TORONTO

STAFF REPORT
ACTION REQUIRED

Eco-Roof Incentive Program Review & Update

Date:	October 24, 2016
To:	Planning and Growth Management Committee
From:	Chief Corporate Officer
Wards:	All
Reference Number:	P:\2016\Internal Services\E&E\Pg16011e&e (AFS #20857)

SUMMARY

Green roofs and cool roofs – known collectively as 'eco-roofs' – help make Toronto more resilient and better adapted to climate change. Eco-roofs reduce urban heat and its associated energy use. Green roofs also help manage storm water runoff, enhance biodiversity, improve air quality, and beautify our city.

The Green Roof Strategy was adopted by City Council in 2006 to encourage the construction of green roofs on City and privately owned buildings through incentives, public education and the development approval process. In 2008, Toronto established the Eco-Roof Incentive Program, which encourages the installation of eco-roofs on existing buildings and some new buildings. In 2010 the Green Roof Bylaw, which requires green roofs on large new developments, came into effect. In 2013, the program became self sustaining drawing its funding from cash-in-lieu payments under the Green Roof Bylaw.

An evaluation of the Eco-Roof Incentive Program was undertaken in 2016, to identify possible changes to increase awareness, improve participation, and help further advance the implementation of eco-roofs in Toronto. This report outlines key recommendations from that review process. Proposed changes to increase the uptake of green roofs include: increasing the incentive to $100/square metre ($m^2$) and providing financial support for structural assessments. With regard to cool roofs, proposed changes to eligibility include: allowing partial roof retrofits and approving cool roofs on new buildings under a certain size threshold. The need to remove the financial caps for eco-roof projects is identified.

This report also responds to item PG12.3 - Eco-Roof Incentive Program Funding for the Proposed Green Roof at 2850 Eglinton Avenue East.

RECOMMENDATIONS

The Chief Corporate Officer recommends that:

1. City Council direct the Director of the Environment and Energy Division to amend the Terms and Conditions of the Eco-Roof Incentive Program, to:

   a) Increase the amount of the green roof incentive to $100 per square metre.

   b) Provide additional funding for structural assessments for green roof projects, of up to a maximum of $1,000, as outlined in the Structural Assessment Grant Guidelines contained in Appendix 3.

   c) Remove the project funding maximum caps of $50,000 for cool roofs and $100,000 for green roofs.

   d) Remove the requirement for cool roofs to cover 100 percent of the available roof space, thus allowing partial roof replacements to be approved, with the provision of a letter from the property owner stating their intention to complete future roof retrofits with an eco-roof surface that meets program criteria.

   e) Allow cool roofs proposed on new buildings with a GFA of less than 2000 m^2 to be eligible for funding.

   f) Add the requirement for the applicant to provide documentation needed to track eco-roof project costs.

Financial Impact

The 2016 Council Approved Operating Budget for Facilities Management, Real Estate, Environment & Energy (FREEE) includes funding of $0.610 million from the Eco-Roof Financial Assistance Reserve Fund (XR1723) dedicated to fund eco-roof projects. FREEE's 2017 Operating Budget submission includes funding of $0.8185 million from this reserve to continue supporting this initiative, pending Council Approval.

The Eco-Roof Incentive Program is self-sustaining, with funding coming from cash-in-lieu paid to the City under the Green Roof Bylaw. Under the Bylaw, some developers may choose to apply for an exemption or variance to the Bylaw and pay cash-in-lieu of $200/m^2 for the required green roof area.[1]

Ongoing approval of projects through the program will be subject to the availability of funds in the Eco-Roof Financial Assistance Reserve that receives contributions from the cash-in-lieu policy tied to the Green Roof Bylaw. As of October 6, 2016, there is $1,435,562 available in the Eco-Roof Financial Assistance Reserve. Current and forecasted revenue are expected to sustain the proposed changes recommended in this report.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

In December 2008, City Council endorsed the terms of reference for the Eco-Roof Incentive Program (http://www.toronto.ca/legdocs/mmis/2008/pg/bgrd/backgroundfile-16869.pdf), which was officially launched in March 2009. Regular progress reports have been made to City Council. The first progress report was presented in February 2010: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2010.EX40.7.
The second progress report was presented in March 2012:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PG13.4

At its meeting of May 26, 2009, City Council adopted the Green Roof Bylaw (Toronto Municipal Code Chapter 492) which provides an option for developers who do not wish to construct a green roof as required, to seek approval to provide cash in-lieu of constructing the green roof. City Council directed that any funds collected as cash-in-lieu be directed to the Eco-Roof Incentive Program and be utilized to provide financial support for green roof installations. The Green Roof Bylaw came into effect in January 2010 and can be viewed at: http://www.toronto.ca/legdocs/municode/1184_492.pdf.

At its meeting in May 2012, City Council authorized the creation of a discretionary reserve fund called the 'Eco-Roof Financial Assistance Reserve Fund' to receive monies raised through the cash-in-lieu policy of the City's Green Roof Bylaw. Council also directed that that all funds acquired, both already received and in the future, through the cash-in-lieu policy of the Green Roof Bylaw be deposited in the Eco-Roof Financial Assistance Reserve Fund.

[1] When City Council approved the Green Roof By-law in 2009, it directed that any funds collected as cash-in-lieu be made available to the Eco-Roof Incentive Program to fund green roofs. In 2013, City Council authorized both green roof and cool roof projects to be eligible to receive funding through the funds collected as cash in-lieu. This change allowed the program to become completely self-sustaining, ensuring ongoing funding for green roofs and cool roofs through the Eco-Roof Incentive Program.

At its meeting in May 2012, City Council also adopted the recommendation to amend the eligibility requirements in the Terms and Conditions of the Eco-Roof Incentive Program, as needed, to ensure that eligibility for Eco-Roof Incentive Program funding is consistent with the requirements of the Green Roof Bylaw. At that time City Council also directed that all new Public, French and Catholic School construction projects be made eligible for green roof subsidies provided by the Eco-Roof Incentive Program regardless of size. The decision document for the May 2012 City Council meeting can be viewed here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PG13.3

At its meeting in January 2013, City Council adopted the following as part of the 2013 Capital and Operating Budgets:

> *"City Council request the Director of the Toronto Environment Office to report on amendment to the City's Green Roof Bylaw and cash-in-lieu policy in 2013 to include future cool roof installations."*

The decision document can be viewed here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX27.1

In July 2013, City Council approved revisions to the Terms and Conditions of the Eco-Roof Incentive Program, to include residential buildings and increase the amount of the incentive offered to green roof projects to $\$75/m^2$. At the same time Council authorized an amendment to Chapter 492 of the Municipal Code – Green Roofs, known as the Toronto Green Roof Bylaw, to allow funds collected as cash-in-lieu of construction of a green roof be directed to the Eco-Roof Incentive Program for the provision of green roofs and cool roofs. With this decision the program became completely self-sustaining. The decision document can be viewed here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.PG25.17

On April 6, 2016, Planning and Growth Committee deferred item PG12.3 to be considered at its November 16, 2016 meeting. The item relates to requested Eco-Roof Incentive Program funding for a proposed green roof at 2850 Eglinton Avenue East by the Toronto French Catholic School Board (Conseil scolaire de district catholique Centre-Sud). The planned 2812 m^2 green roof would be installed on a new high school building in Ward 38, covering approximately 63 percent of the roof. The application for 2850 Eglinton Avenue East was approved and recommended for funding under the Eco-Roof Incentive Program in 2015. Funding was allocated in the amount of $100,000, which is the maximum amount per green roof project. A Member Motion from Councillor De Baeremaeker recommended an allowance for a one-time exemption to the project funding maximum of $100,000. The decision document can be viewed here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PG12.3

ISSUE BACKGROUND

The City of Toronto was the first city in North America to implement a bylaw requiring and governing the construction of green roofs and is one of the first cities to proactively encourage the adoption of eco-roofs for the many environmental, economic and social benefits they provide. As is common in urban centres, a significant amount of Toronto's natural landscape has been replaced by dark, non-permeable surfaces, which disrupt the hydrological cycle; reduce habitat/biodiversity; impact air quality; and increase ambient air temperature (e.g., the urban heat island effect) thereby increasing associated energy use. Green building strategies, including eco-roofs, are encouraged to mitigate these environmental impacts, and help address climate change at the local level.

An "eco-roof" includes both green roofs and cool roofs. A green roof contributes to stormwater management and urban heat island mitigation and is comprised of a waterproof membrane, drainage layer, growing media and vegetation. A cool roof contributes to urban heat island mitigation and has an exterior surface with high solar reflectivity and thermal emissivity which reflects the sun's rays and reduces heat build-up from the sun's thermal energy. A cool roof can be either a coating applied over an existing roof system or a new waterproof membrane.

Green Roof Strategy and Green Roof Bylaw

The Green Roof Strategy was adopted by City Council in 2006 to encourage the construction of green roofs on City and privately owned buildings through incentives, public education and the development approval process. This led to the adoption in May 2009 of the Green Roof Bylaw which requires green roofs on new developments over 2,000 m^2 and governs their construction. Developers who choose not to install a green roof or to vary from the required amount must pay cash-in-lieu of \$200/m^2. The cash-in-lieu amount will be revisited as part of the update to the Green Roof Bylaw report to Planning and Growth management Committee in 2017. Since the Bylaw came into effect in 2010, there have been approximately 664 green roofs required with 62 requests for green roof variances/exemptions.

Eco-Roof Incentive Program

The Eco-Roof Incentive Program builds upon the Green Roof Strategy and the Green Roof Pilot Incentive Program, delivered in 2006 and 2007.

The Eco-Roof Incentive Program, launched in 2009, encourages the installation of green roofs and cool roofs on existing buildings and new buildings not subject to the Green Roof Bylaw. The program was expanded in 2012 to include new and existing Toronto Public and Separate School Board buildings. In 2013, residential buildings were made eligible and the green roof incentive was increased to \$75/m^2. The program became completely self-sustaining in 2013 when Council directed that funds collected as cash-in-lieu of construction of a green roof be directed to the Eco-Roof Incentive Program for the provision of both green roofs and cool roofs. The program supports the goals of Resilient City - Preparing for a Changing Climate, adopted by City Council in July 2014.

A timeline of program development is provided below in Table 1.

Table 1: Eco-Roof Incentive Program development	
Year	**Action**
2006/2007	• Green Roof Strategy adopted by City Council • Green Roof Incentive Program Pilot Program – run by Toronto Water
2008	• Eco-Roof Incentive Program adopted by City Council
2009	• Eco-Roof Incentive Program officially launched in May 2009 • Eligible buildings: Existing industrial, commercial and institutional buildings, as well as some new buildings • Green roofs funded at $\$50/m^2$ to a maximum of $100,000 • Cool roofs funded at $\$2\text{-}5/m^2$ to a maximum of $50,000
2009/2010	• Green Roof Bylaw adopted by City Council in 2009, in effect in 2010 • City Council directed that any funds collected as cash-in-lieu be directed to the Eco-Roof Incentive Program
2012	• City Council allowed new Toronto School Board buildings to access funding for green roofs (this is the one case where the program funds projects where the Green Roof Bylaw applies). • City Council authorized the creation of a discretionary reserve fund called the 'Eco-Roof Financial Assistance Reserve Fund' to receive revenue raised through cash-in-lieu payments under Green Roof Bylaw
2013	• Program review with report to Council. • Council approved expanding the program to include residential buildings. • Council approved increasing the incentive for green roofs to $\$75/m^2$ to a maximum of $100,000. • Program became completely self-sustaining when Council directed that funds collected as cash-in-lieu of construction of a green roof be directed to the Eco-Roof Incentive Program for the provision of both green roofs and cool roofs.
2015/2016	• Program review and evaluation by Consultant • Recommendations for program changes developed and presented in this report

Incentives and eligibility
For green roofs, the program currently offers a $\$75/m^2$ incentive, to a maximum of $100,000 on:

- Existing buildings;
- New buildings with a gross floor area of less than of 2,000 m^2; and
- New and existing Toronto Public and Separate School Board buildings.

For cool roofs on existing buildings only, the program currently offers the following incentives to a maximum of $50,000:

- $\$2/m^2$ incentive for a coating over an existing roof; or
- $\$5/m^2$ for a new roof membrane.

Process
Applicants must submit detailed plans of their proposed roof including roof coverage, maintenance plan and construction details. Applications are reviewed by Environment and Energy Division (EED) staff to ensure they adhere to the program criteria. When necessary, staff from City Planning, Toronto Water, and Toronto Building, are asked to make recommendations to the Director of the EED.

If approved by the Director of the EED, the applicant is required to construct the eco-roof and provide evidence of its completion prior to receiving any part of the grant. Evidence of completion includes a letter of declaration from the installer and photos of the completed roof. Site inspections by City staff are also part of the verification process. City staff may also inspect a green roof at any time during its lifetime to ensure that it is being maintained properly.

More information about the application process can be found at: www.toronto.ca/livegreen/ecoroofs.

COMMENTS

Eco-Roof Incentive Program Outcomes

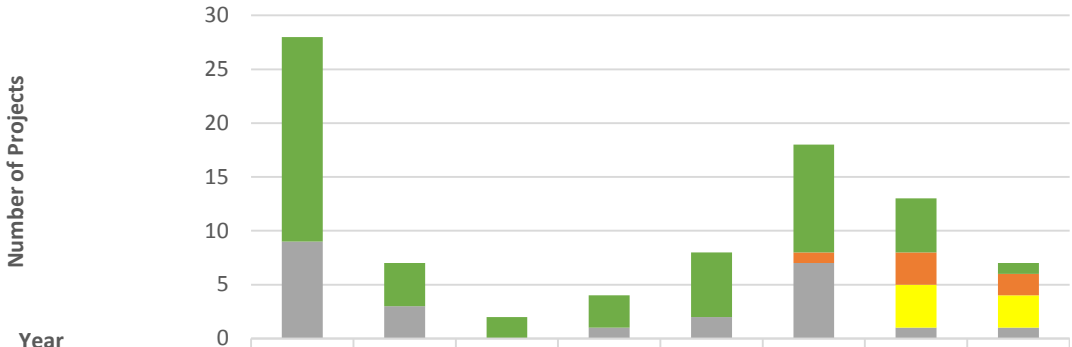
Program Participation and Results

Between March 2009 and October 2016, 370 applications were received, of which 304 applications were approved. Between the same period, 240 projects have been completed (50 green roofs and 190 cool roofs) with 38 projects in progress.

Graph 1 provides a summary of green roof applications by year. Graph 2 provides a summary of cool roof applications by year.

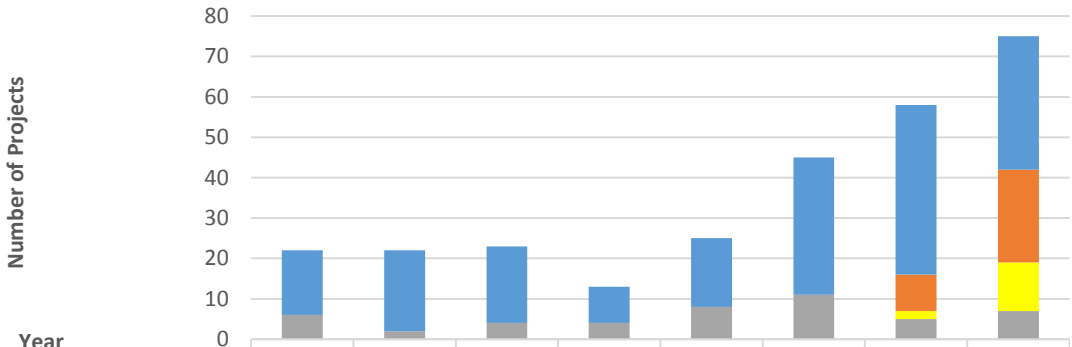
Appendix 1 provides a detailed list of all approved eco-roof projects.

Graph 1: Green Roof Applications



Year	2009	2010	2011	2012	2013	2014	2015	2016
Completed Projects	19	4	2	3	6	10	5	1
Underway						1	3	2
Under Review							4	3
Not Approved/ Canceled	9	3	0	1	2	7	1	1
Total Applications Received	28	7	2	4	8	18	13	7

Graph 2: Cool Roof Applications



Year	2009	2010	2011	2012	2013	2014	2015	2016
Completed Projects	16	20	19	9	17	34	42	33
Underway							9	23
Under Review							2	12
Not Approved/ Canceled	6	2	4	4	8	11	5	7
Total Applications Received	22	22	23	13	25	45	58	75

A total of 593,000 m^2 (equivalent to 99.5 football fields) of green roofs and cool roofs have been approved under the Eco-Roof Incentive Program, with a combined funding allocation of $3.93 million.

Table 2 and 3 provide a summary of completed eco-roof area and funding provided through the program to date.

Table 2: Green Roof Funding and Area by Year

Year	Grants Issued ($)	Verified Area (m^2)
2009	400,689	9,673.57
2010	63,643	1,272.87
2011	122,550	2,451.0
2012	55,141	1,074.5
2013	210,425	3,544
2014	88,560	1,180.81
2015	61,908	825.44
2016**	5,529	73.73
Total	**$1,008,448**	**20,095.92 m^2**

Table 3: Cool Roof Funding and Area by Year

Year	Grants Issued ($)	Verified Area (m^2)
2009	211,911	48,642.21
2010	261,320	52,264.33
2011	211,121	56,073.48
2012*	146,486	29,892.05
2013	153,475	30,695.05
2014	474,975	98,005.01
2015	499,330	99,866.18
2016**	750,639	74,691.54
Total	**$3,923,840**	**490,129.85 m^2**

*Cool roof funding was advertised as ending Dec 31, 2011, resulting in fewer applications in 2012.
**as of October 1, 2016.

Environmental & Economic Benefits

Table 4 summarizes the outcomes associated with the projects supported by the Eco-Roof Incentive Program.

Table 4: Measureable Outcomes of Toronto's Eco-Roof Incentive Program March 2009 to October 2016*	
Area of Concern	**Outcomes**
Storm water Management	Approximately 10.5 million litres of storm water diverted from sewers annually due to 50 completed green roofs. Storm water diversion by completed green roofs results in a minimum cost saving of $100,000. **
Energy Efficiency	Average of 221,055 kilowatt hours per year in energy savings primarily from reduced need for air conditioning due to 50 completed green roofs. Average of 841,390 kilowatt hours per year in energy savings primarily from reduced need for air conditioning due to 190 completed cool roofs. Total electricity savings: $135,462 per year. ***
Greenhouse Gas Emission Reductions and Air Quality	Average of 43.6 tonnes of greenhouse gases avoided annually due to 50 completed green roofs. Average of 157 tonnes of greenhouse gases avoided annually due to completed cool roofs. Green roofs provide an improvement in air quality due to reduction in particulates, nitrogen oxides, sulfur oxides, carbon monoxide and ozone from vegetation.
Green Space Enhancement and Biodiversity	More than 20,095 m^2 of green roofs will help increase green space in the urban environment with the potential to enhance biodiversity.
Economic Development	Minimum of 12 person-years of new employment generated to date due to green roofs through this program. ****
Urban Heat Island Reduction	Eco-roofs reduce the urban heat island effect, which is defined as the observed increase in air and surface temperatures in an urban area caused by concrete and non-porous surfaces locking in heat. Widespread implementation of green roofs can reduce local ambient air temperature 1.5 to 2°C, with a direct 4-5°C temperature roof surface cooling effect, while widespread implementation of cool roofs can reduce local ambient air temperature by 0.6 to 1.72°C. *****
* Based on 240 completed projects. ** Values are based on Toronto's Wet Weather Flow study *** Based on Toronto Hydro's average rate of 12.75 cents per kWh **** Based on green roof benefits as per Living Architecture Monitor, Summer 2013. ***** Not measured directly as a result of the Eco-Roof Incentive Program. Based on research for widespread implementation. Direct green roof cooling effect specific to Toronto as per MacIvor et al, 2016.	

Eco-Roof Incentive Program Review

In 2015, the Environment and Energy Division invited qualified professional consultant teams to review the City of Toronto's Eco-Roof Incentive Program through a divisional Request for Proposals process. The goal was to undertake an evaluation of the program and propose a strategy to help the City determine what changes can be made to increase program awareness, improve program participation, and help further advance the implementation of eco-roofs in Toronto.

The review was completed by a Consultant between December 2015 and July 2016 and consisted of best practices research, stakeholder engagement, and a financial life-cycle analysis of eco-roofs, described below.

Background Research

The Consultant conducted background research to identify best practices from a variety of comparable environmental incentive programs, in order to identify potential improvements to the program.

The background research included:

- A literature review of several environmental incentive programs;
- A best practices review of existing green roof and cool roof programs; and
- A review of environmental communication and marketing strategies.

Stakeholder Engagement

Stakeholder engagement was undertaken by the Consultant to assess barriers to program participation and identify potential improvements.

The following stakeholder groups were targeted during the review:

- Roofing professionals operating in Toronto;
- Past program participants; and
- Property owners and/or managers.

Several complementary approaches were utilized to encourage stakeholder participation in the review process, including: two focus groups, two online surveys and a series of one-to-one interviews. A total of 92 individuals were engaged through focus groups and online surveys.

Financial Modelling

A life-cycle analysis was conducted to determine the life-cycle economics associated with installing and maintaining eco-roofs compared to conventional roofs. Typical cost and benefit information was generated through a literature review. Three different incentive levels were utilized to determine the financial impact of the incentives:

- The current incentive;
- 50 percent higher than the current incentive; and
- 50 percent lower than the current incentive.

A life-cycle cost analysis over 50 years was subsequently conducted on a green and a cool roof for each building typology. The results of the analysis determined the net present value (NPV), simple payback period, discounted payback period, and internal rate of return for each roofing option and building typology per m^2.

The full report prepared by the Consultant can be found at:
www.toronto.ca/livegreen/ecoroofs

Key Recommendations

As a result of the best practices research, stakeholder engagement, and a financial life-cycle analysis, the Consultant identified a series of key recommendations for improvements to the program.

The Consultant noted that the Eco-Roof Incentive Program exemplifies many of the best practices identified in the background research portion of the review and likely inspired the creation of eco-roof incentive programs offered in other jurisdictions. It was also noted that program participation is increasing, which suggests that the program is advancing the City's goal of widespread implementation of eco-roof technology in Toronto.

A summary of the key recommendations to further enhance participation – many of which suggest building on or continuing existing staff actions – is presented below.

Tools to overcome process-related barriers to participation

Based on the Consultant's background research and comments from stakeholders, the Eco-Roof Incentive Program is well structured and program participation is increasing. However opportunities exist to develop tools to overcome process-related barriers to participation which include:

- **Connecting program participants and roofing professionals** to provide a starting point for new program participants interested in installing an eco-roof.
- **Developing a step-by-step guide** for new participants to ensure the full spectrum of program requirements are clearly understood.
- **Creating an online incentive calculator** to allow prospective applicants to estimate the incentive amount they may qualify for based on their specific eco-roof project.
- **Providing support for ongoing maintenance of eco-roofs** through a maintenance plan checklist could help provide a clearer understanding of the resources required and seasonal tasks that should be undertaken to keep eco-roofs performing as they are intended.
- **Continuing to provide application assistance from program staff** to guide participants through the application process.

- **Enhancing the online application form** with the addition of fillable form with self-filling fields for repeated information and helpful tips for mandatory fields.

Opportunities to develop tools to overcome process-related barriers to participation will be explored to make the program more convenient for applicants.

Incentive level and structure

Stakeholders consulted agreed that receiving a grant through the City's Eco-Roof Incentive Program influences decision making and adds credibility to eco-roof products.

While significant progress has been made in establishing eco-roof space in Toronto, many property owners remain reluctant to install eco-roofs due to a variety of barriers to implementation. For cool roofs, comments from the roofing industry confirmed that cool roof products are still an emerging technology in Canada and face barriers to implementation (sourcing materials, finding qualified contractors, aesthetics, lack of awareness, etc), thus an incentive is essential to encouraging the adoption of cool roof technology in Toronto. With regard to green roofs, the Consultant has identified that the higher upfront and total project costs associated with green roofs are significant barriers to program participation.

It was also noted that the current funding caps are deterrents for owners of large properties or those wishing to complete larger eco-roof projects. Recommendations to remove these barriers and increase participation are discussed further in the report.

Increase the incentive level for green roofs to $100/m2

The program currently offers $75/m^2 to a maximum of $100,000 for green roofs that meet the program's eligibility requirements.

Feedback from the stakeholder engagement process indicates that the percentage of project costs offset by the current incentive level of $75/m^2 varies significantly, but is typically well below the original goal of the program --50 percent. In fact, past program participants surveyed, reported that the percentage of the total project costs covered by the grant ranged between 10 and 25 percent. This range was also observed through an analysis by program staff of a sample of completed green roof projects funded by the program. The analysis showed that on average 23 percent of the total costs were covered by the current green roof incentive offered.

The Consultant's financial analysis revealed that green roofs have significant incremental costs, and long payback periods. Green roofs require more upfront investment (due to additional costs such as consultant fees, structural assessments, specialized building materials, etc.) which is a significant barrier to adoption of this type of roof. The Consultant's discussions with the green roof industry in Toronto identified that the incremental costs for extensive green roofs built in Toronto can be approximately $182/m^2. Several comprehensive case studies of grant recipients were developed by the Consultant to show the costs and benefits of funded green roofs. Based on six in-depth

green roof retrofit case studies, the average cost to install these roofs was found to be $\$371/m^2$, further showing the significant cost of green roof retrofits and the need to increase the current green roof incentive to offset these high installation costs.

The recommended increase to $\$100/m^2$ is therefore suggested as an incentive that is more likely to cover a more meaningful percentage of costs, while reducing the initial 'sticker shock' posed by the costs involved in installing a green roof, with the overall goal of encouraging more property owners to consider installing a green roof.

The best practices review by the Consultant identified similar green roof incentives offered in other jurisdictions. In Philadelphia, 50% of all costs incurred to construct the green roof are provided in the form of a tax credit. In Washington, D.C. the RiverSmart Rooftops Rebate provides $10 to $15/ft2 ($143 to $214/m2 CAD) for green roofs installed. Washington is currently ranked as the #1 city for most green roofs installed, with the City of Toronto in the #2 spot.

It is important to note that the Eco-Roof Incentive Program is completely self-sustaining due to funding received through the Green Roof Bylaw cash in-lieu policy. In 2013 Council directed that funds collected as cash-in-lieu of construction of a green roof be directed to the Eco-Roof Incentive Program. Current and forecasted revenue are sufficient to sustain the proposed increase to the green roof incentive.

Additional funding for structural assessments for green roofs

Research and industry response indicates that green roof costs are significantly higher for existing buildings than new construction. Structural modifications to existing buildings to enable them to support the weight of a green roof are often necessary and can increase costs by up to 30 percent. A structural assessment determines whether or not an existing building can carry the additional load of a green roof and is one of the first steps in determining whether to install a green roof. The structural assessment cost is not included in the green roof installation cost.

The Consultant identified that structural assessment costs are a significant barrier for retrofits where the structural integrity of the roof is not easily known. This cost is largely fixed and can range up to $3,000 to complete by a professional engineer. This often means that potential program participants essentially have to pay upfront to determine if they can proceed with the green roof retrofit at all. Some may choose not to explore the option of installing a green roof due to this high upfront cost.

In order to increase program participation, a grant to help offset the cost of structural assessments is advised. This is similar to what is being offered in Washington through the RiverSmart Rooftops Rebate program, where a grant for a structural analysis is offered.

The creation a Structural Assessment Grant (SAG) as part of the Eco-Roof Incentive Program is recommended. The application process would remain the same, except for the addition of a checkbox on the application form to indicate the applicant is interested in applying for a SAG. The amount of the SAG would be either the actual cost of the structural assessment or $1,000, whichever is less. To be eligible applicants must submit a copy of the structural assessment report and the paid invoice. The assessment must be conducted by engineer licensed to work in the Province of Ontario.

The proposed Structural Assessment Grant Guidelines are outlined in Appendix 3. EED staff will work with Toronto Building staff to ensure these guidelines as consistent with the Green Roof Construction Standards.

Remove the financial cap for eco-roof projects

The program currently funds eligible cool roof projects to a maximum of $50,000 and eligible green roofs to a maximum of $100,000.

Feedback from roofing professionals and past program participants indicated that the financial caps per project are barriers to implementing larger eco-roofs. The caps act as deterrents to installing eco-roof projects that maximize the amount of available roof space. For example, some property owners have made decisions to scale back eco-roof projects that reach or exceed the cap, as there is no longer a financial incentive provided, making a larger eco-roof project too costly.

As part of the program review, feedback from one school board in particular indicated that the incentive level and cap directly influences internal decisions about potential eco-roof projects. The Toronto French Catholic School Board indicated that the size of the eco-roof is limited to what can be recovered through the grant. As a case in point, this school board submitted an application for funding to the Eco-Roof Incentive Program in fall 2015 for a green roof that would be installed on a new high school at 2850 Eglinton Avenue East. The proposed green roof would be 2812 m^2 in size and cover approximately 63 percent of the roof. The application was approved in the amount of $100,000, which is the maximum per project. As a result of the cap, the school board is opting to proceed with a smaller green roof project (about half the size) that corresponds with the amount of the approved grant ($100,000).

Removing the financial caps for eco-roof projects is recommended to support the implementation of larger eco-roof projects, thereby increasing eco-roof space in the city and its associated benefits. This action would help lower the overall project costs for eco-roof technology and encourage property owners to opt for larger eco-roof space when possible. Although, the recommendation to approve partial roof retrofits (see below) provides another mechanism to enhance the implementation of cool roofs, more than one partial retrofit at the same property may not be feasible at the current cap, thus providing an additional rationale to remove the cap.

A review of program participation statistics revealed that only one completed green roof project has received the maximum grant amount and only one other project was within $10,000 of reaching the cap. Only three completed cool roof projects have received the maximum grant amount, and four other projects were within $10,000 of reaching the cap. These statistics suggest that increasing or removing the cap for green or cool roofs does not present an immediate risk to depleting the program fund, but would potentially encourage a greater number of larger retrofit projects, resulting in more eco-roof space established in the city - a key goal of the Eco-Roof Incentive Program.

When the Eco-Roof Incentive Program was first established in 2008, the financial caps per project were a necessary safeguard at a time when the amount of dedicated funding was limited. The caps were put in place to ensure funding would be available to multiple projects, without the risk of depleting the fund with one large eco-roof project. This is no longer a concern as the program is completely self-sustaining as of 2013. Current and forecasted revenue is more than adequate to sustain the proposed change to remove the financial caps.

Proposed Green Roof at 2850 Eglinton Avenue East (PG12.3)
The recommendation above to remove the financial cap of $100,000 for green roof projects would allow the Toronto French Catholic School Board to move forward with the proposed green roof at 2850 Eglinton Avenue East of 63% coverage as originally planned.

The School Board confirmed that the final size of the green roof at 2850 Eglinton is limited to what can be recovered through the grant. They have put their construction agreement on hold with the contractor in anticipation of Council's decision on this item. They hope to be able to move forward with the larger green roof if additional funding is approved. Without additional funding support available from the Eco-Roof Incentive Program, the cost of the larger green roof project becomes too high. This becomes a missed opportunity to support a property owner willing to install a larger green roof and encourage the maximum amount of green roof possible, which is one of the primary goals of the Eco-Roof Incentive Program.

Removing the cap for green roof projects would allow the Toronto French Catholic School Board to achieve their vision of establishing a larger green roof on their new high school, providing a suite of long term benefits to the school and the community.

Project eligibility for cool roofs

Allow partial roof retrofits for cool roofs

The program currently requires that cool roof installations cover 100 percent of the roof space of the building, excluding mechanical equipment. The current eligibility criteria for cool roofs limit partial roof retrofits and can be a deterrent for large properties and properties made up of multiple buildings/additions.

It was noted through stakeholder consultation that many properties are a composite of several buildings of varying roof ages (see Photo 1 & 2 below). As a result, roof replacements are often completed in phases as the roof replacement schedule and budget allows. This is also true of single buildings with large roof areas, which cannot be replaced at the same time and are often done in segments over time. For these situations, installing a cool roof with 100 percent coverage is not always possible for technical and financial reasons.

Photo 1: Multiple roof spaces at 2075 Bayview Ave - showing several retrofitted as cool roofs

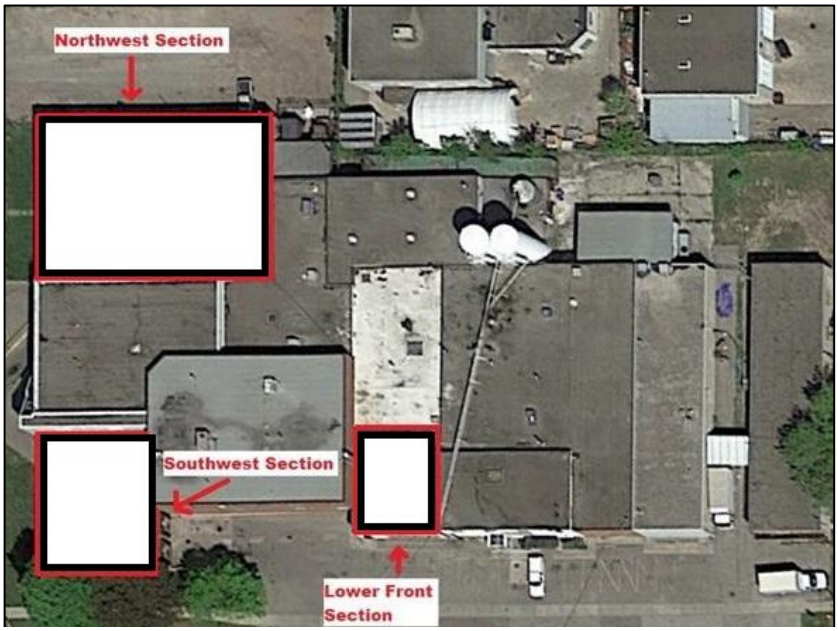


Photo 2: Satellite map image of 344 Bering Ave showing multiple roof spaces, with one portion completed as a cool roof and several others proposed as future cool roof retrofits.

It is recommended to remove the requirement for cool roofs to cover 100 percent of the available roof space, thus allowing partial roof replacements for cool roofs. In most cases the partial roof sections completed over time will result in 100 percent cool roof coverage. In order to ensure that eventually 100 percent of the roof space is converted to an eco-roof, program staff recommend adding the following requirement - a letter from the property owner is provided stating their intention to complete future roof replacements as an eco-roof surface that meets program criteria. This letter will be added to the project file and becomes a condition of grant approval.

Allow cool roofs on new buildings with a GFA of less than 2000 m^2 to be eligible for funding

Currently the program allows funding for cool roofs on existing buildings only. Yet green roofs are eligible on existing buildings and new buildings with a GFA of less than 2000 m^2.

It is proposed that cool roofs on new buildings with a GFA of less than 2000 m^2 also be made eligible for funding. This would make the eligibility requirements consistent between green roofs and cool roofs, and increase the uptake of cool roof technology in the new construction sector.

Please note that the City's Green Roof Bylaw applies to all new construction with a GFA of 2000 m^2 or more. The Eco-Roof Incentive Program provides funding for new buildings less than 2000 m^2 where the Green Roof Bylaw does not apply.

Program Administration and Data Tracking and Management

While stakeholder feedback indicated that the program is well administered and that the level of customer service is sufficient, the following opportunities were identified by the Consultant to enhance the program's administration:

Require project costs to be provided by applicants

As part of ongoing program monitoring, the need to collect data regarding project costs has been identified. Information such as installation costs and maintenance costs are needed to create a database of empirical data that can be used to support future assessments or changes to the program. This is particularly necessary for cool roof data, which is not readily available in a Canadian context.

It is recommended that an additional requirement be added to the program's Terms and Conditions: the provision of documentation needed to track project costs. For example: a final installation invoice, maintenance services invoice (if applicable). This additional supporting documentation about project costs would be required as part of the evidence needed in order to receive the grant payment.

Continue to undertake regular reviews of the program

Program staff will continue to undertake reviews of the program with stakeholder engagement, to ensure the program is still relevant (i.e., addresses a real gap or need, is easy to participate in, etc.). Program staff will continue to report to Council as needed.

Marketing and Promotion

The City uses a combination of outreach strategies to promote program awareness and participation, including:

- Partnerships with other City divisions,
- Local business networks and the roofing industry;
- Attending trade shows and community events; and
- Marketing tools (e.g., website, brochures, case studies, newsletters).

Stakeholder feedback confirmed that roofing professionals and past program participants learned about the program through a variety of sources - confirming the value of a multi-pronged approach. The list below highlights opportunities to build on current marketing and promotional activities:

- **Host information sessions** to provide details about the program to potential participants and address questions.
- **Continue to expand the directory of case studies**, that include information about project costs, pictures, and testimonials, in order to help potential program participants assess the full spectrum of eco-roof project possibilities.
- **Create greater visibility for completed eco-roof projects** through tours, photos and videos.
- **Continue to recognize completed eco-roof projects** with the wall plaque certificate provided to completed projects, and explore other mechanisms for recognition such as awards.

- **Continue to leverage partnerships** to increase both awareness and program uptake by:
    - Including information about the Eco-Roof Incentive Program in communications about City programs (e.g., newsletters, bill inserts).
    - Developing boilerplate text that can be used in third-party marketing materials.
    - Attending industry events (e.g., trade shows, etc.) to reach target audiences.

Opportunities to build on current marketing and promotional activities will be explored to increase program awareness and participation.

Program Outlook

The recommendations made in this report are intended to broaden the Eco-Roof Incentive Program and result in the creation of more eco-roof space in Toronto. Staff is forecasting an increase in applications received for both green roofs and cool roofs based on the proposed program changes.

Table 5 and 6 provide a summary of projects by building type, showing a jump in residential applications since their addition to the program in 2013.

Table 5: Completed Green Roof Projects by Building Type

Year	Industrial	Institutional	Commercial	Mixed Use – Commercial/ Residential	Residential
2009		5	10	4	N/A*
2010		1	2	1	
2011			2		
2012	1	1	1		
2013		2	1		3
2014		1	1		8
2015		1			4
2016**					1
Total	**1**	**11**	**17**	**5**	**16**
Percent of Total	**2%**	**22%**	**34%**	**10%**	**32%**

*The residential sector became eligible for Eco-Roof Incentive Program funding as of 2013.
**as of September 30, 2016.

Table 6: Completed Cool Roof Projects by Building Type

Year	Industrial	Institutional	Commercial	Mixed Use – Commercial/ Residential	Residential
2009	5	4	7		N/A*
2010	5	1	14		
2011	9	3	7		
2012	1	2	5	1	
2013		3	13		1
2014	4	4	21		5
2015	6	2	25		9
2016**	5	2	11		15
Total	**35**	**21**	**103**	**1**	**30**
Percent of Total	**18.5%**	**11%**	**54%**	**0.5%**	**16%**

*The residential sector became eligible for Eco-Roof Incentive Program funding as of 2013.
**as of September 30, 2016.

Since 2013, the Eco-Roof Incentive Program has been completely self-sustaining due to funding from the cash-in-lieu policy tied to the Green Roof Bylaw. Ongoing approval of projects through the program will be subject to the availability of funds received from cash-in-lieu contributions and held in the Eco-Roof Financial Assistance Reserve Fund. As of October 6, 2016, there is $1,435,562 available in the Eco-Roof Financial Assistance Reserve.

Forecasted cash-in-lieu payments from approved exemptions and variances from the Green Roof Bylaw are estimated at $1,501,433. It is important to note that this is an estimated amount. Proponents do not actually pay for their variance or exemption until they apply for their building permit, and may withdraw their request and install the required green roof. As part of the annual budget process, staff will report on the availability of funds from cash-in-lieu payments.

Current and forecasted revenue are expected to sustain the proposed changes recommended in this report.

CONCLUSION

Since 2009, the Eco-Roof Incentive Program has provided many environmental and economic benefits to the community and to the buildings that undertake eco-roof projects.

From December 2015 to July 2016, City staff worked with a consultant that undertook research and stakeholder engagement to determine how to improve uptake of eco-roofs in Toronto and increase applications to the program. Results of the program review have demonstrated that program participation could be increased by revising the Eco-Roof Incentive Program in the following ways:

- Increase the incentive level for green roofs to $\$100/m^2$
- Provide additional funding for structural assessments for green roofs
- Remove the financial cap for green roof and cool roof projects
- Allow partial roof retrofits for cool roofs
- Allow funding for cool roofs on new buildings with a GFA of less than 2000 m^2
- Add the additional requirement for the provision of documentation needed to track project costs

The recommended changes are consistent with the goals of the program. It is anticipated that these adjustments to the Eco-Roof Incentive Program will encourage more property owners to install eco-roof technology on their buildings, resulting in more eco-roof space created in the city of Toronto.

This report was prepared in consultation with City Planning, Toronto Building, and Toronto Water.

CONTACTS

Jim Baxter, Director, Environment and Energy Division
Tel: 416-338-1295, Email: jbaxter2@toronto.ca

Mark Bekkering, Manager Implementation and Support, Environment and Energy Division
Tel: 416-392-8556, Email: mbekker@toronto.ca

Annemarie Baynton, Senior Environmental Planner, Implementation and Support, Environment and Energy Division
Tel: 416-392-1848, Email: abaynto@toronto.ca

SIGNATURE

_____
Josie Scioli
Chief Corporate Officer

ATTACHMENTS

Appendix 1: Approved Eco-Roof Applications, March 2009 to October 2016

Appendix 2: Map showing projects supported by the Eco-Roof Incentive Program, March 2009 to October 2016

Appendix 3: Structural Assessment Grant Guidelines

APPENDIX 1:
Approved Eco-Roof Applications, March 2009 to October 2016

TABLE A: APPROVED GREEN ROOF PROJECTS				
Green Roof Address	**Building Type**	**Green Roof Area (m2)**	**Approved Grant**	**Project Status (as of Oct 2016)**
348 Danforth Avenue	Commercial	471	$23,550	Complete and verified
12 Concorde Place	Commercial	704	$35,200	Complete and verified
20 Grosvenor Street	Commercial	486	$24,300	Complete and verified
207 Queen's Quay West	Mixed Use - Commercial/Residential	607.20	$30,360	Complete and verified
1214 Queen Street West	Commercial	540	$27,000	Complete and verified
30 College Street	Institutional	531	$26,550	Complete and verified
128 Vine Avenue	Commercial	290	$14,500	Complete and verified
6 St. Joseph Street	Institutional	130	$6,500	Complete and verified
380 Queen Street East	Commercial	67.10	$3,355	Complete and verified
3079 Danforth Avenue	Institutional	411.50	$20,575	Complete and verified
17 Broadway Avenue	Institutional	2105	$100,000	Complete and verified
970 Queen Street East	Commercial	493	$24,650	Complete and verified
105 St. George Street	Institutional	485.80	$24,290	Complete and verified
518-520 Oakwood Avenue	Commercial	180	$9,000	Complete and verified
1326 Gerrard Street East	Commercial	150	$7,500	Complete and verified
240 Sterling Road	Commercial	280	$14,000	Complete and verified
80 Western Battery Road	Mixed Use - Commercial/Residential	415	$235	Complete and verified

100 Western Battery Road	Mixed Use - Commercial/Residential	12.97	$648	Complete and verified
25 Cole Street Toronto	Mixed Use - Commercial/Residential	1314	$8,476	Complete and verified
750 Spadina Avenue	Institutional	372	$18,600	Complete and verified
276 Sterling Road	Commercial	206.20	$10,310	Complete and verified
17 Noble Street	Commercial	383.67	$19,183	Complete and verified
550 Bayview Avenue	Mixed Use - Commercial/Residential	311	$15,550	Complete and verified
80 Front Street East	Commercial	1421	$71,050	Complete and verified
55 King Street West	Commercial	1030	$51,500	Complete and verified
1189 Lawrence Avenue West	Industrial	56.67	$4,250	Complete and verified
141 Adelaide Street West	Commercial	297	$14,850	Complete and verified
339 Alton Towers Circle	Institutional	720.83	$36,041	Complete and verified
50 Upper Rouge Trail	Institutional	1090	$54,500	Complete and verified
2811 Dufferin Street	Commercial	1125	$56,250	Complete and verified
275 Merton Street	Institutional	1237	$92,775	Complete and verified
639 Wellington Street West	Residential	18.50	$1,387	Complete and verified
101 Robinson Street	Residential	33	$2,475	Complete and verified
233 Bain Avenue	Residential	40.50	$3,037	Complete and verified
160 Kenwood Avenue	Residential	128	$9,600	Complete and verified
31 Arundel Avenue	Residential	33.75	$2,531	Complete and verified
2216 Queen Street East	Commercial	125	$9,375	Complete and verified
426 Ontario Street	Residential	31	$2,325	Complete and verified
36 Yvonne Avenue	Institutional	633.59	$47,519	Complete and verified
44 Lippincott Street	Residential	77	$5,775	Complete and verified

20A Senlac Road	Residential	62.80	$4,710	Complete and verified
19 Kippendavie Avenue	Residential	46.47	$3,485	Complete and verified
315 Ontario Street	Residential	17.84	$1,338	Complete and verified
1 Esgore Drive	Residential	25.36	$1,902	Complete and verified
59 Barton Avenue	Residential	65	$4,875	Complete and verified
7 Relmar Road	Residential	128.80	$9,660	Complete and verified
59 Clement Road	Institutional	555.70	$41,677	Complete and verified
691 Richmond Street West	Residential	29.70	$2,227	Complete and verified
298 Spadina Road	Residential	46.24	$3,468	Complete and verified
37 Canerouth Drive	Residential	73.73	$5,529	Complete and verified
1290 Castlefield Avenue	Commercial	156.60	$11,745	In progress
4700 Keele Street	Institutional	1498	$100,000	In progress
2850 Eglinton Avenue East	Institutional	2812	$100,000	In progress
3 - 1968 Bloor Street West	Residential	15.29	$1,146	In progress
15 Paschal Court	Institutional	710	$3,550	In progress
11 Beaumont Road	Residential	210	$15,750	In progress
	TOTAL	**25497.81**	**$1,240,640**	

Green Roof Summary

Total Approved Projects:	56 (50 complete, 6 in progress)
Total Approved Area:	25497.81 m2
Total Approved Grants:	$1,240,640

TABLE B: APPROVED COOL ROOF PROJECTS				
Cool Roof Address	**Building Type**	**Cool Roof Area (m2)**	**Approved Grant**	**Project Status (as of Oct 2016)**
20 Pullman Court	Industrial	3623	$18,115	Complete and verified
141 Wilson Avenue	Commercial	5008	$25,040	Complete and verified
1265 Military Trail	Institutional	2611	$13,055	Complete and verified
1695 Eglinton Avenue East	Commercial	1579	$7,895	Complete and verified
931 Yonge Street	Commercial	581	$2,905	Complete and verified
77 Belfield Road	Commercial	600	$1,200	Complete and verified
5 Shoreham Drive	Commercial	1765	$8,825	Complete and verified
357 Kennedy Road	Industrial	2232	$11,160	Complete and verified
105 St. George Street	Institutional	1038.70	$5,193	Complete and verified
61 & 63 Brisbane Road	Industrial	1015	$5,075	Complete and verified
40 Butterick Road	Industrial	4452	$22,760	Complete and verified
1000 Murray Ross Parkway	Institutional	2871	$14,355	Complete and verified
1180 Caledonia Road	Industrial	557	$2,785	Complete and verified
32 Goodmark Place	Commercial	3419	$17,095	Complete and verified
550 Bayview Avenue	Commercial	7290.51	$36,452	Complete and verified
2300 Finch Ave West	Institutional	10000	$20,000	Complete and verified
25 Scarsdale Road	Commercial	4564	$22,820	Complete and verified
470 Glencairn Avenue	Commercial	2090	$10,450	Complete and verified
2275 Markham Road	Commercial	2511	$12,555	Complete and verified
525 Milner Avenue	Industrial	2249	$11,245	Complete and verified
425 Midwest Road	Commercial	2004	$10,020	Complete and verified
253 Wellington Street West	Commercial	790	$3,950	Complete and verified

34 Greensboro Drive	Industrial	2575	$12,875	Complete and verified
555 Rexdale Boulevard	Commercial	790	$3,950	Complete and verified
85 Millwick Drive	Industrial	2031.51	$10,157	Complete and verified
125 Norfinch Drive	Commercial	4687.05	$23,435	Complete and verified
1445 Eglinton Avenue West	Commercial	2039	$10,194	Complete and verified
65 St. Regis Crescent North	Industrial	4148.77	$20,743	Complete and verified
755 Progress Avenue	Commercial	2232	$11,160	Complete and verified
54 Atomic Avenue	Commercial	5584	$27,920	Complete and verified
114 Norfinch Drive	Commercial	3404	$17,020	Complete and verified
77 Belfield Road	Commercial	1578	$7,890	Complete and verified
180 Lesmill Road	Commercial	2901	$14,505	Complete and verified
122 Bond Street	Institutional	2790	$13,950	Complete and verified
101 Milner Avenue	Commercial	2876	$14,380	Complete and verified
665 Dupont Street	Industrial	420	$2,100	Complete and verified
2075 Bayview Avenue	Institutional	521	$2,605	Complete and verified
2786-2800 Lakeshore Blvd West	Commercial	210.40	$1,052	Complete and verified
2019 Yonge Street	Commercial	102	$510	Complete and verified
35 Golden Avenue	Commercial	2120.50	$10,602	Complete and verified
35 Grand Marshall Drive	Industrial	2518.09	$12,590	Complete and verified
43 Fima Crescent	Industrial	468.23	$2,341	Complete and verified
26-36 Advance Road	Industrial	1965.91	$9,829	Complete and verified
50 Rolark Drive	Industrial	1506.40	$7,532	Complete and verified
700-730 Garyray Drive	Commercial	2568.60	$12,843	Complete and verified
1255 Sheppard Ave East	Institutional	1992.20	$9,961	Complete and verified

115 Select Avenue	Industrial	1542.19	$7,710	Complete and verified
1470 Birchmount Road	Industrial	2346.73	$11,733	Complete and verified
77 Union Street	Industrial	2843	$14,215	Complete and verified
2111 Finch Avenue West	Institutional	2118	$10,590	Complete and verified
4186 and 4188 Finch Avenue East	Commercial	4473.50	$22,367	Complete and verified
26-36 Advance Road	Industrial	1170.11	$5,850	Complete and verified
29 Chauncey Avenue	Industrial	524.62	$2,623	Complete and verified
125 Bermondsey Road	Commercial	14000	$50,000	Complete and verified
500 Kipling Avenue	Commercial	13082	$26,164	Complete and verified
405 Gordon Baker Road	Institutional	5852.89	$29,264	Complete and verified
2375 St Clair Ave West	Mixed Commercial/Residential	199.74	$399.48	Complete and verified
33 Cranfield Road	Commercial	6700.80	$33,504	Complete and verified
501 Alliance Avenue	Commercial	10475	$50,000	Complete and verified
21 Commander Blvd	Industrial	2043	$10,215	Complete and verified
161 Nugget Avenue	Commercial	1229	$6,145	Complete and verified
141 Adelaide Street West	Commercial	1023	$5,115	Complete and verified
2075 Bayview Avenue	Institutional	1811	$9,055	Complete and verified
3211 Danforth Avenue	Commercial	557.62	$2,788	Complete and verified
110 Norfinch Drive	Commercial	1186.84	$5,934	Complete and verified
1314 Victoria Park Avenue	Commercial	297.30	$1,486.50	Complete and verified
285 Cummer Avenue	Institutional	428	$2,140	Complete and verified
690 Garyray Drive	Commercial	1124	$5,620	Complete and verified
5 St. Regis Crescent North	Commercial	4950	$24,750	Complete and verified
6489 Kingston Road	Commercial	557.40	$2,787	Complete and verified

450 Winona Drive	Commercial	1621	$8,105	Complete and verified
1800 Ellesmere Road	Institutional	2000	$10,000	Complete and verified
12 Kodiak Crescent	Commercial	1905	$9,525	Complete and verified
12 Steinway Boulevard	Commercial	2684.90	$13,424	Complete and verified
43 Baywood Road	Commercial	1719	$8,595	Complete and verified
1750 Finch Avenue East	Institutional	2130	$10,650	Complete and verified
2345 Lakeshore Blvd West	Residential	735.61	$3,678	Complete and verified
35 Jutland Road	Commercial	3716	$18,580	Complete and verified
845 Progress Avenue	Commercial	1133	$5,665	Complete and verified
849 Progress Avenue	Commercial	1412	$7,060	Complete and verified
133 Bridgeland Avenue	Commercial	3095	$15,475	Complete and verified
447 Roxton Road	Residential	78.25	$391	Complete and verified
84 Medland Crescent	Residential	68.50	$342.	Complete and verified
86 Medland Crescent	Residential	70.40	$352	Complete and verified
2 Rolark Drive	Commercial	3103	$15,515	Complete and verified
11 Bermondsey Road	Industrial	1373.50	$6,867	Complete and verified
345 Rumsey Road	Institutional	2657	$13,285	Complete and verified
347 Rumsey Road	Institutional	1635	$8,175	Complete and verified
125 Nantucket Blvd	Commercial	6715.80	$33,579	Complete and verified
20 Butterick Road	Commercial	4505.90	$22,529	Complete and verified
230 New Toronto Street	Commercial	7102.30	$35,511	Complete and verified
105 Ironside Crescent	Commercial	4144.80	$20,724	Complete and verified
60 Production Drive	Commercial	1478.30	$7,391	Complete and verified
105 Select Avenue	Commercial	1553.30	$7,766	Complete and verified

5243 Steeles Avenue West	Commercial	1008.40	$5,042	Complete and verified
43 Goldthorne Avenue	Commercial	1161.30	$5,806	Complete and verified
40 Horner Avenue	Commercial	4269.70	$21,348	Complete and verified
165 Milner Avenue	Commercial	13010	$50,000	Complete and verified
990 Roselawn Avenue	Commercial	941	$4,705	Complete and verified
36 Butterick Road	Commercial	620.10	$3,100	Complete and verified
130 Dunn Avenue	Institutional	4478	$22,390	Complete and verified
1750 Finch Avenue East	Institutional	3755	$18,775	Complete and verified
34 Canmotor Avenue	Industrial	772.96	$3,864	Complete and verified
396 Pacific Avenue	Commercial	361.15	$1,805	Complete and verified
222 Islington Avenue	Commercial	1755.87	$8,779	Complete and verified
23 Disco Road	Industrial	9077	$45,385	Complete and verified
57 Atomic Avenue	Industrial	1766	$8,830	Complete and verified
1655 Dupont Street	Commercial	1154.78	$5,773	Complete and verified
55 Plywood Place	Commercial	3456	$17,280	Complete and verified
140 Sherway Drive	Commercial	1403	$7,015	Complete and verified
21 Richgrove Drive	Residential	1400	$7,000	Complete and verified
14 Mackenzie Crescent	Residential	132	$660	Complete and verified
1425 The Queensway	Commercial	4906	$24,530	Complete and verified
242 Cherry Street	Commercial	293	$1,465	Complete and verified
950 Warden Avenue	Commercial	7797.70	$38,988	Complete and verified
1500 Lodestar Road	Commercial	2415	$12,075	Complete and verified
500 Commissioners Street	Industrial	9240	$46,200	Complete and verified
715 Milner Avenue	Commercial	9690	$48,450	Complete and verified

50 Underwriters Road	Industrial	3625	$18,125	Complete and verified
41 Hollinger Road	Commercial	892	$4,460	Complete and verified
60 Emblem Court	Commercial	4603	$23,015	Complete and verified
2356 Gerrard Street	Commercial	1189.12	$5,945	Complete and verified
1870 Birchmount Road	Commercial	5338	$26,690	Complete and verified
31 Skagway Avenue	Commercial	1046.16	$5,230	Complete and verified
184 Railside Road	Commercial	4171	$20,855	Complete and verified
670 Mortimer Avenue	Residential	101.54	$507	Complete and verified
6799 Steeles Avenue West	Industrial	1110	$5,550	Complete and verified
120 - 122 Carrier Drive	Industrial	9951	$49,755	Complete and verified
10 Allview Crescent	Residential	260	$1,300	Complete and verified
322 Dufferin Street	Commercial	308	$1,540	Complete and verified
90 Nugget Avenue	Commercial	1207	$6,035	Complete and verified
869 Progress Avenue	Institutional	1110.40	$5,552	Complete and verified
60 Dunstall Crescent	Residential	176.52	$882.58	Complete and verified
605 Fenmar Drive	Commercial	7272.40	$36,362	Complete and verified
2330 Midland Avenue	Commercial	2321	$11,605	Complete and verified
101 Mildenhall Road	Institutional	967	$4,835	Complete and verified
100 Colonel Danforth Trail	Residential	293.50	$1,467	Complete and verified
50 Emblem Court	Commercial	4784.51	$23,922	Complete and verified
142 Millwick Drive	Commercial	278.81	$1,394	Complete and verified
155 Oakdale Road	Commercial	7553	$37,765	Complete and verified
552 Queen St West	Commercial	218.30	$1,091	Complete and verified
320 Danforth Avenue	Commercial	492.50	$2,462	Complete and verified

3459 Sheppard Avenue East	Commercial	969	$4,845	Complete and verified
1070 Birchmount Road	Commercial	1748.81	$8,744	Complete and verified
54 Six Point Road	Industrial	494.24	$2,471	Complete and verified
930 Queen's Plate	Residential	985	$4,925	Complete and verified
172 King Henry Blvd.	Residential	229.30	$1,146	Complete and verified
1655 Dupont Street	Commercial	555.93	$2,779	Complete and verified
94 Brockport Drive	Commercial	5204.24	$26,021	Complete and verified
1 Arrow Road	Commercial	4942.44	$24,712	Complete and verified
71 Merrill Avenue	Residential	116	$580	Complete and verified
1421 Dundas Street West	Commercial	276.50	$1,382	Complete and verified
1351 Dundas Street West	Commercial	210.05	$1,050	Complete and verified
146 Millwick Drive	Commercial	1189.60	$5,948	Complete and verified
40 Bethridge Road	Industrial	2005.96	$10,029	Complete and verified
33 Belgreen Avenue	Residential	185	$925	Complete and verified
48 Beatrice Street	Residential	139.35	$696	Complete and verified
10 Heslop Drive	Residential	111.48	$557	Complete and verified
9 Wellesley Avenue	Residential	74.30	$371	Complete and verified
99 Bertmount Avenue	Residential	103.70	$518	Complete and verified
6A Invergordon Avenue	Residential	111.50	$557	Complete and verified
92 Lionhead Trail	Residential	111.50	$557	Complete and verified
2075 Bayview Avenue	Institutional	6550	$491,250	Complete and verified
3655 Weston Road	Commercial	16245	$50,000	Complete and verified
75 Torbarrie Road	Commercial	502	$2,510	Complete and verified
83 Markland Drive	Residential	260	$1,300	Complete and verified

30 Clairville Drive	Industrial	3335.45	$16,677	Complete and verified
103 Riverview Gardens	Residential	149	$745	Complete and verified
47 Juliet Crescent	Residential	250.84	$1,254	Complete and verified
60 Torlake Crescent	Commercial	4450.98	$22,254	Complete and verified
240 Gledhill Avenue	Residential	55.70	$278.50	Complete and verified
90 Nugget Avenue	Commercial	1732	$8,660	Complete and verified
49 Bakersfield Street	Commercial	3367.45	$16,837	Complete and verified
675 Fenmar Drive	Industrial	5564	$27,820	Complete and verified
12 Burnley Avenue	Residential	157.93	$789	Complete and verified
225 Consumers Road	Commercial	1132.86	$5,664	Complete and verified
65 Claireport Crescent	Commercial	2146	$10,730	Complete and verified
106 Seventh Street	Residential	148.64	$743	Complete and verified
24 McGee Street	Industrial	805.19	$4,025	Complete and verified
60 Martin Ross Avenue	Industrial	1387.38	$6,963	Complete and verified
82 Pogonia Street	Residential	167.22	$836.10	Complete and verified
70 The Pond Road	Institutional	1990	$9,950	Complete and verified
70 Maybrook Drive	Industrial	3818	$19,090	Complete and verified
275 Finchdene Square	Commercial	8835.08	$44,175	Complete and verified
10 McLachlan Drive	Commercial	4292	$21,460	Complete and verified
24 Bethridge Road	Commercial	1652	$8,260	Complete and verified
3 Rovinelli Road	Residential	148.60	$743	Complete and verified
4940 Sheppard Avenue East	Residential	3363.74	$16,818	Complete and verified
62 Logan Ave	Residential	40	$80	Complete and verified
14 Steinway Boulevard	Commercial	1632	$8,160	Complete and verified

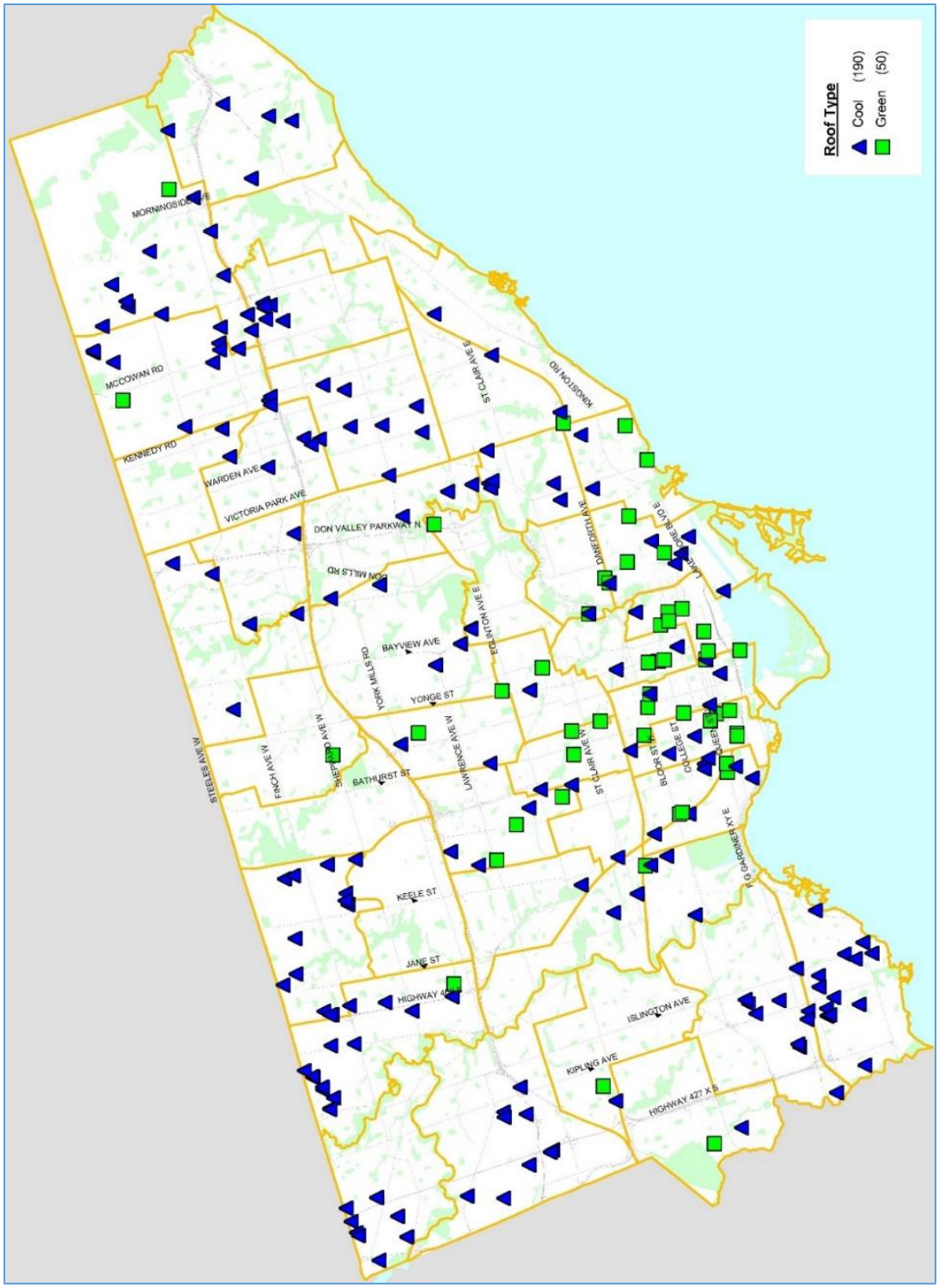
26-36 Advance Road	Commercial	2015	$10,075	In progress
26-36 Advance Road	Commercial	4464	$22,320	In progress
222 Islington Avenue	Commercial	761.80	$3,809	In progress
5 Claxton Blvd.	Residential	390.18	$1,950	In progress
25 Edgar Avenue	Commercial	328.75	$1,643	In progress
1750 Finch Avenue East	Institutional	2409	$12,045	In progress
10 Avoca Avenue	Residential	801	$4,005	In progress
1925 Wilson Avenue	Commercial	5732	$28,660	In progress
71 Rexdale Road	Industrial	9300	$46,500	In progress
120 Sunrise Avenue	Commercial	5575	$27,875	In progress
35 Jutland Road	Commercial	5713.54	$28,567	In progress
1 Eglinton Square Blvd.	Commercial	2378.30	$19,026	In progress
49-51 Six Point Road	Commercial	1181.50	$5,907	In progress
2721 Markham Road	Industrial	9200	$46,000	In progress
144 Hammersmith Avenue	Residential	28	$140	In progress
59 Chilton Road	Residential	102.19	$510	In progress
2 Shale Gate	Institutional	3168	$15,840	In progress
500 Consumers Road	Commercial	3920	$19,600	In progress
35 Rodda Blvd	Residential	288	$1,440	In progress
344 Bering Avenue	Industrial	1064.49	$5,322	In progress
401 Hollywood Avenue	Residential	269	$1,345	In progress
3771 Victoria Park Avenue	Industrial	5307	$26,535	In progress
206 McCaul Street	Residential	371	$1,855	In progress
112 Tiago Avenue	Residential	195	$975	In progress

3637 Weston Road	Commercial	6466	$32,330	In progress
28 Glencrest Blvd.	Residential	204	$1,020	In progress
49 Passmore Avenue	Commercial	3019	$15,095	In progress
91 Cedar Brae Blvd.	Residential	232	$1,160	In progress
344 Bering Avenue	Commercial	152	$760	In progress
75 The East Mall	Industrial	1417	$7,085	In progress
263 Chaplin Crescent	Residential	139	$695	In progress
1214 Caledonia Road	Commercial	669.83	$3,349.15	In progress
	TOTAL:	**567391.43**	**$3,112,703**	

Cool Roof Summary

Total Approved Projects:	222 approved projects (190 complete, 32 in progress)
Total Approved Area:	567391.43 m^2
Total Approved Grants:	$3,112,703

APPENDIX 2:
Map showing projects supported by Toronto's Eco-Roof Incentive Program, March 2009 to October 2016



APPENDIX 3:
Structural Assessment Grant (SAG) Guidelines

Purpose: To help offset the cost of a structural assessment to determine whether or not an existing building can carry the additional load of a green roof.

Amount: The SAG amount is either the actual cost of the structural assessment or $1000, whichever is less.

Required documentation: To be considered for SAG funding, applicants planning to install a green roof must submit the following:

- A copy of the structural assessment report that evaluates the ability of a building to hold the weight of a green roof that meets the requirements of the Greene Roof Construction Standards.
- A copy of the paid invoice for the structural assessment

These two supporting documents must be submitted with Eco-Roof Incentive Program application before the green roof is installed.

Process if proceeding with green roof: After the green roof has been approved, completed and verified by City of Toronto program staff, the SAG amount will be added to the final green roof grant payment and dispersed as one total amount:

SAG amount + Green roof incentive amount = Total grant amount

Process if not proceeding with green roof: If the structural engineer determines that the building cannot support the additional load of a green roof, the applicant is not required to install a green roof, but is still eligible for SAG funding. The applicant will qualify for the SAG as long as the following documents are received:

- A copy of the structural assessment report (the report must state that the building cannot support the additional load of a green roof)
- A copy of the paid invoice for the structural assessment

Qualified professionals: Property owners may choose any structural engineer licensed to work in the Province of Ontario.