

### 3 APPLICANT INFORMATION

#### 3.1 Proposed Ownership

It is anticipated that Minnesota Power will own the Straight River Substation, the switch and the approximately 700-foot tap line into the substation. Great River Energy will own the proposed Blueberry Substation and the approximately 22.5 miles of new 115 kV transmission line between the Hubbard Substation and the Red Eye Substation. Todd-Wadena will own the Red Eye Substation and the relocated Menahga Substation at the Blueberry site.

#### 3.2 Organization and System Background

##### 3.2.1 Great River Energy

Great River Energy is a not-for-profit generation and transmission cooperative based in Maple Grove, Minnesota. Great River Energy provides electrical energy and related services to 28 member cooperatives, including Todd-Wadena, the distribution cooperative serving the areas that will benefit from the proposed Project. Great River Energy's distribution cooperatives, in turn, supply electricity and related services to more than 650,000 residential, commercial and industrial customers in Minnesota and Wisconsin.

Great River Energy and its cooperatives' mission is to provide safe, reliable, competitively priced energy to those they serve.

Great River Energy's generation system includes a mix of baseload and peaking plants, including coal-fired, refuse-derived fuel, natural gas and oil plants as well as wind generators (a total of approximately 3,500 MW). Great River Energy owns approximately 4,600 miles of transmission line in Minnesota, North Dakota, South Dakota, and Wisconsin.

Todd-Wadena provides electricity and related services to approximately 8,000 residential, commercial and industrial customers in Minnesota. Approximately 800 residential, commercial and industrial members of this cooperative would benefit from the proposed high voltage transmission line during normal system operation and up to 1400 would benefit during contingency conditions.

**Figure 1-1** shows Great River Energy's service territory and highlights the service area of Todd-Wadena. Great River Energy's electric system is interconnected directly with neighboring suppliers. Great River Energy is a member of the MRO and MISO.

##### 3.2.2 Minnesota Power

Minnesota Power is an investor-owned public utility headquartered in Duluth, Minnesota. Minnesota Power supplies retail electric service to 143,000 retail customers and wholesale electric service to 16 municipalities in a 26,000-square-mile electric service territory located in

northeastern Minnesota (**Figure 1-2**). Minnesota Power generates and delivers electric energy through a network of transmission and distribution lines and substations throughout northeastern Minnesota. Minnesota Power's transmission network is interconnected with the regional transmission grid to promote reliability and Minnesota Power is a member of the MRO and MISO.

### **3.3 Existing System**

#### **3.3.1 Hubbard–Verndale 34.5 kV System**

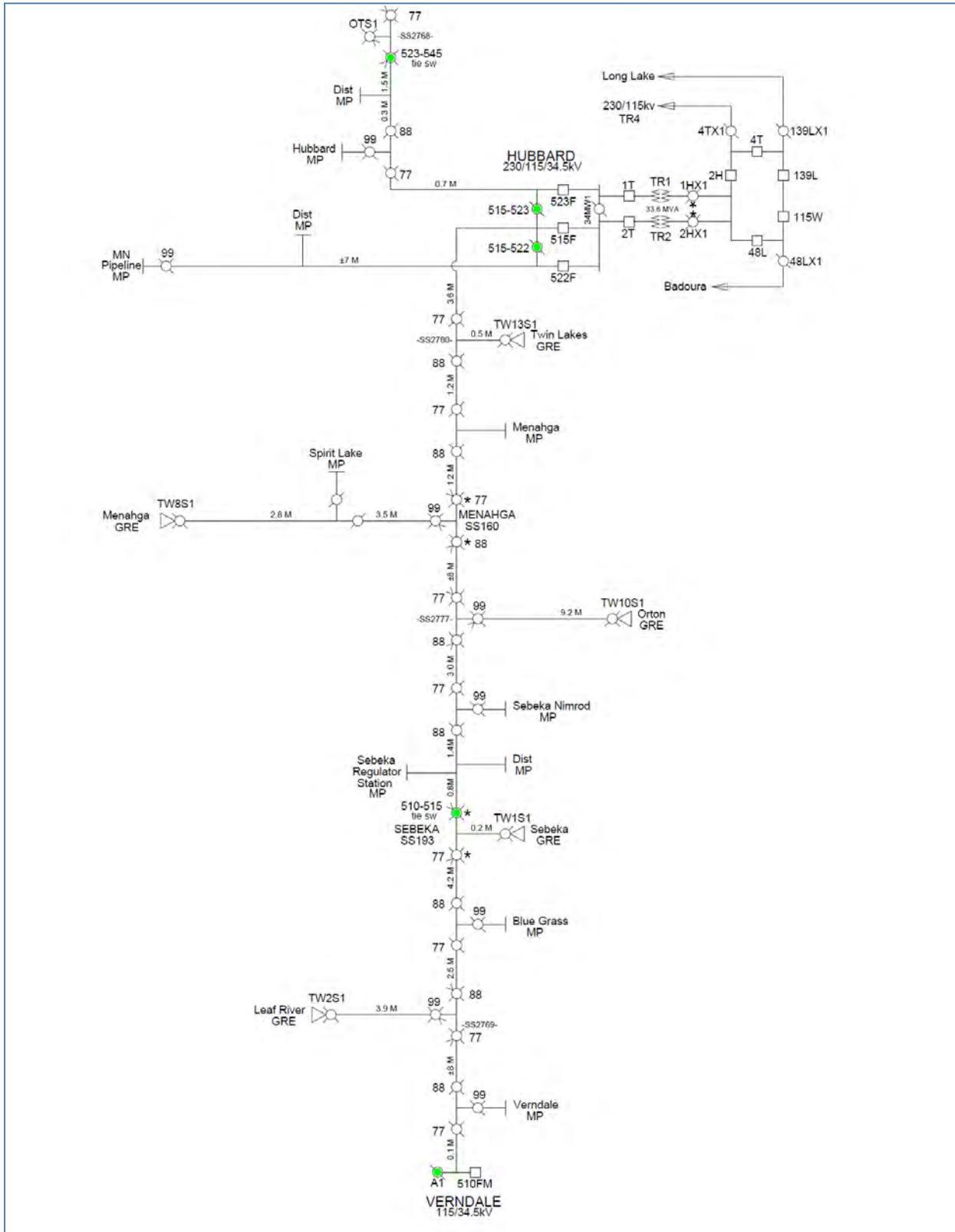
The 34.5 kV sub-transmission system (**Figure 3-1**) is sourced by the Great River Energy 230/115/34.5 kV Hubbard Substation located near Park Rapids and the Minnesota Power 115/34.5 kV Verndale Substation located near Verndale. Between these substations there are nearly 51 miles of 34.5 kV sub-transmission lines (31 miles owned by Minnesota Power and 20 miles owned by Great River Energy).

Along the Hubbard-Verndale 34.5 kV system, there are switches that are used to serve substations and to sectionalize the line for outages, maintenance or system performance. With a 34.5 kV sub-transmission system such as Hubbard-Verndale, it is typical to have one switch designated as a normally open switch between the sources, meaning power cannot flow from one source to the other. The normally open switch maximizes operational flexibility and reduces outage times. The Hubbard-Verndale system is operated with a normally open switch between the Great River Energy Sebeka Substation and the Minnesota Power Regulator Station.

The 34.5 kV sub-transmission system serves a mix of loads including agricultural, residential, commercial, and light industrial loads in the cities and towns in the affected load area through various distribution substations: MN Pipeline, Twin Lakes, Menahga (Minnesota Power), Menahga (Great River Energy), Spirit Lake, Orton, Sebeka-Nimrod, Sebeka, Blue Grass, Leaf River, and Verndale.

In addition to many miles (51 miles) of 34.5 kV sub-transmission lines serving the loads in the Hubbard-Verndale System, the conductors on some segments of the system are of high impedance and low current carrying capacity. The 34.5 kV sub-transmission lines in the affected load area of the Hubbard-Verndale System are a mix of 336 aluminum conductor steel reinforced (ACSR) and smaller 3/0 conductors. Where it has not been replaced with a larger conductor, the smaller 3/0 conductor contributes to increased power loss and voltage drop, and potential overload concerns in the distribution system. During contingencies when the normally open switch near Sebeka is closed, for example the loss of the Verndale 115/34.5 kV source, increased power flows from the Hubbard source could cause segments of 34.5 kV sub-transmission line to overload. The Project proposes to place a new 115/34.5 kV source in the midsection of the Hubbard-Verndale system to mitigate the potential overload while removing load from the 34.5 kV system.

**Figure 3-1. Hubbard-Verndale 34.5 kV Sub-transmission System**



**Table 3-1** summarizes the conductor type, length, and rating of the existing 34.5 kV sub-transmission lines in the affected load area.

**Table 3-1. Affected Load Area and Project Area Conductors**

	<b>Hubbard–Verndale System</b>	
<b>Conductor Type</b>	<b>Length (in miles)</b>	<b>Rating (in MVA )</b>
<b>1/0A</b>	4.6	15.8
<b>3/0A</b>	18.4	16.7
<b>4/0A</b>	6.3	22.7
<b>336 A</b>	21.5	29.6
<b>Total Length</b>	<b>50.8</b>	<b>N/A</b>