Revised Agenda
Committee of Council
The Corporation of the City of Brampton

Date: Wednesday, April 14, 2021

Time: 9:30 a.m.

Location: Council Chambers - 4th Floor, City Hall - Webex Electronic Meeting

Members:

Mayor Patrick Brown (ex officio)	
Regional Councillor R. Santos	Wards 1 and 5
Regional Councillor P. Vicente	Wards 1 and 5
City Councillor D. Whillans	Wards 2 and 6
Regional Councillor M. Palleschi	Wards 2 and 6
Regional Councillor M. Medeiros	Wards 3 and 4
City Councillor J. Bowman	Wards 3 and 4
City Councillor C. Williams	Wards 7 and 8
Regional Councillor P. Fortini	Wards 7 and 8
City Councillor H. Singh	Wards 9 and 10
Regional Councillor G. Dhillon	Wards 9 and 10

NOTICE: In consideration of the current COVID-19 public health orders prohibiting large public gatherings and requiring physical distancing, in-person attendance at Council and Committee meetings will be limited to Members of Council and essential City staff only. Public attendance at meetings is currently restricted. It is strongly recommended that all persons continue to observe meetings online or participate remotely.

For inquiries about this agenda, or to make arrangements for accessibility accommodations for persons attending (some advance notice may be required), please contact:
Sonya Pacheco, Legislative Coordinator, Telephone 905.874.2178, TTY 905.874.2130 cityclerksoffice@brampton.ca

Note: Meeting information is also available in alternate formats upon request.

1. Call to Order

2. Approval of Agenda

3. Declarations of Interest under the Municipal Conflict of Interest Act

4. Consent

In keeping with Council Resolution C019-2021, agenda items will no longer be pre-marked for Consent Motion approval. The Meeting Chair will review the relevant agenda items during this section of the meeting to allow Members to identify agenda items for debate and consideration, with the balance to be approved as part of the Consent Motion given the items are generally deemed to be routine and non-controversial.

5. Announcements

5.1. Announcement - Collision Conference - April 20-22, 2021

Presenter: Andrea Williams, Coordinator, Economic Development

Council Sponsor: Regional Councillor Medeiros

*5.2. Announcement – Volcanic Eruption in St. Vincent

6. Government Relations Matters

*6.1. Staff Update re: Government Relations Matters

A presentation was published on the City's website on April 13, 2021

6.2. Update from Mayor P. Brown, re: COVID-19 Emergency

7. Public Delegations

*7.1. Delegation from Jay Stevens, President and CMO, The Stevens Company Limited, re: The Stevens Company, Logistics Sector and Impact of COVID-19

This item was withdrawn (to be scheduled for a future date).

7.2. Delegation from Nick Rolfe, Partner, and Rob Hacking, Manager, KPMG LLP, re: Business Improvement Review - Insurance RFP

(See Item 11.2.1)

7.3. Delegation from Raghav Patel, Brampton resident, re: Request for Traffic Lights on Wanless Drive, West of Queen Mary Drive - Ward 6

8. Community Services Section

(Regional Councillor R. Santos, Chair; City Councillor C. Williams, Vice-Chair)

8.1. Staff Presentations

8.2. Reports

*8.2.1. ^Staff Report re: Real Estate Transactions executed by Administrative Authority - January 1, 2020 to December 31, 2020

To be received

*8.2.2. ^Staff Report re: Request for Budget Amendment - Developer Reimbursement for the Development of Ouray Developments Inc. Neighbourhood Park and Valley Recreational Trail with Pedestrian Bridge - Ward 8

Recommendation

*8.2.3. ^Staff Report re: Request to Begin Procurement for the Hiring of a General Landscape Contractor for the Construction of Sesquicentennial Park Activity Hub - Ward 9

Recommendation

*8.2.4. ^Staff Report re: Request to Begin Procurement for Installation, Removal and Maintenance of Winter Lights at Various Locations for a Three (3) Year Period

Recommendation

8.3. Other/New Business

8.3.1. Minutes – Brampton Community Safety Advisory Committee – March 25, 2021

To be approved

8.4. Correspondence

8.5. Councillors Question Period

8.6. Public Question Period

5 Minute Limit (regarding any decision made under this section)

During the meeting, the public may submit questions regarding recommendations made at the meeting via email to the City Clerk at cityclerksoffice@brampton.ca, to be introduced during the Public Question Period section of the meeting.

9. Legislative Services Section

(City Councillor J. Bowman, Chair; City Councillor D. Whillans, Vice-Chair)

9.1. Staff Presentations

9.2. Reports

*9.2.1. ^Staff Report re: Request for Budget Amendment – Lobbyist Registry Upgrade Solution

Recommendation

9.3. Other/New Business

9.3.1. Discussion Item at the request of City Councillor Bowman, re: Driveway Prosecutions

Proposed Motion:

WHEREAS driveway prosecutions have been on hold for over one year due to COVID-19;

WHEREAS the number of current files has grown to over 1,000;

WHEREAS the number of files is growing to an unmanageable size, further burdening our staff to keep up with the current case load;

WHEREAS now that new paving, widening and other driveway expansion work has begun throughout the City of Brampton;

THEREFORE BE IT RESOLVED that the City resumes its prosecutions of illegal driveways that violate City by-laws once the current stay-at-home order has been lifted.

9.3.2. Discussion Item at the request of City Councillor Bowman, re: Parking Permits

Proposed Motion:

WHEREAS the City of Brampton accepts requests for parking considerations by residents to park on City streets for as long as 14 days each calendar year, per vehicle licence plate;

WHEREAS the parking consideration allows vehicles to park in excess of three hours and/or between 2am and 6am;

WHEREAS the parking consideration also allows large vehicles designed for recreational use to park on the street;

THEREFORE BE IT RESOLVED that:
i) The City eliminate the 14-day parking permit and replace it with a 7-day permit;
ii) Each permit be assigned to an address the vehicle is associated with;
iii) Each address may have a limit of 40 permits associated with it per calendar year.

9.4. Correspondence

9.5. Councillors Question Period

9.6. Public Question Period

5 Minute Limit (regarding any decision made under this section)

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10. Economic Development Section

(Regional Councillor M. Medeiros, Chair; Regional Councillor P. Vicente, Vice-Chair)

10.1. Staff Presentations

*10.1.1. Staff Presentation re: Brampton Tourism Strategy and 2021 Implementation Plan

Presenter: J. Tamming, Director, Strategic Communications, Culture and Events

(See Item 10.2.1)

Published on the City's website on April 13, 2021

10.2. Reports

10.2.1. Staff Report re: Brampton Tourism Strategy and 2021 Implementation Plan

(See Item 10.1.1)

Recommendation

10.3. Other/New Business

*10.3.1. Discussion Item at the request of Councillor Palleschi re. Information on Recent Town Hall regarding Downtown

10.4. Correspondence

10.5. Councillors Question Period

10.6. Public Question Period

5 Minute Limit (regarding any decision made under this section)

During the meeting, the public may submit questions regarding recommendations made at the meeting via email to the City Clerk at cityclerksoffice@brampton.ca, to be introduced during the Public Question Period section of the meeting.

11. Corporate Services Section

(City Councillor H. Singh, Chair; Regional Councillor R. Santos, Vice-Chair)

11.1. Staff Presentations

*11.1.1. Staff Presentation re: 2020 Year End Operating Budget and Reserve Report

Presenters: D. Barrick, Chief Administrative Officer, and M. Medeiros, Acting Treasurer, Corporate Support Services

(See Item 11.2.4)

Published on the City's website on April 13, 2021

11.2. Reports

11.2.1. Staff Report re: KPMG Insurance RFP Review

(See Item 7.2)

To be received

11.2.2. Staff Report re: Capital Project Financial Status Report – Q4 2020

Recommendation

*11.2.3. ^Staff Report re: Investment Report for the year ended December 31, 2020

To be received

11.2.4. Staff Report re: 2020 Year End Operating Budget and Reserve Report

(See Item 11.1.1)

Recommendation

11.3. Other/New Business

*11.3.1. Discussion Item at the request of Regional Councillor Dhillon, re: Diverse and Ethnic Media

This item was deferred to the Committee of Council Meeting of April 28, 2021.

*11.3.2. Discussion Item at the request of Councillor Palleschi re. Possibility of a Standing Item on Agendas re Consulting

11.4. Correspondence

11.5. Councillors Question Period

11.6. Public Question Period

5 Minute Limit (regarding any decision made under this section)

During the meeting, the public may submit questions regarding recommendations made at the meeting via email to the City Clerk at cityclerksoffice@brampton.ca, to be introduced during the Public Question Period section of the meeting.

12. Public Works and Engineering Section

(Regional Councillor P. Vicente, Chair; Regional Councillor P. Fortini, Vice-Chair)

12.1. Staff Presentations

12.2. Reports

*12.2.1. ^Staff Report re: Initiation of Subdivision Assumption - Four X Development Inc. - Registered Plan 43M-2030 - North of Embelton Road, West of Mississauga Road - Ward 6 (Planning References: C05W07.004 and 21T-10020B)

Recommendation

*12.2.2. ^Staff Report re: Initiation of Subdivision Assumption - Kindwin Development Corporation - Registered Plan 43M-1923 – North of Countryside Drive, East of Airport Road - Ward 10 (Planning References: C07E17.008 and 21T-03007B)

Recommendation

*12.2.3. ^Staff Report re: Initiation of Subdivision Assumption - Scottish Heather Development Inc. - Registered Plan 43M-2029 - North of Steeles Avenue, East of Heritage Road - Ward 6 (Planning References: C05W04.005 and 21T-06024Ba)

Recommendation

*12.2.4. ^Staff Report re: Bee City Designation for Brampton

Recommendation

12.2.5. Staff Report re: Request for Budget Amendment - Brampton One Million Trees Program Update

Recommendation

*12.2.6. Staff Report re: Request for Budget Amendment and Request to Begin Procurement - Zero Carbon Retrofit of South Fletcher's Sportsplex

Recommendation

Appendix 2 was added and published on the City's website on April 13, 2021

*12.2.7. ^Staff Report re: Request for Budget Amendment - Barn Reconstruction at Historic Bovaird House

Recommendation

*12.2.8. ^Staff Report re: Request for Budget Amendment - The City of Brampton-Lorne Scots Military Museum

(See Item 12.4.1)

Recommendation

*12.2.9. ^Staff Report re: Traffic By-law 93-93 - Administrative Update (File I.AC)

Recommendation

*12.3. Other/New Business

*12.3.1. Discussion Item at the request of Councillor Dhillon re. Ontario Dump Truck Association – Strike Update

12.4. Correspondence

*12.4.1. ^Correspondence from HCol (Ret'd) William A. Adcock OMM CD, Chair, The Regimental Museum of the Lorne Scots (Peel, Dufferin and Halton Regiments), dated March 31, 2021, re: The City of Brampton-Lorne Scots Military Museum

(See Item 12.2.8)

12.5. Councillors Question Period

12.6. Public Question Period

5 Minute Limit (regarding any decision made under this section)

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13. Referred Matters List

Note: In accordance with the Procedure By-law and Council Resolution, the Referred Matters List will be published quarterly on a meeting agenda for reference and consideration. A copy of the current Referred Matters List for Council and its committees, including original and updated reporting dates, is publicly available on the City's website.

14. Public Question Period

15 Minute Limit (regarding any decision made at this meeting)

During the meeting, the public may submit questions regarding recommendations made at the meeting via email to the City Clerk at cityclerksoffice@brampton.ca, to be introduced during the Public Question Period section of the meeting.

15. Closed Session

Note: A separate package regarding these agenda items are distributed to Members of Council and senior staff only.

15.1. Open Meeting exception under Section 239 (2) (c) and (k) of the Municipal Act, 2001:

A proposed or pending acquisition or disposition of land by the municipality or local board; and a position, plan, procedure, criteria or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the municipality or local board.

15.2. Open Meeting exception under Section 239 (2) (b) and (d) of the Municipal Act, 2001:

Personal matters about an identifiable individual, including municipal or local board employees and labour relations or employee negotiations.

15.3. Open Meeting exception under Section 239 (2) (b) and (d) of the Municipal Act, 2001:

Personal matters about an identifiable individual, including municipal or local board employees and labour relations or employee negotiations.

*15.4. ^Open Meeting exception under Section 239 (2) (b) of the Municipal Act, 2001:

Personal matters about an identifiable individual, including municipal or local board employees.

*15.5. Open Meeting exception under Section 239 (2) (k) of the Municipal Act, 2001:

A position, plan, procedure, criteria or instruction to be applied to any negotiations carried on or to be carried on by or on behalf of the municipality or local board.

16. Adjournment

Next Regular Meeting: Wednesday, April 28, 2021

BRAMPTON Flower City
brampton.ca

Chief Administrative Office
City Clerk

For Office Use Only:
Meeting Name:
Meeting Date:

Announcement Request

Please complete this form for your request to make an Announcement at a future Council Meeting. An announcement can relate to an event of interest to the general public. Your request must include the name of the Member of Council sponsoring the Announcement. Once this completed form is received by the City Clerk's Office, you will be contacted to confirm your placement on the appropriate agenda. **Announcements are limited two (2) minutes at the meeting.**

Attention: City Clerk's Office, City of Brampton, 2 Wellington Street West, Brampton ON L6Y 4R2
Email: cityclerksoffice@brampton.ca Telephone: (905) 874-2100 Fax: (905) 874-2119

Meeting:
- ☐ City Council
- ☑ Committee of Council
- ☐ Planning and Development Committee
- ☐ Other Committee:

Meeting Date Requested: April 14, 2021

Name of Individual(s): Andrea Williams

Position/Title: Coordinator, Economic Development

Organization/Person being represented: City of Brampton

Full Address for Contact: 2 Wellington Street West
Brampton, ON L6Y 4R2

Telephone: 905-874-3577

Email: andrea.williams@brampton.ca

Event or Subject Name/Title/ Date/Time/Location:	City of Brampton participation at the 2021 Collision Conference
Additional Information:	
Name of Member of Council Sponsoring this Announcement:	Councillor Medeiros

A formal presentation will accompany my Announcement: ☑ Yes ☐ No

Presentation format:
- ☐ PowerPoint File (.ppt)
- ☑ Adobe File or equivalent (.pdf)
- ☐ Picture File (.jpg)
- ☐ Video File (.avi, .mpg)
- ☐ Other:

Additional printed information/materials will be distributed with my Announcement: ☐ Yes ☑ No ☐ Attached

Note: Persons are requested to provide to the City Clerk's Office **well in advance of the meeting date:**
(i) 25 copies of all background material and/or presentations for publication with the meeting agenda and /or distribution at the meeting, and
(ii) the electronic file of the presentation to ensure compatibility with corporate equipment.

Submit by Email

Once this completed form is received by the City Clerk's Office, you will be contacted to confirm your placement on the appropriate meeting agenda.

BRAMPTON MEANS BUSINESS NOW

City of Brampton at:
Collision Conference

Andrea Williams
Economic Development Coordinator

BRAMPTON

INVESTBRAMPTON.CA

COLLISION®

APRIL 20-22, 2021

Collision is the fastest-growing tech conference in North America.

By sponsoring this event staff will: generate high quality leads, strengthen existing corporate relationships & increase Brampton's brand awareness of the Innovation District and its current & new partners.

40,000 People
1,000+ Startups
120+ Countries
850+ Investors
500+ Speakers
110+ Partners

"Collision brings together the people and companies redefining the global tech industry"

COLLISION®

APRIL 20-22, 2021

City of Brampton Sponsorship:

- Curated Masterclass Session - "A Gateway to Canada"
- Mentor Hours
- Pitch Competition: Judge Participation
- Video Ads (3)
- Media Release
- Social Media Campaign
- Investment Meetings

BRAMPTON MEANS BUSINESS NOW

Thank You

Andrea Williams
Economic Development Coordinator

BRAMPTON

INVESTBRAMPTON.CA

GOVERNMENT RELATIONS

BRAMPTON Flower City

brampton.ca

Government Relations Matters

Committee of Council
April 14, 2021

Provincial Government | Update

Ontario

April 11, 2021: Increased capacity of the COVID-19 vaccine rollout with the addition of over 700 pharmacies across the province.

April 8, 2021: Launched a series of zero-tolerance workplace safety inspections in sectors and regions hardest hit by COVID-19, beginning with warehouses, food processors and manufacturers in Peel and Halton Region.

April 9, 2021: Issued **two temporary emergency orders** under the Emergency Management and Civil Protection Act (EMCPA) to maximize system capacity by allowing redeployment of health care professionals and other workers and flexibility to transfer patients to alternate hospital sites.

On April 7, 2021, the Province declared a third **provincial emergency** under s 7.0.1 (1) of the Emergency Management and Civil Protection Act (EMPCA). Effective Thursday, April 8, 2021 at 12:01 a.m., the government issued **province-wide Stay-at-Home order** requiring everyone to remain at home except for essential purposes.

Federal Government | Update

Canada

April 6, 2021: Announced $5.5M in joint funding through the ICIP program for the rehabilitation of the Rose Theatre. Funding breakdown:

- Government of Canada: $2.2 million
- Government of Ontario: $1.8 million
- City of Brampton: $1.5 million

April 8, 2021: Extended the support of the Canadian Red Cross in select long-term care and retirement homes in Ontario. This support was originally scheduled to conclude in March 2021, but will now continue until September 30, 2021.

The 2021 Federal Budget will be announced on Monday, April 19, 2021.

AMO 2021 Conference: Program Update

Sessions to be featured at the 2021 AMO Conference include:

- Broadband
- Community Paramedicine
- Long-term Care Reform
- Ontario Health Teams
- Housing and Neighbourhood Revitalization
- Policing
- Economic Impacts of Climate Change
- Promoting the Best Interests of Children and Youth in Communities
- Conservation Authorities
- Community Benefits Agreements (CBAs)
- E-permitting for Building Officials
- Waste Diversion
- Local Impacts of Cannabis Production

AMO is developing a new panel on ***The Path to Economic Recovery*** and bringing back AMO's ***Women's Leadership Forum*** with a new lineup of distinguished leaders - details to follow.

The 2021 Virtual Conference will also include **delegation meetings** with Ontario Cabinet Ministers and Party Leaders - details to follow.

Registration is open, and **early bird rates apply until April 30, 2021**.

FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

GOVERNMENT RELATIONS

BRAMPTON Flower City brampton.ca

FORWARD

FCM 05-31 >> 06-04 >> 2021 ANNUAL CONFERENCE AND TRADE SHOW

Proposed Advocacy Topics

Infrastructure

- Transit
- Higher Order Transit
- Active Transportation

Sustainability

- Climate Change

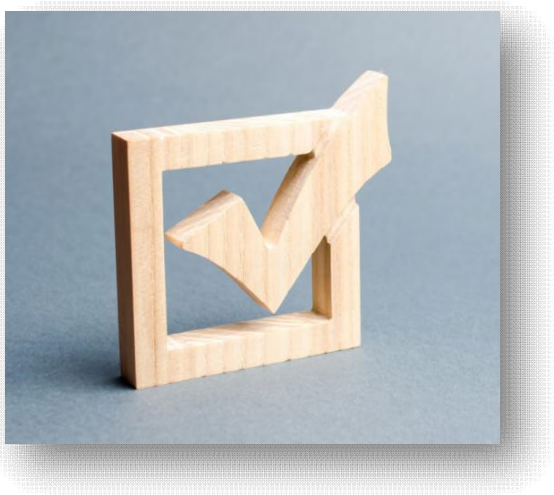
Economy

- Pandemic Recovery
- Opportunities and Innovation

As in previous years, Public Affairs staff are working to develop advocacy materials, and provide Council Members with any required support.

Registration is open, and **early bird rates apply until April 23, 2021**.

FCM's 2021-22 Board of Directors Election



May 25	• Deadline for submission of Consent Form and resolutions for Board of Director positions to be registered on the official ballot • Last day to submit bio and picture for the website
June 1 - 2	Election of Table Officers
June 2	Election of Directors
June 4	• FCM 2021 annual general meeting • Election of Board of Directors slate

- FCM's municipal members attending the Annual Conference are automatically registered to vote virtually or by phone.
- Registered voters will receive a detailed email with instructions on how to vote online.

Requirements to run as a candidate:

- Be an elected official of an FCM-member municipality
- Submit one of these forms:
  - Director consent form: Due May 21, to include your name on the official ballot
  - Submit an official resolution: Council endorsed resolution

BRAMPTON Flower City
brampton.ca

Corporate Services
Council and Administrative Services

Request for Delegation

Attention: City Clerk's Office, City of Brampton, 2 Wellington Street West, Brampton ON L6Y 4R2
Email: cityclerksoffice@brampton.ca Telephone: (905) 874-2100 Fax: (905) 874-2119

Meeting:
- ☐ City Council
- ☐ Planning & Development Committee
- ☒ Committee of Council
- ☐ Other

Meeting Date Requested: April 14, 2021 Agenda Item (if applicable):_____

Name of Individual(s):	Jay Stevens
Position/Title:	President and CMO
Organization/Person being Represented:	The Stevens Company Limited
Full Address for Contact:	425 Railside Drive Brampton, ON L7A 0N8
Telephone No.	800-268-0184
Email/ Fax No.	jay.stevens@stevens.ca

Subject Matter to be Discussed	To provide a short overview of The Stevens Company, the impact of COVID-19, and the logistics sector in Brampton
Action Requested	Delegation to be received

Note: a delegation is limited to not more than five minutes. Attach additional page if required.

I am submitting a formal presentation to accompany my delegation: ☒ Yes ☐ No

I will require the following audio-visual equipment/software for my presentation:

- ☐ Computer Notebook
- ☐ DVD Player
- ☐ PowerPoint
- ☐ Other - please specify_____

Note: Delegates are requested to provide to the City Clerk's Office **well in advance of the meeting date**: (i) 25 copies of all background material and/or presentations for publication with the meeting agenda and/or distribution at the meeting, and (ii) for PowerPoint and other visual presentations, an electronic copy of the presentation (e.g., DVD, CD, .ppt file) to ensure compatibility with corporate equipment.

Once the above information is received by the City Clerk's Office, you will be contacted by a Legislative Coordinator **to confirm your placement on the appropriate agenda**.

STEVENS

Inspired by the care you deliver • Inspiré par les soins que vous distribuez

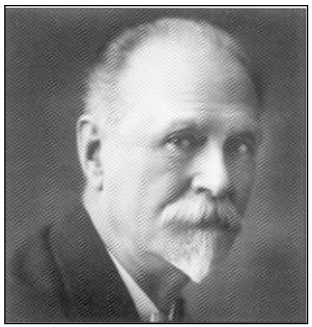
The Stevens Company Limited

A National Canadian Distributor of Medical Supplies and Equipment

Family Business

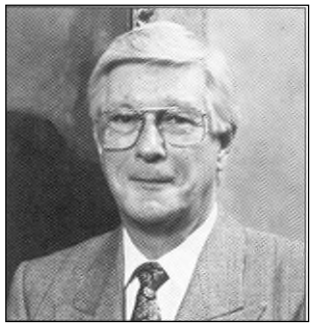
- Family owned and operated, 1830 to present
- Six generations and counting

James Stevens



Daniel Stevens

Paul Stevens



Peter Stevens

Jeff Stevens

Jay Stevens

About Stevens

- Canada's **LARGEST & OLDEST** privately owned distributor of medical supplies and equipment
- Originally founded in 1830 in London, England as a manufacturer of surgical instruments
- First Canadian office opened in 1874 in Toronto, ON

About Stevens

- Acute Care (Hospitals) are our biggest customer base
- Stevens services all classes of trade including:
  - Clinics
  - Doctor offices
  - Long Term Care/Retirement Homes
  - Government (every level)
  - Educational facilities
  - Naturopath
  - Midwifery
  - Veterinary
  - Industrial
  - Home Healthcare

National Distribution

We have six Distribution Centre's across Canada totalling over 300,000 Square Feet

Our inventory exceeds $50,000,000 at any given point in time and products can be drawn from any facility

Our Partners

Stevens represents over 550 vendors with

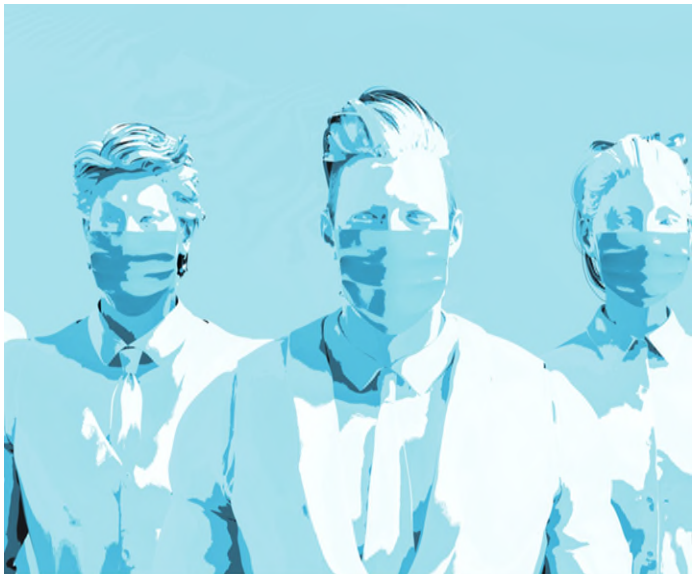
over 50,000 SKU's

Major Vendors include:

3M, Hillrom, Coloplast, Heine, Integra Miltex, Sklar, Kimberly Clark, Midmark, Diversey, Graham Medical, Becton Dickinson, Smith and Nephew, Copan Diagnostics, Meiko, ICU Medical, Sol Millennium and Wipak

COVID Response

- COVID: The Perfect Storm
- Product sourcing challenges
  - Sourcing from China
  - Demand pressure
  - Freight challenges
  - Leveraging great partnerships
- Staffing Challenges
  - Keeping our team safe was our top priority
    - Working from home
    - PPE for on-site staff
    - New protocols in place
    - Virtual meetings



COVID Response

- Rising to new challenges
  - New vendors
  - New customers
  - Federal government contracts
  - Provincial government distribution

- Our team rose to the challenge... and beyond
  - A lot of hard work, a lot of stressful days
  - Hats off to our team for the job they did
  - Federal and Provincial recognition

Communication and Praise

- How did we keep our team engaged and motivated?
  - Frequent communication
  - Empathy, praise and gratitude
  - Relaying the importance of the job being done
  - Sharing customer feedback
  - Food trucks / socially distanced events
  - Virtual staff events

Lessons Learned

- Be prepared and agile enough to adapt
- The value of technology
  - Phone system
  - MS Teams/Zoom etc.

- The importance of mental health
  - COVID has amplified what was already a growing concern
- Remote working isn't necessarily a bad thing

Giving Back

- Brampton
  - Funded and helped to coordinate hundreds of meals with cooperation from the City of Brampton
  - Meals distributed through local organizations and sourced from local restaurants
- Food Banks Canada
  - National donation

KHALSA AID INTERNATIONAL

Knights Table
Helping To Alleviate Hunger in Peel Region

Food Banks Canada

tk's catering
Deliciously Beautiful Events
SINCE 1990

The Food Quotient
Local Food for the Global Mind

MR.SUB

Heart Lake United Church
Connecting God, People and Community

Thank You

BRAMPTON Flower City
brampton.ca

Chief Administrative Office
City Clerk

For Office Use Only:
Meeting Name:
Meeting Date:

Delegation Request

Please complete this form for your request to delegate to Council or Committee on a matter where a decision of the Council may be required. Delegations at Council meetings are generally limited to agenda business published with the meeting agenda. Delegations at Committee meetings can relate to new business within the jurisdiction and authority of the City and/or Committee or agenda business published with the meeting agenda. **All delegations are limited to five (5) minutes.**

Attention: City Clerk's Office, City of Brampton, 2 Wellington Street West, Brampton ON L6Y 4R2
Email: cityclerksoffice@brampton.ca Telephone: (905) 874-2100 Fax: (905) 874-2119

Meeting:
- ☐ City Council
- ☑ Committee of Council
- ☐ Planning and Development Committee
- ☐ Other Committee:

Meeting Date Requested: April 14, 2021 **Agenda Item (if applicable):** TBD

Name of Individual(s): Nick Rolfe
Rob Hacking

Position/Title: Partner,
Manager

Organization/Person being represented: KPMG LLP

Full Address for Contact: 333 Bay Street, Suite 4600
Toronto, Ontario M5H 2S5

Telephone:

Email: nicholasrolfe@kpmg.ca

Subject Matter to be Discussed:	KPMG Business Improvement Review - Insurance RFP
Action Requested:	To receive the report for information.

A formal presentation will accompany my delegation: ☐ Yes ☑ No

Presentation format:
- ☐ PowerPoint File (.ppt)
- ☐ Adobe File or equivalent (.pdf)
- ☐ Picture File (.jpg)
- ☐ Video File (.avi, .mpg)
- ☐ Other:

Additional printed information/materials will be distributed with my delegation: ☐ Yes ☑ No ☐ Attached

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Submit by Email

Once this completed form is received by the City Clerk's Office, you will be contacted to confirm your placement on the appropriate meeting agenda.

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BRAMPTON Flower City
brampton.ca

Corporate Services
Council and Administrative Services

Request for Delegation

Attention: City Clerk's Office, City of Brampton, 2 Wellington Street West, Brampton ON L6Y 4R2
Email: cityclerksoffice@brampton.ca Telephone: (905) 874-2100 Fax: (905) 874-2119

Meeting: ☐ City Council ☐ Planning & Development Committee
☒ Committee of Council
☐ Other

Meeting Date Requested: April 14, 2021 Agenda Item (if applicable):_____

Name of Individual(s): RAGHAV PATEL

Position/Title:

Organization/Person being Represented: RESIDENTS OF HOMES IN SUBDIVISIONS ALONG WANLESS DR., WEST OF QUEEN MARY DR.

Full Address for Contact: BRAMPTON, ON,

Telephone No. _____ Email/ Fax No. _____

Subject Matter to be Discussed	Wanless Dr. is now a 4 lane road, and many new subdivisions west of Queen Mary Dr. feed directly onto the road. But many of these intersections (eg. Edenbrook Hill Dr. & Wanless Dr.) do not have traffic lights, creating a dangerous situations for residents turning onto Wanless Dr., especially during periods of high traffic.
Action Requested	Traffic lights to be added to the described intersections, and during the delegation I will be specifying all of the problem intersections.

Note: a delegation is limited to not more than five minutes. Attach additional page if required.

I am submitting a formal presentation to accompany my delegation: ☒ Yes ☐ No

I will require the following audio-visual equipment/software for my presentation:

☐ Computer Notebook ☐ DVD Player ☒ PowerPoint

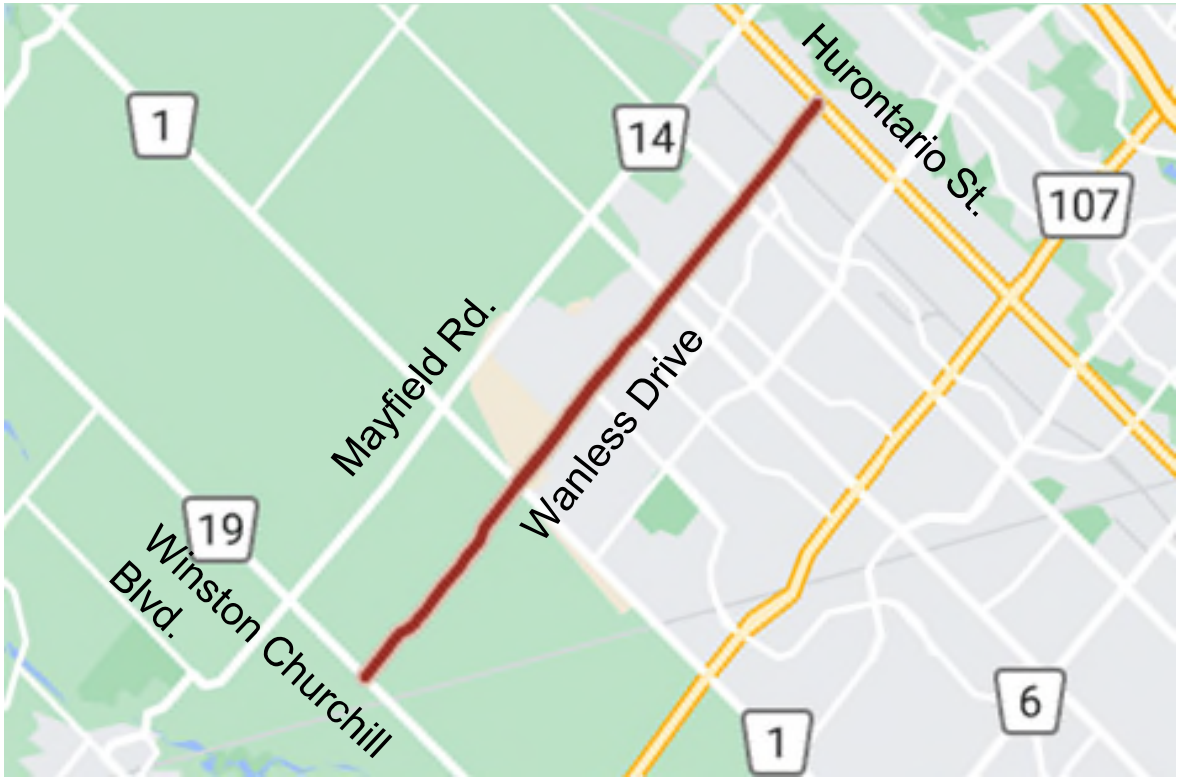
☐ Other - please specify_____

Note: Delegates are requested to provide to the City Clerk's Office **well in advance of the meeting date**: (i) 25 copies of all background material and/or presentations for publication with the meeting agenda and/or distribution at the meeting, and (ii) for PowerPoint and other visual presentations, an electronic copy of the presentation (e.g., DVD, CD, .ppt file) to ensure compatibility with corporate equipment.

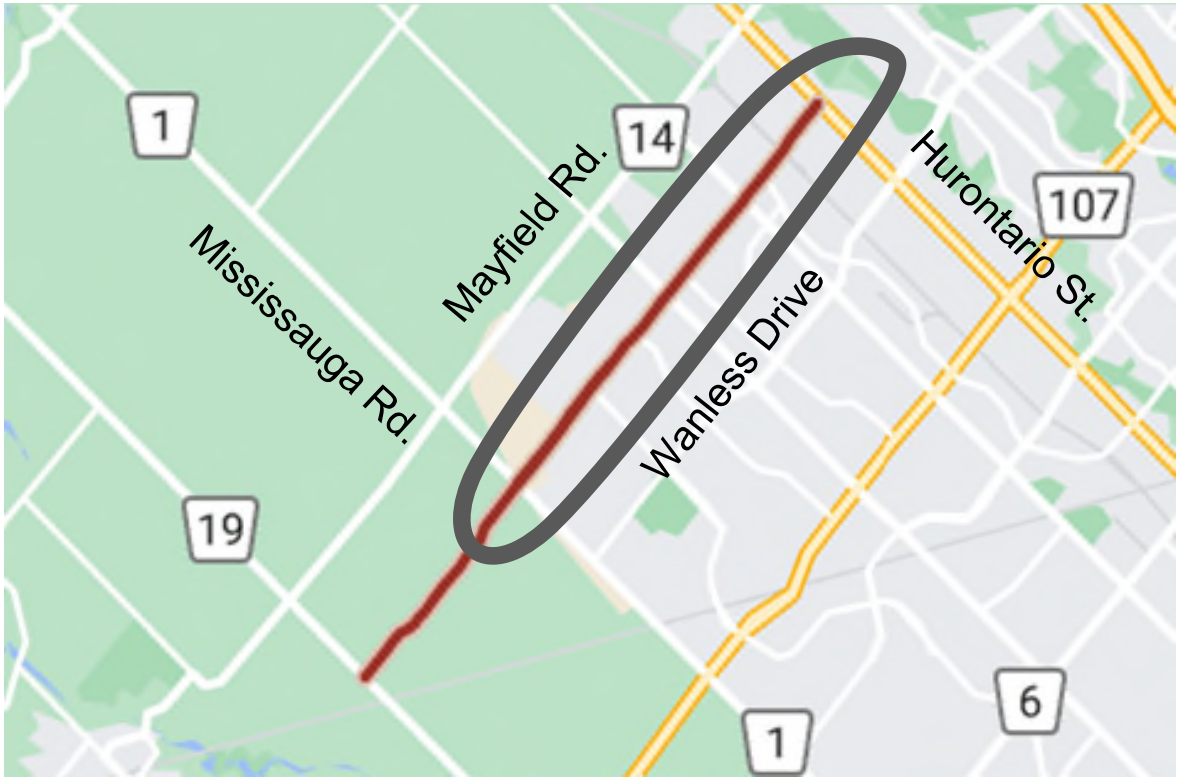
Once the above information is received by the City Clerk's Office, you will be contacted by a Legislative Coordinator **to confirm your placement on the appropriate agenda**.

Request to add Traffic Lights on Wanless Drive West of Queen Mary Drive

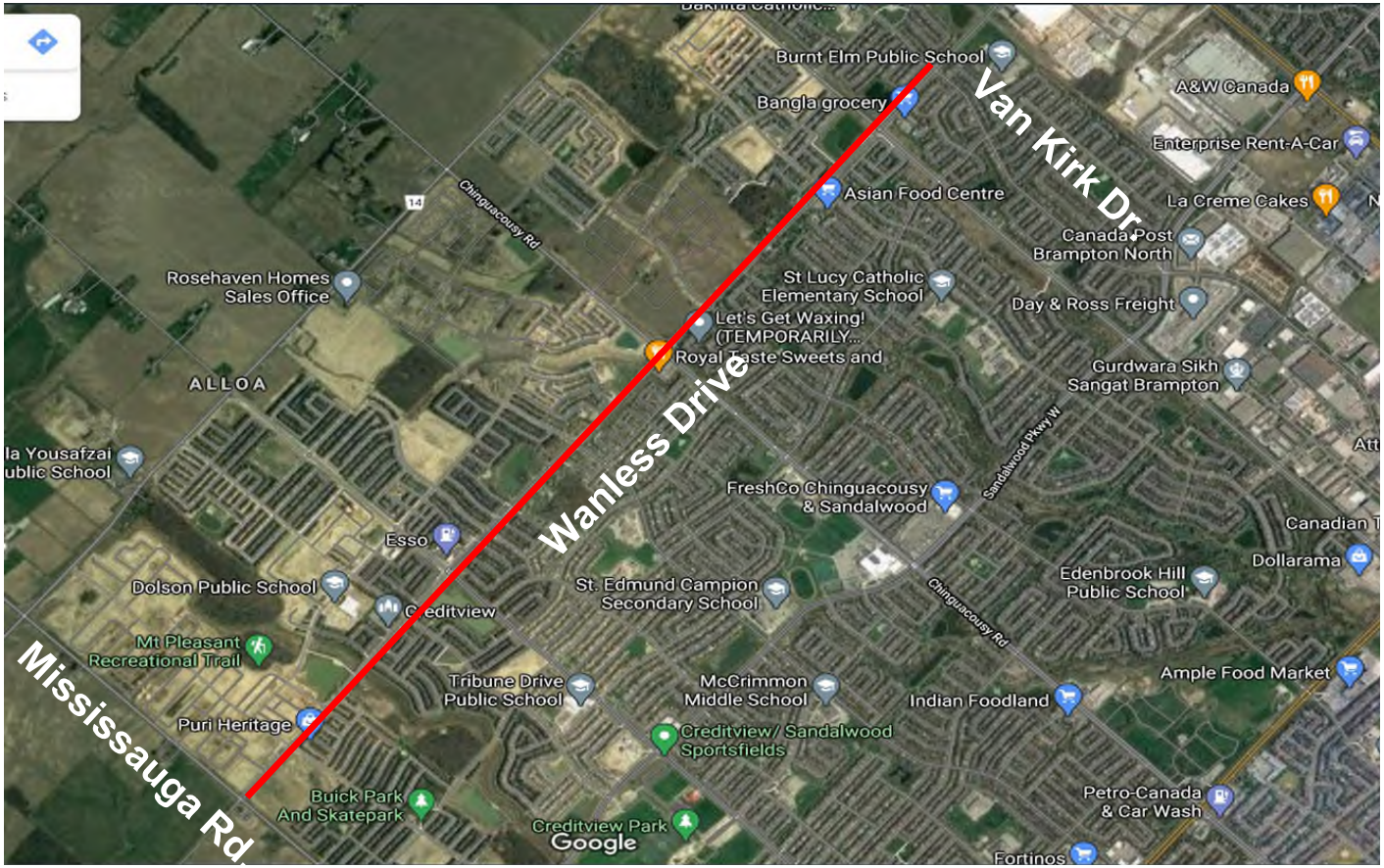
Wanless Drive connects Hurontario St. to Winston Churchill Boulevard, located in Wards 2&6 of Brampton



Wanless Drive is a 4 lane road in between Hurontario Street and Mississauga Road.



In the past several years, large housing subdivisions have been built along Wanless Dr., in between Van Kirk Dr. and Mississauga Rd.



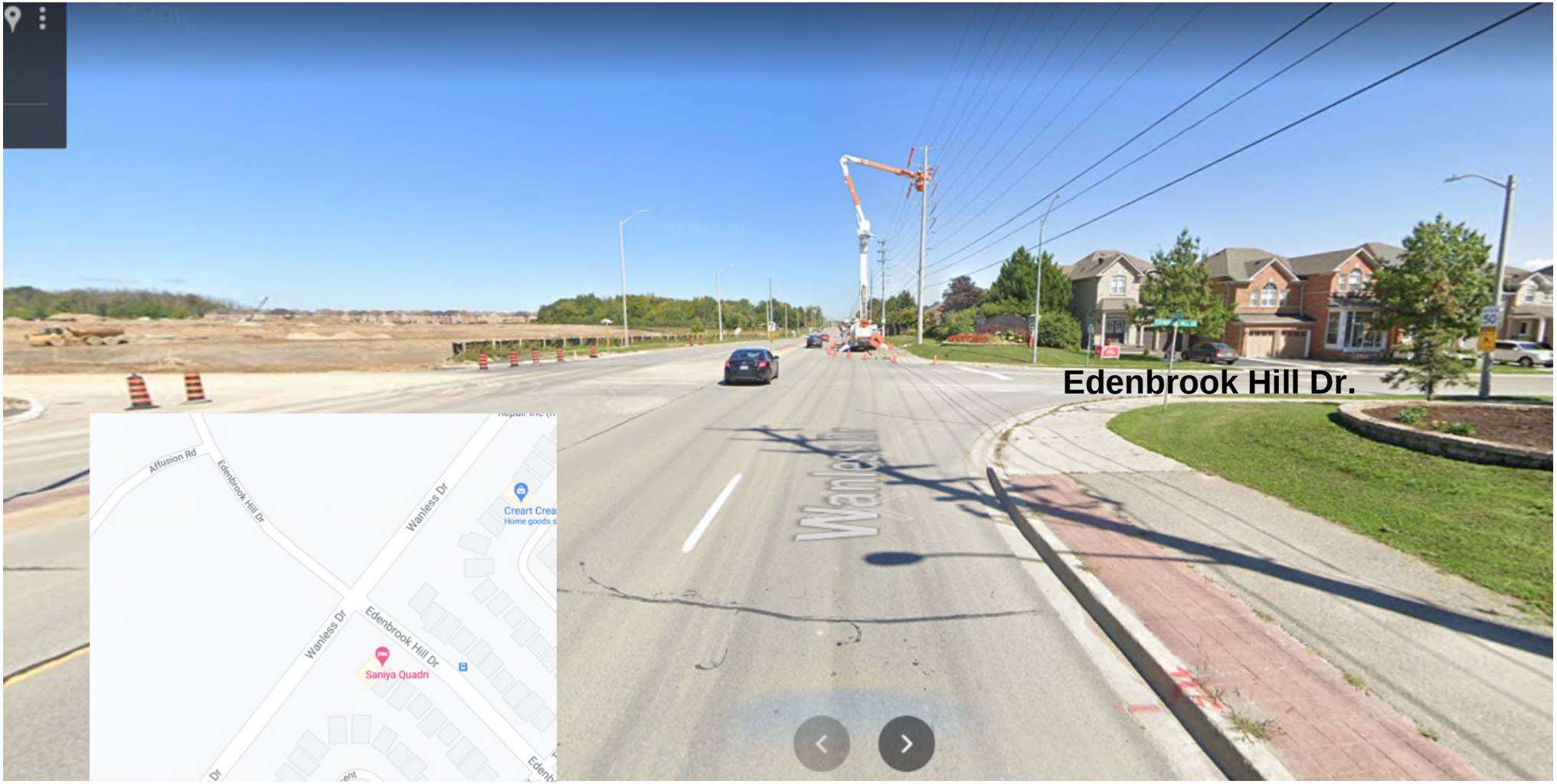
For any street that connects a housing subdivision to a main road, there is a traffic light installed, to ensure the safety of drivers while merging onto the main roads.

This is true for other main roads in the area, like Mayfield Rd., McLaughlin Rd., Bovaird Dr., and generally all main roads in Brampton.

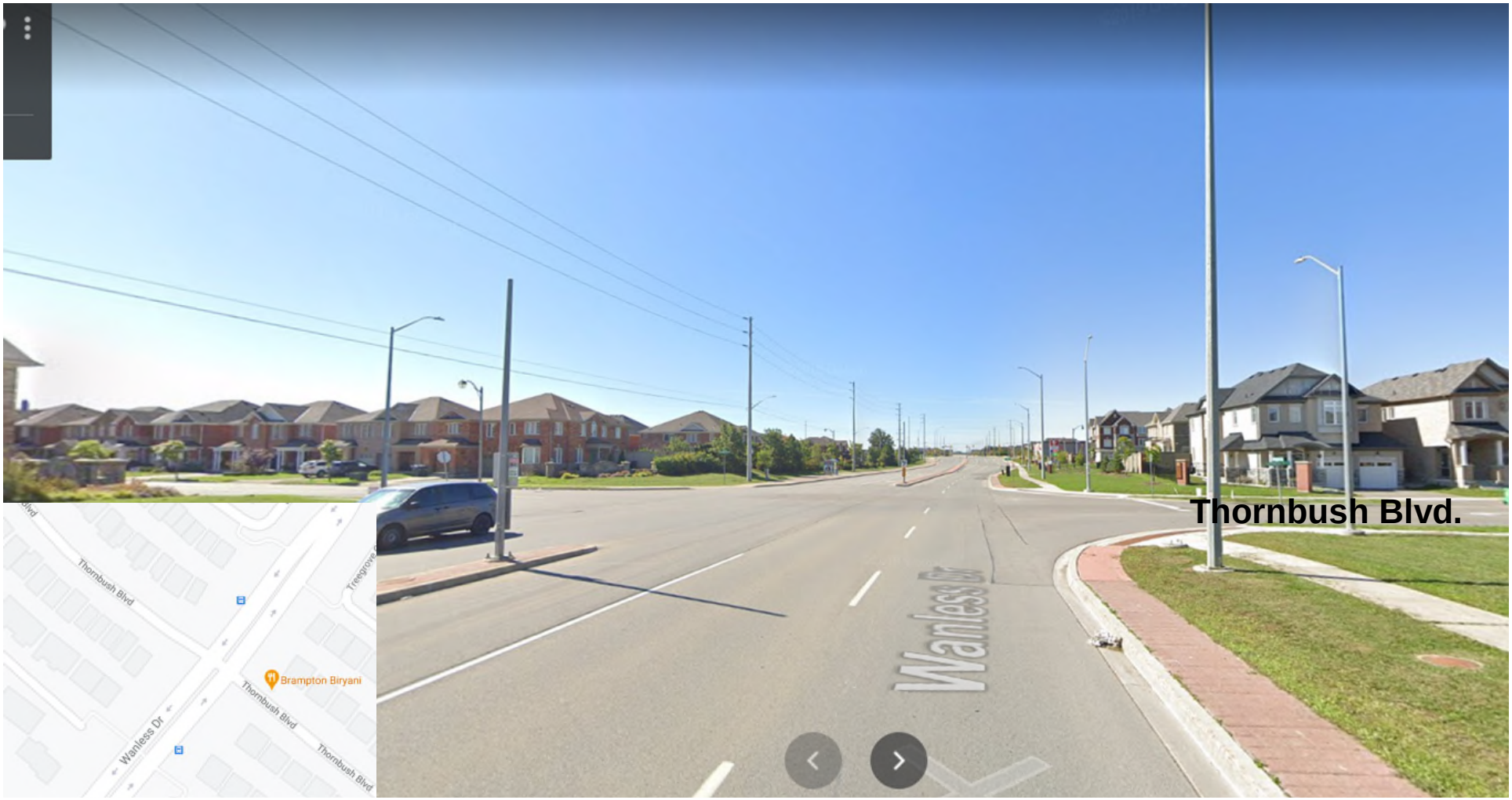
Because of the growth of housing developments along Wanless Dr., Wanless Drive should now be considered a main road.

Many streets that connect housing subdivisions to Wanless Dr. do have traffic lights, but there are still some without.

Wanless Dr. and Edenbrook Hill Dr.



Wanless Dr. and Thornbush Blvd.



Residents from both of the neighbourhoods at these intersections have shared their concerns about the safety of these intersections, especially during the morning rush hour, when left turn lanes exiting the housing subdivisions are backed up, and cars are making rushed left turns to get onto Wanless Dr.

Many residents also have witnessed horrible car crashes, crashes causing cars being flipped over, because they tried to rush a left turn onto Wanless Dr.

<u>In conclusion:</u>

Traffic lights need to be immediately installed at
Wanless Dr. & Edenbrook Hill Dr.
Wanless Dr. & Thornbush Blvd.

When new housing subdivisions are being built, it is important that traffic lights and other road safety measures are installed before residents are moved in.

In many cases, residents are moving into new subdivisions, and are having to wait for years before these basic road safety apparatuses are built.

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2020-12-21

Subject: **Real Estate Transactions executed by Administrative Authority**

Secondary Title: Real Estate Transactions Executed by Administrative Authority, January 1, 2020 to December 31, 2020

Contact: **Kristine Thususka, Senior Real Estate Coordinator, Realty Services, 905-874-2985**

Report Number: Community Services-2021-255

Recommendations:

1. That the report titled: Real Estate Transactions Executed by Administrative Authority– January 1, 2020 to December 31, 2020 (Escribe Number Community Services-2021-255) to the Committee of Council Meeting of April 14, 2021, be received.

Overview:

- **By Administrative Authority By-law 216-2017, authority is delegated to department heads to execute certain real estate transactions.**
- **In order to keep City Council apprised on the quantity and financial implications of agreements executed by administrative authority, Realty Services provides City Council with a summary of such executed agreements attached to this report as Appendix "A"-Summary of Real Estate Transactions executed by Administrative Authority.**
- **This report provides information on real estate agreements executed by administrative authority for the period January 1, 2020 to December 31, 2020. This summary does not include agreements arising as a condition of development (site plan/subdivision/consent) approval.**

Background:

In accordance with the Administrative Authority By-law, authority is delegated to department heads to execute certain real estate agreements. Authority is granted for routine, non-controversial transactions up to specified dollar amounts.

Realty Services has reported to Council on a quarterly basis, on the real estate activities authorized by administrative authority attached to this report as Appendix “A” - Summary of Real Estate Transactions executed by Administrative Authority.

Current Situation:

Due to the extra-ordinary circumstances, of the Covid-19 Pandemic, Realty’s report to Council on the transactions completed by Administrative Authority, is being reported on an annual basis, being the period January 1, 2020 to December 31, 2020 rather than on a quarterly basis as has been the previous practice.

Financial Implications:

This is an information report only and has no financial or other corporate implications.

Strategic Plan:

This report supports the City’s Strategic Plan priority of Good Government. More specifically, it aligns with the strategic initiative of containing costs and capitalizing on funding opportunities, as well as the tactical element of finding efficiencies in the delivery of core services.

Living the Mosaic – 2040 Vision

This Report has been prepared in full consideration of the overall vision that the people of Brampton will ‘Live the Mosaic’ through enabling greater internal capacity and enhancing our commitment to customer service.

Conclusion:

This information report summarizes Realty Services’ reporting on real estate agreements for the period January 1, 2020 to December 31, 2021.

Authored by:

Kristine Thususka
Senior Real Estate Coordinator

Reviewed by:

Donn Bennett
Acting Senior Manager Realty Services

Approved by:

Marion Nader
Commissioner, Community Services

Submitted by:

David Barrick
Chief Administrative Officer

Attachments:

Appendix A-Summary of Real Estate Transactions Executed by Administrative Authority

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Acquisitions – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
L16COB.N.2	Senior Manager Realty Services	1	775367 Ontario Limited (Owner) 1 Nelson Street West Lunchroom space for Brampton Transit One (1) year term	Lease Extension Agreement	$10,050 plus H.S.T
L16COB.B.3	Commissioner Community Services	7	Trustees of Emmanuel United Church (Owner) 420 Balmoral Drive Community Garden Program Ten (10) year term	Licence Agreement	$2
L16B5.5	Commissioner Community Services	7	Peel District School Board (Owner) 233 Balmoral Drive Permit construction by City of 14 temporary parking stalls, while Balmoral Recreation Centre is undergoing renovations Two (2) year term	Licence Agreement	$2
AG-16-117	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 0 Coleraine Drive Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AG-16-119	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 11460 and 11462 Coleraine Drive Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AG-16-120	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 11189 Coleraine Drive Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AG-16-121	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 0 Coleraine Drive PIN#142130079 Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AG-16-156	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 4973 Countryside Drive Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Acquisitions – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
AG-16-182	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 10517 Clarkway Drive Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AG-16-191	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 10015 Coleraine Drive Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AG-16-208	Commissioner Public Works & Engineering	10	SP47 Arterial Road Widening Project 0 Clarkway Drive PIN#142130005 Pre construction investigations December 16, 2019 to September 30, 2020	Permission to Enter	$2
AR-07-133	Commissioner Public Works & Engineering and Treasurer	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 10230 Goreway Drive Two (2) year Temporary Grading Easement and Fee Simple	Agreement of Purchase and Sale	$2,500
AR-07-144	Commissioner Public Works & Engineering and Treasurer	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 10459 Goreway Drive Two (2) year Temporary Grading Easement	Agreement of Purchase and Sale	$31, 837
AR-07-145	Commissioner Public Works & Engineering	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 10559 Goreway Drive Two (2) year Temporary Grading Easement	Agreement of Purchase and Sale	$2, 500
AR-07-155	Commissioner Public Works & Engineering and Treasurer	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 10901 Goreway Drive Two (2) year Temporary Grading Easement	Agreement of Purchase and Sale	$29,127.15
AR-07-156	Commissioner Public Works & Engineering and Treasurer	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 10925 Goreway Drive Two (2) year Temporary Grading Easement and Fee Simple	Agreement of Purchase and Sale	$38,699

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Acquisitions – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
AR-07-157	Commissioner Public Works & Engineering and Treasurer	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 10961 Goreway Drive Two (2) year Temporary Grading Easement and Fee Simple	Agreement of Purchase and Sale	$26,256
AR-07-162	Commissioner Public Works & Engineering and Treasurer	10	Goreway Drive Widening (Countryside Drive to Mayfield Road) 28 Tortoise Court Two (2) year Temporary Grading Easement and Fee Simple	Agreement of Purchase and Sale	$55,323

Disposals – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
PM04W15D	Commissioner Public Works & Engineering	6	The Regional Municipality of Peel South side of Steeles Avenue West, west of Financial Drive Part of PIN#140855453(LT) Fee simple acquisition to facilitate the Steeles Avenue West road widening project	Agreement of Purchase and Sale	$2
PM04W15D	Commissioner Public Works & Engineering	6	The Regional Municipality of Peel South side of Steeles Avenue West, west of Financial Drive, portion of lands comprising a storm water management pond Part of PIN# 140855222(LT) Fee simple acquisition to facilitate the Steeles Avenue West road widening project	Agreement of Purchase and Sale	$2
PM04E05D	Commissioner Public Works & Engineering	7	The Regional Municipality of Peel North East Corner of Dixie Road and Clark Boulevard PIN#141700015 Permanent easement required for East Brampton Water Main Project	Agreement of Purchase and Sale	$2

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements–January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
L16M.1.1A	Commissioner Community Services	1	Beaux Arts Brampton 70-74 Main Street North Release and Surrender Agreement effective August 31, 2020	Release and Surrender Agreement	$2
L16M.8	Senior Manager Realty Services	1	1408811 Ontario Inc. 60 Main Street North Release and Surrender Agreement effective June 20, 2020	Release and Surrender Agreement	$2
L16N.1.2	Commissioner Community Services	1	Unit 104, 8 Nelson Street West Release and Surrender Agreement effective September 21, 2020	Release and Surrender Agreement	$16,978 incl. all taxes
L16R.12	Commissioner Community Services	1	Brampton Tennis Club 38 Union Street Rosalea Tennis Courts and Club house Licence Agreement June 15, 2020 - June 14, 2021	Licence Agreement	$3,600
L16Q.5.1	Commissioner Public Works & Engineering	1	Fanzorelli's Adjacent to 50 Queen Street West Patio Licence Increasing size of patio from 200 square feet to 400 square feet and waiving Fees pursuant to Patio Program By-law)	Amending Licence Agreement	$589.44
L16Q.5.1	Commissioner Public Works & Engineering	1	Fanzorelli's Adjacent to 50 Queen Street West Patio Licence May 7, 2020 to November 1, 2020	Licence Agreement	$589.44
L16Q.5.1	Commissioner Public Works & Engineering	1	Fanzorelli's Adjacent to 50 Queen Street West Patio Licence November 1, 2020 to September 7, 2021	Licence Amending and Extension Agreement	$2

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements– January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
EN20108	Commissioner Public Works & Engineering	2	Vandyk Uptowns Limited White Spruce Park and 10302 Heart Lake Road September 25, 2020 until tie-backs de-stressed	Tie Back Encroachment Agreement	$37, 750 plus H.S.T. per year until Tie-backs de-stressed
L16C.7.4	Chief Administrative Officer	2	Property Management The Regional Municipality of Peel Jim Archdekin Recreation Centre 292 Conestoga Drive Use of portion of premises as a Regional emergency recovery centre Executed May 27, 2020 (**not needed)	Licence Agreement	$2
L16R.10A	Senior Manager Realty Services	3	Property Management Noon Academy Inc. 8 Rutherford Road South Use of portion of the rear of the premises as an outdoor play space for the school September 1, 2020 to August 31, 2021	Licence Extension Agreement	$1,222.80
PM01W13	Commissioner Public Works & Engineering	4	Property Management The Corporation of the City of Mississauga 152 Cherry Tree Drive (Sparrow Park) PIN#140800757 Fletcher's Creek Trail Extension Project Various environmental investigations May 4, 2020 to May 31, 2020 with one (1) option to extend for six (6) months terminating November 30, 2020	Consent to Enter Agreement	$2
PM01W13	Senior Manager Realty Services	4	Property Management The Corporation of the City of Mississauga 152 Cherry Tree Drive (Sparrow Park) PIN#140800757 Fletcher's Creek Trail Extension Project Various environmental investigations Extension of Consent to Enter Agreement December 1, 2020 to June 30, 2021	Extension of Consent to Enter Agreement	$2

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements-January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
L16R.1.15	Chief Administrative Officer	4	Property Management William Osler Health System South Fletchers Recreation Centre 500 Ray Lawson Boulevard Use of portion of premises for a pop up Covid-19 testing site June 16-2020 until WOHS no longer requires the Licensed Premises for the Testing Centre	Licence Agreement	$2
L16R.1.15	Chief Administrative Officer	4	Property Management William Osler Health System South Fletchers Recreation Centre 500 Ray Lawson Boulevard Use of portion of premises for a pop up Covid-19 testing site October 1, 2020 to March 31, 2021	Licence Agreement	$2
L16C.19.1	Commissioner Community Services	4	1654213 Ontario Ltd. Eldorado Park 8520 Creditview Road Operation of an Ice Cream Truck August 4, 2020 to September 27, 2020	Licence Agreement	$7,932.65
EN20201	Commissioner Public Works & Engineering	4	Encroachment Agreement 8395 Creditview Road Maintenance of columns, plantings and decorative fence and gate Twenty (20) year term	Encroachment Agreement	$2
PM04W08A	Commissioner Public Works & Engineering	5	Property Management Golden Gate Royal West Plaza Limited Southeast corner of Williams Parkway and Royal West Drive PIN#140930875 Undertaking of property investigations in advance of entering into lease discussions with the City of Brampton Seven (7) month term	Consent to Enter	$2

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
PM01W09B	Commissioner Public Works & Engineering	5	Property Management The Regional Municipality of Peel 228 Murray Street Murray Street Park Consent to enter for access to complete final park construction and redevelopment of the new Murray Street Park One (1) year Term	Extension of Consent to Enter	$2
EN19161	Commissioner Public Works & Engineering	6	Daniels Choice Mount Pleasant Corporation 0 Lagerfeld Drive Tieback encroachment agreement August 4, 2020 until tie-backs de-stressed	Tie Back Encroachment Agreement	$8,125 plus H.S.T.per year until Tie-backs de-stressed
EN20107	Commissioner Public Works & Engineering	6	Primont (M2 Condos) Inc. 1490 Sandalwood Parkway West and Veterans Drive August 25, 2020 until tie-backs de-stressed	Tie Back Encroachment Agreement	$22,750 plus H.S.T.until Tie-backs de-stressed
L16C.17.1	Commissioner Community Services	6	1654213 Ontario Ltd. Creditview Sandalwood Park 10530 Creditview Road Operation of an Ice Cream Truck August 4, 2020 to September 27, 2020	Licence Agreement	$3,172.95
L16S.3.2	Commissioner Community Services	6	Paul Fisher, dba Fisher Sharpening Cassie Campbell Recreation Centre 1050 Sandalwood Parkway West Provision of skate sharpening services January 1, 2020 to December 30, 2020	Consent to Enter Agreement	$2
L16CC.KKG	Commissioner Community Services	7	Kinder Kollege Primary School Inc. Civic Centre 150 Central Park Drive Permission to locate two planter boxes outside of the Civic Centre Upon full execution of agreement to December 31, 2021	Licence Agreement	$2
L16B.3.16	Commissioner Community Services	7	1654213 Ontario Ltd. Donald M. Gordon Chinguacousy Park 9050 Chinguacousy Road Operation of an Ice Cream Truck August 29, 2020 to October 31, 2020	Licence Agreement	$20,104.32

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
PM08ND01	Commissioner Public Works & Engineering	8	Two Personal Names 8188 Gorewood Drive Permission to cross 0.3 metre City reserve (associated with Committee of Adjustment Notice of Decision dated July 7, 2020 #A-2020-0038) July 7, 2020 to July 6, 2023	Consent to Enter	$2
L16W.4	Commissioner Community Services	8	Global Medic Williams Parkway Operations Centre 1975 Williams Parkway East Use of space to accommodate the food shipments, packaging materials and training of City of Brampton Staff in response to Covid-19 pandemic Three (3) month Term	Licence Agreement	$2
PM08ND02A	Commissioner Public Works & Engineering	8	Property Management University of Waterloo 11 City owned storm water management ponds PIN#s 140210505, 142112380, 142121093,142113068,142100602,142080469, 142271003, 141300652, 142220022,142200307, 142201528 Consent to enter for research studies into ecosystem benefits provided by storm water management ponds October 20, 2020 to August 31, 2022	Consent to Enter Agreement	$2
L16N.7	Commissioner Community Services	8	Property Management 2300 North Park Inc. 0 Trailside Walk PIN#142080477 and 142080478 purposes of constructing a retaining wall on the Owner's lands and associated works January 28, 2020 to March 31, 2020 with one (1) month extension	Consent to Enter Agreement	$2,250 Plus H.S.T. for initial term and $1,125 Plus H.S.T for extension
L16N.7	Commissioner Community Services	8	Property Management 2300 North Park Inc. 0 Trailside Walk PIN#142080477 and 142080478 purposes of constructing a retaining wall on the Owner's lands and associated works May 28, 2020 to July 31, 2020 with one (1) month extension	Consent to Enter Agreement	$2,250 Plus H.S.T. for initial term and $1,125 Plus H.S.T for extension

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements – January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
L16N.7	Commissioner Community Services	8	Property Management 2300 North Park Inc. 0 Trailside Walk PIN#142080477 and 142080478 purposes of constructing a retaining wall on the Owner's lands and associated works September 28, 2020 to November 30, 2020 with one (1) month extension	Consent to Enter Agreement	$2,250 Plus H.S.T. for initial term and $1,125 Plus H.S.T for extension
PM07E10A	Commissioner Public Works & Engineering	8	Property Management Cal-Gore Developments Inc. East side of Goreway Drive, north of Humberwest Parkway Intersection PIN#142100087 Construction of section of road on City owned lands Terminating the earlier of June 30, 2021 or the date when works are completed	Consent to Enter Agreement	$2
PM09E15	Commissioner Public Works & Engineering	9	Property Management HMQ in Right of Ontario as represented by the Minister of Transportation Northside of Countryside Drive, east of Highway 410 PIN#s 142250143/145/149/150/151 GTA West Transportation Corridor Route Planning and Phase 2 Environmental Study December 4, 2020 to December 31, 2022	Consent to Enter Agreement	$2
PM06ND16	Commissioner Community Services	10	Property Management The Regional Municipality of Peel NW Corner of The Gore Road and Countryside Drive City as easement holder providing consent to allow for works in connection with trail construction to be completed Three (3) month Term	Consent to Enter Agreement	$2
AR-07-156	Commissioner Public Works & Engineering	10	Encroachment Agreement Goreway Drive Widening (Countryside Drive to Mayfield Road) 10925 Goreway Drive Three (3) year term	Encroachment Agreement	$2,000

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Occupancy Agreements– January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
PM09ND09G	Commissioner Public Works & Engineering	10	Property Management Toronto and Region Conservation Authority Chrysanthemum Valley NW Corner of McVean Drive and Cottrelle Boulevard PIN#s 142113394,1422113567, 14113569 Consent to enter for purpose of undertaking wetland, forest restoration and plantings Date of full execution and terminating December 29, 2023	Consent to Enter Agreement	$2
PM06E14A	Commissioner Public Works & Engineering	10	Property Management Toronto and Region Conservation Authority Odlum Valley and Odlum Valley Pond SW Corner of Yellow Avens Boulevard and Airport Road PIN#s 142213962,142213963, 142213968, 142214477, 142214695, 142214409 Consent to enter for purpose of completing, stream habitat improvements and restoration, and riparian planting works One (1) year Eighteen (18) month term Date of full execution and terminating December 31, 2021	Consent to Enter Agreement	$2
PM09ND11	Commissioner Community Services	10	Property Management The Regional Municipality of Peel Gore Meadows Community Centre 10150 The Gore Road Consent to enter to permit various works in connection with The Gore Road, road widening project at the entrances Four (4) month Term	Consent to Enter Agreement	$2

Other Agreements– January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
AR07-113	Commissioner Public Works & Engineering	8	Goreway Drive Widening (Humberwest Parkway to Castlemore Road) 9340 Goreway Drive Full and Final Settlement in connection with expropriation	Full and Final Settlement	$57,603.74

Appendix A - Summary of Real Estate Transactions Executed by Administrative Authority

Other Agreements– January 1, 2020 to December 31, 2020					
File No.	**Approved By:**	**Ward**	**Project**	**Transaction**	**Financial Implication For Term**
AR-13-317	Senior Manager Realty Services	10	Countryside Drive Widening (Goreway Drive to The Gore) 4 Fenton Way Request for appraisal services to determine land value	Request for Appraisal Services	$5,500 plus H.S.T. plus BON time at $300/hr

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-09

Subject: **Request for Budget Amendment: Developer Reimbursement for the Development of Ouray Developments Inc. Neighbourhood Park and Valley Recreational Trail with Pedestrian Bridge (Ward 8)**

Contact: Ed Fagan, Acting Director, Parks Maintenance & Forestry
(905) 874 - 2913

Report Number: Community Services-2021-396

Recommendations:

1. That the report titled**: Request for Budget Amendment: Developer Reimbursement for the Development of Ouray Developments Inc. Neighbourhood Park and Valley Recreational Trail with Pedestrian Bridge (Ward 8)**, to the Committee of Council Meeting of April 14, 2021, be received; and

2. That a budget amendment be approved for Project #215860 – Park Blocks in the amount of $746,789 with full funding to be transferred from Reserve #134 – DC: Recreation.

Overview:

- **Ouray Developments Inc. has constructed and completed the following park and recreational trail projects in accordance to the approved drawings and subdivision agreement:**

  1) **Ouray North Development Park Block 17 (Ward 8)**
  2) **Ouray North Development Recreational Trail and Pedestrian Bridge (Ward 8)**

- **In accordance with 'Schedule D' of the approved subdivision agreement, the developer, Ouray Developments Inc., is entitled to reimbursement from the City of Brampton for the agreed upon cost of developing the park and trail.**

- **The developer has satisfied the City's requirements and staff is prepared to issue payments for the construction of the two projects.**

- **This report recommends that Council authorize a budget amendment of $746,789 to reimburse Ouray Developments Inc.**

Background:

When a new subdivision contains a park, the park is typically constructed by the developer. Construction drawings are prepared by the developer's landscape consultant and approved by the City's Open Space Development Section (Community Services Department). The developer is entitled to compensation for the cost of the park development through Development Charges collected. This is detailed in 'Schedule D' of the Subdivision Agreement for the plan. Funding for the reimbursement comes from Reserve #134 - DC: Recreation. Funding for the reimbursement must be approved by Council before payment for the completed works can be processed.

Current Situation:

Through the Subdivision Agreement, Ouray Developments Inc. was required to design and construct the park and recreational trail in their development.

The developer have completed the two projects to staff's satisfaction, met the conditions of the subdivision agreement and has invoiced for the works. This report is intended to obtain approval for the costs in the capital budget and allow the City to complete its obligation to reimburse the developer.

The details of the requested reimbursement are:

Development Name:	**Ouray Developments Inc.**
Registered Plan No.:	**43M-2021**
Park Block:	**Park Block 17**
Ward:	**8**
Reimbursement Amount:	**$ 345,969.08**
(13 % H.S.T. included)	

Development Name:	**Ouray Developments Inc.**
Registered Plan No.:	**43M-2021**
Park Block:	**Recreational Trail and Pedestrian Bridge**
Ward:	**8**
Reimbursement Amount:	**$ 483,306.49**
(13 % H.S.T. included)	

Corporate Implications:

Financial Implications:

The City has received Ouray Developments Inc.'s reimbursement invoices as per 'Schedule D' of the Subdivision Agreement plus approved change orders for additional required work. Therefore, a budget amendment will be required to increase Capital Project 215860 in the amount of $746,789 as shown below, with full funding to be transferred from Reserve #134 – DC: Recreation.

Project # 215860-006
Ouray Developments Inc., Park Block 17 (Registered Plan 43M-2021)
Budget Amendment: $311,556

Project # 215860-007
Ouray Developments Inc., Valley Recreational Trail and Pedestrian Bridge
(Registered Plan 43M-2021)
Budget Amendment: $435,233

Total Budget Amendment: $746,789
*Includes non-recoverable HST of 1.76%

Other Implications:

None.

Term of Council Priorities:

This report supports the following Term of Council Priorities:

- Brampton is a Green City – Implement a Green Framework
- Brampton is a Healthy and Safe City – Continue to design and build new activity hubs to provide accessible spaces and play elements to residents of all ages and abilities

Conclusion:

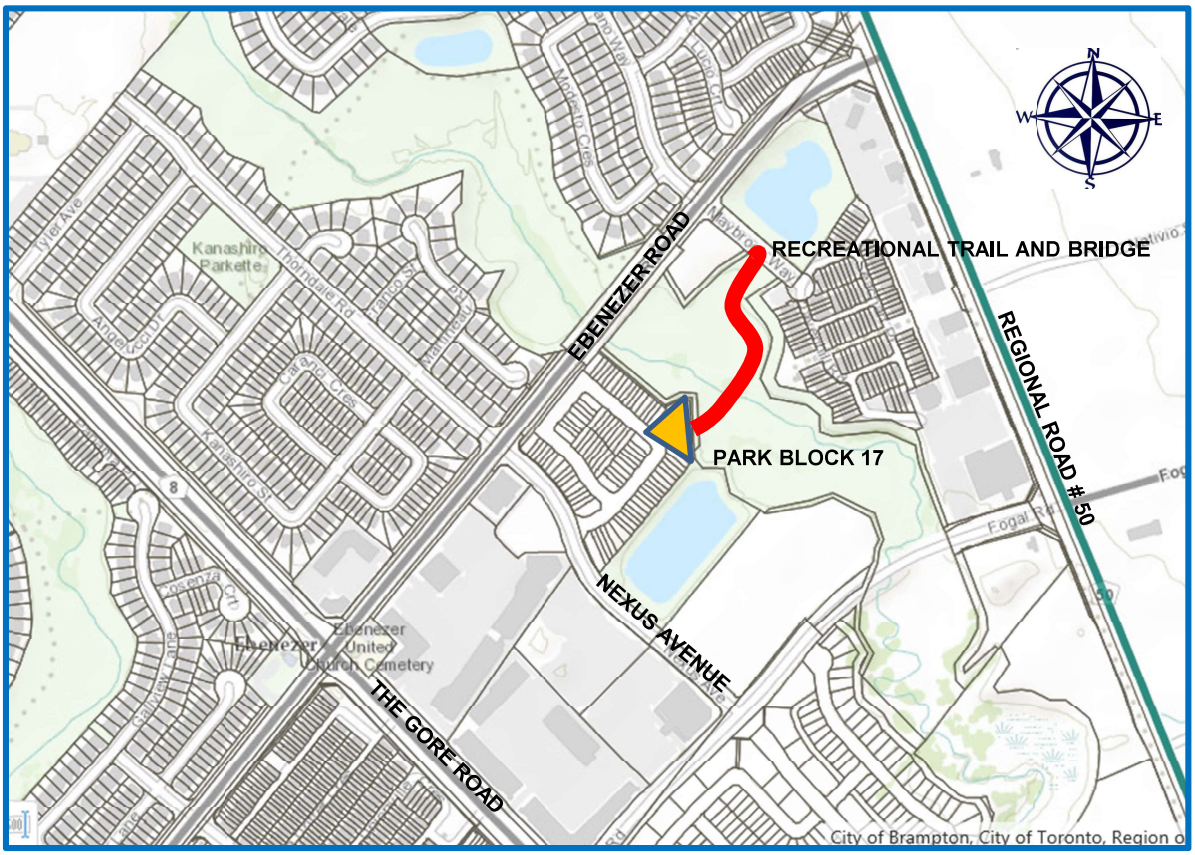
As part of the subdivision agreement, Ouray Developments Inc. has completed the park works in their development to the satisfaction of the City. Therefore, staff recommends that the 2021 Capital Budget be amended to allow the City to meet its obligation to pay the amounts owed to the developer.

Authored by:	Reviewed by:
Werner Kuemmling Manager, Open Space Development	Ed Fagan Acting Director, Parks Maintenance & Forestry
Approved by:	Submitted by:
Marion Nader Commissioner, Community Services	David Barrick Chief Administrative Officer

Attachments:

Appendix A – Location Map and Site Photos, Ouray Developments Inc. Park Block 17
Appendix B – Excerpt of Schedule ‘D’, Ouray Developments Inc. (North)

Appendix A: Location Map and Site Photos
Ouray Developments Inc. North Park Block 17 and Valley Block 7
(Plan No.: 43M-2021)



PARK BLOCK 17

PLAYGROUND AND SHADE STRUCTURE IN PARK BLOCK 17

PEDESTRIAN BRIDGE UNDER CONSTRUCTION IN VALLEY BLOCK 7

Appendix B: Excerpt of Schedule D of the Subdivision Agreement for Ouray Developments Inc. North (Plan No.: 43M-2021)

SCHEDULE D
(continued)

4. SPECIAL PARKLAND REQUIREMENTS

4.1 **Parkland Construction Requirements**

PARK BLOCK 17 AND EXTERNAL VALLEYLAND

The Developer and the City agree that the following is a description of the City's Parkland Works, which the City has requested the Developer to install at the City's cost in accordance with Section 11.
The Applicant will be compensated by the City for all the relevant costs, as per a cost estimate approved by the City, that are identified as DC eligible within the most recent Development Charge Background Study.

City's Park and Valleyland Works shall include but not be limited to:

Park Block 17

- Topsoil spreading, sodding and planting
- Drainage provisions
- Asphalt walkway and lighting
- Shade structure
- Playground and play structure
- Specialty paving
- Site furnishing

Valleyland Pathway and Pedestrian Bridge (East of subject site)

- Grading, topsoil spreading, seeding and planting
- Drainage provisions
- Asphalt pathway and lighting
- Pedestrian bridge
- Armourstone retaining wall and safety barrier

4.2 Cost of Work and Payment Schedule

4.2.1 The total **City costs** for Park Block 17 shall not exceed $327,966.00. The total City costs for the valleyland pathway, bridge and related works shall not exceed $363,833.00, excepting additional costs arising from unforeseen site conditions and engineering requirements.

(Costs include 10% consultant's fee and 13% Harmonized Sales Tax)

Note: The invoice amount for Park Block 17 ($345,969.09) includes additional play equipment and drainage structures requested by Parks Maintenance staff.
The engineering and restoration requirements for the recreational trail and pedestrian bridge were changed dramatically on the request of the Ontario Ministry of the Environment, Conservation and Parks as a condition for permit issuance, resulting in a project cost increase of 33 percent to $483,306.49.

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-12

Subject: **Request to Begin Procurement for the Hiring of a General Landscape Contractor for the Construction of Sesquicentennial Park Activity Hub (Ward 9)"**

Contact: Ed Fagan, Acting Director, Parks Maintenance & Forestry
(905) 874 - 2913

Report Number: Community Services-2021-398

Recommendations:

1. That the report titled **"Request to Begin Procurement for the Hiring of a General Landscape Contractor for the Construction of Sesquicentennial Park Activity Hub (Ward 9)"** to the Committee of Council meeting of April 14, 2021, be received; and
2. That the Purchasing Agent be authorized to commence the procurement for the Hiring of a General Landscape Contractor for the Construction of Sesquicentennial Park Activity Hub.

Overview:

- **This report seeks Council approval to commence the procurement to hire a General Landscape Contractor for the construction of the Sesquicentennial Park Activity Hub.**
- **The project involves constructing a new Activity Hub on open-space inside the existing Sesquicentennial Park. The hub will consist of areas and equipment for playgrounds, water-play, outdoor fitness, sodded open-play, shaded seating and gathering, walkways, lighting and landscaped planting.**

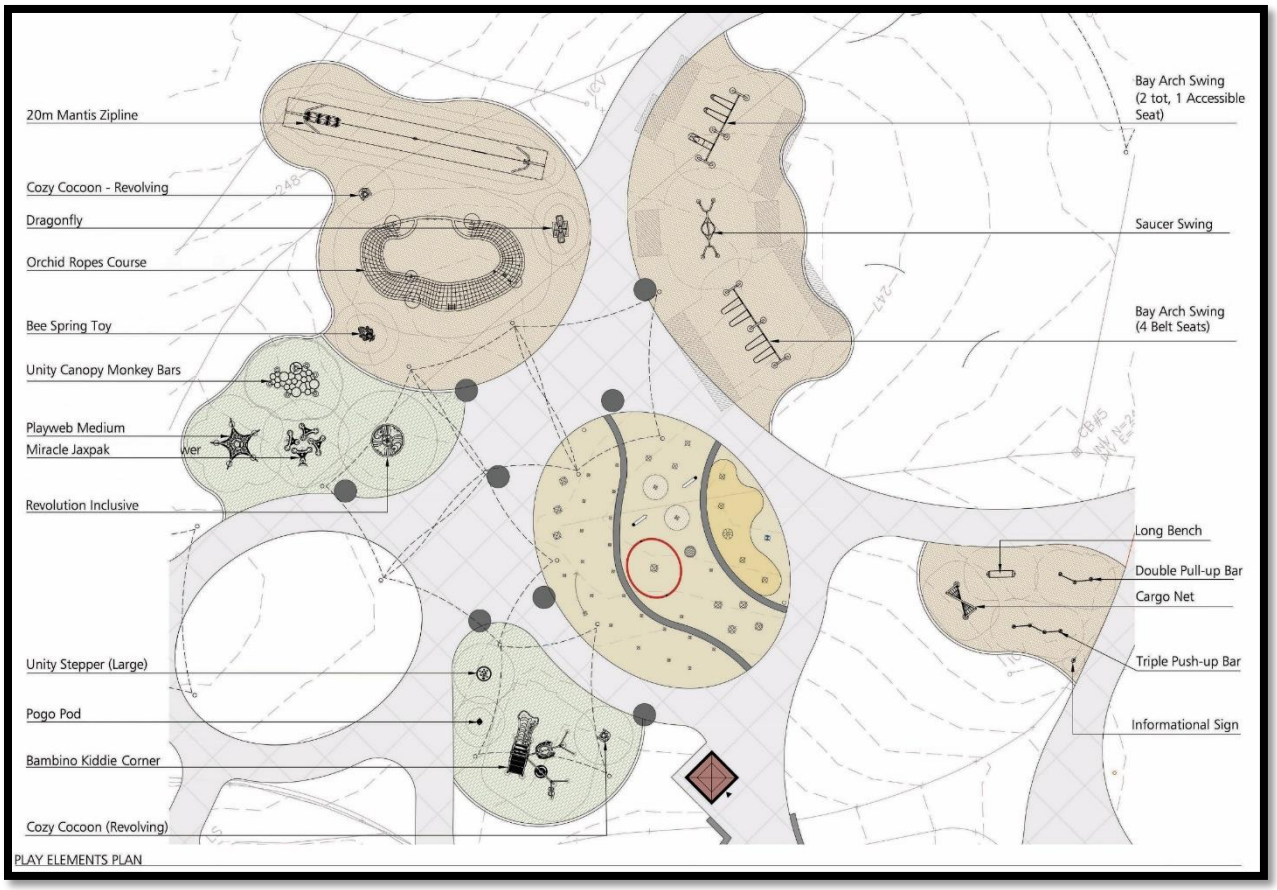
Background:

The project involves the construction a new Activity Hub inside Sesquicentennial Park. Existing open-space areas to north, west and east of the field-house are to be developed for the hub which is approximately 2 hectares (5 acres) in size.

The new Activity Hub area within the existing Sesquicentennial Park is shown in red below.

The new Activity Hub will consist of areas and equipment for playgrounds, water-play, outdoor fitness, artificial-turf open play, shaded seating and gathering, walkways, lighting and landscaped planting areas. The intent of the hub is to be an exciting, bold, fully accessible space for people of all ages and abilities. The hub will serve both local residents and a city-wide community.

The Activity Hub concept is shown below.



Current Situation:

Parks Maintenance and Forestry Division is prepared to proceed with the procurement for the Hiring of a General Landscape Contractor for the Construction of the Sesquicentennial Park Activity Hub.

The Scope of the Project includes installation of the following:

- Waterplay area
- Junior and senior playgrounds
- Outdoor fitness area
- Sodded open-play area
- Seating and gathering areas
- Overhead shade-canopies
- Pedestrian pathways
- Pedestrian and area lighting
- Landscape plantings

The scope of work will also include site grading and drainage, site fencing and decorative features, landscaping, and signage in accordance with City standards.

The new park elements are being built with the support and confirmation of Parks Maintenance and Operations staff who will operate and maintain this facility.

Corporate Implications:

Financial Implications:

Sufficient funding is available for the initiative from the following capital project as follows:

Initiative	Project
Construction - Activity Hub	215865-009

Departmental staff will ensure that sufficient funds are requested through the subsequent budget submissions for this initiative, subject to Council approval.

Other Implications:

Purchasing Comments

The pre-qualified General Landscape Contractors will be invited to submit a Bid and the lowest compliant Bid will be eligible for contract award. Purchase approval will be obtained in accordance with the Purchasing By-Law.

All communication with Bidders involved in the procurement must occur formally, through the contact person identified in the Bid Document.

Item	Proposed Date(s)
Working Drawings and Specifications Complete	March 2021
Issue for Tender (Construction)	April 2021
Issue Purchase Order	May 2021
Start of Construction	June 2021
Substantial Performance	December 2021
Total Completion	Spring 2022

Term of Council Priorities:

This report achieves the Term of Council Priorities in the following manner:

This report has been prepared in full consideration of vision that the people of Brampton will “Live the Mosaic” and is aligned with the Term of Council priority 4 4.2. “Enhance recreation and sports facilities to increase access to programs for residents.”

Conclusion:

An investment in the Sesquicentennial Park Activity Hub will significantly contribute to Brampton’s role as an innovator in diverse childhood play spaces. The city will further be defined as a leader in universally accessible recreation that supports public health and well-being. These initiatives will compliment long-term growth in the area and enhance the park as a vital community facility as well as city-wide destination.

It is recommended that the Purchasing Agent be authorized to commence the procurement for Hiring of a General Landscape Contractor for the Construction of the Sesquicentennial Park Activity Hub as described in this report.

Authored by:

Natalia Fleishman
Acting Supervisor, Parks Projects

Reviewed by:

Ed Fagan
Acting Director, Parks Maintenance & Forestry

Approved by:

Marion Nader
Commissioner, Community Services

Submitted by:

David Barrick
Chief Administrative Officer

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-04

Subject: **Request to Begin Procurement for Installation, Removal and Maintenance of Winter Lights at Various Locations for a Three (3) Year Period**

Contact: Ed Fagan, Acting Director, Parks Maintenance & Forestry
(905) 874 - 2913

Report Number: Community Services-2021-397

Recommendations:

1. That the report titled **Request to Begin Procurement for Installation, Removal and Maintenance of Winter Lights at Various Locations for a Three (3) Year Period**, dated March 4, 2021, to the Committee of Council Meeting of April 14, 2021 be received; and

2. That the Purchasing Agent be authorized to commence procurement for the installation, removal and maintenance of Winter Lights at various locations for a three (3) year period.

Overview:

- **The purpose of this report is to obtain Council authorization to commence the procurement for the installation, removal and maintenance of Winter Lights at various locations for a three (3) year period**

- **Funding is available subject to yearly approvals in the Community Services 2021 – 2023 operating budget. The second and third year (2022-2023) budgeted amount may include CPI increases and is subject to annual budget approvals.**

Background:

The 2021 Community Services operating budget includes sufficient funding to support the first year of the proposed three (3) year contract for the installation, removal and maintenance of Winter Lights at various locations.

Current Situation:

The Community Services Department is ready to begin the procurement process for the installation, removal and maintenance of Winter Lights at various locations within the City of Brampton for a three (3) year period with two (2), one (1) year optional periods.

Corporate Implications:

Financial Implications:

Funding for the installation, removal and maintenance of Winter Lights at various locations is an approved operating program, which currently has sufficient funding for year one of the contract. Staff will ensure that there is sufficient funding in operating budget for the future years of the contract, subject to Council approval.

Scope of the Project:

The scope of work shall include installation and removal of light strands and static lights and displays at various locations within the City of Brampton for a three year from 2021 to 2023, with two (2), one year (1) year optional renewal periods.

Project Budget

The Contract will be subject to yearly approvals in the Community Services operating budget for 2021, 2022 and 2023. The second and third year (2022-2023) may also include CPI increases and is subject to annual budget approvals.

Purchasing Implications:

A public procurement process will be conducted and the lowest compliant bid will be eligible for contract award. Purchase approval shall be obtained in accordance with the Purchasing By-law.

All communication with Bidders involved in the procurement must occur formally, through the contact person identified in the Bid Document.

Term of Council Priorities:

This report supports the Term of Council Priority “Brampton is a Healthy and Safe City” by focusing on community safety, encouraging active and healthy lifestyles, and enhancing facilities to increase access for residents.

Conclusion:

This report recommends that the Purchasing Agent be authorized to commence the procurement as described in this report.

Authored by:

Joe Ferreira
Acting Manager, Forestry, Horticulture and Cemetery Services

Reviewed by:

Ed Fagan
Acting Director, Parks Maintenance & Forestry

Approved by:

Marion Nader
Commissioner, Community Services

Submitted by:

David Barrick
Chief Administrative Officer

Minutes

Brampton Community Safety Advisory Committee

The Corporation of the City of Brampton

Thursday, March 25, 2021

Members Present: City Councillor C. Williams (Chair)
Gurpreet Bains (Vice-Chair)
Regional Councillor P. Vicente
Regional Councillor M. Palleschi
Jason Boiley, Dufferin-Peel Catholic District School Board
Rick Evans, Chair, Downtown Brampton BIA Safety Committee
Marley Budreau, Region of Peel, Public Health
Sandra Solonik, Region of Peel, Human Services
Superintendent Navdeep Chhinzer, Peel Regional Police
Shahbaz Altaf
Andrew deGroot
Danielle Dowdy
Jushan Galhan
Marcia Glasgow
Mbengi Julie Lutete
Ivan Marco Macri
Peter Shah
William Vollmar

Members Absent: Regional Councillor P. Fortini
Representative, Peel Region District School Board
Marla Krakower, Central West LHIN
David Colp
Alana Del Greco
Vickramjeet Aujla

Staff Present: Razmin Said, Manager, Community Safety and Well Being, Community Services
Peter Fay, City Clerk
Tammi Jackson, Legislative Coordinator

1. Call to Order

Note: In consideration of the current COVID-19 public health orders prohibiting large public gatherings of people and requirements for physical distancing between persons, in-person attendance at this Committee meeting was limited and physical distancing was maintained at all times during the meeting.

The meeting was called to order at 7:04 p.m. and adjourned at 9:31 p.m. Gurpreet Bains served as Chair for this meeting.

As this meeting of the Brampton Community Safety Advisory Committee was conducted with electronic participation by Members of the Committee, the meeting started with the City Clerk calling the roll for attendance at the meeting, as follows:

Members present during roll call: Councillor Williams; Gurpreet Bains; Councillor Vicente; Councillor Palleschi; Jason Boiley, on behalf of Lucy Papaloni, Dufferin-Peel Catholic District School Board; Rick Evans, Chair, Downtown Brampton BIA Safety Committee; Marley Budreau, on behalf of Monica Hau, Region of Peel, Public Health; Sean Major, on behalf of Sandra Solonik, Region of Peel Human Services; Superintendent Navdeep Chhinzer, Peel Regional Police; Shabaz Altaf; Andrew DeGroot; Danielle Dowdy; Jushan Galhan; Marcia Glasgow; Mbengi Julie Lutete; Ivan Marco Macri; Peter Shah; William Vollmar.

Members absent during roll call: Councillor Fortini; Representative for Peel District School Board; Marla Krakower, Central West LHIN; David Colp; Vickramjeet Aujla; Alana DelGreco.

2. Approval of Agenda

BCS007-2021

That the Agenda for the Brampton Community Safety Advisory Committee Meeting of March 25, 2021, be approved as published and circulated.

Carried

3. Declarations of Interest under the Municipal Conflict of Interest Act

Nil

4. Previous Minutes

The minutes were considered by Committee of Council on March 10, 2021, and were pending approval by Council on March 24, 2021. The minutes were provided for Committee's information.

5. Presentations\Delegations

5.1 Presentation by Tristan Costa, Planner, Planning, Building and Economic Development, and Andrew McNeill, Manager, Official Plan and Growth Management, Planning, Building and Economic Development, re: **The Brampton Plan - Official Plan Review**

Item 7.3 was brought forward and dealt with at this time.

Andrew McNeill, Manager, Official Plan and Growth Management, Planning, Building and Economic Development provided a brief overview of the subject matter The Brampton Plan - Official Plan Review and answered questions of clarification pertaining to the Precinct Plan, Transportation Development, Light Rail Transportation (LRT), and the use of Principals of Crime Prevention through environmental design.

BCS008-2021

That the presentation by Tristan Costa, Planner, Planning, Building and Economic Development, and Andrew McNeill, Manager, Official Plan and Growth Management, Planning, Building and Economic Development, re: **The Brampton Plan - Official Plan Review**, to the Brampton Community Safety Advisory Committee Meeting of March 25, 2021, be received

Carried

6. Reports/Updates

6.1 Verbal Update at the request of Brampton Community Safety Advisory Committee - Gangs and Gun Violence Sub-Committee, re: **Virtual Town Hall To Discuss Gun And Gang Violence**

Danielle Dowdy, Member and Marcia Glasgow, Member of the Gangs and Gun Violence Sub-Committee provided an overview of their meeting with staff and placed the following motion on the floor for consideration:

It is the recommendation of the Brampton Community Safety Committee:

1. That Council direct the City of Brampton to host a virtual town hall to address gun violence in t Brampton;
2. That the City of Brampton Community Safety manager coordinate with and support the Gangs and Gun Violence Sub-committee with technical support and community outreach in hosting this town hall;
3. That the town hall include collaboration with the Region of Peel, Peel Regional Police Service, and community agencies within the Region of Peel, who serve residents of Brampton.

Committee discussion on the matter included:

- Clarification provided regarding what the sub-committee's end goal is for the town hall.
- Questions relating to who would lead the project, The City of Brampton or the Sub-committee
- Peel Regional Police and Peel Public Health both welcomed the opportunity to be involved with the town hall.
- Inquiry regarding the possibility to a friendly amendment to remove "City Involvement" and add "Concerned Residents"
- Sub-committee members said they would not be comfortable with the removal of "City Involvement."

Peter Fay, City Clerk, provided clarification regarding the official wording of the motion that would go before Committee of Council on April 14, 2021 and ratified at Council on April 21, 2021. In addition, Mr. Fay advised that the process of planning a virtual town hall will take time to plan and may not occur until possibly May or June 2021. Mr. Fay suggested changing the wording in Recommendation # 2 to indicate that the City of Brampton host a virtual town hall to address gun violence in the City.

The following motion was considered.

BCS009-2021

1. That the verbal update from Brampton Community Safety Advisory Committee - Gangs and Gun Violence Sub-Committee, to the Brampton Community Safety Advisory Committee Meeting of March 25, 2021, re: **Virtual Town Hall to Discuss Gun and Gang Violence**, be received; and,

2. It is the position of the Community Safety Advisory Committee that:

   a. the City of Brampton host a virtual town hall to address gun violence in the City.
   b. the City of Brampton Community Safety Office, in conjunction with other City Departments, coordinate the town hall, supported/hosted by the Committee/subcommittee, with City technical support and community outreach in hosting this town hall.
   c. the town hall include collaboration with the Region of Peel, Peel Regional Police Service, and community agencies within the Region of Peel, who serve residents of Brampton.

Carried

7. <u>Other/New Business/Information Items</u>

7.1 Sub-Committee Updates re: **Brampton Community Safety Advisory Committee Worksheets**

No updates were provided.

7.2 Discussion re: **Committee Accomplishments to Date and Area of Focus for the Remainder of the Term.**

Peter Fay, City Clerk, provided a brief overview of the Committee accomplishments to date and opened the floor for discussion on areas of focus for the remainder of the term.

Committee discussion on the matter included:

- Request to add links on future agendas to Peel Police Services Board recent Board minutes related to Community Safety.
- Suggestion to email Committee members with the Council decision on gun violence town hall request (after April 23 Council meeting)

- Request to pause at Agenda Item “4 - Previous Minutes” during future BCSAC meetings to recap any outcomes from Committee recommendations presented to Council for consideration.
- Staff clarified that Quorum, Attendance and Committee Makeup was put on hold through the deferral motion passed at the February 18, 2021 meeting and explained that the Citizen Appointments Committee was very clear regarding the process they will follow for filling vacancies.
- Reference to Council Workshop to be scheduled on community safety
- Concerns the Committee is not receiving feedback with respect to motions that go before Council for consideration.

The following motion was considered.

BCS010-2021

1. That the presentation by Peter Fay, City Clerk, re: Committee Accomplishments to Date and Area of Focus for the Remainder of the Term, to the Brampton Community Safety Advisory Committee Meeting of March 25, 2021, be received; and,
2. That relevant comments from committee members during the discussion be brought forward for consideration to the Community Safety council workshop; and,
3. That the report on the Community Safety Office directions and recommendations coming out of the council workshop be brought back to the Brampton Community Safety Advisory Committee for comments and support prior to council ratification.

Carried

7.3 Memo re: **Brampton Engagement Plan**

Dealt with under Item 5.1 - Recommendation # BCS008-2021.

8. Correspondence

8.1 Correspondence from Alana Del Greco, Member, dated March 17, 2020 re: **Resignation from the Brampton Community Safety Advisory Committee**

The following motion was considered.

BCS011-2021

That the correspondence from Alana Del Greco, Citizen Member, to the Brampton Community Safety Advisory Committee Meeting of March 25, 2021, re: **Resignation from the Brampton Community Safety Advisory Committee**, be received.

Carried

9. Question Period

Tammi Jackson, Legislative Coordinator, answered questions regarding a template for sub-committee minutes and advised that a copy of the template would be emailed to all members of the Committee.

Peter Fay, City Clerk, provided clarification regarding the process the meeting minutes will follow for consideration and ratification.

10. Public Question Period

The public was given the opportunity to submit questions via e-mail to the City Clerk's Office regarding any decisions made at this meeting.

Peter Fay, City Clerk, confirmed that no questions were submitted regarding decisions made at this meeting.

11. Adjournment

Next Regular Meeting:

BCS012-2021

That the Brampton Community Safety Advisory Committee do now adjourn to meet again on Thursday, June 17, 2021, at 7:00 p.m., or at the call of the Chair.

Carried

_____

Councillor Charmaine Williams, Chair

_____

Gurdeep Bains, Vice-Chair

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-04-08

Subject: **Request for Budget Amendment – Lobbyist Registry Upgrade Solution**

Contact: **Peter Fay, City Clerk**

Report Number: Legislative Services-2021-329

Recommendations:

1. That the report titled **Request for Budget Amendment – Lobbyist Registry Upgrade Solution**, to the Committee of Council Meeting of April 14, 2021, be received; and
2. That a budget amendment be approved for Project # 191480-058 in the amount of $90,000, to be sourced from Reserve #4.

Overview:

- **An online Lobbyist Registry was implemented in 2016, as per Council direction.**
- **A capital request was made in the 2019-2021 Budget process (Project #191480-058 Lobbyist Registry Upgrade) for $150,000 for much needed improvements to the lobbyist registry. This amount was an estimate only and there was no benchmark available for comparison.**
- **Two solutions were originally considered:**
  - **Improve the existing lobbyist registry, or**
  - **Develop an in-house solution.**
- **Digital Innovation & IT (DI & IT) has stated it would not be cost effective to support and maintain the existing solution, the current solution was developed through a procurement engagement with Adoxio in 2017.**
- **A public Request for Proposal was initiated in Fall 2020 in accordance with the Purchasing By-law – all short-listed and evaluated bids, including the successful bidder, well exceeded the original budget amount of $150,000.**

Background:

An online Lobbyist Registry was implemented in 2016, as per Council direction. The Registry was developed in-house based on the City's Customer Relationship Management (CRM) solution, which over time, no longer meets the needs of the City (legacy CRM platform no longer supported) and clients (lobbyists are experiencing significant issues with the existing solution). Lobbyist registrations and subject-matter registrations are confusing for people to understand, follow and finalize. An extraordinary amount of staff time is required to guide lobbyists through the registration process and correct registration errors.

In the 2019-2021 Operating & Capital Budget process, a capital budget was established and approved for a Lobbyist Registry Upgrade, at an estimated cost of $150,000.

Staff from DI & IT and the City Clerk's Office discussed options including improving upon the existing lobbyist registry or developing a new in-house solution. The lobbyist registry, developed in-house over 5 years ago has reached its end of life and resides in a now unsupported CRM portal technology environment. The cost to maintain the registry in this environment is approximately $80,000 per year (including but not limited to additional storage, maintenance and licensing), which is not a cost effective solution. Given the timeline, DI & IT Enterprise Architecture suggested rather than building a customized solution, acquiring an existing and proven solution used by another municipality and customizing for the City of Brampton Lobbyist Registry is a more effective and efficient solution. The estimated cost at the time of the business case (developed in 2018) was well within the budget and this option posed the least risk.

An open, public Request for Proposal process was followed in the Fall of 2020, in accordance with the City's Purchasing By-law and procurement process. This report recommends a budget amendment to complete the procurement process to complete the Lobbyist Registry Upgrade project.

Current Situation:

As a result of the competitive procurement process, seven (7) bidders responded to the Request for Proposal and three (3) bidders were short-listed after evaluation. The evaluation process resulted in one (1) bid that best fit the City's business and technology environment requirements and was also the lowest bid. All three (3) shortlisted bids well exceeded the original budget amount of $150,000.

The City of Brampton will be entering into contract negotiations with the selected bidder following approval of a budget amendment of $90,000 to enable completion of the procurement process.

Corporate Implications:

Financial Implications:

A budget amendment is required to increase capital project 191480-058 – Lobbyist Registry Upgrade by $90,000. Sufficient funding is available within Reserve #4 for the requested top up.

Project	Original Approved Budget	Top-Up Requested	New Approved Budget
191480-058	$150,000	$90,000	$240,000

Other Implications:

Term of Council Priorities:

This report furthers the Term of Council Priorities of a Well-Run City by enabling public access to information about lobbying activity occurring at the City to enhance transparency and accountability in City operations and Council decision-making.

Conclusion:

The approved capital project to upgrade the City's Lobbyist Registry tool is underway through a procurement process to have a third party develop an improved registry based on similar registries in place in other municipalities. The original capital budget, approved in 2019, has insufficient funds to complete the project based on the proposal received and evaluated as the best proposal to complete the work. A budget amendment of $90,000 is recommended to proceed with the capital project.

Authored by:

Laurie Robinson,
Business Coordinator, City Clerk's Office

Reviewed by:

Peter Fay,
City Clerk

Approved by:

Paul Morrison,
Acting Commissioner, Legislative Services

Submitted by:

David Barrick,
Chief Administrative Officer

BRAMPTON

A Vision for the Future of Tourism in Brampton

City of Brampton Tourism Strategy

Committee of Council

April 14, 2021

Tourism & Brampton

Tourism celebrates a city's strengths – arts and culture, food, special events, sports and, the people who give a city its personality. A tourism strategy has been developed to share all that makes Brampton amazing.

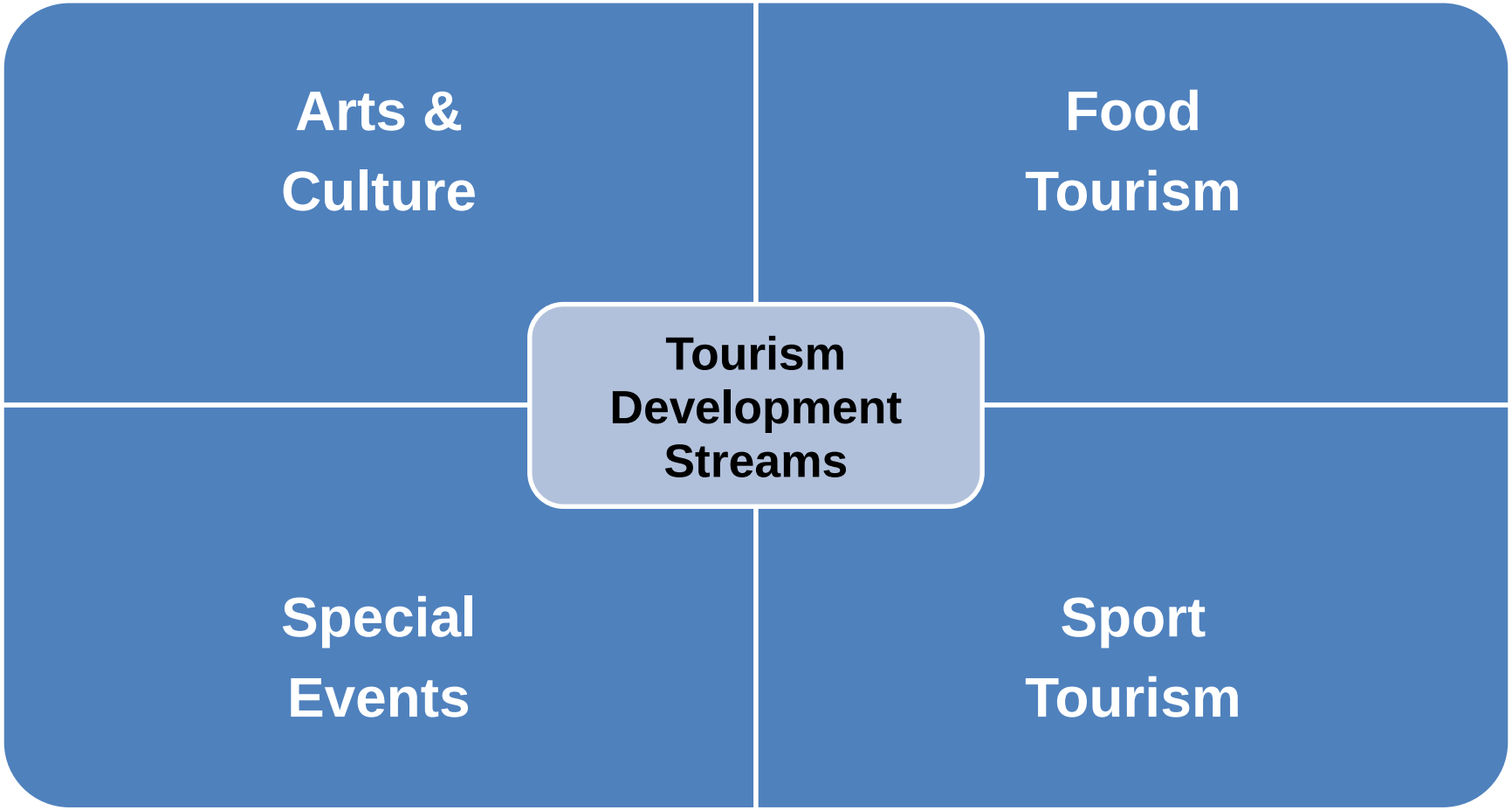
Tourism Strategy Consultations

Resident and visitor engagement was an extremely important component of the strategy development work. 478 individuals were engaged through various methods by both staff and consultants.

The

A Vision for Tourism in Brampton

Brampton is in the early stages of tourism development. The vision for the next five years is robust and reflects the diversity of the City's offerings while emphasizing the importance of collaboration to achieve success.


Arts & Culture
Food Tourism
Tourism Development Streams
Special Events
Sport Tourism

Key Priority Areas (KPA)

- Fostering Pride Of Place
- Marketing & Communications
- Leveraging Tourism Development Streams
- Management & Infrastructure

KPA #1 – Fostering Pride of Place

Harness local support for tourism among the community to change perceptions and leverage visiting friends and relatives.

KPA #2 – Marketing & Communications

Create awareness of Brampton as a tourism destination.

KPA #3 – Leveraging Development Streams

Nurture Brampton's most compelling experiences to begin building a visitor economy.

KPA #4 – Management & Infrastructure

Encourage the creation and improvement of tourism management structures and core tourism infrastructure to address key gaps.

Strategy Implementation

Council will be presented with an annual update of accomplishments as well as an implementation plan for the coming year.

Thank You

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-05

Subject: **Brampton Tourism Strategy & 2021 Implementation Plan**

Contact: Jason Tamming
Director Strategic Communications, Culture and Events
jason.tamming@brampton.ca | 905.874.2889

Report Number: Corporate Support Services-2021-318

Recommendations:

1. That the report from Jason Tamming, Director Strategic Communications, Culture and Events, dated March 5, 2021 to the Committee of Council meeting of April 14, 2021 titled **Brampton Tourism Strategy** be received; and

2. That the Brampton Tourism Strategy be endorsed by Council.

Overview:

- Brampton has much to offer from a tourism perspective – sport tourism, culinary, events and arts and culture - but is considered to be in the infancy stages of tourism development.

- Bannikin Travel and Tourism Ltd. and the Culinary Tourism Alliance were contracted to develop a five-year tourism strategy for Brampton that would focus on building a solid foundation for tourism initiatives going forward, including recommendations for local and regional campaigns during COVID lockdown and recovery and building community participation and pride.

- A total of 29 overarching recommendations are associated with four Tourism Development Streams and four Key Priority Areas.

- A strategic and thoughtful approach to tourism in Brampton will aim to establish the City as a destination and will also aid in supporting local residents and businesses that have been impacted by COVID as recent reports indicate that tourism has been one of the hardest hit sectors in Canada with one out of 10 jobs impacted.

Background:

Discussions regarding the development of a tourism strategy the first to be approved by Council, began in 2019. Required strategy outcomes included a foundational framework to support growth and advancement of the sector through product development, strategic investment and destination marketing. The strategy would also have to focus on leveraging existing tourism elements as well as to strengthen structure, policies and communications for a sustainable future. The supports required by the sector during COVID and into recovery were also to be included in the framework. Tourism strategy work began in March 2020 with the issuing of the project RFP. The contract was awarded in April 2020.

Bannikin Travel & Tourism Ltd. and the Culinary Tourism Alliance were retained through the RFP process to execute the process of developing Brampton's Tourism Strategy alongside city staff.

Bannikin Travel & Tourism Ltd. is a boutique travel and tourism firm with expertise brand and content development, trade development, experience design and tourism strategy for niche-focused tourism brands, including DMOs, tour operators and lodging providers.

The Culinary Tourism Alliance (CTA) is an industry-driven not-for-profit organization with a vision of food tourism becoming a sustainable contributor to local economies in destinations worldwide. CTA is devoted to supporting the growth and development of food tourism in Ontario and beyond.

The consultants completed thorough research, benchmarking, stakeholder engagement and critical analysis. The work of the tourism strategy aligns with previous reports produced by the City of Brampton including the 2018 Culture Master Plan, Food Tourism Strategy Parts 1 & 2, Brampton Vision 2040: Living the Mosaic, 2018 Canada Sport Tourism Alliance report on State of Sport Tourism in Brampton and the 2020 approved Economic Recovery Strategy response to the COVID-19 pandemic.

One of the actions listed in the Council approved Culture Master Plan highlights the importance of the production of a tourism strategy.

"*Launch the development of a tourism strategy that includes signature events and major cultural festivals, and establishes a framework for facilitation and support of community events. Leverage this strategy to strengthen the Brampton tourism office, with a mandate to provide destination marketing and visitor experience."*

The tourism strategy involved considerable stakeholder engagement and focuses on igniting opportunities and instilling pride in the people who live and work in the community and will attract visitors.

Current Situation:

The City of Brampton's Tourism Office is in receipt of the completed five-year tourism strategy. Of importance is the vision for tourism in Brampton for the next five years as well as the key priority areas and tourism development streams.

Five-Year Vision
Brampton is a well-known tourism destination that celebrates its distinct multiculturalism and radiates pride of place through its engaged and dynamic resident-base. Visitors to Brampton are delighted by the range of arts and cultural activities, special events, food-based experiences and sport tourism events available to enjoy.

Tourism in Brampton is developed and managed through a collaborative stakeholder driven process that ensures the City's true authentic self and shared values are well-represented to the world and that tourism in Brampton helps to improve the wellness of residents, businesses, visitors and environment.

Four Key Priority Areas

i. Fostering Pride of Place
ii. Marketing and Communications
iii. Leveraging Key Demand Generators
iv. Infrastructure and Management

Four Tourism Development Streams

i. Arts and Culture
ii. Culinary
iii. Events
iv. Sport Tourism

The strategy details 29 overarching recommendations, each with a subset of tactics for implementation, over the course of the next five years that range from a new brand for tourism to the implementation of the Municipal Accommodation Tax for enhanced marketing purposes, to a Visiting Friends and Relatives program. Staff will report back to Council on an annual basis with updates and implementation plans.

Corporate Implications:

<u>Financial Implications:</u>

There are no direct financial implications from this report. Staff will identify all costs associated with implementing the Brampton Tourism Strategy and will report back to Council for endorsement and approval.

Term of Council Priorities:

This recommendation aligns with the Term of Council Priorities – Brampton is a Mosaic. Funding tourism projects supports Brampton's economy and tourism and furthers Brampton's identity as a diverse city offering cultural events of great interest to residents and visitors.

Conclusion:

Staff recommends approval of the Brampton Tourism Strategy and the 2021 Implementation Plan to direct the foundational work required to establish Brampton as a tourism destination.

Authored by:

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Reviewed by:

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Attachments:

1. Brampton Tourism Strategy

MARCH 2021

CITY OF BRAMPTON

TOURISM STRATEGY

A Vision for the Future of Tourism in Brampton

brampton.ca/tourism

BRAMPTON

Brampton Tourism Strategy

Presented by:

Bannikin Travel & Tourism

and

The Culinary Tourism Alliance

to

The City of Brampton

Cover Photographs

- Special Events - Brampton Author, Illustrator and Poet Rupi Kaur
- Arts and Culture - “Family” by Bartlett
- Food Tourism - Dosa from Annalakshmi Restaurant
- Sport Tourism - GT20 Cricket

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ACKNOWLEDGEMENTS

The City of Brampton Tourism Office is proud to present the Brampton Tourism Strategy. It was important in developing the Strategy to create opportunities that would ignite and instill pride in the people who live and work in the community and to attract visitors to our wonderful City.

Sincerest thanks are extended to Brampton City Council and the many stakeholders, residents, visitors and staff who contributed to the creation of the Brampton Tourism Strategy through participation in one-to-one interviews with our consultants, sector webinars, workshops or by completing an online survey.

The City of Brampton is also grateful for the financial support from Destination Toronto and the Federal Economic Development Agency for Southern Ontario.

TORONTO

Federal Economic Development Agency for Southern Ontario

Agence fédérale de développement économique pour le Sud de l'Ontario

EXECUTIVE SUMMARY

The City of Brampton began creating the first Tourism Strategy for Council approval ("the Strategy") in May 2020, as an initial investment in both determining the potential of developing the City to become a tourism destination, and outlining the foundational steps required to do so. Comprehensive research, resident and stakeholder interviews, workshops and consultation sessions, and participation of the City of Brampton tourism team directly contributed to the insights, analyses and recommendations expressed in the Strategy. This Strategy is designed to serve as a framework to develop Brampton as a tourism destination over a five year time frame.

Brampton is a mosaic with a bright future. With a population nearing 750,000, Canada's 9th largest city is growing at a rapid rate with close to 14,000 new residents a year. More than 50% of Brampton's residents are individuals who were not born in Canada, and there are more than 89 languages spoken by 209 different cultures. The vision of the people of Brampton, as expressed through the creation of the Brampton 2040 Vision to guide the City in the next quarter century, is living the mosaic.

> *The essence of Brampton is diversity and the essence of what the people want for the future is that their city be arranged, governed, seen, and celebrated as a mosaic of people, places and endeavours of all kinds, coexisting in harmony. Living the mosaic in 2040 is the central and simple aspiration of the people of Brampton.*[1]

Tourism celebrates a destination's greatest strengths, and thrives on authentic expressions of culture, including the customs, art, food, and traditions of various ethnic groups that make up a diverse destination. If developed and managed well, Brampton's visitor economy will contribute to the well-being of residents and business owners through job creation and financial gain, but also through peripheral investment into the facilities and infrastructure, such as expanded transit, sport and special event facilities and urban beautification that help tourism flourish. A well managed visitor economy improves resident pride in their home city. What makes a destination a great place to visit makes it a great place to live.

According to the Tourism Industry Association of Ontario (TIAO), prior to 2020 the economic contribution of tourism in Ontario was larger than agriculture, forestry and mining combined, and represented 4.3 per cent of the provincial GDP. While it will take some time to return to these levels, domestic tourism in Ontario has and will continue a strong showing in the post-pandemic period, and shows the most market promise for Brampton for the short and long term.

Due to border closures, health and safety guidelines and diminished consumer confidence, the COVID-19 pandemic has created a dramatic increase in domestic and hyper-local tourism that industry experts predict will remain in place for years to come. People are looking for new experiences closer to home. This trend is an opportunity for

[1] The City of Brampton, Brampton's 2040 Vision, Living the Mosaic. Page 3.

Brampton to securely establish itself as a tourism destination with the people who call Brampton home and with Brampton's closest neighbours, to create a foundation for tourism success for which to build from.

The Strategy consultations revealed Brampton's greatest strengths in the form of products and experiences to attract visitation to the City. These are the four Tourism Development Streams the Strategy will focus on:

- Arts and Culture
- Food Tourism
- Special Events
- Sport Tourism

Detailed analysis and strategic recommendations around these Tourism Development Streams form the basis of the Strategy Framework and Recommendations that, if implemented, will move Brampton forward in becoming a tourism destination that celebrates its multicultural heritage and strength in character.

Four priority areas provide the framework for the recommendations:

- Fostering Pride of Place: Harness local support for tourism to change perceptions and leverage visiting friends and relatives.
- Marketing and Communications: Create awareness of Brampton as a tourism destination.
- Leveraging Tourism Development Streams: Nurture Brampton's more compelling experiences to begin building a visitor economy.
- Management and Infrastructure: Encourage the creation and improvement of tourism management structures and core assets to address key gaps.

Developing Brampton as a tourism destination will expand and build upon the local economy while enhancing residents' appreciation of the city in which they live. Brampton is positioned favourably to benefit from the demand for the kinds of arts and cultural experiences, food tourism, special events and sport tourism experiences on offer in Brampton. As Brampton's tourism industry is in its early stages, strategic development towards ensuring a welcoming resident-base and positive visitor experiences is required.

This Strategy was originally planned to cover a 10-year timeline, however a conscious decision was made to reduce the duration to five years to better align with the changing COVID-19 landscape. The Strategy focuses on establishing a solid foundation for tourism going forward and a focus on hyper-local, local and regional campaigns as the City moves from lockdown to recovery.

FIVE YEAR VISION

Brampton is a developing tourism destination that celebrates its distinct multiculturalism and radiates pride of place through its engaged and dynamic resident-base. Visitors to Brampton are delighted by the range of arts and cultural activities, special events, food-based experiences and sport tourism events available to enjoy.

Tourism in Brampton is developed and managed through a collaborative stakeholder driven process that ensures the City's true authentic self and shared values are well-represented to the world, and that tourism in Brampton helps to improve the wellness of residents, businesses, visitors and the environment.

TOURISM GOALS BY PRIORITY AREAS

Fostering Pride of Place

- Residents of Brampton understand the benefits tourism brings and feel they are well-represented at the city-level.
- Residents of Brampton act as tourism ambassadors by actively participating in tourism experiences, sharing their experiences on social media and encouraging their visiting friends and relatives to explore Brampton.
- Tourism stakeholders and community volunteers who support tourism development feel supported by the City of Brampton.
- Brampton's tourism and political leaders are well-equipped to excite and propel the growth and success of tourism in Brampton.

Marketing and Communications

- Brampton is recognized as a tourism destination that celebrates its multicultural community.
- There is a dedicated tourism website with comprehensive content that is representative of Brampton's people, places and things to do.
- There is a noticeable improvement in the way Brampton is described in media and social media, and a marked increase in the number of positive news stories about Brampton.

Leveraging Tourism Development Streams

- Residents and visitors enjoy the wide-range of arts and culture experiences available in Brampton.
- Visitors celebrate Brampton's multicultural food experiences and enjoy them both as a singular draw and as a supporting element to their visit to the City.
- Brampton has an event that focuses heavily on local food and beverage and local artists.
- Downtown Brampton has begun to emerge as a tourism and community core, with an expanded Farmers' Market.

Management and Infrastructure

- A sport tourism division within the Tourism Office proactively bids and hosts local, regional and national sporting events.
- There is a municipal service corporate entity in place to properly market the destination as a whole with annual city funding and Municipal Accommodation Tax revenue. The entity is sufficiently resourced with city staff to carry out the Strategy and are accountable to its progress and adaptation.
- Tourism is considered when creating policy that affects tourism, such as transit, new recreation facilities and trail and park maintenance.
- There are boutique and four/five star hotels as well as family friendly hotel options for visitors.
- There are plans in place for a food hall.

CONSULTATIONS

Bannikin Travel and Tourism and the Culinary Tourism Alliance conducted the following consultations and research to support the creation of the Strategy. While COVID-19 impacted the ability for more in-depth stakeholder group engagement, the project team was able to successfully gain input from a wide range of stakeholders. However, visitor engagement specifically was low as a result of a decrease in visitor numbers to Brampton at the time of consultation. All efforts were made to engage the diversity of the resident base of Brampton.

Consultation details are as follows:

- Resident one-on-one interviews – 8 participants
- Stakeholder one-on-one interviews – 24 participants
- City of Brampton staff interviews – 10 participants
- Resident public group consultations via Zoom/WebEx – 2 sessions and 37 participants
- City of Brampton Council surveys – 8 respondents
- Tourism Stakeholder Survey – 43 respondents
- Brampton Resident Survey – 292 respondents
- Brampton Visitor Survey – 33 respondents
- Tourism stakeholder workshop – 23 attendees

City of Brampton reports and documents reviewed are as follows:

- 2018 Brampton Visitor Guide
- 2019 Brampton Visitor Guide
- 2020 Events Calendar
- 2020 Experience Brampton Guide
- 2020 Sport Tourism Events Calendar At a Glance
- Arts Walk of Fame
- Brampton 2040 Vision - Living the Mosaic*
- Brampton Destination Assessment Report*
- Brampton PRMP Final
- COB Food Tourism Strategy Phase 1 and Phase 2*
- COB Strategy Implementation Support Compiled Reports
- CSTA Report State of Tourism in Brampton*
- Culture Master Plan*
- Economic Development Master Plan
- Sport Tourism Hosting Program

The recommendations from the documents marked with an asterisk were required, as per the RFP for this project, to be incorporated in this Strategy.

COMPARABLE ANALYSIS

As the City of Brampton looked to develop its first tourism strategy for Council approval, it was important to obtain a more comprehensive understanding for comparative destinations within Ontario and beyond. A more thorough understanding of the paths already charted by similar destinations, and a look into their successes and failures provided ideas for both best practices to mimic and approaches to avoid. A selection of the findings and recommendations outlined in this document were considered for incorporation in the overall Strategy. To complete the analysis, the strategies and performance of five relevant destinations were reviewed:

Hamilton, Ontario
Hamilton was selected because it is a city that has had reputational issues, is located near Toronto, is similar in population to Brampton and has a burgeoning culinary and arts and culture scene.

Richmond, British Columbia
Richmond was selected for its proximity to Vancouver and its airport, combined with its pursuit of sport hosting opportunities, comparable diverse cultural demographic and established culinary scene.

Calgary, Alberta
Calgary was selected based on its leading reputation as a “host” city of special events and sport tourism as well as its effective VFR program.

Surrey, British Columbia
Surrey was selected for its Brampton-comparable demographics, the prominent role VFR plays as a demand generator for the destination and its sport hosting program.

Barrie, Ontario
Barrie was selected based on its proximity to Toronto, its Brampton-comparable parks and outdoor assets and its limited tourism product/relatively recent development of a tourism strategy.

The Approach

- The analysis was broken into areas of focus determined to have specific importance and relevance to Brampton, as follows:
  Building the First Tourism Strategy
- Sport Tourism Development
- Leveraging Arts and Culture
- Leveraging Special Events
- Culinary Tourism
- Meeting and Convention Hosting
- Approaches to Visiting Friends and Relatives
- Leveraging Outdoor and Recreation
- Community Reputation Management

- Success in Leveraging Diverse Communities

Following, we pull out a few key lessons and place considerations and recommendations in the context of the experiences and strategies of analogous destinations.

The findings helped to determine areas of focus for this Strategy, as well as areas to avoid. For example, while Leveraging Outdoor and Recreation and Meeting and Convention Hosting were studied, they were not chosen as priorities areas to focus on as part of this five year Strategy.

Comparable Analysis - Building the First Tourism Strategy
The key takeaway observed in our analysis of destinations building an initial tourism strategy was one of the inherent challenges that come with trying to make the community appreciate the purpose and value of tourism. Our consultations to date confirm that people, including businesses, don't see Brampton as a destination so they are not clear on the value of tourism.

Surrey had this same issue and to counter this challenge, Tourism Surrey developed community-based initiatives like "True Community" to help redefine what tourism means to its partners and enable them to understand the value of tourism to their business, its relevance outside of the community and the bigger picture as a whole.

To this end, Tourism Surrey looked to build relationships; nurture long-term strategic partnerships; provide marketing resources and business support; serve as a platform to share news of recent successes or upcoming events; connect like-minded people and businesses; and act as a supportive hub for those needing to seek advice or access information as its core community buy-in based actions.

Tourism Hamilton prioritized leadership as a strategic pillar in building its tourism strategy. The DMO identified that effective implementation of the tourism strategy would require strong leadership that brought together the public and private sectors at a senior level to facilitate the growth of tourism, and the identification of additional funding for business development and marketing.

Tourism Barrie, which has the least developed strategy of those analyzed, had focused on enhancing public awareness through comprehensive and integrated marketing campaigns to result in increased overnight stays in Barrie. We can observe through Tourism Barrie's content and campaigns that this focus has yet to create a singular narrative or identify a strong demand generator to achieve the desired results.

Tourism Barrie also focused a good deal of its efforts and attention on developing a new online reservation system for its websites, with the intention of closing the sales funnel of 500k+ customers visiting their websites and inspiring them to book "Barrie Stay and Play Getaway Package." Currently, the websites do not promote Barrie Stay and Play Getaway Packages, nor does clicking on 'Book Now' buttons on the tourism website link

to packages, but instead simply links to the accommodation provider's own website or booking page.

Considerations made:

- Prioritize developing a community engagement program to help define (or redefine) what tourism means to Brampton's community and its partners and enables them to understand the value of tourism to their business, its relevance outside of the community and the bigger picture as a whole.
- Prioritize strong leadership in order to bring together the public and private sectors at a senior level to facilitate the growth of tourism.
- Avoid overinvesting in new and developing technologies. Technology and consumer habits change at a rapid pace. Focusing significant spend or effort on developing technologies that will be outdated in just a few years (provided the technology even achieves your initial goals) is an ill-advised move for a developing strategy, especially for DMOs or tourism departments without large budgets and in-house teams capable of executing the new technology.

Comparable Analysis - Sport Tourism Development

In comparing the various approaches to developing sport tourism as a central tenet of tourism strategy one thing quickly became evident: destinations that want to/have succeeded have done so by creating entities specifically designed to drive sport tourism success.

Calgary, Hamilton, Richmond and Surrey's various tourism-focused entities have been working with a variety of budgets with different overall goals; however, each of the destinations has developed a body focused entirely on sport tourism.

Calgary, which has made hosting events the central tenet of its tourism narrative and overall strategic approach, established the Calgary Sport Tourism Authority under the City's Civic Sport Policy in 2005 to increase Calgary's capacity to bid for sporting events. Tourism Calgary has overseen the administration and management of the CSTA, which has effectively positioned Calgary as a premier host of sporting events in Canada.

A 2005 Hamilton Sport Tourism Action Plan strengthened the city's market position and municipal data indicated that sport events over the period 2011-2013 generated an economic impact that exceeds $50 million for the city.

Meanwhile**,** Richmond Sport Hosting (RSH) is a dedicated sport tourism office dedicated to supporting sport event organizers. The RSH Staff work with facility operators, hotel managers and various Richmond-based businesses to make it easier for event organizers to run world class events across the city. Program partners are the City of Richmond, Tourism Richmond, Richmond Sport Council and Richmond Olympic Oval Corporation.

On a smaller scale, Sport Surrey was jointly developed by the City of Surrey and Discover Surrey to be a central resource to assist bid submissions and to support tournament organizers and rights holders ensuring a successful event. The Sport Surrey Strategy was designed to establish Surrey "as a premier sport tourism destination in the Pacific Northwest and Canada while balancing community needs with sport tourism development."

Considerations made:

- Hone a sport tourism-focused team to lead on sport tourism for one to three years, then to develop into a sport tourism-focused body.
- Have the City oversee the sport tourism-focused body.
- Ensure the sport tourism-focused body has the resources to effectively assist event organizers in hosting sporting events in Brampton.

Comparable Analysis - Leveraging Arts and Culture

Effectively leveraging a destination's arts and culture sector for tourism requires an arts and culture sector that is supported by the City with space in which to thrive.

For example, through a needs assessment and community consultation process, Tourism Surrey identified that one of the key issues facing its arts community was a shortage of supportive resources - such as grants programs, affordable live/work spaces and purpose-built facilities - was challenging the capacity of artists and art organizations to deliver services, expand programming and offer events.

In an effort to improve the situation, Surrey has envisioned the creation of a cultural corridor by centralizing arts investments within a defined section of the city. The intention is that its "Cultural Corridor" will grow a critical mass of facilities and amenities and attract investment and entrepreneurs, allowing for collaboration with artists and art groups, and developing arts programming and services. Surrey has recognized that it will be a challenge to develop the Cultural Corridor as a focal point for investment while also providing a balance of services for all residents.

Similarly, Hamilton's tourism strategy identified that it needed to achieve its goal of strengthening the City's distinctive attributes as part of the City's 'Culture Plan.' Central to this plan was the James Street Corridor Project. As James Street North and South represented a corridor running through the heart of Hamilton's informal arts and cultural district and connecting the waterfront as well as the core of the city and the Niagara Escarpment, it offered visitors the potential opportunity to experience both the historic and contemporary character of Hamilton, and the eclectic qualities of the burgeoning arts scene. The strategy recommended building on the city's organic growth of cultural experiences (the growing success of the monthly Friday evening Arts Crawl events and the annual signature Super Crawl) and using the corridor concept as an enabling framework to develop a unique Hamilton experience that celebrated the provenance and creativity of the city.

In 2004, Richmond adopted its first Arts Strategy, with the aim to make Richmond a city with a thriving cultural life where opportunities for participation in the arts at all levels were accessible, artists feel they have a place and are seen as contributing to the community, cultural industries are welcomed, and cultural activity is visible and supported.

Since then, there has been significant civic investment to increase the capacity of artists and arts organizations, offer high-quality arts festivals and programs, and showcase Richmond's artistic talent. Richmond's Arts Strategy 2019–2024 now positions the arts as a means to achieve community goals in economic development, health and well-being, infrastructure and tourism. Its 'Five Major Strategic Directions' to lead arts and cultural development over the next five years are: 1. Ensure affordable and accessible arts for all 2. Promote inclusivity and diversity in the arts 3. Invest in the arts 4. Increase awareness and participation in the arts 5. Activate public spaces through (and for!) the arts.

Getting a destination to effectively support the arts can be a challenge, especially if the arts and culture sector are not currently a primary driver of tourism in the destination. To this end, one of the core elements in Tourism Calgary's Destination Strategy is to attract and enhance premier cultural experiences in the city. To achieve this, the Conference Board of Canada (CBOC) noted it would be important for the city to have a benchmark of tourism spending on the creative sector as the Destination Strategy looked to establish new visitor growth targets that relied on successfully promoting cultural experiences to visitors.

Considerations made:

- Determine what civic arts and culture support systems are already in place (begin with the City of Brampton Culture Master Plan).
- Create or define an enabling framework space in which the community arts and culture sector can thrive (as suggested in the City of Brampton Culture Master Plan).
- Determine a benchmark of tourism spending on the arts and culture sector.
- Provide statistical insights to businesses/community that demonstrate the economic benefits of a well-supported arts and culture sector for tourism.

Comparable Analysis - Leveraging Special Events

A key function of Tourism Calgary is to support the attraction, development and delivery of sport, cultural and major events, in other words, to attract, host and leverage special events. The City has had tremendous success in leveraging its special events, to the point that Tourism Calgary identified its new aspiration was to make Calgary "the ultimate host city."

To achieve this Tourism Calgary identified the following actions:

- Evolve advisory sub-committee to champion the identification, evaluation and oversight of bidding for major events.

- Develop an organizational strategy to identify, support and enhance targeted events that complement the brand, offer shareable experiences and grow visitation.
- Work with stakeholders to elevate hosting potential through activation and marketing.
- Evolve Tourism Calgary's partnership and membership programs to ensure they meet the needs of the industry, and are based on engagement.
- Identify key Destination Strategy-focused partnerships and initiatives in which to invest and advance in the short to mid-term.
- Advocate to appropriate stakeholders on behalf of the tourism industry.
- Develop a baseline, then grow the number of stakeholders who feel engaged with Tourism Calgary.

While Calgary's approach builds on the city's well-established reputation as an event-based destination, Tourism Hamilton's approach to leveraging special events identified the necessity that the effort *only be undertaken* in the context of the city's 'need periods' to attract business at the times of the year and days of the week when there was capacity in terms of commercial accommodation.

In addition, securing the kind of business that was appropriate to the availability and capacities of Hamilton's tourism infrastructure, primarily its meeting and sport venues, was also a major consideration. Having a comprehensive overview of the need periods and the ability to maximize these opportunities required a booking calendar that could be used proactively to plan and execute sales and marketing strategies to deliver the highest yield possible, and to secure business for the city's tourism industry at the times of the year when the business was most needed.

To achieve this, Tourism Hamilton developed an 'Advanced Booking Calendar' to support sales development, which was used to track potential and actual scheduling of events, festivals, M&C business, and sport related tournaments and activities for a forward-looking period of at least three years. This assisted in scheduling and booking more localized or regional events and activities that do not have as much potential to drive overnight stays in paid commercial accommodation. Knowing this reduced the likelihood of securing a local sport tournament during a prime month or week of the year in a venue that is potentially attractive to regional or provincial sport organizations.

Unlike Calgary, Surrey did not have a significant general awareness of its special events offering to lean on in leveraging its special events. All the same, Surrey has foregrounded its festivals and events across its collateral, electing to make festivals and events the first tourism driver featured in its 2018-2019 Visitor Guide.

Festivals and events have also been used to illustrate Surrey's diverse communities with reflective imagery being employed across marketing collateral. Narratively, Surrey employs its special events as a connective tissue between its diverse communities and arts and culture sector.

Considerations made:

- Consider building a community-led marquee event with a heavy focus on culinary and arts and culture to enhance resident pride and create a platform for storytelling.
- Develop an organizational strategy to identify, support and enhance targeted events that complement the tourism offering or brand.
- Secure the kind of business that is appropriate to the availability and capacities of Brampton's tourism infrastructure.
- Develop an 'Advanced Booking Calendar' to support sales development, track potential and actual scheduling of events, festivals, meetings and convention business, and sport related tournaments and activities for a forward-looking period of at least three years.
- Use special events to narratively connect Brampton's diverse communities with its culinary and arts and culture sectors.
- Foreground festivals and events across marketing collateral in order to illustrate Brampton's diverse communities with reflective imagery employed across marketing collateral.

Comparable Analysis - Culinary Tourism

Culinary Tourism as a key element in a tourism strategy is a relatively new development for many destinations, a fact that was reflected in the various strategies and action plans examined in this comparable analysis.

Richmond was the most advanced and pro-active in its approach to culinary tourism, as Tourism Richmond, in conjunction with other key stakeholders, finalized a Richmond Food Tourism Strategy in 2019.

The DMO has stated that the plans account for long and short-term goals to increase visitation - especially in the shoulder season - and strategies to provide visitors with the best experiences when they visit the destination. Prior to the COVID-19 pandemic, the plan had been to begin rolling out the initiatives and actions outlined this year.

Prior to the strategy, Richmond was already working from an established culinary tourism foundation as the city's Alexandra Road has been branded as "Food Street" or "Wai Sek Kai." It is a three-block stretch of the City's Golden Village and has the highest concentration of restaurants in the city, most serving Asian cuisine.

Tourism Richmond also offers a Food Street "Food Crawl" guide available on its website and has developed a "Dumping Trail" (listed among CNN Travel's list of 12 of the world's most enticing food and drink trails), which is available to download as a PDF from the Tourism Richmond website. The organization has also created a number of additional "Dining Guides" made available on its website and has established the Richmond Night Market, which has become an annual tradition and one of the flagship summertime events of the region.

Tourism Surrey's Culinary Arts Program also represented a new perception of the municipality that would be informed by its food culture. Its 'Food with Thought' campaign was launched in February 2014 as a way to introduce locals and visitors to Surrey's burgeoning culinary scene, highlighting Surrey's mixture of urban culture and vast farmland that make it unique to other municipalities. The Food with Thought website (now redirecting to TrueSurrey.ca) was a stage that was designed to showcase stories about Surrey's restaurants and cafes, people's relationships with food and the community that makes up the culinary scene. The site was built to showcase participating brands' stories via videos and profiles, and strengthen the food community in general by sharing recipes, stories and events. 'Food with Thought' aimed to illustrate that the region's culinary scene is more than just dining at a restaurant.

And though not a significant piece of Hamilton's Tourism Strategy, because James Street and adjoining streets provided a number of unique restaurants and cafés with the potential to highlight the ethnic diversity of the area, local personalities, and unique settings, Hamilton has developed a culinary sub-theme to support its Destination Development Arts and Culture theme. Building an emphasis on local produce was designed to strengthen the positioning of the corridor and the culinary sector in general, while enhancing the linkages with the agricultural sector (and the benefits to the local economy).

In the cases of Calgary and Barrie, neither destination indicated its culinary offering offered enough of a potential draw to visitors to foreground it, instead both destinations elected to use the food and drink offering to bolster and support their overall tourism offering by providing food and drink dedicated pages and lists on their consumer facing websites, with latter pages mentions in visitor guides.

Considerations made:

- Prioritize rapid development of and a proactive approach to the culinary tourism plan to help keep Brampton ahead of the growing number of destinations turning their attention to the development of culinary tourism.
- Showcase stories about Brampton's restaurants and cafes, people's relationships with food and the community that makes up the culinary scene.
- Use Brampton's culinary scene to narratively highlight Brampton's diverse communities.

Comparable Analysis - Meeting and Convention Hosting

All five destinations analyzed have placed a significant emphasis on the importance of meeting and convention (M&C) hosting as part of their respective tourism strategies, though none made it a lead priority or pillar in their overall tourism strategies or action plans. That is to say, this is an extremely competitive space, though not one necessarily being prioritized by most comparable DMOs.

With its established reputation as an excellent "host" city, Tourism Calgary actively promotes the city's competitive advantages and works with stakeholders, meeting planners and local champions to secure meeting and convention business. The DMO

places emphasis on developing more programs, as more programs mean new and repeat visitation, broader awareness of the city's business community and increased economic impact for Calgary.

Meanwhile, Hamilton has enjoyed a solid base of business from the M&C sector. Considered as a second tier meetings destination, Hamilton has historically attracted and hosted local, regional, provincial and national association and corporate meetings.

With new management of Hamilton's major facilities for events and the development of new city downtown branded hotel properties by the Vrancor Group, there were new key partners with primary interests in securing events to generate overnight stays. Developing an effective working partnership with shared goals and objectives and enhanced funding was important to Tourism Hamilton in moving forward in a progressive manner. Hamilton's M&C strategy was highly focused and targeted organizations that aligned with Hamilton's core assets and strengths.

Barrie, which competes directly with Brampton for a variety of meetings and conventions, has focused on working to "ensure travellers choose Barrie as their overnight location when choosing an accommodation while travelling for business or booking meeting spaces and conferences." Overall, Barrie has an above average corporate travel occupancy rate at 58% (2017), and Tourism Barrie noted that a slight downturn in corporate travel would have a major effect on the tourism economic impact and growth in the accommodation sector in Barrie.

On its website, Tourism Barrie messages on meetings and convention as: "Barrie is the perfect location in which to hold your conferences, meetings and events. Our beautiful waterfront city can host local, regional or national meetings and events in our variety of impressive facilities. It is an excellent alternative to conventional hotels in big cities and offers a more personal and flexible experience than other venues."

Considerations made:

- Determine definitively how valuable the meetings and conventions sector is to Brampton's tourism economic impact, choose how to prioritize this competitive space accordingly.
- Develop an effective working partnership with shared goals and objectives with meetings and conventions infrastructure owners and management.
- Focus on and target organizations that align with Brampton's core assets and strengths
- Present Brampton as an alternative meetings and conventions destination.

Comparable Analysis - Approaches to Visiting Friends and Relatives

Despite the importance and durability of the 'Visiting Friends and Relatives' (VFR) segment, remarkably few destinations have specific strategies in place to maximize the potential of this market.

Visiting friends and relatives is one of the top five reasons for overnight visits to Calgary. As a result of this, Tourism Calgary recognized the importance of fostering a strong sense of the city's tourism offering amongst Calgarians. The #LoveYYC initiative was designed to celebrate everything that makes Calgary great. Over the last few years, the campaign achieved success as a result of strong support from Calgary's tourism stakeholders and a collective eagerness to engage Calgarians in shareable, memorable experiences. Tourism Calgary noted that Calgarians have increasingly embraced the opportunity to experience something new and showcase their community spirit by supporting local partners and businesses.

Now a year-round campaign, this initiative is designed to educate, engage and impact Calgarians, with the intention of encouraging them to actively invite friends and family to experience Calgary. Tourism Calgary has developed a number of #LoveYYC assets available for download from the industry partners section of its website. They are:

- Red heart #LoveYYC print out for use in photos
- #LoveYYC Facebook and Twitter assets
- #LoveYYC logos
- #LoveYYC digital signage assets

Richmond has also been relatively proactive in developing VFR. Not dissimilar from Tourism Calgary's campaign-based approach to developing and encouraging VFR, Tourism Richmond's 'Pacific. Authentic. Locals.' program helps locals show off Richmond to visiting friends and relatives.

Unlike Tourism Calgary, Tourism Richmond has placed some controls to locals becoming strong ambassadors as locals must pass a knowledge test to receive their Richmond Ambassador certificate. As an incentive, those individuals that pass both tests (Value of Tourism Knowledge Test and Richmond as a Destination Knowledge Test) are entered into a draw to the "ultimate Richmond ambassador prize." The prize package includes:

- 1x Pacific.Authentic.Richmond BC Swag Bag;
- 2x adult tickets on a whale watching tour with Vancouver Whale Watch;
- 2x admissions into the Gulf of Georgia Cannery National Historic Site;
- $50 Gift Card for McArthurGlen Designer Outlet Vancouver Airport.

Locals can prepare for the tests using materials provided on the Tourism Richmond website.

Discover Surrey is a three-hour class originally developed by Tourism Surrey to use for City of Surrey special event volunteers. However, it has since evolved into a course used for both volunteers and newcomers to the community. The goal of the Discover Surrey class is to connect people to the tourism opportunities in the city, increase community pride and inspire residents to explore their own community.

At the launch of Hamilton's tourism strategy, VFR was identified as an existing strength for the destination, as visits were primarily for the day, with VFR being a key motivating factor in generating demand overall. The strategies recommended for Hamilton's VFR

approach were based on strategic segmentation, an enhanced use of digital marketing, and close collaboration with RTO3. Hamilton worked to create a stronger online presence and increase the use of digital channels for information distribution to strengthen the positioning of the city and its sense of place as a destination, and increase stakeholders' ability to leverage RTO3's regional marketing activities, particularly as they related to the city's main source market segments.

Considerations made:

- Create a VFR program.
- Include food and culture focus to maximize economic impact of each visit.
- Provide easy-to-use, easy-to-access digital VFR materials.
- Encourage strong support from tourism stakeholders and partners for VFR campaigns.
- Engage locals in shareable, memorable experiences.
- Utilize VFR to foster and encourage community pride.

Comparable Analysis - Leveraging Outdoor and Recreation

Evidently, destinations with more access to prominent outdoor spaces have put more emphasis on the value of leveraging outdoor and recreational spaces for its tourism offering. As a result, while Tourism Barrie's overall tourism strategy is less developed than many of the other destinations reviewed here, the DMO has recognized its geographical advantage and has put a significant emphasis on leveraging its outdoor and recreation offering to boost its tourism offering.

In particular, Tourism Barrie's 'Winter Fun' program was built to promote Barrie as a winter and ski destination over other Ontario winter destinations. The winter season has lower hotel occupancies and, therefore, Tourism Barrie has worked to capitalize on the region being home to Ontario's five major winter resorts and markets Barrie as the place to stay when vacationing in the area over the winter season. The program was developed as a cooperative marketing program with 17 tourism industry partners combining outdoor winter activities with overnight stay during a traditional slow leisure tourism period.

Meanwhile, 'Barrie by Bike' is a cooperative marketing program involving 10 tourism industry partners and combining outdoor activities and cycling with overnight stay during the months of July and August. Actions involved in developing this program included work with 'Barrie by Bike' partners in developing collaborative and cost effective marketing campaigns to promote Barrie as a cycling destination and targeting the GTA to arrive by Go Train and promote sustainable tourism and alternative transportation. To support, Barrie publishes 20,000 City of Barrie Official Road, Parks and Trails Maps annually.

The enormous scale of Surrey's park system has presented the city with an overarching issue for the delivery of outdoor amenities and services as ensuring the necessary resources to acquire, maintain, and program such an extent and variety of parkland has been identified as a growing challenge for the city over the next decade. As a rapidly

urbanizing city, Surrey recognized it must plan to acquire and develop new parkland to address its growth and ensure equitable access to parkland and park amenities. It should be noted that these needs were not identified as part of tourism strategy, but rather as part of its Parks, Recreation and Culture strategy for the city.

The outskirts of Hamilton have offerings appealing to visitors, with Tourism Hamilton noting it would be of particular interest to those with an interest in ecotourism, agri-tourism, hiking, cycling and mountain biking. Tourism Hamilton's emphasis was put on identifying ways of elevating the significance of these related activities as distinctive experiences and 'supporting demand generators' in terms of increasing length of stay, complementing the James Street corridor and waterfront experience and attracting niche markets.

Considerations made:

- Identify Brampton's outdoor and recreation advantage/unique selling points to differentiate from competitors.
- Determine if outdoor and recreation should be a driver or supporter of overall tourism offering.
- Assess how these outdoor spaces will increase in value in a post-pandemic era, where destinations will need places to disperse visitors.
- Determine if outdoor amenities and services can sustainably scale to an increase in visitors participating without negatively affecting locals and environment.
- Identify ways of elevating the significance of these activities as distinctive experiences.

Comparable Analysis - Community Reputation Management

Combatting a potentially negative community reputation was unique to Hamilton and Surrey in our analysis and as such we will focus on only those destinations for this segment.

In a comprehensive SWOT analysis looking at the industry and the destination experience from a traveller-centric perspective, Tourism Hamilton identified 10 issues and opportunities that need to be either addressed or leveraged: one of which was the negative image of Hamilton as a visitor destination**.**

Hamilton's approach to community reputation management has been central to the city's overall economic development goals. Through the multiple stakeholder engagement exercises that influenced the creation of Hamilton's updated Economic Development Action Plan, businesses and citizens identified the value they saw in the efforts to increase the image of Hamilton regionally, nationally and internationally and the expectation that the City of Hamilton, and specifically the economic development-focused sections of the city, would play a leading role in this effort.

Over the past five years, the marketing efforts from Hamilton's Economic Development office and its investment partners in the Hamilton community have generated scores of positive interest for Hamilton. Among the highlights: Hamilton's changing economy has

been featured repeatedly on a national scale by publications such as the *National Post, Toronto Star* and the *Globe and Mail*; Hamilton is increasingly being known as Canada's most diversified economy (as ranked by the Conference Board of Canada).

Negative marketplace perceptions of Hamilton as a destination were also encountered as a constraint to attracting meetings and convention business. To combat this issue, the Tourism and Culture Division endeavoured to play a key role in building awareness of Hamilton as an events destination within target markets and implementing tactics to overcome the issue of negative perceptions. These included: ensuring the availability of good quality information and content about the city for distribution through multiple online and offline channels; maintaining a program of hosting FAM tours and site inspections for qualified meeting and event planners, and continuing to strengthen market presence through activities associated with industry associations such as Meeting Professionals International (MPI) and Canadian Society of Association Executives (CSAE); developed a public relations program aimed at meeting planners and meeting and convention related media that profiles success stories and highlights Hamilton's outstanding hosting capability; maintain up-to-date sales kits with current images that portrayed the city and its attractions and venues in an effective manner and included a cost-analysis sheet that demonstrated the cost benefits of hosting an event in Hamilton; utilize the proximity to Toronto and Niagara as an opportunity for an extended and enhanced visitor experience.

Historically, Surrey has endured a negative reputation. To counter this, Tourism Surrey launched the True Surrey initiative in 2015 with the goal of effectively articulating the regional identity, values, and differentiation factors to reshape perceptions by highlighting what the destination offers and inciting civic pride among residents.

True Surrey focuses on the unique positive qualities that define the region "rather than paying undue attention to the typical growing pains all burgeoning communities face." The initiative was created to empower the everyday Surrey resident to become a True Surrey brand ambassador. True Surrey aims to communicate the following: "we live in Surrey for many reasons; we are evolving as a community; there is so much to see and do here; the future looks bright; we are excited to share our city with you."

Considerations made:

- Ensuring the availability of good quality information and content about the City for distribution through multiple online and offline channels.
- Maintaining a program of hosting FAM tours and site inspections for qualified industry professionals.
- Strengthen market presence through activities associated with industry associations.
- Develop a public relations program that profiles success stories.
- Maintain up-to-date sales and marketing kits with current images that portray the city and its attractions and venues in an effective manner.
- Utilize the proximity to Toronto as an opportunity for an extended and enhanced visitor experience.

- Make combatting Brampton's reputation issues a pillar of the VFR program.

Comparable Analysis - Success in Leveraging Diverse Communities
Considering Brampton has the 4th largest visible minority population in Canada with 234 different ethnic origins reportedly speaking 89 different languages calling the City home, very few destinations have the kind of diverse community Brampton does, making successful comparables something of a rarity. Which means that fact alone presents Brampton with a unique selling point.

Richmond is another of the most culturally and ethnically diverse cities in Canada. The 2016 Census reported that there were over 150 ethnic origins and over 100 languages spoken in Richmond with six out of 10 residents born outside of Canada.

As a result, Richmond has produced a 'Cultural Harmony Plan' - the first community in Canada to do so. The 10-year plan identifies innovative and collaborative approaches to strengthen intercultural connections among Richmond residents, provides city programs and services that address the needs of the city's diverse population.

The Cultural Harmony Plan was developed based on analysis of statistics related to demographic information in Richmond, research regarding best practices and promising approaches for enhancing cultural harmony and stakeholder engagement including meetings with the Steering Committee, City of Richmond Intercultural Advisory Committee and consultations with key stakeholders.

The city has also made a concerted effort to undertake the development of several plans and strategies that include actions related to the Cultural Harmony Plan, including the Richmond Arts Strategy 2019 to 2024 and Recreation and Sport Strategy 2019 to 2024.

From a purely tourism perspective, Tourism Richmond has made its Asian heritage food offering a lead tourism demand generator and highlights/showcases this offering prominently through its marketing collateral and numerous dining guides.

Surrey, one of the fastest growing cities in Canada, also has a diverse population with approximately 800 new residents moving to the city every month and its population is expected to increase by an additional 250,000 people in the next 30 years.

With half of Surrey residents having a mother tongue language other than English, and 33 percent of households speaking a language other than English at home, Surrey has identified that it must continue recognizing and celebrating the unique needs and interests of community and cultural groups. The City's Parks, Recreation and Culture Plan 2018 to 2027 identified this as an opportunity in its future planning noting that "this presents an opportunity for the City to foster and embrace cultural diversity and build unique programs and services."

Surrey's Culture Division is responsible for the operation of a variety of arts, heritage and cultural facilities as well as the delivery of programs, services and special events to support its vibrant and engaged community and has seen particular success through its cultural programming that celebrates its diversity, particularly through its festivals.

Considerations made:

- Build on successes in Brampton's Culture Master Plan, especially as it relates to "Building Brampton's Identity."
- Centre the Culinary Tourism plan on the diverse offering.
- Forge collaboration and partnerships with Brampton's diverse cultural centres, especially as they relate to and celebrate arts and heritage.
- Recognize and celebrate the unique needs and interests of community and cultural groups in the larger tourism strategy.
- Highlight and support cultural festivals, promote beyond traditional communities.

Comparable Analysis - Summary

Hamilton's overall strategy and related strategic plans have provided the most valuable insights for our analysis, with key learnings as they relate to building a strategy, sport tourism development, leveraging arts and culture, including their culinary sub-theme, leveraging special events, meeting and convention hosting, leveraging outdoor and recreation and community reputation management. The Hamilton-model also provides the most holistic learnings for an overall tourism strategy.

Based on the experiences of the destinations examined here, it can be expected that some of the biggest challenges facing Brampton will be changing the narrative around the City's reputation and maintaining a vibrant arts and culture sector supported by the City and given a space in which to thrive. However, some of the destinations analyzed have managed to make in-roads against these challenges. With a considered-strategy Brampton can expect to overcome these same challenges as well. The key to success in this area appears to be that supporting the latter can help to effectively change the former.

Through our analysis it also became even more apparent that, while destinations like Richmond and Surrey have constructed strategies featuring culinary tourism programs and actions, Brampton's demographics have the City well-positioned to take advantage of its unique assets, especially as culinary tourism is factoring into the tourism strategy at the foundational level of the strategy building process. The space is definitely there for Brampton to create a strong tourism narrative in this sector.

BRAMPTON TOURISM SWOC AND SITUATIONAL ANALYSIS

This section looks at what the current situation in Brampton is from a tourism lens. It identifies what Brampton's main tourism strengths and weaknesses are, as well as significant gaps in resources and activities that are required for a tourism destination to thrive. This section also uncovers the priority areas for the City of Brampton to focus on in developing Brampton as a tourism destination.

This strategy's consultations, background research, asset inventory and site visits revealed key findings in the form of the following strengths, weaknesses, opportunities and challenges (SWOC) as they relate to developing Brampton as a tourism destination. These findings form the framework for which this Strategy is based.

Tourism Strengths

Well-Defined Multiculturalism
Brampton is a very multicultural population with 200 different communities that make up the City and almost 90 different languages spoken.

Established and Emerging Arts and Cultural Assets
The City of Brampton recently launched the Arts, Culture and Creative Industry Development Agency, a recommendation of the Culture Master Plan, which is an exciting step to move the sector forward. The inaugural Chair and Senior Project Lead positions have now been filled. Brampton is home to a number of well-known and world-class institutional arts and culture assets and experiences, including The Rose, Peel Art Gallery, Museum and Archives (PAMA) and The Festival of Literary Diversity (FOLD). Brampton's participation in events such as Doors Open gives visitors and residents the chance to visit many of the City's heritage buildings and places of worship. The City also has a large range of community-based arts and culture assets, events and happenings that are attended by cultural, ethnic or religious communities in Brampton but are not currently part of the tourism landscape.

Food-Based Experiences
Bramptonian's rich multicultural culinary traditions, ingredients and techniques are well represented in the hundreds of restaurants found throughout the City, as well as through the growers, producers, artisans and farmers' markets. Downtown Brampton comes alive every weekend with the large and popular Brampton Farmers' Market. The market will be relocated to Gage Park and Ken Whillans Square for the 2021 and 2022 seasons while water main construction takes place. The new Brampton Food Guide was introduced in 2021.

Accessible History
Downtown Brampton's collection of heritage buildings, homes and markers are well documented and easily accessible through the City's self-guided heritage walking tours for which a digital version will be made available this spring. The restored 19th century mansion, Alderlea House and the Historic Bovaird House are examples of Brampton's

preserved history collection.

Festivals and Special Events
The breadth and depth of city and community-led festivals and events are celebrated, and in demand by the local community.

Sport Tourism
The City of Brampton's assemblage of sport facilities, and investment in a Sport Tourism Coordinator have established a solid foundation to grow this segment of event-based tourism. The slate of sport events held in Brampton continues to grow with the addition of GT20 Cricket and the Brampton Half-Marathon.

Parks and Trails
One of Brampton's best-kept secrets are its unique parks such as Chinguacousy Park and natural spaces such as Heart Lake which are well-connected by impressive trail systems that intertwine all throughout the City. In addition to an extensive slate of municipal natural areas, both Credit Valley Conservation Area and Toronto Regional Conservation Area manage space within Brampton's borders.

Entertainment, Sightseeing and Adventure
Brampton has a variety of attractions in the categories of entertainment, sightseeing and adventure that can be positioned as springboards to tourism development streams.

Location
Brampton is Canada's ninth largest city. It forms part of the Greater Toronto Area (GTA) and is located on the Innovation Corridor (Kitchener-Waterloo to Toronto). Brampton is just 15 minutes from Pearson International Airport, is accessible by VIA and GO trains as well as the 400 series of highways.

Tourism Weaknesses

Resident Awareness
While not universally shared, many residents engaged for this Strategy expressed a limited knowledge of what was available to see, do and experience.

Lack of Visibility and Distinct Brand
Brampton's history, community, assets, experiences and stories are not well-known or understood by people from inside and outside of Brampton.

Downtown Brampton Challenges
While Downtown Brampton contains the majority of the City's most established tourism assets and experiences, including The Rose, PAMA, Brampton Farmers' Market, Garden Square and the many heritage buildings, the area is scheduled for much needed and wide-spread upgrades and repairs that will prevent it from being a flourishing tourism hub until work is completed.

Traffic Congestion
Heavy traffic congestion entering Brampton, particularly during the evening rush hour, can be a deterrent to visitors from other parts of the GTA and Ontario.

Transit
Public transit is widely used in Brampton by residents. A future service review of evenings and weekends could benefit both small businesses' workforce getting to and from tourism establishments as places of work, and the ability for residents and visitors to explore Brampton's tourism offerings more broadly. The lack of regular and easy public transportation options to and from Toronto and other surrounding cities is also a limitation.

Tourism Stakeholder Disconnect
Tourism stakeholders, including business owners, industry representatives and residents cited a lack of consistent connection from the City of Brampton.

*Infrastructure and Amenities**[2]
Core hard infrastructure expected in a tourism destination, such as a range of accommodation options with proximity to amenities, and a tourism core such as a downtown or specific neighbourhood, are not currently available in Brampton.

Tourism Opportunities

Promotion and Storytelling
Increasing strategic marketing and promotion of Brampton's tourism experiences through a distinct destination brand will build general awareness of Brampton as a tourism destination, and ultimately increase visitation to the City.

Celebrating Diversity
Brampton's greatest tourism strength is its diverse range of people and cultures that make up the resident base. Celebrating this by weaving this messaging into all aspects of Brampton's tourism development, including festivals, events, destination marketing and branding, and the building of cultural experiences that visitors can engage in, will further establish Brampton as a tourism destination based on authentic strengths, and enhance resident pride of their city.

Resident Engagement
Informed and engaged residents are crucial to the success of a sustainable and holistically inclusive tourism destination. They act as both formal hosts, when their own friends and relatives visit, and also as informal spokespeople with every interaction they have with visitors to a destination.

[2] The Gap Analysis provides a detailed review of Brampton's missing core infrastructure and amenities.

Determining a Specific Niche
Because Brampton is in its infancy as a tourism destination, it is not known for a specific visitor appeal. This provides an opportunity to build a tourism niche with intention, building from the City's clearest opportunities to become demand generators, including arts and culture, food-based experiences, special events and sport tourism.

Improved Stakeholder Collaboration
A city-led initiative to aid in tourism-related businesses and stakeholder collaboration would support knowledge transfer, capacity building, destination building and improved connection between tourism stakeholders and the City.

Bike Tourism
Leveraging Brampton's green spaces and trail network to connect with other GTA municipalities with a strong cycling culture would better leverage this strong domestic tourism segment.

Beautification, Infrastructure and City Planning
Several large scale infrastructure improvement projects such as Riverwalk and the Shoppers World redevelopment will improve Brampton's appeal to visitors.

Self-Guided Tours
Self-guided tours could be developed to engage with Brampton's collection of well-marked public art and heritage buildings. A digital Downtown Heritage Walking Tour will be launched in the spring.

Youth
Brampton has the youngest population of Canada's largest cities, with an average age of 36.5 years. Including this in messaging and development would aid in tourism positioning.

Hurontario Light Rail Transit Expansion
This expansion is an opportunity to improve traffic congestion and public transit options to and from surrounding cities, which is currently cited as a weakness of Brampton as a tourism destination. The Queen Street-Highway 7 Bus Rapid Transit (BRT) currently under review would also improve connectivity for Brampton.

Two-Way, All Day GO Train
Metrolinx has discussed the possibility for two-way all day GO service for the Kitchener line which includes stops in Brampton at Mount Pleasant Village, Downtown and Bramalea for some time. It is hoped that talks will continue post-pandemic as increased service will certainly improve visitors' ability to easily access Brampton.

Tourism Challenges

Reputation
Resident and visitor perceptions of Brampton do not always align with the reality.

Competition
Brampton is surrounded by large cities, namely Toronto, Mississauga, Hamilton and Vaughan, that have a similar or in some cases, superior make-up of tourism-related strengths.

Business Resiliency
Most of Brampton's tourism-related businesses are small "mom and pop" shops that are not financially resilient to turbulence and crisis.

Changing Conventions and Events Model
COVID-19 has brought about a major change to the viability of large-scale events, shifting most to an online model. It's unknown if this shift will be long lasting.

Gap Analysis

This Strategy's gap analysis identified that the following sentiments and large-scale resources and/or services would best serve the City in moving the needle forward in achieving the Vision and Goals of this Strategy.

Stakeholder Appreciation of Brampton as a Tourism Destination
The majority of stakeholders and residents consulted for this strategy noted they did not see a clear path for Brampton to become a tourism destination.

Organizational Structure to Market the Destination
The City of Brampton does not have an official organizational structure for tourism, such as a municipal service corporation, in place with the mandate to conduct destination marketing services, which is a requirement of the Municipal Accommodation Tax (MAT) allocated for destination marketing.

Boutique Accommodation Options
Hotel offerings in Brampton have increased over the last two years but only within the three-star category. Most have a capacity range of 50 to 150 rooms. Higher rated options, including boutique options, would be a welcome addition to Brampton's accommodation portfolio particularly in the downtown core to service the following:

- Visitors seeking a more service-oriented experience.
- Business travellers to the expanded Innovation District or corporate head offices including Canon and Loblaw.
- Bridal parties celebrating at Alderlea.
- Audience and performers of Rose Theatre productions.
- Visitors seeking a rich culinary or heritage experience.

Family-First Hotel Options
To qualify as a family-first accommodation, of the variety that families will specifically travel for, as opposed to a family-friendly accommodation that welcomes families and may offer just a few family-friendly amenities (i.e. indoor pool and slide), an accommodation needs to be centrally located; offer a babysitting service/kids club; offer a play place; provide packages complete with meals, activities and perks; and have a pool, ideally with a slide(s). At the moment, Brampton has just two hotels with an indoor pool and slides, and none that could serve to attract families on their own merits.

Updated Multi-Purpose Sport Complex
High-profile sport hosting requires bringing people to one concentrated centre. The addition of a multi-purpose sport complex (i.e. 6 to 8 fields/ice sheets/gyms/large food court, common area or event space) with 500-1,000 spectator seating available would improve Brampton's ability to compete with comparable destinations that have larger and more efficient facility offerings. Going forward, the City's tourism office should lend tourism's perspective and engage with the City's recreation and planning teams on development.

Destination Restaurants
While Brampton has an eclectic culinary offering across the City, at present the City's extensive dining options don't include a destination restaurant or food hall, the type of destination dining experience that can compel visitors from outside of the area to travel to Brampton specifically for a food experience. A noteworthy restaurant and/or food hall that is a tourism draw in itself would be advantageous in affirming Brampton's position as a culinary destination.

A Tourism/Community Core
Brampton's tourism assets are spread out across the City, with no centralized hub making overall connectivity is a challenge. Downtowns are representative of the community and visitors interpret a destination's downtown as an overall representation of the greater area. They are also looked to as an indicator of larger social and economic trends. Developing an attractive core that features a mix of specialty retail shops, family-friendly entertainment, restaurants, professional services and residential occupancies within a walkable setting would provide Brampton with a marketable hub and a launch point connecting visitors to the expanse of tourism assets and experiences available to them across the wider City. Achieving this in Brampton will take time due to ongoing large-scale construction, but the downtown's key cultural assets like The Rose and the Peel Art Gallery, Museum and Archives as well as parks and heritage buildings can still be positioned as tourism attractions in the meanwhile.

TOURISM DEVELOPMENT STREAMS

Brampton has four distinct areas of growth that represent the most potential to develop into the main demand generators for Brampton's visitor economy, and have each been given special analysis as to how best to accomplish this. These areas of growth are:

- Arts and Culture
- Food Tourism
- Special Events
- Sport Tourism

Arts and Culture Tourism Development Stream

Current Situation

The City of Brampton has a solid foundation of work on which to build this plan to leverage arts and culture as part of tourism development. Part of Brampton's 2040 vision seeks to position Brampton as an attractive destination through its cultural assets. More specifically, Vision 5 "Brampton will be a rich mosaic of cultures and lifestyles, coexisting with social responsibility, respect, enjoyment, and justice" and Vision 7 "Brampton will support a mosaic of artistic expression and production" are connected to core elements to create demand outlined in this strategy. In 2018, the City's Culture Master Plan identified many areas of action which, although specifically focused on arts and culture, are also in alignment with building Brampton as a tourism destination. One action was to create a tourism strategy. As such, the strategies from the Culture Master Plan inform the recommendations of this plan and should continue to be implemented by the City's culture team as back-bone strategies toward developing Brampton as a destination recognized for its arts and culture. An important milestone of the Culture Master Plan, which this report draws from, is the vision for cultural development in Brampton:

> *Brampton is a city where boundaries between cultural activities and creative entrepreneurship are blurred; bold and unabashed artistic and entrepreneurial activities take place in the context of an interconnected creative ecology. This creative ecology not only produces high-quality artistic expression, but also youthful, cutting-edge, silo-busting creativity expressed in both formal and informal ways.*[3]

Although there are plans for the arts and culture sector to grow in Brampton, the City remains in a place where distance and divisions between *institutional and community-led* arts and culture happenings fragment the understanding of what to do in the City, and the types of cultural offerings accessible to residents and visitors alike. Furthermore, respondents to a survey for the Culture Master Plan shared that one of the biggest barriers to participating in arts and cultural activities was the "lack of variety of arts and cultural offerings."[4] An initial opportunity in developing tourism is establishing and/or strengthening lines of communication across arts and culture bodies, institutions,

[3] Lord Cultural Resources, "City of Brampton Culture Master Plan" (City of Brampton, 2018), 3.

[4] Lord Cultural Resources, "City of Brampton Culture Master Plan" (City of Brampton, 2018), 17.

organizations, events, and community groups to be able to present consistent and accurate information on the arts and culture assets and opportunities with residents and visitors.

Important work has taken place to push the development of arts and culture as part of the City of Brampton's growth and economic development. During this Strategy's research and engagement activities a number of existing cultural assets (events, institutions, and spaces) that are well-developed were identified by stakeholders, residents, and staff as established arts and culture assets. Many of the arts and culture assets named across the research are listed below, not an exhaustive list, and can continue to be looked to, and leveraged for opportunities to grow tourism.

A sample list of the many established/institutional arts and culture assets is as follows:

- The Rose Theatre - City Owned and Operated
- The Peel Art Gallery, Museum, and Archives (PAMA) - Region of Peel Owned and Operated
- The Festival of Literary Diversity (FOLD) - Community-led
- Canada Day Celebrations - City-led
- Downtown Heritage Buildings - City and Community Owned and Operated
- Sikh Heritage Month - Community-led
- Doors Open Brampton - City and Community-led
- Culture Days Brampton - Brampton Library

Additionally, it was noted across the engagements that there are several community-based arts and culture assets, events, and happenings that are attended by cultural, ethnic, or religious communities in Brampton but not widely known or participated in across the City. Although a richness of community-led arts and culture happenings were named as an asset and part of the offer in Brampton, information on what they are, where they take place, and how to participate when appropriate is not readily available for tourism purposes. As such, community-based arts and culture represents an opportunity in the development of tourism in Brampton. Future work needs to invite collaboration and promotion of these events as part of the City's cultural offering and destination identity. In order to grow tourism in Brampton through existing arts and culture institutions, events, and spaces more streamlined communication needs to be developed between the city-led tourism and arts and culture efforts, as well as with non-city led events and institutions.

A number of projects and initiatives being led by municipal and non-municipal organizations were shared across the research engagements. These are established programs that can support tourism development and demonstrate the range of arts and culture related activity in Brampton. Their areas of focus cross over with economic development, municipal planning, resident engagement, etc.

Examples of the many arts and culture projects and initiatives:

- Arts Walk of Fame - Led by the City of Brampton, the walk of fame recognizes Brampton's creative talent.[5]
- Visual Arts Brampton - This non-profit organization serves as an incubator and provides space, programming and resources for arts in Brampton.
- The Rose IG Live - Series of live streamed performances hosted by the city-owned Rose Theatre and shared through its Instagram account during COVID-19 lockdown.
- Culture Calls Weekender - Led by the City of Brampton with various arts and culture organizations in the city for an online experience of artistic expression, collaboration, and community.
- Brampton Visitor Guides - Led by the City of Brampton, these are business and activity guides for tourism in the City. A new food guide was introduced in 2021.
- Doors Open Brampton - Part of Doors Open Ontario, this event gives visitors and residents the chance to visit many of Brampton's heritage buildings and places of worship. In 2020 it was adapted with virtual tours to allow participation without in-person visits.
- Culture Days Brampton - Led by the Brampton Library, Culture Days "offers Brampton's creative community a unique opportunity to display their talents and offers the public a wide range of interactive experiences." It is a part of Culture Days, Canada's national celebration of arts and culture. Brampton Culture Days was among the top 10 hubs of attendance and participation in Ontario.
- Beaux Arts Brampton - Artist run gallery that serves as a not-for-profit exhibition space for visual artists and photographers, founded by the Brampton Arts Council.
- The Arts, Culture and Creative Industries Development Agency - Launching in 2021, this agency will be incubated within the City of Brampton and subsequently evolve into an independent non-profit organization with the mandate of delivering a vision for arts, culture and creative industries.

Although the above listed spell out a range of different programs, there continues to be a lot of room to grow support and awareness for the arts in Brampton and celebrate community-based programs through city channels.

As recognized by the Culture Master Plan and this Strategy's research, resident pride and perception of the quality and quantity of arts and culture offerings in Brampton still needs to be improved. Residents engaged through the resident survey, public consultation sessions, as well as through interviews, did not express much confidence in what makes Brampton a destination worth the visit. From the resident survey shared, under 30% of respondents selected "arts and culture" as something they would take a guest/visitor to do and see in Brampton. However, just under 50% selected festivals and cultural events (e.g. Culture Days, etc.) and over 60% would take guests/visitors to restaurants. Recommendations around encouraging pride of place and increased strategic marketing and communications in this Strategy are designed to address this

[5] City of Brampton, "Arts Walk of Fame", https://www.brampton.ca/EN/Arts-Culture-Tourism/CulturalSrvs/Pages/Arts-Walk-of-Fame.aspx

under appreciation of arts and culture assets over the five year period of this plan. An initial opportunity presents itself to leverage the spaces where residents are already going with visitors, such as restaurants, and infuse them with representations of arts and culture from Brampton.

SWOC Analysis of Arts and Culture as a Tourism Development Stream in Brampton

Strengths

- Number of community-led arts and culture assets, events, and happenings
- Richness of arts and culture connected to the diversity of the resident population
- A significant number of businesses engaged for this strategy identify as operating within Arts, Culture and Heritage (27%, Stakeholder Survey)[6]
- Business community recognizes the importance of culture in bringing visitors to Brampton (71%, Stakeholder Survey)[7]
- Presence of arts and culture institutions gaining recognition beyond Brampton (e.g. The Rose Theatre, The Festival of Literary Diversity)
- The Arts, Culture and Creative Industries Development Agency, launching in 2021, will be incubated within the City of Brampton and subsequently evolve into an independent non-profit organization
- Existing built heritage across the City
- Existing living heritage across diverse communities

Weaknesses:

- Weak connections between institutional and community-led arts and culture happenings
- Low level of awareness of arts and culture activities
- Lack of awareness of Brampton's arts and culture offerings beyond Brampton's border

Opportunities:

- Plans in place to grow the arts and culture sector
- Increasing awareness of cultural happenings
- Fostering trusting relationships and regular communication with cultural communities and leaders
- Establishing and/or strengthening lines of communication across arts and culture municipal and non-municipal institutions, organizations, events, and community groups
- Embracing arts and culture to reshape perceptions of the city's identity among residents and potential visitors
- Featuring arts and culture in the spaces that residents already frequent to build pride and increase awareness
- Enhancing community-based programming and city support for community-based programming

6 City of Brampton's 5-Year Tourism Strategy Research (2020) *Stakeholder Survey*

7 City of Brampton's 5-Year Tourism Strategy Research (2020) *Stakeholder Survey*

Challenges:

- Proximity to destinations understood to have very similar arts and culture offering (i.e. Mississauga and Toronto)
- Lack of ongoing strategic destination marketing plan that includes arts and culture promotion
- Generational and cultural divides within Brampton residents
- COVID-19 restrictions and health and safety measures

Strategy for Going Forward with Arts, Culture and Tourism

The following section takes this current context and specifies actions that will address this question: How can arts and culture be leveraged to celebrate Brampton's people, places, and histories as part of a destination worth visiting?

For Brampton to grow as a tourism destination, important foundational work is needed to leverage what is already in place as assets for tourism and building up Brampton's residents as ambassadors. A key part to building up Brampton residents as ambassadors is co-creating and communicating a city-culture or identity. What are the elements that make people proud to live in Brampton? What are the current arts and culture assets that people celebrate? Narrowing down on these questions and communicating across residents and to potential visitors can have major effects in positioning Brampton in a positive light based on the genuine experiences, assets, and resources available in the City.

On a macro-view of this tourism development stream, moving forward with a feasibility study to develop downtown entities such as Garden Square as a more livable space, and to help create a community hub and cultural heart of Brampton, as major construction is completed, is an important city planning initiative that will benefit tourism development. A similar study could also be undertaken to understand options for Ken Whillans Square as an additional space in downtown. Downtown Brampton has a history as a lively city centre with a range of heritage structures and newer developments. Caution is advised to ensure that the downtown doesn't become a less walkable destination. It is important that as Brampton continues to evolve and grow as a city, access to create and participate in cultural activity continue to inform infrastructure and city planning developments. Growing efforts to expand cultural activity in the downtown area, making more spaces available for artists and creative organizations, and leveraging existing spaces as performance venues for community-groups has the potential to diversify the types of happenings in the city-centre. As a consequence, encouraging the diversity of Brampton to come and share space downtown is essential. Tied to this potential are needed actions to improve transportation within the city and continued participation of diverse socio-economic groups across the city.

In areas outside of the downtown, where community-led arts and cultural activities are most prominent, work needs to be done to uncover these experiences through increased civic engagement and empowering neighbourhoods to celebrate their identity. Communication flow between the City's tourism team and the city-led Nurturing Neighbourhoods program, which aims to connect residents with resources, improve

civic engagement and support residents to play an active role in their neighbourhoods, will be a step towards this.

Arts and culture stakeholders look to the City to facilitate access to infrastructure, grants, funding, but not to determine the programs that will take place across the City. The Culture Master Plan recommends pursuing a "co-curated, bottom-up program development and delivery approach"[8] that the City can encourage in partnership with the new Arts, Culture and Creative Industries Development Agency.

The Culture Master Plan identifies strategies/actions to grow and sustainably support the arts and culture sector in Brampton, including key recommendations on benchmarking and measuring the investment and growth of the City's contributions to arts and culture. This key milestone document should be referred in parallel to the recommendations below as many draw from its actions to foster tourism development. For specific actions from the Culture Master Plan that inform this Tourism Development Stream see Appendix 2.

Brampton's arts and culture offerings should be part of any visitor's overall experience, whether they are in the city for a sport tournament, civic holiday celebration, or major festival. The Tourism Office can play an essential role in connecting arts and culture with the sport, events and festivals, and food and drink sectors, helping to build expanded tourism offerings and enhancing visitor spending. By building relationships with sector stakeholders and co-defining mechanisms for sharing upcoming events and available products, the Tourism Office can facilitate the promotion of tourism opportunities that cross industries, are uniquely Brampton, and contribute to a curated image of the City.

Food Tourism Development Stream

The City of Brampton's tourism team has long recognized the untapped potential for Brampton's food experiences to elevate the City as a tourism destination. Food is a natural expression of culture, and a medium through which people can connect with cultures, authentic combinations of food histories, heritages, and experiences, which is what today's visitors are seeking. As such, prior to the creation of this Strategy, the City had invested in the Culinary Tourism Alliance to build a strategy to develop the City's food tourism segment. While the crux of the food tourism analysis and positioning is covered in this subsection, the complete City of Brampton Food Tourism Strategy, including Phase 1 (2017) and Phase 2 (2020) can be found at brampton.ca/tourism.

Food Tourism Strategy Phase 1 - 2016 to 2017
The City of Brampton Food Tourism Strategy Phase 1 is the outcome of community-based and collaborative research that unearthed the rich food tourism potential in the destination. The strategy is complemented by an online database of information on 351 businesses that make up Brampton's food tourism value chain, which is grouped into the following categories: accommodations; attractions; beverage producers; cooking

[8] Lord Cultural Resources, "City of Brampton Culture Master Plan" (City of Brampton, 2018), 37

schools; farmers' and public markets; festivals and events; foodservice operators; growers and producers; retailers; and tour operators.

Food Tourism Strategy Phase 2 - 2019 to 2020
By way of revisiting and refreshing the work of 2016 to 2017, the City of Brampton engaged in a Food Tourism Strategy – Phase 2 project that focused on conducting an environmental scan, exploring opportunities to position the destination through food and drink, and determining how best to grow the destination's food tourism programming and appeal to food tourists through its municipal markets and corporate events. The result is a Food Tourism Strategy Implementation Support report that compiles the findings and recommendations from each exercise.

Food Tourism Strategy and Tourism Strategy - 2020 to 2021
Recognizing the importance of making food and drink a key part of every visitor experience of Brampton, the City of Brampton saw potential for integrating past food tourism development work into its creation of a tourism strategy for the destination. This includes working to ensure that all past areas of opportunity and related activities are included in the recommendations contained in this Strategy (see Priority Areas and Recommendations).

Food Tourism Current Situation
Brampton has an extremely vast range of styles of cuisine representing the city's multicultural make-up. Brampton's top 20 ethnic cuisines include: African, American, Chinese, Caribbean, Filipino, Greek, Hakka, Indian, Italian, Japanese, Mauritian, Middle Eastern, Mediterranean, Mexican, Pakistani, Portuguese, Sri Lankan, Thai, Vietnamese, West Indian.[9] The diversity of cultures and foods found in Brampton pose both an advantage and a challenge for the destination, especially when it comes to harnessing the growth potential of food tourism. The advantage lies in the variety of culinary traditions, innovations, and fusions that emerge from a population that is known worldwide for being multicultural. The challenge remains how best to integrate diverse foods and food-based experiences into drivers of visitation to Brampton. Brampton has a unique opportunity to leverage its diverse foods and food ways and expand upon this by showcasing the meeting of cultures that takes place as part of the City's food scene.

Of Canada's 22 tourism regions, the Greater Toronto Area is the second highest earning region in the country for international visitor spend, with the largest share of foreign travel expenditures going to accommodation (34.4%) and food and beverages (25.3%)[10]. While it's going to be a significant time before international tourism expenditure returns to 2019 levels, a large number of Ontarians have been and will continue to travel across the province in the post-pandemic period. This positions Brampton well for using food and drink as a means through which to attract visitors from nearby before those from afar, and a strategy for enriching existing experiences while maximizing economic impact.

[9] The Culinary Tourism Alliance, "City of Brampton Food Tourism Strategy" page 51.
[10] Statistics Canada Government of Canada, "The Daily — Visitor Travel Survey, Second Quarter 2019," November 27, 2019, https://www150.statcan.gc.ca/n1/daily-quotidien/191127/dq191127c-eng.htm.

Past and emerging trends confirm that Brampton should proceed to integrate foods and food experiences that reflect the destination. From the rise of the food-connected consumer through to shifts in traveler demands for destination stewardship, the post-pandemic visitor will be exploratory and more purposeful in their travel as well as seek experiences that are multisensory and immersive.

At the moment, Brampton's most unique selling point in relation to food is that the City is known to be a place where international cuisines can be found; however, this connection is not as pronounced as it can be. Importantly, the City of Brampton Destination Assessment Report (2019) notes: "two of the lowest-rated categories of Brampton tourism assets (Restaurants and Hotels) are two of the more reviewed, and talked about, categories on the list, and have the largest potential for improvement."[11] The good news is that there is much opportunity for the City to develop as a destination where food is a part of every visitor experience, and this aligns with its 2040 vision.

As Brampton moves forward with identifying and defining its food image and identities there are a number of important processes to connect with food tourism positioning. These include featuring the diversity of cultures, the foods, cultural traditions, and lifestyles represented in the City, as well as communicating social responsibility actions.

Supporting the innovation and creation of food tourism experiences that align with purposeful travel is an important area of focus for food tourism development. As pointed out in the *City of Brampton Destination Assessment Report*, Brampton does not currently stand out in terms of quality experiences, which include food-based tourism experiences such as food tours, cooking classes, or food or beverage trails. An area of focus moving forward will be building up the number of quality experiences available in destination and ensuring that these are tied to the cultural context and USPs (unique selling proposition) of Brampton.

Additionally, connecting food tourism development to other priority areas for tourism development in Brampton, such as sport tourism, is an important consideration. As new infrastructure is planned and built for sport events or conventions, a constant point of consideration should be how local food businesses and products can be made a part of the consumer-facing side of these projects. Much like Mississauga recognizes the opportunity of connecting tourism development to its planned infrastructure projects, so too should Brampton consider how tourism, and more specifically food tourism, can be connected with cultural, sport, and outdoor recreation development.

The *City of Brampton Destination Assessment Report* places Brampton as standing out in registering the most experiences in the number of restaurants (n=247).[12] This means that the product and places are there, and an area to incorporate more actively is the stories tied to these. It's important to consider what the unique food tourism assets and experiences are that Brampton can leverage when moving forward with Brampton's food tourism positioning.

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[11] Resonance, "City of Brampton Destination Assessment Report" (City of Brampton, 2019), 21.

[12] Resonance, "City of Brampton Destination Assessment Report" (City of Brampton, 2019), 7, 1A.

SWOC Analysis of Food Tourism as a Tourism Development Stream in Brampton

Strengths:

- Diverse flavours available in local restaurants
- Established farmers' market
- Proximity to farms and rural communities
- Strong support across city departments for integrating food and drink into every visitor experience
- Existence of local food champions
- Food industry (processors) is one of the largest employment sectors in the City

Weaknesses:

- Very few businesses are food tourism ready
- Many food businesses have limited to no web or social media presence
- Very few food businesses are using local Ontario produce
- Very few food businesses are calling out their use of local Ontario produce
- Difficult for restaurants to procure an abundance of local food

Opportunities:

- Establish Brampton as a food destination with a focus on global flavours (with local ingredients)
- Develop a dedicated Brampton food festival
- Increase local food businesses' presence at local festivals and events
- Tap food experiences into strong visiting friends and relatives (VFR) market
- Connect food with Brampton's other tourism development streams
- Develop designated kitchens as centres for food entrepreneurship learning and growth
- Redevelop existing events such as Carabram
- Help farmers to distribute food during the week
- Evolution of the Farmers' Market to become a year-round indoor market (currently seasonal and outdoor) or part of a food hall
- Capitalize on celebrity chefs in the City (Jason Rosso, Ranveer Brar and Rick Matharu)

Challenges:

- Strong growth of food scene in nearby and neighbouring cities (i.e. Hamilton)
- Lack of commitment from local stakeholders
- "Bedroom" community of commuters who don't eat out very often and/or typically plan their restaurant spend
- Summer business in restaurant drops approximately 30% (but not unique to Brampton – happens in GTA)
- Restaurants experience a slow growth in the City – 1 to 18 months to grow, 18+ months to establish themselves
- COVID-19 restrictions and health and safety measures

Strategy for Going Forward
With hundreds of restaurants, several festivals and events, as well as growers, producers, artisans and an established farmers' market, the City of Brampton is ideally positioned to leverage its food tourism assets and showcase its mosaic of flavours by supporting the growth and development of food-forward tourism in the destination. To do this, the City must strategically integrate food and drink into all areas of destination development, and use food and drink to exceed visitor expectations, regardless of why they are visiting the destination.

In consideration of past and recent work, several opportunities have been identified for the City to grow food tourism, at both the operator level and through to city-wide approaches. These opportunities, which fall into three categories—including education and engagement, new product development, and marketing and communications—are complemented by specific opportunities related to municipal markets and corporate events. Moving forward, rather than seeing food and drink as a separate tourism development stream, these areas of opportunity, along with specific recommendations contained within previous reports, need to be fully integrated into destination development efforts, as they have been here.

Special Events Development Stream

Current Situation
Considering that the City of Brampton is in the initial stages of development as a tourism destination, the City to date has not utilized special events to generate visitation from outside of Brampton, or as a strategic element for tourism development. However, the City does have a foundation that would allow it to effectively incorporate and leverage special events to increase visitors to Brampton in the mid- to long-term. More specifically, in 2019 there were a total of 98 events, 61 of which were community-led and 37 funded by city grants, including the Santa Claus Parade, the Jazz Festival, and the Festival of Literary Diversity (FOLD).

The majority of residents and stakeholders engaged for this Strategy do not consider Brampton to be a tourism destination at the moment. That said, those residents and stakeholders engaged, who did share that Brampton has potential to become a tourism destination, expressed that hosting special events would be a powerful way to do so. Additionally, the City of Brampton Culture Master Plan identifies the potential of developing and leveraging events in Brampton to support growth of arts and culture in the City.

While it is clear that COVID-19 has heavily impacted the events industry, there is an opportunity to now begin laying the foundations for a robust special events segment, as part of Brampton's visitor economy. Work to evolve special events in anticipation of a confident recovery from COVID-19 in Canada in the medium term, can and should be a contributor to tourism development.

SWOC Analysis of Culinary and Arts and Culture-Based Events as a Tourism Development Stream in Brampton

Strengths:

- 2040 Vision[13] aligns with creating a community-led marquee event with a focus on culinary and arts and culture
- Diverse culinary offerings, which could be leveraged to create a marquee event while reinforcing the destination identity
- Brampton is a mosaic of cultures with many art institutions, community groups and local artists that could contribute and/or be incorporated into a marquee event
- City Council and Brampton residents agree the City's multiculturalism is its strongest asset and should be celebrated through special events

Weaknesses:

- A disconnect between the City and residents regarding events: some residents feel the City is unsupportive, while the City is balancing providing support with empowering community-led events to thrive
- Brampton's lack of a destination identity can lead to confused programming and messaging that doesn't resonate with event attendees
- Lack of a strategic marketing plan incorporating events
- High percentage of food and culture based businesses are not market-ready and lack capacity to participate in events

Opportunities:

- Interactive culinary event programming can engage different audiences by curating programming to target specific audiences, such as families with children (i.e. kids samosa making class) or adult only (i.e. curry making with beer pairings)
- Culinary event programming engages attendees on a deeper level through a connection with food, the chefs, producers and/or farmers
- Increased destinations resonance
- Strengthening Brampton's culinary identity with both locals and tourists, through storytelling of the food program
- Showcasing Brampton's strengths as a multicultural city
- Increased sponsorship opportunities
- Build positive brand image about culinary and arts cultural diversity – the messaging is almost as important as the event, for example Ottawa Blues Fest, Calgary Stampede, Hamilton Arts Week

Challenges:

- COVID-19 restrictions and health and safety measures
- Limited large-scale indoor event space available could limit to outdoor, warm weather events

[13] Beasley and Associates, Planning Inc., "Living the Mosaic, Brampton 2040 Vision." (City of Brampton, 2017.)

Strategy for Going Forward

Area of Opportunity: Enhancing Resident Pride in the Events Sector
An initial and important recommendation is for the City to support a community-led or partnership based initiative to design and execute a marquee festival highlighting culinary and arts. This can include a heavy focus on local culinary and arts supports and contribute to enhancing resident pride and encouraging residents to invite their family and friends to join them in Brampton.

Having a marquee event with a focus on local food and beverage and local artists will provide a consistent platform to engage and showcase these two sectors. Additionally, an event can be a powerful platform to promote and celebrate the multiculturalism that exists in the City, as evidenced by the City of Surrey, which employs its special events as a connective tissue between its diverse communities and arts and culture sector, and adding local culinary and art programs will only further establish this message.

For example, the City of Hamilton hosts an annual Arts Week with the main goal being to showcase that art is everywhere in the city.

> *"Hamilton Arts Week is an annual civic celebration of arts and culture in the City of Hamilton. A dynamic week showcasing events from multiple partnering arts organizations. This year there will be music, art installations, film screenings, live performance, and food."*

The event is presented by the Hamilton Arts Council with support from the City of Hamilton, Ontario Arts Council, Downtown Hamilton BIA, DPAI Architecture, the Cotton Factory and Hamilton Public Library, and is a city-wide event designed to highlight the diverse arts and cultures that exist within the city. The event features installations for children, adults, families, and includes dozens of art installations presented through multiple mediums – ones that are often also combined with food components designed to match the culture showcase. Arts Week engages over 100 artists, venues and performers from the community.

It was identified in resident and stakeholder surveys that one of Brampton's most unique selling points is its multiculturalism. Residents surveyed used terms like *multiculturalism, rich black culture, multi-ethnic community and cultures; varieties of living expressions, very multicultural city that could offer world class festivals, such as Toronto's Caribana.*

When designed properly, a community-led marquee event will not only help to enhance resident pride but will also support the development and establishment of a destination identity by showcasing Brampton's most unique selling points. This will then allow celebrating its people, places, and histories to further reinforce Brampton as a destination worth visiting.

Area of Opportunity: Economic and Social Impact of a Special Event Strategy
Further to the above area of opportunity, a community-led Marquee Tourism Event can contribute to the local economy, as well as offer residents the opportunity to share identities and cultures, thereby strengthening resident pride.

According to a study titled "*The economic impacts of annual community festivals: A case of the Sturgis Falls Celebration*, 2013," it was identified that an event or festival positively impacts the local economy as it creates both direct and indirect spend within the host community[14]. An example of direct spend would be a visitor paying for parking in the host town while attending the event or spending a night at a local hotel. These impacts can then multiply further (the multiplier effect) as the original dollar spent is reinvested back into the community.

An example of an indirect spend would be the cost of renting tables for the event from a local rental company or the cost of hiring residents to run a ticket booth.

The report concluded that "*A festival creates a number of impacts on the host community such as: increased expenditures, creation of employment, increase in labor supply, increase in public finances (such as sales tax), increase in standard of living and increase in awareness of the area."*

Area of Opportunity: Investing to Provide Support and Grow the Events Sector
During City Council interviews for this Strategy it was highlighted that Councillors and stakeholders believe that events offer a powerful opportunity to engage Brampton residents and build a stronger sense of community, but finding a balance where the City fits in to tell the tourism story is challenging. A focus is required to help determine where and how the City should focus their energy to share what the community is doing and how they encourage more events and ideas from the community with a focus on these events being organized by community members.

As the events sector continues to grow, it is recommended that an investment is made to design a comprehensive event marketing strategy, which is essential when trying to attract attendees to an event for both local and visitor markets. A key element of the strategy should focus on tying resident stories into event promotions. Sharing the stories and identities of people from the community will support building resident pride and feelings of inclusion, while also contributing to continuing to build Brampton's destination identity.

Sport Tourism Development Stream

Situational Analysis
While the City of Brampton is in the initial stages of building Brampton as a tourism destination, sport tourism in Brampton has been operating successfully for many years and is by far the largest tourism-related economic driver for Brampton. Through hosting

[14] *Tolle, Chelsea Mae.* "The economic impacts of annual community festivals: A case of the Sturgis Falls Celebration" (2013)

an average of 35 sporting events annually, sport tourism in Brampton generates on average $16 million in revenue annually, and welcomes upwards of 76,000 participants and spectators.

The City has a dedicated sport tourism coordinator, a multitude of indoor and outdoor facilities to host a range of activities, from soccer, basketball, lacrosse, cricket, field hockey, track and field and kabaddi as well as a Mayor and Council that are supportive of further investment in this segment. In fact, the City is currently reviewing options for the construction of cricket facilities, built to international cricket standards. Brampton has hosted events such as the Cruiser Cup International Para Ice Hockey Tournament, and remarkably, is home to the Brampton Canadettes Easter Tournament, the world's largest and longest running female hockey tournament.

However, it isn't a clear path to success for Brampton. There are several gaps in assets, support and systems, as outlined in the following Strengths, Weaknesses, Opportunities and Challenges (SWOC) analysis. Brampton's geographic location is a dichotomy for sport tourism. It's both optimal, being in the heart of the Greater Toronto Area, and just 15 minutes from the Toronto Pearson International Airport; and challenging, being so close to comparable cities of similar size. While Brampton has great facilities for community use, other cities within 50km have more modern and larger facilities with dual purpose for tourism and community. As well, some nearby similar-sized cities also have more cohesive processes for bidding and managing sport tourism events, and more established stakeholder engagement processes. Furthermore, while Brampton successfully hosted large events in the past, those efforts exhausted resources and pointed to the need for additional support in the form of staffing, budget and facilities in order to host events of this size with success in the future.

The good news is that the opportunities outweigh the challenges, and if managed well, sport tourism in Brampton has the chance for a home run, or in celebration of Brampton as the Cricket Capital of Canada[15], a SIX.

Brampton Sport Tourism Critical Assets

Facilities:

- 53 Multi-purpose natural fields – one 14-field complex
- 46 Softball and six hardball diamonds – one eight-diamond complex
- 20 Ice pads – two four-pad complexes, seating up to 5,000
- 15 Cricket pitches (3 of which are lit)
- 14 Beach volleyball courts
- Nine indoor/outdoor artificial turf fields
- FIH Global-certified field hockey field
- Kabaddi stadium – seating up to 3,000
- Track and field stadium – IAAF 400m eight-lane track with nine field event sites

15 The City of Brampton Department of Recreation webpage. https://www.brampton.ca/EN/residents/Recreation/Bookings-Rentals/Pages/Cricket.aspx

Event Support:

- Bid preparation
- Hosting grants
- Facility selection and bookings
- Accommodation options
- Event promotion
- Welcome and orientation packages

SWOC Analysis of Sport Tourism as a Tourism Development Stream in Brampton

Strengths:

- Sport tourism is Brampton's biggest economic driver related to tourism at this time, with an average annual economic impact of $16 million and visitation of 75,600 people, including participants and spectators
- Dedicated sport tourism team member
- Home of the Brampton Canadettes Easter Tournament, "The World's Largest Female Hockey Tournament."
- Strong sport hosting legacy
- A large range of sport facilities and assets to accommodate a variety of sporting events
- Brampton has more facilities than many nearby similar sized cities in multiple-sports including beach volleyball, field hockey, cricket, skateboarding and BMX
- Brampton is the only city in Ontario with Kabaddi facilities
- A recognized sport tourism destination for Cricket, Soccer, Field Hockey, Ultimate, Basketball and Lacrosse
- Engaged Sport Tourism industry representatives
- Established Sport Tourism Hosting Program
- Nearby international and regional airports, rail access, hotel and 400 series highways
- Brampton aiming to be "The Cricket Capital of Canada" and Mayor and Council support of Sport Tourism

Weaknesses:

- Need for a multi-purpose sport complex with the amenities, structure or visual aesthetic required to bring in national or international visitors
- Unable to provide third party event organizers with access to volunteers
- Brampton is geographically situated among many highly competitive sport tourism locations
- Not proactively bidding; reactively hosting
- Lack of an organized system to receive input and engagement from local sport tourism representatives
- Lack of dedicated sport tourism marketing to support bidding and hosting
- General lack of tools and processes related to bid assessment, partnerships, bidding, transition to hosting, event planning and delivery and evaluation and legacy/transfer of knowledge[16]

16 Canada Sport Tourism Alliance Sport Tourism Assessment Tool, 2020

- Lack of Tourism Hosting Program budget
- Reliance on municipal funding

Opportunities:

- Potential for forthcoming cricket stadium built to international standards
- Leveraging Brampton's multiculturalism, arts and culture and culinary offerings through sport tourism
- Dedicated investment and capacity building to move from reactive bidding to proactive bidding
- Leverage Brampton's bidding reputation as the Cricket Capital of Canada in overarching destination marketing

Challenges:

- Case-by-case decision process in place to balance resident use and sport tourism use of facilities
- Some sport tourism stakeholders feel lack of support and investment from City of Brampton
- COVID-19 restrictions and health and safety measures on large gatherings

Strategy for Going Forward

Overview

To capitalize on the opportunities that sport tourism represents for the City of Brampton, the City must invest in a more robust sport tourism segment. While Brampton has many fundamental advantages for sport tourism, it lacks key elements that will take the sector forward. While some of these elements are large in scale, the need for more facilities that are able to accommodate spectators is needed.

In terms of specific sport hosting and bidding opportunities, this strategy recommends focusing on enhancing existing local and regional tournaments through increased stakeholder collaboration, incorporating sport into the City's event marketing and story-telling, and better leveraging visitation (i.e. sport tourism packages) with the goal of expanding participant and spectator numbers, destination engagement and overall revenue for the City's businesses and stakeholders, while building community pride and awareness of Brampton as a sport tourism destination. This will require the expansion of the sport tourism team. Through the success of leveraging these events, sport tourism in Brampton could then expect additional buy-in to add more facilities and funding to upgrade the size of events to target. Ultimately at the completion of this five-year tourism strategy, a destination of Brampton's size that wishes to be a sport tourism destination should be in a position to host large-scale events such as the Ontario Games.

A Note about Sport Tourism Bidding and Hosting

Sport Tourism bidding and hosting is an involved process that requires significant strategy and preparation.

Bidding:
While most local sport events do not require a bid, many larger sport events involve a bidding process of some kind. Events holders establish a set of bid guidelines outlining the requirements of a destination for hosting the event. These requirements often include elements such as resource requirements, sport facility infrastructure, event duration, the tournament format and the number of expected participants. A bidder will be required to respond to the request for proposals and meet bid guidelines. Before bidding, the size and type of events should be considered to ensure that hosting the event is attainable for the destination. Factors to consider include the type of sport, age/demographic of participants, opportunities for sport development and the general fit within the destination's larger sport tourism strategy.

Hosting:
Hosting a sport event is not dissimilar from hosting other larger scale community events and will require the same considerations as major arts and culture events or conferences and trade shows. While the central goal of hosting a sport event will be to deliver a successful and well-run sporting competition on the field/track/court/ice/pitch, the tourism element must also be considered as part of the overall event execution strategy. Ensuring that accommodations, food and beverage, creative content (digital presence, posters, t-shirts, printed event materials) and promotion are considered and built into the hosting strategy will be key to delivering sport events that further the destination's larger sport tourism strategy.

Key Bidding and Hosting Opportunities for Sport Tourism in Brampton

- Enhancing and supporting existing localized and regional community tournaments to bring in more participants, spectators and revenue for the City's businesses.
- Welcoming new local and regional tournaments when the opportunities arise.
- As the Government of Canada's Minister of Science and Sport has targets to achieve gender equity in sport at every level by 2035[1], Brampton should place a particular emphasis on hosting women's sport events as this is expected to be the fastest growing sector. Being the home to the Canadettes gives Brampton an edge in women's sport.
- There may be an opportunity to host the cricket matches of the Commonwealth Games in 2026, further securing Brampton's cricket position in Canada.
- In general, Sport Brampton is poised to focus on the following sport based on the City's current assemblage of facilities: ultimate, soccer, floorball, softball, baseball, ice hockey, track and field, sledge hockey; and those with a particular competitive strength for Brampton based on facilities as well as limited competition from nearby cities are: beach volleyball, field hockey, cricket, Kabaddi, skateboarding and BMX.
- With a healthy skateboard and BMX park offering, Brampton should target Canada Skateboard, which hosts a series of National Series events (street/park) across Canada every year. 2019 host cities included a number of destinations with populations smaller than that of Brampton, namely Cloverdale, BC; Medicine

Hat, AB; Halifax, NS; Vanderhoof, BC; Dartmouth, NS; New Westminster, BC, as well as larger cities including Calgary, AB and Toronto.

- Leverage joint bids with neighbouring municipalities such as Toronto and Mississauga. Applying for the Ontario Sport Hosting Program. Of the 11 sport events that were approved to receive funding in 2019, multiple events were hosted in Mississauga and Ottawa, and events were hosted in Toronto, Sudbury, Windsor and Kingston. The program is designed to encourage the development of legacies for amateur sports and local communities. The application process is administered through Grants Ontario.
- Brampton's multicultural resident base, living culture and renowned international food experiences are unique and significant assets for sport tourism, to be leveraged both in the kinds of sport events it attracts and creates, and the approach to sporting events. Brampton's arts and cultural assets and food and drink should be incorporated into sport tourism events in Brampton when possible and at the discretion of event organizers.
- Should the City of Brampton invest additional funding and staff resources into its sport tourism program, the City would be in an opportune position to host the Ontario Summer Games for youth in the 2025 to 2030 window.

KEY PRIORITY AREAS AND RECOMMENDATIONS

Brampton is in its infancy in terms of tourism development. For the duration of this five-year plan, priority should be given to establishing a solid foundation for a tourism destination, in which to grow.

The tourism industry recognized fundamentals of a sustainable tourism destination are:

- A welcoming resident base (resident communications and engagement)
- An awareness of the things for visitors to do (marketing and promotion)
- Things for visitors to do (experience development)
- Places for visitors to sleep, eat and ways for visitors to get around (infrastructure and amenities)

Therefore this strategy has been designed to put these fundamentals in place according to four Key Priority Areas (KPA):

- Fostering Pride of Place
- Marketing and Communications
- Leveraging Tourism Development Streams
- Management and Infrastructure

Key Priority Area 1 – Fostering Pride of Place
Harness local support for tourism among the community to change perceptions and leverage visiting friends and relatives.

The key takeaway observed in this Strategy's analysis of comparable destinations building an initial tourism strategy was the inherent challenges that come with trying to have the community appreciate the purpose and value of tourism. This Strategy's consultations confirm that people, including businesses, don't see Brampton as a destination, therefore they are not clear on the value of tourism. Addressing this gap begins with aligning the community to appreciate the purpose and value of tourism, and to nurture pride of place in their city. This comes down to effective and coordinated communications, and empowering residents to share their voices by implementing simple communications tools such as regular resident surveys.

Efforts to improve the reputation of Brampton will also serve to increase community pride, and curtail the negative perceptions of Brampton among potential visitors. More than 50% of Brampton's resident base are immigrants.[17] This statistic represents a significant opportunity for a Visiting Friends and Relatives program for Brampton. Targeted, planned programs to engage residents to get out and explore their city with their visiting friends and relatives will increase resident pride, and generate more revenue and spend per visitor in this category.

For tourism stakeholders, building advisory groups; providing resources and business support; serving as a platform to share news of recent successes or upcoming events; connecting like-minded people and businesses; and acting as a supportive hub for

[17] Statistics Canada, Census of Canada 2016.

those needing to seek advice or access information are all core community buy-in based actions for the City of Brampton to facilitate.

Finally, strong leadership from elected leaders and the municipal tourism team that brings together the public and private sectors at a senior level to facilitate the growth of tourism, is fundamentally important.

Recommendations – Fostering Pride of Place

1. Advisory Groups

1.1 Establish a Tourism Advisory Committee.
1.2 Create a staff-led Food Tourism Sub-Committee to advise on key projects related to leveraging Brampton's food and drink assets for tourism.
1.3 Create a staff-led Sport Tourism Sub-Committee to advise on key projects related to and enhancing the City's sport tourism industry.
1.4 Include tourism in other city and/or community tasks forces as appropriate.

2. Resident Engagement

2.1 Develop a Resident Engagement Program in collaboration with the Nurturing Neighbourhood Project.
2.2 Create a tourism "Brambassador" (Ambassador) Program.
2.3 Work with the City's Community Engagement Team to conduct bi-annual resident surveys to both gauge support and guide policy development of the tourism industry.
2.4 Conduct research on elements that make Bramptonians happy and proud to come from or live in Brampton. This will inform resident awareness and future tourism marketing.
2.5 Create a Resident Engagement Communications Plan that shares information regarding the City's tourism industry, developments and the value of tourism to the City to help define what tourism means to Brampton's community led with input from the Community Engagement Team.

3. Stakeholder Engagement

3.1 Develop a Stakeholder Engagement Program.
3.2 Create toolkits and host expert-led workshops to help businesses build capacity, resiliency and better represent and market themselves.
3.3 Facilitate collaboration and a knowledge and skill sharing network related to key tourism segments through virtual and in-person networking opportunities. i.e. Facebook groups
3.4 Implement a professional and engaging Tourism Stakeholder Communication Plan that provides information including relevant tourism-related updates and opportunities, stakeholder news, upcoming events, etc.
3.5 Prioritize strong leadership to bring together the public and private sectors as a senior level to facilitate the growth of tourism.

4. Reputation Management

4.1 Implement a tourism-focused Reputation Management Public Relations Program.

4.2 Compile and ensure the availability of good quality information and content about the City for distribution through multiple online and offline channels.

4.3 Profile Brampton's success stories through the Resident Engagement Communications Plan.

5. Visiting Friends and Relatives

5.1 Create a Visiting Friends and Relatives (VFR) program.

5.2 Promote Brampton experiences for locals and their guests through local marketing and communications campaigns. Emphasize Brampton-based television and radio channels that serve the multicultural resident base.

5.3 Provide easy to use and easy to access digital VFR materials such as local itineraries.

5.4 Promote food and culture as part of itineraries or as stand alone opportunities to maximize the economic impact of VFR visits.

5.5 Encourage strong support from tourism stakeholders and partners for VFR campaigns. Use VFR to foster and encourage community pride.

5.6 Engage locals in shareable and memorable experiences and support sharing via social media.

Key Priority Area 2 – Marketing and Communications

Create awareness of Brampton as a tourism destination.

The City of Brampton would benefit from a distinct destination brand and a cohesive, consistent marketing and communications program to promote the essence of what makes Brampton special and a place worth visiting. A distinct destination brand built from community input that celebrates Brampton's unique assets and multicultural community should form the basis of a consistent, multi-faceted marketing program to get the word out to Brampton's target visitor market that Brampton is a vibrant tourism destination with much to offer.

Geographic Target Markets

These are the overarching geographic target markets to be included in the marketing programs recommended in this Strategy.

GTA+:

Brampton sits within the most populous region in the country and every effort should be made to employ the geographic advantage. The Greater Toronto Area (GTA), Brampton included, is home to the market segments (see below) that will be most attracted to the City's tourism offering (i.e. arts and culture, food tourism, special events and sport tourism). It is recommended that the City's destination marketing efforts and targeted campaigns, traditional and VFR, should focus on the GTA, as well as those communities throughout the Niagara Peninsula and across the Golden Horseshoe that have day-trip/weekend-trip access to the destination.

International/Domestic:
It's recommended that Brampton pursue those markets that can view Brampton as complementary destination for those international and domestic travellers already visiting the GTA for business or pleasure, and can be encouraged to explore beyond the traditional confines of Toronto in order to experience the offerings available in Brampton and accessible from downtown Toronto. It is recommended that Brampton pursue potential campaign partnerships with Tourism Toronto for this market.

Key Market Segments
These are the overarching target visitor groups to be included in the marketing programs recommended in this Strategy.

Culture Explorers:
As Brampton's greatest tourism strength is its diverse range of people and cultures that make up the resident base, the destination will appeal to the culture explorer's desire to embrace, discover and immerse themselves in the culture, people and settings of the places they visit.

Foodies:
A foodie is a person who has an ardent or refined interest in food, is interested in food as a fascination or hobby and is passionate about food and food culture. They are willing to travel in pursuit of unique and special dining experiences they can't find elsewhere and a specific dining experience can often be the impetus to travel to a destination, building the rest of their itinerary around the dining experience.

Sport and Special Events Tourists:
The sport and special events visitor is travelling to either participate in or observe a specific event. While the destination they are visiting may have been dictated by the event location, they are willing to and interested in exploring the destination beyond the event, especially during event downtime or breaks in the event. They use accessible restaurants and events/attractions with minimal barrier to entry (no need to book in advance, activities completed in a short time frame, nearby, easy to find) to complement the central purpose of the trip.

Recommendations – Marketing and Communications

1. Brand

1.1 Create a destination brand that celebrates Brampton's unique assets and multicultural community.

2. Website

2.1 Create a tourism website with a unique look and feel within the existing brampton.ca framework.
2.2 Include a sport tourism micro-site.
2.3 Include a food tourism directory.

3. Destination Marketing

3.1 Create a multi-faceted destination marketing program, based on best practices, celebrating Brampton as a tourism destination.

3.2 Focus on digital marketing using email campaigns and social media channels, specifically Instagram. Create an Instagram account dedicated exclusively for content and promotion of the Farmers' Market.

3.3 Create online destination experience listings and passes.

3.4 Create itineraries and thematic routes incorporating Brampton's arts and culture, *food and drink, heritage and history and outdoor and recreation assets. List these on the website and have them available for download/email.

3.5 Continue off select print materials in appropriate quantities, namely the Experience Brampton Visitor Guide.

3.6 Develop a series of stories that can be pitched to media outlets.

3.7 Leverage influencer relations, including Brampton celebrities.

3.8 Invest in up-to-date content including high quality and standardized imagery and video of Brampton's assets and experiences that is representative of Brampton's multicultural community.

4. Tourism Development Streams

4.1 Highlight within the destination marketing program Brampton's key tourism development streams/demand generators namely Arts and Culture, Food, Special Events and Sport Tourism.

5. Marketing Plans

5.1 Where possible, utilize destination marketing collateral in promotions directed to residents.

5.2 Create a sport tourism marketing plan.

5.3 Create an events marketing plan with consideration being given to city-led and community-led events.

Key Priority Area 3 – Leveraging Tourism Development Streams

Nurture Brampton's most compelling experiences to being building a visitor economy.

At present while Brampton has a plethora of things for people to see and do, it does not have a distinct experience niche. It's unlikely that potential visitors to Brampton would know what there is to see and do in the City, without spending time researching. This is a good opportunity for Brampton to carve a niche for itself based on the City's most compelling characteristics and assets that, with the right positioning and then promotion, could become demand generators. This Strategy's consultations and review revealed that Brampton is strong in a number of core areas, or what this Strategy calls "tourism development streams." These are: Arts and Culture, Food Tourism, Special Events and Sport Tourism.

Recommendations – Leveraging Tourism Development Streams

1. Destination Development and Tourism Development Streams

1.1 Focus destination development on the key tourism development streams including Arts and Culture, Food, Special Events and Sport Tourism.
1.2 Work with food tourism businesses to transition from being visitor-ready to market-ready.

2. Visitor Experience and Key Demand Generators

2.1 Develop or enhance one food tourism marquee experience designed to be a platform for storytelling.
2.2 Develop and launch a Brampton-based food-specific festival led by the community.
2.3 Integrate additional interactive elements into the Brampton Farmers' Market.

3. Amplify

3.1 Use Brampton's ancillary connectors and attractors to amplify tourism development streams.
3.2 Build food related itineraries combining the City's network of trails, parks and outdoor experiences to connect and add value.
3.3 Use attractions such as those in the categories of entertainment, sightseeing and adventure as springboards to other tourism development streams.

4. Arts and Culture and Food Programming

4.1 Create and share a checklist or tool for incorporating the arts and culture and food programming into all city events, large meetings and/or festivals. Share with and encourage community-led events to use the tool as well.
4.2 Incorporate culinary programming into the Brampton Farmers' Market.
4.3 Grow local food procurement while celebrating the integration of local ingredients and world flavours.

5. Leverage Arts and Culture

5.1 Celebrate Brampton's people, places and histories to drive visitor demand for arts and culture.
5.2 Share and support community connections, programs and events with independently owned/operated and/or community-based arts and culture institutions and happenings.
5.3 Support the City's Cultural Services Team's implementation of the Culture Master Plan strategy.

6. Food Strategy

6.1 Implement the Food Tourism Strategy as recommended in this strategy.

7. Leverage Special Events

7.1 Support four event categories including: city funded/sponsored events, community-led events, sport tourism events and a new community-led food focussed marquee event.

7.2 Design and execute, in collaboration with community partners, a community-led marquee event that includes a heavy focus on showcasing local food and beverage as well as local artists and art groups.
7.3 Adopt a special event sponsorship framework for community-led marquee events to replace the Marquee Events Grant.
7.4 Acquire a licence for Destination International's Event Impact Calculator.
7.5 Implement a Special Event Permit process including a Special Event Advisory Team to improve internal workflow and awareness of special events.

8. Sport Tourism Investment

8.1 Continue to build hosting capacity for sport tourism events by a focused team within the Tourism Office. Ensure required budget lines are in place to support bidding and hosting and sector specific activations and promotions.
8.2 Grow the sport tourism division staff resources to increase capacity to enhance localized and regional events with the goal to grow the value of each event, to ultimately increase the number and size of hosted events.
8.3 Ensure the sport tourism team continues to be at the table with Brampton's recreation department to achieve resident and sport tourism facility-use balance
8.4 When sport tourism is further established, invest in a specific sport tourism strategy.
8.5 In the future, establishing a dedicated sport tourism budget line within the Tourism Office to adequately fund the development of sport tourism including: Sport Hosting Program, sport tourism marketing and sales collateral development for bidding and hosting, required equipment, travel, trade shows, etc.
8.6 Evaluate the benefits of adjusting the funds allocated to the Sport Tourism Hosting Program to allow event sponsorship framework opportunities to exist as a hybrid of the current grant program.
8.7 Allocate portions of sport tourism budget to bidding and hosting opportunities in noted areas.
8.8 Build bidding and hosting marketing resources based on current best practices.

9. Meetings and Conventions

9.1 Analyze how the segment has evolved as it recovers from COVID-19, with a focus on the opportunity for optimizing virtual events.
9.2 Develop effective working partnerships with shared values and objectives with meetings and conventions infrastructure owners and management.

Key Priority Area 4 – Management and Infrastructure

Encourage the creation and improvement of tourism management structures and core tourism infrastructure to address key gaps.

This priority area is designed to address the key gaps in the form of organizational structure and soft infrastructure that are required to support a visitor economy. Those gaps are outlined in this strategy's gap analysis. These include creating a management structure such as a municipal service corporation to serve as Brampton's Destination

Marketing Organization to use the Municipal Accommodations Tax to market the destination as a whole; investment attractions of boutique and family-first hotels, and continuing to improve Brampton's downtown to act a community hub and a place for visitors to enjoy.

Recommendations – Management and Infrastructure

1. Revenue

1.1 Work with internal departments to implement the Municipal Accommodation Tax (MAT) as a key source of funding for tourism development.

2. Governance

2.1 Work with internal departments to create a Tourism Municipal Service Corporation that would become the City's destination marketing organization and the recipient of 50% of MAT revenue.

3. Staffing

3.1 Review staff roles on an annual basis with consideration of the following recommended complement:

- Manager, Tourism and Special Events – currently in place
- Sport Tourism Coordinator – currently in place
- Coordinator Strategic Projects – currently in place and responsible for community events and neighbourhood tourism campaigns including Brambassador program.
- Film Specialist – currently in place
- Permit Booking Clerk – currently in place
- Markets and Culinary Tourism Coordinator – for future consideration
- Tourism Coordinator – for future consideration
- Sport Tourism Event Specialist – for future consideration

4. Retail Business Holidays Act

4.1 Designate the Bramalea City Centre Shopping District as a tourism destination. See Appendix 4.

5. Transit

5.1 Support Brampton Transit advocacy efforts for expansion of public transit operating hours.

6. Signage

6.1 Work with internal staff to keep trail and park signage current for visitor and resident ease of use.

6.2 Work with internal staff to determine costing, location and design of a tourism sign, similar to Toronto's sign.

7. Downtown Brampton

7.1 Leverage Downtown Brampton as a tourism and community core.

7.2 Expand the Farmers' Market culinary programming.
7.3 Reassess an indoor year-round market against current location options.
7.4 Continue to support, as appropriate, Downtown Brampton and related projects/improvements such as the Riverwalk Project.
7.5 Lend tourism's voice of support to the City's Planning Team to create a feasibility study to develop Garden Square and Ken Whillans Square as more livable spaces to help create a community hub.

8. Facilities

8.1 Engage with the City's Economic Development and Downtown Planning Team to determine interest and seek investment opportunities for a food hall as part of the City's long-term strategy.

9. Accommodations

9.1 Diversify accommodation options by attracting family-first hotels.
9.2 Diversity accommodation options by attracting boutique and 4 to 5 star hotels.

10. Metrics

10.1 Invest in tools for measuring event impact such as the Event Impact Calculator from Destinations International.

Performance Measurement

Fostering Pride of Place		
Objectives	**Anticipated Outcomes**	**Key Performance Indicators**
To engage industry in activating Brampton as a tourism destination and planning for its future.	That working groups within Brampton's tourism industry are established ASAP.	▪ Tourism Advisory Committee ▪ Sub-Committees
To engage residents in activating Brampton as a tourism destination and planning for its future.	That the tourism team collaborates with the Nurturing Neighbourhoods planning team to include a tourism component, engage neighbourhood ambassadors and create a list of f resident recommendations specific to each neighbourhood for inclusion on the website and promotion.	▪ A resident engagement program ▪ Number of residents engaged across the program ▪ Percentage change in resident support and awareness for tourism in Brampton
To mobilize, empower, and actively engage stakeholders in developing Brampton as a destination.	Align with pandemic guidelines to implement campaigns - social, print, etc. - featuring Brampton as a tourism destination. Various communication channels are made available for the City and local stakeholders to share, collaborate, and implement on initiatives.	▪ A Stakeholder Engagement Program, including a Stakeholder Communications Plan ▪ Number and types of resources created to address program goals ▪ Number of stakeholders reached ▪ Number of stakeholders engaged ▪ Number of connections made (business to business, public and private)
To position Brampton as an exciting tourism destination.	There is a clear change in the way Brampton is perceived by residents, visitors and the media through public communications.	▪ A Reputation Management Public Relations Program ▪ Number of media outlets that share information ▪ Number of success stories profiled

		▪ Number of social media impressions across specific channels
To maximize the impacts of VFR on the destination.	That more Bramptonians are engaging their visiting friends and relatives to get out and explore all that Brampton has to offer.	▪ Number of marketing and promotional assets highlighting Brampton experiences to locals ▪ Number and types of communication channels ▪ Number of social media impressions across specific channels ▪ Digital VFR materials ▪ Number of experience visits from VFR marketing ▪ Itineraries specific to VFR available on the web ▪ Percentage change in resident support and awareness for tourism industry
Marketing and Communications		
Objectives	**Anticipated Outcomes**	**Key Performance Indicators**
To create awareness of Brampton as a destination through developing a strong brand	That Visit Brampton is able to clearly articulate the values associated with Brampton as a destination, through a new look, feel and character that a developed brand provides. That the Visit Brampton brand will connect emotionally to potential visitors, and aid in their decision to visit the city. That Bramptonians can identify and be proud of the Visit Brampton brand.	▪ A cohesive destination brand that expresses shared values

To create a one-stop tourism information hub for visitors to Brampton.	That information about Brampton is more readily available for visitors to Brampton, to ultimately inspire them to visit and explore multiple aspects of the city beyond their primary reason for visiting.	▪ Total website visits and visits per page ▪ Number of visits to Tourism Office with inquiries
To build marketing and communications capacity through strategic investment in talent.	That the Brampton tourism office effectively markets the destination, and effectively communicates to its resident and stakeholder base.	▪ Number and type of investments in capacity-building
To maximize promotional efforts through utilizing a breadth and diversity of marketing channels.	That target audiences are receiving effective and consistent communicated marketing messages about Brampton, to aid in their decision to visit Brampton.	▪ A Destination Marketing Program ▪ Number and type of promotional channels used
To align marketing programs with Brampton's key pillars of tourism growth.	That Brampton's target audiences are compelled to visit Brampton for the city's most export-ready tourism experiences.	▪ Number and types of ways in which key tourism assets are incorporated into Destination Marketing Program
To actively promote Brampton as a sport and special events tourism destination.	That Brampton is more widely recognized as a sport tourism destination among new sport event managers and national sport governing bodies. That Brampton's events receive adequate promotion to generate interest.	▪ A Sport Tourism Marketing Plan ▪ A Special Events Marketing Plan ▪ Number of event inquiries from new sport organizations ▪ Attendees numbers for Special Events
Leveraging Demand Generators		
Objectives	**Anticipated Outcomes**	**Key Performance Indicators**
To select and focus on key demand generators for the	That Brampton's tourism industry develops to offer a	▪ Number of destination development activities that

destination.	specific set of well-defined and well developed experiences.	are connected to key demand generators in T1 ▪ Percentage increase of destination development activities that are connected to key demand generators at end of year one, and mid-way and end of following years
To develop new products and enhance existing ones.	That there is an increase in the number and range of visitor- and market-ready experiences available for Brampton visitors to enjoy.	▪ Number of new tourism products developed ▪ Number of existing tourism products enhanced
To connect demand generators with added-value assets and infrastructure.	That Brampton's demand generators are more easily promotable and accessible, and that tourism operators are partnering to create added-value to the visitor and each other.	▪ Number and types of connections created across demand generators through tourism products/materials (e.g. Food related itineraries that incorporate added-value assets)
To position the City as a tourism leader by reinforcing the value of tourism development streams through municipal activities.	That Brampton's City and community-led events have a strong sense of place and celebrate what makes Brampton special.	▪ Checklist or tool for incorporating added-value assets into City events, large meetings, etc.
To use tourism as a way to connect visitors to the cultures of Brampton.	That Brampton's arts and culture offerings are a key visitation driver to the city.	▪ Number and type of Arts and Culture elements being leveraged to drive visitor demand at T1, mid-way and end of year for following years
To make food and drink a key part of developing the destination.	That Brampton's food and drink experiences are a primary visitation driver to the city, and enhance Brampton's other key experiences.	▪ Number of implemented actions from Food Tourism Strategy

To use special events to celebrate what makes Brampton unique.	That Brampton's special events provide unique visitor experiences that align with the city's cultural identity.	▪ Number of City special events that are being featured and contributing to visitor economy at T1, then at mid-way and end of year of following years ▪ Community-led marquee event
To fully realize the potential of sport tourism in Brampton.	That Brampton becomes a destination for provincial, national and international sport competitions while offering unique social and cultural experiences.	▪ Number and types of investments for Sport Tourism to drive visitor demand at T1, mid-way and end of year for following years ▪ Impact of sport tourism events on Brampton's economy
Management and Infrastructure		
Objectives	**Anticipated Outcomes**	**Key Performance Indicators**
To create an organization to develop, market and manage the destination.	That the City of Brampton's tourism team sits within an organizational structure that allows it to use MAT funds in order to develop, market and manage Brampton as a destination.	▪ A municipal service corporation for tourism marketing and management in Brampton
To build internal capacity around the areas for growth.	That Brampton's tourism industry is prioritized and given the resources it needs to develop.	▪ Number and type of specific tourism staff resources developed and delivered, end Y1, Y2, Y3
To create an enabling policy environment for retail establishments.	That the main retail tourism attractions within Brampton are able to operate during peak visitation days, including holidays.	▪ The Bramalea City Centre Shopping District designated as a tourism destination
To create an enabling policy environment around transit issues.	That the needs of the visitor economy are considered when creating public transit scheduling.	▪ Number and types of supporting tourism growth policies around transit issues Y1, Y2, Y3

To keep trails and parks a viable part of resident and visitor experiences in the destination.	That more visitors use Brampton's network of trails and parks, and that visitors experience consistent enjoyment and ease of use.	▪ Number of trails and parks incorporated in visitor experience
To make Downtown Brampton a focal point of the destination.	That Downtown Brampton is a place visitors are drawn to as their prime reason for visiting Brampton, or as a supporting aspect.	▪ Number and type of tourism activities in downtown Brampton Y1, Y2-Y5
To have the facilities to accommodate desired sport events.	That the sport tourism team has fewer barriers to attracting new sport events to the city.	▪ A multi-sport complex
To bring food and drink under one banner property that celebrates Brampton's diversity.	That visitors to Brampton have an easily accessible destination food experience that includes a range of options and private enterprises.	▪ A food hall
To match accommodation supply with demand.	That Brampton is able to provide overnight accommodation to more visitors and that event participants choose to stay in Brampton overnight.	▪ Number and types of accommodation options Y1, Y2-Y5

CONCLUSION

From the arts and culture experiences, the multitude of ethnic cuisines on offer, the potential for a community-led marquee event celebrating diversity and cuisine, and the legacy of success to build upon in sport tourism, Brampton has much to offer as a future tourism destination. Taking the steps outlined in this strategy through the next five year period will lay the foundation for Brampton to become a tourism destination that celebrates its distinct multiculturalism and radiates pride of place through its engaged and dynamic resident-base.

In creating this Tourism Strategy through thorough stakeholder and resident collaboration, the City of Brampton has taken the first important step in developing its tourism industry in a thoughtful, strategic and engaged way. Continuing with this positive momentum throughout the implementation of this strategy by harnessing the community at large will not only fulfill the desire for a strong tourism industry, but it will build on resident pride in Brampton overall.

APPENDICES

Appendix 1 – 2021 Implementation Plan

Key Priority Area 1 – Fostering Pride of Place
Harness local support for tourism to change perceptions and leverage visiting friends and relatives.

Advisory Groups
Recommendation 1.2: Create a staff-led Food Tourism Sub-Committee to advise on key projects related to leveraging Brampton's food and drink assets for tourism.
Actions: Develop a staff-led sub-committee specific to the food sector including vision, mission and terms of reference.
Timeframe: Begin in 2021 – Ongoing

Recommendation 1.3: Create a staff-led Sport Tourism Sub-Committee to advise on key projects related to and enhancing the City's sport tourism industry.
Actions: Develop a staff-led sub-committee specific to the sport tourism sector including vision, mission and terms of reference.
Timeframe: Begin in 2021 – Ongoing

Resident Engagement
Recommendation 2.1: Develop a Resident Engagement Program in collaboration with the Nurturing Neighbourhood Project.
Actions: Staff to be oriented to the work of the Nurturing Neighbourhoods Program and the neighbourhoods where work has been undertaken. Staff to begin participating in neighbourhood meetings to introduce the importance of supporting local and tourism.
Timeframe: Begin in 2021 – Ongoing

Stakeholder Engagement
Recommendation 3.2: Create toolkits and host expert-led workshops to help businesses build capacity, resiliency and better represent and market themselves.
Actions: Continue offering webinars featuring industry experts for tourism stakeholders including sessions specifically related to current topics of interest.
Timeframe: Begin in 2021 – Ongoing

Key Priority Area 2 – Marketing and Communications
Create awareness of Brampton as a tourism destination.

Branding
Recommendation 1.1: Create a destination brand that celebrates Brampton's unique assets and multicultural community.
Actions: Staff identified the requirement for a new website pre-strategy. An RFP has been created and the process of issuing a contract will be scheduled to align with the approval of this strategy.
Timeframe: Complete in 2021

Website Development
Recommendation 2.1: Create a tourism website with a unique look and feel within the existing brampton.ca framework.
Actions: Work with IT department to conceptualize, draft and produce a new website that includes a new brand and aligns with recommendations of this Strategy.
Timeframe: Complete in 2021

Recommendation 2.2: Include a sport tourism micro-site.
Actions: Work with IT department to conceptualize, draft and produce a new micro site.
Timeframe: Complete in 2021

Recommendation 2.3: Include a food tourism directory.
Actions: Acquire the Dynamics CRM platform. Create restaurant records that can then be pushed to the website to form a restaurant directory.
Timeframe: Complete in 2021.

Key Priority Area 3 - Leveraging Tourism Development Streams
Nurture Brampton's more compelling experiences to begin building a visitor economy.

Arts and Culture and Food Programming
Recommendation 4.1: Create and share a checklist or tool for incorporating the arts and culture and food programming into all city events, large meetings and/or festivals. Share with and encourage community-led events to use the tool as well.
Actions: Assemble content for checklist ensuring input from the Culture Team in included. Provide situational examples of how to incorporate arts and culture and food into events, meetings and festivals.
Timeframe: Begin in 2021 – Ongoing

Leverage Arts and Culture
Recommendation 5.1: Support the City's Cultural Services Team's implementation of the Culture Master Plan strategy.
Actions: Continue to communicate and support the Culture Team with strategy implementation as required.
Timeframe: Ongoing

Food Strategy
Recommendation 6.1: Implement the Food Tourism Strategy as recommended in this strategy.
Actions: Review Food Tourism Strategy and prepare an implementation plan to align with the Brampton Tourism Strategy.
Timeframe: Begin in 2021 - Ongoing

Leverage Special Events
Recommendation 7.3: Actions: Adopt an event sponsorship framework for community-led marquee events to replace the current Marquee Festivals and Events grant fund.
Actions: Undertake an environmental scan of other municipal sponsorship programs. Develop framework for use in Brampton.
Timeframe: Complete in 2021 for 2022 Funding

Recommendation 7.5: Implement a Special Event Permit Program to improve internal workflow.
Actions: Staff has conducted an environmental scan of similar programs, reviewed best practices and met with staff from key internal and external departments.
Timeline: Complete in 2021

Sport Tourism Events
Recommendation 8.6: Evaluate the benefits of adjusting the funds allocated to the Sport Tourism Hosting Program to allow event sponsorship framework opportunities to exist as a hybrid of the current grant program.
Actions: Undertake an environmental scan of other municipal sport tourism sponsorship program to build a framework for Brampton.

Key Priority Area 4 – Management and Infrastructure
Encourage the creation and improvement of tourism management structures and core tourism infrastructure to address key gaps.

Revenue
Recommendation 1.1: Plan to implement the Municipal Accommodation Tax for collection to potentially align with the 2022 budget process pending COVID impacts.
Actions: Staff has researched details of the legislation, reviewed best practices shared by the Tourism Industry Association of Ontario and completed an environmental scan. Meetings with Legal and Finance staff will continue.
Timeline: Restart in 2021 – Ongoing

Governance
Recommendation 2.1: Plan to establish a Tourism Municipal Service Corporation.
Actions: Staff has researched incorporation details, reviewed best practices and completed an environmental scan. Meetings to begin with internal staff.
Timeline: Begin in 2021/22 - Ongoing

Retail Business Holidays Act
Recommendation 4.1: Designate the Bramalea City Centre (BCC) Shopping District as a tourism destination for the purpose of operating on holidays.
Actions: Staff has met with representatives from BCC to discuss the by-law and next steps. Staff has also been in discussion with Region of Peel staff regarding the details of the by-law and requirements for holiday operations.
Timeline: Complete in 2021

Downtown Brampton
Recommendation 7.3: Reassess the indoor year-round market study against current location options.
Actions: Review study requirements and assess for further discussion.
Timeline: Begin in 2021

Recommendation 7.4: Continue to support downtown Brampton initiatives and related improvements such as the Riverwalk Project.
Actions: Staff currently participating in Riverwalk meetings providing suggestions from a tourism lens.
Timeline: Begin in 2021 – Ongoing

Facilities
Recommendation 8.1: Engage with Economic Development and Downtown Planning staff regarding opportunities for a food hall as part of the City's long-term strategy.
Actions: Staff is currently engaged with Economic Development and Downtown Planning staff on possible locations for an existing building in close proximity to higher order transit for a food hall/mixed use facility.
Timeline: Begin in 2021 – Ongoing

Metrics
Recommendation: Invest in tools for measuring event impact such as the Event Impact Calculator from Destinations International.
Actions: Staff has reviewed available impact calculators and will determine when best to acquire a licence based on the Provincial COVID Framework.
Timeline: Begin in 2021– Ongoing

Appendix 2 - Actions Referenced in Strategy from the Culture Master Plan

Resources – Page 30
3. Develop a strategy to measure and monitor the per capita spend on arts and culture in Brampton, including tools to empirically assess the benefits to the community through this expenditure." Include visitors as part of measurement parameters
7. Undertake a feasibility study on establishing a percent for art funding mechanism on municipal capital projects at the level of 2% to provide long-term, sustainable funding for a municipal public art governed under the City's Public Art Policy." > Connected to needed beautification of city spaces.

Funding – Page 31
4. Educate stakeholders on the value of investing in arts and culture and develop a strategy to build a culture of philanthropy in Brampton.

Space – Page 33
1. Participate in Vision 2040 neighbourhood audits to identify areas of strength and gaps across the city where cultural space is underrepresented. Update and use the

City's Culture Map as a key resource in this exercise, and for short, medium and long-term cultural asset planning.

Presentation and Production – Page 37
1. Shift the approach from top-down municipal program development and delivery to a co-curated, bottom-up program development and delivery approach." > need to create strong trusting relationships with community and cultural leaders engaged in arts and culture within various groups represented in Brampton.
9. Strengthen the relationship with the Aboriginal and Indigenous community and work together toward better inclusion and access to cultural activity. This includes reducing barriers to participation for the community and ensuing more proactive and meaningful collaboration on cultural events, programs and services.
10. Recognize the diverse cultures and socio-economic groups living in Brampton and ensure that all residents have equitable access to arts opportunities and the right to celebrate their culture through creative expression.

Promotion – Page 39
2. Develop a public relations strategy for culture in Brampton that builds and promotes a unique, authentic and positive image. The strategy will unearth and promote less visible and informal expressions of arts and culture that are happening in neighbourhoods across the city, leverage Brampton's success stories, engage ambassadors for culture in Brampton, and play a key role in talent and business attraction.
3. Develop a communication and marketing plan for arts and culture in Brampton that reaches a local audience and increases participation and attendance.
5. Recognize and promote Downtown Brampton as a significant cultural location in the city, encouraging creators to locate in this area and continue to build a creative cluster.

Appendix 3 – Actions from the Sport Tourism Assessment Tool

Step 1.4: Marketing
- Create a Sport Brampton Fact Sheet
- Include Sport Brampton Branding Guidelines in destination brand materials
- Update Sport Brampton's sales pitch printed collateral; include map
- Create a Sport Brampton PowerPoint sales pitch
- Create a Sport Brampton video
- Create a Sport Brampton bid PowerPoint template and protocol for site visits

Appendix 4 – Retail Business Holidays Act

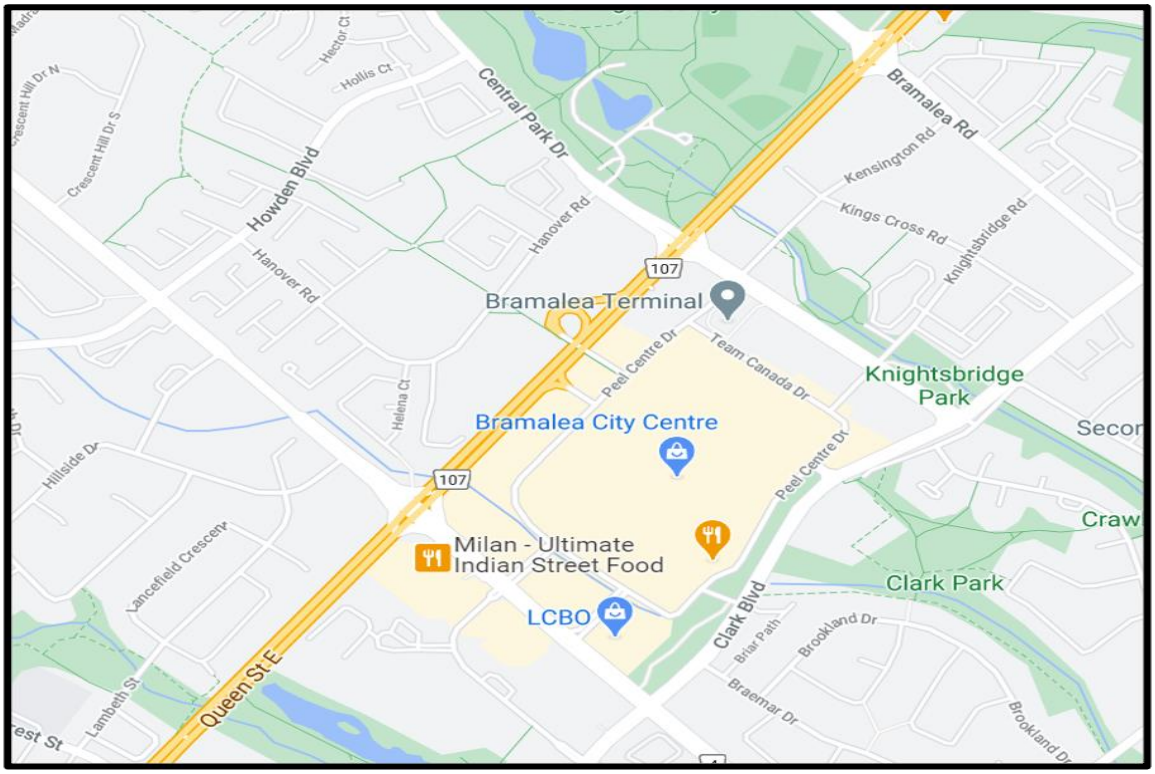
Bramalea City Centre features 1.5 million square feet of retail space which is home to over 300 stores and over 50 food vendors and restaurants. BCC is the fourth largest enclosed shopping centre in Ontario and the seventh largest in Canada. The Bramalea City Centre's designation of tourism destination is based on the size of the complex as well as its extensive offerings which are a draw for residents and visitors alike. As such,

the City of Brampton recognizes the Bramalea City Centre (BCC) shopping district as a tourism destination in the 2021 City of Brampton Tourism Strategy and is permitted to be open on retail holidays in accordance with the Region of Peel By-law No. 34-2018 which regulates retail business holiday shopping in Peel Region.

Additionally, Bramalea City Centre is one of several grandfathered businesses in Peel Region By-law No. 34-2018 permitted to open on retail holidays. The following two by-laws are specific to Bramalea City Centre.

97-2011 - By-law 97-2011 - Region of Peel (peelregion.ca) – New Year's Day, Victoria Day, Canada Day, Labour Day and Thanksgiving Day
18-2013 - By-law 18-2013 - Region of Peel (peelregion.ca) – Family Day

The BCC area is bounded by Queen Street East to the north, Clark Boulevard to the south, Dixie Road to the west and Central Park Drive to the east.



Bramalea City Centre Shopping District

YEAR-END RESULTS 2020

City of Brampton

April 14, 2021

Finance

2020 – STRONG START

- Started with a healthy financial outlook
- 2020 Budget (February) delivered a 2nd consecutive tax freeze and $113M record contribution to reserves
- Milestone achievements on Term of Council Priorities
- Focus on enhancements – Capital Projects Review underway

2020 – MEANINGFUL RESPONSE

- Supported our community in the wake of the COVID-19 pandemic
    - Tax deferral, rental fee cancellation/deferral
    - Enhanced safety, cleaning practices
    - Task Force supports for youth, seniors, businesses and social causes
- Increased communication and engagement (outreach, Tele Town Halls)
- Ramped up advocacy for Safe Restart Agreement funding (including at FCM, AMO)

2020 - OPERATIONAL SAVINGS & MITIGATING MEASURES

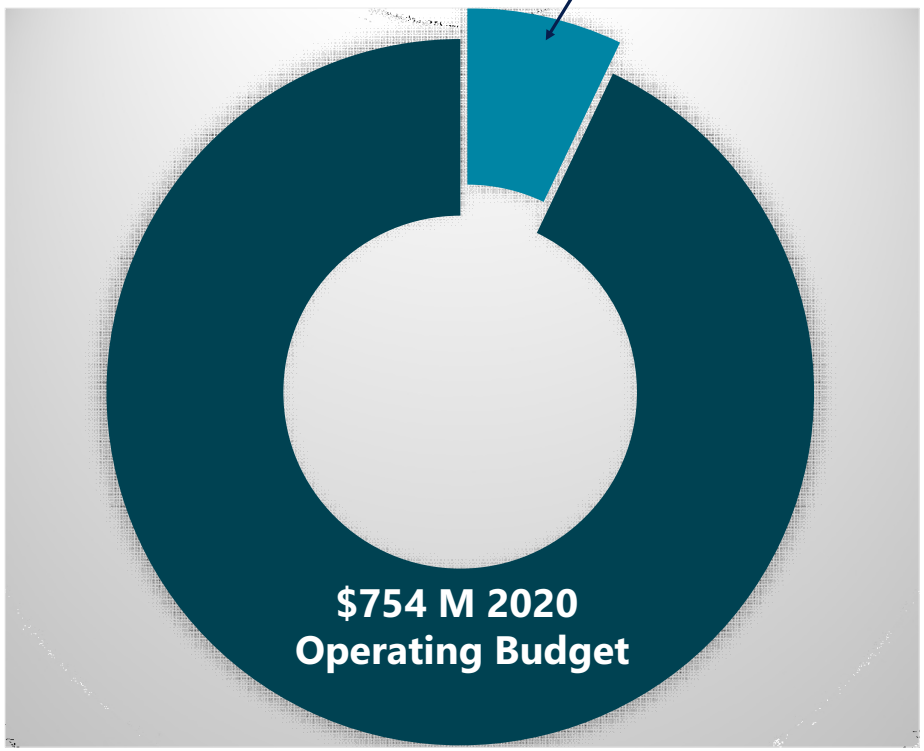
- Collaborative efforts to reduce operational costs (e.g. part-time labour costs)
- Proactive mitigation measures (reduced scheduling/programming; hiring freeze)
- Administrative and marketing savings (utility and fuel rates etc.)

2020 – RESILIENT YEAR END

- Successfully balanced budget to offset the year-end deficit of $52.3M
- Capital Review project by KMPG completed and recommendations being applied
- Maintained Triple AAA credit rating by S&P Global
- 2021 Outlook
  - *16 refreshed Term of Council Priorities as focus for 2021*
  - *2021 Budget delivered 3rd consecutive tax freeze (December 2020) and $114M record contribution to reserves*
  - *City continues to remain agile for pandemic response*

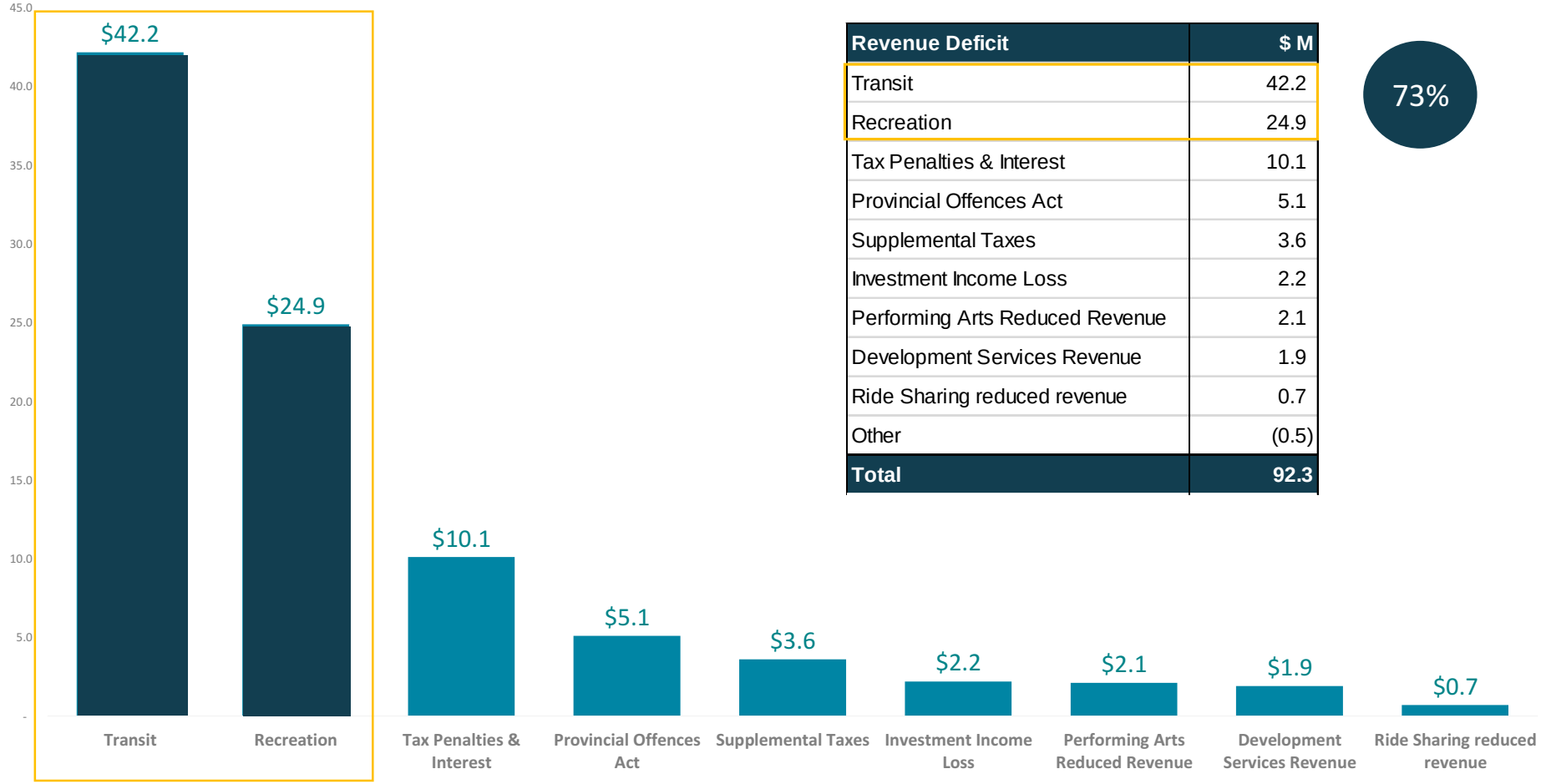
2020 YEAR-END RESULTS

$52.3 M or 6.9% Deficit



Revenue Deficits	$92.3 M
Emergency Measure Costs	$13.5 M
Operational Savings & Mitigating Measures	($53.6 M)
2020 Year End Deficit	**$52.3 M**
Safe Restart Funding Offset	($52.3 M)
Net Corporate Position	**$0 M**

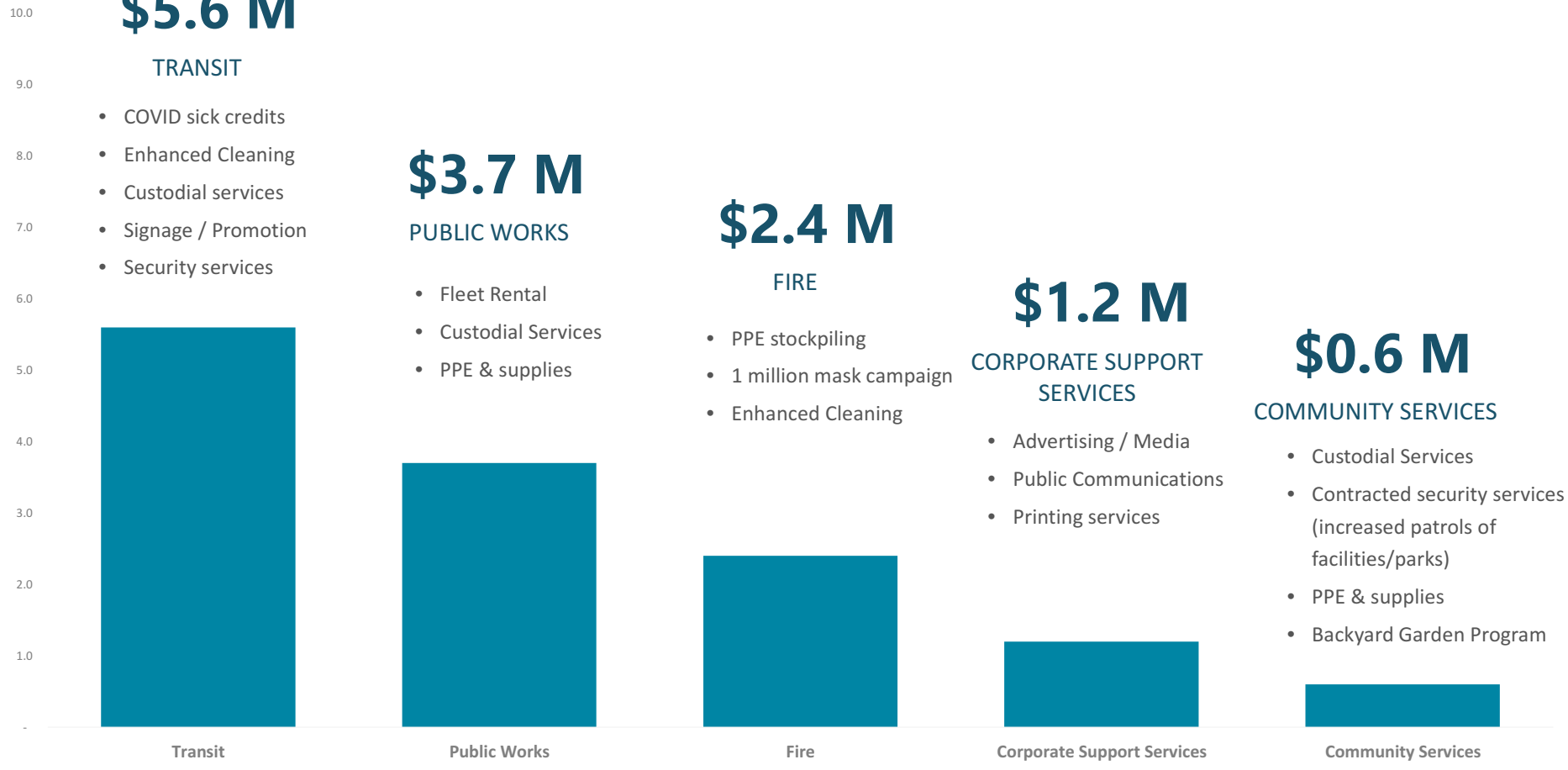
REVENUE DEFICIT - $92.3 M



Revenue Deficit	$ M
Transit	42.2
Recreation	24.9
Tax Penalties & Interest	10.1
Provincial Offences Act	5.1
Supplemental Taxes	3.6
Investment Income Loss	2.2
Performing Arts Reduced Revenue	2.1
Development Services Revenue	1.9
Ride Sharing reduced revenue	0.7
Other	(0.5)
Total	**92.3**

73%

EMERGENCY MEASURES COSTS - $13.5 M



$5.6 M

TRANSIT

- COVID sick credits
- Enhanced Cleaning
- Custodial services
- Signage / Promotion
- Security services

$3.7 M

PUBLIC WORKS

- Fleet Rental
- Custodial Services
- PPE & supplies

$2.4 M

FIRE

- PPE stockpiling
- 1 million mask campaign
- Enhanced Cleaning

$1.2 M

CORPORATE SUPPORT SERVICES

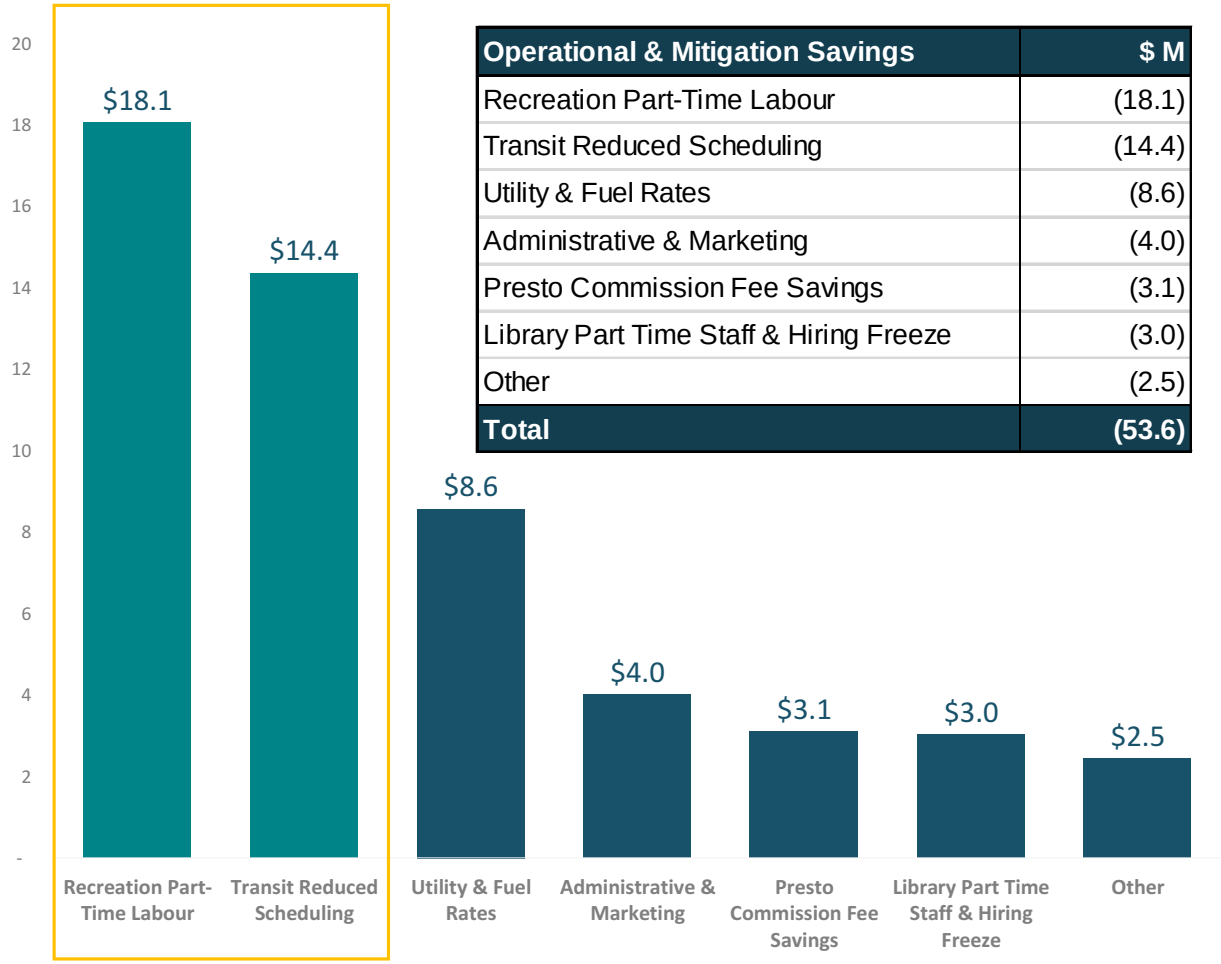
- Advertising / Media
- Public Communications
- Printing services

$0.6 M

COMMUNITY SERVICES

- Custodial Services
- Contracted security services (increased patrols of facilities/parks)
- PPE & supplies
- Backyard Garden Program

OPERATIONAL SAVINGS & MITIGATING MEASURES ($53.6) M



Operational & Mitigation Savings	$ M
Recreation Part-Time Labour	(18.1)
Transit Reduced Scheduling	(14.4)
Utility & Fuel Rates	(8.6)
Administrative & Marketing	(4.0)
Presto Commission Fee Savings	(3.1)
Library Part Time Staff & Hiring Freeze	(3.0)
Other	(2.5)
Total	**(53.6)**

DEFICIT MANAGEMENT – 2020 COVID-19 FUNDING RECEIVED

	MUNICIPAL	TRANSIT	TRANSIT
Total Funding Received (2020)	30.2	24.0	54.2
2020 Year-End Deficit	(29.6)	(22.7)	(52.3)
2020 Funding in City Reserves	0.6	1.3	1.9
Total Funding Received (2021)	8.2	-	8.2
Total Remaining in City Reserves	8.8	1.3	10.1

- **$10.1 M is recommended to be maintained within City reserves for future COVID-19 pressures**

2021 FUNDING ANNOUNCED TO DATE

	ELIGIBILITY	MUNICIPAL STREAM	TRANSIT STREAM	TOTAL
Announced Funding Eligibility or Future Receipt ($M)				
SRA Phase 2	2020-2021	-	30.1	**30.1**
SRA Phase 3	2021	-	23.5	**23.5**
CRFM 2021	2021	14.7	-	**14.7**
MTEC	2021	-	0.6	**0.6**
Total Announced / Pending		**14.7**	**54.2**	**68.9**
2020 Funding in City Reserves		**8.7**	**1.4**	**10.1**
Total Funding Eligibile for 2021		**23.4**	**55.5**	**79.0**

2021 SENSITIVITY ANALYSIS

	2020 Deficit Repeated *(9.5 months)*			2020 Deficit Repeated *(12 months)*		
	SCENARIO #1			SCENARIO #2		
	MUN	TRN	TOTAL	MUN	TRN	TOTAL
2021 Deficit	(29.6)	(22.7)	(52.3)	(39.5)	(30.3)	(69.7)
Fed/Prov Commitment	23.4	22.7	46.1	23.4	30.3	53.7
Remaining Pressure	(6.2)	-	(6.2)	(16.0)	-	(16.0)
GRS* Contribution	6.2		6.2	16.0		16.0
Net Position	-	-	-	-	-	-

**GRS Balance as at December 31st 2020 is $76.1 M which is $0.7 million more than the Council approved target of $75.4 million.*

2021 FINANCIAL OUTLOOK

- 2020 Deficit fully offset
- 2021 funding available is healthy (SRA, CRFM, GRS)
- Finance will continue to monitor and advise Council

Standard Reporting Schedule:

	Q1 Status Update	Q2 YE Projection	Q3 YE Projection	Q4 YE Results
Timing of Reports	May 2021	September 2021	November 2021	April 2022

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-04-14

Subject: **KPMG Insurance RFP Review**

Contact: **Maciej Jurczyk, Sr. Manager, Business Improvement & Innovation;** maciej.jurczyk@brampton.ca

Report Number: CAO's Office-2021-327

Recommendations:
That the report dated April 14, 2021 to Committee of Council re: KPMG Insurance RFP Review be received.

Overview:

- **On December 2, 2020, Committee of Council passed motion CW310-2020:**
  - **"That the delegation from Rupinder Hayer, President, and Nelcia Pereira, VP, Complex Risk and Commercial Div., Armour Insurance Brokers Ltd., to the Committee of Council Meeting of December 2, 2020, re: Request for Proposal - NRFP2020-151 Insurance and Risk Management be referred to staff for review of the specific RFP, and potential process improvements generally, and report back".**

- **KPMG was retained to perform this review. Their report identifying the timeline of key processes, observations and recommendations for improvement are outlined in the attached report.**

Background:
City Council passed resolution CW310-2020 at its December 2, 2020 Committee of Council meeting: "that the delegation from Rupinder Hayer, President, and Nelcia Pereira, VP, Complex Risk and Commercial Div., Armour Insurance Brokers Ltd., to the Committee of Council Meeting of December 2, 2020, re: Request for Proposal - NRFP2020-151 Insurance and Risk Management be referred to staff for review of the specific RFP, and potential process improvements generally, and report back". Staff determined that an independent third-party consultant be retained to perform the review and report back to Council to address the motion. KPMG was selected through a competitive procurement process.

Current Situation:
KPMG's scope of work was divided into two phases to address Council's motion:

- Phase 1 – "Review the allegations made and response by the City"
- Phase 2 – "Review of procurement processes for insurance services"

KPMG requested specific documentation supporting the 2020 insurance RFP from staff and were promptly provided all documents. In addition, KPMG conducted interviews with the following staff groups: Purchasing, Risk & Insurance, and Legal Services. Staff from the Office of the CAO supported KPMG during their review.

KPMG's final report is attached as Appendix 1 to this report, which identifies their timeline of key processes/events, three observations and associated recommendations for business process improvement on future procurement of insurance services.

Corporate Implications:

Financial Implications:

There are no additional costs expected in order to implement KPMG's recommendations.

Other Implications:

KPMG's recommendations will be applied by staff for future procurements of insurance services.

Term of Council Priorities:
This report has been prepared in consideration of the Term of Council Priority of "Brampton is a Well-Run City", with the objective of improving the business process of procuring insurance services ('Stewardship of Assets and Services').

Conclusion:
KPMG was retained to perform a business improvement review to address Council's motion from December 2, 2020. Their report identifies three recommendations for improvement to be considered for future procurements of insurance services by the City.

Authored by:	Reviewed by:
Maciej Jurczyk, Sr. Manager Business Improvement & Innovation	Mikkel Marr, Director, Organizational Performance & Strategy
Approved by:	Submitted by:
David Barrick, Chief Administrative Officer	David Barrick, Chief Administrative Officer

Attachments:
Appendix 1 – KPMG Report “Business Improvement Review - City of Brampton”

Report Approval Details

Document Title:	Insurance RFP Review.docx
Attachments:	- Business Improvement Review - City of Brampton (Final Report).pdf
Final Approval Date:	Apr 7, 2021

This report and all of its attachments were approved and signed as outlined below:

Mikkel Marr - Mar 31, 2021 - 12:10 PM

David Barrick - Apr 7, 2021 - 10:00 PM

Report
Staff Report
Committee of Council
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-29

Subject: **Capital Project Financial Status Report – Q4 2020**

Contact: Maja Kuzmanov, Manager, Accounting, Corporate Support Services (905) 874-2259

Report Number: Corporate Support Services-2021-405

Recommendations:

That the report titled **Capital Project Financial Status Report – Q4 2020,** to the Committee of Council Meeting of April 14, 2021, be received; and

That the Treasurer be authorized to amend the Capital budget for the Projects listed in Schedule D of this report, with no net impact on the City's budget.

Overview:

- **The purpose of this report is to provide City Council with an update on the financial status of the City's Capital Program as at December 31, 2020.**
- **The City's Capital Program at December 31, 2020 included 484 (2019: 450) active capital projects with a total approved budget of $2.0 billion.**
- **$1.3 billion of the approved budget has been spent as of December 31, 2020.**
- **The remaining capital budget stands at $751.7 million as at December 31, 2020 (2019: $752.9 million). Of this amount, $109.8 million has been committed through purchase orders (contracted work underway) for specific projects, leaving $641.9 million not yet committed or spent. The increase is primarily a result of the addition of the approved 2020 Capital Budget as well as budget amendments throughout 2020.**

- **Staff continues to review all active capital projects and return funds no longer required to their original funding sources. As such, $17.0 million of funding has been returned and made available for future allocation to other priorities.**
- **KPMG has completed Phase 1 (pre-2016 capital project review) and presented their findings to Committee Council on June 3, 2020. As part of Phase 1 review, $9.2 million of funding was identified to be returned to source (full amount returned) and additional $10.5 million to be reviewed for potential return ($0.5 million returned).**
- **On December 2, 2020, KPMG presented their Phase 2 report related to the City's project management practices which recommended the establishment of an enterprise-wide Project Management Office (PMO). Council subsequently approved $390,000 in the 2021 operating budget to address KPMG's recommendation and included this initiative in their refreshed Term of Council Priorities.**

Background:

The Capital Project Financial Status Report provides a financial update of the City's Capital Program that includes analysis compiled from submissions made by departments managing their various capital programs. This report keeps Council informed on the use of financial resources and supports senior leaders by providing information to assist with project oversight and delivery.

Although there are a number of methods used to measure progress in Capital Program delivery, level of spending on projects compared to the approved budget is a key performance indicator that is common to all projects. The information reported helps generate discussion at the senior levels of departments with responsibility for project delivery and to draw attention to project areas that might require course correction. It is not meant to replace detailed status reports project managers and project teams produce and use for their own day-to-day project management and reporting.

City Council also passed the following Resolution CW364-2019 at its September 25th, 2019 Council meeting: That staff be directed to develop a draft Terms of Reference to retain an external auditor reporting to Mayor and Council, in order to analyze the project management of the systemic capital project processes (including project planning and budgeting), with particular reference to those projects initiated pre 2016, and report back for Council's review and deliberation. KPMG has completed Phase 1 (pre-2016 capital project review) and presented their findings to Committee Council on June 3, 2020. As part of Phase 1 review, $9.2 million of funding was identified to be

returned to source (full amount returned) and additional $10.5 million to be reviewed for potential return ($0.5 million returned).

On December 2, 2020, KPMG presented their Phase 2 report related to the City's project management practices which recommended the establishment of an enterprise-wide Project Management Office (PMO). Council subsequently approved $390,000 in the 2021 operating budget to address KPMG's recommendation and included this initiative in their refreshed Term of Council Priorities.

Current Situation:

As of December 31, 2020, the City had 484 active projects with a total approved budget of $2.0 billion. The City has spent $1.3 billion towards completion of these projects, with $751.7 million (2019: $752.9 million) budget available to be spent in the coming years. Of this amount, $109.8 million has been committed through purchase orders (contracted work underway) for various capital projects. This leaves $641.9 million remaining in open capital projects not yet committed or spent.

Key projects comprising $304.7 million of the unspent/uncommitted balance include:

- Centre for Education, Innovation and Collaboration - $159.8 million
- Fire Campus Design - $42.7 million
- Bus Purchases - $37.3 million
- Goreway Drive Widening - $33.8 million
- Cottrelle Boulevard (Humberwest to Goreway)- $31.1 million

Schedule A provides a summary, by department, of capital spending and the budget remaining, which includes all committed and remaining budgets. Schedule C provides a detailed list of all open projects with the same information.
This report includes analysis of the following topics:

- Capital Budget Remaining
- Top 30 Projects by Ward Reporting
- 2020 Capital Budget Analysis
- Capital Expenditure Forecast
- Return of Financing and Budget Commitment Reduction

<u>Budget Remaining (Appendix A)</u>

The total capital project budget remaining before commitments, through purchase orders, often referred to as unspent budget or money yet to be spent, as of December 31, 2020,

is $751.7 million. This amount is $1.2 million lower than the amount reported as at December 31, 2019 ($752.9 million).

The following schedule shows the 2020 financial activities of the Capital Program.

	$ Million
Remaining Budget before Commitments as at December 31, 2019	752.9
Less: 2020 Capital Spending	232.7
Less: 2020 Net Return of Financing and adjustments	16.4
Sub Total	503.8
Add: Council approved 2020 Capital Budget	221.9
Add: 2020 Budget Amendments	26.0
Remaining Budget before Commitments as at December 31, 2020	**751.7**

	$ Million
Remaining Budget before Commitments as at December 31, 2020	751.7
Less: Purchase Orders (contracted works underway)	109.8
Remaining Budget, Uncommitted as at December 31, 2020	**641.9**

Top 30 Projects by Ward Reporting (Appendix B)

For the purpose of this analysis, staff has identified 30 major Council approved capital projects, representing 6% of the number of all open projects and 68% of the uncommitted budget of the Capital Program. All of these projects are progressing in various stages of project management.

The status of the 30 major projects is as follows:

- 9 projects have an uncommitted budget of 90% or more.
- 2 projects were approved prior to 2014, some with budget top-ups in recent years.
- Delivery status of the 30 projects
    - 8 of the projects are in construction stage

- 9 projects are in various stages of planning, approval and design
- 6 projects are in the procurement stage
- 2 projects are in either the close-out, litigation or warranty stage
- 5 projects are comprised of multiple activities in various stages of completion

2020 Capital Budget Analysis

Council approved a Capital Budget of $221.9 million for 2020 and an additional $26.0 million in budget amendments. The following Table provides an analysis of the 2020 Capital Budget spending to December 31, 2020 and it highlights that $49.6 million of the approved $247.9 million has been either spent or procured on a year to date basis.

2020 Capital Budget Spending to December 31, 2020

	$ Million
Council Approved 2020 Capital Budget	221.9
2020 Budget Amendments	26.0
Less: YTD Spending Against 2020 Budget	31.2
Less: Purchase Orders Against 2020 Budget	18.4
2020 Capital Budget Remaining	**198.3**

Capital Expenditure Forecast:

The City forecasted through the 2020 budget process that it would achieve $220.0 million in capital spending (cash flow) during the 2020 fiscal year. This includes 2020 spending on projects approved in the 2020 budget and open projects approved in prior years. Actual spending as at December 31, 2020 on all capital projects was $232.7 million comprised of $31.2 million related to the 2020 Capital Budget and $201.5 million related to projects approved prior to 2020.

Following are major contributors to capital spending in 2020:

- Transit bus purchases and refurbishment
- Road construction and resurfacing
- Property acquisition
- Facility repair and replacement

Return of Financing and Budget Commitment Reduction:

As of December 31, 2020, $17.0 million of funding has been returned to source or the budget commitment reduced and made available for future allocation to other priorities. 79 projects were determined complete and therefore closed and $6.6 million of the budget remaining associated with these projects was returned to source. An additional $10.4 million was returned to source for projects that remain active.

Following is summary of return of financing by department:

Corporate Support and Legislative Services	Community Services	Fire	Public Works	Transit	Total
0.4	3.1	0.5	4.0	9.0	17.0

Staff will continue to review the City's Capital Program regularly to determine which projects should remain open, with the goal of returning financing, that is no longer required for project completion, to the original funding sources (Reserve Funds).

Corporate Implications:

Financial Implications:

$17.0 million of capital funding has been returned to source through return of financing and budget amendments and is available for allocation to other priorities, subject to Council approval

Other Implications:

The semi-annual Capital Status report will serve to maintain focus on project delivery and as a tool to identify available financial resources to be reallocated to other City priorities.

Term of Council Priorities:

This report fulfils the Council Priority of a Well-Run City through strict adherence to effective financial management policies and supports Brampton's 2040 Vision by ensuring sustainable financial operations.

Conclusion:

This report provides Council with a financial status of the City's Capital Program and contributes to improved management oversight of the City's Capital Program. As of December 31, 2020, the City had spent $1.3 billion on the 484 open projects with a further $641.9 million remaining yet to be committed or spent to deliver the projects.

KPMG has completed Phase 1 (pre-2016 capital project review) and presented their findings to Committee Council on June 3, 2020. As part of Phase 1 review, $9.2 million of funding was identified to be returned to source and additional $10.5 million to be reviewed for potential return.

On December 2, 2020, KPMG presented their Phase 2 report related to the City's project management practices which recommended the establishment of an enterprise-wide Project Management Office (PMO). Council subsequently approved $390,000 in the 2021 operating budget to address KPMG's recommendation and included this initiative in their refreshed Term of Council Priorities.

Authored by:	Reviewed by:
Maja Kuzmanov, Manager, Accounting	Mark Medeiros, Acting Treasurer
Approved by:	Submitted by:
Michael Davidson, Commissioner, Corporate Support Services	David Barrick, Chief Administrative Officer

Attachments:

Schedule A Capital Project Spending Summary
Schedule B Capital Projects With Significant Budget Remaining
Schedule C Open Projects Analysis
Schedule D Budget Amendments and Reallocations

Schedule A

CAPITAL PROJECTS UNSPENT SUMMARY
AS AT DECEMBER 31, 2020

	No. of Projects	Original Budget	Approved Changes	Revised Budget	Total Expenditures	Expenditures as a % of Revised Budget	Total Budget Remaining before Commitments	Purchase Orders	Total Budget Remaining after Commitments
Summary of All Projects									
CAO-Corporate-Council	21	4,860,752	0	4,860,752	1,335,015	27.47%	3,525,737	685,388	2,840,349
Corporate Supp. Services - ITC	23	54,003,000	1,555,000	55,558,000	23,618,892	42.51%	31,939,108	2,072,481	29,866,627
Legislative Services	4	405,000	0	405,000	279,830	69.09%	125,170	25,281	99,889
Community Services	84	214,432,000	40,243,166	254,675,166	196,794,881	77.27%	57,880,285	9,354,390	48,525,895
Fire & Emergency Services	16	28,464,000	6,825,000	35,289,000	24,338,001	68.97%	10,950,999	1,939,066	9,011,933
Transit	39	264,419,000	118,940,890	383,359,890	284,863,994	74.31%	98,495,896	7,439,444	91,056,452
Public Works & Engineering	244	713,356,884	517,050,811	1,230,407,695	696,247,226	56.59%	534,160,469	85,466,110	448,694,359
Planning, Bldg & Economic Dev.	52	22,761,819	3,337,540	26,099,359	11,988,099	45.93%	14,111,260	2,448,247	11,663,013
Library	1	21,750,000	(1,500,000)	20,250,000	19,746,184	97.51%	503,816	400,966	102,850
Total City	484	1,324,452,455	686,452,407	2,010,904,862	1,259,212,122	62.62%	751,692,740	109,831,373	641,861,367
Summary of 2020 Projects									
CAO-Corporate-Council	7	1,493,000	0	1,493,000	167,587	11.22%	1,325,413		
Corporate Supp. Services - ITC	3	14,099,000	0	14,099,000	901,715	6.40%	13,197,285		
Legislative Services	2	100,000	0	100,000	37,794	37.79%	62,206		
Community Services	19	25,941,000	7,572,318	33,513,318	8,763,053	26.15%	24,750,265		
Fire & Emergency Services	5	5,509,000	2,695,000	8,204,000	4,016,366	48.96%	4,187,634		
Transit	14	95,877,000	0	95,877,000	23,098,707	24.09%	72,778,293		
Public Works & Engineering	64	99,370,000	13,853,200	113,223,200	33,705,681	29.77%	79,517,519		
Planning, Bldg & Economic Dev.	14	6,900,000	1,321,000	8,221,000	4,327,994	52.65%	3,893,006		
Library	-	0	0	0	0	0.00%	0		
Total City	128	249,289,000	25,441,518	274,730,518	75,018,897	27.31%	199,711,621		
Summary of 2019 Projects									
CAO-Corporate-Council	4	506,000	0	506,000	141,296	27.92%	364,704		
Corporate Supp. Services - ITC	3	18,365,000	86,000	18,451,000	5,788,742	31.37%	12,662,258		
Legislative Services	1	20,000	0	20,000	6,009	30.05%	13,991		
Community Services	22	66,083,000	1,510,000	67,593,000	47,405,435	70.13%	20,187,565		
Fire & Emergency Services	5	8,044,000	0	8,044,000	3,000,807	37.30%	5,043,193		
Transit	-	0	0	0	0	0.00%	0		
Public Works & Engineering	55	175,997,000	199,760,750	375,757,750	64,449,272	17.15%	311,308,478		
Planning, Bldg & Economic Dev.	5	1,275,000	300,000	1,575,000	317,226	20.14%	1,257,774		
Library	-	0	0	0	0	0.00%	0		
Total City	95	270,290,000	201,656,750	471,946,750	121,108,787	25.66%	350,837,963		
Summary of 2018 Projects									
CAO-Corporate-Council	6	2,631,752	0	2,631,752	949,412	36.08%	1,682,340		
Corporate Supp. Services - ITC	4	10,698,000	169,000	10,867,000	7,021,733	64.62%	3,845,267		
Legislative Services	1	285,000	0	285,000	236,027	82.82%	48,973		
Community Services	10	10,326,000	12,605,570	22,931,570	18,265,009	79.65%	4,666,561		
Fire & Emergency Services	3	2,721,000	0	2,721,000	1,346,653	49.49%	1,374,347		
Transit	8	40,648,000	8,339,000	48,987,000	36,729,713	74.98%	12,257,287		
Public Works & Engineering	33	114,555,500	61,794,037	176,349,537	81,753,456	46.36%	94,596,081		
Planning, Bldg & Economic Dev.	11	8,887,604	0	8,887,604	2,457,099	27.65%	6,430,505		
Library	-	0	0	0	0	0.00%	0		
Total City	76	190,752,856	82,907,607	273,660,463	148,759,102	54.36%	124,901,361		
Summary of 2017 Projects									
CAO-Corporate-Council	2	114,000	0	114,000	1,272	1.12%	112,728		
Corporate Supp. Services - ITC	6	8,951,000	0	8,951,000	7,532,641	84.15%	1,418,359		
Legislative Services	-	0	0	0	0	0.00%	0		
Community Services	7	34,393,000	7,066,135	41,459,135	39,860,547	96.14%	1,598,588		
Fire & Emergency Services	1	150,000	0	150,000	78,219	52.15%	71,781		
Transit	9	77,689,000	1,000,000	78,689,000	72,303,965	91.89%	6,385,035		
Public Works & Engineering	26	94,700,384	9,521,200	104,221,584	93,743,325	89.95%	10,478,259		
Planning, Bldg & Economic Dev.	6	1,262,000	600,000	1,862,000	979,514	52.61%	882,486		
Library	-	0	0	0	0	0.00%	0		
Total City	57	217,259,384	18,187,335	235,446,719	214,499,483	91.10%	20,947,236		
Summary of 2016 and Prior Projects									
CAO-Corporate-Council	2	116,000	0	116,000	75,448	65.04%	40,552		
Corporate Supp. Services - ITC	7	1,890,000	1,300,000	3,190,000	2,374,061	74.42%	815,939		
Legislative Services	-	0	0	0	0	0.00%	0		
Community Services	26	77,689,000	11,489,143	89,178,143	82,500,837	92.51%	6,677,306		
Fire & Emergency Services	2	12,040,000	4,130,000	16,170,000	15,895,956	98.31%	274,044		
Transit	8	50,205,000	109,601,890	159,806,890	152,731,609	95.57%	7,075,281		
Public Works & Engineering	66	228,734,000	232,121,624	460,855,624	422,595,492	91.70%	38,260,132		
Planning, Bldg & Economic Dev.	16	4,437,215	1,116,540	5,553,755	3,906,266	70.34%	1,647,489		
Library	1	21,750,000	(1,500,000)	20,250,000	19,746,184	97.51%	503,816		
Total City	128	396,861,215	358,259,197	755,120,412	699,825,853	92.68%	55,294,559		

With respect to Schedule A, we have reclassifed projects to different budget years with the following criteria at this point in time:
If the budget amendment for a given year is higher than 25% of the original approved budget, the year with the highest amendment is picked up as the project year if there are multiple budget amendments. Where there are two years with the same total amendment, the most current year becomes the budget amendment year.

CAPITAL PROJECTS WITH SIGNIFICANT BUDGETS REMAINING
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Current Project Budget	Project to Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments	Uncommitted Budget Percentage	Department	Ward	Stage
185160	2018	2019	Centre for Education, Innovation & Collaboration	Open	160,000,000	233,946	159,766,054	354,553	159,411,501	100%	Public Works & Engineering	1	Is on hold at the direction of the office of the CAO pending a review of the scope of work and potential third party post secondary institutional partners. Procurement: The RFP to hire an Architect is to be issued October 2020. Background: To mitigate risks to schedule and budget associated with combining the Centre for Innovation and a transit hub, the functional plan for this project has been simplified to proceed with the CFI on a dedicated site that is separate and decoupled from the transit hub component. Purchasing has been engaged to proceed to issue an RFP to procure an architect. On July 8th 2020 Council directed staff to locate the Centre for Innovation (CFI) at 11, 17 and 21 Nelson Street West, this separated the CFI project from the transit terminal project. Transit Hub: The transit hub project is to undergo a transit hub study before BDC commences work on the project. WSP was engaged at the beginning of the year to conduct the transit hub study. The study was placed on hold as of May 27th 2020. Brampton Transit will be the lead for the transit hub study moving forward. This study will determine the location of the future new terminal and temporary bus services.
162570	2016	2018	Fire Campus Design	Open	59,100,000	16,360,218	42,739,782	37,813,160	4,926,622	8%	Public Works & Engineering	8	Phase 1B (building) underway with structural steel installation in progress. Phase 1A earthworks, foundations and site services work completed. Work performed includes structural framing (95% complete) and precast slab installation (100% complete), delivery of major mechanical, and underground rough-ins. Overall completion for the PH 1B Building is approx. 24%, and proceeding well. Over the month of March 2021, the building roofing and exterior wall framing is expected to begin.
204690	2020	2020	Bus Purchases	Open	37,331,000	-	37,331,000	-	37,331,000	100%	Transit	City Wide	Replacement bus order was on hold pending ICIP approval for this project. That approval is now secured and the procurement documents for this order are being processed. ICIP applications have been made for the conventional/articulated growth buses in this project and we are still awaiting that funding approval.
143580	2014	2018	Goreway Drive Widening	Open	33,920,388	106,619	33,813,769	66,714	33,747,055	99%	Public Works & Engineering	8	Design and approvals being finalized. Anticipated tender summer 2021. Joint project with Mississauga
193980	2019	2019	Cottrelle Blvd: Humberwest Pkwy - Goreway Dr.	Open	31,500,000	406,865	31,093,135	-	31,093,135	99%	Public Works & Engineering	8	Design and approvals being finalized. Anticipated tender summer 2021
185670	2018	2019	Chris Gibson Recreation Centre	Open	20,000,000	420,674	19,579,326	2,062,636	17,516,690	88%	Public Works & Engineering	1	The project is currently in design development stage. Design is on track for September 2021 completion.

CAPITAL PROJECTS WITH SIGNIFICANT BUDGETS REMAINING
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Current Project Budget	Project to Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments	Uncommitted Budget Percentage	Department	Ward	Stage
195740	2019	2019	Victoria Park New Facility	Open	17,500,000	48,353	17,451,647	1,526,912	15,924,735	91%	Public Works & Engineering	7	The Victoria Park Arena redevelopment project is currently in the design stage. The consulting team is working on the contract documents for demolition of the existing arena and concepts for the new facility.
194690	2019	2020	Bus Purchases	Open	26,890,000	12,186,400	14,703,600	-	14,703,600	55%	Transit	City Wide	ICIP application has been made for the articulated growth buses in this project and we are still awaiting that funding approval. Conventional growth/replacement buses were received/paid for in Q4 2020.
194020	2019	2019	Land Acquisitions	Open	16,264,236	2,952,582	13,311,654	142,464	13,169,190	81%	Public Works & Engineering	City Wide	In progress
194880	2019	2019	Transit Maintenance & Storage Facility	Open	15,000,000	1,779,934	13,220,066	1,522,862	11,697,204	78%	Public Works & Engineering	10	WSP has been retained as the Owner's Advisor to provide pre-design services. The RFPQ for design build services has been completed. Other consultants retained to date include external legal for contract development (Blakes), the fairness monitor (RGM), market sounding and information gathering consultant (Deloitte), financial evaluation services consultant (EY). The final TPAP has been submitted to the Ministry of Environment. Staff has been directed by Council to limit expenditures until Federal and Provincial funding have been approved, post the EA process in 2021. The request for proposal target release date is May 2021 pending funding approvals.
205865	2020	2020	New Capital Development	Open	9,585,000	191,771	9,393,229	1,029,437	8,363,792	87%	Community Services	City Wide	Work in progress.
203750	2020	2020	Chinguacousy Road Widening	Open	9,300,000	6,197	9,293,803	-	9,293,803	100%	Public Works & Engineering	6	Design completed. Tender anticipated in late March 2021.
185680	2018	2019	Balmoral Recreation Centre	Open	10,000,000	845,192	9,154,808	1,030,991	8,123,817	81%	Public Works & Engineering	7	Consultants have been retained and design is underway. Tender and construction to follow. Construction start anticipated in 2021. Remaining funds will be utilised for construction. Additional funds in 2021 have been approved.
203820	2020	2020	Road Resurfacing Program	Open	15,000,000	6,866,699	8,133,301	7,119,067	1,014,234	7%	Public Works & Engineering	City Wide	Under Construction. Approximately 50% work was carried over to 2021 due to COVID-19 & Council's request to pause program
191480	2019	2019	Corporate Technology Program	Open	11,236,000	3,169,844	8,066,156	1,154,689	6,911,467	62%	Corporate Support Services	City Wide	Numerous projects under this program - projects are at various stages of completion
192840	2019	2020	Williams Pkwy Works Yard Phase 3	Open	7,600,000	-	7,600,000	-	7,600,000	100%	Public Works & Engineering	8	This project is currently on hold awaiting direction on where to relocate parks staff. Parks staff are currently operating out of 425 Chrysler which is to be demolished at the beginning of 2022. Relocation is a subcomponent of the WPOC Phase 3 project.

CAPITAL PROJECTS WITH SIGNIFICANT BUDGETS REMAINING
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Current Project Budget	Project to Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments	Uncommitted Budget Percentage	Department	Ward	Stage
184690	2018	2018	Bus Purchases	Open	28,205,000	20,884,809	7,320,191	2,160,044	5,160,147	18%	Transit	City Wide	5 replacement e-buses partially billed to date. $3.6M of costs for 60% milestone invoice reversed out of 2020 (when paid) and applied to 2021 (when buses were recieved). Remaining invoicing to be received upon delivery and acceptance of the e-buses in Q1 2021.
201480	2020	2020	Corporate Technology Program	Open	7,369,000	215,403	7,153,597	220,239	6,933,358	94%	Corporate Support Services	City Wide	Numerous projects under this program - projects are at various stages of completion
204680	2020	2020	Bus Refurbishments	Open	7,939,000	1,265,962	6,673,038	-	6,673,038	84%	Transit	City Wide	Project was contingent on ICIP application approval. Approval was granted in August 2020. Transit staff have now begun scheduling and completing these bus refurbishments.
182530	2018	2019	Fire Station 214	Open	10,115,000	3,518,418	6,596,582	290,220	6,306,362	62%	Public Works & Engineering	5	Architect (Prime Consultant) issued a PO on November 15th, 2019. Demolition of existing buildings complete. Contractor prequalification closed on August 12th, 2020. Eight (8) contractors prequalified. Tender to be issued to pre-qualified contractors in March 2021. Site Plan Approval application substantially complete. Building Permit application submitted Lot consolidation to create one lot from the current two municipal addresses of the site underway. Legal working on completing Construction Agreements with the Region of Peel. Reality Services working on an easement agreement with neighbouring properties.
085850	2008	2012	Bram East Community Parkland Campus	Open	98,308,242	92,042,016	6,266,226	8,141	6,258,085	6%	Public Works & Engineering	10	Remaining funds are being held due to the claim and potential litigation.
181771	2018	2018	East-end Community Centre	Open	12,600,000	6,961,561	5,638,439	-	5,638,439	45%	Public Works & Engineering	8	The East End Community Centre (Riverstone) clubhouse and parking lot parcels of land have been purchased. The outstanding balance of this value is committed for future contract purchases of the remaining land parcels. The second phase for facility fit-up including some FFE and interior office renovation is underway, the $550K will accommodate this work.
201427	2020	2020	Core Technologies Program	Open	6,170,000	683,782	5,486,218	-	5,486,218	89%	Corporate Support Services	City Wide	Numerous projects under this program - projects are at various stages of completion
195865	2019	2019	New Capital Development	Open	8,205,000	2,734,467	5,470,533	1,026,118	4,444,415	54%	Community Services	City Wide	Work in progress.
201650	2020	2020	Facilities Repair & Replacement	Open	8,178,000	2,800,485	5,377,515	1,308,019	4,069,496	50%	Public Works & Engineering	City Wide	Various projects at various stages.
194610	2019	2020	Smart Bus	Open	5,000,000	76,945	4,923,055	-	4,923,055	98%	Transit	City Wide	Project was approved through ICIP in August of 2020. Transit staff currently working on procurement for this project.
191650	2019	2020	Facilities Repair & Replacement	Open	17,592,000	12,709,924	4,882,076	1,876,859	3,005,217	17%	Public Works & Engineering	City Wide	Various projects at various stages.
044580	2004	2010	Torbram Rd. / CNR Grade Separation Design	Open	22,573,000	17,801,486	4,771,514	111	4,771,403	21%	Public Works & Engineering	7&8	Complete - in litigation, joint project managed by City of Mississauga.
185600	2018	2019	Howden Recreation Centre	Open	5,000,000	293,417	4,706,583	299,149	4,407,434	88%	Public Works & Engineering	7	FNDS team working towards issuing consultants' RFP after which the project will be handed over to the implementation team.

CAPITAL PROJECTS WITH SIGNIFICANT BUDGETS REMAINING
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Current Project Budget	Project to Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments	Uncommitted Budget Percentage	Department	Ward	Stage
192310	2019	2019	Vehicle Replacement	Open	6,115,000	1,687,291	4,427,709	-	4,427,709	72%	Fire & Emergency Services	City Wide	There is currently $3.9M in requisitions against this project. Most replacement vehicles have been purchased. Remaining vehicles to purchase relate to fire trucks in various stages of the purchasing process
					723,595,866	**209,251,260**	**514,344,606**	**61,012,385**	**453,332,221**				

CAPITAL PROJECT STATUS REPORT - OPEN PROJECTS
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
			CAO, CORPORATE SUPPORT SERVICES & COUNCIL						
151201	2015	2015	Corporate Performance Measurement Dashboard	Open	100,000	75,448	24,552	13,174	11,378
151436	2015	2015	Health & Safety Mgmt System Enhancement	Open	16,000	-	16,000	-	16,000
171255	2017	2017	Sport Tourism Strategy	Open	100,000	1,272	98,728	96,672	2,056
171398	2017	2017	Minor Capital - Human Resources	Open	14,000	-	14,000	-	14,000
181000	2018	2018	Development Charges Study	Open	500,000	149,574	350,426	22,744	327,682
181075	2018	2018	Corporate Asset Management	Open	1,000,000	224,620	775,380	439,370	336,010
181080	2018	2018	Destination District Site Dev.	Open	500,000	-	500,000	-	500,000
181299	2018	2018	Minor Capital Council Members	Open	22,000	15,168	6,832	-	6,832
181430	2018	2018	Technology Acquisition-Refresh	Open	55,000	46,205	8,795	-	8,795
187723	2018	2018	Main St. Revitalization	Open	554,752	513,845	40,907	3,446	37,461
191397	2019	2019	Minor Capital - Strategic Communications	Open	13,000	12,581	419	-	419
191098	2019	2019	Minor Capital - Corporate Wide	Open	130,000	128,715	1,285	-	1,285
191299	2019	2019	Minor Capital - Council Members	Open	13,000	-	13,000	-	13,000
196860	2019	2019	Public Art Investment	Open	350,000	-	350,000	-	350,000
201061	2020	2020	Long-Term Financial MP	Open	250,000	-	250,000	-	250,000
201070	2020	2020	Fair Wage Policy & Community Benefits	Open	150,000	-	150,000	109,982	40,018
201075	2020	2020	Corporate Asset Management	Open	750,000	-	750,000	-	750,000
201098	2020	2020	Minor Capital - Corporate Wide	Open	178,000	67,074	110,926	-	110,926
201360	2020	2020	Communications Master Plan	Open	25,000	-	25,000	-	25,000
206855	2020	2020	Arts Walk of Fame	Open	20,000	-	20,000	-	20,000

CAPITAL PROJECT STATUS REPORT - OPEN PROJECTS
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Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
207600	2020	2020	Nurturing Neighbourhoods Program	Open	120,000	100,513	19,487	-	19,487
			TOTAL CAO, CORPORATE SUPPORT SERVICES & COUNCIL		**4,860,752**	**1,335,015**	**3,525,737.00**	**685,388.00**	**2,840,349**
			CORPORATE SUPPORT SERVICES - ITC						
131459	2013	2013	Mobile Corporate Printing Productivity Enhancement	Open	99,000	10,977	88,023	-	88,023
141466	2014	2014	Prosecution Tracking-Migration	Open	217,000	148,204	68,796	68,795	1
147741	2014	2014	Amanda Building Permit System Upgrade	Open	250,000	177,415	72,585	52,612	19,973
151341	2015	2015	Talent Management	Open	621,000	585,811	35,189	-	35,189
151790	2015	2015	Business Systems Initiatives	Open	1,515,000	1,107,581	407,419	47	407,372
161141	2016	2016	Printer Fleet Management System	Open	188,000	143,357	44,643	-	44,643
161790	2016	2016	Business Systems Initiatives	Open	300,000	200,716	99,284	24,821	74,463
171041	2017	2017	Enterprise Payment Solution	Open	226,000	131,854	94,146	-	94,146
171427	2017	2017	Core Technologies Program	Open	3,620,000	3,567,114	52,886	-	52,886
171468	2017	2017	Service Brampton - Customer Service Enhancements	Open	455,000	438,649	16,351	-	16,351
171478	2017	2017	Citizen Service Program	Open	800,000	614,465	185,535	-	185,535
171480	2017	2017	Corporate Technology Program	Open	3,600,000	2,735,037	864,963	9,346	855,617
177741	2017	2017	Amanda Building Permit System Upgrade	Open	250,000	45,522	204,478	-	204,478
181164	2018	2018	Enforcement-Mobile Technology	Open	60,000	18,279	41,721	-	41,721
181427	2018	2018	Core Technologies Program	Open	4,110,000	3,796,375	313,625	-	313,625
181478	2018	2018	Citizen Service Program	Open	200,000	-	200,000	-	200,000
181480	2018	2018	Corporate Technology Program	Open	6,497,000	3,207,079	3,289,921	539,388	2,750,533
191427	2019	2019	Core Technologies Program	Open	5,465,000	2,138,572	3,326,428	2,544	3,323,884

CAPITAL PROJECT STATUS REPORT - OPEN PROJECTS
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Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
191478	2019	2019	Citizen Service Program	Open	1,750,000	480,326	1,269,674	-	1,269,674
191480	2019	2019	Corporate Technology Program	Open	11,236,000	3,169,844	8,066,156	1,154,689	6,911,467
201427	2020	2020	Core Technologies Program	Open	6,170,000	683,782	5,486,218	-	5,486,218
201478	2020	2020	Citizen Service Program	Open	560,000	2,530	557,470	-	557,470
201480	2020	2020	Corporate Technology Program	Open	7,369,000	215,403	7,153,597	220,239	6,933,358
			TOTAL CORPORATE SUPPORT SERVICES - ITC		**55,558,000**	**23,618,892**	**31,939,108**	**2,072,481**	**29,866,627**
			LEGISLATIVE SERVICES						
181485	2018	2018	Records-Info Mgmt System-BRIMS	Open	285,000	236,027	48,973	25,281	23,692
195181	2019	2019	Animal Services - Misc Initiatives	Open	20,000	6,009	13,991	-	13,991
201193	2020	2020	Minor Capital - Enforcement	Open	40,000	37,794	2,206	-	2,206
205181	2020	2020	Animal Services - Misc Initiatives	Open	60,000	-	60,000	-	60,000
			TOTAL LEGISLATIVE SERVICES		**405,000**	**279,830**	**125,170**	**25,281**	**99,889**
			COMMUNITY SERVICES						
045810	2004	2014	Creditview / Sandalwood City-wide Park	Open	14,440,291	14,395,018	45,273	-	45,273
075940	2007	2007	Pathways Implementation Program	Open	1,922,100	1,878,377	43,723	-	43,723
085940	2008	2012	Pathways Implementation Program	Open	2,289,605	1,298,655	990,950	-	990,950
105400	2010	2010	Outdoor Assets	Open	6,049,817	5,875,123	174,694	-	174,694
105710	2010	2013	Mississauga / Bovaird Community Park	Open	7,515,000	7,502,220	12,780	6,493	6,287
105940	2010	2010	Pathways Implementation Program	Open	2,280,500	1,719,108	561,392	51,746	509,646
106000	2010	2010	Valleyland Development	Open	2,771,177	2,236,584	534,593	-	534,593
115400	2011	2011	Outdoor Asset Replacement	Open	3,366,354	3,296,267	70,087	-	70,087

CAPITAL PROJECT STATUS REPORT - OPEN PROJECTS
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
125400	2012	2012	Outdoor Asset Replacement	Open	7,003,235	6,739,092	264,143	26,680	237,463
125430	2012	2012	Wayfinding & Signage Program	Open	215,000	175,107	39,893	39,893	-
125860	2012	2012	Neighbourhood Parks	Open	1,597,600	1,596,155	1,445	-	1,445
126000	2012	2012	Valleyland Development	Open	2,380,000	2,140,603	239,397	25,296	214,101
135400	2013	2013	Oudoor Asset Replacement	Open	4,243,500	4,104,998	138,502	29,083	109,419
135860	2013	2013	Neighourhood Parks	Open	4,347,540	4,131,933	215,607	-	215,607
135940	2013	2013	Pathways Implementation Program	Open	905,000	445,801	459,199	-	459,199
136000	2013	2013	Valleyland Development	Open	1,190,700	876,173	314,527	-	314,527
144954	2014	2014	Outdoor Asset Replacement - PIS	Open	3,813,979	3,613,406	200,573	103,777	96,796
145860	2014	2014	Neighbourhood Parks	Open	1,911,136	1,615,817	295,319	-	295,319
146000	2014	2014	Valleyland Development	Open	2,713,000	2,063,073	649,927	68,962	580,965
154954	2015	2015	Outdoor Asset Replacement - PIS	Open	4,339,101	4,192,591	146,510	21,825	124,685
156000	2015	2015	Valleyland Development	Open	290,000	24,707	265,293	-	265,293
156770	2015	2015	Natural Heritage Land Acquisition	Open	960,000	941,421	18,579	7,568	11,011
164954	2016	2016	Outdoor Asset Replacement - PIS	Open	6,150,000	6,031,791	118,209	99,999	18,210
166000	2016	2016	Valleyland Development	Open	1,797,450	1,123,147	674,303	20,343	653,960
166600	2016	2016	Emerald Ash Borer	Open	3,703,000	3,694,462	8,538	-	8,538
166700	2016	2016	Tableland Acquisition - Land Acquisition	Open	983,058	789,208	193,850	-	193,850
171583	2017	2017	Downtown Property Acquisition	Open	27,012,115	26,995,318	16,797	-	16,797
174954	2017	2017	Outdoor Asset Replacement	Open	3,025,375	2,283,027	742,348	366,507	375,841
175201	2017	2018	BSC-Artificial Turf Fields & Seasonal Dome Structure	Open	11,300,000	9,393,152	1,906,848	1,645,925	260,923

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175860	2017	2017	Neighbourhood Parks	Open	5,872,850	5,298,529	574,321	-	574,321
175865	2017	2017	Parks - Outdoor Assets	Open	2,925,000	2,693,966	231,034	8,679	222,355
176700	2017	2017	Tableland Acquisition - Land Acquisition	Open	2,211,715	2,181,445	30,270	-	30,270
176810	2017	2017	Arts & Culture Misc. Initiatives	Open	407,080	405,847	1,233	298	935
178199	2017	2017	Minor Capital - Service Brampton	Open	5,000	2,415	2,585	-	2,585
184954	2018	2018	Parks - Outdoor Asset Replacement	Open	745,000	527,757	217,243	165,103	52,140
184955	2018	2018	Park Enhancements	Open	1,250,000	879,726	370,274	84,074	286,200
185560	2018	2018	Recreation - Misc Initiatives	Open	863,000	835,160	27,840	26,365	1,475
185580	2018	2018	Norton Park Development	Open	100,000	45,365	54,635	-	54,635
185865	2018	2018	Parks-New Capital Development	Open	3,741,000	2,376,641	1,364,359	1,304,567	59,792
186000	2018	2018	Valleyland Development	Open	625,000	21,497	603,503	4,248	599,255
186600	2018	2018	Emerald Ash Borer	Open	1,703,000	1,641,316	61,684	-	61,684
186780	2018	2018	Land Acquisition-Inder Heights	Open	2,200,000	2,140,337	59,663	-	59,663
186810	2018	2018	Cultural Services Initiatives	Open	404,570	404,058	512	102	410
191542	2019	2019	Land Acquisition & Preliminary Due Diligence	Open	17,750,000	13,615,739	4,134,261	-	4,134,261
191588	2019	2019	Acquisition-Main St.Properties	Open	9,050,000	8,691,001	358,999	-	358,999
191589	2019	2019	Acquisition-Nelson-George St.	Open	5,900,000	5,803,001	96,999	-	96,999
191775	2019	2019	Acquisition of Property-PVGC	Open	2,080,000	1,971,410	108,590	-	108,590
194954	2019	2019	Outdoor Asset Replacement-Planning & Infrastructure	Open	620,000	293,900	326,100	56,099	270,001
195210	2019	2019	Collaborative Learning Technology Centre	Open	3,000,000	-	3,000,000	-	3,000,000
195420	2019	2019	Playground Repair & Replacement	Open	1,555,000	1,417,079	137,921	-	137,921

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195430	2019	2019	Wayfinding & Signage Program - Outdoors	Open	50,000	41,208	8,792	-	8,792
195499	2019	2019	Minor Capital - Parks - Outdoor Assets	Open	25,000	24,920	80	-	80
195560	2019	2019	Recreation - Misc Initiatives	Open	1,110,000	589,567	520,433	53,561	466,872
195860	2019	2020	Neighbourhood Parks	Open	5,947,318	5,899,041	48,277	-	48,277
195865	2019	2019	New Capital Development	Open	8,205,000	2,734,467	5,470,533	1,026,118	4,444,415
195893	2019	2019	Sportsfield Repair & Replacement	Open	430,000	174,979	255,021	2,137	252,884
195940	2019	2019	Pathways Implementation Program	Open	250,000	-	250,000	-	250,000
195941	2019	2019	Recreation Trail Repair & Replacement	Open	295,000	257,266	37,734	25,727	12,007
196000	2019	2019	Valleyland Development	Open	675,000	72,060	602,940	298,701	304,239
196201	2019	2019	Urban Forestry Master Plan	Open	100,000	30,512	69,488	69,488	-
196600	2019	2019	Emerald Ash Borer	Open	2,703,000	1,907,751	795,249	741,713	53,536
196715	2019	2019	Land Acquisition - Bovaird Dr.	Open	9,800,000	9,605,080	194,920	-	194,920
196760	2019	2019	Parkland Over-Dedication	Open	3,600,000	-	3,600,000	-	3,600,000
196810	2019	2019	Cultural Services Initiatives	Open	300,000	168,334	131,666	-	131,666
196820	2019	2019	Venue Management Software	Open	50,000	-	50,000	-	50,000
196830	2019	2019	Accessibility – Rose Theatre	Open	45,000	7,161	37,839	-	37,839
201588	2020	2020	Purchase-54 Main St. North	Open	2,610,000	116,936	2,493,064	69,238	2,423,826
204150	2020	2020	Engineering & Parkland Studies	Open	1,000,000	93,216	906,784	42,931	863,853
204954	2020	2020	Outdoor Asset Replacement-Planning & Infrastructure	Open	745,000	42,696	702,304	50,000	652,304
204955	2020	2020	Park Enhancements	Open	1,250,000	-	1,250,000	-	1,250,000
205420	2020	2020	Playground Repair & Replacement	Open	2,140,000	75,708	2,064,292	500,850	1,563,442

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205460	2020	2020	Outdoor Winter Rec. Amenities	Open	1,400,000	540,043	859,957	384,654	475,303
205499	2020	2020	Minor Capital - Parks - Outdoor Assets	Open	50,000	27,343	22,657	-	22,657
205560	2020	2020	Recreation - Misc Initiatives	Open	1,270,000	791,134	478,866	109,622	369,244
205730	2020	2020	Gore Meadows Fieldhouse & Ancillary Buildings	Open	1,050,000	-	1,050,000	-	1,050,000
205780	2020	2020	CAA Centre	Open	638,000	599,702	38,298	-	38,298
205865	2020	2020	New Capital Development	Open	9,585,000	191,771	9,393,229	1,029,437	8,363,792
205893	2020	2020	Sportsfield Repair & Replacement	Open	200,000	-	200,000	-	200,000
205894	2020	2020	Accessible Baseball Diamond	Open	150,000	-	150,000	-	150,000
205936	2020	2020	Central Peel - Artificial Turf Field	Open	1,500,000	-	1,500,000	-	1,500,000
206000	2020	2020	Valleyland Development	Open	1,925,000	26,204	1,898,796	-	1,898,796
206600	2020	2020	Emerald Ash Borer	Open	1,703,000	358,221	1,344,779	786,581	558,198
206810	2020	2020	Performing Arts Initiatives	Open	300,000	1,038	298,962	-	298,962
206835	2020	2020	Signage-Rebranding – Rose Theatre	Open	50,000	-	50,000	-	50,000
			TOTAL COMMUNITY SERVICES		**254,675,166**	**196,794,881**	**57,880,285**	**9,354,390.00**	**48,525,895**
			FIRE & EMERGENCY SERVICES						
102120	2010	2012	Station & Apparatus & Maintenance Facility	Open	11,570,000	11,429,356	140,644	12,556	128,088
132506	2013	2013	Station 204 Relocation & Expansion	Open	4,600,000	4,466,600	133,400	34,027	99,373
171840	2017	2017	Emergency Measures	Open	150,000	78,219	71,781	-	71,781
182110	2018	2018	Fire Miscellaneous Initiatives	Open	221,000	113,382	107,618	107,428	190
182300	2018	2018	Growth Vehicles	Open	900,000	-	900,000	-	900,000
182310	2018	2018	Vehicle Replacement	Open	1,600,000	1,233,271	366,729	-	366,729

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182430	2018	2020	Dispatch Equipment	Open	5,349,000	3,655,711	1,693,289	1,328,233	365,056
192110	2019	2019	Fire Miscellaneous Initiatives	Open	241,000	152,977	88,023	88,023	-
192111	2019	2019	Community Safety Project	Open	300,000	139,436	160,564	-	160,564
192310	2019	2019	Vehicle Replacement	Open	6,115,000	1,687,291	4,427,709	-	4,427,709
192430	2019	2019	Dispatch Equipment	Open	400,000	122,601	277,399	-	277,399
192460	2019	2019	Fire Fighting Equipment	Open	988,000	898,502	89,498	54,442	35,056
202110	2020	2020	Fire Miscellaneous Initiatives	Open	200,000	4,506	195,494	-	195,494
202310	2020	2020	Fire Vehicle Replacement	Open	1,270,000	165,798	1,104,202	153,306	950,896
202430	2020	2020	Dispatch Upgrade & Equipment	Open	415,000	30,348	384,652	270	384,382
202460	2020	2020	Fire Fighting Equipment	Open	970,000	160,003	809,997	160,781	649,216
			TOTAL FIRE & EMERGENCY SERVICES		**35,289,000**	**24,338,001**	**10,950,999**	**1,939,066**	**9,011,933**
			TRANSIT						
064610	2006	2007	Smart Bus	Open	7,180,000	7,076,384	103,616	-	103,616
097730	2009	2009	Mt.Pleasant Mobility	Open	29,898,561	25,641,673	4,256,888	462,139	3,794,749
104701	2010	2013	Hurontario / Main Street Corridor Master Plan	Open	3,925,000	3,655,166	269,834	-	269,834
124800	2012	2014	Zum / BRT	Open	115,553,329	114,581,067	972,262	3,330	968,932
144703	2014	2014	Queen Street LRT	Open	1,200,000	860,815	339,185	-	339,185
154714	2015	2015	Transit IT Initiatives	Open	550,000	467,239	82,761	19,806	62,955
164110	2016	2018	Hurontario Light Rail Transit	Open	4,750,000	3,482,937	1,267,063	-	1,267,063
164840	2016	2016	Terminal Improvements	Open	1,000,000	1,488	998,512	-	998,512
164850	2016	2016	Existing Facility Refurbishmnt	Open	500,000	447,777	52,223	1,508	50,715

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174115	2017	2017	Light Rail Transit Extension - Alternative Routes - EA	Open	5,400,000	3,140,214	2,259,786	1,877,867	381,919
174116	2017	2017	Hurontario LRT - Infrastructure & Capital Costs	Open	3,150,000	4,584	3,145,416	-	3,145,416
174680	2017	2017	Bus Refurbishments	Open	960,000	948,645	11,355	-	11,355
174690	2017	2017	Bus Purchases	Open	20,450,000	20,339,106	110,894	-	110,894
174700	2017	2017	Vehicle Maintenance System Pilot	Open	2,522,000	2,501,841	20,159	829	19,330
174771	2017	2017	Transit Amenity Program	Open	2,000,000	1,999,513	487	-	487
174782	2017	2018	Electric Overhead Chargers	Open	5,844,000	3,738,614	2,105,386	1,583,562	521,824
174799	2017	2017	Minor Capital - Transit	Open	207,000	206,989	11	-	11
174800	2017	2017	Zum Service Expansion	Open	19,100,000	19,099,937	63	-	63
174860	2017	2017	Bus Storage & Repair Facility	Open	24,900,000	24,063,136	836,864	43,216	793,648
184635	2018	2018	Transit Operator Safety Shields	Open	2,545,000	2,504,781	40,219	8,393	31,826
184680	2018	2018	Bus Refurbishments	Open	5,520,000	5,518,377	1,623	-	1,623
184690	2018	2018	Bus Purchases	Open	28,205,000	20,884,809	7,320,191	2,160,044	5,160,147
184714	2018	2018	Transit IT Initiatives	Open	1,500,000	751	1,499,249	1,172,676	326,573
184770	2018	2018	Bus Shelters-Pads-Stops	Open	416,000	405,458	10,542	1,477	9,065
184799	2018	2018	Minor Capital - Transit	Open	207,000	193,986	13,014	-	13,014
194610	2019	2020	Smart Bus	Open	5,000,000	76,945	4,923,055	-	4,923,055
194670	2019	2020	Fare Collection Equipment	Open	10,000,000	6,546,659	3,453,341	-	3,453,341
194680	2019	2020	Bus Refurbishments	Open	4,870,000	2,263,838	2,606,162	-	2,606,162
194690	2019	2020	Bus Purchases	Open	26,890,000	12,186,400	14,703,600	-	14,703,600
194712	2019	2020	Emerging Technologies Study	Open	100,000	-	100,000	-	100,000

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194770	2019	2020	Bus Shelters-Pads-Stops	Open	439,000	318,280	120,720	104,597	16,123
204117	2020	2020	Brand Development Strategy	Open	500,000	-	500,000	-	500,000
204120	2020	2020	Queen Rapid Transit Desgn-TPAP	Open	2,000,000	-	2,000,000	-	2,000,000
204641	2020	2020	Fleet Support Vehicles	Open	35,000	-	35,000	-	35,000
204680	2020	2020	Bus Refurbishments	Open	7,939,000	1,265,962	6,673,038	-	6,673,038
204690	2020	2020	Bus Purchases	Open	37,331,000	-	37,331,000	-	37,331,000
204704	2020	2020	Senior Transit Pass Implementation	Open	150,000	-	150,000	-	150,000
204770	2020	2020	Bus Shelters-Pads-Stops	Open	416,000	393,792	22,208	-	22,208
204799	2020	2020	Minor Capital – Transit	Open	207,000	46,831	160,169	-	160,169
			TOTAL TRANSIT		**383,359,890**	**284,863,994**	**98,495,896**	**7,439,444**	**91,056,452**
			PUBLIC WORKS & ENGINEERING						
012810	2001	2013	Sandalwood Works Yard	Open	112,821,000	112,056,760	764,240	-	764,240
044580	2004	2010	Torbram Rd. / CNR Grade Separation Design	Open	22,573,000	17,801,486	4,771,514	111	4,771,403
067970	2006	2011	Sustainable Development Guidelines	Open	180,000	161,336	18,664	-	18,664
073610	2007	2007	Project Design	Open	3,079,753	2,754,475	325,278	325,194	84
083311	2008	2008	Clarkway Dr: Cottrelle - N of Cottrelle	Open	560,000	560,000	-	-	-
083610	2008	2015	Project Design	Open	10,752,710	8,811,306	1,941,404	1,043,989	897,415
083870	2008	2010	James Potter Rd:Queen - 30 Metres South	Open	10,245,713	10,173,404	72,309	-	72,309
085850	2008	2012	Bram East Community Parkland Campus	Open	98,308,242	92,042,016	6,266,226	8,141	6,258,085
093610	2009	2009	Project Design	Open	4,376,881	3,899,286	477,595	64,456	413,139
093625	2009	2019	Utility Relocation	Open	4,624,700	1,400,367	3,224,333	796,435	2,427,898

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094500	2009	2009	Environmental Assessments	Open	2,241,869	2,168,744	73,125	37,048	36,077
097720	2009	2009	Downtown Revitalization	Open	3,947,000	3,877,640	69,360	25,399	43,961
103625	2010	2018	Utility Relocation	Open	1,737,400	1,225,084	512,316	490,309	22,007
113413	2011	2011	Creditview Rd: Spine Rd. - Fairhill Ave.	Open	3,920,000	1,401,969	2,518,031	-	2,518,031
113550	2011	2011	Mayfield Road-Region: Bramalea Rd - Airport Rd	Open	152,727	61,618	91,109	-	91,109
113610	2011	2011	Project Design	Open	6,117,600	5,497,680	619,920	189,539	430,381
113625	2011	2011	Utility Relocation	Open	3,141,476	1,988,054	1,153,422	1,040,672	112,750
114940	2011	2011	Storm Water Management - Restoration	Open	3,279,133	3,146,068	133,065	-	133,065
123030	2012	2012	Safety Performance Functions & Network Screening	Open	65,000	60,980	4,020	-	4,020
123412	2012	2013	Creditview Rd. Reconstruction: Creditview - CN	Open	35,340,000	32,708,388	2,631,612	520,465	2,111,147
123870	2012	2012	James Potter Road	Open	3,902,000	2,567,781	1,334,219	-	1,334,219
124270	2012	2012	Bridge Condition Surveys	Open	16,630	40	16,590	11,494	5,096
124500	2012	2013	Environmental Assessments	Open	3,136,664	2,372,148	764,516	342,728	421,788
124940	2012	2012	Storm Water Management - Restoration	Open	3,293,371	3,029,209	264,162	-	264,162
124950	2012	2012	Storm Water Management Study	Open	200,000	199,530	470	-	470
131432	2013	2015	Asset Management System - Hansen	Open	4,003,000	2,135,775	1,867,225	705,875	1,161,350
133500	2013	2013	North-South Spine Rd: Creditview Rd to Sandalwood	Open	2,870,000	2,854,558	15,442	-	15,442
133880	2013	2013	Bramalea Road Widening: Countryside to Mayfield	Open	10,293,948	9,778,785	515,163	309,199	205,964
134561	2013	2013	Civic Design - Region of Peel	Open	375,000	368,076	6,924	-	6,924
134940	2013	2013	Storm Water Management - Restoration	Open	2,407,907	1,515,340	892,567	-	892,567
134950	2013	2013	Storm Water Management Study	Open	200,000	196,262	3,738	-	3,738

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141500	2014	2014	Corporage Indoor Asset Replacement	Open	874,000	860,721	13,279	-	13,279
142741	2014	2014	Overhead Vehicle Detection	Open	70,000	70,000	-	-	-
143010	2014	2014	Traffic Calming Measures	Open	150,000	135,825	14,175	-	14,175
143380	2014	2017	Humberwest Parkway: Exchange Dr-Williams Pkwy	Open	9,500,000	7,843,166	1,656,834	965,814	691,020
143450	2014	2014	New Road A: Steeles Ave - Financial Dr	Open	3,176,000	2,787,803	388,197	-	388,197
143451	2014	2014	New Road A: Financial Dr - Embleton Rd	Open	2,673,000	775,276	1,897,724	-	1,897,724
143580	2014	2018	Goreway Drive Widening	Open	33,920,388	106,619	33,813,769	66,714	33,747,055
143610	2014	2014	Project Design	Open	3,048,900	2,353,276	695,624	66,700	628,924
143625	2014	2020	Utility Relocation	Open	405,000	93,629	311,371	27,760	283,611
143780	2014	2014	Sandalwood Parkway: Creditview - Mississauga Rd	Open	2,971,000	2,470,891	500,109	-	500,109
143811	2014	2015	Financial Dr: Mississauga Dr - Heritage Rd	Open	3,127,000	2,076,266	1,050,734	-	1,050,734
143870	2014	2014	James Potter Rd: Ashby Field Rd - Bovaird Dr	Open	1,530,000	1,529,852	148	-	148
143940	2014	2014	Countryside Dr: Airport Rd - Goreway Dr	Open	23,687,500	23,415,126	272,374	83,789	188,585
144230	2014	2017	Bridge Repairs	Open	7,723,000	7,068,207	654,793	218,126	436,667
144300	2014	2017	Noise Walls	Open	484,500	474,530	9,970	6,413	3,557
144411	2014	2014	Sidewalks - Region of Peel	Open	1,056,300	1,022,637	33,663	-	33,663
144500	2014	2014	Environmental Assessments	Open	1,456,400	1,048,106	408,294	349,747	58,547
144530	2014	2014	Streetlighting	Open	1,110,600	1,078,950	31,650	10,176	21,474
144940	2014	2014	Storm Water Management - Restoration	Open	979,000	813,051	165,949	133,193	32,756
152950	2015	2015	Replacement Equipment	Open	2,200,000	2,199,414	586	-	586
153099	2015	2015	Minor Capital - Operations	Open	10,000	9,536	464	-	464

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153610	2015	2018	Project Design	Open	2,271,400	2,009,575	261,825	261,269	556
153625	2015	2015	Utility Relocation	Open	1,201,000	1,065,600	135,400	-	135,400
153760	2015	2015	Torbram Rd: Countryside Dr. - Mayfield Rd.	Open	7,141,000	6,814,091	326,909	156,702	170,207
153811	2015	2015	Financial Dr: Steeles Ave. - South City Limit	Open	13,331,000	13,035,007	295,993	246,107	49,886
154410	2015	2015	Sidewalks	Open	665,500	567,884	97,616	45,792	51,824
154950	2015	2015	Storm Water Management Study	Open	300,000	209,312	90,688	90,688	-
161650	2016	2016	Facilities Repair-Replacement	Open	19,318,000	18,518,754	799,246	141,452	657,794
161760	2016	2016	Facility Inspections & Audits	Open	1,264,000	1,046,879	217,121	216,861	260
162570	2016	2018	Fire Campus Design	Open	59,100,000	16,360,218	42,739,782	37,813,160	4,926,622
162732	2016	2017	Electronic Speed Advisry Signs	Open	350,000	345,175	4,825	4,579	246
162770	2016	2016	Traffic Signal Modernization Program	Open	600,000	579,611	20,389	-	20,389
162950	2016	2016	Replacement Equipment	Open	2,424,000	2,198,610	225,390	225,296	94
163010	2016	2016	Traffic Calming Measures	Open	250,000	-	250,000	-	250,000
163099	2016	2016	Minor Capital - Operations	Open	10,000	9,484	516	-	516
163201	2016	2018	Intersection Improvements - Region of Peel	Open	410,500	384,306	26,194	2,505	23,689
163500	2016	2016	North - South Spine Road	Open	2,580,000	1,936,185	643,815	-	643,815
163501	2016	2016	East - West Spine Road	Open	2,335,000	2,312,843	22,157	-	22,157
163610	2016	2016	Project Design	Open	589,200	547,613	41,587	36,446	5,141
163625	2016	2019	Utility Relocation	Open	4,257,614	7,759	4,249,855	2,796,734	1,453,121
163640	2016	2016	Countryvillage Collector	Open	2,520,000	2,485,118	34,882	-	34,882
163870	2016	2016	James Potter Road	Open	1,337,000	-	1,337,000	-	1,337,000

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Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
164230	2016	2016	Bridge Repairs	Open	3,263,000	3,173,466	89,534	42,266	47,268
164486	2016	2016	Parking Garage System Upgrade	Open	350,000	158,187	191,813	29,998	161,815
164530	2016	2016	Streetlighting	Open	991,600	909,309	82,291	-	82,291
164950	2016	2016	Storm Water Management Study	Open	450,000	177,684	272,316	122,315	150,001
167299	2016	2016	Minor Capital - Development Engineering	Open	15,000	14,411	589	-	589
167720	2016	2017	Downtown Revitalization	Open	3,900,000	3,571,939	328,061	171,625	156,436
171520	2017	2017	Energy Programs	Open	1,000,000	852,132	147,868	132,353	15,515
171599	2017	2017	Minor Capital - Facility Operations & Maintenance	Open	400,000	396,405	3,595	3,530	65
171650	2017	2017	Facilities Repair & Replacement	Open	24,833,000	23,111,223	1,721,777	136,655	1,585,122
171760	2017	2017	Facility Inspections & Audits	Open	1,685,000	841,470	843,530	127,525	716,005
171900	2017	2017	Interior Design Services	Open	3,998,000	2,780,209	1,217,791	309,142	908,649
172745	2017	2017	Traffic System Detectors	Open	100,000	99,999	1	-	1
172770	2017	2017	Traffic Signal Modernization	Open	600,000	582,589	17,411	-	17,411
172910	2017	2017	New Equipment	Open	451,000	373,675	77,325	-	77,325
172950	2017	2017	Replacement Equipment	Open	2,385,000	2,384,786	214	-	214
173099	2017	2017	Minor Capital - Road Operations	Open	10,000	9,591	409	-	409
173201	2017	2017	Intersection Improvements	Open	300,000	122,728	177,272	136,510	40,762
173610	2017	2019	Project Design	Open	4,174,500	2,583,817	1,590,683	1,086,371	504,312
173625	2017	2018	Utility Relocation	Open	1,700,000	904,294	795,706	676,481	119,225
173820	2017	2017	Road Resurfacing Program	Open	11,751,000	11,750,784	216	-	216
173830	2017	2017	Road Infrastructure Misc.	Open	250,000	193,428	56,572	53,278	3,294

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173941	2017	2017	Countryside Dr. Widening	Open	19,335,000	18,590,493	744,507	139,294	605,213
174230	2017	2017	Bridge Repairs	Open	547,000	427,300	119,700	32,230	87,470
174280	2017	2017	Bridge Management System Upgrades	Open	150,000	138,618	11,382	11,382	-
174530	2017	2017	Streetlighting	Open	1,509,700	1,150,183	359,517	69,522	289,995
174910	2017	2017	Clean Water & Wastewater Fund	Open	10,742,384	9,153,916	1,588,468	86,573	1,501,895
174940	2017	2017	Storm Water Mgmt-Restoration	Open	2,000,000	1,478,135	521,865	283,770	238,095
174950	2017	2017	Storm Water Management Study	Open	200,000	-	200,000	34,456	165,544
177299	2017	2017	Minor Capital - Development Engineering	Open	17,000	2,644	14,356	-	14,356
181500	2018	2018	Corporate Indoor Asset Replacement	Open	150,000	72,366	77,634	-	77,634
181518	2018	2019	New Facilities Development	Open	6,300,000	6,080,140	219,860	217,923	1,937
181520	2018	2018	Energy Programs	Open	500,000	467,753	32,247	32,247	-
181599	2018	2018	Misc Initiatives–Facilities Operations & Maintenance	Open	350,000	349,546	454	-	454
181650	2018	2018	Facilities Repair & Replacement	Open	12,656,189	10,823,048	1,833,141	999,300	833,841
181760	2018	2018	Facility Inspections & Audits	Open	325,000	84,125	240,875	232,481	8,394
181771	2018	2018	East-end Community Centre	Open	12,600,000	6,961,561	5,638,439	-	5,638,439
181900	2018	2018	Interior Design Services	Open	3,205,000	2,869,253	335,747	43,299	292,448
181940	2018	2018	8 Nelson Purchase / Remediation / Renovation	Open	500,000	207,662	292,338	24,423	267,915
182530	2018	2019	Fire Station 214	Open	10,115,000	3,518,418	6,596,582	290,220	6,306,362
182770	2018	2018	Traffic Signal Modernization Program	Open	600,000	112,417	487,583	113,752	373,831
182910	2018	2018	New Equipment	Open	1,109,000	737,675	371,325	-	371,325
182950	2018	2018	Replacement Equipment	Open	2,260,000	1,031,231	1,228,769	271,275	957,494

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183040	2018	2018	AVL - GPS Solution	Open	450,000	94,696	355,304	193,141	162,163
183200	2018	2018	Intersection Improvements	Open	500,000	487,644	12,356	10,662	1,694
183501	2018	2018	East-West Spine Rd	Open	4,689,000	4,178,869	510,131	-	510,131
183610	2018	2020	Project Design	Open	2,102,000	747,892	1,354,108	-	1,354,108
183625	2018	2018	Utility Relocation	Open	30,000	2,527	27,473	1,687	25,786
183770	2018	2019	Castlemore Road Widening	Open	10,600,000	7,685,900	2,914,100	2,080,056	834,044
183820	2018	2018	Road Resurfacing Program	Open	12,594,000	12,567,827	26,173	25,440	733
183830	2018	2018	Road Infrastructure Misc.	Open	220,160	218,653	1,507	1,497	10
183840	2018	2018	Williams Parkway	Open	11,100,000	10,775,772	324,228	323,588	640
183866	2018	2018	Downtown Improvements	Open	3,000,000	1,359,283	1,640,717	219,935	1,420,782
184230	2018	2018	Bridge Repairs	Open	5,145,000	4,927,558	217,442	211,791	5,651
184410	2018	2018	Sidewalks	Open	392,000	337,529	54,471	-	54,471
184500	2018	2018	Environmental Assessments	Open	1,650,000	863,659	786,341	299,537	486,804
184530	2018	2018	Streetlighting	Open	1,470,000	599,329	870,671	183,001	687,670
184945	2018	2018	Storm Water Pond Retrofits	Open	200,000	137,110	62,890	-	62,890
185160	2018	2019	Centre for Education, Innovation & Collaboration	Open	160,000,000	233,946	159,766,054	354,553	159,411,501
185600	2018	2019	Howden Recreation Centre	Open	5,000,000	293,417	4,706,583	299,149	4,407,434
185670	2018	2019	Chris Gibson Recreation Centre	Open	20,000,000	420,674	19,579,326	2,062,636	17,516,690
185680	2018	2019	Balmoral Recreation Centre	Open	10,000,000	845,192	9,154,808	1,030,991	8,123,817
186100	2018	2018	Natural Heritage Restoration	Open	14,500	2,904	11,596	-	11,596
187485	2018	2018	Environmental Master Plan Implementation	Open	100,000	67,711	32,289	-	32,289

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187735	2018	2018	Riverwalk	Open	1,400,000	425,652	974,348	90,916	883,432
191518	2019	2019	New Facilities Development	Open	900,000	887,011	12,989	12,989	-
191520	2019	2019	Energy Programs	Open	350,000	68,101	281,899	81,703	200,196
191584	2019	2019	Demolition of 14 & 21 Nelson St.	Open	2,000,000	568,170	1,431,830	-	1,431,830
191599	2019	2019	Misc Initiatives–Facilities Operations & Maintenance	Open	350,000	209,525	140,475	44,314	96,161
191650	2019	2020	Facilities Repair & Replacement	Open	17,592,000	12,709,924	4,882,076	1,876,859	3,005,217
191760	2019	2019	Facility Inspections & Audits	Open	1,080,000	422,514	657,486	80,399	577,087
191899	2019	2019	Minor Capital - Corporate Security	Open	245,000	75,776	169,224	-	169,224
191900	2019	2019	Interior Design Services	Open	3,180,000	1,919,880	1,260,120	233,341	1,026,779
192555	2019	2020	Redevelopment of Fire Station 201	Open	1,650,000	582,605	1,067,395	420,738	646,657
192710	2019	2019	Traffic Signalization	Open	600,000	598,178	1,822	1,609	213
192746	2019	2019	Connected Vehicle Infrastructure	Open	100,000	-	100,000	-	100,000
192761	2019	2019	Controlled Pedestrian Crosswalks	Open	50,000	-	50,000	-	50,000
192770	2019	2019	Traffic Signal Modernization Program	Open	700,000	564,233	135,767	-	135,767
192799	2019	2019	Minor Capital - Traffic	Open	10,000	8,247	1,753	-	1,753
192830	2019	2019	Bramalea Transit Terminal Repairs	Open	638,000	205,193	432,807	32,524	400,283
192831	2019	2019	Parking Lots	Open	359,000	170,682	188,318	187,514	804
192840	2019	2020	Williams Pkwy Works Yard Phase 3	Open	7,600,000	-	7,600,000	-	7,600,000
192910	2019	2019	New Equipment	Open	1,393,000	637,342	755,658	-	755,658
192950	2019	2019	Replacement Equipment	Open	3,000,000	602,911	2,397,089	109,172	2,287,917
192971	2019	2019	Green Fleet Strategy	Open	150,000	18,316	131,684	54,947	76,737

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192999	2019	2019	Minor Capital - Engineering	Open	106,700	86,750	19,950	-	19,950
193040	2019	2019	AVL / GPS Solution	Open	155,000	-	155,000	-	155,000
193050	2019	2019	Vehicle Barriers	Open	125,000	-	125,000	-	125,000
193099	2019	2019	Minor Capital - Operations	Open	10,000	8,016	1,984	-	1,984
193130	2019	2019	Active Transportation Infrastructure	Open	2,000,000	413,561	1,586,439	1,053,201	533,238
193610	2019	2020	Project Design	Open	4,622,200	217,210	4,404,990	-	4,404,990
193625	2019	2019	Utility Relocation	Open	2,000,000	-	2,000,000	-	2,000,000
193640	2019	2019	Countryside Village Collector	Open	900,000	-	900,000	-	900,000
193690	2019	2019	Rivermont Road	Open	400,000	-	400,000	-	400,000
193820	2019	2019	Road Resurfacing	Open	15,000,000	13,241,659	1,758,341	53,933	1,704,408
193830	2019	2019	Road Infrastructure Misc.	Open	550,000	314,542	235,458	234,938	520
193920	2019	2019	McLaughlin Road Widening	Open	9,300,000	7,679,892	1,620,108	981,955	638,153
193980	2019	2019	Cottrelle Blvd: Humberwest Pkwy - Goreway Dr.	Open	31,500,000	406,865	31,093,135	-	31,093,135
194020	2019	2019	Land Acquisitions	Open	16,264,236	2,952,582	13,311,654	142,464	13,169,190
194230	2019	2019	Bridge Repairs	Open	2,910,000	1,712,121	1,197,879	131,494	1,066,385
194410	2019	2019	Sidewalks	Open	1,250,000	639,643	610,357	-	610,357
194500	2019	2019	Environmental Assessments	Open	1,350,000	39,093	1,310,907	189,052	1,121,855
194530	2019	2019	Streetlighting	Open	810,000	274,801	535,199	192,495	342,704
194531	2019	2019	Streetlighting LED Retrofit	Open	3,000,000	2,997,921	2,079	-	2,079
194880	2019	2019	Transit Maintenance & Storage Facility	Open	15,000,000	1,779,934	13,220,066	1,522,862	11,697,204
194941	2019	2019	Stormwater Asset Management	Open	600,000	564,541	35,459	759	34,700

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194945	2019	2019	Storm Water Pond Retrofits	Open	1,060,000	133,639	926,361	26,933	899,428
194950	2019	2019	Storm Water Management Study	Open	200,000	-	200,000	-	200,000
195622	2019	2019	Chinguacousy Wellness Interior Renovation	Open	1,500,000	129,649	1,370,351	35,339	1,335,012
195640	2019	2019	Boxing Club Interior Renovation	Open	400,000	384,534	15,466	-	15,466
195740	2019	2019	Victoria Park New Facility	Open	17,500,000	48,353	17,451,647	1,526,912	15,924,735
196110	2019	2019	Fletchers Creek SNAP Program	Open	700,000	112,801	587,199	211,030	376,169
197485	2019	2019	Environmental Master Plan Implementation	Open	290,000	210,106	79,894	-	79,894
197735	2019	2019	Riverwalk	Open	700,000	292,560	407,440	-	407,440
201518	2020	2020	New Facilities Development	Open	1,260,000	541,292	718,708	-	718,708
201520	2020	2020	Energy Programs	Open	600,000	126,293	473,707	292,802	180,905
201585	2020	2020	Demolition of Heritage Theatre & Block	Open	600,000	146,846	453,154	117,960	335,194
201586	2020	2020	Temporary Landscaping of Heritage Block	Open	450,000	9,159	440,841	-	440,841
201599	2020	2020	Misc Initiatives–Facilities Operations & Maintenance	Open	375,000	25,440	349,560	157,565	191,995
201610	2020	2020	Replacement of Signage-Soccer Centre	Open	200,000	1,933	198,067	-	198,067
201650	2020	2020	Facilities Repair & Replacement	Open	8,178,000	2,800,485	5,377,515	1,308,019	4,069,496
201760	2020	2020	Facility Inspections & Audits	Open	1,705,000	596,934	1,108,066	355,884	752,182
201850	2020	2020	Corporate Security Systems	Open	800,000	73,561	726,439	-	726,439
201899	2020	2020	Minor Capital - Corporate Security	Open	325,000	195,313	129,687	43,267	86,420
201900	2020	2020	Interior Design Services	Open	3,739,000	715,165	3,023,835	2,527	3,021,308
202710	2020	2020	Traffic Signalization	Open	600,000	549,741	50,259	31,243	19,016
202745	2020	2020	Traffic System Detectors	Open	100,000	87,808	12,192	-	12,192

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202761	2020	2020	Controlled Pedestrian Crosswalks	Open	50,000	-	50,000	-	50,000
202770	2020	2020	Traffic Signal Modernization Program	Open	1,410,000	21,080	1,388,920	38,730	1,350,190
202790	2020	2020	Traffic Signal Communication	Open	90,000	1,592	88,408	-	88,408
202799	2020	2020	Minor Capital - Traffic	Open	60,000	47,809	12,191	-	12,191
202831	2020	2020	Parking Lots	Open	600,000	173,618	426,382	23,671	402,711
202832	2020	2020	Gateway Transit Terminal Repairs	Open	500,000	312,378	187,622	752	186,870
202910	2020	2020	New Equipment - Vehicles	Open	790,000	399,999	390,001	234,516	155,485
202930	2020	2020	Special Tools	Open	45,000	37,071	7,929	-	7,929
202950	2020	2020	Replacement Equipment - Vehicles	Open	1,000,000	247,922	752,078	467,800	284,278
202985	2020	2020	Road Weather Information System	Open	100,000	-	100,000	-	100,000
202999	2020	2020	Minor Capital - Engineering	Open	100,000	44,589	55,411	-	55,411
203010	2020	2020	Traffic Calming Measures	Open	150,000	513	149,487	-	149,487
203120	2020	2020	Asset Management – Roads	Open	100,000	-	100,000	-	100,000
203140	2020	2020	Railway Crossing Reconstruction	Open	50,000	-	50,000	-	50,000
203200	2020	2020	Intersection Improvements	Open	300,000	89,208	210,792	125,958	84,834
203610	2020	2020	Project Design	Open	750,000	176,925	573,075	117,781	455,294
203620	2020	2020	Pre-Engineering	Open	750,000	226,224	523,776	-	523,776
203625	2020	2020	Utility Relocation	Open	1,550,000	-	1,550,000	888,838	661,162
203710	2020	2020	Remembrance Road	Open	2,000,000	-	2,000,000	-	2,000,000
203750	2020	2020	Chinguacousy Road Widening	Open	9,300,000	6,197	9,293,803	-	9,293,803
203820	2020	2020	Road Resurfacing Program	Open	15,000,000	6,866,699	8,133,301	7,119,067	1,014,234

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203835	2020	2020	Concrete Road Construction	Open	1,500,000	734,369	765,631	166,257	599,374
204160	2020	2020	Road Network Survey	Open	400,000	160,732	239,268	161,685	77,583
204200	2020	2020	Horizontal-Vertical Control Network	Open	200,000	57,290	142,710	10,176	132,534
204230	2020	2020	Bridge Repairs	Open	3,700,000	2,658	3,697,342	-	3,697,342
204300	2020	2020	Noise Walls	Open	750,000	21,349	728,651	-	728,651
204410	2020	2020	Sidewalks	Open	600,000	21,249	578,751	-	578,751
204486	2020	2020	Parking Garage System	Open	455,000	-	455,000	-	455,000
204500	2020	2020	Environmental Assessments	Open	750,000	464	749,536	-	749,536
204530	2020	2020	Streetlighting	Open	1,070,000	5,699	1,064,301	731,405	332,896
204531	2020	2020	Streetlighting LED Retrofit	Open	3,500,000	2,881,550	618,450	185,204	433,246
204920	2020	2020	Stormwater & Environmental Monitoring	Open	450,000	46,930	403,070	140,570	262,500
204940	2020	2020	Storm Water Management - Restoration	Open	4,300,000	872,916	3,427,084	129,104	3,297,980
204941	2020	2020	Stormwater Asset Management	Open	750,000	-	750,000	-	750,000
204945	2020	2020	Storm Water Pond Retrofits	Open	200,000	-	200,000	-	200,000
204950	2020	2020	Storm Water Management Study	Open	400,000	-	400,000	-	400,000
205120	2020	2020	FCCC 1 & 2 Court Yard Infill	Open	300,000	5,392	294,608	-	294,608
205380	2020	2020	Site Servicing Design	Open	3,000,000	-	3,000,000	-	3,000,000
205500	2020	2020	Sports Hall of Fame	Open	420,000	-	420,000	-	420,000
205520	2020	2020	Centennial Community Centre Addition & Renovation	Open	200,000	3,052	196,948	-	196,948
205631	2020	2020	Memorial Arena - Junior A-B Expansion	Open	180,000	7,632	172,368	-	172,368
205651	2020	2020	Century Gardens - Youth Centre	Open	2,000,000	2,951	1,997,049	-	1,997,049

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205691	2020	2020	South Fletchers - Youth Centre	Open	60,000	6,054	53,946	-	53,946
205951	2020	2020	Chinguacousy Park-Bramalea Tennis Club Expansion	Open	240,000	2,340	237,660	-	237,660
207485	2020	2020	Environmental Master Plan Implementation	Open	200,000	-	200,000	-	200,000
			TOTAL PUBLIC WORKS & ENGINEERING		**1,230,407,695**	**696,247,226**	**534,160,469**	**85,466,110**	**448,694,359**
			PLANNING, BUILDING & ECONOMIC DEVELOPMENT						
097813	2009	2016	Large Format Mixed Use/Comm. Dev. Guidelines	Open	100,000	39,518	60,482	10,482	50,000
117175	2011	2011	Provincial Growth Plan Conformity	Open	21,540	7,547	13,993	-	13,993
117852	2011	2015	Queen St West DPS Implementation	Open	85,000	47,619	37,381	-	37,381
117860	2011	2011	Heritage Heights Community Study	Open	1,789,215	1,523,136	266,079	733,400	(467,321)
137030	2013	2013	Downtown Flood Risk Mitigation	Open	267,000	225,743	41,257	-	41,257
137420	2013	2014	Official Plan Review Studies	Open	701,000	624,396	76,604	76,604	-
137740	2013	2014	Building Permit On-Line	Open	1,105,000	444,857	660,143	-	660,143
137821	2013	2013	City Wide Urban Design	Open	30,000	26,192	3,808	3,422	386
137866	2013	2013	Heritage Studies	Open	30,000	27,044	2,956	1,897	1,059
151132	2015	2015	Hospital Area Economic Development Plan	Open	200,000	123,055	76,945	-	76,945
157201	2015	2015	Official Plan Review Studies - Zoning By-Law Review	Open	250,000	207,342	42,658	42,657	1
157420	2015	2017	Official Plan Review Studies - Official Plan Review	Open	1,000,000	826,438	173,562	142,515	31,047
167250	2016	2016	Age Friendly City Master Plan	Open	75,000	64,876	10,124	108	10,016
167360	2016	2016	Transportation Master Plan - TMP	Open	250,000	221,037	28,963	19,057	9,906
167823	2016	2017	Downtown Mobility Hub Master Plan	Open	200,000	142,308	57,692	-	57,692
167827	2016	2016	Community Improvement Plan Program	Open	300,000	199,985	100,015	-	100,015

CAPITAL PROJECT STATUS REPORT - OPEN PROJECTS
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
167834	2016	2016	Development Design Guidelines-High Rise Guidelines	Open	100,000	69,986	30,014	27,348	2,666
167867	2016	2016	Cultural Heritage Plan	Open	250,000	53,933	196,067	-	196,067
177050	2017	2017	Comprehensive Fees Review	Open	200,000	-	200,000	-	200,000
177499	2017	2017	Minor Capital - Building	Open	12,000	5,023	6,977	-	6,977
177824	2017	2017	Gateway Precinct - Mobility Hub Master Plan	Open	150,000	-	150,000	-	150,000
177827	2017	2017	Community Development Plan Program	Open	300,000	5,745	294,255	-	294,255
181256	2018	2018	Branding-Marketing-FDI Strategy	Open	1,875,000	997,902	877,098	-	877,098
187001	2018	2018	Planning Vision Implementation	Open	300,000	191,605	108,395	-	108,395
187002	2018	2018	Strategic Planning Studies	Open	2,000,000	674,701	1,325,299	28,279	1,297,020
187202	2018	2018	Queen Corridor-Policy-Zoning	Open	120,000	-	120,000	-	120,000
187356	2018	2018	Active Transportation Plan - Cycling	Open	1,875,000	337,794	1,537,206	43,569	1,493,637
187360	2018	2018	Transportation Master Plan-TMP	Open	500,000	165,067	334,933	85,344	249,589
187375	2018	2018	Commuter Cycling Program	Open	1,780,604	-	1,780,604	-	1,780,604
187499	2018	2018	Minor Capital Building	Open	12,000	-	12,000	-	12,000
187828	2018	2018	Urban Centres Implementation	Open	200,000	79,225	120,775	-	120,775
187951	2018	2018	Bramalea Mobility Hub MP	Open	150,000	-	150,000	-	150,000
187992	2018	2018	Bram East Emplymnt Land Review	Open	75,000	10,805	64,195	26,337	37,858
191206	2019	2020	Cybersecure Catalyst	Open	2,300,000	1,788,962	511,038	-	511,038
197001	2019	2019	Planning Vision Implementation	Open	500,000	50,738	449,262	-	449,262
197003	2019	2020	Policy Planning Studies	Open	666,000	10,380	655,620	10,664	644,956
197051	2019	2019	Costing Model Review for Administration of the Bldg Code	Open	75,000	24,677	50,323	50,323	-

CAPITAL PROJECT STATUS REPORT - OPEN PROJECTS
AS AT DECEMBER 31, 2020

Project #	Budget Year	Budget Amend. Year	Project Description	Status	Budget	Project To Date Spending	Budget Remaining Before Commitments	Purchase Orders	Budget Remaining After Commitments
197360	2019	2019	Transportation Master Plan - TMP	Open	200,000	-	200,000	-	200,000
197400	2019	2019	Official Plan Review	Open	500,000	241,811	258,189	249,031	9,158
197827	2019	2019	Community Improvement Plan Program	Open	300,000	-	300,000	-	300,000
201256	2020	2020	FDI Stratgy	Open	300,000	-	300,000	-	300,000
207001	2020	2020	Planning Vision Implementation	Open	180,000	-	180,000	-	180,000
207003	2020	2020	Policy Planning Studies	Open	100,000	-	100,000	-	100,000
207357	2020	2020	Transportation Modelling & Data Analytics	Open	25,000	-	25,000	-	25,000
207360	2020	2020	Transportation Master Plan - TMP	Open	150,000	-	150,000	-	150,000
207400	2020	2020	Official Plan Review	Open	300,000	-	300,000	-	300,000
207829	2020	2020	Algoma University Expansion	Open	2,500,000	2,430,000	70,000	-	70,000
207840	2020	2020	Urban Design Standards Manual	Open	250,000	-	250,000	-	250,000
207841	2020	2020	Urban Design Integrated Community Master Plan	Open	150,000	38,451	111,549	100,743	10,806
207858	2020	2020	Queen St. Development Permit Implementation	Open	500,000	-	500,000	356,669	143,331
207860	2020	2020	Heritage Heights Studies	Open	500,000	60,201	439,799	439,798	1
207921	2020	2020	Comprehensive Municipal Parking Strategy	Open	300,000	-	300,000	-	300,000
			TOTAL PLANNING, BUILDING & ECONOMIC DEVELOPMENT		**26,099,359**	**11,988,099**	**14,111,260**	**2,448,247**	**11,663,013**
			LIBRARY						
136961	2013	2013	Springdale Library & Neighbourhood Park	Open	20,250,000	19,746,184	503,816	400,966	102,850
			TOTAL LIBRARY		**20,250,000**	**19,746,184**	**503,816**	**400,966**	**102,850**
					2,010,904,862	**1,259,212,122**	**751,692,740**	**109,831,373**	**641,861,367**

BUDGET AMENDMENTS AND REALLOCATIONS

Budget amendments related to Capital Projects are required in order to reconcile overall funding for the projects as following:

1. Create separate Capital Project by transferring funding ($21,900,000 – Federal Grant and $8,100,000 – External Tax Supported Debt) from existing Capital Project #185160.010 – Downtown Transit Hub; **no net impact on budget**; change is to reflect the fact that this initiative is not related to Community Investment Fund (CIF) program
2. Create following Preventative Maintenance projects:
    i. 213995 - Asset Management & Capital Planning ($820,000 funding to be allocated from existing projects 213998 – Roads Operations Preventative Maintenance and 215998 – Parks Preventative Maintenance)
    ii. 213996 – Fleet ($12,000 funding to be allocated from existing projects 213998 – Roads Operations Preventative Maintenance and 215998 – Parks Preventative Maintenance)
    iii. 213997 - Traffic ($1,918,000 funding to be allocated from existing projects 213998 – Roads Operations Preventative Maintenance and 215998 – Parks Preventative Maintenance)
    iv. 215996 – Recreation ($979,000 funding to be allocated from existing projects 213998 – Roads Operations Preventative Maintenance and 215998 – Parks Preventative Maintenance)
    v. 215997 - Performing Arts ($138,000 funding to be allocated from existing projects 213998 – Roads Operations Preventative Maintenance and 215998 – Parks Preventative Maintenance)

    no net impact on budget
3. Transfer remaining funding ($48,962.10) from Capital Project 206810.002 – Outdoor FF&E Churn to Capital Project 206835.001 – Rose Theatre Signing; **no net impact on budget**
4. Transfer funding ($846,092 – General Rate Stabilization Reserve) from Capital Project 187735.001 – Riverwalk to Capital Project 217735.001- Riverwalk; transfer is requested to reallocate funds from older projects to bring the design phase budget into a single project for reporting purposes; **no net impact on budget**
5. Transfer funding ($153,908 – Reserve #4) from Capital Project 197735.001 – Riverwalk to Capital Project 217735.001 – Riverwalk; transfer is requested to reallocate funds from older projects to bring the design phase budget into a single project for reporting purposes; **no net impact on budget**

6. Transfer funding sources within Capital Project 217735.001- Riverwalk; Amendment is required to swap funding from General Rate Stabilization Reserve ($846,092) and Reserve #4 ($153,908) to Stormwater Reserve #46 ($1,000,000) to bring City's contribution to design phase of the project from the same funding source; **no net impact on budget**
7. Transfer funding ($200,000) from Capital Project 201585.002 - Demolition of Heritage Theatre & Block to Capital Project 211760.09 - New downtown transitional properties – Audits, Assessments & Repairs; transfer is requested as council directed staff to reallocate demolition funds to be used to facilitate appropriate tenant reoccupation of other vacant City owned buildings within the Four Corners including costs related to building condition reports, minor repairs, and partnership arrangements with the private sector; **no net impact on budget**
8. Transfer funding ($1,031,000 - Gas Tax - Res #91) within Capital Project 201650.145 - Project Pool Change Rooms Renovation - Earnscliffe Recreation Centre to Cost Recovery - Federal ($746,496), Cost Recovery - Provincial ($186,624) and Res #4 ($97,880) to establish budgets for funding to be received and provide funding required for City contribution as per the agreement with Investing in Canada Infrastructure Program (ICIP); **net impact is the receipt of $0.9 million in grant funding**
9. Transfer funding ($1,634,000 -Gas Tax - Res #91) within Capital Project 191650.703 - Roof Replacement at 185 Clark Transit Facility to Cost Recovery - Federal ($1,040,052), Cost Recovery - Provincial ($260,013) and Res #4 ($333,935) to establish budgets for funding to be received and provide funding required for City contribution as per the agreement with Investing in Canada Infrastructure Program (ICIP); **net impact is the receipt of $1.3 million in grant funding**
10. Transfer funding ($1,296,000 – Reserve #91) within Capital Project 204230.008 – Bridge Repairs - Creditview Road over Credit River to Reserve #4. Transfer is requested because Government Relations has advised that funding announcement for this project under ICIP COVID stream is expected in the coming weeks. Therefore, amendment required to swap approved gas tax funding within the project with tax funding (Res #4) and as Transfer Payment Agreements for grants from upper level government limit the use of gas tax funding; **no net impact on budget**
11. Capital Project 205691.003 – South Fletchers – Youth Centre: increase budget by $1,102,500 from Cost Recovery - Federal ($565,000), Cost Recovery - Provincial ($470,786) and Cost Recovery-Region ($66,714) to establish budgets for funding to be received and provide for funding required for City contribution as per the agreement with Investing in Canada Infrastructure Program (ICIP); **net impact is the receipt of $1.04 million in grant funding**
12. Capital Project 201650.146 – Washroom Renovation - Civic Centre increase budget by $199,000 (Cost Recovery - Region) to renovate the washroom as per

the tenants request and required for additional work, which is being funded 100% by MNS/Region of Peel; **no funding is required from City of Brampton.**

Report
Staff Report
Committee of Council
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-15

Subject: **Investment Report for the year ended December 31, 2020**

Contact: Mark Medeiros, Treasurer (Acting)
mark.medeiros@brampton.ca 905-874-2520

Report Number: Corporate Support Services-2021-260

Recommendations:

That the report titled: **Investment Report for the year ended December 31, 2020,** to the Committee of Council meeting of April 14, 2021 be received.

Overview:

- **This report provides information on the City's earnings on the investment portfolio for the year ended December 31, 2020. The investment portfolio holds operating funds as well as reserves and reserve funds.**
- **The total investment portfolio had net investment income of $26.7 million on an average monthly balance of $1,159.1 million and yielded a return of 2.3%.**
- **City's investment portfolio is comprised of cash, short-term fixed income securities and long-term bonds and equity investment through One Investment.**
- **In compliance with Provincial Regulation 438/97, all investments to December 31, 2020 were made in accordance with the City's Investment Policy.**
- **The City's current Investment Policy (Fin-200), was last revised and approved by Council on June 24, 2020. Staff are not recommending any changes to the Investment Policy.**

Background:

In accordance with the requirements of Ontario Regulation 438/97 of the *Municipal Act, 2001* and Council approved Investment Policy, this report presents the results of the investment activities, interest earnings and investment yield for the year ended December 31, 2020.

Consideration is given to the following objectives that are set out in the Investment Policy:

- Adherence to legislative and regulatory requirements on eligible investments;
- Preservation of the City's capital funds while maximizing investment returns;
- Minimize the City's investment risk; and,
- Maintain liquidity of the City's funds.

Sources of Investment Portfolio

Sources of investment portfolio funds managed by staff include operating funds for cash management purposes as well as reserves and reserve funds.

Reserve Funds

Reserve funds have been established by the City to address Growth-related infrastructure expansion (funded by Development Charges paid by developers), replacement of City Infrastructure and funding of other special projects as directed and approved by Council. About 70% of the funds are typically available for investment over longer periods and are comprised mainly of Government Bonds, Bank Bonds and similar securities permitted by the *Municipal Act, 2001*, *Ontario Regulation 438/97* with maturities extending beyond one year.

Operating Funds

The City retains necessary funds on hand to provide for any unanticipated operating budget shortfalls as well as to provide bridge financing between the time when expenditures, such as staff payroll and construction contractor payments, are required and the time when major cash inflows, such as tax, user fees and any grants are received. These funds are typically available for investment over short periods and are comprised mainly of cash holdings (i.e. bank accounts), GICs and eligible bond securities.

Investment environment

2020 has been an extraordinary year with the spread of Covid-19 and subsequent business and job loss. Since March 2020, the Bank of Canada has cut interest rate three times, each time by 50 basis points moving from 1.75% to 0.25%. As we entered into 2021, the vaccine rollout for COVID-19 presents significant promise in terms of economic rebound, though the yield curve remains very low.

Current Situation:

Fund Balances

The year-over-year details of the book value and monthly average book value of the total portfolio funds are shown below:

Year-end Book Value ($millions)	**31-Dec-19**	**31-Dec-20**	**Change**
Reserves & Reserve Funds Portfolio	$941.4	$1,038.0	$96.5
Operating Fund Portfolio	$159.4	$41.9	($117.4)
Total Portfolio Funds (Book Value)	**$1,100.8**	**$1,079.9**	**($20.9)**

Monthly Average Book Value ($millions)	**31-Dec-19**	**31-Dec-20**	**Change**
Reserves & Reserve Funds Portfolio	$855.4	$982.4	$127.0
Operating Fund Portfolio	$258.9	$173.3	($85.6)
Total Portfolio Funds (Monthly Average)	**$1,114.2**	**$1,155.7**	**$41.4**

In terms of year-end book value, the overall balance as of December 31, 2020 was $1,079.9 million, a decrease of $20.9 million from 2019. This decrease in overall balance is a result of the lower property tax collection than forecasted. The year over year average balance increase is mostly contributed by the reduced cash out-flow on capital projects.

By end of 2020, City had 31% of the investments in Cash & GICs, 67% in Bonds and 2% in Equity. The following tables show the break-down of the total investment portfolio in terms of shorter-term and longer-term assets:

Year-end Book Value ($millions)	**31-Dec-19**	**31-Dec-20**	**Change**
Cash and GICs	$366.9	$332.0	($34.9)
Bond portfolio	$727.7	$725.9	($1.9)
Equity Portfolio	$6.2	$22.1	$15.9
Total Portfolio Funds (Book Value)	**$1,100.8**	**$1,079.9**	**($20.9)**

Average Book Value ($millions)	**31-Dec-19**	**31-Dec-20**	**Change**
Cash and GICs	$425.2	$438.9	$13.7
Bond portfolio	$685.2	$700.7	$15.5
Equity Portfolio	$3.8	$16.1	$12.3
Total Portfolio Funds (Monthly Average)	**$1,114.2**	**$1,155.7**	**$41.4**

In 2020, the City increased the allocation to longer-term investments to improve the overall earnings while ensuring a prudent amount of liquidity was maintained to meet the cash flow requirements for operating and capital needs. During the year, the City has also increased the investment in equity when the market was very low. In addition, City has continued participation in the equity portfolio managed by ONE Investment. This initiative is part of an

investment strategy to diversify the overall portfolio and to improve the overall yield over the longer term.

Funds' Performance

In 2020, the total investment portfolio had net investment income of $26.7 million on an average monthly balance of $1,155.7 million which equates to an average yield of 2.3%. The yield is 20 basis points lower than that of 2019, mainly due to the 0.75 basis point interest rate cut by the Bank of Canada.

The following tables show the break-down of the overall realized income for 2019 and 2020.

	Investment income ($m)*		**Annualized return****	
Funds	**2019**	**2020**	**2019**	**2020**
Reserves & Reserve Funds	$21.3	$22.7	2.5%	2.3%
Operating Fund	$6.4	$4.0	2.5%	2.3%
Total investment income	**$27.7**	**$26.7**	**2.5%**	**2.3%**

* Investment earnings include earned interest income and realized capital gain
** Earned income divided by the monthly average portfolio balance at book value

	Investment income ($m) *		**Annualized return****	
Portfolio	**2019**	**2020**	**2019**	**2020**
Cash and GICs	$10.4	$6.0	2.4%	1.4%
Bond Portfolio	$17.3	$20.0	2.5%	2.9%
Equity Portfolio	$0.0	$0.7	0.0%	4.1%
Total investment income	**$27.7**	**$26.7**	**2.5%**	**2.3%**

* Investment earnings include earned interest income and realized capital gain
** Earned income divided by the monthly average portfolio balance at book value

Benchmarking

For the bond portfolio, on a market value basis, the 2020 return was 9.48% (2.85% realized yield plus 6.63 unrealized yield), outperforming the fund's benchmark index return of 6.87% by 2.61%. The benchmark was outperformed due to active readjustment of the portfolio holdings to a longer duration than the benchmark. Holding in longer duration worked very well due to a declining interest rate environment.

A breakdown of operating and reserve bond portfolio performance is included in Appendix A. List of all holdings in the operating and reserve fund portfolio are shown in Appendix B.

Investment Income Allocation

The City's total investment income gets allocated to the operating budget and reserve funds according to the Council approved policy. Realized income from all operating funds, Legacy Fund and Community Investment Fund are allocated to the operating budget. The realized income from all other reserves funds are allocated proportionately to each reserve fund.

Investment Policy

The purpose of the City of Brampton's Investment Policy is to provide investment guidelines which will direct the investment of the City's funds not immediately required, with the goal of preserving capital, minimizing investment risk, maintaining liquidity, maximizing investment yields, and ensuring compliance with City's Policy Statement and The *Municipal Act 2001*, Eligible Investments, Regulation 438/97 *(amended to O. Reg 373/11).*

The City's current Investment Policy (Fin-200), was last revised and approved by Council on June 24, 2020. Finance undertook a comprehensive analysis of municipal investment policies and practices, and consulted with Corporate Policy to ensure a consistent, transparent approach was undertaken. Staff is not recommending any changes to the current Investment Policy.

Corporate Implications:

None

<u>Financial Implications:</u>

In 2020, total investment income in the amount of $ 7.7 million was contributed to the operating budget and $19.0 million contributed to Reserve Funds.

Term of Council Priorities:

This report fulfils the Council Priority of a Well-Run City through strict adherence to effective financial management policies and ensuring sustainable financial operations.

Conclusion:

In accordance with the requirements of Regulation 438/97 of the *Municipal Act, 2001* and Council approved Investment Policy, this report presents the results of the investment activities, interest earnings and investment yield for the year ended December 31, 2019.

As per Provincial Regulation 438/97, all investments, to December 31, 2019, were made in accordance with the City's Investment Policy.

Authored by:

Majbah Ahmed, Manager, Banking and Investments

Reviewed by:

Mark Medeiros, Interim Treasurer

Approved by:

Michael Davidson, Commissioner, Corporate Support Services

Submitted by:

David Barrick, Chief Administrative Officer

Attachments:

Appendix A: Market Benchmarking for the Bond Portfolio
Appendix B: List of Securities in Operating and Reserve Bond Portfolio

Appendix A: Market Benchmarking for the Bond Portfolio

City of Brampton: Performance Summary

December 31, 2020

Operating Fund	*Investment Performance*			Rolling Yearly Returns			Annual		
Assets	**1 Month**	**Quarter**	**YTD**	**1 Yr**	**2 Yr**	**4 Yr**	**2019**	**2018**	**2017**
Benchmark*	0.29%	0.36%	6.87%	6.87%	5.38%	3.25%	3.91%	1.95%	0.38%
Operating Fund Portfolio	0.53%	0.75%	9.14%	9.14%	6.69%	4.00%	4.30%	1.81%	0.86%
Value Added	**0.24%**	**0.39%**	**2.27%**	**2.27%**	**1.31%**	**0.75%**	**0.39%**	-0.15%	**0.48%**

* Benchmark: 65% FTSE TMX Short Composite; 32.5% All Gov't Mid Term; 2.5% All Gov't Long Term

Reserve Fund	*Investment Performance*			Rolling Yearly Returns			Annual		
Assets	**1 Month**	**Quarter**	**YTD**	**1 Yr**	**2 Yr**	**4 Yr**	**2019**	**2018**	**2017**
Benchmark*	0.29%	0.36%	6.87%	6.87%	5.38%	3.25%	3.91%	1.95%	0.38%
Reserve Fund Portfolio	0.54%	0.83%	9.54%	9.54%	7.30%	4.37%	5.11%	2.06%	0.97%
Value Added	**0.24%**	**0.46%**	**2.67%**	**2.67%**	**1.92%**	**1.12%**	**1.20%**	**0.11%**	**0.60%**

* Benchmark: 65% FTSE TMX Short Composite; 32.5% All Gov't Mid Term; 2.5% All Gov't Long Term

Total Investment Portfolio	*Investment Performance*			
Assets	**2020**	**2019**	**2018**	**2017**
Benchmark*	6.87%	3.91%	1.95%	0.38%
TOTAL Investment Portfolio	9.48%	4.98%	2.03%	0.96%
Value Added	**2.61%**	**1.07%**	**0.08%**	**0.58%**

* Benchmark: 65% FTSE TMX Short Composite; 32.5% All Gov't Mid Term; 2.5% All Gov't Long Term

Appendix B

City of Brampton

Reserve Fund Bond Portfolio

As of December 31, 2020 (in Canadian dollars)

Issuer	Value at Maturity	Book Value	Yield to Maturity	Maturity Date	Sector	Ratings
CANADA HOUSING TRUST NO.1	5,475,000.00	5,566,396.95	2.39%	2024/06/15	Federal / Agency	AAA
CANADA HOUSING TRUST NO 1	5,165,000.00	5,007,921.82	2.48%	2026/09/15	Federal / Agency	AAA
CANADA HOUSING TRUST NO.1	3,000,000.00	2,995,105.04	2.37%	2028/03/15	Federal / Agency	AAA
CANADA HOUSING TRUST NO.1	3,000,000.00	2,991,057.57	2.70%	2028/03/15	Federal / Agency	AAA
CANADA HOUSING TRUST NO.1	6,000,000.00	6,100,383.96	2.42%	2028/12/15	Federal / Agency	AAA
CANADA HOUSING TRUST NO 1	8,500,000.00	9,036,827.67	1.05%	2030/06/15	Federal / Agency	AAA
CANADA HOUSING TRUST NO 1	5,000,000.00	4,991,380.98	1.12%	2031/03/15	Federal / Agency	AAA
CPPIB CAPITAL INC	12,325,000.00	12,903,566.61	2.31%	2028/06/15	Federal / Agency	AAA
PSP CAPITAL INC	3,250,000.00	3,219,463.33	2.43%	2023/11/22	Federal / Agency	AAA
PROV OF ALBERTA	526,900.00	405,997.22	2.52%	2031/06/01	Provincial	AA(low)
PROV OF ALBERTA	518,178.00	393,037.56	2.55%	2031/12/01	Provincial	AA(low)
PROV OF ALBERTA	517,500.00	386,272.48	2.58%	2032/06/01	Provincial	AA(low)
PROV OF ALBERTA	517,500.00	380,905.22	2.59%	2032/12/01	Provincial	AA(low)
PROV OF ALBERTA	517,500.00	374,199.46	2.63%	2033/06/01	Provincial	AA(low)
PROV OF ALBERTA	6,000,000.00	6,953,586.88	2.46%	2033/12/01	Provincial	AA(low)
PROV OF BRITISH COLUMBIA	5,500,000.00	5,454,020.22	2.69%	2027/06/18	Provincial	AA(high)
PROV OF BRITISH COLUMBIA	5,000,000.00	5,372,663.51	1.36%	2030/06/18	Provincial	AA(high)
PROV OF MANITOBA	3,080,074.00	2,591,077.37	3.08%	2026/09/05	Provincial	A(high)
PROV OF MANITOBA	2,290,000.00	2,851,059.30	2.47%	2029/12/03	Provincial	A(high)
PROV OF MANITOBA	671,000.00	495,057.60	3.35%	2030/03/05	Provincial	A(high)
PROV OF MANITOBA	3,800,000.00	2,751,276.81	3.21%	2031/03/05	Provincial	A(high)
PROV OF MANITOBA	1,500,000.00	1,078,273.33	2.85%	2032/09/05	Provincial	A(high)
PROV OF MANITOBA	2,150,000.00	2,557,520.09	2.90%	2039/03/05	Provincial	A(high)
PROV OF NEW BRUNSWICK	2,300,000.00	2,372,263.04	2.67%	2024/06/03	Provincial	A(high)
PROV OF NEW BRUNSWICK	1,250,000.00	1,273,911.38	2.23%	2026/08/14	Provincial	A(high)
PROV OF NEW BRUNSWICK	4,000,000.00	3,999,221.43	2.35%	2027/08/14	Provincial	A(high)
PROV OF NEW BRUNSWICK	3,300,000.00	2,465,814.43	3.30%	2029/12/03	Provincial	A(high)
PROV OF NEW BRUNSWICK	2,000,000.00	1,442,374.41	3.33%	2030/12/03	Provincial	A(high)
NEWFOUNDLAND & LABRADOR HYDRC	2,184,000.00	2,760,599.95	2.82%	2026/02/27	Provincial	A(low)
NEWFOUNDLAND & LABRADOR HYDRC	2,490,000.00	1,734,265.12	3.43%	2031/08/27	Provincial	A(low)
PROV OF NEWFOUNDLAND	730,000.00	645,252.43	3.05%	2025/02/05	Provincial	A(low)
PROV OF NEWFOUNDLAND	768,000.00	649,481.11	3.21%	2026/04/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	1,100,000.00	883,576.43	3.26%	2027/10/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	1,200,000.00	947,090.35	3.28%	2028/04/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	482,000.00	377,573.56	3.39%	2028/04/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	1,700,000.00	1,251,498.56	3.33%	2030/04/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	842,500.00	590,823.91	3.49%	2031/04/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	3,498,000.00	2,422,286.57	3.44%	2031/10/17	Provincial	A(low)
PROV OF NEWFOUNDLAND	2,300,000.00	1,548,190.12	3.39%	2032/10/17	Provincial	A(low)
PROV OF NOVA SCOTIA	3,000,000.00	3,120,139.98	1.55%	2030/09/01	Provincial	A(high)
PROV OF NOVA SCOTIA	1,175,000.00	850,103.12	3.30%	2030/12/01	Provincial	A(high)
OMERS FINANCE TRUST	5,000,000.00	4,991,191.12	1.58%	2027/04/21	Provincial	AAA
OMERS FINANCE TRUST	8,100,000.00	8,346,390.60	2.20%	2029/05/14	Provincial	AAA
PROV OF ONTARIO	3,775,000.00	4,359,975.18	2.27%	2024/02/07	Provincial	AA(low)
PROV OF ONTARIO	4,000,000.00	3,709,548.20	2.46%	2024/02/07	Provincial	AA(low)
PROV OF ONTARIO	3,100,000.00	3,095,477.04	2.69%	2025/02/05	Provincial	AA(low)
PROV OF ONTARIO	2,850,000.00	2,433,281.69	2.95%	2026/06/02	Provincial	AA(low)
PROV OF ONTARIO	8,800,000.00	7,507,751.74	2.71%	2026/12/02	Provincial	AA(low)
PROV OF ONTARIO	10,000,000.00	9,978,572.51	2.93%	2028/06/02	Provincial	AA(low)
PROV OF ONTARIO	925,000.00	717,213.90	3.28%	2028/11/03	Provincial	AA(low)
PROV OF ONTARIO	2,400,000.00	1,845,358.67	3.31%	2029/01/10	Provincial	AA(low)
PROV OF ONTARIO	1,000,000.00	736,729.09	3.31%	2030/05/03	Provincial	AA(low)
PROV OF ONTARIO	8,000,000.00	7,898,982.93	1.49%	2030/12/02	Provincial	AA(low)
PROV OF ONTARIO	3,902,000.00	2,991,505.36	2.59%	2031/05/03	Provincial	AA(low)
ONTARIO HYDRO	6,000,000.00	4,361,923.92	2.98%	2031/10/17	Provincial	AA(low)
PROV OF ONTARIO	1,000,000.00	686,926.15	3.35%	2032/05/03	Provincial	AA(low)
PROV OF ONTARIO	2,420,442.00	1,663,531.61	2.90%	2034/01/10	Provincial	AA(low)
PROV OF PRINCE EDWARD ISLAND	6,500,000.00	5,295,589.30	3.15%	2027/07/29	Provincial	A
PROV OF PRINCE EDWARD ISLAND	2,100,000.00	2,479,009.76	3.05%	2027/07/29	Provincial	A
PROV OF PRINCE EDWARD ISLAND	397,500.00	290,161.44	3.39%	2030/05/19	Provincial	A
PROV OF PRINCE EDWARD ISLAND	397,500.00	275,598.06	3.40%	2031/11/19	Provincial	A

Issuer	Value at Maturity	Book Value	Yield to Maturity	Maturity Date	Sector	Ratings
PROV OF QUEBEC	1,990,000.00	1,763,729.75	2.89%	2025/03/21	Provincial	AA(low)
PROV OF QUEBEC	424,000.00	367,047.13	3.09%	2025/09/21	Provincial	AA(low)
PROV OF QUEBEC	3,800,000.00	2,890,017.14	2.83%	2030/10/01	Provincial	AA(low)
PROV OF QUEBEC	11,896,000.00	9,022,944.93	2.59%	2031/10/01	Provincial	AA(low)
PROV OF SASKATCHEWAN	2,000,000.00	2,061,757.10	2.25%	2024/06/03	Provincial	AA(low)
PROV OF SASKATCHEWAN	5,025,000.00	5,052,803.02	2.44%	2026/06/02	Provincial	AA(low)
PROV OF SASKATCHEWAN	6,000,000.00	6,372,334.23	1.49%	2030/06/02	Provincial	AA(low)
PROV OF SASKATCHEWAN	4,000,000.00	5,333,495.36	2.68%	2033/09/05	Provincial	AA(low)
MUNICIPAL FINANCE AUTH OF B C	2,000,000.00	1,969,575.92	2.81%	2026/04/19	Municipal	AAA
MUNICIPAL FINANCE AUTH OF BC	3,000,000.00	3,362,763.66	3.00%	2027/12/01	Municipal	AAA
MUNICIPAL FINANCE AUTH OF BC	2,950,000.00	3,274,797.54	1.55%	2028/10/23	Municipal	AAA
MUNICIPAL FINANCE AUTH BC	10,300,000.00	10,497,101.93	2.31%	2029/10/09	Municipal	AAA
HALTON ONT REGL MUNICIPALITY	1,486,000.00	1,486,000.00	1.80%	2030/06/23	Municipal	AAA
LAVAL QUEBEC	3,250,000.00	3,254,688.24	2.80%	2023/10/24	Municipal	AA
LAVAL QUEBEC	2,761,000.00	2,717,429.32	3.04%	2027/01/25	Municipal	AA
LAVAL QUEBEC	3,235,000.00	3,123,485.58	1.90%	2030/06/17	Municipal	AA
LONDON ONTARIO	2,527,000.00	2,525,442.64	2.86%	2027/03/07	Municipal	AAA
LONDON ONTARIO	4,358,000.00	4,348,314.77	2.73%	2028/04/02	Municipal	AAA
MONTREAL QUEBEC	3,000,000.00	3,056,447.52	2.87%	2028/09/01	Municipal	A(high)
MONTREAL QUEBEC	6,075,000.00	6,141,664.43	1.63%	2030/09/01	Municipal	A(high)
MONTREAL QUEBEC	3,000,000.00	3,712,354.06	2.00%	2032/12/01	Municipal	A(high)
MONTREAL QUEBEC	6,500,000.00	7,804,466.52	2.40%	2034/12/01	Municipal	A(high)
MONTREAL QUEBEC	5,000,000.00	5,291,324.75	2.70%	2036/12/01	Municipal	A(high)
MONTREAL QUEBEC	5,600,000.00	5,864,683.83	3.15%	2038/12/01	Municipal	A(high)
OTTAWA ONTARIO	4,000,000.00	4,065,659.59	2.93%	2039/05/10	Municipal	AA(high)
PEEL REGL MUNICIPALITY ONTARIO	1,000,000.00	999,451.25	2.62%	2023/09/28	Municipal	AAA
PEEL REGL MUNICIPALITY ONTARIO	3,500,000.00	3,499,630.71	2.75%	2024/09/28	Municipal	AAA
PEEL REGL MUNICIPALITY ONTARIO	2,000,000.00	1,995,998.46	2.34%	2026/11/02	Municipal	AAA
PEEL REGL MUNICIPALITY ONTARIO	9,000,000.00	10,771,821.74	2.46%	2033/12/02	Municipal	AAA
PEEL REGL MUNICIPALITY ONTARIO	5,000,000.00	5,827,634.37	2.83%	2042/10/30	Municipal	AAA
QUEBEC CITY QUEBEC	2,000,000.00	2,057,086.27	2.90%	2023/09/25	Municipal	AA
QUEBEC CITY QUEBEC	2,465,000.00	2,451,107.70	2.61%	2026/10/05	Municipal	AA
QUEBEC CITY QUEBEC	3,000,000.00	3,025,153.80	3.03%	2028/09/26	Municipal	AA
QUEBEC CITY QUEBEC	5,951,000.00	5,779,699.33	3.00%	2029/03/07	Municipal	AA
QUEBEC CITY QUEBEC	3,000,000.00	2,946,354.72	1.70%	2030/11/25	Municipal	AA
TORONTO ONTARIO	7,093,000.00	7,351,984.75	2.27%	2024/05/21	Municipal	AA
TORONTO ONTARIO	2,500,000.00	2,500,000.00	2.45%	2025/02/06	Municipal	AA
TORONTO ONTARIO	2,000,000.00	1,936,973.23	3.03%	2026/06/24	Municipal	AA
TORONTO ONTARIO	5,000,000.00	4,991,140.43	2.43%	2027/06/07	Municipal	AA
TORONTO ONTARIO	9,225,000.00	9,452,944.66	2.34%	2029/11/09	Municipal	AA
TORONTO ONTARIO	3,000,000.00	3,029,113.85	1.49%	2030/12/02	Municipal	AA
TORONTO ONTARIO	10,000,000.00	10,599,236.47	2.45%	2035/04/28	Municipal	AA
TORONTO ONTARIO	12,000,000.00	12,850,946.04	2.92%	2036/06/02	Municipal	AA
TORONTO ONTARIO	13,460,000.00	13,288,630.44	2.69%	2039/09/24	Municipal	AA
TORONTO ONTARIO	5,500,000.00	7,680,568.29	2.59%	2040/06/01	Municipal	AA
TORONTO ONTARIO	5,500,000.00	5,479,619.10	2.17%	2040/08/25	Municipal	AA
SOUTH COAST BC TRANSN AUTH	5,000,000.00	5,036,397.21	2.87%	2025/06/04	Municipal	AA
SOUTH COAST BC TRANSN AUTH	5,650,000.00	6,005,847.39	2.37%	2028/11/23	Municipal	AA
VANCOUVER BRITISH COLUMBIA	3,140,000.00	3,133,321.72	2.88%	2027/11/03	Municipal	AAA
VANCOUVER BRITISH COLUMBIA	3,535,000.00	3,719,873.80	2.35%	2028/09/21	Municipal	AAA
VANCOUVER BRITISH COLUMBIA	5,000,000.00	4,978,511.38	1.45%	2030/11/06	Municipal	AAA
WATERLOO ONT REGL MUNICIPALITY	2,200,000.00	2,351,745.38	2.88%	2025/11/30	Municipal	AAA
YORK ONTARIO REGL MUNICIPALITY	2,000,000.00	1,990,812.82	2.70%	2025/12/15	Municipal	AA(high)
YORK ONTARIO REGL MUNICIPALITY	4,500,000.00	4,524,840.17	1.64%	2030/05/27	Municipal	AA(high)
YORK ONTARIO REGL MUNICIPALITY	3,000,000.00	3,486,485.30	2.60%	2034/05/01	Municipal	AA(high)
BANK OF MONTREAL	11,800,000.00	11,902,423.71	2.56%	2024/03/06	Corporate	AA(low)
BANK OF MONTREAL	7,500,000.00	7,470,451.21	2.40%	2024/07/29	Corporate	AA(low)
BANK OF MONTREAL	6,150,000.00	6,101,704.59	2.93%	2024/09/11	Corporate	AA
BANK OF MONTREAL	2,000,000.00	1,999,986.01	2.37%	2025/02/03	Corporate	AA(low)
BANK OF MONTREAL	5,000,000.00	5,434,060.80	2.62%	2025/09/10	Corporate	AA
BANK OF MONTREAL	3,500,000.00	3,511,228.52	2.64%	2026/12/09	Corporate	AA
BANK OF NOVA SCOTIA	7,000,000.00	7,090,524.47	1.81%	2023/05/01	Corporate	AA(low)
BANK OF NOVA SCOTIA	5,875,000.00	5,782,501.13	2.77%	2024/06/28	Corporate	AA
BANK OF NOVA SCOTIA	10,000,000.00	10,006,800.04	2.47%	2024/09/23	Corporate	AA(low)
BANK OF NOVA SCOTIA	2,000,000.00	2,010,659.96	2.52%	2026/12/02	Corporate	AA
BANK OF NOVA SCOTIA	3,000,000.00	2,988,142.51	1.46%	2027/11/01	Corporate	AA(low)
BANK OF NOVA SCOTIA	2,075,000.00	2,069,328.58	3.14%	2028/02/02	Corporate	AA
FEDERATION DES CAISSES	7,000,000.00	6,987,674.52	2.47%	2024/10/04	Corporate	AA(low)

Issuer	Value at Maturity	Book Value	Yield to Maturity	Maturity Date	Sector	Ratings
CANADIAN IMPERIAL BK OF COMM	6,750,000.00	6,776,428.66	2.26%	2023/06/09	Corporate	AA(low)
CANADIAN IMPERIAL BK OF COMM	6,000,000.00	6,005,917.72	2.93%	2023/07/11	Corporate	AA
CANADIAN IMPERIAL BK OF COMM	10,725,000.00	10,946,634.81	2.58%	2024/01/15	Corporate	AA(low)
CANADIAN IMPERIAL BK OF COMM	11,400,000.00	11,401,744.21	2.35%	2024/08/28	Corporate	AA(low)
CANADIAN IMPERIAL BK OF COMM	6,500,000.00	6,681,423.38	2.69%	2025/05/26	Corporate	AA
ROYAL BANK OF CANADA	2,000,000.00	1,999,917.33	2.36%	2022/12/05	Corporate	AA(high)
ROYAL BANK OF CANADA	7,900,000.00	8,113,235.18	2.27%	2023/09/26	Corporate	AA
ROYAL BANK OF CANADA	4,800,000.00	4,888,147.58	1.69%	2023/12/05	Corporate	AA(high)
ROYAL BANK OF CANADA	7,500,000.00	7,470,045.43	2.47%	2024/07/02	Corporate	AA
ROYAL BANK OF CANADA	10,250,000.00	10,274,904.24	2.54%	2024/11/01	Corporate	AA
ROYAL BANK OF CANADA	5,000,000.00	5,000,000.00	1.94%	2025/05/01	Corporate	AA
ROYAL BANK OF CANADA	2,250,000.00	2,524,760.24	2.09%	2025/07/16	Corporate	AA(high)
TORONTO DOMINION BANK	3,900,000.00	3,929,794.91	2.60%	2024/03/08	Corporate	AA
TORONTO-DOMINION BANK	10,950,000.00	10,966,675.17	2.45%	2024/12/02	Corporate	AA
Total	**618,511,594.00**	**617,294,609.80**				

City of Brampton
Operating Fund Bond Portfolio
As of December 31, 2020 (in Canadian dollars)

Issuer	Value at Maturity	Book Value	Yield to Maturity	Maturity Date	Sector	Ratings
CPPIB CAPITAL INC	2,000,000.00	2,080,989.36	2.43%	2028/06/15	Federal / Agency	AAA
PROV OF ALBERTA	2,000,000.00	2,052,615.85	2.56%	2029/09/20	Provincial	AA(low)
PROV OF ALBERTA	4,000,000.00	3,915,118.42	2.30%	2030/06/01	Provincial	AA(low)
PROV OF MANITOBA	1,000,000.00	1,045,015.06	2.66%	2029/09/05	Provincial	A(high)
NEWFOUNDLAND & LABRADOR HYDRO	1,126,141.00	949,244.24	2.80%	2027/02/27	Provincial	A(low)
OMERS FINANCE TRUST	1,500,000.00	1,498,643.11	2.61%	2029/05/14	Provincial	AAA
PROV OF ONTARIO	2,550,000.00	2,151,559.63	2.51%	2027/11/03	Provincial	AA(low)
PROV OF PRINCE EDWARD ISLAND	3,000,000.00	2,532,029.07	2.60%	2027/07/29	Provincial	A
PROV OF SASKATCHEWAN	1,000,000.00	1,229,909.10	2.61%	2029/03/05	Provincial	AA(low)
LAVAL QUEBEC	765,000.00	738,629.51	1.90%	2030/06/17	Municipal	AA
LONDON ONTARIO	1,088,000.00	1,086,568.09	2.58%	2026/04/02	Municipal	AAA
MONTREAL QUEBEC	1,925,000.00	1,970,062.39	1.49%	2030/09/01	Municipal	A(high)
MONTREAL QUEBEC	3,500,000.00	3,576,981.41	2.50%	2025/09/01	Municipal	A(high)
MONTREAL QUEBEC	2,900,000.00	3,027,744.00	2.51%	2028/09/01	Municipal	A(high)
MONTREAL QUEBEC	4,050,000.00	4,011,146.63	2.42%	2029/09/01	Municipal	A(high)
MUNICIPAL FINANCE AUTH OF B C	2,000,000.00	1,997,672.61	2.52%	2026/04/19	Municipal	AAA
NIAGARA ONT REGL MUNICIPALITY	3,000,000.00	2,991,702.91	2.44%	2029/07/24	Municipal	AA
QUEBEC CITY QUEBEC	3,826,000.00	3,815,504.40	2.95%	2022/11/28	Municipal	AA
QUEBEC CITY QUEBEC	2,690,000.00	2,845,900.07	2.39%	2028/11/28	Municipal	AA
QUEBEC CITY QUEBEC	3,000,000.00	2,952,999.21	2.40%	2029/09/26	Municipal	AA
SOUTH COAST BC TRANSN AUTH	2,200,000.00	2,345,475.95	2.33%	2028/11/23	Municipal	AA
TORONTO ONTARIO	4,600,000.00	4,602,949.05	2.43%	2025/02/06	Municipal	AA
TORONTO ONTARIO	3,150,000.00	3,111,737.02	2.61%	2027/06/07	Municipal	AA
TORONTO ONTARIO	2,000,000.00	1,994,040.87	2.69%	2029/11/09	Municipal	AA
BANK OF MONTREAL	5,400,000.00	5,436,674.03	2.62%	2024/03/06	Corporate	AA(low)
BANK OF MONTREAL	1,500,000.00	1,631,926.92	2.60%	2025/09/10	Corporate	AA
BANK OF NOVA SCOTIA	6,500,000.00	6,418,804.20	2.67%	2024/06/28	Corporate	AA
BANK OF NOVA SCOTIA	3,750,000.00	3,749,846.49	2.49%	2024/09/23	Corporate	AA(low)
BANK OF NOVA SCOTIA	2,000,000.00	2,006,364.91	2.56%	2026/12/02	Corporate	AA
CANADIAN IMPERIAL BK OF COMM	2,000,000.00	1,981,034.58	2.98%	2022/12/05	Corporate	AA
CANADIAN IMPERIAL BK OF COMM	8,250,000.00	8,418,674.98	2.58%	2024/01/15	Corporate	AA(low)
ROYAL BANK OF CANADA	5,500,000.00	5,492,988.98	2.39%	2024/07/02	Corporate	AA
ROYAL BANK OF CANADA	2,800,000.00	2,800,000.00	2.33%	2027/01/28	Corporate	AA
TORONTO DOMINION BANK	3,900,000.00	3,933,188.37	2.57%	2024/03/08	Corporate	AA
TORONTO-DOMINION BANK	4,250,000.00	4,266,180.31	2.39%	2024/12/02	Corporate	AA
Total	**104,720,141.00**	**104,659,921.73**				

City of Brampton
Operating Portfolio : HISA and Chequing Account Balance
As of December 31, 2020 (in Canadian dollars)

High Interest Savings Account (HISA) and Chequing Account		
Banks	**Balance**	**Type**
Royal Bank of Canada*	(108,979,833.30)	Current Account
Bank of Nova Scotia	45,477,176.02	HISA
Total	**(63,502,657.28)**	

* Negative balance is offset by the positive balance in the Reserve Portfolio chequing account

City of Brampton
Reserve Portfolio : GICs, HISA and Chequing Account Balance
As of December 31, 2020 (in Canadian dollars)

Term deposits (GIC)			
Issuer	**Face Value**	**Rate**	**Maturity**
Bank of Montreal	10,000,000.00	2.44%	13-Jan-21
Bank of Montreal	10,000,000.00	2.01%	31-Mar-21
Bank of Montreal	10,000,000.00	1.78%	12-May-21
Canadian Imperial Bank of Commerce	10,000,000.00	1.36%	03-Jun-21
Total	**40,000,000.00**		

High Interest Savings Account (HISA) and Chequing Account		
Banks	**Balance**	**Type**
Royal Bank of Canada	136,250,855.04	Current Account
Royal Bank of Canada	9,689.31	HISA
Bank of Nova Scotia	112,884,248.90	HISA
ONE Investment	106,411,438.75	HISA
Total	**355,556,232.00**	

City of Brampton
Reserve Portfolio : Equity
As of December 31, 2019 (in Canadian dollars)

	Market value	**Book value**
ONE Canadian Equity Portfolio	**25,470,173.21**	**22,046,687.55**

For details about ONE performance - www.oneinvestment.ca

Report
Staff Report
Committee of Council
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-10

Subject: **2020 Year End Operating Budget and Reserve Report**

Contact: Mark Medeiros, Treasurer (Acting)
mark.medeiros@brampton.ca 905-874-2520

Report Number: Corporate Support Services-2021-404

Recommendations:

1. That the report titled "**2020 Year End Operating Budget and Reserve Report**" to Committee of Council of April 14, 2021 be received;

2. That the 2020 year-end deficit of $52,278,441 be offset with funding contributed from the Federal-Provincial Safe Restart Agreement;

   $22,650,403 funded from Phase 1 of the Ministry of Transportation (MTO) 'transit stream' for Transit specific operating deficits and

   $29,628,038 from Phase 1 and Phase 2 of the Ministry of Municipal Housing (MMAH) 'municipal operating stream' to offset losses for all other COVID-19 operational deficits in 2020.

3. That the remaining funding of $10.1 million received to date under Phase 1 of the transit stream and Phase 2 of the municipal operating stream of the Federal-Provincial Safe Restart Agreement be placed in City reserves to be used for 2021 COVID-19 specific operating pressures.

Overview:

<u>2021 Operating Budget</u>

- **The 2020 Operating Budget resulted in a net year-end deficit of $52.3 million or 6.9% of total budgeted expenditures of $753.5 million.**

- **The deficit is primarily due to the impacts of COVID-19, with revenue losses of $92.3 million and additional COVID-19 emergency measure**

costs of $13.5 million, which are partially offset by $53.6 million in operational savings and mitigating measures.

- **To date the City has received a total of $62.4 million under Phase 1 and Phase 2 of the Safe Restart Agreement. Of the amount received, $54.2 million was eligible to be used for operational pressures and losses in 2020 and was thereby used to offset the City's deficit of $52.3 million; $29.6 million through the municipal operating stream and $22.7 million through the transit stream. The remaining $10.1 million has been placed in City reserves for utilization towards 2021 pandemic-related operating needs.**

- **In a letter dated March 4, 2021 from the Ministry of Municipal Affairs and Housing (MMAH), the City was advised that it will receive $14.7 million under the new 2021 COVID-19 Recovery Funding for Municipalities (CRFM) program.**

- **In a letter dated March 3, 2021 from the Ministry of Transportation (MTO) the City was advised of its eligibility to receive additional funding under the Safe Restart Agreement transit stream; $30.1 million under Phase 2 and $23.5 million under Phase 3.**

- **To date the total eligible funding to offset 2021 operational losses and pressures as a result of COVID-19 is $79.0 million, approximately $23.4 million for municipal pressures and $55.5 million for transit specific pressures.**

- **Considering the funding committed to date, the City is well situated to offset 2021 Transit Operational losses as a results of the pandemic through Phase 2 and 3 of the Safe Restart Agreement. Staff will continue to monitor if funding is required beyond the $23.4 M committed under the Municipal stream and will advise Council should there be a funding gap.**

- **The General Rate Stabilization reserve (GRS) balance as at December 31, 2020 was $84.8 million net of commitments. Within this balance is $8.7 million of funding available through the Safe Restart Agreement which is eligible for 2021 operating deficits as a result of COVID-19. Once this amount is excluded the GRS balance sits at $76.1 million which is $0.7 million more than the Council approved target of $75.4 million.**

<u>Reserves / Reserve Funds</u>

- **An update on the status of the City's primary Reserves and Reserve Funds, including rate stabilization reserves and development charge reserve funds, is also presented.**

Background:

The City's financial management policies require staff to provide Council with periodic status updates related to the City's finances. This report is focused on updating Council on the status of the City's year-end 2020 operating budget and reserves balances.

In March 2020, the Province of Ontario, the Region of Peel and the City of Brampton declared states of emergency to limit the spread of COVID-19 primarily through physical distancing measures. As a result of the unpredictable nature of the pandemic, Council approved a number of necessary measures to meet varying lockdown restrictions throughout the year. These measures had a direct impact on City finances resulting in the City's largest operating deficit to date.

Current Situation:

2021 OPERATING BUDGET

The 2020 Operating Budget resulted in a net year-end deficit of $52.3 million. This variance represents 6.9% of total budgeted expenditures of $753.5 million. The deficit is due to the impacts of COVID-19 with revenue losses of $92.3 million and additional COVID-19 emergency measure costs of $13.5 million, which are partially offset by $53.6 million in operational savings and mitigating measures.

On July 27, 2020, as part of the federal-provincial Safe Restart Agreement, the Ontario government announced up to $4 billion in emergency assistance to provide Ontario's municipalities with the support they need to respond to COVID-19, and deliver the critical services people rely on every day. Through this Phase 1 funding, the City received a total of $34.9 million; $24.0 million through the 'transit stream' administered by MTO and $10.9 million through the 'Municipal Stream' administered through MMAH.

On December 16th, 2020 in a letter from MMAH, the City was allocated an additional $19.3 million to support the municipality's remaining 2020 operating needs based on the application of projected year-end deficits.

Through Council's advocacy efforts, and commitment by the Federal and Provincial governments to provide Ontario's municipalities with the support they need to respond to COVID-19, the City received $54.2 million in relief funding as part of the Safe Restart Agreement to offset operational losses specific to 2020. This funding was used towards the City's deficit of $52.3 million.

The following tables summarize the 2020 Operating Budget year-end results, which include a departmental breakdown of the deficit (Table 1), along with highlights of significant drivers that have contributed to the 2020 operating budget deficit (Table 2).

TABLE 1: 2020 OPERATING BUDGET FINANCIAL SUMMARY

OPERATING VARIANCE:	Annual Net Budget	Q4 YE Actual	(Favourable) / Unfavourable Variance	
Departments		**($000s)**		**%**
Public Works & Engineering	86,747	86,511	(236)	0%
Transit	77,809	94,810	17,002	22%
Community Services	72,355	70,535	(1,820)	-3%
Corporate Support Services	63,497	61,174	(2,323)	-4%
Fire & Emergency Services	80,199	77,991	(2,208)	-3%
Legislative Services	10,729	15,287	4,558	42%
Planning, Building & Economic Development	4,299	5,745	1,446	34%
Mayor & Members Of Council	4,529	3,864	(664)	-15%
Office of the CAO	8,907	6,350	(2,556)	-29%
Brampton Public Library	18,214	15,178	(3,036)	-17%
Gapping	(13,150)	-	13,150	-100%
DEPARTMENTAL VARIANCE : DEFICIT			**23,312**	
GENERAL GOVERNMENT VARIANCE: DEFICIT			**28,967**	
CORPORATE VARIANCE: DEFICIT			**52,278**	
SAFE RESTART FUNDING*			**(52,278)**	
CORPORATE DEFICIT (NET OF SAFE RESTART AGREEMENT OFFSET)			**$ 0**	

**Safe Restart Agreement (SRA) deficit relief is comprised of $22.7 million from the MTO 'transit stream' to offset losses specific to Transit Operations and $29.6 million from the MMAH 'municipal operating stream' to offset losses for all other COVID-19 operational losses.*

Note that $29 M General Government variance to budget includes $13.5 M in COVID-19 emergency measures costs, $10.1 M Interest, taxes & penalties, $3.6 M supplemental taxes delay and $2.1 M investment & banking interest lower than anticipated.

TABLE 2: 2020 OPERATING BUDGET VARIANCES

OPERATING VARIANCE:	YEAR END ACTUALS
Revenue Loss	92,337
Emergency Measures Costs	13,575
Operational Savings and Mitigation Measures	(53,634)
Funding Received*	(52,278)
CORPORATE VARIANCE: DEFICIT	**-**

MAJOR VARIANCES	YEAR END ACTUALS
Transit reduced revenues	42,163
Recreation reduced revenues	24,939
COVID-19 Emergency Measures Costs	13,575
Tax Penalties & Interest Revenue	10,128
POA reduced revenues	5,125
Supplemental Taxes	3,612
Investment income loss	2,167
Performing Arts Reduced Revenue	2,117
Development Services Reduced Revenue	1,874
Ride Sharing reduced revenue	773
Performing Arts Non-Labour Expenditures	(1,521)
Other	838
Parks Non-Labour Expenditures	(3,036)
Library Non-Labour Expenditures	(3,038)
Recreation Non-Labour Expenditures	(4,569)
Transit Non-Labour Expenditures	(10,794)
Labour Savings	(32,076)
CORPORATE VARIANCE: DEFICIT	**52,278**
SAFE RESTART FUNDING*	**(52,278)**
NET CORPORATE DEFICIT	**$ -**

**Safe Restart Agreement (SRA) deficit relief is comprised of $22.7 million from the MTO 'transit stream' to offset losses specific to Transit Operations and $29.6 million from the MMAH 'municipal operating stream' to offset losses for all other COVID-19 operational losses.*

Deficit Summary

The 2020 year-end operating deficit of $52.3 million is due to the impacts of COVID-19 with revenue losses of $92.3 million and additional COVID-19 emergency measure costs of $13.5 million, which are partially offset by $53.6 million in operational savings and mitigating measures.

As illustrated in Table 2, the $92.3 million in revenue deficits are driven by a decline in user fee revenues, which is largely concentrated in the areas of Transit and Recreation Services which account for 73% of revenue losses.

Transit's revenue deficit of $42.2 million is largely due to the suspension of fares between March 21st and July 1st, reduced capacity and lower ridership demand over the course of the year.

Recreation revenue losses continued to be the second largest contributor of the revenue deficit with annual losses amounting to $24.9 million. This was primarily driven by the City's decision to close recreation facilities, limit capacity and cancel programs and rentals to prevent the spread of the pandemic.

Tax related revenue loss of $13.7 million, $3.6 million of which is as a result of delayed supplemental taxes and $10.1 million as a result of the City's decision to support residents through the suspension on tax arrears until the end of the year, has resulted in projected lost revenues of interest, taxes and penalty charges as approved through the the "Relief Measures for Overdue Property Taxes Report" presented to Council on September 23rd 2020.

Several other revenue streams have been impacted by COVID-19 including Provincial Offences Act (POA) revenues of $5.1 million, investment income of $2.2 million, development services revenue of $1.9 million, lost revenue due to unrealized sales of tickets, room and equipment rental of $2.1 million in performing arts, and ridesharing revenue losses of $0.8 million due to decreased demand.

The City's response to the pandemic resulted in emergency measures costs which amounted to $13.5 million by year-end. These costs are attributable to the City's direct efforts to provide safe, clean options for residents and staff through: enhanced cleaning and sanitization; personal protective equipment stock piling for all City departments, critical need long-term care homes and residents as part of the 1 million mask campaign; the Backyard Garden Program; additional rental and contracted janitorial and security services and COVID-19 sick credits provided to Transit frontline staff. Table 3 categorizes the main drivers of these costs.

TABLE 3: 2020 COVID-19 EMERGENCY MEASURES COSTS

COVID-19 Emergency Measure Cost	$ M
Security Services	3.4
Personal Protective Equipment	2.9
Labour	2.8
Enhanced Cleaning	2.3
Media & Communications	1.1
Other	0.9
Total	**13.5**

$53.6 million in operational savings and mitigating measures was realized in 2020 to offset the significant revenue loss and additional costs incurred due to the pandemic.

$32.1 million is as a result of labour related savings, primarily driven by the temporary suspension of part-time, temporary/casual, and seasonal staff in non-essential services, reduced scheduling and hiring freeze or delays. Transit, Recreation and Parks Maintenance & Forestry saw the highest impact of labour savings.

$21.6 million in operational savings was mostly realized in Transit and Recreation due to reduced operations to meet provincial guidelines and limit the spread of COVID-19. Cost savings were also seen throughout the corporation in the areas of utility and fuel, preventative and demand maintenance, contracted services and a lower transfer to Brampton Library due to hiring freezes and temporary layoffs.

Deficit Management - 2020

To date the City has received a total of $62.4 million under Phase 1 and Phase 2 of the Safe Restart Agreement. The funding was placed in City reserves upon transfer payment receipt from the respective ministries:

- $10.9 million to support municipal operating pressures (2020) (Phase 1)
- $24.0 million allocation to support municipal transit pressures (2020) (Phase 1)
- $19.3 million to support municipal operating pressures (2020) (Phase 2)
- $8.2 million to support future municipal operating pressures (2021) (Phase 2)

Of the amount received, $54.2 million was eligible to be used for operational pressures and losses in 2020 and was thereby used to offset the City's deficit of $52.3 million; $29.6 million through the municipal operating stream and $22.7 million through the transit stream.

The remaining funding of $1.9 million, in excess of the deficit offset, remains in City reserves, along with $8.2 million of Phase 2 of the municipal operating stream funding specific to 2021. In total $10.1 million remains in City reserves and will be used to address 2021 pandemic-related operating needs.

TABLE 4: 2020 COVID-19 FEDERAL-PROVINCIAL FUNDING RECEIVED

	ELIGIBILITY	MUNICIPAL STREAM	TRANSIT STREAM	TOTAL
Received to Date ($M)				
SRA Phase 1	2020	10.9	24.0	**34.9**
SRA Phase 2	2020	19.3	-	**19.3**
Total Received for 2020		**30.2**	**24.0**	**54.2**
2020 Year End Deficit Offset		- 29.6	- 22.7	**- 52.3**
2020 Funding in City Reserves	2021	0.5	1.4	**1.9**
SRA Phase 2	2021	8.2	-	**8.2**
Total Remaining in City Reserves	**2021**	**8.7**	**1.4**	**10.1**

Deficit Management - 2021

In addition to the funding received to date, MMAH and MTO have recently advised of further funding supporting the 2021 operating budget and anticipated future operational pressures and losses as a result of the pandemic.

In a letter dated March 4, 2021 from MMAH, the City was advised that it will receive $14.7 million under the new 2021 COVID-19 Recovery Funding for Municipalities program. Brampton's share is based on its proportion of COVID-19 cases during the period of January 1, 2021 to February 18, 2021. The total allocation under the program is $500 million, which is available to help municipalities respond to ongoing 2021 COVID-19 operating pressures. The City can anticipate these funds in two equal instalments, on or before May 1, 2021 and November 1, 2021. Use of funding under the municipal stream is evaluated through periodic reporting as directed by MMAH.

MTO advised the City in a letter dated March 3, of its eligibility to receive additional funding to support the Municipality's COVID-19 municipal transit financial impacts under Phase 2 and 3 of the Safe Restart Program, $30.1 million under Phase 2 for operational pressures and losses between October 1st 2020 and March 31 2021, and $23.5 million under Phase 3 for operational pressures and losses between April 1st 2021 and December 31, 2021. Funding under the transit stream is on a claim basis with scheduled reporting as directed by MTO.

Receipt of $0.6 million through the Municipal Transit Enhanced Cleaning (MTEC) fund is also pending.

To date, the total eligible funding to offset 2021 operational losses and pressures as a result of COVID-19 is $79.0 million, approximately $23.4 million for municipal pressures and $55.5 million for transit specific pressures as illustrated in Table 5.

TABLE 5: 2021 COVID-19 FEDERAL - PROVINCIAL FUNDING ELIGIBILITY

	ELIGIBILITY	MUNICIPAL STREAM	TRANSIT STREAM	TOTAL
Announced Funding Eligibility or Future Receipt ($M)				
SRA Phase 2	2020-2021	-	30.1	**30.1**
SRA Phase 3	2021	-	23.5	**23.5**
CRFM 2021	2021	14.7	-	**14.7**
MTEC	2021	-	0.6	**0.6**
Total Announced / Pending		**14.7**	**54.2**	**68.9**
2020 Funding in City Reserves		**8.7**	**1.4**	**10.1**
Total Funding Eligibile for 2021		**23.4**	**55.5**	**79.0**

Considering the funding committed to date, the City is well situated to offset 2021 Transit Operational losses as a result of the pandemic through Phase 2 and 3 of the Safe Restart Agreement. Staff will continue to monitor if funding is required beyond the $23.4 M committed under the Municipal stream and will advise Council should there be a funding gap.

RESERVES AND RESERVE FUNDS (Schedule A)

Stormwater Reserve Fund

In the 2020 Operating Budget, the Stormwater Fund was established to manage the recently approved stormwater charge. The charge became effective on June 1, 2020 and is collected through the Region of Peel water/wastewater bill in response to the City's maintenance, renewal, replacement and Asset Management Plan for the City's $1.2 billion of stormwater infrastructure.

In 2020, the Brampton stormwater charge resulted in revenues of $10.5 million for the period from June 1st to December 31, 2020. Going forward, the City can anticipate collecting $22 million per year, growing at the rate of inflation.

The balance as at December 31, 2020 is $0.6 million.

Debt Repayment Reserve

The 2020 Operating Budget included approval of $3.6 million in annual debt repayments, related to a 25-year debenture of $26 million, for the Fire and Emergency Services Campus and $107.5 million for a 30-year debenture for the Centre for Innovation.

The Debt Repayment Reserve established in 2018, has a balance of $10.9 million, as at December 31, 2020.

The Region of Peel issued debentures on the City's behalf in the amount of $26 million in 2019 to meet cash flow requirements for the construction of the Fire and Emergency Services Campus.

Development Charge Reserve Funds

Development charges (DCs) are one-time fees levied on new developments to pay for growth-related City infrastructure. The current DC By-laws were approved by Council in 2019, and inputs into the DC Study were based on various master servicing plans and departmental input into how they would meet the needs of servicing new growth.

At present, the DC revenue for 2020 is tracking better than the recession of 2008-2009, but is lower than historic averages. DC reserve funds are currently in a surplus position of $62.9 million, as at December 31, 2020.

Building Rate Stabilization Reserve Fund

As at December 31, 2020, the balance in the Building Rate Stabilization Reserve Fund was $39.9 million, which provides assurance against a future short-term downturn in building activity. The City is obligated to transfer any surplus resulting from building related operations to this reserve fund in accordance with the requirements of Bill 124 *(Building Code Statute Law Amendment Act, 2002).*

Cash In Lieu of Parkland

As at December 31, 2020, there was a balance in the Cash in Lieu of Parkland of $119.2 million. Staff continues to work on strategies to secure and expedite the acquisition of strategic parkland to meet the future needs of residents.

Land Proceeds Reserve

As at December 31, 2020, there was a negative balance in the Land Proceeds Reserve of $29.9 million. This reserve serves as a cash flow through fund to support

strategic opportunities under the Real Estate Modernization Strategy. In future, subject to Council approval, a permanent source of funding will be required to replenish the Land Proceeds Reserve.

General Rate Stabilization Reserve (GRS)

Council has established a GRS reserve balance target at 10% of the annual approved operating budget. The 2020 Operating Budget has been approved at $754 million, resulting in a GRS reserve target of $75.4 million.

The General Rate Stabilization reserve (GRS) balance as at December 31, 2020 was $84.8 million net of commitments. Within this balance is $8.7 million of funding available through the Safe Restart Agreement which is eligible for 2021 operating deficits as a result of COVID-19. Once this amount is excluded, the GRS balance sits at $76.1 million, which is $0.7 million more than the Council approved target of $75.4 million.

In lieu of further funding committed in 2021 to offset potential COVID-19 related deficits, the GRS would be the primary source to offset potential operating pressures.

Interest Rate Stabilization Reserve Fund

As at December 31, 2020, the uncommitted balance in the Interest Rate Stabilization Reserve Fund was $3.0 million. The balance continues to be drawn upon to fund annual operating shortfalls on budgeted Hydro investment income.

It is anticipated that the current low-rate environment will continue in the short-medium term and will ultimately result in this reserve being exhausted. Staff are currently reviewing alternative funding options for Council's consideration.

Legacy, Community Investment, and Community Development Reserve Funds

The Legacy, Community Investment and Community Dividend Reserve Funds were established in 2002 with contributions from the sale of Brampton Hydro. The Council approved objectives of these funds are as follows:

- *Legacy Fund:* Principal to be preserved and invested; investment income available for use
- *Community Investment Fund:* Principal for capital financing through internal borrowing; principal to be preserved over the long term; investment income available for use
- *Community Dividend Fund:* Principal available for direct spending on community orientated initiatives and other extraordinary, non-recurring expenditures; to be

used only after consideration of all alternative funding sources; investment income available for use

Table 7 provides a financial status update on these strategic reserves:

TABLE 7: STRATEGIC RESERVES - FINANCIAL STATUS UPDATE

	AMOUNT $ M	LEGACY	COMMUNITY INVESTMENT	COMMUNITY DIVIDEND
Original Balance (1)	230.0	100.0	100.0	30.0
Spending & Approved Capital Commitments, as at December 31, 2020	(83.4)	(4.8)	(48.6)	(30.0)
Uncommitted Balance, as at December 31, 2020	**146.6**	**95.2**	**51.4**	**-**
Pending Strategic Initiatives: $47.7 M remaining for Ryerson University and $4.8 M for Algoma University	(52.5)			
STRATEGIC RESERVES AVAILABLE BALANCE	**94.1**			

(1) Investment income from these strategic reserves is included as a reserve source in the operating budget at a rate of 4.5%. As these funds are utilized, investment income revenue is reduced from the operating budget. Alternative revenue sources, reduction in expenditures or increases in property taxes would be required to offset the reduction in investment income revenue

- Council has endorsed in principle $50.0 million from the Legacy fund to support the Ryerson University initiative and $7.3 million for the Algoma University initiative. Subsequent to funding these commitments, the Legacy Fund is projected to have a remaining balance of $42.7 million.

- Of the $50.0 million for Ryerson University, Council has approved $5.0 million over a 4 year period (2019-2022) for the Cybersecure Catalyst and $2.3 million has been contributed since 2019. Of the $7.3 million for Algoma University, $2.5 million has been contributed in 2020, leaving a remaining balance of $95.2 million in the Legacy Fund, as at December 31, 2020.

- To date, the Legacy Fund has generated $89.8 million in interest revenue since the inception of the fund. Of this, $72.7 million has been transferred to the operating fund to offset tax levy requirements and the balance has been transferred to the Interest Rate Stabilization Reserve Fund.

- The Community Investment Fund had outstanding internal loans of $48.6 million committed against this fund for previous Council initiatives such as the Rose Theatre, Provincial Offences Act Courthouse and Public Works Yards. As identified in the 2021 Budget, future repayments to the Community Investment Fund are foregone. The balance available for future initiatives is $51.4 million, as at December 31.

- The Community Dividend Fund has been fully drawn down for projects of citywide benefit and was closed out in 2009. Funding was committed towards

initiatives such as the Rose Theatre, Downtown Revitalization and Sheridan College.

Corporate Implications:

N/A

Term of Council Priorities:

This report fulfils the Council Priority of a Well-Run City through strict adherence to effective financial management policies and supports Brampton's 2040 Vision by ensuring sustainable financial operations.

Conclusion:

The 2020 Operating Budget resulted in a net year-end deficit of $52.3 million. This variance represents 6.9% of total budgeted expenditures of $753.5 million.

Through Council's advocacy efforts and commitment by the Federal and Provincial governments to provide Ontario's municipalities with support to respond to COVID-19; the City received $54.2 million in 2020 relief funding as part of the Safe Restart Agreement and was able to fully offset City's deficit of $52.3 million.

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Schedule A: Reserve and Reserve Fund Balances
Schedule B: Departmental Year-End Forecast Variances

SCHEDULE A: RESERVE AND RESERVE FUND BALANCES ($000s)
AS AT DECEMBER 31, 2020

Discretionary Reserve and Reserve Funds	YE 2018	YE 2019	YE 2020
Financial Strategy Reserve Funds			
Res # 211 - Interest Rate Stabilization	$8,075	$5,788	$3,009
Res # 200 - Debt Repayment	$3,237	$9,007	$10,940
Res # 100 - Legacy Fund	$100,000	$99,000	$95,200
Res # 110 - Community Investment Fund	$25,105	$49,158	$51,390
Subtotal	**$136,418**	**$162,954**	**$160,540**
Other Development-Related			
Res # 26 - Cash-in-Lieu of Downtown Parking	$41	$42	$43
Res # 37 - Official Plan Review Reserve Fund	$303	$208	$0
Subtotal	**$344**	**$250**	**$43**
Tax Base Capital Reserve Funds			
Res # 4 - Asset Replacement	$36,488	$27,729	($8,954)
Res # 36 - Joint Use Facility Agreements	$542	$592	$604
Res # 46 - Stormwater Charge			$594
Res # 58 - Theatre Capital Improvements	$771	$615	$0
Res # 78 - 10% Non-DC	$7,699	$4,662	$0
Res # 119 - Transit Levy	$0	$76	$370
Subtotal	**$45,500**	**$33,674**	**($7,386)**
Special Purpose Reserve Funds			
Res # 3 - Workers' Compensation Fund	$7,528	$7,413	$8,107
Res # 8 - 3rd Party Liab. Self Insurance	$18,242	$0	$0
Res # 10 - Civic Centre/Corporate Facilities	$1,379	$1,907	$0
Res # 12 - Land Proceeds	($9,619)	($27,314)	($29,981)
Res # 15 - Conversion of Employee Sick Leave	$7,747	$7,937	$8,144
Res # 16 - Community Grant Surplus Reserve	$1,109	$633	$897
Res # 19 - Employee Ben. Prem. Rate Stab.	$4,865	$5,725	$11,343
Res # 23 - Brampton Columbarium	$26	$29	$33
Res # 25 - Municipal Elections	$1,020	$1,641	$2,458
Res # 30 - Energy Efficiencies			$2,048
Res # 42 - C.A.R.E. Program	$3	$0	$0
Res # 53 - Brampton Senior Fund	$51	$51	$51
Res # 54 - LACAC	$46	$48	$49
Res # 59 - Fire / Life Safety Centre	$190	$194	$199
Res # 88 - Community Improvement Plan Fund	$327	$291	($257)
Res # 96 - Transportation Initiatives Reserve	$377	$9	$44
Res # 97 - Multi -Year Non-Capital Projects	$134	$138	$141
Res # 125 - Heritage Initiatives	$52	$56	$58
Res # 126 - Pledge to Peel Memorial Hospital	$20,350	$20,851	$21,393
Res # 129 - Brampton University Reserve Fund	$25	$25	$26
Subtotal	**$53,851**	**$19,632**	**$24,753**
Total Reserve Funds	**$236,112**	**$216,510**	**$177,950**
Reserves			
General Rate Stabilization Reserve	$71,345	$71,774	$84,840
Subtotal	**$71,345**	**$71,774**	**$84,840**
Total Discretionary Reserve and Reserve Funds	**$307,457**	**$288,284**	**$262,790**

SCHEDULE A: RESERVE AND RESERVE FUND BALANCES ($000s)
AS AT DECEMBER 31, 2020

Obligatory Reserve Funds	YE 2018	YE 2019	YE 2020
Development Charges			
Res # 130 - DC:Growth Studies & Other	$3,252	$3,791	$3,392
Res # 132 - DC:Library	($10,222)	($5,633)	($4,410)
Res # 133 - DC:Fire Protection	($12,958)	($15,343)	($13,043)
Res # 134 - DC:Recreation	$110,067	$90,789	$90,196
Res # 135 - DC:Transit	($37,876)	($44,394)	($33,948)
Res # 136 - DC:Public Works Buildings & Fl	($34,657)	($31,961)	($30,486)
Res # 137 - DC:Roads	$20,714	$7,052	$18,595
Res # 138 - DC:Parking Lots	$6,898	$6,608	$6,250
Res # 142 - DC:Bramwest North South Trans	$21,494	$24,322	$26,358
Subtotal	**$66,712**	**$35,230**	**$62,905**
Other Development-Related			
Res # 2 - Cash in lieu of Parkland	$102,881	$106,733	$119,245
Res # 18 - Dev. Cont. for Future Construction	$30,947	$32,534	$33,799
Res # 38 - Subdivision Maintenance	$15,053	$15,808	$16,617
Subtotal	**$148,881**	**$155,075**	**$169,661**
Special Purpose Reserve Funds			
Res # 22 - Sport /Entertainment Centre	$8,237	$8,243	$8,250
Res # 89 - Dedicated Gas Tax Reserve	$5,551	$2,929	$5,270
Res # 91 - Federal Gas Tax Reserve	$6,436	$13,383	$33,042
Res # 93 - Building Rate Stabilization	$33,491	$40,514	$39,910
Res # 95 - Accele Ride Reserve	$302	$8	$2,566
Res # 121 - Municipal Transit Capital	$23	$8	$1,994
Res # 122 - Municipal Road & Bridge Infrastructure	$38	$44	$45
Res # 123 - Miscellaneous Fed / Prov Transit Capital Grant	$142	$486	$530
Res # 124 - Municipal Transit Demand Management	$1	$1	$1
Res # 127 - Major Maintenance Reserve Fund	$2,973	$3,690	$4,146
Res # 128 - Brampton Starter Company	$162	$315	$94
Subtotal	**$57,355**	**$69,622**	**$95,847**
Total Obligatory Reserve Funds	**$272,948**	**$259,927**	**$328,413**
Total Obligatory and Discretionary Reserve and Reserve Funds	**$580,405**	**$548,211**	**$591,203**

SCHEDULE B: YEAR-END FORECAST VARIANCES AS AT DECEMBER 31, 2020

Transit	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$133,984,105	$119,616,501	($14,367,605)	-10.7%
Other Expenditures	$44,164,213	$33,370,383	($10,793,824)	-24.4%
Total Expenditures	**$178,148,318**	**$152,986,889**	**($25,161,429)**	**-14.1%**
Revenues	($100,339,744)	($58,176,492)	$42,163,252	-42.0%
Net Expenditures	**$77,808,574**	**$94,810,392**	**$17,001,823**	**21.9%**

Legislative Services	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$25,247,729	$23,819,644	($1,428,085)	-5.7%
Other Expenditures	$7,760,081	$7,281,986	($478,101)	-6.2%
Total Expenditures	**$33,007,810**	**$31,101,624**	**($1,906,186)**	**-5.8%**
Revenues	($22,278,567)	($15,814,680)	$6,463,889	-29.0%
Net Expenditures	**$10,729,243**	**$15,286,951**	**$4,557,703**	**42.5%**

Planning, Building & Economic Development	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$23,774,618	$22,562,472	($1,212,143)	-5.1%
Other Expenditures	$2,933,071	$3,505,644	$572,575	19.5%
Total Expenditures	**$26,707,689**	**$26,068,121**	**($639,568)**	**-2.4%**
Revenues	($22,408,505)	($20,323,346)	$2,085,159	-9.3%
Net Expenditures	**$4,299,184**	**$5,744,769**	**$1,445,591**	**33.6%**

Public Works & Engineering	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$45,545,669	$43,360,981	($2,184,694)	-4.8%
Other Expenditures	$55,239,774	$55,826,429	$586,654	1.1%
Total Expenditures	**$100,785,443**	**$99,187,403**	**($1,598,040)**	**-1.6%**
Revenues	($14,038,631)	($12,676,342)	$1,362,290	-9.7%
Net Expenditures	**$86,746,812**	**$86,511,068**	**($235,750)**	**-0.3%**

Mayor & Members Of Council	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$4,329,819	$3,680,178	($649,646)	-15.0%
Other Expenditures	$198,950	$184,160	($14,789)	-7.4%
Total Expenditures	**$4,528,769**	**$3,864,334**	**($664,435)**	**-14.7%**
Revenues	$0	$0	$0	-
Net Expenditures	**$4,528,769**	**$3,864,338**	**($664,435)**	**-14.7%**

SCHEDULE B: YEAR-END FORECAST VARIANCES AS AT DECEMBER 31, 2020

Community Services	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$79,244,063	$58,269,753	($20,974,307)	-26.5%
Other Expenditures	$30,836,982	$22,673,167	($8,163,822)	-26.5%
Total Expenditures	**$110,081,045**	**$80,942,916**	**($29,138,129)**	**-26.5%**
Revenues	($37,725,886)	($10,407,489)	$27,318,398	-72.4%
Net Expenditures	**$72,355,159**	**$70,535,432**	**($1,819,731)**	**-2.5%**

Fire & Emergency Services	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$77,170,895	$75,782,856	($1,388,039)	-1.8%
Other Expenditures	$4,508,000	$3,356,210	($1,151,796)	-25.6%
Total Expenditures	**$81,678,895**	**$79,139,060**	**($2,539,835)**	**-3.1%**
Revenues	($1,480,000)	($1,148,542)	$331,458	-22.4%
Net Expenditures	**$80,198,895**	**$77,990,524**	**($2,208,377)**	**-2.8%**

Corporate Support Services	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$45,593,048	$44,300,143	($1,292,908)	-2.8%
Other Expenditures	$23,710,842	$21,124,770	($2,586,072)	-10.9%
Total Expenditures	**$69,303,890**	**$65,424,910**	**($3,878,980)**	**-5.6%**
Revenues	($5,806,829)	($4,251,126)	$1,555,704	-26.8%
Net Expenditures	**$63,497,061**	**$61,173,786**	**($2,323,276)**	**-3.7%**

Office of the CAO	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$6,261,987	$4,652,389	($1,609,598)	-25.7%
Other Expenditures	$2,924,521	$1,947,878	($976,642)	-33.4%
Total Expenditures	**$9,186,508**	**$6,600,268**	**($2,586,240)**	**-28.2%**
Revenues	($280,000)	($250,000)	$30,000	-10.7%
Net Expenditures	**$8,906,508**	**$6,350,267**	**($2,556,240)**	**-28.7%**

Brampton Public Library	BUDGET	YEAR-END ACTUALS	VARIANCE	%
Labour Expenditures	$0	$0	$0	-
Other Expenditures	$18,214,052	$15,178,377	($3,035,675)	-16.7%
Total Expenditures	**$18,214,052**	**$15,178,377**	**($3,035,675)**	**-16.7%**
Revenues	$0	$0	$0	-
Net Expenditures	**$18,214,052**	**$15,178,377**	**($3,035,675)**	**-16.7%**

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-15

Subject: **Initiation of Subdivision Assumption**

Secondary Title: **Four X Development Inc., Registered Plan 43M-2030 – (North of Embelton Road, West of Mississauga Road), Ward 6 - Planning References – C05W07.004 and 21T-10020B**

Contact: John Edwin, Manager, Development Construction, Environment & Development Engineering Division – 905-874-2538

Report Number: Public Works & Engineering-2021-360

Recommendations:

1. That the report titled: **Initiation of Subdivision Assumption Four X Development Inc., Registered Plan 43M-2030 – (North of Embelton Road, West of Mississauga Road), Ward 6 - Planning References – C05W07.004 and 21T-10020B,** to the Committee of Council Meeting of April 14, 2021 be received;

2. That the City initiate the Subdivision Assumption of Four X Development Inc., Registered Plan 43M-2030; and

3. That a report be forwarded to City Council recommending the Subdivision Assumption of Four X Development Inc., Registered Plan 43M-2030 once all departments have provided their clearance for assumption.

Overview:

The maintenance period has expired and all works with respect to the subject subdivision have been completed to the satisfaction of the Environment & Development Engineering Division. It is now appropriate to initiate the subdivision assumption process in accordance with Council's procedures and policies. Other departments must provide clearance prior to a by-law being passed assuming the subdivision.

Background:

The following development has been completed and the terms of the Subdivision Agreement have been satisfied insofar as the Environment & Development Engineering Division of the Public Works and Engineering Department is concerned. Prior to final release for assumption, all City departments will be circulated to ensure all requirements and conditions have been fulfilled.

Subdivision Name	Legal Description	Street Name
Four X Development Inc.	43M-2030	Blue Silo Way Dairymaid Road Frost Street Longevity Road Lyle Way Raindrop Terrace Rolling Acres Drive Settlers Field Road

Current Situation:

The Environment & Development Engineering Division is satisfied that the services completed within this development may be initiated for assumption.

Corporate Implications:

Upon assumption of this development, approximately 2.5 lane kilometers of roadway and associated municipal infrastructure will be added to the City of Brampton's system. There will be future costs associated with the operation and long-term maintenance of the additional inventory of lands and public highways that include infrastructure such as roads, sewers, streetlighting, streetscaping, stormwater management pond, etc.

Strategic Plan:

This report accomplishes the Strategic Plan priorities by supporting the benefits of sustainable growth to build a pre-eminent city with vibrant and connected communities.

Living the Mosaic – 2040 Vision
This report directly aligns with the vision that Brampton will be a mosaic of complete neighbourhoods and sustainable urban places.

Conclusion:

It is now appropriate that the municipal services within Registered Plan 43M-2030 be initiated for their assumption in accordance with Council's procedures and policies. Other departments must provide clearance prior to a by-law being passed assuming the subdivision.

Respectfully submitted,

Authored by:

_____
John Edwin, EIT, C.E.T.
Manager, Development Construction
Environment & Development Engineering
Public Works and Engineering

Reviewed and Recommended by:

_____
Michael Won, P. Eng., Director
Environment & Development Engineering
Public Works and Engineering

Approved by:

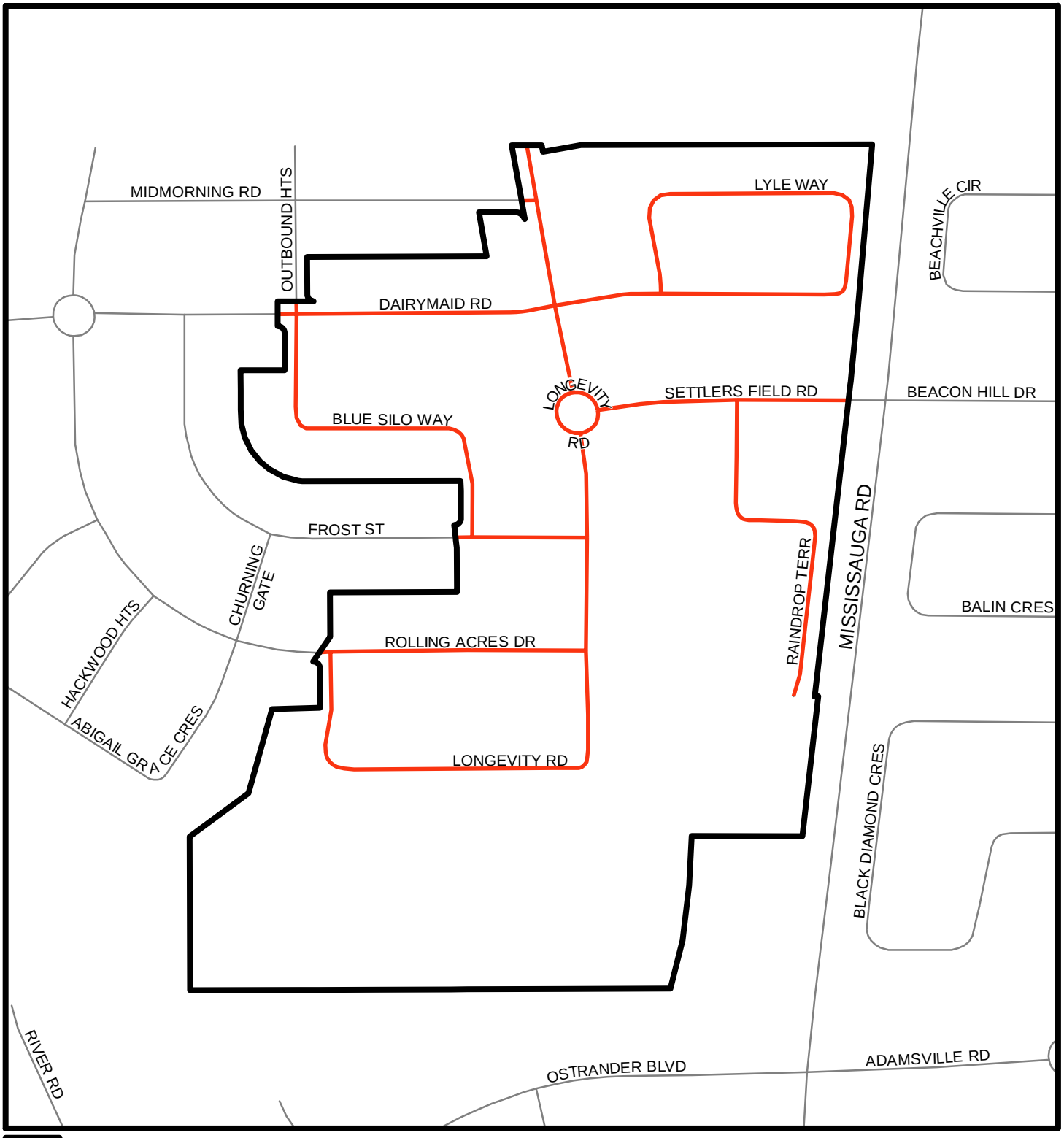
_____
Jayne Holmes, P. Eng.
Acting Commissioner
Public Works & Engineering

Submitted by:

_____
David Barrick
Chief Administrative Officer

Appendices:
Attachment 1: Subdivision Map
Attachment 2: Registered Plan 43M-2030

ATTACHMENT 1



SUBJECT LANDS TO BE ASSUMED

APPROXIMATE ROAD DISTANCE (2.51 KM)

BRAMPTON Flower City
brampton.ca
PLANNING AND DEVELOPMENT SERVICES

0 40 80 120
Meters

Author: ckovac
Date: 2021/03/04

ATTACHMENT 1 - SUBDIVISION ASSUMPTION
FOUR-X DEVELOPMENT INC.

REGISTERED PLAN: 43M-2030

ATTACHMENT 2

PLAN 43M-2030

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF PEEL (No. 43) AT 13:18 O'CLOCK ON THE 15th DAY OF December, 2016 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIERS 14092-0328, 14092-0329 AND 14092-0306. THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT No. PR2134318

D.L. Dorkey

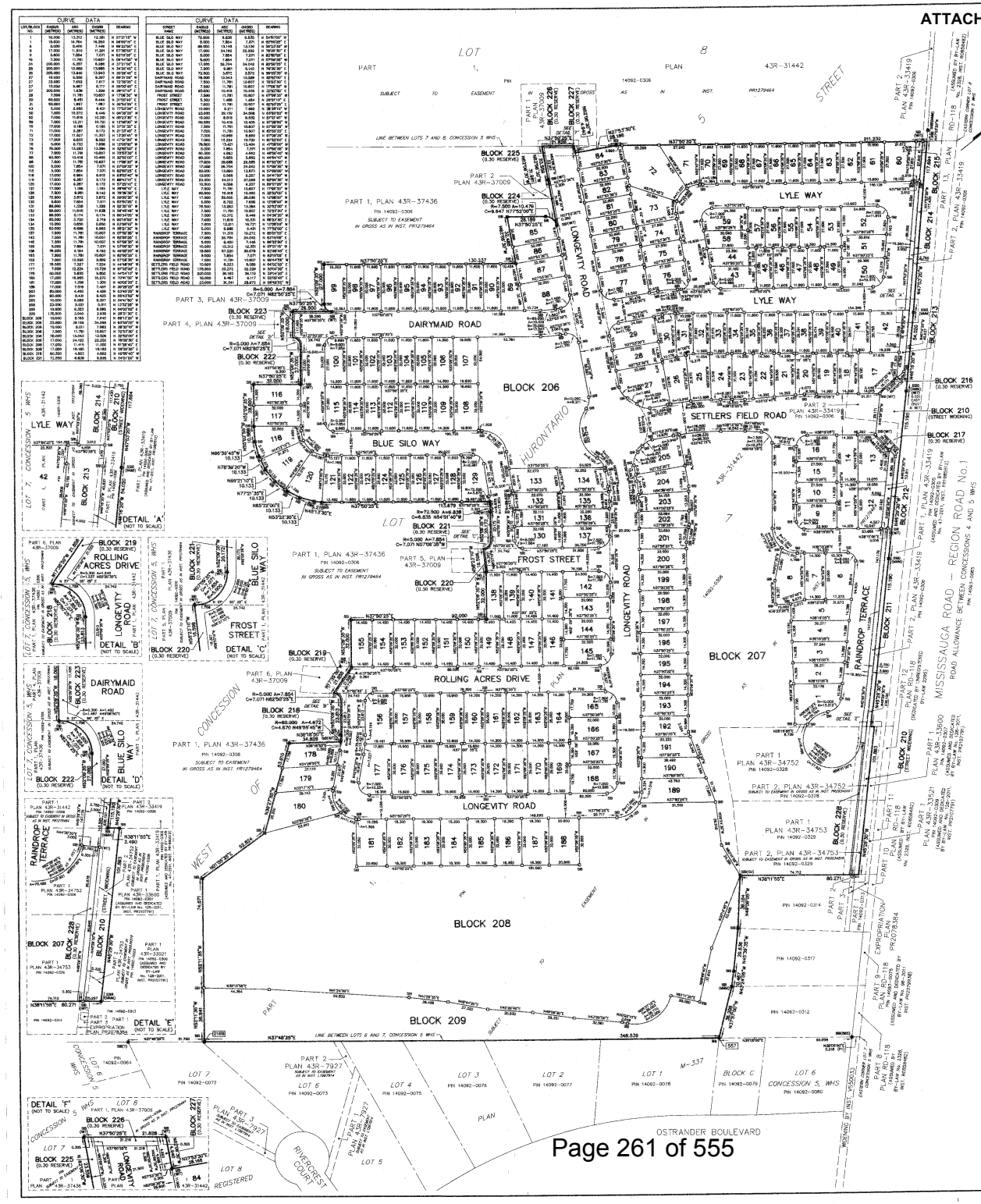
REPRESENTATIVE FOR THE LAND REGISTRAR

THIS PLAN COMPRISES ALL OF PINS 14092-0328, 14092-0329 AND PART OF PIN 14092-0306.

SUBJECT TO EASEMENT IN GROSS AS IN INST. PR1279464 OVER PART 1, PLAN 43R-31442, SAVE AND EXCEPT PART 1, PLAN 43R-33419 (AFFECTS ALL OF LOTS 1 TO 205 INCLUSIVE, BLOCKS 206, 208, 209, 212 TO 215 INCLUSIVE, ALL OF THE 0.3 RESERVES BLOCKS 216 TO 227 INCLUSIVE, ALL OF THE STREETS BLUE SILO WAY, DAIRYMAID ROAD, FROST STREET, LONGEVITY ROAD, LYLE WAY, ROLLING ACRES DRIVE AND SETTLERS FIELD ROAD AND PART OF BLOCK 207, BLOCK 210 (STREET WIDENING), BLOCK 211 AND RAINDROP TERRACE).

SUBJECT TO EASEMENT IN GROSS AS IN INST. PR2034315 OVER PART 2, PLAN 43R-34752 (AFFECTS PART OF BLOCK 210 (STREET WIDENING)).

SUBJECT TO EASEMENT IN GROSS AS IN INST. PR2034315 OVER PART 2, PLAN 43R-34753 (AFFECTS PART OF BLOCK 210 (STREET WIDENING)).



PLAN OF SUBDIVISION OF
PART OF LOT 7, CONCESSION 5
WEST OF HURONTARIO STREET
(GEOGRAPHIC TOWNSHIP OF CHINGUACOUSY)
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL

SCALE 1 : 1000
20 10 0 20 40 60 METRES

HOLDING JONES VANDERVEEN INC.
ONTARIO LAND SURVEYORS

NOTES

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
WIT	DENOTES	WITNESS
DLS	DENOTES	DONALD McLEAN, O.L.S.
HJV	DENOTES	HOLDING JONES VANDERVEEN INC., O.L.S.
OU	DENOTES	ORIGIN UNKNOWN
MMM	DENOTES	MARSHALL MACKLIN MONAGHAN ONTARIO LIMITED, O.L.S.
Y	DENOTES	YATES & YATES LIMITED, O.L.S.
SCP	DENOTES	SPECIFIED CONTROL POINT
WHS	DENOTES	WEST OF HURONTARIO STREET
P1	DENOTES	PLAN RD-118

ALL SURVEY MONUMENTS PLANTED ARE IB, UNLESS OTHERWISE NOTED.
ALL SURVEY MONUMENTS FOUND ARE MARKED (HJV), UNLESS OTHERWISE NOTED.

DISTANCE NOTES

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996852.

BEARINGS AND CO-ORDINATE VALUE NOTES

BEARINGS AND CO-ORDINATES ARE GRID AND ARE DERIVED FROM SPECIFIED CONTROL POINTS No. 04291011G AND No. 04291011B AND ARE REFERRED TO THE 6° UNIVERSAL TRANSVERSE MERCATOR GRID PROJECTION, ZONE 17, CENTRAL MERIDIAN 81°00' WEST LONGITUDE, NAD83 (ORIGINAL).
CO-ORDINATES TO URBAN ACCURACY PER SEC. 14(2) OF O. REG. 216/10.

POINT ID	EASTING	NORTHING
SCP 04291011G	596156.317	4838506.564
SCP 04291011B	594525.301	4833485.813
567	596050.591	4833736.365
2199	595837.000	4833484.081

CO-ORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

DISTANCES AND CO-ORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT:
1. LOTS 1 TO 205, BOTH INCLUSIVE, BLOCKS 206 TO 209 AND BLOCKS 211 TO 215, BOTH INCLUSIVE AND THE STREETS, NAMELY BLUE SILO WAY, DAIRYMAID ROAD, FROST STREET, LONGEVITY ROAD, LYLE WAY, RAINDROP TERRACE, ROLLING ACRES DRIVE AND SETTLERS FIELD ROAD, THE STREET WIDENING, NAMELY BLOCK 210, AND THE 0.30 RESERVES, NAMELY BLOCKS 216 TO 226, BOTH INCLUSIVE, HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.
2. THE STREETS ARE DEDICATED TO THE CORPORATION OF THE CITY OF BRAMPTON AS PUBLIC HIGHWAY.
3. THE STREET WIDENING IS DEDICATED TO THE REGIONAL MUNICIPALITY OF PEEL AS PUBLIC HIGHWAY.

FOUR X DEVELOPMENT INC.

NOVEMBER 15, 2016
DATE

DARIO STEDMAN
AUTHORIZED SIGNING OFFICER

I HAVE THE AUTHORITY TO BIND THE CORPORATION.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE THE SURVEYS ACT, THE SURVEYORS AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON NOVEMBER 15, 2016.

NOVEMBER 15, 2016
DATE

GARY B. VANDERVEEN
ONTARIO LAND SURVEYOR

MUNICIPAL APPROVAL
21T-10020B

APPROVED UNDER SECTION 51 OF THE PLANNING ACT, R.S.O. 1990.

THIS 14th DAY OF December 2016.

Heather MacDonald

HEATHER MacDONALD
INTERIM COMMISSIONER
PLANNING & DEVELOPMENT SERVICES DEPARTMENT
CORPORATION OF THE CITY OF BRAMPTON

HOLDING JONES VANDERVEEN INC.
ONTARIO LAND SURVEYORS
1700 LANGSTAFF ROAD, SUITE 1002
VAUGHAN, ON L4K 3S3
PHONE: 905-660-4005, 416-445-3800 EMAIL: hjv@hjv-ols.ca

VERSION DATE: NOVEMBER 15, 2016		PROJECT: 04-1592-MPLAN1
SCALE: 1:1000	DRAWN BY: V.P. CHKD. BY: D.H.	

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-03

Subject: **Initiation of Subdivision Assumption**

Secondary Title: **Kindwin Development Corporation, Registered Plan 43M-1923 – (North of Countryside Drive, East of Airport Road), Ward 10 - Planning References – C07E17.008 and 21T-03007B**

Contact: John Edwin, Manager, Development Construction, Environment & Development Engineering Division – 905-874-2538

Report Number: Public Works & Engineering-2021-308

Recommendations:

1. That the report titled: **Initiation of Subdivision Assumption Kindwin Development Corporation, Registered Plan 43M-1923 – (North of Countryside Drive, East of Airport Road), Ward 10 - Planning References – C07E17.008 and 21T-03007B,** to the Committee of Council Meeting of April 14, 2021 be received;

2. That the City initiate the Subdivision Assumption of Kindwin Development Corporation, Registered Plan 43M-1923; and

3. That a report be forwarded to City Council recommending the Subdivision Assumption of Kindwin Development Corporation, Registered Plan 43M-1923 once all departments have provided their clearance for assumption.

Overview:

The maintenance period has expired and all works with respect to the subject subdivision have been completed to the satisfaction of the Environment & Development Engineering Division. It is now appropriate to initiate the subdivision assumption process in accordance with Council's procedures and policies. Other departments must provide clearance prior to a by-law being passed assuming the subdivision.

Background:

The following development has been completed and the terms of the Subdivision Agreement have been satisfied insofar as the Environment & Development Engineering Division of the Public Works and Engineering Department is concerned. Prior to final release for assumption, all City departments will be circulated to ensure all requirements and conditions have been fulfilled.

Current Situation:

The Environment & Development Engineering Division is satisfied that the services completed within this development may be initiated for assumption.

Corporate Implications:

Upon assumption of this development, associated municipal infrastructure will be added to the City of Brampton's system.

Strategic Plan:

This report accomplishes the Strategic Plan priorities by supporting the benefits of sustainable growth to build a pre-eminent city with vibrant and connected communities.

Living the Mosaic – 2040 Vision
This report directly aligns with the vision that Brampton will be a mosaic of complete neighbourhoods and sustainable urban places.

Conclusion:

It is now appropriate that the municipal services within Registered Plan 43M-1923 be initiated for their assumption in accordance with Council's procedures and policies. Other departments must provide clearance prior to a by-law being passed assuming the subdivision.

Respectfully submitted,

Authored by:

_____
John Edwin, EIT, C.E.T.
Manager, Development Construction
Environment & Development Engineering
Public Works and Engineering

Reviewed and Recommended by:

_____
Michael Won, P. Eng., Director
Environment & Development Engineering
Public Works and Engineering

Approved by:

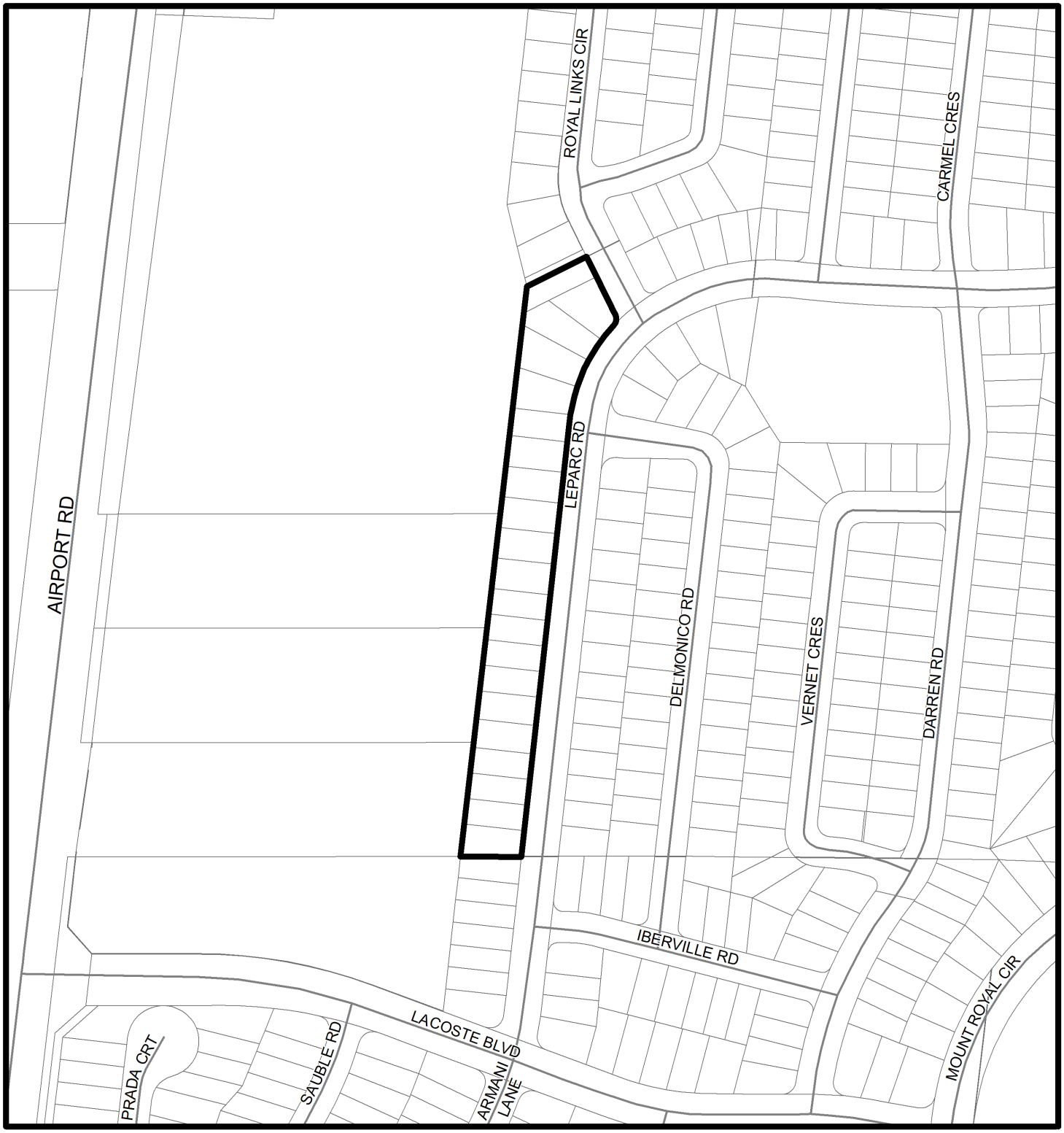
_____
Jayne Holmes, P. Eng.
Acting Commissioner
Public Works & Engineering

Submitted by:

_____
David Barrick
Chief Administrative Officer

Appendices:
Attachment 1: Subdivision Map
Attachment 2: Registered Plan 43M-1923

ATTACHMENT 1



SUBJECT LANDS TO BE ASSUMED

BRAMPTON
Flower City
brampton.ca
PLANNING AND DEVELOPMENT SERVICES

0 30 60 90
Meters

Author: ckovac
Date: 2021/03/02

ATTACHMENT 1 - SUBDIVISION ASSUMPTION
KINDWIN DEVELOPMENT CORPORATION

REGISTERED PLAN: 43M-1923

METRIC: DISTANCES AND COORDINATES ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ATTACHMENT 2

PLAN 43M- 1923

I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF PEEL No. 43 AT 15:56 O'CLOCK ON THE 3rd DAY OF April 2013 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIER NO. 14219-1542 AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NO. PR2351632

Sandra Barbosa
Representative For Land Registrar

THIS PLAN COMPRISES ALL OF PIN 14219-1542.

PLAN OF SUBDIVISION OF

PART OF LOT 17, CONCESSION 7, NORTHERN DIVISION

(GEOGRAPHIC TOWNSHIP OF TORONTO GORE)

NOW IN THE

CITY OF BRAMPTON

REGIONAL MUNICIPALITY OF PEEL

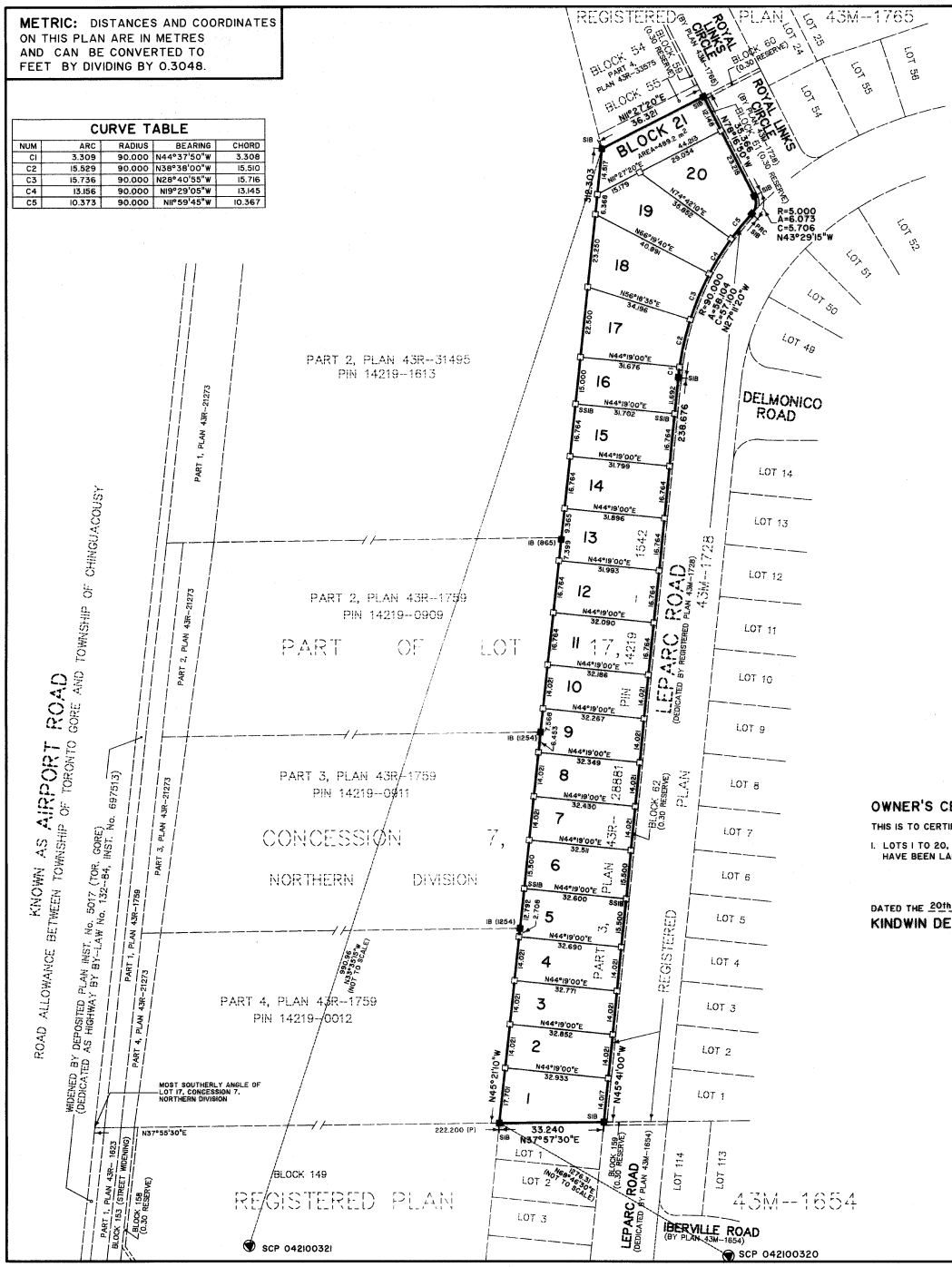
SCALE 1:1000

20 10 0 20 40 60 80 100 METRES

SCHAEFFER DZALDOV BENNETT LTD.

CURVE TABLE

NUM	ARC	RADIUS	BEARING	CHORD
C1	3.309	90.000	N44°37'50"W	3.308
C2	15.529	90.000	N36°36'00"W	15.510
C3	15.736	90.000	N28°40'55"W	15.716
C4	13.156	90.000	N19°29'05"W	13.145
C5	10.373	90.000	N11°59'45"W	10.367



OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT:

1. LOTS 1 TO 20, BOTH INCLUSIVE AND BLOCK 21, HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.

DATED THE 20th DAY OF AUGUST, 2012.

KINDWIN DEVELOPMENT CORPORATION

DAVID BRAND - PRESIDENT
'I HAVE THE AUTHORITY TO BIND THE CORPORATION'

MUNICIPAL APPROVAL
21T-03-007B
APPROVED UNDER SECTION 51 OF THE PLANNING ACT, R.S.O. 1990 THIS 28 DAY OF MAR., 2013.

COMMISSIONER, PLANNING, DESIGN AND DEVELOPMENT DEPARTMENT OF THE CITY OF BRAMPTON

NOTES

□	DENOTES	PLANTED IRON BAR
■	"	FOUND MONUMENT
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
P	"	PLAN 43R-28881
PI	"	REGISTERED PLAN 43M-1728
M	"	MEASURED
922	"	SCHAEFFER DZALDOV BENNETT LTD.
1254	"	R.E. CLIPSHAM, O.L.S.
PRC	"	POINT OF REVERSE CURVE

ALL FOUND MONUMENTS ARE NUMBERED 922 UNLESS NOTED OTHERWISE.

THE 0.30 RESERVE HAS BEEN EXAGGERATED FOR CLARITY.

TOTAL AREA OF SUBDIVISION = 1.0971 ha.

BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIED CONTROL POINTS 042100320 AND 042100321, UTM ZONE 17, NAD83 (ORIGINAL).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY A COMBINED SCALE FACTOR OF 0.999691

SPECIFIED CONTROL POINTS (SCPs): UTM ZONE 17, NAD83 (ORIGINAL) COORDINATES TO URBAN ACCURACY PER SEC. 14(2) OF O.REG. 216/10

POINT ID.	NORTHING	EASTING
SCP 042100320	4849612.291	601552.370
SCP 042100321	4848544.559	600688.921

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 17th DAY OF AUGUST, 2012.

DATE AUGUST 21, 2012.

DAN DZALDOV
Ontario Land Surveyor

SCHAEFFER DZALDOV BENNETT LTD.
ONTARIO LAND SURVEYORS
64 JARDIN DRIVE CONCORD, ONTARIO L4K 3P3 TEL.(416)987-0101

DRAWN: ACAD/SL/LW	CHECKED: WMF	SCALE 1:1000	JOB NO. 02-108-06-02B

NOVEMBER 16, 2012

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-15

Subject: **Initiation of Subdivision Assumption**

Secondary Title: **Scottish Heather Development Inc., Registered Plan 43M-2029 – (North of Steeles Avenue, East of Heritage Road), Ward 6 - Planning References – C05W04.005 and 21T-06024Ba**

Contact: John Edwin, Manager, Development Construction, Environment & Development Engineering Division – 905-874-2538

Report Number: Public Works & Engineering-2021-337

Recommendations:

1. That the report titled: **Initiation of Subdivision Assumption Scottish Heather Development Inc., Registered Plan 43M-2029 – (North of Steeles Avenue, East of Heritage Road), Ward 6 - Planning References – C05W04.005 and 21T-06024Ba,** to the Committee of Council Meeting of April 14, 2021 be received;

2. That the City initiate the Subdivision Assumption of Scottish Heather Development Inc**.**, Registered Plan 43M-2029; and

3. That a report be forwarded to City Council recommending the Subdivision Assumption of Scottish Heather Development Inc., Registered Plan 43M-2029 once all departments have provided their clearance for assumption.

Overview:

- **The maintenance period has expired and all works with respect to the subject subdivision have been completed to the satisfaction of the Environment & Development Engineering Division. It is now appropriate to initiate the subdivision assumption process in accordance with Council's procedures and policies. Other departments must provide clearance prior to a by-law being passed assuming the subdivision.**

Background:

The following development has been completed and the terms of the Subdivision Agreement have been satisfied insofar as the Environment & Development Engineering Division of the Public Works and Engineering Department is concerned. Prior to final release for assumption, all City departments will be circulated to ensure all requirements and conditions have been fulfilled.

Subdivision Name	Legal Description	Street Name
Scottish Heather Development Inc.	43M-2029	Rivermont Road Lionhead Golf Club Road Vetch Street Mussle White Road Temple Manor Tanzanite Lane Financial Drive Lefroy Lane Renardi Lane Gettysburg Gate Brushwood Drive

Current Situation:

The Environment & Development Engineering Division is satisfied that the services completed within this development may be initiated for assumption.

Corporate Implications:

Upon assumption of this development, approximately 2.3 lane kilometers of roadway and associated municipal infrastructure will be added to the City of Brampton's system. There will be future costs associated with the operation and long-term maintenance of the additional inventory of lands and public highways that include infrastructure such as roads, sewers, streetlighting, streetscaping, stormwater management pond, etc.

Strategic Plan:

This report accomplishes the Strategic Plan priorities by supporting the benefits of sustainable growth to build a pre-eminent city with vibrant and connected communities.

Living the Mosaic – 2040 Vision
This report directly aligns with the vision that Brampton will be a mosaic of complete neighbourhoods and sustainable urban places.

Conclusion:

It is now appropriate that the municipal services within Registered Plan 43M-2029 be initiated for their assumption in accordance with Council's procedures and policies. Other departments must provide clearance prior to a by-law being passed assuming the subdivision.

Respectfully submitted,

Authored by:

_____
John Edwin, EIT, C.E.T.
Manager, Development Construction
Environment & Development Engineering
Public Works and Engineering

Reviewed and Recommended by:

_____
Michael Won, P. Eng., Director
Environment & Development Engineering
Public Works and Engineering

Approved by:

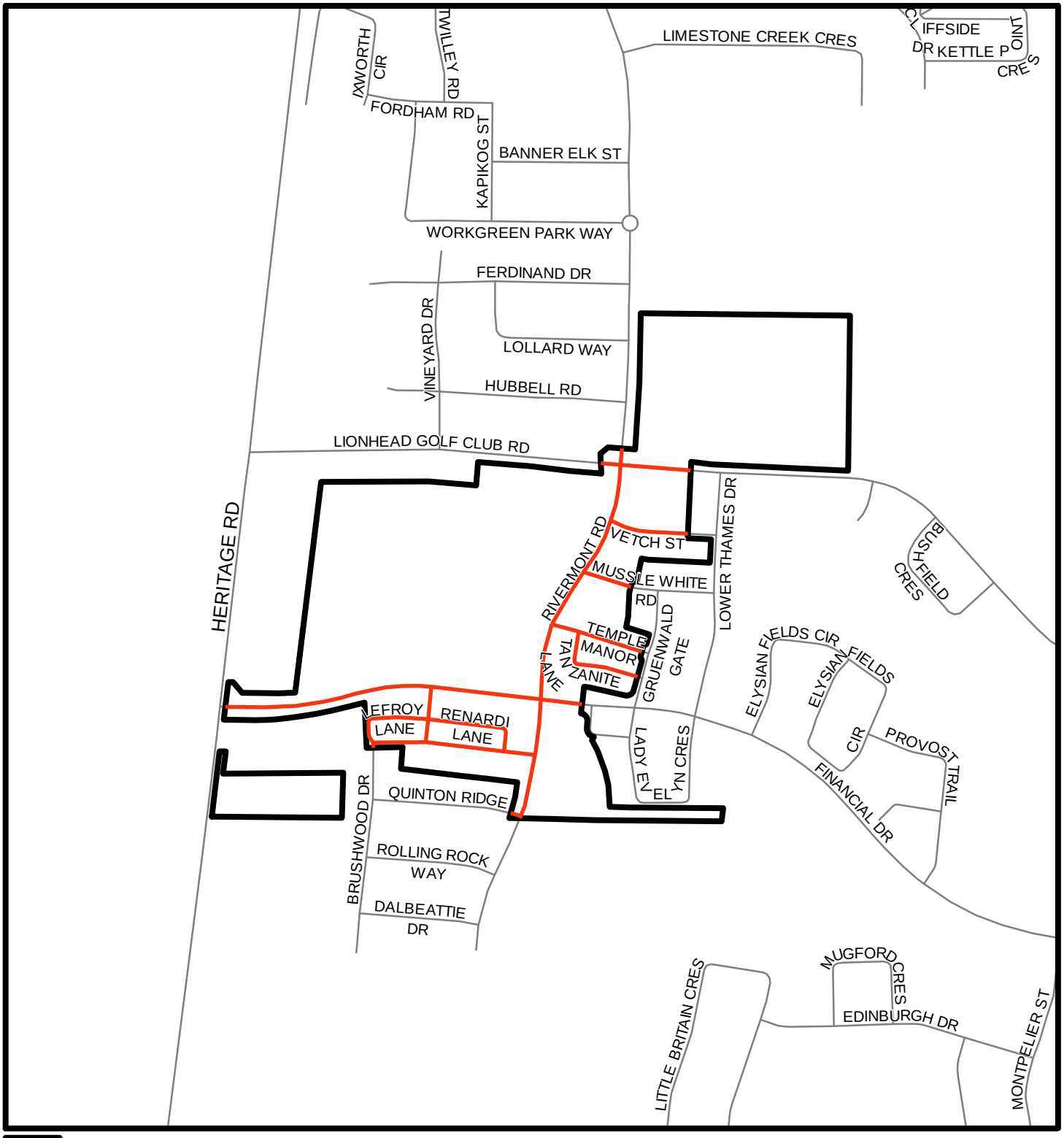
_____
Jayne Holmes, P. Eng.
Acting Commissioner
Public Works & Engineering

Submitted by:

_____
David Barrick
Chief Administrative Officer

Appendices:
Attachment 1: Subdivision Map
Attachment 2: Registered Plan 43M-2029

ATTACHMENT 1



SUBJECT LANDS TO BE ASSUMED

APPROXIMATE ROAD DISTANCE (2.26 KM)

BRAMPTON Flower City
brampton.ca
PLANNING AND DEVELOPMENT SERVICES

0 90 180 270
Meters

Author: ckovac
Date: 2021/03/10

ATTACHMENT 1 - SUBDIVISION ASSUMPTION
SCOTTISH HEATHER DEVELOPMENTS PHASE 2

REGISTERED PLAN: 43M-2029

ATTACHMENT 2

PLAN 43M - 2029

I CERTIFY THIS PLAN 43M - 2029 IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF PEEL (NO. 43) IN 15.55 O'CLOCK ON THE 2nd DAY OF DECEMBER, 2016 AND ENTERED IN THE REGISTERS) FOR PIN(S) 14088-0783, AND REQUIRED CONSENTS AND AFFIDAVITS ARE REGISTERED AS PLAN DOCUMENT NO. PR2014211

Representative for the Land Registrar

THIS PLAN COMPRISES PART OF PIN 14088-0783

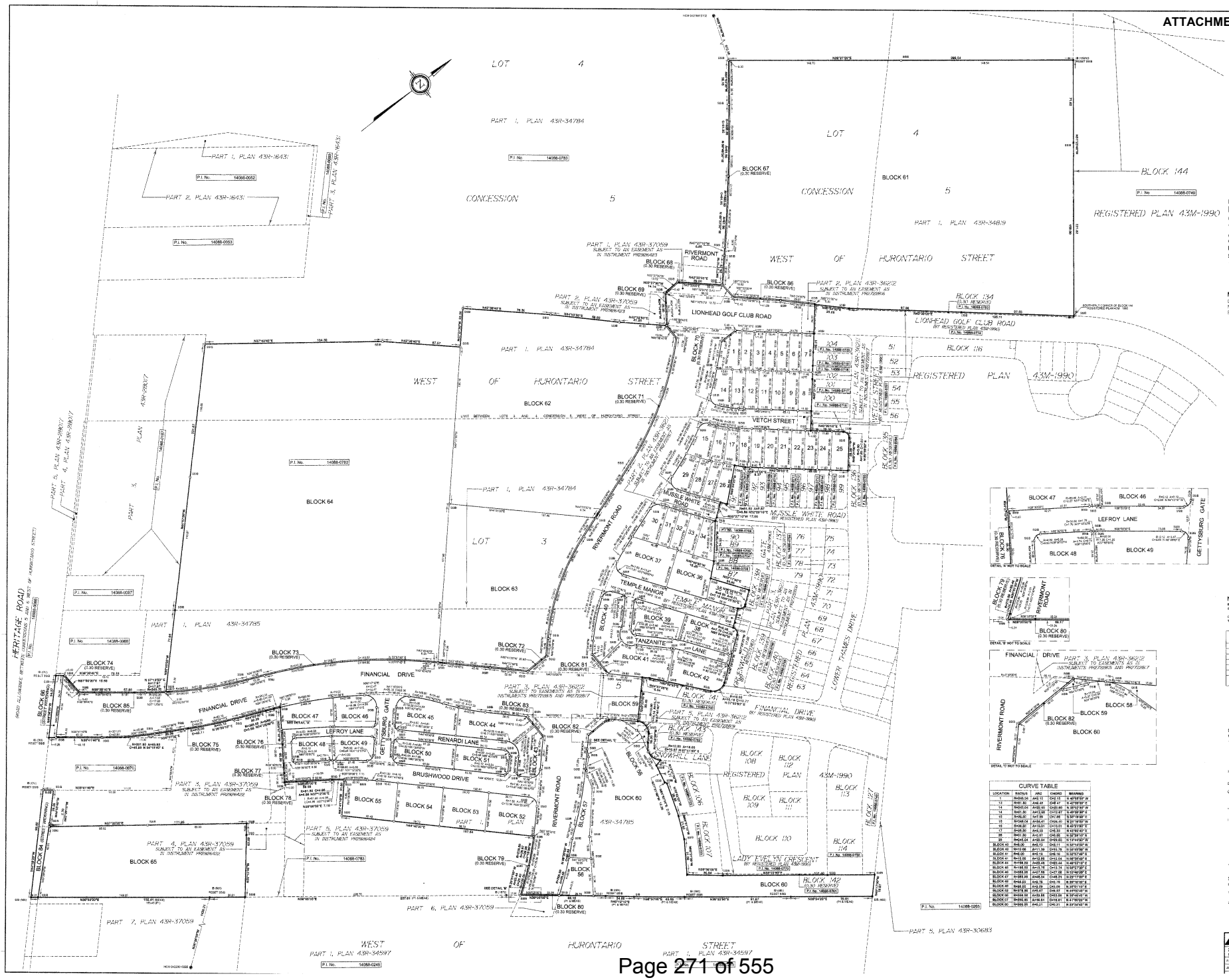
SUBJECT TO AN EASEMENT AS IN INSTRUMENT PR572815 (AFFECTS PART OF RIVERMONT ROAD AND PART OF FINANCIAL DRIVE)

SUBJECT TO AN EASEMENT AS IN INSTRUMENT PR572815 (AFFECTS PART OF LIONHEAD GOLF CLUB ROAD)

SUBJECT TO AN EASEMENT AS IN INSTRUMENT PR572817 (AFFECTS PART OF RIVERMONT ROAD, PART OF FINANCIAL DRIVE, PART OF VETCH STREET, AND PART OF MUSSLE WHITE ROAD)

SUBJECT TO AN EASEMENT AS IN INSTRUMENT PR572818 (AFFECTS PART OF RIVER WOODS)

SUBJECT TO AN EASEMENT AS IN INSTRUMENT PR572819 (AFFECTS PART OF BLOCK 38)



PLAN OF SUBDIVISION OF
PART OF LOTS 3 AND 4
CONCESSION 5,
WEST OF HURONTARIO STREET
(GEOGRAPHIC TOWNSHIP OF CHINGUACOUSY, COUNTY OF PEEL)
CITY OF BRAMPTON
REGIONAL MUNICIPALITY OF PEEL
SCALE 1: 1000

0 5 10 20 30 40 50 100 metres

MMM GEOMATICS ONTARIO LIMITED
ONTARIO LAND SURVEYORS
2016

METRIC
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

NOTE

BEARINGS ARE UTM GRID, DERIVED FROM SPECIFIED CONTROL POINTS (NAD83 (CSRS) AND MTM ZONE 10, UTM ZONE 17, NAD83 (CSRS)).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996511.

SPECIFIED CONTROL POINTS (NAD83 (CSRS) UTM ZONE 17, NAD83 (CSRS) COORDINATES TO UPGRADE ACCURACY PER REG. 216/10 OF O.LS.A. 2002)		
POINT ID	NORTHING	EASTING
04220011005	4830120.73	607558.79
04220011012	4830404.08	608817.05
COORDINATES CANNOT IN THESE LISTS, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.		

■	CONCRETE	ROUND
●	CONCRETE	ROUND, FOUND IRON BAR, PLANTED
C	CONCRETE	IRON BAR, PLANTED
IBC	CONCRETE	DOR MOLDING CO. INC.
IBT2	CONCRETE	TONY BITUMENAK O.L.S.
MMM	CONCRETE	MMM ONTARIO LTD. ONTARIO LIMITED
P1	CONCRETE	PLAN 43R-34785

OWNER'S CERTIFICATE

THIS IS TO CERTIFY THAT:

1. ALL OF LOTS 1 TO 38 BOTH INCLUSIVE, ALL OF BLOCKS 39 TO 85 BOTH INCLUSIVE, STREETS NAMELY ALL OF RIVERMONT ROAD, LIONHEAD GOLF CLUB ROAD, VETCH STREET, MUSSLE WHITE ROAD, TEMPLE MANOR, TANZANITE LANE, FINANCIAL DRIVE, LEFROY LANE, RENARDI LANE, GETTYSBURG GATE, AND BRUSHWOOD DRIVE, AND STREET WIDENING BLOCKS 86 TO 141 BOTH INCLUSIVE, AND RESERVE BLOCKS 142 TO 145 BOTH INCLUSIVE AND 0.3m RESERVE BLOCKS 66 AND 80, HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.
2. THE STREETS AND STREET WIDENING ARE HEREBY DEDICATED TO THE CORPORATION OF THE CITY OF BRAMPTON AS PUBLIC HIGHWAY.

DATED THIS 11 DAY OF October 2016

OWNER: SCOTTISH HEATHER DEVELOPMENT INC.

KATHLEEN SCHOFIELD, A.S.O.

I HAVE THE AUTHORITY TO BIND THE CORPORATION.

MUNICIPAL APPROVAL
CITY OF BRAMPTON
As a Delegate Pursuant to 17 of The Planning Act, R.S.O.1990
Date: December 16

Allan Parsons, Manager, Development Services Department
The Corporation of The City of Brampton

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT AND THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 20TH DAY OF SEPTEMBER, 2016.

September 16, 2016
DATE

BRIAN HODGSON
ONTARIO LAND SURVEYOR

CURVE TABLE

LOCATION	RADIUS	ARC	CHORD	BEARING
1	R=50.00	A=2.15	C=2.15	N 45°28'55" E
2	R=61.50	A=6.49	C=6.47	N 42°25'55" E
3	R=50.00	A=22.50	C=22.31	N 35°12'37" E
4	R=61.50	A=17.00	C=17.07	N 49°29'39" E
5	R=50.00	A=7.39	C=7.38	N 53°37'39" E
6	R=246.04	A=64.41	C=64.20	N 52°16'55" W
7	R=50.00	A=10.01	C=10.01	N 45°31'39" E
8	R=50.00	A=6.33	C=6.33	N 41°52'40" E
9	R=61.50	A=5.47	C=5.46	N 38°39'39" E
10	R=246.04	A=20.64	C=20.63	N 13°44'52" W
BLOCK 45	R=50.00	A=9.13	C=9.11	N 33°41'00" E
BLOCK 45	R=110.00	A=11.59	C=11.78	N 35°45'00" W
BLOCK 41	R=50.00	A=8.16	C=8.16	N 33°57'46" E
BLOCK 41	R=110.00	A=12.85	C=12.84	N 66°36'46" E
BLOCK 41	R=50.00	A=28.49	C=28.11	N 48°23'37" E
BLOCK 41	R=165.00	A=13.78	C=13.74	N 25°21'00" E
BLOCK 42	R=50.00	A=27.86	C=27.58	N 23°56'00" E
BLOCK 47	R=165.00	A=46.24	C=46.21	N 23°11'00" E
BLOCK 48	R=50.00	A=6.15	C=6.15	N 38°31'00" E
BLOCK 48	R=50.00	A=9.09	C=9.08	N 38°31'00" E
BLOCK 48	R=110.00	A=25.07	C=25.07	N 44°31'00" E
BLOCK 50	R=50.00	A=33.85	C=33.38	N 58°40'42" W
BLOCK 51	R=50.00	A=16.61	C=16.61	N 47°56'00" W
BLOCK 60	R=50.00	A=42.31	C=41.31	N 23°34'47" W

Report
Staff Report
The Corporation of the City of Brampton
2021-03-31

Date: 2021-03-31

Subject: **Recommendation Report: Bee City Designation for Brampton**

Contact: Michael Hoy, Supervisor Environmental Planning, Public Works and Engineering, michael.hoy@brampton.ca, 905-874-2083

Report Number: Public Works & Engineering-2021-301

Recommendations:

1. That the report titled**: Bee City Designation for Brampton** to the Committee of Council meeting of March 31, 2021 be received;

2. That staff be directed to complete Bee City Canada's application process to designate Brampton as a Bee City; and

3. That Council proclaim the third week of June annually as National Pollinator Week.

Overview:

- **Pollinator species worldwide are at an increasing risk of population decline due to habitat loss, climate change, pesticides and pest diseases.**
- **The Bee City designation administered by Bee City Canada is a yearly commitment a municipality can make to ensure that pollinators are protected and recognizes the municipality's efforts towards pollinator protection.**
- **Currently there are 45 Bee Cities in Canada with 30 in Ontario.**
- **The City of Brampton is currently implementing multiple supporting plans and programs that protect pollinators and promote collaborations that benefit both pollinators and residents.**
- **The Bee City Canada designation builds upon existing initiatives, and can establish new approaches and partnerships that advance numerous City objectives, including those identified in the Term of Council Priorities, Brampton 2040 Vision, and the Brampton Grow Green Environmental Master Plan.**

Background:

Plants form the building blocks of all ecosystems and disruption to their pollination and subsequent reproduction is likely to result in a decline in plant species diversity and can adversely affect the animals and birds that rely on them. Pollinators play a critical role in maintaining healthy native plant communities and in ensuring that flowering plants produce seeds. In addition, these pollinators play a significant role in crop production. It is estimated that the commercial value of crop pollinators in Canada is roughly $2 billion annually.

Founded in 2016, Bee City Canada is a federally recognized charitable organization with the goal to educate Canadians about the importance of pollinators and to inspire action to ensure pollinator habitat protection. The organization supports collaborative efforts of communities and organizations committed to helping pollinators by offering four designations. These designations are: Bee Cities, Bee Partners, Bee Schools and Bee Campuses.

Bee City Canada offers an opportunity for the City of Brampton to promote and enhance its leading efforts to protect and enhance the City's natural heritage system. The **Bee City Canada Designation** builds upon existing initiatives and can establish new approaches and partnerships that advance numerous City objectives.

This designation requires a yearly commitment that a municipality can make to promote healthy, sustainable habitat for pollinators by supporting collaboration and initiatives that benefit both pollinators and City residents. It also gives deserved recognition to cities that are advocating for pollinators.

National Pollinator Week celebrates pollinators and educates the public about how to protect them. Originally started in the U.S, Pollinator Week has expanded as an international celebration including Canada and is administered by Pollinator Partnership Canada (P2C). Pollinator Partnership Canada is a registered charitable organization that is dedicated to protecting and promoting pollinators and their habitats through conservation, education and research.

Brampton is well positioned to be a Bee City. The Bee City designation is supported by the Brampton Grow Green Environmental Master Plan, Parks and Recreation Master Plan, Natural Heritage and Environmental Management Strategy (NHEMS) and the Eco Park Strategy.

These overarching frameworks and strategies inform the following programs and initiatives that improve pollinator health and habitat:

- Brampton One Million Trees Program
- Don't Mow Let it Grow Initiative
- Valley Naturalization Program
- Park Environmental Stewardship Program
- Community Stewardship Program

As Canada's Flower City, Brampton's floral heritage is an important aspect of the City's cultural heritage. With over 400 road-side gardens and one million spring flowers, the City offers beautiful views to residents and tourists. Acquiring the Bee City designation is great way to celebrate Brampton's Flower City heritage.

Current Situation:

As outlined in Brampton's Official Plan, the City recognizes the importance to protect the natural environment. The Bee City designation provides the opportunity to:

1. promote healthy, sustainable habitat for pollinators to thrive in Brampton;
2. celebrate Brampton's leadership in natural heritage protection and enhancement;
3. foster environmental awareness and increase collaboration and engagement of community stewards for pollinators and pollinator habitat;
4. set an example and encourage residents and businesses to recognize the importance of biodiversity and how pollinators are impacted by climate change; and
5. celebrate Brampton's "Flower City" heritage and ensure the succession of floral blooms in the city's 400 roadside gardens.

Currently, there are 45 municipalities in Canada that have achieved the Bee City designation; with 30 located in Ontario. Some of the Bee Cities include:

- Toronto
- Montreal
- Calgary
- Mississauga
- Hamilton

To see a complete list of Canada's Bee Cities, visit Bee City Canada's website. Additionally, in Brampton, the Friends and Stewards of Dorchester Park have achieved Bee City's Bee Partners designation.

Bee City Canada Application

To apply to become a Bee City, Bee City Canada has set out requirements under its application that require internal staff to oversee all Bee City affairs. These requirements can all be accommodated by existing City programs and include:

1. Establishing a cross functional team - The City's existing Green City Team (consisting of Parks Maintenance and Forestry, Parks Planning and Development and Environment and Engineering staff) will be responsible in undertaking this role as it is a cross-functional collaborative team that coordinates actions of the Natural Heritage Restoration Program;
2. Paying an annual re-application fee – the $1000 annual fee covers resources provided by Bee City Canada; and
3. Committing to the following actions:
    - Create and maintain current pollinator habitats
    - Educate the public about the importance of pollinators
    - Celebrate pollinators during National Pollinator Week (June)

Through the proclamation of the National Pollinator Week, the City can further enhance pollinator outreach and engagement to fulfill the yearly Bee City commitments.

Next Steps:

Following Council's direction to submit the Bee City Canada application to designate Brampton as Bee City, next steps include:

1. Integrating the Bee City requirements into the existing Green City Team mandate;
2. Promoting the Bee City designation on the City's website and social media; and
3. Continuing to support collaborative efforts with residents such as establishing pollinator gardens and engaging the community in environmental stewardship.

Corporate Implications:

<u>Financial Implications:</u>

The Bee City Canada Designation requires a yearly renewal fee of $1000 that will be funded from the City's Environmental Master Plan Implementation budget.

<u>Other Implications:</u>

There are no other implications resulting from the approval of the recommendations of this report.

Term of Council Priorities:

The Bee City Canada focuses on three of the Term of Council Priorities.

The Bee City Canada Designation supports *Brampton is a Green City* priority as it ensures that the City will focus on actions that support natural heritage restoration as well as promote community events and outreach programs that benefit residents and the natural environment.

The Bee City Designation also supports the *Brampton is Healthy and Safe City* and *Brampton is a Mosaic* priorities by supporting urban agriculture initiatives, providing green space for residents to connect with nature to improve mental health, and supporting community events, engagements and outreach programs that empower Brampton's residents.

Conclusion:

The Bee City Designation will recognize the City as a leader in biodiversity protection and set an example for surrounding municipalities. Bee City Canada offers the opportunity to effectively engage residents with Brampton's natural environment and help the City achieve its sustainability goals, all of which align with City's Term of Council priorities.

Authored by:

Karley Cianchino, Environmental Planning

Reviewed by:

Michael Won, Director, Environment and Development Engineering

Approved by:

Jayne Holmes, Acting Commissioner, Public Works & Engineering

Submitted by:

David Barrick, Chief Administrative Officer

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-04-14

Subject: **Request for Budget Amendment: Brampton One Million Trees Program Update**

Contact: Zoe Milligan, Environmental Project Specialist, 905-874-5286, zoe.milligan@brampton.ca

Report Number: Public Works & Engineering-2021-371

Recommendations:

1. That the report titled: **Request for Budget Amendment: Brampton One Million Trees Program Update** to the Committee of Council meeting of April 14, 2021, be received;

2. That a budget amendment of $50,000 be approved and a new capital project be established with funding to be transferred from the Reserve Fund #18 - Tree Canopy Account to facilitate the establishment of a Residential Tree Planting Program; and

3. That Council designate September as Brampton Tree Month.

Overview:

- **The *Brampton One Million Trees Program* is a catalytic action in the *Brampton 2040 Vision: Living the Mosaic* and contributes to the Term of Council "Brampton is a Green City' Priority - *"Implement a Green Framework"* and "Brampton is a Mosaic" Priority - *"Innovative Engagement"* through maintaining and enhancing the City's urban forest.**
- **As part of this program, staff is proposing the development and implementation of a Residential Tree Planting Program to help achieve the City's target of one million trees planted by 2040.**
- **To facilitate this initiative as per the *Brampton One Million Trees Program*'s Five Year Action Plan, funds will need to be drawn from the City's Reserve 18 - Tree Canopy Account. These funds are received as cash-in-lieu**

compensation from the development industry when healthy trees are removed during construction.

- **This report also proposes that Council consider designating the month of September as Brampton Tree Month. This aligns with the Strategy's Five Year Action Plan, the majority of the City's tree planting events, National Forest Week and National Tree Day.**
- **Canadian National Railway (CN) has been secured as the first sponsor for the *Brampton One Million Trees Program.***

Background:

The City of Brampton is a strong leader in the stewardship of its natural heritage, urban forest and trees. Along with its many partners, including the Conservation Authorities, the development industry and the general public, the City plants an average of 43,000 trees per year. Strong stewardship of the urban forest by the community has resulted in Brampton's urban forest accounting for 18% of land cover in Brampton.

The *Brampton One Million Trees Program*, approved by Council in January 2020, is a plan to achieve one million trees planted in Brampton by 2040. To meet the one million trees target by 2040, 50,000 trees on average need to be planted across Brampton each year for the next 20 years.

The City has a number of tools in place to support Brampton's urban forest and maintain it in the long-term. For example, the City requires all healthy tableland trees removed for new development to be replaced with new tree plantings in accordance with the replacement ratios outlined by the City's Tableland Tree Assessment Guidelines. In circumstances where compensation by planting is not achievable on the development site, the City accepts cash-in-lieu, which is used to fund tree planting initiatives in other locations across Brampton. These funds are placed in the City's Reserve 18 – Tree Canopy Account. This report is requesting the withdrawal of funds from this Reserve Account to assist with the establishment of the first stage of the Residential Tree Planting Program.

Current Situation:

In 2020, 24,200 trees were planted in Brampton, including 6,100 planted by the City of Brampton. The last year was challenging for tree planting programs in Brampton due to the COVID-19 pandemic. The majority of community planting events usually held by the City and Conservation Authorities were cancelled or significantly reduced. City and Conservation Authority staff were able to recoup some planting activity in the fall and winter of 2020.

It is expected that community plantings will continue to be impacted by COVID-19 restrictions this year; however, staff is further developing strategies to help improve tree planting numbers as well as to continue to engage the community and build stewardship of Brampton's trees and urban forest. This includes significant tree plantings in parklands and valleylands, and the initiation of new tree planting initiatives, such as a Residential Tree Planting Program.

In addition to planting trees, the following actions have been completed as part of the *Brampton One Million Trees Program* since the Program's approval in January 2020.

- Initiation of the "Green City Working Group" that includes Environmental Planning, Forestry, Parks Planning and Development, Parks Maintenance and (Parks) Community Programs.
- Launching of a new tree webpage at www.brampton.ca/trees.
- Development of a public interactive Tree Planting Tracker map to promote and track the progress of the *Brampton One Million Trees Program*.
- Production of a tree brochure that outlines the benefits of trees, as well as tree planting and maintenance tips.
- Continued encouragement of residents and businesses to plant and care for trees on their own property, through online resources, videos and social media.
- Collaboration with other City initiatives (e.g. Nurturing Neighbourhoods Program, SNAPS, Eco Park) to leverage resources and help identify priority planting locations.
- Development of a parks tree planting program for existing parks.
- Integration of tableland tree planting projects into the City's Naturalization Program.
- Acquisition of Canadian National Railway (CN) as the *Brampton One Million Trees Program*'s first sponsor.

Brampton's Urban Forest Management Plan

Staff from Urban Forestry and Environmental Planning have been working with Urban Forest Innovations Inc. in developing Brampton's first *Urban Forest Management Plan* since 2019. A background review and analysis informed engagement activities with internal and external stakeholders that were completed in January 2021. The final deliverable will be an *Urban Forest Management Plan* in early 2022.

Engagement activities completed include an internal and external workshop as well as a public survey. Over 300 community members provided their input for the *Urban Forest*

Management Plan through the survey. Staff also launched a public art contest for the front cover of the Urban Forest Management Plan Framework. Community members submitted over 200 pieces of art for the contest (see Appendix 1).

Residential Tree Planting Program

A key recommendation in the *Brampton One Million Trees Program* is to provide tree planting incentives for planting on residential property. This year as part of Brampton Tree Month, the Green City Working Group is planning to launch the first stage of a Residential Tree Planting Program through the sale of subsidized trees to encourage Brampton residents to plant on their property. The launch of this stage will be subject to the COVID-19 restrictions in place at that time.

To undertake this initiative, staff is requesting approval of a budget amendment of $50,000 and establishment of a new capital project, with funding to be transferred from the City's Reserve Fund #18 –Tree Canopy Account.

Brampton Tree Month

A short-term action identified in the *Brampton One Million Trees Program* is the designation of September as Brampton Tree Month. This designation would improve recognition of the City's existing tree planting initiatives and provide new opportunities to celebrate the City's leadership in enhancing and maintaining Brampton's urban forest. It would also complement National Tree Day and National Forest Week, both of which fall within the month of September. In the past, the City participated in celebrations of National Tree Day and National Forest Week by organizing a series of community planting events throughout September. In 2020, a social media tree campaign was conducted for the month of September with tree videos and additional resources for residents posted within the City's Tree webpages to celebrate these days. This campaign received significant support from residents and strong public participation and engagement.

Funding:

Cash in Lieu of Tableland Trees in New Development

The City requires all healthy tableland trees removed for new development to be compensated as outlined in the City's Tableland Tree Assessment Guidelines. When compensation by planting is not achievable on the development site, the City accepts cash-in-lieu of new trees planted, which is used to fund tree planting initiatives in other locations across Brampton.

The City established Reserve 18 - Tree Canopy Account (#650165) in 2017 to facilitate the tree compensation planting cash-in-lieu process. This report is requesting withdrawal from this reserve to assist with the Residential Tree Planting Program.

Additional Funding Opportunities

The Government of Canada recognizes the importance of trees through its *2 Billion Trees Commitment,* whereas in 2020, they committed to planting 2 billion trees over the next 10 years to clean the air and make communities greener. The Federal Government is looking to support municipalities and community groups in their tree planting initiatives to help achieve this target and is providing funding opportunities through its *Growing Canada's Forests Program* to support municipal tree planting goals. The *Brampton One Million Trees Program* and its initiatives align with the Federal *2 Billion Trees Commitment* and staff will continue to pursue funding opportunities made available through this Federal initiative.

Additionally, the *Brampton One Million Trees Program* secured its first sponsor, Canadian National Railway (CN). Staff will continue to look for opportunities for private sponsorship of the *Brampton One Million Trees Program* initiatives.

Next Steps:

Upon approval of this report by Council, the City's Green City Working Group will:

- Finalize the Residential Tree Planting Program;
- Develop a communication and engagement strategy for 2021 Brampton Tree Month; and
- Identify funding opportunities through the *Growing Canada's Forests Program* and private sponsorships.

Corporate Implications:

Financial Implications

Subject to Council approval, a budget amendment will be required and a new capital project will need to be established in the amount of $50,000 for the initiation of a Residential Tree Planting Program through a subsidized tree sale with funding to be transferred from Reserve # 18 - Future Construction (Tree Canopy receipt # 8237 ($7,500) and receipt # 9311 ($42,500)), which currently has sufficient funding.

Term of Council Priorities:

The development and implementation of the *Brampton One Million Trees Program* actions, including the development of a Residential Tree Program and the designation of Brampton Tree Month, contribute to the Term of Council "Green City" Priority – *"Implement a Green Framework*" through the promotion of individual and community tree plantings in Brampton and through providing the tools for residents to steward and care for Brampton's urban forest.

In addition, the initiatives contribute to the "Mosaic" Priority – *"Innovative Engagement"* through engaging communities to take pride and care in their City's landscape and participate in activities to celebrate and build awareness around the importance of trees and the City's urban forest, including residential tree plantings, neighborhood tree plantings and community events with local organizations and community groups.

Conclusion:

The City of Brampton is a leader in the stewardship of trees and the city's urban forest through the many programs and initiatives it has undertaken. Though 2020 tree planting numbers did not meet targets due to the COVID-19 pandemic restrictions, the City continues to make good progress on building a framework for future success and taking actions that will see Brampton achieve or exceed its goal of planting one million trees by 2040.

Authored by:

Zoe Milligan,
Environmental Project Specialist

Reviewed by:

Michael Won,
Director, Environment and Development Engineering

Approved by:

Jayne Holmes,
Acting Commissioner, Public Works & Engineering

Submitted by:

David Barrick,
Chief Administrative Officer

Attachments:
Appendix 1 Finalists in the Urban Forest Art Contest

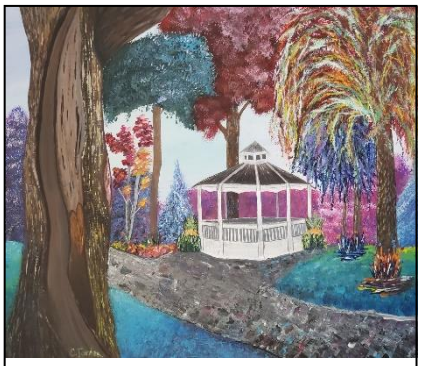
Appendix A – Urban Forest Art Contest Finalists

All art submissions can be viewed at the Brampton's Urban Forest webpage here.

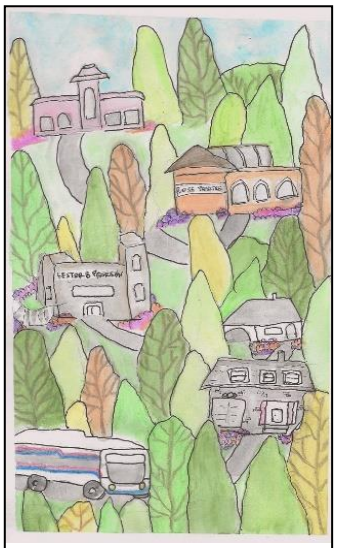
Winner – Sujana Haider

Runner up – Nimesh Shah

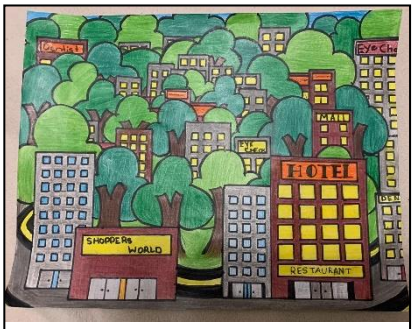
Runner up – Mei Le Wong



Runner up – Cristina Jordan



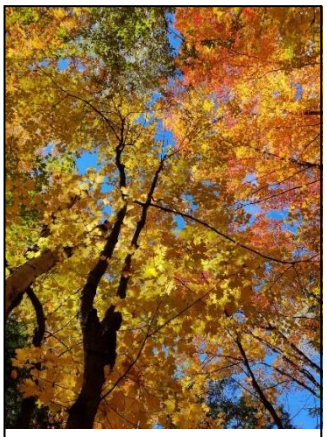
Runner up – Amanda Ocampo



Runner up – Keshvi Vaghela

Runner up – Hirnakshi Joshi

Runner up – Anna Sizova



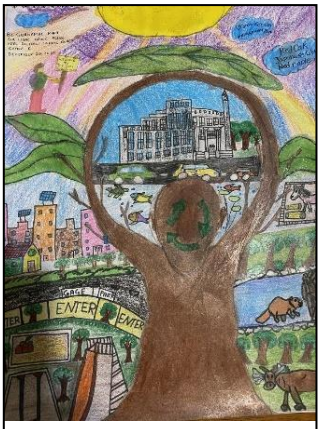
Runner up – Kasturi Bhatt

Runner up – Shannia Lewis

Runner up – Mary Perkins

Honorable Mention – Malika Haider

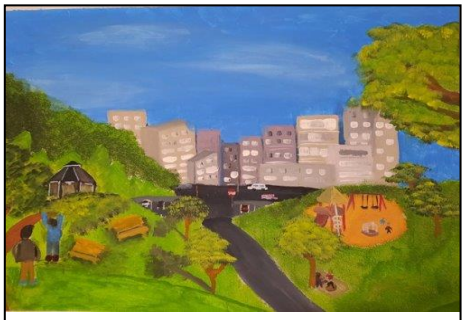
Honorable Mention – Jagtar Singh Jaura



Honorable Mention – Prab Kainth

Honorable Mention – Johal

Honorable Mention – Dolson Public School Grade 2 Class



Honorable Mention – Pratishtha

Report
Staff Report
The Corporation of the City of Brampton
2021-03-31

Date: 2021-03-16

Subject: **Zero Carbon Retrofit of South Fletcher's Sportsplex – Budget Amendment and Request to Begin Procurement**

Contact: **Chun Liang, Supervisor – Energy Management**

Report Number: Public Works & Engineering-2021-370

Recommendations:
Based on the following report, it is recommended:

1. That the report from Chun Liang, Supervisor, Energy Management, to the Committee of Council meeting of March 31 2021, re: Zero Carbon Retrofit of South Fletcher's Sportsplex – Budget Amendment and Request to Begin Procurement be received; and

2. That a budget amendment be approved and a new capital project be established in the amount of $1,420,000 for detail design services of the Zero Carbon Retrofit of South Fletcher's Sportsplex, with funding of $1,420,000 transferred from Reserve #30-Energy Efficiencies to this capital project; and
3. That the Purchasing Agent be authorized to commence the procurement for the **Zero Carbon Retrofit of South Fletcher's Sportsplex**
4. That staff be authorized to enter into a contract for detailed design services with subsequent phases for construction and measurement and verification subject to Council approval.

Overview:

- **In 2019, the City committed to reduce corporate facility GHG emissions by 80% from 2010 levels by 2050; 30% from 2010 levels by 2030; and 20% from 2010 levels by 2024.**

- **In 2020, the City of Brampton completed the City's first carbon neutral feasibility study for the South Fletcher's Sportsplex which identified various options to reach 50-100% in GHG emissions reductions for the facility**

- **This report seeks Council approval to commence procurement to complete work at South Fletcher's in order to make it the City's first zero carbon recreation facility.**

Background:

In 2019, the City of Brampton released the Energy & Emissions Management Plan 2019-2024: A Zero Carbon Transition, which aims to achieve a zero carbon transition for the City's new and existing corporate facilities. This plan outlines three key objectives: to minimize emissions intensity, to minimize energy intensity, and to maximize cost recovery.

The City of Brampton is committed to leading by example, and has adopted the provincial and federal greenhouse gas (GHG) emission reduction targets of 30% and 80% for 2030 and 2050, respectively (using a 2010 baseline) for all City owned and managed facilities. The City has set an interim target of 20% GHG emissions reduction for all City owned and managed facilities by 2024.

The City has also demonstrated its commitment towards improving energy efficiency and reducing GHG emissions in Brampton through:

- City Council's Climate Emergency declaration, which included a target to reduce GHGs generated in Brampton by 80 percent by 2050.
- City's Community Energy and Emission Reduction Plan (CEERP), which includes community wide energy efficiency and GHG emission reduction targets.
- City's membership in the Global Covenant of Mayors for Climate and Energy, a first-of-its-kind global alliance of more than 9,200 cities leading the fight against climate change.
- the City's participation in the Peel Climate Change Partnership, a collaboration between the Region of Peel and local municipalities that work together on projects and to secure funding to help reduce GHG emissions and adapt to climate change across Peel.
- The Brampton Grow Green Environmental Master Plan, which recommends the development of energy conservation and GHG emission reduction strategies for City facilities.

In order to achieve its environment sustainability and climate change targets, the City must reduce GHG emissions from the largest GHG emitting City-owned facilities.

Recreational facilities account for nearly 50 percent of the City's annual GHG emissions. South Fletcher's Sportsplex has been identified as one of the City's top five GHG emitters. This facility is also one of the City's largest multi-use recreational facilities at about 173,000 ft^2 and most of the major building systems are at the end of their useful life. As such, the South Fletcher's Sportsplex provides an opportunity to undertake retrofit options that will transform the City asset into a zero carbon facility.

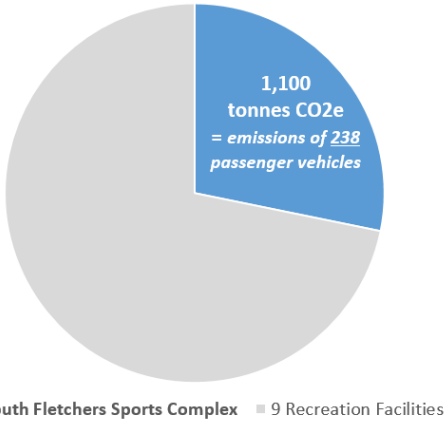


Figure 1 - Top 10 Recreational Facilities >15 years old

Current Situation:

A Carbon Neutral Study was recently completed by a consultant, to identify options for GHG reductions, and energy and life cycle savings for South Fletcher's Sportsplex.

The preferred two options from this study include:

1) Option 1: an 80% reduction in GHG emissions from energy efficiency measures, and carbon offsets to reach 100% reduction; and
2) Option 2: a 100% reduction in GHG emissions.

The major measures included within each of these options are summarized in the table below

Measure	Option 1	Option 2
Battery Energy Storage	✓	✓
Ground Source Heating and Cooling	✓ *Low-Temp	✓ **High-Temp
Automation and Control	✓	✓
High Efficiency Ice Plant with Heat Recovery	✓	✓
Solar PV – Rooftop		✓
Carbon Offsets	✓	

The estimated costs for implementing Options 1 and 2 **(not including design)** are summarized in the table below:

	Option 1	Option 2
Capital Costs (M)	$12.97*	$20.84
Annual Utility Savings (M)	$0.50	$0.50
Life Cycle Cost Savings (M)	$3.08	-$3.49
Cost/ GHG Reduction	$7,501	$12,091

**Note: The $12.97M capital costs includes an additional $100k for the costs of carbon offsets. This also affects the cost per GHG reduction.*

At this time, Energy Management staff recommend that the City retain an Energy Services Company (ESCo) as the ESCo can provide a guarantee on the energy cost savings and emissions target delivered through a performance contract. Pricing will be requested for detailed design, construction and measurement and verification for a 100% GHG reduction project; however, the final costs for construction will be confirmed by the ESCo after completion of the detailed design. Staff will report back to Council with the final implementation costs for the project.

Programming Considerations

Staff will also consider the implications of each of the options in regards to the operation of the facility due to COVID-19, impacts to recreation programming, life cycle age of the equipment to be replaced, payback periods, as well as work associated with the proposed Community Youth Hub.

Carbon Neutral Design and Guarantee

The proposed delivery method includes a performance guarantee for meeting the energy and emissions targets to ensure success of the project. The guarantee is important in ensuring that the ESCo meets the target specified. This approach has been used by other municipalities and by the federal government.

The successful ESCo will undertake the project in two phases. The first phase, to be completed in 2021, is the **Detailed Design** for which the ESCo will provide the City with detailed drawings and specifications for the selected GHG and energy cost reduction measures to complete the work required to make South Fletcher's a zero carbon recreational facility. Subsequent to Council approval to proceed, construction will be planned for 2022 with the same ESCo who was awarded the detailed design in order to maintain the performance guarantee. This will be followed by Measurement & Verification.

Project Benefits

This project has the following benefits in addition to GHG reductions and energy cost savings:

<u>Operational</u>

- Reduced equipment failure due to major building systems being at the end of their useful life
- Lifecycle cost savings for maintenance of building systems

<u>Community</u>

- Broader education and awareness regarding zero carbon technologies
- Improved thermal comfort for facility users
- Community pride in one of the first carbon neutral recreation centres

Corporate Implications:

Purchasing Comments

A public procurement process will be conducted and the submissions shall be evaluated in accordance with the published evaluation process within the bid document. The document will request submissions and pricing for the full scope of the project, being detailed design, construction and measurement and verification; however, provisions will be included to allow for a decision point after award of the detailed design phase where approval by Council will be required to proceed with the subsequent phases for construction and measurement and verification. Purchase approval shall be obtained in accordance with the Purchasing By-law.

All communication with Bidders involved in the procurement must occur formally, through the contact person identified in the Bid Document.

Financial Implications:

Subject to Council approval of the budget amendment, a new Capital Project will need to be established for detail design services of the Zero Carbon Retrofit of South Fletcher's Sportsplex, with funding of $1,420,000 transferred from Reserve #30-Energy Efficiencies, which has sufficient funding as at December 31, 2020.

Subsequent phases for Zero Carbon Retrofit of South Fletcher's Sportsplex, will require additional funding, which will be confirmed by the ESCo after completion of the detailed design and staff will report back to Council on the final construction, and measurement and verification costs for the project, subject to council approval.

Based on the initial feasibility study, staff expects annual utility costs savings of approx. $500,000 as a result of this initiative, and if construction is approved, the South Fletcher Capital projects, listed in table below, which council has Approved in Principal in the amount of $4,245,000 for year 2022 may be incorporated into this initiative.

South Fletchers Capital Program-Approved In Principal			Forecast	
Project Id	**Activity Id**	**Activity Description**	**Year**	**Budget**
201650	016	Solar Photovoltaic Panels Addition	**2022**	1,598,000
201650	048	Replacement of Heat Pumps	**2022**	1,041,000
201650	049	Building Automation System (BAS) Replacement	**2022**	296,000
201650	051	Replacement of Refrigeration Plant Equipment	**2022**	1,059,000
201650	052	Replacement of Mechanical Equipment	**2022**	251,000
Total				**$ 4,245,000**

Legal Implications

Given the anticipated monetary expenditure with a third party Vendor, and following the Purchasing By-Law (19-2018), Procurement should be engaged to provide a full, open and transparent competitive bid process. Legal will assist to review and provide input for any third party engagement agreement to ensure that the City is protected in accordance with industry practices.

Other Implications:

There are no other implications resulting from the approval of the recommendations of this report.

Term of Council Priorities:

The South Fletcher's Sportsplex Zero Carbon Retrofit project directly fulfills the "Brampton is a Green City" Term of Council Direction, in particular Council Priority "Lead Environmental Innovation" that includes the Key Initiative to "Implement environmental and energy efficiency standards across City facilities".

This project also supports the Term of Council Direction "Brampton is a Well-Run City", particularly the Council Priorities for the "Stewardship of Assets and Services" and "Service Excellence".

Conclusion:

An investment in the zero carbon retrofit of South Fletcher's Sportsplex will further the City's role as a leader in creating sustainable facilities, and as champion of energy conservation and GHG emissions reductions.

It is also possible that the South Fletcher's Sportsplex may be recognized as the country's and City's first zero carbon recreational facility retrofit, under the CaGBC's zero carbon performance standard. This would bring wider recognition to the City as a whole confirming Brampton's commitment to reducing the effects of climate change.

Authored by:

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Director, Facilities Operations & Maintenance
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Approved by:

Jayne Holmes
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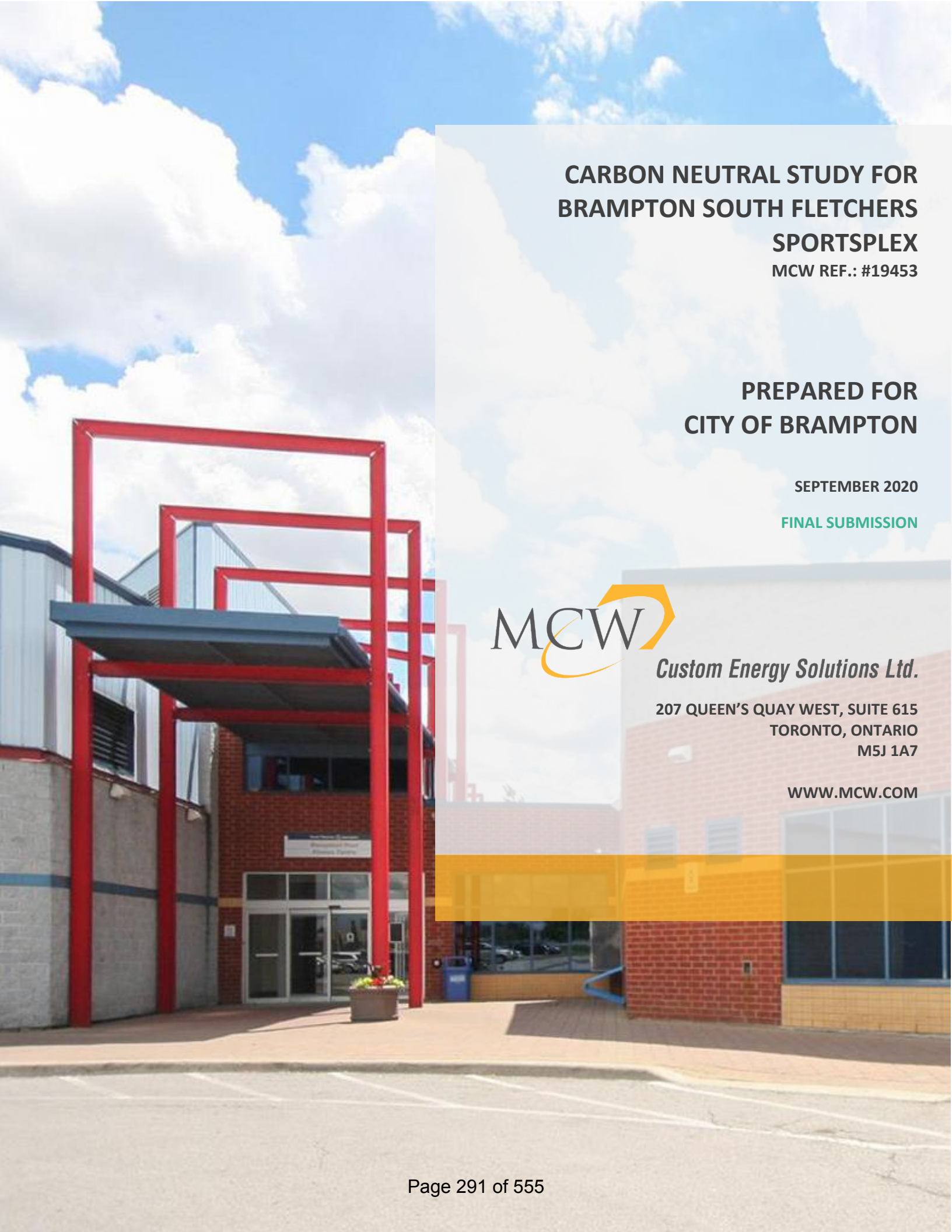
Public Works & Engineering

Submitted by:

David Barrick
Chief Administrative Officer
Office of the CAO

Attachments:

- South Fletcher's Carbon Neutral Feasibility Study



CARBON NEUTRAL STUDY FOR BRAMPTON SOUTH FLETCHERS SPORTSPLEX

MCW REF.: #19453

PREPARED FOR CITY OF BRAMPTON

SEPTEMBER 2020

FINAL SUBMISSION

MCW Custom Energy Solutions Ltd.

207 QUEEN'S QUAY WEST, SUITE 615
TORONTO, ONTARIO
M5J 1A7

WWW.MCW.COM

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SECTION 1

EXECUTIVE SUMMARY

1 EXECUTIVE SUMMARY

1.1 OVERVIEW & TERMS OF REFERENCE

MCW Custom Energy Solutions Ltd. has been commissioned to provide a Carbon Study at the South Fletchers Sportsplex Building located at 500 Ray Lawson Blvd, Brampton, ON. The objective of this study is to complete a comprehensive technical and financial analysis of options and determine the best approach to reduce the building's carbon footprint. The Carbon Neutral Study is to identify opportunities to significantly reduce the building's energy consumption and resulting greenhouse gas (GHG) emissions. The proposed changes should also significantly reduce the energy costs for the building.

The South Fletchers Sportsplex is a (172,827 ft^2) community centre located in Brampton, ON. The two-storey facility was constructed in 1996. This report provides a comprehensive analysis of the facilities energy consumption, carbon footprint, existing asset service life and corresponding expenditure, and ties each component together through a Life Cycle Cost Analysis (LCCA) to determine which solution has the best Net Present Value (NPV) for the facility.

The preparation of this feasibility study 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 (FCM). Notwithstanding this support, the views expressed are the personal views of the authors, and the FCM and the Government of Canada accept no responsibility for them.

1.1.1 CARBON SAVINGS TARGETS

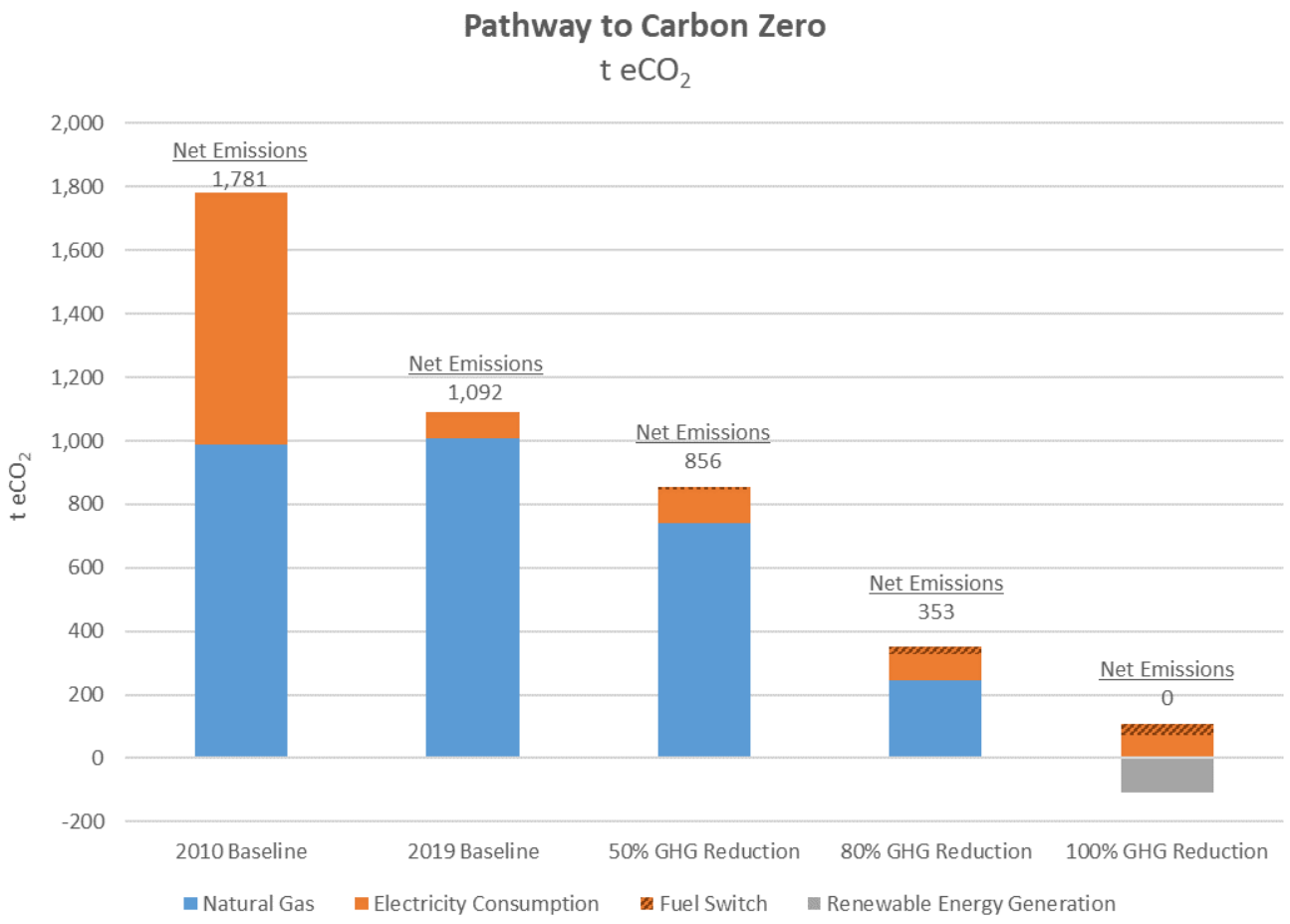
As part of this iterative design process the City has requested ten Energy Retrofit Program options for comparison. The stated requirements of the options are:

- Option 0: Existing Building Operation
- Option 1-3: 50% Carbon reduction from status quo
- Option 4-6: 80% Carbon reduction from status quo
- Option 7-9: 100% Carbon reduction from status quo

Carbon reductions can be achieved through various means. Available strategies include energy conservation measures, fuel switching, renewable energy generation, and renewable energy credits/carbon offsets. All of these strategies have been considered as part of this report and more are included as the carbon reduction target increases. To what extent each strategy is used is a function of the carbon target (i.e. 100% targets require that a full fuel switch from on site natural gas use to electric be completed) and feasibility.

Before the energy audit of the building was completed, a benchmarking exercise was completed in order to determine the extent to which each of these strategies would need to be entertained to achieve each reduction target. How the benchmarks were arrived at is presented in *Section 3 – Utility Analysis*, but the results of this benchmarking exercise are presented here, so as to inform the reader of how the targets stack up against the existing conditions. This "Roadmap to Carbon Zero" served as the bases for the energy audit and ECM generation that is presented in this report.

1 EXECUTIVE SUMMARY



1.2 ENERGY RETROFIT PROGRAMS

Energy Retrofit Programs have been assembled to meet the targets as follows. All programs include those ECMs determined to be low payback which present a viable business case (A01 - LED lighting retrofits, A04 – Arena lighting controls, B01 – Battery Energy Storage System, and H01 – Domestic Water Retrofits). Additional ECMs:

- Option 1, 50% Target: This option includes a retrofit of the ice plants with new C02 chillers with a higher heat recovery capacity
- Option 2, 50% Target: This option includes a retrofit of the ice plants, but with ammonia chillers instead of C02. As a result, integration onto a district energy heating system is required to hit the reduction target.
- Option 3, 50% Target: This option considers implementing all those measures with capital projects under consideration (ice plant replacement, BAS upgrades, and replacements of the boilers, air handlers, and heat pumps).

Energy Retrofit Programs with 80% targets and above require a significant electrification of the building's heating system. This is accomplished through the installation of a ground source heat loop that displaces the requirement for the boilers to serve building's low temperature heating loop.

- Option 4, 80% Target: This option includes a retrofit of the boilers, ice plants, and air handlers, and BAS.
- Option 5, 80% Target: This option includes a retrofit of the boilers, ice plants, and air handlers, and BAS. Additional lighting retrofits add to the carbon savings.
- Option 6, 80% Target: This option is similar to option 4, but forgoes retrofits of the air handlers and substitutes a partial recladding of the building envelope.

Energy Retrofit Programs with 100% targets, carbon neutral operation, require a full electrification of building heating. Additional retrofits reduce the carbon footprint of the electrical consumption.

- Option 7, 100% Target: This option includes the installation of a ground source heating loop to serve the entirety of the buildings heating needs. Retrofits of the air handlers, BAS, and ice plants are also included. All heating sources including in stand heating and dehumidifiers are decarbonized, as are the arena's ice resurfacers. A significant recladding of the building is also included.
- Option 8, 100% Target: This option is similar to option 7, but building heat is generated from a waste water source heat pump tied into a region of Peel sewer trunk north west of the building, in lieu of the ground source system envisioned in option 7.
- Option 9, 100% Target: This option is similar to option 7, but forgoes recladding the building envelope.

Options 7 – 9 do not meet the 100% carbon reduction targets using traditional EMCs, but the use of Renewable Energy Credits and/or Carbon Offsets allow for carbon neutral operation of the building.

1 EXECUTIVE SUMMARY

1.2.1 SCENARIO MEASURE SCOPE MATRIX

Each of the energy retrofit programs requires a different selection of ECMs. These scenarios are summarized in the following Measure Scope Matrix:

Measure Scope Matrix											
Measures			50% Annual GHG Emissions Reduction			80% Annual GHG Emissions Reduction			Carbon-Neutral Operations		
Group	Tag	Name	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
	A	Lighting Retrofits & Redesigns									
	A01	LED Retrofits & New Fixtures (Interior)	IN	IN	IN	IN	IN	IN	IN	IN	IN
	A02	LED New Fixtures (Exterior)					IN		IN	IN	IN
	A03	Lighting Controls (Basic)					IN		IN	IN	IN
	A04	Lighting Controls (Arena)	IN	IN	IN	IN	IN	IN	IN	IN	IN
	B	Electrical Modifications									
	B01	Battery Energy Storage System (City Owned)	IN	IN	IN	IN	IN	IN	IN	IN	IN
	B02	Battery Energy Storage as a Service									
	C	Building Automation System									
	C01	Demand Control Ventilation			IN	IN	IN		IN	IN	IN
	C02	Analytic Control Tuning							IN	IN	IN
	D	HVAC									
	D01	Heating Boilers - Condensing			IN						
	D02	Heating Boilers - Condensing Lower Water Temperature				IN	IN	IN			
	D03	DHW Boiler - Condensing			IN	IN	IN	IN			
	D04	Pool Boiler - Condensing			IN	IN	IN	IN			
	D05	Ground Source Heat Loop - Low Temp Loop				IN	IN	IN			
	D06	Ground Source Heat Loop - High Temp Loop							IN		IN
	D07	AHU Replacement			IN	IN	IN	IN	IN	IN	IN
	D08	AHU VAV Conversion				IN	IN		IN	IN	IN
	D09	Heat Pump Replacement			IN				IN	IN	IN
	D10	Low Temp Loop Variable Speed Pumping							IN	IN	IN
	D11	Waste Water HR - High Temp Loop								IN	
	D12	District Energy Integration		IN							

Measure Scope Matrix											
Measures			50% Annual GHG Emissions Reduction			80% Annual GHG Emissions Reduction			Carbon-Neutral Operations		
Group	Tag	Name	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C	Scenario A	Scenario B	Scenario C
	E	Refrigeration									
	E01	Chiller Replacement w HR - Ammonia Plate and Frame		IN							
	E02 A	Chiller Replacement w HR - C02 - Indirect Slab Cooling	IN		IN	IN	IN	IN	IN	IN	IN
	E02 B	Chiller Replacement w HR - C02 - Direct Slab Cooling									
	E03	Cold Water Flooding					IN		IN	IN	IN
	E04	Ice Resurfacer Replacement							IN	IN	IN
	E05	Radiant Heating Conversion				IN	IN	IN	IN	IN	IN
	E06	Dehumidifier Conversion				IN	IN	IN	IN	IN	IN
	F	Pool Systems									
	F01	Pool and Whirlpool VFD									
	F02	Pool Temperature Setback	IN	IN	IN	IN	IN	IN	IN	IN	IN
	G	Building Envelope									
	G01	High Performance Glazing							IN	IN	
	G02	Roof Insulation - Phase I							IN	IN	
	G03	Roof Insulation - Phase II							IN	IN	
	G04	Exterior Wall Insulation - Phase I							IN	IN	
	G05	Exterior Wall Insulation - Phase II						IN	IN	IN	
	G06	Interior Window Replacement									
	H	Domestic Water Conservation									
	H01	Domestic Water Retrofits	IN	IN	IN	IN	IN	IN	IN	IN	IN
	I	Renewable Energy Generation									
	I01A	Solar PV - Roof - 1.18 MW array									
	I01B	Solar PV - Roof - 0.60 MW array							IN	IN	IN
	I02	Solar PV - Parking Lot - 1.03 MW array									
	I03	Solar Thermal - Pool Heating									
	J01	Remove In Stand Heating									

1.2.2 SCENARIO FINANCIAL PERFORMANCE SUMMARY

The following Financial Performance Summary table presents the financial results and GHG emissions reductions associated with each Option.

Design Option	Implementation Cost	Annual Energy Cost	Life Cycle Cost	Annual GHG Emissions	Annual GHG Reduction		Cost/GHG Reduction
					[Tonnes eCO2]	[%]	
Option 0	-	$846,500	$22,380,000	1781	-		-
Option 1 50% A	$4,414,000	$445,200	$14,630,000	716	1,065	60%	$4,143
Option 2 50% B	$4,496,000	$422,200	$14,340,000	895	886	50%	$5,601
Option 3 50% C	$8,830,000	$409,900	$17,900,000	635	1,146	64%	$7,705
Option 4 80% A	$12,710,000	$345,500	$19,400,000	373	1,408	79%	$9,028
Option 5 80% B	$12,870,000	$339,800	$19,300,000	375	1,406	79%	$9,153
Option 6 80% C	$13,250,000	$354,200	$19,260,000	361	1,420	80%	$9,331
Option 7 100% A	$29,230,000	$275,400	$31,430,000	53	1,728	97%	$16,991
Option 8 100% B	$28,930,000	$274,400	$31,190,000	52	1,729	97%	$16,737
Option 9 100% C	$20,840,000	$301,200	$25,870,000	57	1,724	97%	$12,091

NOTES:

1. Annual greenhouse gas (GHG) emissions reduction is compared to Option 0 using a GHG baseline of 2010.

1.2.3 SCENARIO SUMMARY INFOGRAPHIC

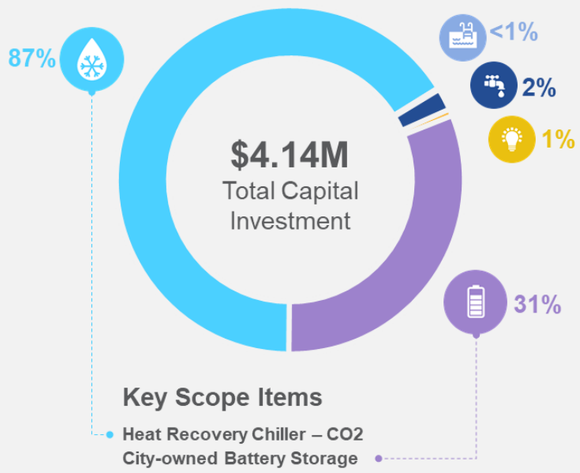
The following pages include infographics that provide a high-level overview of each Scenario's program scope in terms of measure group % of total project cost alongside key financial and energy performance indicators.

Scenario Analysis: Pathway to Carbon-Neutrality

50% Reduction in Annual GHG Emissions

Option 1

Scope of Work



KPIs

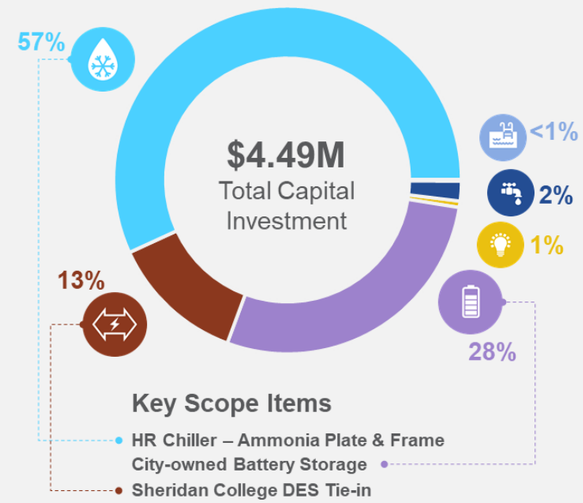
60% Reduction in Annual GHG Emissions
[1,065 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **123 cars taken off the road***

$401,300
Annual utility costs savings from this Scenario

$7.75M
Project lifecycle cost savings from this Scenario

Option 2



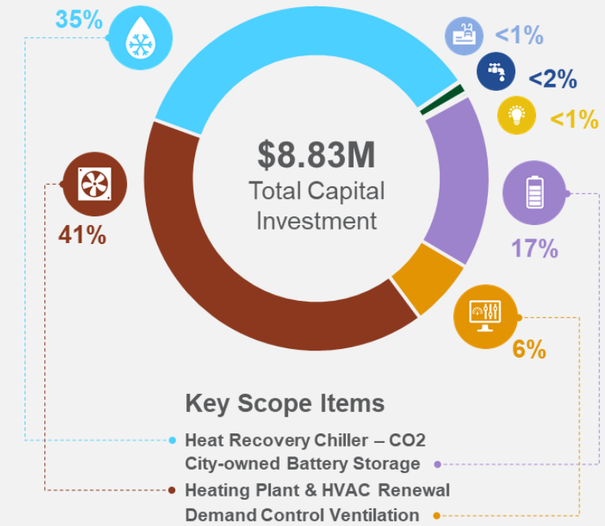
50% Reduction in Annual GHG Emissions
[886 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **14,650 trees planted***

$424,300
Annual utility costs savings from this Scenario

$8.04M
Project lifecycle cost savings from this Scenario

Option 3



64% Reduction in Annual GHG Emissions
[1,146 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **132 homes' energy use***

$436,600
Annual utility costs savings from this Scenario

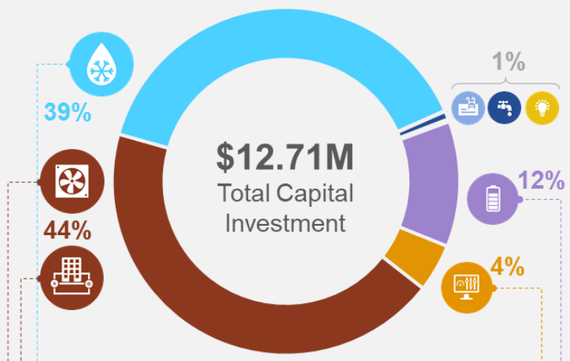
$4.48M
Project lifecycle cost savings from this Scenario

Scenario Analysis: Pathway to Carbon-Neutrality

80% Reduction in Annual GHG Emissions

Option 4

Scope of Work



Key Scope Items

- CO2 HR Chiller & Rink Systems
- City-owned Battery Storage
- Heating Plant & HVAC Renewal
- New Low-temp Geo-Exchange Loop
- Demand Control Ventilation

KPIs

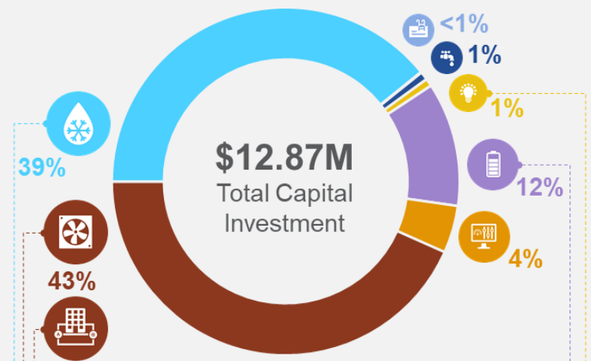
79% Reduction in Annual GHG Emissions
[1,408 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **304 cars taken off the road***

$501,000
Annual utility costs savings from this Scenario

$2.98M
Project lifecycle cost savings from this Scenario

Option 5



Key Scope Items

- CO2 HR Chiller & Rink Systems
- City-owned Battery Storage
- Heating Plant & HVAC Renewal
- New Low-temp Geo-Exchange Loop
- Expanded Lighting Program

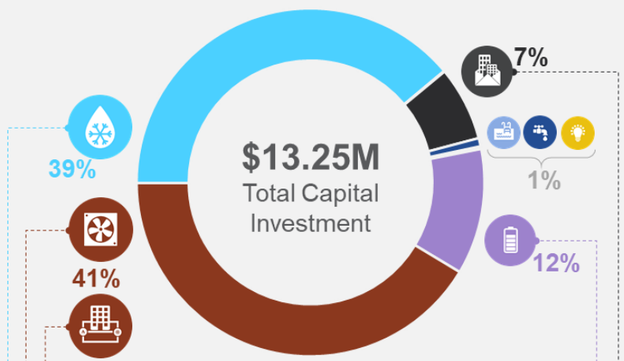
79% Reduction in Annual GHG Emissions
[1,406 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **23,249 trees planted***

$506,700
Annual utility costs savings from this Scenario

$3.08M
Project lifecycle cost savings from this Scenario

Option 6



Key Scope Items

- CO2 HR Chiller & Select Rink Systems
- City-owned Battery Storage
- Heating Plant & HVAC Renewal
- New Low-temp Geo-Exchange Loop
- Exterior Wall Insulation (Phase 2)

80% Reduction in Annual GHG Emissions
[1,420 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **164 homes' energy use***

$492,300
Annual utility costs savings from this Scenario

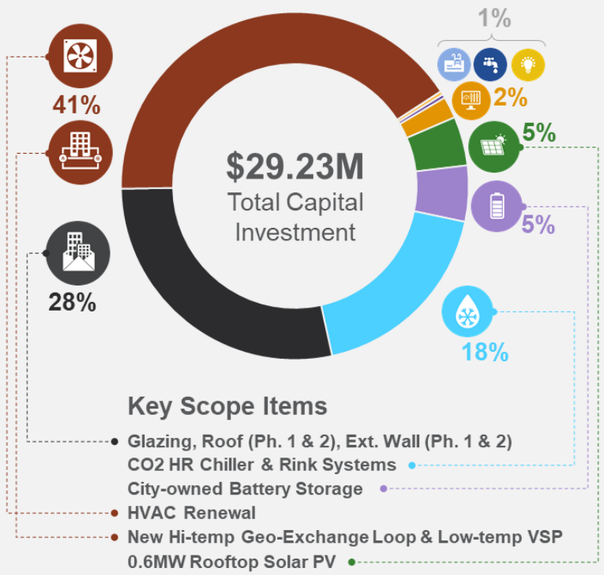
$3.12M
Project lifecycle cost savings from this Scenario

Scenario Analysis: Pathway to Carbon-Neutrality

Carbon-Neutral (Net Zero) Operations

Option 7

Scope of Work



KPIs

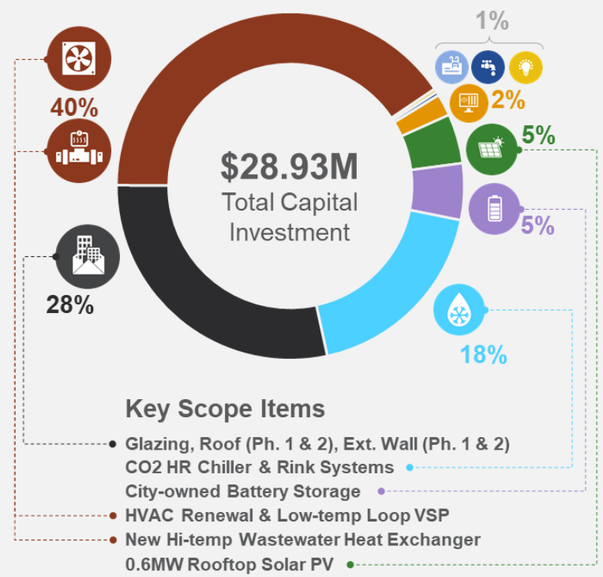
97% Reduction in Annual GHG Emissions
[1,728 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **373 cars taken off the road***

$571,100
Annual utility costs savings from this Scenario

$(9.05M)
Project lifecycle cost savings from this Scenario

Option 8



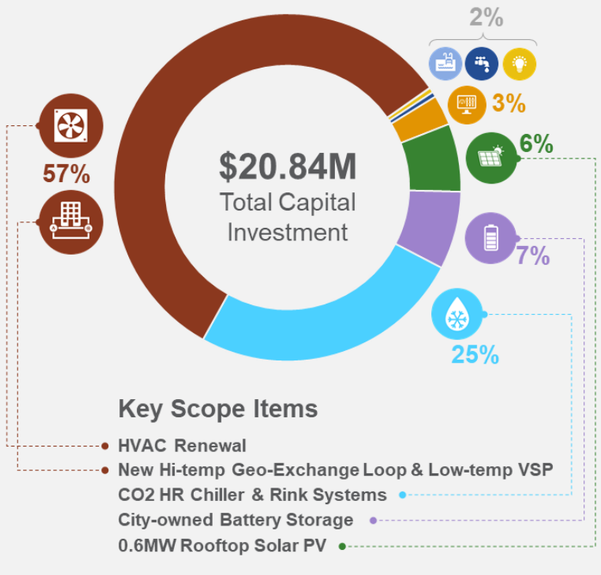
97% Reduction in Annual GHG Emissions
[1,729 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **28,589 trees planted***

$572,100
Annual utility costs savings from this Scenario

$(8.81M)
Project lifecycle cost

Option 9



97% Reduction in Annual GHG Emissions
[1,724 Tonnes eCO_2]

*Annual GHG emissions reductions in this scenario equal **199 homes' energy use***

$545,300
Annual utility costs savings from this Scenario

$(3.49M)
Project lifecycle cost

1.3 COST AND SAVINGS METHODOLOGY

1.3.1 PROJECT COST

Net costs for each measure have been estimated through a combination of contractor pricing and direct MCW project experience with measures used in similar applications. The Total Costs includes all of the costs to deliver a turn-keyed project including, engineering, project management, construction management, and administration. For more information on how ECMs were costed, the reader is advised to consult *Appendix B – Cost Consultant Report*. Project cost are presented without HST.

1.3.2 SAVINGS

Savings are generated through the use of Integrated Environmental Solutions Virtual Environment (IES-VE-VE) modeling software. The Energy modeling provides a thorough review and evaluation of the energy use profiles of the facility. This analysis establishes a baseline of energy consumption that is reconciled with the actual metered consumption. The savings are then measured from the baseline energy model and serves as a guide to investigate certain building systems and operations exhibiting energy saving potential.

The energy analysis was carried out based on the gathering of building equipment data and information on the hours of operation for all building equipment through system schedules, discussion with building operators, control system analysis and site observations. IES-VE-VE permits the complex system integrations to interact with various control strategies and capture the building properties such as the thermal mass and stratification effects from the existing systems at the South Fletchers Sportsplex Building.

Savings rates, and carbon emission factors used in reporting savings are discussed in Section 03 – Utility Analysis.

1.4 PROGRAM FINANCIAL SUMMARY

The Program Financial Summary on the following page provides an overview of the financial results associated with the ECMs which have been identified and evaluated as part of this report. Of note this represents the impact of each ECM if it was to be implemented without any interactive effects of other ECMs being taken into consideration.

Program Financial Summary: South Fletcher's Sportsplex

BUILDING / MEASURE		SAVINGS								COSTS				TOTALS	
BLDG # MSR TAG	BUILDING MEASURE	TOTAL SAVINGS [$]	ELECTRICITY CONSUMPTION [kWh]	ELECTRICITY DEMAND PEAK/MONTH [kW]	GLOBAL ADJUSTMENT KW [kW]	NATURAL GAS [m³]	WATER [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL ECM COST [$]	$/TONNE eC02 [$]	CAPITAL CONTRIBUTIONS [$]	INCENTIVES [$]	TOTAL MEASURE COST w/INCENTIVES & CC [$]	SIMPLE PAYBACK w/INCENTIVES & CC [Years]
A - LIGHTING RETROFITS & REDESIGN		**$ 5,890**	**170,955**	**3.2**	**3**	**-**	**-**	**-**	**26**	**$ 107,362**	**$ 4,187**	**-**	**$ 8,548**	**$ 98,814**	**16.8**
A01	LED Retrofits & New Fixtures (Interior)	$ 2,739	25,574	3.2	3	-	-	-	4	$ 24,401	$ 6,361	-	$ 1,279	$ 23,122	8.4
A02	LED New Fixtures (Exterior)	$ 541	24,943	-	-	-	-	-	4	$ 50,042	$ 13,375	-	$ 1,247	$ 48,795	>50
A03	Lighting Controls (Basic)	$ 399	18,420	-	-	-	-	-	3	$ 21,555	$ 7,801	-	$ 921	$ 20,634	>50
A04	Lighting Controls (Arena)	$ 2,211	102,018	-	-	-	-	-	15	$ 11,364	$ 743	-	$ 5,101	$ 6,263	2.8
B - ELECTRICAL MODIFICATIONS		**$ 414,698**	**-219,000**	**-**	**475**	**-**	**-**	**109,550**	**-33**	**$ 1,090,101**	**NA**	**-**	**-**	**$ 1,090,101**	**2.6**
B01	Battery Energy Storage System (City Owned)	$ 326,296	-109,500	-	475	-	-	50,775	-16	$ 1,090,100	NA	-	-	$ 1,090,100	3.3
B02	Battery Energy Storage as a Service	$ 88,402	-109,500	-	-	-	-	58,775	-16	$ 1	NA	-	-	$ 1	0
C - BUILDING AUTOMATION SYSTEMS		**$ 10,408**	**192,676**	**-**	**-**	**21,917**	**-**	**-**	**71**	**$ 660,550**	**$ 9,358**	**-**	**$ 26,939**	**$ 633,611**	**>50**
C01	Demand Control Ventilation	$ 6,478	113,446	-	-	14,132	-	-	44	$ 651,200	$ 14,835	-	$ 22,689	$ 628,511	>50
C02	Analytic Control Tuning	$ 3,931	79,230	-	-	7,785	-	-	27	$ 9,350	$ 350	-	$ 4,250	$ 5,100	1.3
D - HVAC		**$ 217,284**	**-2,492,230**	**-**	**-**	**1,103,770**	**-**	**-42,622**	**1,488**	**$ 27,496,700**	**$ 18,478**	**$ 4,384,600**	**$ 66,218**	**$ 23,045,882**	**>50**
D01	Heating Boilers - Condensing	$ 11,848	-	-	-	41,660	-	-	79	$ 508,200	$ 6,414	$ 380,600	$ 8,332	$ 119,268	10.1
D02	Heating Boilers - Condensing Lower Water Temperature	$ 18,010	-9,420	-	-	64,043	-	-	120	$ 508,200	$ 4,221	$ 380,600	$ 12,809	$ 114,791	6.4
D03	DHW Boiler - Condensing	$ 1,596	-	-	-	5,613	-	-	11	$ 161,700	$ 15,146	$ 111,100	-	$ 50,600	31.7
D04	Pool Boiler - Condensing	$ 5,082	846	-	-	17,806	-	-	34	$ 206,800	$ 6,083	$ 114,400	$ 3,561	$ 88,839	17.5
D05	Ground Source Heat Loop - Low Temp Loop	$ 19,598	-47,713	-	-	72,546	-	-	131	$ 2,652,100	$ 20,272	$ 380,600	-	$ 2,271,500	>50
D06	Ground Source Heat Loop - High Temp Loop	$ 63,276	-1,452,095	-	-	333,134	-	-	416	$ 9,574,400	$ 23,026	$ 380,600	-	$ 9,193,800	>50
D07	AHU Replacement	$ 10,535	21,233	-	-	35,424	-	-	71	$ 2,494,800	$ 35,356	$ 1,124,200	-	$ 1,370,600	>50
D08	AHU VAV Conversion	$ 18,577	309,937	-	-	41,705	-	-	126	$ 375,100	$ 2,981	-	$ 39,335	$ 335,765	18.1
D09	Heat Pump Replacement	$ -169	68,126	-	-	-5,786	-	-	-1	$ 837,100	$ -1,064,915	$ 751,300	-	$ 85,800	NA
D10	Low Temp Loop Variable Speed Pumping	$ -103	21,819	-	-	-2,026	-	-	-1	$ 174,900	$ -301,239	-	$ 2,182	$ 172,718	NA
D11	Waste Water HR - High Temp Loop	$ 64,298	-1,404,963	-	-	333,134	-	-	423	$ 9,243,300	$ 21,858	$ 380,600	-	$ 8,862,700	>50
D12	District Energy Integration	$ 4,736	-	-	-	166,517	-	-42,622	79	$ 760,100	$ 9,593	$ 380,600	-	$ 379,500	>50
E - REFRIGERATION		**$ 159,767**	**674,279**	**-**	**-**	**507,850**	**277**	**-**	**1,067**	**$ 17,410,100**	**$ 16,316**	**$ 10,342,200**	**$ 117,606**	**$ 6,950,294**	**43.5**
E01	Chiller Replacement w HR - Ammonia Plate and Frame	$ 27,494	321,532	-	-	72,173	-	-	186	$ 3,447,400	$ 18,584	$ 3,447,400	$ 46,588	$ -46,588	0
E02A	Chiller Replacement w HR - C02 - Indirect Slab Cooling	$ 51,859	268,379	-	-	161,895	-	-	348	$ 3,610,200	$ 10,369	$ 3,447,400	$ 59,217	$ 103,583	2.0
E02B	Chiller Replacement w HR - C02 - Direct Slab Cooling	$ 54,809	482,863	-	-	155,927	-	-	369	$ 7,984,900	$ 21,639	$ 3,447,400	-	$ 4,537,500	>50
E03	Cold Water Flooding	$ 4,730	106,361	-	-	8,528	-	-	32	$ 108,900	$ 3,385	-	$ 10,636	$ 98,264	20.8
E04	Ice Resurfacer Replacement	$ 1,009	11,654	-	-	118	277	-	2	$ 183,000	$ 92,774	-	$ 1,165	$ 181,835	>50
E05	Radiant Heating Conversion	$ 3,731	-297,793	-	-	35,810	-	-	23	$ 172,700	$ 7,367	-	-	$ 172,700	46.3
E06	Dehumidifier Conversion	$ 16,135	-218,717	-	-	73,399	-	-	107	$ 1,903,000	$ 17,819	-	-	$ 1,903,000	>50
F - POOL		**$ 2,004**	**40,000**	**-**	**-**	**4,000**	**-**	**-**	**14**	**$ 50,600**	**$ 3,718**	**-**	**$ 4,800**	**$ 45,800**	**22.8**
F01	Pool and Whirlpool VFD	$ 867	40,000	-	-	-	-	-	6	$ 41,800	$ 6,967	-	$ 4,000	$ 37,800	43.6
F02	Pool Temperature Setback	$ 1,138	-	-	-	4,000	-	-	8	$ 8,800	$ 1,157	-	$ 800	$ 8,000	7.0
G - BUILDING ENVELOPE UPGRADES		**$ 25,971**	**104,606**	**-**	**-**	**83,348**	**-**	**-**	**174**	**$ 9,577,700**	**$ 54,975**	**-**	**$ 26,999**	**$ 9,550,701**	**>50**
G01	High Performance Glazing	$ 1,021	4,583	-	-	3,241	-	-	7	$ 464,200	$ 67,748	-	$ 1,107	$ 463,094	>50
G02	Roof Insulation - Phase I	$ 543	-1,608	-	-	2,032	-	-	4	$ 2,911,700	$ 803,524	-	$ 406	$ 2,911,294	>50
G03	Roof Insulation - Phase II	$ 1,843	10,861	-	-	5,651	-	-	12	$ 3,041,500	$ 245,731	-	$ 2,216	$ 3,039,284	>50
G04	Exterior Wall Insulation - Phase I	$ 6,071	11,722	-	-	20,453	-	-	41	$ 1,809,500	$ 44,503	-	$ 5,263	$ 1,804,237	>50
G05	Exterior Wall Insulation - Phase II	$ 16,357	76,736	-	-	51,667	-	-	110	$ 1,006,500	$ 9,168	-	$ 18,007	$ 988,493	>50
G06	Interior Window Replacement	$ 137	2,312	-	-	304	-	-	1	$ 344,300	$ 372,213	-	-	$ 344,300	>50
H - DOMESTIC WATER CONSERVATION		**$ 17,034**	**-**	**-**	**-**	**12,866**	**5,126**	**-**	**24**	**$ 111,100**	**$ 4,540**	**$ 111,100**	**-**	**-**	**0**
H01	Domestic Water Retrofits	$ 17,034	-	-	-	12,866	5,126	-	24	$ 111,100	$ 4,540	$ 111,100	-	-	0
I - RENEWABLE ENERGY		**$ 73,622**	**3,249,218**	**-**	**-**	**11,293**	**-**	**-**	**509**	**$ 16,748,768**	**$ 32,914**	**-**	**$ 2,259**	**$ 16,746,510**	**>50**
I01A	Solar PV - Roof - 1.18 MW array	$ 29,385	1,356,000	-	-	-	-	-	203	$ 4,552,900	$ 22,384	-	-	$ 4,552,900	>50
I01B	Solar PV - Roof - 0.60 MW array	$ 14,941	689,491	-	-	-	-	-	103	$ 1,491,768	$ 14,424	-	-	$ 1,491,768	>50
I02	Solar PV - Parking Lot - 1.03 MW array	$ 26,091	1,204,000	-	-	-	-	-	181	$ 10,626,000	$ 58,837	-	-	$ 10,626,000	>50
I03	Solar Thermal - Pool Heating	$ 3,206	-273	-	-	11,293	-	-	21	$ 78,100	$ 3,643	-	$ 2,259	$ 75,841	23.7
J - OPERATIONAL CHANGES		**$ 8,834**	**9,201**	**-**	**-**	**30,360**	**-**	**-**	**59**	**$ 1**	**$ 0**	**-**	**-**	**$ 1**	**0**
J01	Remove In Stand Heating	$ 8,834	9,201	-	-	30,360	-	-	59	$ 1	$ 0	-	-	$ 1	0

SECTION 1

EXECUTIVE SUMMARY

SECTION 2

BUILDING PROFILE

2 BUILDING PROFILE

2.1 OVERVIEW

2.1.1 BRAMPTON SOUTH FLETCHERS SPORTSPLEX

BUILDING NAME:	Brampton South Fletchers Sportsplex
BUILDING ADDRESS:	500 Ray Lawson Blvd.
CATEGORY:	Recreation Centre
TOTAL FLOOR AREA (FT^2):	172,827
STOREYS ABOVE GRADE:	2
STOREYS BELOW GRADE:	-
YEAR OPENED:	1996

2.1.2 BUILDING DESCRIPTION

The South Fletchers Sports plex is a Community Centre located at 500 Raw Lawson Bldg, Brampton, ON. The building consists of two (2) storeys above grade. The centre provides services for the community by hosting a four pad arena, pool, gymnasium, workout space, childcare centre, and a library. There are also meeting spaces for community centre activities.

The building is owned and operated by the City of Brampton. The building is serviced with electricity, natural gas and city water services. The facility was constructed in two phases. The arena, referred to as Phase I, was completed in 1995. The Community Centre, Phase II, followed in 1996.

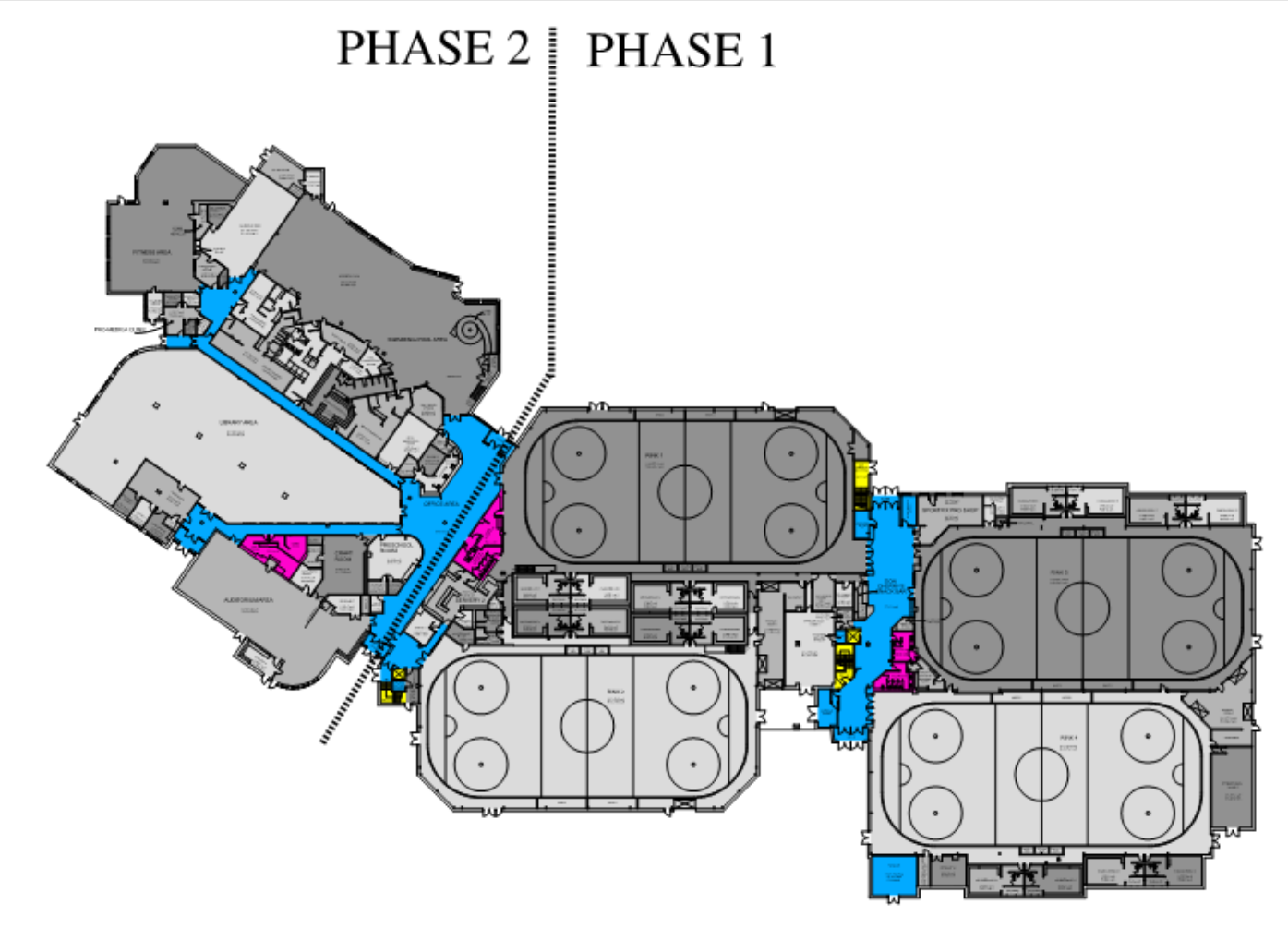


Figure 2.1.1: South Fletcher's Sportsplex Floor Plan

2.1.3 BUILDING ENVELOPE SYSTEMS

The phase I walls have two primary constructions. The upper portions are insulated metal panel on 75 mm of insulation on masonry block. The lower portions are brick on 75 mm insulation on masonry block.

The phase I roof consists of a pitched standing seam metal roof on 75 mm fibreglass insulation on vinyl sheet air/vapour barrier on 250 mm steel purlins on a steel frame.

The phase II roof consists of rounded Gravel Ballast on four ply built up roofing on 13 mm fibreboard on 75mm rigid insulation on air/vapour barrier on 38 metal deckwalls.

2.1.4 LIGHTING SYSTEMS

Almost all lighting in the building has recently been upgraded to LED. The majority of the general spaces are illuminated by a combination of 1'x4', 2'x4' and 2'x2' recessed troffer fixtures and downlights, whereas change rooms have suspended integrated strip fixtures. The arenas, pool, and gymnasium have LED high bay luminaries. One area of note is the main lobby with its still existing metal halide decorative fixtures.

Most lighting is controlled by line voltage toggle switches with no occupancy sensors in the building. The four arenas are controlled by an *nLight Wired* system allowing for dimming and scene control.

The exterior wall packs are mix LED and metal halide wall packs, whereas the pole lighting remains metal halide. It was not determined how the exterior lighting is controlled.

2.1.5 ELECTRICAL SYSTEMS

Electricity is purchased from Alectra Utilities and supplied to the facility by a Y-Y connection transformer of 500 kVA capacity, located inside of a transformer vault. The main service has a 347/600 volt, 3 phase, 4 wire system, set at 2000 amp. The building operates on 347/600 volt and 120/208 volt systems. The system is comprised of approximately 28 panels boards located in centrally distributed sub-electrical rooms. The main distribution switchboard is equipped with digital check meters.

2.1.6 HVAC SYSTEM

Building heating is provided by three (3) x 1825 MBH atmospheric natural gas boilers. Domestic water is provided by a 1467 MBH atmospheric natural gas boiler.

Terminal heating is provided by thirteen (13) horizontal discharge unit heaters serving mechanical rooms, seven (7) cabinet unit heaters serving vestibules and stairwells, fifteen (15) cabinet convectors serving interior spaces, and sixteen (16) finned tube radiators serving the arena change rooms.

The building is served by two primary loops, a high temperature loop that serves air handlers, and terminal units, and a low temperature loop that serves the heat pumps. The low temperature loop is provided with a fluid cooler for heat rejections when operating in cooling mode.

The building is served by six (6) main air handling units that provide conditioned fresh air to the space.

Equipment Tag	Make	Air Flow	HTG	CLG	Function
AIR HANDLING UNITS					
AHU-1 ERV	AAON, Inc.	3,600 CFM	195 MBH	11 Ton	AHU providing ventilation air to change rooms along perimeter wall of Rink 3
AHU-2 ERV	AAON, Inc.	3,600 CFM	195 MBH	11 Ton	AHU providing ventilation air to change rooms along perimeter wall of Rink 4
HRU-1	Main Air	18,000 CFM	1000 MBH	50 Ton	AHU providing ventilation air to change rooms inbetweem Rinks 1&2
HRU-2	Engineered Air	18,000 CFM	1000 MBH	50 Ton	Outdoor packaged AHU unit providing ventilation air to all of Phase 2 office, washrooms, and library spaces.
MUA-1	Lennox		126 MBH	3 Ton	MUA providing ventilation make up air to fitness zone of the facility
Dry-O-Thon	Dectron	18000 CFM	525 MBH	30 Tons (Nominal)	Pool dehumidifier using high temp loop for heating and low temp loop for reheat

Air handlers HRU1, and the Dectron are served by the hot water loop, while the rest have direct natural gas connections. The air handlers are all provided with air cooled DX condensers for cooling. All of the air handlers are equipped with air side heat recovery systems, either enthalpy wheels, or in the case of HRU1 a heat pipe.

Space heating and cooling is augmented by forty three (43) water source heat pumps. The heat pumps mix outdoor air and recirculated space air and further condition air to be supplied to the spaces by either heating or cooling it.

The arena is served by two ice plants each serving two pads. Each ice plant includes two 90 ton built up ammonia chillers, one plant is served by five (5) reciprocating compressors, the other is served by six (6). Each ice plant is equipped with a dedicated cooling tower. Under-pad heating and snow melting is accomplished from heat recovery off the chiller plants, however not enough heat is recovered to accomplish all the required snow melting.

The arenas are served by desiccant dehumidifiers. One dehumidifier serves rinks 1 & 2 regenerated electrically and one serves each of rinks 3 & 4 regenerated by natural gas.

The arena is also served by twenty (20) in stand natural gas radiant heaters in rinks 1 & 2.

The pool is served by an 825 MBH atmospheric natural gas boiler. The whirlpool is served by a 150 MBH atmospheric natural gas boiler.

The reader is encouraged to consult ***Appendix C – Mechanical Energy Flow Diagram*** for a schematic outlining the existing HVAC system.

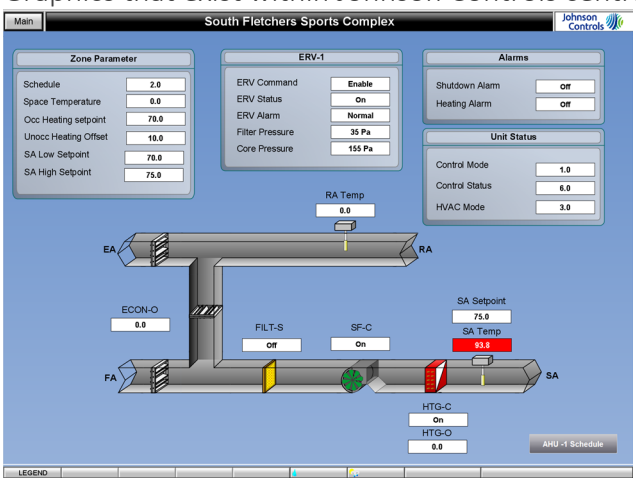
2.1.7 CONTROLS

The existing controls system in the facility is a Johnson Controls Metasys system comprised of two general vintages: 1990s vintage legacy N2 protocol communicating DX9100 and Unitary controllers, as well as newer BACnet protocol based FEC controllers.

These two vintages of controls are connected to a Johnson Controls NAE55. The NAE55 reads and maps both the proprietary N2 objects and non-proprietary BACnet MS/TP objects as a collection of 2599 (at time of audit) objects that are visualized as BACnet objects accessible via BACnet/IP integral to the NAE55 (specifically: Object 512 at 192.168.11.37:47808).

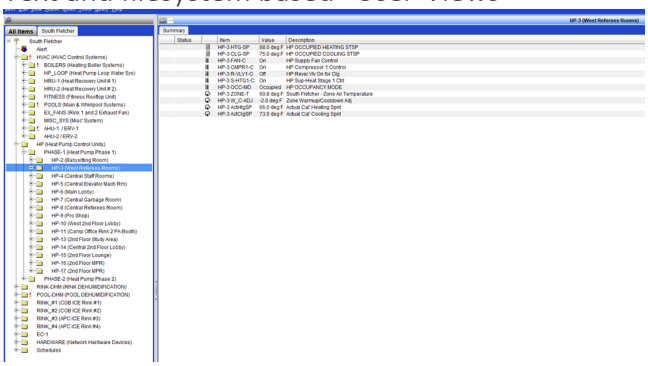
The graphical interface has two components:

1) Graphics that exist within Johnson Controls central ADX server (residing in BASJCVM)



This interface is limited and appears to be incomplete. There is limited information available in terms of sequences of operation, location of equipment, and service thereof.

2) Text and filesystem based "User-Views"



The user views have a comprehensive and structured view of the equipment within the facility, however the learning curve for this style of interface is much steeper than a simple schematic depiction of a system allowing an operator situational awareness in the event a system is not controlling appropriately.

From an operational perspective, there were no apparent issues with existing methods of control.

SECTION 3

UTILITY ANALYSIS

3 UTILITY ANALYSIS

3.1 UTILITIES OVERVIEW

Utility Services & Accounts

Table 3.1.1 summarizes the main utility services at South Fletcher's Sportsplex.

Table 3.1.1: Summary of Main Utility Providers & Accounts

Utility	Utility Provider	Account #	Meter #
Electricity	Alectra Utilities	1165485074	B139780
Natural Gas	Enbridge	82 18 26 67999 1	1003697
Water	Region of Peel	5897110000	SFW01

3.2 ANALYSIS OF UTILITIES

3.2.1 BASLINE SELECTION

A 2010 baseline was selected in order to align this report with the City of Brampton's *Energy and Emissions Management Plan 2019-2024: A Zero Carbon Transition*. As the building's energy consumption and the carbon intensity of Ontario's electrical grid have materially changed during the period 2010 – 2020 this presents the following implications for savings reported in this document:

Where Energy Retrofit Programs are presented, their carbon reduction savings are presented against 2010 carbon consumption, but their utility cost reduction is presented against current operation.

Where Energy Conservation Measures are presented, their carbon reduction savings are presented against current operation, as are reported utility cost reductions.

3.2.2 ELECTRICITY ANALYSIS

Electricity Consumption

Figure 3.2.1 below shows the historical electricity use at South Fletcher's Sportsplex building over the past three years, as well as the consumption during the 2010 GHG baseline period. The recent data was obtained from the Region of Peel and represents adjusted usage billed to South Fletcher's. While electricity consumption was higher in 2010, consumption in more recent years has been lower and relatively constant, with reduced usage in the summer.

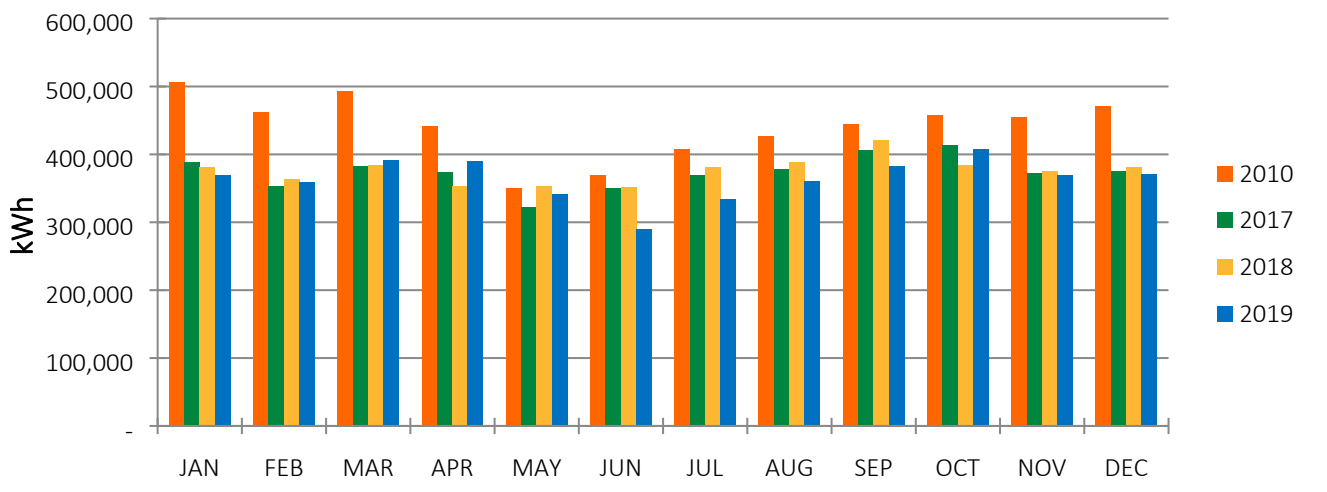


Figure 3.2.1: South Fletcher's Sportsplex Electricity Consumption Profile

Electricity Demand

Figure 3.2.2 below shows the historical electricity demand at South Fletcher's Sportsplex since 2016, as well as the 2010 baseline period. Similar to electricity consumption, demand is reduced in the summer months.

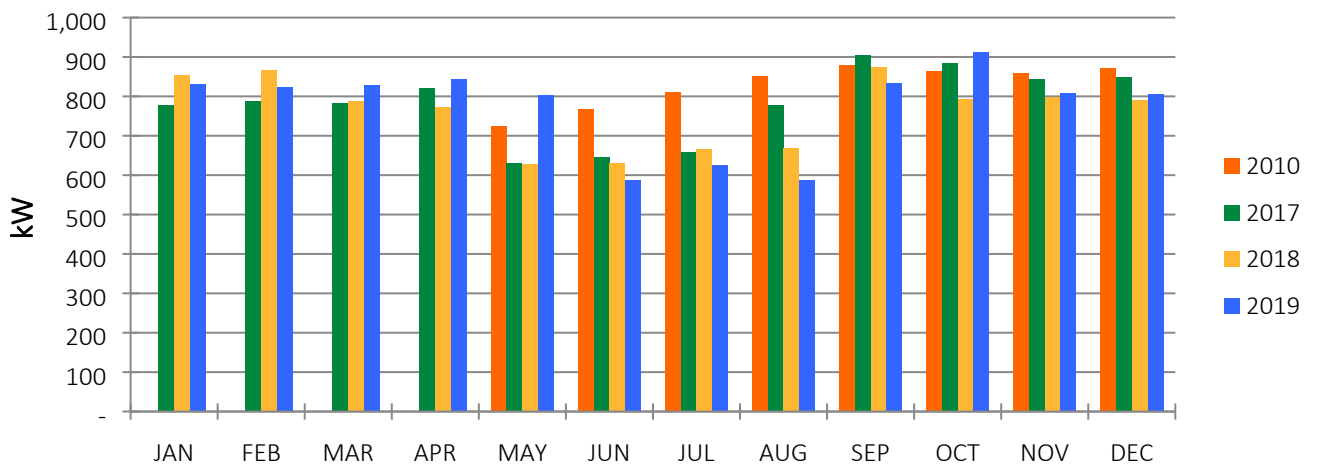


Figure 3.2.2: South Fletcher's Sportsplex Electricity Demand Profile

3.2.2.1 ELECTRICITY RATE STRUCTURE

In Ontario there are 3 main components that determine the cost of electricity for non-residential accounts:

1. A commodity charge levied on each kWh consumed at the Hourly Cost of Electricity (HOEP rate)
2. A demand charge levied on each kW occurring on the facility's peak hour
3. A Global Adjustment charge

Background on Global Adjustment

The Global Adjustment (GA) charge is the Province's catch-all cost to offset all the costs associated with running the electrical grid, including costs associated with ensuring that enough electricity supply will be available over the long term. Without the GA charge the grid operator (the IESO) would consistently run a deficit. A more detailed outline what the global adjustment funds and how it reacts to the spot market price (HOEP) can be found at the IESO's website http://www.ieso.ca/power-data/price-overview/global-adjustment

The GA is applied to each electrical account in one of two ways; Class A or Class B. Class A participation is reserved for those accounts with an average peak demand in excess of 1,000 kW which precludes most facilities from participation. Under class A the GA charge is applied as a function of peak demand, whereas under class B the charge applied as a function of energy consumption. By default all accounts are Class B unless they have opted into Class A.

Electricity charges for South Fletcher's Sportsplex is currently under a Class B rate structure. MCW has investigated the feasibility and financial return of a move to Class A and it is our opinion the Facility would benefit financially if it were to be included in a Class A rate structure. The ECMs outlined in this study, specifically ECMs B01 and B02 relating to battery energy storage allow for the building to opt into the Class A rate structure.

This in turn paves the way for ECMs that involve the electrification of mechanical equipment, and increase electrical consumption by making their implementation less financially onerous. By way of comparison ECM E05 converts the radiant arena stand heaters from gas operation to electric, a requirement to reach carbon neutral operation. Under a class A rate structure this results in a utility savings of $3,731 annually. Under a class B rate structure the same ECM would result in a net cost of $28,894 annually.

Class A customers are those who have a monthly demand peak greater than 1,000 kW. Falling into this category, South Fletcher's Sportsplex will be eligible to participate in the Industrial Conservation Initiative (ICI), and have the ability to manipulate the portion of the provincial GA at which it pays.

Class A Global Adjustment

The GA charge for Class A customers is determined using two (2) variables:

1. The Peak Demand Factor (PDF) (calculated yearly)
2. The System-wide GA Rate (calculated monthly, published by the IESO).

Peak Demand Factor (PDF): The PDF represents the customer's electrical demand compared to the total provincial electrical demand. It is calculated by taking the sum of the facility's coincident demand during the top 5 Ontario demand peaks, and dividing this value by the sum of the Top 5 system-wide peaks. The PDF is expressed as a percentage, and can be considered as the fractional use of the grid during peak events.

There is a lag between when the PDF is calculated and when it is applied for billing purposes, as each cycle of the ICI starts with a base period. At the end of the base period, noted below in *Figure 3.2.1.1*, customers are assessed for eligibility. Customers who qualify as a Class A will be notified of their PDF. The PDF is then used to calculate costs during an Adjustment Period. Performance in year X is therefore applied to year X+1.

Base Period (Peak-setting period) = May 1, (Year X) to April 30, (Year X+1)

Adjustment Period (Billing period) = July 1, (Year X+1) to June 30, (Year X+2)

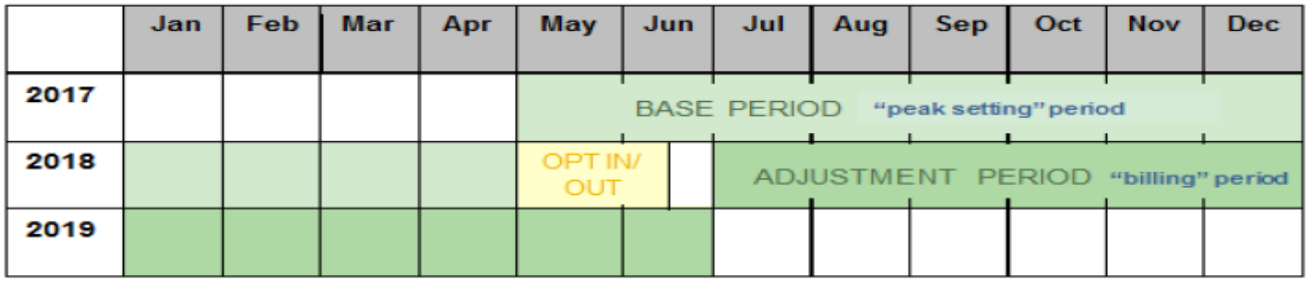


Figure 3.2.1.1: GA Base and Adjustment Periods

System-wide GA Rate: As the GA charge accounts for differences between the wholesale market price for electricity and regulated rates applicable for Ontario Power Generation's nuclear and hydroelectric generating stations, the global adjustment varies from month to month. When the HOEP is lower, the global adjustment is generally higher in order to cover the costs of regulated and contracted generation.

GA Charge: The resultant Class A customer GA charge is calculated monthly based on these two factors:

GA Charge (calculated monthly) = PDF x System-wide monthly Global Adjustment Rate

In addition to the GA Charge, Class A customers pay a portion of the province-wide total Capacity Based Recovery (CBR) amount, also calculated using their site PDF. This is done by multiplying the monthly Ontario-wide total CBR Amount costs by the PDF.

CBR Cost (calculated monthly) = PDF x System-wide monthly CBR Amount

Class A Rate Structure Benefits

The Class A Global Adjustment charges can have significant cost benefits over the Class B Global Adjustment charges if the customer can effectively manage their electrical demand, shifting usage to lower demand periods, thereby reducing their PDF. The lower the demand during the top 5 Ontario peaks, the lower the PDF, and therefore lower monthly GA Charges. Class B customers do not have this same opportunity, as they pay towards the system-wide total on an electricity consumed basis, regardless of how much (or little) electricity they consume during provincial peak hours.

The Peak Provincial hours typically occur late in the day during the summer months, coinciding with high residential air conditioning use. This can prove advantageous for South Fletcher's as electrical demand is reduced in the summer when the rink capacity is reduced.

An analysis of the relative cost of Class A vs Class B participation has been undertaken for South Fletcher's Sportsplex, seen in Figure 3.2.2 and detailed further in *Appendix A*:

- For the Base Period of May 2018 – April 2019, savings would have totalled $53,121 operating under Class A. This represents a cost savings of 8.4% of the calendar 2019 electricity spend.

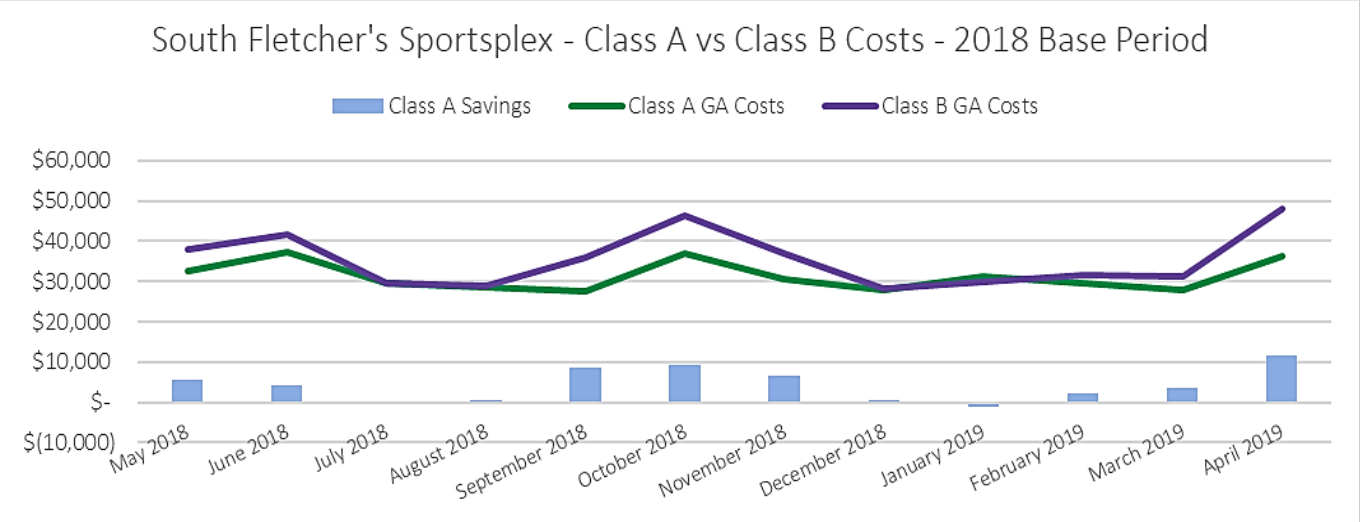


Figure 3.2.1.2: Class A vs. Class B GA Costs and Savings

As electricity usage increases at South Fletcher's Sportsplex, the savings potential from operating as a Class A customer will also increase, due to the large difference in electrical savings rates between Class A and Class B. These are detailed below in **Table 3.2.1** and further explained in ***Appendix A: Extended Utility Analysis***.

Table 3.2.1: Class A vs. Class B Electrical Savings Rates (Tax Excluded)

Utility	Class B Rates	Class A Rates
Electricity Consumption	$ 0.1309 per kWh	$ 0.0217 per kWh
Electricity Demand	$ 8.8691 per kW	$ 8.8691 per kW
GA and CBR Rate[1]	-	$ 585.0392 per kW

Notes:
1. *Global adjustment savings are annual savings for kW reductions that occur in all 5 GA hours.*

Class A Rate Structure Risks

As outlined above the Class A rate structure provides an avenue for considerable cost savings, and allows for a more financially viable pathway to low carbon operation for the facility, but there are risks associated with Class A rate class participation.

Firstly the facility must take care to manage its peak in response to provincial peaks. Under a Class A rate structure an errant peak can be quite costly for the facility negating any potential savings. This risk can be managed through by ensuring facility staff are aware of potential peak events. It is for this reason that enrollment in a peak advisory service is included in measure B01 – Battery Energy Storage System.

Secondly, there is a risk that the IESO could change the way the Global Adjustment is levied. In a worst case scenario the province could move to an entirely consumption based rate class system. This would

potentially negate the savings outlined above available under a rate class switch. That said, any adjustment made to how the Global Adjustment is levied would not be without considerable consequence to the Ontario electricity market, and it is expected that such a change would not be made without the provision of a considerable amount of forward guidance from the IESO (as was the case when the ICI was enacted). This risk is of particular import to measure B01 – Battery Energy Storage System, but it is expected that if this ECM was implemented that it would reach financial payback within a potential forward guidance period, and in all likelihood the ECM would retain some value in a new rate structure that retained some component of demand and/or time of us pricing.

At the time of writing the ICI program has been put on hiatus due to the ongoing Covid-19 pandemic. The Government's stated objective in enacting this hiatus is: "to allow industrial and commercial businesses to focus on recovering from the impacts of COVID-19", see Ontario news release: Ontario Provides Stable Electricity Pricing for Industrial and Commercial Companies issued June 26, 2020 3:30 P.M.

Every indication from the Ontario Government is that this indeed a hiatus and not a shift towards a different rate regime. The highest coincident peak of 2020 without the ICI program in effect was 24,446 MW, considerably higher than the highest 2019 peak, 21,275 MW. This disparity indicates how effective the ICI program is at reducing peak demand and how if the ICI program was to be modified, that peak demand would remain a strong focus.

3.2.3 NATURAL GAS ANALYSIS

Figure 3.2.3 shows the historical natural gas consumption at South Fletcher's Sportsplex since 2016, as well as the 2010 baseline period. This data was obtained from Enbridge historical gas bills for the site and represents actual usage. As South Fletcher's Sportsplex is billed mid-month, the monthly profile seen in *Figure 3.2.3* is based upon the bill end date. Natural gas consumption is higher in the winter months, indicating a heating component to usage. Correlation to weather detailed in Appendix A is based on calendar days.

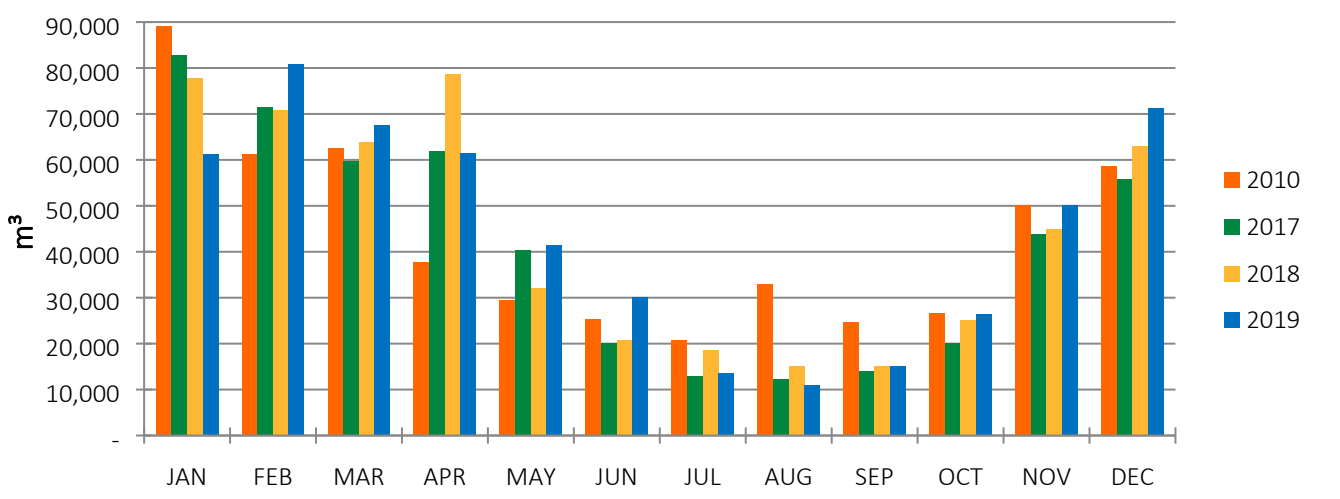


Figure 3.2.3: South Fletcher's Sportsplex Natural Gas Consumption Profile

3.2.4 WATER ANALYSIS

Water Consumption

Figure 3.2.4 below shows the historical water use at the South Fletcher's Sportsplex over the past 3 years, as well as the 2010 baseline period. This data was obtained from the Region of Peel and represents actual usage. Water consumption is variable and does not have any clear correlation to weather in recent years or during the baseline period.

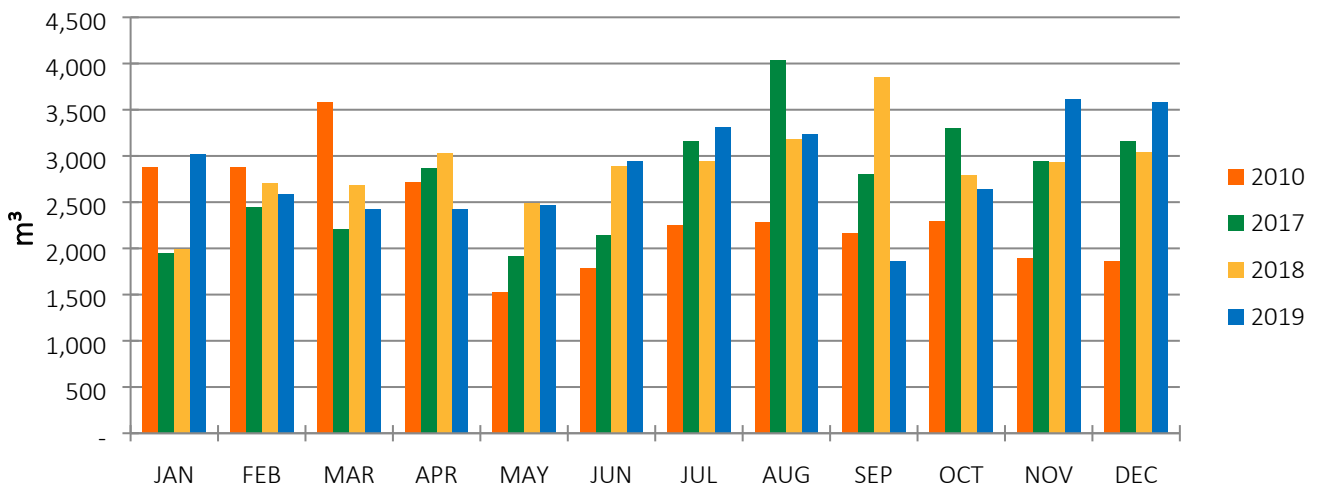


Figure 3.2.4: South Fletcher's Sportsplex Water Consumption Profile

3.2.5 UTILITY USAGE SUMMARY

The following summary of utility consumption in Table 3.2.2 is based on Calendar Year (CY) 2010 for all utilities, while costs shown are retrieved from utility bills provided for CY2019. This reflects the baseline utility data against which Energy Retrofit Programs are measured.

As electricity demand data was not available for the 2010 baseline period under investigation, both demand data and costs shown are reflective of CY2019.

The 2010 baseline was selected in order to align this report with the City of Brampton's *Energy and Emissions Management Plan*.

Table 3.2.2: South Fletcher's Sportsplex Summary of Annual Utilities (Tax Excluded)

Utility	Costs ($)	Annual Usage	Annual Energy Usage (ekWh)	Energy Use Intensity (ekWh/ft²)	GHG Emissions (Tonnes $eC0_2$)
Electricity Consumption	$ 561,477	5,282,745 kWh	5,282,745	30.6	792 (Scope 2)
Electricity Demand	$ 73,425	9,290 kW	-	-	-

Table 3.2.2: South Fletcher's Sportsplex Summary of Annual Utilities (Tax Excluded)					
Utility	Costs ($)	Annual Usage	Annual Energy Usage (ekWh)	Energy Use Intensity (ekWh/ft²)	GHG Emissions (Tonnes eCO_2)
Natural Gas	$ 123,971	519,606 m³	5,367,530	31.1	988 (Scope 1)
Water	$ 87,627	28,090 m³	-	-	-
Total	$ 846,500		10,650,275	61.6	1,781

Notes:

a. *Annual usage data is based on CY2010 utility data provided by City of Brampton.*
b. *Annual costs reported are based on CY2019 utility invoices provided by the utility providers.*
c. *Electricity Demand data is based on CY2019.*
d. *Energy Use Intensity is based on an overall floor area of 172,827 ft².*
e. *GHG Emissions are based on CY2010 emission factors, outlined in Table 3.1.2.*

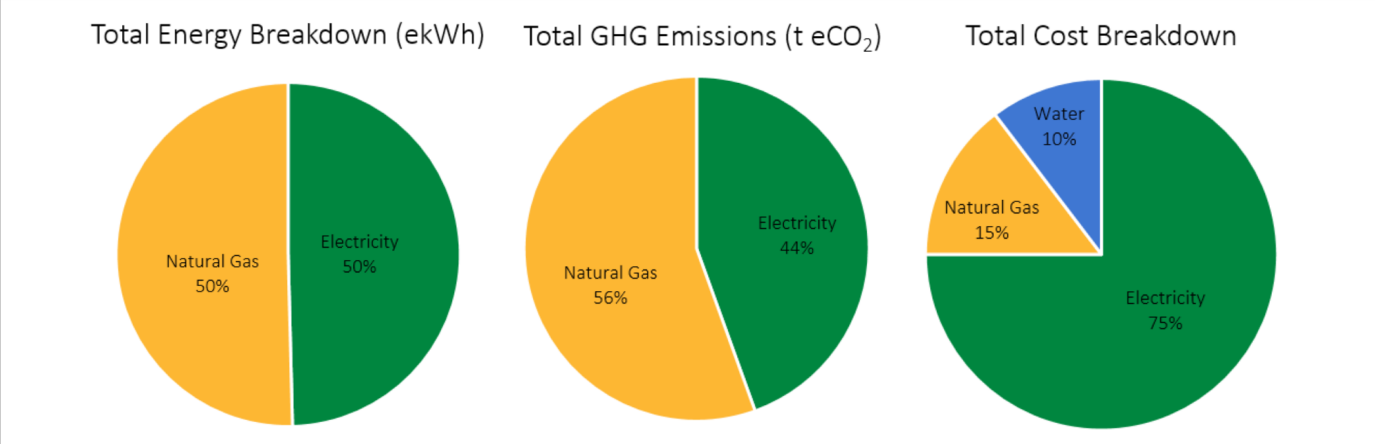


Figure 3.2.5: South Fletchers Sportsplex 2010 Utility Usage Breakdown

3.2.6 SAVINGS RATES SUMMARY

Table 3.2.3 summarizes the utility rates used. These savings rates refer to those rates used for the purpose of calculating energy and water savings to determine Program Financials, based on the most recent rates available from the respective utility providers. Determination of these rates are detailed further in *Appendix A: Extended Utility Analysis*.

Table 3.2.3: Savings Rates (Tax Excluded)	
Utility	Savings Rate
Electricity Consumption	$ 0.02167 per kWh
Electricity Demand	$ 8.8691 per kW

Table 3.2.3: Savings Rates (Tax Excluded)	
Utility	Savings Rate
Global Adjustment Demand	$ 585.04 per GA kW
Natural Gas	$ 0.2844 per m^3
Water	$ 2.6092 per m^3

3.2.7 SUMMARY OF GHG EMISSION FACTORS

The GHG emissions factors used to calculate the GHG emissions and GHG savings resulting from the project are shown in Table 3.1.4, and are 2010 emission factors for Ontario from the Federal National Inventory Report of GHG Sources and Sinks.

Table 3.2.4: GHG Emission Factors by Utility		
Utility	Emissions Factors (eCO_2 Metric Tonnes)	
Electricity	0.000150	per kWh
Natural Gas	0.001902	per m^3

SECTION 4

ENERGY MODEL

4 ENERGY MODEL

4.1 BASELINE MODEL INPUT SUMMARY

The baseline energy model for the South Fletcher's Sportsplex was created by using the available design information provided by the City of Brampton. This information was supplemented by the results of both the ASHRAE Level 2 Audit completed in 2018, and the audit completed as a part of this study. For parameters such as envelope thermal performance and infiltration, reasonable first estimates were made given what is known about the constructions and vintage of the building. These parameters were then varied as a part of the calibration exercise. Information such as the thermographic scans of the building helped validate the inputs.

4.1.1 WEATHER AND CALENDAR

The baseline model was simulated using weather for the 365 days starting December 17, 2018. This aligned with the range of the most up-to-date utility bills. The billing cycle for electricity aligns with the calendar month while the natural gas cycle is mid-month. The weather was aligned with the natural gas billing cycle because natural gas consumption is much more weather dependent than the electricity consumption as shown in the Utility Analysis section of this report. The weather file was created by taking the CWEC weather file for Toronto Pearson Airport (WMO: 71624) and updating it with the dry-bulb and wet-bulb temperatures from Environment Canada for the same location.

4.1.2 MODEL GEOMETRY

The model geometry was based on the original architectural design documents from 1996 with updates as appropriate for the interior design updates from 2010. The overall model floor area is 16,211 m^2, and well within the 5% range of the actual floor area that is commonly deemed acceptable in energy modelling

The model geometry is shown as a ground floor plan with zones coloured in **Figure 4.1.1** and a 3-D version of the model shown in **Figure 4.1.2**

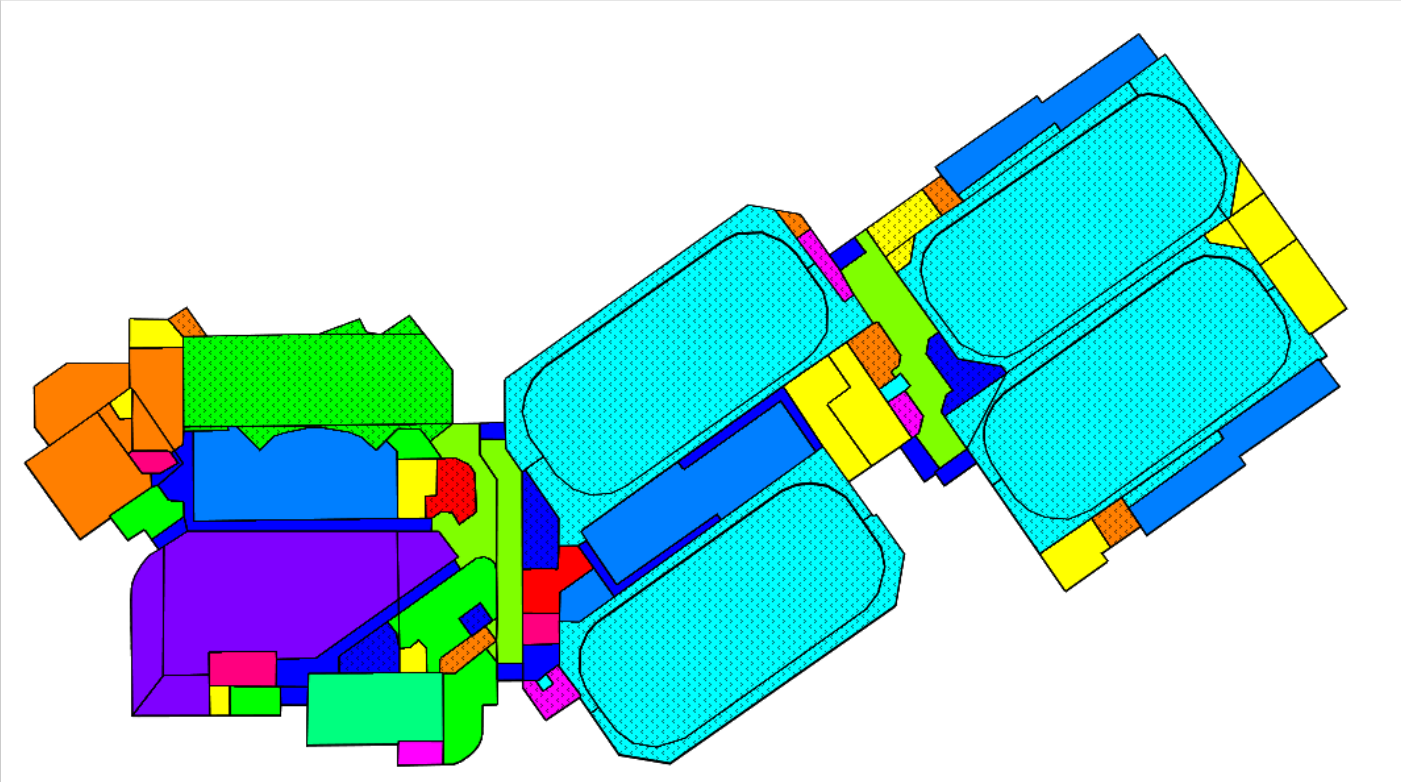


Figure 4.1.1: South Fletchers Sportsplex ground floor plan

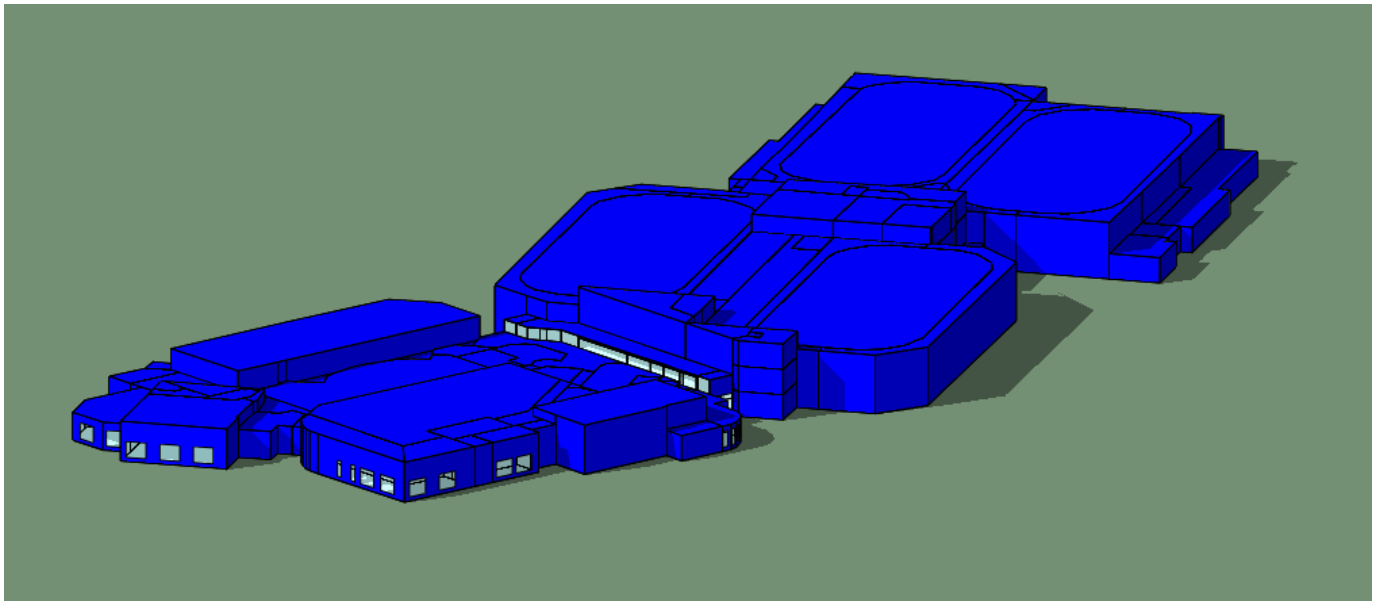


Figure 4.1.2: South Fletchers Sportsplex 3D model view

4.1.3 INTERNAL GAINS

The schedules used for internal gains were based on the operating hours of the library, community centre, and rinks.

Lighting

The lighting was originally based on the lighting power densities from ASHRAE90.1-2016 based on space type with updates according to the audit completed as a part of this study. The ASHRAE90.1-2016 lighting power represents a very good starting point for the building as the LED retrofit occurred in 2016. The ASHRAE90.1-2016 LPDs used as a base are shown in Table 4.1.3.

Table 4.1.3: Summary of ASHRAE90.1-2016 Lighting Power Density used in Model

Space Type	Lighting Power (W/m2)
Daycare	13.347
Conference/ Meeting/ Multipurpose	13.24
Corridor	7.104
Restaurant – Dining Area	9.58
Electrical/ Mechanical	4.521
Food preparation	13.024
Fitness center - Exercise area	7.75
Gymnasium - Playing area	12.9
Library	11.41
Lobby	9.688
Locker Room	8.073
Office - Enclosed	11.948
Office - Open plan	10.549
Restrooms	10.549
Retail	15.5
Sports Arena - Audience Seating	4.628
Sports arena - Playing area 4	12.917
Stairs	7.427
Storage	6.781

Receptacle Loads

Receptacle loads are difficult to know *a priori* in a calibrated energy model and therefore the defaults in IES<VE> were used with some changes made during the calibration process in order to better reflect the building operation.

Table 4.1.4: Summary of ASHRAE90.1-2016 Receptacle Loads used in Model

Space Type	Receptacle Loads (W/m2)
Daycare	1.0
Conference/ Meeting/ Multipurpose	1.0
Corridor	0.0
Restaurant – Dining Area	5.382
Electrical/ Mechanical	0.0
Food preparation	16.146
Fitness center - Exercise area	1.0
Gymnasium - Playing area	1.0
Library	7.5
Lobby	5.382
Locker Room	5.382
Office - Enclosed	7.5
Office - Open plan	7.5
Restrooms	0.0
Retail	5.382
Sports Arena - Audience Seating	7.5
Sports arena - Playing area	1.0
Stairs	0.0
Storage	2.153

Occupants

The occupant numbers were based on default IES<VE> numbers per space type with modifications made to better reflect the actual operation of the facility.

4.1.4 BUILDING ENVELOPE PERFORMANCE

The building envelope performance was originally based on the design drawings for the envelope assemblies taking into account thermal bridging for the clear field performance. Further degradation was added to account for other thermal bridges such has wall-to-parapet lengths, window-to-wall transition lengths, and wall-to-wall transitions lengths. The degradation of envelope thermal performance due to thermal bridges (both clear field and at interfaces) can be quite large compared to installed insulation performance. The BC Hydro Thermal Envelope Bridging Guide provided methods and guidance for evaluating envelope performance for the building. Additionally, the thermographic scans showed that in some areas wall performance was quite bad and not greatly different from window performance. Finally, the infiltration in the model was originally assumed to be 0.25 l/s/m^2 of façade (as per NECB modelling rules) but as a result of calibration this was increased to 1.2 l/s/m^2 of façade area. This corresponds to a whole building infiltration rate of 10.2 l/s/m^2 façade at 75 Pa.

The overall modelled envelope performance and details in the calibrated model are shown in **Table 4.1.5**.

Table 4.1.5: Summary of Envelope Constructions

Type	Details	Performance U (W/m2K)
Wall	Insulated metal panel on steel with 75 mm insulation – Upper Rink Walls	1.18
	Brick on 75mm insulation on LWB – Lower Rink Walls	1.27
	Brick on 50 mm insulation on LWB – Community Centre	1.59
	Metal Panel on 50 mm insulation on LWB – Community Centre	2.06
Roof	Rounded gravel ballast on four ply built up roofing on 13 mm fibreboard on 75 mm rigid insulation on metal deck – Community Centre Roof	0.311
	Standing seam roof with insulation – Rink Roof	0.261
Glazing	Double glazed with aluminum frames	3.18

4.1.5 RINK OPERATIONS

The operation of the rinks and how these details are modelled in IES<VE> are essential to creating a well calibrated energy model. The rink operations include rink occupancy and flooding schedules, flood temperatures and volumes. Table 4.1.6 summarizes the inputs to the calibrated energy model for rink operation. The calibration procedure hinted at certain operational details such as March Break and summer rink usage confirmed by the facility booking schedule for 2019 provided by the City of Brampton.

Table 4.1.6: Summary of Rink Operations in Model

Input	Details	Notes
Usage Schedule	5am - 9am and 6 pm –midnight Monday to Friday 5 am to midnight Saturday and Sunday	Increased usage during March Break
Flooding Load – Rinks 1 & 2	46 kWh heating and 130 kWh cooling per flood	Heating is sensible heating only, cooling includes latent to freeze water
Flooding Load – Rinks 3 & 4	9.2 kWh heating and 90 kWh cooling per flood	Heating is sensible heating only, cooling includes latent to freeze water
Summer operation	May 1 – August 31	Rinks 1 and 2 no ice, Rink 4 used with ice present on Rink 3

4.1.6 POOL OPERATIONS AND MODELLING DETAILS

There is no specific module for modelling natatoriums in IES<VE> however the evaporation of pool water, humidity control, and pool water make-up volumes can all easily be simulated directly in the software. The pool water zone was simulated as a zone with the volume and thermal mass matching the pool water. This zone had sensible gain from occupants in the pool and a sensible loss from the evaporation of water from the pool surface. The evaporation adds latent gain to the zone above the pool water zone. The pool evaporation rate was estimated using the methods laid out in *2003 ASHRAE Applications Handbook*.

4.1.7 HVAC SYSTEMS

Air-side HVAC

There are 3 major air-side system types in the South Fletcher's Sportsplex, which are:

1. Dedicated outdoor air systems with water-loop heat pumps serving zones (HRU-1, HRU-2, RTU-1)
2. Pool dehumidification system
3. Rink Dehumidification systems

The modelling of each of these systems is summarized in Table 4.1.7.

Table 4.1.7: Summary of Air-side HVAC systems

System	Description	Details
HRU-1	DOAS with water-loop heat pumps serving zones	HRU-1 Supply fan: 15.7 kW Return fan: 6.8 kW Sensible energy recovery effectiveness: 50% Hot water heating coil in HRU-1 with DX cooling coil WLHPs in zone Heating COP 3.8, cooling COP 3.5.
HRU-2	DOAS with water-loop heat pumps serving zones	HRU-2 Supply fan: 14.3 kW Return fan: 5.8 kW Sensible energy recovery effectiveness: 65% Latent energy recovery effectiveness: 60% Furnace for heating with DX cooling coil WLHPs in zone Heating COP 3.8, cooling COP 3.5.
RTU-1	RTU serving fitness area	Supply fan: 1 kW Return fan: 0.5 kW Furnace for heating with DX cooling coil
Pool System	Dectron system for pool dehumidification	Exhaust heat recovery, hot water heating coil, DX cooling coil with hot gas reheat and heat recovery for pool water heating, economizer operation. DX coil modelled as part-load chiller with heat recovery providing heat to hot-gas reheat coil and pool water heating system. Supply fan: 12 kW Return fan: 8 kW

Table 4.1.7: Summary of Air-side HVAC systems		
System	Description	Details
Rink Dehumidification	Three active desiccant wheel dehumidification systems (Rink 1/2, Rink 3, and Rink 4)	Desiccant wheel modelled with negative latent recovery efficiency with extra dehumidification efficiency due to regen simulated with "dummy" cooling coil consuming no energy. Regen modelled to supply 113°C air via direct-fired natural gas furnace. Runs to supply ventilation when CO2 limit is reached or when dew-point exceeds 3°C Rink 1/2 Regen fan: 1 kW, Rink 1/2 Supply fan: 5 kW Rink 3 Regen fan: 0.5 kW, Rink 3 Supply fan: 2.6 kW Rink 4 Regen fan: 0.5 kW, Rink 3 Supply fan: 2.6 kW

Water-side HVAC

There are three major water-side HVAC systems, the hot water system, the water-loop heat pump system and the rink refrigeration system. The hot water system supplies heat to hot water coils in air handling units as well as a variety of perimeter radiation and unit heaters throughout the facility. The boilers have been modelled as 80% efficient non-condensing boilers (1835 MBH each) using the default performance curves in IES<VE>. The pumping is primary only with constant speed operation with the pump riding the pump curve.

The water-loop heat pump system receives heat from the hot water loop. However, IES<VE> is not capable of having a hot water-loop directly supply heat to the water-loop heat pump loop and therefore one of the three installed boilers is used in the water-loop heat pump system (with the other two serving the hot water loop directly).

Rink Systems

The refrigeration plants are each modelled as two chillers with a cooling tower. The compressors have not been modelled separately but combined into each chiller with an overall COP set for the chiller of. The chillers each have a capacity of 90 tons while the cooling towers have a capacity of 300 tons each. The ice-slabs are modelled by in-floor radiant slabs in IE<VE>. The extra cooling load due to flooding is applied directly to the chilled water loop rather than to the ice slab zones. This approach allowed for better control of ice temperature compared to applying the load directly to the ice slab zones despite being a slight approximation of the actual operation.

4.2 BASELINE MODEL CALIBRATION REPORT

The calibration of the model was done in accordance with ASHRAE Guideline 14-2014. The specific requirements for a calibrated model are that the Normalized Mean Bias Error (NMBE) is 5% maximum and Co-efficient of variation of root-mean-square error (CV(RSME)) is limited to 15% for monthly utility data. As noted in ASHRAE-211 the goal of calibrating the model is not "to find a unique and best calibrated solution" but instead to have a plausible and realistic model of the building. The vast number of independent variables in an energy model allows for the ability to easily "over-calibrate" the model. The NMBE and CV(RSME) are defined as shown below:.

$$\text{NMBE} = \frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)}{(n-p)\times \bar{y}} \qquad \text{CV(RMSE)} = \frac{\sqrt{\frac{\sum(y_i - \hat{y}_i)^2}{(n-p)}}}{\bar{y}}$$

Where y_i is the utility data, $\hat{y}_i$ is the modelled data, $n = 12$ is the number of months and $p = 1$.

The results of the calibration with Electricity and Natural Gas Utility bills are shown in **Figure 4.2.1** and **Figure 4.2.2** respectively. For electricity the NMBE is 4.8% and CV(RSME) is 7%, and natural gas the NMBE is 4.1% and CV(RMSE) is 15.0%. All measures are below the ASHRAE Guideline 14 recommendations for a calibrated energy model. As per the weather and calendar section, the calibration is for the 365 days starting December 17, 2018. For natural gas calibration shown in **Figure 4.2.2** the month represents the billing period ending on or around the 15th of that month.

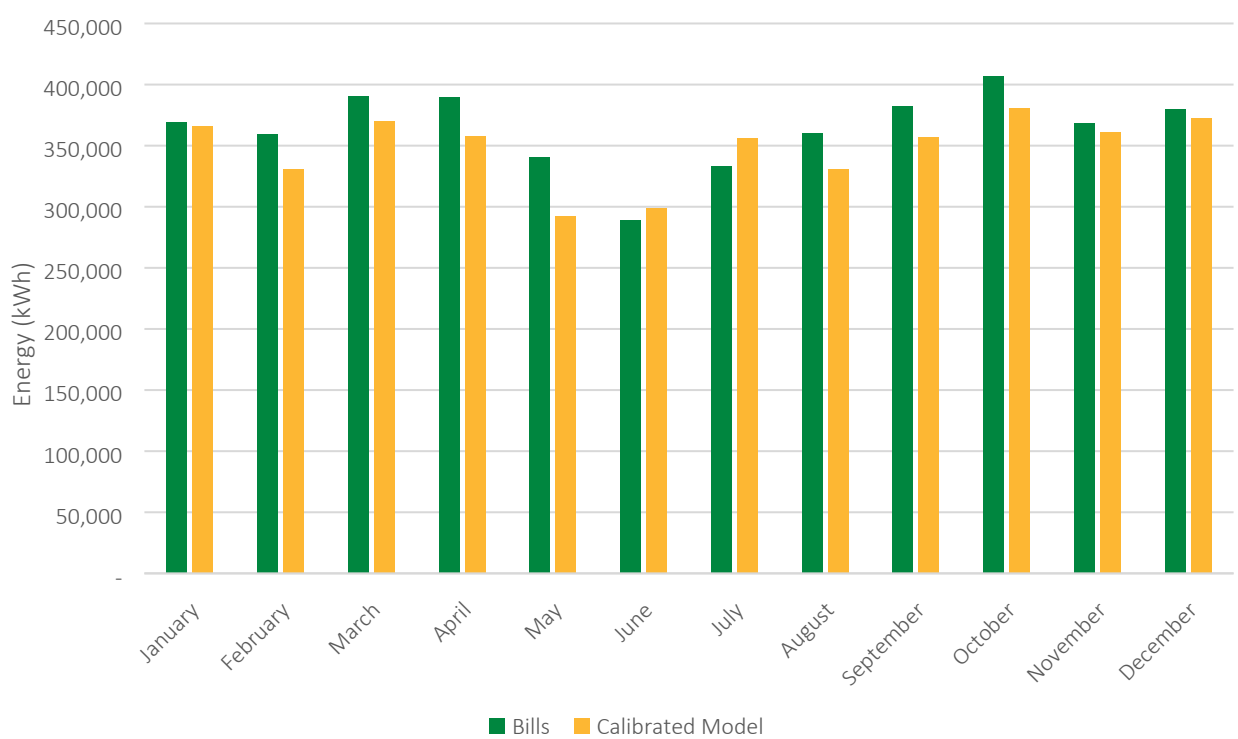


Figure 4.2.1: Electricity Calibration results for South Fletcher's Sportsplex

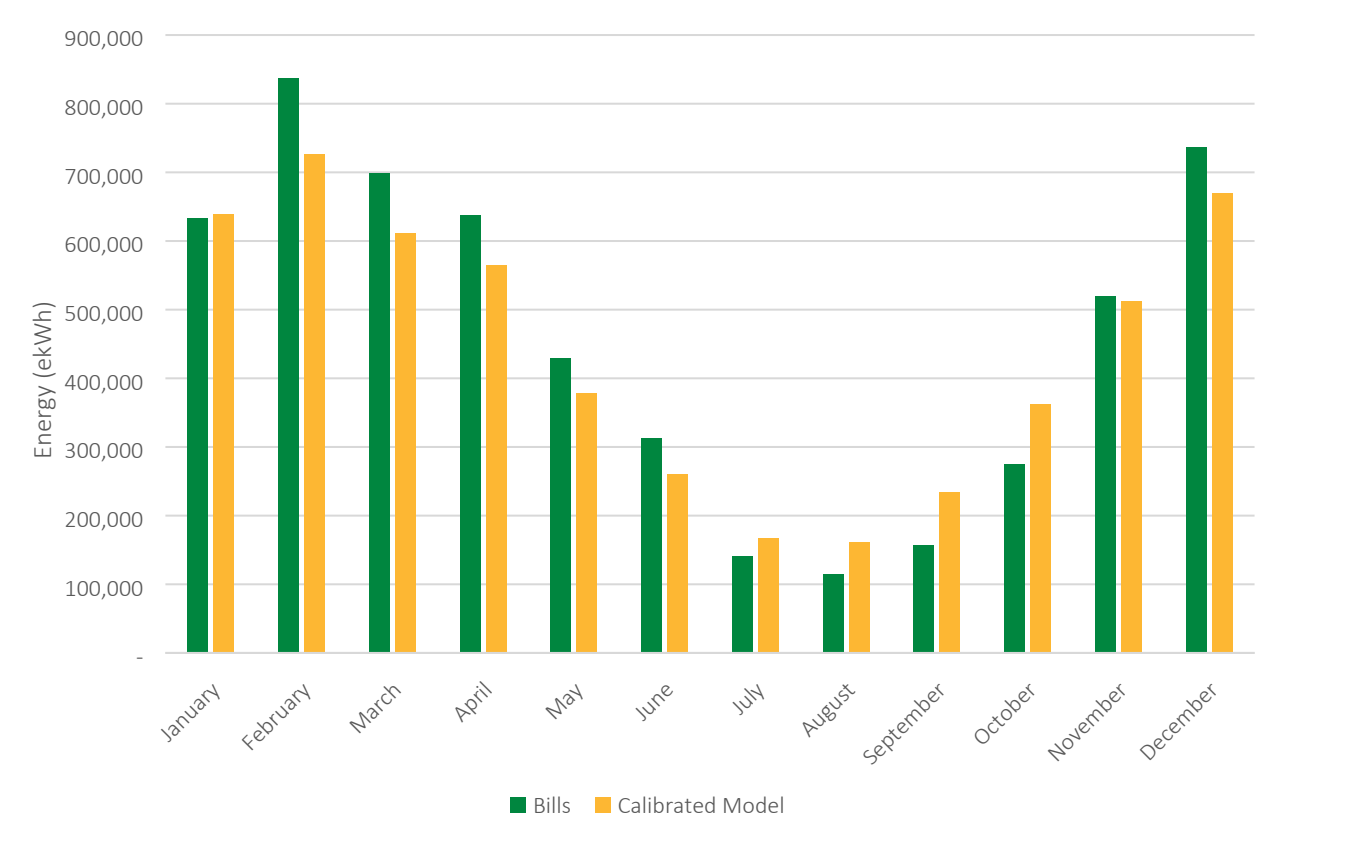


Figure 4.2.2: Natural Gas Calibration results for South Fletcher's Sportsplex

4.2.1 BASELINE END-USE SUMMARY

The end-uses for the baseline model are shown in Figure 4.2.3 for both energy and GHG emissions (using 2010 emissions factors). From the data the major energy end-use and GHG contributor is due to heating. In fact almost 60% of GHG emissions are from space heating. This shows the importance of reducing space heating in terms of magnitude and emission factor (by fuel switching) as a part of the drive to reduce total GHG emissions. The refrigeration plant also is a major contributor to energy consumption. The magnitude of this consumption highlights the potential for heat recovery from the refrigeration plant and how this may offset some of the heating requirements of the facility.

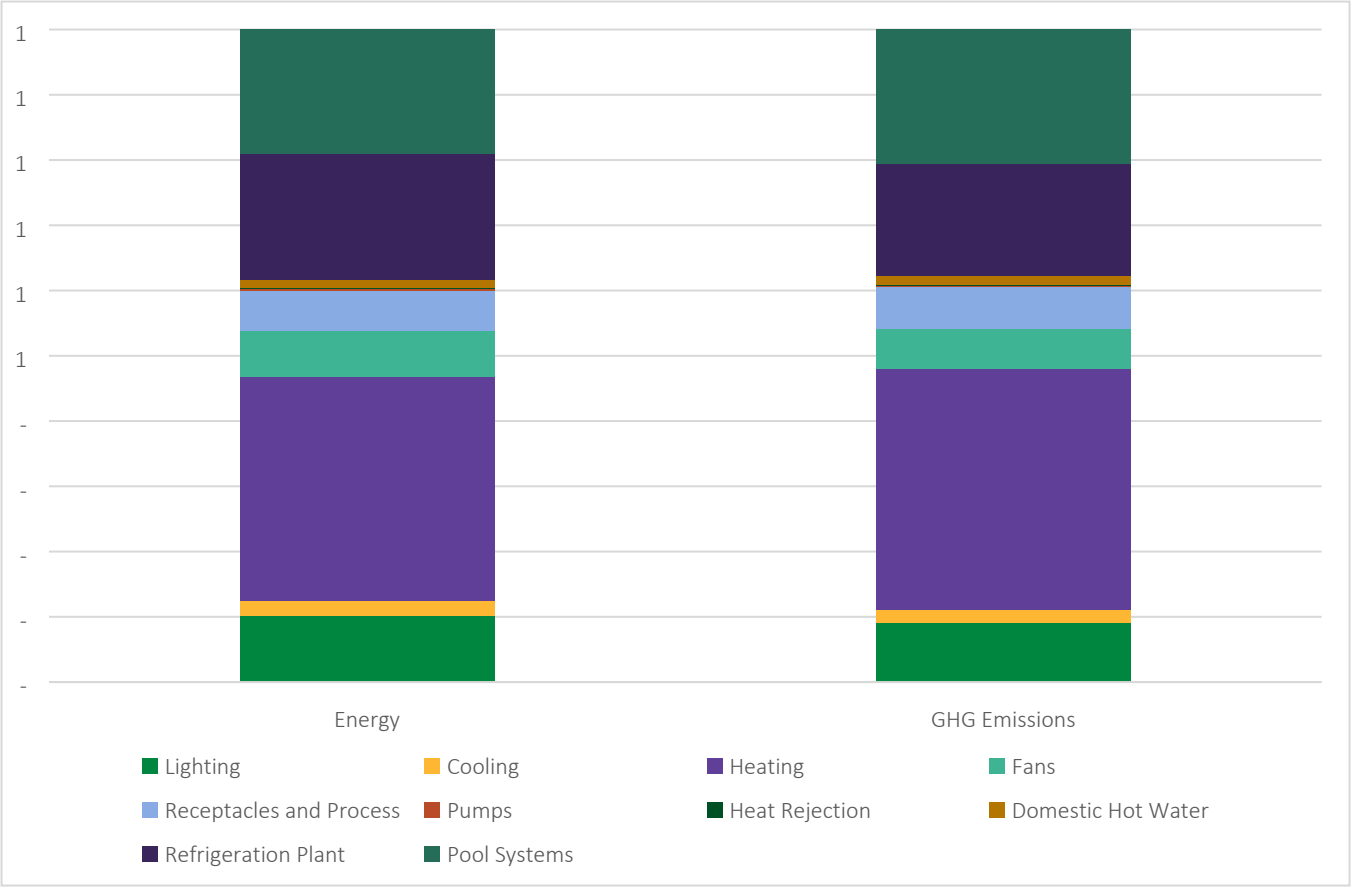


Figure 4.2.3: Energy and GHG baseline Use Summary

4.3 PARAMETRIC MODELLING

Parametric modelling was included as a part of the study to investigate the impact of varying numerous design parameters on energy performance. The specific parameters under investigation here were:

1. Infiltration
2. Solar Heat Gain Coefficient of windows,
3. Window U-value,
4. Phase 1 Wall U-value,

5. Phase 1 Roof U-value,
6. Phase 2 Wall U-value,
7. Phase 2 Roof U-value, and
8. ERV effectiveness of HRU-1 and HRU-2

The calibrated business as usual model was used as the basis for the analysis with the 2018-2019 weather data used for calibration. By varying the parameters above and running a number of simulations, a "metamodel" of the energy model response to varying these parameters was created[i]. From this metamodel a parallel co-ordinates plot was created. Parallel co-ordinates plots are interactive tools and therefore the plot has not been included here directly, but instead can be found at:

https://tedi-calc.mcw-labs.net/project/19453/parallel_coords

The units for the Greenhouse Gas Intensity (GHGI) are kgCO2e/m^2 and Energy Use Intensity (EUI) are kWh/m^2.

It is possible to take the derivative of the metamodel parameters with respect to GHGI to reveal which parameters are most important to greenhouse gas emissions. The most important parameters of those under investigation is ERV effectiveness followed by infiltration. Conversely the least important parameters are window solar heat gain coefficient and U-value. These results make intuitive sense because both infiltration and ERV effectiveness represent the conditioning of outdoor air using carbon intensive natural gas while the window-to-wall ratio of the building is very low such that window parameters are not important. Finally, the sign of the derivative is important and reveals that increasing infiltration or any envelope U-value parameter increases GHGI, while increasing SHGC or ERV effectiveness decreases GHGI.

4.4 CLIMATE ADAPTATION MODELLING

As a part of the study climate adaptation modelling has been included by using expected future weather data. The hourly future weather data used is a result of the Sustainable Buildings Canada white paper "Modelling Weather Futures" which represents expected typical weather in the 2040's. This future weather data was created using a Weather Research and Forecasting Model for the years 2040-2049 for Toronto Pearson Airport ("Toronto's Future Weather and Climate Driver Study" by SENES Consultants Ltd). Using the TMY2 methodology this future decade's worth of weather data was converted into a single typical year weather.

As expected this future weather data is warmer than current typical weather resulting is substantially lower heating degree days, and higher cooling degree days. The result of which was a 23% decrease in natural gas consumption and 16% increase in electrical consumption for a typical MURB ("Modelling Weather Futures" from Sustainable Buildings Canada).

Table 4.4.1 compares the natural gas and electricity consumption changes as a result of going from 2018-2019 weather to typical year 2040's future weather data as produced by the Sustainable Building Canada white paper. Similar to the MURB results in the Sustainable Buildings Canada white paper, natural gas usage decreases using future weather while cooling increases. The impact is slightly smaller compared to the MURB case due to the relative importance of end-uses which have lower weather dependence, such as pool heating and rink refrigeration.

Table 4.4.1: Energy Differences for Each Package Due to Future Weather

Package	Natural Gas (ekWh)	Electricity (kWh)
50A	-455,801	219,056
50B	-440,597	215,835
50C	-371,045	219,985
80A	-257,742	99,220
80B	-276,315	100,812
80C	-215,238	120,746
100A	0	143,357
100B	0	145,899
100C	0	60,651

[i] see "Review of metamodeling techniques in support of engineering design optimization" G.G. Wang and S. Shan in *Journal of Mechanical Design* vol. 129, no.4 pp. 370-380

SECTION 5

ENERGY CONSERVATION MEASURES

5 ENERGY CONSERVATION MEASURES

5.1 OVERVIEW

The following Measure Profile Summary table contains a brief overview of the identified Energy Conservation Measures ("ECM"), which is the subject of this Carbon Neutral Study.

Table 5.1: Energy Conservation Measures List

ECM Tag	Measure Name	Description
A LIGHTING RETROFIT & REDESIGN		
A01	LED Retrofits & New Fixtures (Interior)	Replace lobby fixtures with new fixtures and retrofit T8 fluorescent fixtures with T8 LED lamps.
A02	LED New Fixtures (Exterior)	Replace all metal halide wall packs & pole lighting with LED luminaires.
A03	Lighting Controls (Basic)	Ceiling mounted occupancy sensors will be installed in all change rooms, washrooms and corridors. Wall switch timers will be installed in all mechanical spaces.
A04	Lighting Controls (Arena)	nLight enable occupancy sensors will be installed in the arenas, enabling the arena lighting to automatically dim when space is vacant.
B ELECTRICAL MODIFICATION		
B01	Battery Energy Storage System (City Owned)	Installation of a Battery Energy Storage System (BESS) to allow for the building to enrol in the ICI program.
B02	Battery Energy Storage as a Service	Installation of a Battery Energy Storage System (BESS) by a third party to allow for the building to enrol in the ICI program.
C BUILDING AUTOMATION SYSTEMS		
C01	Analytic Control Tuning	Install data acquisition devices to trend and analyse HVAC operations.
C02	Demand Control Ventilation	Augment the existing space temperature sensors with combination C02/occupancy sensors, set back the outdoor air and temperature setpoint to unoccupied areas.
D HVAC MODIFICATIONS		
D01	Heating Boilers - Condensing	Replace the existing atmospheric heating boilers with condensing boilers
D02	Heating Boilers – Condensing Lower Water Temperature	Replace the existing atmospheric heating boilers with condensing boilers, convert the high temperature loop to a lower water temperature
D03	DHW Boiler - Condensing	Replace the existing atmospheric DHW boiler with a condensing boiler
D04	Pool Boilers - Condensing	Replace the existing atmospheric pool and whirlpool boilers with condensing boilers
D05	Ground Source Heat Loop – Low Temperature Loop	Install a ground source heat loop to serve the low temperature heating loop.

Table 5.1: Energy Conservation Measures List

ECM Tag	Measure Name	Description
D06	Ground Source Heat Loop – High Temperature Loop	Install a ground source heat loop to replace the main heating boilers and electrify the building heating source
D07	AHU Replacement	Replace the existing air handlers and add them to the low temperature loop
D08	AHU VAV Conversion	Install Variable Speed Drives and VAV boxes to reduce the amount of fresh air that must be conditioned by the air handlers
D09	Heat Pump Replacement	Replace the water to air heat pumps on the low temperature loop with newer more efficient ones.
D10	Low Temp Loop Variable Speed Pumping	Install variable speed drives on the low temperature loop pumps, provide control valves at each heat pump.
D11	Waste Water Heat Recovery – High Temp Loop	Install a waste water source heat loop to replace the main heating boilers and electrify the building heating source
D12	District Energy Integration	Integrate the building's heating system with a new district energy system served by the Sheridan College central plant.
E REFRIGERATION		
E01	Chiller Replacement w HR - Ammonia Shell and Tube	Replace the existing built up ice plants with new packaged Ammonia Plate and Frame equivalent
E02A	Chiller Replacement w HR - C02 Plate and Frame – Indirect Slab Cooling	Replace the existing built up ice plants with new packaged C02 Plate and Frame equivalent
E02B	Chiller Replacement w HR - C02 Plate and Frame – Direct Slab Cooling	Replace the existing built up ice plants with new packaged C02 Plate and Frame equivalent, replace in slab piping.
E03	Cold Water Flooding	Install an air separating system to allow for ice resurfacing to be completed with cold water.
E04	Ice Resurfacer Replacement	Replacement of fossil fuel powered ice resurfacers with electric models equipped with Laser Ice Levelling Systems
E05	Radiant Heating Conversion	Replace the radiant stand heaters with electric equivalents
F POOL		
F01	Pool and Whirlpool VFD	Install variable speed drives on the main pool and whirlpool circulating pumps.
F02	Pool Temperature Setback	Reduce Pool Temperature Setpoint During Unoccupied Hours
G BUILDING ENVELOPE UPGRADES		
G01	High Performance Glazing	Replace existing windows with new high performance glazing.
G02	Roof Insulation – Phase I	Install additional insulation on the roof of the arena section of the building
G03	Roof Insulation-Phase II	Install additional insulation on the roof of the community centre section of the building
G04	Exterior Wall Insulation – Phase I	Provide a recladding of the exterior walls of the arena
G05	Exterior Wall Insulation – Phase II	Provide a recladding of the exterior walls of the community centre
G06	Interior Window Replacement	Replace single pane windows partitioning the arena from the rest of the building

Table 5.1: Energy Conservation Measures List

ECM Tag	Measure Name	Description
H DOMESTIC WATER CONSERVATION		
H01	Domestic Water Retrofits	Install low flow domestic water fixtures to replace high flow fixtures
I RENEWABLE ENERGY		
I01A	Solar PV – Roof – 1.18MW array	Installation of a 1.18 MW roof mounted Photo Voltaic (PV) Solar Array to generate renewable electricity.
I01B	Solar PV – Roof – 0.60 MW array	Installation of a 0.60 MW roof mounted Photo Voltaic (PV) Solar Array to generate renewable electricity.
I02	Solar PV - Parking Lot – 1.03 MW array	Installation of a 1.03 MW parking lot stand mounted Photo Voltaic (PV) Solar Array to generate renewable electricity.
I03	Solar Thermal - Pool Heating	Installation of Solar Thermal panel array tied directly into the pool heating system.
J OPERATIONAL CHANGES		
J01	Remove In Stand Heating	Remove the radiant in stand heating from the arena
K GREEN POWER & CARBON OFFSETS		
K01	Renewable Energy Credits	Purchase Renewable Energy Credits as required to achieve carbon neutral operation
K02	Carbon Offsets	Purchase Carbon Offsets as required to achieve carbon neutral operation

5.2 ENERGY CONSERVATION MEASURES

5.2 MEASURE DESCRIPTION GROUP A – LIGHTING RETROFIT & REDESIGN

5.2.1 A01 – LED RETROFITS & NEW FIXTURES (INTERIOR)

MEASURE ID:	A01
MEASURE NAME:	LED Retrofits & New Fixtures (Interior)
MEASURE SUMMARY:	Replace lobby fixtures with new fixtures and retrofit T8 fluorescent fixtures with T8 LED lamps.

Scope of Work

The primary lighting in the lobby currently consists of 35 metal halide decorative fixtures that operate 24/7. These fixtures draw 96W each. Each fixture will be replaced on a 1-for-1 basis with a new LED luminaire with similar aesthetics and better light distribution.

All change room showers each currently have a vapour proof fixture containing a pair of T8 fluorescent lamps powered by an electronic ballast (29 fixtures total). These fixtures draw 59W each. All lamps will be replaced with 10W T8 LED plastic lamps, and all ballasts will be replaced with a high efficiency instant start low ballast factor ballast.

Impact on Operations and Maintenance

The quality of light in the lobby will be greatly improved. LED lighting is known to have much higher CRI (colour rendering index) than metal halide. Also unlike with metal halide lamps, LED fixtures can have their colour temperature (CCT) pre-selected based on the space requirements. A photometric analysis will be done to ensure that the space will be uniformly illuminated, and if possible reduce the number of fixtures. The lights will now be able to be turned on/off instantly, and dimmed (dimming will require additional controls). This opens the possibility (not discussed in this study) for the fixtures to be dimmed at night, and/or controlled by occupancy sensors, for additional savings.

Given the high failure rate of both metal halide lamps and ballast, a significant amount of maintenance time will be saved.

Visually, the lighting produced from the vapour proof fixtures will remain the same. The lamps will however last significantly longer.

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

5.2 ENERGY CONSERVATION MEASURES

Item	Associated Costs
BAU Annual Operation and Maintenance Cost (Retain existing light fixtures)	$5,800
ECM Annual Operation and Maintenance Cost	$1,800
Annual O&M Cost Beyond Business as Usual Case	($4,000)
Equipment Expected Useful Life	13 years

IES Model Input Variables

Savings for this ECM were manually calculated. See Appendix F for a summary of these calculations.

General Assumptions:

- Calculations were calculated using a custom in-house Lighting Database
- Existing and proposed lamp & luminaire wattages were procured from manufacturer technical information sheets
- Building and room occupancy hours were estimated based on talks with staff present, building operators, and general observations during audit
- Refer to **Appendix F: Lighting Line-By-Line** for room-by-room breakdown of all lighting associated with project
- Existing wiring is code compliant.
- Existing electrical grounding systems are code compliant and do not need to be modified.
- No seismic updates are required as a result of lighting changes.

Sample Calculations:

$$kWh = [Load(W) \cdot FixtureQuantity \cdot Hours]\frac{1}{1000}$$

$$kW = [Load(W) \cdot FixtureQuantity \cdot Diversity\ Factor^{*}]\frac{1}{1000}$$

*Where Diversity factor represents the probability the luminaires will be on during peak demand, estimated to be in late afternoon

5.2 ENERGY CONSERVATION MEASURES

Figures

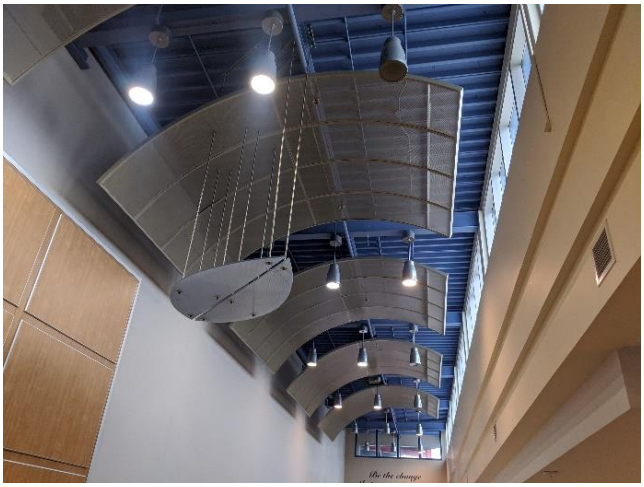


Figure A01.1 – Main lobby lighting.

Figure A01.2 – Proposed lobby fixtures, by Lithonia.

Cost & Savings Summary

A summary for this improvement is outlined below.

A01 LED RETROFITS & NEW FIXTURES (INTERIOR)								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	ELECTRICITY DEMAND PEAK/MONTHLY [kW]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
25,574	3	-	4	$2,739	$24,401	$1,279	8.4	$ 10,620

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.2 ENERGY CONSERVATION MEASURES

5.2.2 A02 – LED NEW FIXTURES (EXTERIOR)

MEASURE ID:	A02
MEASURE NAME:	LED New Fixtures (Exterior)
MEASURE SUMMARY:	Replace all metal halide wall packs & pole lighting with LED luminaires.

Scope of Work

The building's exterior lighting is currently a mix of LED and metal halide fixtures. It is likely that as the metal halide fixtures fail, they are replaced with LED equivalents. This will be fast-tracked and all metal halide fixtures will be replaced with LED fixtures. There currently remains 25 metal halide wall packs. Each of these draw 96 W.

The parking lots are currently illuminated by pole mounted metal halide fixtures. They too will be replaced with LED fixtures. A photometric analysis will be done to ensure minimum light levels are met throughout the entire parking area. There currently exists 7 pole fixtures mounted at 15' drawing 185W each, and 24 pole fixtures mounted at 25' drawing 292W each.

Impact on Operations and Maintenance

By replacing all metal halide fixtures at the same time, going forward a group fixture replacement can be done for the LED fixtures when approaching their end of rated life (24 years). This length of time has is based on the rated life of typical exterior LED products (>100,000 hours) and the assumption that exterior lighting is "on" for a daily average of 12 hours per day.

The quality of light coming from the new fixtures will also be greatly improved with a uniform distribution around the space it's illuminating. Light quality will also be improved, and lumen depreciation will be negligible in the cold weather.

Maintenance of the fixtures will be significantly reduced given that they will not need to be replaced for many years.

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

5.2 ENERGY CONSERVATION MEASURES

Item	Associated Costs
BAU Annual Operation and Maintenance Cost (Retain existing light fixtures)	$5,700
ECM Annual Operation and Maintenance Cost	$1,600
Annual O&M Cost Beyond Business as Usual Case	($4,100)
Equipment Expected Useful Life	24 years

IES Model Input Variables

Savings for this ECM were manually calculated. See Appendix F for a summary of these calculations.

General Assumptions:

- Calculations were calculated using a custom in-house Lighting Database
- Existing and proposed lamp & luminaire wattages were procured from manufacturer technical information sheets
- Building and room occupancy hours were estimated based on talks with staff present, building operators, and general observations during audit
- Refer to **Appendix F: Lighting Line-By-Line** for room-by-room breakdown of all lighting associated with project
- Existing wiring is code compliant.
- Existing electrical grounding systems are code compliant and do not need to be modified.
- No seismic updates are required as a result of lighting changes.

Sample Calculations:

$$kWh = [Load(W) \cdot FixtureQuantity \cdot Hours]\frac{1}{1000}$$

$$kW = [Load(W) \cdot FixtureQuantity \cdot Diversity\ Factor^{*}]\frac{1}{1000}$$

*Where Diversity factor represents the probability the luminaires will be on during peak demand, estimated to be in late afternoon

Figures

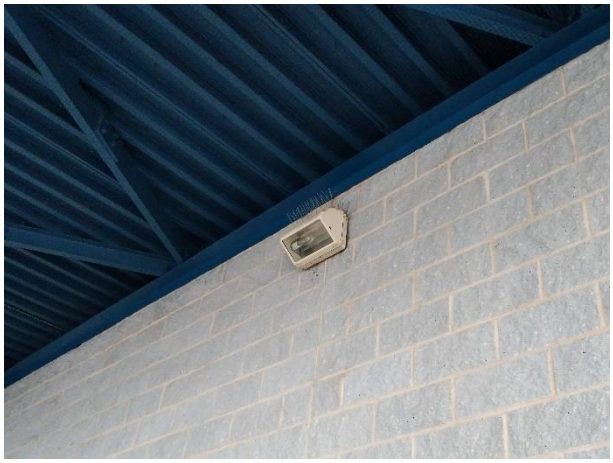


Figure A02.1 – Existing metal halide wall packs

Figure A02.2 – LED wall pack replacements

Figure A02.3 – Typical metal halide pole lighting illuminating the parking area

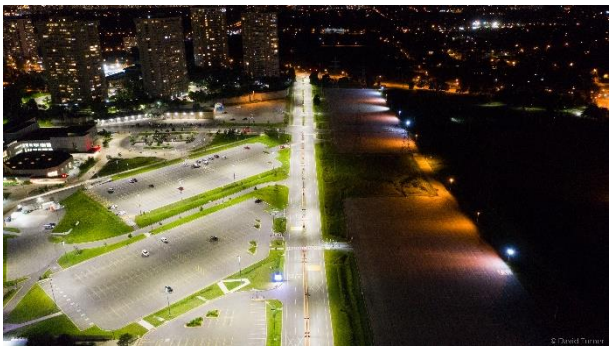


Figure A02.4 – A side by side comparison of LED (left) and metal halide/high pressure sodium (right, out of scope). This lighting retrofit was completed by MCW in 2019.

Cost & Savings Summary

A summary for this improvement is outlined below.

A02 LED NEW FIXTURES (EXTERIOR)								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	ELECTRICITY DEMAND PEAK/MONTHLY [kW]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
24,943	-	-	4	$541	$50,042	$1,247	>50	-$ 36,355

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.2 ENERGY CONSERVATION MEASURES

5.2.3 A03 – LIGHTING CONTROLS (BASIC)

MEASURE ID:	A03
MEASURE NAME:	Lighting Controls (Basic)
MEASURE SUMMARY:	Ceiling mounted occupancy sensors will be installed in all change rooms, washrooms and corridors. Wall switch timers will be installed in all mechanical spaces.

Scope of Work

All change rooms and corridors are currently controlled by a line voltage toggle switch within each room. Some washrooms also have switches, while others are on a remote timer set to operate 24/7. All change rooms and washrooms will have ceiling mounted occupancy sensors installed in the space. The low voltage sensor will be connected to a powerpack, which will control the lights in the space. All sensors will have ultrasonic (sounds) and infrared (movement) technologies, ensuring occupants are always detected even when in washroom stalls or around a corner. Occupancy sensors in hockey change rooms will come with a protective cage to ensure they are not damaged.

Mechanical rooms are also currently controlled by a line voltage toggle switch within each room, however it was observed that some rooms have been inadvertently left on 24/7. All wall switches will be replaced with switches with timers, such that after a pre-determined number of hours the lights will turn off automatically. The switch timers will feature a warning system, such that 15 minutes prior to light shutoff, the lights will begin to flash, notifying the occupant. That in addition to ample emergency lighting will ensure safety is not compromised in the spaces.

All control devices proposed in this measure are considered “stand alone” devices, such that they would not be integrated into the building’s BAS, nor would they have that capability for future consideration.

Impact on Operations and Maintenance

Occupancy sensors and switch timers are both quite reliable and do not require maintenance.

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

5.2 ENERGY CONSERVATION MEASURES

Item	Associated Costs
BAU Annual Operation and Maintenance Cost (Do not install occupancy sensors)	$0
ECM Annual Operation and Maintenance Cost	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	20 years

IES Model Input Variables

Savings for this ECM were manually calculated. See Appendix F for a summary of these calculations.

General Assumptions:

- Calculations were calculated using a custom in-house Lighting Database
- Existing and proposed lamp & luminaire wattages were procured from manufacturer technical information sheets
- Building and room occupancy hours were estimated based on talks with staff present, building operators, and general observations during audit
- Refer to **Appendix F: Lighting Line-By-Line** for room-by-room breakdown of all lighting associated with project
- Existing wiring is code compliant.
- Existing electrical grounding systems are code compliant and do not need to be modified.
- No seismic updates are required as a result of lighting changes.

Sample Calculations:

$$kWh = [Load(W) \cdot FixtureQuantity \cdot Hours]\frac{1}{1000}$$

$$kW = [Load(W) \cdot FixtureQuantity \cdot Diversity\ Factor^{*}]\frac{1}{1000}$$

*Where Diversity factor represents the probability the luminaires will be on during peak demand, estimated to be in late afternoon

Figures

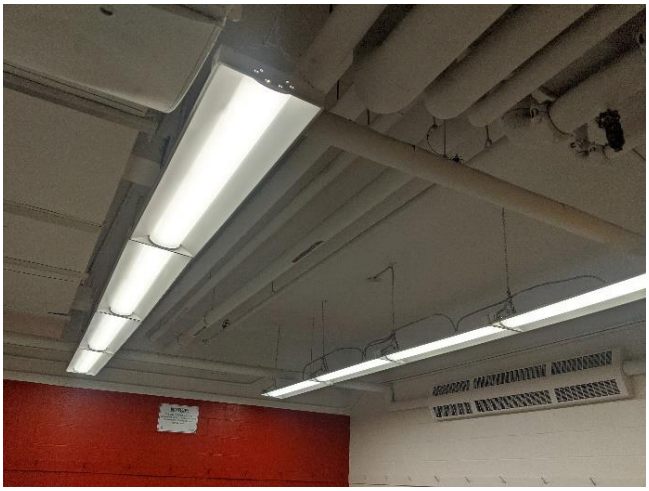


Figure A03.1 – Typical lighting layout in a change room. Occupancy sensor to be place in center of room.

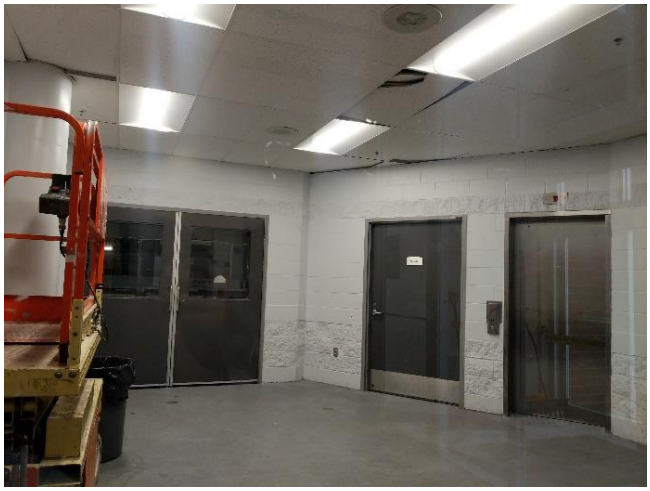


Figure A03.2 – Vestibule between main lobby and arena. Space is not used but lights remain on; good opportunity for an occupancy sensor.

Figure A03.3 – Timerclock used to control some washroom lighting, set to operated 24/7.

Cost & Savings Summary

A summary for this improvement is outlined below.

A03 LIGHTING CONTROLS (BASIC)								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	ELECTRICITY DEMAND PEAK/MONTHLY [kW]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
18,420	-	-	3	$399	$21,555	$921	>50	-$ 13,551

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.2 ENERGY CONSERVATION MEASURES

5.2.4 A04 – LIGHTING CONTROLS (ARENA)

MEASURE ID:	A04
MEASURE NAME:	Lighting Controls (Arena)
MEASURE SUMMARY:	*nLight* enable occupancy sensors will be installed in the arenas, enabling the arena lighting to automatically dim when space is vacant.

Scope of Work

The arena lighting is currently controlled by an *nLight Wired* lighting controller. All fixtures are daisy chained via Cat5e cable to the controller and switches, located in the Zamboni room. Though fixtures can be dimmed and scenes have been programmed, it appears the fixtures are rarely dimmed/turned off when spaces are vacant. *nLight* enabled occupancy sensors will be installed over and around each rink, and connected back to the system. When vacancy is detected for 15 minutes by all sensors in the space, the lights will be commanded to dim to 20% output, allowing for significant savings while still ensuring the space is bright enough to easily navigate.

Impact on Operations and Maintenance

Occupancy sensors are quite reliable and do not require maintenance.

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
BAU Annual Operation and Maintenance Cost (Do not install occupancy sensors)	$0
ECM Annual Operation and Maintenance Cost	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	20 years

5.2 ENERGY CONSERVATION MEASURES

IES Model Input Variables

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered IES Model Input Variables

Savings for this ECM were manually calculated. See Appendix F for a summary of these calculations.

General Assumptions:

- Calculations were calculated using a custom in-house Lighting Database
- Existing and proposed lamp & luminaire wattages were procured from manufacturer technical information sheets
- Building and room occupancy hours were estimated based on talks with staff present, building operators, and general observations during audit
- Refer to **Appendix F: Lighting Line-By-Line** for room-by-room breakdown of all lighting associated with project
- Existing wiring is code compliant.
- Existing electrical grounding systems are code compliant and do not need to be modified.
- No seismic updates are required as a result of lighting changes.

Sample Calculations:

$$kWh = [Load(W) \cdot FixtureQuantity \cdot Hours]\frac{1}{1000}$$

$$kW = [Load(W) \cdot FixtureQuantity \cdot Diversity\ Factor^{*}]\frac{1}{1000}$$

*Where Diversity factor represents the probability the luminaires will be on during peak demand, estimated to be in late afternoon

Figures

Figure A04.1 – The current nLight control system. No changes will be made to the front end of the system.

Figure A04.2 – Typical rink. Each rink will have eight fixtures installed.

Cost & Savings Summary

A summary for this improvement is outlined below.

A04 LIGHTING CONTROLS (ARENA)								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	ELECTRICITY DEMAND PEAK/MONTHLY [kW]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
102,018	-	-	15	$2,211	$11,364	$5,101	2.8	$ 32,966

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.3 MEASURE DESCRIPTION GROUP B – ELECTRICAL MODIFICATIONS

5.3.1 MEASURE B01: BATTERY ENERGY STORAGE SYSTEM (CITY OWNED)

MEASURE ID:	B01
MEASURE NAME:	Battery Energy Storage System (City Owned)
MEASURE SUMMARY:	Installation of a Battery Energy Storage System (BESS) to allow for the building to enrol in the ICI program.

Scope of Work

As the building currently operates as a class B electrical consumer, electricity is billed largely as a function of consumption. By installing a Battery Energy Storage System, the building can be artificially brought into the class A rate whereby its electricity costs would become a function of peak demand. Please see Section 3 of this report for a discussion of the two rate classes.

The building currently experiences monthly peak demand events that are close to, but not above the 1.0 MW threshold to participate in the class A rate. A BESS would be discharged monthly during off peak hours to ensure the monthly peak demand of the building was in excess of 1.0 MW. The BESS would also be used in conjunction with a Global Adjustment prediction service to lower the building's demand during global adjustment events.

In order to electrify the building's heat source, which is required in order to achieve carbon neutral operation, a shift to a demand based rate structure is preferable. It will require a significant increase in electrical consumption without a similarly significant increase to the building's electrical demand.

This measure installs a new 500kW x 2 hr battery array adjacent to the building exterior. The installation includes:

- NMC Lithium ion battery packs, sized such that the array could discharge 1,000 kWh over a two hour window
- Concrete equipment pad, including security fencing located adjacent to the building. The pad orientation is customizable but requires approximately 1,000 sqft for an array of this size.
- Inverters, transformer (480V to 600V) and associated switchgear
- Electrical installation to tie the array into the electrical distribution system. The assumed point of connection is distribution panel DP1 which has the capacity to accommodate such an array
- Battery control system that automatically charges and discharges the array based on market conditions.

On days where no peak event is expected the array can be used to take advantage of fluctuations in the hourly cost of electricity or the carbon intensity of the grid. Under a class A rate structure the building is still charged the Hourly Ontario Energy Price (HOEP) on each kWh consumed. The HOEP varies hourly but it does so in patterns that are, for the most part, predictable. Energy prices are typically $0.018/kWh higher during the daytime as compared to the evening. By charging the array when the HOEP is low and discharging when the HOEP is high additional cost savings can be achieved. Similarly an analysis of IESO data for the 2016 year indicates the Ontario grid uses 54.4 g C02/kWh during peak hours and only 28.62 g C02/kWh during off peak hours.

Running the array daily yields an additional $6,300 in time of use savings and 9 tonnes of C02 annually. When assessed against the cost of operating and maintaining the BESS given the additional use it is preferable to keep the BESS idle and only operate it in order to reduce global adjustment peaks.

The proposed BESS would be specified such that it is to be compliant with the following safety standards:

- Battery cells to UL 1642 - Lithium Batteries
- System to UL 1642 - Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications
- System to UL 9450 - Standard for Energy Storage Systems and Equipment
- System to UL 9450A - Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
- System to UL 1741 - Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources

Impact on Operations and Maintenance

Lithium Ion NMC battery cells experience wear however when used correctly (not left in extremely high or low charge states for extended periods) industry standard is 3000 cycles while retaining 70% charge rating. If the BESS is used only for peak shaving and boosting the building to class A, it is expected that its useful life would exceed 50 years. If it is used more frequently this would decrease, but even at daily use it would still be expected to provide a 20 year service life.

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$10,000
BAU Annual Operation and Maintenance Cost (Do not install a BESS)	$0

Annual O&M Cost Beyond Business as Usual Case	$10,000
Equipment Expected Useful Life	30 years

IES Model Input Variables

Savings for this measure were calculated manually, outside of IES-VE.

Figures

Figure B01.1 – Extended battery installation representative of installation for proposed measure

Cost & Savings Summary

A summary for this improvement is outlined below.

B01 BATTERY ENERGY STORAGE SYSTEM (CITY OWNED)							
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]
ELECTRICITY CONSUMPTION [kWh]	GLOBAL ADJUSTMENT KW [kW]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]			
-109,500	475	50,775	-16	$326,296	$1,090,100	3.3	$6,419,438

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.3.2 MEASURE B02: BATTERY ENERGY STORAGE SYSTEM (ESAS)

MEASURE ID:	B02
MEASURE NAME:	Battery Energy Storage as a Service
MEASURE SUMMARY:	Installation of a Battery Energy Storage System (BESS) by a third party to allow for the building to enrol in the ICI program.

Scope of Work

This ECM is effectively identical to measure B01, however in this case the BESS is installed and operated by a third party under an Energy Storage as a Service (ESAS) contract at no initial cost to the City.

Under an ESAS contract the building could still be moved to the ICI program (class A), but the savings stream is diminished to allow for the ESAS provider to recoup the cost of installing and operating the BESS.

ESAS contracts are typically enrolled in with a 10 year term. Termination fees do apply if the City elects to terminate the ESAS contract early.

ESAS projects are typically larger than the 500kW array proposed for measure B01. An array of this size would garner an annual payout to the city in the $8,000 range. This figure grows quick as the array size does. A 1MW array can provide an annual payout in the $175,000 range, however the facility does not have a large enough electrical demand load to support such an array.

Impact on Operations and Maintenance

As the BESS would be owned and operated by a third party, this ECM would have no impact to operations and maintenance.

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Do not install a BESS)	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	NA

IES Model Input Variables

Savings for this measure were provided in consultation with third party ESAS providers.

Figures

N/A.

Expected Service Life of Measure

The ESAS contract can be tailored to have differing terms, this is at the option of the City.

Cost & Savings Summary

A summary for this improvement is outlined below.

B02 BATTERY ENERGY STORAGE AS A SERVICE								
ANNUAL SAVINGS						TOTAL MEASURE COST [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	ELECTRICITY DEMAND PEAK/MONTHLY [kW]	GLOBAL ADJUSTMENT KW [kW]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]			
-109,500	-	-	58,885	-16	$88,402	$1	0.0	$ 1,318,186

Notes:
1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.4 MEASURE DESCRIPTION GROUP C – BUILDING AUTOMATION SYSTEMS

5.4.1 MEASURE C01: DEMAND CONTROL VENTILATION

MEASURE ID:	C01
MEASURE NAME:	Demand Control Ventilation
MEASURE SUMMARY:	Augment the existing space temperature sensors with combination C02/occupancy sensors, set back outdoor air and temperature setpoint to unoccupied areas.

Scope of Work

The concept of this measure is to ensure that new variable air primary (i.e. outdoor air) boxes are controlled to satisfy dilution of CO2 in occupied spaces, and that unoccupied spaces have their space temperature setpoints offset from normal occupied temperature.

This measures proposes to provide this by installing new network connected, display-less, combination temperature, humidity, CO2, and occupancy sensor by Johnson Controls: NSB8MTC042-0. These would be installed on a per-zone basis, and the setpoints associated with the operation of variable air volume ventilation and heat pump conditioning would be coordinated for different conditions: when there is no scheduled occupancy of the facility (i.e. a deep setback of 14 deg C heating/28 deg C cooling), when there is scheduled occupancy of facility but no detected occupancy (i.e. a light setback of 18 deg C heating/24 deg C cooling), and when there is schedule occupancy and detected occupancy (normal occupied temperature setpoint).

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$15,000
BAU Annual Operation and Maintenance Cost (Retain Existing BAS)	$12,000
Annual O&M Cost Beyond Business as Usual Case	$3,000
Equipment Expected Useful Life	10 years

IES Model Input Variables

Demand control ventilation was implemented in the appropriate spaces directly in IES by using CO2 sensors. However, without full VAV conversion the minimum flow was set to a value of 70%.

Parameter	Calibrated Model	ECM Implementation
Minimum flow ratio to zones	1.0	0.7

Figures

Figure C02.1 Depiction of the various networkable sensors (Johnson Controls power + BACnet MS/TP communications' SA-bus) available for connection to their VMA controllers.

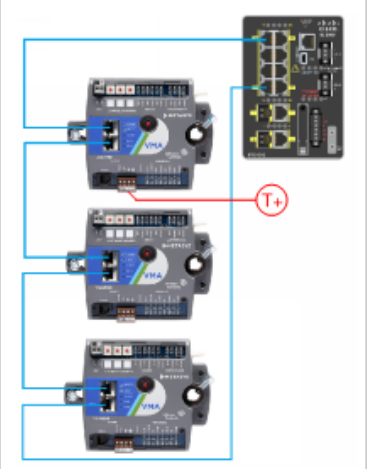


Figure C02.2 Depiction of the daisy-chained Ethernet ring topology for fast communication of the information being retrieved from network combination sensors (shown as T+).

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

C01 DEMAND CONTROL VENTILATION								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
113,446	14,132	-	44	$6,478	$651,200	$22,689	>50	-$ 556,863

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.4.2 MEASURE C02: ANALYTIC CONTROL TUNING

MEASURE ID:	C02
MEASURE NAME:	Analytic Control Tuning
MEASURE SUMMARY:	Install data acquisition devices to trend and analyse HVAC operations.

Scope of Work

Proper identification and correction of excursions in the operation of a building's energy system can lead to substantial savings. This measure proposes the installation of a data aggregator and analytics software package. This system will aggregate BACnet trend logs into a single database, which is then mirrored into a cloud based software platform. The intent of the software platform is to be able to apply logical rules to the information that is captured from site so that fault finding algorithms can capture instances of equipment behaving erroneously.

Predicted faults include:

- Systems that are commanded to be disabled, but are showing status due to starters being in hand control.
- Ongoing drift associated with the operation of a motor, whether it's current is deviating from normal levels.
- Whether speed is changing as a function of expected load (potentially indicative of poor set point or sensor placement).
- System input values that have not changed over hours, based on COV reporting (indicative of faulty sensors).
- Execution of calibration routines to assess whether the mixed air dampers are holding shut through temperature monitoring during full recirculation morning warmup.
- Assessment of leaking valves through the application of differential temperature measurement while valves are closed.

The cost of implementation associated with this measure is based on a one time cost of installation in addition to a subscription fee for the first year of the service. The first year after implementation will serve as a demonstration of the capabilities of the technology and the savings that can be realized through the use of a Data Capture and Analytics system. Subscription to the service in subsequent years will be determined at a future date. Historically this service has shown to bring continued value through its ability to flag faults and excursions affecting system performance, thereby increasing likelihood of savings performance.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

There is little to no expected maintenance costs associated with this ECM, however an ongoing service subscription is required.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$8,500
BAU Annual Operation and Maintenance Cost (Do not implement building analytics)	$0
Annual O&M Cost Beyond Business as Usual Case	$8,500
Equipment Expected Useful Life	25 years

IES Model Input Variables

The savings for this measure were estimated based on a review of the BAS performance. This estimate was revised downward to reflect the close involvement the City's energy group has in reviewing the ongoing operation of the BAS.

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

C02 ANALYTIC CONTROL TUNING								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
79,230	7,785	-	27	$3,931	$9,350	$4,250	1.3	$113,670

Notes:
1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5 MEASURE DESCRIPTION GROUP D – HVAC MODIFICATIONS

5.5.1 MEASURE D01: HEATING BOILERS - CONDENSING

MEASURE ID:	D01
MEASURE NAME:	Heating Boilers - Condensing
MEASURE SUMMARY:	Replace the existing atmospheric heating boilers with condensing boilers

Scope of Work

The perimeter heating, HRU 1, HRU 2, and the Deck-Tron are served by a hydronic system consisting of three Raytherm 1825 MBH atmospheric boilers. These boiler are at the end of their useful life.

This measure proposes to replace these boilers with boilers with new, higher efficiency condensing boilers to be used to supply the hydronic heating system load. The new boilers would also include a more intelligent controls interface that would allow them to communicate with a separate outdoor air reset package. The new replacement boilers would have a rated efficiency of up to 97%, and thus be able to fulfill the heating needs of the building with less natural gas consumption.

The high rated efficiency of a condensing boiler is only reached when the boiler is operating at a condensing temperature. Without modifying the existing hot water loop to work with a lower supply temperature, the new boilers will experience some loss of efficiency in the coldest months of the winter when they would not condense. During the shoulder season the condensing boiler would be able to operate at full rated efficiency for much of the time. Please see ECM D02 for a further discussion of this.

The replacement of the boilers would also require replacement of the existing boiler stacks to allow for condensing operation as the condensed flue gas would corrode the existing stacks.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$7,500
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency boilers)	$7,500
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Rated Boiler Efficiency	80%	93%
Boiler Performance Curve	Default Non-condensing boiler	Default Condensing boiler
Minimum Supply Water Reset Temperature	None	130°F

Figures

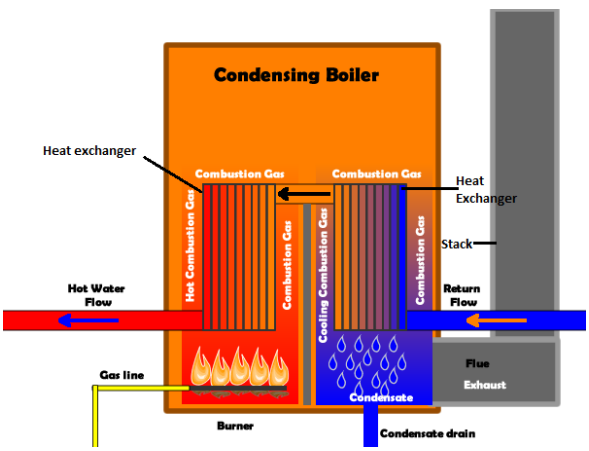


Figure D01.1- Principle of operation for a condensing boiler

Figure D01.2 – Existing Atmospheric Boiler

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D01 HEATING BOILERS - CONDENSING								
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]					
41,660	-	79	$11,848	$508,200	$380,600	$8,332	10.1	$ 304,858

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.2 MEASURE D02: CONDENSING BOILERS – LOWER WATER TEMPERATURE

MEASURE ID:	D02
MEASURE NAME:	Heating Boilers – Condensing Lower Water Temperature
MEASURE SUMMARY:	Replace the existing atmospheric heating boilers with condensing boilers, convert the high temperature loop to a lower water temperature

Scope of Work

This ECM is effectively equivalent to measure D01, however the savings presented represent the effect of lowering the heating water temperature of the high temperature heating loop from 155 deg F to 130 deg F. This would allow the new boilers to run in condensing mode for nearly the entirety of the heating season.

To accomplish this all terminal equipment (unit heaters, perimeter rads, and cabinet heaters) would need to be replaced to accommodate the lower temperature water. Similarly air handlers served by the high temperature loop (HRU1, and the Deck Tron) would need to be retrofitted with new heating coils.

The costs associated with these conversions is carried in other measures presented in this report (measure D07 for air handlers and measures E01/02 for terminal equipment). This ECM is presented not as a stand-alone project, but rather to reinforce to the reader the degree of interdependence between each of the individual mechanical measures.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$7,500
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency boilers)	$7,500
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Rated Boiler Efficiency	80%	93%
Boiler Performance Curve	Default Non-condensing boiler	Default Condensing boiler
Supply Water Temperature	180°F	130°F

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D02 HEATING BOILERS - CONDENSING LOWER WATER TEMPERATURE									
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]					
-9,420	64,043	-	120	$18,010	$508,200	$380,600	$12,809	6.4	$ 532,510

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.3 MEASURE D03: DHW BOILER - CONDENSING

MEASURE ID:	D03
MEASURE NAME:	DHW Boiler - Condensing
MEASURE SUMMARY:	Replace the existing atmospheric DHW boiler with a condensing boiler

Scope of Work

Domestic hot water is provided by a single Raytherm 1,467 MBH atmospheric boiler. This boiler serves all domestic water loads in the buildings, but does not serve the ice rink flooding. The existing domestic water boiler is of a similar make, vintage, and performance as the main water heating boilers.

This ECM replaces this boiler with a high efficiency condensing boiler designed to provide domestic hot water at 140 deg F. Domestic hot water represents an ideal application for condensing boilers as the lower water temperature allow for condensing operation at all times.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,500
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency DHW boiler)	$1,500
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Rated Boiler Efficiency	85%	95%
Boiler Performance Curve	Default Non-condensing boiler	Default Condensing boiler

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D03 DHW BOILER - CONDENSING							
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
5,613	-	11	$1,596	$161,700	$111,100	31.7	$ 6,544

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.4 MEASURE D04: POOL BOILERS - CONDENSING

MEASURE ID:	D04
MEASURE NAME:	Pool Boilers - Condensing
MEASURE SUMMARY:	Replace the existing atmospheric pool and whirlpool boilers with condensing boilers

Scope of Work

The existing pool and whirlpool boiler is of a similar make, vintage, and performance as the main water heating boilers. Each is served by a single atmospheric boiler rated at 825MBH and 150MBH respectively. Pool heating and whirlpool heating represent ideal candidates for condensing boiler retrofits as they are low temperature applications that do not require lowering the supply temperature in order to achieve the high performance available through condensing operation.

This ECM replaces these boilers with high efficiency condensing boilers and to replace the existing boiler stacks to accommodate condensing operation.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,500
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency pool boilers)	$1,500
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Rated Boiler Efficiency	85%	95%
Boiler Performance Curve	Default Non-condensing boiler	Default Condensing boiler

Figures

Figure D03.1 – Existing Atmospheric Pool Boiler

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D04 POOL BOILER - CONDENSING									
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]					
846	17,806	-	34	$5,082	$206,800	$114,400	$3,561	17.5	$ 92,860

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.5 MEASURE D05: GROUND SOURCE HEAT LOOP – LOW TEMPERATURE LOOP

MEASURE ID:	D05
MEASURE NAME:	Ground Source Heat Loop – Low Temperature Loop
MEASURE SUMMARY:	Install a ground source heat loop to serve the low temperature heating loop.

Scope of Work

The building is served by two hydronic loops. A high temperature loop and a low temperature loop. The low temperature loop serves the water to air heat pumps that provide much of the heating and cooling for the air supplied to the spaces. These heat pumps, and by extension the low temperature loop, are served by the high temperature where heat is injected indirectly from the building's heating boilers.

In essence the existence of the low temperature loop presents an opportunity to electrify a significant portion of the building's HVAC system without resorting to invasive changes to air handlers, terminal devices or piping that will be required as part of a full electrification of the building's heating system that will be required as part of carbon neutral operation.

This measure proposes to install a ground source heating loop sized to carry the operation of the low temperature loop (200 tons). A conservative estimate of the required borehole field yields a field consisting of 50 holes to a depth of 600 feet. This field fits well within the greenspace area north of the building. This estimate would need to be verified by conducting a test drill before proceeding to detailed design.

High lift heat pump technology has recently improved such that this application can be served by heat pumps equipped with centrifugal compressors in lieu of positive displacement compressors. This allows for the heat pump to be added to the facility without negatively impacting its TSSA rating.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$4,500
BAU Annual Operation and Maintenance Cost (Low temp loop supplied by mid efficiency boilers)	$1,500
Annual O&M Cost Beyond Business as Usual Case	$3,000
Equipment Expected Useful Life	25 years

IES Model Input Variables

A ground-source heat exchanger was added to the water-loop heat pump loop to add heat during the winter and act as a sink in summer. The ground water temperature was estimated by on a month-by-month basis using the software program Ground Loop Design and the simulated loads on the ground loop.

Figures

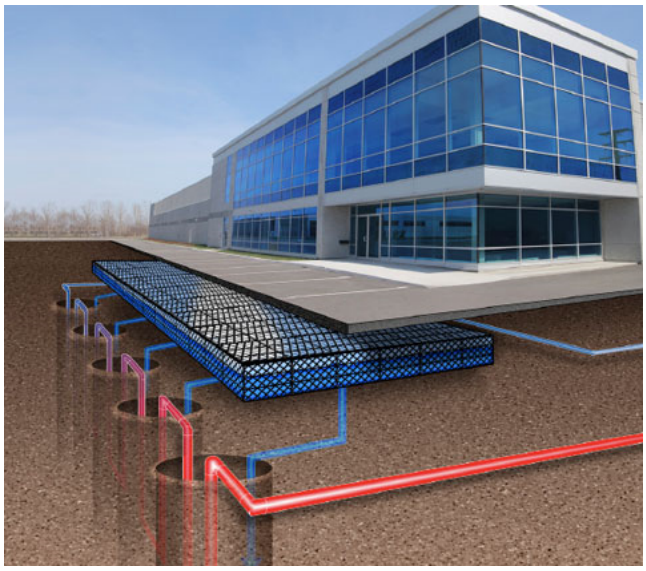


Figure D05.1- Ground Source Heat Loop

Figure D05.2- Ground Source Heat Pump

Figure D05.3- Low Temp Loop Required Bore Hole Area

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D05 GROUND SOURCE HEAT LOOP - LOW TEMP LOOP								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
-47,713	72,546	-	131	$19,598	$2,652,100	$380,600	>50	-$ 1,556,730

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.6 MEASURE D06: GROUND SOURCE HEAT LOOP – HIGH TEMPERATURE LOOP

MEASURE ID:	D06
MEASURE NAME:	Ground Source Heat Loop – High Temperature Loop
MEASURE SUMMARY:	Install a ground source heat loop to replace the main heating boilers and electrify the building heating source

Scope of Work

In order to achieve carbon neutral operation, the main heating boilers, pool boilers, and domestic hot water boilers must be electrified.

This measure proposes to install a ground source heating loop sized to carry the operation of the entire building. A conservative estimate of the required borehole field yields a field consisting of 200 holes to a depth of 600 feet. This field fits within the greenspace area north of the building without having to disrupt the parking lot. This estimate would need to be verified by conducting a test drill before proceeding to detailed design.

As part of the electrification process the high temperature water loop would have its temperature reduced from 155 deg F to 130 deg F. This lower heating water temperature 130 def F represents something of a "magic number" for the building for three reasons:

- 130 deg F is the maximum temperature of heat recovery water that can be recovered as superheat from the arena ice plants
- 130 deg F is the minimum temperature that can be used to regenerate the arena's desiccant dehumidifiers
- 130 deg F is the maximum temperature that a heat pump can reasonably lift to from ground water temperature before a sharp drop off in its COP is encountered

This measure includes the resizing of all terminal heating equipment (rads, unit heaters, and cabinet heaters) to ensure they are able to operate at the new heating water temperature, and tying the heat rejection from the arena desuperheaters onto the high temperature loop.

This measure also includes tying the domestic hot water, pool, and whirlpool heating loads onto the low temperature loop with dedicated heat pumps, new low temperature loop distribution piping, and upsizing the pumps on the low temperature loop. The reader is directed to Appendix C – Mechanical Energy Flow Diagram

High lift heat pump technology has recently improved such that this application can be served by heat pumps equipped with centrifugal compressors in lieu of positive displacement compressors. This allows for the heat pump to be added to the facility without negatively impacting its TSSA rating.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$11,000
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency boilers)	$7,500
Annual O&M Cost Beyond Business as Usual Case	$3,500
Equipment Expected Useful Life	25 years

IES Model Input Variables

A water-to-water heat pump was modelled in IES. The heat pump had a constant seasonal COP of 3.0 as linking a water-to-water heat pump to a variable temperature source is not possible.

Figures

Figure D06.1- High Temp Loop Required Bore Hole Area

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D06 GROUND SOURCE HEAT LOOP - HIGH TEMP LOOP								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
-1,452,095	333,134	-	416	$63,276	$9,574,400	$380,600	>50	-$ 6,526,472

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.7 MEASURE D07: AHU REPLACEMENT

MEASURE ID:	D07
MEASURE NAME:	AHU Replacement
MEASURE SUMMARY:	Replace the existing air handlers and add them to the low temperature loop

Scope of Work

The facility is served by six main air handlers that provide preheating and cooling of the outdoor air before it is passed onto the ventilation system where the air is further conditioned by the space heat pumps.

Air Handler	Serves	End of Life	Heating Source	Flow (Cfm)	Heating (MBH)	Cooling (Ton)
HRU 1	Arena	Yes	High Temp Loop	18,000	1,000	50
HRU 2	Community Centre	Yes	Natural Gas	18,000	1,000	50
Dectron	Pool	No	High Temp Loop	18,000	525	30
MUA 1	Workout Space	Yes	Natural Gas	1,000*	126	3
ERV 1	Arena change area	No	Natural Gas	3,600	195	11
ERV 2	Arena change area	No	Natural Gas	3,600	195	11

*Estimated

All of these air handlers are equipped with air side heat recovery.

This measure proposes to replace the air handlers in order to electrify the building's heating system and achieve carbon neutral operation. All of the units will be moved from the high temp loop or natural gas heating onto the low temperature loop and will be equipped with self contained heat pumps in order to provide sufficient and cooling heating to the ventilation system.

Moving the units from direct expansion air cooled condensers to heat pumps allows for variable speed operation at a lower speed. The proposed units are able to turn down cooling operation to as little as 10% of full rating, as such this measure and measure D08 AHU VAV Conversion are strongly interdependent.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$12,000
BAU Annual Operation and Maintenance Cost (Install new standard efficiency air handles for HRU1, HRU2, MUA1, retain other air handlers)	$10,500
Annual O&M Cost Beyond Business as Usual Case	$1,500
Equipment Expected Useful Life	25 years

IES Model Input Variables

The heat recovery effectiveness of the AHUs was increased to 85% sensible, and 80% latent effectiveness to model a heat wheel. The AHU heating coils were all set to water-loop heat pumps and coupled to the water-loop heat pump loop.

Parameter	Calibrated Model	ECM Implementation
HRU-1 Sensible Recovery Effectiveness	50%	85%
HRU-1 Latent Recovery Effectiveness	0%	80%
HRU-2 Sensible Recovery Effectiveness	65%	85%
HRU-2 Latent Recovery Effectiveness	60%	80%
HRU-1 Heating Coil	Hot water	Water-loop heat pump
HRU-2 Heating Coil	Natural gas furnace	Water-loop heat pump

Figures

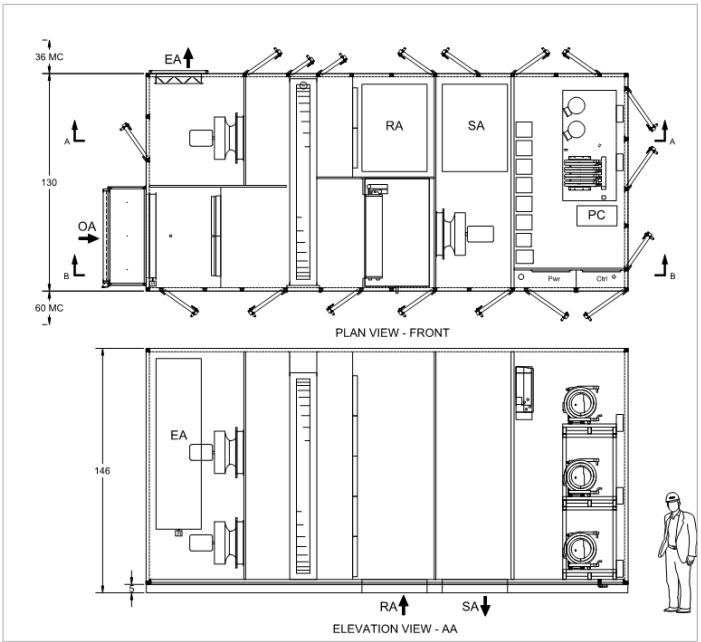


Figure D07.1- HRU-1 Proposed Retrofit Air Handler

Figure D07.2- Existing Air Handler MUA-1

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D07 AHU REPLACEMENT								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
21,233	35,424	-	71	$10,535	$2,494,800	$1,124,200	>50	-$ 999,371

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.8 MEASURE D08: AHU VAV CONVERSION

MEASURE ID:	D08
MEASURE NAME:	AHU VAV Conversion
MEASURE SUMMARY:	Install Variable Speed Drives and VAV boxes to reduce the amount of fresh air that must be conditioned by the air handlers

Scope of Work

The existing air handlers, while largely efficient in their operation, are all constant volume units. Their fans run at a constant volume regardless of the air volume required.

This measure proposes to add variable speed drives to all air handlers (save for the Dectron) and reduce air flow based on minimum OA requirements. VAV boxes would also be provided for each space heat pump, with new VAV controllers tied to the C02 sensors described in measure C02 – Demand Control Ventilation.

This measure also has a large interdependency with measure D07 air handler replacement as the existing air handlers are equipped with air cooled condensers and care must be taken to ensure air flow isn't reduced to the point that the coils are at risk of freezing.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$2,500
BAU Annual Operation and Maintenance Cost (Retain existing constant volume operation)	$0
Annual O&M Cost Beyond Business as Usual Case	$2,500
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Minimum flow ratio to zones	1.0	Meet ASHRAE62.1 minimum
Demand control ventilation	None	CO2 sensors

Figures

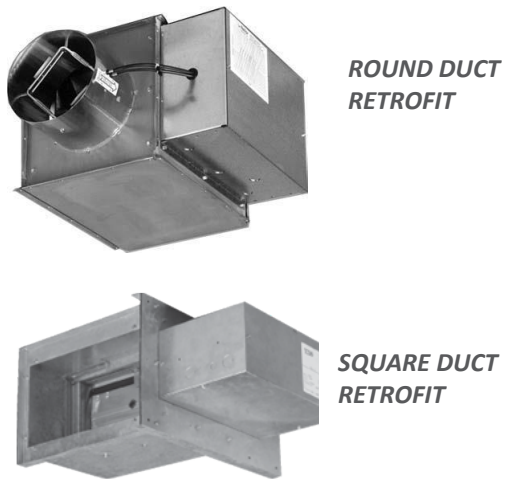


Figure D08.1- VAV Box retrofit Kits

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D08 AHU VAV CONVERSION								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
309,937	41,705	-	126	$18,577	$375,100	$39,335	18.1	$ 243,392

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.9 MEASURE D09: HEAT PUMP REPLACEMENT

MEASURE ID:	D09
MEASURE NAME:	Heat Pump Replacement
MEASURE SUMMARY:	Replace the water to air heat pumps on the low temperature loop with newer more efficient ones.

Scope of Work

The building is served by forty one (41) water to air heat pumps on the low temperature loop. These heat pumps provide conditioning to building spaces in either heating or cooling mode.

Heat Pump Quantity	Size (MCA)	Cooling Capacity (kW)	Heating Capacity (kW)
1	0.5	2.6	3.2
1	3.8	2.0	2.4
3	6.6	3.4	4.3
4	7.8	4.0	5.2
2	8.7	11.0	13.1
2	9.5	4.0	5.2
3	10.0	7.9	9.8
2	11.6	17.4	21.6
2	12.0	NA (Snowmelt)	25.0
1	12.5	6.6	7.7
2	12.6	7.7	8.7
2	13.1	4.9	6.6
2	13.6	6.5	7.8
2	13.7	30.8	36.4
1	15.2	9.1	11.0
5	16.5	10.2	11.0
1	19.9	34.4	44.8
1	22.4	43.7	41.1
2	22.9	60.7	72.3
1	25.3	42.0	49.2
1	81.0	80.3	79.3

Many of these heat pumps are nearing the end of their useful life and will need to be replaced soon. At the time of construction the heat pumps were charged with Refrigerant R-22 (Chlorodifluoromethane). R-22 was phased out and as of January 1 2020 is no longer manufactured (though it can be reclaimed and reused) in keeping with the Montreal protocol.

Newer heat pumps use Refrigerant R-413A, an HFC with less ozone depletion potential, but advances in heat pump design since the building was constructed allow for comparable performance to the existing R-22 units for heat pumps of the same size.

This measure proposes that the heat pumps be replaced with new high efficiency heat pumps with larger coils than a normal like for like replacement would entertain.

This measure does not provide an optimal payback given the class A rate structure adopted for the purpose of this study, but it's implementation should be considered in energy retrofit programs where carbon neutral operation is targeted.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$8,000
BAU Annual Operation and Maintenance Cost (Install mid efficient heat pumps)	$8,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

The heat pump performance was modified to represent current state-of-the-art by using the performance prescribed in the latest version of ASHRAE90.1 and adding ECM motors to reduce fan power.

Parameter	Calibrated Model	ECM Implementation
Heating COP	3.8	4.5
Cooling COP	3.5	3.8
Fan Power	0.3 W/CFM	0.25 W/CFM
Fan speed control	2-speed	3-speed

Figures

Figure D09.1- High efficiency water source heat pumps in vertical and horizontal configurations

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D09 HEAT PUMP REPLACEMENT								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
68,126	-5,786	-	-1	-$169	$837,100	$751,300	>50	-$ 110,729

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.10 MEASURE D10: LOW TEMP LOOP VARIABLE SPEED PUMPING

MEASURE ID:	D10
MEASURE NAME:	Low Temp Loop Variable Speed Pumping
MEASURE SUMMARY:	Install variable speed drives on the low temperature loop pumps, provide control valves at each heat pump.

Scope of Work

This low temperature loop is served by constant speed pumps which operates at full speed 100% of the time. Balancing valves are shown on mechanical drawings so its likely flow to the heat pumps has been balanced.

If a variable speed drive is used with a centrifugal pump, the energy consumed is directly proportional to the cube of pump speed, the pump head is directly proportional to the square of the pump speed and the flow is directly proportional with the pump speed. Therefore, a small reduction in the flow or head obtained by a small reduction in the pump speed results in a much larger reduction of the energy used by the pump. By reducing the pumped flow or head to match the distribution system requirements, significant energy savings can be achieved. Pump speed will vary through a pressure control device so that the water distribution system requirements are always satisfied with the least amount of pumping power

This measure proposes to install variable speed drives on the low temperature loop pumps (pumps 3 & 4, both are 20Hp) so that they can run at a lower speed. The implementation of this measure will also require new pressure independent control valves (PICVs) at each of the heat pumps. Valves and VFDs would be added to the BAS.

This measure does not provide an optimal payback given the class A rate structure adopted for the purpose of this study, but it's implementation should be considered in energy retrofit programs where carbon neutral operation is targeted. This measure should also be considered for implementation if either measure D09 Heat Pump replacement or C02 demand control ventilation are selected for implementation given the proximity of the work in those ECMs to what is proposed in D10.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$2,000
BAU Annual Operation and Maintenance Cost (Retain existing constant flow operation)	$0
Annual O&M Cost Beyond Business as Usual Case	$2,000
Equipment Expected Useful Life	25 years

IES Model Input Variables

The pumps serving the low temperature loop were changed to be variable speed using the default VFD pump curves.

Parameter	Calibrated Model	ECM Implementation
Pump speed control	Constant speed	Variable speed
Pump performance curve	Default pump riding the curve	Default VFD pump curve

Figures

Figure D10.1- PICV with actuator

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D10 LOW TEMP LOOP VARIABLE SPEED PUMPING								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
21,819	-2,026	-	-1	-$103	$174,900	$2,182	0	-$ 182,462

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.11 MEASURE D11: WASTE WATER HEAT RECOVERY – HIGH TEMP LOOP

MEASURE ID:	D11
MEASURE NAME:	Waste Water Heat Recovery – High Temp Loop
MEASURE SUMMARY:	Install a waste water source heat loop to replace the main heating boilers and electrify the building heating source

Scope of Work

This measure is similar to measure D06 in that it proposes to electrify the buildings heating system, however instead of a ground source geothermal heat pump the heat source would be a waste water sewer trunk. A Region of Peel sewer trunk large enough to serve as a heat source/sink exists ~350m North West of the building. Discussions with the Region of Peel indicate that the flow in this trunk is adequate to act as an adequate heat source/sink.

The system has four main components:

1. Sewer: system is independent of sewer shape and size. Even small flow rates are handled without problems due to the gravity system and intake near the sewer bottom.
2. Wet Well – Shaft with Screen: The shaft is located directly at the sewer and has two functions. It serves as a sump for the pump feeding the heat exchanger and houses the pumping station screen. This type of screen has been specially developed for this application and is well-proven to ensure pre-screening of the wastewater to protect the heat exchanger against coarse material. A vertical screw conveyor with brushes transports the separated solids upwards and at its top discharges them to the sewer.
3. Heat Exchanger: The Heat Exchanger is selected especially for wastewater applications. The tank is completely made of stainless steel and is odour-tight, and therefore can be installed even in residential areas. A self-cleaning mechanism and sediments removal screw inside ensure continuous system operation with low maintenance requirements.
4. Heat Pump: Similar in capacity to measure D06, but as waste water is at a constant temperature, and higher than ground water the heat pump in this system can operate at a higher COP.

This measure also includes the requisite actions to lower the building heating loop to 130F, and electrify the heating system.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being

analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$14,000
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency boilers)	$7,500
Annual O&M Cost Beyond Business as Usual Case	$6,500
Equipment Expected Useful Life	25 years

IES Model Input Variables

A water-to-water heat pump was modelled in IES. The heat pump had a constant seasonal COP of 3.5 as linking a water-to-water heat pump to a variable temperature source is not possible. The low temperature was loop was modelled as having a constant source temperature of 20°C to simulate the relatively constant temperatures attainable from this system.

Parameter	Calibrated Model	ECM Implementation
Heating COP	None	3.5
Water-source temperature	None	20°C

Figures

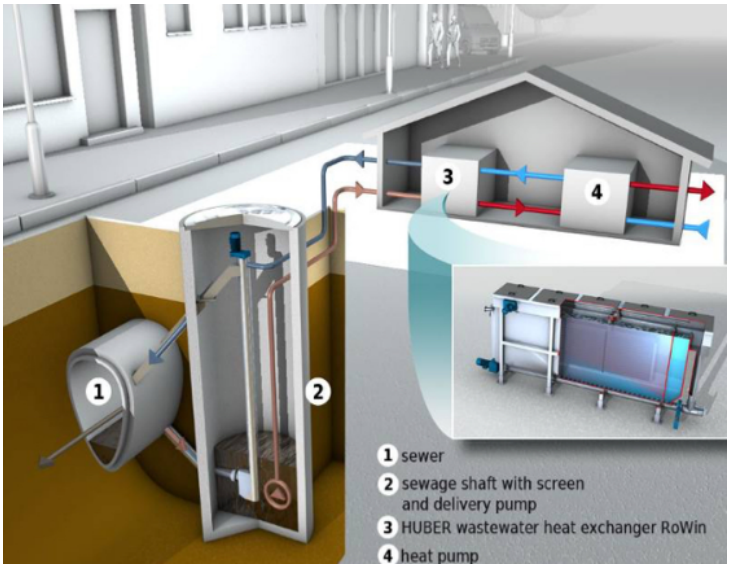


Figure D11.1- Principle of operation for a waste water source heat pump

Figure D11.2- Waste Water Source Heat Pump

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D11 WASTE WATER HR - HIGH TEMP LOOP								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
-1,404,963	333,134	-	423	$64,298	$9,243,300	$380,600	>50	-$ 6,171,866

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.5.12 MEASURE D12: DISTRICT ENERGY INTEGRATION

MEASURE ID:	D12
MEASURE NAME:	District Energy Integration
MEASURE SUMMARY:	Integrate the building's heating system with a new district energy system served by the Sheridan College central plant.

Scope of Work

Sheridan College Davis Campus occupies the adjacent plot north of the facility. The College is equipped with a central plant system that provides heat (and other utilities) to the various buildings/wings of the College.

The College is amenable to expanding the distribution system of the central plan to serve the Sportsplex as a client facility. This would provide the Sportsplex the opportunity to benefit from the economics of scale associated with running a larger heating plant that are not necessarily feasible at a smaller, stand-alone facility. The College's central plant utilizes natural gas fired combined heat and power (CHP) units that operate at a considerably higher efficiency relative the existing boilers at the Sportsplex.

In order to integrate with the Sheridan distribution system piping would need to be run between the College and the Sportsplex and a heat transfer station installed within the Sportsplex. For the purposes of this report it is assumed that the City would be required to assume the cost of construction for the heat transfer station, and piping to the property line between the College and the Sportsplex. It is also assumed that the cost of energy from the system would be set to reflect 90% of the current heating cost to operate the heating boilers and DHW boiler.

Two of the existing three heating boilers would be demolished to provide room for the heat transfer station, one boiler would be retained for redundancy in the event the district energy system was not available. The DHW boiler would also remain but as a redundant asset.

This ECM is applicable to Energy Retrofit Programs targeting 50% carbon reduction, but is not suitable for more ambitious carbon reduction goals as the primary heat source for the building remains carbon intensive natural gas, even if used more efficiently.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,000
BAU Annual Operation and Maintenance Cost (Install standard mid efficiency boilers)	$7,500
Annual O&M Cost Beyond Business as Usual Case	($6,500)
Equipment Expected Useful Life	25 years

IES Model Input Variables

This ECM was not modelled in IES as it does not represent a change in building operation. IES was used to quantify the amount of energy used in the heating and DHW boilers to determine the cost savings available from switching to district energy.

Figures

Figure D12.1- Example of District Heating Substation

Figure D12.2- Extent of new buried district energy piping

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

D12 DISTRICT ENERGY INTEGRATION							
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
166,517	-	317	$47,357	$760,100	$380,600	8.0	$ 1,315,752

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.6 MEASURE DESCRIPTION GROUP E – REFRIGERATION

5.6.1 MEASURE E01: CHILLER REPLACEMENT W HR - AMMONIA PLATE AND FRAME

MEASURE ID:	E01
MEASURE NAME:	Chiller Replacement w HR - Ammonia Plate and Frame
MEASURE SUMMARY:	Replace the existing built up ice plants with new packaged Ammonia Plate and Frame equivalent

Scope of Work

This measure proposes to replace the existing built up ammonia plants (2 x 150 ton) with new packaged ammonia plate and frame chillers. The new chiller plants represent a significant increase in energy consumption performance (COP of 2.82 as compared to the existing plant which has an estimated COP of 2.00)

The availability of heat recovery from the new packaged plant is comparable to what is available now.

A general scope of work for this ECM would be as follows:

- Pump out all Ammonia for disposal
- Pump out all cold floor and warm floor glycol and stored for reuse.
- Removal and demolition of two Ammonia refrigeration rooms
- Supply & install 2 x 150 ton Refrigeration Package. Each package to contain;
  - 2 x Screw Compressors
  - 1 x Plate & Frame Chiller c/w Surge Drum
  - 1 x Plate & Frame Condenser
  - 1 x Plate & Frame Glycol to Water Heat Exchanger
  - 1 x Shell & Tube Underfloor Heat Exchanger
  - 2 x Cold Floor Glycol Pump
  - 1 x Warm Floor Glycol Pump
  - 1 x Condenser Glycol Pump
  - 1 x Shell & Tube Oil Cooler
  - 1 x Oil Separator
  - 1 x Starter Panel

- Supply & install 2 x Cooling Towers
- Supply & install 2 x Cooling Tower Water Pumps
- Supply & install 2 x Cooling Tower Tanks
- Supply & install 2 x SMART Hub DDC Controller
- Supply & install 2 x Cold Glycol Expansion Tank
- Supply & install 2 x Warm Glycol Expansion Tank
- Supply & install 2 x Water Treatment System
- All necessary power & control wiring between starter panel to refrigeration equipment
- All necessary insulation for refrigeration related piping within the refrigeration room
- Supply and charge new system with Ammonia

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$75,000
BAU Annual Operation and Maintenance Cost (This ECM represents BAU case)	$75,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Chiller plant COP	2.4	3.07
Maximum heat recovery available	None	90%
Heat recovery recipient	None	High temperature loop

Figures

Figure E01.1 – Packaged Ammonia ice plant

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

E01 CHILLER REPLACEMENT W HR - AMMONIA PLATE AND FRAME									
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]					
321,532	72,173	-	186	$27,494	$3,447,400	$3,447,400	$46,588	0	$ 941,712

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.6.2 MEASURE E02A: CHILLER REPLACEMENT W HR - C02 PLATE AND FRAME – INDIRECT SLAD COOLING

MEASURE ID:	E02A
MEASURE NAME:	Chiller Replacement w HR - C02 Plate and Frame – Indirect Slab Cooling
MEASURE SUMMARY:	Replace the existing built up ice plants with new packaged C02 Plate and Frame equivalent

Scope of Work

This measure proposes to replace the existing built up ammonia plants (2 x 150 ton) with new packaged carbon dioxide plate and frame chillers.

Carbon dioxide poses a similar threat compared to ammonia refrigerant in the event of a leak. It is odourless which can make leaks more difficult to detect, but a properly functioning monitoring system manages this risk. Carbon dioxide is also non-flammable while ammonia is slightly flammable.

ASHRAE categorizes Ammonia as a class B2L safety group refrigerant (lower flammability, higher toxicity) whereas Carbon Dioxide is categorized a class A1 safety group refrigerant (No flame propagation, lower toxicity). The A1 designation is the lowest risk designation assigned to refrigerants by ASHRAE.

A conversion to carbon dioxide plants would not meaningfully alter the TSSA registration of the plants. Attending operator requirements would be unchanged with a class B operator required 8hrs/day of operation.

This ECM retains the existing brine headers below the arena slabs. A more pronounced increase in efficiency is attained when the carbon dioxide refrigerant is piped directly beneath the arena slabs, but this requires new piping and a requisite replacement of the slabs. This is considered in ECM E02B.

The new chiller plants represent a significant increase in energy consumption performance (COP of 2.67 as compared to the existing plant which has an estimated COP of 2.00)

The availability of heat recovery from the new packaged plant is significantly augmented. A considerably amount of heat is available at a higher grade that can be used for building heating applications.

A general scope of work for this ECM would be as follows

- Pump out all Ammonia for disposal
- Pump out all cold floor and warm floor glycol and stored for reuse.
- Removal and demolition of two Ammonia refrigeration rooms
- Supply & install 2 x 150 ton Refrigeration Package. Each package to contain;
    - 10 x Semi-Hermetic Compressors

  - 1 x Plate & Frame Chiller c/w Surge Drum
  - 1 x Plate & Frame Condenser
  - 1 x Plate & Frame Glycol to Water Heat Exchanger
  - 1 x Shell & Tube Underfloor Heat Exchanger
  - 2 x Cold Floor Glycol Pump
  - 1 x Warm Floor Glycol Pump
  - 1 x Condenser Glycol Pump
  - 1 x Shell & Tube Oil Cooler
  - 1 x Oil Separator
  - 1 x Starter Panel
- Supply & install 2 x Cooling Towers
- Supply & install 2 x Cooling Tower Water Pumps
- Supply & install 2 x Cooling Tower Tanks
- Supply & install 2 x SMART Hub DDC Controller
- Supply & install 2 x Cold Glycol Expansion Tank
- Supply & install 2 x Warm Glycol Expansion Tank
- Supply & install 2 x Water Treatment System
- All necessary power & control wiring between starter panel to refrigeration equipment
- All necessary insulation for refrigeration related piping within the refrigeration room
- Supply and charge new system with CO2

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$75,000
BAU Annual Operation and Maintenance Cost (Implement ECM E01)	$75,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Chiller plant COP	2.4	2.92
Maximum heat recovery available	None	80%
Heat recovery recipient	None	High and low temperature loops

Figures

Figure E01.1 – Packaged Carbon Dioxide ice plant

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

E02A CHILLER REPLACEMENT W HR - C02 - INDIRECT SLAB COOLING									
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]					
268,379	161,895	-	348	$51,859	$3,610,200	$3,447,400	$59,217	2.0	$ 1,678,462

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.6.3 MEASURE E02B: CHILLER REPLACEMENT W HR - C02 PLATE AND FRAME – DIRECT SLAB COOLING

MEASURE ID:	E02B
MEASURE NAME:	Chiller Replacement w HR - C02 Plate and Frame – Direct Slab Cooling
MEASURE SUMMARY:	Replace the existing built up ice plants with new packaged C02 Plate and Frame equivalent, replace in-slab piping.

Scope of Work

This measure is essentially the same as measure E02B, however the scope of work is expanded to include the replacement of the brine headers under the arena slabs with direct refrigerant piping. This allows for an increase in the energy efficiency of the chillers, but requires a full replacement of the arena slabs as well.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$75,000
BAU Annual Operation and Maintenance Cost (Implement ECM E01)	$75,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Chiller plant COP	2.4	3.56
Maximum heat recovery available	None	80%
Heat recovery recipient	None	High and low temperature loops

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

E02B CHILLER REPLACEMENT W HR - C02 - DIRECT SLAB COOLING								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
482,863	155,927	-	369	$54,809	$7,984,900	$3,447,400	>50	-$ 2,709,245

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.6.4 MEASURE E03: COLD WATER FLOODING

MEASURE ID:	E03
MEASURE NAME:	Cold Water Flooding
MEASURE SUMMARY:	Install an air separating system to allow for ice resurfacing to be completed with cold water.

Scope of Work

Ice resurfacing, also referred to as flooding, is a very energy intensive process. Resurfacing the ice consists of pouring a thin film of water over the entire surface of the rink. The most common method of doing this is using hot water (between 130-140F) to ensure proper bonding exists within the ice, which mitigates cracking. Hot water is produced through the by gas tank heaters in the Zamboni room where the machines are filled. Once the water has been added to the ice pad it represents a significant load for the chiller plant to freeze it.

This Measure recommends the addition of a de-aerator cold-water treatment device for the Ice Resurfacing refill water. The device is typically wall mounted and located in the Zamboni room, or adjacent space. With the use of cold-water flooding not only will there be a major decrease in heating load coming from domestic hot water production, but there will also be a reduction seen on the cooling load from the ice plant.

The use of untreated cold water resurfacing can cause major issues such as brittle or soft ice susceptible to cracking. This technology is able to treat cold water by removing micro-air bubbles inherent in the liquid, resulting in a purer form with enhanced bonding properties that can properly and safely be used by staff to resurface the sheets of ice.

This ECM has already been partially implemented and has been piloted on two of the four ice pads with no reported issues.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Do not install air separator)	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

The energy to warm water to flooding temperature was reduced in the model for each flood as well as the energy added by the flood water to the ice sheet at each flood.

Parameter	Calibrated Model	ECM Implementation
Flooding Heating Load – Rinks 1 & 2	46 kWh/flood	9.2 kWh/flood
Flooding Cooling Load – Rinks 1 & 2	130 kWh/flood	90 kWh/flood

Figures

Figure E03.1 – Detailed View of Air Separation Device

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

E03 COLD WATER FLOODING								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
106,361	8,528	-	32	$4,730	$108,900	$10,636	20.8	$ 41,602

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.6.5 MEASURE E04: ICE RESURFACER REPLACEMENT

MEASURE ID:	E04
MEASURE NAME:	Ice Resurfacer Replacement
MEASURE SUMMARY:	Replacement of fossil fuel powered ice resurfacers with electric models equipped with Laser Ice Levelling Systems

Scope of Work

The four (4) rinks in South Fletcher's Sportsplex are currently served by two (2) Olympia Millennium H model fossil fuel powered Ice Resurfacers. This Measure recommends the replacement of these with two new Olympia Millennium E electric models equipped with a Laser Ice Levelling System in order to achieve carbon neutral operation.

Laser Ice Levelling technology uses a laser to detect ice to a point within 0.5 mm and automatically control the cutting of the blade to cut ice with precision. Ice can therefore be maintained at a reduced, and consistent ice thickness.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Laser Ice Leveling reduces the wear and tear of the Ice Resurfacer machine and extends the blade life. The reduced ice thickness reduces the amount of flood water used, reduced runtime on the compressor plant, and reduced overall maintenance time.

While initial operator training is required, operator error is reduced and ice resurfacing time reduced by 5%. Edging can be reduced to twice a week.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,200
BAU Annual Operation and Maintenance Cost (Retain Existing Resurfacers)	$1,500
Annual O&M Cost Beyond Business as Usual Case	($300)
Equipment Expected Useful Life	15 years

IES Model Input Variables

Savings for this ECM were not calculated using IES-VE, a manual calculation method was used.

$\boldsymbol{Energy\ Savings}$ = (Energy Consumed by Fossil Fuel Ice Resurfacer) – (Energy Consumed by Electric Ice Resurfacer) – (Reduced Operation from Laser Level Ice System)

$$= \left(\left(15.5\ {}^{lb\ Natural\ Gas}/_{hr} \cdot\ 0.6542\ \mathrm{m}^{m^3}/_{lb\ Natural\ Gas} \cdot 3102.5\ {}^{hr}/_{yr} \cdot 10.33^{kWh}/_{m^3}\right) - \left(16\ \mathrm{kW\ Operating\ Pow}\right.\right.$$

$$= 278{,}000\ ekWh/yr$$

Assumptions

1. Runtime hours: 3102.5 hr/yr
2. 5% Reduction in operating time

Figures

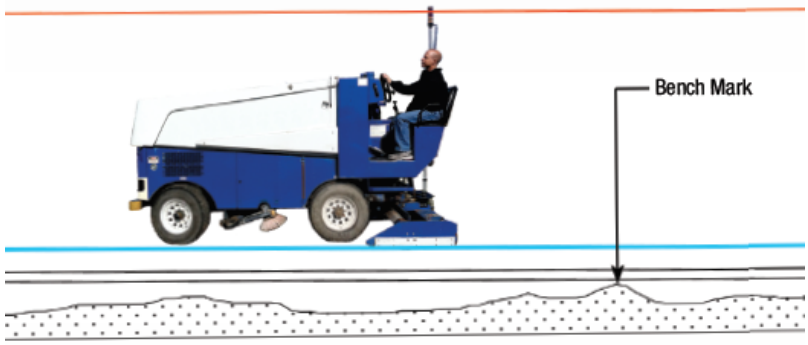


Figure E04.1 – Laser Level Ice Technology

Figure E04.2 – Example of Laser Mount

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

E04 ICE RESURFACER REPLACEMENT								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	WATER [m³]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
11,654	118	277	2	$1,009	$183,000	$1,165	>50	-$ 158,187

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.6.6 MEASURE E05: RADIANT HEATING CONVERSION

MEASURE ID:	E05
MEASURE NAME:	Radiant Heating Conversion
MEASURE SUMMARY:	Replace the radiant stand heaters with electric equivalents

Scope of Work

There are twenty (20) heaters serving the rinks to provide in stand heating. The heaters are radiant type, they heat the objects directly as opposed to the air, and run at a high temperature that precludes them from being fed by even the 155 deg F high temperature loop.

In order to decarbonize these heaters this measure proposes to replace them with electric equivalents. It should be noted that while these heaters are used sparingly, they are extremely energy intensive, and their conversion require a considerable amount of electric distribution equipment. The new heaters would use consume some 200kW, or approximately ~25% of the power that the entire building does currently. The existing distribution system can handle this additional load, but it cannot accommodate this ECM and other electrically intensive one with additional electrical work.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$500
BAU Annual Operation and Maintenance Cost (Retain Existing Gas Fired Stand Heaters)	$500
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Radiant heater fuel type	Natural gas	Electricity
Radiant heating efficiency	80%	100%

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

E05 RADIANT HEATING CONVERSION							
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]			
-297,793	35,810	-	23	$3,731	$172,700	46.3	$ 43,353

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.7 MEASURE DESCRIPTION GROUP F – POOL

5.7.1 MEASURE F01: POOL AND WHIRLPOOL VFD

MEASURE ID:	F01
MEASURE NAME:	Pool and Whirlpool VFD
MEASURE SUMMARY:	Install variable speed drives on the main pool and whirlpool circulating pumps.

Scope of Work

The pool and whirlpool circulation pumps, 10Hp and 7.5Hp respectively, are currently left to run at a full capacity at all times and flow is controlled by manually adjusted throttling valves.

The installation of variable speed drives on these pumps will allow for energy cost savings in lieu of wasteful throttling and provides the opportunity for them to set back to a reduced flow rate during unoccupied hours while still maintaining the requirements of the chemical treatment system.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Do not install VFDs)	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Pump Throttling	30%	None, VFD control

Figures

Figure F01.1 – Pool Pump

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

F01 POOL AND WHIRLPOOL VFD							
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
40,000	-	6	$867	$41,800	$4,000	43.6	-$ 17,851

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.7.2 MEASURE F02: POOL TEMPERATURE SETBACK

MEASURE ID:	F02
MEASURE NAME:	Pool Temperature Setback
MEASURE SUMMARY:	Reduce Pool Temperature Setpoint During Unoccupied Hours

Scope of Work

The pool is currently maintained at a constant temperature of 86 deg F. During unoccupied periods this setpoint can be reduced to lower the requirement of the pool heating plant. It is proposed to reduce the setpoint as low as 75 deg F, though the thermal mass of the water will likely preclude it from ever cooling to this temperature. To ensure that the pool is brought back up to setpoint by the time it reopens the BAS will be programmed with an optimum start/stop algorithm. In addition to pool temperature the air temperature in the pool area will be reset to match the pool setback.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Do not modify existing sequence)	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

The pool setback was included in the energy model by changing the set-point of the controller that controls pool temperature and including a setback. A setback of the air temperature in the pool area was included as well to match both the timing and setback of the water temperature.

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

F02 POOL TEMPERATURE SETBACK							
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
4,000	-	8	$1,138	$8,800	$800	7.0	$ 32,723

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.8 MEASURE DESCRIPTION GROUP G – BUILDING ENVELOPE UPGRADES

5.8.1 MEASURE G01: HIGH PERFORMANCE GLAZING

MEASURE ID:	G01
MEASURE NAME:	High Performance Glazing
MEASURE SUMMARY:	Replace existing windows with new high performance glazing.

Scope of Work

The existing facility windows are aluminum double framed glazing with a low E coating. This measure proposes to replace them with triple glazed, low e coating argon filled windows supplied with thermally broken frames and warm edge spacers to minimize energy loses through the glazing.

Room	Rough Opening Area (m2)	Location	Note
L1 - Library - p	7.20	North West	
L1 - Library - p	7.20	North West	
L1 - Vestibule	4.37	West	Glass Doors
L1 - Vestibule	6.19	West	
L1 - Vestibule	1.31	West	
L1 - Vestibule	6.88	West	
L1 - Community Room	2.16	West	
L1 - Community Room	2.16	West	
L1 - Community Room	2.16	West	
L1 - Community Room	2.16	West	
L1 - Community Room	2.16	West	
L1 - Vestibule	4.37	West	Glass Door
L1 - Vestibule	2.81	West	
L1 - Vestibule	3.60	West	
L1 - Vestibule	3.09	West	
L1 - Vestibule	6.12	West	
L1 - Vestibule	3.75	East	Glass Door
L1 - Vestibule	3.51	East	
L1 - Vestibule	0.75	East	
L1 - Vestibule	4.76	East	
L1 - Vestibule	4.90	East	

Room	Rough Opening Area (m2)	Location	Note
L1 - Library - p	7.20	West	
L1 - Library - p	7.20	West	
L1 - Library - p	2.16	West	
L1 - Library - p	2.16	West	
L1 - Pool and Deck	7.20	East	
L1 - Pool and Deck	7.20	East	
L1 - Pool and Deck	7.20	East	
L1 - Pool and Deck	6.02	East	
L1 - Pool and Deck	7.20	East	
L1 - Pool and Deck	7.20	East	
L1 - Pool and Deck	7.20	East	
L1 - Lunch Room	7.20	West	
L1 - Lunch Room	7.20	West	
L1 - Lobby	14.65	Clerestory	All one big opening
L1 - Lobby	0.57	Clerestory	
L1 - Lobby	8.11	Clerestory	
L1 - Lobby	7.03	Clerestory	
L1 - Lobby	4.64	Clerestory	
L1 - Lobby	9.20	Clerestory	
L1 - Lobby	27.47	Clerestory	
L1 - Fitness	7.20	North	
L1 - Fitness	7.20	North	
L1 - Fitness	7.20	North	
L1 - Fitness	7.20	North	
L1 - Fitness	7.20	North	

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$9,500
BAU Annual Operation and Maintenance Cost (Retain existing windows)	$9,500
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	35 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
External glazing U-value	3.18 W/m^{2}K	1.7 W/m^{2}K

Figures

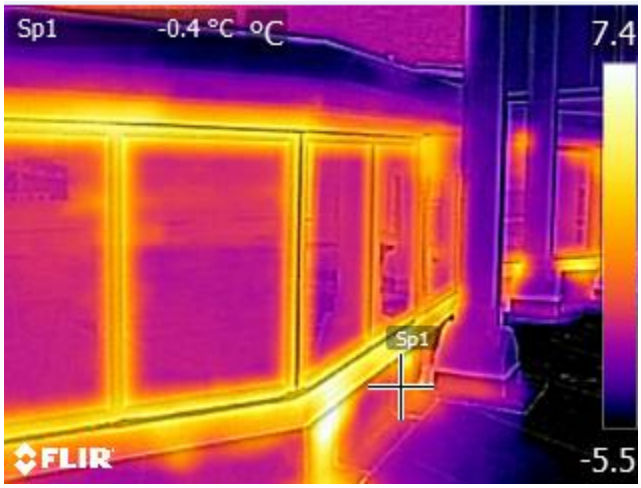


Figure G01.1– Thermal Imagine of existing windows indicating thermal bridging

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

G01 HIGH PERFORMANCE GLAZING								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
4,583	3,241	-	7	$1,021	$464,200	$1,107	453.5	-$ 427,812

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.8.2 MEASURE G02: ROOF INSULATION – PHASE I

MEASURE ID:	G02
MEASURE NAME:	Roof Insulation – Phase I
MEASURE SUMMARY:	Install additional insulation on the roof of the arena section of the building

Scope of Work

The sloped arena roof consist of standing seam metal roof on 75mm of fibreglass insulation on vinyl sheeting air/vapour barrier above a metal deck supported by steel purlins.

This measure proposes to install and additional 75mm of fibreglass insulation.

Counterintuitively this results in the building consuming additional electricity, though it does save natural gas. This is due to the heat being trapped in the arenas which must be removed by the chiller plants.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,000
BAU Annual Operation and Maintenance Cost (Retain existing roof)	$1,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Phase 1 Roof U-value	0.261W/m^{2}K	0.19 W/m^{2}K

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below. The increase in electricity consumption is due to increased refrigeration energy required in the winter. The better insulation traps more heat in the arena which must be cooled via the refrigeration plant.

G02 ROOF INSULATION - PHASE I								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
-1,608	2,032	-	4	$543	$2,911,700	$406	>50	-$ 2,891,408

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.8.3 MEASURE G03: ROOF INSULATION – PHASE II

MEASURE ID:	G03
MEASURE NAME:	Roof Insulation – Phase II
MEASURE SUMMARY:	Install additional insulation on the roof of the community centre section of the building

Scope of Work

The flat roof area consists of rounded gravel ballast on four ply built up roofing on a 13mm fibreboard on 75mm rigid insulation supported by a metal deck.

This measure proposes to install and additional 75mm of fibreglass insulation.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,000
BAU Annual Operation and Maintenance Cost (Retain existing roof)	$1,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	25 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Phase 2 Roof U-value	0.311W/m^{2}K	0.19 W/m^{2}K

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

G03 ROOF INSULATION - PHASE II								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
10,861	5,651	-	12	$1,843	$3,041,500	$2,216	>50	-$ 2,976,336

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.8.4 MEASURE G04: EXTERIOR WALL INSULATION – PHASE I

MEASURE ID:	G04
MEASURE NAME:	Exterior Wall Insulation – Phase I
MEASURE SUMMARY:	Provide a recladding of the exterior walls of the arena

Scope of Work

The upper portion of the area wall is constructed of insulated metal panels on steel with 75mm of insulation. The lower portion of the wall is constructed of brick on 75mm of insulation on light weight masonry block. This is the case for all four arenas.

This measure proposes to re-clad these constructions including a layer of R-35 mineral wool.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Retain existing cladding)	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	50 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Phase 1 Wall – Brick	1.59 W/m²K	0.25 W/m²K
Phase 1 Wall – Metal Panel	2.06 W/m²K	0.25 W/m²K

Figures

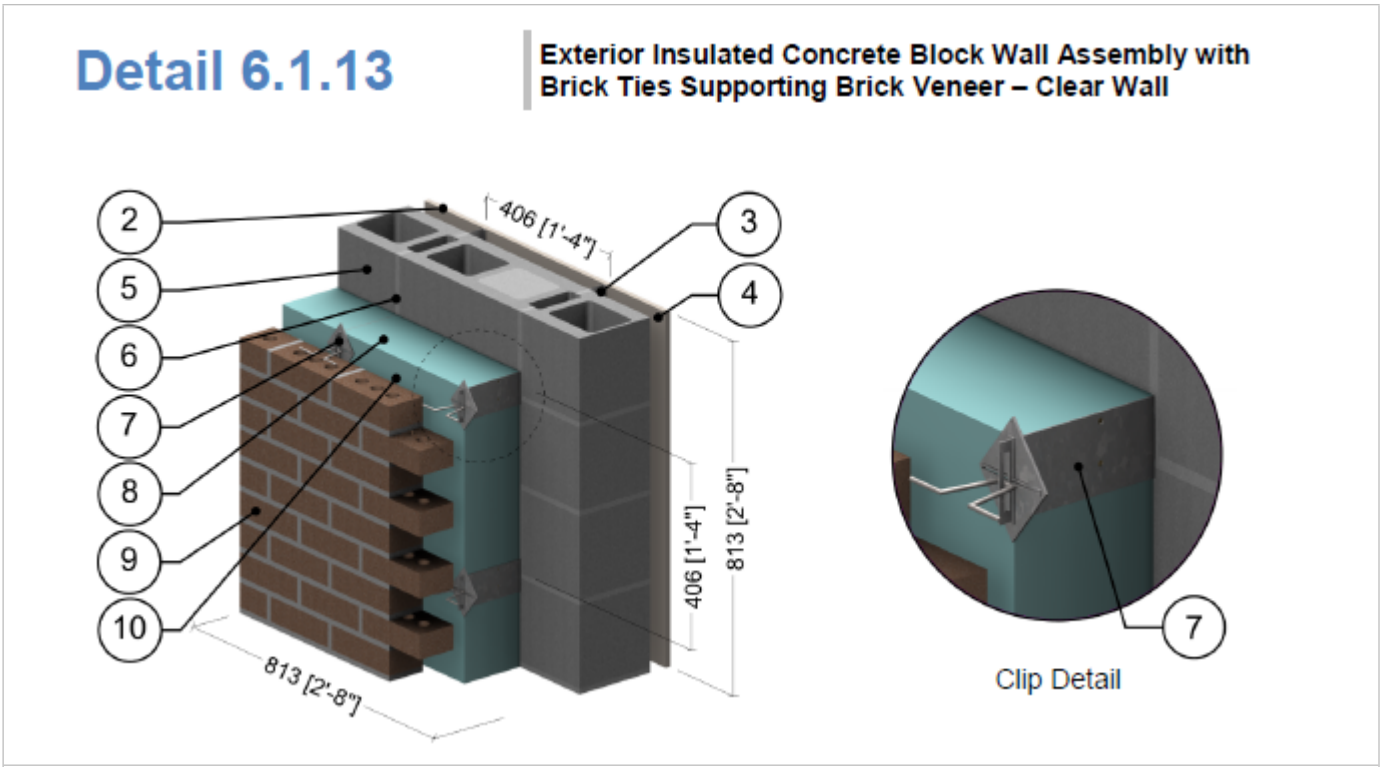


Figure G03.1: Proposed Construction Lower Arena Wall

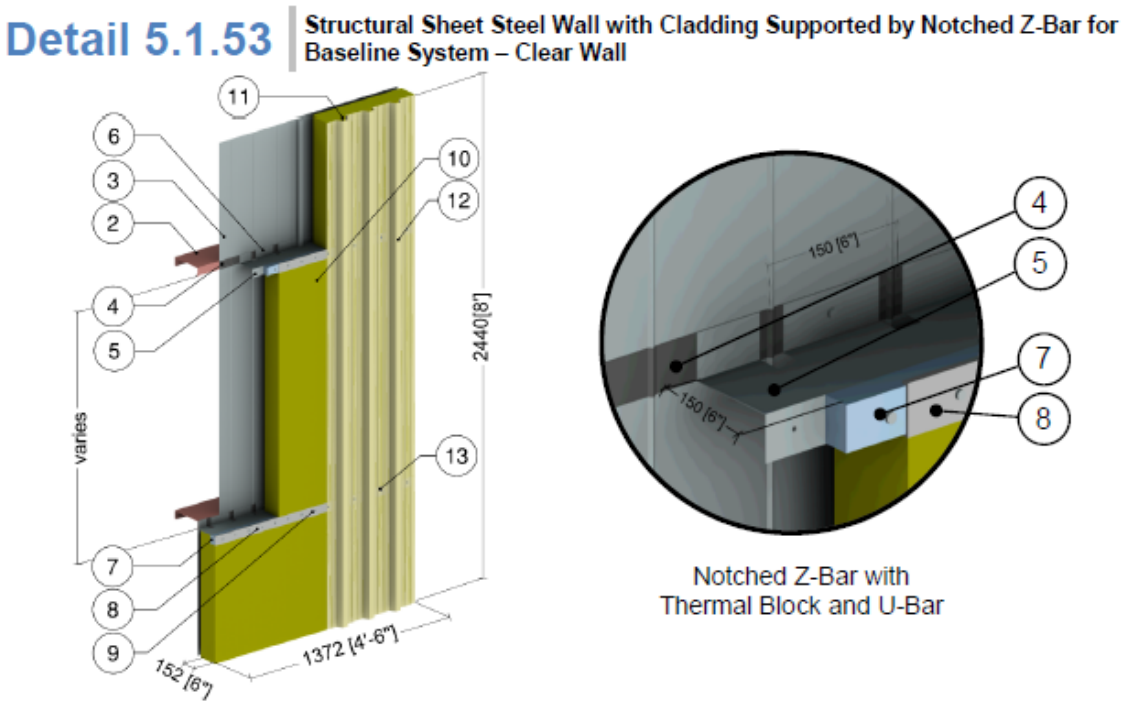


Figure G03.2: Proposed Construction Upper Arena Wall

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

G04 EXTERIOR WALL INSULATION - PHASE I								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
11,722	20,453	-	41	$6,071	$1,809,500	$5,263	>50	-$ 1,590,166

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.8.5 MEASURE G05: EXTERIOR WALL INSULATION – PHASE II

MEASURE ID:	G05
MEASURE NAME:	Exterior Wall Insulation – Phase II
MEASURE SUMMARY:	Provide a recladding of the exterior walls of the community centre

Scope of Work

The exposed portion of the community centre wall (portions of wall viewable from the ground) is constructed brick on 50 mm of insulation on light weight masonry block. The concealed portions of the wall is constructed of metal panels on 50mm of insulation on light weight masonry block.

This measure proposes to re-clad these constructions including a layer of R-30 mineral wool.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Retain existing cladding)	$0
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	50 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Phase 2 Wall – Brick	1.27 W/m²K	0.25 W/m²K
Phase 1 Wall – Metal Panel	1.18 W/m²K	0.25 W/m²K

Figures

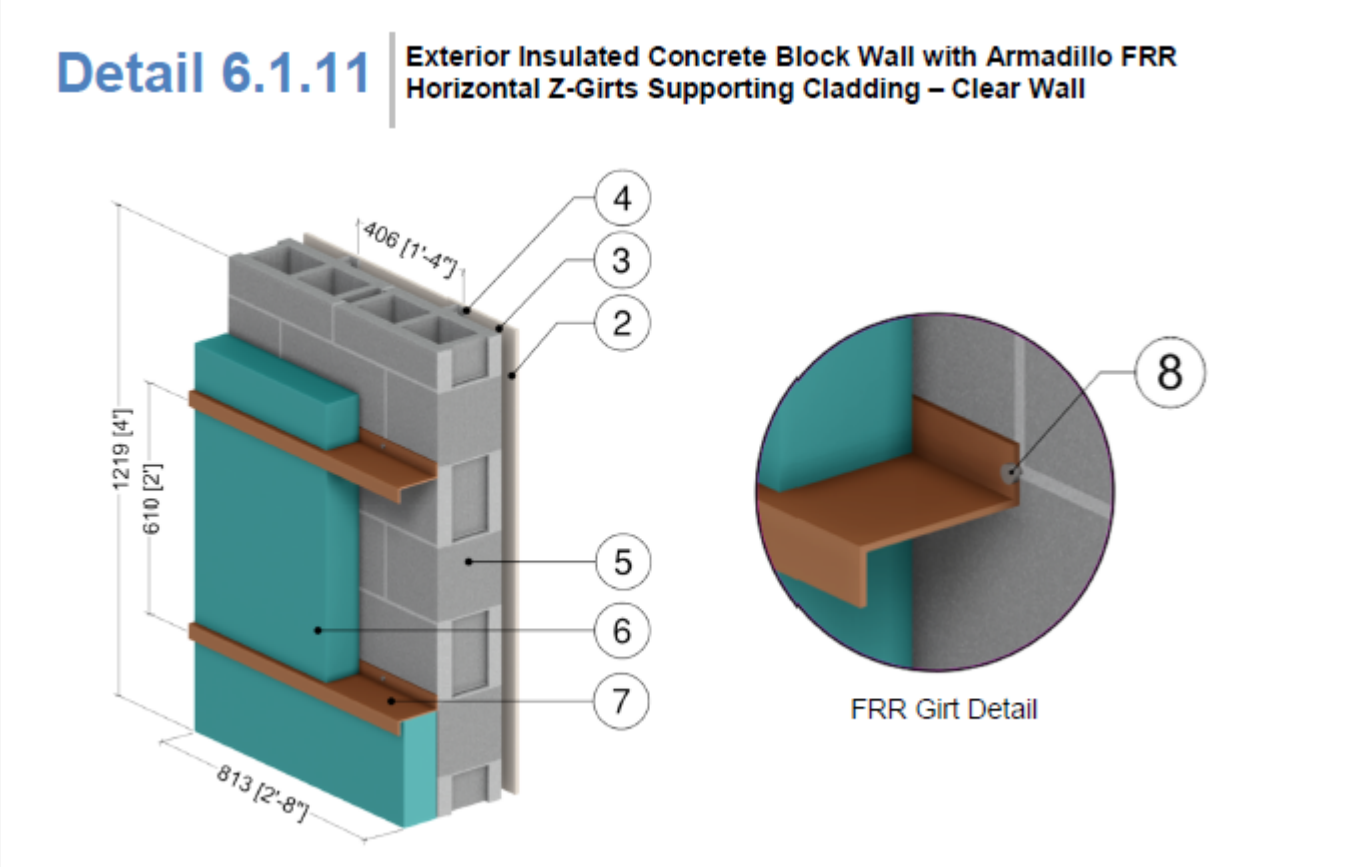


Figure G04.1: Proposed Construction – Concealed Wall Section

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

G05 EXTERIOR WALL INSULATION - PHASE II								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
76,736	51,667	-	110	$16,357	$1,006,500	$18,007	>50	-$ 424,219

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.8.6 MEASURE G06: INTERIOR WINDOW REPLACEMENT

MEASURE ID:	G06
MEASURE NAME:	Interior Window Replacement
MEASURE SUMMARY:	Replace single pane windows partitioning the arena from the rest of the building

Scope of Work

There are several areas on the second floor of the facility that allow occupants to view rinks 1 & 2 from conditioned spaces. These two areas are partitioned by single pane windows that allow migration of heat between the two spaces.

This measure proposes to replace these windows with new double pane windows.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$1,000
BAU Annual Operation and Maintenance Cost (Retain existing windows)	$0
Annual O&M Cost Beyond Business as Usual Case	$1,000
Equipment Expected Useful Life	35 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Interior Arena Window U-value	5.8 W/m^{2}K	2.56 W/m^{2}K

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

G06 INTERIOR WINDOW REPLACEMENT								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
2,312	304	-	1	$137	$344,300	-	>50	-$ 340,052

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.9 MEASURE DESCRIPTION GROUP H – DOMESTIC WATER CONSERVATION

5.9.1 MEASURE H01: DOMESTIC WATER RETROFITS

MEASURE ID:	H01
MEASURE NAME:	Domestic Water Retrofits
MEASURE SUMMARY:	Install low flow domestic water fixtures to replace high flow fixtures

Scope of Work

It is proposed to replace all mid flow domestic water fixtures with new, low flow counterparts.

Existing **tank type** and **flush valve toilets** with flow rates of 6 LpF or higher in woman's and gender neutral washrooms will be retrofitted with dual flush models with an effective flow rate of 4.8 LpF.

Flush valve urinals with flow rates of 3.8 LpF will be retrofitted with new 1.9 LpF flush valves.

All mid flow washroom **faucet aerators** will be retrofitted with 1.9 LpM aerators, and 8.3 LpM aerators will remain in areas where receptacle filling occurs frequently. Any kitchen or general areas with missing aerators will have an 8.3 LpM aerators installed.

Mid flow **showerheads** will be retrofitted with 5.7 LpM shower heads equipped with pressure resetting flow adjustment. Occupants may adjust the flow higher once the shower has been activated, but it will reset itself to 5.7 LpM flow once the shower is deactivated. This ensures that water conservation is balanced against occupant comfort.

Summaries of the existing fixtures and the proposed retrofits are as follows:

Existing Fixtures	Count
Faucet Aerator - 1.9 Lpm	31
Faucet Aerator- 5.7 Lpm	4
Faucet Aerator- 8.3 Lpm	14
Flush Valve Toilets Wall - 6Lpf	18
Flush Valve Toilets Floor - 6Lpf	27
Flush Valve Toilets Floor - 13Lpf	11
Flush Valve Urinal Wall - 3.8 Lpf	14
Shower - 7.6 Lpm	18
Shower - 9.5 Lpm	54

Retrofit Fixtures	Count
Faucet Aerator - 1.9 Lpm	10
Flush Valve Toilets Wall (Dual) (3.5,6 lpf)	18
Flush Valve Toilets Floor (Dual) (3.5,6 lpf)	38
Flush Valve Urinal - 1.9Lpf	14
Showerhead 5.7 Lpm	72

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$2,000
BAU Annual Operation and Maintenance Cost (This ECM represents the BAU Case)	$2,000
Annual O&M Cost Beyond Business as Usual Case	$0
Equipment Expected Useful Life	10 years

IES Model Input Variables

Domestic Water savings not modelled in IES-VE. A domestic water model spreadsheet was used to determine savings for this ECM. Water savings are based on the difference between the average flow rate of a building's existing fixtures and the average flow rate for the building's fixtures post retrofit.

Assumptions:

- Domestic hot water usage is roughly equal to 1/3 total domestic water use
- Female visitors use the washroom once every 3 hours
- Male visitors use the washroom once every 4 hours
- Bathroom sink use fraction 0.75

Calculations:

$$Savings = \frac{Occ \times Hrs \times Use \times FF \times (FLOW_{PRE} - FLOW_{POST}) \times Time \times 365\frac{days}{year}}{1000\ L/m^3}$$

Where:
FlowPRE = Average Pre-Retrofit flow rate in L/use
FlowPOST = Average Post-Retrofit flow rate in L/use
Occ = Average number of daily building occupants
Hrs = Average time each occupant spends in the building
Use = Average number of uses per hour
FF = Fixture Fraction (% of fixture type in given Zone)
Time = Amount of time fixture is used for (T=1 for toilets & urinals)

For faucets and showers, additional heating savings will result from the reduction of hot water use.

$$Savings = \frac{Water\ Savings \times HW_{\%} \times \rho \times C_p \times (T_2 - T_1)}{AFUE}$$

Where:
Water Savings = Volume of DW saved
HW% = % of water that is warmed
ρ = Water density (kg/m^3)
Cp = Specific heat capacity of water (kJ/(kg K))
T2 = Domestic Mixed Water Temp (K)
T1 = Domestic Cold Water Temp (K)

Refer to Appendix H: Domestic Water Models

Figures

Figure H01.1 – Example of Tamper Proof Low Flow Aerator

Figure H01.2 – Example of 6 Lpf manual flush valve.

Cost & Savings Summary

A summary for this improvement is outlined below.

H01 DOMESTIC WATER RETROFITS							
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	CAPITAL CONTRIBUTIONS [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]
NATURAL GAS [m³]	WATER [m³]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
12,866	5,126	24	$17,034	$111,100	$111,100	0	$197,216

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.10 MEASURE DESCRIPTION GROUP I – RENEWABLE ENERGY

5.10.1 MEASURE I01A: SOLAR PV – ROOF – 1.18 MW ARRAY

MEASURE ID:	I01A
MEASURE NAME:	Solar PV – Roof – 1.18MW array
MEASURE SUMMARY:	Installation of a 1.18 MW roof mounted Photo Voltaic (PV) Solar Array to generate renewable electricity.

Scope of Work

Installation of a total of a 1.18 MW PV panel array. This array has been sized to maximize the amount of energy that can be generated from the existing roof structure taking into account all existing rooftop equipment and obstruction. The proposed system would consist of:

1. 3,017 x 390W PV panels (1.0 m x 2.0 m monocrystalline).
2. All panels will be ballast mounted so as to allow for roof repair and roof replacement in the future.
3. Solar panels will be fixed tilt at an optimal angle of 10deg, and will be flush mounted with the rack.
4. Installation will use a total of 40 x 25kW invertors

This ECM, along with ECM I02 are included to illustrate to the reader the magnitude of effort required to attain 100% carbon neutral operation of the facility using on site assets only.

An Energy Retrofit Program including these two ECMs, as well as the measures outlined in any of ECM Programs 100%A, 100%B, or 100%C would still require a net consumption of electricity from the grid. That is to say the solar array would not generate enough kWh over the course of the year to match the building's total kWh consumption.

At times the array would produce more power than the building could consume, which would be exported to the grid. Under current market conditions the city would not be compensated for this export, though for the purposes of determining the carbon savings of this ECM exported kWh carried at full value. Under current operation it is estimated that as much as 49% of the energy generated by the array would be exported, though this figure would drop if ECMs relating to electrification of carbon based energy consumption (D05, D06, D07, E05, and E06) were implemented in tandem. The battery energy storage system discussed (ECM B01) could also be used to offset this export.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being

analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$18,500
BAU Annual Operation and Maintenance Cost (Do not install PV array)	$0
Annual O&M Cost Beyond Business as Usual Case	$18,500
Equipment Expected Useful Life	25 years

IES Model Input Variables

This ECM was not included in the IES-VE Energy Model

Savings for this measure were calculated using a separate solar modeling software, Helioscope. The production model uses a variety of variables including building azimuth, module tilt, shading analysis, AC/DC ratio, and panel efficiency in order to provide an accurate generation estimate for the system.

Model Parameters:

- PV Module Characteristics: AE390M6-72 (AE Solar)
- Inverter Characteristics: Sunny Tripower 24000TL-US (SMA)
- Weather Dataset: TMY 10km Grid, meteonorm
- Solar Angle Location: Meteo Lag/LNG
- Transposition Model: Perez Model
- Temperature Model: Sandia Model
- Temperature Model Parameters:
    - Fixed Tilt a: -3.56, b: -0.075 Temperature Delta 3degC
    - Flush Mount a: -2.81 b: -0.046 Temperature Delta 0decC
- Soiling: 2%
- Irradiation Variance: 5%
- Cell Temperature Spread: 4 degC
- Module Binning Range: -2.5% to 2.5%
- AC System Derate: 0.50%

Figures

Figure I01A. 1: Helioscope rendering of proposed array

Cost & Savings Summary

The cost and savings for each improvement were extracted from the Helioscope modeling software and compiled in a database. A summary for this improvement is outlined below.

I01A SOLAR PV - ROOF - 1.18 MW ARRAY							
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
1,356,000	-	203	$29,385	$4,552,900	-	>50	-$ 3,876,630

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.10.2 MEASURE I01B: SOLAR PV - ROOF

MEASURE ID:	I01B
MEASURE NAME:	Solar PV – Roof – 0.60 MW array
MEASURE SUMMARY:	Installation of a roof mounted Photo Voltaic (PV) Solar Array to generate renewable electricity.

Scope of Work

This ECM considers the installation of a total of a 0.60 MW PV panel array. The City has indicated it is proceeding with a capital project including an array of this size, but no additional indication regarding roof location or other design parameters has been shared.

For the purposes of this report this ECM assumes that the PV array would be of a similar design of those proposed in ECM I01A and I02:

1. 1,538 x 390W PV panels (1.0 m x 2.0 m monocrystalline).
2. All panels will be ballast mounted so as to allow for roof repair and roof replacement in the future, the roof will need to be evaluated to assess what if any structural modifications would need to be made, but for the purposes of this report it is assumed none are required.
3. Solar panels will be fixed tilt at an optimal angle of 10deg, and will be flush mounted with the rack.
4. Installation will use a total of 24 x 25kW invertors

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$9,400
BAU Annual Operation and Maintenance Cost (Do not install PV array)	$0
Annual O&M Cost Beyond Business as Usual Case	$9,400
Equipment Expected Useful Life	25 years

IES Model Input Variables

This ECM was not included in the IES-VE Energy Model

Savings for this measure were calculated using a separate solar modeling software, Helioscope. The production model uses a variety of variables including building azimuth, module tilt, shading analysis, AC/DC ratio, and panel efficiency in order to provide an accurate generation estimate for the system.

Model Parameters:

- PV Module Characteristics: AE390M6-72 (AE Solar)
- Inverter Characteristics: Sunny Tripower 24000TL-US (SMA)
- Weather Dataset: TMY 10km Grid, meteonorm
- Solar Angle Location: Meteo Lag/LNG
- Transposition Model: Perez Model
- Temperature Model: Sandia Model
- Temperature Model Parameters:
    - Fixed Tilt a: -3.56, b: -0.075 Temperature Delta 3degC
    - Flush Mount a: -2.81 b: -0.046 Temperature Delta 0decC
- Soiling: 2%
- Irradiation Variance: 5%
- Cell Temperature Spread: 4 degC
- Module Binning Range: -2.5% to 2.5%
- AC System Derate: 0.50%

Figures

Figure I01B. 1: Proposed PV Panel, AE Solar 72 Cell Monocrystalline

Cost & Savings Summary

The cost and savings for each improvement were extracted from the Helioscope modeling software and compiled in a database. A summary for this improvement is outlined below.

I01B SOLAR PV - ROOF - 0.60 MW ARRAY						
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]			
689,491	-	103	$14,941	$1,491,768	>50	-$ 1,147,902

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.10.3 MEASURE I02: SOLAR PV - PARKING LOT

MEASURE ID:	I02
MEASURE NAME:	Solar PV - Parking Lot – 1.03 MW array
MEASURE SUMMARY:	Installation of 1.03 MW parking lot stand mounted Photo Voltaic (PV) Solar Array to generate renewable electricity.

Scope of Work

Installation of a total of a 1.03 MW PV panel array. This array has been sized to maximize the amount of energy that can be generated from the existing parking lot space. The proposed system would consist of:

1. 2,630 x 390W PV panels (1.0 m x 2.0 m monocrystalline).
2. All panels will be mounted directly to 285 carport support structures, each on a caisson foundation.
3. Solar panels will be fixed tilt at an optimal angle of 10deg, and will be flush mounted with the rack.
4. Installation will use a total of 35 x 25kW invertors.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$16,000
BAU Annual Operation and Maintenance Cost (Do not install PV array)	$0
Annual O&M Cost Beyond Business as Usual Case	$16,000
Equipment Expected Useful Life	25 years

IES Model Input Variables

This ECM was not included in the IESC VE Energy Model

Savings for this measure were calculated using a separate solar modeling software, Helioscope. The production model uses a variety of variables including building azimuth, module tilt, shading analysis, AC/DC ratio, and panel efficiency in order to provide an accurate generation estimate for the system.

Model Parameters:

- PV Module Characteristics: AE390M6-72 (AE Solar)
- Inverter Characteristics: Sunny Tripower 24000TL-US (SMA)
- Weather Dataset: TMY 10km Grid, meteonorm
- Solar Angle Location: Meteo Lag/LNG
- Transposition Model: Perez Model
- Temperature Model: Sandia Model
- Temperature Model Parameters:
    - Fixed Tilt a: -3.56, b: -0.075 Temperature Delta 3degC
    - Flush Mount a: -2.81 b: -0.046 Temperature Delta 0decC
- Soiling: 2%
- Irradiation Variance: 5%
- Cell Temperature Spread: 4 degC
- Module Binning Range: -2.5% to 2.5%
- AC System Derate: 0.50%

Figures

Figure I02.1: : Helioscope rendering of proposed array

Figure I02.2: : Proposed solar carport support structure, similar array installed at Mohawk College, Hamilton

Cost & Savings Summary

The cost and savings for each improvement were extracted from the Helioscope modeling software and compiled in a database. A summary for this improvement is outlined below.

I02 SOLAR PV - PARKING LOT - 1.03 MW ARRAY						
ANNUAL SAVINGS				TOTAL MEASURE COST [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]			
1,204,000	-	181	$26,091	$10,626,000	>50	-$ 10,025,536

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.10.4 MEASURE I03: SOLAR THERMAL - POOL HEATING

MEASURE ID:	I03
MEASURE NAME:	Solar Thermal - Pool Heating
MEASURE SUMMARY:	Installation of Solar Thermal panel array tied directly into the pool heating system.

Scope of Work

Installation of a total of a 2,304sqft panel array tied directly into the existing pool supply heating line. This array has been sized based on the pool temperature and surface area. The proposed system would consist of:

1. 68 x 13 kWh/day solar thermal panels.
2. All panels will be mounted directly to the area roof with 4 deg spacers to ensure they are flat facing.
3. Installation includes dedicated system controller

As the system in installed directly into the existing pool heating system a storage tank is not required as is normally the case for solar thermal systems providing domestic water heating.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$3,500
BAU Annual Operation and Maintenance Cost (Do not install solar thermal array)	$0
Annual O&M Cost Beyond Business as Usual Case	$3,500
Equipment Expected Useful Life	20 years

IES Model Input Variables

Parameter	Calibrated Model	ECM Implementation
Solar thermal collector area	None	2304 sqft
Solar thermal model parameters	None	IES defaults

Figures

Figure I03.1: : Similar array installed at Tansley Woods community centre, Burlington

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

I03 SOLAR THERMAL - POOL HEATING								
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	TOTAL INCENTIVES [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]				
-273	11,293	-	21	$3,206	$78,100	$2,259	23.7	$ 38,993

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.11 MEASURE DESCRIPTION GROUP J – OPERATIONAL CHANGES

5.11.1 MEASURE J01: SCHEDULING RATIONALIZATION

MEASURE ID:	J01
MEASURE NAME:	Remove In Stand Heating
MEASURE SUMMARY:	Remove the radiant in stand heating from the arena

Scope of Work

The arena is served by twenty (20) in radiant heaters that serve the stands in arenas 1 & 2. Use of these heaters is rationed by the building operators as their use is very energy intensive and can negatively impact the operation of the ice plant. As these heaters are served by natural gas a conversion to electric heaters was contemplated in measure E05.

Another consideration could be to remove the heaters altogether. While this represents a reduction in service provided, that service must be weighed against the energy intensity of the heaters.

Impact on Operations and Maintenance

In the analyses of each potential ECM, the annual operations and maintenance costs (O&M), expected useful life (EUL) and major mid-life repair costs were included to provide a life cycle cost of the ECM being analyzed in addition to the energy impact of the measures. If a value is not populated, it is considered negligible. A summary of each is listed below for this improvement.

Item	Associated Costs
ECM Annual Operation and Maintenance Cost	$0
BAU Annual Operation and Maintenance Cost (Retain in stand heating)	$500
Annual O&M Cost Beyond Business as Usual Case	($500)
Equipment Expected Useful Life	NA

IES Model Input Variables

The radiators were removed from the model.

Cost & Savings Summary

The cost and savings for each improvement were extracted from the IES-VE modeling software and compiled in a database. A summary for this improvement is outlined below.

J01 REMOVE IN STAND HEATING							
ANNUAL SAVINGS					TOTAL MEASURE COST [$]	SIMPLE PAYBACK w/ INCENTIVES [YEARS]	NPV
ELECTRICITY CONSUMPTION [kWh]	NATURAL GAS [m³]	OPERATIONAL COSTS AND SAVINGS [$]	GHG EMISSIONS REDUCTIONS [Tonnes eCO2]	TOTAL [$]			
9,201	30,360	-	59	$8,834	$1	0.0	$ 113,670

Notes:

1. Annual Savings [$] based on Savings Rates as per Section 03 Utility Analysis
2. Consult Appendix B for detailed costing breakouts. A 10% cost for engineering design has been carried in the cost estimate presented here.

5.12 MEASURE DESCRIPTION GROUP K – GREEN POWER & CARBON OFFSETS

5.12.1 MEASURE K01: RENEWABLE ENERGY CREDITS

MEASURE ID:	K01
MEASURE NAME:	Renewable Energy Credits (RECs)
MEASURE SUMMARY:	Purchase Renewable Energy Credits as required to achieve carbon neutral operation

Scope of Work

RECs are certificates which can be purchased to offset scope 2 emissions. Scope 2 emissions are greenhouse gas emissions associated with the purchase of electricity. Scope 2 emissions will be related to how clean an electricity grid is in any given location. RECs are produced from renewable energy sources such as wind or solar. It is recommended RECs with recognized certifications be purchased to ensure reliable offsetting of scope 2 emissions.

Renewable energy generation facilities may be credited with one REC for every 1 mWh of renewable energy created and provided to a grid. Certified RECs are provided with a unique identifying number given to ensure savings are only accounted for once.

The amount of electricity to be offset must first be determined by the project team. Once determined, an environmental broker may facilitate a REC purchase agreement for a set number of years. Purchased RECs may only offset scope 2 emissions, which refers to emissions that result from generation of electricity, heat or steam purchased from a utility provider.

The certificates purchased can vary in production location and energy source, such as wind or solar. The source or location of the REC will impact cost. Purchasing RECs with a recognized certification helps to ensure legitimate offsetting of scope 2 emissions.

Regulating bodies that certify RECs include the ECOLOGO® Certification and Green-e Climate Standard programs. The ECOLOGO® Certification Program uses the standard *UL 2854 Renewable Low-Impact Electricity Products*. This standard covers both *Bundled Renewable Low-Impact Electricity* and *Renewable Energy Certificates* and allows for the commodification of renewable energy generation. The impacts of the products covered by this standard have low net GHG emissions, limit the depletion of non-renewable resources and have reduced impact on natural environments. The requirement of the Green-e Climate Standard include, a Green-e Climate Annual Verification Audit, and review by the Program Administrator of product disclosures and marketing materials to ensure transparency.

These voluntary, third party verified programs include rigorous requirements. Both the ECOLOGO® Certification Program and Green-e Energy program are recognized in third party building certifications such as the CaGBC Zero Carbon Building Standard and LEED®.

Cost Savings and Summary

Green power is a one time purchase that requires no physical impact to the project, there is no associated payback and the quantity of GHG emissions reduced is set by the purchaser. Indicative estimate for the cost of RECs is $0.025/kWh and this rate has been applied where they are carried in the energy retrofit program.

The cost per tonne of eCO2 depends on the type of electricity being offset, based on the emissions factor applied to this project (0.000150 Tonne eCO2/kWh) for electricity, the cost to offset one tonne of carbon with a REC is $166.7/tonne eCO2.

Typical purchase terms for RECs range from 2-5 years.

5.12.2 MEASURE K02: CARBON OFFSETS

MEASURE ID:	K02
MEASURE NAME:	Carbon Offsets
MEASURE SUMMARY:	Purchase Carbon Offsets as required to achieve carbon neutral operation

Scope of Work

Carbon offsets are certificates that can be purchased to offset scope 1 emissions. Scope 1 emissions are emitted directly from the burning of fossil fuels through energy consumption on site. Carbon offsets can be produced from a wide range of activities such as modifying agriculture practices, fuel switching, reducing methane emissions in waste and tree planting. These activities reduce, sequester or avoid emissions of GHGs and therefore are credited with a carbon offset. It is recommended carbon offsets with recognized certifications be purchased to ensure reliable offsetting of scope 1 emissions.

Carbon offsets are created through activities that reduce, sequester or avoid emissions of GHGs therefore warranting an offset. These activities are subject to standards which regulate project design, monitoring and reporting criteria to ensure consistency and accuracy of carbon offsets. Standard approaches allow for the quantification of GHGs avoided from project activities. This results in carbon offsets which are sold as equivalent tonnes of carbon (tCO_2e).

When purchasing a carbon offset, buyers can request the specific location, activity or vintage of the offset. The vintage refers to the year in which the offset is produced, location is the location of the offsetting activity. These are all contributing factors to the overall price of a carbon offset. More recent vintages, produced in more favourable locations and via more socially preferred activities, such as tree planting, will typically be on the higher end of the price spectrum.

The amount of carbon to be offset is must first be determined by the project team, through modelling or utility data review. Once determined, an environmental broker may facilitate a carbon offset purchase agreement for a set number of years.

Purchasing carbon offsets with a recognized certification helps to ensure legitimate offsetting of scope 1 emissions. Regulating bodies that certify carbon include the ECOLOGO® Certification and Green-e Climate programs. These voluntary, third party verified programs include rigorous requirements. Purchasing carbon offsets with a recognized certification helps to ensure legitimate offsetting of scope 2 emissions. Both the ECOLOGO® Certification Program and Green-e Energy program are recognized in third party building certifications such as the CaGBC Zero Carbon Building Standard and LEED®.

Cost Savings and Summary

Carbon offsets are a one time purchase that requires no physical impact to the project, they have no payback and the quantity of GHG emissions reduced is set by the purchaser. The average cost per for carbon offsets is in the range of \$5-\$20/tCO_2e, a rate of \$12 has been applied where they are carried in the energy retrofit program.

SECTION 6

INCENTIVE SUMMARY

6 INCENTIVE SUMMARY

6.1 OVERVIEW

Incentives and rebates are available from both Local Distribution Companies ("LDC") and Government Agencies and can be used to reduce the payback period associated with implementation of the measures related in the Energy Conservation Measures Program. Below **Table 5.1: Incentive Summary** provides a summary of the incentives which may be available should all measures be implemented.

Table 6.1: Incentive Summary

DESCRIPTION	AMOUNT ($)	DETAILS
IMPLEMENTATION FUNDING – TOTAL: $253,369		
IESO SAVEONENERGY RETROFIT PROGRAM	$153,845	**Lighting**: $400/kW of demand savings, or $0.05/kWh of first year electricity savings. **Non-Lighting:** $800/kW of demand savings, or $0.10/kWh of first year electricity savings (whichever is greater) A max. of 50% of the project cost. Electricity Consumption savings is base on the first year savings only. Prescriptive (per fixture rebates) are available for non-lighting measures as well. This incentive cap is for custom incentives (based on both material and labour costs) – for prescriptive the incentive cap is 100% of material costs
ENBRIDGE GAS COMMERCIAL RETROFIT INCENTIVE PROGRAM	$99,524	$0.10/m³ to $0.20/ m³ up to 50% of your project cost. (not to exceed $100,000)
AUDIT FUNDING – TOTAL: $4.000		
ENBRIDGE GAS ENGINEERING FEASIBILITY STUDY	$5,000	50% up to $4,000 (multi-site customer incentive cap $10,000 per customer)

NOTES:

1. IESO – Independent Electricity System Operator
2. Enbridge Gas Engineering Feasibility Study – Pre-approval Received
3. Implementation Funding Amount estimated, re-evaluation will be required during design phase.

6.2 IMPLEMENTATION FUNDING - INCENTIVES

IESO – SAVEONENERGY – RETROFIT PROGRAM

The **Retrofit Program** assists building owners and tenants to install and benefit from newer, more energy efficient measures to improve the overall efficiency of your building.

To participate, the project must receive pre-approval. The program includes two options to apply: PRESCRIPTIVE Track & CUSTOM Track

PRESCRIPTIVE TRACK "Quick System Upgrade"

- List of set measures which correspond with a predefined incentive amount.
- Worksheets include: HVAC Plug Loads, Refrigeration, VSD Compressed Air, Lighting, Exterior Lighting, Agribusiness, Unitary AC, Motors, Multi Res In Suite, Synchronous Belt, Variable Frequency Drive, AEM Service Hot Water
- Project must be worth a *minimum of $100* of incentives.

CUSTOM TRACK "Comprehensive Projects"

- Flexibility for more comprehensive projects with opportunities for increased energy savings
- Complex or innovated solutions not covered by Prescriptive Track
- Information provided on the worksheet: description of facility baseline electricity use, equipment being replaced, new equipment, disposal cost of old equipment, operating schedule, cost of new equipment.
- Worksheets include: Compressed Air, Combined Lighting, Lighting Controls, VSD Compressed Air, VSD Pump, VSD Fan, and Unitary AC.

Available Incentives

	Lighting	Non-Lighting* incl. Lighting Controls
PRESCRIPTIVE TRACK funded up to a maximum of 100% of material costs	Per Unit	Per Unit
CUSTOM TRACK	Greater of either; $400/kW of demand savings, or $0.05/kWh of first year electricity savings (to a max. of 50% of the project cost)	Greater of either; $800/kW of demand savings, or $0.10/kWh of first year electricity savings (to a max. of 50% of the project cost)

**Non-Lighting refers to mechanical, building controls, and lighting controls measures*
**The incentives can also be based on demand reduction ($400/kW for lighting, $800/kW for non-lighting).*
**Non-Lighting refers to mechanical and controls measures*

Eligibility

- Applicants must be owners or tenants of business premises served by the LDC.
- Custom Track, Project must be worth a minimum incentive of $1500
- All projects must be pre-approved and minimum estimated demand reduction of 1 kW or annual energy electricity of 2,000 kWh of savings.
- The program eligibility period is until December 31, 2020.

Mandatory Program Requirements

- Register online and provide your business details.
- All applications must be completed on the saveonenergy.ca website.
- Participant will implement the projects as described in the project schedule provided in the application and in no event after December 31, 2020.
- Upon completion of the project, must provide contractor invoices, and any other evidence required upon completion of implementation no later than 90 days following completion date.
- Project must deliver energy savings for at least 48 months, starting first day of the month in which the LDC pays the Participant Incentive
- Projects that include Custom Measures to which incentives between $10,000 and $40,000 and greater, a Monitoring & Verification plan is required (see below for more details)
- All Environmental Attributes are to be transferred and assigned to the LDC, and the LDC will transfer the Environmental Attributes to IESO.

Monitoring & Verification Procedures

- Basic M&V – Custom Projects including Measures to which incentives are greater than $10,000 and equal to or lesser than $40,000 require a Basic M&V Plan. Which includes;
  - Project General Information
  - Energy Conservation Measures
  - (ECM) intent
  - Baseline: Period, Energy & Conditions
  - Basis for Adjustment
  - Analysis Procedure
  - Report Format
- Enhanced M&V - Large Custom Projects including Measures to which incentives greater than $40,000 require an Enhanced M&V Plan. Which includes;
  - Project General Information
  - Energy Conservation Measures (ECM) Intent
  - Selected IPMVP Option and Measurement Boundary
  - Baseline: Period, Energy & Conditions
  - Reporting Period
  - Basis for Adjustment
  - Quality Assurance
  - Analysis Procedure
  - Energy Prices
  - Meter Specification
  - Monitoring Responsibilities
  - Expected Accuracy
  - Budget
  - Report Format

- The following measures will be discounted by **25%** if supporting baseline data is provided to the LDC and **50%** if supporting baseline data is **not** provided to the LDC.
  - Building Automation Controls – Basic and Enhanced M&V
  - Lighting Controls – Basic and Enhanced M&V

Web Link	*https://saveonenergy.ca/Business/Program-Overviews/Retrofit-for-Commercial.aspx*

ENBRIDGE – CUSTOM ENGINEERING INCENTIVES

Enbridge provides financial incentives for the installation of specific types of energy efficient equipment as part of this program. This program will fund energy efficiency projects that reduce natural gas consumption for new and retrofitted applications. Pre-approval is required.

Typical Projects:

- Boilers
- High Efficiency Process Equipment
- Steam Systems Equipment
- Combined Heat & Power
- Building and Process Controls
- Building Envelope Technologies

The retrofit incentives for commercial customers are calculated on natural gas savings using the following rates:

Commercial Customers	
General Services (Rates M1, M2, R1, R10) $0.20/m³ to a max. $100,000	Total incentives cannot exceed 50% of the project cost
Contract Services (Rates M4, M5A, M7, T1, R20) $0.10/ m³ to a max. $100,000	

General Services Customers – Submit your project by June 30, 2020 and received $0.40/m3 for upgrading heating & hot water systems with high efficiency and condensing boilers.

Web Link	*https://www.uniongas.com/business/save-money-and-energy/engineering-projects*

6 INCENTIVE SUMMARY

UNION GAS – EQUIPMENT INCENTIVES (PRESCRIPTIVE)

Incentives are available under Prescriptive Track in which do not apply to current ECM proposed in this study.

Web Link	*https://www.uniongas.com/business/save-money-and-energy/equipment-incentive-program/space-heating-programs*

6.3 IMPLEMENTATION FUNDING – GRANTS

FCM – CAPTIAL PROJECT SIGNATURE INITIATIVE

The Captial Project Signature Initiative helps Canadian cities and communities of all sizes implement bold environmental projects that reduce GHG emissions and protect the air, water or land. This funding is designed to accommodate transformative, best-in-class municipal projects, meaning they're highly innovative and impactful.

Available Funding

Regular Loans and Grants
Low interest loan of up to $5 million, covering up to 80% of project costs. Grant of up to 15% of the loan
High Ranking Loans and Grants
Low interest loan of up to $10 million, covering up to 80% of project costs. Grant of up to 15% of the loan

6.4 AUDIT FUNDING

ENBRIDGE – ENGINEERING FEASIBILITY STUDY INCENTIVES

Enbridge provides study incentives to support energy efficiency measures on natural gas consumption equipment; gas related heating systems or facilities of commercial buildings.

Available Incentives

Commercial Customers

50% of the study cost, to a max. $4,000
(multi-site customer incentive cap $10,000 per customer)

Applications are submitted once the Final Energy Feasibility Study is complete.

Application Requirements:

- Baseline types and costs of all energy use per process/pieces of equipment
- Analysis of use, waste and potential impact on production
- In depth description of improvements to current operational procedures, process, and technology and installation of new equipment
- Projected/predicted future performance for all energy use for improvements
- Final analysis of opportunities sufficient to support customer management review and projected approval

Web Link	*https://www.uniongas.com/business/save-money-and-energy/engineering-projects*

Pre-approval	*Received by Enbridge Gas Distribution in the amount of $5,000*

APPENDICES

APPENDIX A

EXTENDED UTILITY ANALYSIS

A EXTENDED UTILITY ANALYSIS

A.1 SAVING RATES

Electricity Rate Structure Background

Electricity for South Fletcher's Sportsplex is serviced by Alectra Utilities, and is currently under a Class B rate structure. Electricity consumption supply rates outlined in Table A.1 are based on the average CY2019 Class B rates published by the IESO. The Alectra Utilities delivery rates outlined in Table A.2 are the most recent rates published for a business rate class for monthly demand of 700 to 4999 kW in Brampton. Fixed customer charges are not included as they do not apply to monthly usage.

Table A.1: Alectra Utilities Supply Rates (Tax Excluded)		
IESO Electricity Rates		
Hourly Ontario Energy Price (HOEP)[1]	per kWh	$0.0178
Global Adjustment – Class B[1]	per kWh	$0.1092
Regulatory Charges		
Wholesale Market Service Charge	per kWh	$0.0035
Capacity Based Recovery	per kWh	$0.0004
Total Rate	**per kWh**	**$0.1309**

Notes:
1) *CY2019 Average.*

Table A.2: Alectra Utilities Delivery Rates (Tax Excluded)		Monthly Demand of 700 to 4999 kW
Distribution Charge	per kW[1]	$3.4221
Transmission Network Charge	per kW[2]	$3.0385
Transmission Connection Charge	per kW[3]	$2.3309
Rate Rider for Recovery of Incremental Capital (2018)	per kW	$0.0317
Rate Rider for Disposition of Lost Revenue Adjustment Mechanism Variance Accounts (2020)	per kW	$0.0459
Total Rate	**per kW**	**$8.8691**

Notes:
1) *Based on the greater of kW demand or 90% kVA incurred in a 15 minute rolling window for the month.*
2) *Based on the Peak Demand (actual kW demand or 90% kVA) incurred in a 60 minute rolling window between 7:00 AM and 7:00 PM, excluding weekends and statutory holidays.*
3) *Based on the Peak Demand (actual kW demand or 90% kVA) incurred in a 60 minute rolling window for the month.*

As measures of this EPC increase electrical demand and will move South Fletcher's Sportsplex into a Class A rate structure, Table A.3 outlines the electricity rates that will be applicable with this change. A description of these charges are also detailed below.

Table A.3: Class A Electricity Rates (Tax Excluded)	
Utility	Savings Rate
Electricity Consumption	$ 0.0217 per kWh
Electricity Demand	$ 8.8691 per kW
GA and CBR Charge[1]	$ 585.0392 per kW

Notes:
1) Global adjustment savings are annual savings for kW reductions that occur in all 5 GA hours

While the Alectra delivery fees do not change or impact the monthly demand charge, electricity consumption charges do not include the Global Adjustment rates, as shown below in Table A.4.

Table A.4: Class A Customer Consumption Rates (Tax Excluded)		
IESO Electricity Rates		
Hourly Ontario Energy Price (HOEP)[1]	per kWh	$0.0178
Regulatory Charges		
Wholesale Market Service Charge	per kWh	$0.0035
Capacity Based Recovery	per kWh	$0.0004
Total Rate	per kWh	$0.1309

Notes:
1) CY2019 Average.

Global Adjustment (GA) & Capacity Based Recovery (CBR) Charge

While Class A customers do not pay a GA Charge against consumption, they instead pay a monthly GA and CBR Charge based on the site peak demand factor (PDF) and System-wide GA monthly rate (published by the IESO), as discussed in *Section 3.2.1.1*, and calculated as:

South Fletcher's Sportsplex GA Charge *(to be calculated monthly) = PDF * System-Wide monthly GA Rate*

To calculate the GA Charge savings rate, the annual System-wide GA rate and CBR amount during the baseline period is analyzed. The total GA charge is expressed as a $/kW for kWs occurring in all 5 peak hours, and can be calculated as:

$$\boldsymbol{Total\ GA\ Charge}\ \left({}^{\$}/_{\boldsymbol{kW}}\right) = \frac{(\boldsymbol{System-wide\ GA\ Cost}\ (\$) + \boldsymbol{Total\ CBR}(\$))}{\boldsymbol{System-wide\ Consumption}\ (\boldsymbol{kW})} \cdot \mathbf{12} \cdot \mathbf{5}$$

For CY2019, the average GA & CBR charge was $585.0392/kW.

Table A.5: Class A GA & CBR Costs				
Month	System-Wide GA Cost (M$)	Total CBR Amount (M$)	System-Wide Consumption (MW)	Total GA Charge ($/kW)
January-2019	$956.20	$3.50	107,344.76	$536.42
February-2019	$908.10	$2.60	107,344.76	$509.03
March-2019	$857.60	$3.50	107,344.76	$481.31
April-2019	$1,118.70	$3.90	107,344.76	$627.47
May-2019	$1,133.30	$3.80	107,344.76	$635.58
June-2019	$1,261.30	$3.40	107,344.76	$706.90
July-2019	$1,149.60	$3.00	115,213.43	$600.24
August-2019	$1,327.70	$2.40	115,213.43	$692.68
September-2019	$1,082.90	$2.80	115,213.43	$565.40
October-2019	$1,209.60	$2.70	115,213.43	$631.33
November-2019	$979.00	$3.30	115,213.43	$511.55
December-2019	$1,000.20	$3.20	115,213.43	$522.54
			CY2019 Average GA Cost & CBR Rate ($/kW)	$ 585.0392

While interval data was not available to calculate South Fletcher's PDF, it can be estimated using the monthly peaks corresponding to the top 5 Ontario peaks as follows:

Table A.6: South Fletcher's Sportsplex Estimated				
Top Five AQEW Peaks from May 1, 2018 to April 30, 2019				South Fletcher's Sportsplex
Rank	Date	Hour Ending	Total (MW)	Monthly Peak (kW)
1	September 5, 2018	17	23,627	873.41
2	July 5, 2018	15	23,834	666.36
3	July 4, 2018	18	22,857	666.36
4	August 28, 2018	17	22,713	669.60
5	September 4, 2018	17	22,182	873.41
	Total		115,213	3,749.14

$$\boldsymbol{South\ Fletcher's\ Sportsplex\ PDF} = \frac{3{,}749\ kW}{115{,}213\ MW \cdot 1000 kw/MW} = 0.0032541$$

This PDF can be used to estimate the applicable electricity savings for South Fletcher's Sportsplex from moving from a Class B to a Class A customer, as seen in Table A.7

Table A.7: Estimated Savings from Class A Rate Change

Month	Measured Values		Class A			Class B		Difference (Class B vs. A)
	Demand	Consumption	System-Wide GA Cost	PDF	Class A Costs	GA Actual Rate	Class B Costs	
	kW	kWh	$mill		$	$/kWh	$	
May 2018	629	352,277	$1,001.10	0.000032541	$32,577	$0.1079	$38,021	$5,445
June 2018	630	351,634	$1,151.00	0.000032541	$37,454	$0.1190	$41,830	$4,376
July 2018	666	380,799	$911.80	0.000032541	$29,671	$0.0774	$29,462	-$208
August 2018	670	387,879	$876.40	0.000032541	$28,519	$0.0749	$29,052	$533
September 2018	873	419,922	$847.30	0.000032541	$27,572	$0.0858	$36,046	$8,474
October 2018	793	383,992	$1,135.30	0.000032541	$36,944	$0.1206	$46,306	$9,362
November 2018	799	374,198	$936.40	0.000032541	$30,471	$0.0986	$36,877	$6,406
December 2018	792	380,050	$853.20	0.000032541	$27,764	$0.0740	$28,139	$375
January 2019	831	369,456	$956.20	0.000032541	$31,116	$0.0809	$29,896	-$1,219
February 2019	824	359,358	$908.10	0.000032541	$29,550	$0.0881	$31,667	$2,116
March 2019	829	390,639	$857.60	0.000032541	$27,907	$0.0804	$31,411	$3,504
April 2019	843	389,311	$1,118.70	0.000032541	$36,403	$0.1233	$48,014	$11,610
FY 2018/2019	9,179	4,539,515			$375,947		$426,722	$50,775

Natural Gas Rate Structure Background

Natural gas pricing for South Fletcher's Sportsplex consists of distribution charges by Enbridge and commodity charges under a separate contract with Perimeter Energy Inc. Natural gas is distributed to the South Fletcher's Sportsplex by Enbridge as a Rate Class 6 customer. The savings rate has associated customer, delivery, and transportation to Enbridge charges, as detailed in **Table A.8** below. Enbridge rates are based on the most recent data available for Rate class 6, updated on January 1st, 2020. As usage for the building over the baseline period is over 28,300 m^3 on average, the marginal delivery charge of \$.0.05116/m^3 is carried into the natural gas savings rate.

The applicable commodity charges from Perimeter Energy Inc. are based on the 2019 rate charged to South Fletcher's Sportsplex as indicated on the utility bills provided.

Table A.8 Natural Gas Savings Rates (Tax Excluded)							
Enbridge Charges (Rate 6)							
Transportation Charge	per m^3	\$0.04336					
Delivery Charge	per m^3	First 500	Next 1050	Next 4500	Next 7000	Next 15250	**Over 28300**
		\$0.10207	\$ 0.08086	\$ 0.06601	\$ 0.05646	\$ 0.05222	**\$ 0.05116**
Cost Adjustment[1]	per m^3	-\$0.00221					
Carbon Charge	per m^3	\$0.03910					
Perimeter Energy Inc.							
Transportation Charge	per m^3	\$0.05900					
Gas Supply Charge	per m^3	\$0.09400					
Total Natural Gas Rate	**per m^3**	**\$0.28441**					

Notes:
1) South Fletcher's Sportsplex is charged the Rate 6 Delivery Cost Adjustment from Enbridge

Water Rate Structure Background

Water for South Fletcher's Sportsplex is supplied by the Region of Peel. The water consumption savings rate outlined in **Table A.9** are taken from the most recent Region of Peel water rates published.

Table A.9: City of Hamilton Water Rates (Tax Excluded)		0 to 5000 m^3
Consumption Charges		
Water Charge	per m^3	\$1.4725
Sewer Charge	per m^3	\$1.1367
Total Rate	**per m^3**	**\$2.6092**

A EXTENDED UTILITY ANALYSIS

A.2 UTILITY REGRESSION

A.2.1 ELECTRICITY

To understand the influence of weather on the building's electricity use, the most recent year of electricity consumption data was plotted against outside air temperature. Most recent data was used to be reflective of current usage patterns. As seen in *Figure A.1*, usage does not show any clear weather dependency.

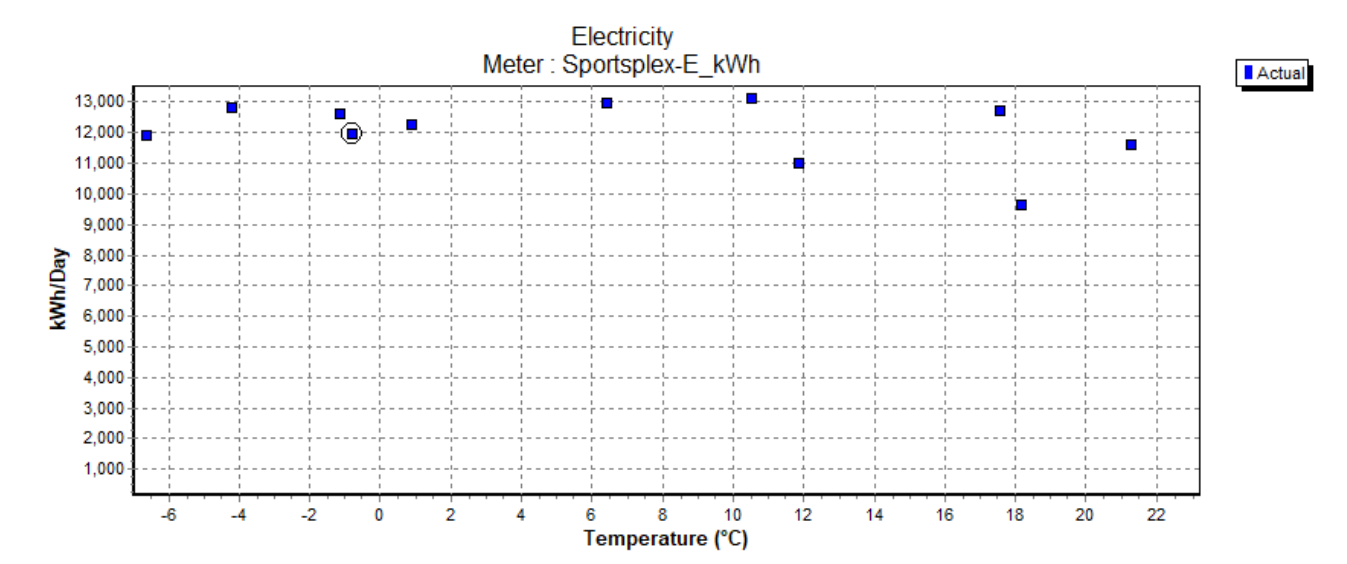


Figure A.1: South Fletcher's Sportsplex Electricity Consumption vs. Outdoor Air Temperature

Electricity Demand

When electricity demand is plotted against outside air temperature, demand is constant around 800 kW above 18C, above which demand is reduced, as seen in *Figure A.2*. However, there was no apparent relationship to weather. This pattern could instead be due to the reduced load in the summer when two rinks are not operational.

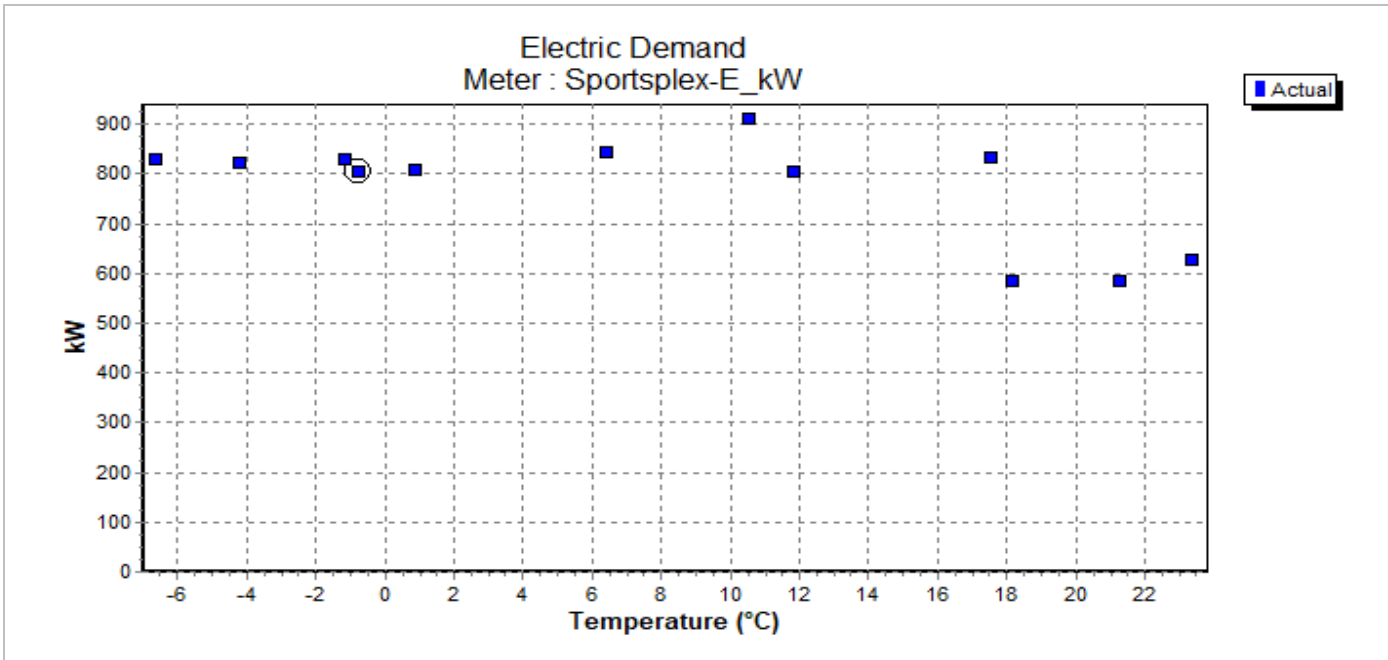


Figure A.2: South Fletcher's Sportsplex Electricity Demand vs. Outdoor Air Temperature

A.2.2 NATURAL GAS

When the most recent year of data is plotted against outdoor air temperature, natural gas usage decreases as temperature increases until 20°C, as seen in *Figure A.3*. This is indicative of natural gas used for heating spaces, as would be expected from the mechanical audits.

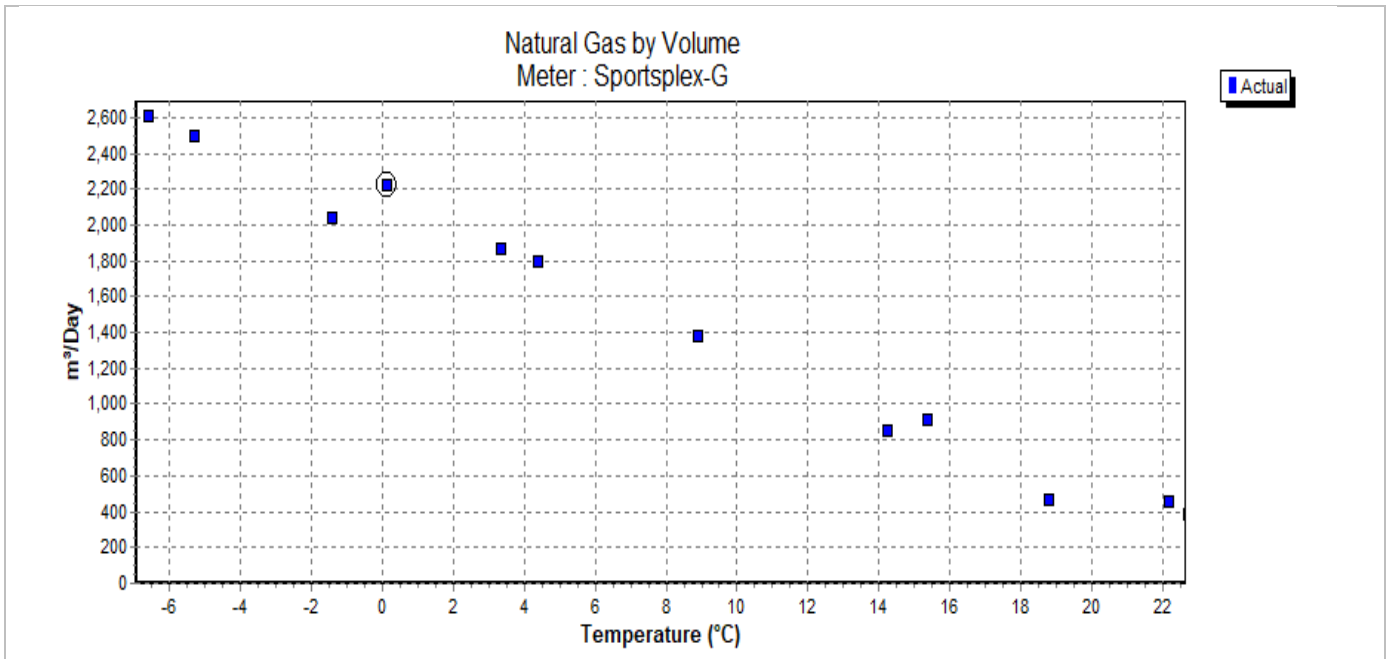


Figure A.3: South Fletcher's Sportsplex Natural Gas Consumption vs. Outdoor Air Temperature

When usage is plotted against heating degree days (HDDs), the resulting regression can be seen in ***Figure A.4***. The regression is considered acceptable if the R^2 value is at least 0.75, and if the CVRSME is no higher than 25. Setting the balance point temperature to 19°C for heating results the following regression equation with an R^2 value of 0.986, indicating an excellent correlation with weather;

*Regression Equation: m^3= (458.9 * #Days) + (85.88 * HDD)*

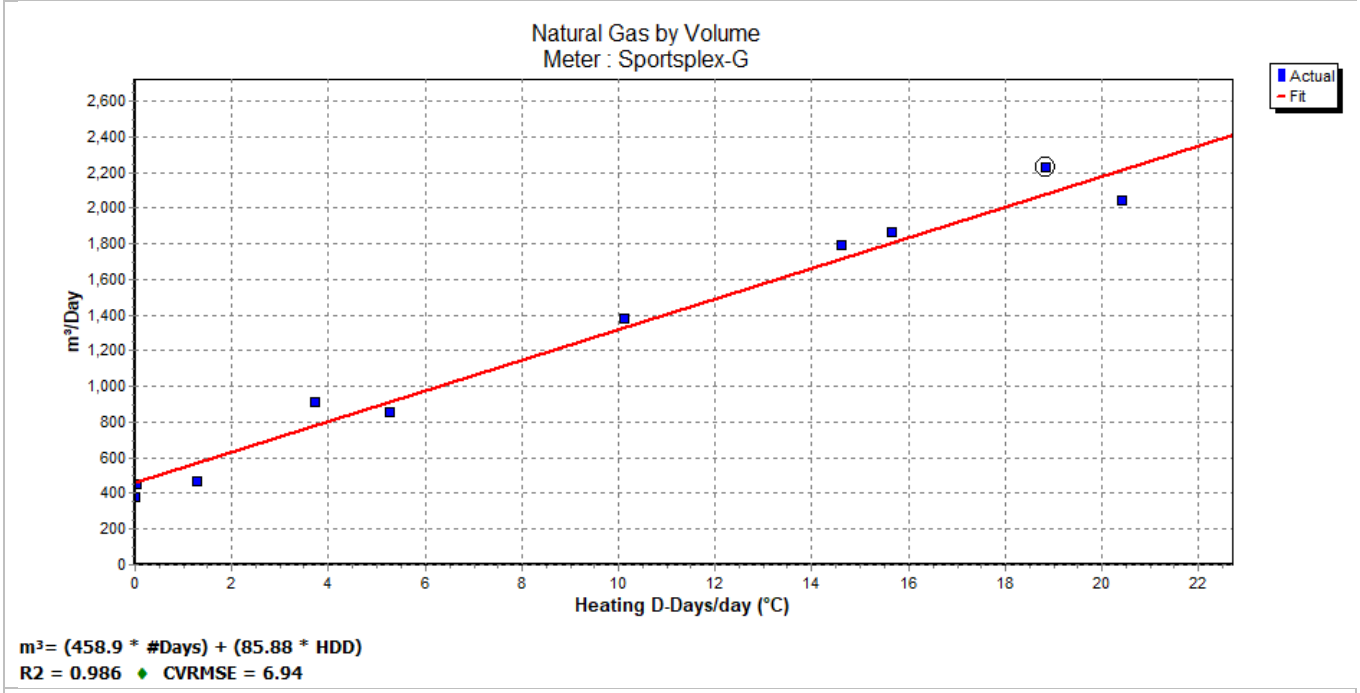


Figure A.4: South Fletcher's Sportsplex Natural Gas Consumption vs. HDDs

A.2.3 WATER

When water consumption is plotted against outside air temperature, there is no clear relationship to weather during the baseline period.

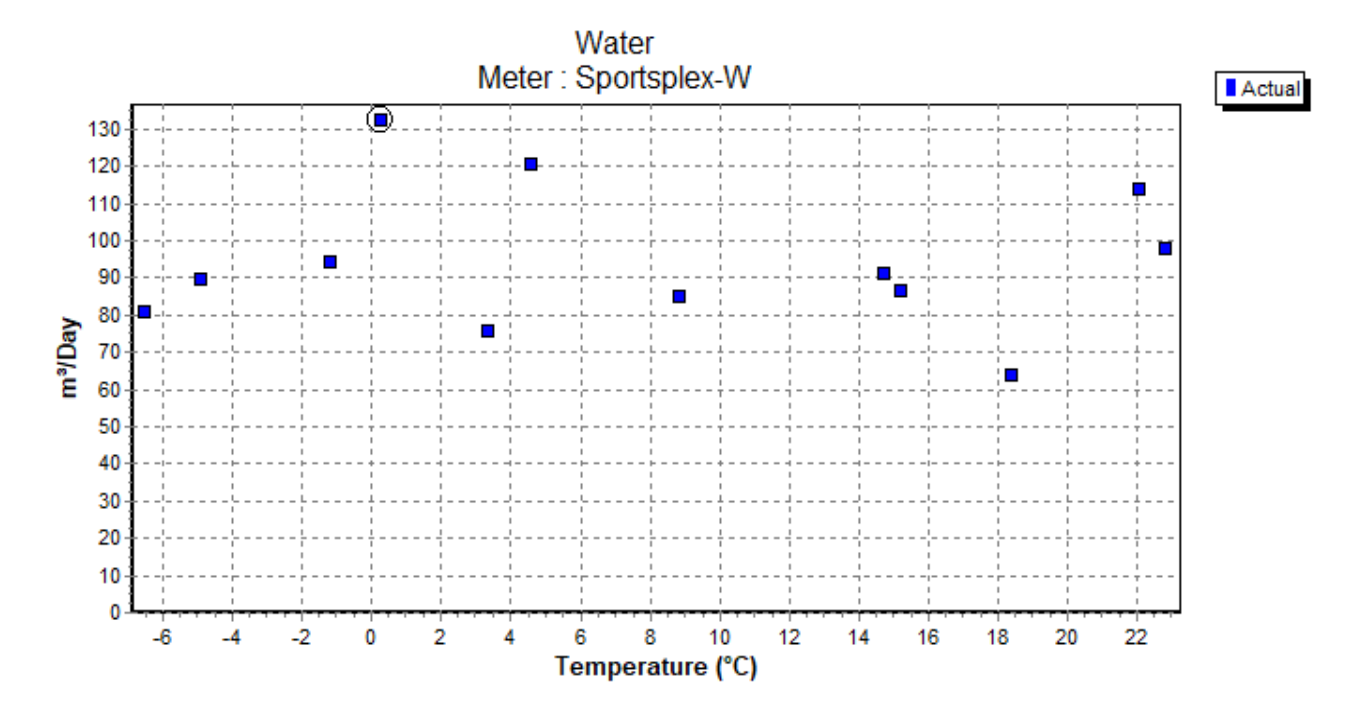


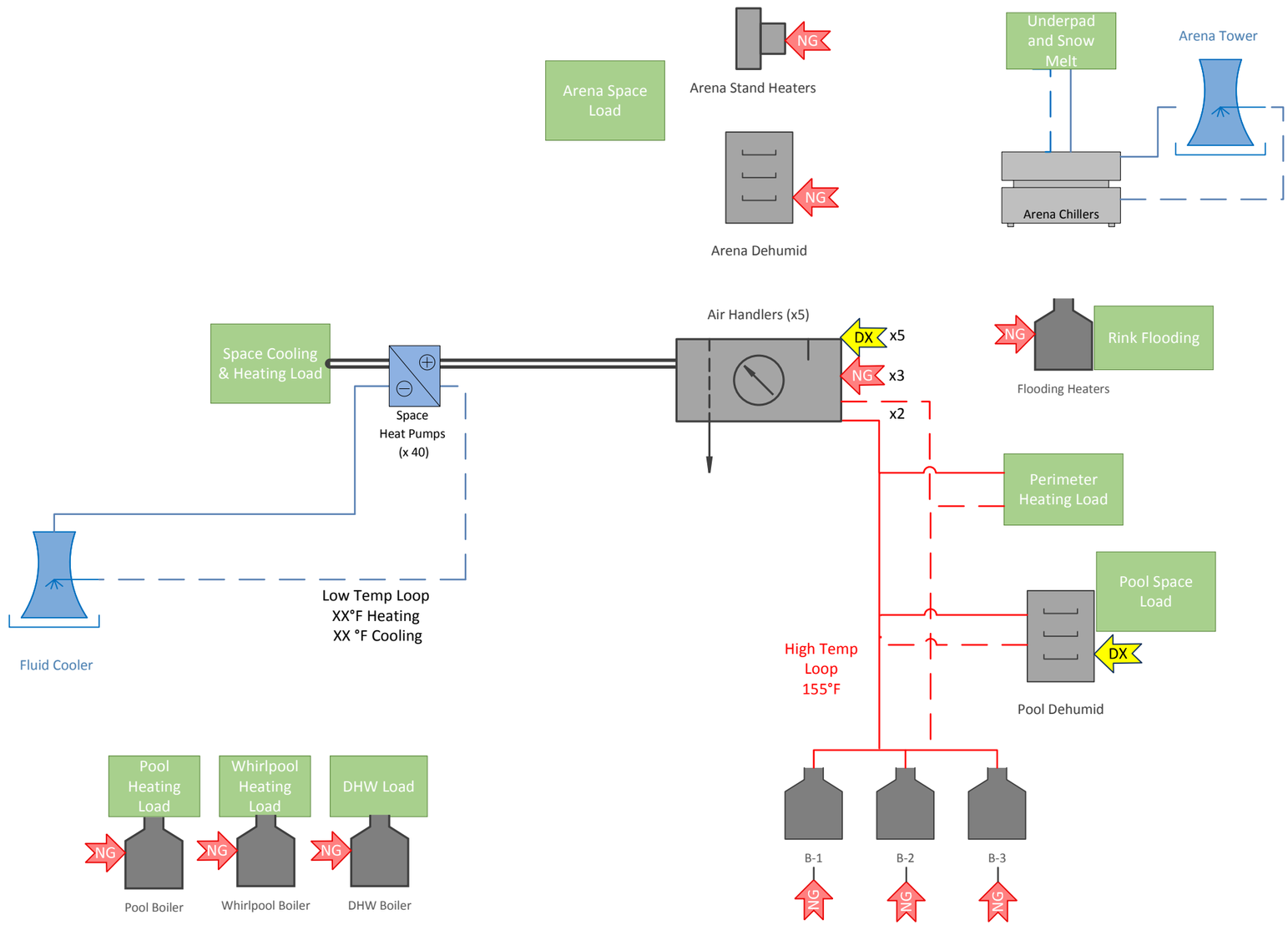
Figure A.7: South Fletcher's Sportsplex Water Consumption vs. Outdoor Air Temperature

APPENDIX B

COST CONSULTANT REPORT

APPENDIX C

MECHANICAL ENERGY FLOW DIAGRAM



South Fletcher's Sportsplex

Current Design

NOTES

MCW Custom Energy Solutions Ltd.

PROJECT

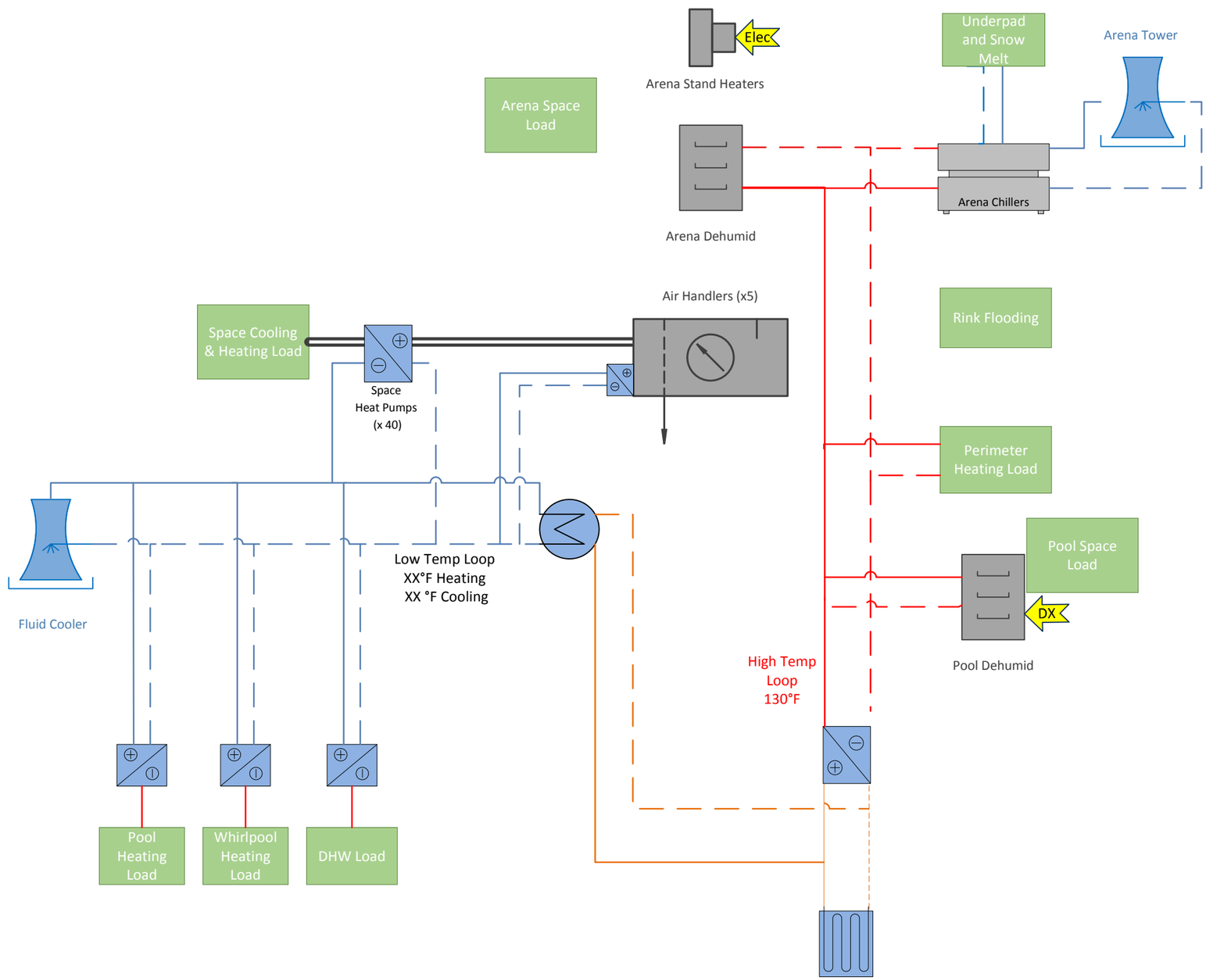
City of Brampton
South Fletcher's Sportsplex

DRAWING

PROJECT NO.

1958

DRAWN BY : SD	DATE: 2020-03-09
CHECKED BY: SB	DATE: 2020-03-09
SCALE: NTS	
FILE: SFS Energy Flow Schematic V2.vsdx	
SHEET	Current



South Fletcher's Sportsplex

Carbon Neutral Design

NOTES

MCW Custom Energy Solutions Ltd.

PROJECT

City of Brampton
South Fletcher's Sportsplex

DRAWING

PROJECT NO.

1958

DRAWN BY : SD	DATE: 2020-03-09
CHECKED BY: SB	DATE: 2020-03-09
SCALE: NTS	
FILE: SFS Energy Flow Schematic V2.vsdx	
SHEET	Carbon Neutral

APPENDIX D

THERMAL IMAGING REPORT

MCW Custom Energy Solutions Ltd.

Thermography Report: Brampton South Fletcher's Sportsplex

City of Brampton, ON

March 12, 2020

Table of Contents

Introduction

The goal of this report is to provide insight into potential energy savings at the South Fletcher Sportsplex located in Brampton Ontario. The approach taken will be to analyse infrared imagery of the Sportsplex and determine locations of the building that are subject to thermal bridging and air leakage.

Thermal bridging is defined as movement of heat across an object that is more conductive than surrounding materials. This creates a thermal bridge between the indoor air and the outdoor air, and causes an increased heat transfer rate.

Locating and insulating thermal bridges is an effective way to reduce cooling and heating loads within South Fletcher Sportsplex. Reducing air leakage between window sills and doorways is another effective way to increase energy savings. Caulking window sills and ensuring gaps between doors remain as small as possible will help South Fletcher Sportsplex achieve its energy efficiency goals.

The following section will use thermal imagery to discuss areas of the Sportsplex that contain abnormally high rates of heat transfer, as well as the reason for these abnormalities.

Results and Discussion

Figure 1: Outdoor Wall and the Ground

Thermal bridging can be noted at the intersection of the outdoor wall and the ground. This is caused by the use of a different material with a higher thermal conductivity at the bottom of the wall.

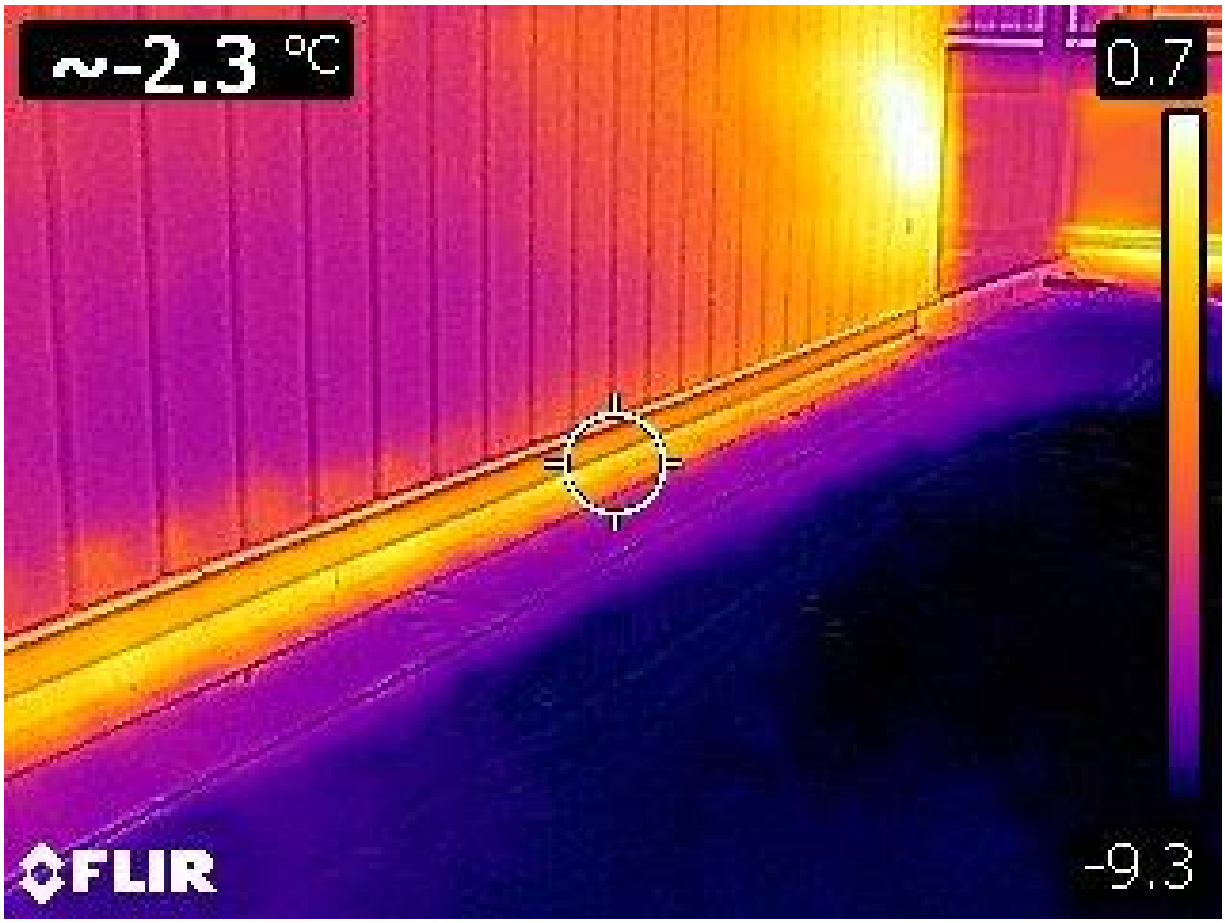


Figure 1

Figure 2: Window Borders & Lower Walls

Thermal bridging can be identified on the border of the windows as well as various sections of the wall below the windows. On top of this, a small amount of air leakage can be seen coming from the window seals.

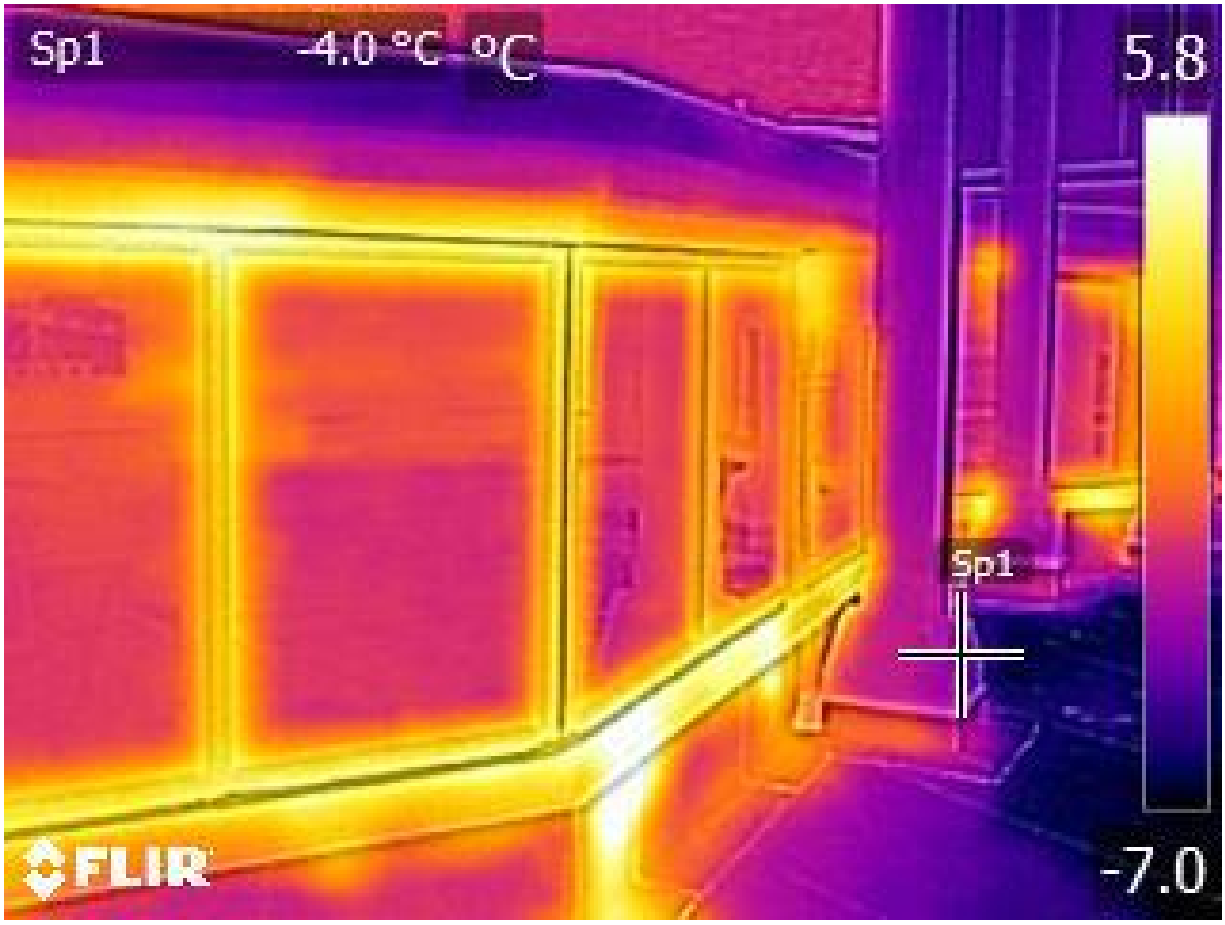


Figure 2

Figure 3: Window Siding

Thermal bridging can be seen on the siding of the windows, although no air leakage is present.

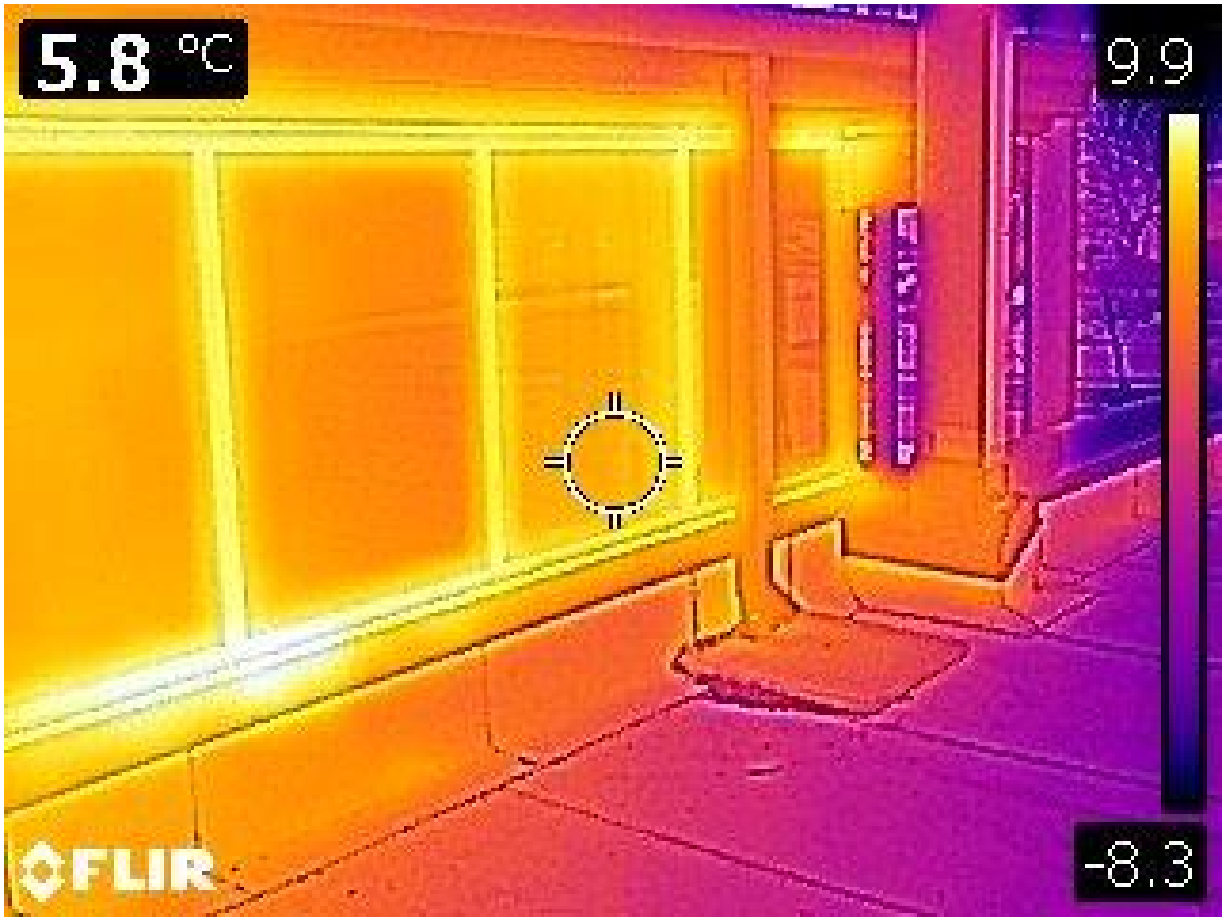


Figure 3

Figures 4-to-6: Doorways

Figure 4: Single Door Seal - Outdoor

Air leakage present around the perimeter of the doors. Although the door has a high thermal resistance, heat is allowed to escape through the cracks between the door and the wall.

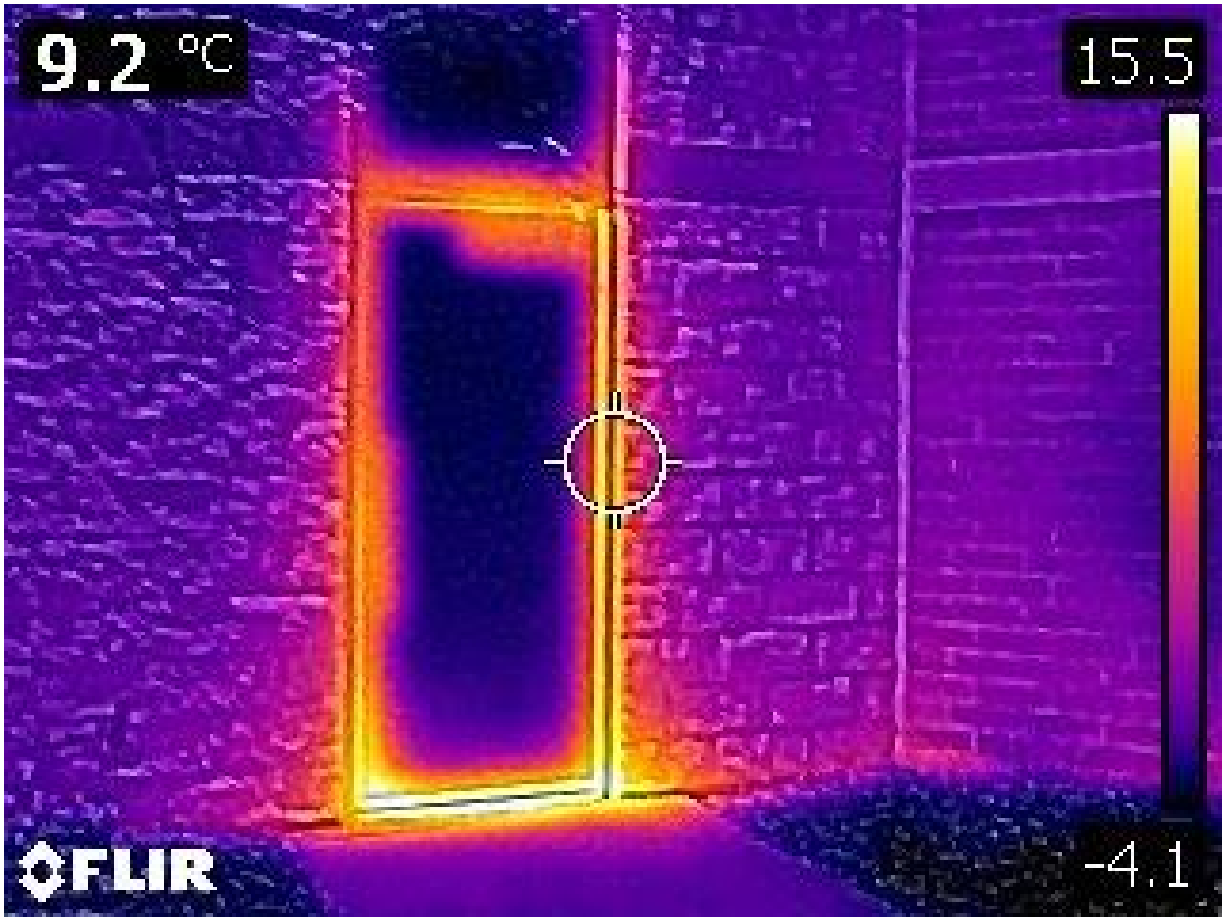


Figure 4

Figure 5: Double Doorway Seal - Outdoor

Thermal bridging and air leakage can be seen around the entire perimeter of the door. Air leakage is primarily present in the bottom right section of the door frame.

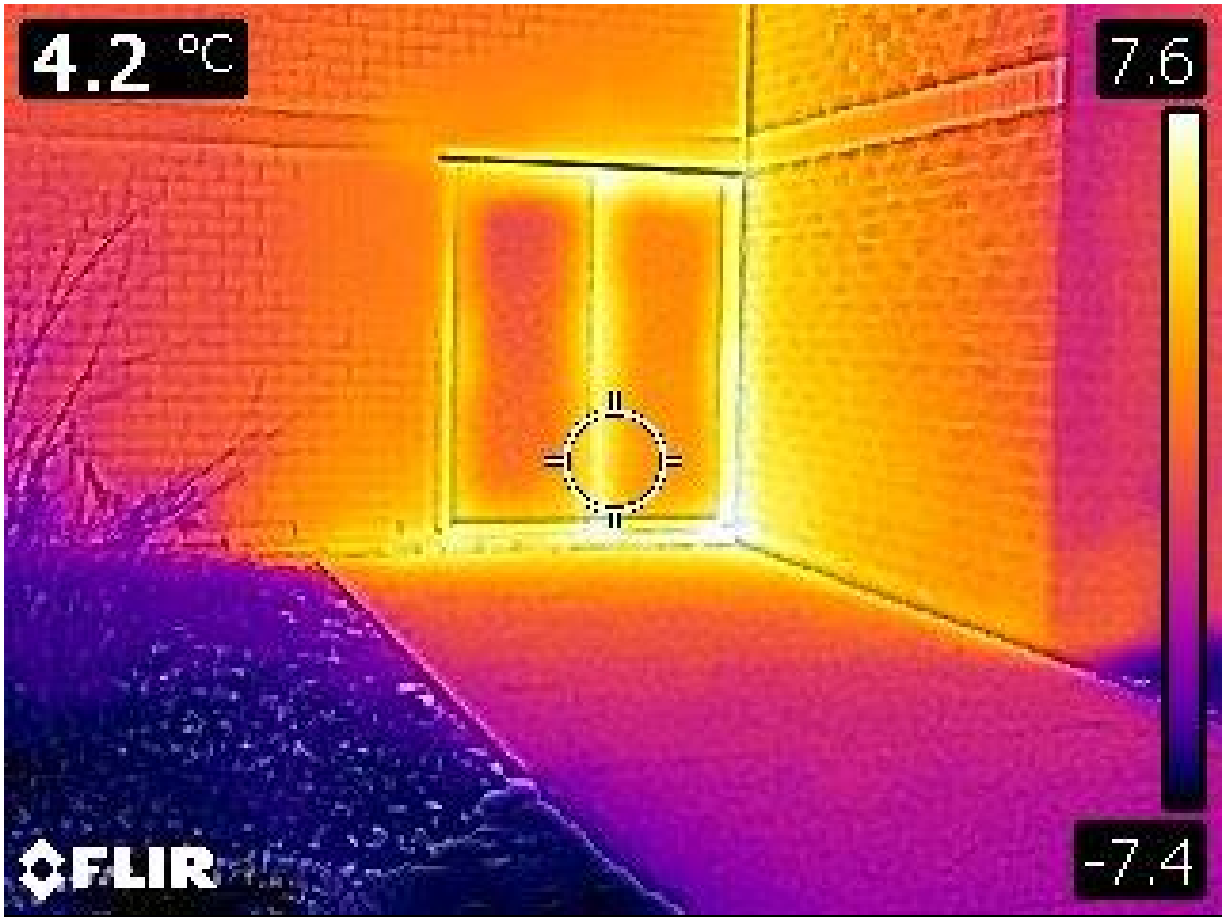


Figure 5

Figure 6: Double Doorway Seal – Indoor

Air leakage identified around the border of the door. The bottom of the door frame contains a higher degree of air leakage.

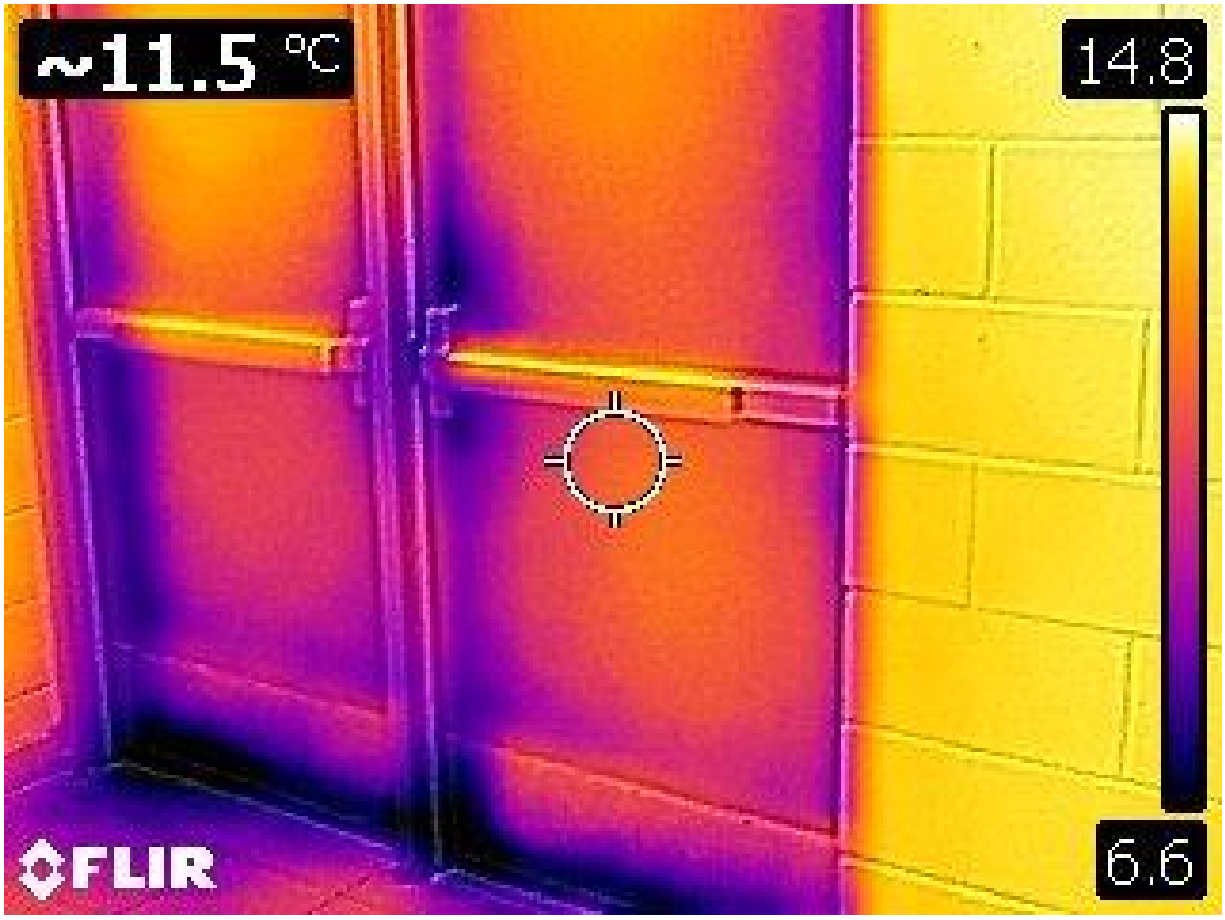


Figure 6

Conclusions

Thermal imaging was able to unveil various locations of the Brampton South Fletcher Sportsplex that are subject to air leakage and thermal bridging. It will be important to address these defects.in order to lower cooling and heating loads as much as possible, which will in turn increase energy efficiency.

This report includes thermal images that were taken on March 4th, 2020. While this is a suitable time for thermal imaging, MCW CES recommends conducting additional thermal imaging during the summer months. Summertime thermal imaging will enable greater visibility in to the impact of warm outdoor penetration on the cool, temperature-controlled indoor arena areas. This will be particularly important given the high costs for summertime cooling in the facility.

Appendix A:
Additional Thermal Imaging Samples

Figure A-1

Thermal bridging at the bottom of the wall.

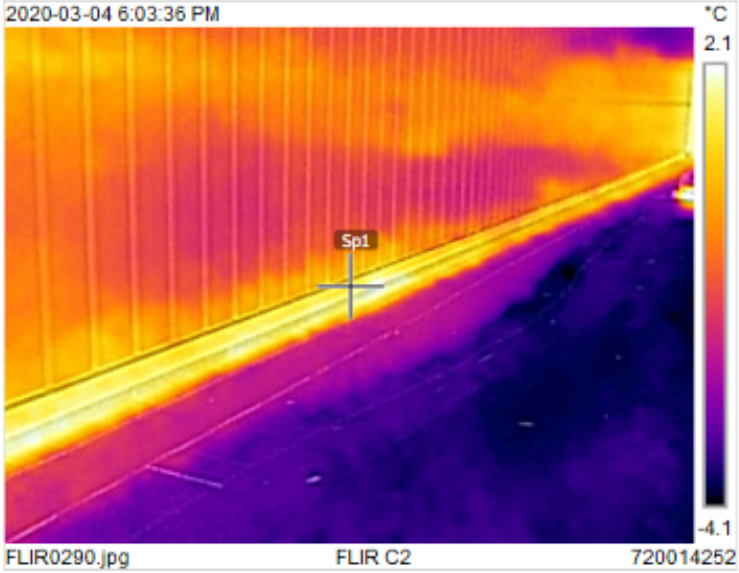


Figure A-2

Very slight thermal bridging at the lower portion of the wall.

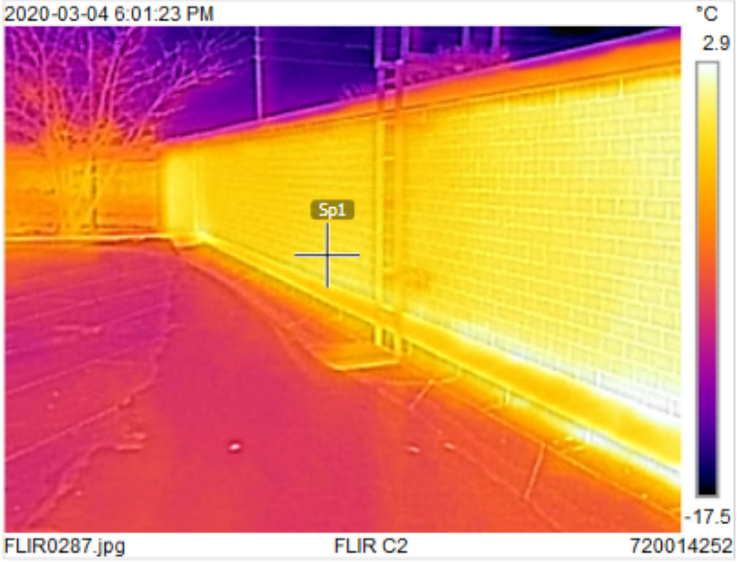


Figure A-3

Thermal bridging present around the window border.

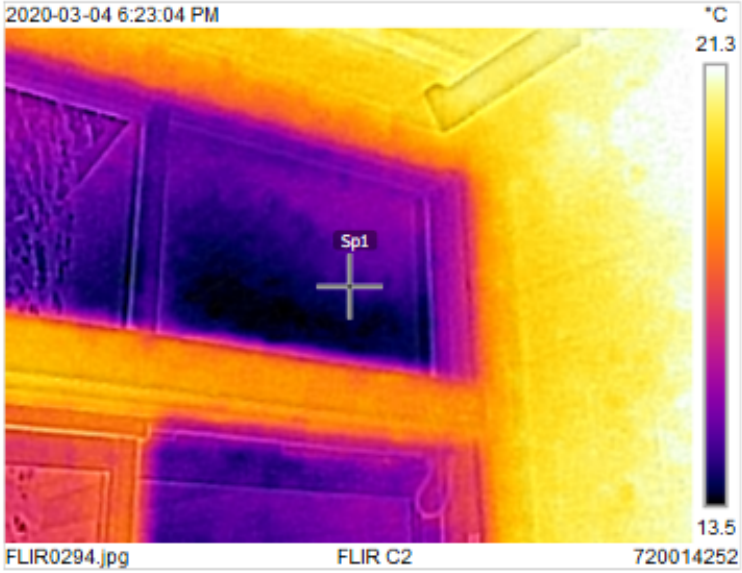


Figure A-4

Thermal bridging present around several window borders.

Figure A-5

Thermal bridging present around the border of the windows, as well as the supporting column.

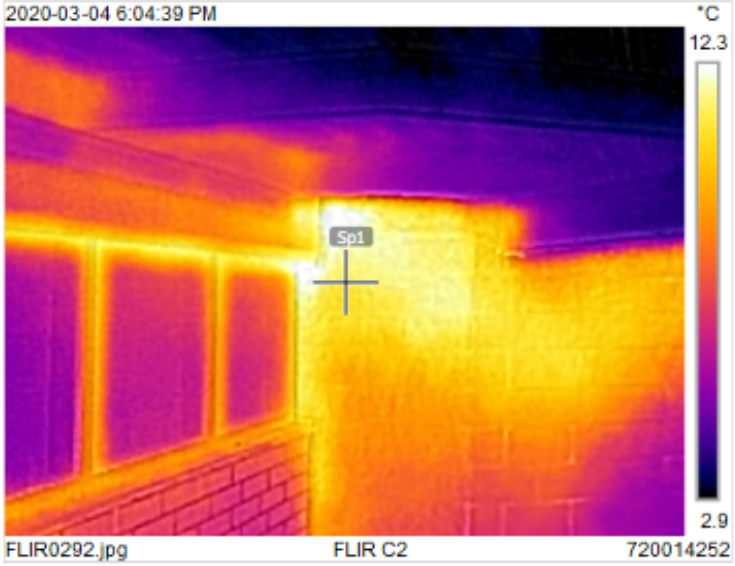


Figure A-6

Serious air leakage around the entire border of the door, as well as thermal bridging on the lower portion of the door frame.

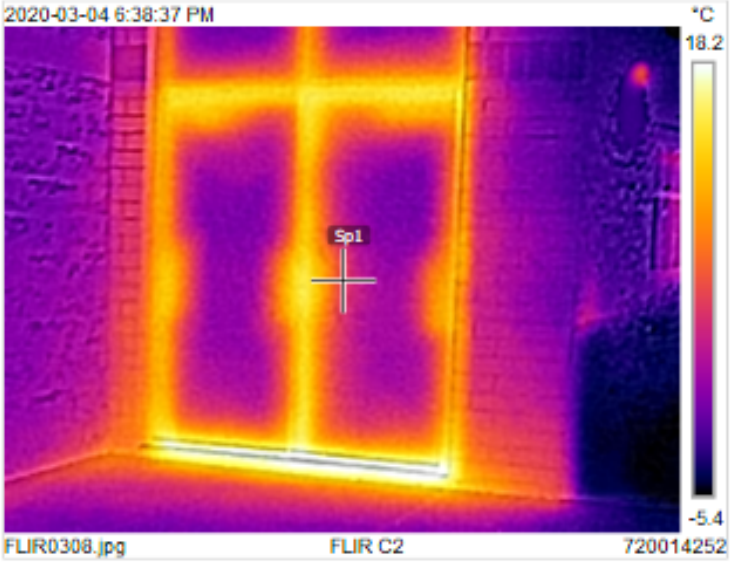


Figure A-7

Air leakage around the entire perimeter of the door, as well as thermal bridging on the lower section of both door frames.

APPENDIX E

LIGHTING LINE BY LINE AUDIT

APPENDIX F

BATTERY ENERGY STORAGE SYSTEM SINGLE LINE

APPENDIX G

DOMESTIC WATER MODEL

APPENDIX H

LIFE CYCLE COSTING ANALYSIS

OPTION 0 - BUSINESS AS USUAL CASE

BUILDING ASSETS													TERM YEARS																											TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	$ 12,000	$ 1,200	$ 13,200	-	-	-	-	-	-	$ 13,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,280
2	TEST	Exterior Lights	A02	IN	1996	30	24	2026	-	$ 30,000	$ 3,000	$ 33,000	-	-	-	-	-	-	$ 33,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -13,200
3	TEST	BAS	C01	IN	1996	25	24	2021	$ 5,000	$ 400,000	$ 40,000	$ 440,000	-	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -35,200
4	TEST	Heating Boilers (Tagged to D01)	D01	IN	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	IN	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	IN	1996	25	24	2021	$ 1,500	$ 110,100	$ 11,010	$ 121,110	-	$ 121,110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -9,689
7	TEST	Pool Boiler	D04	IN	1996	25	24	2021	$ 750	$ 65,000	$ 6,500	$ 71,500	-	$ 71,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,720
8	TEST	Whilrpool Boiler	D05	IN	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	IN	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	IN	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (Tagged to D06)	D06	IN	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	IN	1996	30	24	2026	$ 3,000	$ 350,000	$ 35,000	$ 385,000	-	-	-	-	-	-	$ 385,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -154,000
13	TEST	HRU 2	D07	IN	1996	30	24	2026	$ 3,000	$ 250,000	$ 25,000	$ 275,000	-	-	-	-	-	-	$ 275,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -110,000
14	TEST	MUA 1	D07	IN	1996	30	24	2026	$ 1,000	$ 83,000	$ 8,300	$ 91,300	-	-	-	-	-	-	$ 91,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -36,520
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	$ 2,000	$ 150,000	$ 15,000	$ 165,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,000
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	$ 3,000	$ 250,000	$ 25,000	$ 275,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -55,000
17	TEST	Terminal Heat Pumps	D09	IN	1996	30	24	2026	$ 2,500	$ 683,000	$ 68,300	$ 751,300	-	-	-	-	-	-	$ 751,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -300,520
18	TEST	Heating Boilers (Tagged to D11)	D11	IN	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	IN	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	IN	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	IN	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	IN	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
33	TEST	Ice Plant (Tagged to E02B)	E02B	IN	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	IN	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	$ 500	$ 62,000	$ 6,200	$ 68,200	-	$ 68,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,456
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	-	-	-	-	-	-	-	-	$ -140,800
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	$ -211,200
27	TEST	Windows	G01	IN	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	IN	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	IN	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	IN	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	IN	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	IN	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
TOTAL						**1,090**	**664**		**$ 227,500**	**$ 24,129,500**	**$ 2,394,650**	**$ 26,524,150**	**-**	**$ 13,136,312**	**-**	**-**	**-**	**-**	**$ 1,548,801**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 457,341**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**$ 6,173,201**	**-**	**$ -10,457,014**

PROGRAM 50% A

BUILDING ASSETS													TERM YEARS																											TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	OUT	1996	30	24	2026	-	$ 30,000	$ 3,000	$ 33,000	-	-	-	-	-	-	$ 33,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -13,200
3	TEST	BAS	C01	OUT	1996	25	24	2021	$ 5,000	$ 400,000	$ 40,000	$ 440,000	-	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -35,200
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	OUT	1996	25	24	2021	$ 1,500	$ 110,100	$ 11,010	$ 121,110	-	$ 121,110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -9,689
7	TEST	Pool Boiler	D04	OUT	1996	25	24	2021	$ 750	$ 65,000	$ 6,500	$ 71,500	-	$ 71,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,720
8	TEST	Whilrpool Boiler	D05	OUT	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	OUT	1996	30	24	2026	$ 3,000	$ 350,000	$ 35,000	$ 385,000	-	-	-	-	-	-	$ 385,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -154,000
13	TEST	HRU 2	D07	OUT	1996	30	24	2026	$ 3,000	$ 250,000	$ 25,000	$ 275,000	-	-	-	-	-	-	$ 275,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -110,000
14	TEST	MUA 1	D07	OUT	1996	30	24	2026	$ 1,000	$ 83,000	$ 8,300	$ 91,300	-	-	-	-	-	-	$ 91,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -36,520
15	TEST	ERV 1&2	D07	OUT	2018	30	2	2048	$ 2,000	$ 150,000	$ 15,000	$ 165,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,000
16	TEST	Dec-Tron	D07	OUT	2018	30	2	2048	$ 3,000	$ 250,000	$ 25,000	$ 275,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -55,000
17	TEST	Terminal Heat Pumps	D09	OUT	1996	30	24	2026	$ 2,500	$ 683,000	$ 68,300	$ 751,300	-	-	-	-	-	-	$ 751,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -300,520
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	OUT	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	OUT	1996	25	24	2021	$ 500	$ 62,000	$ 6,200	$ 68,200	-	$ 68,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,456
25	TEST	Munters Arena Dehumidifier	E06	OUT	2010	25	10	2035	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	-	-	-	-	-	-	-	-	-	$ -140,800
26	TEST	Arid Ice Dehumidifiers	E06	OUT	2018	25	2	2043	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	$ -211,200
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	OUT	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	OUT	2020	24	-	2044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-
	Energy Conservation M	Lighting Controls (Basic)	A03	OUT	2020	20	-	2040	-				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Analytic Control Tuning	C02	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	DHW Boiler - Condensing	D03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool Boiler - Condensing	D04	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU VAV Conversion	D08	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heat Pump Replacement	D09	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Frarr	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ice Resurfacer Replacement	E04	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Radiant Heating Conversion	E05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Dehumidifier Conversion	E06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						203	48		$ 6,000	$ 4,414,514	$ 441,451	$ 4,855,965	-	$ 0	-	-	-	-	$ 0	-	-	-	$ 111,100	-	-	$ 24,401	-	-	-	-	-	-	$ 122,465	-	-	-	-	$ -446,509

PROGRAM 50% B

BUILDING ASSETS													TERM YEARS																									TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	OUT	1996	30	24	2026	-	$ 30,000	$ 3,000	$ 33,000	-	-	-	-	-	-	$ 33,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -13,200
3	TEST	BAS	C01	OUT	1996	25	24	2021	$ 5,000	$ 400,000	$ 40,000	$ 440,000	-	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -35,200
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	OUT	1996	25	24	2021	$ 1,500	$ 110,100	$ 11,010	$ 121,110	-	$ 121,110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -9,689
7	TEST	Pool Boiler	D04	OUT	1996	25	24	2021	$ 750	$ 65,000	$ 6,500	$ 71,500	-	$ 71,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,720
8	TEST	Whilrpool Boiler	D05	OUT	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	OUT	1996	30	24	2026	$ 3,000	$ 350,000	$ 35,000	$ 385,000	-	-	-	-	-	-	$ 385,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -154,000
13	TEST	HRU 2	D07	OUT	1996	30	24	2026	$ 3,000	$ 250,000	$ 25,000	$ 275,000	-	-	-	-	-	-	$ 275,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -110,000
14	TEST	MUA 1	D07	OUT	1996	30	24	2026	$ 1,000	$ 83,000	$ 8,300	$ 91,300	-	-	-	-	-	-	$ 91,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -36,520
15	TEST	ERV 1&2	D07	OUT	2018	30	2	2048	$ 2,000	$ 150,000	$ 15,000	$ 165,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,000
16	TEST	Dec-Tron	D07	OUT	2018	30	2	2048	$ 3,000	$ 250,000	$ 25,000	$ 275,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -55,000
17	TEST	Terminal Heat Pumps	D09	OUT	1996	30	24	2026	$ 2,500	$ 683,000	$ 68,300	$ 751,300	-	-	-	-	-	-	$ 751,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -300,520
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	TEST	Ice Plant (Tagged to E01)	E01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	TEST	Ice Plant (Tagged to E02A)	E02A	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	OUT	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	OUT	1996	25	24	2021	$ 500	$ 62,000	$ 6,200	$ 68,200	-	$ 68,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,456
25	TEST	Munters Arena Dehumidifier	E06	OUT	2010	25	10	2035	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	-	-	-	-	-	-	-	-	$ -140,800
26	TEST	Arid Ice Dehumidifiers	E06	OUT	2018	25	2	2043	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	$ -211,200
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	OUT	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	OUT	2020	24	-	2044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-
	Energy Conservation M	Lighting Controls (Basic)	A03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Analytic Control Tuning	C02	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperatu	D02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	DHW Boiler - Condensing	D03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool Boiler - Condensing	D04	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU VAV Conversion	D08	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heat Pump Replacement	D09	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	IN	2020	25	-	2045	-	$ 691,000	$ 69,100	$ 760,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -30,404
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	IN	2020	25	-	2045	-	$ 3,134,000	$ 313,400	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -137,896
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Cooling	E02A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ice Resurfacer Replacement	E04	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Radiant Heating Conversion	E05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Dehumidifier Conversion	E06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						253	72		$ 6,000	$ 4,957,514	$ 495,751	$ 5,453,265	-	$ 0	-	-	-	-	$ 0	-	-	-	$ 111,100	-	-	$ 24,401	-	-	-	-	-	-	$ 122,465	-	-	-	-	$ -470,401

PROGRAM 50% C

BUILDING ASSETS													TERM YEARS																									TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	BCM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	OUT	1996	30	24	2026	-	$ 30,000	$ 3,000	$ 33,000	-	-	-	-	-	-	$ 33,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -13,200
3	TEST	BAS	C01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TEST	Heating Boilers (Tagged to D01)	D01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	TEST	Heating Boilers (Tagged to D02)	D02	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TEST	Pool Boiler	D04	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	TEST	Whilrpool Boiler	D05	OUT	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	OUT	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	OUT	1996	25	24	2021	$ 500	$ 62,000	$ 6,200	$ 68,200	-	$ 68,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,456
25	TEST	Munters Arena Dehumidifier	E06	OUT	2010	25	10	2035	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	-	-	-	-	-	-	-	-	$ -140,800
26	TEST	Arid Ice Dehumidifiers	E06	OUT	2018	25	2	2043	$ 2,000	$ 200,000	$ 20,000	$ 220,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 220,000	-	$ -211,200
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	OUT	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	OUT	2020	24	-	2044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-
	Energy Conservation M	Lighting Controls (Basic)	A03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	IN	2020	20	-	2040	$ 3,000	$ 592,000	$ 59,200	$ 651,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 651,200	-	-	-	-	$ -520,960
	Energy Conservation M	Analytic Control Tuning	C02	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing	D01	IN	2020	25	-	2045	-	$ 462,000	$ 46,200	$ 508,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -20,328
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperatu	D02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	DHW Boiler - Condensing	D03	IN	2020	25	-	2045	-	$ 147,000	$ 14,700	$ 161,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,468
	Energy Conservation M	Pool Boiler - Condensing	D04	IN	2020	25	-	2045	-	$ 188,000	$ 18,800	$ 206,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -8,272
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heat Pump Replacement	D09	IN	2020	25	-	2045	-	$ 761,000	$ 76,100	$ 837,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,484
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Frame	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Cooling	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ice Resurfacer Replacement	E04	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Radiant Heating Conversion	E05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Dehumidifier Conversion	E06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						628	244		$ 10,500	$ 8,832,514	$ 883,251	$ 9,715,765	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	-	-	-	-	-	$ 773,665	-	-	-	-	$ -1,135,813

PROGRAM 80% A

BUILDING ASSETS													TERM YEARS																									TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	OUT	1996	30	24	2026	-	$ 30,000	$ 3,000	$ 33,000	-	-	-	-	-	-	$ 33,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -13,200
3	TEST	BAS	C01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	TEST	DHW Boiler	D03	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TEST	Pool Boiler	D04	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	TEST	Whilrpool Boiler	D05	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	OUT	1996	30	24	2026	$ 2,500	$ 683,000	$ 68,300	$ 751,300	-	-	-	-	-	-	$ 751,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -300,520
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	OUT	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	OUT	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	OUT	2020	24	-	2044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-
	Energy Conservation M	Lighting Controls (Basic)	A03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	IN	2020	20	-	2040	$ 3,000	$ 592,000	$ 59,200	$ 651,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 651,200	-	-	-	-	$ -520,960
	Energy Conservation M	Analytic Control Tuning	C02	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	IN	2020	25	-	2045	-	$ 462,000	$ 46,200	$ 508,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -20,328
	Energy Conservation M	DHW Boiler - Condensing	D03	IN	2020	25	-	2045	-	$ 147,000	$ 14,700	$ 161,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,468
	Energy Conservation M	Pool Boiler - Condensing	D04	IN	2020	25	-	2045	-	$ 188,000	$ 18,800	$ 206,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -8,272
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	IN	2020	25	-	2045	$ 4,500	$ 2,411,000	$ 241,100	$ 2,652,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -106,084
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	IN	2020	25	-	2045	$ 2,500	$ 341,000	$ 34,100	$ 375,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -15,004
	Energy Conservation M	Heat Pump Replacement	D09	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ice Resurfacer Replacement	E04	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Radiant Heating Conversion	E05	IN	2020	25	-	2045	-	$ 157,000	$ 15,700	$ 172,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,908
	Energy Conservation M	Dehumidifier Conversion	E06	IN	2020	25	-	2045	$ 1,000	$ 1,730,000	$ 173,000	$ 1,903,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -76,120
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						773	266		$ 18,500	$ 12,710,514	$ 1,271,051	$ 13,981,565	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	$ 0	-	-	-	-	$ 773,665	-	-	$ 0	-	$ -1,306,445

PROGRAM 80% B

BUILDING ASSETS													TERM YEARS																									TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TEST	BAS	C01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	TEST	DHW Boiler	D03	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TEST	Pool Boiler	D04	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	TEST	Whilrpool Boiler	D05	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	OUT	1996	30	24	2026	$ 2,500	$ 683,000	$ 68,300	$ 751,300	-	-	-	-	-	-	$ 751,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -300,520
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	OUT	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	OUT	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	IN	2020	24	-	2044	$ -4,100	$ 45,493	$ 4,549	$ 50,042	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 50,042	$ -50,042
	Energy Conservation M	Lighting Controls (Basic)	A03	IN	2020	20	-	2040	-	$ 19,595	$ 1,960	$ 21,555	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 21,555	-	-	-	-	$ -17,244
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	IN	2020	20	-	2040	$ 3,000	$ 592,000	$ 59,200	$ 651,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 651,200	-	-	-	-	$ -520,960
	Energy Conservation M	Analytic Control Tuning	C02	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	IN	2020	25	-	2045	-	$ 462,000	$ 46,200	$ 508,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -20,328
	Energy Conservation M	DHW Boiler - Condensing	D03	IN	2020	25	-	2045	-	$ 147,000	$ 14,700	$ 161,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,468
	Energy Conservation M	Pool Boiler - Condensing	D04	IN	2020	25	-	2045	-	$ 188,000	$ 18,800	$ 206,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -8,272
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	IN	2020	25	-	2045	$ 4,500	$ 2,411,000	$ 241,100	$ 2,652,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -106,084
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	IN	2020	25	-	2045	$ 2,500	$ 341,000	$ 34,100	$ 375,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -15,004
	Energy Conservation M	Heat Pump Replacement	D09	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	IN	2020	25	-	2045	-	$ 99,000	$ 9,900	$ 108,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,356
	Energy Conservation M	Ice Resurfacer Replacement	E04	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Radiant Heating Conversion	E05	IN	2020	25	-	2045	-	$ 157,000	$ 15,700	$ 172,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,908
	Energy Conservation M	Dehumidifier Conversion	E06	IN	2020	25	-	2045	$ 1,000	$ 1,730,000	$ 173,000	$ 1,903,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -76,120
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						872	290		$ 14,400	$ 12,874,602	$ 1,287,460	$ 14,162,062	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	$ 0	-	-	-	-	$ 795,220	-	-	$ 0	$ 50,042	$ -1,378,087

PROGRAM 80% C

BUILDING ASSETS													TERM YEARS																											TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (RAL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	OUT	1996	30	24	2026	-	$ 30,000	$ 3,000	$ 33,000	-	-	-	-	-	-	$ 33,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -13,200
3	TEST	BAS	C01	OUT	1996	25	24	2021	$ 5,000	$ 400,000	$ 40,000	$ 440,000	-	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -35,200
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	TEST	DHW Boiler	D03	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	TEST	Pool Boiler	D04	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	TEST	Whilrpool Boiler	D05	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	OUT	1996	30	24	2026	$ 2,500	$ 683,000	$ 68,300	$ 751,300	-	-	-	-	-	-	$ 751,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -300,520
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	OUT	2010	25	10	2035	$ 1,500	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	$ -117,120
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	OUT	2020	24	-	2044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
	Energy Conservation M	Lighting Controls (Basic)	A03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 1,550,000	$ 155,000	$ 1,705,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -341,000
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Analytic Control Tuning	C02	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	IN	2020	25	-	2045	-	$ 462,000	$ 46,200	$ 508,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -20,328
	Energy Conservation M	DHW Boiler - Condensing	D03	IN	2020	25	-	2045	-	$ 147,000	$ 14,700	$ 161,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,468
	Energy Conservation M	Pool Boiler - Condensing	D04	IN	2020	25	-	2045	-	$ 188,000	$ 18,800	$ 206,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -8,272
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	IN	2020	25	-	2045	$ 4,500	$ 2,411,000	$ 241,100	$ 2,652,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -106,084
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heat Pump Replacement	D09	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ice Resurfacer Replacement	E04	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Radiant Heating Conversion	E05	IN	2020	25	-	2045	-	$ 157,000	$ 15,700	$ 172,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,908
	Energy Conservation M	Dehumidifier Conversion	E06	IN	2020	25	-	2045	$ 1,000	$ 1,730,000	$ 173,000	$ 1,903,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -76,120
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	IN	2020	50	-	2070	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						803	266		$ 13,000	$ 13,251,514	$ 1,325,151	$ 14,576,665	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	$ 0	-	-	-	$ 122,465	-	-	$ 0	-	$ -1,416,841

PROGRAM 100% A

BUILDING ASSETS													TERM YEARS																													TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (RUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TEST	BAS	C01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	OUT	1996	25	24	2021	$ 1,500	$ 110,100	$ 11,010	$ 121,110	-	$ 121,110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -9,689
7	TEST	Pool Boiler	D04	OUT	1996	25	24	2021	$ 750	$ 65,000	$ 6,500	$ 71,500	-	$ 71,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,720
8	TEST	Whilrpool Boiler	D05	OUT	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
27	TEST	Windows	G01	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	TEST	Phase I Roof	G02	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
29	TEST	Phase II Roof	G03	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
30	TEST	Phase I Exterior Walls	G04	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	TEST	Phase II Exterior Walls	G05	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	IN	2020	24	-	2044	$ -4,100	$ 45,493	$ 4,549	$ 50,042	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 50,042	$ -50,042
	Energy Conservation M	Lighting Controls (Basic)	A03	IN	2020	20	-	2040	-	$ 19,595	$ 1,960	$ 21,555	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 21,555	-	-	-	-	$ -17,244
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	IN	2020	20	-	2040	$ 3,000	$ 592,000	$ 59,200	$ 651,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 651,200	-	-	-	-	$ -520,960
	Energy Conservation M	Analytic Control Tuning	C02	IN	2020	20	-	2040	$ 8,500	$ 8,500	$ 850	$ 9,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 9,350	-	-	-	-	$ -7,480
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	DHW Boiler - Condensing	D03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool Boiler - Condensing	D04	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	IN	2020	25	-	2045	$ 3,500	$ 8,704,000	$ 870,400	$ 9,574,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -382,976
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	IN	2020	25	-	2045	$ 2,500	$ 341,000	$ 34,100	$ 375,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -15,004
	Energy Conservation M	Heat Pump Replacement	D09	IN	2020	25	-	2045	-	$ 761,000	$ 76,100	$ 837,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,484
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	IN	2020	25	-	2045	$ 2,000	$ 159,000	$ 15,900	$ 174,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,996
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	IN	2020	25	-	2045	-	$ 99,000	$ 9,900	$ 108,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,356
	Energy Conservation M	Ice Resurfacer Replacement	E04	IN	2020	20	-	2040	$ -300	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	$ -146,400
	Energy Conservation M	Radiant Heating Conversion	E05	IN	2020	25	-	2045	-	$ 157,000	$ 15,700	$ 172,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,908
	Energy Conservation M	Dehumidifier Conversion	E06	IN	2020	25	-	2045	$ 1,000	$ 1,730,000	$ 173,000	$ 1,903,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -76,120
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	IN	2020	50	-	2070	-	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
	Energy Conservation M	Roof Insulation - Phase I	G02	IN	2020	25	-	2045	-	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -116,468
	Energy Conservation M	Roof Insulation - Phase II	G03	IN	2020	25	-	2045	-	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -121,660
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	IN	2020	50	-	2070	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	IN	2020	50	-	2070	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	IN	2020	25	-	2045	$ 9,400	$ 1,356,153	$ 135,615	$ 1,491,768	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -59,671
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						1,392	390		$ 33,000	$ 29,232,255	$ 2,904,925	$ 32,137,180	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	$ 0	-	-	-	-	$ 987,570	-	-	$ 1	$ 50,042	$ -3,817,774

PROGRAM 100% B

BUILDING ASSETS													TERM YEARS																									TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TEST	BAS	C01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	OUT	1996	25	24	2021	$ 1,500	$ 110,100	$ 11,010	$ 121,110	-	$ 121,110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -9,689
7	TEST	Pool Boiler	D04	OUT	1996	25	24	2021	$ 750	$ 65,000	$ 6,500	$ 71,500	-	$ 71,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,720
8	TEST	Whirlpool Boiler	D05	OUT	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	TEST	Heating Boilers (Tagged to D11)	D11	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
27	TEST	Windows	G01	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	TEST	Phase I Roof	G02	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
29	TEST	Phase II Roof	G03	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
30	TEST	Phase I Exterior Walls	G04	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	TEST	Phase II Exterior Walls	G05	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	IN	2020	24	-	2044	$ -4,100	$ 45,493	$ 4,549	$ 50,042	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 50,042	$ -50,042
	Energy Conservation M	Lighting Controls (Basic)	A03	IN	2020	20	-	2040	-	$ 19,595	$ 1,960	$ 21,555	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 21,555	-	-	-	-	$ -17,244
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	IN	2020	20	-	2040	$ 3,000	$ 592,000	$ 59,200	$ 651,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 651,200	-	-	-	-	$ -520,960
	Energy Conservation M	Analytic Control Tuning	C02	IN	2020	20	-	2040	$ 8,500	$ 8,500	$ 850	$ 9,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 9,350	-	-	-	-	$ -7,480
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	DHW Boiler - Condensing	D03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool Boiler - Condensing	D04	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	IN	2020	25	-	2045	$ 2,500	$ 341,000	$ 34,100	$ 375,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -15,004
	Energy Conservation M	Heat Pump Replacement	D09	IN	2020	25	-	2045	-	$ 761,000	$ 76,100	$ 837,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,484
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	IN	2020	25	-	2045	$ 2,000	$ 159,000	$ 15,900	$ 174,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,996
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	IN	2020	25	-	2045	$ 6,500	$ 8,403,000	$ 840,300	$ 9,243,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -369,732
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	IN	2020	25	-	2045	-	$ 99,000	$ 9,900	$ 108,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,356
	Energy Conservation M	Ice Resurfacer Replacement	E04	IN	2020	20	-	2040	$ -300	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	$ -146,400
	Energy Conservation M	Radiant Heating Conversion	E05	IN	2020	25	-	2045	-	$ 157,000	$ 15,700	$ 172,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,908
	Energy Conservation M	Dehumidifier Conversion	E06	IN	2020	25	-	2045	$ 1,000	$ 1,730,000	$ 173,000	$ 1,903,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -76,120
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	IN	2020	50	-	2070	-	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
	Energy Conservation M	Roof Insulation - Phase I	G02	IN	2020	25	-	2045	-	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -116,468
	Energy Conservation M	Roof Insulation - Phase II	G03	IN	2020	25	-	2045	-	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -121,660
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	IN	2020	50	-	2070	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	IN	2020	50	-	2070	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	IN	2020	25	-	2045	$ 9,400	$ 1,356,153	$ 135,615	$ 1,491,768	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -59,671
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						1,392	390		$ 36,000	$ 28,931,255	$ 2,874,825	$ 31,806,080	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	$ 0	-	-	-	-	$ 987,570	-	-	$ 1	$ 50,042	$ -3,804,530

PROGRAM 100% C

BUILDING ASSETS													TERM YEARS																									TOTALS
UNIFORMAT CODE	GROUP	COMPONENT	ECM AFFECTING COMPONENT	IN/OUT	YEAR OF INSTALLATION OR REPAIR	EXPECTED USEFUL LIFE (EUL)	CURRENT AGE	YEAR OF REPLACEMENT (LIFE CYCLE)	ANNUAL MAINTENANCE COST	REPLACEMENT COST	SOFT COST	TOTAL COST	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	RECAP VALUE
1	TEST	Lobby Lights	A01	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	TEST	Exterior Lights	A02	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	TEST	BAS	C01	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	TEST	Heating Boilers (Tagged to D01)	D01	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
5	TEST	Heating Boilers (Tagged to D02)	D02	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
6	TEST	DHW Boiler	D03	OUT	1996	25	24	2021	$ 1,500	$ 110,100	$ 11,010	$ 121,110	-	$ 121,110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -9,689
7	TEST	Pool Boiler	D04	OUT	1996	25	24	2021	$ 750	$ 65,000	$ 6,500	$ 71,500	-	$ 71,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -5,720
8	TEST	Whilrpool Boiler	D05	OUT	2010	25	10	2035	$ 750	$ 49,400	$ 4,940	$ 54,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 54,340	-	-	-	-	-	-	-	-	-	$ -34,778
9	TEST	Heating Boilers (Tagged to D06)	D06	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	TEST	Hot Water Loop Piping (Tagged to D06)	D06	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	TEST	Hot Water Terminal Units (tagged to D06)	D06	IN	1996	50	24	2046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	TEST	HRU 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	TEST	HRU 2	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	TEST	MUA 1	D07	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	TEST	ERV 1&2	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	TEST	Dec-Tron	D07	IN	2018	30	2	2048	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	TEST	Terminal Heat Pumps	D09	IN	1996	30	24	2026	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	TEST	Heating Boilers (Tagged to D11)	D11	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
19	TEST	Hot Water Loop Piping (Tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 400,000	$ 40,000	$ 440,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -228,800
20	TEST	Hot Water Terminal Units (tagged to D11)	D11	OUT	1996	50	24	2046	-	$ 120,000	$ 12,000	$ 132,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -68,640
32	TEST	Heating Boilers (Tagged to D12)	D12	OUT	1996	25	24	2021	$ 7,500	$ 380,600	$ 38,060	$ 418,660	-	$ 418,660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,493
21	TEST	Ice Plant (Tagged to E01)	E01	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
22	TEST	Ice Plant (Tagged to E02A)	E02A	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	TEST	Ice Plant (Tagged to E02B)	E02B	OUT	1996	25	24	2021	$ 50,000	$ 3,134,000	$ 313,400	$ 3,447,400	-	$ 3,447,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -275,792
23	TEST	Ice Resurfacers	E04	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
24	TEST	Arena Stand Heaters	E05	IN	1996	25	24	2021	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	TEST	Munters Arena Dehumidifier	E06	IN	2010	25	10	2035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-
26	TEST	Arid Ice Dehumidifiers	E06	IN	2018	25	2	2043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-
27	TEST	Windows	G01	OUT	1996	50	24	2046	$ 9,500	$ 422,000	$ 42,200	$ 464,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -241,384
28	TEST	Phase I Roof	G02	OUT	2018	25	2	2043	$ 1,000	$ 2,647,000	$ 264,700	$ 2,911,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 2,911,700	-	$ -2,795,232
29	TEST	Phase II Roof	G03	OUT	2018	25	2	2043	$ 1,000	$ 2,765,000	$ 276,500	$ 3,041,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 3,041,500	-	$ -2,919,840
30	TEST	Phase I Exterior Walls	G04	OUT	1996	50	24	2046	-	$ 1,645,000	$ 164,500	$ 1,809,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -940,940
31	TEST	Phase II Exterior Walls	G05	OUT	1996	50	24	2046	-	$ 915,000	$ 91,500	$ 1,006,500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -523,380
33	TEST	Interior Windows	G06	OUT	1996	50	24	2046	-	$ 313,000	$ 31,300	$ 344,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -179,036
	Energy Conservation M	LED Retrofits & New Fixtures (Interior)	A01	IN	2020	13	-	2033	$ -4,000	$ 22,183	$ 2,218	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 24,401	-	-	-	-	-	-	-	-	-	-	-	$ -3,754
	Energy Conservation M	LED New Fixtures (Exterior)	A02	IN	2020	24	-	2044	$ -4,100	$ 45,493	$ 4,549	$ 50,042	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 50,042	$ -50,042
	Energy Conservation M	Lighting Controls (Basic)	A03	IN	2020	20	-	2040	-	$ 19,595	$ 1,960	$ 21,555	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 21,555	-	-	-	-	$ -17,244
	Energy Conservation M	Lighting Controls (Arena)	A04	IN	2020	20	-	2040	-	$ 10,331	$ 1,033	$ 11,364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 11,365	-	-	-	-	$ -9,091
	Energy Conservation M	Battery Energy Storage System (City Owned)	B01	IN	2020	30	-	2050	$ 10,000	$ 991,000	$ 99,100	$ 1,090,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -218,020
	Energy Conservation M	Battery Energy Storage as a Service	B02	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Demand Control Ventilation	C01	IN	2020	20	-	2040	$ 3,000	$ 592,000	$ 59,200	$ 651,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 651,200	-	-	-	-	$ -520,960
	Energy Conservation M	Analytic Control Tuning	C02	IN	2020	20	-	2040	$ 8,500	$ 8,500	$ 850	$ 9,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 9,350	-	-	-	-	$ -7,480
	Energy Conservation M	Heating Boilers - Condensing	D01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Heating Boilers - Condensing Lower Water Temperat	D02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	DHW Boiler - Condensing	D03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Pool Boiler - Condensing	D04	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - Low Temp Loop	D05	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Ground Source Heat Loop - High Temp Loop	D06	IN	2020	25	-	2045	$ 3,500	$ 8,704,000	$ 870,400	$ 9,574,400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -382,976
	Energy Conservation M	AHU Replacement	D07	IN	2020	25	-	2045	$ 1,500	$ 2,268,000	$ 226,800	$ 2,494,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -99,792
	Energy Conservation M	AHU VAV Conversion	D08	IN	2020	25	-	2045	$ 2,500	$ 341,000	$ 34,100	$ 375,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -15,004
	Energy Conservation M	Heat Pump Replacement	D09	IN	2020	25	-	2045	-	$ 761,000	$ 76,100	$ 837,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -33,484
	Energy Conservation M	Low Temp Loop Variable Speed Pumping	D10	IN	2020	25	-	2045	$ 2,000	$ 159,000	$ 15,900	$ 174,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,996
	Energy Conservation M	Waste Water HR - High Temp Loop	D11	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	District Energy Integration	D12	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - Ammonia Plate and Fram	E01	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Chiller Replacement w HR - C02 - Indirect Slab Coolin	E02A	IN	2020	25	-	2045	-	$ 3,282,000	$ 328,200	$ 3,610,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -144,408
	Energy Conservation M	Chiller Replacement w HR - C02 - Direct Slab Cooling	E02B	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Cold Water Flooding	E03	IN	2020	25	-	2045	-	$ 99,000	$ 9,900	$ 108,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,356
	Energy Conservation M	Ice Resurfacer Replacement	E04	IN	2020	20	-	2040	$ -300	$ 183,000	-	$ 183,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 183,000	-	-	-	-	$ -146,400
	Energy Conservation M	Radiant Heating Conversion	E05	IN	2020	25	-	2045	-	$ 157,000	$ 15,700	$ 172,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -6,908
	Energy Conservation M	Dehumidifier Conversion	E06	IN	2020	25	-	2045	$ 1,000	$ 1,730,000	$ 173,000	$ 1,903,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -76,120
	Energy Conservation M	Pool and Whirlpool VFD	F01	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Pool Temperature Setback	F02	IN	2020	50	-	2070	-	$ 8,000	$ 800	$ 8,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -4,576
	Energy Conservation M	High Performance Glazing	G01	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase I	G02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Roof Insulation - Phase II	G03	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase I	G04	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Exterior Wall Insulation - Phase II	G05	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Interior Window Replacement	G06	OUT	2020	50	-	2070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Domestic Water Retrofits	H01	IN	2020	10	-	2030	-	$ 101,000	$ 10,100	$ 111,100	-	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	-	-	-	-	-	$ 111,100	-	-	-	-	$ -66,660
	Energy Conservation M	Solar PV - Roof - 1.18 MW array	I01A	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar PV - Roof - 0.60 MW array	I01B	IN	2020	25	-	2045	$ 9,400	$ 1,356,153	$ 135,615	$ 1,491,768	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ -59,671
	Energy Conservation M	Solar PV - Parking Lot - 1.03 MW array	I02	OUT	2020	25	-	2045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Energy Conservation M	Solar Thermal - Pool Heating	I03	OUT	2020	20	-	2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	$ 0	-	-	-	-	-
	Energy Conservation M	Remove In Stand Heating	J01	OUT	2020	-	-	2020	-	-	-	-	$ 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL						992	314		$ 33,000	$ 20,838,255	$ 2,065,525	$ 22,903,780	-	$ 1	-	-	-	-	$ 1	-	-	-	$ 111,100	-	-	$ 24,401	-	$ 0	-	-	-	-	$ 987,570	-	-	$ 0	$ 50,042	$ -1,873,942

APPENDIX I

WORKSHOP MATERIALS

Energy Management Group – Individual ECM Ranking Interpretation

	O+M	Occupant Impact	Impact to Site	Overall Rating	Simple Payback	Cost Ranking	Average
50% A CO2 Chiller	7.0	5.3	5.0	8.3	7.5	6.5	**6.6**
50% B Ammonia Chiller	7.1	5.2	5.1	8.0	6.1	6.4	**6.3**
50% C HVAC & BAS Heavy, DCV, VAV	6.9	5.3	5.1	8.0	5.9	6.6	**6.3**
80% A Solar Thermal, DCV, VAV	6.6	5.2	5.0	7.7	4.9	5.9	**6.0**
80% B Cold Water Flooding, Lighting+, DCV, VAV	6.8	5.3	5.1	7.8	3.8	6.6	**5.9**
80% C Solar Thermal, Envelope	6.6	5.2	5.0	7.6	4.9	6.1	**5.9**

Energy Management Group – Individual ECM Ranking Interpretation

	O+M	Occupant Impact	Impact to Site	Overall Rating	Simple Payback	Cost Ranking	Average
100% A High-Temp Ground Source, Envelope+	6.6	5.6	5.0	7.1	2.9	5.5	**5.5**
100% B Waste Water Heat Recovery, Envelope+	6.6	5.6	5.0	6.9	2.9	5.5	**5.4**
100% C High-Temp Ground Source, Renewable Energy Credits	6.7	5.3	5.1	7.6	3.6	6.2	**5.8**

Operations & Maintenance

	O+M	Occupant Impact	Impact to Site	Overall Rating	Cost to Implement	Average
50% A CO2 Chiller	5	5	8	5	8	**6.2**
50% B Ammonia Chiller	8	5	8	5	7	**6.6**
50% C HVAC & BAS Heavy, DCV, VAV	5	8	8	3	9	**6.6**
80% A Solar Thermal, DCV, VAV	5	5	5	5	6	**5.2**
80% B Cold Water Flooding, Lighting+, DCV, VAV	7	5	8	8	5	**6.6**
80% C Solar Thermal, Envelope	7	3	3	5	4	**4.4**

Operations & Maintenance

	O+M	Occupant Impact	Impact to Site	Overall Rating	Cost to Implement	Average
100% A High-Temp Ground Source, Envelope+	5	3	3	3	2	**3.2**
100% B Waste Water Heat Recovery, Envelope+	5	3	3	3	1	**3.0**
100% C High-Temp Ground Source, Renewable Energy Credits	5	5	5	5	3	**4.6**

MCW BD+C

	O+M	Occupant Impact	Impact to Site	Overall Rating	Cost to Implement	Average
50% A CO2 Chiller	5	7	3	3	8	**5.2**
50% B Ammonia Chiller	9	7	8	9	7	**8**
50% C HVAC & BAS Heavy, DCV, VAV	9	9	6	9	9	**8.4**
80% A Solar Thermal, DCV, VAV	4	7	3	3	6	**4.6**
80% B Cold Water Flooding, Lighting+, DCV, VAV	4	7	3	3	5	**4.4**
80% C Solar Thermal, Envelope	4	7	3	3	4	**4.2**

	O+M	Occupant Impact	Impact to Site	Overall Rating	Cost to Implement	Average
100% A High-Temp Ground Source, Envelope+	4	7	2	2	2	**3.4**
100% B Waste Water Heat Recovery, Envelope+	2	7	1	2	1	**2.6**
100% C High-Temp Ground Source, Renewable Energy Credits	4	7	2	3	3	**3.8**

	O+M	Occupant Impact	Impact to Site	Overall Rating	Cost to Implement	Average
50% A CO2 Chiller	5	5	5	5	8	**5.6**
50% B Ammonia Chiller	5	5	5	5	7	**5.4**
50% C HVAC & BAS Heavy, DCV, VAV	10	10	5	10	9	**8.8**
80% A Solar Thermal, DCV, VAV	10	10	5	10	6	**8.2**
80% B Cold Water Flooding, Lighting+, DCV, VAV	5	5	5	5	5	**5**
80% C Solar Thermal, Envelope	10	10	5	10	4	**7.8**

SWOT

	Strength	Weakness
Internal Factors	Describe what this Program achieves - how does it improve the space? Is it better than other programs or the status quo?	Barriers to optimal function or implementation within the City of Brampton.
	Opportunity	**Threat**
External Factors	Favorable external factors that could have a beneficial impact on the Program or the City of Brampton.	Potentially harmful external factors that could be outside of the City's control.

SWOT – Programs 50%

Option 1, 50% Target: This option includes a retrofit of the ice plants with new C02 chillers with a higher heat recovery capacity. *CO2 Chiller*

	Strength	Weakness
Internal Factors	All ECMs are either low payback or supported by requirement for capital contribution Lowest implementation cost Showcase ECM	C02 Chiller - new technology Could be perceived as "business as usual"
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation	Global Adjustment Rate Class Risk Future Legislation

SWOT – Programs 50%

Option 2, 50% Target: This option includes a retrofit of the ice plants, but with ammonia chillers instead of C02. As a result, integration onto a district energy heating system is required to hit the reduction target. *Chiller + District Energy*

	Strength	Weakness
Internal Factors	Overall low implementation cost Low maintenance costs	Lowest carbon impact
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Load conglomeration/economy of scale	Global Adjustment Rate Class Risk Locked into carbon intensive heating Locked into long term contract Future legislation

SWOT – Programs 50%

Option 3, 50% Target: This option considers implementing all those measures with capital projects under consideration (ice plant replacement, BAS upgrades, and replacements of the boilers, air handlers, and heat pumps). *Capital Projects*

	Strength	Weakness
Internal Factors	Significant Renewal of building assets Significant carbon impact beyond target	Could be perceived as business as usual
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation	Global Adjustment Rate Class Risk Future Legislation

SWOT – Programs 80%

Option 4, 80% Target: This option includes a retrofit of the boilers, ice plants, and air handlers, and BAS. *Solar Thermal, DCV, VAV*

	Strength	Weakness
Internal Factors	Significant Renewal of building assets Showcase ECM	Considerable incremental investment beyond 50% targets for modest carbon savings
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Future Legislation	Global Adjustment Rate Class Risk

SWOT – Programs 80%

Option 5, 80% Target: This option includes a retrofit of the boilers, ice plants, and air handlers, and BAS. Additional lighting retrofits add to the carbon savings.

Cold Water Flooding, Lighting+, DCV, VAV

	Strength	Weakness
Internal Factors	More diverse ECM program Significant Renewal of buliding assets Showcase ECM	Considerable incremental investment beyond 50% targets for modest carbon savings
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Future Legislation	Global Adjustment Rate Class Risk

SWOT – Programs 80%

Option 6, 80% Target: This option is similar to option 4, but forgoes retrofits of the air handlers and substitutes a partial recladding of the building envelope.

Solar Thermal, Envelope

	Strength	Weakness
Internal Factors	Significant Renewal of building assets Showcase ECM Most visible, and most carbon savings of 80% target programs	Considerable incremental investment beyond 50% targets for modest carbon savings Least energy savings of 80% target programs
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Future Legislation	Global Adjustment Rate Class Risk

Option 7, 100% Target: This option includes the installation of a ground source heating loop to serve the entirety of the buildings heating needs. Retrofits of the air handlers, BAS, and ice plants are also included. All heating sources including in stand heating and dehumidifiers are decarbonized, as are the arena's ice resurfacers. A significant recladding of the building is also included.

High-Temp Ground Source, Envelope+

	Strength	Weakness
Internal Factors	Most Renewal of buliding assets Showcase ECMs, Renewable Generation Carbon Neutral	Considerable incremental investment beyond 80% targets for modest carbon savings Higher lifecycle costing than 50% or 80% targets
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Future Legislation	Global Adjustment Rate Class Risk

Option 8, 100% Target: This option is similar to option 7, but building heat is generated from a waste water source heat pump tied into a region of Peel sewer trunk north west of the building, in lieu of the ground source system envisioned in option 7. *Waste Water Heat Recovery, Envelope+*

	Strength	Weakness
Internal Factors	Most Renewal of building assets Showcase ECMs +, Renewable Generation Carbon Neutral Potential to act as a district energy host	Considerable incremental investment beyond 80% targets for modest carbon savings Higher lifecycle costing than 50% or 80% targets
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Future Legislation	Global Adjustment Rate Class Risk

Option 9, 100% Target: This option is similar to option 7, but forgoes recladding the building envelope. *High-Temp Ground Source, Renewable Energy Credits*

	Strength	Weakness
Internal Factors	Significant Renewal of building assets Showcase ECMs, Renewable Generation Carbon Neutral, Lowest life cycle cost of carbon neutral options	Considerable incremental investment beyond 80% targets for modest carbon savings Recladding may still be required
	Opportunity	**Threat**
External Factors	ICI Rate Class Participation Future Legislation	Global Adjustment Rate Class Risk

Workshop II - Group I Discussion Notes

Program	Strength	Weakness
General		
1 (CO2 Chiller)		• Fear of new technology (EM) • Unknown risks (BDC) • Lifecycle of piping impacted by the CO2 (BDC) • How to do repairs if leaks (BDC)
2 (District Energy)		• Feasibility study by university is in “pre” stage (BDC)
3 (Capital Projects)	• Cost effective	• Did we do enough?
4 (Low Temp Loop + VAV)	• Flexibility of the boilers (EM)	• Footprint and piping requirements (BDC) • True heat transfer capacity required before implementation
5 (Option 4 + ECMs)	• Flexibility of the boilers (EM)	• Footprint and piping requirements (BDC) • True heat transfer capacity required before implementation
6 (Low Temp Loop + Recladding)	• Flexibility of the boilers (EM)	• Footprint and piping requirements (BDC) • True heat transfer capacity required before implementation
7 (Fully Electrify Ground + Reclad)		• Recladding roof interacting effects with solar panels?
8 (Fully Electrify Waste Water + Reclad)		
9 (Fully Electrify Ground)		

Programs	Opportunity	Threat
General		
1 (CO2 Chiller)		
2 (District Energy)		• Unknown pricing of district energy (EM) • At mercy of the university (EM) • Not currently in operation – would be new client (EM)
3 (Capital Projects)		

4 (Low Temp Loop + VAV)		
5 (Option 4 + ECMs)		
6 (Low Temp Loop + Recladding)		
7 (Fully Electrify Ground + Reclad)		
8 (Fully Electrify Waste Water + Reclad)		
9 (Fully Electrify Ground)		
General		
• Getting to carbon zero with carbon credits is cheaper but does not set a good example of technology options to reach targets and goals		

Workshop II - Group II Discussion Notes

Program	Strength	Weakness
General	• Adaptability of updates	• The report does not outline which ECMs do not work well together. •
1		• 50% Targets are not future ready.
2		• 50% Targets are not future ready. • Most other programs are scalable, this one is limiting because it is more difficult to reduce emissions from a DES.
3		• 50% Targets are not future ready.
4	• 80% low temp loop is a great opportunity to electrify • Future ready now (80&100) • Can provide increased training and skills for operations team.	• A concern over this program is that it may be harder to operate or add more steps to daily routines
5	• 80% low temp loop is a great opportunity to electrify • Future ready now (80&100)	
6	• 80% low temp loop is a great opportunity to electrify • Future ready now (80&100)	
7		• Diminishing returns on carbon reduction (100%)
8		•
9		• If recladding is not pursued then there are concerns that this program will not reach its required targets. There could be a larger makeup required with RECs.

Programs	Opportunity	Threat
General	• Incentive grants for higher tiers • The community accepts the climate emergency declaration. • Planning ahead for legislation rather than playing catch-up with some of the more ambitious retrofit goals. • Advanced planning to know what costs are and getting to market faster with plans. Limited players available to do deep energy retrofit. Being there quickly can allow for cost containment. • Councillors are supportive of sustainable targets at this time. • Savings from electricity based on future weather scenarios.	• Reliance on incentive funding (80&100) • Green funding incentives tend to be “Shovel Ready” so advanced planning is required.
1		
2		• Future legislation could negatively impact the DES incorporation. • The cost ratio of $/CO2 reduction for upper tier programs is high. • Technology could significantly improve over time, which is a risk to early adopters stuck with less efficient systems.
3		
4	• Ground loops can provide training to operators	
5		
6		
7		
8		
9		
General		

- Having a better understanding about the budget available for retrofits would allow participants to make a better judgement call on the acceptance of costs. Environmental Planning and EMG provided informational background on capital developments funding and some availability of funds – 25% of all budget surplus is entered into energy retrofit funds (as informed by Environmental Planning)
- Zero-Over-Time (ZOT) approach would be an ideal component of this report to show how the City of Brampton could scale the ECMs
- 50% targets are not ambitious enough.

Memo

April 12, 2021

Appendix #2 - Information in regards to energy efficiency/zero carbon potential for other City facilities

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This appendix is additional information to inform **the Zero Carbon Retrofit of South Fletcher's Sportsplex** report being considered at the April 14, 2021 Committee of Council meeting.

On March 31, 2021, a motion was passed to consider making the South Fletcher's Sportsplex, the first zero carbon building for the City of Brampton. The request from Committee of Council at that time was to provide information in regards to the energy efficiency/zero carbon potential for other City facilities.

State of Good Repair Facilities and Top GHG Emitters

Chris Gibson

It was not in the scope of work or RFP to make the entire Chris Gibson facility have net zero emissions. The new systems for the building addition will be entirely electric which contributes to less GHG emissions but the existing natural gas system in the old building will remain as it is since it is not in the scope to replace.

Facilities

There are approximately 100 facilities and 30 of these are responsible for 85% of Brampton's emissions[1]. Thus, these 30 were investigated including State of Good Repair (SOGR) projects[2]. These 30 are divided into two categorized lists.

Recreation

Recreation facilities that are top 30 emitters and some of which have upcoming state of good repair projects for 2022 are in the below list and itemized as 1-16. The facilities at the top (1-6) have updates while the ones following (7-16) do not have mechanical or Heating Ventilation and Air conditioning (HVAC) SOGR projects planned for 2022.

1. Loafer's Lake Recreation Centre – construction renovation started and to be completed in 2021
2. Balmoral Recreation Centre – design at 60% with project team
3. Earncliffe Recreation Centre – currently under study for zero carbon

[1] 2018 emission which is most current year based on available emission factors

[2] BDC's proposed preliminary list of Recreation facility SOGR capital projects for the 2022 Capital submission will likely change prior to the final submission.

4. Century Gardens Recreation Centre – HVAC upgrades planned for 2021, under study for zero carbon
5. Jim Archdekin Recreation Centre – mechanical equipment replacement (duct heater, various pumps)
6. Terry Miller Recreation Centre – refrigeration plant compressors and dehumidifiers replacement
7. South Fletcher's Sportsplex – Committee of Council (CoC) report in e-scribe
8. Chinguacousy Park Tennis and Curling
9. Chinguacousy Wellness Centre
10. Chinguacousy Park Greenhouses
11. Gore Meadows Community Centre and Library
12. Cassie Campbell Community Centre
13. Brampton Soccer Centre
14. Senior's Centre – FCCC
15. FCCC Units 1 & 2
16. Kiwanis Youth Hub

Facilities, Operations and Maintenance, Fire, and Transit
The (non-recreation) facilities that are top 30 emitters with some having upcoming SOGR projects for 2022 are shown as 17-29. The facilities at the top 17-19 have updates while the ones following (20-29) do not have mechanical or HVAC SOGR projects planned for 2022.

17. Civic Centre – mechanical and HVAC upgrades
18. POA Courthouse – HVAC upgrades
19. Rose Theatre – RFP development for HVAC upgrades
20. Brampton Transit Yard Sandalwood Facility
21. Brampton Transit Yard Clark Facility
22. Williams Parkway Works Operation Centre
23. City Hall
24. Williams Parkway Administrative Building & Fire Station 203
25. City Hall West Tower
26. Sandalwood Sand & Salt Storage and Garage Building
27. 129 Glidden Rd
28. Animal Shelter
29. A & M Fire Apparatus Building

To complete the Top 30, number 30 is Chris Gibson which is described at the beginning of this Appendix.

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-24

Subject: **Request for Budget Amendment - Barn Reconstruction at Historic Bovaird House**

Contact: **Sean Cressman, Manager, Building Design and Construction, Public Works & Engineering, 647.825.4158 sean.cressman@brampton.ca**

Report Number: Public Works & Engineering-2021-421

Recommendations:

1. That the report from Sean Cressman, Manager, Building Design & Construction, Public Works and Engineering, to the Committee of Council Meeting of April 14, 2021, re: **Request for Budget Amendment - Barn Reconstruction at Historic Bovaird House,** be received; and

2. That a budget amendment be approved and a new capital project be established in the amount of $160,000 for the design and approvals to reconstruct the Robinson Barn at the Historic Bovaird House site, with funding to be transferred from Reserve # 4 Repair and Replacement.

Overview:

- **The Historic Bovaird House is located at 563 Bovaird Drive East and is part of a designated heritage property owned by the City of Brampton and operated by the Friends of Historic Bovaird House (FHBH).**

- **In 2016 the existing Robinson Barn, was dismantled from it's previous location in Caledon, was relocated to the City's Sandalwood Public Works yard, and is currently being stored using sea containers and tarps. The condition of the barn wood is unknown, and there will likely be significant replacement and restoration of materials required.**

- **This report seeks direction for the use of the disassembled barn materials and for the resurrection and restoration of the Robinson Barn at the Historic Bovaird House property.**

- **On March 11th, 2021, staff consulted with the FHBH to investigate the opportunity for the FHBH to undertake restoration of the Robinson Barn. It was determined that it is not an option for the FHBH to undertake the barn restoration.**

- **The FHBH advised that they spent $20,000 to purchase and relocate the barn, and will contribute an additional $20,000 towards reconstruction. This will be incorporated as a funding source for the future construction funding request.**

- **If the project is to proceed, the estimated project cost is $800,000. This estimate is comprised of costs for consulting, additional materials and restoration of materials, construction, project management and contingency costs, as outlined in this report.**

- **COVID-19 remains a large risk for project cost estimates at this time, as labour and materials may be experiencing significant price escalation. The lack of available drawings and unknown condition of materials is also a risk to the estimate. For these reasons, staff is recommending only design funding of approximately 20% ($160,000) be approved at this time, with construction funding to be considered as part of the 2022 budget process after the design is available, the materials have been reviewed, and a more accurate 3rd party estimate can be developed.**

Background:

In 2016 the Friends of Historic Bovaird House (FHBH) acquired the Robinson barn, disassembled and relocated the materials, and stored the materials at the City's Sandalwood Public Works Facility. Barn boards and various materials are being stored in sea cans, and the larger structural members are stored outside under tarps. The condition of the existing materials is unknown to staff, and a consultant's review is required to assess materials and determine what is usable. Engineered drawings of the previous barn are not available.

There are no ongoing costs for the storage of the barn materials. Rodents and the weather pose a risk of deterioration and damage to wood members, particularly the larger members being stored outside. The existing condition of the wood materials is unknown, and there will likely be significant restoration efforts and material replacement required to facilitate reconstruction.

The existing Historic Bovaird House site is a cultural heritage resource located on a designated property. The City owns the Historic Bovaird House facility and property, and conduct maintenance to the site at the City's cost. In 2019 the City completed

construction of an outdoor comfort station on this property, and in 2015 completed construction of a log cabin. If the barn construction project is to proceed, ongoing maintenance costs for this structure would be at the expense of the City.

With the construction of the previous comfort station and log cabin buildings, a careful storm water management review was required with the City and the Region of Peel. Another storm water review exercise is needed if a barn structure is to be built on site. The property does not currently have an off-site storm water connection, this may be a requirement of the Region of Peel for the barn, however it is not known until the storm water review is conducted as part of the barn construction project.

The FHBH operate the facility and site, the group conducts programming and tours. The existing Robinson Barn materials currently in storage are the property of the FHBH.

On April 17, 2019, Council Resolution CW187-2019 was passed, and staff were requested to:

- Provide itemized costs for the City's estimate for the resurrection of the barn on the Historic Bovaird House property; and
- Consult with the Friends of Historic Bovaird House (FHBH) regarding the opportunity to investigate the option of FHBH undertaking restoration of the Robinson Barn.

Current Situation:

Staff are seeking direction from Council on how to proceed for the project to resurrect the Robinson Barn at the Historic Bovaird House property. The project involves the design, approvals, and construction of the barn.

<u>Scope of Work</u>

At this time, accurate drawings and a design of the barn are not available. The current condition of the barn materials in storage is also not known. Based on the March 11th, 2021 conversation with FHBH representatives, the scope of work is understood as outlined below:

- It is believed that all exterior wall cladding and roofing for the barn will need to be new. If there is deterioration or damage to the existing structural members in storage, these may require restoration or need to be new as well.
- There are stone materials in storage as well from the previous barn that would be reincorporated into the new building.
- The future barn is to be an unheated space.
- There will be no washroom or kitchen facilities in the barn.
- The barn is to be one storey.

- The barn will be located to avoid the need for regrading on site.
- The requirements for a sprinkler system are to be reviewed.

Design and construction of the Robinson barn at the Historic Bovaird House site requires the use of a qualified Architect as well as a specialty contractor with experience in the conservation and restoration of heritage buildings. A Heritage Impact Assessment, Heritage Conservation Plan as well as consultation with the Brampton Heritage Board would be required. In addition to these approvals, the project will involve close collaboration with the FHBH.

A type of Site Plan Approval review will be required for this project. In addition, a Building Permit will be required.

A review of the site storm water management is required to construct any additional buildings on the property. A storm water review will be conducted as part of the barn project. It is assumed that there is no major storm water management work required and that a new storm connection to Simmons Boulevard is not required, If the storm water review determines that a new storm line or major site regrading is needed, this will be included in the future construction funding request.

Development Plan

After consultation with the FHBH, it was determined that there is not an opportunity for the FHBH to undertake the barn restoration. Therefore the City of Brampton would need to take on the design and construction costs of the barn rehabilitation.

- **Roles and Responsibilities:** The City would be responsible for hiring a qualified Architect and carrying-out design and approvals, as well as hiring a specialty contractor to conduct restoration and construction of the Barn. The FHBH would be consulted with during the design and site layout process.
- **Estimated Costs to the City:** $800,000 (to be split into separate design and construction funding requests)
- **Timeline:** 14-18 months from the date of design funding approval, weather and permit approval dependent.

Project Costing

A high level project cost is forecasted at $800,000. This is comprised of design, heritage studies, testing, project contingencies, construction, contractor fees, restoration and additional materials, as well as project management overhead. The estimated high-level itemized project costs are as follows:

- Design by qualified Architect, permit, heritage studies & soil testing: $118,000
- Hard cost: construction by specialty Contractor, restoration, fees & additional materials: $558,000
- Project Management (up to 18 months design + construction): $42,000
- Project Contingencies (unknowns and COVID-19 escalation & risks): $68,000
- Non-recoverable tax $14,000

The FHBH advised that they had been in communication with an Architect, who forecasted a cost per square foot of $350-$500 for barn reconstruction. The exact barn measurements are not available, however staff were advised that the barn is approximately 1,100sf, which would have a hard project cost of $550,000 at $500/sf.

Given typical annual non-residential inflation costs and unknowns related to COVID-19 materials and labour inflation, the above forecasted hard cost is roughly in line with the FHBH's consultation with the Architect. There is also reduced estimate accuracy at this time, due to the unknown condition of the existing materials, and a lack of available design drawings.

It is recommended that funding for this project be separated into design and construction funding. This would involve approval of initial design funding of approximately 20% ($160,000), and future construction funding approval for the remaining budget. This allows for design to proceed, and prior to construction funding being requested, a more detailed and accurate cost estimate can be performed. A separate future construction funding request would be more accurate, since a barn design would be available, the condition of wood materials would have been assessed, the storm water management requirements will be known, impacts of COVID-19 escalation would be clearer, and a 3rd party cost estimate could be performed. This request would be made as part of the 2022 budget process.

The FHBH have advised that they will contribute $20,000 towards this project. Pending a funding agreement being established, staff will incorporate this funding source into the construction funding request in the 2022 budget process.

Corporate Implications:

Heritage Implications:

Policy 2.6.1 of the 2020 Provincial Policy Statement directs municipalities to conserve significant built heritage resources and cultural heritage landscapes. Policy 4.10.8.2 of the City of Brampton Official Plan provides direction to the City of Brampton to protect and maintain its city-owned heritage resources to a good standard to set a model for high standard heritage conservation.

Through fundraising initiatives, the Friends of Historic Bovaird House spent time and efforts to salvage and save the Robinson Barn. This barn is estimated to have been

constructed in 1875. Compared to many other historic barns, the Robinson Barn has a size that is relatively smaller, which is suitable to fit within the site of the Bovaird House. Historically, the Bovaird House was functioning as a farmhouse within an agricultural cultural heritage landscape. The relocation and reconstruction of the Robinson Barn within the vicinity of the Bovaird House is historically appropriate because a barn would have been present on the Bovaird property.

Barns are becoming increasingly rare within the Region of Peel and across Southern Ontario. There is an evident decline in the preservation of rural heritage sites, and our early farming heritage is an important part of Peel and Brampton's history. The restoration and incorporation of the Robinson Barn within the property of the Bovaird House is a key opportunity to conserve and celebrate the agricultural past of the region. There is a lack of opportunities to conserve barns in the context of redeveloping large agricultural properties into new subdivisions. Barns are being lost at a faster rate than heritage farmhouses.

Prior to the Second World War, two thirds of all Canadians lived on a farm, but today most children have never had the opportunity to visit and experience an old barn. Brampton has a unique opportunity to include this barn on the Bovaird house property and contribute to the celebration and remembrance of Brampton's rich agriculture. The reconstruction and incorporation of the Barn within the property will complement the site of the Bovaird House for educational and interpretation purposes, and will provide cultural and tourism benefits to the City.

Purchasing Implications:

If Council directs staff to proceed with the project, a public Procurement Process will be conducted and bid submissions shall be evaluated in accordance with the published evaluation process within the bid document. Purchase approval shall be obtained in accordance with the Purchasing By-law.

All communication with Bidders involved in the procurement must occur formally, through the contact person identified in the Bid Document.

Financial Implications:

Subject to Council approval of the recommendation # 2, a budget amendment will be required and a new capital project will need to be established in the amount of $160,000 for the design and approvals stage of the project to reconstruct the Robinson Barn at the Historic Bovaird House site; with funding to be transferred from Reserve # 4 Repair and Replacement, which currently has sufficient funding.

Additional funding for the construction phase, which is currently estimated at $640,000, can be requested for Council's approval after the design is available, the materials have been reviewed, and a more reliable third party estimate can be developed.

Term of Council Priorities:

This report supports the Term of Council Priorities and the 2040 Vision.

Brampton is a Safe & Healthy City: the resurrection of the Robinson Barn on the Historic Bovaird House site strengthens community partnerships through this shared project between the City of Brampton and the Friends of Historic Bovaird House.

Brampton is a Well-Run City: the resurrection of the Robinson Barn on the Historic Bovaird House site reinforces collaboration and advocacy in the community by leveraging the City's relationship with the Friends of Historic Bovaird House in completing this project.

Conclusion:

This report seeks Council direction for the project to reconstruct and restore the Robinson Barn at the Historic Bovaird House site. Existing barn materials are in storage at the City's Sandalwood Public Works Yard, and are the property of the Friends of Historic Bovaird House (FHBH). This report recommends that funding be approved to complete the due diligence and design work. Construction funding is to be requested at a later date after the design is available and unknowns can be resolved.

Authored by:

Sean Cressman, BDC Manager, Public Works and Engineering

Reviewed and Recommended by:

David Bottoni, BDC Director, Public Works and Engineering

Approved by:

Jayne Holmes, Commissioner (Acting), Public Works and Engineering

Submitted by:

David Barrick, Chief Administrative Officer, City of Brampton

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-25

Subject: **Request for Budget Amendment - the City of Brampton-Lorne Scots Military Museum**

Contact: **Sean Cressman, Manager, Building Design and Construction, Public Works & Engineering, 647.825.4158 sean.cressman@brampton.ca**

Report Number: Public Works & Engineering-2021-424

Recommendations:

1. That the report from Sean Cressman, Manager, Building Design & Construction, Public Works and Engineering, to the Committee of Council Meeting of April 14, 2021, re: **Request for Budget Amendment - the City of Brampton-Lorne Scots Military Museum,** be received; and

2. That staff be authorized to negotiate and execute a Memorandum of Understanding and Lease Agreement with the Regimental Association of The Lorne Scots (Peel Dufferin and Halton Regiment), for the use of a portion of 55 Queen Street East as the City of Brampton-Lorne Scots Military Museum, on such other terms and conditions as may be satisfactory to the Commissioners of Community Services and Public Works and Engineering; and

3. That a budget amendment be approved and a new capital project be established in the amount of $250,000 to make modifications to 55 Queen Street East to accommodate a museum tenancy, with funding to be transferred from Reserve # 4 Repair and Replacement to this capital project.

Overview:

- **On September 9th, 2020 there was a delegation on behalf of the Regimental Association of The Lorne Scots (Peel Dufferin and Halton Regiment) regarding a Proposal for a City of Brampton-Lorne Scots Military Museum. The proposal provides for the use of a portion of the 55 Queen Street East facility as a regimental museum.**

- **Staff reviewed the project requirements with Accessibility, Heritage and Building Division stakeholders. Staff also consulted with representatives from the Lorne Scots.**
- **In order for the City to provide a space sufficient for use as a museum, an initial capital project is required. This project would accommodate the required change of use for the building and carry out minor modifications. These changes would include a second emergency exit from the upper floor, as well as minor interior finishes alterations. The initial capital project is estimated to cost $250,000.**
- **This project does not include extensive renovation, electrical alterations, complete finishes replacement or accessible wheelchair access. If these or other significant changes to the scope of work result from MOU negotiations, the project budget will likely require a top-up.**
- **The Regimental Association of The Lorne Scots (Peel Dufferin and Halton Regiment) have proposed that all facility life cycle maintenance costs, security expenses and utility costs would be paid for by the City, with no lease fees paid for by the Lorne Scots.**
- **Fit-up of the space with displays and operation of the museum is to be performed by the Lorne Scots.**
- **The only current tenant of the existing facility is the Brampton Concert Band, the group occupies a portion of the lower floor. The remainder of the building is vacant.**

Background:

The existing 55 Queen Street East facility is part of a designated heritage property owned by the City of Brampton. The building was constructed in 1906 and is a rare example of Beaux Art Style architecture in Brampton.

The building is accessible only by stairs for both the upper and lower level. There is no wheelchair access to the building. The building also only has one exit from the upper floor. The number of exits would need to be increased for use as a museum space. There is also no on-site parking, and due to the tight site constraints there is no space available for the addition of parking stalls.

Currently the only tenant is the Brampton Concert Band. This organization uses a portion of the basement. The remaining basement space and entire upper floor are vacant.

The Lorne Scots Regimental Museum is currently operating in a space nearby at 48 John Street. The group's current location no longer meets their needs and space requirements.

On September 9th, 2020, Council Resolution CW163-2020 was passed, which outlined:

1. That the delegation from Henry F. Verschuren CD, Government and Community Liaison, The Regimental Association of The Lorne Scots (Peel Dufferin and Halton Regiment), to the Committee of Council Meeting of September 9, 2020, re: **Proposal for The City of Brampton-Lorne Scots Military Museum** be received; and
2. That the delegation request be **referred** to staff for consideration and a report back to a future Committee of Council meeting.

Current Situation:

Staff have reviewed the proposed City of Brampton-Lorne Scots Military Museum and liaised with representatives for the Regimental Association of The Lorne Scots (Peel Dufferin and Halton Regiment). Staff have also consulted with stakeholders for Accessibility, Heritage and the Building Division.

The delegation from Henry F. Verschuren CD on September 9th had identified that time is of the essence for this arrangement, as there was a Presentation of Colours Parade and potential Regimental reunion scheduled for the fall of 2021. On March 1st, 2021 staff met with representatives of the Lorne Scots, and were advised that the parade has been cancelled for the fall of 2021 and will be rescheduled.

This report is seeking direction to proceed with the City of Brampton-Lorne Scots Military Museum. If staff are to proceed, a Memorandum of Understanding (MOU) would be required between the City and the Lorne Scots. The MOU would outline the preliminary terms of the Lease Agreement as well as initial project and fit-up responsibilities of the City and the Lorne Scots.

The Lorne Scots have proposed that there would be no ongoing lease fees paid to the City, and the City would continue to conduct life cycle maintenance, operate security and pay utilities. The Lorne Scots have proposed 10 year term for the museum, with options for renewal. Renewal would require agreement from both organizations.

Policy to deal with requests for lease or purchase at less than market value is based on a September 2007 Committee of Council Report. As there would be no lease fee payable, the Lorne Scots would need to provide a note justifying the discount from market rate with a quantifiable analysis of all the other benefits the City would receive from the project (i.e. jobs, local spending, etc.) in return for the discount. The note is to be reviewed by the Economic Development team to determine if their justification is acceptable for the City.

City Capital Project Requirements

The City's scope of work for the initial capital project would include a change of use for the facility to an Assembly occupancy. This change of use requires the addition of a second exit from the upper floor. As part of this project the City would also repair damaged finishes and ensure there is sufficient colour contrast to address visual accessibility needs. A small exterior sign for the museum is to be included in this capital project, the details of the sign are to be reviewed with Heritage staff and the Lorne Scots. Based on the rough scope of work available, the initial capital project is forecasted to cost $250,000. In the event the scope changes significantly during MOU negotiations, the budget may require a top-up.

Lorne Scots Responsibilities

The Regimental Association of the Lorne Scots (Peel Dufferin and Halton Regiment) would be responsible for fit-up of the space. This includes the relocation and setup of museum materials and furnishings. Minor electrical alterations if required, would be the responsibility of the Lorne Scots.

Not Included in the Capital Project

The City's scope of work does not include significant renovations to the space, extensive finishes replacement or electrical work. The intention of this project is to provide a space in a timely manner sufficient for a museum tenancy, with minimal financial costs to be incurred by the City.

The existing building is in close proximity to the property lines, and does not have any dedicated parking spaces. Given the tight site constraints, parking spaces within the property is not feasible. No parking arrangements or construction is included in the project.

Accessible access to the space is not included in this project. It was determined that minor upgrades to provide wheelchair access would have a significant impact on the heritage characteristics of the facility while significantly increasing project costs. The preferred long-term approach for wheelchair access to this facility would include a building addition with a lift or a co-development with the neighbouring 2 Chapel Street facility to provide wheelchair access from the adjacent building. These accessibility solutions could be considered in the future as part of a larger project for the building and surrounding area.

Corporate Implications:

Purchasing Comments:

A public Procurement Process will be conducted and the lowest compliant Bid will be eligible for contract award. Purchase approval shall be obtained in accordance with the Purchasing By-law.

All communication with Bidders involved in the procurement must occur formally, through the contact person identified in the Bid Document.

Financial Implications:

Subject to Council approval of the recommendation, a budget amendment will be required and a new capital project will need to be established in the amount of $250,000 to make minor modifications to 55 Queen Street East to accommodate a museum tenancy; with funding to be transferred from Reserve # 4 Repair and Replacement, which currently has sufficient funding.

Any additional funding required due to changes to scope of work resulting from MOU negotiations will either be outlined in a future report or submitted through the annual budget process for Council's consideration and approval.

The ongoing annual operational costs associated with this arrangement are approximately $55,000.

Realty Implications:

Based on the Council direction, Realty Services will assist with the negotiation and execution of the Memorandum of Understanding/ Lease Agreement.

FOM Implications:

Based on the staff report, there would be no ongoing lease fees paid to the City, and the City would continue to conduct life cycle maintenance for the facility.

Estimated annual operating costs for the whole building are $73,400 ($10.34/sq ft, Rentable area - 7100sq.ft.).

Please note Brampton Concert Band is currently using part of the basement (approximate rentable area 2300sq.ft.). Based on square footage, their portion of the facility equates to operational costs of approximately $23,782 annually, however they are not paying rent or utilities currently.

Based on the remaining area used by Lorne Scot's Museum, annual operating costs for the museum portion of the building are approximately $55,000 annually.

Term of Council Priorities:

This report supports the Term of Council Priorities and the 2040 Vision.

Brampton is a Safe & Healthy City: this project strengthens community partnerships through a shared project between the City of Brampton and the Regimental Association of the Lorne Scots (Peel Dufferin and Halton Regiment).

Brampton is a Well-Run City: this project reinforces collaboration and advocacy in the community by leveraging the City's relationship with the Regimental Association of the Lorne Scots (Peel Dufferin and Halton Regiment).

Conclusion:

This report seeks Council direction to proceed with a City of Brampton-Lorne Scots Military Museum. If staff are authorized to proceed, a Memorandum of Understanding (MOU) and Lease Agreement would be required between the City and the Regimental Association of the Lorne Scots (Peel Dufferin and Halton Regiment). The MOU would outline that the City is to prepare the space for use as a museum, and that the Lorne Scots would be responsible for fit-up of the space. No ongoing lease fees are proposed, and the City would remain responsible for life cycle maintenance, security and utilities. The initial project to provide a space suitable for a museum use is forecasted to cost $250,000. This project includes a change of use to an Assembly occupancy, installation of a second exit from the upper floor and minor finishes alterations.

Authored by:

Sean Cressman, BDC Manager, Public Works and Engineering

Reviewed and Recommended by:

David Bottoni, BDC Director, Public Works and Engineering

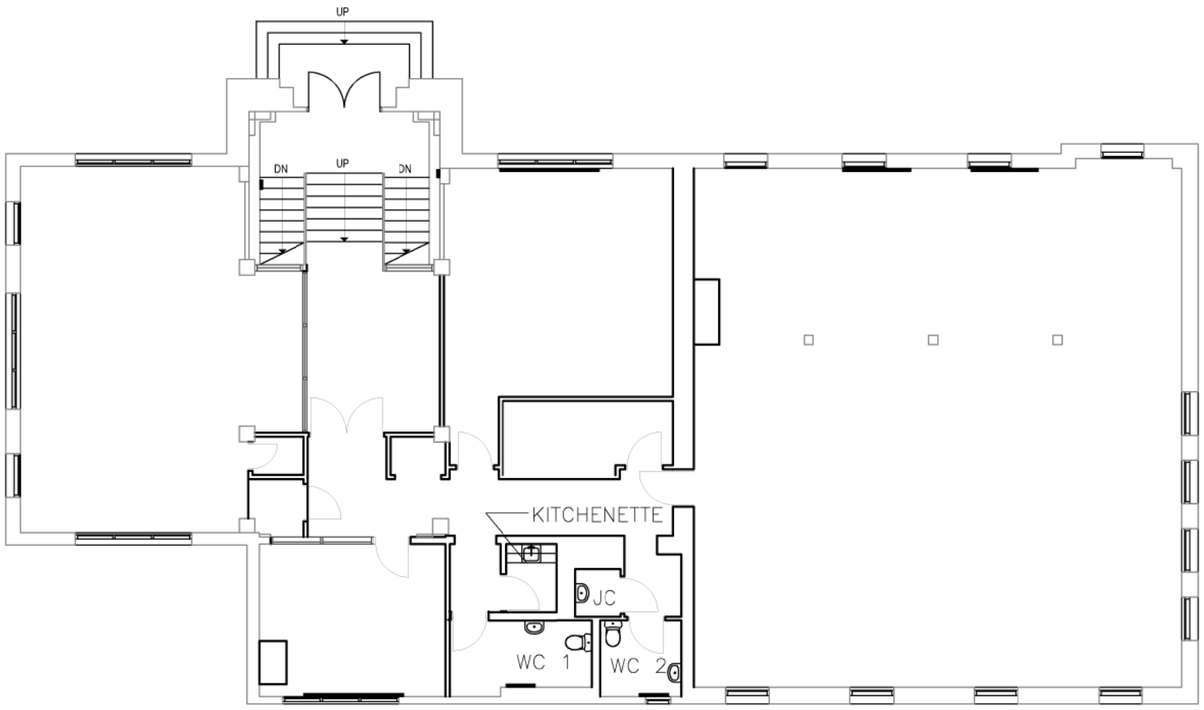
Approved by:

Jayne Holmes, Commissioner (Acting), Public Works and Engineering

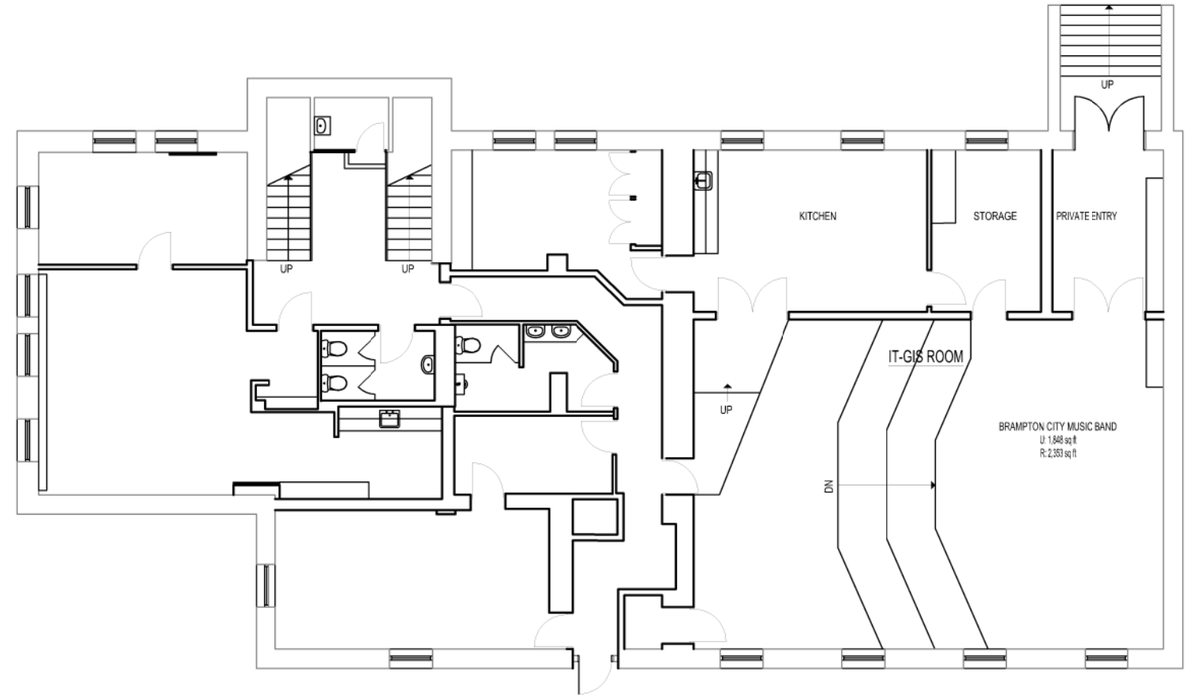
Submitted by:

David Barrick, Chief Administrative Officer, City of Brampton

Attachments: Appendix A – 55 Queen St E - Existing Floor Plans



EXISTING UPPER FLOOR



EXISTING LOWER LEVEL BASEMENT

NOT FOR CONSTRUCTION
ILLUSTRATION IS ARTISTS CONCEPT E.&O.E.

55 QUEEN STREET EAST
EXISTING FLOOR PLANS

Report
Staff Report
The Corporation of the City of Brampton
2021-04-14

Date: 2021-03-10

Subject: **Traffic By-law 93-93 - Administrative Update - File I.AC (TRAF)**

Contact: Binita Poudyal, Traffic Operations Technologist, Road Maintenance, Operations and Fleet, Public Works and Engineering Department, 905-874-2878

Report Number: Public Works & Engineering-2021-338

Recommendations:

1. That the report titled: **Traffic By-law 93-93 - Administrative Update – (R338/2021 - File I.AC TRAF)**, to the Committee of Council meeting of April 14, 2021, be received; and,

2. That Traffic By-law 93-93, as amended, be further amended

Overview:

- **Administrative changes are required to update and/or add new by-law information to the appropriate schedules and consolidated text of the General Traffic By-law 93-93.**

- **The by-law schedules relating to "Rate of Speed" and "Community Safety Zones" are impacted by this administrative update.**

Background:

Administrative changes to Traffic By-law 93-93 are necessary on a regular basis as staff identifies, adds and modifies by-law information to the appropriate schedules of the by-law. This allows Traffic By-law 93-93 to support appropriate changes to the City's road network and subsequent traffic and parking regulations.

Current Situation:

The following amendments to the schedules of Traffic By-law 93-93 are recommended:

Rate of Speed (Schedule X):

A housekeeping amendment is required to the “Rate of Speed” schedule to correct an error related to the limits of the posted speed zone on Fairlawn Boulevard.

Community Safety Zones (Schedule XXIV):

Based on the report to the July 8, 2020 Council meeting titled “Timetable for Automated Speed Enforcement Implementation”, the following roadway sections are recommended to be designated as Community Safety Zones to meet the provincial requirements for implementing Automated Speed Enforcement.

Street Name	**Between**	**Ward**
Ardglen Drive	Centre Street South and Wilton Drive (easterly intersection)	3
Beech Street	Centre Street North and Woodward Avenue	1
Bleasdale Avenue	Bevington Road and Commuter Drive (southerly intersection)	6
Burnt Elm Drive	Van Scott Drive and Fordwich Boulevard	2
Chapparal Drive	Sunny Meadow Boulevard and Sandalwood Parkway East	9
Commuter Drive	Bleasdale Avenue (northerly intersection) and a point 58 metres west of Sidford Road	6
Craig Street	Elliott Street and Mill Street South	3
Earnscliffe Circle	A point 25 metres east of Earnscliffe Gate and Edenridge Drive (southerly intersection)	7
Fairlawn Boulevard	Humberwest Parkway and Ricardo Road	10
Greenbriar Road	Central Park Drive and Grenoble Boulevard	8
Herkley Drive	Scenic Gate and Archdekin Drive	1
Madoc Drive	Rutherford Road North and a point 117 metres north of Archdekin Drive (westerly intersection)	1
Maitland Street	Mansion Street and Majestic Crescent	7
Remembrance Road	A point 95 metres west of Sweetviolet Court/ Divinity Circle and Robert Parkinson Drive	6
Rutherford Road North	Weybridge Trail (westerly intersection) and Stephensen Court	1
Thorndale Road	Cottrelle Boulevard and Eastbrook Way	10
Valleyway Drive	A point 60 metres east of Creditview Road and Williams Parkway	5

Corporate Implications:

Financial Implications:

There is no financial impact resulting from the recommendations in this report.

Strategic Plan:

This report achieves the “Move & Connect” Priority of the Strategic Plan by supporting the “active transportation and cycling strategy” initiative of the plan.

Council Priority – Streets for People

This report incorporates the Vision Zero framework into transportation planning, design and operations to prevent fatal and serious injury from motor vehicle collisions within the City right-of-way.

Conclusion:

The aforementioned administrative updates to Traffic By-law 93-93 are required to support appropriate changes to the City’s road network and subsequent traffic and parking regulations.

Authored by:	Reviewed and Recommended by:
Binita Poudyal Traffic Operations Technologist, Road Maintenance, Operations and Fleet, Public Works and Engineering Department	Michael Parks, C.E.T. Director, Road Maintenance, Operations and Fleet Public Works and Engineering
Approved by:	Submitted by:
Jayne Holmes Acting Commissioner Public Works and Engineering	David Barrick, Chief Administrative Officer

The Regimental Museum of
The Lorne Scots
(Peel, Dufferin and Halton Regiment)

HCol (Ret'd) William A. Adcock OMM CD
Chair

March 31 2021

Committee of Council
The Corporation of the City of Brampton
Via the Office of the City Clerk
Email only

Dear Committee of Council

Re: Staff Report on the Proposal for "The City of Brampton-Lorne Scots Military Museum"

On behalf of the Regimental Museum of the Lorne Scots (Peel, Dufferin and Halton Regiment) I would like to thank City staff for their consultation process with respect to the proposal to create "The City of Brampton-Lorne Scots Military Museum" to be located in the vacant space at the Carnegie Library. More particularly, we thank Jayne Holmes, Acting Commissioner Public Works & Engineering, David Bottoni, Director, Building Design and Construction, and Sean Cressman, Manager, Building Design and Construction. We also thank Gary Collins of the Office of the Mayor for his ongoing advice to our committee.

We have been briefed with respect to the staff report on this proposal to come before you on April 14, 2021. We concur with the report and appreciate the extent in which we were invited to participate in its creation.

If approved by Committee of Council, and later the full Council, this proposal will create a community partnership between the City and the Lorne Scots. In relation to this particular project, this partnership may be new, but it is a manifestation of the ongoing partnership between The City and the Regiment that has existed since before Brampton was incorporated as a village. This new project will celebrate that fact.

2 Chapel Street, Brampton Ontario L6W 2H1

The location of the new museum is also poignant. As you are aware the upper floor of the Carnegie Library has been vacant for many years. We can think of no better location than this Heritage Building to be used as a site to celebrate an important aspect of our history. In the housing of the Brampton Concert Band (another heritage institution of Brampton) and the City of Brampton-Lorne Scots Military Museum on the same premises, this building will become a Heritage destination in this city.

While this project will commemorate the past, it will also celebrate the present and educate future generations. It will be a resource centre for schools and youth groups in the area particularly cadets and other such organizations. It will also serve historians in their research of our archives as to the traditions of this city going back to pre-confederation days.

In celebrating the present, we honour the Mosaic that is Brampton. The Lorne Scots (Peel, Dufferin and Halton Regiment) is one of the most diverse units in Canada and truly representative of this community. Our planned displays will demonstrate this diversity both historically and in the present day. The composition of our Board of Directors for this Museum also reflects our community.

In closing, on behalf of the Regimental Museum of the Lorne Scots (Peel, Dufferin and Halton Regiment) I commend the staff report under your consideration with the certainty that you will look upon it with favor.

Going forward, I am available to you for any communications, and you may also refer to our Government and Community Liaison, Henry F Verschuren CD, whose contact information is a matter of record. Until such time, I remain;

Yours Truly

W Adcock

HCol (Ret'd) William A. Adcock OMM CD
Chair – The Regimental Museum of the Lorne Scots (Peel, Dufferin and Halton Regiment)

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