

# TORONTO TRANSIT COMMISSION REPORT NO.

**MEETING DATE:** March 26, 2008

**SUBJECT:** INSTALLATION OF GREEN/COOL ROOFS  
ON TTC FACILITIES

**ACTION ITEM:** x                      **INFORMATION ITEM:**

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## RECOMMENDATION

1. It is recommended that the Commission approve staff:
  - a) Proceeding with the current roofing program as previously approved by the Commission which includes the installation of a green roof at Victoria Park Station, cool roofs at Wilson Carhouse, Pape Station, Islington Station and Kipling Station and the replacement in kind of existing roofs where the design is undertaken in 2008;
  - b) Incorporating installation of green/cool roofs in designs starting in 2009 as part of the proposed TTC 2009 – 2013 Capital Program in accordance with the Toronto City Council motion adopted on March 3, 2008; and
  - c) Forwarding this report to the City Budget Committee for information.

## FUNDING

No funds are available to accommodate the cost increase of \$1.8M due to the inclusion of additional green/cool roofs in the TTC 2008-2012 Capital Program for the designs starting in 2009 but will be included in the TTC 2009-2013 Capital Program submission.

## BACKGROUND

A multi-year Roofing Rehabilitation Program was initiated in 1996 to ensure that the roofs on Commission buildings are maintained in a state of good repair. Under this program, roofs are generally replaced in kind.

On January 31, 2006, Toronto City Council adopted the Making Green Roofs Happen report, and recommended that where feasible and practical, green roofs be installed on existing City-owned buildings, including Agencies, Boards and Commissions, when roofs are due to be replaced.

In response, TTC staff carried out a green roof study in 2007 and presented a report to the Commission at its meeting of June 13, 2007. The Commission approved the staff recommendation to proceed with a pilot project to provide a green roof at Victoria Park Station and a cool roof at Wilson Carhouse. The duration of the pilot project was 5 years to ascertain the maintainability and cost effectiveness of these roofs over their lives. Currently, the design of the Victoria Park Station and Wilson Carhouse projects are complete and the construction phase is to commence in 2008. The premium for installing a green roof is approximately 50% and a cool roof 10%. Based on a 35-year life cycle costing analysis, the additional capital investment on green roof installations would break even, as compared to the current TTC standard roofing system, if no structural reinforcement is required. As for the cool roof installations, the same analysis demonstrated that the additional initial capital investment would generally result in a savings of up to 5% as compared to the current TTC standard roofing system in 35 years.

During the course of development of the plans for the modernization of Pape, Islington and Kipling Stations, cool roofs were incorporated into the designs as a result of design review by the public and elected officials.

At its meeting of March 3, 2008, Toronto City Council adopted the motion "where technically practical, green roofs be installed on existing City-owned buildings, including Agencies, Boards and Commission, when roofs are due to be replaced".

## **DISCUSSION**

As a result of the adoption by Council of the revised green roof strategy, staff prepared this report to advise the Commission of staff's current plans and seek confirmation going forward.

### **Roofing Rehabilitation Program**

Currently staff are proceeding with designing replacement in kind roofs at Eglinton West Station (bus platform and subway platform), Birchmount Garage, Lakeshore Garage, Davenport Garage, and at several substations and subway entrances scheduled for construction in 2008. These roofs are either built up with layers of bitumen with a gravel topping or steel panelled.

To accommodate a green roof at the larger locations, except for the Eglinton West Station roofs, would require costly reinforcement of the roof structure steel which is not practical. The roof over the Eglinton West Station bus platform can accommodate a green roof. Because of the numerous roof openings and raised structural members, a continuous green roof installation is not possible and therefore is not desirable. The roof over the subway platform at Eglinton West Station can accommodate a green roof at a premium of \$750,000. There would be a schedule delay of approximately 3 to 4 months to redo the design as the design is nearly complete. It should be noted that unlike other roof locations, this roof is visible to the public because of its location in the Allen Expressway median area.

All of these locations noted above can accommodate a cool roof at a cost premium of \$1.05M. Given the budget and schedule impacts, it is undesirable to proceed with this change at this stage.

The total cost premium for the remaining roofs in the TTC 2008-2012 Capital Program (designs starting in 2009) is \$1.8M.

**Modernization Projects**

Cool roofs are being designed for Pape (including existing roofs), Islington and Kipling Stations. At Pape Station, about 15% of the roof is new and could be redesigned to accommodate a green roof at a cost of \$100,000. The structural capacity of the remaining roof has not been assessed as to whether it could accommodate a green roof. However if it could, there would be a premium of about \$200,000. There would be a project delay of 2 to 3 months to do the change. The Kipling bus terminal design is being undertaken by GO Transit, whereas the east entrance is being designed by TTC. At Kipling Station, the east entrance is under the Kipling Avenue Bridge and accordingly, providing either a cool or green roof would not be of benefit. The connecting walkway is a bridge type structure that spans the TTC subway right-of-way and would not be considered an ideal candidate for changing from a cool roof to a green roof. At Islington Station, the bus platform and new entrance building roof structures would have to be redesigned to accommodate a green roof at a cost of \$1,300,000 with a project delay of 2 to 3 months.

In summary, should the Commission direct staff to immediately change the roof designs to accommodate green and cool roofs where practical, the implications are:

- (i) for the roofs being designed as part of the Roofing Rehabilitation Program in 2008, a cost increase of \$1.8M, an underexpenditure of \$1.4M in 2008 and project delays of 3 to 4 months;
- (ii) for the remaining roofs being designed after 2008 as part of the 2008-2012 Roofing Rehabilitation Program a cost increase of \$1.8M with no project delays;
- (iii) for the roofs being designed in the various modernization projects, a cost increase of \$1.6M and underexpenditure of \$1.2M and a schedule delay of 2 to 3 months;
- (iv) a change in cash flow as follows:

	2008	2009	2010	2011	2012	Total
Change Δ\$	-2,600	2,230	4,100	700	770	5,200

Given the status of the design, and the schedule and cost implications, staff recommend to continue with designs as currently budgeted and incorporate installation of green/cool roofs in the upcoming TTC 2009 – 2013 Capital Program submission in accordance with the Toronto City Council motion adopted on March 3, 2008 for designs to start in 2009.

**JUSTIFICATION**

Approval of staff recommendations is the most efficient way to move forward in complying

with the Toronto City Council motion adopted on March 3, 2008, while maintaining the progress of the current project schedule for construction in 2008.

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