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**Item No. 12.1.1**  
**Environment and Sustainability Standing Committee**  
**July 7, 2021**

**TO:** Chair and Members of the Environment and Sustainability Standing Committee

**SUBMITTED BY:**

*Original Signed*

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Kelly Denty, Executive Director, Planning and Development

*Original Signed*

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Jacques Dubé, Chief Administrative Officer

**DATE:** May 21, 2021

**SUBJECT:** Halifax Solar City Program Update and Future Program Recommendation

**ORIGIN**

On December 04, 2018, Regional Council passed the following motion:

*MOVED by Deputy Mayor Mancini, seconded by Councillor Whitman that Halifax Regional Council:*

1. *Approve the continuation of the Solar City Program as a clean energy, community-based program; and,*
2. *Direct staff to provide annual reports on the Solar City Program to the Environment and Sustainability Standing Committee.*

On January 28, 2020, Regional Council passed the following motion:

*MOVED by Councillor Cleary, seconded by Councillor Walker that Halifax Regional Council:*

*Approve an increase to the gross budget for capital account CD990005 – Solar City Program by \$9,000,000, with repayment received from Solar City Participants for no net impact to the overall budget.*

**LEGISLATIVE AUTHORITY**

Clause79(1)(ada)      "...Council may expend money required by the Municipality for...(ada) providing for, financing and installing energy-efficiency equipment on private property including, without restricting the generality of the foregoing, solar panels.

**RECOMMENDATION ON PAGE 2**

Clause 104A(1)(a) "...Council may make by-laws imposing, fixing and providing methods of enforcing payment of charges for the for the financing and installation of any of the following on private property with the consent of the property owner...(a) equipment installed pursuant to an expenditure under clause 79(1)(ada);

By-law Number S-500 Respecting Charges for Energy Equipment

### **RECOMMENDATION**

It is recommended that the Environment and Sustainability Standing Committee recommend that Halifax Regional Council:

1. Approve the inclusion of additional energy measures beyond solar as part of a deep energy retrofit pilot program; and
2. Approve the deep energy retrofit pilot program which could incur up to \$3.5M of expenditures, to be fully recoverable from the property owner, and operate in the same manner as the Solar City program.

### **BACKGROUND**

The Solar City Program offers financing to property owners who wish to install a solar energy system at their property. Eligible property owners include residential, not for profits and places of worship and eligible technologies include solar electric (photovoltaic), solar hot air and solar hot water.

With guidance from the Solar City administrator, property owners select their preferred solar energy system and solar contractor. The administrator provides a level of review and due diligence to help ensure that proposed solar energy system meet industry standards and will provide energy and cost savings over the lifetime of the system.

Financing for systems is applied to the property and not the individual, similar to a Local Improvement Charge (LIC). There are no credit checks required to confirm eligibility; however, property owners must be in good financial standing with respect to property taxes, LICs, and any other relevant municipal charges. Financing is repaid separately from the annual property tax bill at a fixed interest rate of 4.75% over ten years. Property owners have the option to pay in full at any time without penalty. If a participant sells their property before full repayment, they have the option to pay in full at the point of sale or pass the charge to the next property owner.

Property owners wishing to install a solar energy system, whether financed privately or through the solar city program, are required to obtain a solar building permit.

### **DISCUSSION**

#### **Measuring Program Performance**

Since the Program launched in May of 2016, nearly 2,900 property owners across the municipality have shown interest in solar energy by registering their property for consideration. At the point of registration, property owners are informed of the solar technologies eligible for financing, potential system costs and savings before being instructed to reach out to solar contractors for a formal quotation. As summarized in Table 1, 553 Solar City Participant Agreements have been executed, totalling \$13.95 million in financing committed to the installation of solar energy technologies. These systems are expected to save property owners a total of \$950,000 each year in utility costs and reduce annual greenhouse gas (GHG) emissions

in the community by approximately 4,120 tonnes. To date, the Solar City Program has enabled the installation of 5 megawatts (MW) of renewable energy in the municipality. **For context, HalifACT requires nine times this amount per year to meet our targets.** In 2020, the total value of approved financing was 45% less than the financing provided in 2019. Based on industry observations and discussion, this reduction is likely due to alternative, lower interest financing options offered by some solar contactors and to the COVID-19 pandemic. While the number of new projects approved has declined, just over \$4 million has been paid out to contractors since mid March 2020.

Table 1: Summary of Solar City Program statistics.

Key Performance Indicators	2016/17	2018	2019	2020	Total
Capacity (MW)	0.31	1.37	2.07	1.19	4.94
Energy generated per year (eMWh)	350	1,600	2,500	1,400	5,850
GHG emissions offset per year (tonnes eCO <sub>2</sub> )	240	1,150	1,750	980	4,120
First year utility savings	\$55,000	\$260,000	\$407,000	\$228,000	\$950,000
25-year utility savings	\$2,700,000	\$12,000,000	\$13,600,000	\$7,600,000	\$35,900,000
System costs (HST included)	\$990,000	\$3,890,000	\$5,840,000	\$3,230,000	\$13,950,000
Executed Solar City Participant Agreements	65	159	217	112	553

Tables 2 and 3 summarize individual technology metrics as tracked through the Program. To date there has been only one solar hot air system installed which does not provide enough information to accurately gauge average system expectations. As shown in Table 2, 42 solar hot water system agreements have been executed through the program. 41 of these systems use flat plate technology while the other uses evacuated tube technology. All flat plate systems were designed to pre-heat domestic hot water, while the single evacuated tube system was installed as a hybrid, preheating both domestic hot water and space heat. Both electricity and furnace oil consumption will be offset by these systems. Solar hot water systems installed under the Program are expected to save property owners an average of \$410 on their utility bills in the first year of operation. With the expected escalation of fuel costs, the average property owner can expect to see a system payback of 16.5 years and will save approximately \$20,000 over the 25-year analysis period. The 25-year return on investment (ROI) and internal rate of return (IRR) is estimated to be 119% and 5.21% respectively.

Table 2: Summary of solar hot water statistics through the Solar City Program.

Key Performance Indicators	Average	Total
Executed Solar City Participant Agreements	-	42
Energy generated per year (eMWh)	2.65	111
GHG emissions avoided per year (tonnes eCO <sub>2</sub> )	1.70	70
System costs (HST included)	\$8,800	\$370,000

As shown in Table 3, there have been 510 solar electric system agreements executed through the Program. All but one system is connected to Nova Scotia Power Inc.'s transmission and distribution grid, making use of their Enhanced Net Metering Program.<sup>1</sup> Solar electric systems installed under the Program are expected to save property owners an average of \$1,830 on their utility bills in the first year of operation. With the expected escalation of fuel costs, the average property owner can expect to see a system payback of 14.3 years (10.8 with the SolarHomes Rebate) and save a total of \$68,700 over the 25-year analysis period. The

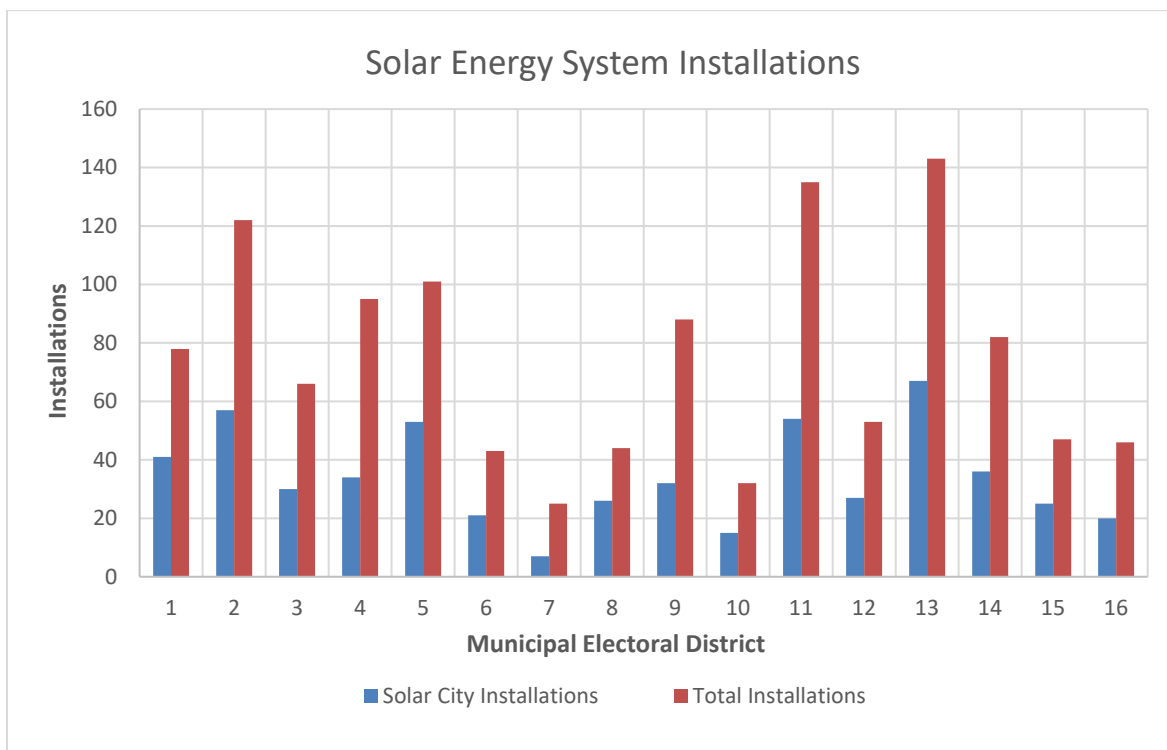
<sup>1</sup> Nova Scotia Power "Enhanced Net Metering" <https://www.nspower.ca/your-home/save-money-energy/make-own-energy/enhanced-net-metering>

25-year ROI and IRR is estimated to be 157% and 6.08% respectively. The average levelized cost of energy<sup>2</sup> (LCOE) for these solar electric systems is 16.53 cents per kilowatt hour (¢/kWh), a third of a cent **less** the current residential rate. This LCOE is locked in for the lifetime of the system independent of increasing energy costs.

*Table 3: Summary of solar electric statistics through the Solar City Program.<sup>3</sup>*

Key Performance Indicators	Average	Total
Executed Solar City Participant Agreements	-	510
Energy generated per year (eMWh)	11	5,700
GHG emissions avoided per year (tonnes eCO2)	8.00	4,000
System costs (HST included)	\$26,600	\$13,500,000

As shown in the figure below, property owners from across the municipality have been participating in the Solar City Program. Figure 1 compares the number of systems financed through the Solar City Program to the overall number of systems installed, broken down by municipal electoral district. The total number of systems installed was informed by the number of solar building permits obtained. Approximately 45% of all systems installed within the municipality since 2016 have been financed through the Solar City Program. While some property owners opt to use alternative financing, the program routinely supports those looking for unbiased advice and education on the various solar technologies, industry trends and average pricing. The program also offers a level of review of the feasibility assessment offered to the property owner by the contractor to ensure accurate savings estimates. Regardless of the financing method selected, supporting the uptake of solar in the Municipality is furthering the successful implementation of HalifACT.



<sup>2</sup>Levelized cost is the average expected unit-cost over the 25-year system lifespan

<sup>3</sup>Statistics do not include the SolarHomes Rebate.

Figure 1: Total installations by municipal electoral district

While the Solar City Program offers complete financing to all feasible solar technologies, there has been a clear shift towards solar electric systems. Of the committed financing, 97% has been allocated to the install of solar electric. This uptake in solar electric can be attributed to innovative financing and awareness initiatives like the Solar City Program, increased market competition, the Enhanced Net Metering Program and the SolarHomes Rebate Program.

### Industry Impacts

The Solar City Program has contributed to the growth of a competitive solar industry. In 2016, five solar contractors from across the province were participating in the Program while today, there are 32. The contractors who are actively participating have realized the value provided by the Program as it is a key point of contact for unbiased advice and education. This has greatly assisted solar contractors with the cost of acquisition as it allows them to streamline the quoting process and provide timely responses to interested property owners. While 32 solar contractors have participated in the program over the past five years, six have been very active, collectively installing just over 80% of all systems to date. By encouraging property owners to contact several solar contractors and evaluate each based on price, experience and quality, the value being offered has remained high while costs through the Program have steadily declined as shown in Figure 2.

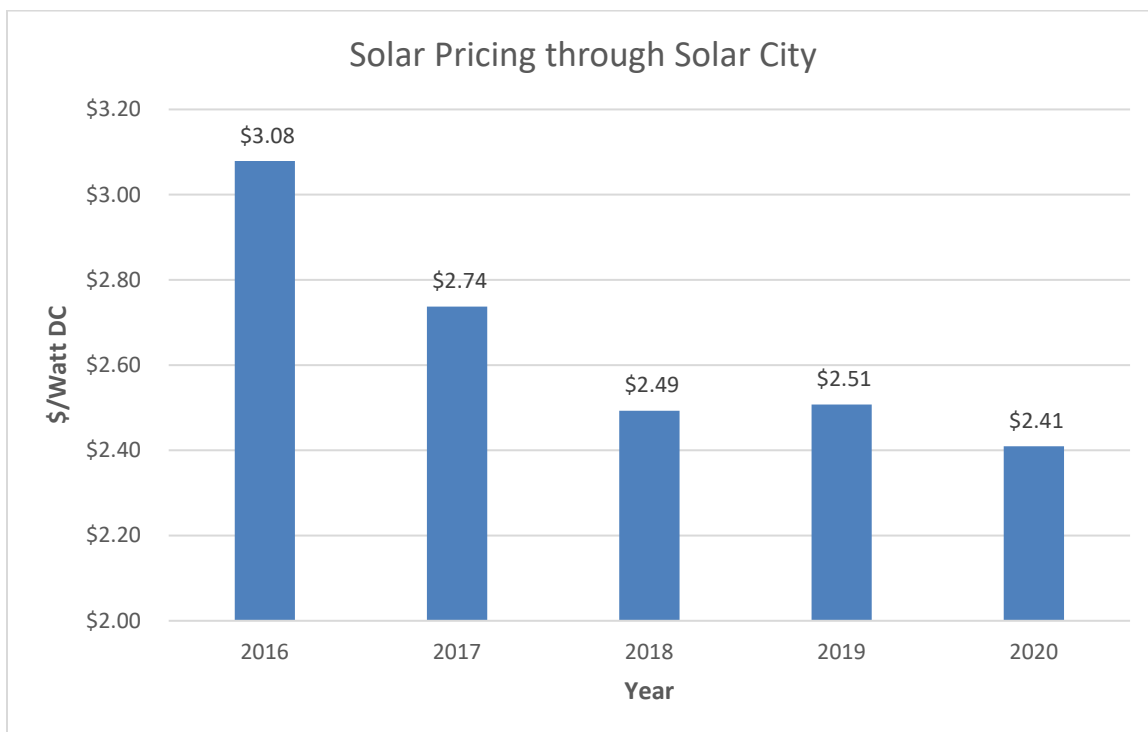


Figure 2: Installed unit cost (before HST) for solar electric systems approved through the program. Average pricing has declined from roughly \$3.08/Watt (DC) in 2016 to \$2.41/Watt (DC) in 2020.

### SolarHomes Rebate

In August of 2018, the SolarHomes rebate program was launched to assist residential property owners install solar electric systems at their property. The rebate is funded federally through the Low Carbon Economy Fund and is being administered by Efficiency Nova Scotia. At the program launch, the rebate was valued at \$1/Watt (DC) installed up to a maximum of \$10,000 or 40% of the overall system cost before

taxes. The rebate has been reduced twice since the launch and now sits at \$0.60/Watt (DC) installed up to a maximum of \$6,000 or 25% of the overall system cost before taxes. Plans for future rebate values are unknown at this time however the provincial government recently announced an additional \$5.5 million over the next two years for the program, funded by Nova Scotia's two cap-and-trade auctions.<sup>4</sup> This is welcome news as the SolarHomes rebate program has been very popular amongst Haligonians. To date it is estimated that participants of the Solar City Program will receive \$3.4 million in total SolarHomes rebates, an average of 28% of the overall systems costs (HST included). This rebate has alleviated much of the concerns for property owners regarding high system costs and payback periods. Combining the provincial rebate with the Municipality's financing has resulted in an average expected system payback period of 10.8 years.

### ***National Recognition***

In fall 2019, the Municipality was identified by the Federation of Canadian Municipalities (FCM) as a leader in community energy financing programming and was invited to sit on a Community Efficiency Financing (CEF) program design advisory group. Along with 20 other experts across the country, municipal representatives participated in three workshops identifying market and financial barriers to large scale retrofit programs and offered guidance and feedback on CEF program design elements. This last spring the CEF program was launched, offering \$300 million to eligible municipalities and partner organizations to accelerate residential energy efficiency and renewable energy projects utilizing innovative financing mechanisms.

In March 2020, the Solar City Pilot program was selected by FCM as one of the top 20 projects funded through their Green Municipal Fund since its inception. In partnership with a writer hired by FCM, a case study of the pilot was developed outlining the projects purpose, challenges, results and legacy. The case study was made public in September 2020.<sup>5</sup> To celebrate the fund's 20<sup>th</sup> anniversary, FCM is running a 3-part webinar series between February and March 2021 to showcase **some** of the top 20 projects. The Solar City Pilot program was selected and on February 2<sup>nd</sup>, 2021, Energy & Environment staff presented to other municipalities on how to build a strong business case for sustainable municipal projects. The presentation will be made available on FCM's website at a future date.

### ***HalifACT and the Deep Energy Retrofit Pilot***

In June 2020, Halifax Regional Council adopted HalifACT and directed staff to prioritize efforts in seven critical core areas. One of these areas was to create an energy retrofit and renewable energy program. To action this, staff created a Retrofit, Renewables and Resiliency (R3) program design team consisting of municipal staff, non-profit organizations and retrofit industry experts. Facilitation, education and advisory services for the R3 team is being supported by funding from the Nova Scotia Department of Energy and Mines. Building on the successes and lessons learned through the Solar City Program, the R3 team has been meeting weekly for several months to identify and work through the key barriers facing property owners in actioning deep energy retrofits. The primary objective is to offer a program that will achieve a 50% reduction in energy demand for both residential and non-residential community buildings by 2040. While existing programs have been successful, they need to be significantly expanded and scaled up to meet this objective. The HalifACT climate modelling to achieve net-zero by 2050 calls for 5,000 deep energy building retrofits and the addition of 45 MW of rooftop solar, each year on average, leading to a combined emissions reduction of 2,140 kt by 2050. It is also a priority that the program offers more equitable financing and can be easily accessed by all property owners.

To help address the barrier of more equitable financing, staff have applied to the Federation of Canadian Municipalities' Community Efficiency Financing (CEF) program for a grant to perform a program evaluation study. If successful, the study will evaluate the Solar City Program through a lens of equitable access, loan

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<sup>4</sup> Nova Scotia News Release "Green Fund Supports Energy Efficiency, Renewable Energy and Youth Jobs"  
<https://novascotia.ca/news/release/?id=20210202004>

<sup>5</sup> FCM "Compendium case studies" <https://fcm.ca/en/programs/green-municipal-fund/compendium/compendium-case-studies/successful-solar-hot-water-pilot-leads-major-program-expansion>

product competitiveness and the ability to scale to meet the targets of HalifACT. The intended results of this study are to develop minimum requirements for third-party lenders, private investors or utilities, to enable the investment needed to implement the retrofit goals of HalifACT. The study will take place over several months and application results are expected shortly.

To ensure the program is accessible to all property owners and achieves the necessary targets, more assistance between the standard initial energy audit and the completion of retrofit measures is required. An energy audit provides the property owner with an EnerGuide rating and a customized report of prioritized measures to reduce energy consumption, following a thorough assessment of the home's insulation levels, air leakage and mechanical systems. Unfortunately, even when equipped with the custom report and associated incentives, most property owners do not have the time or expertise to find reliable contractors to complete the necessary measures. To make the process easier for property owners, the R3 team is suggesting that a **navigator role** be developed. The navigator would act as a project manager and be the key point of contact for advice and education. The navigator would be responsible for coordinating all subtrades, financing and rebate approvals. To test if a navigator role increases the conversion rate between the initial audit and the completion of the identified measures, it is recommended that Halifax Regional Council approve the launch of a retrofit navigator pilot program.

The proposed pilot program will be administered like the Solar City Program. It will offer financing to eligible property owners who wish to perform a deep energy retrofit. As this is a pilot, it will be limited to a number of property owners. A virtual energy audit will be performed for each applicant, and those with the highest energy reduction potential will be approved for participation in the pilot. The approved property owners would then work with the navigator to determine the final suite of actions required to achieve a minimum 50% reduction in energy demand before executing a financing agreement with the Municipality. The navigator would then facilitate the retrofits with all subtrades before completing all rebate and close out documentation on behalf of the property owner.

Through the technical analysis of HalifACT, and a study completed by the Clean Foundation, it is estimated that a residential deep energy retrofit can cost between \$45,000 and \$70,000, depending on the measures performed. These measures can include, but are not limited to:

- envelope upgrades (windows, insulation, and air sealing);
- mechanical upgrades (increasing the efficiency of heating and cooling systems and switching to a lower carbon intensive fuel); and
- onsite renewables and resiliency measures (battery storage).

To facilitate the pilot program and ensure appropriate financing is available for these potential measures, it is recommended that Halifax Regional Council approve the allocation of \$3.5 million to the Solar City operating account M532. As with the Solar City Program, all approved financing will be repaid over the 10-year term length, resulting in no net cost to the Municipality. Funding for the navigator role will be shared between both the program interest rate and funding received from the Nova Scotia Department of Energy and Mines.

The Municipality has the legislative authority for this pilot via By-law Number S-500, Respecting Charges for Energy Equipment and the *HRM Charter*. If this recommendation is approved by Regional Council, the R3 team will finalize the details of the navigator role, procure the navigator and develop a memorandum of understanding with Efficiency Nova Scotia to ensure a streamlined rebate and virtual auditing process. The R3 team will also finalize the pilot program approval criteria and the process for participation. This work is expected over the summer, targeting the launch of the pilot program by fall 2021. The pilot program will run until all funds approved for financing have been exhausted, or until such time that the R3 team has determined that sufficient information has been gained to inform a full-scale program. Staff will return to Regional Council with future program recommendations for consideration.

### **FINANCIAL IMPLICATIONS**

The Solar City program is designed to cover all costs associated with, administration and marketing through the program's fixed interest rate of 4.75%. With current financial assumptions and forecasted program participation levels, all costs will be recovered once full repayment of all systems financed is complete. As program participation levels and interest rates change, the program will be regularly monitored to ensure interest revenue collected is adequate to cover direct administration and marketing costs.

Due to the nature of the expenditures and recoveries for this program, budgeting for the Solar City program was moved from a capital account to an operating account in fiscal year 2020/21. The budget will be set at the expected amount of solar installations for the upcoming year but the amount of actual expenditures that occur will be fully recoverable. There is no impact to the general tax rate base.

The Deep Energy Retrofit Pilot Program will operate in the same manner as the solar city program. HRM will pay the vendor(s) directly for the energy retrofit and HRM will recover the full cost, plus interest, from the property owner. The pilot program will be capped at \$3.5M of deep energy retrofit investments. Once the Deep Energy Retrofit Pilot Program reaches that level, staff will assess if the program has met its objectives and recommend possible changes. The program will be tracked in operating account (M535) to monitor expenditures and recoveries separate from Solar City.

### **RISK CONSIDERATION**

There is little risk to the recommendations of this report, as the pilot will be used for information gathering purposes and all financing approved will be repaid over the term length. If the recommendations are not approved, there is a risk to further delays in action to meeting the retrofit targets of HalifACT.

### **COMMUNITY ENGAGEMENT**

Community engagement was not formally conducted as part of this report. Engagement with the community has been ongoing through the Solar City Program as inquiries have been received by email or phone and through marketing efforts and participant surveys. Deep engagement with experts has been ongoing through the R3 Design Team.

### **ENVIRONMENTAL IMPLICATIONS**

If the recommendation is approved, substantial environmental benefits through both the emission and energy reductions realized through the deep energy retrofits will be enabled.

### **ALTERNATIVES**

The Environment and Sustainability Standing Committee may decide not to forward the recommendation to Halifax Regional Council. This is not recommended as piloting the navigator role will assist in developing a full-scale deep energy retrofit program. This program is the most impactful of the seven critical areas in terms of immediate emissions reductions, which Halifax Regional Council directed the CAO to prioritize through the approval of HalifACT.



**ATTACHMENTS**

None.

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A copy of this report can be obtained online at [halifax.ca](http://halifax.ca) or by contacting the Office of the Municipal Clerk at 902.490.4210.

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