



ALADACO
The Power of Conservation

**Energy Conservation and
Demand Management Plan**

Date: July 1st, 2024

**Prepared For:
The Town of Newmarket**

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Executive Summary

This Conservation and Demand Management Plan (CDMP) outlines the Town of Newmarket's (The Town) plans over the next five years (2024-2028) to manage and reduce energy consumption and greenhouse gas emissions across its facilities. This Plan is crafted in alignment with the requirements of Ontario Regulation 25/23 and aims to support the Town's broader commitment to energy reduction and sustainability.

Reflecting on the previous CDMP (2019-2023), the Town has achieved significant reductions in both overall energy use and energy intensity values at most of its facilities. The energy conservation measures implemented during this period have yielded significant financial benefits, with annual cumulative cost savings of over **\$30,000**. This achievement underscores the effectiveness of the Town's energy management and reduction strategies.

For the forthcoming period (2024-2028), the Town has set an ambitious **10% total energy reduction target** from its portfolio of facilities, relative to 2023 levels. The Plan outlines a series of future ECMs as well as highlights the critical role of building automation systems and recommissioning activities in achieving these energy targets. These future projects will be coordinated with existing capital renewal plans wherever possible to increase efficiencies and reduce upfront costs.

List of Acronyms

BAS – Building Automation System

CDMP – Energy Conservation and Demand Management Plan

ECMs – Energy Conservation Measures

ekWh – Equivalent kilowatt-hour

GHG – Greenhouse Gas

kWh – Kilowatt-hour

MJ – Mega Joules

Sqft – Square Foot

tCO₂e – Tonne (metric) of Carbon Dioxide Equivalent

Introduction

The Town of Newmarket (The Town) engaged Aladaco Consulting (“Aladaco”) to develop a 5-year (2024-2028) Energy Conservation and Demand Management Plan (CDMP) that is required to be published on the Town’s website by July 1, 2024.

This CDMP was developed in accordance with the requirements described in Ontario Regulation 25/23 – Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans, made under the Electricity Act (1998). This CDMP is divided into sections split by address. As different buildings have unique use cases and characteristics, this allows for a more detailed review of energy performance and greenhouse gas (GHG) emissions.

More generally, this CDMP provides information related to:

The Past: Outlining the previous CDMP results, and energy conservation projects implemented between 2018 and 2023.

The Present: Provides insights into the Town’s current energy performance as well as outlining the 2024 to 2028 energy reduction targets.

The Future: Details the ECMs that will form the steps required for the Town to achieve their energy reduction targets.

Energy consumption described herein is split into two categories – electricity and natural gas. Electricity consumption is measured in kilowatt-hours (kWh) and natural gas is measured in cubic metres (m³). Equivalent kilowatt-hours (ekWh) are the combination of electricity and natural gas consumption in a common unit of energy.

All energy data was provided to Aladaco by the Town of Newmarket.

The Past: Implemented ECMs and Results

2019 CDM Plan Results

The Town of Newmarket's 2019 CDM Plan has proven to be highly beneficial, leading to the successful implementation of 14 energy efficiency projects over the past five years. These initiatives have significantly reduced energy consumption, improved lighting levels, enhanced the efficacy of HVAC equipment, and boosted the overall efficiency of the Town's operations. Collectively, these projects have saved over 323,000 kWh of electricity, equivalent to the annual electricity consumption of 32 homes. These projects have also reduced natural gas consumption by over 8,500 m³. Combined, these efforts have reduced the Town's operating costs by more than \$30,000 annually.

As illustrated in Figure 1, the energy intensities for nearly all buildings, have decreased in 2023 compared to the 2018 baseline levels. This demonstrates the effectiveness of the CDM Plan in achieving its goals of energy efficiency and cost savings. The positive impact of these projects underscores the importance of continued investment in energy efficiency initiatives to maintain and further enhance the sustainability of the Town's operations.

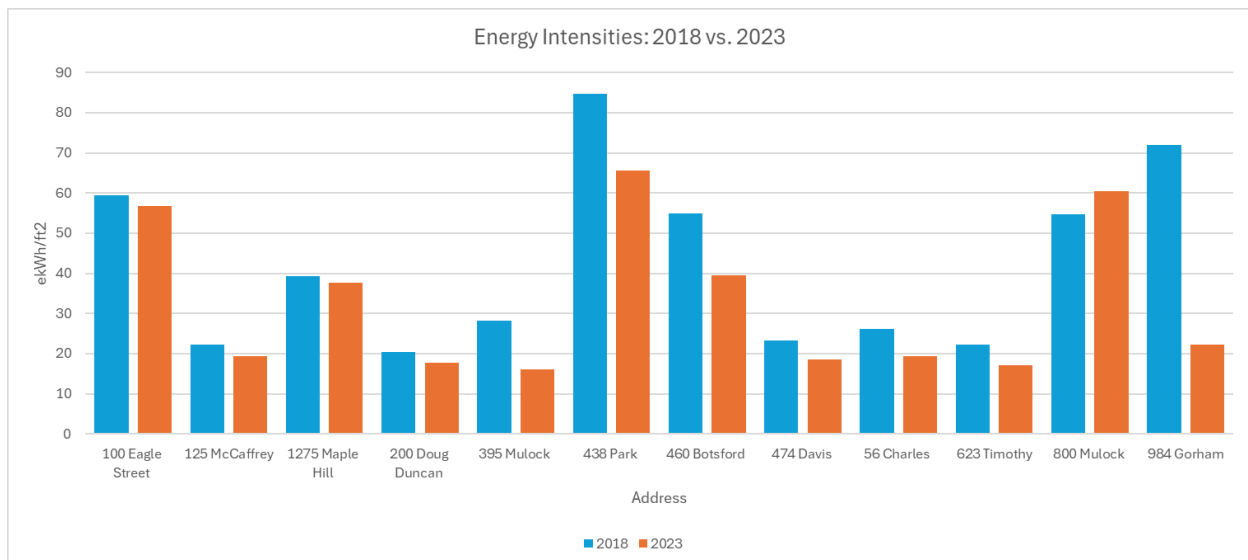


Figure 1 – Total Energy Intensities 2018 vs. 2023

Additionally, as shown in Figure 2, energy use is relatively low for most buildings, except for 100 Eagle Street and 800 Mulock Drive. These two facilities account for approximately 80% of the total energy consumed by the Town's buildings. As a result, they have been identified as having the greatest number of potential ECMs within this report. This focus on 100 Eagle Street and 800 Mulock Drive highlights the significant opportunity for energy savings and efficiency improvements in these high-consumption facilities. By targeting these buildings, the Town can achieve substantial

reductions in energy use and operating costs, further enhancing the overall efficiency and sustainability of its operations.

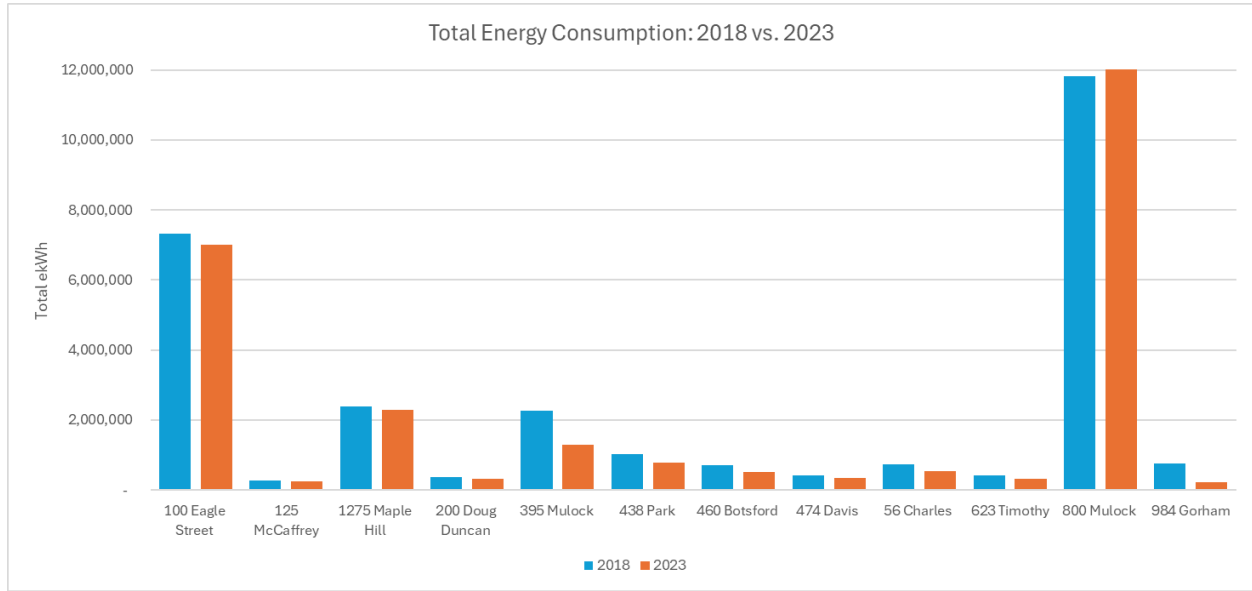


Figure 2 - Energy 2018 vs. 2023

Overall, the 2023 consumption rates for the facilities contained within the previous CDMP are lower than the 2018 Baseline, as seen in the Table 1 below. The 2018 baseline is 28,485,098 ekWh, and these facilities consumed a combined 26,932,829 ekWh in 2023. This decline can largely be attributed to the implementation of LED retrofits and other energy conservation measures across several buildings. This trend is encouraging for the Town, and with the continued implementation of energy conservation measures, these figures are anticipated to further decrease.

Year	Total (ekWh)
2018	28,485,098
2023	26,932,829

Table 1 - 2019 CDMP Facilities Energy Consumption: 2018 vs. 2023

Energy Conservation Projects Implemented: 2018-2023

Aladaco Consulting has conducted an evaluation of the Town of Newmarket's performance in accordance with its 2019 CDM Plan, focusing on the realized energy savings from the recommended conservation projects. In close collaboration with the Town, we identified and quantified the projects completed since the issuance of the 2019 CDM Plan.

Table 2 outlines the Town's CDM initiatives over the past five years, showcasing the achieved energy savings and emissions reductions. These results are based on



previous energy audits conducted by external entities, with data provided by the Town of Newmarket. The Town has advised that the transition to LED lighting across some facilities is ongoing, with replacements occurring gradually as old lights expire. Consequently, the anticipated savings from LED lighting in the 2019 CDM Plan have been adjusted to reflect the actual proportion of completed LED retrofits.

It is important to note that the previous CDMP did not anticipate all recommendations being executed within its five-year timeframe, especially given the overlap between suggestions like LED lamp retrofits and fixture replacements. While several projects identified in the 2019 CDM Plan have not yet been completed, the projects that have been executed have yielded significant benefits. The remaining viable projects from the 2019 CDM Plan have been carried forward and included within this report, ensuring ongoing progress toward the Town's energy conservation goals.

Facility	Opportunity	Electricity (kWh)	Natural Gas (m ³)	CO ₂ e (t)
Newmarket Town Hall	Upgrade to LED Fixtures	46,254	0	2.3
Robert N. Shelton Operations Centre	Set Heat Pumps to Auto	3,000	0	0.15
Robert N. Shelton Operations Centre	Install Vending Machine Controls	2,000	0	0.10
Recreation Youth Centre & Sk8 Park	Upgrade Interior Fixtures to LED	12,394	0	0.62
Community Centre & Lions Hall	Upgrade Interior Fixtures to LED	1,722	0	0.09
Community Centre & Lions Hall	Upgrade Exterior Fixtures to LED	1,502	0	0.08
Ray Twinney Recreation Complex	Upgrade to Interior LED Fixtures	99,813	0	4.99
Ray Twinney Recreation Complex	Upgrade to Exterior LED Field Lighting	15,702	0	0.44
Magna Centre	Lower Leisure Pool Water Temperature	39,322	8,137	10.22
Magna Centre	Lighting Controls: Install Occupancy Sensors	15,624	0	0.78
Magna Centre	Lighting Upgrade: LED Fixtures	34,768	0	1.74
Old Town Hall	Install Rooftop Unit Staging Controls	3,750	0	0.19
Public Library	Upgrade to LED Fixtures	47,191	0	2.36
Fire Station 4-1	Turn off Radiant Tube Heaters in the Summer	0	370	0.70
TOTALS:		323,042	8,507	24.76

Table 2 – Town of Newmarket CDM Initiatives

The Present: 2023 Baseline and Energy Performance Goals

2023 CDMP Baseline

This section details the current baseline energy performance of all facilities owned or operated by the Town of Newmarket that meet the inclusion criteria defined by the Ontario Energy Board. Since the previous 2019 version of this report, there have been changes to these criteria. As a result, the Town’s portfolio of facilities contained within the CDM Plan reporting requirements has grown from 12 to 19 facilities. Despite this increase in the number of facilities, the total energy consumption within the 2023 baseline is lower than the amount quantified in the 2018 baseline.

Year	Total (ekWh)
2018 Baseline (12 Facilities)	28,485,098
2023 Baseline (19 Facilities)	28,003,134

Table 3 - 2018 Baseline vs. 2023 Baseline

Figure 3 provides a summary of the Town's energy consumption (in ekWh) for 2023, categorized by building. As evidenced in both Figure 1 and Figure 2 there have been reductions in energy consumption in 2023. Furthermore, Figure 3 illustrates that most facilities exhibit energy consumption levels below 2,000,000 ekWh, with the exception of three buildings. The Town will continue to prioritize efficiency initiatives at these facilities over the life of this plan to mitigate the impact these buildings have on the total quantity of energy consumed.

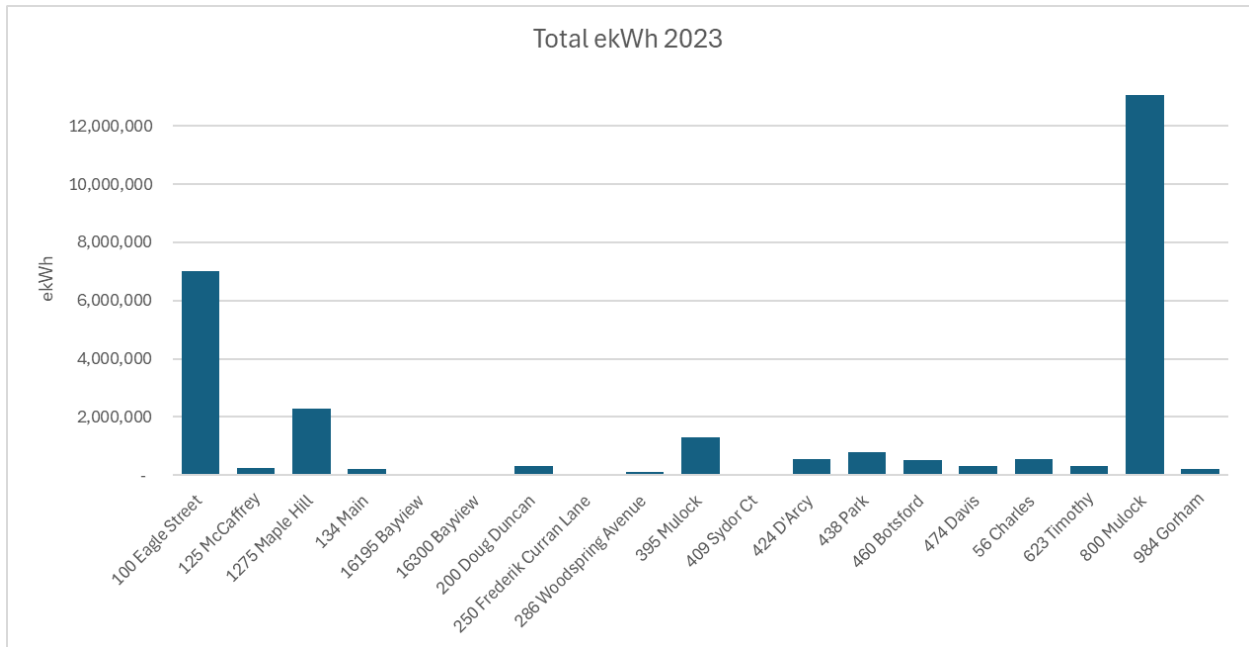


Figure 3 - Total ekWh by Facility

The following table details the facilities included within the 2023 baseline. This list is inclusive of all facilities required by OEB regulations and a more detailed version of Table 4 is included within Appendix A – Facility List.

Building Name	Address	Floor Area (ft ²)	Type of Facility	Total 2023 Energy Use (ekWh)	Total GHG Emissions (tCO ₂ e)
Magna Centre	800 Mulock	216,000	Indoor Recreational Facility	13,059,326	1,322.4
Ray Twinney	100 Eagle Street	123,437	Indoor Recreational Facility	6,999,571	869.3
Operations Centre	1275 Maple Hill	61,054	Administrative Offices	2,298,291	283.4
Newmarket Town Hall	395 Mulock	80,316	Administrative Offices	1,294,993	117.3
Public Library	438 Park	12,000	Public Library	788,134	97.8
Gorman Pool	424 D'Arcy	9,700	Recreation Centre	571,616	69.3
Youth Centre	56 Charles	28,000	Indoor Recreational Facility	542,796	66.2
Old Town Hall	460 Botsford	12,862	Art Gallery	507,431	63.4
Community Centre	200 Doug Duncan	18,000	Community Centre	318,606	44.6

Building Name	Address	Floor Area (ft ²)	Type of Facility	Total 2023 Energy Use (ekWh)	Total GHG Emissions (tCO ₂ e)
Senior's Meeting Place	474 Davis	18,000	Cultural Facility	334,086	39.5
Fire Training Centre	623 Timothy	18,800	Fire Station	322,986	43.3
Fire Station 4-2	125 McCaffrey	12,201	Fire Station	235,222	29.1
Fire Station 4-1	984 Gorham	10,416	Fire Station	231,388	40.6
Museum	134 Main	6,528	Cultural Facility	214,017	28.6
Pumping Station	286 Woodspring Avenue	105	Pumping Station	111,664	3.1
Pumping Station	16300 Bayview	200	Pumping Station	61,359	1.7
Art Ferguson	16195 Bayview	1,427	Community Centre	43,792	3.1
Pumping Station	250 Frederik Curran Lane	125	Pumping Station	40,962	3.2
Pumping Station	409 Sydor Ct	456	Pumping Station	26,895	0.8

Table 4 - Facility List

2024-2028 Energy Performance Goals

The primary goal of the Town of Newmarket's 2023 ECDMP is to achieve a 10% reduction in total energy consumption, measured in ekWh. To achieve this goal, the Town has recently conducted Energy Audits at the majority of the facilities included in the 2023 Baseline. These audits, the results of which are detailed in this report, have provided a comprehensive list of quantified and qualitative ECMs. The Town will work to implement these ECMs across the next five years, using existing operating budgets and through coordination with capital renewal plans.

Combined the list of quantified ECMs identified in this report total 2,592,583 ekWh in energy savings. This represents a 9.2% reduction from the 2023 baseline ekWh total. These savings, in conjunction with the Additional Recommendations and qualitative ECMs included herein, will be sufficient for the Town to achieve this target.

Achieving a 10% reduction in total energy consumption would yield substantial benefits over and above the financial savings expected. In particular, these savings represent significant reductions in GHG emissions, and the Town would significantly decrease its reliance on fossil fuels and other non-renewable energy sources. These emissions reductions would contribute to the Town's broader sustainability goals and help combat climate change by mitigating the impacts of greenhouse gases on the environment.

Beyond environmental benefits, a 10% reduction in energy consumption would also lead to tangible economic advantages for the Town. Decreased energy usage translates to lower utility costs, resulting in cost savings for the Town's budget. These savings could then be reallocated towards other community initiatives or infrastructure projects, fostering economic resilience and enhancing overall quality of life for residents.

The Future: Steps to Success

The following sections detail the ECMs that will form the steps required for the Town to achieve their energy reduction targets. Not all facilities have had recent (2024) energy audits completed, and thus not all have a dedicated section for future ECMs. In these cases, the Town will prioritize and investigate the buildings with the highest energy use intensity and will facilitate future audits as necessary. Additionally, ECMs identified in previous audits completed prior to the 2019 CDM Plan, which remain viable and have not yet been implemented, are included within relevant sections. These sections also detail the non-quantifiable measures that the Town intends to implement over the course of this CDM Plan. Finally, the Additional Recommendations section provides guidance on additional steps the Town may consider as part of their journey to sustainability.

Newmarket Community Centre & Lions Hall

The Community Centre is located at 200 Doug Duncan Drive and is approximately 18,000 ft² in size and was constructed in 1975. The Centre has 4 community and event rooms, kitchen areas, interior and exterior washrooms, and mechanical rooms. The property also has an outdoor rink which doubles as a water feature during the summer. The property hosts a community farmers' market throughout the summer months on most weekends as well as various concerts and other outdoor community events. The facility underwent a major renovation in 2011 which replaced all of the major HVAC and Ice Plant equipment. The facility has two primary entrances, both of which have glass vestibule doors.

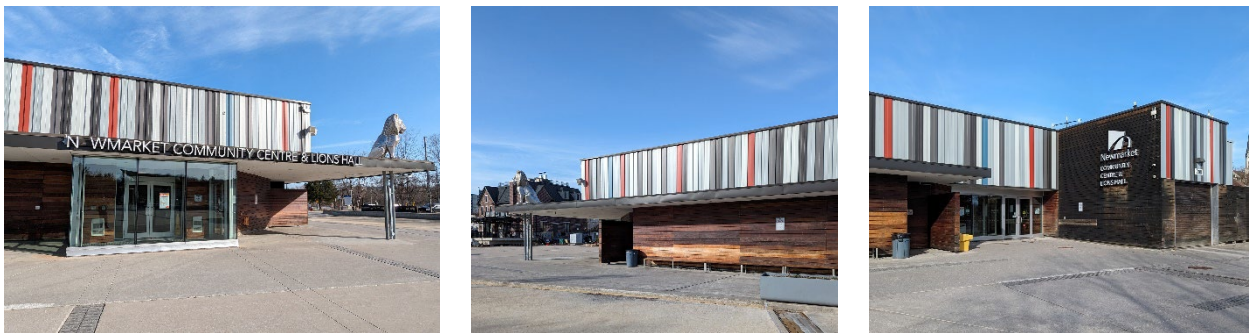


Figure 4 - 200 Doug Duncan Drive

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Estimated Simple Payback (Years)	Total ekWh Savings
Install VFD on Cooling Tower Fan	7,117	-	0.2	7,117
Exterior LEDs	1,663	-	1.7	1,663
On-Demand Ventilation	4,201	3,071	5.9	36,987
Totals	12,981	3,071	-	45,767

Table 5 - Summary of Community Centre ECMs

Newmarket Public Library

Newmarket Public Library is located at 438 Park Avenue and is approximately 12,000 ft² in size. The facility is a two-story building with basement, with large glass curtain walls and brick façade construction. The facility is reported to have been constructed in 1956 and has undergone several large-scale renovations. The most recent of which was in 1995, which included the addition of a second floor and the expansion of floor area on the existing levels. The entrances are automatic sliding glass doors with vestibules and the primary common areas are large open spaces for reading and study. The Library also houses administration offices, staff rooms, a kitchen, and public washrooms. In all, the Facility has 3 levels of public space, which are generally fully occupied.

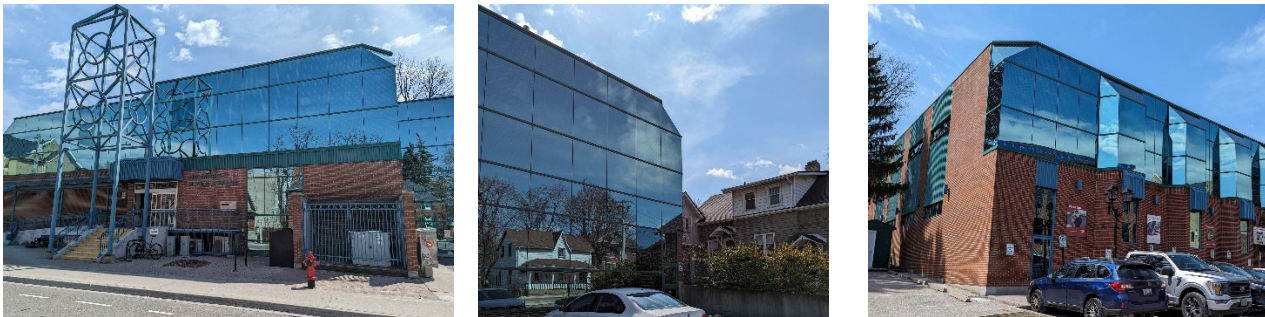


Figure 5 - 438 Park Avenue

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m3)	Estimated Simple Payback (Years)	Total kWh Savings
On-Demand Ventilation	26,127	5,884	6.1	88,950
Install Smart Thermostats	403	1,554	7.5	16,997
Replace Windows	0	13,003	86.3	138,820
Totals	26,530	20,441	-	244,767

Table 6 - Summary of Public Library ECMs

Magna Centre

Magna Centre, constructed in 2007, is located at 800 Mulock Drive and is approximately 216,000 ft² in size. The Magna Centre houses an aquatic centre featuring a lap pool and a leisure pool. It also includes three North American-sized ice pads, one Olympic-size arena, multi-purpose meeting areas and offices, a fitness area, a gymnasium and walking track, and changerooms and washrooms. The facility is reported to have not undergone any major additions or renovations since its original construction. The entrances are automatic sliding glass doors with vestibules and air curtains to reduce heat loss to the exterior.

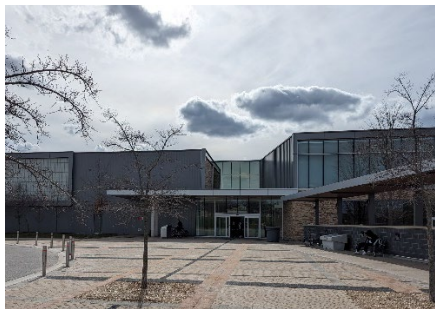


Figure 6 - 800 Mulock Drive

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Estimated Simple Payback (Years)	Total kWh Savings
Exterior LEDs	3,305	-	0.5	3,305
Retro-Commissioning	107,340	24,455	2.7	368,425
Floating Head Pressure Controls	178,670	-	3.1	178,670
Install a Liquid Pool Cover	22,350	4,795	3.8	73,541
Demand Control Ventilation	83,565	15,437	4.0	248,260
VFD Pumps	52,120	-	10.0	52,120
Install Pool Waste Heat Recovery Control System	0	26,162	50.5	279,306
Totals	447,350	70,849	-	1,203,627

Table 7 - Summary of Magna Centre ECMs

Old Town Hall

Newmarket's Old Town Hall, originally constructed in 1883, is located at 460 Botsford Street and is approximately 12,860 ft² in size. The building underwent significant renovations between 2012 and 2016, which included a three-storey addition with basement. The facility contains exhibition and performance spaces, including a large auditorium. It also has a commercial kitchen, communal offices, washrooms, and storage and mechanical areas. The original 1883 building has been designated as a heritage building.



Figure 7 - 460 Botsford Street

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total ekWh Savings
Demand Control Ventilation	10,076	4,112	3.4	53,976
Install VFD on AHU-1 Supply Fan	12,428	-	10.9	12,428
Upgrade to LED Retrofit Lamps	24,577	-	16.2	24,577
Totals	47,081	4,112	-	90,981

Table 8 - Summary of Old Town Hall ECMs

Ray Twinney Recreation Complex

Ray Twinney Recreation Complex, constructed in 1985, is located at 100 Eagle Street and is approximately 111,200 ft² in size. The Community Centre houses an aquatic centre featuring a five-lane main lap pool along with learning and swirl pool basins. It also includes two NHL-size ice rink arenas, a fitness centre, two lounges, change/washrooms, offices, and service rooms. The facility has not undergone any major addition or renovation since the final phase of construction was reportedly completed in the 1990's, when the second Ice Pad was constructed. The entrances are generally automatic sliding glass doors and there are multiple secondary entrances to various parts of the facility. The complex also has a fitness centre and various offices for sporting associations located throughout the facility.



Figure 8 - 100 Eagle Street

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total ekWh Savings
Arena LED Lighting	98,245	-	-	98,245
Install Liquid Pool Cover	18,264	4,031	1.8	61,299
Lighting Controls	13,957	-	2.8	13,957
Repair VFDs	18,000	-	4.1	18,000
Make-up Water Controls	1,378	2,178	5.6	24,630

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total kWh Savings
Implement Floating Head Pressure Controls	81,103	-	5.5	81,103
Install Low-E Ceiling for Arena 1	81,788	-	6.6	81,788
Pool Pumps VFDs	40,176	-	6.7	40,176
Totals	44,114	6,209	-	419,198

Table 9 - Summary of Ray Twinney Recreation Centre ECMs

Art Ferguson Club House

Art Ferguson Club House is located at 16195 Bayview Avenue and is approximately 1,500 ft² in size and was constructed in 1992. The Club House has a common area, office, kitchen, washrooms, and a basement. The property is primarily a recreational facility that serves as an office and meeting space for community groups. It also provides storage for sports equipment for the surrounding fields. The facility has 3 entrances, two of which are insulated metal single doors, while the other is a glazed metal-double door.



Figure 9 - 16195 Bayview Avenue

The following ECMs were identified for implementation.

Measure	Incentives Available	Annual Electricity Savings	Annual Natural Gas Savings	Simple Payback
Replace Exterior Field Lighting with LEDs	Yes	Low	None	Long
Install High Efficiency Windows	No	Low	Low	Long
Install HVAC dampers	No	Low	Low	Short
Install Smart Thermostat	No	Low	Low	Short

Table 10 - Summary of Art Ferguson ECMs

Elman W. Campbell Museum

Newmarket's Museum, located at 134 Main St South, Newmarket, ON, is a single-storey building with a basement. The facility has an original section built in 1884, designated as a heritage building, along with a 1954 addition, covering a total gross floor area of approximately 6,500 ft². The main floor houses exhibition galleries, offices, staff areas, an entrance lobby, a kitchenette, and a communal washroom. The basement includes storage for collections, a workroom, an office, washrooms, and a mechanical room.



Figure 10 - 134 Main Street

The following ECMs were identified for implementation.

Measure	Incentives Available	Annual Electricity Savings	Annual Natural Gas Savings	Simple Payback
Interior LED Retrofit	Yes	Low	N/A	Short
Replace Exterior Lighting with LEDs	No	Low	None	Medium
Install High Efficiency Windows	No	Low	Low	Long
Disable Continuous Fan on RTUs	No	Low	N/A	N/A

Table 11 - Summary of Museum ECMs

Recreation Youth Centre and Sk8park

Newmarket's Youth Centre is located at 56 Charles Street and is approximately 28,000 ft² in size. The two storey facility is reported to have been constructed in 1960 and has undergone several large-scale renovations. The most recent of which was in 2004. Historically the facility served as a Movie Theater but has since been re-purposed into a recreation and social centre for Newmarket's youth. The facility has a large indoor skatepark, a gymnasium, meeting rooms, kitchen, offices, and common areas. The entrances are single glass doors. The primary common area is a large open social space. The facility is generally well used, with activities planned 7-days a week September to June (closed on weekends from July through August).



Figure 11 - 56 Charles Street

The following ECMs were identified for implementation.

Measure	Incentives Available	Annual Electricity Savings	Annual Natural Gas Savings	Simple Payback
Disable Continuous Fan on Gym West RTU	No	Low	N/A	N/A
RTU Temperature Setbacks	No	Low	N/A	N/A
Interior LED Retrofit	Yes	High	N/A	Short
Lighting Occupancy Controls	Yes	Medium	N/A	Short
Implement Demand Control Ventilation on RTUs	Yes	Low	Low	Long
Install Instantaneous Hot Water Heater	Yes	Low	N/A	Long

Table 12 - Summary of Youth Centre ECMs

Newmarket Town Hall

Newmarket Town Hall is located at 395 Mulock Drive, Newmarket, ON. This 80,316 ft², single-story building primarily functions as office space and house council chambers, with a portion leased to Rogers TV. Constructed with a brick veneer façade supported by reinforced concrete block units, the building's heating system comprises one vertical tube boiler and two atmospheric boilers. Warm air is circulated using electric heat pumps connected to the hot water heating loop, while cooling is provided by electric heat pumps supplied with chilled water from a cooling tower. Ventilation is facilitated by one large air handling unit and two heat recovery ventilators. A gas-fired domestic hot water, alongside electric hot water heater tanks and an on-demand electric hot water heater, supply the building's water fixtures.

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total ekWh Savings
Install VFD on Air Handling Unit	102,249	12,001	1.9	230,372
Install Lighting Controls	5,704	-	4.7	5,704
Total	107,953	12,001	-	236,076

Table 13 - Summary of Newmarket Town Hall ECMs

Robert N. Shelton Operations Centre

Newmarket Operations Centre is located at 1275 Maple Hill Ct., in Newmarket, ON. This two-story building, spanning 61,054 ft², was constructed in 2010 and serves dual purposes as an office space and a truck bay for the city's fleet. Its construction primarily features a brick veneer façade supported by reinforced concrete blocks. As a LEED Silver-certified structure, the operations centre integrates various energy-efficient principles into its design. These include the implementation of a ground-source heat pump system, a solar thermal system for domestic hot water, solar photovoltaic technology, and the incorporation of a green roof.

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total ekWh Savings
Upgrade to LED Lighting	89,000	-	6.9	89,000

Table 14 - Summary of Operations Centre ECMs

Seniors Meeting Place

The Seniors' Meeting Place is located at 474 Davis Dr., in Newmarket, ON. This single-story building spans 18,000 ft² and primarily serves as a recreational hub for seniors. Its amenities include a computer room, games room, craft room, lounge, commercial kitchen, five halls, and a woodworking area. The building is constructed with vinyl siding supported by reinforced concrete blocks.

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total kWh Savings
Add Electric Baseboard Heaters to BAS	6,606	0	8.0	6,606
Implement Demand Control Ventilation on RTUs	1,046	3,914	11.0	42,832
Total	7,652	3,914	-	49,438

Table 15 - Summary of Seniors Meeting Place ECMs

Fire Station 4-1

Fire Station 4-1 is situated at 984 Gorham St., in Newmarket, ON. This two-story structure spans 10,400 ft² and primarily serves as a fire station, housing essential facilities such as a firetruck bay, fire prevention office, chief offices, and firefighter quarters, which include washrooms, a lounge, kitchen, bedrooms, and a gym. The building's construction comprises brick supported by reinforced concrete block units.

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total kWh Savings
Add Electric Baseboard Heaters to BAS	6,134	0	7.3	6,134
Install Lighting Controls	3,066	0	8.2	3,066
Upgrade to LED Fixtures	30,658	0	13.0	30,658
Replace R22 RTUs with ERVs	0	5,500	197.6	58,718
Total	39,858	5,500	-	98,576

Table 16 - Summary of Fire Station 4-1 ECMs

Fire Station 4-2

Fire Station 4-2 is located at 125 McCaffrey Rd., in Newmarket, ON. This one-story building covers an area of 12,200 ft² and primarily operates as a fire station, equipped with essential facilities including a firetruck bay, chief offices, and firefighter quarters featuring washrooms, a lounge, kitchen, bedrooms, and a gym and training room. The building is constructed with brick on reinforced concrete block units for structural support.

The following ECMs were identified for implementation.

Measure	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (m ³)	Simple Payback (Years)	Total ekWh Savings
Upgrade to LED Fixtures	22,333	0	6.7	22,333
Install Lighting Controls	2,233	0	11.2	2,233
Total	24,566	0	-	24,566

Table 17 - Summary of Fire Station 4-2 ECMs

Additional Measures

Over the next five years the Town of Newmarket will undertake several additional energy conservation actions which will positively impact the amount of energy consumed at their facilities. These additional actions are not as easily quantifiable as the measures previously described, nonetheless they will provide significant impacts on overall consumption rates.

Building Automation System Upgrades

The Town is currently in preparation for the implementation of a significant upgrade to their existing Building Automation System (BAS) software. This upgrade will enable more precise control of the major energy consuming equipment at many of the Towns largest facilities. These controls will enable local operators to adapt building systems more readily to the requirements of the occupants, which will result in lower energy costs and improved occupant comfort. The BAS will also undergo minor re-commissioning of the existing parameters at the time of the upgrade. This will ensure that the energy efficiency features and capabilities of the existing system are optimized and continue to provide efficiency benefits.

High Efficiency Replacements

Over the next five years, the Town plans to replace several large pieces of building operations equipment due to their age. These items, identified as being in poor to very poor condition through building condition assessments, are scheduled for replacement as part of planned capital renewal projects. To help mitigate the cost impacts of these projects, the Town will strive to source the highest efficiency replacement models for each renewal while staying within current budgets. This commitment to sustainability will enable the Town to maintain building service standards and benefit from the increased efficiency of newer, more modern equipment. Additionally, moving away from like-for-like replacements will help reduce ongoing operational costs of the facilities.

Pumping Stations

The Town has 4 primary pumping stations. These stations consume electricity and natural gas to power the pumps and maintain sufficient interior temperatures to avoid freezing during the winter. Their water flow rates are measured based on a m³/day basis, as displayed in Table 18 below. All of these pumping stations aid in the collection of sanitary sewer water for the Town.

Address	Flow Rate (m ³ /day)
Bayview Pumping Station: 16300 Bayview Ave	3,570
Northwest Sanitary Pumping: 286 Woodspring Ave	800
Woodland Hill Pumping Station, 250 Frederik Curran Lane	260
St. Andrews Pumping Station: 409 Sydor Ct.	17

Table 18 - Flow Rate

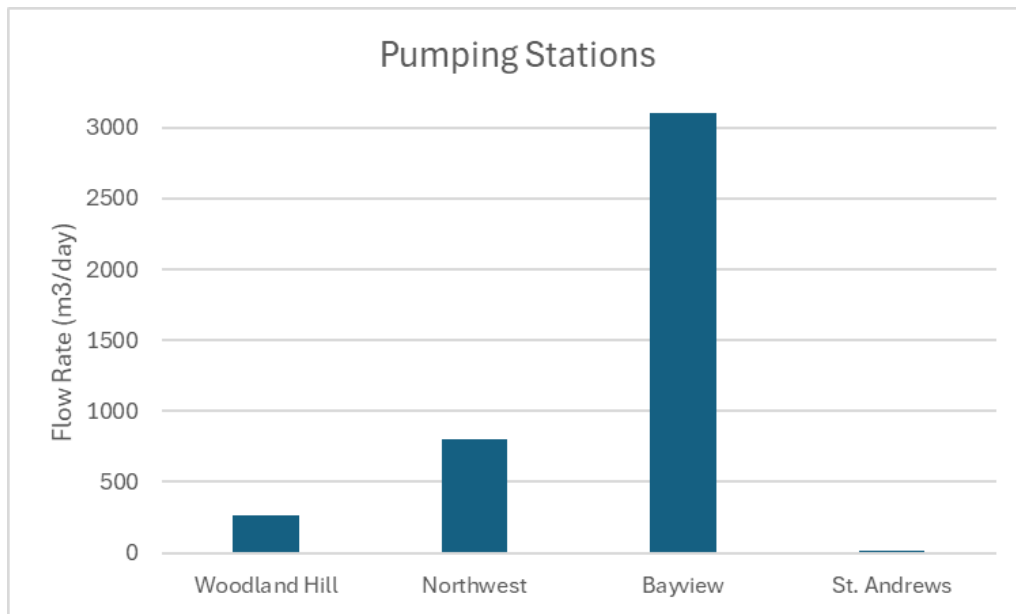


Figure 12 - Pumping Station Flow Rate

Ground Source Energy

Ground source heat pumps are highly efficient heating and cooling systems that use the relatively stable temperature of the earth to transfer heat. They work by circulating a fluid, such as water, through a loop of underground pipes called a ground loop. In general, these systems offer decreased operating costs, reduced greenhouse gas emissions, and less reliance on fossil fuels compared to conventional heating and cooling systems. The Town of Newmarket utilizes ground source heat pumps at their Operations Centre at 1275 Maple Hill as a means of supplying energy to the building. The system is maintained by two 7.5 HP pumps, keeping the building's temperature between 18°C and 30°C. In the winter, glycol is sent to the heat pumps to increase indoor temperatures, while the cycle is reversed in the summer to cool the facility. The heat pump system was installed when the facility was first built and remains in good operating condition.

Proposed Heat Pump Installations

The Town is currently in negotiations to replace several of their aged, conventional RTUs, with modern heat pump equipped RTUs. Specifically, they are looking to replace four (4) RTU's at the Newmarket Town Hall with TRANE heat pump equipped units. There are an additional six (6) units scheduled for replacement at the Recreation Youth Centre and Sk8park facility. The proposed replacements for these units are also TRANE RTU's equipped with heat pumps. Overall, these upgrades exemplify innovative approaches to sustainable building design, offering both environmental benefits and cost savings for the Town.

Solar Thermal Energy Heat Source



The Town currently uses one (1) solar thermal energy technology, which is in place at the Robert N. Shelton Operations Centre. Installed at this location are four (4) Vitosol 200-FM flat plate solar collectors. These collectors pre-heat the domestic hot water up to a temperature of 60° C. By harnessing sunlight to generate heat, this eco-friendly and cost-effective alternative reduces the need for natural gas water heating. It is estimated that the solar collectors contribute approximately

111,000 MJ of energy to the domestic hot water system. This use of solar thermal

energy not only reduces reliance on fossil fuels but also lowers energy bills and carbon emissions.

Renewable Energy

The Town of Newmarket has several solar panel installations at its facilities. These installations provide a source of renewable clean energy for the Town. This energy is supplied to the electrical grid and offsets the cost of energy consumed by the Town’s facilities. The amount of electricity produced (on an annual basis) for each installation, as well as the amount of financial credit received, is summarized in Table 19.



Address	Size (kW)	Year	kWh	Generation Credits
Operations Centre 1275 Maple Hill Court	11.3	2023	13,642	\$8,162.64
Community Centre 200 Doug Duncan Drive	9.9	2023	10,313	\$7,347.39
Peter Gorman Pool 424 D'Arcy Street	9.9	2023	9,354	\$3,201.28
Ray Twinney Complex 100 Eagle Street West	174.0	2023	158,746	\$96,687.88
Station 4-1 Fire Hall 984 Gorham Street	9.9	2023	10,604	\$6,479.67
Station 4-2 Fire Hall 125 McCaffrey Road	9.9	2023	10,386	\$6,308.43
Magna Centre 800 Mulock Drive	594.8	2023	617,236	\$229,452.80
Total			830,281	\$357,640.09

Table 19 - Facility Generation Credit Data

Note: The Town acknowledges that there is one additional solar installation at the Seniors Centre, 474 Davis St, that is not included in this analysis. This installation, which is 9.9 kW in size, does not currently have available generation and credit data to include in this report. As the data becomes available the Town will either update this section of the report or include the data in subsequent CDM Plans.

Recommended Next Steps

Recommissioning

During the recent Energy Audits at the Town's facilities, several opportunities for recommissioning existing building systems were identified. Recommissioning involves identifying, testing, and validating the processes and controls within these systems. Over time, the design parameters of building systems can drift from their original settings, reducing efficiency. This is particularly true for facilities that rely on coordination between different HVAC systems, such as the Magna Centre. It is recommended that the Town of Newmarket pursue recommissioning of their larger building systems to identify any deficiencies that may have arisen since the original commissioning. This process can uncover significant savings opportunities by validating the original design parameters and optimizing the sequences of operations.

GHG Inventories

The Federal Government has set an ambitious Net-Zero carbon emissions target for 2050, and Canadian municipalities will play a crucial role in achieving this goal. Understanding the quantity of emissions within the municipality is an essential first step in creating a roadmap for carbon reductions.

Currently, this CDMP quantifies only some of the Scope 1 and Scope 2 emissions related to utility use, and only within a select sample of municipal buildings. It does not however provide a comprehensive inventory of the total greenhouse gas (GHG) emissions associated with the Town of Newmarket's operations.

A full GHG inventory would encompass all Scope 1 and Scope 2 sources, including emissions from all buildings, transportation, fugitive emissions, and other related sources attributable to the Town. This comprehensive data would enable the Town to accurately gauge its current emissions, plan effectively, and strategize on how best to contribute to the 2050 Net-Zero target.

To achieve this, it is recommended that the Town engage a qualified organization to conduct a municipal GHG inventory. The inventory should be based on accepted GHG accounting principles, such as the World Resources Institute's GHG Protocol, to ensure that the accounting is standardized and repeatable. By doing so, the Town can ensure accurate tracking and reporting of emissions, which is vital for setting actionable and measurable carbon reduction targets.

With a complete GHG inventory, the Town of Newmarket will be better equipped to develop targeted initiatives, monitor progress, and make informed decisions that align with federal climate goals. This proactive approach will not only contribute to the national Net-Zero target but also position the Town as a leader in sustainability and environmental stewardship.

Engage in Waste Audits

As a potential strategy over the next five years, the Town of Newmarket may consider conducting regular waste audits alongside its existing energy conservation initiatives. These audits would involve meticulously analyzing the composition and volume of waste generated across its facilities. By identifying opportunities for waste reduction and diversion, the Town could implement tailored waste management strategies aimed at minimizing landfill waste and conserving resources. While the outcomes of waste audits may not be immediately quantifiable, their integration into the Town's sustainability efforts holds significant potential for advancing environmental stewardship and achieving overall consumption reduction goals.

Install Green Roofs

One initiative the Town could pursue is the addition of green roofs to some of their facilities. Green roofs, with their vegetative coverings, offer numerous environmental benefits such as improved insulation, reduced stormwater runoff, and enhanced air quality. While the direct energy savings from green roofs may not be as easily quantifiable as other measures, their positive impacts on overall consumption rates and environmental sustainability are significant. By incorporating green roofs into their building infrastructure, the Town demonstrates a commitment to adopting innovative and sustainable solutions to reduce energy usage and mitigate environmental impact.

Confirmation of Approval

This Energy Conservation and Demand Management Plan has been approved by the Town of Newmarket Senior Management.

Disclaimer

This document was exclusively prepared by Aladaco for the Town of Newmarket and is intended solely for their use. Other parties should not rely on this report in whole or in part. The information contained herein is based on data available at the time of preparation and is subject to limitations, assumptions, and qualifications stated herein.

Aladaco applied professional judgment in the development of this report with respect to estimates and opinions on costs, schedules, and technical matters, based on its experience and the information available at the time of report preparation. Aladaco cannot guarantee the accuracy of such estimates or opinions due to potential changes in market conditions or other factors outside of its control. Reliance on these estimates is at the reader's own risk.

By acceptance of this report, the Town acknowledges these limitations and confirms that the report satisfies the requirements of the scope of work.

Appendices

Appendix A – Facility List

Building Name	Address	Floor Area (ft ²)	Year Built	Type of Facility	Operation Time	Electrical (kWh)	Natural Gas (m ³)	Total ekWh	Total GHG Emissions (tCO ₂ e)
Ray Twinney	100 Eagle Street	123,437	1985	Indoor Recreational Facility	M: 5:30AM to 8:00PM, Tu-Th: 5:30AM to 7:00PM, F: 5:30AM to 10:00PM, Sat, Sun: 7:00AM to 4:00PM	2,597,814	412,304	6,999,571	869.3
Fire Station 4-2	125 McCaffrey	12,201	1999	Fire Station	24/7/365	87,979	13,792	235,222	29.1
Operations Centre	1275 Maple Hill	61,054	2010	Administrative Offices	M-F: 7:00AM to 3:30PM	866,255	134,136	2,298,291	283.4
Museum	134 Main	6,528	1884	Cultural Facility	Tu-Sat: 10:00AM to 12:00PM and 1:00PM to 4:00PM	66,347	13,832	214,017	28.6
Art Ferguson	16195 Bayview	1,427	1992	Community Centre	24/7/365	31,258	1,174	43,792	3.1
Pumping Station	16300 Bayview	200	1970	Pumping Station	24/7/365	61,359	0	61,359	1.7
Community Centre	200 Doug Duncan	18,000	1922	Community Centre	M-F: 9:00AM to 5:00PM	85,570	21,828	318,606	44.6
Pumping Station	250 Frederik Curran Lane	125	1990	Pumping Station	24/7/365	27,766	1,236	40,962	3.2

Building Name	Address	Floor Area (ft ²)	Year Built	Type of Facility	Operation Time	Electrical (kWh)	Natural Gas (m ³)	Total ekWh	Total GHG Emissions (tCO ₂ e)
Pumping Station	286 Woodspring Avenue	105	1990	Pumping Station	24/7/365	111,664	0	111,664	3.1
Newmarket Town Hall	395 Mulock	80,316	1998	Administrative Offices	M-F: 8:30AM to 4:30PM	765,143	49,630	1,294,993	117.3
Pumping Station	409 Sydor Ct	456	1990	Pumping Station	24/7/365	26,863	3	26,895	0.8
Gorman Pool	424 D'Arcy	9,700	1980	Recreation Centre	M-Sun: 10:00AM to 8:00PM (June to September)	223,514	32,606	571,616	69.3
Public Library	438 Park	12,000	1996	Public Library	Tu-Th: 9:30AM to 9:00PM, F, Sat: 9:30AM to 5:00PM, Sun: 1:00PM to 5:00PM	292,885	46,389	788,134	97.8
Old Town Hall	460 Botsford	12,862	2013	Art Gallery	Tu-F: 4:00PM to 8:00PM, Sat: 11:00AM to 2:00PM	186,169	30,092	507,431	63.4
Senior's Meeting Place	474 Davis	18,000	1960	Cultural Facility	M-F: 8:30AM to 10:00PM, Sat: 9:00AM to 12:00PM	137,327	18,430	334,086	39.5

Building Name	Address	Floor Area (ft ²)	Year Built	Type of Facility	Operation Time	Electrical (kWh)	Natural Gas (m ³)	Total ekWh	Total GHG Emissions (tCO ₂ e)
Youth Centre	56 Charles	28,000	1960	Indoor Recreational Facility	M-W: 4:00PM to 9:00PM, Th.-F: 4:00PM to 10:00PM, Sat: 9:00AM to 2:00PM, 4:00PM to 9:00PM, Sun: 9:00AM to 2:00PM ¹	209,117	31,255	542,796	66.2
Fire Training Centre	623 Timothy	18,800	1950	Fire Station	24/7/365	99,196	20,962	322,986	43.3
Magna Centre	800 Mulock	216,000	2004	Indoor Recreational Facility	M-F: 6:00AM to 10:00PM, Sat, Sun: 7:00AM to 9:00PM	6,804,695	585,859	13,059,326	1,322.4
Fire Station 4-1	984 Gorham	10,416	1991	Fire Station	24/7/365	8,505	20,877	231,388	40.6

Table 20 - Full Facility List

¹ Closed on Weekends July through August

Appendix B – Master Table of ECMs

Building Name	Address	ECM	Implementation Cost	Savings (\$)	Total Emissions	Total kWh Savings
Community Centre	200 Doug Duncan Drive	On-Demand Ventilation	\$10,500	\$1,640	5.9	36,987
Community Centre	200 Doug Duncan Drive	Install VFD on Cooling Tower Fan	\$9,000	\$712	0.2	7,117
Community Centre	200 Doug Duncan Drive	Exterior LEDs	\$450	\$260	-	1,663
Public Library	438 Park Avenue	Replace Windows	\$258,180	\$2,991	25.1	138,820
Public Library	438 Park Avenue	On-Demand Ventilation	\$42,250	\$6,360	12.1	88,950
Public Library	438 Park Avenue	Install Smart Thermostat	\$4,025	\$540	3.0	16,997
Magna Centre	800 Mulock Drive	Retro-Commissioning	\$54,000	\$19,950	50.3	368,425
Magna Centre	800 Mulock Drive	Install Pool Waste Heat Recovery Control System	\$55,926	\$11,657	50.5	279,306
Magna Centre	800 Mulock Drive	Demand Control Ventilation	\$69,875	\$14,615	2.3	248,260
Magna Centre	800 Mulock Drive	Floating Head Pressure Controls	\$70,285	\$22,870	5.0	178,670
Magna Centre	800 Mulock Drive	Install a Liquid Pool Cover	\$10,225	\$3,120	9.9	73,541
Magna Centre	800 Mulock Drive	VFD Pumps	\$73,500	\$6,670	1.5	52,120
Magna Centre	800 Mulock Drive	Exterior LEDs	\$205	\$425	0.5	3,305
Old Town Hall	460 Botsford Street	Demand Control Ventilation	\$10,875	\$2,600	7.9	53,976
Old Town Hall	460 Botsford Street	Upgrade to LED Retrofit Lamps	\$7,733	\$4,116	0.7	24,577

Building Name	Address	ECM	Implementation Cost	Savings (\$)	Total Emissions	Total ekWh Savings
Old Town Hall	460 Botsford Street	Install VFD on AHU-1 Supply Fan	\$11,667	\$1,067	0.3	12,428
Ray Twinney	100 Eagle Street	Arena LED Lighting	\$-	\$15,130	2.8	98,245
Ray Twinney	100 Eagle Street	Install Low-E Ceiling for Arena 1	\$54,373	\$8,498	2.3	81,788
Ray Twinney	100 Eagle Street	Implement Floating Head Pressure Controls	\$46,090	\$8,427	2.3	81,103
Ray Twinney	100 Eagle Street	Install Liquid Pool Cover	\$5,171	\$2,905	8.3	61,299
Ray Twinney	100 Eagle Street	Pool Pumps VFDs	\$45,375	\$6,185	0.1	40,176
Ray Twinney	100 Eagle Street	Make-up Water Controls	\$41,800	\$7,510	4.2	24,630
Ray Twinney	100 Eagle Street	Repair VFDs	\$11,500	\$2,770	0.5	18,000
Ray Twinney	100 Eagle Street	Lighting Controls	\$6,000	\$2,150	0.4	13,957
Newmarket Town Hall	395 Mulock Drive	Install VFD on Air Handling Unit	\$26,186	\$13,624	26.0	230,372
Newmarket Town Hall	395 Mulock Drive	Install Lighting Controls	\$2,797	\$593	0.2	5,704
Operations Centre	1275 Maple Hill Ct.	Upgrade to LED Lighting	\$89,000	\$12,000	2.5	89,000
Senior's Centre	474 Davis Dr.	Implement Demand Control Ventilation on RTUs	\$11,000	\$1,003	7.6	42,832
Senior's Centre	474 Davis Dr.	Add Electric Baseboard Heaters to BAS	\$5,141	\$646	0.2	6,606
Fire Station 4-1	984 Gorham St.	Replace R22 RTUs with ERVs	\$250,000	\$1,265	10.6	58,718
Fire Station 4-1	984 Gorham St.	Upgrade to LED Fixtures	\$40,000	\$3,066	0.9	30,658

Building Name	Address	ECM	Implementation Cost	Savings (\$)	Total Emissions	Total kWh Savings
Fire Station 4-1	984 Gorham St.	Add Electric Baseboard Heaters to BAS	\$4,500	\$613	0.2	6,134
Fire Station 4-1	984 Gorham St.	Install Lighting Controls	\$2,500	\$307	0.1	3,066
Fire Station 4-2	125 McCaffrey Rd.	Upgrade to LED Fixtures	\$15,000	\$2,233	0.6	22,333
Fire Station 4-2	125 McCaffrey Rd.	Install Lighting Controls	\$2,500	\$223	0.1	2,233

Table 21- Master Table of ECMs (quantitative)

Building Name	Address	ECM	Incentives Available	Annual Electricity Savings	Annual Natural Gas Savings	Simple Payback
Club House	16195 Bayview Avenue	Install HVAC Dampers	No	Low	Low	Short
Club House	16195 Bayview Avenue	Install Smart Thermostat	No	Low	Low	Short
Club House	16195 Bayview Avenue	Install High Efficiency Windows	No	Low	Low	Long
Club House	16195 Bayview Avenue	Replace Exterior Field Lighting with LEDs	Yes	Low	None	Long
Museum	134 Main St South	Interior LED Retrofit	Yes	Low	N/A	Short
Museum	134 Main St South	Replace Exterior Lighting with LEDs	No	Low	None	Medium
Museum	134 Main St South	Install High Efficiency Windows	No	Low	Low	Long

Building Name	Address	ECM	Incentives Available	Annual Electricity Savings	Annual Natural Gas Savings	Simple Payback
Museum	134 Main St South	Disable Continuous Fan on RTUs	No	Low	N/A	N/A
Youth Centre	56 Charles Street	Interior LED Retrofit	Yes	High	N/A	Short
Youth Centre	56 Charles Street	Lighting Occupancy Controls	Yes	Medium	N/A	Short
Youth Centre	56 Charles Street	Implement Demand Control Ventilation on RTUs	Yes	Low	Low	Long
Youth Centre	56 Charles Street	Install Instantaneous Hot Water Heater	Yes	Low	N/A	Long
Youth Centre	56 Charles Street	Disable Continuous Fan on Gym West RTU	No	Low	N/A	N/A
Youth Centre	56 Charles Street	RTU Temperature Setbacks	No	Low	N/A	N/A

Table 22 – Master Table of ECMs (qualitative)

Qualitative measures are defined as follows:

- Energy Savings Estimates: Low = 1-3%, Medium = 4-8%, High = 8%+
- Simple Payback Periods = Short = <5 years, Medium = 6-9 years, Long = 10 years+