

SCHEDULE F – PROJECT COMPLETION REPORT TEMPLATE

VERY IMPORTANT:

Timing: You need to email a report, to your GMF project officer (contact info is in Schedule C), on the dates indicated in Schedule C or whenever FCM asks for such a report.

Copyright: Before you submit a report to FCM, make sure you hold the copyright for the report. If you're hiring a consultant to prepare the report, please make sure to get the copyright (see FCM's copyright tips document), or else FCM will not be able to disburse the Grant Amount.

Accessibility for people with disabilities: Please do not change the format, font, layout, etc. of this report. This template has been specially designed, following FCM's Accessibility Guidelines, in order to be accessible to people with disabilities.

Confidentiality: If your report contains any Confidential Information that you would prefer not be made available to the public (e.g. through a case study or other materials produced by FCM that relate to your Project), please submit two versions of the report:

- 1. Complete report including Confidential Information:** Please clearly label this report with the word "**Confidential**" or similar wording and FCM will treat it as confidential.
- 2. Abridged report excluding Confidential Information:** This report may be posted on the FCM website and otherwise made available to interested third parties, to help FCM meet its knowledge sharing objectives.

Please contact your project officer to receive an electronic copy of the Completion Report Template.

Upon completion of the Project, a copy of the Final Deliverable must be submitted along with this Completion Report.

FCM will post your report on the [Green Municipal Fund™ \(GMF\) website](#). This is because one of FCM's mandates is to help municipal governments share their knowledge and expertise regarding municipal environmental projects, plans and studies.

How to complete the Completion Report

The purpose of the Completion Report is to share the story of your community's experience in undertaking your project with others seeking to address similar issues in their own communities.

Please write the report in plain language that can be understood by people who are not specialists on the subject. A Completion Report is typically in the range of 5–10 pages, but may be longer or shorter, depending on the complexity of the project.

GMF grant recipients must enclose **final** copies of the Completion Report and the Final Deliverable with their final Request for Contribution. The reports, including all attachments and appendices, must be submitted in PDF format with searchable text functionality. Reports that are not clearly identifiable as final reports, such as those displaying headers, footers, titles or watermarks containing terms like "draft" or "for internal use only," will not be accepted by GMF. Additionally, reports must be dated. If you have questions about completing this report, please consult GMF staff.

GMF number:	17924
Name of the Recipient:	Corporation of the City of Kingston
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Date of the Report:	August 2022

1. Summary of the Initiative (several paragraphs, key outcomes, attach reports as references)

- a. Please briefly describe the Project, its objectives (i.e. what was the Recipient trying to achieve, and why) and who was involved.

In 2021, City of Kingston Facilities Management and Construction Services (FMCS) completed a comprehensive Retro-commissioning and Deep carbon audit of large municipal facilities which identified a list of items to be repaired and reviewed in those facilities. This program has had a major positive impact on the GHG emissions of the corporation with over 300 Tonnes of emissions having been reduced compared to a 2018 baseline from this project alone. A brief description of the program can be found below:

Recommissioning (RCx): Optimizing existing buildings to ensure equipment and systems are running efficiently (as designed) to meet occupant needs. The fine tuning completed at this stage leads directly to operational efficiencies, energy savings as well as GHG reductions between 5% – 15%. This stage will provide us with an in-depth report of issues to be resolved along with costing, LCC, NPV and an energy model for energy impacts.

This program identified a total of 60 facilities in need of re-commissioning and through this grant were able to complete 18 locations, all of which are major facilities with large GHG emission portfolios. This process involved multiple steps (as outlined in the paragraph below) and was done by an experienced engineering and mechanical consultant. It was overseen by internal City resources with expertise in this type of work. Overall, the project was a major success, and not included in the grant we also had the consultant complete a deep carbon study which identified capital retrofit measures to be implemented that could reduce GHG emissions by up to 80%.

This program was completed across the corporation, and involved all departments, divisions, internal and external agencies. The results of these studies have been shared with all groups involved or interested to ensure transparency.

- b. Please summarize the activities completed as part of this Project, as per Schedule A. Note: Your summary should build on the information you included in your previous Progress report(s) (if applicable).

The intent of the RCx program is to return facilities to optimal performance levels based on the original design intent, current as-built construction, and operating conditions. The scope of work and deliverables will include, but not be limited to, the following.

Review of Available Background Information:

Where practicable, the following documentation will be made available to the successful proponent for review:

1. As-built drawings, specifications, and O&M manuals.
2. Recent building condition assessments.
3. List of equipment from the City's asset management system.
4. Monthly utility consumption data (minimum 48 months).
5. Summary of ECM's implemented in the past 5 years.
6. Current operating conditions and occupancy schedules.
7. BAS sequence of operations through read-only access to City's dashboard interface.

Technical Staff Interviews:

1. The successful proponent will be provided with a list of personnel to be interviewed about facilities operations, current operating practices and facility requirements, key issues and concerns with mechanical and electrical systems, performance of the BAS and current sequence of operations for the building systems.

Deliverables: Issues log and updated summary of facility requirements.

Initial Site Review and Assessment:

1. Conduct a detailed walkthrough and general evaluation of the building energy systems at each facility to assess the potential reduction in GHG emissions, energy consumption and operating costs. It's anticipated that the successful proponent will follow the methodology for ASHRAE Level 2 – Energy Survey and Analysis or similar best practices.
2. Review energy consumption for past 48 months.
3. Review any facility changes or upgrades that have been completed.
4. As applicable, verify available background information provided for review.
5. Perform a desktop evaluation of all equipment and systems (review actual operating conditions, consumption, and demand profiles during peak periods, etc.).
6. Prepare a summary memo for each facility outlining the initial site assessment, desktop evaluation of various systems, recommended functional testing plan, proposed methodology for measurement and verification (M&V), as well as any other suggested audits.

Deliverables: Summary memo for each location

On-Site Testing/Verification of Building Mechanical Systems and Controls - RCx:

1. The successful proponent shall engage a qualified team of specialists, including the City's current BAS service provider as well as other contractors as required, to carry out detailed on-site testing/verification/calibration of all facility mechanical equipment and controls. Testing/verification shall include the following systems at a minimum:
 - a. All HVAC equipment, other heating and cooling systems, DHW systems, VFD's, VAV boxes, and special processes (e.g. pool equipment, refrigeration plants, compressors, etc.)
 - b. Electrical equipment, Lighting systems, compressors, and other electrical loads.
 - c. Building envelope systems (e.g. air leakage testing, IR scanning, etc.).
 2. Measure and identify key opportunities for no-cost operational changes including but not limited to scheduling, temperature set points, ventilation control, flow, as well as other potential changes to the BAS or facility operation.
 3. Carry out the RCx work required to bring the building systems back to optimal performance, working in collaboration with all applicable City stakeholders. All system changes are to be approved by City staff. This work will include any relevant no-cost ECM's to reduce consumption and GHG emissions.
 4. It is anticipated that the successful proponent will employ a systematic methodology informed by industry standards and best practices such as NRCAn's RCx Guide for Building Owners and Managers.
- Deliverables: Functional testing data sheets complete with summary of findings and proposed system changes for each facility.

Summary RCx Report:

Consolidate all information collected and provide a summary RCx report including but not limited to the following:

1. Executive summary outlining the objective of the RCx, measures implemented, as well as key energy and GHG reduction outcomes including financial impacts.
2. Overview of building systems as found.
3. Detailed description of all changes that were made during the RCx process, including no-cost ECM's and GHG reduction measures that were implemented.
4. In-depth financial analysis and summary of the impacts expected from the specific energy and GHG reduction measures implemented.
5. Reported issues log and utility benchmark.
6. If there is a list of measures considered but not implemented, list the reasons why for the measures considered.
7. Estimate the impact on each building's operations, maintenance, and procedures as well as the practicality of each measure.
8. Proposed M&V plan to be implemented by the City to verify actual performance.

- a. Were there any significant changes to the scope or costs of the Project as described in the Agreement or in a previously submitted Project Progress Report (if applicable)? If so, please briefly explain why.

No, there were no significant changes to the scope or cost of this program, schedule, budget and all deliverables were met.

2. Community Context

- a) Please provide a brief (five to six sentences) profile of the community building(s) that is the object of this Project, including community use and the services provided.

This program had a total of 18 facilities included that ranged from recreational complexes, pools, arenas and arts and cultural facilities and administration sites. Each one had its own challenges to be resolved, and different heritage requirements. The consultant had to work closely with the City to ensure that the deliverables were modified for the needs of the building.

The services provided by the community buildings for example are: Pools, community centres, multi purpose rooms, gymnasiums, museums, ice rinks, library, housing and social services, storage sites and other community facing applications.

3. Environmental, Economic and Social Benefits of the Project

For the questions in this section: If the answer to the question is clearly outlined in the documents provided as part of the Project, it is sufficient to indicate the section and page number(s) of the document in which the information can be found.

- a) As a result of your Project, what environmental benefits (ie. Reduced energy use, GHG emissions, water use, etc.) have been realized?

This project realized the GHG emissions reduction of over 330 tonnes of annual emissions, compared to 2018. This goal aligns with the a City council priority to reduce GHG emissions by 15% by 2022 (from 2018). Please refer to the reports attached for the exact figure for each facility.

- b) Have there been any increased operational savings identified or realized based on this Project?

Yes, in time after implementations are made the City of Kingston will further decreased GHG emissions and will benefit from cost savings (considered to be low cost energy conservation measures). Operational savings will be seen from increased efficiency, but also some due to decreased maintenance requirements.

4. Outcomes and Next Steps

- a) What next steps do you plan to take now that your Project is completed?

We plan on continuing with the RCx program on more buildings that did not qualify for this Grant. A total of 39 facilities by June 2023 and aiming for 60 by June 2024 will be addressed. Once this is complete, we are developing a method of completing ongoing RCx internally with our own staff so we can commission buildings every four years as technology changes and to ensure efficiencies are maintained. The thought behind a four-year cycle is that it will allow our staff to continuously maintain efficiency and it aligns with capital budget forecasting

We are also reviewing the use of energy models that came from this project and how those can be used more effectively for business case decisions for every single project to ensure all savings or increases are tracked and reported on.

- b) Do you anticipate any changes to municipal operations, policies or programmes as a result of having completed this Project? If so, please describe these changes.

We are considering an implementation of continuous or ongoing commissioning integrated into our Facility design guidelines and facilities management policies to ensure program continuity. By completing ongoing RCx on a four-year cycle we will be able to establish a division focussed on this work, how are able to help forecast capital budget requirements while maintaining the status quo of facility energy use.

Operations will change as we implement the ongoing commissioning program, however the scale of impact is still being reviewed in terms of staffing and resource constraints.

5. Lessons Learned

In answering the questions in this section, please consider all aspects of the preparation of the Project—from the initial planning through each of the essential tasks until the Project was completed.

- a) If your municipality was planning to undertake the preparation of this kind of project again, what (if anything) would you do *differently* (based on your experience with the preparation of this Project), and why?

Project delivery was smooth and the project manager had thought about most items prior to implementation, however one change that would have made a difference is the financial tracking and change order process as it relates to unexpected major issues identified by the RCx program.

While recommendations for minor changes and repairs are possible to accommodate, recommendations for major repairs or upgrades become capital projects, which may not be able to be done by the contracted proponent (creates a need for council approval and budget). Going forward it would be ideal to include a cash allowance in the budget for each site to allow for major repairs. If the major repairs could not occur in the project scope, then cash allowance would have allowed for detailed design to be created for use in future tenders.

- b) If your municipality was planning to undertake the preparation of this kind of project again, what (if anything) would you want to do *in the same way* (based on your experience with the preparation of this Project), and why?

This project went very well and having a project manager who is highly trained in energy management and building science is the key to success. That individual brings the understanding of technical information being delivered by the consultant and for the City of Kingston was the most impactful part of this project. While a project manager or program manager could deliver this, if they do not have the specific skillset in energy management, the consultant information may not be as precise as it needs to be to have a major

impact. Having a deep understanding of existing building issues is helpful in formulating a plan to RCx specific issues being identified by staff. Finally having a very clear scope of work helped answer most consultant questions prior to site visits and set the stage for a very detailed report as a deliverable.

- c) What barriers/challenges (if any) did your municipality encounter in undertaking the preparation of this Plan, and how were they overcome?

This plan was developed over 2 years and the major barrier was creating a realistic budget for a program that in its entirety spanned over 50 buildings. The submission pricing that came in was very different, and the difference in pricing for the same deliverables was difficult to understand. It did take some time to work through the submissions and ensure we were getting the highest quality reporting for the price provided.

Part of the challenge was educating senior management about the concept of Re-Commissioning and why it is an important part of a building lifecycle. Once again having internal staff who are highly skilled in this field made the process much easier to convey and communicate.

6. Knowledge Sharing

- a) Has the Project received any recognition, media coverage, or notable public support? If so, please describe briefly (three to four sentences).

No, it has not because the grant has not been publicly announced yet. We have received word that the earliest we can expect an announcement is the end of October (After municipal elections). We are developing a communication plan with internal and external partners for the appropriate time. Due to the long timeframe of this program we are looking forward to sharing the results of this first year to the public along with the expected outcomes of future years (When given permission to do so).

We are also working with the CBR advisory program offered by FCM and an external communication agency who will help us develop a communication strategy for internal and external stakeholders.

- b) Is there a website where more information about the Project can be found? If so, please provide the web address with links to the relevant section.

The website is under development. Once the website is live we are happy to share it with FCM.

- c) Aside from the establishment of the monitoring and analysis system/existing building commissioning report, has your work resulted in anything else that could be of use to another municipality (for example, case studies, best practices, new policies, new operating procedures, implementation of new and innovative technologies, etc.)? If so, please describe the item(s) briefly here, and include a copy of the item(s) when submitting this report, so that it can be shared with other communities.

The corporate structure of our City Facilities Management and Construction Services department is the most useful part of this process, and if other municipalities are looking to complete a program like this, we could offer support in how to centralize maintenance, construction, and asset management before beginning this process. Without centralization of these services, it is not our belief that this program would have been as successful. All parts of our centralized department were involved in this project, and each group had a role to play which resulted in true investment.

- d) Would you like to showcase your Project through an FCM webinar or workshop?

Yes, we are very interested in presenting this program and outcomes to the public or other municipalities. Please reach out to Russell Horne rhorne@cityofkingston.ca if there are any opportunities for presentations of showcases of this program.

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This project was carried out with assistance from the Green Municipal Fund, a Fund financed by the Government of Canada and administered by the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.