Facility Services
Five Year Capital Plan
(A Future Outlook)
Version 1

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1 EXECUTIVE SUMMARY

Space on campus has recently slipped from 75% of what is needed, to 70% (equivalent to the Ontario-wide average). 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 satellite expansion opportunities, and to take advantage of the 88,000 net assignable square metres of space 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 is committed for an incremental budget allocation of $2.0 million per annum until the deferred maintenance funding for the academic portfolio reaches $10.2 M in four years. A $10.2 million annual investment will maintain control of the top priority deferred maintenance items in the short term.

Also, 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 is McMaster President and Vice-Chancellor Patrick Deane's 2011 letter, “Forward with Integrity” (FWI), which outlines the priorities and principles he believes will best help shape the University's development.

2 INTRODUCTION

2.1 Scope of the Capital Plan

McMaster University's Capital Plan is a planning document that supports the University's strategy Forward with Integrity (2011) and the various planning processes. The intended purpose of this Capital Plan is to guide the growth of physical assets at McMaster University until the 2018 – 2019 fiscal year (5-year plan). The plan will encompass all buildings under the purview of McMaster, both on and off the main campus. While acknowledging that different management models exist, the Campus Plan will become 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 should be viewed as an organic document which is subject to change in order to align itself with the shifting strategic visions of the University. Additionally, the plan is supported by detailed documents which 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.

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, 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 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.

<table>
<thead>
<tr>
<th>Level of Planning/Reporting</th>
<th>Key Capital Plans and Reports at McMaster University</th>
<th>Audience</th>
<th>Review</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong>: University’s overall philosophy and approach to managing capital; highest level of planning; fundamental decisions and actions directed to achieving institutional goals</td>
<td>McMaster Capital Plan</td>
<td>Public</td>
<td>Every planning cycle</td>
</tr>
<tr>
<td></td>
<td>Campus Master Plan</td>
<td>Public</td>
<td>Every 5 years</td>
</tr>
<tr>
<td></td>
<td>Asset Management Plan</td>
<td>Public</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Energy Management Plan</td>
<td>Public</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Campus Accessibility Plan</td>
<td>Public</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Campus Capacity Study</td>
<td>Public</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>Debt Management Policy</td>
<td>Public</td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>Debt Strategy Report (new 2013)</td>
<td>Finance Committee</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Multi-Year Projections (includes Capital and Strategic Plans)</td>
<td>Finance Committee</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Annual Consolidated Budget (includes Capital Fund)</td>
<td>Public</td>
<td>Annual</td>
</tr>
<tr>
<td><strong>Portfolio Governance</strong>: Updates/funding status of capital projects for Board; delineate McMaster’s management, oversight and monitor capital projects approved/under construction</td>
<td>Annual Capital Plan</td>
<td>Public</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Major Capital Project Status Report</td>
<td>UPC / Planning &amp; Building Committee</td>
<td>Quarterly</td>
</tr>
<tr>
<td></td>
<td>Capital Funding and Expenditure Report</td>
<td>Finance Committee</td>
<td>Every meeting</td>
</tr>
<tr>
<td><strong>Project Management</strong>: Identify strategic and specific capital requirements along with plans and strategies intended to resolve the most urgent and highest priority needs</td>
<td>Key Technical/Management Documents (Asset Reports)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asset Management Plan</td>
<td>Public</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td>Major Projects Progress Report</td>
<td>Public</td>
<td>Monthly</td>
</tr>
</tbody>
</table>

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, Consequences of Inadequate Funding
- Section 9, Updating the Capital Plan
- Section 10, Conclusion and Recommendations
- Section 11, 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, outlines potential funding solutions and strategies, which 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.

The Capital Plan will only address the McMaster University Medical Centre (MUMC) to the extent of the Faculty of Health Sciences (FHS) occupancy. It will include all University-owned or occupied assets whether on or off main campus.

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 - 2012

3.2.1 Added Construction and Renovation 1960 – 2012

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 4 residence buildings, a biology greenhouse, and various lab, classroom, and administration buildings. During this decade McMaster added a total of 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, CE Burke Science Building, ET Clarke Centre, and the Commons Building. Mills Memorial Library, CE Burke Science Building 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.
<table>
<thead>
<tr>
<th>Building</th>
<th>Construction Date/Renovation Date</th>
<th>Gross Area (Square Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Science Building</td>
<td>1962</td>
<td>59,583</td>
</tr>
<tr>
<td>Chester New Hall</td>
<td>1964</td>
<td>87,870</td>
</tr>
<tr>
<td>Ivor Wynne Centre</td>
<td>1964</td>
<td>154,374</td>
</tr>
<tr>
<td>Mathews Hall</td>
<td>1964</td>
<td>61,808</td>
</tr>
<tr>
<td>McKay Hall</td>
<td>1964</td>
<td>66,824</td>
</tr>
<tr>
<td>Commons Building</td>
<td>1965</td>
<td>33,879</td>
</tr>
<tr>
<td>Togo Salmon Hall</td>
<td>1965</td>
<td>136,222</td>
</tr>
<tr>
<td>Tandem Accelerator</td>
<td>1966</td>
<td>25,305</td>
</tr>
<tr>
<td>Biology Greenhouse</td>
<td>1967</td>
<td>8,378</td>
</tr>
<tr>
<td>Applied Dynamics Lab</td>
<td>1967</td>
<td>21,480</td>
</tr>
<tr>
<td>Preliminary Lab</td>
<td>1967</td>
<td>23,067</td>
</tr>
<tr>
<td>Campus Services Building</td>
<td>1968</td>
<td>51,936</td>
</tr>
<tr>
<td>AN Bourns Science Building</td>
<td>1968</td>
<td>245,828</td>
</tr>
<tr>
<td>Woodstock Hall</td>
<td>1968</td>
<td>64,341</td>
</tr>
<tr>
<td>Brandon Hall</td>
<td>1968</td>
<td>118,355</td>
</tr>
<tr>
<td><strong>Total New Construction</strong></td>
<td></td>
<td><strong>1,159,250</strong></td>
</tr>
<tr>
<td>Renovation/Addition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.E. Burke Science Building</td>
<td>1961</td>
<td>20,833</td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>22,419</td>
</tr>
<tr>
<td></td>
<td>1969</td>
<td>44,876</td>
</tr>
<tr>
<td>Mills Memorial Library</td>
<td>1962</td>
<td>36,492</td>
</tr>
<tr>
<td></td>
<td>1969</td>
<td>76,008</td>
</tr>
<tr>
<td>E.T. Clarke Centre</td>
<td>1965</td>
<td>5,200</td>
</tr>
<tr>
<td></td>
<td>1968</td>
<td>44,223</td>
</tr>
<tr>
<td>Commons Building</td>
<td>1968</td>
<td>22,570</td>
</tr>
<tr>
<td>**Total Renovation/Addition</td>
<td></td>
<td><strong>272,620</strong></td>
</tr>
</tbody>
</table>

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

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.

<table>
<thead>
<tr>
<th>Building</th>
<th>Construction Date/Renovation Date</th>
<th>Gross Area (Square Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications Research Lab</td>
<td>1983</td>
<td>19,773</td>
</tr>
<tr>
<td>Hedden Hall</td>
<td>1989</td>
<td>104,279</td>
</tr>
<tr>
<td>Scourge Building</td>
<td>1989</td>
<td>2,112</td>
</tr>
<tr>
<td>Total New Construction</td>
<td></td>
<td>126,164</td>
</tr>
<tr>
<td>Renovation/Addition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications Research Lab</td>
<td>1989</td>
<td>10,186</td>
</tr>
<tr>
<td>Total Renovation/Addition</td>
<td></td>
<td>10,186</td>
</tr>
</tbody>
</table>

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. This provided an additional 13,820 gross square feet.

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.

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

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

3.2.1.5 Since 2000

Since 2000 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 12 buildings were constructed on campus during the 13 year period. 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.

The Ron Joyce Centre, a remote campus focused on Business graduate studies in Burlington, provided an additional 105,745 gross square feet of infrastructural growth to McMaster in 2010.

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 since 2000 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 since 2000 updated or added to the existing campus infrastructure 586,792 gross square feet.
Table 6 shows a complete list of new construction and renovations/additions completed since 2000.

<table>
<thead>
<tr>
<th>Building</th>
<th>Construction Date/Renovation Date</th>
<th>Gross Area (Square Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mohawk-McMaster Institute for Applied Health Sciences</td>
<td>2000</td>
<td>179,672</td>
</tr>
<tr>
<td>Dramatic Arts Workshop</td>
<td>2000</td>
<td>1,678</td>
</tr>
<tr>
<td>Mary E. Keyes Residence</td>
<td>2002</td>
<td>146,195</td>
</tr>
<tr>
<td>McMaster University Student Centre</td>
<td>2002</td>
<td>145,430</td>
</tr>
<tr>
<td>T28 Temporary Lecture Theatre</td>
<td>2002</td>
<td>5,077</td>
</tr>
<tr>
<td>T29 Temporary Lecture Theatre</td>
<td>2003</td>
<td>6,068</td>
</tr>
<tr>
<td>Michael G. Degroote Centre for Learning and Discovery</td>
<td>2004</td>
<td>298,526</td>
</tr>
<tr>
<td>Les Prince Hall</td>
<td>2006</td>
<td>106,016</td>
</tr>
<tr>
<td>David Braley Athletic Centre</td>
<td>2007</td>
<td>140,479</td>
</tr>
<tr>
<td>Ron Joyce Stadium</td>
<td>2008</td>
<td>56,942</td>
</tr>
<tr>
<td>Engineering Technology Building</td>
<td>2009</td>
<td>125,600</td>
</tr>
<tr>
<td>Total New Construction</td>
<td></td>
<td>1,211,683</td>
</tr>
</tbody>
</table>

| Renovation/Addition                                |                                  |                          |
| Togo Salmon Hall                                   | 2000                             | 4,242                    |
| Nuclear Research Building                          | 2001                             | 10,635                   |
|                                                   | 2011                             | 23,605                   |
| 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                   |
|                                                   | 2013                             | 12,163                   |
| 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                    |
| C.E. Burke Science Building                        | 2005                             | 196,401                  |
| McMaster University Medical Centre                 | 2005                             | 49,098                   |
| Ivor Wynne Centre                                  | 2012                             | 20,010                   |
| Total Renovation/Addition                          |                                  | 586,792                  |

Table 6: New Construction and Renovated Buildings on Campus Since 2000

3.2.1.6 Details of Recent 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.

- 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.
• 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 is now one of the largest fitness centres at a Canadian university, and 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.

Other

• Ron Joyce Centre (Burlington)
  ▪ Built in 2010, this 105,745 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 is expected to accommodate 700-800 students.
• 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.

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. 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.

- **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.
  - In 2013 the McMaster Institute for Music and the Mind, a 12,163 gross square foot, single-storey addition to the psychology building, was completed. This addition was designed by McCallum Sather Architects.

- **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.

• **C.E. Burke Science Building**
  - 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.

• **Ivor Wynne Centre**
  - Built in 2012, the Centre for Spinal Cord Injury Education, Research and Rehabilitation; and the Centre for Cancer Education, Research and Rehabilitation together form a $20 million, 20,010 gross square foot, three-storey, LEED® Silver addition to the existing Centre for Health Promotion and Rehabilitation. 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.

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**Other**

• **The 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.

• **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, as a separate project, fit out to accommodate the Bachelor of Technology (B.Tech) learning space. MARC, including B.Tech, includes 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.

• **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 renovation and upgrade of the Communication Centre at $89,000 (not including equipment).

3.2.2 Buildings Procured 1960 – 2013

In the past 53 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: the MMRI Ancaster Building (procured for use in 2002), the McMaster Downtown Centre (leased from the city of Hamilton starting in 2000, but anticipated to be relocated to a newly fit out space at 1 James Street North in Lloyd D. Jackson Square, in 2015), and McMaster Innovation Park (procured for use in 2004). Also, 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.

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

- The Waterloo Regional campus, for example, was established by McMaster at the University of Waterloo in 2007, and focuses on Health and Medical Sciences.
- Similarly, the Niagara Regional campus was established in 2008 at the St. Catharines General Hospital.
- In 2010 McMaster built the Ron Joyce Centre in Burlington.
- The Welland McMaster Family Health Team has been in operation since 2011, with locations in Welland and Fonthill.

3.2.3 Summary

Since 1960 McMaster has added a total of 36 buildings (on campus) to its existing infrastructure through new construction. These buildings total 4,400,984 gross square feet of added infrastructure, during the past 53 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 18 campus buildings. A gross area of 1,070,204 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.

The following 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 time period. From 1980 to 2010 student enrolment increased by 140%, but space increased by only 63%.
3.3 Existing Usage, Ownership, and Condition of McMaster’s Physical Assets

Today, McMaster University is home to a total enrolment of approximately 29,500 students (undergraduate and graduate, full- and part-time, on- and off-campus). The University employs roughly 6,437 staff (excluding Librarians and Temporary/Casual Employees) and an additional 1,394 full-time instructional faculty (including clinicians). In regard to the critical space categories, space is dispersed as indicated in Table 7.
McMaster’s most recent Campus Capacity Study cites critical needs for administrative office and related space, graduate student offices, assembly facilities, and service space.

McMaster has 54 buildings on campus, including 12 residences, a nuclear reactor, a stadium complex, a hospital. Additionally 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 5,720,000 square feet of floor space. Of the 54 buildings, the following have unique ownership arrangements:

- Divinity College – owned by College of Divinity.
- Health Sciences Centre – owned by McMaster and leased to HHSC (HHSC then leases approximately 40% of the space back to FHS).
- 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:

- Ron Joyce Centre (Burlington)
- 1 Head Street, Dundas, JRF International, Library and Bookstore
- 10 Victoria Street, Kitchener, Education Services, Faculty of Health Sciences
- 100 Main Street, Hamilton, McMaster Health Campus
- 108 Victoria Street N., Kitchener, Waterloo Regional Campus, Education Services, Faculty of Health Sciences
- 199 James Street North, Unit 2, Hamilton, Sociology
- 1205 Rymal Road East, Hamilton, Faculty of Health Sciences
- 1237 Main Street West, Hamilton, vacant land
- 142 Queenston St., St. Catharines, Niagara Campus, School of Medicine
- 1429 Main Street East, Hamilton, School of Nursing
- 16-24 Ontario Street, St. Catharines, Medical Clinic
- 1685 Main Street West, Hamilton, Main West Village, School of Nursing
- 180 James Street South, Hamilton, Collaborative Maternity Centre of Hamilton
• 249 Caroline St S, Unit A, Hamilton, School of Nursing
• 25 Charlton Avenue East, Hamilton, Suites 207, 300, 303, 501, 505, 610, 612, 614, 801, and 5th and 6th Floor for Storage, Family Medicine
• 293 Wellington Street North, Hamilton, Family Medicine-Surgery
• 3155 Harvester Rd., Burlington, Family Medicine
• 495 Woodward Avenue, Hamilton,
• 4960 Main Street West, Ancaster
• Lower Lions Club Road property, Ancaster, vacant land
• 55 Unsworth Drive, Hamilton, Open Source Clinical Application and Resource (Oscar McMaster)
• 701 Main St. West, Suite 101, Hamilton, Family Medicine-Maternity Centre
• Brock University, Level 200 @ 500 Glenridge Ave., St. Catharines, Education Services
• Rental of Storage Space for Patient Files,
• 1670 Sandhill Drive, Ancaster
• Storage Space (BHSc Program - MDCL)
• Storage Space (MD Program - MDCL)
• McMaster Innovation Park, 175 Longwood Street South, Hamilton, Suites:
  101 - Academic Department of Radiology
  B20, 107, 309A & 313A – Canadian Longitudinal Study on Aging (CLSA)
  109A, 201A & 210A – Family Medicine
  301A – CISCO Systems of Canada
  302A-1 - Communication Studies and Multimedia
  302A-2 – Anthropology
  302A-3 NeuroSparc
  305 – McMaster Industry Liaison Office (MILO)
  313A
• MARC Warehouse, Hamilton, McMaster: McMaster Materials Research Institute, MacAuto, CERC in Hybrid Powertrain Program, Centre for Mechatronics and Hybrid Technologies, B.Tech learning space.
• 50 Main Street East, Hamilton, Down Town Centre (DTC), The Centre for Continuing Education (CCE), Regional Medical Associates (RMA), Finance, University Advancement (UA), Institutional Research and Analysis (IRA)
• 110 King Street West, Hamilton,
• 345 King Street West, Hamilton
Chart 4 and chart 5 show the breakdown of McMaster’s on-campus occupiable building age and area.

**Chart 4**

**Physical Assets including Residences**

- 40%: Buildings less than 10 years old
- 22%: Buildings 10 - 39 years old
- 26%: Buildings 40 - 49 years old
- 9%: Buildings 50 years old
- 12%: Buildings over 50 years old

**Chart 5**

Building gross area based on age

- 31%: Buildings less than 10 years old
- 18%: Buildings 10 - 39 years old
- 42%: Buildings 40 - 49 years old
- 9%: Buildings 50 years old

Chart 6 and chart 7 below show the breakdown of the condition of these facilities by building gross area.

**Facility Condition by Building Gross Area (excluding Residences)**

- 69%: 0-4.99% (Excellent)
- 27%: 5-9.99% (Good)
- 4%: 10% and up (Fair to Poor)

**Facility Condition by Building Gross Area (including Residences)**

- 66%: 0-4.99% (Excellent)
- 27%: 5-9.99% (Good)
- 7%: 10% and up (Fair to Poor)
At McMaster, surveys conducted on campus in the fall of 2012 have provided us with data from which the following conclusions can be made. The estimated replacement value of the University’s physical assets is $1.78 billion. High priority deferred maintenance in academic and ancillary infrastructure totals $301 million. At the rate of the historical $2.15 million annual allocation for deferred maintenance, the infrastructure will continue to decay and the requirements backlog will grow to $460 million by year 9. Section 6.2 Existing Building Infrastructure Asset Management and Renewal provides more information related to the current condition of McMaster’s infrastructure assets.

It was noted in McMaster’s Preliminary Findings of the Council of Ontario Universities (COU) Triennial Report 2010/2011, that “overall, McMaster’s space has increased by 6.4% since the last COU Triennial Report in 2007/2008. McMaster’s current space totals 358,595.9 Net Assignable Square Metres (NASM).” Specifically with classrooms, space has increased from 20,897 NASM to 26,357 NASM, or 26.1%. However, given the ever-increasing number of students, McMaster should have 31,074.45 NASM. The finally published Inventory of Physical Facilities of Ontario Universities, 2010-11, shows that overall, the institution has dropped from having approximately 75% of the space it needs (2007) to having 70% of the space it needs (2010).” The most recently published data has the Ontario-wide average also at 70%.
3.3.1 Computerized Maintenance Management System

McMaster University Facility Services has been using “AiM Enterprise Asset Management System”, including Core modules and Maintenance Management modules, by Assetworks. This system was utilized to different degrees in order to manage existing infrastructure.

Facility Services is moving to PeopleSoft to manage infrastructure investment. The information managed within AiM will be coordinated with the PeopleSoft project costing module for capital. Overall, it is envisioned that the management systems to support maintenance and capital projects will be best served by optimizing the capabilities of PeopleSoft while considering information availability to the University community and minimizing duplicative efforts.

3.4 Land Assets, Physical Growth Opportunities

The McMaster University Campus Master Plan, originally prepared in 2002 and updated in 2008, provides an overall physical framework for campus growth and renewal. The Campus Master Plan outlines a 30-year vision for the campus. 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. Taking into account the demolition of Wentworth House and the start of construction of L. R. Wilson Hall at its location, all since the Campus Master Plan was updated in 2008, the current capacity available for new development is estimated to be 118,000 GSM, or 88,000 NASM, 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.

A series of development sites were identified throughout the Campus, 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: along Scholar’s Road east of Mary E. Keyes Residence; north of Bates Residence beside the President’s Residence; sites along the Cootes Drive, Main Street and Forsyth Avenue frontages; and significant gateway/landmark development sites at the locations of two existing buildings that are to be removed, T-13 and Wentworth House. (Since The Campus Master
Plan was last updated in 2008, Wentworth House has been demolished and construction has started on L. R. Wilson Hall at its location.)

- Even with years of substantial building activity in North Campus (the David Braley Athletic Centre, Stadium and Les Prince Hall), there remains development potential, west of the athletic centre. Future development should line Stearn Drive and the new Marauders Walk adjacent to the football stadium.

- 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.

Other potential expansion sites on campus are identified in the Campus Master Plan. These sites include the west courts of each of the following buildings: John Hodgins Engineering, Burke Science, and A. N. Bourns Science.

Figure 1: Potential Development Sites

Off-campus, McMaster has recently 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 is building a new health campus; the north parcel of the building site includes an existing parking lot facing King Street West and Bay Street, which remains vacant and could be developed. Also, McMaster’s property at 1276 Sandhill Drive could see future development.

### 3.5 Accessibility

#### 3.5.1 Proposed Built Environment Standard

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). As of October 2011, the Built Environment
Standard of the AODA is still in a proposed format, and as such, the details of the requirements as well as the compliance dates have not been finalized. The proposed standard is currently with the Minister of Community and Social Services, who is considering what will become law and when. In the meantime, McMaster continues to address accessibility issues that may fall within the purview of the Built Environment Standard on an as needed basis. It is anticipated that the Standard will set firm time lines for the completion of accessibility initiatives that McMaster may already be in the process of implementing.

The proposed Built Environment Standard will address different aspects of the built environment such as: common access and circulation, interior accessible routes, exterior spaces, communication elements and facilities, and plumbing elements.

3.5.2 Existing Conditions According to the Ontario Building Code

Facility Services has conducted a survey for 57 McMaster buildings, academic, residential, and others (all 56 on-campus buildings plus Multi-Use Building #47 in Ancaster). The buildings were analyzed for accessibility based on the Ontario Building Code Requirements. This analysis found that:

- 40% of the academic buildings have a barrier-free ramp or else 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.

The McMaster University Accessibility Plan 2012 – 2025 concludes that the University and MAC as well as the President’s Advisory Committee on Building an Inclusive Community (PACBIC), recognize that further steps need to be taken to help McMaster become completely barrier free, physically, academically, attitudinally, and socially. As such, the Plan reflects a commitment 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 process will be meaningful and effective as the committee endorses a consistent and resolute approach to barrier removal and prevention. McMaster has approved its new Campus Accessibility Plan in 2013. 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 million Comprehensive Energy and Water Reduction Program that concluded in 2007 with annual recorded energy savings exceeding $1.5 million and annual CO2 reductions of 12,000 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.


3.6.1 LEED®

McMaster as of 2013 had nine LEED registered or certified projects, the most of any Ontario University; and McMaster’s current policy moving forward is to develop new and undertake major renovations of occupied facilities to meet or exceed the Silver level rating of the LEED Rating System. There are three additional projects currently in construction which are pursing LEED certifications.

Table 8 lists projects at McMaster that have either attained LEED® Certification, or are expected to in the very near future. There are 12 projects, totaling 1,317,781 gross square feet of space.
### Table 8: LEED® Certified Projects

<table>
<thead>
<tr>
<th>New Construction / Renovation/Addition</th>
<th>Gross Area (Square Feet)</th>
<th>Attained/Anticipated LEED® Certification Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Building</strong></td>
<td><strong>Construction Date/Renovation Date</strong></td>
<td><strong>Gross Area (Square Feet)</strong></td>
</tr>
<tr>
<td>Les Prince Hall</td>
<td>2006</td>
<td>106,016</td>
</tr>
<tr>
<td>David Braley Athletic Centre</td>
<td>2007</td>
<td>140,479</td>
</tr>
<tr>
<td>Engineering Technology Building</td>
<td>2009</td>
<td>125,600</td>
</tr>
<tr>
<td>Ron Joyce Centre (Burlington)</td>
<td>2010</td>
<td>105,745</td>
</tr>
<tr>
<td>CANMET Materials Technology Laboratory (MIP)</td>
<td>2010</td>
<td>145,000</td>
</tr>
<tr>
<td>Halton-McMaster Family Medicine Centre</td>
<td>2014</td>
<td>10,647</td>
</tr>
<tr>
<td>McMaster Health Campus – Downtown Hamilton</td>
<td>2014</td>
<td>215,278</td>
</tr>
<tr>
<td>L. R. Wilson Hall</td>
<td>2015</td>
<td>144,000</td>
</tr>
<tr>
<td><strong>Total New Construction</strong></td>
<td></td>
<td><strong>992,765</strong></td>
</tr>
</tbody>
</table>

| Renovation/Addition                  |                          | **325,016**                                   |
| C.E. Burke Science Building          | 2005                     | 196,401                                       |
| Nuclear Research Building            | 2011                     | 23,605                                        |
| Ivor Wynne Centre                    | 2012                     | 20,010                                        |
| McMaster Automotive Resource Centre (MARC) | 2012                     | 85,000                                        |
| **Total Renovation/Addition**        |                          | **325,016**                                   |

* denotes anticipated certification level

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 the trends below.

Natural gas fuel consumption at McMaster has on average been on the rise, from the 2001-02 fiscal year (a mild winter), to the 2012-13 fiscal year. This tracked data is shown in chart 9.
Electricity consumption at McMaster has on average also been on the rise, from the 2001-02 fiscal year, to the 2012-13 fiscal year. Increased student enrollment and the increase in weather temperature, with 2012 being the hottest on record, have also driven electricity consumption. Normalized for enrollment, McMaster electricity consumption in 2012-13 is still lower than 2001-02 consumption levels. This tracked data is shown in chart 10.
Water consumption at McMaster has recently increased but has been decreasing on student enrollment basis, from the 2001-02 fiscal year, the 2012-13 fiscal year. This tracked data is shown in chart 11.

The Energy Management Plan extends from 2013 to 2018 and proposes approximately 20 projects and sub-projects, with a total anticipated investment of $22,273,148 over five years, and a total anticipated Annual savings of $7,571,931 (after rebates).

The average payback period of the projects is two years (excluding photovoltaic installations, which have a payback period of 18.8 years).

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 9 below:

<table>
<thead>
<tr>
<th>Total Reduction</th>
<th>% Reduction from 2011-12</th>
<th>Total annual savings (at 2017 review)</th>
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<tbody>
<tr>
<td>Co-generation</td>
<td></td>
<td>$3,800,000</td>
</tr>
<tr>
<td>Electricity savings</td>
<td>17,770,917 kWh</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$1,777,092</td>
</tr>
<tr>
<td>Gas savings</td>
<td>5,801,823 m3</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$1,450,455</td>
</tr>
<tr>
<td>Water Savings</td>
<td>175,360m3</td>
<td>37%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$420,864</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$7,448,411</td>
</tr>
</tbody>
</table>

Table 9: Total Energy savings from Energy Action Plan
Furthermore, the total anticipated reduction in the carbon footprint is estimated to be 14,961,574 kg of equivalent CO\textsubscript{2} which is a 31.6% reduction from the latest available campus carbon survey performed in 2009 by Zerofootprint.

The Energy Management Plan is to be financed through an internal revolving loan from the Central Bank. The approved loan will be available to fund the Energy Management Plan as needed and savings will be used to repay principle and interest (the loan would cover all EMP projects except a Cogeneration project which would be separately funded based upon the submission and approval of a business case through University governance). A revolving loan of up to $7.03 million will be utilized at an interest rate of 6.75%. This loan would be established for the EMP and would be repaid within seven years from savings.

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 Province of Ontario’s Ontario Power Authority. The OPA supplementary incentives (excluding co-generation project which would qualify under the Industrial Accelerator category) are estimated to total in excess of $1 million.

### 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) regulations with the objective to develop a long term Environmental Compliance Action Plan. Based on the findings of the draft report and early discussions with the consultant, significant mitigation is required for buildings that are non-compliant, mainly for noise. The total cost for mitigation measures excluding the Health Sciences Centre, is estimated at approximately $4.2 million. A funding recommendation will be made to the 2013/14 Budget Committee.

Following is McMaster’s compliance status current as of February 2013 (based on the draft report):

- All buildings on campus are compliant in terms of Air emissions
- 27 buildings do not require ECA due to lack of significant emission source
- 18 buildings have one or more emission sources and require ECA out of which 3 require the less onerous EASR (Environmental Approvals & Sector Registry).
- John Hodgins Engineering Building: Approval obtained for existing equipment. ECA Application for new micro-turbine / pizza oven exhaust submitted to MOE. Changes to the sources due to the Photovoltaic project has been subjected to design review to ensure compliance, but the ECA application is yet to be filed.
- Burke Sciences Building: CofA (Certificate of Approval - Air) obtained, however there are issues with noise compliance that require mitigation
- Life Sciences Building: CofA obtained, however there are issues with noise compliance that require mitigation
- E.T.Clark Centre: CofA obtained for the 2 generators however significant noise compliance issues that will require complex mitigation and detailed re-assessment of operations.
- Tandem Accelerator: Recent changes involving fume-hood exhaust are being designed to be compliant.
- 4 buildings have incomplete ECA. Emission sources are compliant for air, however have issues with noise compliance and the building as a whole does not have an ECA.
- A complete ECA application has been submitted for MDCL and the application is currently under review by the Ministry.
- ECA application for the Engineering Technology Building was recently submitted with a commitment to the Ministry that the noise mitigation will be undertaken with the next year.

Based on McMaster’s consultant’s recommendations, the strategy moving forward will be to seek building-specific compliance rather than campus wide compliance.

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, the Academic 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 as that is eventually negotiated with the Province.

4.1 Forward with Integrity (FWI)

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 it 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 Refining Directions Plan

The guiding principles from the approved McMaster University Refining Directions Plan for 2003-2007 are to:

1. provide an innovative and stimulating learning environment where students can prepare themselves to excel in life.
2. achieve the next level in research results and reputation by building on existing and emerging areas of excellence.
3. build an inclusive community with a shared purpose.
4. define a distinctive reputation for McMaster locally, regionally, and globally.

4.2 The Academic Plan

In 2000, an ad hoc group organized by the Provost produced The McMaster University Academic Plan 2000 – 2005. It was approved by the Senate and endorsed by the University Planning Committee. Its four guiding principles are:

1. McMaster should cultivate a culture of planning that includes incentives and rewards for those who help McMaster achieve its academic goals.
2. McMaster should strive to produce an environment in which the linked concepts of scholarship and teaching can flourish.
3. The McMaster teaching and research environments should be supported by an appropriate complement of faculty and staff and well-considered space, adequate facilities and technical support systems.
4. A McMaster education should enable students to develop a set of life and learning skills that promote a continuing ability and desire to learn, and a set of technical and professional skills that permit a range of career choices.

4.3 Research Priorities

In regard to research, McMaster University continues to submit applications for review for competitive funding from the Leading Edge Fund (LEF) and the New Initiatives Fund (NIF) at the Canada Foundation for Innovation (CFI), for the purposes of new construction and renovation projects. This is in support of McMaster’s innovative and transformative research and technology development activities.

Most recently McMaster has received funding for two projects. The first project is “Small Angle Neutron Scattering for Advanced Characterization of Nanostructure in Materials (SANS for Nanostructured Materials)”. Construction budget is $2,596,258. The second project is “Magnifying Canadian Leadership in X-ray Microscopy: Enhancing the Spectromicroscopy Beamline and Endstations at the Canadian Light Source”.

Implementation for each is expected to start before May 2014.

McMaster is also considering the following major projects to address research priorities. Section 6.1 provides more details on these projects and their current priority levels as well as the proposed funding strategies based on the current input from the university stakeholders and the University’s financial health.

- Arts Quad Renovations.
- MIP Infrastructure.
- Libraries (Thode and Mills) (improvements).
- Pilot Project: McMaster Experiential Learning Centre.
- Centre for Emerging Device Technologies.
- STEM Academic Building
- Ron Joyce Centre (4th Floor Completion)
4.4 Campus Capacity Study

A Campus Capacity Study was prepared with Urban Strategies Inc., Rickes Associates Inc., and MMM Group Ltd., on April 5, 2011. The following is derived from the conclusions of the Study.

The capacity of McMaster University is impacted by a number of factors, including the nature of its facilities, potential increases in enrolment, the physical access to the campus, the available development sites, and the relationship of the campus to the surrounding context. The aim of the Campus Capacity Study is to provide critical information to support McMaster’s ongoing discussion regarding facility growth and renewal and the relationship between physical capacity and enrolment levels.

Collectively, the individual components of the Campus Capacity Study constitute a useful tool that equips McMaster to respond to the likely continuation of strong enrolment growth for the foreseeable future. However, if McMaster campus grows beyond its current enrolment, the campus will require expanded and renovated space to accommodate new faculty members, evolving academic programs, expanded program offerings, and additional services. These directions will need to be led by the McMaster administration, building on the findings of this study which provide a comprehensive snapshot of the University’s current capacity, as well as projected future space needs. Based on a current enrolment of approximately 25,000 FTE, the following facility space types are required. These numbers reflect COU space standards. The most critical space needs, based on total NASM required include:

- Administrative Office and Related Space (Category 10 – including executive and administrative offices and support space),
- Graduate Student Offices (Category 4.3 - Single or multiple occupancy rooms allocated by the department to graduate students for study and research, and to graduate and undergraduate students in their capacity as tutors, teaching or research assistants),
- Assembly Facilities (Category 15.1 – a category covering convocation halls, auditoria / theatres, chapels, and ancillary areas), and

The need for new additional space is critical, given that McMaster is expected to increase its student population while only having 70% (equivalent to the Ontario-wide average) of the space that it needs to meet current demand.

In addition to facility space constraints, private vehicle access to the Main Campus is severely congested. Although parking capacity is adequate, the proximity of this parking
remains an issue for some. The University, surrounding neighbourhoods and the City of Hamilton should continue to work together to promote and realize improved transit service and alternatives to the private automobile. Subject to available resources, there are a number of initiatives, both physical and policy based, that the University may pursue to improve space utilization. These initiatives may include the “right-sizing” of classrooms and more transparent space management procedures, as referred to in charts 12 and 13 from the Campus Capacity Study.

The current capacity available for new development is estimated to be 118,000 GSM, or 88,000 NASM, on the Main Campus. Should the University choose to increase enrolment, as the result of external demographic pressures and/or to accommodate internal changes in faculty programs, space needs would likely increase beyond this threshold in approximately 10-15 years, with all other factors remaining constant. Off-campus facilities, in appropriate locations, such as downtown, should continue to be considered. The housing of students remains a priority for McMaster. Should enrolments increase, housing strategies will continue to align housing demand with appropriate housing sites and formats, protecting and enhancing McMaster’s host communities and the quality of life for students and neighbours alike.

The Campus Capacity Study also provides input to, and sets the stage for areas of investigation that this Capital Plan touches on, including:

- A Phasing and Implementation Space Plan – This plan will identify the classrooms that are candidates for rightsizing, maintenance, and other upgrades. It would consider the enrolment, course schedule, and potential need for expanded facilities to support new programs, adjusting as the institution grows. Ultimately, this plan will provide McMaster with the appropriate array of classrooms, both now and in the future.
- Off-Campus Land Management Strategies – This study would identify the potential of existing off-campus lands to support further University growth. It may also include a real estate strategy for the acquisition of new sites for McMaster.
- A Student Housing Plan – This plan would explore opportunities and constraints for the expansion of student housing on and off-campus. It may also include potential site locations for student housing, as well as potential partnership and funding options.
4.5 Westdale Campus Master Plan

The McMaster University Campus plan was prepared with Urban Strategies Inc. and MMM Group, and was approved by the Board of Governors in March of 2002. This document will help to guide the University's development over the next 30 years.

From the foreword to the Campus Master Plan:

The McMaster University Campus Master Plan, originally prepared in 2002 and updated in 2008, is a very exciting opportunity to create a new, comprehensive framework to guide development on the campus. It promotes and preserves the qualities that make McMaster special, and provides a strategy for continued investment in the quality of the campus over time. This will become more and more important as new buildings continue to fill the campus. Developing new partnerships with the surrounding neighbourhood and the City of Hamilton, and nurturing [McMaster’s] already established relationships, is an important theme of the Campus Master Plan. It encourages an open and sustained dialogue with [McMaster’s] partners to ensure that [the University] continues to make positive contributions to the City. The Campus Master Plan promises to be an effective, flexible and practical tool for decision-making about the future of the University. [McMaster University is] committed to its implementation, beginning with the projects that have been identified as priorities for the campus.

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.

The Campus Master Plan provides for the development of up to 1.5 million square feet (140,000 square metres) of building area 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.
There is additional room for further intensification. However, at this density important issues begin to emerge. For example, it may not be possible to provide sufficient parking to meet demand, and access routes would likely exceed their capacity. Therefore, a growth projection of 2 million square feet reflects the likely maximum amount of growth that can be accommodated on the Main Street Campus.

4.6 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 by 3.7 million more people and 1.8 million more jobs by 2031, accounting for approximately 80 percent of Ontario's population growth. 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 by approximately 150,000 people and will generate approximately 90,000 employment opportunities over a 30-year period (2001-2031). It is expected that the City of Hamilton will accommodate approximately 8% of the new population growth and 7% of the new employment growth by 2031.

Further, according to the Growth Plan, Halton Region will grow by approximately 780,000 people and will generate approximately 390,000 employment opportunities over a 30-year period (2001-2031). It is expected that Halton Region will accommodate approximately 9% of the new population growth and approximately 9% of the new employment growth expected to take place in the Greater Golden Horseshoe by 2031. Due to the fact that much of McMaster’s new enrolment comes from Halton Region, the anticipated increases in population in this area does impact the University’s enrolment considerations. The Growth Plan forecasts that total population growth within a 60 minute commute to campus is 1,230,000 people.

5 PLANNING AND GROWTH ASSUMPTIONS

5.1 Enrolment Growth

McMaster has experienced rapid growth in recent years, due to population increases in the Greater Toronto Area and Hamilton Region. This institutional growth has been further accelerated due to 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 14 illustrates the trend of enrolment growth vs. building area growth since 1957.
In 2011, international and out-of-province students (undergraduate and graduate) represented, respectively, 7.1 percent (83 countries) and 3.3 percent (all other provinces and two territories). International graduate students represented 15.8 percent of the graduate student body. Also in 2011, 27,168 applications were received from Ontario high schools. Of these 13.2 percent were from Toronto. The Toronto and Peel School Boards accounted for 23.2 percent of applicants.

5.2 Research Growth

The McMaster University Strategic Research Plan, April 2012, indicates that the University has invested heavily in capital improvements to relevant facilities. The six (6) strategic areas identified through extensive consultations reflect core strengths and ambitions that will remain indicative of long-term potential and relevance and, together with Faculty priorities, will continue to direct institutional initiatives and investments.

The seven multi-disciplinary (cross-Faculty) strategic areas resulting in part from Strategic Planning Exercises are:

- Molecular Biology
- Integrated Health Research
- Information Technology
- Globalization and the Human Condition
- Work and Society
- Science-based Innovation in Manufacturing (and Materials)
• Water.

Section 4.3 includes information on specific McMaster projects that address these strategic areas. A highlight of McMaster’s strategic research plans is the establishment of McMaster’s Innovation Park (MIP), a vehicle for supporting research and development in key industrial areas, thereby facilitating and accelerating knowledge transfer and the impact of outcomes from recognized research strengths.

The McMaster University Strategic Research Plan, April 2012, indicates that our institution-wide and faculty-specific strategic directions provide the framework for institutional research and infrastructure applications, institutional resource allocations (e.g., faculty appointments and capital expenditures) and for ongoing fundraising. McMaster University and its affiliated hospitals use an integrated approach to opportunities provided by partnership and strategic programs such as the Canada Research Chairs (CRC), Networks of Centres of Excellence, Ontario Centres of Excellence, Ontario Research Fund, and tri-council initiatives including the NSERC Collaborative Research Education and Training Experience (CREATE). These opportunities allow us to sustain and further enhance McMaster’s areas of research strength as well as engage in inter-disciplinary, multi-institutional research initiatives. McMaster and its hospital partners strive to capitalize on their collective strengths to develop collaborative research both regionally and more broadly with other institutions within Canada and abroad. Critical to recruiting, retaining and supporting excellent researchers is the establishment of world-class infrastructure. The aligned support of the Canada Foundation for Innovation (CFI) and the Ontario Research Fund Research Infrastructure (ORF-RI) program is critical to maintaining McMaster’s competitive edge. This blend of federal and provincial support has spurred several multi-institutional initiatives which could not have otherwise developed. A number of strategies are employed to capitalize on federal and provincial programs. Institutional priority for CFI and ORF-RI applications is given to those research programs that most closely align with one or more of McMaster’s strategic directions and take into account Federal and Provincial science and technology priorities.

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 previous Centre for Leadership and Learning (CLL) has evolved to the McMaster Institute for Innovation and Excellence in Teaching and Learning (MIITEL), where Facility and MIITEL are working on the development of more technology and active learning classrooms.
Vision 2020, produced in April 2010, outlined the strategic directions for technology at McMaster. The document notes:

The University's current state of technology is severely lacking on a number of fronts, with McMaster being the last of the G13 to undertake a review of its critical systems that support students, faculty and researchers. The inability to efficiently gather and disseminate information impedes effective decision-making and clearly highlights the need for a comprehensive data storage and retrieval solution. A substantial investment in technology is required to address these issues, supported by a clear vision for the future....

Vision 2020’s strategic direction (SD) for technology outlines five essential areas where attention should be directed to achieve the greatest results:

- SD1: Systems Renewal and Data Integration.
- SD2: Renewed Focus on Service Delivery.
- SD3: Modernization and Simplification of Infrastructure.
- SD4: A Hybrid Model based on Cooperation.
- SD5: Technology Risk Mitigation Practices.

The Implementation of Mosaic
The main objectives of Mosaic are to modernize business processes and to replace computer systems that are used to operate much of the university with an enterprise resource planning (ERP) system. The main systems that will be impacted are:

- finance and finance research (entered testing stage)
- research administration (May 2014)
- human resources and student administration (2014)

The McMaster University Strategic Research Plan, April 2012, indicates that to support the research enterprise, McMaster has invested heavily into services to assist researchers in knowledge transfer activities, including membership in the C4 consortium (Southwest Ontario’s Technology Transfer Community). McMaster has partnered with city, regional, provincial and national stakeholders with a focus on economic development activities to capitalize particularly on biotechnology and materials developments. These initiatives, together with a unique set of policies covering intellectual property management and inclusive of all work conducted with McMaster’s affiliated hospitals, equip the University and McMaster’s hospital partners with the ability to execute knowledge and technology transfer and commercialization in collaboration with McMaster’s industry partners.

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 Space Management Committee, as a working committee, would receive space demands, review right-sizing plans, review inventory, and conceives and considers options and makes recommendations to the Provost and the VP Administration. The committee also is to receive notices of space being returned or right-sized.

The Space Management Committee, as a planning committee, would develop for approval an updated Space Policy, review and recommend space standards, provide guidance on related aspects, and review new building designs to ensure inclusion of required services, and identify opportunities.

5.5 Student Residences

On June 16, 2006 the Government of Ontario released the 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. The percentage changes from year to year based on factors including number of applicants, existing capacity, and department cut-off percentages. For the 2012-2013 academic year, the residence admissions cut-off average was 82%. At this level we are behind many peers and McMaster is not meeting its objective as outlined above.

McMaster has twelve different residence buildings on campus, with a range of room types, sizes, and lifestyle themes. Capacity on average is 307 residents/building, for a total capacity across all buildings of 3,685 residents. Given enrolment growth as noted above, more capacity is needed. To this end, a new residence building is being planned. Section 6.5, New Residence Building, includes more information.
6 PROJECTS AND INITIATIVES TO SUPPORT THE CAPITAL PLAN

6.1 Addressing Research, Program, and Enrolment Growth

McMaster’s inventory vs. generated (I/G) ratio (or, the amount of net assignable space that McMaster has vs. how much McMaster should have based on standards set by the Council of Ontario Universities), is 70%, as of 2010. (Data from 2010 also tells us that the Ontario-wide average at 70%)

For classroom space, McMaster’s I/G is 84.8%. The Ontario average is 73.5%.

For library space, McMaster’s I/G is 77.1%. The Ontario average is 68.3%.

For laboratory - research facilities, McMaster’s I/G is 61.9%. The Ontario average is 68.8%.

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, and research 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.

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 $195 - $200 million per year, not including intake for affiliated hospitals.

McMaster is expecting payment of $3,800,462 per year moving forward for graduate expansion capital funding, for projects like the Engineering Technology Building; the Michael DeGroote Centre for Learning and Discovery, second floor renovation; and L. R. Wilson Hall.

6.1.2 Ongoing Projects and Initiatives

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

- L. R. Wilson Hall
  - The project is currently at the construction stage, and has a $66 million (approximate) budget (including parking). Occupancy for 1,200 new student positions is planned for September 2015. This new building is planned to have approximately 174,000 gross square feet for classrooms and labs; more specifically the building will have community outreach spaces and research areas. Additionally, this building will address 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® Silver certification.

- McMaster Health Campus – Downtown Hamilton
  - McMaster is currently constructing this new $84 million (approximate) facility at the site of the former Hamilton Wentworth District School Board building in downtown Hamilton. Occupancy is planned for late 2014. This new building is planned to have approximately 195,000 gross square feet for students, teaching, patient care, and research. The Campus will see 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. This project is anticipated to enhance McMaster’s connection to the community in part by having family doctors right down town.

- Halton-McMaster Family Medicine Centre
  - McMaster is currently constructing this 10,647 gross square feet of tenant improvement space in the new Joseph Brant Hospital Building in Burlington. Occupancy of this two-storey, LEED® Silver (anticipated) project is planned for 2014.

- Engineering Centre for Experiential Learning (ExCEL)
  - McMaster has approved the construction of this building at an estimated cost of $8.5 million; preliminary plans are for a 20,000 gross square foot facility on a footprint of 6,000 square feet located immediately to the south of JHE. ExCEL 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 has approved a levy to fund a portion of the expected cost. 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.

- Dr. Robert and Andrée Rhéaume Fitzhenry Studios and Atrium
  - This is a $3 million external donor initiative to add a 1,700 sq. ft. to Togo Salmon Hall and to renovate 4,000 sq. ft. of interior space. The new addition will increase art studio capacity to accommodate more students, will function as art gallery and will house art events. The interior renovation is to integrate the interior space with the new addition.

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. 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, and research space.

This is a dynamic list, subject to change based on the dynamic strategic priorities, further review and discussion with the Provost’s office and considerations for the University’s financial health is required. 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

- Ron Joyce Centre 4th Floor Completion (Burlington Campus Business School)
  - The fourth floor in Burlington campus remains a shell space. This space is proposed to be developed to provide educational space that is needed for the School of Business for its executive MBA program.

- Downtown Centre Relocation and Fit-Up
  - At the request of the City of Hamilton, McMaster is to vacate the existing facility at 50 Main Street East, Hamilton, i.e., the Downtown Centre. It is proposed that the existing programs be relocated temporarily to newly fit-out and leased space at 1 James Street North.

- CFI 2014, University Contribution
  - This is a mandatory contribution that is required by the university towards successful CFI applications.

B- High Priority Projects and Externally Funded

- Fraunhofer, IAO Applied Research Centre, Burlington
  - It is proposed that 50,000 sq. ft. of research and education space be built and fit out in a new building in Burlington at cost of $20 million, for Fraunhofer, IAO Applied Research.

- Fraunhofer Centre IZI at MIP
  - 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 some 40,000 to 50,000 sq. ft. at MIP. The total renovation cost is estimated at $20 million including $4 million to be requested from the City of Hamilton.

- Centre for Student Entrepreneurship at MIP (The Foundry)
  - The Foundry at McMaster Innovation Park (MIP) is a Campus Lead Accelerator (CLA) designed to provide a focal point where students and business enterprises connect. McMaster is to dedicate 20,000 sq. ft. next to McMaster’s new Automotive Resource Centre (MARC) for this project. The Foundry will be seeking an investment of $3 million from FedDev to support the renovation and fit-out of this space.

C- Projects for Consideration to be Funded Through the Central Bank and to be Approved for the 2014/2015 Cycle

- Living and Learning Centre (Academic/Residence/Admin/Children Centre)
  - In recognition of the strong need at McMaster for more classroom, exam-writing, residence, administrative space and Children Centre, this project is planned for construction at the current location of temporary buildings #T28 and #T29 at an approximate cost of $80 million.
• Classroom Reconfiguration Plan
  ▪ As noted previously, the University has a need for more classroom space. For this type of space, McMaster’s I/G is 84.8% according to the 2010 COU Triennial Report. A design committee has been 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 will probably result in the need to reconfigure classroom spaces and to right-size them. The analysis will include a study related to the flexibility of classroom spaces to support different pedagogies and teaching modes. Only the first year of this, funded at $2M, is to be approved.

• Land Acquisition for Future Expansion
  ▪ This item is in consideration of planning for future expansion.

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

• Shelled Space in Burlington Campus
  ▪ It is proposed that 150,000 sq. ft. of space be constructed at an estimated cost of $30 million as shelled space within a proposed new building (Fraunhofer, IAO Applied Research Centre Burlington), for future fit out.

• Libraries (Thode and Mills)
  ▪ Both the Thode Library of Science and Engineering and the Mills Memorial Library are to be improved by way of an $8 million (approximate) renovation project, so as to create a Web and New Media Commons (NMC) that will help to address the dramatically increasing numbers of McMaster library visitors.

• Gilmour Hall Redevelopment
  ▪ This redevelopment is to reorganize the registrar space and the Student Success Centre in order to provide a one stop shop for students’ services.

• Arts Quad Renovations
  ▪ Upon completion of L. R. Wilson Hall (Phase 1), this project would allocate $63 million toward critically needed improvements in regard to the campus-wide deferred maintenance backlog, and to the teaching and learning spaces at Chester New Hall, Togo Salmon Hall, and Kenneth Taylor Hall.

• Administrative / Academic Building
  ▪ The building is anticipated to deal with some of the administrative spaces needs for the University but primarily to find a permanent home for administrative staff in DTC. Additional academic space will be available to respond to new active learning spaces and to provide experiential learning spaces.

E- Projects to be Considered when External Funding is Available

• STEM Building
  ▪ The University plans to expand the capabilities of STEM facilities research and teaching by constructing this proposed 200,000 sq. ft. at an estimated cost of $100 million. The proposed location of the building is at the current site of T13.
- **Swimming Pool Renovations**
  - $8 million in renovations is planned for the swimming pool over the 2015-16 / 2016-17 fiscal years.

- **MIP Infrastructure**
  - This $12.5 million (approximate) project will complete McMaster Innovation Park's exterior infrastructure (roads, sewers, water, etc.) to accommodate further development of the Park.

- **Experiential Learning Project (Downtown)**
  - McMaster University is requesting $10 million from the province to support this $60 - $80 million 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.

- **Centre for Emerging Device Technologies at MIP**
  - This $30 million new build on existing vacant land at MIP would help with the commercialization of research from health sciences, an area that the government is keenly interested in.

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

McMaster Facility Services is proceeding through fiscal year 2013/2014 with 115 separate approved repair jobs, building upgrades, minor renovations, equipment replacements / new installations, and emergency allowances. These projects/allotments range from $3,000 to $1 million.

### 6.2 Existing Building Infrastructure Asset Management and Renewal

The current deferred maintenance backlog in academic building infrastructure is estimated at $301 million. It is important to note that McMaster's total deferred maintenance backlog classified as critical (priority 1) amounts to $35 million and by definition should be corrected within the next year. The deferred maintenance classified as potentially critical and necessary but not yet critical (priorities 2 & 3) totals over $266 million and should be addressed within the next five years.

The Asset Management Plan concluded that a deferred maintenance funding investment on academic buildings infrastructure of $10.2 million per year will allow McMaster to deal with and focus on the prioritized priorities.

As recommended in the Asset Management Plan, McMaster approved an incremental increase of $2 million per year until the deferred maintenance funding reached $10.2 million per year. At this funding level, as indicated in chart 15 (for Prioritized Priority 1, 2, and 3 requirements only), the deferred maintenance backlog is projected to remain relatively constant.
Cashflow requirements are included in Appendix ‘A’. For a more detailed analysis, see the McMaster Asset Management Plan on the Facility Services website.

### 6.3 Energy Management Projects and Sustainability

The following details a proposed plan for targeting reductions in on-campus energy consumption including natural gas fuel, electricity, and water.

Tables 10, 11, and 12 below detail the natural gas fuel, electricity, and water consumption reduction targets, respectively.

<table>
<thead>
<tr>
<th>Year</th>
<th>Gas saved m$^3$ (Total as of end of each fiscal year)</th>
<th>Cost savings (Total as of end of each fiscal year)</th>
<th>Percent reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>476,635</td>
<td>$119,158</td>
<td>4%</td>
</tr>
<tr>
<td>2014-15</td>
<td>953,270</td>
<td>$238,317</td>
<td>8%</td>
</tr>
<tr>
<td>2015-16</td>
<td>1,429,906</td>
<td>$357,476</td>
<td>12%</td>
</tr>
<tr>
<td>2016-17</td>
<td>1,906,541</td>
<td>$476,635</td>
<td>16%</td>
</tr>
<tr>
<td>2017-18</td>
<td>2,383,176</td>
<td>$595,794</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,383,176</strong></td>
<td><strong>$595,794</strong></td>
<td><strong>20%</strong></td>
</tr>
</tbody>
</table>

**Table 10: Gas conservation targets**

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity saved KWh (total as of end of each fiscal year)</th>
<th>Cost savings (Total as of end of each fiscal year)</th>
<th>Percent reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>3,090,920</td>
<td>$370,910</td>
<td>4%</td>
</tr>
<tr>
<td>2014-15</td>
<td>6,181,840</td>
<td>$741,821</td>
<td>8%</td>
</tr>
<tr>
<td>2015-16</td>
<td>9,272,760</td>
<td>$1,112,731</td>
<td>12%</td>
</tr>
<tr>
<td>2016-17</td>
<td>12,363,679</td>
<td>$1,483,642</td>
<td>16%</td>
</tr>
<tr>
<td>2017-18</td>
<td>15,454,599</td>
<td>$1,854,552</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,454,599</strong></td>
<td><strong>$1,854,552</strong></td>
<td><strong>20%</strong></td>
</tr>
</tbody>
</table>

**Table 11: Electricity conservation targets**
To address the above targets of reducing energy consumption, the following table details the required investment in the Plan, and savings resulting from the Proposed Plan, anticipated through fiscal year 2017-2018.

<table>
<thead>
<tr>
<th>Timeframe</th>
<th>Required Investment</th>
<th>Anticipated Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>$ 1,321,500</td>
<td>TBD</td>
</tr>
<tr>
<td>2014-15</td>
<td>3,681,688</td>
<td>TBD</td>
</tr>
<tr>
<td>2015-16</td>
<td>$ 2,188,000</td>
<td>TBD</td>
</tr>
<tr>
<td>2016-17</td>
<td>$ 14,706,000</td>
<td>TBD</td>
</tr>
<tr>
<td>2017-18</td>
<td>$ 375,000</td>
<td>$ 7,571,931 *</td>
</tr>
<tr>
<td>Total</td>
<td>22,272,148</td>
<td>TBD</td>
</tr>
</tbody>
</table>

*after rebates

Table 13

Cashflow requirements planned are included in Appendix ‘A’ with financing considerations identified in section 7 below. The Plan is approved to be funded from the central bank via a revolving loan which will be paid from the Energy savings. For a more detailed list of projects and initiatives, see the Energy Management Plan on the Facility Services website.

### 6.4 Campus Accessibility Action Plan (CAAP)

The Facility Services’ Campus Accessibility Action Plan (CAAP) notes that McMaster will invest $334,000 annually for accessibility-related improvements to McMaster buildings. This five year plan has been approved by McMaster University.

The University funded the 2012-13 accessibility program with $334,000 which suggests that the minimum recommended measures for the main academic buildings (not including residences) of the campus could be completed with no new additional funds in a 5 year program, including approximately $60,000 available each year to fund the soft costs associated with the projects such as design, permits and project management.
6.4.1 Washroom Renovations Needed

As noted in Section 3.5.2, Existing Conditions According to the Ontario Building Code, only 79% of surveyed buildings had at least one labeled accessible washroom. Moving forward, any renovations that occur in areas that impact on existing non-compliant construction, will be planned to be brought up to code.

6.4.2 Code Compliance Needed

As noted in Section 3.5.2, Existing Conditions According to the Ontario Building Code, the surveyed buildings are lacking 100% inclusion of accessible entries, fountains, washrooms, elevators, and strobe fire alarm lights. Moving forward, any renovations that occur in areas that impact on existing non-compliant construction, will be planned to be brought up to code.

6.5 Environmental Compliance

An Environmental Compliance Approval Action Plan has been developed to ensure compliance of all campus buildings to MOE regulations. Based on preliminary order of magnitude budget estimates, $4.2 million is required for mitigation of non-compliant sources on campus. Approximately 60% of this cost is to mitigate the noise emission sources at E.T.Clark Centre, which require large and complex mitigation measures.

Facilities Staff are proposing a 2 phase approach, Phase 1 for mitigation measures for all buildings on campus and engineering analysis for E.T.Clark and Phase 2 specifically for mitigation measures at E.T.Clark.

The plan will set aside $400,000 a year for the next 5 years and obtain ECA for the 22 buildings on campus that require the certificate and perform detailed engineering analysis required for E.T.Clark Center compliance. It was proposed that these funds be allocated as part of the approved funds for Deferred Maintenance.

The proposed funding of $400,000 per year will be supplemented by additional contributions from Ancillaries including Housing and Conference Services and Athletics and Recreation. For Phase 2, the detailed engineering analysis carried out in Phase 1, will determine the approach and the actual funds required.

6.6 New Graduate/Undergraduate Residence Building

A new Undergraduate Residence is required in order to support student recruitment and retention and to also further enhance the student experience at McMaster. A 200,000 sq. ft. residence is proposed at a projected cost of $50 million.
### 6.7 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 off-campus properties:

- 4350 South Service Road, Burlington (east side – Ron Joyce Centre for use by the DeGroote School of Business)
- 4350 South Service Road, Burlington (west side – farmland)
- 100 Main Street West, Hamilton (south side – under development as Medical Health Campus)
- 100 Main Street West, Hamilton (north side – parking)
- Property on north side of Lower Lions Club Road, east of Louise Drive, Ancaster (undeveloped)
- 120 Forsyth Avenue North, Hamilton (The Oval at Mayfair Crescent)
- 88 Forsyth Avenue North (residence)
- 1475 Upper Ottawa Street, Hamilton (Stonechurch Family Health Centre)
- 175 Longwood Road and 270 Longwood Road (McMaster Innovation Park)
- 1276 Sandhill Drive, Ancaster (14,000 sf. building)
- Osler Drive, south side, east of University Plaza (undeveloped)
- Osler Drive, north side, east of University Plaza (undeveloped)
- Grant Boulevard at Barrie Street (undeveloped)
- 1190 Main Street West (between Forsyth Avenue South and Dalewood Avenue) (undeveloped)

### 6.8 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.

Facility Services is engaged in the development of 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, for the purposes of informing all future construction.

The introduction to the Overall Policies for the Campus as detailed in the Campus Master Plan, is as follows.

The overall planning policies for the McMaster Campus follow from the six principles [as detailed in Section 4.5, 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.

7 FIVE YEAR CAPITAL PLAN and BUDGET

Currently the University makes a small annual provision of $1.9 million for deferred maintenance and $3.2 million for strategic capital projects in the Operating Budget. 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.

Recent 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 Finance 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 and minor projects approved and under development as well as additional proposed initiatives. Section 6.1.2, Ongoing Projects and Initiatives (Construction Only) will add 518,788 square feet of space at an estimated cost of $230,086,626. Section 6.1.3, Planned Projects and Initiatives, is to add 1,191,145 square feet of space at an estimated cost of $565,000,000 if the Plan is fully funded. The remaining sections 6.2 through 6.7, which focus on a proposed new Graduate and Undergraduate Residence at 200,000 square feet, but also account for asset and energy management, accessibility improvements, and environmental compliance, is estimated to cost approximately $183,242,148. 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 McMaster Health 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 loans and/or seek additional external financing while managing within the University’s Debt Policy and its associated financial health monitoring ratios. Management considers projects identified in this category 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.¹

Some projects in category 3 are linked to current strategic priorities and might be considered mission critical if not completed. However, it should be noted that this situation is not dissimilar to the position that the University faced in 2000/01 when preparing for the double cohort. Capital expansion and renovations were required to accommodate the additional influx of students where many of the needed projects were not fully funded. At that time, additional external debt in the form of a $120 million bond was secured (maturing in 2052) for the capital plans considered mission critical. The debt resulted in an annual interest allocation to be made from the Operating Fund of $7.5 million. This strategic decision to fund critical priorities created a long term Operating Fund obligation that will continue until 2052.

More recently, the provincial government has introduced policy levers and other strategies that further reduce current base funding in the Operating Fund. For example, in 2013/14 $1.8 million in reduced funding from the province is expected and another $2.5 million the year after. Given the challenges ahead for the Operating Fund and the associated risks of inadequately funding this Plan, the University must work toward an appropriate balance between overall financial health and funding both capital and strategic “priorities”. 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,

¹ 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.”
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. In an effort to better inform this process, a Debt Strategy Report will be prepared with the multi-year projections to help senior management and Board members understand the implications to the University’s financial health if all Plan needs or a sub-set of needs go forward into the consolidated budget. The Debt Strategy Report and multi-year projections will be presented to the Finance Committee in April 2013.

8 CONSEQUENCES OF INADEQUATE FUNDING

Total net assignable square metres (NASM) on campus has recently slipped from 75% of currently needed space to 70% (The most recently published data has the Ontario-wide average at 70%). Without stepping up new construction, renovations/additions, and new lease arrangements, it can be expected that this percentage will slip even further; and McMaster can expect ramped up feedback in the manner of what has already been received recently through consultation events in conjunction with the preparation of the Campus Capacity Study:

- There has been significant recent enrolment growth, but it is perceived to have taken place with minimal resources to support this growth.
- Over time, space assignments have become opportunistic, fragmented and inequitable.
- There is a concern that the quality of experience and life on campus is being compromised.

Compounding this need is the anticipated continual population growth in the region, and the consequent expected enrolment growth at McMaster. As suggested by the Campus Capacity Study, ignoring this growth will jeopardize McMaster’s efforts to “become one of North America’s most prominent universities.”

Abandoning certain upgrade projects, such as for example barrier-free renovations or acoustic attenuation, can make McMaster less accessible, welcoming, and occupiable. It can also bring the University into conflict with authorities having jurisdiction for violation of regulations relating to the building code, or environmental compliance.

In regard to existing infrastructure asset management, inadequate funding means that facilities will continue to deteriorate, ultimately to a substandard degree; critical systems could fail; and teaching, research, athletics and recreation activities will suffer. McMaster University Facility Services’ Asset Management Plan for 2012 indicates that the amount of deferred Maintenance backlog in 2012, projected out to 2022 based on a $2.15 million annual investment is seen in chart 16. The requirements backlog is projected to grow to $460 million by year 2022. This projection assumes a 2% per year inflation rate, and a 3% backlog deterioration.
Priority 1, 2 and 3 deferred maintenance requirements amount to over $301 million excluding residences. Understanding that the historical $2 to $3 million annual allocation for deferred maintenance will not address the existing deferred maintenance backlog or provide an appropriate asset management plan, McMaster decided to increase the funding by $2 million per year over the next four years until it reaches $10.2 million annually. This increased funding is projected to keep the deferred maintenance backlog dollars for the next ten years relatively stable. Had we maintained the historical $2 to $3 million annual allocation, the Facility Condition Index would have continued to increase, putting the University to 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 regard to energy management, natural gas fuel, electricity, and water consumption at McMaster have all been on the increase over the past few years. Without appropriate funding to energy management programs, consumption can be expected to continue to increase. This will drive up energy purchasing costs, tax the environment in an unsustainable manner, and disappoint students and members of the larger McMaster community who look to their institutions for model practices. The targeted capital need for energy management and conservation programs through fiscal year 2016 – 2017 is approximately $22 million. This investment is expected to bring annual energy savings to repay the initial project investments and provide the University ongoing savings.

9 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.

- 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, the academic plan, 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. PVPD Committee (review for plan integrity and consistency)
  3. University Planning Committee (for approval)
  4. Planning and Building Committee (to recommend approval by the Board of Governors)
  5. Finance Committee (to endorse the recommendation of approval by the Board of Governors)
  6. 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 MTCU, certain projects will be subject to further approval by the Ministry.

10 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. But still, the University would need to increase its net assignable square metres (NASM) by 30% (the comparable Ontario-wide average here would be equivalent) were it to fully meet its current needs for occupiable space. It is estimated that there is 88,000 NASM 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 five 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 66% of McMaster buildings are over 40 years old, and 66% are in fair to poor condition. Consequently, funding for deferred maintenance is a high priority. McMaster University Facility Services’ Asset Management Plan for 2012 notes that, “A $10.2 million annual investment will maintain control of the priority 1, 2, and 3 requirements [which presently total $301 million excluding residences], and will also put McMaster in compliance with the provincial government’s Building Together guidelines.”

In the interest of sustainability, energy conservation and cost savings, McMaster has implemented a number of energy management programs.
11.1 Capital Budget – Summary (Section 6)

Project | Gross Area (Square Feet) | Estimated Cost | Funding Category |
---------|--------------------------|----------------|----------------|
1        | 80,000                   | $24,653,480    | 2012-2013       |
2        | 126,000                  | $20,388,736    | 2013-2014       |
3        | 142,000                  | $18,803,199    | 2014-2015       |
4        | 187,000                  | $20,388,736    | 2015-2016       |
5        | 187,000                  | $20,388,736    | 2016-2017       |
6        | 187,000                  | $20,388,736    | 2017-2018       |
7        | 187,000                  | $20,388,736    | 2018-2019       |
8        | 187,000                  | $20,388,736    | 2019-2020       |
9        | 187,000                  | $20,388,736    | 2020-2021       |
10       | 187,000                  | $20,388,736    | 2021-2022       |
11       | 187,000                  | $20,388,736    | 2022-2023       |
12       | 187,000                  | $20,388,736    | 2023-2024       |

- 3 High Priority Projects: That need to Proceed and Will be Funded from the Central Book
- D High Priority Projects for Consideration to be Funded Through the Central Book 2015-2021

<table>
<thead>
<tr>
<th>Project</th>
<th>Estimated Cost</th>
<th>Funding Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>187,000</td>
<td>$30,000,000</td>
<td>2015-2016</td>
</tr>
<tr>
<td>187,000</td>
<td>$3,000,000</td>
<td>2016-2017</td>
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<tr>
<td>187,000</td>
<td>$10,000,000</td>
<td>2017-2018</td>
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<tr>
<td>187,000</td>
<td>$10,000,000</td>
<td>2023-2024</td>
</tr>
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</table>

Appendix A

McMaster University, Five Year Capital Plan
## 11.2 Schedule of Facilities

<table>
<thead>
<tr>
<th>Building Code</th>
<th>Building Name</th>
<th>Building Section</th>
<th>Construction Date / Renovation Date</th>
<th>Current Total Building Gross Area (Square Feet)</th>
<th>Current Total Building Gross Area (Square Metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University Hall</td>
<td></td>
<td>1929</td>
<td>48,652.83</td>
<td>4,520.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elevator Addition</td>
<td>1991</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hamilton Hall</td>
<td></td>
<td>1929</td>
<td>51,865.81</td>
<td>4,818.49</td>
</tr>
<tr>
<td>4</td>
<td>Refectory</td>
<td></td>
<td>1929</td>
<td>23,365.44</td>
<td>2,170.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Addition</td>
<td>1965</td>
<td></td>
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