Town of Grimsby

Energy Conservation and Demand Management Plan, 2024-2029

Acknowledgements

The writing of the plan engaged the Town of Grimsby's staff to provide institutional history and subject matter expertise. Tree House Energy Services would like to thank plan contributors:

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Special thanks to Jillian who acted as the primary contact.

Table of Contents

Executive Summary

The Town of Grimsby is located between the south shores of Lake Ontario and the Niagara Escarpment. With a population of over 28,883, Grimsby is a growing municipality in the Niagara Region. The municipality owns and operates 14 facilities including the Peach King Centre, the Grimsby Lions Pool, and Town Hall. Energy management of these facilities is apart of the ongoing operations and maintenance that are performed by the Town. It is mandated by Ontario Regulation 25/23 for municipalities to develop Energy Conservation and Demand Management Plans and has been identified in the Town's Official Plan as an important climate change initiative. .

Beyond the provincial regulation, energy management contributes to powering Ontario's Growth Plan by identifying opportunities to improve energy efficiency and setting emission reduction targets. Aligning municipal actions to support the national greenhouse gas emissions target for 2050 of net-zero, under the Net Zero Pathways Accountability Act.

Through asset management planning and projects, the Town has made contributions to energy conservation and demand management (CDM). Example projects include:

- Upgrading existing lighting in the Museum, Art Gallery and Town Hall, East & West Rinks in the Peach King Centre from fluorescent to LED technology reducing approximately 40-50% of lighting electricity demand and consumption
- Upgrading the existing rooftop units in the Library and Art Gallery that were installed in 2001 to higher efficiency units in 2022 reducing energy use by approximately 30% to 50%

These projects have contributed to the overall decrease in (unnormalized) energy use of 2.4% using 2019 as the base line year and 2023 as the performance year. However, natural gas use has increased by 0.9% and emissions have increased by 2.7%. The Town is in the process of inventorying their community emissions as a first step to emissions reduction. It is recommended that a broader approach be implemented that includes an energy reduction target of at least 2% over the course of the next five years (Plan term). This could be part of a strategic plan for larger reductions in energy as well as emissions to align with municipal, provincial and federal plans and targets.

For these large reductions, this CDM Plan has identified facilities that currently have the most impact including: the Peach King Centre, Town Hall, Library/Art Gallery and Operations. **Since the Peach King Centre is currently under construction, it is suggested that the Centre be considered for a longer-term plan. The Town Hall, Library/Art Gallery and Operations are recommended to be included in a cost and benefit study that would provide an implementation road map for net zero emissions-- including renewable technology--in the long term and a 2% energy reduction in the short term over the next five years.**

1 Background and Introduction

The Town of Grimsby offers an unparalleled setting between the south shores of Lake Ontario and the Niagara Escarpment. With a population of over 28,883, Grimsby is a growing municipality in the Niagara Region. As the midpoint between Hamilton and St. Catharines, and

the westernmost Town in Niagara Region, Grimsby is part of the Hamilton Census Metropolitan Area. Grimsby is a sought-after community that has experienced significant growth over the past decade due in part to its geographic location between the Greater Hamilton and Toronto Areas, and the Niagara Region – providing access to world class amenities and direct access to the U.S. border within 30 minutes. Included in these amenities are 14 municipal facilities such as the Peach King Centre, the Grimsby Lions Pool, Grimsby Town Hall and Southward Community Park.
Energy management is apart of the ongoing facilities operations and maintenance that is performed by the Town. The Energy Conservation and Demand Management (CDM) Plan mentioned in the Town's Official Plan entitled Envision Grimsby, Official Plan Review, 2051 under Policy Direction Report 4: Sustainability & Climate Change as an important climate change initiative. The Official Plan is referenced in Grimsby's Strategic Plan, 2023-2026 under the priority Responsible and Progressive Growth to develop a strong plan for how our community grows.

The connection between the Envision Grimsby and Energy Management and Conservation Demand Management (CDM) Plan, 2024-2029 is outlined in the following section.

2 Energy Management

2.1 Plans and Regulations: Municipal, Provincial and Federal

The Official Plan under Policy Direction Report 4 proposes: "Promoting energy efficient and sustainable building through the development process" and "Requiring and incentivizing developments to follow green building standards or implementing electric vehicle charging stations." This potential policy for new buildings, aligns with the goals and targets identified in this CDM Plan (also referenced in Report 4).

This CDM Plan will include potential benefits that are financial, innovative, environmental or a combination of all three. For more information on these benefits and the Town's energy and emissions management approach, see Section 4, Conservation and Demand Management Plan as well as its sub-sections.

Ontario Regulation 25/23

This CDM Plan complies with Regulation 25/23 Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans. This regulation falls under the ELECTRICITY ACT, 1998 that requires public agencies to prepare, publish, and implement energy conservation and demand management plans. The CDM Plan must document annual energy consumption and greenhouse gas emissions resulting from municipal operations, and describe previous, current and proposed measures for conserving and reducing the amount of energy consumed. The Plan manages municipal demand for energy and includes a forecast of the expected results of current and proposed measures. A list of the required facilities that municipalities are to include in their annual energy consumption reports can be found in Appendix C: Required Facilities, O. Reg. 25/23.

The Electricity Act further requires a description and a forecast of the expected results of current and proposed activities. The plan is to outline measures to conserve the energy consumed by Town operations and to otherwise reduce the amount of energy consumed, by employing such energy conservation and demand management methods as may be prescribed. The CDM Plan summarizes progress and achievements in energy conservation and other reductions since the previous plan. The CDM Plan must be posted on the Town's website and available in printed form in the municipal office.

Powering Ontario's Growth

Related to O. Reg. 25/23 and energy management, Ontario has a plan to provide families and industries with reliable, low-cost and clean power[1] with ten actions including:

Energy Efficiency: Planning for the future of energy efficiency programs in Ontario.

Next Competitive Electricity Procurement: Start planning for Ontario's next competitive electricity procurement focused on new clean resources including wind, solar, hydroelectric, batteries and biogas.

The Energy Efficiency action aligns with the Town's Official Plan and for the electricity procurement of new clean resources—the 2014 CDM Plan stated: "…development of renewable energy systems that are compatible with our asset management and land use planning objectives. As a result, we will investigate the potential to develop renewable energy systems in the future." This investigation could lead to the development of resources that would contribute to the Town's own emissions reductions in the context of the federal act, covered in the following section.

Net Zero Pathways Accountability Act

The purpose of this Federal Act that was passed by federal government is to require the setting of national targets for the reduction of greenhouse gas emissions based on the best scientific information available. This will help promote transparency, accountability and immediate and ambitious action in relation to achieving targets, that support reaching net-zero emissions in Canada by 2050[2] and Canada's international commitments in respect of mitigating climate change. Although, O. Reg. 25/23 does not require a plan for emission reductions, it does require the reporting of GHG emissions including a description of any renewable energy generation facility operated by a public agency and the amount of annual energy produced.

2.2 Accomplishments

The Town has completed a number of projects at their facilities to manage energy consumption. Some major projects and highlights:

Lighting

- Upgrading existing lighting in the East and West Rinks in the Peach King Centre fluorescent to LED technology reducing approximately 40-50% of lighting electricity demand and consumption

[1] https://www.ontario.ca/page/powering-ontarios-growth#section-1

- Upgrading existing lighting in the Museum, Art Gallery and Town Hall from fluorescent to LED technology reducing approximately 40-50% of lighting electricity demand and consumption

Lighting controls are also recommended for these facilities which could be occupancy, daylight harvesting, dimming or schedule control. Occupancy sensors could save up to 35% using sensors in an open office environment.[2]

Heating, Ventilation and Air Conditioning

- Upgrading existing rooftop units in the Library and Art Gallery that were installed in 2001 to higher efficiency units in 2022 reducing energy use by approximately 30 to 50%[3]

2.3 Facilities Consumption

The required facilities to be reported as per O. Reg. 25/23 are in the table below to reflect the performance year of 2023. See Appendix B - Compliance with O. Reg 25/23 for more details on reporting requirements.

Item No.	Facility Name	Address	Use	Area (ft^2)
1	Alway Community Centre	494 Ridge Road West	Social/Meeting Hall	2,594
2	GFD Station 1	261 Ontario Street	Fire Station	7,674
3	GFD Station 2	167 Mountain Street	Fire Station	1,593
4	Lions Pool	1 Elm Street	Social/Meeting Hall	4,047
5	Livingston Activity Centre	18 Livingston Ave	Social/Meeting Hall	9,439
6	Peach King Centre Garage	162 D Livingston	Other - Public Services	4,994
7	Southward Park	84 Mud Street W	Social/Meeting Hall	6,673
8	Town Hall	160 Livingston Ave	Office	23,314
9	Grimsby Museum	6 Murray Street	Indoor Arena	4,090
10	Grimsby Public Library & Art Gallery	18 Carnegie Lane	Library	21,000
11	Peach King Centre	162 Livingston Ave	Ice/Curling Rink	79,782
12	Pump House	447 Elizabeth St.	Social/Meeting Hall	2,368
13	PW Operations Centre	2 Clark St	Other - Public Services	11,054
14	Carnegie Commons	25 Adelaide St	Other - Public Services	2,217

2.4 2019 and 2023 Energy Use

The following table shows the electricity and natural gas use for 2019 and 2023. 2019 is the base year and years 2020 to 2023 are compared to it in the Benchmarking section. These figures are not adjusted (unnormalized) for weather effects on energy use since that would have required monthly data for 2019. It is a recommendation to enter monthly data going forward so that future baseline and performance years can be normalized and compared. As tabled, the overall energy use has declined by 2.4%, however, emissions have climbed by 2.7%.

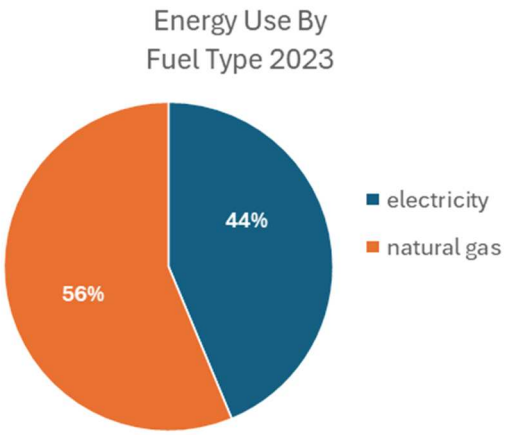
[2] https://publications-cnrc.canada.ca/eng/view/accepted/?id=b23dfd7d-3280-4740-b2fa-c57cd48806e9
[3] https://betterbuildingssolutioncenter.energy.gov/upgrade-your-rtus-and-reduce-energy-use-30-50

2019 Energy Use		2023 Energy Use		Percent Change		Percent Change
Electricity (kWh)	Gas (m^3)	Electricity (kWh)	Gas (m^3)	Electricity (kWh)	Gas (m^3)	Electricity and Gas
2,714,496	309,033	2,541,251	311,877	-6.4%	0.9%	-2.4%

GHG Emissions (tonnes $CO2_e$)		Percent Change in GHG Emissions
2019	2023	
674	692	2.7%

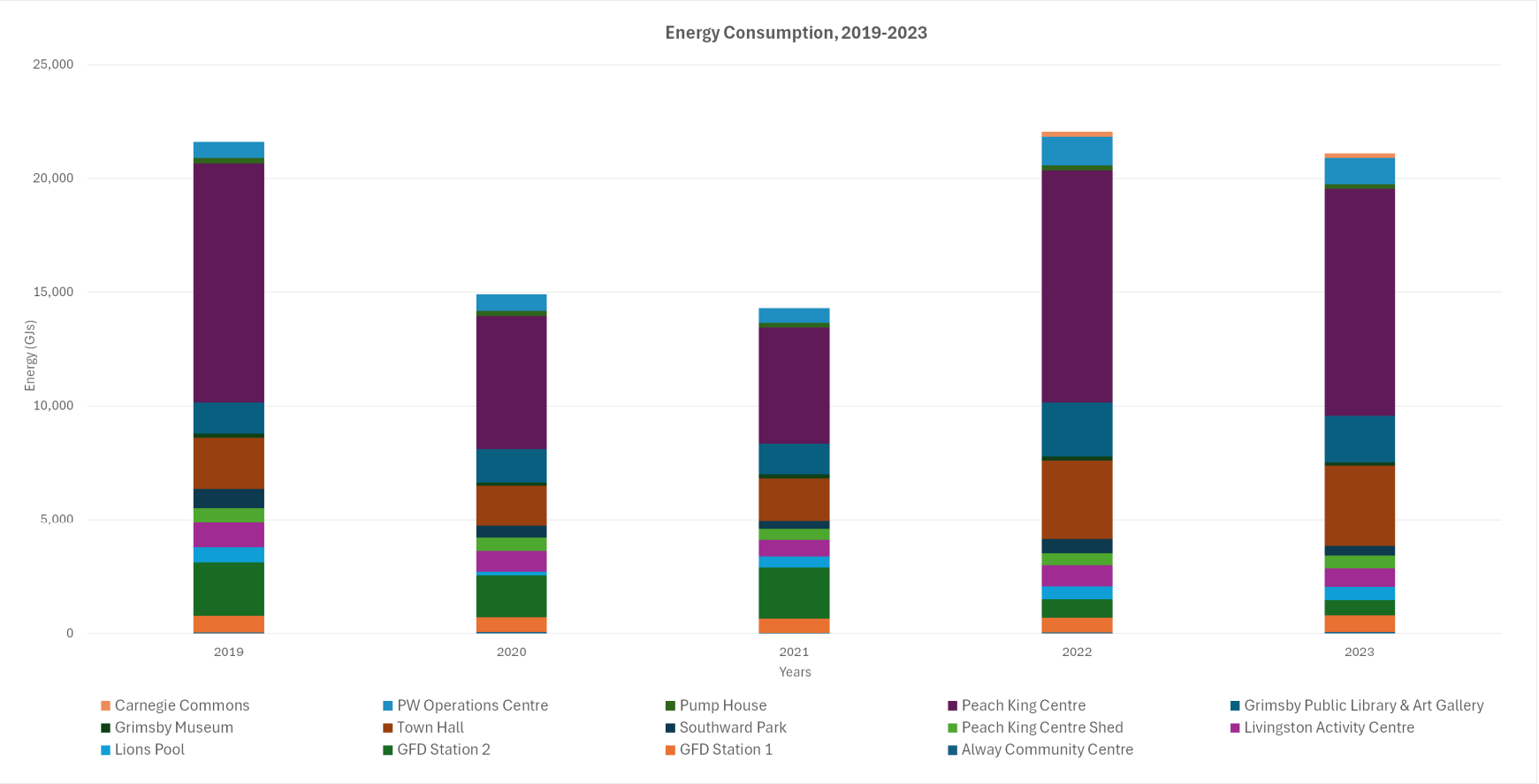
2.5 Breakdown of Energy Use by Type

Energy use for all facilities is shown in the pie graph below. The figures shown are a percentage of the number of Joules for each fuel type divided by the total of number Joules. As indicated in the previous section electricity use in 2023 was 2,541,251 kWh and natural gas use was 311,877 m^3. The percentage split between electricity and fossil fuels (natural gas, fuel oil, propane) for the municipalities that Tree House has in its database is on average 52% and 48% respectively. Thus, Grimsby's split is comparable.



2.6 Benchmarking

Annual energy consumption provided in the chart below is used to rank the larger energy consumers to the smaller ones. The ranking (or benchmarking) reveals facilities that may have the most potential for energy conservation and demand management and could indicate the facilities that have better energy performance. The stacked bars indicate facilities with a larger footprint where each column represents the year of energy consumption and each color represents a different facility.



The Peach King Centre, Town Hall, Grimsby Public Library & Art Gallery and Operations are the largest energy using facilities. Based on benchmarks provided by Statistics Canada through their Survey of Commercial and Institutional Energy Use: Commercial and institutional buildings, 2019 [4], the average benchmark--energy use intensity or EUI--for Libraries and Galleries are 1.01 GJ/m^2 and 0.85 GJ/m^2 respectively. The Grimsby Library and Art Gallery is at 1.13 GJ/m^2 for 2023. For Operations, a warehouse benchmark from the same survey was utilized as the closest comparable.

Facility	Year of Construction	EUI (GJ/m^2)	Benchmark EUI (GJ/m^2)
Peach King Centre	1984/2004	1.35	1.07
Town Hall	1981/2011	1.64	1.04
Library/Art Gallery	2004	1.05	1.01 and 0.85
Operations	1976	1.13	1.16

The Peach King Centre presents the most opportunity to reduce energy consumption and could be considered for a longer term plan, however, it is currently under construction. . It is understood that energy conservation measures have been a consideration for the new and renovated areas. It is recommended that the Town Hall, Library/Art Gallery and Operations be investigated further for energy savings opportunities in the term of this CDM Plan.

[4] https://www150.statcan.gc.ca/n1/daily-quotidien/220805/t002c-eng.htm

2.7 Renewable Energy

While the Town does not have renewable energy installations, it is suggested to study options with funding from third party programs. This study could lead to more cost-effective emission reduction solutions that could align with the Town's Partners in Climate Protection report.

3 Resources

3.1 Team

For the CDM Plan, the Town formed an Energy Management Team consisting of representatives from different departments including Community Services and Finance to ensure collaboration across the Town's departments.

The need for staff resources becomes more significant as energy reductions could become more challenging to achieve. It is suggested that an energy champion be designated to lead projects that could provide larger reductions. The projects could potentially be funded from third party programs.

3.2 Funding

One example of a third-party program that could be leveraged to fund further energy reductions is the Green Municipal Fund (GMF) . The GMF fund is a program overseen by the Federation of Canadian Municipalities. It has a number of funding streams including a Community Buildings Retrofit and a Sustainable Municipal Buildings stream that funds studies as well as capital projects to reduce emissions which could also include energy reductions.

4 Conservation and Demand Management (CDM) Plan

4.1 Projects, Programs and Policies

A number of initiatives that are centred around upcoming projects have been planned for the Town and are described in Appendix A – CDM Plan Initiatives. Project initiatives are retrofits at facilities that have equipment nearing the end of their life cycle. These facility projects have been identified for energy savings, cost recovery, reductions in emissions, or a combination of all three.

Regarding clean electricity procurement by the province (as referenced in Section 2), it is suggested that the Town consider investments in renewable energy, which is a form of clean energy, to reduce its increased electricity use, recover costs, and support the reduction of GHG emissions. A suggested investigation is included in Appendix A as part of a net zero emissions

Appendix A – CDM Plan – Recommended Initiatives

Proposed Initiative	Facility	Detailed Description	Annual Savings	Completion Year
Upgrade domestic hot water tank heater	Peach King Centre	Building domestic hot supply is provided by a gas-fired domestic hot water (DHW) tank heater. The DHW tank heater is manufactured by Rheem model G82-156 is installed in the second-floor West mechanical room. The DHW heater has a storage capacity of 310L and a heating maximum input capacity of 156 MBH. It's recommended to replace the tank heater with an instantaneous hot water heater to reduce heat loss from storage.	The gas savings are estimated to be 15-20%.	2024-25
Retrofit make up air with heat pump system	Peach King Centre	There is a direct fired make-up air unit, manufactured by Trane installed on the roof. The unit has a heating capacity of 400 MBH. It’s recommended to investigate options including the feasibility of an air source heat pump to increase energy efficiency.	See annual savings comment for the Upgrade Rooftop Unit initiative.	2025
Upgrade Ice Rink Controls	West Rink	The existing ice rink plant includes a centralized starter and control system with central control panel,	The savings are estimated are approximately 23% of electrical consumption if floating head	2025-2028

Proposed Initiative	Facility	Detailed Description	Annual Savings	Completion Year
		sensors, gauges, control valves and wiring. The system has exceeded its expected service life and to maintain reliability, safety and improve energy performance, an upgrade is recommended. It is recommended to upgrade to a SMART controller with infrared ice temperature sensors as well as outdoor air (and humidity), floor slab, underfloor, and brine temperature sensors for the ice rink as well as pressure sensors to reduce energy consumption. The system could also include VFD condenser fan. The upgrade could be contingent on funding and see also investigate funding initiative (last table item)	pressure, VFD brine pumps and low-e ceiling are implemented.[5]	
Investigate Destratification Fans	Peach King Centre East and West Rinks, PW Operations Centre	Destratification fans are ceiling mounted and provide mixing of warm and cool air to reduce heat at ceiling level and improve thermal comfort closer to the floor and in occupied zones. It's recommended to investigate destratification fans for the rinks in the	Energy savings would depend on the building geometry—especially the roof area where heat loss occurs.[6]	2024-2029

[5] https://trca.ca/app/uploads/2016/11/MMCforum16_CanmetENERGY-BestPracticesforRefrigerationIcePlantSystems.pdf
[6] https://natural-resources.canada.ca/sites/nrcan/files/oee/buildings/pdf/NRCan_Retrofit_NF_Retail_en.pdf

Proposed Initiative	Facility	Detailed Description	Annual Savings	Completion Year
		Peach King Centre and also for the Operations Centre, where feasible.		
High Speed Roll up Doors	PW Operations Centre	High speed roll-up doors or rapid air doors can reduce the amount of conditioned air that escapes from a loading dock area. It's recommended that these kinds of doors be investigation for the PW Operations Centre.	The energy savings will depend on door height, width, frequency of use and the duration the door is in an open position.[7]	2024-2029
Investigate advanced controls for rooftop units	Various	Investigate advanced rooftop unit controls that could include economizers, demand control ventilation and supply fan variable frequency drives It's recommended this investigation include make up air unit for dressing room for east rink.	Average electricity savings of 35% and average gas savings of 5%.[8]	2024-2029
Investigate funding for a net zero emissions study and capital project for one or more facilities	Various	Complete a study and capital project (based on the study) to achieve net zero emissions as well as energy cost recovery pending investigation of FCM funding under the Community Buildings Retrofit stream and recommended facilities are the Town	Energy cost recovery could be up to $168,000 per year for the Town Hall, Library/Art Gallery and Public Works Operations.	2024-2029

[7] https://www.enbridgegas.com/ontario/business-industrial/incentives-conservation/energy-calculators/rapid-air-doors

[8] According to an April 2024 technical report by National Renewable Energy Laboratory called "End-Use Savings Shapes Measure Documentation: Advanced Rooftop Unit Control", https://www.nrel.gov/docs/fy24osti/89117.pdf

Proposed Initiative	Facility	Detailed Description	Annual Savings	Completion Year
		Hall, Library/Art Gallery and Public Works Operations; the initiatives mentioned above for these facilities could be included in the study. Since the Peach King Centre is under construction, it could be included with a longer term implementation horizon.		

APPENDIX B - COMPLIANCE WITH O. Reg 25/23

In 2019, the Town published an Energy Conservation and Demand Management Plan based on and in compliance with Ontario Regulation 507/18 – *Energy Conservation and Demand Management Plans* (O. Reg. 507/18). The regulation also required municipalities and other public sector groups to report annually on energy use and greenhouse gas (GHG) emissions for buildings and facilities in which the agency conducts its operations, that are heated or cooled or are related to the treatment or pumping of water or sewage. See table (which is an excerpt from the regulation) on the following page for details of the required facilities to be reported.

O. Reg. 507/18 has since been revoked and replaced with O. Reg. 25/23. The major amendments to 507/18 that are included in the current regulation are:[9]

1. **Reporting and Tracking:** Moving reporting from a custom-made platform to ENERGY STAR Portfolio Manager.

2. **Reporting Period:** Reporting of 2021 data in 2023, 2022 and 2023 in 2024 and one year (2024) of data in 2025.

3. **Prescriptive Elements:** Updates to the title of form and removal of specific units of measurement to allow BPS organizations to use units they want to report as long it is an industry standard.

The Town complies with O. Reg. 25/23 by carrying out the following:

- senior management has adopted the CDM Plan
- the CDM Plan has been placed on the Town website
- a hard copy is available at the Town Hall offices.
- Staff will complete annual reporting with respect to emissions each year (?)

Staff will build an updated CDM plan into workplans for 2028 to ensure continued compliance.

[9] https://ero.ontario.ca/notice/019-6168

Table 1: The required facilities to be reported as per O. Reg. 25/23

Item	*Type of public agency*	*Operation*
1.	*Municipality*	1. *Administrative offices and related facilities, including municipal council chambers.* 2. *Public libraries.* 3. *Cultural facilities, indoor recreational facilities and community centres, including art galleries, performing art facilities, auditoriums, indoor sports arenas, indoor ice rinks, indoor swimming pools, gyms and indoor courts for playing tennis, basketball or other sports.* 4. *Ambulance stations and associated offices and facilities.* 5. *Fire stations and associated offices and facilities.* 6. *Police stations and associated offices and facilities.* 7. *Storage facilities where equipment or vehicles are maintained, repaired or stored.* 8. *Buildings or facilities related to the treatment of water or sewage.* 9. *Parking garages.*
2.	*Municipal service board*	1. *Buildings or facilities related to the treatment of water or sewage.*
3.	*Post-secondary educational institution*	1. *Administrative offices and related facilities.* 2. *Classrooms and related facilities.* 3. *Laboratories.* 4. *Student residences that have more than three storeys or a building area of more than 600 square metres.* 5. *Student recreational facilities and athletic facilities.* 6. *Libraries.* 7. *Parking garages.*
4.	*School board*	1. *Schools.* 2. *Administrative offices and related facilities.* 3. *Parking garages.*
5.	*Public hospital*	1. *Facilities used for hospital purposes.* 2. *Administrative offices and related facilities.*