3.0 Engineering Design, Right-of-Way Acquisition and Construction

3.1 Substation

The proposed new East Substation will consist of a 115 kV to 13.8 kV local distribution substation located in the NW quarter of Section 5, T112N, R35W in Paxton Township. The substation area will include driveways, a control building, and an electrical substation. The control building will be single-story structure with a painted sheet-metal finish. The substation will be enclosed in a fenced area with a crushed rock surface. See Figure 3.1-1 for site layout dimensions and details.

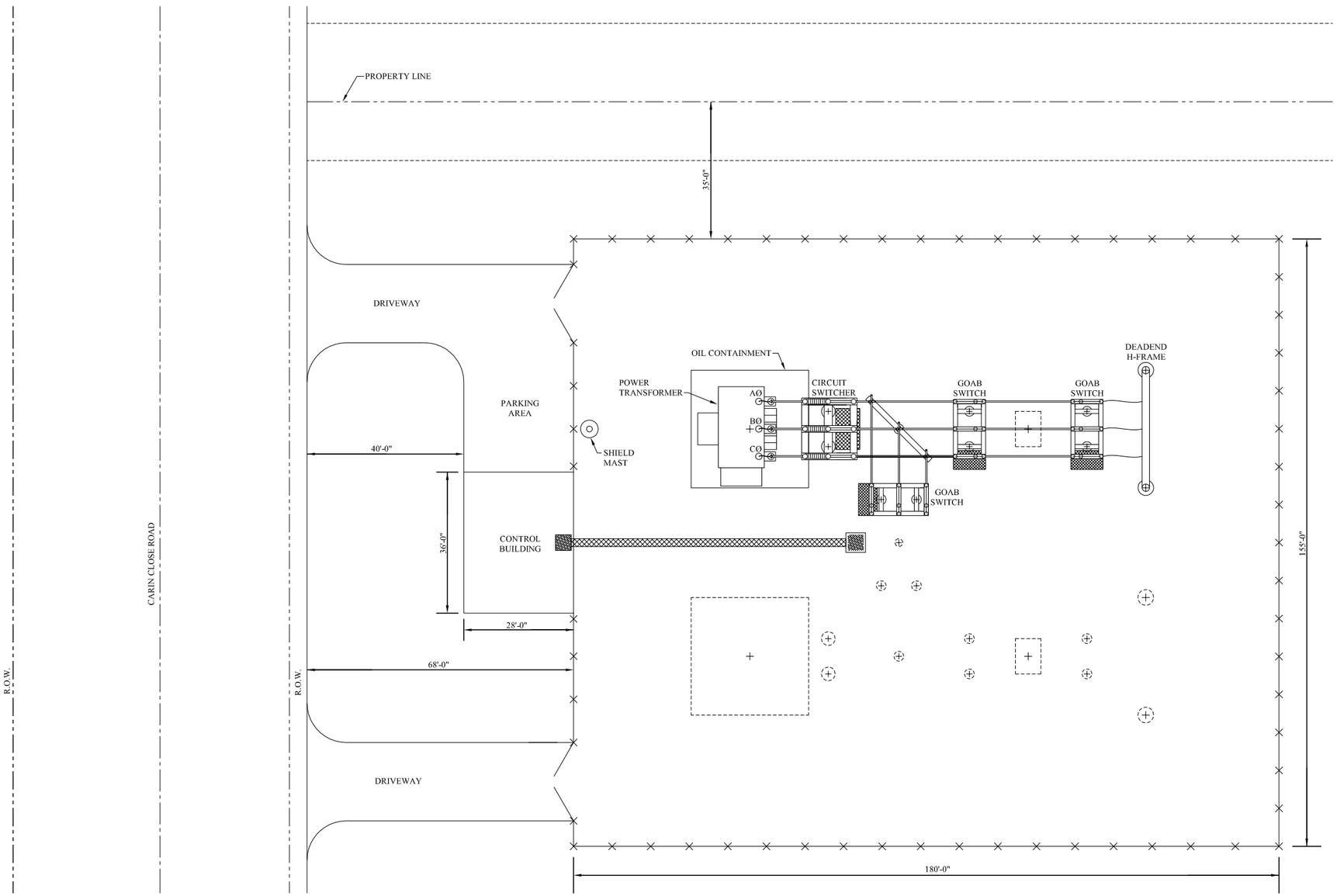
Equipment contained within the substation area include: steel structures, low-profile 115 kV rigid bus work, 115 kV switches, and a 115/13.8 kV power transformer. The power transformer will operate while filled with mineral oil and provisions will be installed for containment in the event of an oil leak.

3.2 Transmission Line

The proposed transmission line will be a single circuit design (Figure 3.2-1), consisting of three phase wires and a shield wire for lightning protection. The new 115 kV transmission line will be constructed with 477 ACSR conductor supported by single, wood poles that will be 70 to 80 feet in height, with pole heights increasing to 95 feet for locations where existing distribution lines are attached to the line. Generally, poles will be spaced approximately 300 feet apart except where existing distribution lines are attached along with the new transmission line.

The existing distribution lines will be attached along with the new transmission line along the proposed route from the intersection of State Highway 67 and Laser Avenue to the intersection of Ramsey Street and 327th Street (see Figure 1.2-1). For this section of the proposed route, the transmission and distribution poles will be installed every other structure at a spacing of approximately 200 feet. Thus the transmission line pole spacing would be approximately 400 feet in these locations. A bracing insulator will be installed in these sections to strengthen the horizontal line post insulators, shown in the Figure 3.2-1, to accommodate the longer 400 feet span. Guy wires and anchors may be required to support the poles in areas, but will be minimized to the extent possible.

There are three locations along the proposed transmission line where the existing distribution line will be buried instead of attached along with the new transmission line. (See Figure 1.2-1).

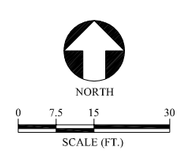


LEGEND

- Proposed pad or foundation
- Future pad or foundation
- Chainlink fence w/barbed wire
- Ductbank for power and/or control cables
- GP — Personnel grounding platform

NOTES

1. Drawing is for visual representation only.



PRELIMINARY
NOT FOR CONSTRUCTION

P:\04-226\02\DWG\XMSSN\PERMITTING\FIGURE 3.1-1.DWG

REV	DATE	DESCRIPTION

DGR
DeWild Grant Reckert & Assoc. Co.
Consulting Engineers
Rock Rapids, Iowa

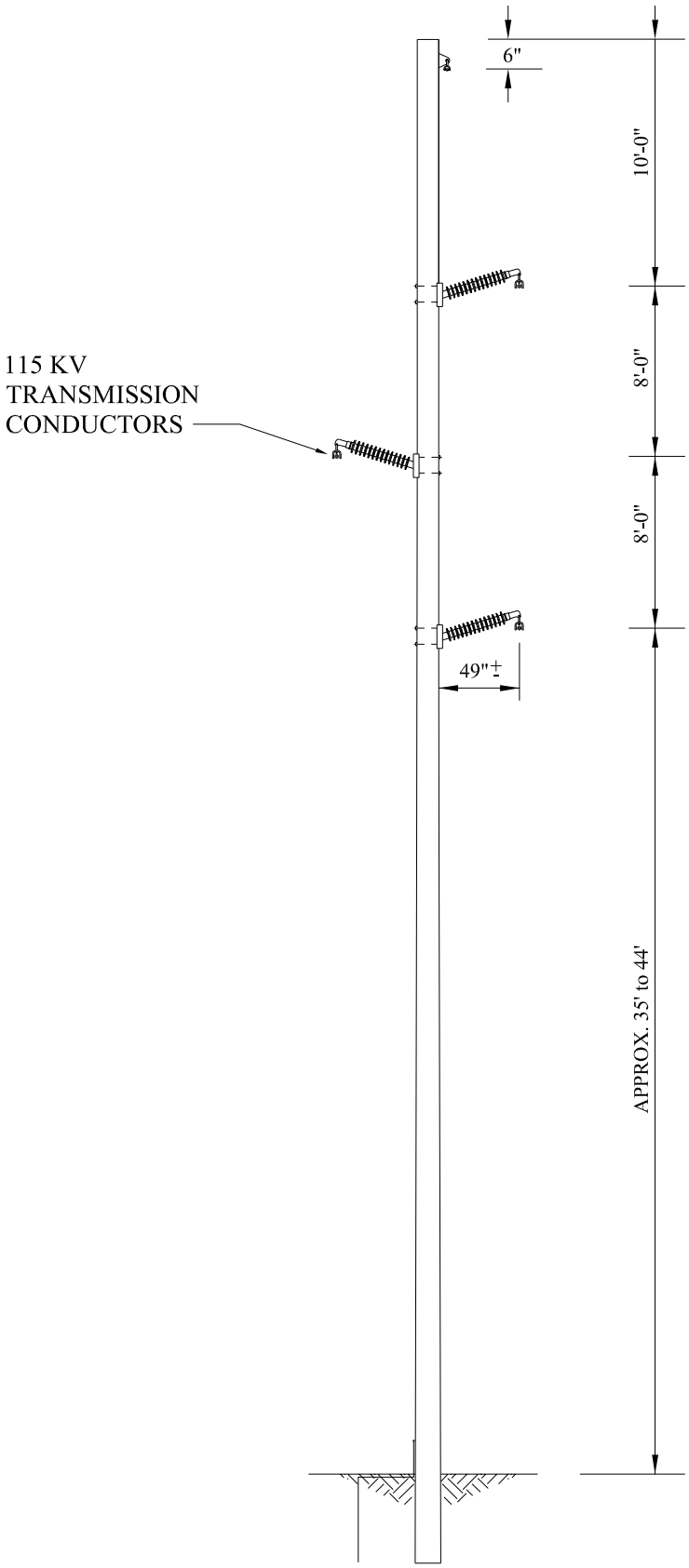
Date:	2-11
Designed By:	TAB
Project Manager:	CAR
Project Number:	421103

REDWOOD FALLS PUBLIC UTILITIES
REDWOOD FALLS, MINNESOTA

SITE PLAN
EAST SUBSTATION
REDWOOD FALLS, MN

DWG NO

FIGURE 3.1-1



REV	DATE	APP	DESCRIPTION

P:\04\226\02\DWG\XMSSN\FIG1-TYPICALTANGENTSTR.DWG

DeWild Grant Reckert & Assoc. Co.
Consulting Engineers, Rock Rapids, Iowa

Date: 2-11
Designed By: TWM
Project Manager: TWM
Project Number: 422602

SOUTHERN MINNESOTA MUNICIPAL POWER AGENCY
ROCHESTER, MINNESOTA

TYPICAL TANGENT STRUCTURE - PROPOSED 115 KV TRANSMISSION LINE

DWG NO

FIGURE 3.2-1

3.3 Right-of-Way Acquisition

SMMPA initially started the ROW acquisition process with the landowners that will be affected by the proposed Project in fall 2010. An easement will be requested from landowners that will have transmission line structures or an overhang of the wires or apparatus on their property. In areas where the line is to be located in road ROW, a 15-foot overhang easement will be required. In areas where the line traverses across private property a 75-foot ROW easement will be required. The easement will provide access for construction and maintenance, vegetation control, and determine structure placement limitations within the easement area. Vegetation will be trimmed or removed a minimum of 15 feet around the closest phase conductor. The majority of the easement area will still be allowed for use by the landowner for farming activities, drainage systems, underground utilities and access drives. A fair offer of compensation will be discussed with the landowners as well as easements.

3.4 Construction and Maintenance Procedures

The proposed new substation construction is scheduled to begin during summer of 2011 with completion scheduled during the winter of 2011-2012. Construction will start with minor grading to create a level site, with a slight grade to provide drainage. Following completion of the site work, construction will begin for foundations and other sub-surface facilities, including conduit and ground grid. Best management practices (BMPs) will be used to provide erosion control to minimize runoff during all phases of construction. Once foundations are completed, the control building, steel structures, and high voltage bus work will be constructed. Prior to installation of a permanent chain link fencing, temporary fencing will be used to provide site security. An approved SMMPA or RFPU contractor would perform substation construction in compliance with local, state, National Electrical Safety Code, and industry standards.

Construction of the proposed transmission Project is planned to begin in late summer of 2011, depending on when required permitting approvals are obtained and easement acquisition is completed. The proposed 115 kV transmission line would be constructed at grade elevations; therefore, no structure locations would require grading unless it is necessary to provide a level area for construction access and activities. Construction would comply with the latest industry standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, ROW widths, erecting power poles, and stringing of transmission line conductors.

The excavation for a typical structure would require disturbing a soil area that is 3 to 4 feet in diameter and 9 to 12 feet deep. Structures located in wet environments or angle-type structures may require additional foundation support, typically consisting of a concrete foundation or placement of

the structure base inside a vertical, galvanized steel culvert. BMPs will be used to provide erosion control to minimize runoff during all phases of construction. An approved SMMPA contractor would perform transmission line construction in compliance with local, state, National Electrical Safety Code, and industry standards.

Structures would either be delivered to the staked site designated for the structure or to a project storage yard. If the poles were delivered to a staked site, they would be placed within the ROW and outside of the clear zone of any adjacent roadways or designated pathways. Insulators and other hardware would typically be attached while the structure was lying on the ground. The structure would then be lifted, placed, and secured on the foundation by a bucket truck or crane.

Once the structures have been erected, conductors would be installed by establishing stringing-setup areas within the ROW. The stringing-setup areas would usually be established every 2 miles along the proposed route. Conductor stringing operations also require brief access to each structure to secure the conductor wire to the insulators or to install shield wire clamps once final line sag is established. Temporary guard or clearance structures would be installed, as needed, over existing distribution or communication lines, streets, roads, highways, railways, or other obstructions after any necessary notifications were made or permits were obtained. This ensures that conductors would not obstruct traffic, would not contact existing energized conductors or other cables, and would be protected from damage.

In areas where the existing distribution would be buried underground, construction is generally completed by plowing, trenching, or boring in the 15 kV or 600 V insulated power cables. Where foreign utilities are limited and the number of cables is limited (e.g., only the main circuit cables are included and not any other cables for services to customers, etc.), the preferred construction method would be plowing as it is more cost effective and impacts less of an area—approximately a 4 to 6 inch cut in the ground. The second option, trenching, consists of installing a trench varying from 4 to 12 inches, depending on the number of cables to install and the digging conditions. The final option for construction would be the boring method. This method consists of drilling a horizontal hole, approximately 2 to 4 inches in diameter, beneath the ground surface and then pulling the cables back through the hole. This method is typically only used to cross major roads, paved areas, or where structures cannot be moved as it generally has a much higher installation cost. For any of the methods, the primary power cables will be installed at a depth of 36 inches, minimum, with the typical depth of 42 inches. The secondary power cables (600 V rated or less) are generally installed at a depth of 24 inches.

During construction, limited ground disturbance at the structure sites may occur. Disturbed areas would be restored to their original condition to the maximum extent practicable as negotiated with the landowner. Post-construction reclamation activities include:

- Removing and disposing of debris,
- Removing all temporary facilities (including staging and lay down areas),
- Employing appropriate erosion control measures,
- Reseeding and mulching areas disturbed by construction activities with vegetation similar to that which was removed and,
- Restoring the areas to their original condition to the extent possible.
- In cases where soil compaction has occurred, the construction crews or site restoration contractor uses various methods to alleviate the compaction as negotiated with landowners.

Upon completion of the proposed Project, SMMPA would periodically use the transmission line ROW to perform inspections, maintain equipment, and repair any damage. SMMPA would also conduct regular route maintenance for weed control and removal of undesired vegetation that would interfere with the operation of the proposed transmission line.