

# Facility Services Five Year Capital Plan

(A Future Outlook)  
Version 3



Dr. Mohamed Attalla, Assistant Vice President & Chief Facilities Officer  
Robert Craik, Manager, Space Planning and Utilization

March, 2018

## Table of Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>EXECUTIVE SUMMARY .....</b>   | <b>4</b>  |
| <b>2</b> | <b>INTRODUCTION.....</b>   | <b>4</b>  |
| 2.1      | <i>Scope of the Capital Plan.....</i>  | <i>4</i>  |
| 2.2      | <i>What is a Capital Plan?.....</i>  | <i>5</i>  |
| 2.3      | <i>Why Create a Capital Plan?.....</i>   | <i>6</i>  |
| <b>3</b> | <b>BACKGROUND AND THE CURRENT STATE OF CAPITAL INFRASTRUCTURE .....</b>              | <b>7</b>  |
| 3.1      | <i>The First 30 Years in Hamilton.....</i>   | <i>7</i>  |
| 3.2      | <i>Planning and Infrastructure Development History: McMaster 1960 – 2018.....</i>    | <i>7</i>  |
| 3.2.1    | <i>Added Construction and Renovation 1960 –2018 .....</i>                            | <i>7</i>  |
| 3.2.1.1  | <i>The 1960s.....</i>  | <i>7</i>  |
| 3.2.1.2  | <i>The 1970s.....</i>  | <i>8</i>  |
| 3.2.1.3  | <i>The 1980s.....</i>  | <i>9</i>  |
| 3.2.1.4  | <i>The 1990s.....</i>  | <i>10</i> |
| 3.2.1.5  | <i>The 2000s (2000 – 2009).....</i>  | <i>10</i> |
| 3.2.1.6  | <i>The 2010s.....</i>  | <i>14</i> |
| 3.2.2    | <i>Buildings Procured 1960 – 2018.....</i>   | <i>17</i> |
| 3.2.3    | <i>Summary .....</i>   | <i>18</i> |
| 3.3      | <i>Existing Usage, Ownership, and Condition of McMaster’s Physical Assets .....</i>  | <i>19</i> |
| 3.3.1    | <i>Computerized Maintenance Management System .....</i>                              | <i>24</i> |
| 3.4      | <i>Land Assets, Physical Growth Opportunities .....</i>                              | <i>25</i> |
| 3.5      | <i>Accessibility.....</i>  | <i>27</i> |
| 3.5.1    | <i>McMaster University Accessibility Plan 2012-2025 .....</i>                        | <i>27</i> |
| 3.5.2    | <i>Campus Accessibility Action Plan (CAAP) .....</i>                                 | <i>27</i> |
| 3.6      | <i>Building Sustainability and Energy Management .....</i>                           | <i>28</i> |
| 3.6.1    | <i>LEED® .....</i>   | <i>29</i> |
| 3.6.2    | <i>Trends of Energy Consumption .....</i>  | <i>29</i> |
| 3.7      | <i>Environmental Compliance.....</i>   | <i>33</i> |
| <b>4</b> | <b>STRATEGIES GUIDING FUTURE CAPITAL DEVELOPMENT .....</b>                           | <b>34</b> |
| 4.1      | <i>Forward with Integrity (FWI) and Forward with Integrity: The Next Phase .....</i> | <i>34</i> |
| 4.1.1    | <i>Forward with Integrity: The Next Phase.....</i>                                   | <i>36</i> |
| 4.2      | <i>Strategic Mandate Agreement.....</i>  | <i>36</i> |
| 4.3      | <i>Research Priorities.....</i>  | <i>36</i> |
| 4.4      | <i>Westdale Campus Master Plan .....</i>   | <i>37</i> |
| 4.5      | <i>Provincial Growth Plan for the Greater Golden Horseshoe.....</i>                  | <i>38</i> |
| <b>5</b> | <b>PLANNING AND GROWTH ASSUMPTIONS .....</b>   | <b>39</b> |

|           |  |           |
|-----------|--|-----------|
| 5.1       | <i>Enrolment Growth</i> .....  | 39        |
| 5.2       | <i>Research Growth</i> .....   | 40        |
| 5.3       | <i>Technological Development</i> .....                                     | 40        |
| 5.4       | <i>Efficient Space Management</i> .....                                    | 41        |
| 5.5       | <i>Student Residences</i> .....  | 41        |
| 5.5.1     | The Peter George Centre for Living and Learning (PGCLL).....               | 42        |
| 5.6       | <i>Health Sciences Centre (HSC)</i> .....                                  | 42        |
| <b>6</b>  | <b>PROJECTS AND INITIATIVES TO SUPPORT THE CAPITAL PLAN</b> .....          | <b>43</b> |
| 6.1       | <i>Addressing Research, Program, and Enrolment Growth</i> .....            | 43        |
| 6.1.1     | Projections of Growth in Research .....                                    | 43        |
| 6.1.2     | Ongoing / Recently Completed Projects and Initiatives .....                | 43        |
| 6.1.3     | Planned Projects and Initiatives .....                                     | 45        |
| 6.1.3.1   | Major Projects .....   | 45        |
| 6.1.3.2   | Renovations, Upgrades, Maintenance, and Minor Projects .....               | 47        |
| 6.2       | <i>Existing Building Infrastructure Asset Management and Renewal</i> ..... | 47        |
| 6.3       | <i>Energy Management Projects and Sustainability</i> .....                 | 50        |
| 6.4       | <i>Campus Accessibility Action Plan (CAAP)</i> .....                       | 55        |
| 6.5       | <i>Environmental Compliance</i> .....                                      | 55        |
| 6.6       | <i>Holdings and Land Acquisition</i> .....                                 | 55        |
| 6.7       | <i>Design Principles and Standards</i> .....                               | 56        |
| 6.9       | <i>Capital Refresh</i> .....   | 56        |
| <b>7</b>  | <b>FIVE YEAR CAPITAL PLAN and BUDGET</b> .....                             | <b>57</b> |
| 7.1       | <i>Summary of Capital Budget</i> .....                                     | 57        |
| 7.2       | <i>Financing Considerations</i> .....                                      | 58        |
| <b>8</b>  | <b>UPDATING THE CAPITAL PLAN</b> .....                                     | <b>58</b> |
| <b>9</b>  | <b>CONCLUSION AND RECOMMENDATIONS</b> .....                                | <b>59</b> |
| <b>10</b> | <b>APPENDICES</b> .....  | <b>61</b> |
| 11.1      | <i>Capital Budget – Summary (Section 6)</i> .....                          | A-1       |
| 11.2      | <i>Schedule of Facilities</i> .....  | B-1       |

# **1 EXECUTIVE SUMMARY**

This Capital Plan Version 3 is an update of Version 2, published by McMaster University Facility Services in March 2016.

The amount of classroom space on campus is close to 85% of what is needed, by COU standards. Full-Time Student Enrolment, and the subsequent critical demands for space, is increasing. As such, McMaster University needs to identify and take advantage of existing opportunities for physical growth. McMaster needs to seek out off-campus expansion opportunities, and to take advantage of the 3 million square metres of gross floor area available for development on the main campus. It will also be essential to increase efficiencies in planning for the utilization of existing space.

Over its rich history, McMaster has accumulated a wealth of physical assets. The challenge today is to manage this inventory of aging buildings and infrastructure as best suits anticipated needs. To this effect, McMaster University has increased the deferred maintenance funding for the academic portfolio to \$8 million / year, an investment that will maintain control of the top priority deferred maintenance items in the short term.

In addition, McMaster needs to further embrace sustainable construction and energy management practices. Accessibility needs to be increased for compliance with today's standards, including new installations of barrier-free ramps, washrooms, fire alarm strobe lights, water fountains, etc.

Numerous documents and reports have been produced to inform McMaster's efforts. Chief among them are McMaster President and Vice-Chancellor Patrick Deane's 2011 letter, "Forward with Integrity" (FWI), his 2012 letter, "Forward with Integrity: The Emerging Landscape", and the follow up document "Forward with Integrity: Next Phase" issued in October, 2015. These outline the priorities and principles he believes will best help shape the University's development. Also, McMaster has joined the world's health-promoting universities and colleges in signing the Okanagan Charter, dedicated to advancing human and societal health and wellbeing.

## **2 INTRODUCTION**

### **2.1 Scope of the Capital Plan**

McMaster University's Five Year Capital Plan (A Future Outlook) Version 3, 2018-2023, is a planning document that supports the University's strategy Forward with Integrity (2011) and the Strategic Mandate Agreement (2014-17, and 2017-20). The intended purpose of this Capital Plan is to guide the growth of physical assets at McMaster University until the year 2023. The Capital Plan encompasses all buildings under the purview of McMaster, both on and off the main campus. The Campus Plan is a subsidiary document.

The Capital Plan is a board-approved document to guide the University's priority setting and planning of capital projects over a period of time. It is intended to be responsive to the University's strategic vision both at present and in the future. As a result, the Capital Plan is viewed as a dynamic document that is subject to change in order to align itself with the shifting priorities and opportunities of the University. According to the Board approved capital planning process, this plan is updated annually each fall with input from University stakeholders. Additionally, the plan is supported by detailed documents that elaborate on various concepts and initiatives related to infrastructure such as academic and enrolment plans, research priorities, the Campus Master Plan, the Campus Capacity Study, the Asset Management Plan, the Campus Accessibility Action Plan, and the Energy Management Plan. The Capital Plan will integrate and incorporate input from all stakeholders in the University community.

In 2016, the University engaged in a "Capital Refresh", i.e., a statement of information regarding proposed projects, for the Ontario Ministry of Advanced Education and Skills Development (MAESD, formerly MTCU). Input from stakeholders has been gathered and incorporated into this version of the Capital Plan. The Capital Refresh statement touched on then proposed projects such as the Peter George Centre for Living and Learning (PGCLL), and the Centre for Emerging Devices at MIP, but also included more detail on those proposals for which provincial funding was being requested: L.R. Wilson Hall Phase 2 – Arts Quad Renovation, and the STEM Academic Building.

## **2.2 What is a Capital Plan?**

The Capital Plan represents McMaster University's existing approved priorities and a number of additional projects (funded, partially funded, or unfunded) for capital investment over the designated planning cycle (five years). It will set forth a framework to guide the growth of physical assets such as buildings and land, and infrastructure. The Information Technology (IT) plan, Vision 2020, which sets the strategy for information systems, is a separate document.

The Capital Plan provides an overview of the capital needs, issues, and projects in various stages of development. Additionally the plan summarizes the status of current and planned capital activities that are directly related to various planning processes. Furthermore, the Capital Plan encompasses other capital projects' activities related to the current condition of the University's building infrastructure, energy management capital projects and building accessibility capital investments. Table 1 illustrates the relationship of the Capital Plan within the hierarchy of key capital plans and other documents prepared for the University.

| Level of Planning/Reporting  | Key Capital Plans and Reports at McMaster University          | Audience                        | Review        |
|--|---|---------------------------------|---------------|
| <b>Strategic:</b> University's overall philosophy and approach to managing capital; highest level of planning; fundamental decisions and actions directed to achieving institutional goals | <b>McMaster Capital Plan</b>                                  | <b>Public</b>                   | <b>Annual</b> |
|  | Campus Master Plan  | Public                          | Every 5 years |
|  | Asset Management Plan   | Public                          | Annual        |
|  | Energy Management Plan  | Public                          | Annual        |
|  | Campus Accessibility Action Plan                              | Public                          | Annual        |
|  | Campus Capacity Study   | Public                          | 2011          |
|  | Debt Management Policy  | Public                          | 2016          |
|  | Debt Strategy Report  | Planning and Resource Committee | Annual        |
|  | Multi-Year Projections (includes Capital and Strategic Plans) | Planning and Resource Committee | Annual        |
|  | Annual Consolidated Budget (includes Capital Fund)            | Public                          | Annual        |
| <b>Portfolio Governance:</b><br>Updates/funding status of capital projects for Board; delineate McMaster's management, oversight and monitor capital projects approved/under construction  | Annual Capital Plan   | Public                          | Annual        |
|  | Major Capital Project Status Report                           | Planning and Resource Committee | Quarterly     |
|  | Capital Funding and Expenditure Report                        | Planning and Resource Committee | Every meeting |
| <b>Project Management:</b><br>Identify strategic and specific capital requirements along with plans and strategies intended to resolve the most urgent and highest priority needs          | Key Technical/Management Documents (Asset Reports)            |                                 |               |
|  | Asset Management Plan   | Public                          | Annual        |
|  | Major Projects Progress Report                                | Public                          | Monthly       |

**Table 1**

The Capital Plan includes the following sections:

- Section 1, Executive Summary
- Section 2, Introduction
- Section 3, Background and the Current State of Capital Infrastructure
- Section 4, Strategies Guiding Future Capital Development
- Section 5, Planning and Growth Assumptions
- Section 6, Projects and Initiatives to Support the Capital Plan
- Section 7, Five Year Capital Plan and Budget
- Section 8, Updating the Capital Plan
- Section 9, Conclusion and Recommendations
- Section 10, Appendices

## 2.3 Why Create a Capital Plan?

The Capital Plan provides strategic guidance and direction for long-range capital development needs. As a post-secondary institution, McMaster is subject to ongoing demand for changes to its physical, structural, and economic landscapes. To this end, the Capital Plan identifies capital funding needs and issues, summarizes current actions and

capital projects, and outlines potential funding solutions and strategies. This may include a combination of internal and external financing, and informs decision-making at McMaster that is tied closely to the various planning processes and informs priority setting and the annual consolidated budget. The Capital Plan achieves all of these objectives in an effort to promote a synoptic system of capital related resource allocation at McMaster. It is not however intended to deny opportunity; rather it provides a contrast against which to consider opportunities.

### **3 BACKGROUND AND THE CURRENT STATE OF CAPITAL INFRASTRUCTURE**

#### **3.1 The First 30 Years in Hamilton**

In 1930, the University moved from Toronto to Hamilton, the forty-first academic session opening on the present site. The University's lands and new buildings were secured through gifts from graduates, members of the churches of the Baptist Convention of Ontario and Quebec, and citizens of Hamilton.

#### **3.2 Planning and Infrastructure Development History: McMaster 1960 – 2018**

##### **3.2.1 Added Construction and Renovation 1960 –2018**

It is worth mentioning one project that was built in the years just prior to the busy 1960's construction period. On April 10, 1959, a ceremony was held to officially open the McMaster Nuclear Reactor (MNR), the first university-based nuclear reactor in the British Commonwealth.

More than 50 years later, MNR continues to operate five days per week, providing an invaluable source of neutrons for research scientists, performing service irradiations for a number of industries, and generating medical isotopes for cancer therapy.

##### **3.2.1.1 The 1960s**

Between 1960 and 1970, the full-time undergraduate student population at McMaster increased from approximately 1,417 to 6,540 for a total increase of 5,123 students, or 362%. During this period, McMaster constructed fifteen new buildings on campus. Among these buildings were four residence buildings, a biology greenhouse, and various lab, classroom, and administration buildings. During this decade, McMaster added 1,159,250 gross square feet to its infrastructure.

In addition to new construction, McMaster also invested capital resources in renovation/addition projects for existing infrastructure in the 1960s. These renovations and additions were centered on four specific buildings: Mills Memorial Library, Charles E Burke Science Building (BSB), ET Clarke Centre, and the Commons Building. Mills Memorial



Library, Charles E Burke Science Building (BSB) and the ET Clarke Centre were all approximately 10 years old at the time of their renovations/additions, and at least two separate renovation/addition projects were completed for each building during the 10-year period. Approximately 272,620 gross square feet of space was added to the existing infrastructure through the renovations. Table 2 shows a complete list of new construction and renovations/additions completed during the 1960s.

| Building                                | Construction Date/Renovation Date | Gross Area (Square Feet) |
|---|-----------------------------------|--------------------------|
| <b>New Construction</b>                 |                                   |                          |
| General Science Building                | 1962                              | 59,583                   |
| Chester New Hall                        | 1964                              | 87,870                   |
| Ivor Wynne Centre                       | 1964                              | 154,374                  |
| Mathews Hall                            | 1964                              | 61,808                   |
| McKay Hall                              | 1964                              | 66,824                   |
| Commons Building                        | 1965                              | 33,879                   |
| Togo Salmon Hall                        | 1965                              | 136,222                  |
| Tandem Accelerator                      | 1966                              | 25,305                   |
| Biology Greenhouse                      | 1967                              | 8,378                    |
| Applied Dynamics Lab                    | 1967                              | 21,480                   |
| Preliminary Lab                         | 1967                              | 23,067                   |
| Campus Services Building                | 1968                              | 51,936                   |
| AN Bourns Science Building              | 1968                              | 245,828                  |
| Woodstock Hall                          | 1968                              | 64,341                   |
| Brandon Hall                            | 1968                              | 118,355                  |
| <b>Total New Construction</b>           |                                   | <b>1,159,250</b>         |
| <b>Renovation/Addition</b>              |                                   |                          |
| Charles E. Burke Science Building (BSB) | 1961                              | 20,833                   |
|   | 1963                              | 22,419                   |
|   | 1969                              | 44,876                   |
| Mills Memorial Library                  | 1962                              | 36,492                   |
|   | 1969                              | 76,008                   |
| E.T. Clarke Centre                      | 1965                              | 5,200                    |
|   | 1968                              | 44,223                   |
| Commons Building                        | 1968                              | 22,570                   |
| <b>Total Renovation/Addition</b>        |                                   | <b>272,620</b>           |

**Table 2: New Construction and Renovated Buildings on Campus during the 1960s**

### 3.2.1.2 The 1970s

In the 1970s, the full-time undergraduate student population at McMaster increased from approximately 6,540 to 8,611 for a total increase of 2,071 students, or 32%. During this period, McMaster's infrastructure growth through new build construction decreased compared to the previous decade. Between 1970 and 1980, McMaster constructed only six new buildings on campus. These buildings included one residence, one library, and the hospital (Health Sciences Centre). Including the hospital, McMaster added 1,849,242 gross square feet of infrastructure to the campus in the 1970s; excluding the hospital, 576,220 gross square feet were added.

Renovation/addition projects were also scarce at McMaster between 1970 and 1980. Only one addition was completed during this time: a 54,148 gross square foot addition to the Ivor Wynne Centre recreational facility. Table 3 shows a complete list of new construction



and renovations/additions completed during the 1970s, including McMaster's largest and most distinct building, the Health Sciences Centre. It was designed by architect Eberhard Zeidler's firm, then called Craig, Zeidler and Strong, in the Structuralist style.

| Building  | Construction Date/Renovation Date | Gross Area (Square Feet) |
|---|-----------------------------------|--------------------------|
| <b>New Construction</b>   |                                   |                          |
| Psychology Building   | 1970                              | 90,528                   |
| Health Science Centre   | 1970                              | 1,273,022                |
| Life Sciences Building  | 1970                              | 106,852                  |
| Kenneth Taylor Hall   | 1971                              | 126,991                  |
| Bates Residence   | 1972                              | 164,055                  |
| H.G. Thode Library  | 1976                              | 87,794                   |
| <b>Total New Construction (including Health Science Centre)</b> |                                   | <b>1,849,242</b>         |
| <b>Total New Construction (excluding Health Science Centre)</b> |                                   | <b>576,220</b>           |
| <b>Renovation/Addition</b>                                      |                                   |                          |
| Ivor Wynne Centre   | 1972                              | 54,148                   |
| <b>Total Renovation/Addition</b>                                |                                   | <b>54,148</b>            |

**Table 3: New Construction and Renovated Buildings on Campus during the 1970s**

### 3.2.1.3 The 1980s

In the 1980s, the full-time undergraduate student population at McMaster increased from approximately 8,611 to 10,900 for a total increase of 2,289 students, or 27%.

Continuing the trend seen in the 1970s, McMaster's infrastructure growth via new build construction continued to decrease throughout the 1980s. During this time, three new buildings were constructed on campus grossing a total added area of 126,164 gross square feet. The new buildings consisted of a residence and two classroom/lab space buildings.

Renovation and addition projects were completed on one building during this ten-year period adding roughly 10,186 square feet of gross area. The Communications Research Lab was only 6 years old at the time of its renovation. Table 4 shows a complete list of new construction and renovations/additions completed during the 1980s.

| Building                         | Construction Date/Renovation Date | Gross Area (Square Feet) |
|----------------------------------|-----------------------------------|--------------------------|
| <b>New Construction</b>          |                                   |                          |
| Communications Research Lab      | 1983                              | 19,773                   |
| Hedden Hall                      | 1989                              | 104,279                  |
| Scourge Building                 | 1989                              | 2,112                    |
| <b>Total New Construction</b>    |                                   | <b>126,164</b>           |
| <b>Renovation/Addition</b>       |                                   |                          |
| Communications Research Lab      | 1989                              | 10,186                   |
| <b>Total Renovation/Addition</b> |                                   | <b>10,186</b>            |

**Table 4: New Construction and Renovated Buildings on Campus during the 1980s**

Further to this, McMaster acquired the Multi-Use Building at 1276 Sandhill Drive, Ancaster, in 1983 (then sold it in 2016). This provided an additional 13,820 gross square feet at the time

### 3.2.1.4 The 1990s

The 1990's saw the least amount of new building projects in McMaster's 50-year history. The DeGroote School of Business was the only building constructed between 1990 and 2000. This building added a gross area of 54,645 square feet to the existing campus infrastructure.

On the other hand, the renovations and additions that were completed on existing buildings during the 1990s added the largest amount of infrastructure to the campus since the renovations completed in the 1960s. Approximately 146,458 gross square feet was added to the campus through the renovation of three buildings: Mills Memorial Library (which was 40 years old at the time of renovation), J. Hodgins Engineering Building, and the DeGroote School of Business (which had been built nine years prior to its renovation). Table 5 shows a complete list of new construction and renovations/additions completed during the 1990s.

| Building                         | Construction Date/Renovation Date | Gross Area (Square Feet) |
|----------------------------------|-----------------------------------|--------------------------|
| <b>New Construction</b>          |                                   |                          |
| DeGroote School of Business      | 1990                              | 54,645                   |
| <b>Total New Construction</b>    |                                   | <b>54,645</b>            |
| <b>Renovation/Addition</b>       |                                   |                          |
| Mills Memorial Library           | 1990                              | 83,899                   |
| J. Hodgins Engineering Building  | 1992                              | 57,883                   |
| DeGroote School of Business      | 1999                              | 4,676                    |
| <b>Total Renovation/Addition</b> |                                   | <b>146,458</b>           |

**Table 5: New Construction and Renovated Buildings on Campus during the 1990s**

### 3.2.1.5 The 2000s (2000 – 2009)

During the 2000s, McMaster has experienced unprecedented infrastructure growth. The growth has been centralized on the main campus; however, there has also been new construction of remote campuses. A total of 11 buildings were constructed on campus during this decade. These buildings added two residences, a new recreational facility, and a stadium complex to the existing infrastructure as well as additional lab, classroom and office space buildings. In total, 1,211,683 gross square feet of infrastructure was added.

McMaster University acquired the 37-acre Camco property on Longwood Road in January 2005, for the purposes of developing a facility for the commercialization of research, the McMaster Innovation Park (MIP).

McMaster completed many renovation/addition projects during the 2000s simultaneously to new build construction projects. A total of 15 existing buildings on the main campus received renovations/additions to update and add usable space. Half of the buildings that received renovations/additions were at least 40 years old at the time of the projects. Other buildings were between 35 and 40 years old at the time of their renovations. The renovations/additions that were completed during the 2000s updated or added to the existing campus infrastructure 531,014 gross square feet.

Table 6 shows a complete list of new construction and renovations/additions completed during the 2000s.

| Building  | Construction Date/Renovation Date | Gross Area (Square Feet) |
|---|-----------------------------------|--------------------------|
| <b>New Construction</b>                               |                                   |                          |
| Mohawk-McMaster Institute for Applied Health Sciences | 2000                              | 179,672                  |
| Dramatic Arts Workshop                                | 2000                              | 1,678                    |
| Mary E. Keyes Residence                               | 2002                              | 146,195                  |
| McMaster University Student Centre                    | 2002                              | 145,430                  |
| T28 Temporary Lecture Theatre                         | 2002                              | 5,077                    |
| T29 Temporary Lecture Theatre                         | 2003                              | 6,068                    |
| Michael G. DeGroote Centre for Learning and Discovery | 2004                              | 298,526                  |
| Les Prince Hall                                       | 2006                              | 106,016                  |
| David Braley Athletic Centre                          | 2007                              | 140,479                  |
| Ron Joyce Stadium                                     | 2008                              | 56,942                   |
| Engineering Technology Building                       | 2009                              | 125,600                  |
| <b>Total New Construction</b>                         |                                   | <b>1,211,683</b>         |
| <b>Renovation/Addition</b>                            |                                   |                          |
| Togo Salmon Hall                                      | 2000                              | 4,242                    |
| Nuclear Research Building                             | 2001                              | 10,635                   |
| DeGroote School of Business                           | 2001                              | 15,102                   |
| Information Technology Building                       | 2001                              | 81,805                   |
| J. Hodgins Engineering Building                       | 2001                              | 15,233                   |
| E.T. Clarke Centre                                    | 2002                              | 4,084                    |
| Tandem Accelerator                                    | 2002                              | 8,513                    |
| Psychology Building                                   | 2002                              | 42,399                   |
| Hamilton Hall   | 2003                              | 51,866                   |
| A.N. Bourns Science Building                          | 2003                              | 30,715                   |
|   | 2006                              | 8,709                    |
| Alumni Memorial Hall                                  | 2003                              | 6,613                    |
| Michael G. Degroote Centre for Learning and Discovery | 2005                              | 5,599                    |
| Charles E. Burke Science Building (BSB)               | 2005                              | 196,401                  |
| McMaster University Medical Centre                    | 2005                              | 49,098                   |
| <b>Total Renovation/Addition</b>                      |                                   | <b>531,014</b>           |

**Table 6: New Construction and Renovated Buildings on Campus, 2000 - 2009**

## Details of 2000-2009 Projects

### New Construction

- Mohawk-McMaster Institute for Applied Health Sciences
  - Built in 2000, this 179,672 gross square foot facility is a joint initiative with the Faculty of Health Sciences and Human Services at Mohawk College. The Institute houses the School of Rehabilitation Science with graduate programs in occupational therapy, rehabilitation and physiotherapy, along with Mohawk students involved in the McMaster-Mohawk-Conestoga BScN Program.
- Dramatic Arts Workshop
  - Built in 2000, this is a 1,678 gross square foot, one-storey building. This building was also known as T18 or TB18, and was demolished in 2016 to make room for the Peter George Centre for Living and Learning.
- Mary E. Keyes Residence
  - Built in 2002, this residence is McMaster's only "suite" style building on campus. This seven-storey building has 146,195 gross square feet for 280 students. A Tim Hortons, convenience store, and "East Meets West Bistro" are located on the main floor.

- McMaster University Student Centre
  - Built in 2002, this 145,430 gross square foot building connects to two existing buildings and houses new student services and associated offices, full food court, servery and kitchen/banquet facilities, games room, bar and restaurant, meeting/seminar rooms, and lounges with atriums.
- T28 and T29: Temporary Lecture Theatres
  - Built in 2002 and 2003, these are 5,077 and 6,068 gross square foot (respectively) one storey buildings. These were both demolished in 2016 to make room for the Peter George Centre for Living and Learning.
- Michael G. DeGroote Centre for Learning and Discovery (MDCL)
  - Built in 2004, the 298,526 gross square foot, five-storey building is an expansion to the north side of the McMaster University Medical Centre. The new facility provides much needed space for teaching, learning, and research.
- Les Prince Hall
  - Built in 2006, Les Prince Hall is McMaster's newest residence. This new \$24 million, six-storey, LEED® Certified building has 106,016 gross square feet for 390 beds in single and double rooms. Residents share common rooms on each floor.
- David Braley Athletic Centre
  - Built in 2007, the 140,479 gross square foot, two-storey, LEED® certified facility was built with the help of a \$5 million donation from David Braley. The Centre includes recreational gymnasium space, an indoor track, squash courts and a sports medicine and rehabilitation clinic.
- Ron Joyce Stadium
  - Built in 2008, this 56,941 gross square foot, two-storey facility was built with the help of a \$10 million donation from Ron Joyce. The stadium includes seating for 6,000, a large press box, a sports medicine clinic, dressing rooms, multi-purpose rooms, and parking for 335 under the adjacent Les Prince Field, a CFL/FIFA regulation sized pitch.
- Engineering Technology Building
  - Built in 2009, this 125,600 square foot, five-storey, state of the art, LEED® Gold certified facility supports the Faculty of Engineering's expansion into emerging areas of research and study. Multiple uses are facilitated here including nanotechnology research and Mohawk College studies. The building also features two indoor garden spaces.

## Renovations/Additions

- Togo Salmon Hall
  - Built in 2000, this 4,242 gross square foot, one-storey addition includes a computer lab on top of the existing second storey level roof.
- Nuclear Research Building (NRB) Additions
  - The 2001 south addition consists of 10,635 gross square feet over three occupiable storeys, and includes a reception area, offices, and an addition to the pedestrian bridge.

- DeGroote School of Business
  - Built in 2001, this 15,102 gross square foot, three-storey addition includes classrooms and offices, for the purposes of e-commerce/stock trading education.
- Information Technology Building
  - In 2001, this existing 81,805 gross square foot high school was renovated for the purposes of university education, including the conversion of the auditorium into a lecture hall, and the gymnasium into offices.
- J. Hodgins Engineering Building
  - Built in 2001, this 15,233 gross square foot, four-storey addition to the south-west court of this building includes a machine shop, offices, classrooms, meeting rooms, and a mechanical penthouse.
- E. T. Clarke Centre
  - Built in 2002, this 4,084 gross square foot equipment room was added.
- Tandem Accelerator
  - Built in 2002, this 8,513 gross square foot addition includes a lab, washrooms, an elevator and a new entry on the building's west side.
- Psychology Building
  - In 2002, 42,399 gross square feet of this building were extensively renovated to accommodate animal and human research.
- Hamilton Hall
  - In 2003, the interior of this 51,866 gross square foot, historic 1929 building was renovated for use as the innovative James Stewart Centre for Mathematics. KPMB were the architects of this \$8.5 million, multiple-award-winning contemporary design.
- A. N. Bourns Science Building
  - In 2003, 30,715 gross square feet were added to this building, including labs and offices. In 2006, a new microscopy lab was added to the basement level. This renovation/addition project totaled 8,709 gross square feet.
- Alumni Memorial Hall
  - Completed in 2003, this 6,613 gross square foot, addition and renovation project included a new elevator.
- Charles E. Burke Science Building (BSB)
  - In 2005, the interior of this 196,401 gross square foot building was entirely renovated and updated in a LEED® Silver project.
- Michael G. DeGroote Centre for Learning and Discovery (MDCL)
  - Built in 2005, this 5,599 gross square foot, three-storey landmark glass-enclosed atrium space, designed by NORR Architects, was added to the north-west corner of the existing school.
- McMaster University Medical Centre
  - In 2005, the existing Health Science Library was modified in a 49,098 square foot addition and renovation project, which included a new reading pavilion on the north-west corner of the existing hospital.

## Other

- **Atrium@MIP**
  - The Renovation and upgrade of this factory building at 175 Longwood Road South was completed in late 2009. At the cost of \$22 million, the 180,000 square foot, four-level building houses office, laboratory and conference spaces. The building was retrofitted to create a multi-tenant environment. MIP offers leasing opportunities to industries in support of research and development in areas in which McMaster has recognized research strength.

### 3.2.1.6 The 2010s

Table 7 shows a list of new construction and major renovations/additions completed on and off campus during the 2010s so far.

| Building   | Construction Date/Renovation Date | Gross Area (Square Feet) |
|--|-----------------------------------|--------------------------|
| <b>New Construction</b>  |                                   |                          |
| T-32 (Temporary Portables Offices)   | 2013                              | 6,031                    |
| T-33 (McMaster Children Centre)  | 2013                              | 7,805                    |
| L.R Wilson Hall  | 2016                              | 177,927                  |
| <b>Total New Construction (on campus)</b>  |                                   | <b>191,763</b>           |
| <b>Renovation/Addition</b>   |                                   |                          |
| Ivor Wynne Centre  |                                   |                          |
| - Centre for Spinal Cord Research and Rehabilitation                                 | 2012                              | 20,010                   |
| Psychology Building  |                                   |                          |
| - McMaster Institute for Music and the Mind  | 2013                              | 12,163                   |
| Dr. Robert and Andrée Rhéaume Fitzhenry Studios and Atrium                           |                                   |                          |
| - Exterior addition at Togo Salmon Hall  | 2015                              | 1,700                    |
| - Interior renovation at Togo Salmon Hall  | 2015                              | 5,576                    |
| McMaster University Student Centre   |                                   |                          |
| - Lobby Expansion  | 2016                              | 1,401                    |
| John Hodgins Engineering Building  |                                   |                          |
| - Main Lobby Expansion   | 2016                              | 2,002                    |
| - Hatch Centre Addition  | 2017                              | 28,007                   |
| Nuclear Research Building  |                                   |                          |
| - North-West Addition  | 2011                              | 23,605                   |
| - Small Angle Neutron Scattering Facility  | 2017                              | 3,810                    |
| Michael G. Degroote Centre for Learning and Discovery                                |                                   |                          |
| - Side Entrance Vestibule Addition   | 2017                              | 241                      |
| <b>Total Renovation/Addition (on campus)</b>   |                                   | <b>98,515</b>            |
| <b>Off Campus</b>  |                                   |                          |
| Ron Joyce Centre - Burlington  | 2010                              | 110,455                  |
| CANMET Materials Technology Laboratory - MIP   | 2010                              | 145,000                  |
| St. Paul's Anglican Church – Leased Space  | 2013                              | 5,685                    |
| McMaster University Automotive Resource Centre (MARC) including B.Tech fit-out - MIP | 2013                              | 85,000                   |
| Halton McMaster Family Health Centre – Burlington                                    | 2014                              | 10,647                   |
| One James North – Downtown Hamilton – Leased Space                                   | 2015                              | 55,186                   |
| David Braley Health Sciences Centre – Downtown Hamilton                              | 2015                              | 192,081                  |
| Canadian Martyrs – Licensed Space  | 2016                              | 4,465                    |
| <b>Total Off Campus</b>  |                                   | <b>608,519</b>           |

**Table 7: New Construction and Renovated Buildings on and off Campus during the 2010s**

## New Construction

- **L.R Wilson Hall**
  - McMaster completed construction on L. R. Wilson Hall in 2016, a Social Sciences and Humanities facility of approximately 177,927 gross square

feet for active learning classrooms, labs, community outreach spaces, research areas, and includes a new 350-seat concert hall. It is intended that this facility will attain LEED® Gold certification.

## Renovations/Additions

- Ivor Wynne Centre
  - Built in 2012, the Centre for Spinal Cord Research and Rehabilitation is a \$20 million, 20,010 gross square foot, three-storey, LEED® Silver addition to the existing IWC. It was built with the help of a \$16.5 million investment from the federal and provincial governments. The new space includes labs, rehabilitation facilities, offices, and a 72-seat lecture theatre.
- Psychology Building
  - In 2013 the McMaster Institute for Music and the Mind, a 12,163 gross square foot, second-storey addition to the psychology building, was completed. McCallum Sather Architects designed this addition.
- Dr. Robert and Andrée Rhéaume Fitzhenry Studios and Atrium
  - The School of Art at Togo Salmon Hall received a \$3 million donation from alumni Dr. Robert Fitzhenry for the renovation of existing space, as well as the addition of new space, named the Dr. Robert and Andrée Rhéaume Fitzhenry Studios and Atrium. The new addition increased art studio capacity to accommodate more students, and functions as an art gallery and event space. The interior renovation integrates the interior space with the new addition.
- McMaster University Student Centre
  - The McMaster University Student Centre lobby renovation and expansion was completed in 2016. This provided 1,401 gross square feet of additional usable floor area including lounge seating in front of Starbucks. Another part of the project was to improve pedestrian traffic flow around the food court seating area.
- John Hodgins Engineering Building
  - Expansion of the main entrance lobby at the JHE building in 2016 added 2,002 gross square feet of seating and common area.
  - The Gerald Hatch Centre for Engineering Experiential Learning was completed in 2017 at an estimated cost of \$11 million. This facility consists of 28,007 gross square feet added to the south of JHE. The Hatch Centre will serve as a living laboratory for researching and applying sustainable building technologies as well as being a student centre for experiential learning. The Centre will house student clubs and societies, collaborative workspace and show space for design teams, study space, and space for extracurricular experiential learning activities.
- Nuclear Research Building (NRB) Additions
  - The 2011 LEED® Gold north-west addition consists of 23,605 gross square feet over three occupiable storeys: the first and second floors house laboratories for several different groups of researchers and their staff. The third floor includes offices for the same research groups.



- An addition was completed in late 2017. The Small Angle Neutron Scattering facility has 3,810 gross square feet of lab space that will be used to conduct experiments in nuclear physics.
- Michael G. Degroote Centre for Learning and Discovery  
A new exterior side entry vestibule was added at the ground level in 2017.

#### Off Campus / Other

- Ron Joyce Centre - Burlington
  - Built in 2010 as a remote campus, this 110,455 gross square foot, four-storey, LEED® Gold certified building is home to the DeGroote School of Business' MBA and executive education programs. The facility is built in, and in partnership with, the neighbouring city of Burlington; and accommodates 700-800 students.
  - In 2016, level four was fit out. This development provides additional teaching, faculty spaces, meeting rooms, and a research centre.
- CANMET Materials Technology Laboratory
  - Built in 2010 at MIP, this 145,000 gross square foot, LEED® Platinum, \$40 million complex includes facilities for casting, rolling and forming metal, and designing and testing new materials. Diamond and Schmitt Architects designed this award-winning building.
- St. Paul's Anglican Church – Leased Space
  - In 2013, McMaster University leased 5,685 gross square feet of space in St. Paul's Anglican Church located at 1140 King Street, West, Hamilton for administrative purposes.
- McMaster University Automotive Resource Centre (MARC)
  - In 2013, MARC took occupancy of approximately 85,000 gross square feet of renovated space within a former warehouse at McMaster Innovation Park. That same year, 12,422 gross square feet of that space was fit out as a separate project to accommodate the Bachelor of Technology (B.Tech) learning space. MARC, including B.Tech, is comprised of labs, offices, and common areas; in support of new development, prototyping, and large-scale product trials in order to market newly developed “green” automotive technology for mass production. This project will foster new University-industry partnerships and train hundreds of students for industry.
- Halton McMaster Family Health Centre - Burlington
  - The Family Medicine Clinic located in the new Halton McMaster Family Health Centre building in Burlington, opened in 2014. This joint venture between McMaster University and Joseph Brant Hospital is part of the Joseph Brant Hospital Phase 1 redevelopment project. This building is LEED® Gold and the Family Medicine Clinic contributed 10,647 gross square feet of space to the project.
- One James North – Leased Space
  - The programs and occupancies in the old Downtown Centre, previously occupying space that was leased from the City of Hamilton from 2000, have been relocated to a newly leased and fit out space at One James Street North in Lloyd D. Jackson Square, in 2015.

- David Braley Health Sciences Centre – Downtown Hamilton
  - The new \$84 million David Braley Health Sciences Centre on the site of the former Hamilton Wentworth District School Board building in downtown Hamilton opened on May 15, 2015. The Centre has approximately 192,081 gross square feet for students, teaching patient care, and research. This facility can service up to 54,000 patient visits per year, bring 4,000 McMaster students downtown to participate in classes, training and events, and be home to 450 employees. It is expected that this project will help revitalize downtown Hamilton and enhance McMaster's connection to the community.
- Canadian Martyrs – Licensed Space
  - McMaster University entered into a License Agreement with the Hamilton-Wentworth Catholic District School Board in 2016 for the use of classroom space at Canadian Martyrs Catholic Elementary School. McMaster has fit out and is now using the 4,465 gross square feet space for exams and testing.
- Security Improvements
  - An emergency notification system was implemented in 2010, to alert students, staff, and faculty to emergency situations. Three sirens were installed: one on a 50' high pole on the boulevard by Mary E. Keyes Residence, a second next to the ravine by the Alumni Memorial Building, and the third on the John Hodgins Engineering Building penthouse roof.
  - The Communication Centre was renovated and upgraded for \$89,000 (not including equipment).

### 3.2.2 Buildings Procured 1960 – 2018

In the past 58 years McMaster has not only acquired infrastructure through new build construction and renovation/addition projects, but has also procured the use of various existing off-campus buildings. For example:

- McMaster's family practice teaching unit, established in the early 1970's at Henderson Hospital, was relocated in the early 1990's to the south mountain as the Stonechurch Family Health Centre.
- McMaster Innovation Park (procured for use in 2004).
- 88 Forsyth Avenue (purchased in 2015).
- 47 Whitton Road (acquired in May 2015 and used for research purposes).
- 182 Sterling Street (purchased in 2015).
- One James North (as noted in Section 3.2.1.6).
- 96 Forsyth Avenue North (purchased in 2017).

Furthermore, McMaster has expanded to house remote campuses in space procured or leased in municipalities other than Hamilton:

- The Waterloo Regional campus was established by McMaster at the University of Waterloo in 2007, and focuses on Health and Medical Sciences.
- Similarly, in 2012, McMaster opened Educational Services space in St. Catharine's at Brock University's Cairns Family Health and Bioscience Research Complex.

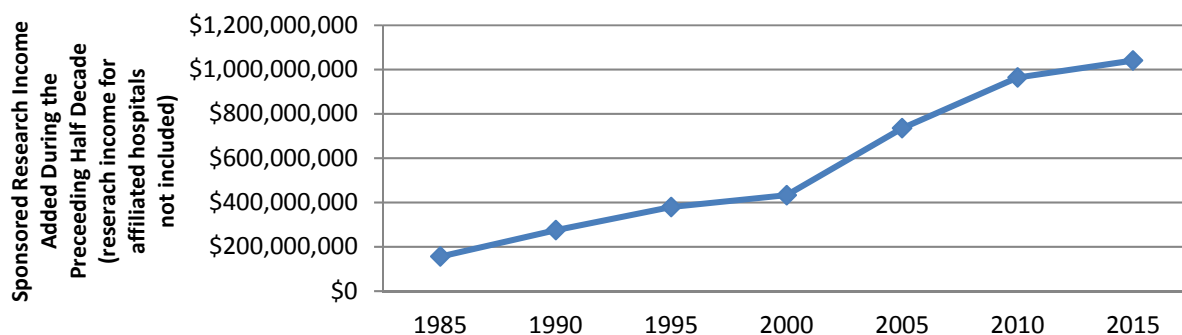
- In 2010, McMaster built the Ron Joyce Centre in Burlington.
- The Welland McMaster Family Health Team has been in operation since 2011.

### 3.2.3 Summary

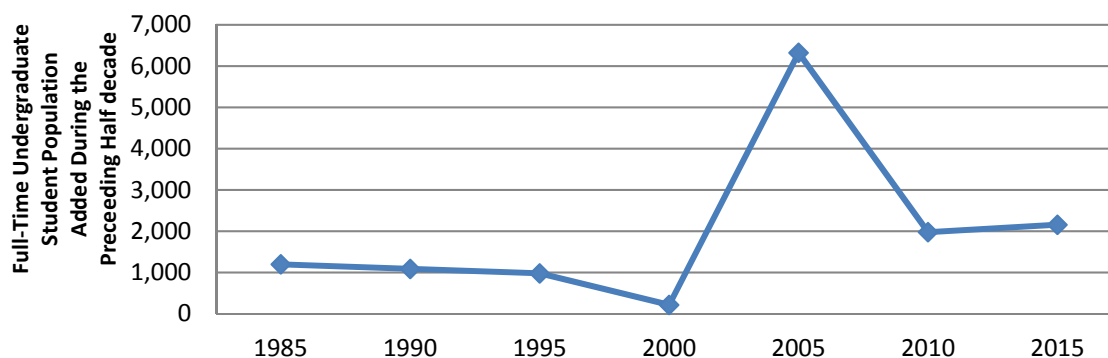
Since 1960, McMaster has added a total of 37 buildings on campus to its existing infrastructure through new construction. These buildings total 4,620,979 gross square feet of added infrastructure, during the past 58 years. McMaster has also invested in several renovation/addition projects to existing infrastructure since 1960. During this time, McMaster has completed major renovations/additions on 21 campus buildings. A gross area of 1,138,125 square feet of infrastructure was added to the campus by way of these renovations/additions. Renovations and additions were often completed in order to update technological, electrical, and utility infrastructure as well as add usable space. These construction projects have been supplemented with infrastructure growth off campus, particularly in the last decade, through the procurement of buildings and property.

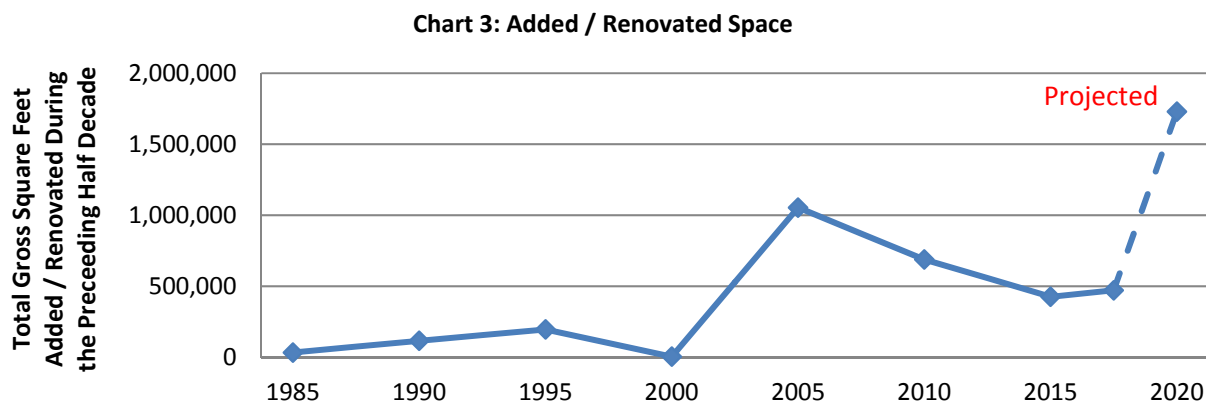
Charts 1 through 3 indicate the growth in sponsored research money intake and student population, and the comparative amount of new space added to McMaster, over the same recent period.

**Chart 1: Added Sponsored Research Income**



**Chart 2: Added Student Population**





### 3.3 Existing Usage, Ownership, and Condition of McMaster's Physical Assets

In the 2015/2016 school year, McMaster University was home to a total enrolment of 29,865 students (undergraduate and graduate, full- and part-time, on- and off-campus). The University employs 6,113 staff (excluding Librarians and Temporary/Casual Employees) and an additional 1,154 full-time instructional faculty (including clinicians). Concerning the critical space categories, space is dispersed as indicated in Table 8.

| Category                         | 2016 NASM      |
|----------------------------------|----------------|
| 1 Classrooms                     | 26,419         |
| 2 Class Labs                     | 18,071         |
| 3 Research Labs                  | 57,666         |
| 4 Office Academics               | 59,913         |
| 10 Office Administration         | 18,129         |
| 5 Study                          | 9,902          |
| 5 Library Stacks                 | 9,748          |
| 5 Library Support                | 967            |
| 6 Athletics                      | 17,242         |
| 9 Maintenance Shop               | 3,402          |
| 7,8,12,13,14,15 Central Services | 23,962         |
| <b>Total</b>                     | <b>245,421</b> |

**Table 8: 2014 Space in Net Assignable Square Metres (NASM), by Category**

McMaster's most recent Campus Capacity Study cites critical needs for administrative office and related space, graduate student offices, assembly facilities, and service space. This Study is ready for renewal.

McMaster has 53 buildings on the main (Westdale) and west campus, including 12 residences, a nuclear reactor, a stadium complex, and a hospital. McMaster owns or otherwise operates out of several more buildings throughout Hamilton and the province, such as the Ron Joyce Centre in Burlington. The main campus itself sits on 296 acres of land with approximately 5,900,000 gross square feet of building area. Of the on-campus buildings, the following have unique ownership arrangements:

- Divinity College – owned by College of Divinity.
- Health Sciences Centre – owned by McMaster and leased to Hamilton Health Sciences (HHS then leases approximately space back to the Faculty of Health Sciences).

- Institute for Applied Health Sciences – owned jointly by McMaster and Mohawk.
- McMaster University Student Centre – operated by McMaster Students Union under the direction of a management committee.
- David Braley Athletic Centre – owned by McMaster and operated by Athletics and Recreation; construction paid for from external sources, operating expenses paid for by McMaster and the students.

Additionally, off campus, the University owns or leases the following:

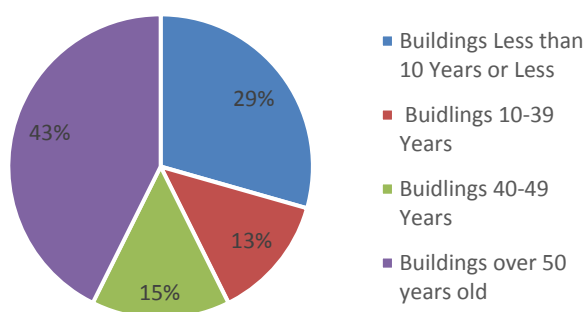
- 4350 South Service Road, Burlington – Ron Joyce Centre (east side)
- 4350 South Service Road, Burlington – Farmland (west side)
- 1475 Upper Ottawa St, Hamilton – Stonechurch Family Health Centre
- 200 Longwood Rd South, Hamilton – McMaster Automotive Resource Centre (MARC) Warehouse (MIP):
  - McMaster Materials Research Institute
  - Electric Vehicle R & D Centre (Maibaum)
  - Hybrid Electric Vehicle Technologies (Emadi)
  - CERC in Hybrid Powertrain Program
  - Centre for Mechatronics and Hybrid Technologies
  - B.Tech learning space
- 175 Longwood Rd South, Hamilton – The Atrium Building at McMaster Innovation Park (MIP), aka The Atrium@MIP Suites:
  - B22 – Capacities for a Sustainable Archeology (Dr. Cannon)
  - 101– McMaster Informatics and Imaging Research Centre (Dr. Koff)
  - 107– Canadian Longitudinal Study on Aging (CLSA) (Dr. Raina)
  - 107A – Faculty of Science; Neuroscience and Society Lab (Dr. Obhi)
  - 109A – Dr Raina’s new Gerosciences Institute
  - 201A – Offord Centre for Child Studies
  - 207A – Clinical Epidemiology & Biostatistics
  - 210A – National Centre for Collaboration Methods and Tools (NCCMT)
  - 301 – Centre for Surgical Invention and Innovation (Csii) (Dr. Anvari)
  - 301A – The Forge
  - 302A-1– Communication Studies and Multimedia
  - 302A-2 – Anthropology
  - 302A-3 – NeuroSparc
  - 305 – McMaster Industry Liaison Office (MILO)
  - 305A – MEEI (McMaster Engineering Entrepreneurship & Innovation): The Don Pether Incubation Centre/ iF Factory Floor
  - 306A – CFI G-Scale (Gaming Scalability Environment) - Carette
  - 401A – Faculty of Engineering; Computer Science Research Centre (CIRC)
  - 420A – The Faculty of Science, Department of Psychology, Neuroscience & Behavior Hearing Technology Research Lab
- 565 Sanatorium Road, Hamilton – Chedoke Hospital (leased space)
- 25 Charlton Avenue East, Hamilton, Suites: 300, 303, and 702 – Family Medicine
- 30 Birge Street, Hamilton – David Braley Research Institute (leased space)
- 237 Barton Street East, Hamilton – Hamilton General Hospital (leased space)
- 699 Concession Street, Hamilton – Juravinski Cancer Centre (leased space)
- 100 West 5th Street, Hamilton – Juravinski Centre for Integrated Healthcare (leased space)

- 711 Concession Street, Hamilton – Juravinski Hospital (leased space)
- 180 James Street South, Hamilton – Collaborative Maternity Centre of Hamilton (leased space)
- 2757 King Street East, Hamilton – St. Joseph’s Community Health Services (leased space)
- 50 Charlton Avenue East, Hamilton – St. Joseph’s Healthcare (leased space)
- 1140 King Street West, Hamilton – St. Paul’s Anglican Church in Westdale (leased space)
- 10B Victoria Street, Kitchener – McMaster Michael G. DeGroote School of Medicine in the Integrated Health Building, Waterloo Regional Campus, Education Services, Faculty of Health Sciences
- 1685 Main Street West, Hamilton – Main West Village, School of Nursing
- 25 Main Street West – (leased space)
- 96 Forsyth Avenue North, Hamilton
- 88 Forsyth Avenue North, Hamilton
- 100 Main Street West, Hamilton – David Braley Health Sciences Centre (south side)
- 100 Main Street West, Hamilton – Parking (north side)
- One James North, Hamilton – (previously known as The Downtown Centre, i.e., DTC) (leased space at Lloyd D. Jackson Square):  
The Centre for Continuing Education (CCE),  
Finance,  
University Advancement (UA),  
Institutional Research and Analysis (IRA)
- 47 Whitton Road, Hamilton
- 182 Sterling Street, Hamilton
- Osler Drive, south side, east of University Plaza (undeveloped)
- Osler Drive, north side, east of University Plaza (undeveloped)
- 110 King Street West, Hamilton – (leased space)
- 199 James Street North, Unit 2, Hamilton – (leased space, Sociology)
- 1205 Rymal Road East, Hamilton – (leased space, Faculty of Health Sciences)
- 1221 Lakeshore Road, Burlington – Halton McMaster Family Health Centre at Joseph Brant Hospital
- 1429 Main Street East, Hamilton – (leased space, School of Nursing)
- 16-24 Ontario Street, St. Catharines – (leased space, Medical Clinic)
- 249 Caroline St S, Unit A, Hamilton – (leased space, School of Nursing)
- 293 Wellington Street North, Hamilton - (leased space, Family Medicine - Surgery), Suites: 110, 111
- 3155 Harvester Rd., Burlington – (leased space, Family Medicine), Suites: 207, 208, 209
- 345 King Street West, Hamilton – (leased space)
- 495 Woodward Avenue, Hamilton – (leased space)
- 1960 Main Street West, Ancaster – (leased space)
- 55 Unsworth Drive, Hamilton – Open Source Clinical Application & Resource (OSCAR)
- 555 Prince Charles Drive North, Suite 201, Welland – (leased space)
- 700 Bay Street, Suite 2303, Toronto – (leased space)

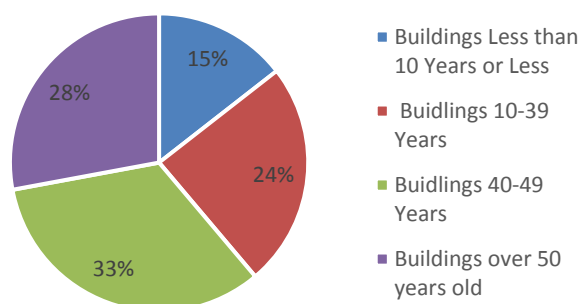
- 701 Main St. West, Suite 101, Hamilton - Family Medicine – Maternity Centre (leased space)
- Brock University, Level 200 @ 500 Glenridge Ave., St. Catharines – (leased space, Education Services)
- 162 Ward Avenue, Hamilton - Parking lot (leased lot)
- Lot 56, of Hamilton Plan 1475 – (MIP)
- 155 Chatham Street, Hamilton – (MIP) (undeveloped)
- 245 James Street North, Hamilton – (leased space)
- 200 Victoria Street, Toronto, unit 1506 (leased space)
- Property on the north side of Lower Lions Club Road, east of Louise Drive, Ancaster – (undeveloped 115 acres)
- 120 Forsyth Avenue North, Hamilton – (The Oval at Mayfair Crescent: 5.5 acres)
- Grant Boulevard at Barrie Street, Hamilton – (undeveloped)
- 1190 Main Street West, Hamilton – (between Forsyth Avenue South and Dalewood Avenue) (undeveloped)

Charts 4 and chart 5 shows the breakdown of McMaster's building age and area (facilities as listed in Appendix B).

**Chart 4 Distribution Based on Building Age**



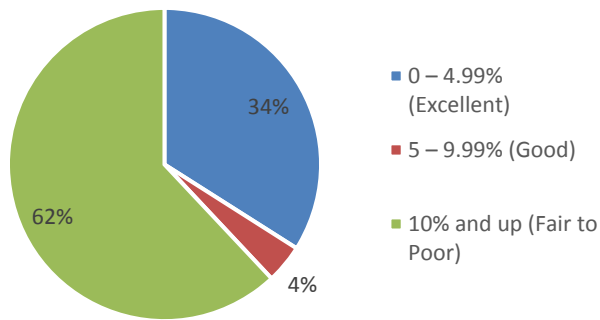
**Chart 5: Building Gross Area Based on Age**



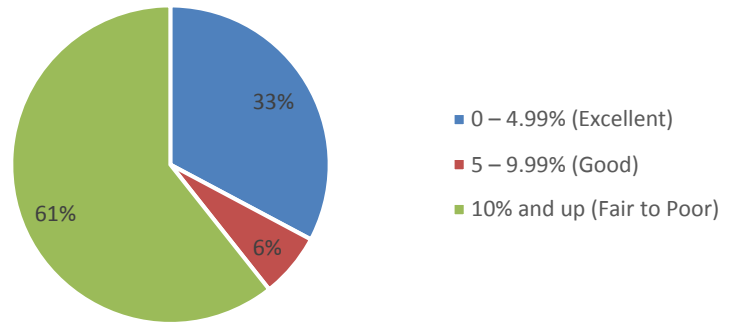
Charts 6 and chart 7 show the breakdown of the condition of the on-campus occupiable facilities by building gross area.



**Chart 6: Facility Condition Index by Building Gross Area (Excluding Residences)**



**Chart 7: Facility Condition Index by Building Gross Area (Including Residences)**



By comparison, chart 8 shows when space was constructed at Canadian Campuses.

**Chart 8: Constructed Space Since 1880 in Canada's Universities (CAUBO Study)**

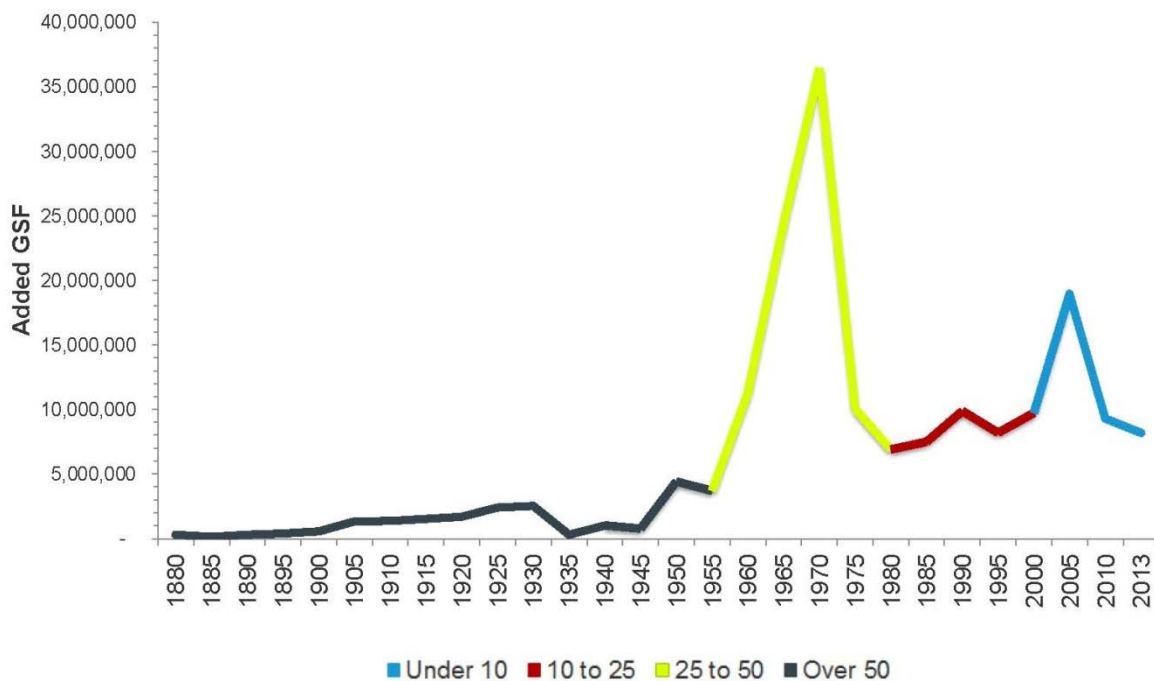
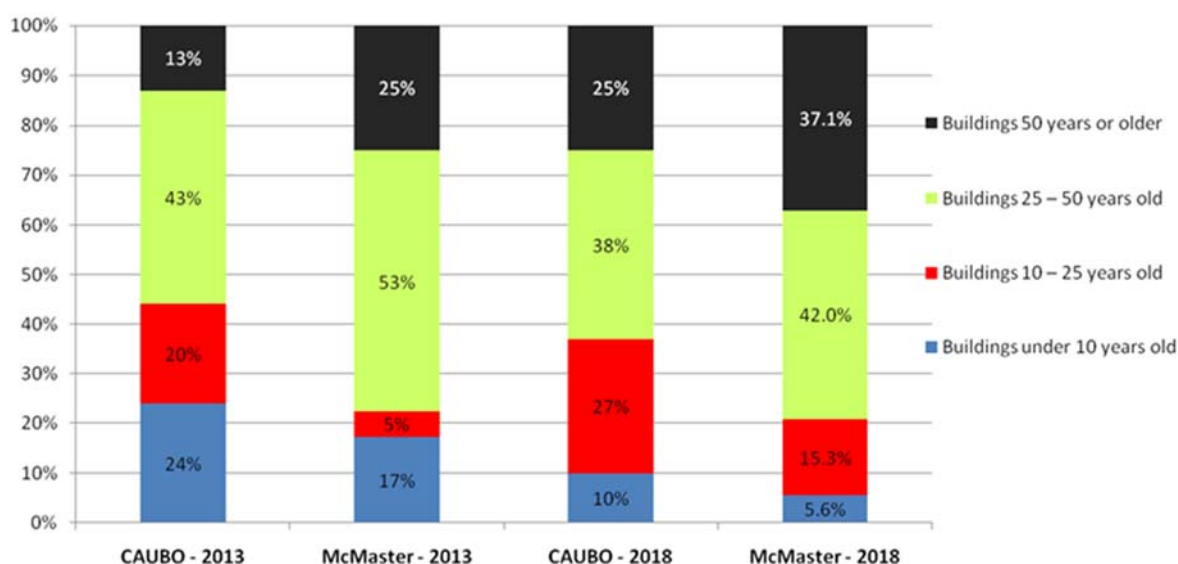


Chart 9 shows building age (as a percentage of total building area) at Canadian campuses compared to that at McMaster.

**Chart 9: Building Age: Canadian Campuses compared with McMaster**



**\* This chart includes existing buildings only. Potential new development is not included.**

At McMaster, surveys were conducted on campus in the fall of 2012, which provided campus wide deferred maintenance data. An asset management plan was developed and approved shortly after and spending on deferred maintenance was increased. As of Sept 2012 the Current replacement Value (CRV) was \$1.75 billion and as of May 2017 it is \$2.07 billion, the total deferred maintenance backlog has reduced from \$295 million to \$270 million. The campus Facility Condition Index (FCI), a numeric score reflecting asset condition, decreased over the last four and half years from 18.89% to 14.44%. Section 6.2 Existing Building Infrastructure Asset Management and Renewal provides more information related to the current condition of McMaster's infrastructure assets.

The Council of Ontario Universities (COU) Space Management Committee's Triennial Report to be published as the Inventory of Physical Facilities of Ontario Universities 2016-17 will show that McMaster's current interior classroom space totals 284,000 net assignable square feet. It will also show that overall, the institution has increased its inventory of classroom space from having approximately 84% of the space it needs (2014) to 85% (2017) according to COU standards. This is covered in more detail in Section 6.1.

### 3.3.1 Computerized Maintenance Management System

Facility Services is utilizing PeopleSoft's Maintenance and Asset Management modules, to maintain University facilities, in integration with McMaster's PeopleSoft Finance landscape (Asset Management, Project Costing, Expenses, Procurement and Payables, and General Ledger). Proper maintenance of an organization's asset infrastructure is essential to ensuring safety, complying with regulations, and achieving the financial and operational targets that are established by the organization's leadership team. PeopleSoft Maintenance Management enables organizations to create work orders, schedule resources, and track the costs that are associated with the maintenance and repair of these assets. In addition, the employees of an organization, can create an online self-service request to arrange for

maintenance, repairs, renovations, cleaning, moves or various facility service activities. If necessary, a work order can be generated based on a service request and associated costs can be billed to the requestor, through Project Costing, to General Ledger.

### **3.4 Land Assets, Physical Growth Opportunities**

The McMaster University Campus Master Plan was originally prepared in 2002 and updated in 2008. Most recently, Facility Services engaged with a consultant to help prepare a 2017 update to the Campus Master Plan. This process included the sourcing of campus user input by way of on-campus visioning stations, online polling, and meetings with stakeholders in a working committee that included students, staff, and faculty.

The Campus Master Plan provides an overall physical framework for campus growth and renewal. The Plan outlines a vision for the campus, and recommends that this be updated every five to ten years. Specifically, it establishes a framework for future development that extends the structure of the campus's historic core to its periphery while respecting the surrounding built and open space context. Although it does not advocate for growth, it identifies area for potential new development, with supporting open space amenities and infrastructure initiatives. The current capacity available for new development is estimated to be 3,000,000 gross square feet of floor area on the Main Campus. As outlined in the Campus Master Plan, physical capacity on McMaster's main campus has been largely determined by its physical structure, which contains a well-established hierarchy of streets and natural features. This clear structure has provided a strong setting and logic for development and infrastructure investments to continue to evolve in an integrated manner. The Campus Master Plan is intended to be flexible, to accommodate the changing needs of various departments and Faculties, and to enhance learning by providing the physical environment in which to gain knowledge, live and work.

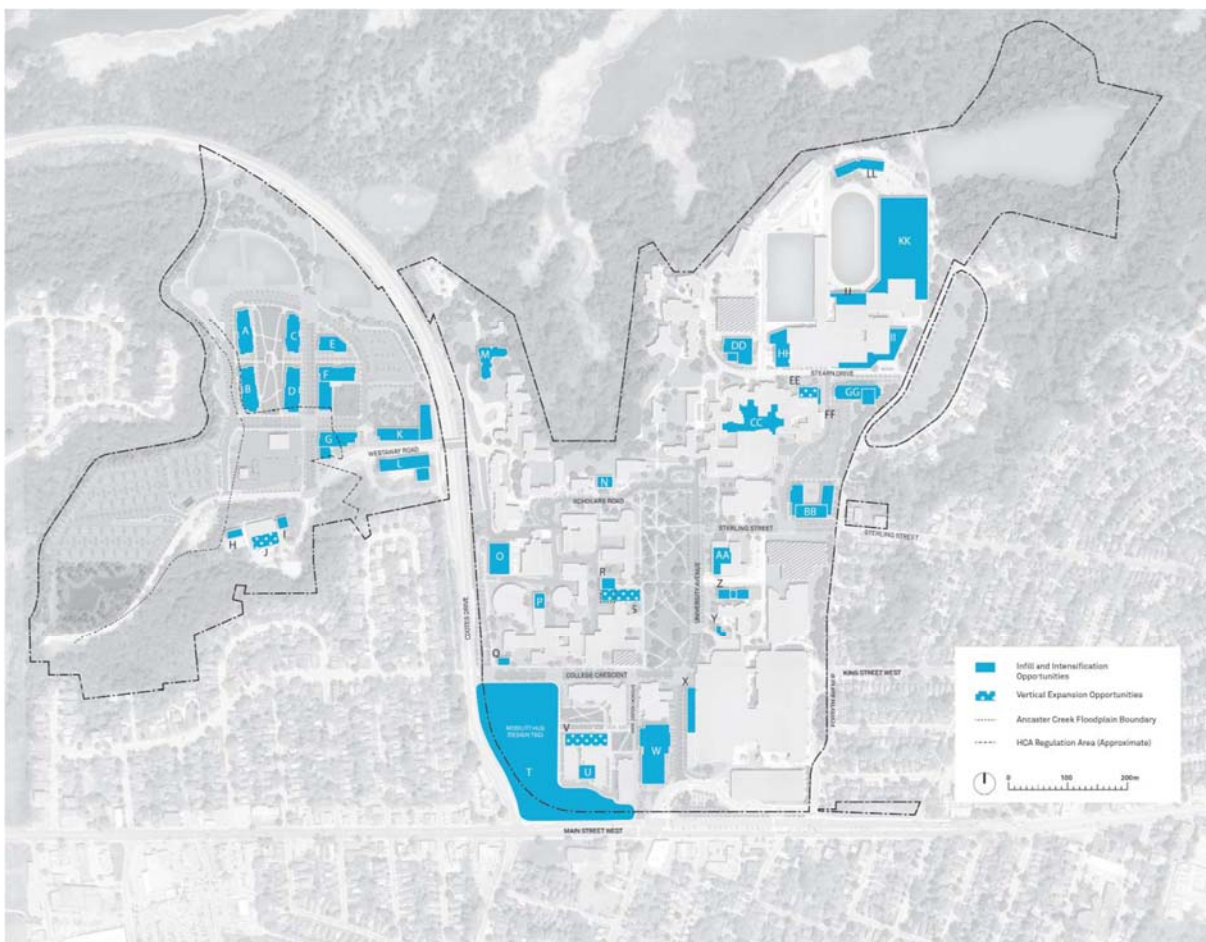
An important component of the implementation of the vision outlined in the Campus Master Plan was the identification of several potential development sites that could support incremental growth throughout the University campus. However, it is understood that some of these sites may not be developed and that McMaster may need to consider further off-campus development in appropriate locations.

The identified development sites are primarily within the Core Campus, North Campus, and West Campus.

- Within the Core Campus, there are several opportunities to introduce new buildings and/or building additions: north of Bates Residence beside the President's Residence, Forsyth Avenue frontages, and a significant gateway/landmark development site at the location of existing building to be removed, T-13. Parking Lot 'I' at Cootes Drive and Main Street is being planned for development of a transit hub. A SIF project is currently underway: a large addition is currently being constructed at the north wing of ABB.
- Even with years of substantial building activity in the North Campus (the David Braley Athletic Centre, Stadium and Les Prince Hall), there remains development potential in the area. The Peter George Centre for Living and Learning is currently under construction at the location of previously demolished buildings T28, T29,

and T18. The McMaster Athletics and Recreation Complex Facility Assessment and Master Plan Study, October 2016, identified a number of potential additions that are either under consideration for future development or otherwise are already at the design stage.

- West Campus has substantial potential to accommodate new buildings outside of the Ancaster Creek floodplain, subject to more detailed investigations regarding soil bearing capacity. The area within the floodplain is not suitable for most buildings but could potentially accommodate two single-level parking structures.



**Figure 1: Potential Development Sites**

Off campus, McMaster has acquired the land adjacent to the Ron Joyce Centre in Burlington, which would allow for more construction in an expansion of that campus. In downtown Hamilton, McMaster has built the David Braley Health Sciences Centre; the north parcel of that building site includes an existing parking lot facing King Street West and Bay Street South, which remains vacant and could be developed. Also, McMaster’s property at Lower Lions Club Road, currently used in part by the Faculty of Science, could see future development to further that Faculty’s efforts.

McMaster has recently acquired four existing houses in the Westdale neighbourhood. Renovation is underway to make 88 Forsyth Avenue North the new Home of the Bertrand Russell Archives and Research Centre. The Faculty of Engineering is using 47 Whitton as a “Smart House”, i.e., as a space to monitor elderly health in a typical home. 182 Sterling is

now being used by Student Affairs for recipients of the Wilson Leadership Scholar Award. 96 Forsyth can be made to accommodate visiting scholars.

McMaster also owns land and a grouping of houses bound by Main Street West, Traymore Avenue, Dalewood Avenue, and Forsyth Avenue South. This is a prime development location, immediately adjacent to the main campus. Building intensification on Main Street is a key component of the City's development plans for west Hamilton.

McMaster is also working in a partnership to develop a large vacant property on the south-west corner of King Street West and Bay Street South in downtown Hamilton. This is across the street from the existing David Braley Health Sciences Centre.

## **3.5 Accessibility**

### **3.5.1 McMaster University Accessibility Plan 2012-2025**

In September 2012, the McMaster Accessibility Council (MAC) published the McMaster University Accessibility Plan 2012-2025 in order to comply with the evolving Accessibility for Ontarians with Disabilities Act (AODA). This plan reflects a commitment by the University to engage in incremental initiatives in accordance with the AODA and the expectation that the University will be free of attitudinal, physical and social barriers by the year 2025.

The Built Environment Standards is one of the categories of the AODA. Effective as of January 1, 2015, the Ontario Building Code has been amended to include the Built Environment Standards. Facility Services ensures that all new construction and building renovations are completed in compliance with the OBC.

### **3.5.2 Campus Accessibility Action Plan (CAAP)**

Many improvements have been made at McMaster with regard to physical accessibility. However, a need for establishing priorities for accessibility improvements and capital funding arose. In 2012, Facility Services conducted a campus-wide accessibility audit to identify accessibility priorities and improve the overall accessibility of the campus. The results informed a new Campus Accessibility Action Plan, a multi-year plan to address the identified accessibility issues on campus buildings.

The audit included a survey of the 57 McMaster buildings (academic, residence, and others). The buildings were analyzed for accessibility based on the Ontario Building Code Requirements and accessibility standards. This analysis found that:

- 40% of the academic buildings have a barrier-free ramp or have ground-level accessibility.
- 73% of the academic buildings have fully accessible interiors.
- 79% have at least one labeled accessible washroom.
- 40% of the campus buildings have fire alarm strobe lights.



- 79% of elevating devices incorporate the use of Braille in the call buttons or floor buttons within the elevators.
- 7% of the elevators use voice notification or a talking keypad to assist individuals with vision issues.
- Of those campus buildings that have water fountains, 60% have at least one fountain at an accessible height.

McMaster approved the five-year Campus Accessibility Action Plan (CAAP) 2012-2017 in 2013, and the recommended accessibility improvements were completed. Phase 2 of the CAAP (2018-2023), which is an extension of the CAAP 2012-2017, is currently being submitted for approval. Details on the plan are found in Section 6.4.

### **3.6 Building Sustainability and Energy Management**

In keeping with Ontario's Action Plan on Climate Change, McMaster is striving to incorporate energy efficiencies in building design and operation. In order to assist the province in achieving its environmental goals:

- McMaster established a "Sustainable Building Policy" in 2005, encouraging the incorporation of the LEED® system on building projects. This policy is reviewed annually.
- McMaster has undertaken a \$28.6 million Comprehensive Energy and Water Reduction Program that concluded in 2016 with annual recorded energy savings approximating \$3.5 million and annual CO<sub>2</sub> reductions of 1,450 tonnes. Section 6.3, Energy Management Projects and Sustainability, includes more information.
- In cooperation with Cleanfield Energy Corporation in 2006-2009, McMaster engaged in a wind power pilot project utilizing a vertical helix wind turbine at McMaster Innovation Park (MIP) campus. This project was to conduct research on the manufacture of small turbines that interact with complicated wind patterns in urban environments.
- In 2010, with \$5 million in funding from the federal government, McMaster became home to the Natural Sciences and Engineering Research Council of Canada (NSERC) Photovoltaic Innovation Network. This is a partnership between the research community, industry, government, funding agencies and advocacy groups to foster and accelerate the widespread adoption of photovoltaics as a renewable energy resource in Canada.
- McMaster has a geo-thermal plant. The system is located underground between the Atrium building and the CANMET lab at McMaster Innovation Park (MIP), and supplements traditional systems to both heat and cool both buildings, the MARC building across the street, and a fourth building to be built in the area in the future.

The McMaster University Facility Services Energy Management Plan identified and recommended 11 potential energy-saving projects. More information about Energy Management is included in Section 3.6.2, Trends of Energy Consumption, and Section 6.3, Energy Management Projects and Sustainability. The cogen installation was completed in December 2017. The next/second Energy Management Plan, for 2017-2022, is approved.

### 3.6.1 LEED®

McMaster currently has fifteen LEED® certified or anticipated to be certified projects. McMaster's policy is to develop new and undertake major renovations of occupied facilities to meet or exceed the Silver level rating of the LEED® Rating System.

Table 9 lists these projects. They total 1,754,858 gross square feet of space.

| Building  | Construction Date/Renovation Date | Gross Area (Square Feet) | Attained/Anticipated LEED® Certification Level |
|---|-----------------------------------|--------------------------|--|
| <b>New Construction</b>                                   |                                   |                          |  |
| Les Prince Hall   | 2006                              | 106,016                  | LEED® Certified                                |
| David Braley Athletic Centre                              | 2007                              | 140,479                  | LEED® Certified                                |
| Engineering Technology Building                           | 2009                              | 125,600                  | LEED® Gold                                     |
| Ron Joyce Centre (Burlington)                             | 2010                              | 105,745                  | LEED® Gold                                     |
| CANMET Materials Technology Laboratory (MIP)              | 2010                              | 145,000                  | LEED® Platinum                                 |
| Halton McMaster Family Health Centre – Burlington         | 2014                              | 10,647                   | LEED® Gold                                     |
| David Braley Health Sciences Centre – Downtown Hamilton   | 2014                              | 192,081                  | LEED® Gold*                                    |
| L. R. Wilson Hall   | 2015                              | 177,927                  | LEED® Gold*                                    |
| Peter George Centre for Living and Learning (PGCLL)       | 2019                              | 335,167                  | LEED® Silver*                                  |
| <b>Total New Construction</b>                             |                                   | <b>1,338,662</b>         |  |
| <b>Renovation/Addition</b>                                |                                   |                          |  |
| C.E. Burke Science Building                               | 2005                              | 196,401                  | LEED® Silver                                   |
| Nuclear Research Building                                 | 2011                              | 23,605                   | LEED® Gold                                     |
| Ivor Wynne Centre   | 2012                              | 20,010                   | LEED® Silver                                   |
| McMaster Automotive Resource Centre (MARC)                | 2013                              | 85,000                   | LEED® Silver*                                  |
| Gerald Hatch Centre for Engineering Experiential Learning | 2017                              | 28,007                   | LEED® Silver*                                  |
| ABB Addition  | 2018                              | 63,173                   | LEED® Silver*                                  |
| <b>Total Renovation/Addition</b>                          |                                   | <b>416,196</b>           |  |

\* denotes anticipated certification level

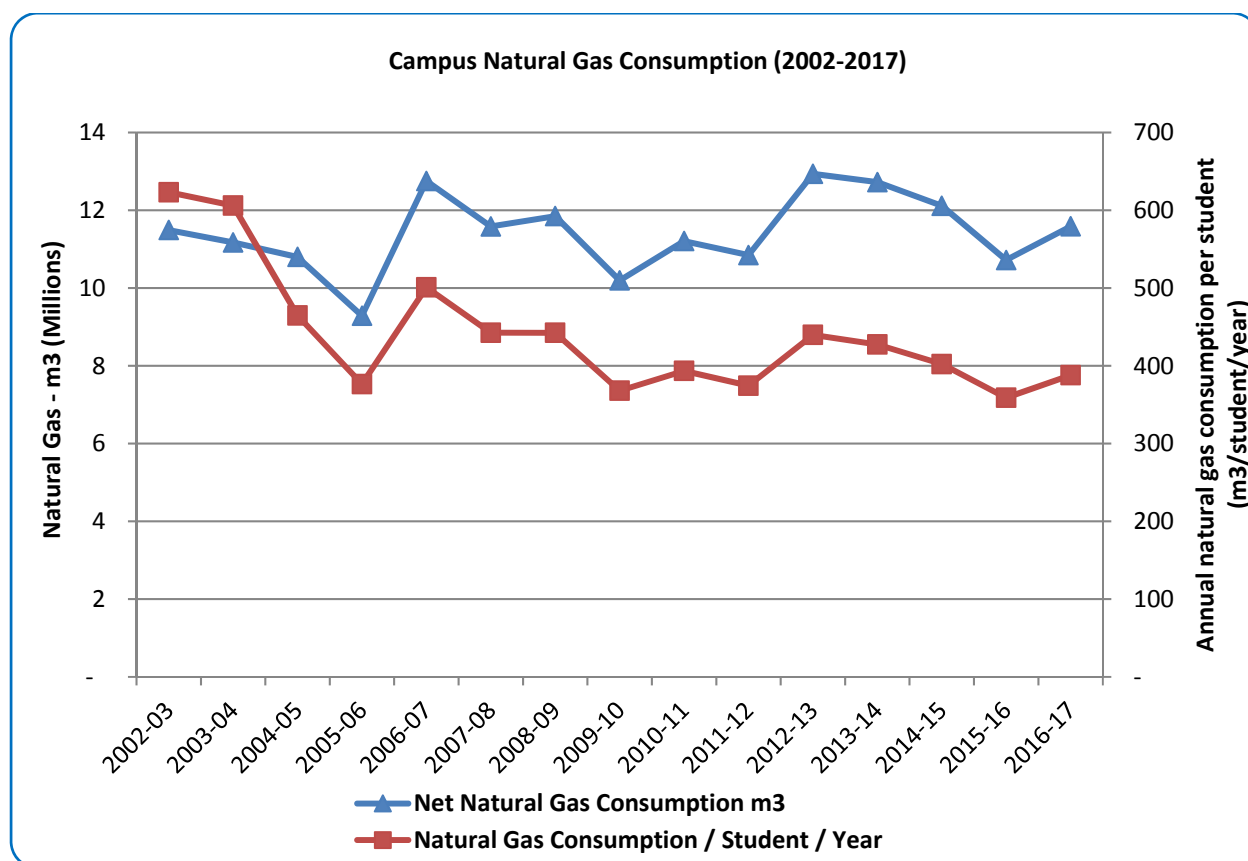
**Table 9: LEED® Certified Projects**

### 3.6.2 Trends of Energy Consumption

Energy consumption at McMaster, including natural gas fuel, electricity, and water has been tracked for the past decade. Gas, electricity, and water are used heavily and are expensive, so understanding these trends is an essential component to identifying opportunities for increased efficiency, sustainability, and cost-savings. To clarify the influence of factors driving energy consumption, consumption values normalized for student enrollment are also included in charts 10 to 12. These charts present the consumption trends from the 2002-2003 academic year to the 2016-2017 academic year.

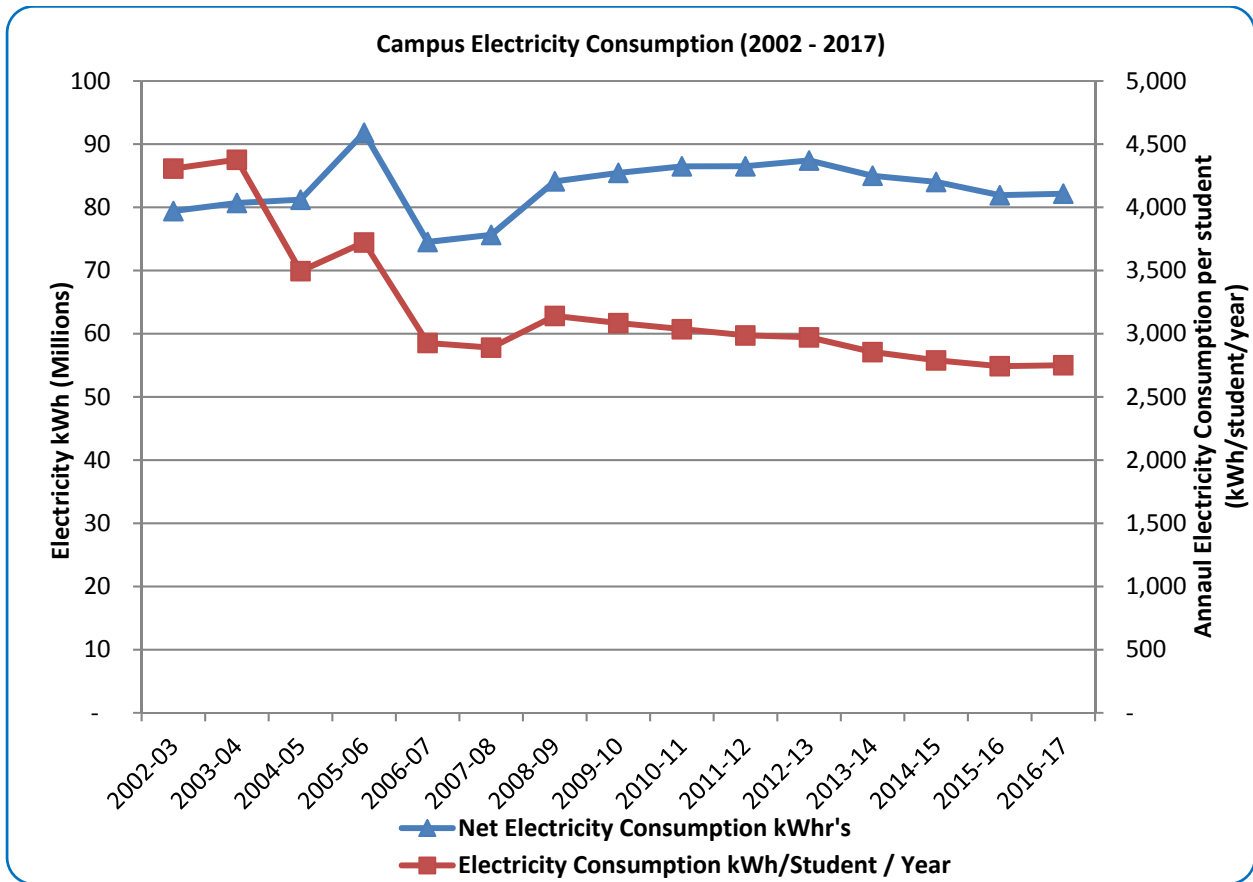


Chart 10: Campus Natural Gas Consumption (2002-2017)



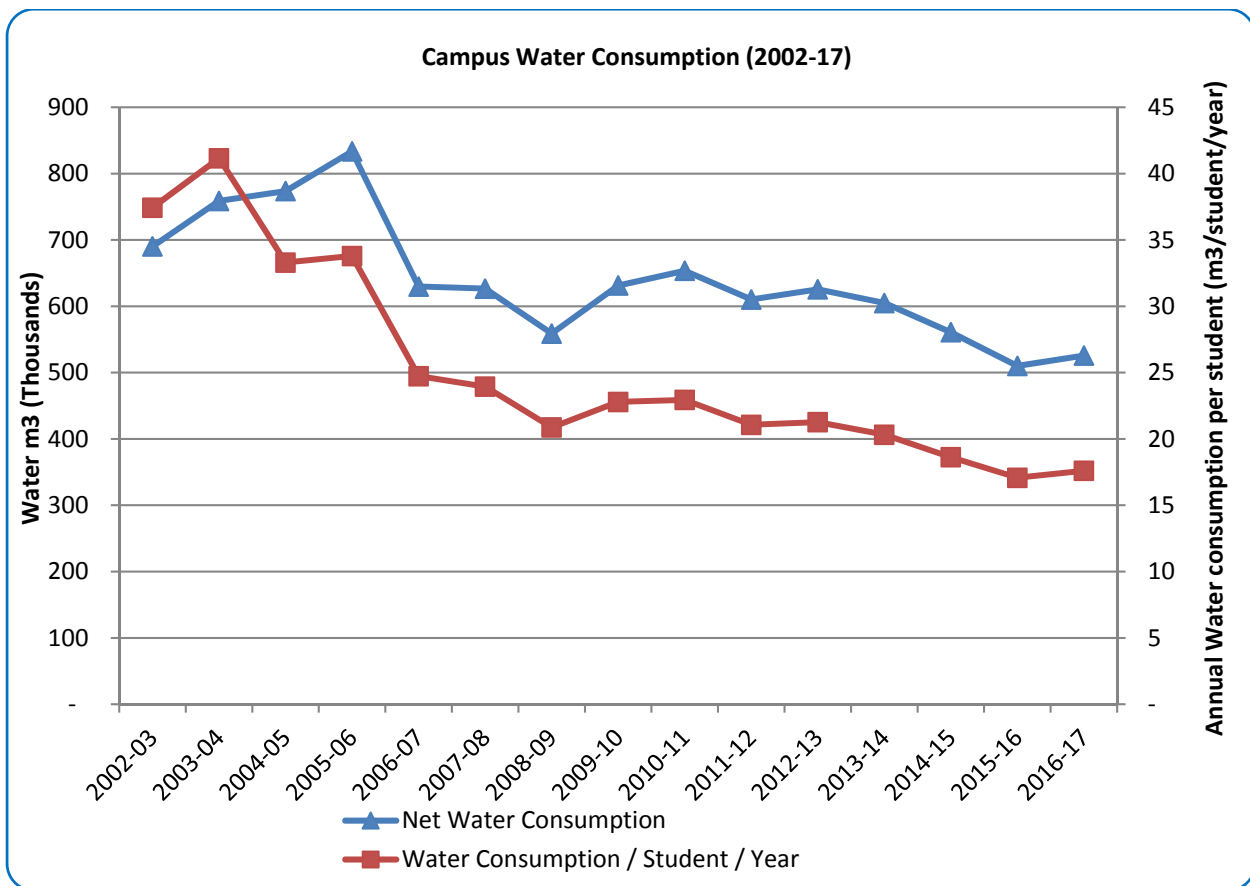
**\*Note:** The above chart shows the complete McMaster campus consumption (excluding FHS). This chart has been updated from the 2017 EMP. Historically, electricity and water consumed for producing other forms of energy (chilled water, steam, cooling) was deducted from the overall numbers. The above chart includes all purchased energy.

Chart 11: Campus Electricity Consumption (2002-2017)



**\*Note:** The above chart shows the complete McMaster campus consumption (excluding FHS). This chart has been updated from the 2017 EMP. Historically, electricity and water consumed for producing other forms of energy (chilled water, steam, cooling) was deducted from the overall numbers. The above chart includes all purchased energy.

Chart 12: Campus Water Consumption (2002-2017)



**\*Note:** The above chart shows the complete McMaster campus consumption (excluding FHS). This chart has been updated from the 2017 EMP. Historically, electricity and water consumed for producing other forms of energy (chilled water, steam, cooling) was deducted from the overall numbers. The above chart includes all purchased energy.

Charts 10 to 12 show that the overall consumption of gas and electricity has increased at a significantly lower rate than the student population growth and that consumption on a per student basis has dropped significantly. Gas consumption increased in 2013-2014 as a result of experiencing a very cold winter. Electricity consumption at McMaster on average has been stable, from the 2002-2003 academic year, to the 2015-2016 fiscal year. Increased student enrollment and the increase in weather temperature, have also driven electricity consumption.

Electricity and natural gas consumption per student has dropped by around 40% since 2002 while water consumption per student has dropped more than 50%. Also, we can see a consistent drop in water consumption since 2010-2011. The above is the result of the implementation of the various energy efficiency measures in the past ten years.

The 2017 report on the Energy Management Plan targets a 4% reduction of electricity consumption on campus, 4% reduction in gas consumption and 7% in water consumption by end of 2020 through the implementation of various energy initiatives and projects. The average payback period of the projects is seven years.

The Five Year Energy Management Plan extends from 2013 to 2018 and proposes approximately 19 projects and sub-projects, with a total anticipated investment of \$26 million over five years, and a total anticipated Annual savings of \$4 million (after rebates). The total energy savings and co-generation savings (but excluding cost savings only projects, such as ENBALA and the Union Gas Contract as well as the photovoltaic installation) is outlined in Table 10.

|                            | <b>Total Reduction</b>   | <b>% Reduction from 2011-12</b> | <b>Total annual savings (at 2018-19)</b> |
|----------------------------|--------------------------|---------------------------------|--|
| <b>Co-generation</b>       |                          |                                 | <b>\$2,381,000</b>                       |
| <b>Electricity savings</b> | 9,670,405 kWh            | 11.2%                           | \$1,063,744                              |
| <b>Gas savings</b>         | 2,476,553 m <sup>3</sup> | 19%                             | \$495,310                                |
| <b>Water Savings</b>       | 102,120 m <sup>3</sup>   | 14.3 %                          | \$285,936                                |
| <b>TOTAL</b>               |                          |                                 | <b>\$4,225,990</b>                       |

**Table 10: Total Energy savings from Energy Action Plan**

Furthermore, the total anticipated reduction in the carbon footprint is estimated to be 4,500 metric tonnes of equivalent CO<sub>2</sub> which is a 10% reduction from the latest available campus carbon survey performed in 2009 by Zerofootprint.

The Energy Management Plan is financed through an internal revolving loan from the Central Bank. The approved loan is available to fund the Energy Management Plan as needed and savings will be used to repay principle and interest. A revolving loan of up to \$7.03 million is utilized at an interest rate of 5.75%.

To date, facility services staff have worked on low cost, quick payback projects. These projects are in various stages of initiation and progress. A major focus has been obtaining approvals for supplementary capital incentives from the Independent Electricity System Operator (IESO, previously OPA). The supplementary incentives (excluding co-generation project that would qualify under the Industrial Accelerator category) are estimated to total of \$700,000. The Cogen project is completed and McMaster has received a \$7.7 million incentive upon operation.

### **3.7 Environmental Compliance**

McMaster University retained the services of an external consultant in late 2012 to survey all campus buildings in terms of their compliance with Ontario Ministry of Environment (MOE) air & noise emissions regulations. A long term Environmental Compliance Action Plan (ECAP) was developed in the fall of 2013.

The ECAP identified many noise sources on various campus buildings that require mitigation to achieve compliance. The total cost for mitigation measures excluding the Health Sciences Centre and E.T. Clarke Centre, was estimated at \$2 million. A funding recommendation was made to the 2013/14 Budget Committee and the funding level of \$400,000 per year for five years (2013 – 2018) was approved. This proposed funding will

be supplemented by additional contributions from Ancillaries including Housing and Conference Services and Athletics and Recreation. In 2017, as part of the cogeneration project Environmental Compliance Approval application process, the Ministry of the Environment and Climate Change (MOECC) asked McMaster University to apply for an Environmental Compliance Approval (ECA) for the entire campus. This changed the requirement for building emissions and a re-audit of all campus buildings was undertaken in 2017. A campus wide ECA application was made in June 2017 and it was approved in November, 2017.

Following is McMaster's current ECAP compliance progress status.

- All buildings on campus are compliant in terms of air emissions.
- 27 buildings do not require ECA because of lack of significant emission source.
- As part of the ECAP 2014/15, additional noise mitigation measures required by MOE at Engineering Technology Building (ETB) and Michael DeGroote Centre for Learning & Discovery (MDCL) were completed as part of the 2014/15 program. Edwards Hall, McKay Hall and Whidden Hall noise sources were mitigated in 2016. Noise source mitigation of General Sciences Building, Alumni Memorial Hall, Ivor Wynne Centre – Spinal Cord Addition and Nuclear Reactor Cooling Tower were completed as part of the 2015/16 program.
- John Hodgins Engineering Building: ECA Approval for all equipment in the building including the new micro-turbine exhaust was received from MOE in July 2015.
- Burke Sciences Building: CofA (Certificate of Approval-Air) obtained for fume hoods in 2008.
- Life Sciences Building: CofA obtained for fume hoods in 2008.
- Tandem Accelerator: Recent projects involving changes to the fume-hood exhaust were designed to be compliant.
- There are eight on-campus buildings with noise sources that are being mitigated as part of the Environmental Compliance Action Plan (ECAP) 2017/18.

## **4 STRATEGIES GUIDING FUTURE CAPITAL DEVELOPMENT**

In developing the Capital Plan at McMaster, seven strategic areas are considered, namely: Forward with Integrity (FWI) and its follow-up reports, the Refining Directions Plan, Research Priorities, the Campus Capacity Study, the Campus Master Plan, and the Provincial Growth Plan. The plan will also be impacted by the Strategic Mandate Agreement.

### **4.1 Forward with Integrity (FWI) and Forward with Integrity: The Next Phase**

On September 21, 2011, in a letter titled “Forward with Integrity”, shared with the McMaster community, McMaster President and Vice-Chancellor Patrick Deane outlined the priorities and principles he believes will best help shape the University's development.

"I wanted to share my thoughts on the principles that guide us in planning for [McMaster's] future and the priorities that I believe will be critical if [McMaster is to achieve its] goals," said Deane. "I hope that everyone takes the time to read the letter and to participate within their units and in broader University discussions to develop ways to advance the priorities outlined."

It is a general implication of Forward with Integrity that McMaster needs to accommodate evolving technology. One aspect of this, is online courses. There is a growing interest in online training and education, given that a high percentage of the general population and most students attending institutes of higher education have Internet access. An advantage of Internet training and education is that it can be used virtually anywhere and anytime to learn about innovative topics. Educational institutions generally see this as a way to extend their market reach, since students do not have to physically attend the institution in order to access courses. McMaster's E-Learn@Mac (ELM), which replaced WebCT, has itself been replaced by a new online course management system called Avenue to Learn. McMaster's online learning and teaching community is supported by McMaster's Centre for Leadership in Learning.

The "Forward with Integrity Letter" letter was followed by task force reports on each of these priorities and a composite report titled "The Emerging Landscape". This report set forth the following fundamental operating Principles:

McMaster will make the following commitments consistent with a culture of integrity. These commitments apply to, and can be expected by, all members of the University community:

1. To provide an environment that *educates for capability*, considers multiple perspectives, supports individuals and instills an inquiring, self-directed frame of mind.
2. To promote civility, openness and flexibility in its relationships and application of policies and procedures.
3. To strengthen its internal community as well as develop and sustain mutually beneficial connections and partnerships with local and global communities.
4. To encourage reflection and radical questioning and support responsible risk-taking.

The Emerging Landscape proceeds to make the following flagship recommendations:

- Encouraging flexibility.
- Creation of the McMaster Learning Portfolio.
- Creation of the University Research Council.
- Enabling Community Champions.
- Develop platforms for communication and coordination.
- Promotion of Internationalization through an Office of Community and Global Engagement.
- Motivate through incentives.

Forward with Integrity and its sequel, The Emerging Landscape, will impact on the capital assets of the University in the following manner. McMaster needs:

- to accommodate evolving technology.
- increased amount of collaborative /integrative space.
- increased campus use by the community.
- more distributed buildings in the community.
- greater partnerships, as with for example, Mohawk College.

#### 4.1.1 Forward with Integrity: The Next Phase

The President's latest FWI Update, FWI: The Next Phase lays out priorities and areas of focus for the 2015-2016 academic year and beyond. It is published alongside McMaster Goals and Priorities, 2014-2015, which contains a more detailed account of McMaster's FWI priorities, as well as some of the key initiatives and outcomes associated with them.

The Next phase covers as areas of priority: Research, Community Engagement and Internationalization, Focus on the McMaster Community, Integrity as a Precondition for Success, and Reputation and Branding.

## 4.2 Strategic Mandate Agreement

McMaster University and the Ministry of Advanced Education and Skills Development have signed on to a Strategic Mandate Agreement (SMA) for 2017-2020. This is a second phase that follows on the SMA 2014-2017. The agreement outlines the role that the University currently performs in the postsecondary education system and how it will build on its current strengths to achieve its vision and help drive system-wide objectives and government priorities.

The SMA notes that McMaster University:

- Is a research-focused student-centred institution dedicated to creating a brighter world through the art and science of discovery.
- Strives to foster the creative and intellectual potential of our students, while also preparing them to build successful careers.
- Has transformed postsecondary teaching and learning over many decades, and our signature pedagogies have been adopted worldwide.
- Is deeply committed to the principles of access and equity.
- Is dedicated to serving the public good through innovative research, industry collaborations, and engagement with our local, provincial, national, and global communities.

## 4.3 Research Priorities

In regard to research, McMaster University continues to submit applications to the Canada Foundation for Innovation's (CFI) Innovation Fund (IF) competitions and to the Ontario's Ministry of Research, Innovation and Science seeking funding for new construction and



renovation projects to support McMaster's innovative and transformative research and technology development activities.

Most recently McMaster has received funding from the CFI Innovation Fund for a \$15M project entitled "The Good Bugs, Bad Bugs Program". The construction budget is \$1.250M. No construction is required however renovations are needed within the Michael G. DeGroote Centre for Learning and Discovery (MDCL) to accommodate the new infrastructure which will enable this research program. New infrastructure and associated renovations will facilitate development of a more comprehensive understanding of microbial biology and pathogenesis and enable the application of this knowledge to accelerate the discovery of therapeutic leads aimed at improving human health.

McMaster led the development of the \$9M "Canadian Research Data Centre Network Transition to High Performance Computing: Liberating Data for Research and Policy" infrastructure proposal which was recently awarded CFI funding of ~\$2.7M. Minor renovations to L. R. Wilson Hall will enable security upgrades at the McMaster site. This multi-institutional project involving 28 other universities will develop a high performance computing platform which will enable researchers across Canada to access and research survey and census data to better evaluate and craft policies to improve Canadians' health and well-being.

Implementation for each is expected to start in 2018.

The creation of a new strategic research plan is currently in process, and will be published shortly.

#### **4.4 Westdale Campus Master Plan**

The McMaster University Campus Master Plan was originally prepared and approved by the Board of Governors in March of 2002. The Plan was updated in 2008 and then again in 2017 by Facility Services in coordination with the Working Committee, and with input from stakeholders.

This document will help to guide the University's development over the next 30 years. From the foreword to the current Plan:

The intent of the plan is to provide a clear vision and framework to guide the development of buildings, open spaces, streets, and other elements that define the campus character. The objective of this update is to re-focus the 2008 plan to respond to changes on campus, most notably new buildings, planned LRT on Main Street, and new directions in the way students, faculty, staff, and the community engage and interact on campus as well as to reflect the University's focus on advancing human and societal health and well-being, and the commitments made under the Okanagan Charter to embed considerations of health, wellness, and sustainability into our institutional policies and decision-making processes.

The six principles from the Plan are:

1. McMaster's Main Street Campus will be the focus for future growth and evolution.
2. The Campus Master Plan will be a living document that is practical and visionary, permanent yet flexible.
3. McMaster will have a pedestrian-focused campus that is accessible and user-friendly for all persons, regardless of their physical abilities.
4. The setting and image of the campus will be enhanced and maintained at a high level of quality.
5. The campus will be planned to achieve a high level of sustainability and environmental stewardship.
6. The campus will function as a village and a partner within the larger community.

Additional principles from the 2017 Plan are:

7. The plan will redefine the hierarchy of campus entry points to prioritize pedestrians first.
8. A variety of campus outdoor spaces will be provided, that reflect the way in which users teach, learn and socialize on campus, and which support the promotion of physical and mental wellness for members of the McMaster and local communities.
9. The core campus circulation networks will be revitalized to enhance wayfinding.
10. New buildings and additions will be located to frame campus streets, entrances and open spaces.
11. Student study/lounge and common spaces will be increased and diversified to reflect contemporary campus activities.
12. Signage, wayfinding, and public art will be developed in a consistent and complimentary manner, to reinforce a common campus character.

The Campus Master Plan provides for the development of up to 3,000,000 gross square feet of built form over 30 years, assuming an average new building height of 4 to 6 storeys. This rate of growth is consistent with the University's growth trend since the 1960s. While McMaster is not planning for significant additional growth in its student population over the next 30 years, the Campus Master Plan will provide the necessary foundation and structure to make the campus a beautiful place. Should it not be necessary to build out the development sites to their maximum capacity, the campus structure defines how open spaces and parking lots can contribute to making the campus a special place.

## **4.5 Provincial Growth Plan for the Greater Golden Horseshoe**

Under the current forecasts prepared in conjunction with the Growth Plan for the Greater Golden Horseshoe, the greater Toronto and Hamilton area is anticipated to grow to 10 million people and to 4.8 million jobs by 2041. The City of Hamilton has been identified as a built-up area and Downtown Hamilton has been highlighted as an urban growth centre, which are defined as centres that can accommodate intensification and growth.

According to the Growth Plan, the City of Hamilton will grow to approximately 780,000 people and to 350,000 employment opportunities by 2041.

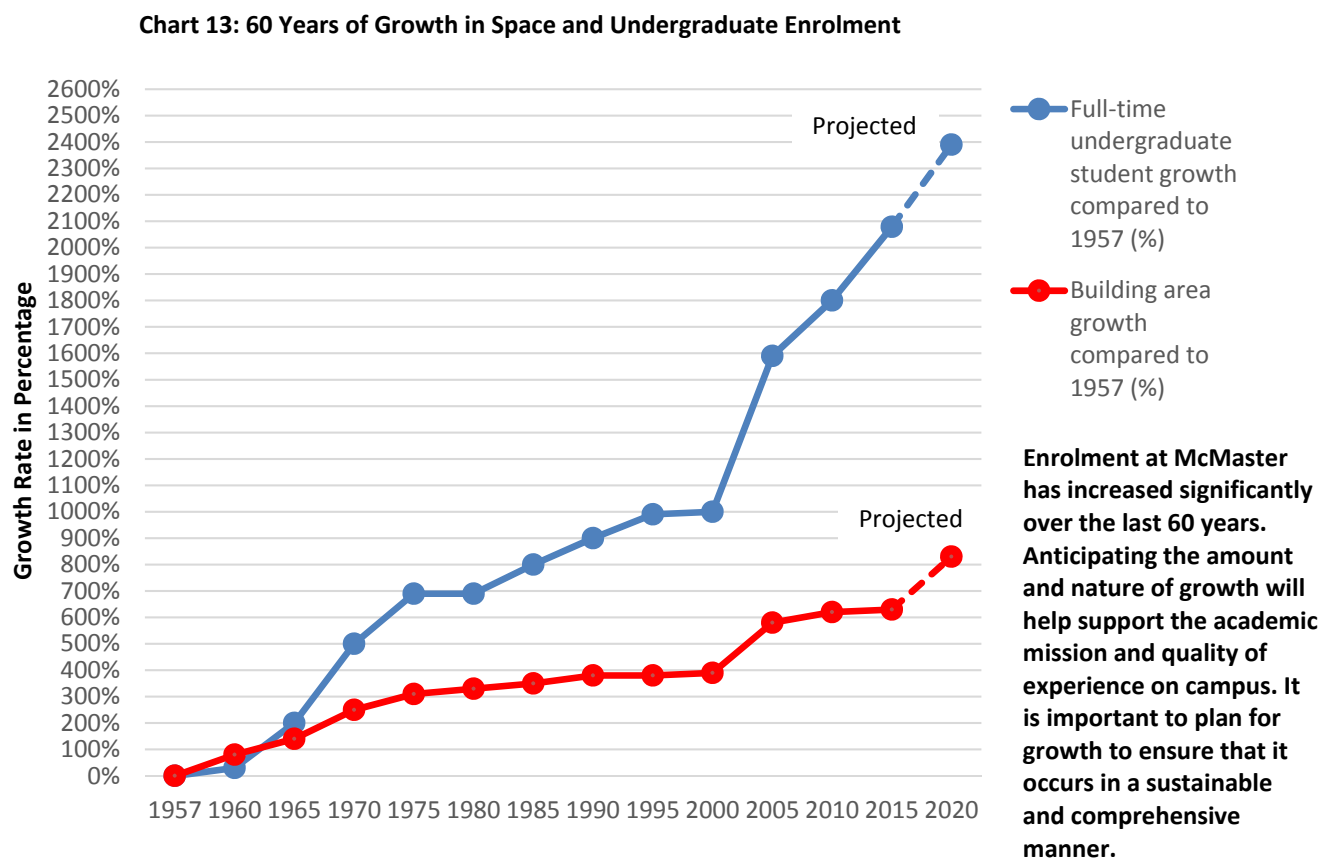
Further, according to the Growth Plan, Halton Region will grow to approximately 1 million people and to 350,000 employment opportunities by 2041. This amounts to approximately 10% of the population and employment in the Greater Toronto and Hamilton area (in 2041). Much of McMaster's new enrolment comes from Halton Region, so the anticipated increases in population in this area does impact the University's enrolment considerations.

## 5 PLANNING AND GROWTH ASSUMPTIONS

### 5.1 Enrolment Growth

McMaster has experienced rapid growth in recent years, because of population increases in the Greater Toronto Area and Hamilton Region. This institutional growth has been further accelerated because of the rising prominence of many of the University's diverse academic offerings, particularly in the fields of Health Sciences and Engineering. With continued enrolment growth expected, and the ongoing development of new academic programs, McMaster is ideally positioned to become one of North America's most prominent universities.

Chart 13 illustrates the trend of enrolment growth vs. building area growth since 1957.



In Fall 2016, 9.7% of all McMaster students were international, represented by 107 countries. International graduate students represented 21.9 percent of the graduate

student body. Also in 2016, 28,079 applications were received from Ontario high schools. Applications overall increased from 35,541 to 35,218. The percentage of undergraduate students registering with an admission average of 90% and above rose from 13.5% in 2000 to 35.84% in 2016.

The Province has introduced corridor funding to provide equitable, predictable and stable funding for all institutions. In the corridor funding model, enrolment at between plus and minus 3% (calculated based on a moving 5 year average) of the corridor midpoint are kept whole but funded at the midpoint, which is the 2016-17 enrolment level. If the 5-year average enrolment drops below 3% of the midpoint, the Province will reduce its funding accordingly. If it rises above 3% of the corridor midpoint, the Province will not increase operating grants, unless there is an agreement in place to fund the enrolment increase above the midpoint.

## **5.2 Research Growth**

McMaster's research strength is among our most prized and valued assets, as it has allowed us to build our infrastructure and recruit some of the best and brightest students and faculty. Our research is recognized around the world through investments, by reputation and by its impact. The Vice-President Research is currently working with top researchers from all Faculties to develop a new Strategic Research Plan that will identify key priority areas and how they will be supported. The new Plan will outline our areas of strength and future development and provide strategies to ensure we use our resources to maximize our impact. A draft version of the Plan, "Research for a Brighter World" has been produced and is expected to be completed and published shortly.

## **5.3 Technological Development**

**The McMaster University Task Force on Teaching and Learning (TOTAL):** Initial Observations and Recommendations, was produced in October, 2008. It noted through an analysis of the strengths, weaknesses, opportunities and threats (SWOT) facing teaching and learning at McMaster, that the quality and effectiveness of teaching and learning could be enhanced by examining the quality, management and scheduling of learning spaces (including technology) across campus toward the end goal of having all learning spaces having appropriate infrastructure and technology, managed in a way that allows for flexibility and greatest efficiency in the use of the space.

Also, the McMaster Institute for Innovation and Excellence in Teaching and Learning (MIETL) – previously known as the Centre for Leadership and Learning (CLL) – has been coordinating with Facility Services on the development of more technologically advanced classrooms for more participatory active learning.

Computer systems that were used to operate much of the University have been replaced with an enterprise resource planning (ERP) system named Mosaic. This includes finance, research, human resources, and student administration.

In 2016, the IT Services Review Committee completed a wide ranging and deep look at all information technology services and delivery in all areas of the University. Their final

report identified opportunities to improve customer satisfaction around IT Services. These include the areas of governance, accountability, optimization, and strategic hires. For IT governance, it has been recommended that a multi-tiered structure be developed to ensure that the right stakeholders participate in IT decision-making (strategic planning, budgeting, project prioritization etc.).

A new IT Strategic Plan is currently in the process of being written for eventual adoption and publication.

## **5.4 Efficient Space Management**

In order to actively and responsibly plan for future growth, McMaster is presently reviewing its current space management practices. The McMaster University Space Management Policy was last approved in 1987 and is targeted for an update. Space processes such as maintenance of the space inventory database, control of scheduling, maintenance of facilities, new project approval, evaluation of space requests, etc., were dispersed among several departments and offices. However, the “oversight” of McMaster’s space has been consolidated and shifted to Facility Services, given that this department plays a central role in the long term maintenance of existing space and the planning of new space. For faculty-controlled space, in this model, the individual faculties would maintain local control of their existing space, while Facility Services would provide overall coordination. This shift would bring McMaster’s practices more into alignment with those of other Canadian and American universities.

The University has a need for more and better classroom space. For this type of space, McMaster’s I/G (Inventory of Space / Generated, or needed space based on COU standards) is 85%. In 2014, a Classroom Design Subcommittee was struck, co-chaired by the AVP Facilities and the AVP Leadership and Learning, to study and analyze the current utilization of classroom spaces. This activity has resulted in a Reconfiguration Plan which calls for the upgrading of existing classrooms, and which also lays out a strategic approach to designing new, needed, teaching and learning space.

## **5.5 Student Residences**

In May of 2017, The Government of Ontario released an update to the June 16, 2006 Growth Plan for the Greater Golden Horseshoe, under the terms of the provincial Places to Grow Act, 2005. A core objective of the Growth Plan policies is accommodating and directing new population and employment growth to built-up areas through intensification. Directing growth in this manner is intended to create complete communities that offer options for living, working, shopping and playing; providing greater choice in housing types; and curbing development sprawl.

McMaster’s efforts to accommodate population growth are as follows.

McMaster’s objective is to guarantee all first year entrants with a grade above a particular percentage a space in residence. This cut-off percentage changes from year to year based on factors including: number of applicants, existing capacity, and department cut-off percentages. At this level McMaster is behind many peers.

Since 2012, configurations to campus residences – such as changing bunk and loft rooms to double rooms – have impacted total capacity. McMaster has twelve different residence buildings on campus, with a variety of room types, and lifestyle themes for a total capacity across all buildings of 3,780 students living on campus. Given enrolment growth as noted above, more capacity is needed. To this end, new residence buildings are being planned.

Plans for a new Main Street student residence on Main Street West and Dalewood Avenue, are now moving through the approval stages with the City of Hamilton. This new residence will include up to 800 beds.

McMaster is also working in partnership with a developer on the design of a new graduate student residence and adjacent parking garage, on the south-west corner of King Street West and Bay Street South in downtown Hamilton.

### 5.5.1 The Peter George Centre for Living and Learning (PGCLL)

After extensive development by way of design committee meetings with stakeholders, resulting in the creation of a comprehensive business case and functional program, and the sourcing of an architect, the University approved in 2015, the construction of a new multipurpose building. This building is to include a student residence and several other programs. Construction is underway on the 334,870 gross square foot mixed-use building, to be located at the previous site of temporary buildings T-28, T-29, and T-18. The \$123 million (approximate) project is being financed by the University. It will provide residence accommodations for 514 first year and upper year students.

Research shows that students who stay in residence develop stronger relationships and support networks, leading to a more positive overall student experience. McMaster is one of only two universities in Ontario that cannot guarantee residence to all first-year students, for lack of space. Residence enables student success, and the provision of 514 new residence beds is anticipated to help meet the demand for this type of experience.

## 5.6 Health Sciences Centre (HSC)

The Health Sciences Centre is occupied by McMaster's Faculty of Health Sciences (FHS) and the McMaster University Medical Centre (MUMC), as operated by Hamilton Health Sciences (HHS). MUMC has been playing a major role in the provision of healthcare services for Hamilton and the surrounding region. MUMC is home to Adult Day Clinics (Medical and Surgical), McMaster Children's Hospital and the Women's Reproductive Health and Newborn Care program. The HHS board has now approved a plan to stop operating at this facility, within the next ten years. It is expected that MUMC space, which amounts to approximately 620,000 net square feet, will be returned to McMaster. McMaster will need to investigate possible future use of this space and also the abatement of any existing hazardous materials, in this 1970s era building.



## 6 PROJECTS AND INITIATIVES TO SUPPORT THE CAPITAL PLAN

### 6.1 Addressing Research, Program, and Enrolment Growth

Space at McMaster is tracked relative to its need. McMaster's inventory vs. generated (I/G) ratio represents the amount of net assignable space that McMaster has vs. how much it should have based on standards set by the Council of Ontario Universities. The construction of new buildings and additions, the fluctuation in the number of students and professors, and consideration of different needs for different types of spaces, are some of the factors that impact this ratio.

The Council of Ontario Universities (COU) is expected to publish the results of the most recently prepared triennial report on space, i.e., from 2016, this year. The results may be compared those from 2013. McMaster's I/G for classroom space and athletics and recreation space kept relatively stable compared to the previous (2013) triennial report, at 85.3% and 68.6% respectively. In these cases, student population growth kept close pace with net building floor area growth.

For library space, McMaster's I/G is 78.6%. This is a decrease over the previous report, resulting from a change in COU standards that required study space to be split into library and (a new separate category) non-library space.

As noted in part in the Campus Capacity Study, the most critical space needs at McMaster are for administrative offices, graduate student offices, assembly facilities, service space, classrooms, research space, recreation space, and quiet study space.

The University needs classrooms of different sizes, particularly larger sizes, but for classrooms that have enough built-in flexibility to allow for adjusting into smaller size classrooms as may be needed in the future. The new Peter George Centre for Living and Learning (PGCLL), described in Section 6.1.2, addresses the need for new large classrooms. A new addition is being made to ABB as part of a SIF project. Another project is underway (design stage) to increase athletics and recreation space. This project is to build additions to the David Braley Athletics Centre and the Ivor Wynne Centre.

#### 6.1.1 Projections of Growth in Research

Recent trends (five years of McMaster's financial statements as reported to the Canadian Association of University Business Officers (CAUBO)) indicate a sponsored research income of approximately \$200 - \$215 million per year, not including intake for affiliated hospitals.

#### 6.1.2 Ongoing / Recently Completed Projects and Initiatives

The following is a sample of ongoing major capital projects in McMaster.

- L.R. Wilson Hall
  - This building is now occupied. This new building has 177,927 gross square feet for classrooms and labs; more specifically the building has community outreach spaces and research areas. Additionally, this

building addresses some of McMaster's critical need, as noted previously, for administrative and graduate student offices; for lounge and service space; and assembly facilities by way of a new 350 seat concert hall. It is intended that this facility will attain LEED® Gold certification.

- The Gerald Hatch Centre for Engineering Experiential Learning (formerly ExCEL)
  - This building is now occupied. The facility is 28,007 gross square feet on a footprint of 6,000 square feet located immediately to the south of JHE. The Hatch Centre will serve as a living laboratory for researching and applying sustainable building technologies as well as being a student centre for experiential learning. The McMaster Engineering Society approved a levy to fund a portion of the cost. The Centre houses student clubs and societies, collaborative workspace and show space for design teams, study space, and space for extracurricular experiential learning activities.
- Peter George Centre for Living and Learning (Academic/Residence/Admin/Children Centre)
  - In recognition of the strong need at McMaster for more classroom, exam-writing, residence, administrative, and daycare space, this project is under construction at the previous location of temporary buildings #T28, #T29, and #T18, including 335,000 gross square feet at an approximate cost of \$122 million.
- Fraunhofer Centre IZI at MIP - Biomedical Engineering and Advanced Manufacturing (BEAM)
  - Fraunhofer-IZI is the Institute for Cell Therapy and Immunology which develops technology solutions at the interfaces of medicine, life sciences, and engineering. The Institute anticipates that the new facility, initially, will occupy 20,000 sq.ft.at MIP. The total renovation cost is estimated at \$17.4 million, including \$4 million to be requested from the City of Hamilton.
- ABB-SIF (Renovation, Addition, Deferred Maintenance)
  - This is a \$56 million project at the A.N. Bourns Science Building (ABB), partially funded through the federal government's Strategic Initiative Fund (SIF). The project includes a thorough interior renovation, addressing deferred maintenance throughout the building, and a 63,000 gross square foot addition primarily for engineering lab space. Completion is expected in 2018.
- Centre for the Commercialization of Research
  - This is a \$20 million, 40,000 sq. ft. fit out of existing warehouse space at McMaster Innovation Park (MIP). This is to include wet lab space for rent to researchers (MacLabs), and space to established businesses (MacGrowth).
- Advanced Manufacturing Lab at MIP
  - It is intended that the McMaster Manufacturing Research Institute (MMRI) relocate from existing space (12,000 sq. ft.) at the John Hodgins Engineering Building (JHE), to newly renovated space at MIP, as a component of the Advanced Manufacturing Consortium (AMC). This is an equal partnership between McMaster University, University of Waterloo and Western University, funded by these parties and the Provincial Government. The partnership is devoted to fostering and developing

innovative processes in advanced manufacturing and new products for the market and for industry.

- Home of the Bertrand Russell Archives and Research Centre
  - This year, McMaster University Library is celebrating the 50th anniversary of the acquisition of the archives of renowned peace activist, philosopher and Nobel laureate Bertrand Russell. Renovation is underway to make 88 Forsyth Avenue North the new Home of the Bertrand Russell Archives and the Bertrand Russell Research Centre, both currently located at Mills Library.

### 6.1.3 Planned Projects and Initiatives

#### 6.1.3.1 Major Projects

The following projects respond to the demands outlined above but are mostly as yet unfunded.

This is a dynamic list, subject to change based on the dynamic strategic priorities and considerations for the University's financial health. The following projects are grouped based on their current funding status and also based on their priorities as viewed by the University. This list will be updated annually according to the Capital Planning Program.

#### A- High Priority Projects That Need to Proceed and Will Be Funded From the Central Bank

- CFI 2015 and CFI 2017, University Contributions
  - These are mandatory contributions required by the University towards successful CFI applications.
- Bates Residence – Retrofit
  - This \$24 million, multi-year, multi-phase project calls for major upgrades to nearly all building systems at Bates Residence and includes interior finish replacements and suite re-arrangements.
- New Graduate Residence and Adjacent Parking Structure
  - A new Graduate Residence will support student recruitment and retention and will also further enhance the student experience at McMaster. A 310,000 sq. ft., 559 bed, off-campus residence is currently being designed. A seven storey parking structure at a projected cost of \$15 million also forms part of this project.
- Mills Library Phase One
  - This is part of a multi-project, multi-phase effort to thoroughly renovate and expand all library space on campus.

#### B- High Priority Projects and Externally Funded

- LRT Associated Facilities
  - The Metrolinx light-rail transit (LRT) line on Main Street West has been planned to terminate in the vicinity of the south end of McMaster's main

campus. This terminus may incorporate a mixed-use McMaster building with programs appropriate to the accommodation of LRT users.

- Forge Expansion at MIP Parking Garage
  - The Forge is a startup incubator and on-campus entrepreneurship initiative. The program employs a hands-on workshop-based structure with the goal of educating young entrepreneurs about building a successful startup. This proposed expansion into 10,000 sq. ft. of the existing MIP parking garage is estimated to cost \$1.4 million.

C- Projects for Consideration to be Funded Through the Central Bank and to be Approved

- Greenhouse Demolition and New Construction
  - It is planned that the existing Greenhouse is to be demolished and relocated to the vacant lot between the Life Sciences Building and Divinity College
- Global Hub / International Affairs / One-Stop Shop (Student Affairs) Renovation
  - This major renovation is planned for select spaces at Gilmour Hall, Togo Salmon Hall, and Kenneth Taylor Hall. The relevant areas on these levels total approximately 26,600 square feet (departmental gross). The project is to include front-facing student service space, back-of-house office space, and consolidation of existing functions.

D- Projects for Consideration to be Funded Through the Central Bank or Fundraising and to be Prioritized in the Near Future

- L.R. Wilson Hall Phase 2 - Arts Quad Renovations
  - The completed construction of McMaster's new Humanities building, L. R. Wilson Hall (phase 1), allows for the migration of teaching and learning space uses from the existing Arts Quad, to this new building. This period of transition allows for this new project, L. R. Wilson Hall Phase 2 – Arts Quad Renovation, which would allocate \$63 million toward critically needed design and construction renovation improvements in the teaching and learning spaces at the existing Arts Quad.
- New Building Burlington Campus
  - This is a proposal for a 500,000 sq. ft., \$100 million building including the Fraunhofer, IAO Applied Research Centre (Advanced Manufacturing Proposal).
- DSB (Innis) Expansion
  - To address the need for more new administrative and academic space at the DeGroote School of Business, this \$43 million, 100,000 sq. ft. project will allow for additional floor levels to be built over the existing building, in the area of Innis Library.
- Athletics and Recreation – Phase Two and Three Expansions
  - Multiple phases of expansion to the existing David Braley Athletics Centre and Ivor Wynne Centre athletics complex, are planned, at an estimated total cost of \$148 million. The expansions are to include gymnasium and pool space, and other student athletic, activity, and lounge space.

- MAC Forest – Proposed Teaching and Learning Building
  - This is a planned 5,000 sq. ft. building. The total estimated cost is \$4 million, which includes extensive mandatory site assessments and permitting. The property is owned by McMaster, on Lower Lions Club Road.

#### E- Projects to be Considered when External Funding is Available

- Arts Quad Cover
  - This is a proposal to cover the Arts Quad, i.e., the 39,000 sq. ft. exposed plaza level, to provide security and weather protection, and more large-scale programmable interior space. Cost is estimated at \$47.5 million.
- STEM Academic Building
  - In an effort to help generate more qualified candidates for high-tech careers, and to have STEM work taught within a more integrated curriculum, McMaster is planning to expand its existing robust capabilities by constructing this proposed 200,000 sq. ft. facility at an estimated cost of \$100 million. This new STEM facility would be comprised of space to accommodate the existing McMaster departments of Life Sciences and Health Sciences. The building would help to foster collaborations amongst Engineering, Science, and Health Sciences – building on existing partnerships. The building is proposed to be constructed at the site of the existing temporary building T13.
- Capacity Expansion – Downtown Hamilton (formerly Experiential Learning)
  - McMaster University is requesting \$10 million from the province to support this \$80 million, 183,000 sq. ft. project in downtown Hamilton. This project would provide concrete economic benefit to the City of Hamilton while simultaneously benefitting McMaster students and the quality of the undergraduate experience.
- Mills and Thode Library Renovations
  - This is a multi-project, multi-phase future effort to thoroughly renovate and expand all library space on campus.
- Emerging Technology Centre (formerly CEDT) at MIP
  - This is a \$30 million, 80,000 sq. ft. new build on existing vacant land at MIP. The potential of this project is to advance the commercialization of health sciences research – a key area of growth for McMaster.

#### 6.1.3.2 Renovations, Upgrades, Maintenance, and Minor Projects

McMaster Facility Services is proceeding through fiscal year 2017/2018 with over 130 separate approved repair jobs, building upgrades, minor renovations, equipment replacements / new installations, and emergency allowances. The budgets for these projects-range from \$3,000 to multi-million dollar projects.

## 6.2 Existing Building Infrastructure Asset Management and Renewal

The current deferred maintenance backlog (Priority 1 to 5) in academic buildings and infrastructure excluding residences is estimated at \$270 million. Considering the large

deferred maintenance funding requirements, a methodical prioritization process was necessary to develop an implementation plan. This plan further prioritizes the tasks based on non-critical & critical building systems, and removed all self-funded building from the list.

McMaster University has increased the deferred maintenance funding for the academic portfolio to \$8 million / year, an investment that will maintain control of the top priority deferred maintenance items in the short term.

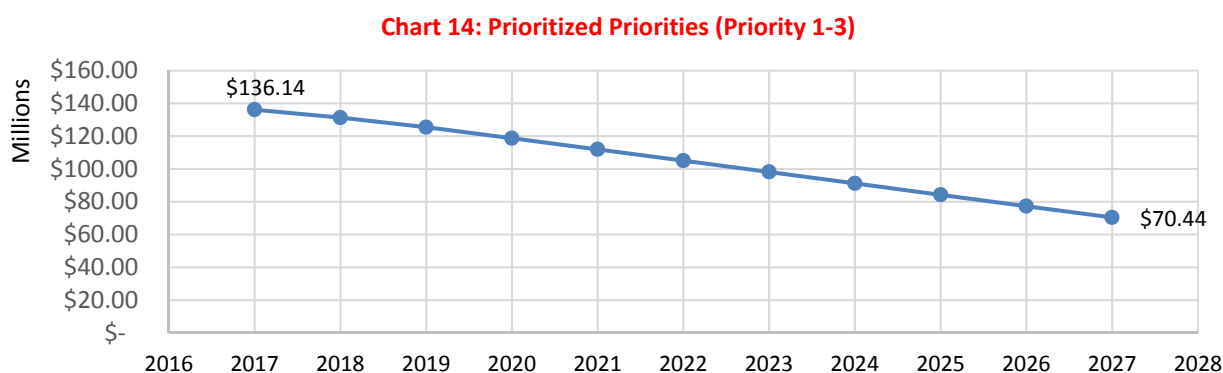
At this funding level, the prioritized priorities (Priorities 1-3) backlog is forecasted to decrease from the 2017 position of \$136 million to about \$70 million in 2027.

In Table 10, the forecasted funds for deferred maintenance from 2015/2016 to 2026/2027 are shown.

| Year                | 15/16    | 16/17    | 17/18     | 18/19    | 19/20    | 20/21    | 21/22    | 22/23    | 23/24    | 24/25    | 25/26    | 26/27    |
|---------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Fund                |          |          |           |          |          |          |          |          |          |          |          |          |
| MTCU/MAESD          | \$1.82 M | \$3.83 M | \$2.73 M  | \$3.65 M | \$4.42M  | \$4.42M  | \$4.42M  | \$4.42M  | \$4.42M  | \$4.42M  | \$4.42M  | \$4.42M  |
| FOC                 | \$1.0 M  | \$1.0 M  | \$1.0 M   | \$1.0 M  | \$1.0M   | \$1.0M   | \$1.0M   | \$1.0M   | \$1.0M   | \$1.0M   | \$1.0M   | \$1.0M   |
| AMP - Base Increase | \$6.0 M  | \$8.0M   | \$8.0M    | \$8.0 M  | \$8.0 M  | \$8.0 M  | \$8.0 M  | \$8.0 M  | \$8.0 M  | \$8.0 M  | \$8.0 M  | \$8.0 M  |
| Total               | \$8.82M  | \$12.83M | \$11.73 M | \$12.65M | \$13.42M | \$13.42M | \$13.42M | \$13.42M | \$13.42M | \$13.42M | \$13.42M | \$13.42M |

**Table 10: Forecasted Funds for Deferred Maintenance**

Subsequently, the expected backlog decreases of the prioritized priorities based on the projected funding levels are illustrated in Chart 14.



Charts 14 and 15 are based on the forecasted deferred maintenance funding levels and the promised increase to the Ministry of Advanced Education and Skills Development (MAESD) funding by 2019/20. An annual investment of \$13.4 million toward deferred maintenance



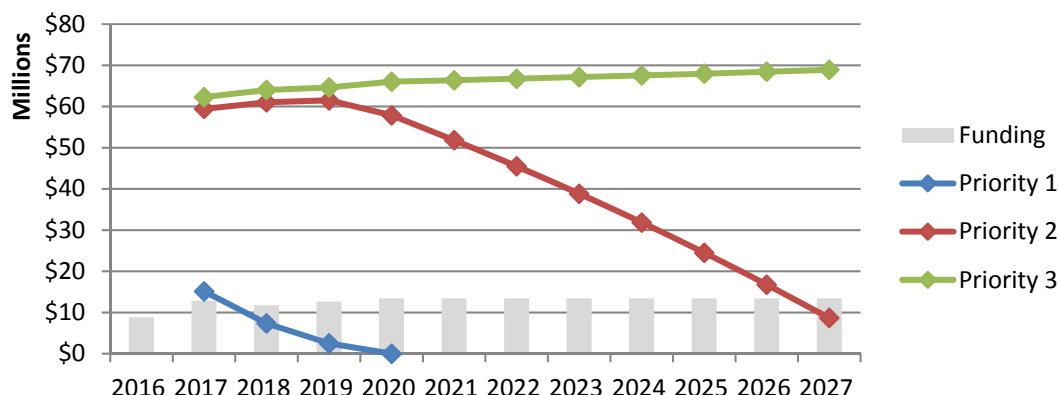
is expected in year 2019/20 and beyond, as per the Report to Planning and Building Committee (now the Planning and Resources Committee) dated September 11<sup>th</sup>, 2014. The projections take into consideration the re-audit of one-third of the campus, completed in the fall of 2017. Further regular condition assessment updates may change these projections.

Cashflow requirements are included in Appendix 'A'. For a more detailed analysis, see the McMaster Asset Management Plan on the Facility Services website.

To ensure that McMaster is dealing with its most vulnerable systems, Facility Services continues to focus on the Prioritized Priorities list. The increased funding to deferred maintenance is projected to make a substantial impact on the deferred maintenance backlog dollars for the next ten years. Had McMaster maintained the historical \$2 to \$3 million annual allocation, the Facility Condition Index would have continued to deteriorate, putting the University into a “poor condition” rating. This growing liability will continue to pressure Facility Services’ ability to maintain the current condition of the buildings and will increase the potential of unforeseen building and system failures, which threatens the normal operation of the University.

In Chart 15, the forecasted Prioritized Priorities 1, 2, and 3 backlog from 2017 to 2027 are illustrated. This chart is based on the current survey of deferred maintenance.

**Chart 15**



## 6.3 Energy Management Projects and Sustainability

Charts 16 to 18 present the forecasted reduction in electricity, gas and water consumption in the coming three years.

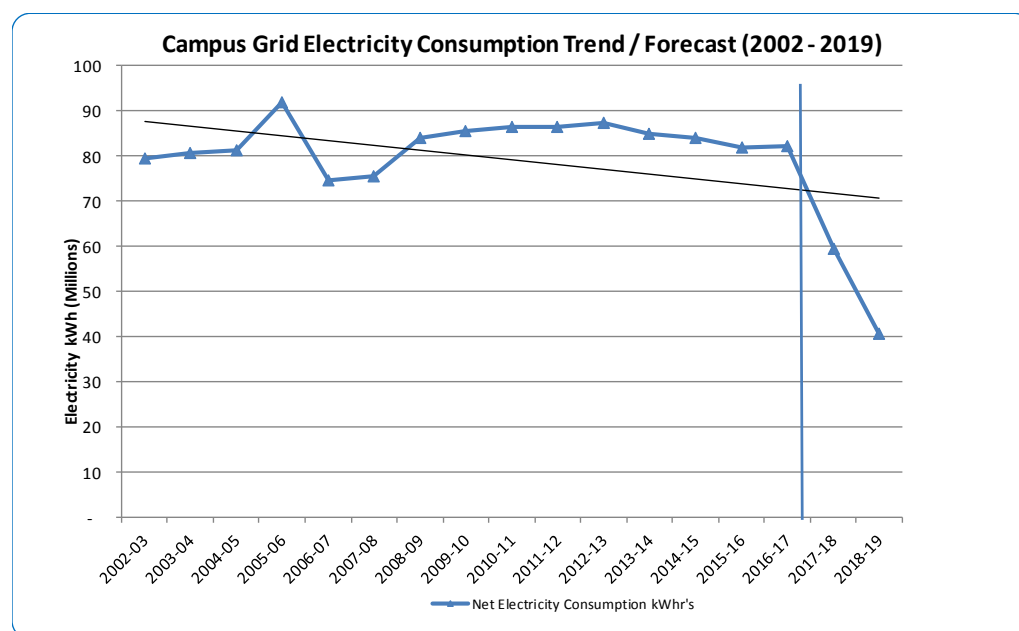


Chart 16: Electricity Consumption Trends and Forecast 2002-19

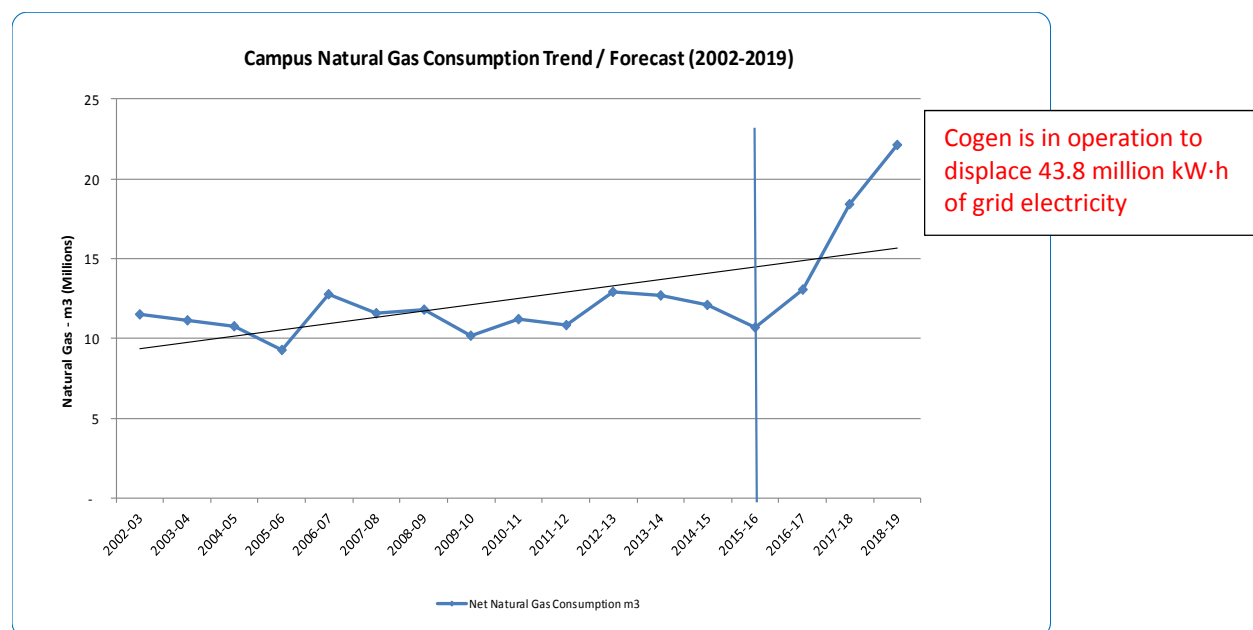
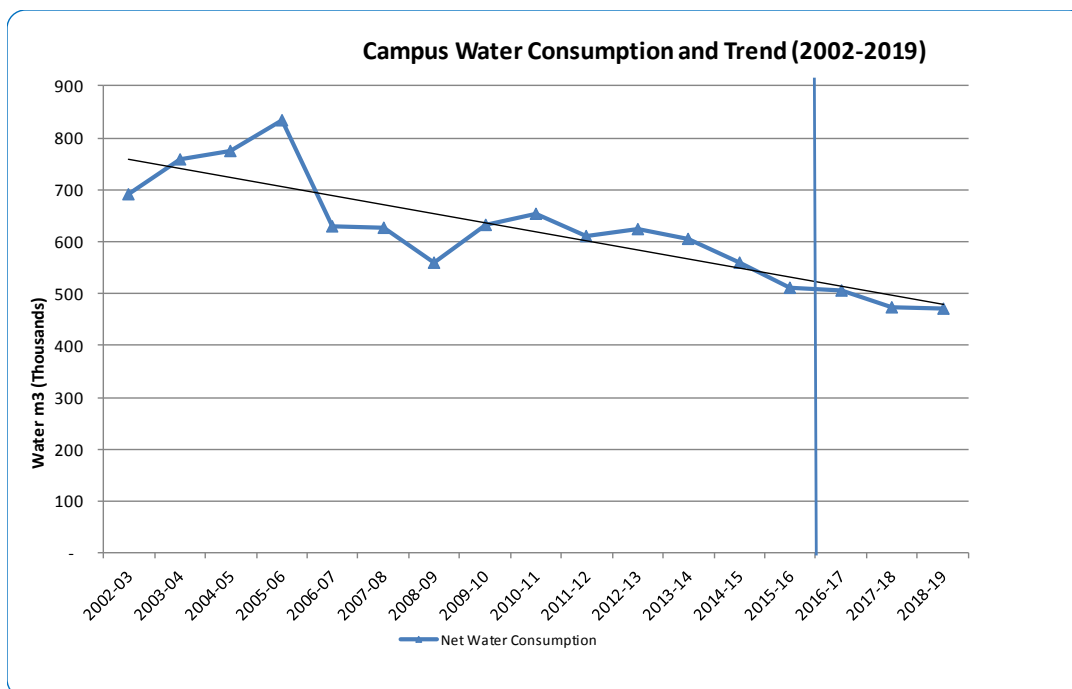


Chart 17: Gas Consumption Trends and Forecast 2002-19



**Chart 18: Water Consumption Trends and Forecast 2002-19**

Tables 11, 12, and 13 detail the natural gas fuel, electricity, and water consumption reduction targets, respectively.

| Year         | Gas saved m <sup>3</sup><br>(Total as of end of<br>each fiscal year) | Cost savings<br>(Total as of end of<br>each fiscal year)* | Percent reduction |
|--------------|--|---|-------------------|
| 2014-15      | 378,830  | \$75,766  | 3%                |
| 2015-16      | 145,900  | \$29,180  | 1.1%              |
| 2016-17      | 394,206  | \$78,841  | 3.1%              |
| 2017-18      | 220,600  | \$44,120  | 1.7%              |
| 2018-19      | 544,000  | \$108,800   | 4.2%              |
| <b>Total</b> | <b>1,683,536</b>   | <b>\$336,707</b>  | <b>13%</b>        |

**Table 11: Gas conservation targets**

\* Based on 0.20 \$/m<sup>3</sup> natural gas rates.

\*\* The above gas consumption numbers do not include the CHP project, commissioned in December, 2017 and now operational, which is estimated to increase annual gas consumption by 9.5 million m<sup>3</sup> to displace annual 43.8 million kWh of electricity currently procured from the provincial electrical grid.

| Year         | Electricity saved<br>KWh (total as of end<br>of each fiscal year) | Cost savings<br>(Total as of end of<br>each fiscal year)*  | Percent reduction |
|--------------|---|--|-------------------|
| 2014-15      | 780,800   | \$85,888   | 1%                |
| 2015-16      | 691,222   | \$76,034   | 1%                |
| 2016-17      | 2,204,756   | \$242,523  | 2.6%              |
| 2017-18      | 2,204,756   | \$312,510  | 3.6%              |
| 2018-19      | 2,841,000   | \$261,850  | 2.8%              |
| <b>Total</b> | <b>9,148,232</b>  | \$978,805 /<br>\$3,360,136 -<br>(including CHP<br>savings) | <b>10.3%</b>      |

**Table 12: Electricity conservation targets**

\* Based on 0.11 \$/kWh electricity rates.

| Year         | Water saved m <sup>3</sup><br>(total as of end of<br>each fiscal year) | Cost savings<br>(Total as of end of<br>each fiscal year)* | Percent reduction |
|--------------|--|---|-------------------|
| 2014-15      | 3,000  | \$8,700   | 0.5%              |
| 2015-16      | 52,485   | \$ 152,206  | 7.5%              |
| 2016-17      | 10,500   | \$ 30,450   | 1.5%              |
| 2017-18      | 31,135   | \$ 90,291   | 4.4%              |
| 2018-19      | 12,500   | \$ 36,250   | 1.8%              |
| <b>Total</b> | <b>109,620</b>   | <b>\$ 317,898</b>   | <b>15.36%</b>     |

**Table 13: Water conservation targets**

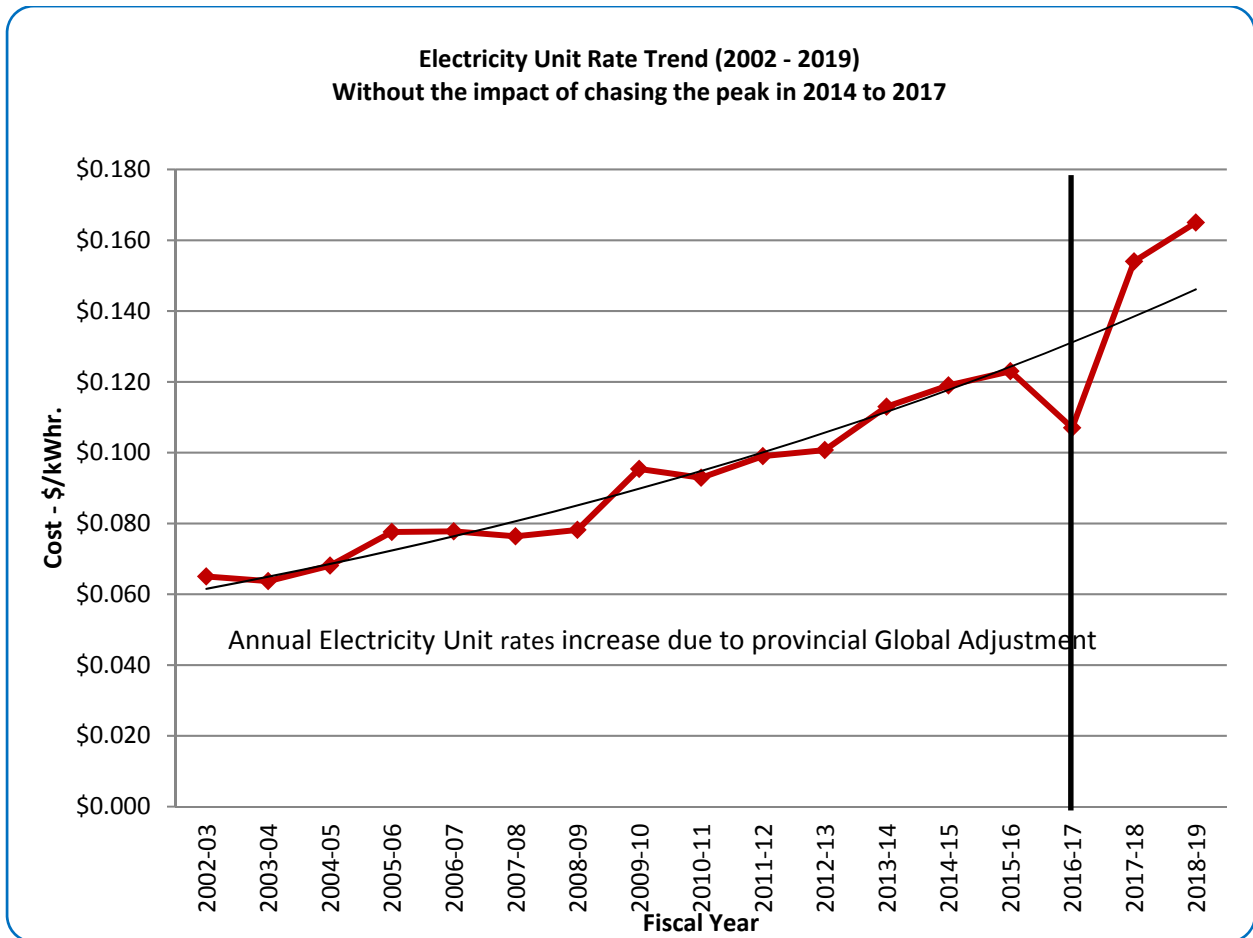
\* Based on 2.9 \$ / m3 water rates.

To address the above targets of reducing energy consumption, Table 14 details the required investment in the Plan, and savings resulting from the Proposed Plan, anticipated through fiscal year 2018-2019.

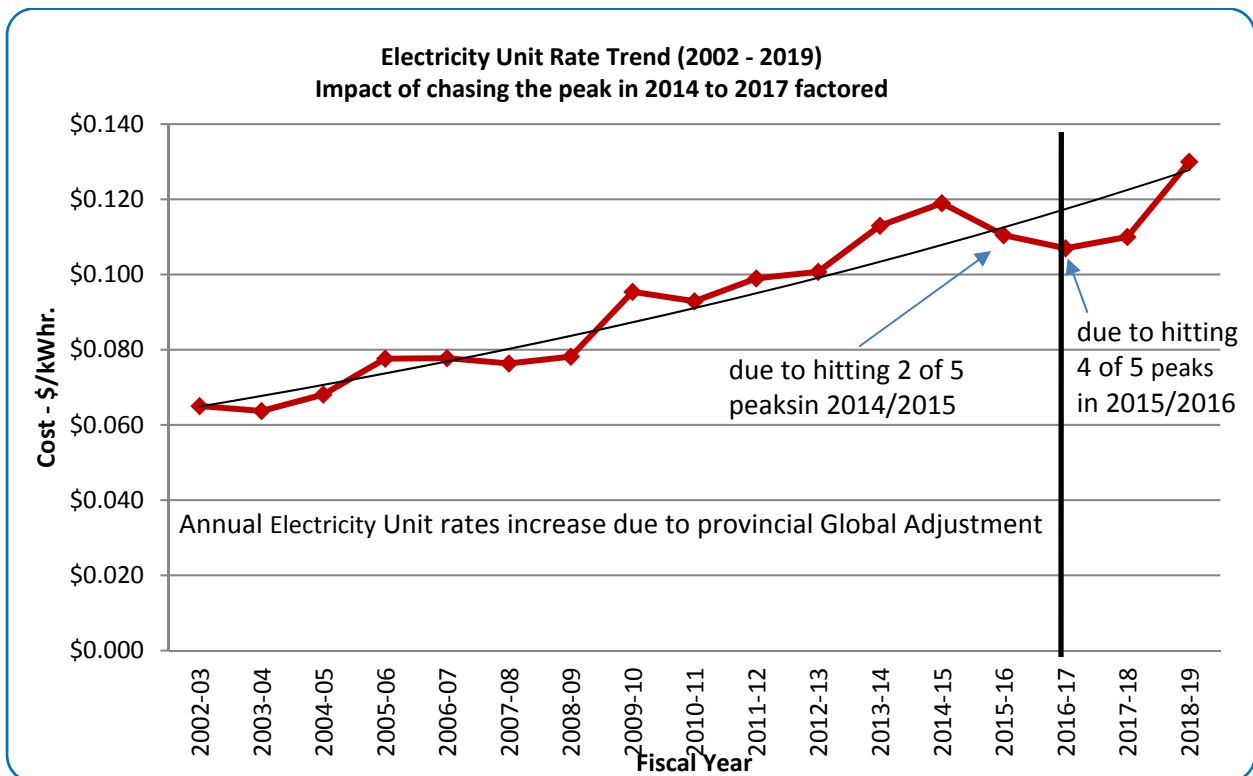
**Table 14: Energy Management Overview**

| Timeframe | Required<br>Investment | Anticipated Savings |
|-----------|------------------------|---------------------|
| 2013-14   | \$ 215,000             | <b>\$170,074</b>    |
| 2014-15   | \$ 440,129             | <b>\$264,075</b>    |
| 2015-16   | \$ 9,159,122           | <b>\$ 874,963</b>   |
| 2016-17   | \$ 14,991,723          | <b>\$ 376,989</b>   |
| 2017-18   | \$ 2,112,051           | <b>\$ 2,274,971</b> |

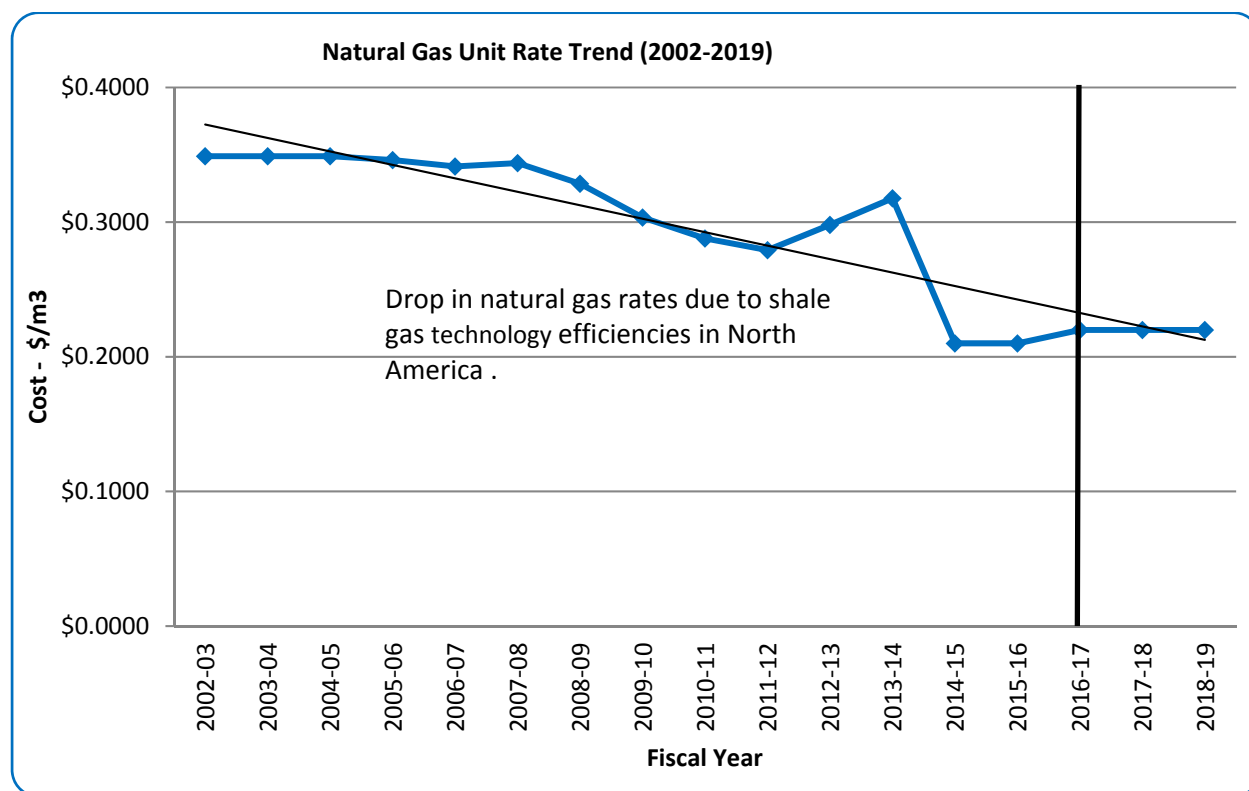
To have a better understanding on the importance of achieving these noted targets in energy and water savings, the electricity, natural gas and water rates (past rates and future anticipated trends) are presented in charts 19 to 22.



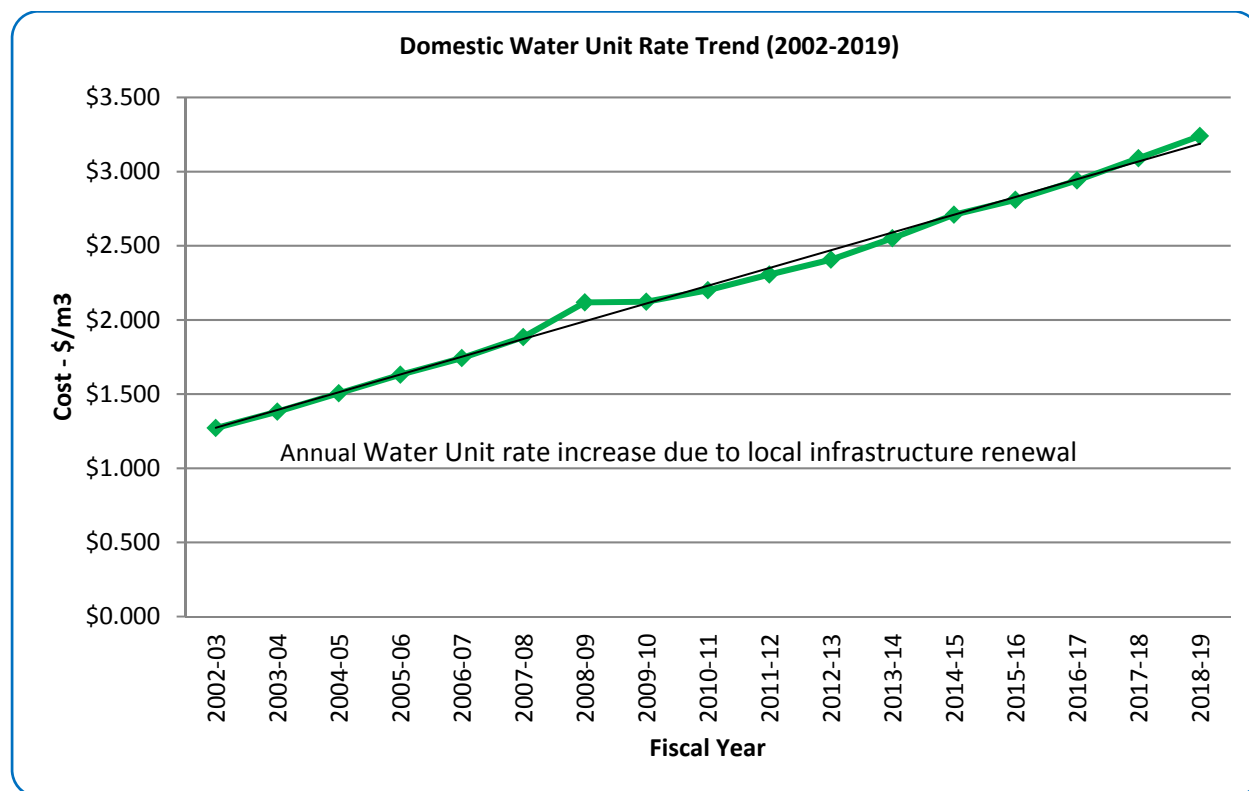
**Chart 19: Actual Electricity Rates and Trend (2002-2019 – without chasing the peak)**



**Chart 20: Actual Electricity Rates and Trend (2002-2019 – with chasing the peak)**



**Chart 21: Actual Gas Rates and Trend (2002-2019)**



**Chart 22: Actual and Forecasted Water Prices 2002-19**

## **6.4 Campus Accessibility Action Plan (CAAP)**

The approved Campus Accessibility Action Plan (CAAP) invests \$334,000 annually for accessibility-related improvements to McMaster buildings. The CAAP Phase 1 ran from 2012-2013 through to 2016-2017. Phase 2 of CAAP (2018-2023) is proposing an increase in investment for \$605,000 per year for next five years.

## **6.5 Environmental Compliance**

The new CHP (Cogen) project currently underway at E.T. Clarke Centre required an ECA and the Ministry asked McMaster to submit a campus wide ECA application. Some of the major noncompliance noise sources such as cooling towers will be mitigated as part of a multi-year plan. McMaster is implementing a 10 year phased plan given that most of the non-compliant sources are at the end of their service life and are identified for replacement as part of the deferred maintenance/Asset Management Plan.

## **6.6 Holdings and Land Acquisition**

The University is nearing saturation of our main campus site. Expansion opportunities lie in the West Campus. Currently other University land holdings provide limited development potential. As a result, the University will be attracted to acquiring, whether by donation or acquisition, land that allows for contiguous or close development in Hamilton and Burlington.

McMaster owns the following important off-campus properties:

- 4350 South Service Road, Burlington – Ron Joyce Centre (east side)
- 4350 South Service Road, Burlington – Farmland (west side)
- 1475 Upper Ottawa St, Hamilton – Stonechurch Family Health Centre
- 200 Longwood Rd South, Hamilton – McMaster Automotive Resource Centre (MARC) Warehouse (MIP)
- 175 Longwood Rd South, Hamilton – The Atrium Building at McMaster Innovation Park (MIP), aka The Atrium@MIP
- 88 Forsyth Avenue North, Hamilton
- 100 Main Street West, Hamilton – David Braley Health Sciences Centre (south side)
- 100 Main Street West, Hamilton – Parking (north side)
- 47 Whitton Road, Hamilton
- 182 Sterling Street, Hamilton
- Lot 56, of Hamilton Plan 1475 – (MIP)
- 155 Chatham Street, Hamilton – (MIP) (undeveloped)
- Property on the north side of Lower Lions Club Road, east of Louise Drive, Ancaster – (undeveloped)
- 120 Forsyth Avenue North, Hamilton – (The Oval at Mayfair Crescent)
- 96 Forsyth Avenue North, Hamilton

McMaster also owns the following:



- Osler Drive, south side, east of University Plaza (undeveloped)
- Osler Drive, north side, east of University Plaza (undeveloped)
- Grant Boulevard at Barrie Street, Hamilton – (undeveloped)
- 1190 Main Street West, Hamilton – (between Forsyth Avenue South and Dalewood Avenue) (undeveloped)

## **6.7 Design Principles and Standards**

All future projects will be executed in accordance with appropriate campus planning principles, design standards, code compliance, and functional requirements; and all future major projects are to meet or exceed the Silver Level Rating of the LEED® Rating System in accordance with McMaster policy.

The overall planning policies for the McMaster Campus follow from the twelve principles as detailed in Section 4.4, Westdale Campus Master Plan. They are intended to guide the University's growth and renewal over time. They are supplemented by area-specific policies for the campus found elsewhere in the Campus Master Plan.

In all cases, the policies are intended to reflect the intent of the University's Environmental Policies, including its Sustainable Building Policy, the City of Hamilton's Official Plan and Zoning By-law, the principles of Hamilton's Vision 2020 document, and the planning and environmental policies of the Hamilton Conservation Authority and Royal Botanical Gardens.

Also, the recommendation has been put forth to review and revise the space standards from the McMaster Space Management Policy (1987), to more appropriate and up-to-date minimum standards, based on current minimum space standards outlined by the Council of Ontario Universities, and the analysis of McMaster's current spatial data to reflect how space is actually being used on campus.

The University has a need for more and better classroom space. The 2014 Classroom Design Subcommittee produced a set of Learning Space Design Standards for review with faculty and students, so as to set forth the University's intentions in regard to ideal, twenty-first century classrooms for different faculties at the University. This is to inform all future construction. The Subcommittee's final report concluded with specific recommendations to improve space, particularly in proposing more active learning classrooms, i.e., learning spaces that are high-tech, flat-floor, non-directional / non-hierarchical, flexible, and conducive to group work.

## **6.9 Capital Refresh**

Given all of the information as noted above on proposed major capital priority projects, Facility Services, in coordination with University stakeholders, engaged in a "Capital Refresh". McMaster prepared and delivered this detailed statement as required to the Ontario Ministry of Advanced Education and Skills Development (MAESD, formerly MTCU) in 2015. Input from stakeholders has been gathered and incorporated into the Refresh, and

into this version of the Capital Plan. The Refresh identified the following in an Inventory of Major Capital Priority Projects:

- Peter George Centre for Living and Learning (PGCLL).
- L.R. Wilson Hall Phase 2 – Arts Quad Renovation.
- STEM Academic Building.
- Fraunhofer, IAO Applied Research Centre, Burlington.
- Centre for Emerging Technologies (formerly CEDT) at MIP.
- New Graduate Residence.
- Enhanced Accessibility (added Elevators).

The Refresh also included greater detail on those projects for which provincial funding is being requested: L.R. Wilson Hall Phase 2 – Arts Quad Renovation, and the STEM Academic Building.

## **7 FIVE YEAR CAPITAL PLAN and BUDGET**

Currently the University funds deferred maintenance from the operating budget. The asset management base was increased by \$2 million in each of 2013/14, 2014/2015, 2015/16, and 2016/17; i.e, until the allocation reached an annual base increase of \$8 million per year. Consequently, new building developments or significant renovations require funding support from government, donors, departmental reserves, or through successful research competitions (or a combination of these sources). The University then absorbs the operating costs for new buildings and renovations by making reallocations within the Operating Budget.

An earlier Provincial direction includes a requirement for universities to make investments in capital projects of up to 30%, unless already funded by donations, or other sources. This direction requires the University to annually consider its potential financing commitments and make suitable provisions for projects that are not fully funded. This type of analysis is more comprehensively performed each year for senior management and the Planning and Resource Committee as part of the University's multi-year projections. The multi-year projections take into consideration both capital and strategic plans. The outcome of the projections, which includes the University's debt policy monitoring ratios, informs the amount of capital (and strategic) initiatives that will be budgeted and included in the consolidated budget for the Board of Governors approval each June.

### **7.1 Summary of Capital Budget**

The McMaster Capital Budget, as outlined in Appendix 'A', accounts for major projects approved and under development as well as additional proposed initiatives. Section 6.1.2, Ongoing Projects and Initiatives (Construction Only) will add one million square feet of space at an estimated cost of \$481.5 million. Section 6.1.3, Planned Projects and Initiatives, is to add two million square feet of space at an estimated cost of \$753.6 million if the Plan is fully funded. The remaining sections 6.2 through 6.8, which focus on asset and energy management, accessibility improvements, and environmental compliance, are estimated to

cost approximately \$210.5 million. The Financial Capacity of the University is addressed in the multi-year financial projections.

## 7.2 Financing Considerations

Funding for capital projects has been and will continue to be a significant challenge for the University. From a financing perspective the projects in Appendix 'A' can be categorized into one of three categories (and is reflected in the Appendix):

**Category 1:** includes projects that will generate either revenues or savings that can be used to repay the capital investment, such as a new residence.

**Category 2:** includes projects for which external and internal funding sources have been confirmed, such as the David Braley Health Sciences Centre or L. R. Wilson Hall.

**Category 3:** includes projects for which a funding source has not yet been identified.

The timing for projects in category 1 will be governed by the availability of internal loans, which are balanced by the University's ability to self-fund the central bank. The University was able to secure \$120 million in additional long-term financing in November 2015 (maturing in 2065). This financing was obtained to assist in funding the University's capital plan by adding funding to the central bank. Management considers projects identified in category 1 will proceed on the time line planned in Appendix 'A' (unless further prioritization is requested before the consolidated budget is finalized).

Projects in category 2, those for which external and internal funding sources have been confirmed, are expected to proceed on the time line listed in Appendix 'A'.

Projects in category 3, those for which funding source/and or a payback plan has not yet been identified will begin when a funding source or a payback plan has been identified.<sup>1</sup>

The priorities may not include all initiatives identified in this Plan due to the implications to the University's overall ability to sustain operations funded by the Operating Fund. Each year, as the University completes the annual consolidated budget process and the multi-year projections, the University is forced to make a number of choices to balance financial health and competing priorities. The choices across both capital and strategic needs are then reflected in the Annual Consolidated Budget document.

## 8 UPDATING THE CAPITAL PLAN

The Capital Planning Process, which was approved by the PVP, the Senate, and the Board of Governors, indicates that the following steps will be undertaken to update the Capital Plan.

---

<sup>1</sup> In accordance with PAC-ICES Recommendation – Operational –Capital –“Limit all new projects to those that are fully funded and supported by an appropriately costed and approved business plan. This will significantly reduce the risks associated with additional debt.”

- The Capital Plan will be completed collaboratively with key stakeholders commencing September annually.
- The AVP Facility Services will initiate the annual capital planning process commencing with Faculty input via memo to the Deans/Provost. The Capital Plan will be based upon the University mission and vision as represented by *Forward with Integrity* and research priorities. In addition, the Capital Plan will take into consideration our current physical (infrastructure) inventory, the approved Campus Plan, and the University's Capacity Plan.
- The AVP Facility Services will engage the Office of Institutional Research and Analysis, and Government Relations in this process to ensure academic and research priorities are incorporated and linked to government programs.
- The Capital Plan will incorporate a funding/financing summary based upon the Multi-Year Projections and Debt Strategy Report completed by Financial Affairs. The Capital Plan financing summary may identify projects that require prioritization, if this is the case, the prioritization recommendations and/or alternatives will be included with the Multi-Year Projections and Debt Strategy Report that encompasses both capital and strategic plans and financing alternatives.
- The completed Capital Plan will be presented to the PVP Committee for initial review and approval. Then it will flow through the following recommendation, endorsement, and approval sequence:
  1. PVP Committee (review and approve for submission through University Governance)
  2. University Planning Committee (for approval)
  3. Planning and Resource Committee (to recommend approval by the Board of Governors)
  4. Board of Governors (for approval)
- Senate approval of the proposed disbandment of the Project Prioritization Committee.

Also, according to the new policy framework on major capacity expansions, which was issued by the Ministry of Advanced Education and Skills Development (MAESD, formerly MTCU), certain projects will be subject to further approval by the Ministry.

## 9 CONCLUSION AND RECOMMENDATIONS

McMaster has recently successfully completed a great deal of new construction, addition/renovation projects, and has acquired new space by lease arrangements. It is estimated that there is 3 million square metres of gross floor area of space available for development at the Main Campus. This location needs to be the focus of future growth.

Population in the Hamilton and Halton regions is growing, spurring increasing need for post-secondary education facilities; so McMaster would need to aim even higher to accommodate this anticipated future growth. McMaster's many currently ongoing

addition/renovation projects, and plans for a new residence building and two new teaching facilities, will help to bridge this gap over the next few years.

Future construction will be directed by the President's initiative (Forward with Integrity), and the principles therein; and will follow the most appropriate standards for sustainability, accessibility, building code and environmental compliance, and campus planning. McMaster's Approval Authorities policy, a newly developed space management system, and a new set of learning space standards, will further inform future construction.

In regard to existing infrastructure asset management, it should be noted that 58% of McMaster buildings are over 40 years old, and 61% are in fair to poor condition. Consequently, funding for deferred maintenance is a high priority. McMaster University is currently funding deferred maintenance for the academic portfolio to \$8 million / year, an investment that will maintain control of the top priority deferred maintenance items in the short term.

In the interest of sustainability, energy conservation and cost savings, McMaster has implemented a number of energy management programs.

## **10 APPENDICES**



11.1 Capital Budget – Summary (Section 6)

| Project   |  | Gross Area<br>(Square Feet) | Estimated Cost | Funding<br>Category | Pre 2016    | 2016-2017  | 2017-2018   | 2018-2019   | 2019-2020   | 2020-2021   | 2021-2022   | 2022-2023   | 2023-2024  | 2024-2025  | 2025-2026            |
|---|--|-----------------------------|----------------|---------------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|------------|----------------------|
| 6.1 Addressing Research Program and Enrolment Growth  |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 6.1.2 Ongoing Projects and Initiatives (Construction Only)  |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 1   | L. R. Wilson Hall and Parking  | 177,927                     | 66,054,595     | 1&2                 | 47,269,996  | 13,400,950 | 2,500,000   | 2,883,649   | -           | -           | -           | -           | -          | -          | -                    |
| 2   | David Braley Health Sciences Centre – Downtown Hamilton                        | 215,278                     | 84,644,854     | 2                   | 78,325,274  | 3,062,100  | 2,500,000   | 757,480     | -           | -           | -           | -           | -          | -          | -                    |
| 3   | Centre for Advanced Nuclear Systems(Luxat) (CFI) - finished per                | N/A                         | 9,003,558      | 2                   | 8,740,448   | 263,510    | 30          | -           | -           | -           | -           | -           | -          | -          | -                    |
| 4   | The Gerald Hatch Centre for Engineering Experiential Learning                  | 28,007                      | 11,749,999     | 2                   | 3,030,526   | 7,626,883  | 1,092,590   | -           | -           | -           | -           | -           | -          | -          | -                    |
| 5   | Dr. Robert and Andr  e Rh  aume Fitzhenry Studios and Atrium                   | 1,700                       | 3,428,842      | 2                   | 3,350,698   | 78,144     | -           | -           | -           | -           | -           | -           | -          | -          | -                    |
| 6   | DTC/ Relocation, Lease Option \$100/sq. ft.                                    | 55,000                      | 6,100,000      | 2                   | 5,175,084   | 662,846    | 100,000     | 162,070     | -           | -           | -           | -           | -          | -          | -                    |
| 7   | Peter George Centre for Living and Learning                                    | 334,870                     | 122,320,000    | 1&3                 | 1,620,167   | 5,495,875  | 40,000,000  | 35,550,000  | 31,550,000  | 8,103,958   | -           | -           | -          | -          | -                    |
| 8   | SANS for Nanostructured Materials (Gaulin CFI)                                 | 3,810                       | 8,920,669      | 1&2                 | 318,803     | 1,259,954  | 4,395,088   | 2,946,824   | -           | -           | -           | -           | -          | -          | -                    |
| 9   | Fraunhofer Center IZI at MIP   | 20,000                      | 17,400,000     | 2                   | 517,764     | 3,581,602  | 12,400,634  | 900,000     | -           | -           | -           | -           | -          | -          | -                    |
| 10  | ABB - SIF (renovation, addition, deferred maintenance)                         | 63,173                      | 56,220,000     | 2                   | -           | 3,270,694  | 46,220,000  | 6,729,306   | -           | -           | -           | -           | -          | -          | -                    |
| 11  | Stadium Renovation - Turf  | N/A                         | 1,011,000      | 2                   | -           | 874,739    | 136,261     | -           | -           | -           | -           | -           | -          | -          | -                    |
| 12  | DSB Main Floor Renovations   | N/A                         | 760,488        | 2                   | 52,271      | 707,489    | 728         | -           | -           | -           | -           | -           | -          | -          | -                    |
| 13  | Thode: Maker Space   | 2,450                       | 1,000,000      | 2                   | -           | -          | 1,000,000   | -           | -           | -           | -           | -           | -          | -          | -                    |
| 14  | Athletics and Recreation - Pulse, Student Space Expansion; New Gym             | 102,814                     | 59,462,908     | 1                   | -           | -          | 1,462,908   | 20,000,000  | 20,000,000  | 15,000,000  | 3,000,000   | -           | -          | -          | -                    |
| 15  | Temporary Lecture Hall   | 4,300                       | 1,800,000      | 1                   | -           | -          | 180,000     | 1,620,000   | -           | -           | -           | -           | -          | -          | -                    |
| 16  | Centre for the Commercialization of Research                                   | 40,000                      | 20,000,000     | 3                   | -           | -          | 300,000     | 12,000,000  | 7,700,000   | -           | -           | -           | -          | -          | -                    |
| 17  | Advanced Manufacturing Lab   | 15,000                      | 9,060,000      | 2&3                 | -           | -          | -           | 4,530,000   | 4,530,000   | -           | -           | -           | -          | -          | -                    |
| 18  | Home of the Bertrand Russell Archives (Sherman)                                | N/A                         | 2,600,000      | 2&3                 | 795,415     | 8,664      | 1,695,921   | 100,000     | -           | -           | -           | -           | -          | -          | -                    |
| Subtotal for Ongoing Projects and Initiatives (Construction Only):  |  | 1,064,329                   | 481,536,913    |                     | 149,196,446 | 40,293,450 | 113,984,160 | 88,179,329  | 63,780,000  | 23,103,958  | 3,000,000   | -           | -          | -          | -                    |
| 6.1.3 Planned Projects and Initiatives  |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 6.1.3.1 Major Projects  |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| A- High Priority Projects That Need to Proceed and Will Be Funded From the Central Bank                                     |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 19  | CFI 2015, University Contribution  | N/A                         | 1,280,538      | 2                   | -           | -          | 1,280,538   | -           | -           | -           | -           | -           | -          | -          | -                    |
| 20  | Bates Residence - Retrofit   | N/A                         | 24,000,000     | 2                   | -           | -          | -           | 2,000,000   | 10,000,000  | 10,000,000  | 2,000,000   | -           | -          | -          | -                    |
| 21  | Graduate Student Residence Partnership   | 310,000                     | -1,482,111     | 1                   | -           | -          | 15,000      | 8,404,553   | 8,419,553   | -18,321,217 | -           | -           | -          | -          | -                    |
| 22  | Adj. Graduate Student Residence Parking Structure                              | N/A                         | 15,000,000     | 2                   | -           | -          | -           | -           | 15,000,000  | -           | -           | -           | -          | -          | -                    |
| 23  | Main Street McMaster Residence   | 250,000                     | 13,121,000     | 1                   | -           | -          | 6,434,360   | 9,415,640   | -           | -           | -2,729,000  | -           | -          | -          | -                    |
| 24  | CFI 2017, University Contribution  | N/A                         | 6,011,769      | 2                   | -           | -          | -           | 6,011,769   | -           | -           | -           | -           | -          | -          | -                    |
| 25  | Mills Library Phase 1 (Sherman)  | 8,000                       | 4,000,000      | 3                   | -           | -          | -           | 2,000,000   | 2,000,000   | -           | -           | -           | -          | -          | -                    |
| 26  | Research Projects not yet identified   | N/A                         | 4,807,693      | 2                   | -           | -          | -           | -           | 4,807,693   | -           | -           | -           | -          | -          | -                    |
| B- High Priority Projects and Externally Funded   |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 27  | LRT Transit Hub - Garage and Foundation (Phase 1)                              | 200,000                     | 8,981,000      | 2                   | -           | -          | -           | -           | 5,927,460   | 3,053,540   | -           | -           | -          | -          | -                    |
| 28  | LRT Transit Hub - Academic and Commercial Building (Phase 2)                   |                             | 34,900,000     | 3                   | -           | -          | -           | -           | -           | -           | 4,900,000   | 25,000,000  | 5,000,000  | -          | -                    |
| 29  | LRT Transit Hub - Academic Classroom (Phase 3)                                 |                             | 56,250,000     | 3                   | -           | -          | -           | -           | -           | -           | 0           | 11,250,000  | 45,000,000 | -          | -                    |
| 30  | Forge expansion at MIP parking garage  | 10,000                      | 1,400,000      | 2                   | -           | -          | -           | 700,000     | 700,000     | -           | -           | -           | -          | -          | -                    |
| C- Projects for Consideration to be Funded Through the Central Bank and to be Approved                                      |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 31  | Greenhouse demolition and new construction                                     | 3,000                       | 2,000,000      | 2                   | -           | -          | -           | 1,000,000   | 1,000,000   | -           | -           | -           | -          | -          | -                    |
| 32  | Global Hub / inernational Affairs / One-Stop Shop (Student Affairs) Reno Study | 26,600                      | 3,000,000      | 2                   | -           | -          | -           | 1,500,000   | 1,500,000   | -           | -           | -           | -          | -          | -                    |
| D- Projects for Consideration to be Funded Through the Central Bank or Fundraising and to be Prioritized in the Near Future |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 33  | Arts Quad Renovations  | N/A                         | 63,000,000     | 3                   | -           | -          | -           | -           | 3,000,000   | 31,500,000  | 28,500,000  | -           | -          | -          | -                    |
| 34  | New Building, Burlington Campus  | 500,000                     | 100,000,000    | 3                   | -           | -          | -           | 5,000,000   | 20,000,000  | 60,000,000  | 15,000,000  | -           | -          | -          | -                    |
| 35  | DSB Expansion (at Innis Library)   | 100,000                     | 43,000,000     | 3                   | -           | -          | -           | 4,000,000   | 23,000,000  | 10,000,000  | 6,000,000   | -           | -          | -          | -                    |
| 36  | Athletics and Recreation - Phase 2 Expansion                                   | N/A                         | 50,400,000     | 3                   | -           | -          | -           | -           | 1,008,000   | 5,040,000   | 15,120,000  | 15,120,000  | 14,112,000 | -          | -                    |
| 37  | Athletics and Recreation - Phase 3 Expansion                                   | N/A                         | 37,900,000     | 3                   | -           | -          | -           | -           | -           | 758,000     | 3,790,000   | 11,370,000  | 11,370,000 | 10,612,000 | -                    |
| 38  | MAC Forest - proposed teaching and research building                           | 5,000                       | 4,000,000      | 3                   | -           | -          | 66,000      | 66,000      | 68,000      | 2,500,000   | 1,300,000   | -           | -          | -          | -                    |
| E- Projects to be Considered when External Funding is Available   |  |                             |                |                     |             |            |             |             |             |             |             |             |            |            |                      |
| 39  | Arts Quad Cover  | 39,000                      | 47,500,000     | 3                   | -           | -          | -           | 500,000     | 7,000,000   | 20,000,000  | 16,000,000  | 4,000,000   | -          | -          | -                    |
| 40  | STEM Academic Building   | 204,514                     | 100,000,000    | 3                   | -           | -          | -           | -           | 2,000,000   | 32,000,000  | 42,000,000  | 17,000,000  | 7,000,000  | -          | -                    |
| 41  | Capacity Expansion - Downtown Hamilton (Formerly Experiential Learning)        | 183,000                     | 80,000,000     | 3                   | -           | -          | -           | -           | 8,000,000   | 20,000,000  | 40,000,000  | 12,000,000  | -          | -          | -                    |
| 42  | Mills Phase 2: Entry, Washroom, CAV Renovations                                | 9,000                       | 3,200,000      | 3                   | -           | -          | -           | 300,000     | 2,900,000   | -           | -           | -           | -          | -          | -                    |
| 43  | Mills Phase 3: Staff, Learning, and Collections Area Renovations Part 1        | 18,000                      | 4,600,000      | 3                   | -           | -          | -           | 400,000     | 3,000,000   | 1,200,000   | -           | -           | -          | -          | -                    |
| 44  | Mills Phase 4: Staff, Learning, and Collections Area Renovations Part 2        | 30,000                      | 6,500,000      | 3                   | -           | -          | -           | -           | 500,000     | 4,000,000   | 2,000,000   | -           | -          | -          | -                    |
| 45  | Thode Phase 1: High-Density Shelving   | N/A                         | 2,000,000      | 3                   | -           | -          | -           | 200,000     | 1,200,000   | 600,000     | -           | -           | -          | -          | -                    |
| 46  | Thode Phase 2: Major Renovations   | 61,721                      | 8,300,000      | 3                   | -           | -          | -           | -           | 800,000     | 5,000,000   | 2,500,000   | -           | -          | -          | -                    |
| 47  | Emerging Technology Centre (ETC) at MIP  | 80,000                      | 30,000,000     | 3                   | -           | -          | -           | 1,000,000   | 20,000,000  | 9,000,000   | -           | -           | -          | -          | -                    |
| Subtotal for Planned Projects and Initiatives:  |  | 2,037,835                   | 753,669,889    |                     | 0           | 0          | 7,795,898   | 42,497,962  | 141,830,706 | 196,330,323 | 176,381,000 | 95,740,000  | 82,482,000 | 10,612,000 | 0                    |
| 6.2 Existing Building Infrastructure Asset Management and Renewal   |  | N/A                         | 132,870,000    | 2&3                 | 16,000,000  | 13,300,000 | 12,200,000  | 13,250,000  | 13,020,000  | 13,020,000  | 13,020,000  | 13,020,000  | 13,020,000 | 13,020,000 | 13,020,000           |
| 6.3 Energy Management Projects and Sustainability <sup>1</sup>  |  | N/A                         | 27,055,491     | 1                   | 1,741,935   | 10,804,792 | 14,088,764  | 420,000     | -           | -           | -           | -           | -          | -          | -                    |
| 6.4 Campus Accessibility Action Plan (CAAP)   |  | N/A                         | 6,239,000      | 2                   | 1,336,000   | 334,000    | 334,000     | 605,000     | 605,000     | 605,000     | 605,000     | 605,000     | 605,000    | 605,000    | 605,000 <sup>2</sup> |
| 6.5 Environmental Compliance Action Plan: for air & noise emissions on campus   |  | N/A                         | 4,400,000      | 2                   | 800,000     | 400,000    | 400,000     | 400,000     | 400,000     | 400,000     | 400,000     | 400,000     | 400,000    | 400,000    | 400,000              |
| 6.6 Classroom Reconfiguration Plan  |  | N/A                         | 12,000,000     | 3                   | 1,420,000   | 100,000    | 2,480,000   | 2,000,000   | 2,000,000   | 2,000,000   | 2,000,000   | -           | -          | -          | -                    |
| 6.7 Private Residence Purchase  |  | N/A                         | 2,600,000      | 1                   | -           | -          | 2,600,000   | -           | -           | -           | -           | -           | -          | -          | -                    |
| 6.8 Residence Renewal   |  | N/A                         | 16,000,000     | 2                   | -           | -          | 2,000,000   | 2,000,000   | 2,000,000   | 2,000,000   | 2,000,000   | 2,000,000   | 2,000,000  | 2,000,000  | 2,000,000            |
| 6.9 Energy Projects (for ministry loan)   |  | N/A                         | 9,300,000      | 2                   | -           | -          | -           | -           | 4,650,000   | 4,650,000   | -           | -           | -          | -          | -                    |
| Subtotal  |  | 0                           | 210,464,491    |                     | 21,297,935  | 24,938,792 | 34,102,764  | 18,675,000  | 22,675,000  | 22,675,000  | 18,025,000  | 16,025,000  | 16,025,000 | 16,025,000 | 16,025,000           |
| Grand Total   |  | 3,102,164                   | 1,445,671,293  |                     | 170,494,381 | 65,232,242 | 155,882,822 | 149,352,291 | 228,285,706 | 242,109,281 | 197,406,000 | 111,765,000 | 98,507,000 | 26,637,000 | 16,025,000           |

Funding Category Index: 1- Project will pay back, eg. Internal Loan., 2- External and Internal Sources Confirmed, 3- Not yet identified

<sup>1</sup> Note: 6.3 includes Cogen and other projects.

<sup>2</sup> Note: Not yet approved.



## 11.2 Schedule of Facilities

| Building Code | Building Name                                 | Building Section | Construction / Renovation / Acquisition Date | Current Total Building Gross Area (Square Feet) | Current Total Building Gross Area (Square Metres) |
|---------------|---|------------------|--|---|---|
| 1             | University Hall                               |                  | 1929   | 48,652.83                                       | 4,520.00  |
|               |   | Addition         | 1991   |   |   |
| 2             | Hamilton Hall                                 |                  | 1929   | 51,865.81                                       | 4,818.49  |
| 4             | Refectory                                     |                  | 1929   | 23,365.44                                       | 2,170.72  |
|               |   | Addition         | 1965   |   |   |
| 5             | Edwards Hall                                  |                  | 1929   | 25,025.44                                       | 2,324.94  |
| 6             | Wallingford Hall                              |                  | 1929   | 23,461.70                                       | 2,179.66  |
| 7             | Alumni House (Formerly President's Residence) |                  | 1929   | 6,523.90  | 606.09  |
| 8             | Alumni Memorial Building                      |                  | 1949   | 14,062.10                                       | 1,306.41  |
|               |   | Addition         | 2003   |   |   |
| 9             | Nuclear Research Building                     |                  | 1950   | 66,814.39                                       | 6,207.26  |
|               |   | Addition         | 1957   |   |   |
|               |   | Addition         | 2001   |   |   |
|               |   | Addition         | 2011   |   |   |
|               |   | Addition         | 2017   |   |   |
| 10            | Mills Memorial Library/Alvin A. Lee Building  |                  | 1950   | 238,624.05                                      | 22,168.90   |
|               |   | Addition         | 1962   |   |   |
|               |   | Addition         | 1968   |   |   |
|               |   | Addition         | 1990   |   |   |
| 11            | Burke Science Building                        |                  | 1953   | 196,401.35                                      | 18,246.28   |
|               |   | Addition         | 1958   |   |   |
|               |   | Addition         | 1961   |   |   |
|               |   | Addition         | 1963   |   |   |
|               |   | Addition         | 1969   |   |   |
| 12            | E. T. Clarke Centre                           |                  | 1954   | 53,465.93                                       | 4,967.15  |
|               |   | Addition         | 1958   |   |   |
|               |   | Addition         | 1965   |   |   |
|               |   | Addition         | 1968   |   |   |
|               |   | Addition         | 1996   |   |   |
|               |   | Addition         | 2002   |   |   |
| 15            | Nuclear Reactor                               |                  | 1957   | 24,332.69                                       | 2,260.58  |

|    |                                       |          |      |              |            |
|----|---------------------------------------|----------|------|--------------|------------|
| 16 | John Hodgins Engineering Building     |          | 1958 | 278,267.32   | 25,851.88  |
|    |                                       | Addition | 1989 |              |            |
|    |                                       | Addition | 2001 |              |            |
|    |                                       | Addition | 2016 |              |            |
|    |                                       | Addition | 2017 |              |            |
| 17 | Divinity College                      |          | 1959 | 38,148.20    | 3,544.08   |
| 18 | Moulton Hall                          |          | 1959 | 58,692.50    | 5,452.71   |
| 19 | Whidden Hall                          |          | 1959 | 69,989.40    | 6,502.23   |
| 20 | Gilmour Hall                          |          | 1959 | 90,127.80    | 8,373.15   |
| 22 | General Sciences Building             |          | 1962 | 59,583.20    | 5,535.46   |
| 23 | Chester New Hall                      |          | 1964 | 87,870.01    | 8,163.39   |
| 24 | Ivor Wynne Centre                     |          | 1964 | 246,954.00   | 22,942.78  |
|    |                                       | Addition | 1972 |              |            |
|    |                                       | Addition | 2011 |              |            |
| 25 | Arthur N. Bourns Building             |          | 1968 | 289,475.00   | 26,893.11  |
|    |                                       | Addition | 2003 |              |            |
|    |                                       | Addition | 2006 |              |            |
| 26 | Matthews Hall                         |          | 1964 | 61,808.30    | 5,742.18   |
| 27 | McKay Hall                            |          | 1964 | 66,824.30    | 6,208.18   |
| 28 | Commons Building                      |          | 1965 | 56,448.90    | 5,244.27   |
|    |                                       | Addition | 1968 |              |            |
| 29 | Togo Salmon Hall                      |          | 1965 | 146,039.68   | 13,567.53  |
|    |                                       | Addition | 2000 |              |            |
|    |                                       | Addition | 2015 |              |            |
| 30 | Biology Greenhouse                    |          | 1967 | 8,377.60     | 778.30     |
| 31 | Campus Services Building              |          | 1968 | 51,935.60    | 4,824.98   |
| 32 | Tandem Accelerator Building           |          | 1966 | 36,493.00    | 3,390.31   |
|    |                                       | Addition | 2002 |              |            |
|    |                                       | Addition | 2011 |              |            |
| 33 | Applied Dynamics Laboratory           |          | 1967 | 21,480.00    | 1,995.56   |
| 34 | Psychology Building                   |          | 1970 | 102,691.47   | 9,540.35   |
|    |                                       | Addition | 2013 |              |            |
| 35 | Woodstock Hall                        |          | 1968 | 64,341.30    | 5,977.50   |
| 36 | Brandon Hall                          |          | 1968 | 118,354.70   | 10,995.51  |
| 37 | Health Sciences Centre                |          | 1970 | 1,273,021.70 | 118,267.59 |
|    |                                       | Addition | 2005 |              |            |
| 38 | Kenneth Taylor Hall                   |          | 1971 | 126,990.70   | 11,797.82  |
| 39 | Life Sciences Building                |          | 1970 | 106,851.52   | 9,926.83   |
| 40 | Bates Residence                       |          | 1971 | 164,055.40   | 15,241.25  |
|    |                                       | Addition | 1972 |              |            |
| 42 | H. G. Thode Library                   |          | 1976 | 87,793.70    | 8,156.30   |
| 43 | Communications Research Laboratory    |          | 1983 | 28,862.00    | 2,681.37   |
|    |                                       | Addition | 1989 |              |            |
| 44 | Health Sciences Parking Garage        |          | 1986 | N/A          | N/A        |
| 45 | Hedden Hall                           |          | 1989 | 104,279.10   | 9,687.85   |
| 46 | DeGroote School of Business           |          | 1990 | 74,422.44    | 6,914.07   |
|    |                                       | Addition | 1999 |              |            |
|    |                                       | Addition | 2001 |              |            |
| 48 | Institute for Applied Health Sciences |          | 2000 | 177,444.22   | 16,485.11  |
| 49 | Information Technology Building       |          | 1955 | 123,725.60   | 11,494.48  |

|                     |   | Addition | 1959 |                     |                   |
|---------------------|---|----------|------|---------------------|-------------------|
|                     |   | Addition | 2001 |                     |                   |
| 50                  | Mary E. Keyes Residence                                   |          | 2002 | 146,195.20          | 13,581.98         |
| 51                  | McMaster University Student Centre                        |          | 2002 | 146,830.69          | 13,641.02         |
|                     |   |          | 2016 |                     |                   |
| 52                  | Michael G. Degroote Centre for Learning and Discovery     |          | 2004 | 304,365.61          | 28,276.49         |
|                     |   | Addition | 2005 |                     |                   |
|                     |   | Addition | 2017 |                     |                   |
| 53                  | Les Prince Hall   |          | 2006 | 106,016.20          | 9,849.23          |
| 54                  | David Braley Athletic Centre                              |          | 2007 | 140,478.85          | 13,050.91         |
| 55                  | Ron V. Joyce Stadium                                      |          | 2008 | 56,941.95           | 5,290.08          |
| 56                  | Engineering Technology Building                           |          | 2009 | 138,682.22          | 12,884.00         |
| 57                  | Ron Joyce Centre (Burlington)                             |          | 2010 | 103,591.87          | 9,624.00          |
| 58                  | MIP - MARC  |          | 2013 | 85,000              | 7896.76           |
| 59                  | MIP – Atrium Building                                     |          | 2009 | 26,220.24           | 2,435.94          |
| 73                  | St. Paul's Anglican Church (Hamilton) – Leased Space      |          | 2013 | 10,817.01           | 1,004.93          |
| 74                  | L.R Wilson Hall   |          | 2016 | 177,927             | 20,438.20         |
| 82                  | 88 Forsyth Avenue North                                   |          | 2015 | 2,699.80            | 250.82            |
| 83                  | David Braley Health Sciences Centre                       |          | 2015 | 215,780             | 20,046.62         |
| 85                  | One James North – Leased Space                            |          | 2015 | 54,195.97           | 5,034.97          |
| 86                  | 47 Whitton Road   |          | 2015 | 3,857.57            | 358.38            |
| 87                  | 182 Sterling Street                                       |          | 2015 | 3,933.03            | 365.39            |
| 90                  | Halton McMaster Family Health Centre/JBH                  |          | 2013 | 31,107.70           | 2,890.00          |
| 91                  | Canadian Martyrs – Licensed Space                         |          | 2016 | 4,464.65            | 414.78            |
| 92                  | Cairns Research Complex- (Brock University)               |          | 2012 | 10,176.33           | 945.41            |
| 94                  | 96 Forsyth Avenue North                                   |          | 2017 | 5,944.78            | 552.29            |
| T13                 | Preliminary Laboratory                                    |          | 1967 | 23,066.60           | 2,142.96          |
| T26                 | Temporary Building, Multi-use (Formerly Scourge Building) |          | 1989 | 2,112.00            | 196.21            |
| T31                 | Stone Church Family Health Care Centre                    |          | N/A  | 30,943.01           | 2,874.7           |
| T32                 | Temporary Portables (Offices)                             |          | 2013 | 6,031.56            | 560.35            |
| T33                 | Temporary Portables (McMaster Children's Centre)          |          | 2013 | 7,805.02            | 725.11            |
| 200                 | Integrated Health Building (Waterloo)                     |          | 2010 | 59,816.34           | 5,557.12          |
| <b>Grand Total:</b> |   |          |      | <b>6,954,454.92</b> | <b>646,031.48</b> |