NICOLLET HOTEL BLOCK DEVELOPMENT RFP

STREETCAR SUBSTATION REQUIREMENTS

The proposed NHB development must include accommodations for future installation, operation and maintenance of a traction power substation (TPSS). The TPSS is a required element of one or more electrified streetcar systems that are being studied for implementation in the vicinity of the development site.

Detailed design of the future TPSS installation will be completed during the final design and construction of the streetcar system. The accommodations required in the proposed NHB development are based upon preliminary design assumptions for the planned streetcar system, characteristics of similar systems in other locations, and consultation with Metro Transit.

Specific TPSS considerations and required accommodations include:

Location
The TPSS may be located anywhere on the proposed NHB development site, subject to: a) satisfaction of all requirements, accommodations and constraints identified in this section; b) City of Minneapolis and Metro Transit review and consent; and c) compliance with all applicable codes, ordinances and regulations.

Type
The proposed NHB development will need to select and clearly depict one of two possible TPSS installations:

> Prefabricated: A prefabricated TPSS comes preassembled in a freestanding metal building with electrical switchgear installed prior to TPSS delivery. The specific configuration and dimensions of the prefabricated units vary by supplier, but typical low-voltage (480 Vac) TPSS enclosures are no larger than 22 feet (L) x 14 feet (W) x 12 feet (H). With additional clearance for doors, steps and an electrical ground mat, the overall footprint required for the prefabricated TPSS installation is 30 feet long and 22 feet wide. If necessary, screen walls, fencing, or landscaping would be located beyond this footprint. Note that vertical clearance provisions must consider the prefabricated TPSS installation process using an overhead crane or laterally using jacks and rollers.
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> Field Assembled: The second possibility is to construct a dedicated TPSS room or freestanding building and install all of the substation equipment on-site. The required interior dimensions for a field-assembled low-voltage (480 Vac) TPSS room are 20 feet by 14 feet, with a minimum ceiling height of 10 feet. A TPSS room typically requires two doors, one of which is positioned and sized for installation and removal of large substation equipment. The room also must meet specific requirements and accommodations for HVAC, lighting, fire/smoke and electrical service, and must be designed to facilitate installation and operation of the TPSS equipment.

Grounding
The TPSS will require installation of a dedicated electrical ground mat. The area required for this ground mat will vary significantly depending on the primary Xcel feed voltage (480 Vac or 13.8 kVac), and the utility provided fault current characteristics. Assuming that a low-voltage (480 Vac) service is provided

for the TPSS, the required ground grid would extent approximately 4 feet beyond the perimeter of any grounded metallic structure. Ground mats are installed in the earth directly beneath a prefabricated or field assembled TPSS and then bonded to the ground bus within the substation. Because of the electrical grounding requirements, a prefabricated TPSS typically must be located directly on the earth. The preferred location for a field-assembled TPSS is also directly on the earth. Although it is possible to install a field-assembled TPSS on a structural floor deck, that approach may require ground conductors that are integral with the structural slab and a separate area of the development site to be designated for installation of the required ground rods.

Conduits

The TPSS will require installation of underground ductbanks and conduits from the TPSS to the public right-of-way for traction power, communications, and utility service feeds. The proposed NHB development must be arranged to maintain a clear and direct path for future construction of these conduits out to underground vaults in the public street right-of-way. To facilitate the installation of these ductbanks and conduits, the preferred TPSS location is directly on the earth and along the perimeter of the development site.

Acccess

The TPSS will require 24/7/365 access by authorized personnel and vehicles to conduct periodic inspections, perform routine maintenance and respond to incidents or emergencies. Space must be available for parking a service vehicle at the TPSS without significantly impeding other traffic. A 15-foot wide clear zone along the front of the TPSS enclosure or room will be required when necessary to facilitate removal and replacement of large substation equipment. Assume a vertical clearance of 98 inches for the service vehicle access route to the TPSS location.

Utility Service

The TPSS will require a dedicated direct Xcel Energy service connection. The proposed NHB development must make accommodations for electrical service to the TPSS, including space for additional Xcel transformers or other equipment if required. The requirements described in this section assume that the incoming Xcel service is low voltage (480 Vac). If a medium voltage (13.8 kVac) Xcel service must be accommodated, the required TPSS footprint will be significantly larger to provide space for larger switchgear, metering equipment and a larger ground mat.