

# Cathedral Place

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## Executive Summary

The electrical systems existing conditions report analyzes the power distribution system of Cathedral Place from service entrance to end utilization based on the available information given in the construction documents. The building was modeled using NEC demand load and calculations for all equipment, lighting, power systems, and emergency backup systems to determine the appropriate sizing and to compare these evaluations to the actual design. Using accurate approximations for all of the building loads, and distributing the motor loads appropriately throughout the buildings panels, a thorough energy and demand usage was determined and finally compared to the actual electric load profile for the building over the last 24 months.

The following report analyzes the building from a conservative standpoint wherein slightly oversized values were consistently used to get a “worst-case scenario” of the building. This applies mostly to the unit occupancy load approximations and the main distribution from the substation transformers at the main switchboard. Other aspects of the electrical system including overcurrent protection, transformer configuration, building utilization voltages, and overall distribution were also analyzed as a whole, but were detailed on an individual basis through the calculated NEC building design load. This analysis was found to be of considerable importance given the building’s many multifunction spaces, various utility voltages, and separate metering and billing accounts.

After completion of the NEC building design load, it was found that 99% of the equipment was sized appropriately with the few exceptions occurring due to overestimation of building loads (office bus duct riser total load), oversized demand load (transformer T/LB) or a minor drafting error (Panel H/LA overcurrent). While the system does provide for a redundancy at the service entrance, it was found that a single transformer working to provide electricity for the entire building would be working at near 100% capacity. This being the case, a sizing factor for future expansion was not adequately accounted for in a single-transformer failure condition, but more than adequately provided for in normal operation.

For ease of reference, the bulk of the detailed information was placed in the NEC Building Design Load information section, or in the appendices at the end of the report. The Appendix includes the rebuilt riser diagram for the whole building, two main switchboard single-line diagrams, motor schedule with load calculations, feeder schedule for panel references, utility rate structure for the current provider, and lamp and ballast data. (Note: the appendix includes/references two separate files included with this report for the single-line diagram and motor schedule due to their size and the constraints of printing the report at standard size.)