power Engineers identified existing overhead  
21 distribution or transmission lines as routing opportunities. Power Engineers also  
22 identified major arterial streets and highways as opportunities.

23 **Q. For what reasons were these routing opportunities selected?**



1 A. Power Engineers identified the above routing opportunities in order to minimize  
2 impacts to landowners and the environment. Using existing infrastructure and rights-  
3 of-way rather than “greenfield” development avoids accessing private properties,  
4 consolidates impacts associated with the transmission line with existing development,  
5 and reduces construction-related and visual impacts to landowners and environmental  
6 resources, including vegetation, wetlands and water resources, and avian and wildlife  
7 species and habitat. These opportunities provide further benefits by reducing  
8 construction costs and timelines as well as the need for additional permits, which would  
9 be costly and time-consuming.

10 **Q. What routing priorities and concerns were identified by Power Engineers for**  
11 **siting the new transmission line, and what was the reason for each?**

12 A. Priorities and concerns for siting the new transmission lines included:

- 13 1. *Minimizing the need to double-circuit existing transmission lines (two*  
14 *transmission lines on the same poles/structures).* Minimizing double-circuits  
15 protects system reliability.
- 16 2. *Follow road rights-of-way.* Following road rights-of-way helps avoid private  
17 property and minimizes impacts to landowners and the environment, which also  
18 drives down construction costs.
- 19 3. *Maintaining trees.* Maintaining vegetation mitigates impacts to avian and wildlife  
20 species and habitat and minimizes visual impacts.
- 21 4. *Avoiding wetlands.* Avoiding wetlands maintains the environment and wildlife  
22 habitat.

1           5. *Keeping lines overhead.* As discussed in more detail in the testimony of Larry  
2           Bekkedahl, undergrounding a transmission line would significantly increase the  
3           direct costs for the entire line borne by PGE's customers from \$18.6 million to  
4           approximately \$111-185 million—about six to 10 times more than overhead  
5           transmission.<sup>3</sup> In addition, undergrounding transmission involves significant  
6           ground disturbance and requires more restrictive easements, which causes greater  
7           impacts to landowners and the environment, and creates operational challenges in  
8           the form of time-consuming and costly maintenance and repair.

9           6. *Rebuilding existing distribution lines to support both distribution and*  
10           *transmission lines located on the same pole/structure.* Note that the Power  
11           Engineers study considered rebuilding existing distribution lines to be less  
12           compatible because of increased costs and additional temporary outages during  
13           construction.

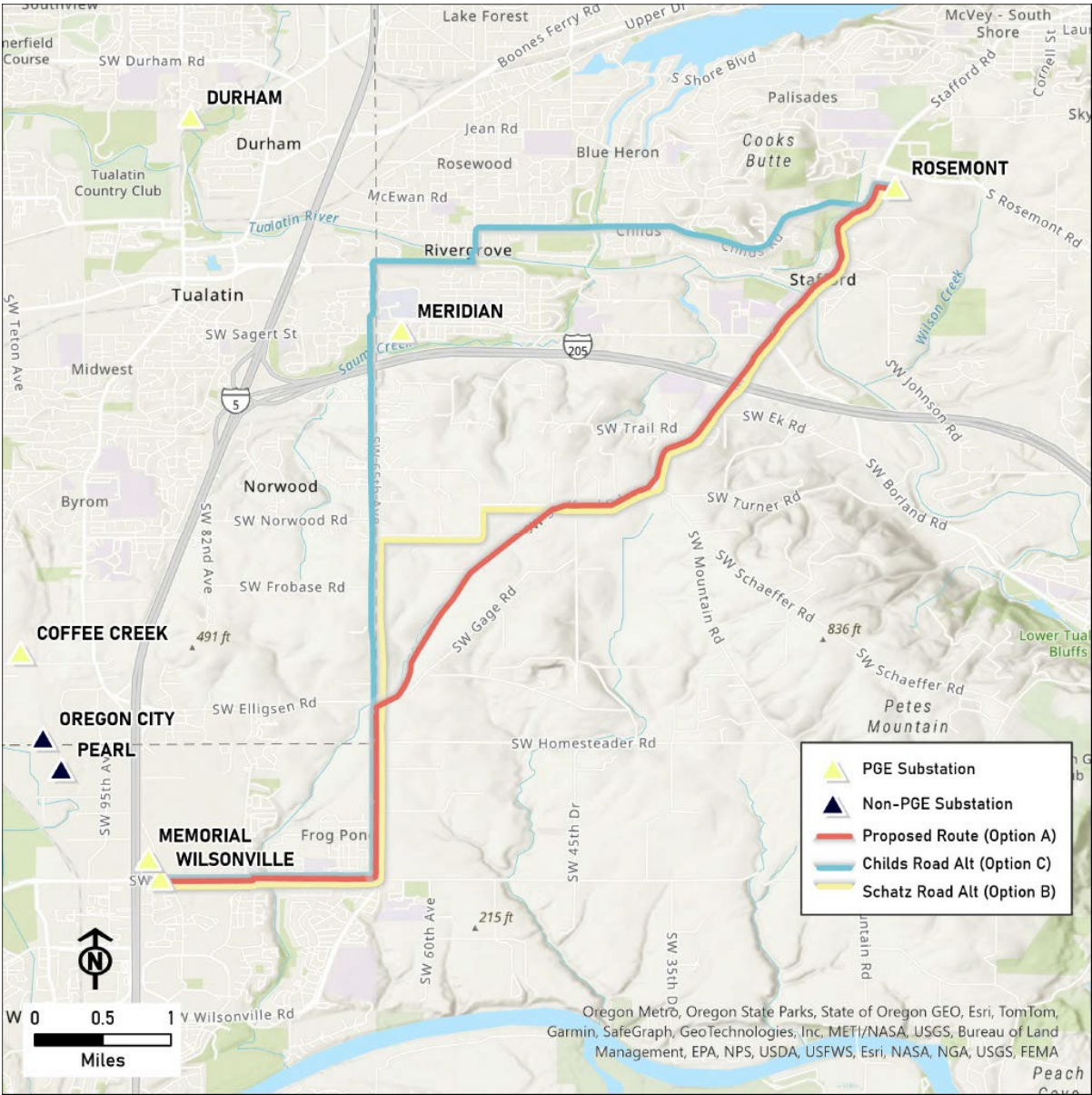
14       **Q. Please describe in more detail the process by which Power Engineers assessed**  
15       **alternative routes for the Rosemont-Wilsonville Line.**

16       A. Power Engineers began the process of identifying alternative routes by developing a  
17       network of route links, which were connected to form alternative routes. Power  
18       Engineers reviewed and analyzed a total of 38.3 miles of alternative route links for the  
19       Rosemont-Wilsonville segment, which resulted in three route options: the proposed  
20       route (Option A); the Childs Road Alternative (Option C); and the Schatz Road  
21       Alternative (Option B). A map of the three routes identified and evaluated is provided  
22       below.

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<sup>3</sup> PGE/200, Bekkedahl/26-30.

Figure 1: Map of Proposed Route and Alternative Routes



- 1 The following criteria were used to evaluate and compare the alternative routes:
- 2 (1) route length in miles (the more miles in length, the less compatible); (2) number of
- 3 parcels crossed (the greater number of parcels crossed, the less compatible); (3) miles

1 of rebuild required (the more miles of rebuild required, the less compatible);<sup>4</sup> (4) miles  
2 of new rights-of-way required (the more miles of new rights-of way required, the less  
3 compatible); (5) land use, including counts of buildings within 100 feet and 300 feet of  
4 the routes (the greater the number of buildings and structures within 100 feet and 300  
5 feet of the routes, the less compatible); (6) wetlands and floodplains crossed (the more  
6 linear feet of wetlands and floodplains crossed, the less compatible); (7) the number of  
7 rivers and streams crossed (the greater the number of rivers and streams crossed, the  
8 less compatible); (8) miles of tree cover (the more miles of tree cover, the less  
9 compatible); (9) miles of threatened and endangered species habitat crossed (the more  
10 miles of habitat crossed, the less compatible); (10) miles of line parallel to roads (the  
11 more miles parallel to roads, the more compatible); (11) the engineering  
12 constructability (e.g., lack of overhead lines nearby, the less compatible); and (12)  
13 comparative construction costs, order of magnitude only (the costlier, the less  
14 compatible).

15 **Q. What were the results of Power Engineer’s study?**

16 A. The Power Engineers routing study presented the following conclusions:

- 17 • The proposed route is the shortest of the three route options at a total  
18 length of 7.4 miles, approximately 5.0 miles of which will be new  
19 construction. The new construction portion of the line starts at  
20 Rosemont Substation and double-circuits with the existing Meridian-

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<sup>4</sup> As discussed above, the Power Engineers study considered rebuilding existing distribution segments to be less compatible because of increased costs and additional temporary outages; however, in the aggregate, PGE considers the benefits of rebuilding existing distribution infrastructure to outweigh the costs due to comparatively lesser impacts on adjacent properties, minimization of visual impacts, and the benefits of safer and up-to-date equipment.

1 Rosemont 115-kV Line until the roundabout at Borland Road, which is  
2 a distance of approximately 1.4 miles. From Borland Road the new  
3 construction portion of the line then transitions to the installation of new  
4 115-kV structures along the existing Rosemont-Mossy Brae 13-kV  
5 distribution feeder right-of-way for approximately 0.3 miles. New  
6 structures will be constructed for the next 0.3 miles where there are not  
7 currently any electrical lines as the line crosses over Interstate 205.  
8 Next, new 115-kV structures will again utilize the existing Meridian-  
9 Meridian 13 and Wilsonville-Boeckman 13-kV distribution rights-of-  
10 way for approximately 3.0 miles. Finally, the line will tie into the  
11 existing McLoughlin-Wilsonville 115-kV line for 2.4 miles until it  
12 connects to the Wilsonville Substation. In comparison, the Childs Road  
13 Alternative and Schatz Road Alternative are both longer, at  
14 approximately 8.9 miles and 8.0 miles, respectively.

- 15 • The proposed route included the shortest distance for constructing the  
16 line in a new right-of-way at approximately 0.7 miles. The Childs Road  
17 Alternative required 1.6 miles of line in a new right-of-way and the  
18 Schatz Road Alternative required 0.8 miles of line in a new right-of-  
19 way.
- 20 • The proposed route impacted the fewest total number of parcels as  
21 compared to the alternative routes. In particular, the proposed route  
22 impacted 14 parcels, while the Childs Road Alternative impacted 36  
23 parcels and the Schatz Road Alternative impacted 22 parcels.

- 1                   • The proposed route passed the fewest number of buildings within 100  
2 feet and 300 feet compared to the Childs Road Alternative and Schatz  
3 Road Alternative. The proposed route was within 100 feet of 119  
4 buildings and structures and within 300 feet of 352 buildings and  
5 structures. The Childs Road Alternative was within 100 feet of 203  
6 buildings and structures and within 300 feet of 653 buildings and  
7 structures. The Schatz Road Alternative was within 100 feet of 127  
8 buildings and structures and within 300 feet of 403 buildings and  
9 structures.
- 10                  • The proposed route was comparable, though nominally better in  
11 comparison with the Schatz Road Alternative for the fewest number of  
12 schools and parks within 300 feet. The proposed route was situated  
13 within 300 feet of seven schools and/or parks and six places of worship  
14 and/or cemeteries. The Schatz Road Alternative was situated within  
15 300 feet of seven schools and/or parks and seven places of worship  
16 and/or cemeteries. The Childs Road Alternative was situated within 300  
17 feet of 13 schools and/or parks and five places of worship and/or  
18 cemeteries.
- 19                  • The proposed route crossed the fewest number of streams and rivers.  
20 The proposed route crossed six rivers and streams, while the Childs  
21 Road Alternative crossed 13 streams and rivers and the Schatz Road  
22 Alternative crossed eight streams and rivers.

- 1           • The proposed route crossed the shortest length (in linear feet) of  
2           wetlands and floodplains/floodways. The proposed route crossed 353  
3           feet of wetlands and 360 feet of floodplains/floodways. The Childs  
4           Road Alternative crossed 1,020 feet of wetlands and 6,233 feet of  
5           floodplains/floodways. The Schatz Road Alternative crossed 382 feet of  
6           wetlands and 360 feet of floodplains/floodways.
- 7           • No route crossed threatened or endangered species habitat.

8   **Q. Did PGE perform its own field assessment of the route options analyzed by Power**  
9   **Engineers?**

10 A. Yes. After Power Engineers completed its analysis and ranking of the three  
11 alternatives, but before it finalized its study, Power Engineers reached out to PGE with  
12 its preliminary conclusions. Specifically, Power Engineers identified the three routes  
13 that it had focused on and explained that the proposed route along Stafford Road was  
14 its first choice. However, Power Engineers noted that its company’s expertise was in  
15 engineering, not construction and therefore Power Engineers requested that PGE drive  
16 the route to make sure that from a construction perspective, there was nothing on the  
17 ground that would be a “showstopper” for any of the three routes. Accordingly, PGE  
18 had one of its construction managers spend a few days driving down the routes to make  
19 sure that there were no conditions that would suggest any one of the routes could not  
20 be constructed. While PGE did not observe any “showstopping” conditions, PGE did  
21 note that the road right-of-way along Childs Road was very narrow, and the homes  
22 along Childs Road were located much closer to the road right-of-way than those along  
23 Stafford Road—which would put them in close proximity to new transmission



1 structures. In addition, Childs Road runs through a more densely populated residential  
2 area. In addition, PGE observed that while the Schatz Road Alternative appeared to  
3 present similar constraints and opportunities in comparison with the proposed route,  
4 the homes along the proposed route were set back farther from the road. PGE reported  
5 its conclusions to Power Engineers, and Power Engineers finalized its study consistent  
6 with the conclusions it had reported to PGE.

7 **Figure 2. Childs Road Google Earth Imagery**



8 **Q. Did the detailed design for the proposed route confirm that the route was viable?**

9 A. Yes. As the detailed design commenced, PGE performed surveys and locates of below  
10 grade facilities to determine if there were any other conflicts that were not immediately  
11 apparent when performing the routing studies. The preferred route was found to be  
12 sufficiently clear of any below grade conflicts and there were no other “deal breaking”



1 design challenges, such as a major natural gas line and/or water line in close proximity  
2 and parallel to the proposed alignment of the transmission line.

3 **Q. What challenges were identified in connection with the proposed route?**

4 A. In particular, the need for easements is a challenge associated with the proposed route.  
5 However, the other two other alternatives considered would present similar issues and  
6 include a greater number of impacted landowners.

7 **Q. Did the Power Engineers study include a precise cost estimate of the routes  
8 analyzed?**

9 A. No. Although the Power Engineers study included a rough per unit cost, it did not  
10 include a number of key factors that inform the development of a more precise cost  
11 estimate. At that time, no engineering or surveying had been performed for any  
12 alternative, and the Power Engineers study primarily considered the length of the line,  
13 tree-trimming, and areas requiring rebuilding existing distribution, but did not account  
14 for areas of constrained right-of-way, did not account for additional steel poles that  
15 would be required, and did not include costs associated with acquisition of easements.  
16 That said, based on the basic design and relative locations of the alternative routes,  
17 PGE made a working assumption that the cost of the three routes would be roughly  
18 comparable—an assumption that the Power Engineers study bore out, albeit at a very  
19 general level.

20 **Q. Has PGE prepared an updated cost comparison of the three routes that accounts  
21 for the factors omitted in the Power Engineers study?**

22 A. Yes. PGE prepared an updated Class 5 cost estimate that builds from the Power  
23 Engineers study and factors in 2024 costs for materials (including the additional steel

1 poles) and also includes easement acquisition, among other factors. In the updated cost  
2 study, the proposed route is the least costly, at \$17.5 million,<sup>5</sup> while the Childs Road  
3 Alternative is \$19.6 million, and the Schatz Road Alternative is \$19.0 million.

4 **Q. How accurate is a Class 5 estimate?**

5 A. Class 5 estimates are typically used for initial screening and are prepared without the  
6 benefit of detailed design and have an accuracy of -50 percent to +100 percent.

7 **Q. Was cost a primary driver in route selection?**

8 A. Given the similarities among the routes and the relatively small cost differentials  
9 among the estimates, cost was not the primary driver in route selection. Nonetheless,  
10 the Power Engineers study and PGE's subsequent analysis demonstrate that PGE  
11 selected the proposed route as the least costly and least impactful alignment for the  
12 Rosemont-Wilsonville Line.

13 **Q. Since performing the original siting analysis in 2020, has PGE revisited its  
14 consideration of these alternatives to confirm that the proposed route is feasible?**

15 A. Yes. In February 2024, HMW, PGE's construction contractor, confirmed that the  
16 proposed route would be the least costly, least impactful with day-to-day operations,  
17 and result in the least amount of disturbance, especially for landowners abutting the  
18 utility right-of-way (attached as Exhibit PGE/402). HMW noted the Schatz Road  
19 Alternative as a second choice comparable to the proposed route, although this route  
20 would impact more parcels and landowners. HMW concluded that the Childs Road  
21 Alternative, while feasible, would incur significant costs, result in the most disturbance

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<sup>5</sup> As noted below, the Company's most current direct cost estimate of approximately \$18.6 million is based upon a 100 percent design and hard bids from contractors and suppliers and is therefore more accurate.

1 to the general public, both private and commercial, and holds the largest amount of risk  
2 of the three options concerning constructability.

3 **Q. Were there any other alternative routes that PGE considered but eliminated at**  
4 **the conceptual stage?**

5 A. Yes. PGE considered opportunities for routing in this area along Interstate 5 and  
6 Interstate 205. However, following coordination with the Oregon Department of  
7 Transportation (ODOT), PGE eliminated alternative route links along these two  
8 interstate freeways as ODOT's regulations and policies restrict placing electric  
9 transmission lines in or adjacent to highway right-of-way absent demonstration of  
10 "extreme hardship." As a general matter, the agency does "not allow longitudinal  
11 installations within the right of way." (*See Exhibit PGE/403*).

12 In addition, links along the McLoughlin-Wilsonville 115-kV transmission line  
13 lattice tower right-of-way were also initially evaluated but eliminated for  
14 constructability reasons by PGE. Specifically, the Company determined that the PGE  
15 easement that the lattice towers occupy did not have sufficient width to allow for a new  
16 115-kV circuit and PGE would have to rebuild that corridor to allow for the addition.

17 Finally, at a conceptual level during the initial, internal PGE planning phase for  
18 this transmission system upgrade, PGE considered a route that followed an existing  
19 railroad. This route option was approximately 10.9 miles long; would have impacted  
20 244 land parcels, 10 wetlands, and 5.4 miles of railroad right-of-way; had two  
21 Interstate 5 crossings with larger structures required to span the distance and maintain  
22 line separation and overpass crossing with taller structures needed; lacked space along  
23 the route for micro-siting to avoid the need for easements; would have required

1 significant street tree clearing in residential neighborhoods; and would pass through a  
2 number of densely developed residential areas, including areas with communities of  
3 color and low-income communities, where project impacts to residents would be  
4 unavoidable. This route option would also have more complex regulatory and  
5 permitting requirements. This route was eliminated from further consideration after  
6 preliminary review because of the large number of impacts and constructability  
7 challenges.

8 **B. Project Costs and Risks**

9 **Q. Is the Class 5 estimate for the proposed route, discussed above, the Company's**  
10 **current cost estimate?**

11 A. No. The Company completed final engineering for the proposed route and issued  
12 construction documents for contractor bids. All material purchases and construction  
13 scope have been hard bid and actuals have been incorporated into the current budget  
14 estimate that is presented below.<sup>6</sup> At this point, PGE expects that costs will be accurate  
15 to +/- five percent.

16 **Q. What is PGE's estimate of the costs of the Rosemont-Wilsonville Line?**

17 A. The Company estimates total costs for the Rosemont-Wilsonville Line of \$27.4  
18 million, which is made up of costs associated with the transmission facilities including  
19 a contingency, overheads, Allowance for Funds Used During Construction (AFUDC),  
20 and property taxes. A summary of the estimated direct costs is attached as Highly  
21 Protected Exhibit PGE/404.

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<sup>6</sup> It is important to note that while PGE has continued to refine its design for the proposed route, the Company has not done so for the two alternative routes that were analyzed in the routing study.

| Estimated Total Costs (in \$ millions)     |        |
|--|--------|
| <b>Direct Costs, including contingency</b> | \$18.6 |
| <b>Overhead Costs</b>                      | \$5.5  |
| <b>AFUDC</b>                               | \$3.1  |
| <b>Property Taxes</b>                      | \$0.2  |
| <b>Total</b>                               | \$27.4 |

| Estimated Direct Costs (in \$ millions)     |   |
|---|---|
| PGE Internal Labor                          | \$0.34                                      |
| Material and Equipment                      | Begin Protected/ [REDACTED] End Protected   |
| Engineering and Other Professional Services | Begin Protected/ [REDACTED] End Protected   |
| Construction Services                       | Begin Protected/ [REDACTED] / End Protected |
| Other Expenses                              | Begin Protected/ [REDACTED] / End Protected |
| <b>Total</b>                                | \$18.63                                     |

1 **Q. What is the basis for the cost estimate for the Rosemont-Wilsonville Line?**

2 A. The cost estimate is primarily based on actual quotes for materials and services with  
3 additions of historical PGE internal costs for all remaining line items.

4 **Q. Please explain any assumptions included in the cost estimate.**

5 A. For items that were not based on actual quotes, PGE assumed historical internal costs  
6 as cost estimates.

7 **Q. Does the cost estimate include costs associated with any mitigation of impacts?**

8 A. The total cost estimate for the project includes a flat contingency amount of five percent  
9 of construction costs to cover any mitigation of impacts or other costs that are not  
10 already itemized.

11 **Q. Please describe any cost control measures that PGE has in place for the Rosemont-  
12 Wilsonville Line.**

1 A. Project costs will be monitored closely using various mechanisms. A PGE  
2 Construction Manager will be deployed to the field during construction to monitor  
3 progress, assist in impact mitigation, handle unforeseen issues, and provide direct  
4 communication between the contractor and the engineering team. Monthly budget  
5 forecasts and expected run rates will be reviewed to ensure the Rosemont-Wilsonville  
6 Line stays on track and within budgeted costs. Any change orders requested by the  
7 contractor will not be approved until vetted through PGE's engineering, operations,  
8 and executive management teams.

9 **Q. Is PGE's contingency for the Rosemont-Wilsonville Line sufficient to support**  
10 **construction of the line?**

11 A. Yes, based on past project experience. In general, project contingency amounts are  
12 based on the amount of design completed and are adjusted on a sliding scale or based  
13 on the assessed risk exposure to construction cost escalations. Because the Rosemont-  
14 Wilsonville Line is at 100 percent project design, a five percent contingency is in  
15 accordance with PGE project experience at this amount of design completed and is  
16 appropriate and sufficient to support construction of the line.

17 **Q. When was funding allocated for the Tonquin Project, including the Rosemont**  
18 **Wilsonville Line?**

19 A. In January 2021, PGE's Capital Group allocated funding for the engineering and design  
20 for the Tonquin Project, as well as procurement of long lead materials. Funding for  
21 construction of the Tonquin Project was fully allocated in June 2023.

22 **Q. How does PGE propose to pay for the construction of the Rosemont-Wilsonville**  
23 **Line?**

1 A. Consistent with PGE's overall capital portfolio, the Rosemont-Wilsonville Line project  
2 has been financed through a combination of shareholder equity and long-term debt. As  
3 the total capital cost of this asset is relatively small in comparison to PGE's overall  
4 capital portfolio, there is no specific debt or equity issuance tied to this project.

5 **Q. What is the estimated total cost for acquiring easements for the Rosemont-**  
6 **Wilsonville Line?**

7 A. The estimated total cost for acquiring easements for the Rosemont-Wilsonville Line is  
8 approximately **Begin Highly Protected**/[REDACTED]/**End Highly Protected** million. This  
9 estimated total cost does not include permitting costs, costs for vegetation mitigation,  
10 or administrative or legal costs.

11 **Q. What is the total consideration paid by PGE for the Rosemont-Wilsonville Line**  
12 **project easements the Company has already acquired?**

13 A. The total consideration paid by PGE for the Rosemont-Wilsonville Line project  
14 easements it has already obtained that are necessary for construction of the line is  
15 approximately **Begin Highly Protected**/[REDACTED]**End Highly Protected**. In addition,  
16 PGE has paid approximately **Begin Highly Protected**/[REDACTED]/**End Highly Protected**  
17 for ancillary easements for proactive vegetation clearance.

18 **Q. What is the estimated cost of obtaining the remaining easements necessary to**  
19 **construct the Rosemont-Wilsonville Line?**

20 A. The estimated cost of obtaining the remaining easements necessary to construct the  
21 Rosemont-Wilsonville Line is approximately **Begin Highly Protected**/[REDACTED]**End**  
22 **Highly Protected** excluding costs for vegetation mitigation and administrative and  
23 legal costs associated with condemnation actions. The estimated cost of obtaining the

1 remaining easements necessary to construct the Rosemont-Wilsonville Line is  
 2 approximately **Begin Highly Protected** ██████████ **End Highly Protected** excluding  
 3 costs for vegetation mitigation and administrative and legal costs associated with  
 4 condemnation actions.

5 **Q. Will PGE continue to negotiate easements during the Certificate for Public**  
 6 **Convenience and Necessity (CPCN) proceedings?**

7 A. Yes, PGE will continue to negotiate in good faith with landowners during the CPCN  
 8 proceedings to obtain the remaining easements.

9 **C. Experience in Constructing, Operating, and Maintaining Transmission Lines**

10 **Q. Does PGE have experience in constructing, operating, and maintaining**  
 11 **transmission lines?**

12 A. PGE has extensive experience constructing, operating, and maintaining transmission  
 13 lines in Oregon in a safe and reliable manner for more than 130 years. The Company  
 14 operates and maintains 1,613 circuit miles of sub-transmission/transmission lines  
 15 (including generation lead lines) ranging from 57-kV through 500-kV in its service  
 16 territory.<sup>7</sup> In particular, PGE maintains over 550 circuit miles of 115-kV transmission  
 17 lines like the proposed Rosemont-Wilsonville Line in Oregon.<sup>8</sup> In addition to its 115-  
 18 kV transmission lines, in the past five years the Company has developed 25 circuit  
 19 miles of high-voltage transmission ranging from 57-kV to 230-kV system-wide.

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<sup>7</sup> PGE, Longer Term Local Transmission Plan For the 2023-2024 Planning Cycle at 8 (Dec. 26, 2023), *available at* [http://www.oasis.oati.com/woa/docs/PGE/PGEdocs/2023\\_Local\\_Transmission\\_Plan.pdf](http://www.oasis.oati.com/woa/docs/PGE/PGEdocs/2023_Local_Transmission_Plan.pdf) (PGE/109, Beil/8).

<sup>8</sup> PGE/109, Beil/8.



1 **Q. Has PGE retained contractors with sufficient experience, expertise, and**  
2 **knowledge to construct the Rosemont-Wilsonville Line by the planned in-service**  
3 **date?**

4 A. Yes. PGE retained HMW as the construction contractor, which has over a century of  
5 experience in constructing reliable utility infrastructure networks, including overhead  
6 transmission projects, in the Western United States. Each year, HMW helps construct  
7 thousands of miles of power lines across the country while keeping thousands of  
8 workers safe. In total, HMW has helped design, engineer, construct, monitor and  
9 maintain about 700,000 circuit miles of electric transmission lines in the United States.  
10 HMW is also a founding member of the Electrical Transmission and Distribution  
11 Strategic Partnership, a formal collaboration of industry stakeholders, working to  
12 improve safety for workers in the electric transmission and distribution line  
13 construction industry. Additionally, over the past several years, PGE has retained  
14 HMW on a number of successful projects in which the contractor has delivered projects  
15 on time and to the Company's specifications in accordance with their contractual  
16 obligations. In short, HMW has a proven track record of delivering on-time, quality  
17 projects by employing highly trained and qualified workers and ensuring safe work  
18 practices.

19 At the time of this filing, HMW has executed all material orders and all material  
20 necessary to construct the Rosemont-Wilsonville Line will be on hand at the  
21 commencement of construction for the proposed route. If HMW is able to begin  
22 construction by May 2025, there is a reasonable probability of completing construction  
23 by the end of 2025.

1 **Q. Please describe the major construction milestones following commencement of**  
2 **construction.**

3 A. Following the commencement of construction, the awarded contractor, HMW, will  
4 schedule the required traffic control and begin staking all proposed pole locations.  
5 Once the poles have been staked, the distribution framing will be spread to provide an  
6 additional level of safety for the crew members. Poles will then be installed along the  
7 alignment with the proposed transmission framing installed. The transmission  
8 conductor will be installed at this stage of construction, then sagged and clipped into  
9 the transmission hardware per PGE specifications. The distribution conductors and  
10 framing will be installed on the new structures, and the existing poles will be topped at  
11 the communication level. All communication entities will be engaged at this time, and  
12 communication cables will be transferred to the new poles. Once the communication  
13 transfers have been executed, the existing poles will be removed. All restoration along  
14 the alignment will be executed prior to the conclusion of construction.

15 **Q. Will the contractors be subject to penalties for breaches of contract, including**  
16 **missing construction timelines?**

17 A. Yes. Contractors are held to performance standards, warranty conditions, and time of  
18 performance requirements. To the extent any of these are breached, PGE has rights  
19 and remedies under its contracts to address nonconformance and noncompliance.

20 **Q. Are the contractors subject to budgetary limits?**

21 A. Yes. Project costs may not exceed the budget provided in the contract plus the five  
22 percent contingency. As discussed above, project costs will be monitored closely using  
23 various mechanisms.

1 **Q.** Does this conclude your testimony?

2 **A.** Yes.

## **List of Exhibits**

| <b><u>PGE Exhibit</u></b> | <b><u>Description</u></b>                               |
|---------------------------|---|
| PGE/401                   | Power Engineers Tonquin Routing Study (Dec. 30, 2020)   |
| PGE/402                   | HMW Rosemont-Wilsonville Constructability Review        |
| PGE/403                   | Letter from Zach Candreau, ODOT, to PGE (Mar. 22, 2024) |
| PGE/404 <b>HP / P</b>     | Summary of Direct Costs                                 |

**P** – Protected Information

**HP** – Highly Protected Information

**PGE/401**

**Power Engineers Tonquin Routing Study (Dec. 30, 2020)**



POWER ENGINEERS, INC.  
3 CENTERPOINTE DRIVE  
SUITE 500  
LAKE OSWEGO, OR 97035 USA

PHONE 503-892-6700  
FAX 503-892-6799

**LETTER OF TRANSMITTAL**

**DATE:** December 30, 2020  
**TO:** Matt Gordanier, PGE  
Jordan Messinger, PGE  
**SUBJECT:** PGE Tonquin Routing Study  
**PROJECT NUMBER:** 166908

**THESE ARE TRANSMITTED:**  FOR YOUR INFORMATION  FOR ACTION SPECIFIED BELOW  FOR REVIEW AND COMMENT  FOR YOUR USE  AS REQUESTED

| COPIES | DESCRIPTION         |
|--------|---------------------|
|        | PLEASE SEE ATTACHED |

**MESSAGE**

Matt / Jordan,

Thanks again for the opportunity to assist you with the Tonquin Routing Study. Attached are the following documents for your use:

- Routing Study Memo
- Attachment 1 – Overview and Alternative Route Maps
- Attachment 2 – Route Comparison Table
- Attachment 3 – Route Criteria Detail Table
- Attachment 4 – Route Alternatives .kmz file

**ROUTING STUDY MEMO**



POWER ENGINEERS, INC.  
3 CENTERPOINTE DRIVE  
SUITE 500  
LAKE OSWEGO, OR 97035 USA

PHONE 503-892-6700  
FAX 503-892-6799

## MEMORANDUM

**DATE:** December 30, 2020

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**TO:** Matt Gordanier, PGE  
Jordan Messinger, PGE

---

**CC:** Mike Doyle, John Hanna - POWER

---

**FROM:** Derik Vowels, Darel Tracy

---

**SUBJECT:** 166908 Tonquin Substation Line Routing Study

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### MESSAGE

This memo outlines the approach that POWER Engineers, Inc. (POWER) used to conduct the Tonquin Substation Line Routing Study (Project) and the study's results.

#### Study Methodology

POWER conducted a transmission line route review for the Project to identify and evaluate possible alternative routes to the current PGE proposed routes for new 115 kV transmission lines between Tualatin, Wilsonville, and Lake Oswego, Oregon. The Project's elements included:

- Rosemont-Wilsonville
  - A new 115 kV transmission line connecting the existing Rosemont Substation in unincorporated Clackamas County, Oregon and the existing Wilsonville Substation in the City of Wilsonville, Oregon. Approximately 7 to 9 miles.
- McLoughlin-Tonquin
  - A new 115 kV transmission line connecting the existing McLoughlin transmission line and the existing Coffee Creek Substation in unincorporated Washington County, Oregon to the proposed Tonquin Substation in the City of Tualatin, Oregon using a tap point on the existing McLoughlin-Wilsonville 230 kV transmission line. Approximately 3.3 miles.

Using available aerial imagery, POWER created a study area boundary within which to identify and evaluate alternative routes. The study area boundary covered approximately 29 square miles in order to identify a range of reasonable and feasible alternative routes. After defining the study area boundary, POWER collected transmission and distribution network data from PGE, municipal and county land use data from local governments, and environmental resource data including rivers/streams, floodplains, and wetlands from state and federal agencies. POWER's data sources included:

- PGE
- Regional Land Information System for the Portland, Oregon metropolitan area
- Outdoor Recreation and Conservation Areas
- Federal Emergency Management Agency



- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Google Earth aerial imagery

Routing opportunities for the new 115 kV transmission lines were identified to include:

- Existing overhead distribution or transmission lines
- Major arterial streets and highways

Priorities for siting the new transmission lines included:

- Minimizing the need to double-circuit existing transmission lines
- Overbuilding distribution lines
- Following road rights-of-way (ROW)
- Keeping lines overhead
- Maintaining trees
- Avoiding wetlands

POWER began the process of identifying alternative routes by developing a network of route links. These links were connected to form alternative routes. Each link was assigned a tracking number for the purpose of organizing data. A map of route links identified and evaluated, is provided as Attachment 1.

POWER identified potential alternative routes and summarized the alignments in the comparison table provided as Attachment 2. For reference, route details are included in the routing criteria detail table provided as Attachment 3. The following criteria were used to evaluate and compare the alternative routes:

- Route length in miles
- Mileage crossing county and municipal jurisdictions
- Number of parcels crossed
- Miles of rebuild required
- Miles of new ROW required
- Land use, including counts of buildings within 100 feet and 300 feet of the routes
- Wetlands and floodplains crossed
- Engineering constructability
- Comparative construction costs – order of magnitude only

## **Study Results**

### **Rosemont-Wilsonville**

A total of 38.3 miles of alternative route links were reviewed and analyzed for the Rosemont-Wilsonville segment of the project, which resulted in three route options: A, B, and C.

The preferred route – Alternative A – is approximately 7.4 miles in length and the shortest of the three alternatives. This route also would include the shortest distance for constructing the line in a new ROW at approximately 0.7 mile. Alternative Route A includes the fewest number of buildings within 100 feet and 300 feet compared to Alternative Routes B and C. Additionally,

Alternative Route A is tied with Alternative Route B for the fewest number of schools and parks within 300 feet. Alternative Route A crosses the fewest number of rivers and streams.

Concerning engineering constructability and cost, Alternative Route A might be difficult to construct along the south half of Link 60, which follows SW Stafford Road. However, Alternative Route B would pose the same challenge for constructability and its cost is equal to that of Alternative A at approximately \$2.5 million. Alternative Route C's cost is approximately \$2.9 million and would require crossing the Tualatin River and additional U.S. Army Corps of Engineers permit approval.

Route A would likely require a Type III Conditional Use Land Use approval from Clackamas County for the construction of new transmission line across parcels zoned Rural Residential Farm Forest 5-Acre.

All routes included PGE's preference to reroute the existing McLoughlin-Wilsonville transmission line from SW Stafford Road and SW 65<sup>th</sup> Avenue to connect to the Wilsonville Substation.

Along with other roads, opportunities for routing in this area included Interstate 5 and Interstate 205. However, coordination with the Oregon Department of Transportation (ODOT) eliminated alternative route links along these two highways as ODOT's policy restricts placing electric transmission lines in or adjacent to highway ROW.

In addition, links along the McLoughlin-Wilsonville transmission line lattice tower ROW were also initially evaluated but eliminated for constructability reasons by PGE.

### **McLoughlin-Tonquin**

A total of 7.1 miles of alternative route links were reviewed and analyzed for the McLoughlin-Tonquin segment of the project, which resulted in six route options: A, B, C, D, E, and F.

The preferred route – Alternative E – is approximately 3.18 miles in length and the shortest of the six alternatives and resulted in the fewest number of buildings within 100 feet. The routes included PGE's preference to extend McLoughlin-Wilsonville northwest to the Meridian-Sherwood Coffee Creek Tap near SW Grahams Ferry Road and SW Clay Street, use the Tap northwest to SW 124<sup>th</sup> Avenue, and construct the new line along SW 124<sup>th</sup> Avenue to the proposed Tonquin Substation.

Concerning engineering constructability and cost, Alternative Route E might present the easiest engineering option in this portion of the Study area and it is the least expensive at approximately \$960,000.

A route link along the Union Pacific Railroad near SW Grahams Ferry Road was evaluated but eliminated due to permitting and coordination requirements with the railroad.

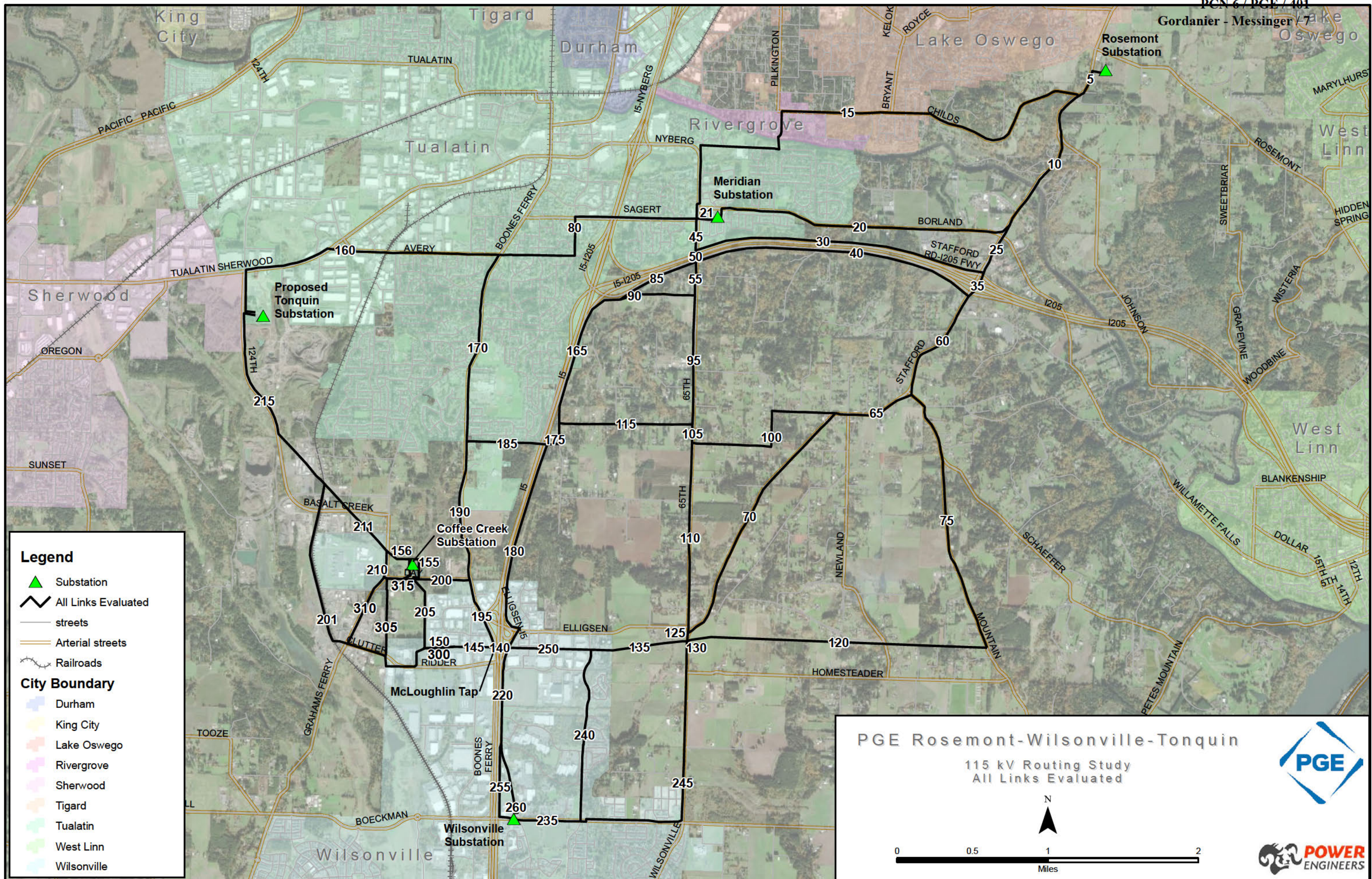
Route links along Tualatin Sherwood Road were also evaluated but eliminated to minimize double-circuiting of transmission and to achieve increased transmission reliability to Tonquin Substation from a new ROW.

Attachments:

- 1) Study Overview and Alternative Route Maps
- 2) Route Comparison Table
- 3) Route Criteria Detail Table
- 4) Route Alternatives .kmz

**ATTACHMENT 1 – OVERVIEW AND ALTERNATIVE ROUTE MAPS**





**Legend**

- Substation
- All Links Evaluated
- streets
- Arterial streets
- Railroads

**City Boundary**

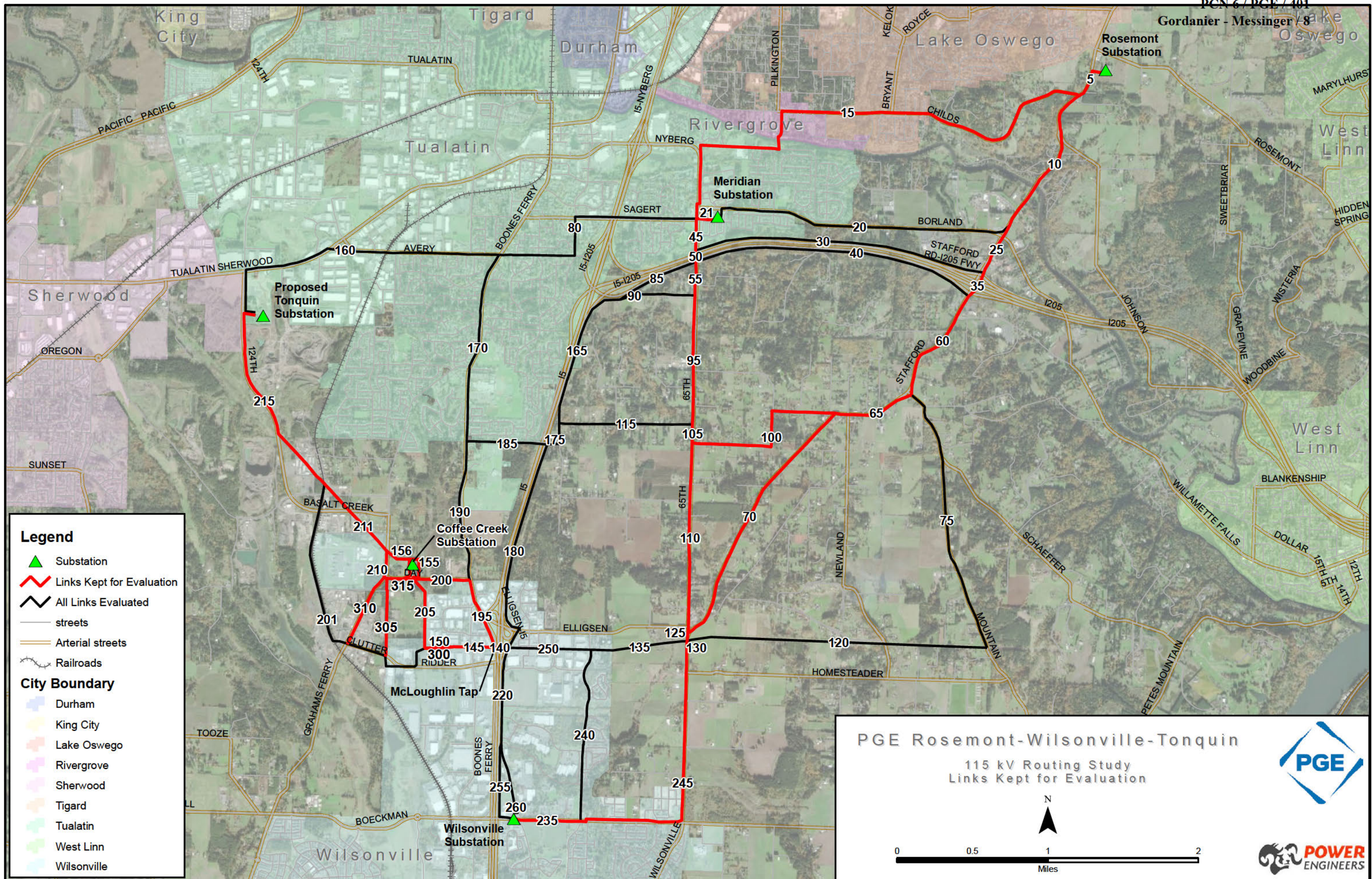
- Durham
- King City
- Lake Oswego
- Rivergrove
- Sherwood
- Tigard
- Tualatin
- West Linn
- Wilsonville

**PGE Rosemont-Wilsonville-Tonquin**

115 kV Routing Study  
All Links Evaluated







**Legend**

- Substation
- Links Kept for Evaluation
- All Links Evaluated
- streets
- Arterial streets
- Railroads

**City Boundary**

- Durham
- King City
- Lake Oswego
- Rivergrove
- Sherwood
- Tigard
- Tualatin
- West Linn
- Wilsonville

**PGE Rosemont-Wilsonville-Tonquin**

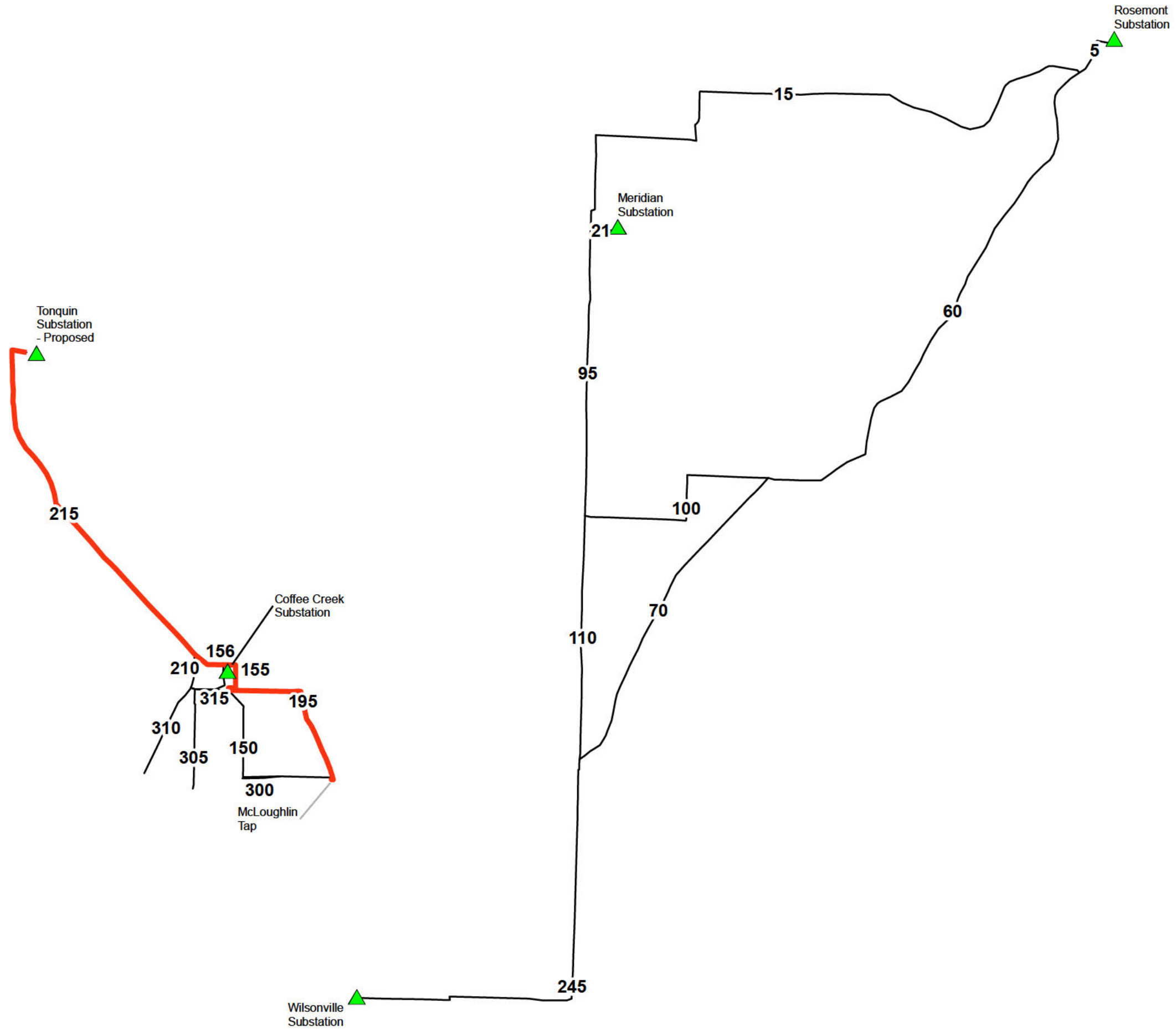
115 kV Routing Study  
Links Kept for Evaluation





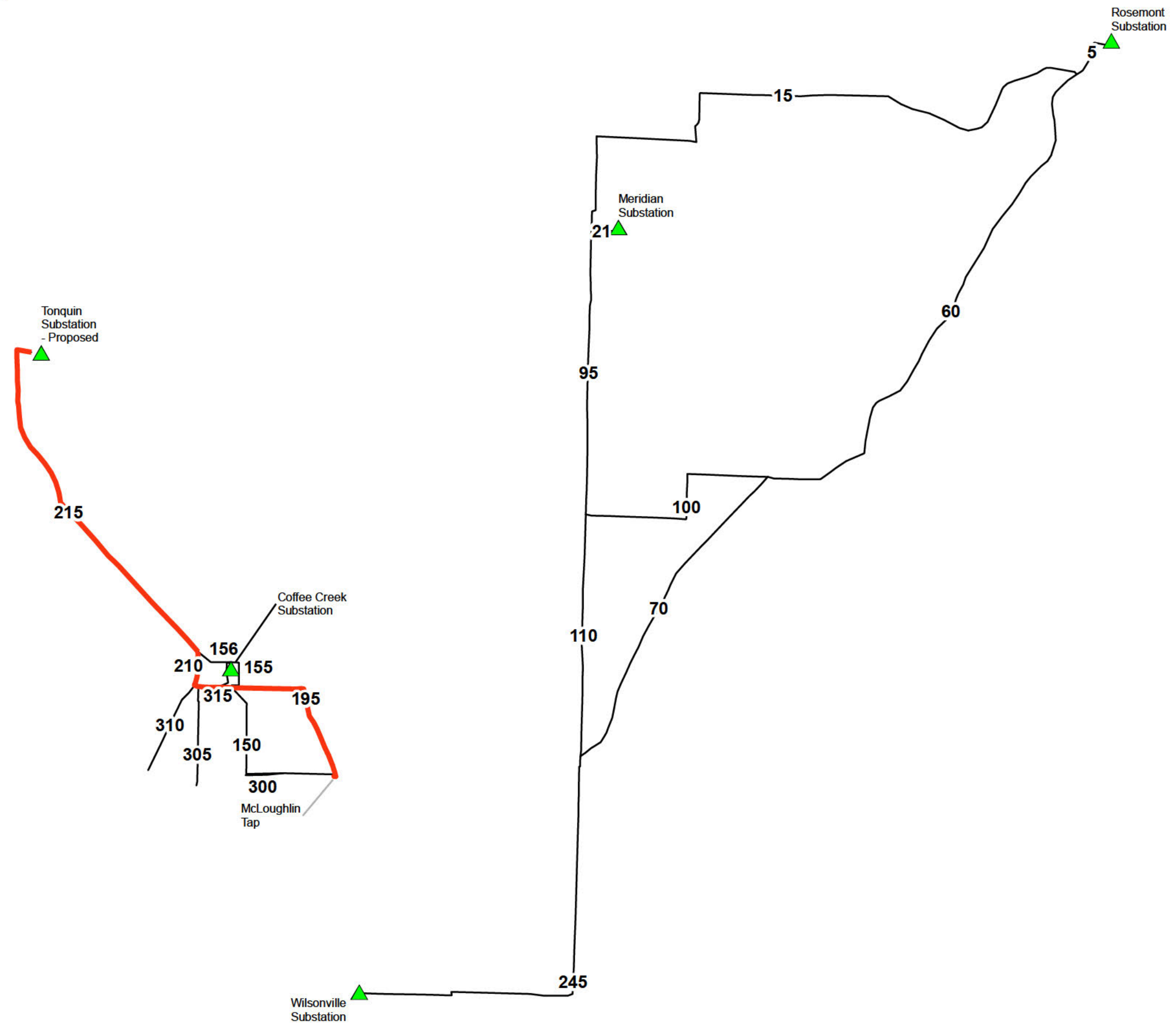
# Tonquin - McLoughlin

Route A  
3.28 miles



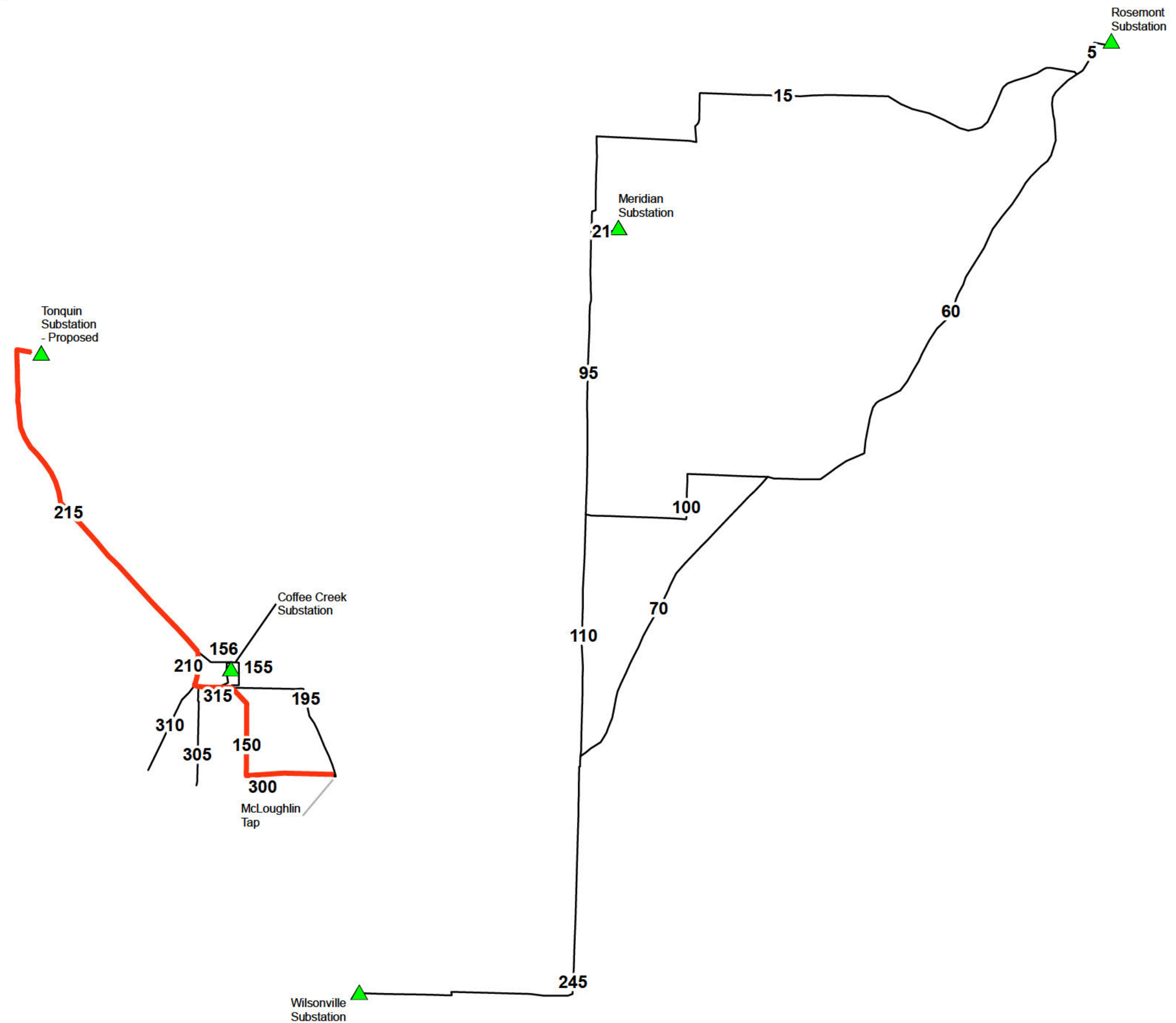
# Tonquin - McLoughlin

Route B  
3.26 miles



# Tonquin - McLoughlin

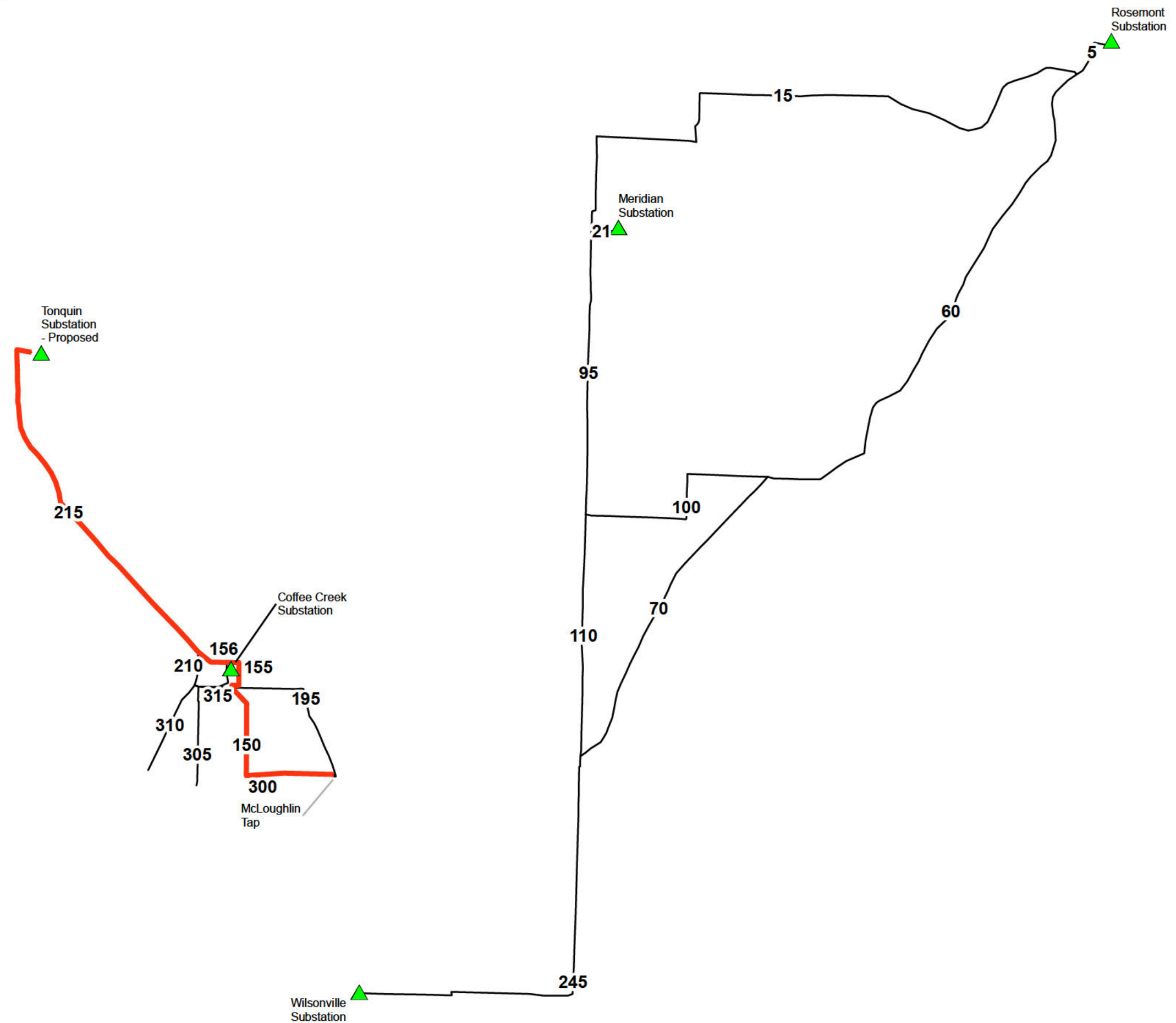
Route C  
3.32 miles





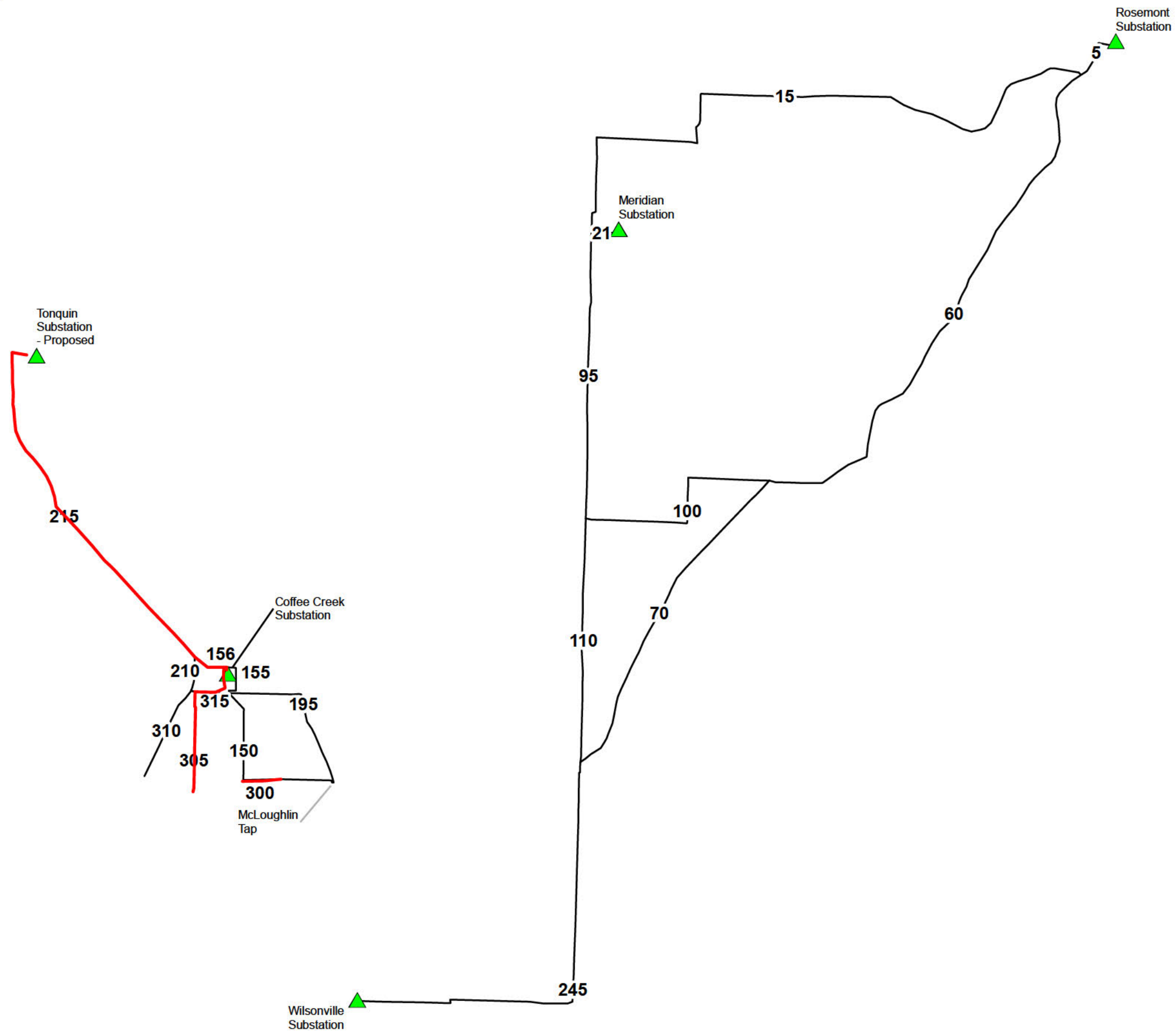
# Tonquin - McLoughlin

Route D  
3.35 miles



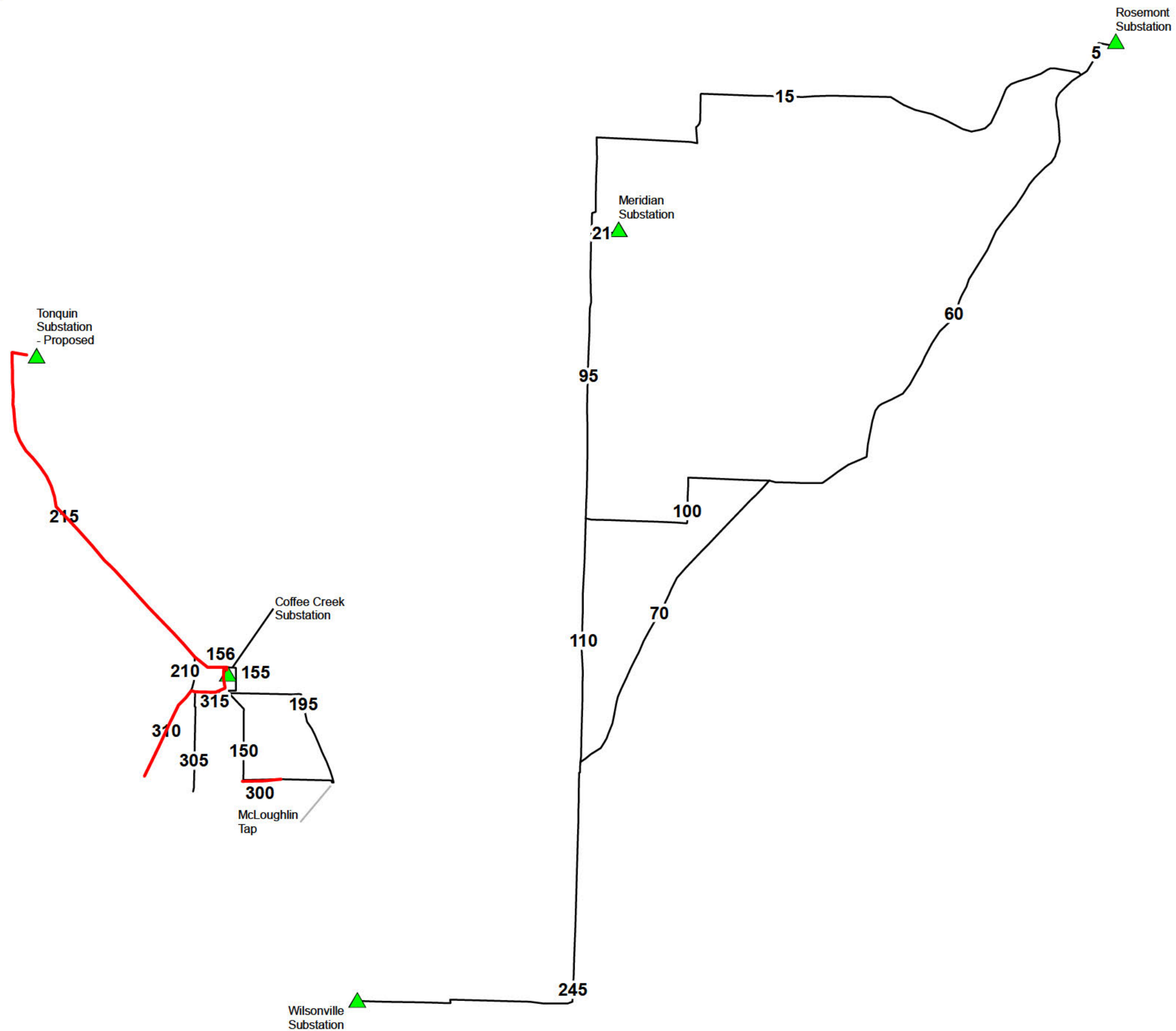
# Tonquin - McLoughlin

Route E  
3.19 miles



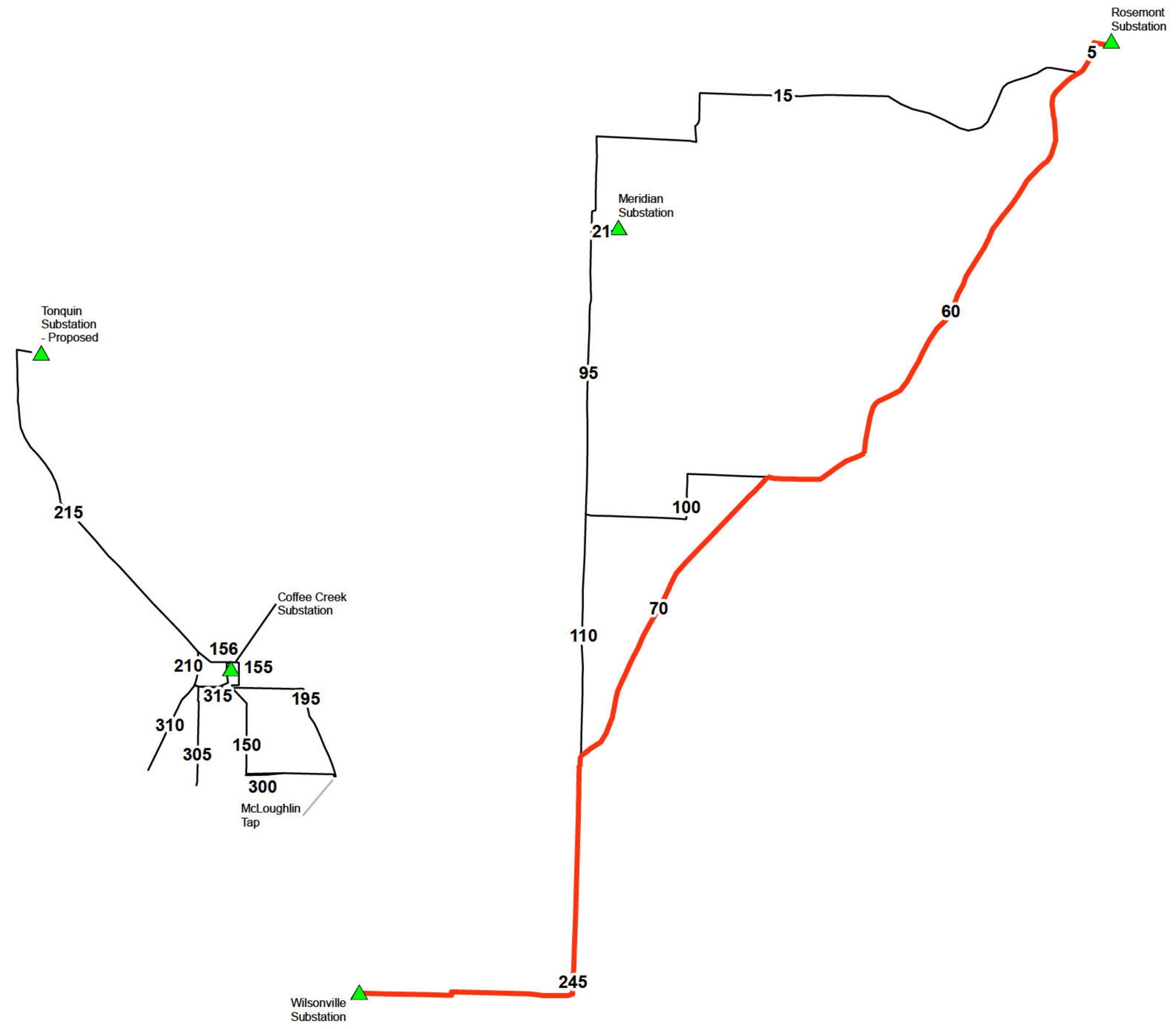
# Tonquin - McLoughlin

Route F  
3.20 miles



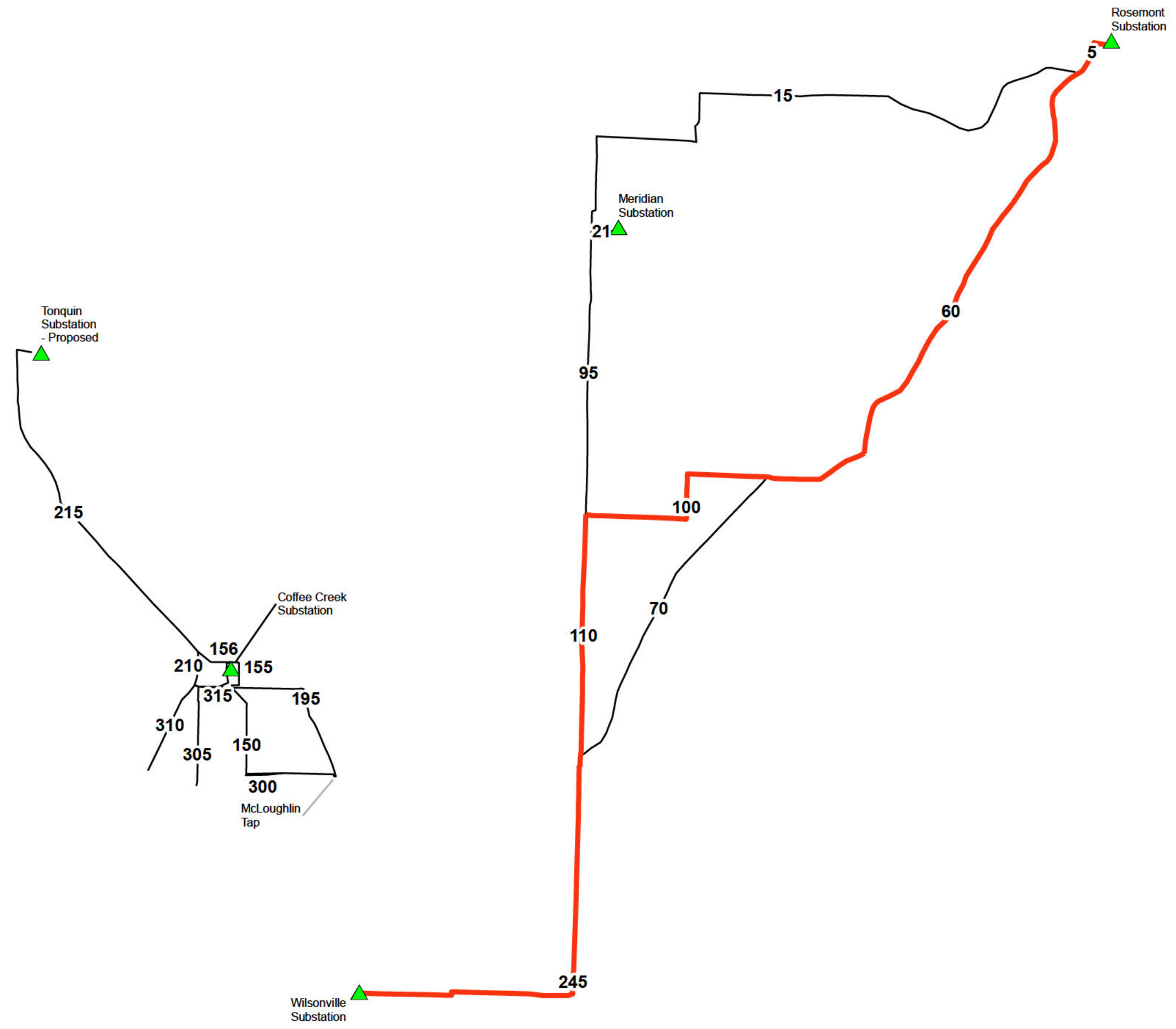
# Rosemont - Wilsonville

Route A  
7.39 miles



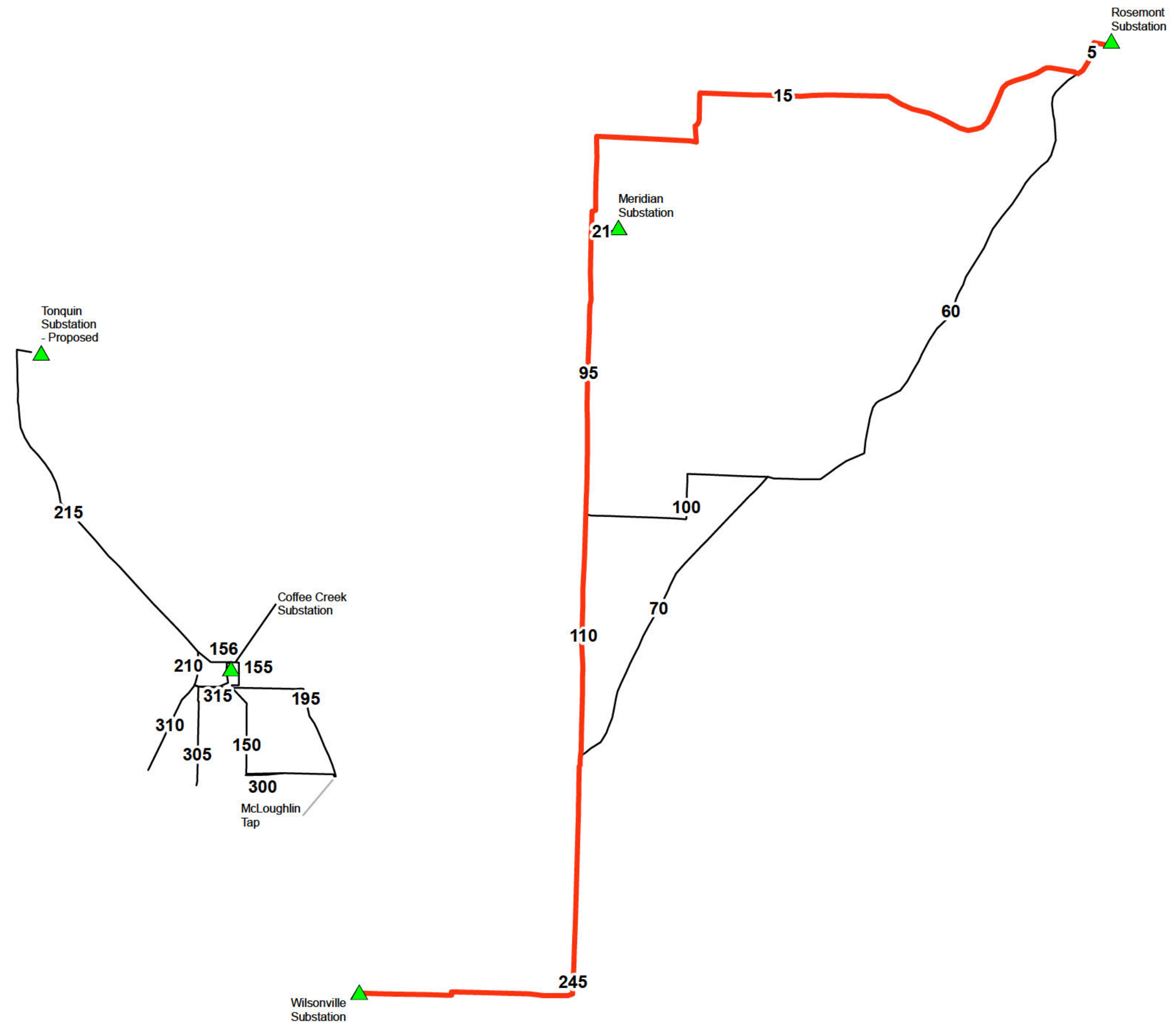
# Rosemont - Wilsonville

Route B  
8.05 miles



# Rosemont - Wilsonville

Route C  
8.89 miles



**ATTACHMENT 2 – ROUTE COMPARISON TABLE**

Rosemont to Wilsonville - Route Comparison Matrix  
PGE Tonquin Route Study  
POWER Engineers, Inc.

| Alternative Routes           | Total Mileage | Mileage by Ownership / Jurisdiction |                   |                     |                    |                  |                     | New Line - No Existing Distribution or Transmission (Miles) | Distribution Overbuild / Underbuild (Miles) | Parallel to Roads (Miles) | New ROW Acquisition Needed | Land Use        |  |  |  | Wetlands / Floodplains  |   | Key Engineering / Constructability Issues | Estimated Construction Costs   | Notes       | Preferred Route Ranking  |                                      |
|------------------------------|---------------|-------------------------------------|-------------------|---------------------|--------------------|------------------|---------------------|---|---|---------------------------|----------------------------|-----------------|--|--|--|---|---|---|--|-------------|--|--------------------------------------|
|                              |               | Clackamas County                    | Washington County | City of Lake Oswego | City of Rivergrove | City of Tualatin | City of Wilsonville |   |   |                           |                            | Parcels Crossed | Buildings / Structures Within 100 Feet | Buildings / Structures Within 300 Feet | Airport Approach Surface (Miles Crossed) | General Zoning (Zoning Type - Miles Crossed)  | National Wetland Inventory Crossed (Feet) |   |  |             |  | Floodplain / Floodway Crossed (Feet) |
| Rosemont-Wilsonville Route A | 7.4           | 6.3                                 | 0.0               | 0.0                 | 0.0                | 0.0              | 1.1                 | 0.7   | 6.7   | 7.3                       | Yes: 0.7 mile              | 14              | 119                                    | 352                                    | 0.0                                      | Commercial: 0%<br>Future Urban Development: 1%<br>Industrial: 0%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 2%<br>Parks and Open Space: 0%<br>Rural: 92%<br>Single-Family: 5%<br><b>Total Miles Represented: 6.4</b>            | 353                                       | 360                                       | Existing 115 kV line along north portion of route would need to be double-circuit. Distribution trunk underbuild. Long freeway crossing. No overhead lines nearby. Difficult construction along south half of Link 60. | \$2,490,000 | This route is situated within 300 feet of 7 schools and/or parks and 6 places of worship and/or cemeteries. Approximately 2 miles of tree cover exists along this route. Likely requires Type III Conditional Use Approval from Clackamas County for new ROW construction along Links 25 & 35.   | 1                                    |
| Rosemont-Wilsonville Route B | 8.0           | 6.9                                 | 0.0               | 0.0                 | 0.0                | 0.0              | 1.1                 | 0.8   | 7.2   | 7.9                       | Yes: 0.8 mile              | 22              | 127                                    | 403                                    | 0.0                                      | Commercial: 0%<br>Future Urban Development: 1%<br>Industrial: 0%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 2%<br>Parks and Open Space: 0%<br>Rural: 92%<br>Single-Family: 5%<br><b>Total Miles Represented: 6.5</b>            | 382                                       | 360                                       | Existing 115 kV line along north portion of route would need to be double-circuit. Distribution trunk underbuild. Long freeway crossing. No overhead lines nearby. Difficult construction along south half of Link 60. | \$2,500,000 | This route is situated within 300 feet of 7 schools and/or parks and 7 places of worship and/or cemeteries. Approximately 2 miles of tree cover exists along this route. Likely requires Type III Conditional Use Approval from Clackamas County for new ROW construction along Links 25 & 35.   | 2                                    |
| Rosemont-Wilsonville Route C | 8.9           | 5.4                                 | 0.0               | 0.7                 | 0.4                | 1.3              | 1.1                 | 1.6   | 7.3   | 8.6                       | Yes: 1.6 miles             | 36              | 203                                    | 653                                    | 0.0                                      | Commercial: 8%<br>Future Urban Development: 1%<br>Industrial: 0%<br>Multi-Family: less than 1%<br>Mixed-Use Residential: 0%<br>Public Facilities: 2%<br>Parks and Open Space: 3%<br>Rural: 55%<br>Single-Family: 30%<br><b>Total Miles Represented: 6.8</b> | 1,020                                     | 6,233                                     | Difficult, curvy construction likely along Link 5. Distribution tap lines and trunks present along remainder of route.   | \$2,900,000 | This route is situated within 300 feet of 13 schools and/or parks and 5 places of worship and/or cemeteries. Approximately 3.3 miles of tree cover exists along this route. Tualatin River crossing at Link 15 would likely require a Sect 10 Permit from U.S. Army Corps of Engineers. Likely requires Type III Conditional Use Approval from Clackamas County for new ROW construction along Link 110. | 3                                    |



Tonquin to McLoughlin - Route Comparison Matrix  
PGE Tonquin Route Study  
POWER Engineers, Inc.

| Alternative Routes         | Total Mileage | Mileage by Ownership / Jurisdiction |                   |                     |                    |                  |                     | New Line - No Existing Distribution or Transmission (Miles) | Distribution Overbuild / Underbuild (Miles) | Parallel to Roads (Miles) | New ROW Acquisition Needed | Land Use        |  |  |  | Wetlands / Floodplains  |   | Key Engineering / Constructability Issues | Estimated Construction Costs   | Notes       | Preferred Route Ranking  |                                      |
|----------------------------|---------------|-------------------------------------|-------------------|---------------------|--------------------|------------------|---------------------|---|---|---------------------------|----------------------------|-----------------|--|--|--|---|---|---|--|-------------|--|--------------------------------------|
|                            |               | Clackamas County                    | Washington County | City of Lake Oswego | City of Rivergrove | City of Tualatin | City of Wilsonville |   |   |                           |                            | Parcels Crossed | Buildings / Structures Within 100 Feet | Buildings / Structures Within 300 Feet | Airport Approach Surface (Miles Crossed) | General Zoning (Zoning Type - Miles Crossed)  | National Wetland Inventory Crossed (Feet) |   |  |             |  | Floodplain / Floodway Crossed (Feet) |
| Tonquin-McLoughlin Route A | 3.3           | 0.0                                 | 2.1               | 0.0                 | 0.0                | 0.1              | 1.1                 | 0.9   | 2.0   | 1.8                       | Yes: 0.9 mile              | 18              | 34                                     | 99                                     | 0.0                                      | Commercial: 0%<br>Future Urban Development: 24%<br>Industrial: 70%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 6%<br>Parks and Open Space: 0%<br>Rural: 0%<br>Single-Family: 0%<br>Total Miles Represented: 2.3  | 64  | 0   | At the proposed Tonquin Substation, greenfield construction will need to duck under existing lattice tower line and BPA 115 kV lines.<br><br>Along the south portion of Link 195, the existing distribution trunks could pose a big challenge.<br><br>At the Tonquin Tap, tapping the south side of the lattice towers coupled with the NW corridor alignment could pose a big challenge.  | \$1,080,000 | No schools, parks, places of worship, or cemeteries are situated within 300 feet of this route.<br><br>Approximately 0.5 mile of tree cover exists along this route.                                       | 3                                    |
| Tonquin-McLoughlin Route B | 3.2           | 0.0                                 | 1.7               | 0.0                 | 0.0                | 0.1              | 1.4                 | 0.9   | 2.3   | 2.2                       | Yes: 0.9 mile              | 16              | 40                                     | 113                                    | 0.0                                      | Commercial: 0%<br>Future Urban Development: 10%<br>Industrial: 80%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 10%<br>Parks and Open Space: 0%<br>Rural: 0%<br>Single-Family: 0%<br>Total Miles Represented: 2.1 | 64  | 0   | At the proposed Tonquin Substation, greenfield construction will need to duck under existing lattice tower line and BPA 115 kV lines.<br><br>Along the south portion of Link 155, getting under the existing lines could pose a big challenge.<br><br>Along the south portion of Link 195, the existing distribution trunks could pose a big challenge.<br><br>At the Tonquin Tap, tapping the south side of the lattice towers coupled with the NW corridor alignment could pose a big challenge. | \$1,180,000 | No schools, parks, places of worship, or cemeteries are situated within 300 feet of this route.<br><br>Approximately 0.5 mile of tree cover exists along this route.                                       | 4                                    |
| Tonquin-McLoughlin Route C | 3.3           | 0.0                                 | 2.2               | 0.0                 | 0.0                | 0.1              | 1.0                 | 1.1   | 1.7   | 1.3                       | Yes: 1.1 miles             | 30              | 35                                     | 111                                    | 0.0                                      | Commercial: 0%<br>Future Urban Development: 23%<br>Industrial: 67%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 10%<br>Parks and Open Space: 0%<br>Rural: 0%<br>Single-Family: 0%<br>Total Miles Represented: 3.0 | 43  | 0   | At the proposed Tonquin Substation, greenfield construction will need to duck under existing lattice tower line and BPA 115 kV lines.<br><br>Along Link 150, the existing 115 kV would need to be double-circuit, which could pose a challenge where Link 150 turns east.  | \$1,300,000 | No schools, parks, places of worship, or cemeteries are situated within 300 feet of this route.<br><br>Approximately 0.7 mile of tree cover exists along this route.                                       | 6                                    |
| Tonquin-McLoughlin Route D | 3.3           | 0.0                                 | 2.5               | 0.0                 | 0.0                | 0.1              | 0.7                 | 1.1   | 1.4   | 0.9                       | Yes: 1.1 miles             | 32              | 29                                     | 97                                     | 0.0                                      | Commercial: 0%<br>Future Urban Development: 32%<br>Industrial: 61%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 7%<br>Parks and Open Space: 0%<br>Rural: 0%<br>Single-Family: 0%<br>Total Miles Represented: 3.3  | 43  | 0   | At the proposed Tonquin Substation, greenfield construction will need to duck under existing lattice tower line and BPA 115 kV lines.<br><br>Along Link 150, the existing 115 kV would need to be double-circuit, which could pose a challenge where Link 150 turns east.  | \$1,200,000 | No schools, parks, places of worship, or cemeteries are situated within 300 feet of this route.<br><br>Approximately 0.7 mile of tree cover exists along this route.                                       | 5                                    |
| Tonquin-McLoughlin Route E | 3.2           | 0.0                                 | 2.0               | 0.0                 | 0.0                | 0.1              | 1.0                 | 1.1   | 1.8   | 1.6                       | Yes: 1.1 miles             | 21              | 25                                     | 109                                    | 0.0                                      | Commercial: 0%<br>Future Urban Development: 15%<br>Industrial: 49%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 36%<br>Parks and Open Space: 0%<br>Rural: 0%<br>Single-Family: 0%<br>Total Miles Represented: 3.5 | 42  | 0   | Along Link 215 exiting the proposed Tonquin Substation, the route alternative will need to duck under the existing lattice tower and the 115 kV lines that are presumably operated by BPA.   | \$958,333   | No schools, parks, places of worship, or cemeteries are situated within 300 feet of this route.<br><br>Second longest distance of tree cover at 0.75 mile among the Tonquin-McLoughlin route alternatives. | 1                                    |
| Tonquin-McLoughlin Route F | 3.2           | 0.0                                 | 2.4               | 0.0                 | 0.0                | 0.1              | 0.7                 | 1.1   | 1.8   | 1.6                       | Yes: 1.1 miles             | 22              | 25                                     | 112                                    | 0.0                                      | Commercial: 0%<br>Future Urban Development: 24%<br>Industrial: 66%<br>Multi-Family: 0%<br>Mixed-Use Residential: 0%<br>Public Facilities: 10%<br>Parks and Open Space: 0%<br>Rural: 0%<br>Single-Family: 0%<br>Total Miles Represented: 2.6 | 42  | 0   | Along Link 215 exiting the proposed Tonquin Substation, the route alternative will need to duck under the existing lattice tower and the 115 kV lines that are presumably operated by BPA.<br><br>Where Links 310 and 315 meet, the design may require a steel pole at the intersection.   | \$1,012,733 | No schools, parks, places of worship, or cemeteries are situated within 300 feet of this route.<br><br>Longest distance of tree cover at 0.79 mile among the Tonquin-McLoughlin route alternatives.        | 2                                    |

**ATTACHMENT 3 – ROUTE CRITERIA DETAIL TABLE**

Portland General Electric: Tonquin Route Study - Route Alternatives Comparison

| Routing Criteria  | Route Alternatives     |              |              |                        |              |              |              |            |              |
|---|------------------------|--------------|--------------|------------------------|--------------|--------------|--------------|------------|--------------|
|   | Rosemont-Wilsonville   |              |              | Tonquin-McLoughlin     |              |              |              |            |              |
|   | Route A                | Route B      | Route C      | Route A                | Route B      | Route C      | Route D      | Route E    | Route F      |
| <b>General Criteria</b>   |                        |              |              |                        |              |              |              |            |              |
| Length of Link, in miles  | 7.39                   | 8.03         | 8.88         | 3.27                   | 3.24         | 3.31         | 3.34         | 3.18       | 3.19         |
| Number of Parcels Crossed   | 14                     | 22           | 36           | 18                     | 16           | 30           | 32           | 21         | 22           |
| Miles Parallel to Roads   | 7.28                   | 7.92         | 8.63         | 1.82                   | 2.19         | 1.31         | 0.94         | 1.59       | 1.60         |
| Miles of Rebuild  | 6.71                   | 7.23         | 7.28         | 2.02                   | 2.31         | 1.73         | 1.44         | 1.79       | 1.80         |
| Miles of Construction in New Right-of-Way                         | 0.69                   | 0.81         | 1.58         | 0.94                   | 0.94         | 1.13         | 1.13         | 1.10       | 1.10         |
| Miles of Underground Distribution within 100 Feet                 | 0.00                   | 0.12         | 0.12         | 0.00                   | 0.00         | 0.00         | 0.00         | 0.00       | 0.00         |
| <b>Land Use and Environmental Resource Criteria</b>               |                        |              |              |                        |              |              |              |            |              |
| <b>Land Use</b>   |                        |              |              |                        |              |              |              |            |              |
| <u>Miles of Local Government Jurisdiction Crossed:</u>            |                        |              |              |                        |              |              |              |            |              |
| Clackamas County  | 6.26                   | 6.90         | 5.34         | 0.00                   | 0.00         | 0.00         | 0.00         | 0.00       | 0.00         |
| Washington County   | 0.00                   | 0.00         | 0.00         | 2.05                   | 1.69         | 2.17         | 2.53         | 2.01       | 2.40         |
| City of Lake Oswego   | 0.00                   | 0.00         | 0.68         | 0.00                   | 0.00         | 0.00         | 0.00         | 0.00       | 0.00         |
| City of Rivergrove  | 0.00                   | 0.00         | 0.43         | 0.00                   | 0.00         | 0.00         | 0.00         | 0.00       | 0.00         |
| City of Tualatin  | 0.00                   | 0.00         | 1.31         | 0.14                   | 0.14         | 0.14         | 0.14         | 0.14       | 0.14         |
| City of Wilsonville   | 1.12                   | 1.12         | 1.12         | 1.08                   | 1.41         | 1.00         | 0.67         | 1.03       | 0.65         |
| <u>Existing Land Use Concerns:</u>                                |                        |              |              |                        |              |              |              |            |              |
| Number of Buildings within 100 Feet                               | 119                    | 127          | 203          | 34                     | 40           | 35           | 29           | 25         | 25           |
| Number of Buildings within 300 Feet                               | 352                    | 403          | 653          | 99                     | 113          | 111          | 97           | 109        | 112          |
| Number of Schools and Parks within 300 Feet                       | 7                      | 7            | 13           | 0                      | 0            | 0            | 0            | 0          | 0            |
| Number of Places of Worship and Cemeteries within 300 Feet        | 6                      | 7            | 5            | 0                      | 0            | 0            | 0            | 0          | 0            |
| Miles of Airport Approach Surface Crossed                         | 0.00                   | 0.00         | 0.00         | 0.00                   | 0.00         | 0.00         | 0.00         | 0.00       | 0.00         |
| <b>Environmental Resources</b>                                    |                        |              |              |                        |              |              |              |            |              |
| Miles of Tree Cover   | 1.97                   | 1.89         | 3.26         | 0.53                   | 0.53         | 0.66         | 0.67         | 0.75       | 0.79         |
| Linear Feet of National Wetland Inventory-mapped Wetlands Crossed | 353                    | 382          | 1,020        | 64                     | 64           | 43           | 43           | 42         | 42           |
| Number of Streams/Rivers Crossed                                  | 6                      | 8            | 13           | 3                      | 3            | 3            | 3            | 3          | 3            |
| Linear Feet of FEMA-designated 100-Year Floodplain Crossed        | 360                    | 360          | 6,233        | 0                      | 0            | 0            | 0            | 0          | 0            |
| Miles of Threatened and Endangered Species Habitat Crossed        | 0.00                   | 0.00         | 0.00         | 0.00                   | 0.00         | 0.00         | 0.00         | 0.00       | 0.00         |
| <b>Engineering Criteria</b>                                       |                        |              |              |                        |              |              |              |            |              |
| Constructability  | See Comparison Matrix. |              |              | See Comparison Matrix. |              |              |              |            |              |
| Comparative Construction Cost Estimates                           | \$ 2,490,000           | \$ 2,500,000 | \$ 2,900,000 | \$ 1,080,000           | \$ 1,180,000 | \$ 1,300,000 | \$ 1,200,000 | \$ 960,000 | \$ 1,013,000 |

Levels of Compatibility

|                        |
|------------------------|
| Most Compatible        |
| Moderate Compatibility |
| Least Compatible       |

Lowest number in each category is considered the most compatible route.

**ATTACHMENT 4 – ROUTE ALTERNATIVES .KMZ FILE**

**(See .kmz in attachment to pdf)**

**PGE/402**

**HMW Rosemont-Wilsonville Constructability Review**



Jordan Messinger, PE, SE  
Senior Project Manager  
Portland General Electric  
[Jordan.Messinger@pgn.com](mailto:Jordan.Messinger@pgn.com)

Andy Brewer  
Contractor, Transmission Engineering  
Portland General Electric  
[Andy.Brewer@pgn.com](mailto:Andy.Brewer@pgn.com)

RE: Rosemont Wilsonville – Constructability Review

SUB: Henkels & McCoy West, LLC – Portland General Electric (Rosemont-Wilsonville – Constructability Review) – 02.09.2024

HMW has performed extensive field study's regarding the alternate routing options presented for the upcoming Rosemont-Wilsonville 115kV Transmisson project. Below are our Team's notes, representing the constructability aspect of each proposed line route.

- Route A – Stafford Road
  - Pros
    - Shortest path of rebuild/new construction of the three routes, resulting in a shortest schedule and least impact to customers.
    - Material orders have been executed and all material should be on hand at the commencement of construction for this route.
    - River crossing aligns with a current bridge, allowing for an expedited crossing installation and no need for aerial support and permitting.
  - Cons
    - Vehicle congestion along Stafford road and impact of operation to daily traffic will be substantial.
    - I205 crossing concides with on overpass with on/off ramps and is heavily traveled. Most impacful to traffic traversing, entering and exiting the Interstate.
  
- Route B – Stafford Road/SW 65<sup>th</sup>/SW Meridian/SW Schatz/Stafford
  - Pros
    - Route does hold a portion of construction on less trafficed roadways between SW 65<sup>th</sup> Ave and Stafford Road, which would provide a safer coordior for craft and the public.
    - Wetland deleniations are on par with Route A.
    - Vegetation management on par with Route A.
    - Mitigated impact with the increase in new ROW needed, leaving larger portions of work availabe while ROW is acquired in additonal sections along route.
  - Cons
    - Assumption that additonal foundations between SW 65<sup>th</sup> Ave and Stafford Road would require additonal foundation/self supporting towers. Foundation operation is the most impactful part of the construction operation.
    - Conductor operations would have to be broken down into additional sections from SW 65<sup>th</sup> Ave and Stafford Road, as opposed to the route in A or C. This would also increase impacted quantities in needing to pull between the two roads as conductor setups are limited near the 'projected' dead-end pole locations.
    - Procurement of dead-end material, custom steel poles are longer lead time items as opposed to current material purchase for route A, or the potential need to increase short lead time quantities for route C.
    - Additional customer coordination with increase in affected parcels.

Wade English

Thank you,

operations/processes.

Please feel free to reach out with our Team if there are any questions, or greater detail needed based around our standard construction

the largest amount of risk of the three options.

feasible, would be the most costly and result in the most disturbance to the general public, both private and commercial, and holds reduction in impacts with current customers and the general public traversing either SW 65<sup>th</sup> Ave or Stafford Road. Route C, while be the Teams recommendation that Route B, would be a potential second choice, but believe the rerouting does not yield a large operations and result in the least amount of disturbance, especially for that customers in direct contact with the utility ROW. It would Based on the reviews of the HMMW Team, it is our recommendation that Route A would be the least impactful with day-to-day

with this route, could result in additional hour restrictions and or additional permitting (noise ordinance).

- Larger volume of customers within close proximity to construction which, contingent on permitting restrictions main, current traffic routes through the area.

- Operations at times would affect both Stafford Road and SW 65<sup>th</sup> Ave, resulting in further congestion on two cost and potential permitting complications with nearby hospital.

- The new proposed river crossing for this line section would require aerial and boat support, adding considerable Substantial increase in vegetation management/clearing

likely increase substantially and take considerable time to acquire desired quantities.

- Considerable increase in wetland delineation and ESCD installation/maintenance. Level of matting needed would inability to perform work linearly due to a larger area of ROW needing to be acquired.

- Larger developments would be affected by any necessary outages during construction.

- Larger volume of rebuilding/replacing distribution infrastructure, creating greater impacts to customers. operations.

- Customer coordination substantially increases with nearly three times the parcels affected by construction Considerable increase in overall project duration due to the increase in length.

- Nearly 1.5 additional miles of transmission/distribution material needed to procure.

○ Cons

associated with TCP execution.

- 1205 crossing aligns with overpass without on/off ramps, which could reduce impact to traffic and costs end/corner or specialty materials.

- Procurement timelines regarding material for tangent/small angle structures are more favorable than dead-throughout construction.

- Alignment route is straight, potentially resulting in longer/safer conductor pulls while increasing efficiency

○ Pros

- Route C – Stafford Road/SW 65<sup>th</sup>/Borland/SW Childs

runs along Stafford Road.

- Cost/Schedule impacts for the minor alignment change outweigh Route A given that a majority of the route still



**PGE/403**

**Letter from Zach Candeanu, ODOT, to PGE (Mar. 22, 2024)**





# Oregon

Tina Kotek, Governor

Department of Transportation

District 2B

9200 SE Lawnfield Rd

Clackamas, Oregon, 97015

Phone: (971) 673-6200

Fax: (503) 653-5655

Email:

March 22, 2024

To whom it may concern within PGE:

This letter is to clarify installation regulations within Oregon Department of Transportation right of way, specifically on Federal Interstates. We have Oregon Administrative Rules in place (OAR's) which we are required to follow. We do not allow longitudinal installations within the right of way.

## DIVISION 55

POLE LINES, BURIED CABLES, PIPE LINES, SIGNS, MISCELLANEOUS FACILITIES AND MISCELLANEOUS OPERATIONS [SECURE.SOS.STATE.OR.US]

### **734-055-0080**

#### **Freeways**

(1) All permit applications that request the use of freeway rights-of-way shall reasonably comply with the current AASHTO policy on the Accommodation of Utilities Within the Freeway Right-of-Way. Installations that may be allowed on freeways are generally limited to crossings only, with all of the installation work and maintenance activities performed outside of the access control line. All permit applications must include detailed drawings that show the location of the proposed facility and the freeway access control lines and/or right-of-way lines.

(2) Consideration will be given for new longitudinal installations that can be located between the freeway access control line and the freeway right-of-way line.

(3) Only extreme hardship cases will be considered for new longitudinal installations that are inside the freeway access control lines. Applications of this nature must satisfy the AASHTO Policy requirements regarding the impact on the freeway traffic safety, operations, and maintenance; the future freeway design and construction; and applicant must demonstrate that alternate locations are not available. Applicant shall address each of the above subjects on the form provided by the DM, titled Permit Variance Request. The Department will evaluate the Permit Variance Request by applying sound engineering principles and judgment to determine the approval or denial of the permit application.

(4) Ground-mounted facilities shall be located to comply with the current clear zone criteria established by AASHTO.

(5) The following activities and installations are prohibited on Interstate Freeway right-of-way:



# Oregon

Tina Kotek, Governor

Department of Transportation

District 2B

9200 SE Lawnfield Rd

Clackamas, Oregon, 97015

Phone: (971) 673-6200

Fax: (503) 653-5655

Email:

(a) Open cutting of the roadway surface;

(b) Service connections.

(6) Generally, applicant shall not have or gain direct access, either ingress or egress, to any of the facilities authorized by the permit from the main traveled way of said freeway or its on or off ramps. Upon notice to the DM that an emergency exists, and repairs are needed for the immediate protection of property and prevention of personal injury, applicant may request direct access to said authorized facility except that no vehicular traffic movement will be permitted which would cross traffic or affect the normal traffic movement. A permit will only be granted during the actual time of the emergency when applicant can assure the safety of the freeway users.

**Statutory/Other Authority:** ORS 184 & 374

**Statutes/Other Implemented:** ORS 374.305

**History:**

HWY 6-1989, f. & cert. ef. 10-25-89

<https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3318>  
[\[secure.sos.state.or.us\]](https://secure.sos.state.or.us)

If you have any questions, please contact ODOT permitting.

Regards,

Zach Candeaux  
Assistant District Manager, Dist. 2B  
Oregon Department of Transportation

3/22/2024

**PGE/404**  
**Summary of Direct Costs**

**Exhibit 404 contains highly protected information**

**and is subject to**

**Modified Protective Order No. 24-087**

**CERTIFICATE OF SERVICE**


I hereby certify that I served a true and correct copy of Portland General Electric Company’s Direct Testimonies of Dr. Ian Beil, Larry Bekkedahl, Matt Gordanier, Jordan Messinger, Kevin Putnam, and Dan Nuñez on the parties to Docket PCN 6 on the date indicated below by email addressed to said person(s) at his or her last-known address(es) indicated below. Copies containing Highly Protected Information and Protected Information are being sent via encrypted zip file to the Filing Center and parties who have signed Modified Protective Order No. 24-087 and General Protective Order No. 23-132.

**SERVICE LIST**

**PCN 6**

|   |   |
|---|---|
| <b>Staff</b><br><br>Isaac Kort-Meade (C)(HC)<br>Public Utility Commission of Oregon<br>P.O. Box 1088<br>Salem, OR 97308<br><a href="mailto:Isaac.kort.meade@puc.oregon.gov">Isaac.kort.meade@puc.oregon.gov</a>   | <b>Staff</b><br><br>Johanna Riemenschneider (C)(HC)<br>Oregon Department of Justice<br>Business Activities Section<br>1162 Court St. NE<br>Salem, OR 97301-4796<br><a href="mailto:Johanna.riemenschneider@doj.state.or.us">Johanna.riemenschneider@doj.state.or.us</a> |
| <b>PGE</b><br><br>Brendan McCarthy (C)(HC)<br>Portland General Electric Company<br>121 SW Salmon St. 1WTC1301<br>Portland, OR 97204<br><a href="mailto:Brendan.mccarthy@pgn.com">Brendan.mccarthy@pgn.com</a><br><a href="mailto:Opucdockets@pgn.com">Opucdockets@pgn.com</a> | <b>PGE</b><br><br>Jocelyn C. Pease (C)(HC)<br>McDowell Rackner Gibson PC<br>419 SW 11 <sup>th</sup> Ave. Ste. 400<br>Portland, OR 97205<br><a href="mailto:jocelyn@mrg-law.com">jocelyn@mrg-law.com</a><br><a href="mailto:dockets@mrg-law.com">dockets@mrg-law.com</a> |

DATED: April 17, 2024

  
\_\_\_\_\_  
Cole Albee  
Paralegal