University of Toronto

Office of the Assistant Vice-President, Facilities and Services

TO: Business Board

SPONSOR: Ron Swail, Assistant Vice-President, Facilities and Services

CONTACT INFORMATION: 416-978-5098; ron.swail@utoronto.ca

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AGENDA ITEM: **6(f)**

ITEM IDENTIFICATION:

Southeast Campus Electrical Plan

JURISDICTIONAL INFORMATION:

The Terms of Reference for the Business Board state that the Board is responsible for approval of capital expenditures for, and the execution of, approved projects.

BACKGROUND

Power required for building sites on the University's Master Plan slated for development in the near future will be provided by major infrastructure additions by Toronto Hydro initiated in 2003 and 2005. However, renovations to existing buildings that use disproportionately large amounts of the limited electricity capacity remaining on the University's own distribution system are more difficult to forecast. In some parts of campus, where infrastructure is near the end of its service life, and feeder loops are at capacity, renovations that include substantial additions of large research equipment can require significant changes to be made to the system before the laboratory projects can proceed. In some cases this may mean re-feeding buildings from another source, either from the University of Toronto or Toronto Hydro. In this latter situation, such a change may be accompanied by a large cost renovation of the existing electrical rooms or substantial reworking of existing distribution infrastructure.

A committee was struck to predict future growth and new research initiatives that would fall within a 5-year horizon so that the necessary modifications to the electrical infrastructure required to accommodate these changes could be planned in advance.
The committee initiated planning exercises within the three major research faculties – Engineering, Medicine and Arts and Science – and determined that the state of the existing infrastructure and known upcoming renovations clearly indicated that the southeast precinct of the campus requires early remedial action. The first priority is the Wallberg Building, and the second priority, the Medical Sciences Building. This report will address the Wallberg Building and a subsequent plan will address the Medical Sciences Building.

Failure to deal with the capacity shortage will mean that research using large equipment may have to be scheduled, curtailed, or relocated to another building.

HIGHLIGHTS

The Wallberg Building is fed from Loop # 1 on the University's 4,160 volt system. The Pratt Building is sub-fed from the Wallberg Building at 4,160 volts. The Engineering Annex and the Electrometallurgy Buildings are sub-fed from Wallberg at 600volts. Loop#1 also serves Mechanical Engineering, Rosebrugh, Fitzgerald and the Sigmund Samuel Library directly, and the Sigmund Samuel Library sub-feeds the Canadiana Building at low voltage.

Loads on the loop have grown to the extent that the ability to feed buildings around the loop in either direction has been compromised. If a failure occurred on one segment of cable, the intact segments could not handle the entire load from all these buildings. Buildings at the end of the line would be without power until the failed line could be repaired or load shedding is imposed, which may have an impact on research activities. This level of risk from prolonged outages is further enhanced by the aging of cables and switchboards.

New research initiatives in the Faculty of Applied Science and Engineering will increase the electrical load of the Wallberg and Pratt Buildings within a 5-year horizon by 465 KVA. The total required capacity will be 1,878 kVA. The Committee recommends obtaining 2,500 kVA with a resulting 33% excess capacity to provide room for growth.

The recommendation is to re-feed Wallberg directly from the Toronto Hydro Electric System (THES) because 2.5 MW would be sourced from their existing infrastructure. In addition to work from the THES, the University would have to provide a new 13,800 volt switchboard as the Wallberg is currently on 4,160 volt supply. There is no space for this equipment within the Wallberg Building therefore it would have to be located in an addition in the parking area directly behind the Wallberg Building. Two parking spots must be removed for the additions. Transformers in the Pratt Building will have to be replaced with 13,800 volt primary equipment. (Transformers for Wallberg are presently being replaced with dual primary voltage to handle either voltage.)

FINANCIAL AND PLANNING IMPLICATIONS

The Total Project Cost Estimate including site restoration will be $3.0 million.

FUNDING SOURCES

This project will be funded under the Capital Renewal Program 2007/08.

SCHEDULE

The increased power capacity is required as soon as possible. Immediate implementation will occur with approval of this project planning report.

RECOMMENDATIONS

Be it resolved

Subject to Governing Council approval of the project,

THAT the Vice-President, Business Affairs be authorized to execute the Southeast Campus Electrical Plan at a cost not to exceed $3 M, with funding to be provided by the Capital Renewal Program 2007/08.