Secondary Service Design

1. Scope

This standard provides the process to determine whether a secondary service shall be overhead or underground and the size of the secondary overhead conductor.

2. Application

This standard is intended for use by Seattle City Light (SCL) engineering and operations personnel.

3. Discussion

SCL has seen an increase in the loads requested by customers due to a higher use of electricity as an energy source. This increase is a result of the need for electric car chargers and the use of electric heating and cooling systems and appliances. An increased load results in the need for larger panel sizes as well as larger conductors that are needed to serve them.

Typically these requests have been met by providing an overhead service drop. However, the larger conductors that are required are often too heavy to be supported by the existing overhead infrastructure. As a result, more designs will require underground services, which translates into additional costs to the customer.

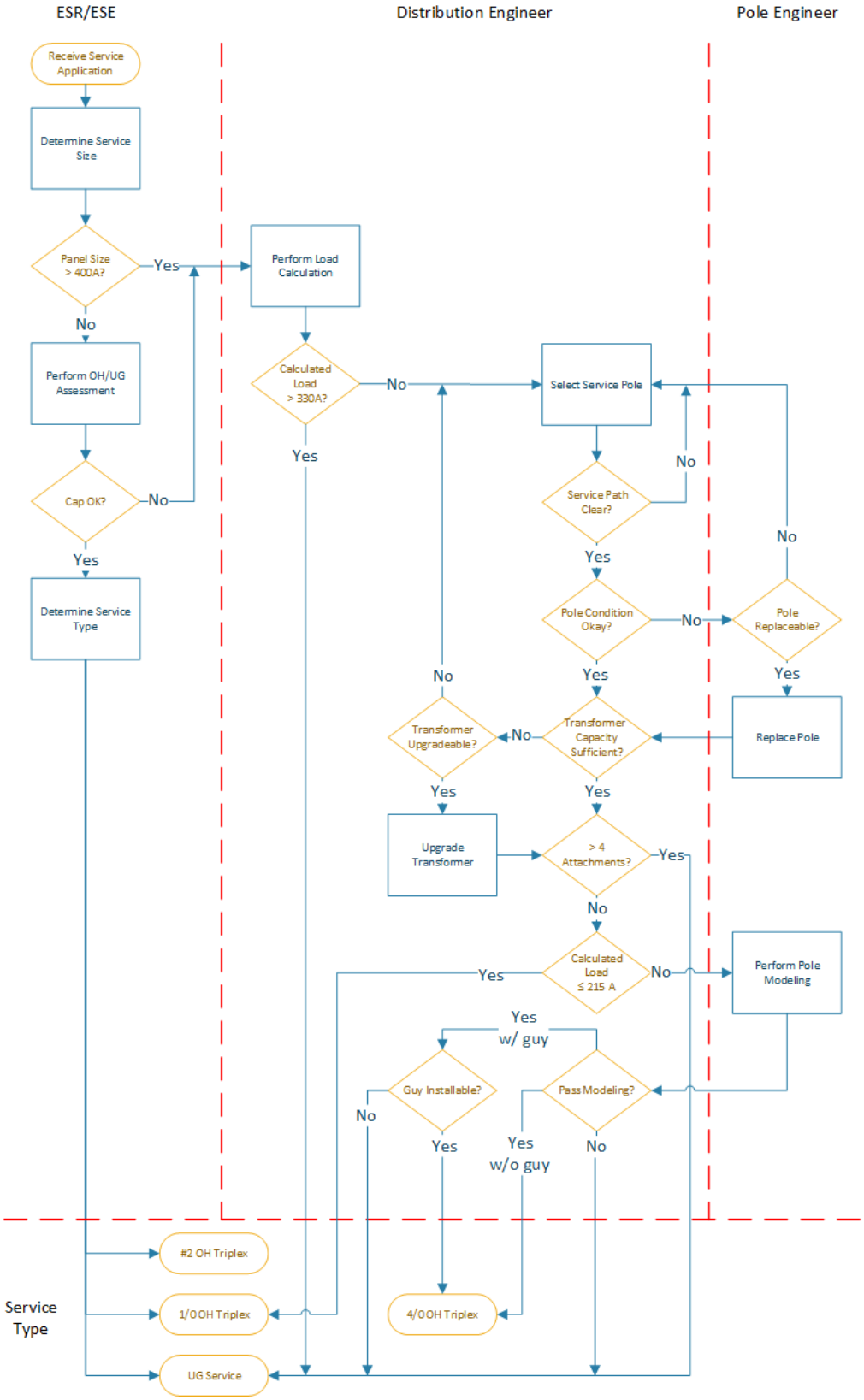
The following section presents the design process to determine whether the service will require undergrounding or the overhead service drop can be used.

4. Design Process

The following steps outline the secondary service design process to determine whether overhead or underground service needs to be specified.

See Figure 4 for a process flow diagram that incorporates the steps required of each of the three groups represented in this process: Electric Service Representatives (ESRs)/ Electric Service Engineers (ESEs), Distribution Engineers, and Pole Engineers.

Figure 4. Secondary Service Design Process Flow



4.1 ESR/ESE Steps

Step 1. ESR/ESE receives service application and creates service request (SR).

Step 2. Determine NEC service (panel) size.

- If less than or equal to 400 A, proceed to Step 3.
- If greater than 400 A, send to Distribution Engineering for next steps. See Section 4.2.

Step 3. Perform an OH or UG Service Assessment.

- If capacity is determined to be sufficient (Cap OK), proceed to Step 4.
- If capacity is determined to be insufficient, send to Distribution Engineering for next steps. See Section 4.2.

Step 4. Perform calculations to determine service type (#2 triplex, 1/0 triplex, or underground).

4.2 Engineering Assessment and Design Steps (performed by Distribution Engineering)

Step 1. Perform load calculation for sizing service to determine load on utility:

- If load is greater than 330 A, require an underground service.
- If load is less than or equal to 330 A, proceed to Step 2.

Step 2. Select service pole and check to see if service path is clear.

- If service path is not clear, choose another pole until a suitable option is found.

Step 3. Check pole condition.

- If pole fails, choose another pole or replace pole.

Step 4. Check the transformer capacity

- Upgrade if necessary, and if possible.

Step 5. Check attachments (service drops, guy wires, communications lines) to the pole.

- If there are more than 4 total attachments that are in the same direction (+/- 45 degrees), require an underground service.
- If there are 4 or fewer total attachments (or no attachments), proceed to Step 6.

Step 6. Determine if pole modeling is needed:

- If load is less than or equal to 215 A, use a 1/0 OH triplex service conductor.
- If load is greater than 215 A, send to Pole Engineering to verify if a 4/0 OH triplex can be used. See Section 4.3.

4.3 Pole Engineering Steps

Step 1. Perform pole modeling using SPIDAcalc.

Step 2. Send results to Distribution Engineering

4.4 Pole Guy Assessment Steps (performed by Distribution Engineering)

Step 1. From pole modeling results received from Pole Engineering, perform a guy assessment.

- If pole fails, require an underground service.
- If pole passes and does not require a guy, use a 4/0 OH triplex service conductor.
- If pole passes and requires a guy, proceed to Step 2.

Step 2. Determine whether a guy can be installed.

- If a guy can be installed, use a 4/0 OH triplex service conductor.
- If a guy cannot be installed, require an underground service.

5. Sources

Lu, Curtis; SCL Standards Engineer, originator, and subject matter expert for 0030.01