

## **Green Roof Incentive Pilot Program**

<b>Date:</b>	April 18, 2007
<b>To:</b>	Planning and Growth Management Committee
<b>From:</b>	Lou Di Gironimo, General Manager, Toronto Water
<b>Wards:</b>	All
<b>Reference Number:</b>	P:\2007\Cluster B\TW\pg07016 (AFS# 3677)

### **SUMMARY**

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This report provides an evaluation of the Green Roof Incentive Pilot Program which was administered in 2006, resulting in the construction of 16 new green roofs in the City by the end of 2007. Based on the experience gained from administering the pilot program and continued public interest in green roofs, this report outlines proposed changes to the program to help further advance the implementation of green roof technology in buildings within the City, particularly within the industrial and commercial sectors.

The revised Green Roof Incentive Pilot Program continues to be available to all property owners in the City of Toronto. However, changes in the Program are proposed to increase the level of uptake which includes simplified performance and eligibility criteria and increases in financial incentives offered.

The benefits of green roof technology in reducing energy consumption, stormwater runoff and the urban heat island effect are recognized and a green roof incentive program has been proposed as a key component in the City's forthcoming Climate Change and Clean Air Action Plan.

### **RECOMMENDATIONS**

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The General Manager, Toronto Water in consultation with the Executive Director, City Planning and the Executive Director and Chief Building Official of Toronto Building, recommends that:

1. The General Manager of Toronto Water be authorized to establish and implement the administrative details for the extension of the Green Roof Incentive Pilot

- Program on terms and conditions satisfactory to the General Manager in accordance with the terms of reference adopted and until funding for the program is depleted;
2. The terms of reference set out in Appendix 1 to this report be adopted as the selection criteria for the Green Roof Incentive Pilot Program;
  3. The General Manager of Toronto Water be authorized to exercise a discretion, to ensure a broad range of installation types (building form, size and location, and green roof design), in the selection of applications for inclusion in the Program in the event that there is a greater demand for grant funds than have been budgeted for in the Green Roof Incentive Pilot Program on the following basis:
    - (a) where there is more than one application for a similar installation type, subject to meeting the terms and conditions of the Program, the successful applicant will be based on the earliest complete application received; and
    - (b) where there is more than one application by a property owner, the application for the building with the larger roof area will be selected, subject to meeting the requirements in 3 (a);
  4. For the purposes of the Green Roof Incentive Pilot Program only, a financial incentive of:
    - (a) \$20.00 per square metre of green roof installed, be paid to eligible single-family residential property owners as per the terms of reference set out in Attachment 1 to this report, to a maximum of \$10,000.00; and
    - (b) \$50.00 per square metre of green roof installed, be paid to eligible industrial, commercial and multi-family residential property owners as per the terms of reference set out in Attachment 1 to this report, to a maximum of \$100,000.00;
  5. The General Manager of Toronto Water enter into discussions with Toronto Hydro or other agencies with a view of securing additional funding for the Green Roof Incentive Pilot Program;
  6. This report be forwarded to the Parks and Environment Committee, for their consideration in establishing a permanent Green Roof Incentive Program, including a review of the level of financial incentives, other parties that should be contributing funding to the program in light of the issues raised in this report and various options to address regulatory matters, all in support of the City's Climate Change and Clean Air Action Plan; and

7. The appropriate City officials be authorized and directed to take the necessary action to give effect thereto.

## **FINANCIAL IMPACT**

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The 2007 Toronto Water approved Capital Budget includes \$200,000 in WBS Element CWW475 – Green Roof Pilot Incentive for this initiative.

## **DECISION HISTORY**

In November 2005, City staff presented to Toronto's Roundtable on the Environment, a Discussion Paper entitled "Making Green Roofs Happen". This ultimately led to City Council adoption of the green roof strategy on January 31, 2006. A copy of the Council Decision Document can be found at:

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060131/pof1rpt/cl020.pdf>

Leading up to the adoption of the green roof strategy, City staff hosted workshops to get feedback from stakeholders on the definition of green roofs, as well as the barriers and solutions to build more green roofs. In addition, Ryerson University completed its report on the monetary values of some of green roofs' important benefits, including mitigating developments' impact on stormwater quality and quantity, improving buildings' energy efficiency, and reducing the urban heat island and thereby improving air quality.

One of the main recommendations contained in the Green Roof strategy was the creation of a financial incentive program for City of Toronto property owners wishing to install a green roof. A Green Roof Pilot Incentive Program was approved by Council at its meeting on April 25, 26 and 27, 2006. A copy of the Council Decision Document can be found at:

<http://www.toronto.ca/legdocs/2006/agendas/council/cc060425/wks2rpt/cl013.pdf>

On March 26, 2007, Council's Executive Committee formally launched the process for engaging the community in developing a climate change and clean air action plan. Providing financial incentives for green roofs is among the key recommendations of the report which can be found at:

<http://www.toronto.ca/legdocs/mmis/2007/ex/bgrd/backgroundfile-2428.pdf>

## **ISSUE BACKGROUND**

Council approved the Green Roof Policy in February 2006 and established a pilot incentive program to promote the construction of green roofs in the City. The City of Toronto's Green Roof Incentive Pilot Program ended on October 15, 2006. Applications for 16 sites were approved, qualifying for a financial incentive of \$10/square metre. Residential, commercial and institutional green roofs are being constructed as part of the pilot for a total of 3,000 square metres of green roof area being installed before the end of 2007. It is estimated that there are about 60 buildings with green roofs in the City with about 20 more being planned.

Interest in green buildings is steadily increasing among the development sector, as evident in the positive response to the City's new Green Development Standard, and the number of buildings applying for LEED certification. Due to their public visibility, green roofs are often one of the most popular features of green buildings. Public interest in the Green Roof Incentive Pilot Program continues to be high, with daily inquiries about the program being received through the City's website.

The benefits of green roofs are well documented and have been clearly demonstrated in the cost/benefit study by Ryerson University titled "*Environmental Benefits and Costs of Green Roof Technology for the City of Toronto*", October 31, 2005. Analytical and numerical models were used in the study to quantify the benefits of green roofs, assuming all large flat roof areas across the City were retrofitted with green roofs, in reducing: stormwater runoff, energy consumption, the urban heat island effect (through roof temperature reductions) and improving air quality.

Providing financial incentives for green roofs is among the key initiatives identified for reducing greenhouse gas emissions in the City's proposed Climate Change and Clean Air Action Plan. While there are broad environmental benefits associated with the implementation of a green roof program, at this time, the funding of incentives for the Pilot Program has been provided exclusively by Toronto Water in recognition of the stormwater management benefits of the technology.

## **COMMENTS**

Toronto is one of the first cities in Canada to actively promote green roofs, and the Pilot Program has been instrumental in raising the profile for green roofs in Toronto as well as the broader context of green building and the City's own Green Development Standard. The Pilot Program provided an opportunity to test the parameters of a financial incentive program for green roofs and to identify suitable criteria and submission requirements. The Pilot Program identified some administrative and practical considerations for implementing a permanent program including the simplification of performance criteria and longer term maintenance considerations.

### **Pilot Program Goal**

The overall goal of the Green Roof Pilot Incentive Program was to encourage green roof construction in the City. In addition, the program was directed at:

- Supporting the construction of a variety of green roof types which could be used for education and promotional purposes;
- Providing an opportunity to showcase various green roof technologies and planting styles; and
- Providing a grant of \$10 per square metre (approximately \$1 per square foot) of eligible green roof area up to a maximum of \$20,000.

Applications representing institutional, commercial and residential buildings were received under the Green Roof Pilot Incentive Program, with a surprising majority coming from the residential sector. This indicates a strong interest in green roofs from private homeowners. Although several inquiries were received from the industrial sector- the inquiries did not result in any formal applications being received. Critical comments from this sector have been consistent, stating that the financial incentive of \$10 per square metre of roof area was too low to encourage the installation of green roofs over large areas, where the average cost is about \$200 per square metre. In comparison, other jurisdictions pay 5 to 10 times as much in financial incentives and it is apparent that a larger financial incentive is required to attract more applicants to the program.

Interest in green roofs is high among individual home owners, public and private property owners as well as the development industry. However, even though there were a number of inquiries from the commercial building sector, no applications were received for a large building. It is in the relatively large commercial, institutional and industrial buildings where the benefits of green roofs would be greatest in terms of on-site stormwater and energy use reductions. However, a significant increase in the financial incentive will be necessary to advance the implementation of the technology in these sectors.

### **Green Roof Incentive Pilot Program**

All pilot program participants provided detailed information about the installation of their green roofs as well as photographs, which have been posted on the City's website. Each applicant completed a detailed questionnaire providing construction and technical details which will assist City staff and other agencies in the development of future permanent programs.

Given the above, it is proposed that the Green Roof Incentive Pilot Program be continued for another year. Applications will be posted on the City's Green Roof web site and also made available by mail. A staff team with representatives from Toronto Water, Toronto Building and City Planning will review the applications. Once accepted into the program the participants will be required to complete the construction of the roof, before funds are released. The Program requirements including performance criteria are attached as Appendix 1. Three areas where changes are being recommended to the Pilot Program include the performance criteria, maintenance agreements and the financial incentive amount, which are summarized in the following:

*a) Performance Criteria* - The performance criteria for green roofs have been simplified to reflect advances in technology which allow a thinner and lighter plant layer which is more absorptive and better suited for retrofit situations. It has been clearly demonstrated that all green roof systems reduce stormwater runoff however; the runoff coefficients vary depending on the system used and the site conditions. It is very difficult for individual property owners to demonstrate precise runoff coefficients without an engineering study, therefore runoff coefficient calculations will only be required on projects larger than 1,000 square metres (10,000 square feet) where a stormwater

management study will be required as part of the application process. The revised performance criteria are listed in Appendix 1.

*b) Maintenance of Green Roofs* - To help ensure that the newly constructed green roof is sustained over the longer term, the property owner of a green roof over 1,000 square metres, will be required to demonstrate that the green roof will be maintained for a period of at least 5 years, prior to the release of the financial incentive. This could include entering into a maintenance contract with a maintenance provider.

*c) Financial Incentive* - Based on comments received from program applicants and the development industry it is clear that the \$10 per square metre financial incentive offered as part of the original Pilot Program was insufficient to attract broad interest, particularly for large scale projects, given the high installation costs estimated at over \$200 per square metre.

The cities of Montreal and Chicago have successful green roof incentive programs. In Montreal, Gaz Metro provides a \$50 per square metre (\$5 per square foot) incentive and Chicago provides \$100 per square metre (\$10 per square foot) for their downtown buildings. To attract a broader range of property owners, it is proposed that the financial incentives in the City's Pilot Program be increased to \$50 per square metre (\$5 per square foot) to a maximum of \$100,000 per property owner for commercial, institutional, industrial and multi-residential buildings. Similarly, in order to increase interest and uptake of the program within the single family sector, including duplex and tri-plex properties, it is proposed that the financial incentive during the Pilot phase be increased to \$20 per square metre to a maximum of \$10,000 per property owner.

The terms of reference for the Green Roof Incentive Pilot Program including performance criteria are set out in full in Appendix 1. As the green roof construction standard is developed, further refinements may be made to the program criteria to reflect the adopted standards.

### **Future Considerations**

At this time, financial incentives for the Pilot Program have been provided by Toronto Water, exclusively, in recognition of the stormwater benefits of the technology. However, the level of funding proposed for the pilot program is not sustainable on the basis of stormwater benefits alone. For example, the research carried out to date suggests that the incentives that are being proposed are about 30 to 50 times the direct benefit to Toronto Water in terms of reduced costs for stormwater management. Research carried out for the City has shown that the reductions in energy requirements for cooling (during the summer) and heating (during the winter) by introducing green roofs, particularly for buildings with large roof areas, will result in even greater cost benefits. These benefits accrue not only to the owner of the green roof, but also to society at large through reductions in greenhouse gas emissions and other pollutants associated with energy production. Therefore, future consideration for the development of a permanent Green Roof Incentive Program, in support of the City's forthcoming Climate Change and Clean Air Action Plan, should include a review of the level of financial incentives, other parties

that should be contributing funding to the program in light of the issues raised in this report and various options to address regulatory instruments.

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## **SIGNATURE**

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Lou Di Gironimo  
General Manager, Toronto Water

## **ATTACHMENTS**

Appendix 1- Terms of Reference for the City of Toronto Green Roof Incentive Pilot Program.

## **APPENDIX 1**

### **TERMS OF REFERENCE FOR THE CITY OF TORONTO GREEN ROOF PILOT INCENTIVE PROGRAM**

#### **Administration**

1. The Green Roof Incentive Pilot Program ("the Program") will be administered by the Toronto Water Division of the City of Toronto ("the City").

#### **Program Application**

2. The Green Roof Incentive Pilot Program applies to:
  - any size and building type as long as the building is heated and the green roof is above grade;
  - both active (intensive) and passive (extensive) Green Roofs;
  - new roof and roof retrofits; and
  - roofs with a maximum slope of up to 10%.

#### **Selection of Participants**

3. The City wishes to make financial incentives available under this Program on a fair basis to a broad range of eligible applicants and, for this purpose, the City reserves the absolute right to limit the approval of applications and/or funds granted in such a manner so as to ensure no single applicant or property owner receives a disproportionate share of Program funds, notwithstanding there may be available Program funds or that all funding eligibility requirements have been met by the Applicant.

By signing this Application, the Applicant acknowledges and agrees that the selection and approval of an application for a Program grant is in the absolute discretion of the City, and that the City has reserved rights to limit the number of grants approved and the manner of grant approval on such grounds and conditions as it deems in the best interests of the public. Without limiting the foregoing, where the number of eligible grant applications received exceeds available program funding, the General Manager of Toronto Water shall have the absolute discretion in the selection and approval of applications subject to such selection criteria as may be established by City Council. Any discretion exercised on behalf of the City in the selection and approval of applications shall be exercised by the General Manager of Toronto Water.

#### **Eligibility Criteria**

4. To be eligible for consideration for participation in the Green Roof Incentive Pilot Program, a building must be located in the City of Toronto; have a water account with the City; and meet the Green Roof specifications, Requirements of Participation and other terms and conditions of this Program:



#### 4.1 Green Roof Specifications

(a) “Green Roof” means a system where a vegetated area becomes part of the building's roof and includes vegetation, a growing medium, a filter layer, a drainage layer, a root resistant layer and a waterproof membrane.

(b) To be eligible for consideration for participation in the Green Roof Incentive Pilot Program, each Green Roof applicant must demonstrate that the proposed Green Roof:

- (i) shall have a continuous coverage of growing media over at least 50% of the roof footprint of the building;
- (ii) shall have a vegetation mix (as opposed to a monoculture) and a sustainable organic growing medium that replenishes nutrients and retains moisture;
- (iii) shall have a maximum slope of ten percent (10%) ;
- (iv) on a new building, shall have a depth of at least 150 mm (6 inches). The depth will permit greater flexibility in terms of the type and variety of vegetation that can be incorporated and will help ensure greater survival of plants. (Notwithstanding the foregoing, for existing buildings a lesser growing medium thickness may be considered by the City); and
- (v) shall be installed over heated spaces (non-heated spaces such as underground garages will not be acceptable).

#### **Requirements of Participation**

5. (a) Application and Supporting Documentation - No application will be accepted or approved unless the applicant has submitted the following:

- (i) detailed plans of the proposed green roof showing percentage coverage, plant material, type of growing medium and construction details;
- (ii) a runoff calculation report for the proposed green roof design for projects over 1000sq m;
- (iii) a maintenance contract for 5 years on projects over 1000 sq m; and
- (iv) the completed Application form.

(b) Compliance with Specifications and other Program Requirements - All applicants participating in this Program shall comply with all specifications and other requirements set out in this Application to be eligible for payment of any funds by the City.

(c) Compliance with Laws - All applicants shall comply with all applicable laws, by-laws, regulations, orders, directives, requirements and policies of the federal, provincial and municipal governments, including the City, and all applicable court

orders, judgments and declarations of a court or tribunal of competent jurisdiction, including, without limitation, those laws and regulations applying to building methods, health and safety (collectively referred to as “Laws”).

(d) Building Permit Required - All applicants, whether for a new building or the re-roofing of an existing building, shall obtain a building permit prior to the commencement of any work on the Green Roof from the City and meet all requirements of such permit and the Building Code, 1992, as amended and all applicable regulations thereunder.

(e) Stormwater Management Report - On new projects with more than 1000 square metres of roof area, an engineering report showing source controls (including runoff coefficients for green roofs) should be included as per the requirements of the stormwater management report for the development site.

### **Application Deadline and Review**

6. The Program is undertaken annually and the application deadline for this Program is December 31, of the current program year. Applications will be reviewed 2 times per year. Notwithstanding such application deadline, upon commencement of the Program, if the City determines, at any time and in its sole discretion, that:

(a) it has received a sufficient number of acceptable applications to achieve its purposes and objectives of the Program, it may cease accepting any further applications, subject to clause (b) hereof; and

(b) it has received an insufficient number of acceptable applications to achieve its purposes and objectives of the Program, or an initial determination of sufficiency subsequently becomes insufficient for whatever reason, City Council may suspend or further extend the deadline date of the program as it in its unfettered discretion deems appropriate.

### **Applicant's Responsibility with respect to Work**

7. Each selected Applicant shall, and by signing this application agrees to, assume all financial and other responsibility for all work whatsoever in respect to and related to installation, performance, maintenance, repair and use of the Green Roof including, without limitation, the selection of the installers (where applicable) the proper installation of the Green Roof and any consequence arising from the installation of the Green Roof and the compliance with all Laws in respect to such work.

### **Waiver and Release**

8. The City makes no representation or warranty, express or implied, relating to any Green Roof or the availability, competence, quality or financial status of any installer or their work, and by submitting an application, including acceptance of same by the City and any agreement arising thereunder or in consequence thereof, each Applicant fully and completely, without qualification, agrees hereby to

waive and release and shall be deemed to have waived and released the City, its officials, officers, employees, agents and representatives from and against any claims or liabilities whatsoever including, without limitation, any damages, costs and liability for any and all loss, injury or damage to any property or person, whether direct, special, consequential, indirect or of any other nature, in connection with or related to the installation of a Green Roof or related to the participation in this Program.

### **Conditions of Payment**

9. No payment of a grant or financial incentive under this Program shall be made unless and until the following conditions are met:
  - (a) a complete and compliant Program application has been approved and the installation is fully completed in accordance with all terms and conditions of this Program set out herein; and
  - (b) an inspection by the City of the installed Green Roof has been completed in accordance with the terms and conditions of this Program.

### **Terms of Payment**

10. Upon successful completion of the installation of the Green Roof in accordance with the terms and conditions of this Program set out herein, those grant monies for which an approved applicant may be entitled under this Program will be awarded and paid over to such applicant

### **Information and Access Rights of City**

11. Each Applicant selected and approved by the City for this Program hereby consents to and shall provide and authorize the City and its Toronto Water personnel:
  - (a) access during installation period and/or after the installation for a period up to six (6) months from completion to verify compliance of the work with this Program and to photograph the installation, if Toronto Water so requires;
  - (b) the right to use or take, including the right to make reproductions of, any information, photographs and digital images and other data concerning any building selected and approved under this Program in any report and/or promotional and educational materials produced by and/or for the City; and
  - (c) to have access to, and the right to make reproductions of, utility records of any building selected and approved under this Program, for the two (2) year period preceding and following the Green Roof installation (four years in total), for Program evaluation purposes.