November 10, 2016

TO: Members of the University Planning Committee

FROM: Mark Downard
Senior Governance Advisor and Associate University Secretary

I am writing to inform you that the next meeting of the University Planning Committee will be held on **Wednesday, November 16, 2016 at 10:30 a.m. in the Council Chambers (Gilmour Hall, Room 111)**.

If you are unable to attend this meeting, please contact the University Secretariat at telephone 905-525-9140, ext. 24337 or e-mail univsec@mcmaster.ca.
UNIVERSITY PLANNING COMMITTEE

Wednesday, November 16, 2016 at 10:30 a.m.
Council Chambers, Gilmour Hall, Room 111

AGENDA

OPEN SESSION

I MINUTES of the Open Session Meeting of September 21, 2016
(attached – for approval)

II BUSINESS ARISING

III CHAIR’S COMMENTS AND UPDATES

IV STRATEGIC MANDATE AGREEMENT – REPORT (to be
circulated – for information)

V ESTABLISHMENT OF THE COMPUTING
INFRASTRUCTURE RESEARCH CENTRE (attached – for
approval)

VI ATHLETICS AND RECREATION COMPLEX (attached – for
approval)

VII CAMPUS MASTER PLAN (attached – for approval)

VIII OTHER BUSINESS

CLOSED SESSION

IX MINUTES of the Closed Session meeting of September 21, 2016
(attached – for approval)

X BUSINESS ARISING

XI LRT – VERBAL UPDATE (for information)

XII PROJECT STATUS REPORT (attached – for information)

XIII GRADUATE RESIDENCE PROJECT (to be circulated – for
approval)

XIV OFF-CAMPUS DEVELOPMENT (to be circulated – for approval)

XV NAMING VALUES AND OPPORTUNITIES (attached – for
approval)

XVI OTHER BUSINESS
McMaster University

UNIVERSITY PLANNING COMMITTEE

Wednesday, September 21, 2016 at 10:30 a.m.
Council Room (Room 111), Gilmour Hall

PRESENT: Dr. D. Wilkinson (Chair), Dr. R. Baker, Dr. W. D’Angelo, Dr. J. Daniel, Mr. R. Deshpande, Dr. S. Hanna, Dr. J. Hurley, Dr. A. McQueen, Dr. T. Moffat, Ms L. Serviss, Ms H. Ayre (University Secretary), Ms T. Bates (Governance Advisor and Assistant University Secretary)

OBSERVERS: Dr. S. Denburg, Dr. S. Searls Giroux, Ms M. Williams

CONSULTANTS: Dr. J. Lee, Ms L. Coslovi

INVITED: Ms L. Harrington

REGRETS RECEIVED: Mr. R. Couldrey, Dr. P. Deane, Ms J. Pike, Mr. S. Van Koughnett, Dr. D. Welch

Dr. Wilkinson welcomed new members of the Committee.

I MINUTES

On a motion duly moved and seconded, the minutes of the meeting held on June 22, 2016 were Approved as circulated.

II BUSINESS ARISING

There was no business arising from the minutes of the previous meeting.

III CHAIR’S COMMENTS AND UPDATES

Dr. Wilkinson reminded members that the University Planning Committee is an important body, as it is the one place in which considerations of academic mission and resources come together. Senate reviews only items pertaining to the academic mission of the University and the Board of Governors ensures that the University’s finances are in order; the University Planning Committee, however, does both. The Committee provides a broader context for the academic mission and financially responsible planning.

It is important to note that the University Planning Committee does not duplicate the work of other bodies, such as Undergraduate Council, but reviews submissions at a higher level to ensure they fit into the broader mission of the University. Everything that comes to this Committee has been through other bodies. New programs, for example, come from Departments and Faculties, through Undergraduate Council or Graduate Council before
reaching the University Planning Committee. Similarly, the research institutes and centres are also reviewed extensively and must be approved by the Committee on Research Institutes prior to submission to the University Planning Committee.

There is a clear process regarding the order of approvals, and the expectation is that the approval processes will be adhered to as much as possible. There are occasions, however, where an adjustment needs to be made to that process. In some cases, an adjustment may be required to accommodate specific external or government deadlines. The renovations to the A.N. Bourns Building is an example of this; this Committee was told about the project in the spring, but the Strategic Investment Fund (SIF) submission deadlines did not enable the usual approvals for the project.

The results of the Strategic Investment Fund initiative are still to be announced by the government. The results will be announced on Friday, until such time it is not possible to speak freely about the projects. However, McMaster’s allocation of funds was higher than expected. The project fits well with other projects currently underway at the University, the Living and Learning Centre in particular.

The Strategic Mandate Agreement with the Ministry expires at the end of this year and McMaster will be negotiating a new one with the government this year. As is typical, nothing is known yet about the parameters of the agreement and these will not likely be announced until closer to the submission deadline. However, although there is some expectation that the focus will be a little different, there are not likely to be many changes to the substance of the agreement.

The funding formula is also under review. The revised formula will not likely be completely new, but there will be some changes. The expectation that there will be a return to corridors, meaning that the Province will provide static grants, even as enrollments change. There will be negotiations with the government about what McMaster’s corridors will look like. This is expected to be rolled out in the third Strategic Mandate Agreement, in three or four years.

The current tuition framework ends this year. The best guess at present is that the Province will leave it as it for the next year or two before looking at this. It is more likely that they will wait for two years to get through the next election.

A hold was put on new engineering programs, as a product of the current Strategic Mandate Agreement, given that a lot of institutions indicating that they were developing new and growing existing programs. That moratorium has now been lifted.

The University has been developing a number of initiatives internally. Dr. Searls Giroux is leading an initiative on equity, which follows from a report on gender equity among faculty issued a couple of years ago. The current initiative extends the review to gender equity among staff, faculty and students, as well as equity writ large, that is, for all groups seeking equity. Dr. Searls Giroux will be working on this and then will recommend changes across the board with an expectation that this will include changes in policies and procedures across the University. Dr. Searls Giroux is working closely with Wanda McKenna, Assistant Vice-President & Chief Human Resources Officer, to ensure that there is a parallel process for staff and faculty.
Several academic reform initiatives, all of which have come out of the recommendations of the Warner Report, are also underway. Dr. Searls Giroux is chairing the Committee on Programming in the Arts and Science Faculties (PASF), which includes membership from the Faculties of Humanities, Science, and Social Sciences. Dr. Wilkinson said he is chairing the Undergraduate Council Ad Hoc Committee on Academic Structures for Student Success, which is conducting a review of the academic regulations across the University. Andrea Thyret-Kidd has been seconded to facilitate both Committees and to liaise between the two. It is anticipated that the work of both Committees will lead to several changes, some of which will be brought to the University Planning Committee in due course. Given the nature of the changes, it is likely to be at least a year before they will be brought to this Committee.

Kathy Denney is working hard on the IT review. A number of surveys have been conducted and the reports are expected to start coming to the Committee in the fall.

The President’s Advisory Committee on Fossil Fuels Divestment, of which Dr. Wilkinson is the chair, has been meeting regularly. Roger Couldrey is a member of that Committee and Dee Henne serves as a consultant. The Committee has been looking at fossil fuels divestment in response to two petitions submitted to the President from both students and faculty members. The Committee thus far has been involved in an evidence based discussion and there will be a number of opportunities for consultation and for the McMaster community to engage on these issues. A report will be released soon along with some other material including an infographic and a video.

### IV BUDGET COMMITTEE MEMBERSHIP FOR 2016-2017

The Committee was reminded that Dr. Daniel was elected as the Chair of the Budget Committee in July. The faculty members elected to the University Planning Committee reported that they had elected, from among themselves, Dr. D’Angelo and Dr. Hanna to serve as the faculty representatives to the Budget Committee for the coming year.

### V 2016-2017 MEETING DATES AND MEMBERSHIP (Appendix A)

The Committee received the meeting dates and membership list for the coming year.

### VI RESEARCH INSTITUTES AND CENTRES (Appendix B)

1. **Revisions to the McMaster Institute for Research on Aging**

2. **Establishment of the Centre for Mobility in Aging**

Ms Harrington joined the meeting.

Dr. Baker presented these two items together. There are proposed changes to the structure and function of the McMaster Institute for Research on Aging (MIRA). A new Centre for Mobility in Aging (CMA), which will operate under MIRA is proposed. Canada’s population is aging like never before, and the federal government is supporting initiatives designed to keep older people in their homes as long as possible. In order to address some of the issues related to mobility – not just moving, but
interacting with people in the community, but mobility in the broader sense – a centre was needed to bring this research together.

The new Centre for Mobility in Aging would be ideally housed within the existing MIRA and in order to do this MIRA needed a change in structure. The CMA will be the first Centre to be created under the umbrella of MIRA. McMaster has contributed funding to MIRA, and slight modifications to the structure and function were required to ensure that the Institute performs as necessary; however, the CMA is wholly supported by a donation.

It was duly moved and seconded,

i. That the University Planning Committee approves, for recommendation to Senate, the revisions to the structure and function of the McMaster Institute for Research on Aging (MIRA) as set out in Appendix B (i).

ii. That the University Planning Committee approves, for recommendation to Senate, the establishment of the Centre for Mobility in Aging (CMA) as set out in Appendix B (ii).

The interdisciplinarity of the Institute, particularly given the proposed revisions, was stressed. There are several Faculties involved in the institute now, and membership will continue to be expanded. The Institute, which was originally established as the McMaster Institute for GeroScience, was started by a group of researchers we had like interests. Similarly the CMA began with a group of researchers interested in mobility issues. Membership is now open to anyone who wishes to join.

Members remarked that the CMA is being established with a generous gift and, in response to questions, heard that this was not an endowment at the donor’s request; the donor has given to the University in the form of endowments in the past, but chose not to do so in this case. The donor specifically wanted the money to be spendable. Members asked if this was appropriate and expressed concern about what will happen when that initial funding runs out. Members heard that research centres and institutes are always looking for new sources of funding. The expectation is that increased visibility will lead to increased interest and, hopefully, to increased funding. This kind of funding is becoming more and more common as donors want to see their money spent and to see things happening with that money. It is expected that this will be increasingly the case.

The motion was carried.

Ms Harrington left the meeting.

VII OTHER BUSINESS

There was no other business in the open session of the meeting.
October 21, 2016

TO: University Planning Committee

FROM: Robert Baker

RE: Computing Infrastructure Research Centre (CIRC) Proposal

The Committee on Research Institutes has reviewed the attached Proposal for the Computing Infrastructure Research Centre, as per the policies and guidelines.

The proposal has the unanimous support of the Committee on Research Institutes.

Please include this as an Agenda Item for the next University Planning Committee Meeting.

RLB:pb

Attach.

cc: David Wilkinson
    Ishwar Puri
    Doug Welch
    Helen Ayre
Computing Infrastructure Research Centre
Foundation Proposal

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1 EXECUTIVE SUMMARY
The Computing Infrastructure Research Centre (CIRC) will be a platform for transformative innovations in the design philosophy of data centres (DCs) and other forms of computing infrastructure (CI). The research thrusts of the centre will include the following elements of DCs: (1) intelligent thermal management, (2) holistic design approaches, (3) intelligent computing load distribution strategies, (4) autonomous and predictive maintenance, and (5) modular packaging solutions for deployment.

CIRC will house unique facilities, making it the first research centre of its kind in Canada and among a handful others worldwide. Most notable among these are two flexible DCs that are designed to probe the impacts of new technology on performance and resource utilization. This will equip an interdisciplinary team to (1) rapidly implement pilot studies and (2) exhaustively validate new technologies, thus delivering 21st century innovations to an industry that is plagued by archaic designs and other inadequacies inherited from previous generations of computer technology.

Various industry partners will enable seamless translation of research findings into commercial products. In particular, Cinnos Mission Critical Incorporated (CMCI), which is a McMaster spin-off startup venture, will provide continuous knowledge transfer to ensure research efforts are designed to derive maximum commercial impact of research findings.

The activities at CIRC are translational by design, including for education of the current and future workforce. It will leverage McMaster’s mission of excellence in experiential learning, delivering hands-on curricula to the next generation of McMaster engineering graduates and customized training workshops to industry personnel.

CIRC’s governance structure comprises (1) an Academic Director (AD) to authorize/approve projects and (2) the Executive Committee (EC) led by the Managing Director (MD) to develop work proposals and execute decisions by the director. An Advisory Committee, comprising academic and industry leaders, will aid the director(s). In addition, an outreach committee and a commercialization committee will serve the AD and EC in an advisory and decision support role.

The initial support for CIRC originates from substantial cash and in-kind contributions from CMCI and other industry partners, which are being leveraged to secure research grants from Federal and Provincial funding agencies. Other means of sustained revenue include (1) consulting services and (2) royalties.
2 DESCRIPTION OF THE CENTRE

2.1 Name & Branding
The centre will be named the Computing Infrastructure Research Centre (CIRC). The logo, presented alongside, is hereby proposed as secondary branding, to be used in accordance with McMaster's policy on the use of such vehicles.

2.2 Location
CIRC will be located at the McMaster Innovation Park in Suite 401A, collocating with CMCI, which is a McMaster spin-off startup venture. This is a pioneering model of university-industry collaboration that is designed to remove barriers between University research capabilities and its surrounding innovation ecosystem. It is anticipated to provide substantial benefits to its missions in both research and education, e.g., through accelerated translation of research for economic and societal impact, and by facilitating an immersive learning environment that strongly portrays real-life experiences. We expect this to serve as an exemplary model for effective industry-university collaborations in the future.

2.3 Objectives
CIRC is designed to be the world’s premiere centre for translational research and development of advanced, efficient and sustainable technologies in the field of CI. Further, CIRC will develop and deliver pioneering hands-on academic curricula to meet the growing needs of highly skilled personnel in the CI industry.

2.4 Proposed Activities
2.4.1 Research
Research thrusts at CIRC include: (1) holistic modeling of DCs, (2) intelligent thermal management approaches, (3) automated design tools, (4) intelligent resource management, (5) predictive maintenance, and (6) modular components for DC deployment. Their interrelations are illustrated in Figure 2.

Figure 2 Research Objectives The two on the left are fundamental engineering advances, which the three in the centre will exploit to develop market-ready technologies that address industry-wide deficiencies. The one on the right is a vehicle for rapid deployment of the technologies.
At the core of CIRC research will be an integrated computational model for DCs and other forms of CI. The model will be founded on physical laws and complemented with statistical algorithms that iteratively refine its accuracy using years of operational data sourced from a wide variety of DCs as well as real time data collected from various operating DCs. Such a model will enable the optimization of all events in the life-cycle of a DC, i.e., its design, installation, operation, maintenance and expansion. Efficacy of the optimization will be validated by pilot tests. A suite of software tools are anticipated to aid the CI industry in design, operation and maintenance of their facilities.

In addition, a plethora of disruptive technologies for DC components are envisaged, e.g., novel means for heat removal, intelligent control systems for load distribution and real-time data analysis for predictive maintenance. These components will foster a new paradigm of DC architecture, enabling highly profitable yet environmentally responsible computing practices.

CIRC's research ambitions will be realized by complementary informal groups comprising dedicated research scientists/engineers and technicians working in tandem with postdoctoral fellows, graduate and undergraduate students.

2.4.2 Education/Training
Several of the private sector partners have expressed an immediate need for skilled personnel capable of the design, operation and maintenance of CI. However, curricula addressing such needs are quite rare. To address these needs, CIRC will develop not for credit courses, workshops, and other informal programs, to be offered to both industry personnel and members of the McMaster community. The Centre will consider offering a Certificate of Completion for those who complete a set level of such activities.

Further to curricular education, CIRC will host approximately twelve graduate students (MSc/PhD) by the end of 2016, and the number is expected to increase thereafter. CIRC will also host undergraduate research interns every summer. Such students will gain hands-on training in CI design and operations and become conversant with the frontiers in scientific and technical developments relevant to the CI industry.

CIRC’s unique environment presents a novel model of education that is designed to evolve experiential learning to the context of the ever-changing societal landscape today. Students will get to witness the 21st century innovation economy in action. This will happen through a problem-based learning plan, featuring problems that are of considerable economic or societal value. The most profound differentiator to the education at CIRC is the holistic nature of the experience: students will be exposed to frequent interactions, e.g., with personnel in R&D, manufacturing, support, sales, marketing, supply-chain, customers, and consultants. Such experiences will stimulate seamless cross-pollination of ideas, which is difficult to emulate in a classroom environment, or even in project laboratories.

2.4.3 Industry Engagement
CIRC will serve its industry patrons through R&D and consulting services and by providing a forum for technology advancements. The CIRC team will couple research findings with business case studies, deployment logistics and competitive market strategies, providing a never-before envelope of services to industry patrons.
Further, CIRC will deliver customized training workshops to industry patrons for a fee. Such workshops are extremely useful for companies bringing new personnel on-board and promise to be a significant revenue source for CIRC.

3 RATIONALE FOR ESTABLISHING THE CENTRE

3.1 Background
Data centres (DCs) are a critical part of 21st century infrastructure. They house the ~75 million servers that ‘run’ our digital lives, and ~10 million new servers are sold every year. For the servers to operate, the DCs must house a plethora of supporting equipment, e.g., for cooling, power distribution and back up, networking, and fire suppression. Thus, in addition to selecting the best possible information technology equipment (ITE), a DC architect is tasked with interfacing the ITE to the available real-estate by selecting suitable supporting equipment and their appropriate interconnections. Currently, this involves an exceedingly complex year-long manual process. Thus, end-users typically requisition DCs to service ~10 years of anticipated business demand, and add a generous contingency. This leads to habitual excessive over design. Consequently, DCs typically run at ~15% of their design capacity, and on average waste ~90% of the energy consumed. These two inefficiencies translate, respectively, into exorbitant locked-in capital costs and operating expense for end-users. Considering that about 3% of the energy produced worldwide is consumed by DCs, this wastefulness is also an escalating energy crisis. Considering that much of electricity production still depends on fossil fuel combustion, this contributes to global greenhouse gas (GHG) emissions. Therefore, DC over-design is both fiscally and environmentally imprudent.

3.2 The Opportunity
The poor design of computing infrastructure stems from a classical disciplinary divide in Engineering: electrical engineers design the computer servers, computer scientists develop the software that manages their utilization, and mechanical engineers implement the systems for thermal management. Historically, integration between these three disciplines has been rare. CIRC bridges this gap by bringing dedicated personnel from each area under one roof. This will enable a holistic approach to the design of CI, enabling both incremental and disruptive innovation in the field. The availability of two flexible DCs will enable rapid pilot testing and exhaustive validation of the technologies; such infrastructure is unavailable elsewhere in Canada. Further, colocation with CMCI and close contact with other industry partners will enable seamless commercialization.

3.3 Alignment with the Strategic Priorities of McMaster University
3.3.1 Research Foci
CIRC will conduct research in the Information Technology sector, which is one of the six multi-disciplinary (cross-faculty) strategic areas identified in the 2012 Strategic Research Plan. Further, the research addresses a big environmental concern by reducing energy needs in one of the fastest growing verticals of its consumption. Simultaneously, it addresses an immediate market need, promising substantial commercial impact.

3.3.2 Research Capacity Building
CIRC will be home to two on-site DCs that are designed to examine the influence of new technologies on performance and energy consumption. They will enable seamless validation of novel technology through direct measurements. Further, two dedicated laboratories will be
developed for benchtop experiments: (1) the thermal management laboratory for measuring the various thermal properties of materials and systems, and (2) the electrical testing laboratory to probe electrical losses and health monitoring of CI. Thus, CIRC’s infrastructure is quite unique. **It is the first of its kind in Canada and is among very few others worldwide.** It promises transformational research activities and will attract the best of researchers and students from all over the world as direct participants or through strategic collaborations.

CIRC will initially host three dedicated research scientists/engineers, leading the three complementary research groups. In the long run, these individuals will serve as excellent candidates for assuming NSERC Industrial Research Chair positions at various levels. Such opportunities will be aggressively pursued in collaboration with the various private sector partners. This contributes to the sustainability of the various research programs to be hosted at CIRC.

CIRC will capitalize on opportunities from various funding agencies: (1) NSERC CRD grants will be used to match all cash and in-kind contributions from the sponsors, (2) an ORF-RE application is being prepared to leverage such contributions further, and (3) application for a CFI Innovation Fund and a matching ORF-RI award is planned to boost the infrastructure. Further, CIRC will explore avenues to attract funding from the Networks of Centres of Excellence.

### 3.4 Research Impact
CIRC will position McMaster and Hamilton as a hot bed for disruptive innovations in the rapidly growing DC & CI industry, attracting businesses and experts of international repute. Further, the research findings will be commercialized exclusively through Ontario based manufacturing, design and service organizations, furthering the innovation ecosystem in Hamilton.

### 4 PARTICIPANTS

#### 4.1 Principal Investigator
Ishwar Puri, Professor, Department of Mechanical Engineering

*Note:* The Vice President Research will appoint Professor Puri as the Acting Academic Director for the four-month period following the launch of the centre, during which time he will run a search for the Academic Director. Ordinarily, the director of a Faculty-based centre reports to the Dean of the Faculty. However, considering Prof. Puri is also the Dean of Engineering, the Academic Director will report to the Vice President of Research until another Academic Director is appointed or Prof. Puri is no longer the Dean of Engineering.

#### 4.2 Co-Investigators
Douglas Down, Professor, Department of Computing and Software
Ranil Sonnadara, Managing Director, Research and High Performance Computing
Rong Zheng, Professor, Department of Computing and Software

#### 4.3 Managing Director
Suvojit Ghosh, Department of Engineering Physics

#### 4.4 Researchers, trainees, and students
The researchers, comprising group leaders of the three proposed research groups, technicians, postdoctoral fellows, graduate and undergraduate students will be members of the McMaster community.
4.5 **Community Support**
Many organizations in the local ecosystem have expressed interest in supporting CIRC. Notable participants comprise the Innovation Factory, enabling integration with the local innovation ecosystem, the Population Health Research Institute, through data on and access to their computing infrastructure, and the Department of Economic Development of the City of Hamilton, by integration with Hamilton’s innovation initiatives. Letters of support already availed are attached herewith.

4.6 **Private Sector Partners**
The following industry partners have committed contributions (cash and/or in-kind) to activities at CIRC:
   1. Cinnos Mission Critical Incorporated, Hamilton, ON (founding partner)
   2. Access Communications, Hamilton, ON
   3. ClearCable Networks, Hamilton, ON.
   4. Spectra Engineering, Toronto, ON.
   5. Heroux Devtek, Toronto, ON.
   6. Burloak Technologies, Dundas, ON.

4.7 **Advisory Board**
The following individuals have committed to serving on the Advisory Board of CIRC.
   1. **Michael Bauer**, Scientific Director, SHARCNET & Professor, Department of Computer Science, Western University
   2. **Roop Mahajan**, Director, Institute for Critical Technologies and Applied Science, Virginia Tech
   3. **Dimos Poulikakos**, Professor, Laboratory of Thermodynamics in Emerging Technologies, ETH Zurich

4.8 **Expansion of Membership**
Immediate expansion is planned in the Advisory Board with particular focus on the inclusion of leaders from the CI industry. As CIRC expands, the board will recruit additional members who are of strategic interest to the centre’s growth, sustainability and impact. Additional research projects will also be sought through support from private sector partners, and the staff members expanded accordingly. Contributions from a number of potential private sector partners are being sought, and are anticipated shortly.

5 **ORGANIZATIONAL STRUCTURE & GOVERNANCE**
The Academic Director will be supported by an administrative team, consisting of the (1) Managing Director (MD), (2) an Executive Committee, (3) an Advisory Board, and in the future two committees focused on (4) knowledge translation and (5) intellectual property. The MD will be responsible for the overall execution of the activities required for supporting all in-house projects. The respective PIs of all projects will have oversight of the project activities.

5.1 **Executive Committee (EC)**
The EC will comprise the Academic Director (AD), who will serve as the EC chair, the three group leaders (described below), the Managing Director (MD), the PIs and co-PIs of the various projects being undertaken at CIRC, and a nominee from the Advisory Board. It will meet **twice a month** to monitor activities and discuss how to realign activities to ensure that research,
technical, and commercialization milestones are achieved as planned and the program goals are satisfied. The EC will propose realignment measures to the AD. Other EC responsibilities will include advising the MD on the day to day management of the centre, executing the AD’s decisions, planning for industry and international collaborations, reporting to the various sponsors, issuing recommendations regarding projects, and planning for the dissemination of research results, technology transfer and commercialization.

5.2 Managing Director (MD)
This role will be served by Dr. Suvojit Ghosh. Ghosh will be responsible for the day-to-day operation of the projects, e.g., managing personnel and resources to execute the objectives of the various projects. Other responsibilities of the MD include: (1) design and implementation of systems and procedures, such as personnel and fiscal decisions with the approval of AD, to manage complex projects and their integration, (2) organization of key meetings, (3) serve as the point of contact for all inward communications from external entities, such as industry and innovation partners, and, with the consent of the AD, provincial entities, e.g., concerning intellectual property, outreach and commercialization opportunities, (4) satisfying planned commercialization objectives and aggressively pursuing new avenues for project expansion and sustainability, and exploring technology transfer and commercialization opportunities, (5) human resource planning, hiring and training of new personnel affiliated with the many projects, (6) management and operation of laboratories, (7) maintaining current knowledge on upcoming funding opportunities and informing all stakeholders in a timely fashion and (8) monitoring of research accounts.

5.3 Advisory Board (AB)
The Advisory Board, which will be chaired by the AD, will assume a role of scientific and intellectual leadership for the guidance and development of the various projects and make recommendations on project direction and progress toward milestones. In order to do so, the AB will convene twice a year for a half-day event at CIRC premises. In order to ensure impartial evaluation, the AB will only comprise of individuals who hold an arm’s length relationship to the project. The AB will comprise seven national and international senior scientific and technical experts who present complementary backgrounds in R&D, technology translation, design, deployment and operation of DCs. The AB will evaluate the relevance of proposed activities, review the outcome of projects and their impact, provide additional technical direction, and advise on enhanced commercialization opportunities. Further, with consent of individual AB members, the MD will seek their mentorship for the young researchers, students and trainees. This mentorship, while voluntary, is critical to develop highly qualified personnel (HQP) for the DC industry.

5.4 Knowledge Translation and Communication Committee
Knowledge translation and communication is crucial to CIRC for building a Canadian innovation ecosystem in the DC industry. Thus, it is integrated into the mandate of CIRC through this committee. This committee will develop communication strategies with the ultimate goal to position Ontario as a leader in the rapidly growing industry of Data Centres management. Its responsibilities will include annual reports, newsletters, website development, and standardization of communication. The committee will comprise the MD, officials responsible for handling communications and outreach at the Faculty of Engineering at McMaster, and nominated members of the AB and EC (one each, on a rotating basis).
5.5 Intellectual Property and Commercialization Committee
This committee will monitor and manage the resulting intellectual property through: monitoring of scientific progress, fostering of dissemination of innovations, contributing to commercialization policies/procedures of CIRC and identification of potential new collaborations. The committee will comprise the MD, an official from the McMaster Industry Liaison Office, most likely to be Mr. Glen Crossley, and nominated member of the AB who holds a senior management role with an industry partner (on a rotating basis). Members from a regional innovation centre or business incubator (Innovation Factory/Communitech) or concerned industry patrons will be requested to volunteer if/when the need arises.

![Figure 3 Organization/governance structure of CIRC](image)

6 REPORTING
The centre will report annually to the Vice President of Research. The annual reports will describe the centre’s progress towards its mission, activities, growth plan and finances. In such communications, the centre will keep the Associate Dean of Research and the Director of Finances & Operations of the Faculty of Engineering fully apprised.

7 SUSTAINABILITY
The appetite for digital technologies will continue to grow exponentially in the foreseeable future. Thus, the collective demand for computing capacity of the planet will keep growing. This presents a continuous need to discover, invent, and innovate our computing machines, i.e., our DCs. The proposed work is designed to seed a long-term establishment that can service this need, and place Ontario at its focus. Our novel model for university-industry partnership is a major enabler in its sustenance and growth:

1. By collocating at the McMaster Innovation Park with Cinnos Mission Critical Inc. (CMCI), a McMaster-born rapidly growing company in the DC industry, we are in continuous contact with industry needs to ensure the relevance and impact of our research activities.
2. We have forged strategic partnerships with five other Ontario-based business serving the DC industry who collectively serve the entire industry value-chain.

3. As the various projects progress, we will grow this network to form a close-knit ecosystem of Ontario companies, which currently exist as scattered resources. Our program will assimilate them into a synergistic network in southern Ontario, specifically in the GTHA.

4. The strategic network will be complemented by the superior technologies translated out of our research, enabling them to compete with foreign businesses who currently dominate the global $100B+ industry.

These are fundamental differentiators of our unique impact realization strategy, and enables substantial revenues to the Ontario companies, as detailed in Section 21.

As the Ontario companies in our network prosper, their capacity to adopt advanced technologies will grow. Such technologies will be developed by our research program as sponsored projects using the unique and enabling on-site facilities that we create, which are the first of their kind in Canada and among very few others worldwide. Whenever appropriate, the team will capitalize on opportunities from various funding agencies: NSERC CRD grants will be used to match all cash and in-kind contributions from the sponsors, and an application for a CFI Innovation Fund and a matching ORF-RI award is planned to boost the infrastructure. Further, the team will explore avenues to attract funding from the Networks of Centres of Excellence. All of these combined provide a promising growth trajectory for our research capacity in the foreseeable future.
Athletics & Recreation Complex Expansion
Business Case
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Authority Signatures

Include the signatures of the project executive sponsor and other project sponsors, indicating that they agree with the proposed business case.

_________________________                ____October 12, 2016________
Executive Sponsor              Date
David Wilkinson
Provost and Vice-President (Academic)

_________________________                ___October 12, 2016________
Project Sponsor Date
Sean Van Koughnett
Associate Vice-President (Students & Learning
and Dean of Students

_________________________                  ___October 12, 2016        ___
Project Sponsor  Date
Glen Grunwald
Director, Athletics & Recreation
Business Case Conclusion & Recommendations

Approve an expansion and addition to the McMaster Athletics & Recreation Complex, which supports the vision and redevelopment strategy contained in a study prepared by Perkins + Will as part of McMaster’s initiative to enhance the student experience and meet capacity needs.

Support this Business Case prepared for the University Planning Committee, Planning and Resources Committee, and the Board of Governors regarding a Phase 1 (more specifically Phase 1a and 1b detailed in later sections) projects based on a student fee funding model to support student athletic and recreation additions/enhancements and to provide additional student learning space whereby post construction operating costs will be supported by the University as common space costs distributed to activity units (Faculties) using the budget model. This Business Case is based on a 40-year Central Bank loan funded by student fees, and some community revenues. Student fees in this business case are subject to a January 2017 undergraduate student referendum, thus governance approvals are contingent on the vote outcome.

Recommendation:

That the Planning and Resources Committee and the University Planning Committee approve, for recommendation to the Board of Governors, components of the Athletics and Recreation Phase 1 Space Expansion, involving 1a) expansion to the Pulse and an additional gym (62,814 GSF of both new and renovated space), and 1b) additional student community space (an additional 40,000 GSF) totalling 102,814 GSF of both new and renovated space supported by an approved 40 year Central Bank Loan at the University’s weighted average cost of capital (currently 5.75%); for which the business case and Central Bank loan approvals are contingent upon a successful January 2017 student fees referendum supporting either the total project (both 1a and 1b) at a total project cost of $59.5 million, inclusive of net HST, or only the Pulse and additional gym (1a only) at a project cost of $33.7 million, inclusive of net HST.

Support a student referendum to the full-time undergraduate students scheduled for January 2017 asking for a continuation and an increase to the existing DBAC fee to achieve Phase 1a and 1b projects (expanded Pulse, new gym and student community space) representing $59.5 million in capital costs and 100% of the athletic and recreation (Pulse and Gym) operating costs; this increase will be levied to students at the time of completion in 2020/21.

Note: Students will be provided with two options at time of referendum: 1a) approve the Pulse and Gym expansion along with the elimination of the Pulse membership fee and an increase to the A&R Activity fee, or 1a) plus 1b) approve an addition to the student community space. Appendices are provided to demonstrate the operating costs (proforma revenues and expenses) for 1a only and 1a and 1b together. In addition to proformas, loan amortization schedules, operating costs, and cash outflows are provided. Regardless of referendum outcome the conservative proforma analysis support both options, with a preference or stronger financial result with 1a and 1b combined.
Executive Summary

In 2016, Perkins + Will Architects, in association with Councilman Hunsaker, Smith + Anderson, Turner & Townsend, were engaged by McMaster University Athletics & Recreation (A&R) to identify redevelopment strategies and convey a short- and long-term vision for growth for the entire McMaster Athletics & Recreation Complex (ARC) in support of our student experience. The goal of the project is an enhanced experience for all students addressing specific needs associated with student well-being, recreation and intercollegiate athletics. Since 2007, when the David Braley Athletic Centre (DBAC) was opened, the student population has more than doubled. The need for redevelopment strategies is a direct response to the challenges of aging facilities and not meeting current or growing needs and expectations of our students. The current lack of capacity has resulted in overcrowding and an inability to provide quality varsity and recreational programming; this has a significant negative impact on the student experience. Working with the consultants a number of opportunities to maximize the use of the A&R footprint for increased capacity and new functionality within the complex have been identified.

Our vision is to be the healthiest campus in Canada where health and fitness become core to daily student life. The ARC strategy includes the delivery of additional and needed comfortable student spaces, allows for diversity and inclusiveness, integrates academics and athletics, enhances and connects student learning with physical activity and engagement space, expands recreational programming, and provides quality performance facilities. In August 2016, the consultants provided a final report that identified four potential phases totalling $159.8 million. The fourth phase (student residence) recommended by Perkins+Will has not been incorporated as part of the long-term strategy nor included in this business case. Construction costs for the first 3 phases totalling $139 million are included in Table 1.

Table 1: Redevelopment Phases ARC Strategy

<table>
<thead>
<tr>
<th>Phase 1 - $50.8 million*</th>
<th>a) David Braley Athletic Centre (DBAC) Pulse Fitness Expansion and Additional Gym, totalling 62,814 Gross Square Feet (GSF) at a construction cost of $21.3 million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b) Ivor Wynne Centre (IWC) Student Community Space Expansion, totally 40,000 GSF at a construction cost of $18.3 million</td>
</tr>
<tr>
<td></td>
<td>Deferred phase 1 items (for later consideration)**:</td>
</tr>
<tr>
<td></td>
<td>c) Pool Renovations: Upgrades to existing pool associated with 7,220 GSF at a construction cost of $2.9</td>
</tr>
</tbody>
</table>

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*Deferred phase 1 items (for later consideration)**: 
Business Case | [Athletics: Recreation | Phase 1 Space Expansion]

<table>
<thead>
<tr>
<th>Phase 2 - $50.3 million</th>
<th>million</th>
</tr>
</thead>
<tbody>
<tr>
<td>d) Major Retrofitting: Lockers, storage expansion, new corridor affecting 45,600 GSF at a construction cost of $8.3 million</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
*Construction costs adjusted for inflation to the date of tender (2018).

**1c) is physically adjacent to 1b), and construction costs were estimated based on completing both projects at the same time. Completing 1c) after 1b) will impact its construction costs and the accessibility of the facility during the renovation period. If funds become available, consideration should be given to completing 1c) at the same time as 1b).

<table>
<thead>
<tr>
<th>Phase 3 – 37.9 million</th>
<th>million</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) New Pool affecting 97,000 GSF at a construction cost of $42.23 million</td>
<td></td>
</tr>
<tr>
<td>b) New Student Gym and major retrofitting totalling 23,190 GSF at a construction cost of $8.1 million</td>
<td></td>
</tr>
<tr>
<td>a) New Field House &amp; High Performance Centre totalling 111,000 GSF at a construction costs of $25.8 million</td>
<td></td>
</tr>
<tr>
<td>b) Covered Parking totalling 71,700 GSF at a construction cost of $12.1 million</td>
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</tbody>
</table>

A copy of the Facility Assessment and Master Plan study referred to is a separate attachment that complements this business case and is available upon request.

Based on the business case analysis, it is recommended that we proceed with both Phase 1a and 1b of the redevelopment strategy, or at minimum Phase 1a, the final determination following Board of Governors approval will be contingent on the January 2017 student referendum results. The referendum asks undergraduate students to increase student fees, including an increase to the A&R Activity fee and elimination of the Pulse user fee.
An executive summary of these projects are as follows:

**Pulse Fitness and Gym Expansion:** The current Pulse Fitness space is limited in size and at peak hours the Pulse is unable to accommodate members resulting in some members having to wait for others to finish their workout prior to being let in. The plan is to double the size of the Pulse to accommodate all students and most other members at all times. The current gyms are also in high demand and heavily used. These constraints have impacted A&Rs ability to meet demands to support recreation, intramurals, varsity, social, and community sports. This phase 1 project plan is to build one additional Gym at this time to meet these demands. The Pulse Fitness and Gym renovations affect 62,814 GSF representing both new and renovated space. The Pulse Fitness and Gym are key staples of healthy living on campus and is positively correlated with student satisfaction and improved health conditions.

**Student Community Space Expansion:** There is currently insufficient student community and informal collaborative space for students on campus. The McMaster University Student Centre (MUSC) remains overcrowded and over utilized despite recently providing increased seating. The ARC Student Community Space Expansion will support collaborative student life space needs and promote healthy active living. The space will potentially feature multi-purpose event spaces for students, a peer support centre (run by the McMaster Student Union (MSU)), multi-faith space, food collective centre, recreational practise space (dance groups, marching band), movie theatre (for clubs and services), nap centre/student lounge space, and un-programmed collaborative student space where students can work on projects, study or just eat and socialize with friends. This space will amount an additional 40,000 GSF.

**Section 1: The Strategic Context**

1 **Business Needs and Desired Outcomes**

1.1 **Strategic Environment**

1.1.1 **Organizational Overview**

McMaster University is committed to a transformative approach to advancing human and societal health and wellbeing, meaning as the institution delivers on its social obligations, both through the discovery, communication and preservation of knowledge and through the production of thoughtful, creative and resilient global citizens, it will also undergo significant changes to itself. These changes must relate to the University’s commitment to “developing a distinctive, personalized, engaging and sustainable student experience” and should focus on institutional values, including:

**The Cultivation of Human Potential:** “We are an institution devoted to the cultivation of human potential, which we believe cannot be realized by individuals in isolation from one another, from their history or their imagined future, from the society which surrounds them, or from the physical universe which sustains them.” (Forward With Integrity, p. 4)
**Diversity and Inclusion:** “The importance of promoting and supporting diversity within our student body is also crucial; our campus must be a welcoming and supportive environment for all students, whether they come from overseas or more locally, and regardless of their ethnic origin, background, gender, sexual orientation, religious beliefs, or political alliances.” (Forward With Integrity: The Next Phase, p. 5)

**Learning Outside of the Classroom:** “Experiential components deliver obvious benefits in terms of the quality of the learning experience and the level of engagement felt by students.” (Forward With Integrity, p. 7)

**Social Learning:** “[The] quality and richness of our life together on this planet is the point of education. This physical space is therefore highly significant; it is literally the ground of our coming together and the emblem of our deeper commonality, kinship and shared aspirations.” (Patrick Deane, Spring 2016 Convocation Speech)

**Partnerships with Students:** “Since the good of students, graduate as well as undergraduate, is at the heart of this initiative, students must be drawn even more deeply into [the University’s] discussions...” (Forward With Integrity, p. 14)

**Student Health and Wellbeing:** “We envision a community that recognizes improving the health of our campus is a shared commitment. We strive to foster a healthy, supportive and inclusive educational environment and one of our primary goals is to create a culture of caring and support: ‘we care for the whole student and we care for one another’. We as a campus recognize that student well-being and good student mental health are critical foundations for student success.” (Student Mental Health & Well-Being Strategy)

The Athletics & Recreation Major Expansion Project arises from and responds to each of these institutional values. The Project was developed in partnership with students, for students—the McMaster Students Union has been involved in all stages of planning and will continue to support the Project through its execution by providing input and guidance on the use, design and eventual governance of the space. The Project focuses on inclusion of all students with varying backgrounds and abilities, delivering on the University’s commitment to create an environment that is welcoming and supportive of all students and that celebrates the abundance of our community. The Project creates more opportunities for co-curricular, social learning by increasing the space available on campus for sports and recreational activities, and it makes student-led initiatives in un-programmed space more possible. The Project focuses on accessibility and healthy active living, which contribute to improved student experiences, better mental health and wellbeing.
1.1.2 Detailed Description of the Business Need & Drivers for Change

**Pulse Fitness and Gym Expansion**

Student interest in athletic and recreational space at McMaster University exceeds the capacity of existing facilities on campus. According to the National Student Affairs Professional Association’s (NAPSA) Recreation Benchmarking Study conducted in 2014 (742 respondents for McMaster University), both users (64%) and non-users (36%) of the facilities indicated that overcrowding was a problem and that accessibility to the space needed improvement. Respondents indicated the need for more cardio and fitness classes (67%) and more weights (63%).

The NAPSA survey responses were reinforced by Perkins + Will Architects as they conducted tours and interviews with staff while developing a facility assessment and master plan study in 2016. The study observed, “Sharing undersized facilities is a challenge to meet the needs of all students, varsity teams, faculty, staff, and the community.” While initial designs for the current facilities were based on an undergraduate enrolment of 14,600 students, McMaster University now has over 22,000 undergraduates—the added volume puts pressure on the facilities, especially during peak workout times (11:00 am – 8:00 pm). With over 10,000 undergraduate Pulse members in the 2015/2016 academic year, it is no surprise that student enrollment has outpaced the capacity of existing facilities.

The proposed expansion (1a) will increase space available for fitness programming by a factor of 2.2. The current gross square footage will be increased from 17,575 to 39,301 GSF and will provide three additional group exercise spaces. The new space will make it possible to create different equipment zones overlooking the football field, thus increasing user access to cardio machines and weights. The Business Plan includes $1.5M for new equipment in this space.

In addition to overcrowding at the Pulse, the current facilities struggle to meet student needs for gym space. Sport Hall and Burridge Gym are both programmed over 80% of the time, meaning they are in use for varsity practices, intramurals, recreational drop-ins and occasional external rentals. These numbers increase to over 90% during peak hours (8 am – 10 pm). When the gyms are not occupied by formal programming, they are open for and consistently used as recreational time. The addition of a new gym is included in the proposed expansion (1a), which will add 12,833 GSF to the Project.
The proposed expansion and renovation will not only improve the quality of services available for current users but will also increase capacity and thus encourage participation amongst current non-users. Additionally, by eliminating the existing Pulse membership fee and instead applying a reduced amount to the existing A&R compulsory fee for all students, the cost per student to access the Pulse will decrease from $144 per eight months per student (current Pulse membership) to $105 per year per student (proposed increase to the Activity Fee). This, too, should increase participation and responds to feedback from the NAPSA survey highlighting affordability as a deterrent to participation for 47% of non-users.

The elimination of the existing membership fee for the Pulse and replacement with an increase to the mandatory Athletics & Recreation Activity Fee will be presented along with a proposed continuation of and increase to the existing David Braley Athletic Centre Fee in the January 2017 MSU referendum.

Note: The proposed expansion will not be able to proceed without the approval of these fee increases by the undergraduate student body.

Student Community Space Expansion

McMaster University is in need of additional unprogrammed student space. In a 2016 survey conducted by the MSU, 80% of the 273 respondents indicated a need for new space to study, work on projects, eat and socialize. Additionally, the MSU has identified a list of student needs that cannot be accommodated due to a lack of available space. The establishment of a peer support centre, a multi-faith prayer room, napping pods, an event/entertainment space, an entrepreneurship incubator and an off-campus student lounge will be considered as part of the detailed design phase.

The McMaster University Student Centre (MUSC) opened in 2002 to address student needs for unprogrammed space, but it was designed for a student population of 15,000 undergraduates; as mentioned above, undergraduate enrolment is now well over 22,000. Recent renovations to the MUSC and other spaces on campus have increased seating and study space for students—the MUSC spent over $1.1M on renovations in the summer of 2016, which increased seating capacity in the building by 180 seats. While changes like these alleviate some of the pressure for study and social space, the gap between campus resources and the needs of a growing student population remains significant and demands a large-scale, student-led solution.
The proposed student community space (1b) will add 40,000 GSF to the Athletics & Recreation Complex. Initial planning for the space has been conducted in partnership with the MSU. Leading up to the January 2017 referendum, the MSU and University will publish an informational website and campaign describing the nature of the Project and inviting feedback on the concept. If the referendum passes (1a and 1b), a committee with representatives from both the University and the MSU will be established to build detailed plans for the space and to codify its management.

1.1.3 Business Outcomes – Financial Highlights

Detailed Operating Revenue and Cost analysis (proformas) are provided in the Appendices. A summary of the Capital Costs are provided in Table 2 below. **Note: at the time of producing this business case for governance approvals a review was initiated to determine whether any Ivor Wynne deferred maintenance funding could be used to reduce the capital project cost of the student community space funded by fees in this model. The review will occur in parallel to governance approvals being requested, however should be known by January 2017 (the time of the referendum); if a capital cost reduction is possible a governance update will be provided showing the impact of a DM investment on the Phase 1a and 1b mortgage**

<table>
<thead>
<tr>
<th>Table 2: Capital Project Costs</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Gross Square Feet</td>
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<tr>
<td>Construction Costs (note 1)</td>
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<tr>
<td>Soft Costs (note 2)</td>
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<tr>
<td>Subtotal Construction</td>
</tr>
<tr>
<td>Furniture and Equipment (note 3)</td>
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<tr>
<td>Subtotal</td>
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<tr>
<td>Bridge Financing Costs (note 4)</td>
</tr>
<tr>
<td>Total Capital Costs</td>
</tr>
<tr>
<td>Construction Cost /Sq. Ft</td>
</tr>
<tr>
<td>Total Capital Cost</td>
</tr>
</tbody>
</table>
Notes:

Construction costs provided by Turner & Townsend – August 2016. Estimate includes a 15% gross up for the General Contractor Fee. Includes insurance, mobilization, demolition. Construction costs increased by 3% per year to construction.

Soft Costs based on 26% of capital costs and includes administration costs, contingency, other contracts (hazardous materials, IT, security, signage, etc.), professional services, permit fees, Net HST.

Pulse & Gym and Student Community Space – Pulse and Gym furniture and equipment is based on 20% of capital costs plus $1.5 million for cardio equipment. Student space is based on 10% of capital costs.

Bridge financing costs based on 2% of estimated cash flows during construction period.

Phase 1a Pulse Fitness and Gym Expansion Only:

Revenue generation will come from the existing DBAC fee charged to students and an increased fee to be implemented when the new expansion is complete in 2020/21. Undergraduate students currently pay an existing fee of $141.60 per full-time unit load or $4.72 per unit to finance the previous 2007 capital expansion and half of the operating costs. This mortgage is projected to be paid in 2023 resulting in $104 per full time unit load becoming available for the expansion, pending positive results from the January 2017 student referendum to continue and increase the existing DBAC levy. This Business Case assumes that this levy will continue along with an increase to this levy to support the proposed Pulse and Gym space expansion (to be approved January 2017 for implementation in 2020/21) of $59.10 per full-time unit load or $1.97 per unit when the expansion is completed and ready for use by students.

Students will be responsible for paying 100% of the facilities and operating costs associated with the Pulse and Gym expansion estimated at $1.8 million annually (refer to Appendix 1a Proforma).

Revenue generated from community memberships of $50,000 per year will continue to be committed to the Business Case and are reasonably assumed over the 40 year proforma appendix analysis.

Central bank loan re-payments represent 40% of running costs during the first 9 years of the business case (reflecting a 40-year loan period). Facilities operating costs have been incorporated into the plan and are consistent to the charges for other buildings on campus. Additional staffing, supplies, and required equipment have also been included in addition to bridge financing costs. The total cost for this expansion is $33.9 million (as shown in Table 2 above).
Phase 1b Student Community Space Expansion in addition to the Pulse Fitness and Gym Expansion:

Students will be provided with an option to fund the Student Community Space Expansion in addition to the Phase 1a Pulse Fitness and Gym Expansion. Revenue generation will continue to come from the existing DBAC fee charged to students and an additional fee increase implemented upon the completion of the expansions in 2020/21. The Business Case assumes that this levy will continue to support the proposed expansion in addition to an increase of $118.50 per full-time unit load or $3.95 per unit in 2020/21. Additional staffing, supplies and required furniture have been included in addition to bridge financing costs. The total cost of this expansion is $26 million for a combined expansion total of $59.5 million (as shown in Table 2 above).

Students will be responsible for paying 100% of the facilities and operating costs for 1a) expansion estimated at $1.9 million annually commencing in 2022 (refer to Appendix 1a and 1b Proforma).

The expanded student space will be treated as University Student “Common Space” under the budget model resulting in the operating costs of the space being distributed to Faculties. The consolidated fully loaded impact approximates $1.1 million in University supported contribution annually commencing in 2022 (noting costs in 2021 are not based on 12 months of operation), (refer to Appendix 1a and 1b Proforma).

Refer to Graph 1 below for the split in operating cost support based on the above:
1.2 Strategic Fit

1.2.1 Pulse Fitness and Gym Expansion

In addition to some benefits already highlighted, the proposed expansion aligns with President Deane’s mission of personal growth and enhancement of the undergraduate experience and student success.

The proposed expansion aligns with A&R’s vision of “striving for excellence” by providing the opportunity for all students to have access to participate in sports, exercise and maintain a healthy lifestyle, as a result, we help create one of the healthiest campus’ in the world. The Student Community Space Expansion supports our vision for facilitating student learning, engagement and collaboration outside of the classroom, while accommodating the diverse needs of our students and community.

The proposed expansion opens access to the student body further aligning to the University’s branding directions of health, promoting healthy lifestyles, mental health and wellness, and physical activity integrated in each students learning years at McMaster.

1.2.2 Prioritized Requirements (High Level)

The Athletics and Recreation team have reviewed all options proposed by the consultant’s report and have evaluated highest level needs as items that address current capacity constraints. This means other items, some that have been on our capital plan for several years like the swimming pool, have not been recommended at this time. Ideally third party funding opportunities will arise to address items deferred (refer to Table 3 Priority Summary):

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Priority</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>DBAC Pulse Expansion and Gym</td>
<td>High</td>
<td>Recommended</td>
</tr>
<tr>
<td>1b</td>
<td>IWC Student Community Space Expansion</td>
<td>High</td>
<td>Recommended</td>
</tr>
<tr>
<td>1c</td>
<td>Pool Renovations</td>
<td>Med</td>
<td>Deferred</td>
</tr>
<tr>
<td>1d</td>
<td>Major Retrofitting</td>
<td>Med</td>
<td>Deferred</td>
</tr>
<tr>
<td>2a</td>
<td>New Pool</td>
<td>Med</td>
<td>Deferred</td>
</tr>
<tr>
<td>2b</td>
<td>New Student Gym &amp; Major Retrofitting</td>
<td>Med</td>
<td>Deferred</td>
</tr>
<tr>
<td>3a</td>
<td>New Field House &amp; High Performance Centre</td>
<td>Med</td>
<td>Deferred</td>
</tr>
<tr>
<td>3b</td>
<td>Covered Parking</td>
<td>Low</td>
<td>Deferred</td>
</tr>
<tr>
<td>4</td>
<td>Student Residence</td>
<td>Low</td>
<td>Deferred</td>
</tr>
</tbody>
</table>
1.2.3 Key Assumptions

Key assumptions were made to develop the business case proformas including:

- Conservative student growth: incorporating 80% of the planned undergraduate growth targeted 2016 to 2021 supporting the LLC business case, then a 0.5% UG student growth rate from 2022 to 2024, and 0% thereafter;
- Fee Inflation rate of 1.5% per year (typically fees increase between 1.25% and 3% per year);
- Cost escalation or inflation of 2.0% per year until 2040, then 2.5% thereafter (consistent with multi-year financial projection outlook and historical trends);
- Facilities operating costs based on the University budget model cost per square foot inflated per year using the cost escalation assumption; and
- Mortgage Central Bank Loan rate will equal the University’s approved weighted average cost of capital (currently 5.75%).

Other costs such as total capital project costs come from facilities (refer to Table 2), amortization schedule, total mortgage costs, net present value analysis, proforma modelling, cash flows, simple payback period, and project impact to McMaster Net Asset position come from both Student and Financial Affairs.

1.3 Scope

1.3.1 Boundaries

The scope of this project is very clearly defined. It will include Phase 1a Pulse Fitness and Gym Expansion and Phase 1b the Student Community Space and exclude any remaining phases, including upgrades to the current pool environment as identified by the consultants. It will also exclude, at this time, any major retrofitting for potential new study space, classroom space, storage expansion and locker layout and expansion also included in Phase 1.

Although the redevelopment plan addressed two options for the pool (Phase 1c – Repair and Phase 2a – New Build) there is no financing strategy to support either. The study concluded that the IWC Pool requires significant investment to improve its physical and environmental quality. Repair of the pool tanks and room repair is estimated at $3.2 million while the cost of a new pool is estimated at $42.2 million. Repurposing the existing pool into potential study space and the build of an additional gym would add $8.1 million to the cost. Overall, a new pool build remains the preferred option. Athletics and Recreation is currently working with Government Relations on securing funding from the federal government’s Canada New Building Fund in support of this initiative. In addition, at this time there is no plan for additional locker rooms due to funding constraints. To support this initiative, we are exploring
potential fundraising opportunities that would allow for naming options. Due to the uncertainty of additional external revenue sources Phases beyond 1a and 1b are deferred and not included in the current Business Case. Athletics and Recreation will, however, continue to pursue grants and donor funds in these areas.

Business plans to support the additional phases of the redevelopment strategy will be developed as funding sources are identified, which will go to Planning and Resources Committee for approval at a future date.

Section 2: Analysis and Recommendation

2 Preliminary Options Analysis
2.1 List the Possible Options
Option 1 – Phase 1a Pulse Fitness and Gym Expansion Only (62,814 GSF)
Option 2 – Phase 1a and 1b: Pulse Fitness and Gym (62,814 GSF) and Student Community Space (40,000 GSF)

Both options will involve the elimination of the Pulse user fee and increase to the A&R Activity fee.

2.1.1 The Status Quo
The baseline status quo means no space expansions, resulting in maintaining the Pulse and gym designed for an undergraduate enrolment of 14,600 students in 2007. Continued overcrowding will worsen based on targeted growth plans to support LLC and pressure for un-programmed student community space will only increase. Students may vote to approve the Pulse and Gym Expansions only as the two options presented leaving us the challenge to further accommodate un-programmed space in our existing buildings to respond to student common space demands.

2.2 Screening of Options
- Refer to Table 4 below:

<table>
<thead>
<tr>
<th>Screening Criteria</th>
<th>Status Quo</th>
<th>Option 1: 1a</th>
<th>Option 2: 1a and 1b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic fit and business needs</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Potential achievability</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Potential affordability</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Supports Student Common Space Needs</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Cost of Additional University “Common Space”</td>
<td>No Change</td>
<td>No change</td>
<td>$1.1 million</td>
</tr>
</tbody>
</table>
2.3 Advantages and Disadvantages of Options

Refer to Table 5 summary below:

<table>
<thead>
<tr>
<th>Status Quo</th>
<th>Option 1: 1a</th>
<th>Option 2: 1a and 1b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td><strong>Disadvantages</strong></td>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>No additional student space</td>
<td>No additional student space</td>
<td>No additional student space</td>
</tr>
<tr>
<td>Pulse remains overcrowded</td>
<td>Pulse expanded</td>
<td>Pulse expanded</td>
</tr>
<tr>
<td>Affordable</td>
<td>Affordable with fees</td>
<td>Affordable with fees</td>
</tr>
<tr>
<td>Financially viable</td>
<td>Financially viable with fees</td>
<td>Financially viable with fees</td>
</tr>
<tr>
<td>No change to fees needed</td>
<td>Change to fees $1.97/unit</td>
<td>Change to fees $1.97/unit</td>
</tr>
<tr>
<td>No Athletics &amp; Recreation mortgage by 2023</td>
<td>Medium new long-term mortgage</td>
<td>Temporary draw down of net assets $35M</td>
</tr>
<tr>
<td>Positive Impact to Net Assets</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.4 Recommendation

Based on the screening criteria along with the advantages and disadvantages of each option it is **recommended that Phase 1a and 1b be approved** by Planning and Resource Committee, for approval by the Board of Governors, **contingent on the outcome of the student referendum**. However, if the referendum results support only 1a it is recommended that Planning and Resource Committee approve Phase 1a, for approval by the Board of Governors. **Overall, Phase 1a and 1b are optimal to meeting both physical health needs and access to facilities for the students, as well as providing additional greatly needed common space for students.**
Section 3: Management and Capacity

3 Managing the Investment

3.1 Governance and Oversight

Athletics and Recreation successfully run the Pulse and gym areas using an existing infrastructure and trained professional staff. The Student Community Space Expansion will be a collaborative effort between the University (Student Affairs/Athletics & Recreation) and the MSU. A Memorandum of Understanding will be prepared between the MSU and the University outlining the guiding principles for the operations and usage of the space and potential revenue generation strategies. If this project is approved by students via referendum in January 2017, a detailed functional design will be initiated by McMaster and the MSU and involving significant student input.

3.1.1 Contracting and Procurement

The Phase 1a only or ideally the combined 1a and 1b project, if approved, will follow the normal capital projects approach. The project will be overseen by Facilities Services using a project account for the approved cost. The approvals for awards will follow the execution of instruments by-law obtaining Planning and resource Committee (PRC) approval for any items over $2 million and further Board of Governors approval for items over $10 million. The cash flow requirements during construction and the final Central Bank loan upon completion will be managed by Financial Affairs. The status of the loan and repayments are disclosed annually to the PRC on the Central Bank Loan report.

3.1.2 Implementation Plan

The Associate Vice-President (Students & Learning) & Dean of Students and the Director of Athletics & Recreation have worked very closely with the MSU to identify expansion priorities in support of student life and promoting a healthy lifestyle. The Business Case to support components of Phase 1 have been reviewed and endorsed by the MSU. Athletics and Recreation, with the MSU, will commence a communication and campaign strategy for the referendum once approval for the Business Case is received from the University Planning Committee. The referendum will take place in January 2017 during the MSU presidential election campaigns. Once the levy is approved work with the MSU will be initiated on the functional design of the Student Community Space, including any new programming ideas. Planning will occur in 2017 with construction commencing in 2018 and completion by September 2020.
3.1.3 Project Review Strategy
There will be ongoing review and monitoring of this major expansion project by Facilities Services in collaboration with Athletics and Recreation to ensure that the project remains in scope and the budget is met. Changes in scope may be required if the budget cannot be met.

3.2 Risk Management Strategy
3.2.1 Risk Summary

<table>
<thead>
<tr>
<th>Risk</th>
<th>Probability</th>
<th>Impact</th>
<th>Mitigation</th>
<th>Contingency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student enrollment targets are not met</td>
<td>Low</td>
<td>Low because 80% of planned growth has been used until 2021, only 0.5% growth 2022 to 2024, and 0% thereafter for the 40 year schedule</td>
<td>AVP (Students &amp; Learning) &amp; Dean of Students is responsible for managing enrollment targets. If necessary reduced revenues will be managed through cost reductions</td>
<td>N/A</td>
</tr>
<tr>
<td>Students do not support any of the options presented for fee increases</td>
<td>Low</td>
<td>Low because the AVP (Students &amp; Learning) &amp; Dean of Students has worked collaboratively with the MSU to ensure that needs are being met</td>
<td>There are no mitigation strategies. This project will not move ahead without student approval</td>
<td>N/A</td>
</tr>
<tr>
<td>Project cost runs over budget</td>
<td>Medium</td>
<td>Medium because the scope would be readdressed to reduce cost.</td>
<td>The budget will be closely monitored for scope and budget.</td>
<td>15%</td>
</tr>
<tr>
<td>Project is not completed on time</td>
<td>Medium</td>
<td>New fee collection may need to be pushed out another year</td>
<td>Facilities Services will monitor and manage timeline using contract recourse for delay where possible</td>
<td>None</td>
</tr>
</tbody>
</table>

3.3 Performance Measurement Strategy
- NASPA Recreation Benchmarking Survey Comparison
- National Intramural-Recreational Sports Association (NIRSA) metrics in comparison to other universities
- Increase in Usage Statistics by non-users – more students adopt a healthier life-style
- Waiting time for use of the Pulse and equipment is reduced, less crowding
- Student Community Space is used to meet diverse needs of students in leisure and learning activities
- The MUSC is less crowded as students gravitate to the new Student Community Space
- Increased engagement by off-campus students
- Student Satisfaction Surveys
- Increased retention
Appendix 1a (Pulse Expansion and Additional Gym Only)
## Appendix 1a (Pulse Expansion and Additional Gym Only) Proforma 2015 - 2023

### Appendix 1a Proforma

#### New DBAC Expansion - Pulse, Gym, Studio Space

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>01-Sep-14</td>
<td>1-Sep-2015</td>
<td>1-Sep-2016</td>
<td>1-Sep-2017</td>
<td>1-Sep-2018</td>
<td>1-Sep-2019</td>
<td>1-Sep-2020</td>
<td>1-Sep-2021</td>
<td>1-Sep-2022</td>
</tr>
<tr>
<td>-5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>Completion of Expansion</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

- **DBAC Annual Fee Increase (typically between 1.25% to 3.00%)**
  - 1.5%  
  - 1.5%  
  - 1.5%  
  - 1.5%  
  - 1.5%  

- **Student Growth Assumption**
  - 600  
  - 600  
  - 600  
  - 600  
  - 600  

- **Cost Inflation**
  - 2.00%  
  - 2.00%  
  - 2.00%  
  - 2.00%  
  - 2.00%  

#### Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$4.72</td>
</tr>
<tr>
<td>2016</td>
<td>$139.80</td>
</tr>
<tr>
<td>2017</td>
<td>$141.60</td>
</tr>
<tr>
<td>2018</td>
<td>$143.72</td>
</tr>
<tr>
<td>2019</td>
<td>$145.88</td>
</tr>
<tr>
<td>2020</td>
<td>$148.07</td>
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<tr>
<td>2021</td>
<td>$150.29</td>
</tr>
<tr>
<td>2022</td>
<td>$152.54</td>
</tr>
<tr>
<td>2023</td>
<td>$154.83</td>
</tr>
</tbody>
</table>

#### Expansion Capital Fee - New DBAC Expansion Only

<table>
<thead>
<tr>
<th>Year</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$1.97</td>
</tr>
<tr>
<td>2016</td>
<td>$59.10</td>
</tr>
<tr>
<td>2017</td>
<td>$59.99</td>
</tr>
<tr>
<td>2018</td>
<td>$60.89</td>
</tr>
<tr>
<td>2019</td>
<td>$59.10</td>
</tr>
<tr>
<td>2020</td>
<td>$59.99</td>
</tr>
<tr>
<td>2021</td>
<td>$60.89</td>
</tr>
<tr>
<td>2022</td>
<td>$59.10</td>
</tr>
<tr>
<td>2023</td>
<td>$59.99</td>
</tr>
</tbody>
</table>

**New DBAC Expansion - Pulse & Gym Expansion Size (sq ft)**

- Modeled Growth 2,550
- 80%

**Total Capital Cost**

- $33,722,201

### Incoming Revenue (Annual)

- **Student Fees (Existing DBAC Capital Fee) - Undergrad**
  - $2,762,000
  - $2,790,800
  - $2,848,000
  - $2,976,954
  - $3,109,137
  - $3,244,615
  - $3,383,457
  - $3,451,380
  - $3,520,667

- **Student Fees (Expansion Capital Fee) - Undergrad**
  - $1,330,518
  - $1,357,228
  - $1,384,474

- **Graduate Student Fees (Existing DBAC Capital Fee) - Grad**
  - $113,000
  - $115,800
  - $117,000
  - $119,340
  - $121,727
  - $124,161
  - $126,645
  - $129,177
  - $131,761

- **Community Membership**
  - $50,000
  - $50,000
  - $50,000
  - $50,000
  - $50,000
  - $50,000
  - $50,000
  - $50,000
  - $50,000

- **Total Revenue**
  - $2,925,000
  - $2,956,600
  - $3,015,000
  - $3,146,294
  - $3,280,863
  - $3,418,776
  - $4,890,620
  - $4,987,786
  - $5,086,902

### Outflow Expenses (Annual)

- **Mortgage Payable (Existing DBAC)**
  - $1,531,710
  - $1,531,710
  - $1,531,710
  - $1,531,710
  - $1,531,710
  - $1,531,710
  - $1,531,710
  - $1,531,710
  - $646,163

- **Facilities Cost (Existing DBAC)**
  - $633,000
  - $929,755
  - $984,719
  - $1,027,455
  - $1,048,004
  - $1,068,964
  - $1,090,343
  - $1,112,150
  - $1,134,474

- **Facilities Cost (DBAC Expansion)**
  - $1,090,343
  - $1,112,150
  - $1,134,474

- **Equipment Provision**
  - $173,333
  - $260,000
  - $265,200

- **Staffing**
  - $133,333
  - $204,000
  - $208,080

- **Supplies & Maintenance**
  - $133,333
  - $204,000
  - $208,080

- **Mortgage Payable (DBAC Expansion)**
  - $2,171,004
  - $2,171,004
  - $2,171,004

- **Total Costs**
  - $2,164,710
  - $2,461,465
  - $2,516,429
  - $2,559,165
  - $2,579,714
  - $2,600,674
  - $5,972,961
  - $6,614,917
  - $5,787,614

### Net Surplus or Deficit

- $33,722,201
- $3,188,776
- $5,086,902
- $8,086,902
- $11,086,902
- $14,086,902
- $17,086,902
- $20,086,902
- $23,086,902

### Ending Appropriations (Positive or Negative)

- $548,226
- $812,466
- $1,630,567
- $548,226
- $812,466
- $1,630,567
- $548,226
- $812,466
- $1,630,567

### Outstanding Mortgage Balance, end of year (40-year)

- $33,752,599
- $33,505,361
- $33,243,907

### McMaster University Net Asset Improvement or Reduction

- $33,204,373
- $34,584,267
- $35,023,525
### Appendix 1a (Pulse Expansion and Additional Gym Only) Proforma 2024 - 2032

<table>
<thead>
<tr>
<th>New DBAC Expansion - Pulse, Gym, Studio Space</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
<th>2031</th>
<th>2032</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>1-Sep-2024</td>
<td>1-Sep-2025</td>
<td>1-Sep-2026</td>
<td>1-Sep-2027</td>
<td>1-Sep-2028</td>
<td>1-Sep-2029</td>
<td>1-Sep-2030</td>
<td>1-Sep-2031</td>
<td></td>
</tr>
<tr>
<td>5.75% - 40 year term</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBAC Annual Fee increase (typically between 1.25% to 3.00%)</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Student Growth Assumption</td>
<td>0.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Inflation</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
</tr>
<tr>
<td>Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017</td>
<td>$4.72 $157.15 $159.51</td>
<td>$161.90</td>
<td>$164.33 $166.80</td>
<td>$169.30</td>
<td>$171.84 $174.42</td>
<td>$177.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expansion Capital Fee - New DBAC Expansion Only</td>
<td>$1.97 $61.80 $62.73</td>
<td>$63.67</td>
<td>$64.62 $65.59</td>
<td>$66.58</td>
<td>$67.57</td>
<td>$68.59</td>
<td>$69.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing DBAC Capital Fee - Grad (per term) - 2016-2017</td>
<td>$12.19</td>
<td>$22,852 $22,852 $22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
</tr>
<tr>
<td>Incremental Facilities Cost - New DBAC Expansion</td>
<td>$1,034,856</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Total Capital Cost</td>
<td>$33,722,201</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Income Revenue (Annual)

- **Student Fees (Expansion Capital Fee) - Undergrad**: $1,412,268, $1,433,452, $1,454,954, $1,476,778, $1,498,930, $1,521,413, $1,544,233, $1,567,398, $1,590,909
- **Graduate Student Fees (Existing DBAC Capital Fee) - Grad**: $134,396, $137,084, $139,826, $142,622, $145,475, $148,384, $151,352, $154,379, $157,467
- **Community Membership**: $50,000, $50,000, $50,000, $50,000, $50,000, $50,000, $50,000, $50,000, $50,000
- **Total Revenue**: $5,188,008, $5,265,750, $5,344,672, $5,424,791, $5,506,126, $5,588,695, $5,672,517, $5,757,612, $5,843,998

#### Outflow Expenses (Annual)

- **Mortgage Payable (Existing DBAC)**: $1,157,081, $1,180,223, $1,203,827, $1,227,904, $1,252,462, $1,277,511, $1,303,061, $1,329,123, $1,355,705
- **Facilities Cost (Existing DBAC)**: $1,098,197, $1,120,161, $1,142,564, $1,165,416, $1,188,724, $1,212,498, $1,236,748, $1,261,483, $1,286,713
- **Equipment Provision**: $270,504, $275,914, $281,432, $287,061, $292,802, $298,658, $304,631, $310,724, $316,939
- **Staffing**: $291,832, $297,669, $303,622, $309,695, $315,889, $322,206, $328,650, $335,223, $341,928
- **Supplies & Maintenance**: $212,242, $216,486, $220,816, $225,232, $229,737, $234,332, $239,019, $243,799, $248,675
- **Mortgage Payable (DBAC Expansion)**: $2,171,004, $2,171,004, $2,171,004, $2,171,004, $2,171,004, $2,171,004, $2,171,004, $2,171,004, $2,171,004
- **Total Costs**: $5,200,860, $5,261,457, $5,323,266, $5,386,312, $5,450,618, $5,516,210, $5,583,114, $5,651,356, $5,720,963

#### Net Surplus or Deficit

- **Net Surplus or Deficit**: $-12,852, $4,293, $21,405, $38,479, $55,508, $72,485, $89,403, $106,256, $123,035

#### Ending Appropriations (Positive or Negative)

- **Ending Appropriations (Positive or Negative)**: $2,229,809, $2,229,809, $2,229,809, $2,229,809, $2,229,809, $2,229,809, $2,229,809, $2,229,809, $2,229,809

#### Outstanding Mortgage Balance, end of year (40-year)

- **Outstanding Mortgage Balance, end of year (40-year)**: $32,967,420, $32,675,034, $32,365,836, $32,038,859, $31,693,081, $31,327,421, $30,940,735, $30,531,815, $30,099,382

#### McMaster University Net Asset Improvement or Reduction

- **McMaster University Net Asset Improvement or Reduction**: $34,759,889, $34,463,211, $34,132,608, $33,767,151, $33,365,865, $32,927,720, $32,451,631, $31,936,455, $31,380,987
**Appendix 1a (Pulse Expansion and Additional Gym Only) Proforma Continued 2033-2041**

<table>
<thead>
<tr>
<th>Appendix 1 a Proforma</th>
<th>New DBAC Expansion - Pulse, Gym, Studio Space</th>
<th>2033</th>
<th>2034</th>
<th>2035</th>
<th>2036</th>
<th>2037</th>
<th>2038</th>
<th>2039</th>
<th>2040</th>
<th>2041</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.75% - 40 year term</td>
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</tr>
<tr>
<td>DBAC Annual Fee increase (typically between 1.25% to 3.00%)</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
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<td>2.00%</td>
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<td>2.00%</td>
<td>2.00%</td>
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<tr>
<td>Cost Inflation</td>
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<td>Students (FTE) - 2014-2015</td>
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<tr>
<td>Incremental Facilities Cost - New DBAC Expansion</td>
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<tr>
<td>New DBAC Expansion - Pulse &amp; Gym Expansion Size (sq ft)</td>
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<tr>
<td>Total Capital Cost</td>
<td>$33,722,201</td>
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<td>Student Fees (Existing DBAC Capital Fee) - Undergrad</td>
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<td>$4,293,876</td>
<td>$4,358,284</td>
<td>$4,423,658</td>
<td>$4,490,013</td>
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<td>Student Fees (Expansion Capital Fee) - Undergrad</td>
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<td>$1,765,662</td>
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<td>Graduate Student Fees (Existing DBAC Capital Fee) - Grad</td>
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<td>$170,447</td>
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<td>Outflow Expenses (Annual)</td>
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<td>Mortgage Payable (Existing DBAC)</td>
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<td>$1,526,744</td>
<td>$1,557,279</td>
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<td>$1,312,447</td>
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<td>$1,449,048</td>
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<td>Facilities Cost (DBAC Expansion)</td>
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<td>$329,743</td>
<td>$336,338</td>
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<td>$364,063</td>
<td>$371,344</td>
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<td>Supplies &amp; Maintenance</td>
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<td>$2,171,004</td>
<td>$2,171,004</td>
<td>$2,171,004</td>
<td>$2,171,004</td>
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<td>$2,171,004</td>
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<tr>
<td>Total Costs</td>
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<td>$5,864,382</td>
<td>$5,938,249</td>
<td>$6,013,594</td>
<td>$6,090,446</td>
<td>$6,168,835</td>
<td>$6,248,791</td>
<td>$6,330,347</td>
<td>$6,434,331</td>
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<td>Net Surplus or Deficit</td>
<td>$139,733</td>
<td>$156,342</td>
<td>$172,855</td>
<td>$189,262</td>
<td>$205,555</td>
<td>$221,762</td>
<td>$237,764</td>
<td>$253,661</td>
<td>$249,532</td>
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<tr>
<td>Ending Appropriations (Positive or Negative)</td>
<td>$2,229,809</td>
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<td>-$985,530</td>
<td>-$812,676</td>
<td>-$623,414</td>
<td>-$417,859</td>
<td>-$196,133</td>
<td>$41,631</td>
<td>$295,292</td>
<td>$544,824</td>
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<td>Outstanding Mortgage Balance, end of year (40-year)</td>
<td>$29,642,084</td>
<td>$29,158,491</td>
<td>$28,647,092</td>
<td>$28,106,289</td>
<td>$27,534,387</td>
<td>$27,929,602</td>
<td>$26,390,041</td>
<td>$25,613,706</td>
<td>$24,898,482</td>
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</tbody>
</table>

**Business Case | [Athletics: Recreation | Space Expansion]**
# Appendix 1 (Pulse Expansion and Additional Gym Only) Proforma 2042 - 2050

<table>
<thead>
<tr>
<th>Appendix 1a Proforma</th>
<th>2042</th>
<th>2043</th>
<th>2044</th>
<th>2045</th>
<th>2046</th>
<th>2047</th>
<th>2048</th>
<th>2049</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>New DBAC Expansion - Pulse, Gym, Studio Space</td>
<td>5.75% - 40 year term</td>
<td>1-Sep-2041</td>
<td>1-Sep-2042</td>
<td>1-Sep-2043</td>
<td>1-Sep-2044</td>
<td>1-Sep-2045</td>
<td>1-Sep-2046</td>
<td>1-Sep-2047</td>
<td>1-Sep-2048</td>
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<td>29</td>
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<tr>
<td>DBAC Annual Fee increase (typically between 1.25% to 3.00%)</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Student Growth Assumption</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
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<tr>
<td>Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017</td>
<td>$4.72</td>
<td>$205.45</td>
<td>$208.54</td>
<td>$211.66</td>
<td>$214.84</td>
<td>$218.06</td>
<td>$221.33</td>
<td>$224.65</td>
<td>$228.02</td>
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<td>Expansion Capital Fee - New DBAC Expansion Only</td>
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<td>$80.79</td>
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<td>$84.48</td>
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<td>$88.34</td>
<td>$89.67</td>
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<tr>
<td>Existing DBAC Capital Fee - Grad (per term) - 2016-2017</td>
<td>$12.19</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
</tr>
<tr>
<td>Incremental Facilities Cost - New DBAC Expansion</td>
<td>$1,034,856</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>New DBAC Expansion - Pulse &amp; Gym Expansion Size (sq ft)</td>
<td>$62,814</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Capital Cost</td>
<td>$33,722,201</td>
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**Incoming Revenue (Annual)**

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<th>2047</th>
<th>2048</th>
<th>2049</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Fees (Existing DBAC Capital Fee) - Undergrad</td>
<td>$4,695,110</td>
<td>$4,765,536</td>
<td>$4,837,020</td>
<td>$4,909,575</td>
<td>$4,983,218</td>
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<td>$5,133,836</td>
<td>$5,210,844</td>
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<td>Student Fees (Expansion Capital Fee) - Undergrad</td>
<td>$1,846,315</td>
<td>$1,874,010</td>
<td>$1,902,120</td>
<td>$1,930,652</td>
<td>$1,959,612</td>
<td>$1,989,006</td>
<td>$2,018,841</td>
<td>$2,049,123</td>
<td>$2,079,860</td>
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<tr>
<td>Graduate Student Fees (Existing DBAC Capital Fee) - Grad</td>
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<td>$198,683</td>
<td>$203,650</td>
<td>$208,742</td>
<td>$213,960</td>
<td>$219,309</td>
<td>$224,792</td>
<td>$230,412</td>
<td>$236,172</td>
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<td>$50,000</td>
<td>$50,000</td>
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<td>$7,206,790</td>
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**Outflow Expenses (Annual)**

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<tbody>
<tr>
<td>Mortgage Payable (Existing DBAC)</td>
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<td>Equipment Provision</td>
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<td>$174,925</td>
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<td>Ending Appropriations (Positive or Negative)</td>
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**Business Case** | [Athletics: Recreation | Phase 1 Space Expansion]
## Appendix 1a (Pulse Expansion and Additional Gym Only) Proforma Continued 2051-2060

### Business Case | [Athletics: Recreation | Space Expansion]

#### Appendix 1a Proforma

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<th>New DBAC Expansion - Pulse, Gym, Studio Space</th>
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<tbody>
<tr>
<td>5.75% - 40 year term</td>
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<tr>
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<td><strong>38</strong></td>
<td><strong>39</strong></td>
<td><strong>40</strong></td>
<td></td>
</tr>
<tr>
<td>DBAC Annual Fee increase (typcially between 1.25% to 3.00%)</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Cost Inflation</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
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<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
</tr>
<tr>
<td>Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017</td>
<td>$4.72</td>
<td>$234.91</td>
<td>$238.44</td>
<td>$242.01</td>
<td>$245.64</td>
<td>$249.33</td>
<td>$253.07</td>
<td>$256.87</td>
<td>$260.72</td>
<td>$264.63</td>
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<tr>
<td>Expansion Capital Fee - New DBAC Expansion Only</td>
<td>$1.97</td>
<td>$92.38</td>
<td>$93.76</td>
<td>$95.17</td>
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<td>$101.01</td>
<td>$102.53</td>
<td>$104.06</td>
</tr>
<tr>
<td>Existing DBAC Capital Fee - Grad (per term) - 2016-2017</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students (FTE) - 2014-2015</td>
<td></td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
</tr>
<tr>
<td>Incremental Facilities Cost - New DBAC Expansion</td>
<td>$1,034,856</td>
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<td></td>
</tr>
<tr>
<td>New DBAC Expansion - Pulse &amp; Gym Expansion Size (sq ft)</td>
<td>62,814</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Total Capital Cost</strong></td>
<td>$33,722,201</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Outflow Expenses (Annual)

| Mortgage Payable (Existing DBAC)                | $2,084,151 | $2,136,254 | $2,189,661 | $2,244,402 | $2,300,512 | $2,358,025 | $2,416,976 | $2,477,400 | $2,539,335 | $2,602,819 |
| Facilities Cost (Existing DBAC)                 | $1,978,088 | $2,027,540 | $2,078,229 | $2,130,184 | $2,183,439 | $2,238,025 | $2,293,976 | $2,351,325 | $2,410,108 | $2,470,361 |
| Equipment Provision                             | $487,236 | $499,416 | $511,902 | $524,699 | $537,817 | $551,262 | $565,044 | $579,170 | $593,649 | $608,490 |
| Staffing                                       | $525,652 | $538,793 | $552,263 | $566,070 | $580,222 | $594,727 | $609,595 | $624,835 | $640,456 | $656,468 |
| Supplies & Maintenance                         | $382,933 | $391,850 | $401,646 | $411,687 | $421,979 | $432,529 | $443,342 | $454,462 | $465,786 | $477,431 |
| Mortgage Payable (DBAC Expansion)              | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 | $2,171,004 |
| **Total Costs**                                | $7,628,423 | $7,764,858 | $7,904,705 | $8,048,047 | $8,194,973 | $8,345,572 | $8,499,937 | $8,658,160 | $8,820,359 | $8,980,572 |

#### Ending Appropriations (Positive or Negative)

| **$2,229,809** | $2,559,699 | $2,684,559 | $2,789,651 | $2,873,340 | $2,933,936 | $2,969,688 | $2,978,785 | $2,959,351 | $2,909,447 | $2,827,066 |

#### Outstanding Mortgage Balance, end of year (40-year)

| **$15,045,466** | $13,722,568 | $12,333,603 | $10,844,198 | $9,379,727 | $7,625,299 | $5,875,741 | $4,025,584 | $2,069,042 | $0 |

#### McMaster University Net Asset Improvement or Reduction

| **-12,485,767** | **-11,038,009** | **-9,533,953** | **-7,970,858** | **-6,345,791** | **-4,655,611** | **-2,896,956** | **-1,066,242** | **$840,405** | **$2,827,065.77** |
## Appendix 1a Amortization Schedule

### Appendix 1a Pulse Expansion and Additional Gym Loan Amortization Schedule

<table>
<thead>
<tr>
<th>Month</th>
<th>Opening Balance</th>
<th>Interest</th>
<th>Payment</th>
<th>Closing Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 1,2021</td>
<td>$33,722,201</td>
<td>$1,939,027</td>
<td>$2,171,004</td>
<td>$33,490,224</td>
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<tr>
<td>Oct 1,2022</td>
<td>$33,490,224</td>
<td>$1,925,688</td>
<td>$2,171,004</td>
<td>$33,244,908</td>
</tr>
<tr>
<td>Oct 1,2023</td>
<td>$33,244,908</td>
<td>$1,911,582</td>
<td>$2,171,004</td>
<td>$32,985,486</td>
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<tr>
<td>Oct 1,2024</td>
<td>$32,985,486</td>
<td>$1,896,665</td>
<td>$2,171,004</td>
<td>$32,711,147</td>
</tr>
<tr>
<td>Oct 1,2025</td>
<td>$32,711,147</td>
<td>$1,880,891</td>
<td>$2,171,004</td>
<td>$32,421,035</td>
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<tr>
<td>Oct 1,2026</td>
<td>$32,421,035</td>
<td>$1,864,209</td>
<td>$2,171,004</td>
<td>$32,114,240</td>
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<td>Oct 1,2027</td>
<td>$32,114,240</td>
<td>$1,846,569</td>
<td>$2,171,004</td>
<td>$31,789,805</td>
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<tr>
<td>Oct 1,2028</td>
<td>$31,789,805</td>
<td>$1,827,914</td>
<td>$2,171,004</td>
<td>$31,446,715</td>
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<tr>
<td>Oct 1,2029</td>
<td>$31,446,715</td>
<td>$1,808,186</td>
<td>$2,171,004</td>
<td>$31,083,897</td>
</tr>
<tr>
<td>Oct 1,2030</td>
<td>$31,083,897</td>
<td>$1,787,324</td>
<td>$2,171,004</td>
<td>$30,700,217</td>
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<tr>
<td>Oct 1,2031</td>
<td>$30,700,217</td>
<td>$1,765,262</td>
<td>$2,171,004</td>
<td>$30,294,476</td>
</tr>
<tr>
<td>Oct 1,2032</td>
<td>$30,294,476</td>
<td>$1,741,932</td>
<td>$2,171,004</td>
<td>$29,865,404</td>
</tr>
<tr>
<td>Oct 1,2033</td>
<td>$29,865,404</td>
<td>$1,717,261</td>
<td>$2,171,004</td>
<td>$29,411,661</td>
</tr>
<tr>
<td>Oct 1,2034</td>
<td>$29,411,661</td>
<td>$1,691,171</td>
<td>$2,171,004</td>
<td>$28,931,828</td>
</tr>
<tr>
<td>Oct 1,2035</td>
<td>$28,931,828</td>
<td>$1,663,580</td>
<td>$2,171,004</td>
<td>$28,424,404</td>
</tr>
<tr>
<td>Oct 1,2036</td>
<td>$28,424,404</td>
<td>$1,634,403</td>
<td>$2,171,004</td>
<td>$27,887,803</td>
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<tr>
<td>Oct 1,2037</td>
<td>$27,887,803</td>
<td>$1,603,549</td>
<td>$2,171,004</td>
<td>$27,320,348</td>
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<tr>
<td>Oct 1,2038</td>
<td>$27,320,348</td>
<td>$1,570,920</td>
<td>$2,171,004</td>
<td>$26,720,264</td>
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<tr>
<td>Oct 1,2039</td>
<td>$26,720,264</td>
<td>$1,536,415</td>
<td>$2,171,004</td>
<td>$26,085,676</td>
</tr>
<tr>
<td>Oct 1,2040</td>
<td>$26,085,676</td>
<td>$1,499,926</td>
<td>$2,171,004</td>
<td>$25,414,598</td>
</tr>
</tbody>
</table>

### Summary

Total Interest & Payments over term: $53,117,955
Total Opening Balance: $2,171,003.89
Total Closing Balance: $0
### Appendix 1a Incremental Operating Costs

#### Pulse & Gym

<table>
<thead>
<tr>
<th>Net Expansion Space</th>
<th>39,301 sq.ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>$0.76 $29,869</td>
</tr>
<tr>
<td>Logistics and Mail Services</td>
<td>$0.38 $14,934</td>
</tr>
<tr>
<td>Custodial Services</td>
<td>$2.13 $83,711</td>
</tr>
<tr>
<td>Facilities Maintenance Service</td>
<td>$3.00 $117,903</td>
</tr>
<tr>
<td>Design &amp; construction</td>
<td>$0.36 $14,148</td>
</tr>
<tr>
<td>Grounds</td>
<td>$0.45 $17,685</td>
</tr>
<tr>
<td>Facilities Central Admin OH</td>
<td>$1.39 $54,628</td>
</tr>
<tr>
<td>Utilities</td>
<td>$11.01 $432,704</td>
</tr>
<tr>
<td>Renovation Contingency</td>
<td>$0.46 $18,078</td>
</tr>
<tr>
<td></td>
<td><strong>$19.94 $783,662</strong></td>
</tr>
<tr>
<td>Deferred Maintenance</td>
<td>$4.88 $191,789</td>
</tr>
<tr>
<td><strong>Total Facilities Rate today</strong></td>
<td><strong>$24.82 $975,451</strong></td>
</tr>
<tr>
<td>With Inflation to 2021</td>
<td>$1,034,856</td>
</tr>
<tr>
<td><strong>Year 2021 = 8 / 12s</strong></td>
<td><strong>$689,904</strong></td>
</tr>
</tbody>
</table>

#### Construction Cost Cashflow Schedule - Pulse/Gym Only

<table>
<thead>
<tr>
<th>Costs</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>26,888,086</td>
<td>1,344,404</td>
<td>2,688,809</td>
<td>16,132,852</td>
<td>32,656,036</td>
</tr>
<tr>
<td>Furniture</td>
<td>5,767,950</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge Financing</td>
<td>2%</td>
<td>26,888</td>
<td>81,202</td>
<td>378,057</td>
<td>580,018</td>
</tr>
<tr>
<td>Total Costs</td>
<td></td>
<td>1,371,292</td>
<td>2,770,011</td>
<td>16,510,909</td>
<td>13,069,989</td>
</tr>
</tbody>
</table>

Estimated Cash outflow %
- 2016/17 - 5%
- 2017/18 - 10%
- 2018/19 - 60%
- 2019/20 - 25%
Appendix 1a and 1b Pulse Expansion and Additional Gym, plus Student Space Expansion
## Appendix 1a and 1b (Pulse Expansion and Additional Gym, plus Student Space Expansion) Proforma 2015-2023

### Appendix 1a and 1b Proforma

**New DBAC Expansion - Pulse, Gym, Studio Space + Student Community Space**

<table>
<thead>
<tr>
<th>University Central Bank Loan Rate</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>Completion of Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>01-Sep-14</td>
<td>1-Sep-2015</td>
<td>1-Sep-2016</td>
<td>1-Sep-2017</td>
<td>1-Sep-2018</td>
<td>1-Sep-2019</td>
<td>1-Sep-2020</td>
</tr>
<tr>
<td>Assumptions:</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>DBAC Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI)</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Student Growth</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>Cost Inflation</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
<td>2.00%</td>
</tr>
<tr>
<td>Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017</td>
<td>$4,721</td>
<td>$139,801</td>
<td>$141,601</td>
<td>$143,721</td>
<td>$145,881</td>
<td>$148,071</td>
<td>$150,291</td>
</tr>
<tr>
<td>Expansion Capital Fee - New DBAC Expansion Only + Student Community Space</td>
<td>$3,950</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Existing DBAC Capital Fee - Grad (per term) - 2016-2017</td>
<td>$12,190</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students (FTE) - 2014-2015</td>
<td>19,963</td>
<td>20,113</td>
<td>20,713</td>
<td>21,313</td>
<td>21,913</td>
<td>22,513</td>
<td>22,626</td>
</tr>
<tr>
<td>Incremental Facilities Cost - New DBAC Expansion</td>
<td>$1,034,856</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Incremental Facilities Cost - Student Community Space</td>
<td>$1,053,262</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New DBAC Expansion - Pulse &amp; Gym Expansion Size (sq ft)</td>
<td>62,814</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Community Space (sq ft)</td>
<td>40,000</td>
<td></td>
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</tr>
<tr>
<td>Total Capital Cost</td>
<td>$59,462,908</td>
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### Incoming Revenue (Annual)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Student Fees (Existing DBAC Capital Fee) - Undergrad</td>
<td>$2,762,000</td>
<td>$2,790,800</td>
<td>$2,848,000</td>
<td>$2,976,954</td>
<td>$3,109,137</td>
<td>$3,244,615</td>
<td>$3,383,457</td>
</tr>
<tr>
<td>Graduate Student Fees (Existing DBAC Capital Fee) - Cost infl. Inc. rate</td>
<td>$113,000</td>
<td>$115,800</td>
<td>$117,000</td>
<td>$119,340</td>
<td>$121,727</td>
<td>$124,161</td>
<td>$126,645</td>
</tr>
<tr>
<td>Community Memberships (Static over 40 years conservative)</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Total University Student &quot;Common Space&quot; Budget Model Space Cost Distributed</td>
<td>$3,925,000</td>
<td>$3,956,600</td>
<td>$3,915,000</td>
<td>$3,965,454</td>
<td>$4,098,317</td>
<td>$4,244,085</td>
<td>$4,383,457</td>
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<tr>
<td>Modeled Growth</td>
<td>$720,174</td>
<td>$746,004</td>
<td>$772,834</td>
<td>$800,664</td>
<td>$829,500</td>
<td>$858,336</td>
<td>$887,174</td>
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<tr>
<td>Total Revenue</td>
<td>$4,645,174</td>
<td>$4,692,604</td>
<td>$4,687,834</td>
<td>$4,768,120</td>
<td>$5,127,817</td>
<td>$5,304,181</td>
<td>$5,465,337</td>
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### Outflow Expenses (Annual)

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Mortgage Payable (Existing DBAC)</td>
<td>$1,531,710</td>
<td>$1,531,710</td>
<td>$1,531,710</td>
<td>$1,531,710</td>
<td>$1,531,710</td>
<td>$1,531,710</td>
<td>$1,531,710</td>
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<tr>
<td>Facilities Cost (Existing DBAC)</td>
<td>$633,000</td>
<td>$929,755</td>
<td>$984,719</td>
<td>$1,027,455</td>
<td>$1,048,004</td>
<td>$1,068,964</td>
<td>$1,090,343</td>
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<tr>
<td>Facilities Cost (DBAC Expansion)</td>
<td>$1,090,343</td>
<td>$1,112,150</td>
<td>$1,134,393</td>
<td>$1,156,636</td>
<td>$1,178,880</td>
<td>$1,201,126</td>
<td>$1,223,373</td>
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<tr>
<td>Equipment Provision</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Staffing</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Supplies &amp; Maintenance</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mortgage Payable (DBAC Expansion + Student Community Space)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Student &quot;Common Space&quot; Budget Model Space Cost Distributed</td>
<td>$702,174</td>
<td>$746,004</td>
<td>$790,834</td>
<td>$834,664</td>
<td>$878,500</td>
<td>$922,336</td>
<td>$966,174</td>
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<tr>
<td>Total Costs</td>
<td>$2,164,710</td>
<td>$2,461,465</td>
<td>$2,559,165</td>
<td>$2,657,714</td>
<td>$2,760,674</td>
<td>$2,864,530</td>
<td>$2,968,367</td>
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<tr>
<td>Net Surplus or Deficit</td>
<td>$760,290</td>
<td>$945,315</td>
<td>$988,571</td>
<td>$957,129</td>
<td>$971,499</td>
<td>$984,102</td>
<td>$988,433</td>
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<tr>
<td>Ending Position - appropriation</td>
<td>$2,229,809</td>
<td>$2,469,519</td>
<td>$2,574,384</td>
<td>$2,675,813</td>
<td>$2,771,166</td>
<td>$2,864,530</td>
<td>$2,968,367</td>
</tr>
</tbody>
</table>

### McMaster University Net Asset Improvement or Reduction

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding Mortgage Balance, end of year (based on 40-year Mortgage)</td>
<td>$59,053,859</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>McMaster University Net Asset Improvement or Reduction</td>
<td>-$58,892,190</td>
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<td></td>
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<td></td>
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</tbody>
</table>

### Business Case

**[Athletics: Recreation | Space Expansion]**
### Appendix 1a and 1b (Pulse Expansion and Additional Gym, plus Student Space Expansion)

**Proforma 2024-2032**

<table>
<thead>
<tr>
<th>Appendix 1a and 1b Proforma</th>
<th>New DBAC Expansion - Pulse, Gym, Studio Space + Student Community Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Central Bank Loan Rate = Weighted Average Cost of Capital</td>
<td>5.75%</td>
</tr>
</tbody>
</table>

**Assumptions:**
- DB Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI)
- Student Growth: 0.5%
- Cost Inflation: 2.00%
- Existing DB Capital Fee - Undergrad (per unit) - 2016-2017 $4.72
- Expansion Capital Fee - New DBAC Expansion Only + Student Community Space $3.95
- Existing DB Capital Fee - Grad (per term) - 2016-2017 $12.19
- Students (FTE) - 2014-2015 22,852
- Incremental Facilities Cost - New DBAC Expansion $1,034,856
- Incremental Facilities Cost - Student Community Space $1,053,262
- New DBAC Expansion - Pulse & Gym Expansion Size (sq ft) 62,814
- Student Community Space (sq ft) 40,000

**Total Capital Cost** $59,462,908

#### Income Revenue (Annual)

- **Student Fees (Expansion Capital Fee) - Undergrad** $2,831,704 $2,874,180 $2,917,293 $2,961,052 $3,005,468 $3,050,550 $3,096,308 $3,142,753 $3,189,894
- **Graduate Student Fees (Existing DB Capital Fee) - Cost infl. Inc. rate** $134,396 $137,084 $139,826 $142,622 $145,475 $148,384 $151,352 $154,379 $157,467
- **Community Memberships (Static over 40 years conservative)** $50,000 $50,000 $50,000 $50,000 $50,000 $50,000 $50,000 $50,000 $50,000

**University Student "Common Space" Budget Model Space Cost Distributed**: No JE

**Total Revenue** $7,725,174 $7,846,562 $7,969,897 $8,095,209 $8,222,531 $8,351,895 $8,483,336 $8,616,887 $8,752,581

#### Outflow Expenses (Annually)

- **Mortgage-Payable (Existing DBAC)** $1,157,081 $1,180,223 $1,203,827 $1,227,904 $1,252,462 $1,277,511 $1,303,061 $1,329,123 $1,355,705
- **Facilities Cost (Existing DBAC)** $1,098,197 $1,120,161 $1,142,564 $1,165,416 $1,188,724 $1,212,498 $1,236,748 $1,261,483 $1,286,713
- **Equipment Provision** $374,544 $382,035 $389,676 $397,469 $405,418 $413,527 $421,797 $430,233 $438,838
- **Staffing** $291,832 $297,669 $303,622 $309,695 $315,889 $322,206 $328,650 $335,223 $341,928
- **Supplies & Maintenance** $212,242 $216,486 $220,816 $225,232 $229,737 $234,332 $239,019 $243,799 $248,675

**University Student "Common Space" Budget Model Space Cost Distributed**: No JE

**Total Costs** $8,079,792 $8,164,825 $8,251,558 $8,340,026 $8,430,263 $8,522,305 $8,616,188 $8,711,948 $8,809,624

**Net Surplus or Deficit** -$354,618 -$318,263 -$281,661 -$244,817 -$207,732 -$170,410 -$132,852 -$95,062 -$57,043


**Outstanding Mortgage Balance, end of year (based on 40-year Mortgage)** $57,680,101 $57,168,540 $56,627,564 $56,055,483 $55,450,506 $54,810,744 $54,134,195 $53,418,744 $52,662,156

**McMaster University Net Asset Improvement or Reduction** -$560,961,600 -$560,768,302 -$560,508,988 -$560,181,723 -$559,784,479 -$559,315,126 -$558,711,429 -$558,151,041 -$557,451,494
Business Case | [Athletics: Recreation | Space Expansion]

Appendix 1a and 1b (Pulse Expansion and Additional Gym, plus Student Space Expansion) Proforma 2033-2041

<table>
<thead>
<tr>
<th>Year</th>
<th>1-Sep-2033</th>
<th>1-Sep-2034</th>
<th>1-Sep-2035</th>
<th>1-Sep-2036</th>
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<th>1-Sep-2039</th>
<th>1-Sep-2040</th>
<th>1-Sep-2041</th>
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<tr>
<td>Asmptions:</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>DBA Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI) &amp;</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
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<td>1.5%</td>
</tr>
<tr>
<td>Student Growth &amp;</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,320,807</td>
<td>1.5%</td>
<td>$4,105,604</td>
<td>1.5%</td>
<td>$4,632,857</td>
<td>1.5%</td>
<td>$51,862,063</td>
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<tr>
<td>Cost inflation</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
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<tr>
<td>Expansion Capital Fee - New DBAC Expansion Only + Student Community Space</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
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<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
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<tr>
<td>Existing DBAC Capital Fee - Grad (per term) - 2016-2017 &amp;</td>
<td>$12,19</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
</tr>
<tr>
<td>Incremental Facilities Cost - New DBAC Expansion &amp;</td>
<td>$1,053,262</td>
<td>$1,034,856</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Incremental Facilities Cost - Student Community Space &amp;</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
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<tr>
<td>New DBAC Expansion - Pulse &amp; Gym Expansion Size (sq ft)</td>
<td>$82,814</td>
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<tr>
<td>Student Community Space (sq ft) &amp;</td>
<td>$40,000</td>
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<td></td>
</tr>
<tr>
<td>Total Capital Cost &amp;</td>
<td>$59,462,908</td>
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Incoming Revenue (Annual)

<table>
<thead>
<tr>
<th>Year</th>
<th>1-Sep-2033</th>
<th>1-Sep-2034</th>
<th>1-Sep-2035</th>
<th>1-Sep-2036</th>
<th>1-Sep-2037</th>
<th>1-Sep-2038</th>
<th>1-Sep-2039</th>
<th>1-Sep-2040</th>
<th>1-Sep-2041</th>
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<tbody>
<tr>
<td>Student Fees (Existing DBAC Capital Fee) - Undergrad &amp;</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
</tr>
<tr>
<td>Graduate Student Fees (Existing DBAC Capital Fee) - Cost infl. Inc. rate &amp;</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
</tr>
<tr>
<td>Community Memberships (Static over 40 years conservatvie) &amp;</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
</tr>
<tr>
<td>University Student &quot;Common Space&quot; Budget Model Space Cost Distributed &amp; NETS IN Budget Model Directly</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
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<tr>
<td>Total Revenue &amp;</td>
<td>$4,000</td>
<td></td>
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</table>

Outflow Expenses (Annually)

<table>
<thead>
<tr>
<th>Year</th>
<th>1-Sep-2033</th>
<th>1-Sep-2034</th>
<th>1-Sep-2035</th>
<th>1-Sep-2036</th>
<th>1-Sep-2037</th>
<th>1-Sep-2038</th>
<th>1-Sep-2039</th>
<th>1-Sep-2040</th>
<th>1-Sep-2041</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortgage Payable (Existing DBAC) &amp;</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
</tr>
<tr>
<td>Facilities Cost (Existing DBAC) &amp;</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
</tr>
<tr>
<td>Equipment Provision &amp;</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
</tr>
<tr>
<td>Supplies &amp; Maintenance &amp;</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
<td>2.00%</td>
<td>$2,063</td>
</tr>
<tr>
<td>Mortgage Payable (DBAC Expansion + Student Community Space) &amp; NETS IN Budget Model Directly</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
<td>1.5%</td>
<td>$1,335,790</td>
</tr>
<tr>
<td>University Student &quot;Common Space&quot; Budget Model Space Cost Distributed &amp; NETS IN Budget Model Directly</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
<td>2.00%</td>
<td>$4,000</td>
</tr>
<tr>
<td>Total Costs &amp;</td>
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</tr>
</tbody>
</table>

Net Surplus or Deficit & | $18,798 | $19,689 | $58,355 | $97,255 | $136,366 | $175,683 | $215,202 | $254,918 | $274,238 |

Ending Position appropriation & | $2,229,809 | $4,080,137 | $4,788,467 | $4,730,112 | $4,632,857 | $4,496,490 | $4,320,807 | $4,105,604 | $3,850,686 | $3,576,449 |

Outstanding Mortgage Balance, end of year (based on 40-year Mortgage) & | $51,862,063 | $51,015,963 | $50,121,216 | $49,175,029 | $48,174,416 | $47,116,279 | $46,097,298 |

McMaster University Net Asset Improvement or Reduction & | $56,670,199 | $55,904,432 | $54,851,325 | $53,800,876 | $52,757,907 | $51,717,906 | $50,687,903 | $49,657,902 | $48,627,901
Appendix 1a and 1b (Pulse Expansion and Additional Gym, plus Student Space Expansion) Proforma 2042-2050

<table>
<thead>
<tr>
<th>Appendix 1a and 1b Proforma</th>
<th>New DBAC Expansion - Pulse, Gym, Studio Space + Student Community Space</th>
<th>5.75%</th>
<th>2042</th>
<th>2043</th>
<th>2044</th>
<th>2045</th>
<th>2046</th>
<th>2047</th>
<th>2048</th>
<th>2049</th>
<th>2050</th>
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<tr>
<td>University Central Bank Loan Rate</td>
<td>Weighted Average Cost of Capital Assumptions:</td>
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<td>1-Sep-2042</td>
<td>1-Sep-2043</td>
<td>1-Sep-2044</td>
<td>1-Sep-2045</td>
<td>1-Sep-2046</td>
<td>1-Sep-2047</td>
<td>1-Sep-2048</td>
<td>1-Sep-2049</td>
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<tr>
<td>DBAC Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI)</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
<td>1.5%</td>
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<td></td>
</tr>
<tr>
<td>Student Growth</td>
<td>Cost Inflation</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
<td>2.50%</td>
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<tr>
<td>Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017</td>
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<td>$208.54</td>
<td>$211.66</td>
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<td>$218.06</td>
<td>$221.33</td>
<td>$224.65</td>
<td>$228.02</td>
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<td>Expansion Capital Fee - New DBAC Expansion Only + Student Community Space</td>
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<td>Existing DBAC Capital Fee - Grad (per term) - 2016-2017</td>
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<tr>
<td>Students (FTE) - 2014-2015</td>
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<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
<td>$22,852</td>
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</tr>
<tr>
<td>Incremental Facilities Cost - New DBAC Expansion</td>
<td>$1,034,856</td>
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<tr>
<td>Incremental Facilities Cost - Student Community Space</td>
<td>$1,053,262</td>
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</tr>
<tr>
<td>New DBAC Expansion - Pulse &amp; Gym Expansion Size (sq ft)</td>
<td>62,814</td>
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</tr>
<tr>
<td>Student Community Space (sq ft)</td>
<td>40,000</td>
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<td></td>
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</tr>
<tr>
<td>Outflow Expenses (Annually)</td>
<td>Total Capital Cost</td>
<td>$59,462,908</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

**Incoming Revenue (Annual)**

- Student Fees (Existing DBAC Capital Fee) - Undergrad
- Student Fees (Expansion Capital Fee) - Undergrad
- Graduate Student Fees (Existing DBAC Capital Fee) - Cost infl. Inc. rate
- Community Memberships (Static over 40 years conservative)
- University Student "Common Space" Budget Model Space Cost Distributed

**Total Revenue**

**Outflow Expenses (Annually)**

- Mortgage Payable (Existing DBAC)
- Facilities Cost (Existing DBAC)
- Facilities Cost (DBAC Expansion)
- Equipment Provision
- Staffing
- Supplies & Maintenance
- Mortgage Payable (DBAC Expansion + Student Community Space)
- University Student "Common Space" Budget Model Space Cost Distributed

**Total Costs**

**Net Surplus or Deficit**

**Ending Position**

**Outstanding Mortgage Balance, end of year (based on 40-year Mortgage)**

**McMaster University Net Asset Improvement or Reduction**

---

Appendix 1a and 1b Proforma 2042-2050

**New DBAC Expansion - Pulse, Gym, Studio Space + Student Community Space**

**DBAC Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI)**

**Student Growth**

**Cost Inflation**

**Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017**

**Expansion Capital Fee - New DBAC Expansion Only + Student Community Space**

**Existing DBAC Capital Fee - Grad (per term) - 2016-2017**

**Students (FTE) - 2014-2015**

**Incremental Facilities Cost - New DBAC Expansion**

**Incremental Facilities Cost - Student Community Space**

**New DBAC Expansion - Pulse & Gym Expansion Size (sq ft)**

**Student Community Space (sq ft)**

**Outflow Expenses (Annually)**

**Total Capital Cost**

**Incoming Revenue (Annual)**

- Student Fees (Existing DBAC Capital Fee) - Undergrad
- Student Fees (Expansion Capital Fee) - Undergrad
- Graduate Student Fees (Existing DBAC Capital Fee) - Cost infl. Inc. rate
- Community Memberships (Static over 40 years conservative)
- University Student "Common Space" Budget Model Space Cost Distributed

**Total Revenue**

**Outflow Expenses (Annually)**

- Mortgage Payable (Existing DBAC)
- Facilities Cost (Existing DBAC)
- Facilities Cost (DBAC Expansion)
- Equipment Provision
- Staffing
- Supplies & Maintenance
- Mortgage Payable (DBAC Expansion + Student Community Space)
- University Student "Common Space" Budget Model Space Cost Distributed

**Total Costs**

**Net Surplus or Deficit**

**Ending Position**

**Outstanding Mortgage Balance, end of year (based on 40-year Mortgage)**

**McMaster University Net Asset Improvement or Reduction**

---

Appendix 1a and 1b Proforma 2042-2050

**New DBAC Expansion - Pulse, Gym, Studio Space + Student Community Space**

**DBAC Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI)**

**Student Growth**

**Cost Inflation**

**Existing DBAC Capital Fee - Undergrad (per unit) - 2016-2017**

**Expansion Capital Fee - New DBAC Expansion Only + Student Community Space**

**Existing DBAC Capital Fee - Grad (per term) - 2016-2017**

**Students (FTE) - 2014-2015**

**Incremental Facilities Cost - New DBAC Expansion**

**Incremental Facilities Cost - Student Community Space**

**New DBAC Expansion - Pulse & Gym Expansion Size (sq ft)**

**Student Community Space (sq ft)**

**Outflow Expenses (Annually)**

- Mortgage Payable (Existing DBAC)
- Facilities Cost (Existing DBAC)
- Facilities Cost (DBAC Expansion)
- Equipment Provision
- Staffing
- Supplies & Maintenance
- Mortgage Payable (DBAC Expansion + Student Community Space)
- University Student "Common Space" Budget Model Space Cost Distributed

**Total Costs**

**Net Surplus or Deficit**

**Ending Position**

**Outstanding Mortgage Balance, end of year (based on 40-year Mortgage)**

**McMaster University Net Asset Improvement or Reduction**

---
### Appendix 1a and 1b (Pulse Expansion and Additional Gym, plus Student Space Expansion) Proforma 2051-2060

**Assumptions:**
- **Student Growth:** Increase likely 1.25% to 3% per year depending on market/CPI
- **Cost Inflation:** 2.50% annually
- **Existing DBAC Capital Fee - Undergrad:** 2016-2017 $4.72
- **Expansion Capital Fee - New DBAC Expansion Only + Student Community Space:** $3.95
- **Existing DBAC Capital Fee - Grad (per term):** 2016-2017 $12.19
- **Students (FTE):** 2014-2015
- **Incremental Facilities Cost - New DBAC Expansion:** $1,034,856
- **Incremental Facilities Cost - Student Community Space:** $1,053,262
- **New DBAC Expansion - Pulse & Gym Expansion Size (sq ft):** 62,814
- **Student Community Space (sq ft):** 40,000

**Total Capital Cost:** $59,462,908

<table>
<thead>
<tr>
<th><strong>New DBAC Expansion - Pulse, Gym, Studio Space + Student Community Space</strong></th>
<th>2051</th>
<th>2052</th>
<th>2053</th>
<th>2054</th>
<th>2055</th>
<th>2056</th>
<th>2057</th>
<th>2058</th>
<th>2059</th>
<th>2060</th>
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<td>1-Sep-2051</td>
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<td>1-Sep-2056</td>
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| **DBAC Capital Fee increase (likely 1.25% to 3% per year depending on market/CPI):** | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% |
| **Student Growth:** | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |

**Inflow Revenue (Annual):**
- **Student Fees (Existing DBAC Capital Fee - Undergrad):** $4,223,270
- **Student Fees (Expansion Capital Fee - Undergrad):** $4,426,325
- **Graduate Student Fees (Existing DBAC Capital Fee):** $242,076
- **Community Memberships:** $50,000
- **University Student "Common Space" Budget Model Space Cost Distributed:** $2,013,270

**Total Revenue:** $11,906,520

**Outflow Expenses (Annual):**
- **Mortgage Payable (Existing DBAC):** $2,084,151
- **Facilities Cost (Existing DBAC):** $1,978,088
- **Equipment Provision:** $674,634
- **Staffing:** $525,652
- **Supplies & Maintenance:** $382,293
- **Mortgage Payable (DBAC Expansion + Student Community Space):** $3,828,167
- **University Student "Common Space" Budget Model Space Cost Distributed:** $2,013,270

**Total Costs:** $11,486,254

**Net Surplus or Deficit:** $420,266

**Ending Position - appropriation:** $2,229,809

**Outstanding Mortgage Balance, end of year (based on 40-year Mortgage):** $26,323,686

**McMaster University Net Asset Improvement or Reduction:** $20,277,108

**Business Case** | [Athletics: Recreation | Space Expansion]
## Appendix 1a and 1b Amortization Schedule

### Additional Gym Loan, and Student Community Space Expansion Amortization Schedule

| Interest rate | 5.75% |
| Loan period   | 40 Years |
| Payment amount| $3,828,165.64 |

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### Appendix 1a and 1b Operating Costs Combined

#### Appendix 1a Incremental Operating Costs

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**Total Facilities Rate today** $19.94 $783,662

**With inflation to 2021** $1,034,856

**Year 2021 = 8 / 12s** $689,904

#### Appendix 1b Incremental Operating Costs

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<th>Expansion Space</th>
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**Total Facilities Rate** $19.94 $797,600

**Deferred Maintenance** $4.88 $195,200

**With Inflation to 2021** $1,053,262

**Year 2021 = 8 / 12s** $702,174
Appendix 1a and 1b Cash Flow

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<td>Bridge Financing</td>
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</table>

Estimated Cash outflow %
- 2016/17 - 5%
- 2017/18 - 10%
- 2018/19 - 60%
- 2019/20 - 25%
Recap of Detailed Assumptions

Sources of Revenue

1. **Student Fees (Existing DBAC Capital Fee) – Undergraduates**: The existing DBAC fee approved in 2003 will continue to be a significant source of revenue for the Pulse and Gym expansion once the existing DBAC mortgage is paid in 2023. The current DBAC fee of $141.60 ($4.72 per unit) is assumed to grow at a rate of 1.5% throughout the 40 year proforma period. The annual mortgage payment associated with the previous DBAC expansion is $1,531,710 and once retired (in 2023) all fees, along with other revenues will be pooled to cover operating costs and the new mortgage related to the Phase 1 approved expansion scope.

2. **Student Fees (Expansion Capital Fee) – Undergraduates**:

   **Option 1: Phase 1a DBAC Expansion Only** - The cost of the Pulse and Gym expansion only totals $33.9 million. An increase to the current DBAC fee of $59.10 ($1.97 per unit) will be implemented in year 2021 after completion if this option is successful in the student referendum. This fee will increase by CPI yearly.

   **Option 2: Phase 1a and 1b DBAC Expansion + Student Community Space** - The cost of the Pulse and Gym expansion in addition to the Student Community Space totals $59.4 million. An increase to the current DBAC fee of $118.50 ($3.95 per unit) will be implemented in year 2021 after completion if this option is successful in the referendum. This fee will increase by CPI yearly.

3. **Graduate Student Fees (Existing DBAC Capital Fee) – Graduates**: Graduate students pay $12.19 per term per student. Total fees projected in 2017 total $117,000. This fee is assumed to increase at the same rate as cost inflation.

4. **Community Membership** – An amount of $50,000 will be allocated from Community memberships yearly to assist in the financing of the plan.

5. **Rental Income** – this revenue line has been left blank for both sets of proforma’s. Although rental income is possible it is difficult to predict and the year-over-year variability of this income makes it more conservative to leave out of the projections. If rental (or event) income were substantial it would be determined by Athletics and Recreation, in conjunction with Student Affairs, on how best to apply those funds. For rental income generated through the Student Community Space, the partnership MOU between MSU and the University will articulate how
these funds will be applied (either to programs or additional loan repayment to accelerate loan retirement).

6. **University Contribution – Facilities Operating Costs**

   Option 1: The cost of the yearly Facilities Operating costs relating to the Pulse and the Gym will be paid entirely by students and are included in the Business Case. There is no impact to the University budget.

   Option 2: The cost of the yearly facilities operating costs relating to the Pulse and the Gym will continue to be paid by the students and are included in the business plan. The facilities operating costs relating to the Student Community Space “common space” will be distributed to activity units in the Budget Model (activity units are Faculties). This amount is estimated to be $1.1 million commencing in 2022.

**Expenditures**

1. **Mortgage Payable (Existing DBAC):** $1,531,710 payable is allocated to the existing DBAC mortgage based off a previously approved 15-year amortization schedule. This mortgage will be paid off by year 2023, with the final year payable equal to $646,163.

2. **Facilities Operating Costs**

   **Existing DBAC Expansion (2007)** - The Business Case incorporates 50% of the facilities operating costs for the existing DBAC expansion. Students agreed to pay 50% of these costs with the University paying the other 50%. These costs will continue to be paid by the existing DBAC fee estimated at $984 thousand in 2017.

   **Pulse and Gym Expansion** – The Business Case incorporates 100% of the facilities operating costs relating to Pulse Gym Expansion. The calculation is based on the incremental space addition of 39,301 GSF. The proposal being brought forward to students includes full payment of these costs estimated at $1 million. These costs have been incorporated in the calculation for the increase needed in the DBAC fee.

   **Student Community Space** – The Business Case incorporates 100% of the facilities operating costs relating to the Student Space Community Space as a University funded cost.
3. **Incremental Operating Costs (Pulse and Gym Expansion):** Incremental costs associated with the expansion of the Pulse and gym. Below are the expenses that are anticipated to increase in year 2021.

   i. **Staffing:** Additional $275,000 is anticipated in staffing expenses which will increase at the (cost) inflationary rate of 2.0% per year.

   ii. **Supplies and Maintenance:** Additional $200,000 is anticipated in supplies and maintenance expenses which will increase at the (cost) inflationary rate of 2.0% per year.

   iii. **Equipment Replacement:** An annual provision of $260k is included under Option 1 relating to DBAC Expansion. This annual provision is increased to $360k under Option 2.
MEMORANDUM

November 16, 2016

TO: University Planning Committee

FROM: Dr. Mohamed Attalla, Assistant Vice President & Chief Facilities Officer

Re.: Campus Master Plan Update 2016

Recommendation

That the University Planning Committee approves for recommendation to the Board of Governors, the proposed Campus Master Plan Update 2016.

Background

The Campus Master Plan was originally prepared in 2002, and updated in 2008. The Master Plan, one of McMaster’s key strategic plans that speaks to the University’s overall philosophy and approach to campus planning and achieving the institution’s goals, is updated intermittently and made public.

This 2016 version was created in collaboration with a planning consultant, the Campus Master Plan Steering Committee, and many stakeholders both internal and external. The intent of the Plan is to provide a clear vision and framework to guide the development of buildings, open spaces, streets, and other elements that define the campus character.

Objective

The objective of this update is to re-focus the 2008 plan to respond to changes on campus, most notably new buildings, the planned LRT on Main Street, and new directions in the way students, faculty and staff engage and interact on campus. The 2016 update proposes significant changes from the 2008 plan, including the addition of a mobility hub, new development sites, and a considerable re-imagining of the West Campus. This report also departs from previous reports, in that a) it includes off-campus locations, and b) it is a more concise, practical document so as to be more easily implementable.

Vision Statement

The Campus Master Plan update envisions a future for McMaster University that is attractive, welcoming, and sustainable for generations of students, faculty, and staff.

McMaster University will build on and strengthen the extraordinary qualities that define the campus today, including well-integrated historic and contemporary buildings, a variety of passive and formal open spaces, extensive landscaping, and its striking location adjacent to Cootes Paradise and the Royal Botanical Gardens.
As the campus evolves, new development will establish a mix of research, classroom, amenity and recreational uses; these will promote synergies between the Core Campus and the West Campus. Vehicular traffic will be further directed to the edge of campus, redefining campus entrances and reinforcing a people-focused and vehicle-free core campus. A new mobility hub will consolidate campus transit, anchor the southwest edge, and create an attractive ‘front door’ for many users. New open spaces, and enhancements to existing open spaces, will provide opportunities to teach and study, gather and socialize, and recreate. The rich history and culture of McMaster University will be subtly embedded throughout the campus, including public art, wayfinding and signage, and landscaping.

**Design Principles - 2008**

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 and cyclist-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 of Hamilton.

**Additional Principles - 2016**

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

**Overview**

The Campus Master Plan update illustrates the long-term vision for the design and development of McMaster University. It outlines opportunities for new development, and intensification of existing facilities, while protecting the historic buildings that define the campus. Strategic improvements to the campus edges, including Main Street, Cootes Drive, and Forsyth Avenue, will strengthen the image of the campus, and improve the interface with adjacent neighbourhoods.

The plan furthers the University’s commitment to a vehicle-free core campus, consolidating parking and transit service at the campus edges. Upgrades to internal streets, including University Avenue, College Crescent, Scholars Road, and Sterling Street, will reinforce pedestrian priority and cycling throughout the campus.

A new mobility hub at the southwest edge of campus provides seamless integration between all...
modes of transportation. It integrates HSR and GO Transit on site, while providing an iconic welcome centre and arrival plaza for LRT on Main Street. New buildings will frame and enhance Cootes Drive and Main Street, while accommodating a mix of academic, research, and supporting campus uses.

Building on the momentum of the Living and Learning Centre, the plan proposes new buildings, improvements to Stearn Drive, and enhanced pedestrian pathways to better connect the North Campus to the remaining campus, while reinforcing the recommendations of the Athletics and Recreation Master Plan and the Library Master Plan.

A re-imagining of the West Campus focuses on establishing a self-sufficient campus, with a mix of academic, research, amenity and social space that supports day-long use. New development will respond to and integrate unique natural features, including the Ancaster Creek floodplain, MacMarsh, and existing mature tree stands.

The plan was developed through ongoing consultation with students, faculty, and staff. It demonstrates one way in which the vision and guiding principles can be achieved. It will be used to guide future development and decision making processes, while allowing the flexibility to respond as the campus evolves, ensuring development is consistent with the intent of the plan.

Attachment (1): Campus Master Plan Update 2016
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ii. McMaster Transportation Assessment  
iii. Nineteen Considerations for Future Planning  
iv. Consultation/Stakeholder Findings
Section One
Introduction & Overview

The McMaster University Campus Master Plan (prepared in 2002, and updated in 2008) provided a vision for the future growth of McMaster University. Since then, changes have occurred and are proposed to the physical campus. There has also been a shift in the dynamic and flexible ways that students learn, study, and socialize on campus. The 2016 Campus Master Plan Update will refresh the vision for the campus and provide McMaster University with a plan to guide positive future growth.

1.1 Purpose of the Plan

The McMaster University Campus Master Plan was originally prepared in 2002, and updated in 2008. The intent of the plan is to provide a clear vision and framework to guide the development of buildings, open spaces, streets, and other elements that define the campus character.

The objective of this update is to re-focus the 2008 plan to respond to changes on campus, most notably new buildings, planned LRT on Main Street, and new directions in the way students, faculty and staff engage and interact on campus.

The 2016 update proposes significant changes from the 2008 plan, including the addition of a mobility hub, new development sites, and a considerable re-imagining of the West Campus. This report also represents a departure from the previous reports, focusing on providing the University with a concise, practical document that is easily implementable.

How to Use This Document

This document has two intended audiences:

If You’re a Campus Builder - This includes Facility Services staff, and those who are involved in the design and construction of the campus (i.e. consultants). You have a responsibility to understand and achieve the intent of the campus plan and should use the document as follows:

• Step 1 - Review Campus Vision and Guiding Principles (Section Two) to gain a high level understanding of the campus plan.
• Step 2 - Review Sections Three (Master Plan Systems) and/or Four (Campus Character Areas) based on relevance to your project. Read both the Rationale and Priority Directions to ensure a complete understanding.
• Step 3 - Many campus projects will impact multiple elements of the plan. Where directed to See Also, read and understand all references to other sections of the document.
If You’re a Member of the Public - This includes stakeholders, staff, students, faculty and those who have a vested interest in the long-term growth of the campus (i.e. nearby residents, alumni). You may be mostly interested in a high-level understanding of where the campus is going and are invited to explore this document as follows:

• **Step 1** - Review Campus Vision and Guiding Principles (Section Two) to gain a high level understanding of the campus plan.

• **Step 2** - Review Sections Three (Master Plan Systems) and Four (Campus Character Areas) based on your specific interest. Each sub-section begins with a brief *Overview* to facilitate a quick understanding.

• **Step 3** - For elements you’re interested in, read the *Rationale* and *Priority Directions* for additional information.
1.2 Campus Context

The McMaster campus comprises 196 hectares, located less than five kilometres west of Downtown Hamilton. It is generally bordered by Main Street West, Forsyth Avenue, and Cootes Drive. To the north, the property borders on Cootes Paradise and the Royal Botanical Gardens property.

With the exception of commercial uses along Main Street, McMaster University is generally bordered by mature residential neighbourhoods, including Westdale South and Ainslie Wood North.

As part of Metrolinx’s regional transportation plan, The Big Move, $1 billion is being invested in LRT along Main Street, from McMaster University to the East End. This LRT line will have a transformative impact on both Main Street, and McMaster University, promoting an interface that extends the University’s frontage outwards, and inviting members of the community to explore the campus.

The campus itself comprises a mix of buildings, including residences, academic and institutional buildings, and recreational facilities. Key open spaces and amenity areas on campus include:

- The Mall (a large centrally-located quad);
- The MUSC Quad;
- The Arts Quad;
- A quad between IAHS and ITB;
- Faculty Hollow (a small open space nestled in the trees behind Hamilton Hall);
- The Oval (a large open space at the campus’ east edge); and,
- The 10 acre sports field at the northeast edge of the campus.

In addition to these spaces, many buildings have well-landscaped yards and/or entry plazas that help to tie the campus together.

On the west side of Cootes Drive, a large amount of campus land is used predominantly for parking, as well as a few administration and academic buildings and three baseball diamonds. This edge is bounded by Ancaster Creek, and its sensitive flood zone.
1.3 The Master Plan Process

The 2016 Campus Master Plan Update commenced in September, 2015 and was completed by September, 2016. The process was completed through three phases, including:

- **Phase One: Issues and Opportunities** - The objective of Phase One was to gain a comprehensive understanding of the issues and opportunities at McMaster University, responding to recent and planned development, future enrollment projections, and the ongoing evolution of best practices in post-secondary campus design since the last update to the master plan (2008). This understanding was accomplished through site visits, project team meetings, background research and analysis, and data collection.

- **Phase Two: Stakeholder Consultation** - The objective of Phase Two was to engage the University community, including students, faculty, and staff, as well as the broader City of Hamilton, in a dialogue about the future of McMaster University. This was accomplished through multiple engagement sessions, including three on-site feedback stations, three off-site feedback stations (the David Braley Health Sciences Centre, One James North, and the Ron Joyce Centre), an online survey, and three formal design charrettes to refine the master plan options. One-on-one interviews were also held with key stakeholders representing The City of Hamilton, the Royal Botanical Gardens, the President’s Advisory Committee on Community Relations (PACCR) and others.

- **Phase Three: Updated Campus Master Plan** - The objective of Phase Three was to consolidate the findings of Phases One and Two and develop an updated campus master plan and supporting documentation. The plan outlines a clear path for the University to address issues and opportunities in alignment with the Facility Services Five Year Capital Plan. The plan was presented at a Public Open House event, and the information received was used to inform the preparation of this document.
Key directions and project progress were vetted at bi-weekly meetings with a Working Committee comprised of:

- Gordon Arbeau, Director, Public & Community Relations, U. Advancement
- Mohamed Attalla, AVP & Chief Facilities Officer (Committee Chair)
- Robert Baker, Dean of Science
- Robin Cameron, Professor, Biology
- Linda Coslovi, Executive Director, Finance and Planning (Academic)
- Robert Craik, Manager, Space Planning & Utilization, (Committee Coordinator)
- Jim Dunn, Professor and Chair; Health, Aging and Society
- Carlos Figueira, Director, Custodial Services
- Glen Grunwald, Director of Athletics and Recreation
- Bonny Ibhwah, Acting Associate Vice-President, Research
- Ehab Kamarah, Director, Design and Construction
- Sean Van Koughnett, AVP (Students & Learning) and Dean of Students, Student Affairs
- Debbie Martin, Assistant Vice-President Chief Administrative Officer, Faculty of Health Sciences
- John McGowan, General Manager, MSU
- Ehima Osazuwa, President, MSU
- Talena Rambarran, President, GSA

At key milestones, the plan was presented to, and feedback received from the following Governing Committees:

- President/Vice-Presidents (PVP)
- University Planning Committee
- Planning and Building Committee
- Provost Council
1.4 Consultation Overview

The campus master plan update was founded on ongoing engagement and collaboration with the campus community, including students, faculty, and staff. In addition to bi-weekly meetings with the Working Committee, consultation included:

- **Considerations for Future Planning** - Since completion of the 2008 campus master plan update, Facility Services has been receiving feedback on the physical design and development of the campus. This includes input from students, faculty, staff, and alumni, and has resulted in a series of considerations for future planning. This feedback is reflected throughout the plan, and a detailed overview of the considerations (including their references in the document) can be found in the Appendix.

- **Three In-Situ Visioning Stations (November 3, 2015)** - To kick off the feedback gathering portion of the project, members of the consultant team hosted three informal visioning stations at MUSC (Alumni Hallway), MDCL (Atrium Entry), and ETB (Outside E-Cafe). At two hours each, these sessions encouraged passers-by to stop and share their thoughts on the McMaster campus. Using guiding worksheets, participants completed a number of exercises to describe their day-to-day experiences on campus, identify areas they like/dislike, and evaluate precedents from other campuses across Canada and internationally. The sessions were well-attended, including a mix of participants providing brief feedback between classes, and those who were able to stay and provide significant feedback.

- **Off-Campus Sessions (December 3, 2015)** - To extend the reach of the In-Situ Visioning Stations, a second series of stations were facilitated at the University’s key off-campus sites, including the David Braley Health Sciences Centre, One James North, and the Ron Joyce Centre (DeGroote School of Business). Participants at these sessions completed the same worksheet used for the previous sessions and provided a valuable off-campus perspective.

- **Three Formal Design Charettes (January 14th, 2016)** - Following the preparation of Key Directions, three formal design charettes were held in Celebration Hall to receive feedback from the campus community. For logistical purposes, the meeting invitations were grouped into: (1) Engineering, Humanities, Business (2) Health Science, Social Science, Science, and non-faculty related departments, and (3) Facilities, Athletics and Rec, Finance, Advancement. Those who could not attend their specific sessions were encouraged to join
either of the other sessions. At the charrettes, participants were given a brief presentation outlining the Key Directions to date. Following this, they were split into smaller groups and used a guiding worksheet to review and discuss each of the directions to determine if they agree with the direction, and if not, how they would change/improve it.

**Stakeholder Interviews** - On February 12th and April 8th, members of the consultant team met for one-on-one interviews with key campus stakeholders. These interviews elicited feedback on a draft master plan concept based on user-specific insight. The intended stakeholders represented the following areas:
- City of Hamilton Traffic Engineering;
- Royal Botanical Gardens;
- Office of Sustainability;
- McMaster Museum of Art
- President’s Advisory Committee on Community Relations (PACCR);
- Campus Accessibility;
- Campus Security and Parking;
- McMaster Biology Greenhouse;
- McMaster Library;
- McMaster Campus Store;
- Health Sciences.

**Final Open House (April 15th)** - A final open house was held on April 15th, at the David Braley Athletic Centre, to present the draft final campus master plan. This included three one hour sessions, with each session beginning with a consultant presentation of the plan, followed by a question and answer period. The plan was well received.

Refer to the appendix for the key points identified at these sessions.
2.1 Campus Vision Statement

The following vision statement encapsulates the key directions found throughout this document and reflects the desired long-term character of McMaster University. It should be referenced regularly, and should inform all future building, open space, and landscape projects.

The campus master plan update envisions a future for McMaster University that is attractive, welcoming, and sustainable for generations of students, faculty, and staff.

McMaster University will build on and strengthen the extraordinary qualities that define the campus today, including well-integrated historic and contemporary buildings, a variety of passive and formal open spaces, extensive landscaping, and its striking location adjacent to Cootes Paradise and the Royal Botanical Gardens.

As the campus evolves, new development will establish a mix of research, classroom, amenity and recreational uses; these will promote synergies between the Core Campus and the West Campus. Vehicular traffic will be further directed to the edge of campus, redefining campus entrances and reinforcing a people-focused and vehicle-free core campus. A new mobility hub will consolidate campus transit, anchor the southwest edge, and create an attractive ‘front door’ for many users. New open spaces, and enhancements to existing open spaces, will provide opportunities to teach and study, gather and socialize, and recreate. The rich history and culture of McMaster University will be subtly embedded throughout the campus, including public art, wayfinding and signage, and landscaping.
2.2 Design Principles

The 2008 Campus Master Plan was founded on six principles which reflect the values and priorities expressed by the members of the McMaster community and its neighbours. These principles address many of the issues and opportunities identified throughout this study, and remain relevant. To ensure the master plan reflects contemporary campus growth and reflects the changing ways in which staff, students and faculty engage on campus, six additional principles have been provided.

Original Principles

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 and cyclist-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 of Hamilton.
Additional Principles (2016)

7. Redefine the hierarchy of campus entry points to prioritize pedestrians first.

8. Provide a variety of campus outdoor spaces that reflect the way in which users teach, learn and socialize on campus.

9. Revitalize the core campus circulation networks to enhance wayfinding.

10. Locate new buildings and additions to frame campus streets, entrances and open spaces.

11. Increase and diversify student study/lounge and common spaces to reflect contemporary campus activities.

12. Develop consistent and complimentary signage, wayfinding, and public art to reinforce a common campus character.
2.3
Master Plan Overview

The campus master plan update illustrates the long-term vision for the design and development of McMaster University. It outlines opportunities for new development, and intensification of existing facilities, while protecting the historic buildings that define the campus. Strategic improvements to the campus edges, including Main Street, Cootes Drive, and Forsyth Avenue, will strengthen the imageability of the campus, and improve the interface with adjacent neighbourhoods.

The plan furthers the University’s commitment to a vehicle-free core campus, consolidating parking and transit service at the campus edges. Upgrades to internal streets, including University Avenue, College Crescent, Scholars Road, and Sterling Street, will reinforce pedestrian priority and cycling throughout the campus.

A new mobility hub at the southwest edge of campus provides seamless integration between all modes of transportation. It integrates HSR and GO Transit on site, while providing an iconic welcome centre and arrival plaza for LRT on Main Street. New buildings will frame and enhance Cootes Drive and Main Street, while accommodating a mix of academic, research, and supporting campus uses.

Building on the momentum of the Living and Learning Centre, the plan proposes new buildings, improvements to Stearn Drive, and enhanced pedestrian pathways to better connect the North Campus to the remaining campus, while reinforcing the recommendations of the Athletics and Recreation Master Plan (Perkins + Will, 2016).

A re-imagining of the West Campus focuses on establishing a self-sufficient campus, with a mix of academic, research, amenity and social space that supports day-long use. New development will respond to and integrate unique natural features, including the Ancaster Creek floodplain, MacMarsh, and existing mature tree stands.

The plan was developed through ongoing consultation with students, faculty, and staff. It demonstrates one way in which the vision and guiding principles can be achieved. It will be used to guide future development and decision making processes, while allowing the flexibility to respond as the campus evolves, ensuring development is consistent with the intent of the plan.
Section Three
Master Plan Systems

3.1
Campus Entrances

Re-directing the majority of vehicle traffic to Cootes Drive and Sterling Street, and providing direct routing to parking areas, allows the Main Street/University Avenue entrance to reflect its role as the primary pedestrian gateway, and a welcoming and memorable ‘front door’ for campus users and visitors from the surrounding communities.

Rationale
Primary access to McMaster Campus is provided from Main Street and University Avenue, including a mix of pedestrians, cyclists, vehicles and transit. The unusual geometry of this entrance, which includes access to College Crescent and the hospital parking garage, as well as pedestrian and cyclists crossing, results in significant congestion, confusion and anxiety, and subsequently, potentially dangerous conditions.

Entrances should signal arrival to the campus, establish a strong identity and sense of place, and reinforce safety, wayfinding and orientation. They should be designed to reflect a clear hierarchy, including:

Primary Pedestrian Entrance - As the primary pedestrian entrance, and the most visibly significant access point, Main Street/University Avenue should be a focus for funding. It should have the highest quality of design and should facilitate clear, safe, and memorable access to the campus. New development, landscaping, gateway signage, public art, and high quality materials should all reinforce the significance of this entrance. While vehicles will use this entrance to access the hospital parking garage, its design will prioritize pedestrians.

Secondary Entrances - Secondary entrances, including Sterling Street, and the existing and proposed entrances off Cootes Drive, will accommodate the majority of vehicle traffic on campus. These entrances should reinforce a sense of arrival through strong built form, unique planting and landscape features, and directional signage to key campus locations.

Tertiary Entrances - Tertiary entrances are informal pedestrian access routes, such as King’s Walk at the terminus of King Street West. These entrances should be formalized through enhanced landscaping, high-quality paving, and wayfinding signage. Where these entrances are not highly visible, they should be well lit to ensure safety and security throughout the day.

Opposite: Campus Entrances Map
Priority Directions

1. A new Secondary Entrance at College Crescent and Cootes Drive. With the re-focusing of the University Avenue/Main Street entrance as a pedestrian gateway (see Sections 3.2 and 4.3), the majority of vehicles (including all buses) will enter campus at College Crescent. This entrance should reinforce a sense of arrival through strong built form, unique planting and landscape features, and directional signage to key campus locations.

2. Right-out access from Forsyth Avenue to Main Street to re-route traffic from Forsyth Avenue, and exiting the hospital parking garage, away from the Main Street/University Avenue intersection. This would require the creation of a T-intersection between the two sections of Forsyth Avenue, with stop signs. Right-in access would not be permitted due to lack of visibility and potential conflicts with vehicles turning left onto the northern section of Forsyth Avenue. In preliminary discussions with the City of Hamilton, it was noted that a detailed transportation study would be required prior to implementation to determine the traffic impacts on Main Street, the Westdale neighbourhood and local schools.

Precedent showing how new infill buildings on campus can frame and animate outdoor spaces, including quads, plazas, pathways, and streets.
3. A new plaza and landscaping at Main Street, in association with new infill buildings (i.e. at T13 and CRL), to complement the existing landscaping on the east side of University Avenue (see Section 4.2). This should include new entry and wayfinding signage, seating areas, public art, and bicycle parking.

4. An improved entrance experience on Sterling Street through the development of L.R. Wilson Hall, and a new building on the north side of Sterling Street. This should include the removal of the existing traffic island to provide additional boulevard width, as well as more room for cycling.
3.2 Vehicle-Free Core Campus

By redirecting vehicle traffic to the edge of campus, and providing a dedicated location for bus circulation at the mobility hub, University Avenue, College Crescent, and Scholars Road can be re-imagined as Pedestrian Priority Streets that reinforce the University's vision for a vehicle-free core campus that puts pedestrian safety at the forefront.

Rationale

McMaster is committed to providing users with a vehicle-free core campus. Currently, vehicles are not permitted on University Avenue or Scholars Road, with the exception of HSR buses, emergency vehicles, and University vehicles. To facilitate this, parking areas are located at the edge of campus.

Reducing vehicles on campus has a variety of benefits, including:

- Provides a safer and more attractive campus by minimizing potentially dangerous conflicts between users.
- Provides additional space within existing roadways to accommodate dedicated cycling routes.
- Eliminates damage, and the associated maintenance costs, caused by buses.

As LRT reduces the demand for buses and private vehicles on campus, this master plan update is the next step in realizing the University's vision for a vehicle-free campus. Restricting vehicle access to the edge of campus will allow the conversion of University Avenue, College Crescent and a significant portion of Sterling Street to Pedestrian Priority Streets.
Priority Directions

1. Re-direct vehicular traffic to a new Secondary Entrance at College Crescent and Cootes Drive, or to Sterling Street, where parking will be provided in the immediate proximity of the campus entrance.

2. Eliminate vehicle access on the entirety of University Avenue with the exception of University vehicles, emergency vehicles, and traffic from Main Street accessing the hospital parking garage.

3. Provide right-out access from Forsyth Avenue to Main Street to re-route traffic exiting the hospital parking garage away from the Main Street/University Avenue intersection.

4. Eliminate vehicle access on Sterling Street west of Stearn Drive, with the exception of emergency and University vehicles. If it is determined that a bus turn-around is required off of Sterling Street long-term, a portion of the existing window road can be maintained (eliminating Building BB on Page 24 as a potential development site).

5. Convert University Avenue, College Crescent, Sterling Street, and Scholars Road to Pedestrian Priority Streets, including special paving, seating, enhanced landscaping, and embedded public art. Refer to the proposed cross-section on the following pages.

6. Remove College Crescent between Scholars Road and the new Cootes Drive entrance. Provide a well-landscaped multi-use pathway that links College Crescent and Scholars Road, providing a ‘pedestrian-loop’ through the core campus. Prior to removal of the road, the University should undertake a detailed study to confirm frequency of use, and the impacts of removal in the context of the new Cootes Drive access.
Vehicle-free Core Campus (Plan)

Vehicle-free Core Campus (Section)
3.3 Infill and Intensification

A number of new infill and intensification opportunities have been identified on campus, subject to funding and University needs, including a new mobility hub that integrates LRT on Main Street and a variety of buildings that re-imagine the West Campus as a self-sustaining destination.

Rationale

In the 2008 Campus Master Plan, a number of potential development and expansion sites were identified, subject to University needs and funding. These sites included areas that are currently vacant and/or underutilized (e.g. surface parking lots). Since this time, two of the sites have been realized: L.R. Wilson Hall (under construction) and the Living and Learning Centre (in design). The remaining sites continue to be recognized as infill sites in this update.

In addition to the previously identified sites, this plan recognizes a number of new (or revised) opportunities for development, including a mobility hub at the southwest edge of campus, additional buildings within the West Campus, and smaller additions throughout the campus.

Many of these sites are challenging for development, given their location, policy context, and/or access. As McMaster requires new building sites, these locations should be balanced against opportunities for the intensification of existing lower-density (i.e. 2-storey) buildings that may be nearing the end of their life cycle, and that better achieve the development objectives.

McMaster University is located directly adjacent to Cootes Paradise, which is part of the Niagara Escarpment and identified as an Escarpment Natural Area (Niagara Escarpment Plan, Map 2). To protect the water quality of the adjacent stream, setback provisions may apply as determined by the implementing authority in consultation with the Ministry of Environment and Climate Change, the Conservation Authority, and the Ministry of Natural Resources and Forestry (Niagara Escarpment Plan, Section 2.6.3). It is recommended that the University engage the Niagara Escarpment Commission prior to the development of any infill or intensification sites to confirm boundary lines, identify potential issues, and foster positive partnerships.

No development is permitted within the Ancaster Creek Floodplain. The sites identified in the West Campus are outside of the floodplain. However, as they are partially within the Regulation Area, the precise hazard limits have to be determined on a site-by-site basis and may involve hazard assessment studies. If such studies demonstrate that the proposed buildings are truly outside of the hazard area (stable slope and setback), all that is required is a Letter of Permission from the Conservation Authority. Considering this, partnerships with the Hamilton Conservation Authority are encouraged throughout the redevelopment process.

For a breakdown of the infill and intensification sites, including their potential use and yield, please refer to the table on page 26.
Priority Directions

1. As LRT is integrated along Main Street, the parking lot at Main Street/Cootes Drive should be redeveloped to provide a mobility hub that integrates all modes of transportation (e.g. HSR, LRT, and GO Transit), provides a ‘welcome centre,’ and accommodates a variety of transit-supportive buildings.

2. Provide a number of new buildings in the West Campus to create a self-sufficient campus that clusters complementary uses, and allows students, faculty, and staff to remain on this campus for the majority of their day.

3. Implement the recommendations of the Athletics and Recreation Master Plan (Perkins + Will, 2016), including additions to existing buildings, and the construction of a new field house and residence building.

4. As GO Transit services relocate to the mobility hub, redevelop the existing terminal as a new academic or research building.

5. Provide new development to the south of the Living and Learning Centre, and at Stearn Drive/ Forsyth Avenue to frame and create a stronger presence on Forsyth Avenue.

6. Integrate the Communications Research Laboratory with the redevelopment of T13. At 2-storeys, this building is currently underutilized. Redevelopment of both sites would allow more intensified use at this important entrance, and a building that appropriately addresses University Avenue.

7. Provide a new building on the north side of the Life Sciences Building (incorporating the existing tunnel) to further frame the eastern edge of The Mall, and the pedestrian connection to the north.

8. Re-location of the existing Biology Greenhouse to the south side of the Life Sciences Building. The existing site should be redeveloped as an academic or research space.

9. A maximum 2-storey closed atrium space within the existing Arts Quad to create a unique, flexible space that can be used year-round.

10. A narrow addition on the western edge of the hospital to soften this edge, and provide a stronger, pedestrian-oriented presence on University Avenue. As a narrow addition, this site could accommodate a unique study/lounge space with limited retail, and opportunities for spill-out and active uses.

11. With the recent announcement that Hamilton Health Sciences will be ceasing operations at McMaster University Medical Centre as part of a 20-year plan, the future use of this building/site should be considered in the future planning of the campus.

Planning and Zoning Implications

The following table supports the infill and intensification sites identified on Page 24. It identifies the potential use and development yield for each of the sites, as well as the planning/policy implications that will need to be considered at the time of development.
<table>
<thead>
<tr>
<th>Infill Site</th>
<th>Site Area (Square Metres)</th>
<th>Min Height (Stories)</th>
<th>Max Height (Stories)</th>
<th>Min GFA</th>
<th>Max GFA</th>
<th>Potential Use</th>
<th>Policy Implications</th>
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<td>This site meets the conditions related to horizontal area and adjacencies (see Section 8.1(c)(ii)(b) and (d)).</td>
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<td>This zone also permits a library, art gallery, museum, observatory, community centre, gymnasium, swimming pool or similar cultural, recreational or community buildings or structures, golf course, bowling green, tennis court, playground, playfield, playlot, picnic ground or other similar recreational uses.</td>
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<td>10,521.84</td>
<td>15,782.76</td>
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<td>In a &quot;B&quot; District, no building shall exceed two and a half storeys and no structure shall exceed 11.0 metres (36.09 feet) in height (see 8.21).</td>
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<td>Every individual building must be sited on a site where it has a front yard of a depth of at least 12.0 metres; a side yard along each side lot line of a width of at least 3.0 metres; and a rear yard of a depth of at least 9.0 metres (see 8.3). The Site must also have a width of at least 20.0 metres (66.62 feet) and an area of at least 1,100.0 square metres (11,840.69 square feet) (see 8.4).</td>
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<td>The sites identified in the West Campus are generally outside of the Ancaster Creek Floodplain. However, as they are partially located within the Regulated Area, the precise hazard limits have to be determined on a site-by-site basis and may involve hazard assessment studies. If such studies demonstrate that the proposed buildings are truly outside of the hazard area (stable slope and setback), all that is required is a Letter of Permission from the Conservation Authority.</td>
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<td>T</td>
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<td>The maximum height is 38.0 metres, only where the property line abuts a Residential Zone property line. As this property does not abut a Residential Zone, the proposed building heights are permitted (see 8.3.2.2).</td>
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<td>McMaster University is located directly adjacent to Cootes Paradise, which is part of the Niagara Escarpment and identified as an Escarpment Natural Area (Niagara Escarpment Plan, Map 2). To protect the water quality of the adjacent stream, setback provisions may apply as determined by the implementing authority in consultation with the Ministry of Environment and Climate Change, the Conservation Authority, and the Ministry of Natural Resources and Forestry (Niagara Escarpment Plan, Section 2.6.3).</td>
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<td>Refer to Athletics &amp; Recreation Master Plan (Perkins + Will, 2016)</td>
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* Potential development to be either a new addition (Q) or an addition on top of the existing building (R).
3.4 Parking Strategy

As infill and intensification occurs on campus, structured parking (including both underground parking and a parking garage) will be required to maintain the existing number of parking spaces. Efforts should be made to balance additional campus populations with a modal shift towards cycling and transit, including new LRT on Main Street.

Rationale
A lack of short-term parking, and parking near prominent campus buildings, was identified as a significant concern during the campus consultation sessions. Beyond convenience, it was noted that a lack of parking is a deterrent for student and faculty recruitment, visiting researchers, and staff retention.

As infill and intensification occurs on campus (see Section 3.3), surface parking lots are prime sites for redevelopment. It is anticipated that LRT on Main Street, and the cycling improvements proposed throughout this document, will alleviate some pressure on existing parking facilities. However, a long-term solution is required that balances parking demand with the broader goals of developing the campus edges, promoting active transportation, and reinforcing a sustainable campus.

A parking assessment undertaken by MMM Group, with assistance from campus parking staff, analyzed data during peak periods (1:00-2:00pm, September and January). It was determined that:

- On an average September day, data for 3,910 parking spaces in university parking lots showed a demand for 2,815 parking spaces. This equates to 72% of the parking spaces being utilized;
- The demand for parking spaces at most parking lots is within the lot’s capacity;
- Some smaller lots on campus (i.e. Forsyth Avenue/Stearn Drive, Michell Crescent north of the playfield, and east of Hedden Hall) may have limited spare capacity. These lots are more expensive to park in compared to lots further from campus;
- September sees the peak demand; typically demand is lower than this in other months of the year;
- Drivers parking at the University appear to be cost-conscious and elect to park further away to reduce their parking costs. Similarly, if parking rates are increased, these users may seek different modes to access the campus (e.g. transit); and,
- Parking supply should be managed and not designed for the peak period; doing so would be fiscally irresponsible and would not encourage the use of more sustainable modes.

Opposite: Parking Map
To manage parking as the campus evolves, the analysis recommends:

• Maintaining the current supply of parking (4,397 spots)\(^1\) as a baseline, and to manage future demand;

• Enhancing cycling and pedestrian circulation to encourage these modes of travel by providing dedicated cycling lanes and paths, increasing the number of bike racks, and ensuring that an interconnected network of pedestrian sidewalks is maintained;

• Advocating for expedited construction of the proposed LRT on Main Street;

• Working with the City and GO Transit to review and improve bus routings and timings;

• Identifying locations to construct additional parking, including underground parking in association with new buildings, as well as a parking garage on campus.

Please refer to the Appendix for the full Transportation Assessment.

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\(^1\) Includes surface lots, underground parking, smaller individual spaces, and off-campus parking at Ward Avenue, the Ron Joyce Centre and the David Braley Health Science Centre.

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Priority Directions

1. Parking needs should be regularly reassessed in light of the increasing size of the McMaster University community and changing commuting patterns.

2. Structured parking should be considered within new buildings located at the campus edges and within the West Campus. The diagram on Page 28 shows the potential for 4,104 spaces, including existing surface parking and structured parking within new buildings (assuming a single level for each new building). Where feasible (e.g. in the mobility hub), multiple levels of parking could be provided to increase this number to match the existing 4,397 spaces.

3. Where underground parking is not feasible, opportunities to accommodate parking above grade should be explored on a site-by-site basis, including parking within the first two storeys of buildings, or a stand-alone parking garage on one of the infill and intensification opportunities identified on Page 24. This approach is anticipated in the West Campus where underground parking is not feasible.

4. Where above-grade parking is provided within the first two storeys of new buildings, it should be wrapped by active uses (e.g. offices, campus amenity spaces, etc.) and should not be visible from the public realm. Vehicular access to these sites should be from the rear or side of the building and should also be screened from view.

5. Improved wayfinding within parking lots (surface and underground) to facilitate immediate and direct access to campus destinations.

6. Where surface parking is provided, the principles of low impact development should be incorporated to mitigate impacts. Low impact development seeks to absorb stormwater on site through the regular placement of control mechanisms (i.e. bioswales, permeable paving, rain gardens).

7. An updated shelter for the West Campus shuttle. It should be fully enclosed, and should include electronic updates related to shuttle arrival and campus news.

8. Explore strategies to increase parking costs in order to reduce demand and encourage users to travel via cycling and/or transit. This will need to be introduced strategically to ensure receptivity.
Precedents demonstrating how new and updated surface parking areas should minimize their visual and environmental impacts through permeable paving, significant buffer planting, and other Low Impact Development interventions.
3.5
Cycling

Cycling is a primary mode of transportation for a significant amount of students, faculty and staff. With the integration of LRT, and the University’s commitment to a vehicle-free core campus, dedicated cycling routes will be provided on key streets to ensure safe, continuous connections to, and throughout, the campus.

Rationale

There is a strong network of cycling routes in close proximity to, and approaching McMaster Campus, including bicycle lanes on Sterling Street, King Street, and Sanders Boulevard, and multi-use trails along Cootes Drive and just south of the campus (Hamilton-Brantford Rail Trail). These trails end abruptly at McMaster campus which does not provide marked and consistent paths through internal streets resulting in an increased risk of cyclist/vehicle conflicts.

With a commitment to a vehicle-free core campus (see Section 3.2), a series of dedicated cycling routes should be provided on key north-south and east-west streets through the campus to provide access to key destinations, facilitate connections through the campus, and link to adjacent bicycle lanes and multi-use paths throughout the City.

Priority Directions

1. Sharrows on College Crescent, University Avenue, Sterling Street, Scholars Road, and Westaway Road. As vehicle traffic is limited on these streets, sharrows will provide a generally exclusive route for cyclists.

2. Provide additional bicycle parking at the Primary, Secondary and Tertiary Entrances identified in Section 3.1, including weather-protected facilities where possible.

3. Provide significant bike parking and storage at the mobility hub to facilitate convenient transition between modes of transportation.

4. Expand SoBi Hamilton (Hamilton Bike Share) to the mobility hub, and to the West Campus.

5. Provide a second location for MACycle within the mobility hub.

6. Upgrade and formalize existing bike parking areas to reduce undesirable conditions (e.g. broken facilities, forgotten bicycles, muddy conditions, etc.).
3.6 Open Spaces and Landscaping

Open spaces and landscaping reinforce a strong aesthetic quality and a memorable experience at McMaster. The master plan envisions new open spaces, and enhancements to existing open spaces, to reinforce this network and provide a variety of spaces to teach, collaborate, and socialize.

Rationale
The McMaster University campus has a strong network of open spaces, including a mix of large formal quads (The Mall, the Arts Quad, the east side of the MUSC Quad), and open lawns (The Oval, Faculty Hollow). These spaces are framed and highlighted by well-landscaped areas at the edge of buildings and along pathways. Together, these features enhance the aesthetic quality of the campus, offer gathering and social spaces, and provide opportunities to connect with nature. The master plan update looks to strengthen this network through the creation of new open spaces as well as upgrades and improvements to existing spaces. The recommendations that follow, and their associated costs, should be considered for future capital planning.
Priority Directions

1. Continuous and high-quality landscaping at the edge of all buildings, and in ‘left-over’ spaces, to support beautification across the campus. Where underutilized outdoor space exists (e.g. in front of the A.N. Bourns Science Building), consider unique and functional interventions, such as urban agriculture, informal plazas, or rain gardens.

2. The University should establish a formal process for the consistent naming/theming of new open spaces and gardens. This should involve all relevant departments (e.g. Facility Services, Advancement Services), and should consider:
   - Historic/cultural theming vs. donor-driven;
   - Identification requirements (e.g. plaque, sign) including size, location, and materials;
   - Amenities (e.g. seating, bike racks, public art) including University standard vs. custom;
   - Initial and replacement costs of donated elements;
   - Maintenance and lifespan of elements; and,
   - Rules and regulations to govern donated items.

3. A new entrance plaza in association with the redevelopment of T13 and CRL (see Section 4.2). Associated landscaping will provide a direct visual and physical connection to the ‘welcome centre’ within the mobility hub (see Section 4.1).

4. Formalized pathways through The Mall with seating at the edges (see Section 4.3).

5. Improvements to the MUSC Quad to support its use as a flexible, outdoor gathering space (see Section 4.3).

6. An improved quad between IAHS and ITB as part of the redevelopment of the mobility hub (see Section 4.1) pending the development of the site for a future McMaster University/Mohawk College building.

7. A new quad within the West Campus to provide attractive outdoor space and support the West Campus as a self-sustaining campus (see Section 4.7).

8. Provide for additional use of The Oval through increased awareness and programming while providing a buffer to adjacent residential uses: a dense row of trees at the east edge.

9. Smoking should be banned within 9m of all primary building entrances.
Left: Precedent showing the use of native, low-maintenance species to create an attractive campus edge.

Right: Precedent showing how small ‘left-over’ spaces can be converted to welcoming, attractive places.
3.7 Campus Edges

The edges of campus are most visible from adjacent streets and neighbourhoods, and often set the foundation for an attractive and welcoming campus. New street trees and additional landscaping will strengthen the campus edges along Main Street, Cootes Drive, and Forsyth Avenue.

**Rationale**
The edges of campus, or the areas that interface with adjacent uses, determine the initial impression of McMaster University for many users. This is most notable at the south edge, where McMaster has significant frontage on Main Street, but is also important along Forsyth Avenue and Cootes Drive. With the integration of LRT on Main Street, and the reconfiguration of campus entrances (see Section 3.1), these edges will become visible to a much greater number of users, and should reinforce a welcoming and attractive environment.

**Priority Directions**
1. A new entrance plaza in association with the redevelopment of T13 and CRL (see Section 4.2).
2. A double row of trees along the entire Main Street frontage.
3. A strong entry plaza near the corner of Main Street and Cootes Drive to accommodate users arriving to campus by LRT.
4. High-quality landscaping along Cootes Drive, including a continuous pedestrian pathway, as part of the mobility hub redevelopment.
5. The University should undertake a detailed study of the window road portion of College Crescent that runs parallel to Cootes Drive to confirm the frequency of use, and the impacts of removal in the context of the new Cootes Drive access. With direct access from College Crescent to Cootes Drive, this connection may no longer be required (and may result in significant congestion due to insufficient spacing between intersections). Removal of this road will further the University’s goal for a vehicle-free campus and provide the opportunity for a high-quality landscaped edge that continues throughout the mobility hub.
6. Infill trees as necessary along Forsyth Avenue to ensure a dense tree canopy that screens the University uses from the adjacent community and enhances the pedestrian experience.
Rendering and precedents demonstrating how high-quality landscaping can define campus edges.
3.8 Signage and Wayfinding

Signage and wayfinding creates cohesion across campus, and enhances the daily experience for students, faculty, staff, and visitors. Student-operated ‘information stations’ can provide an initial point of contact for campus users, while a detailed signage and wayfinding strategy will identify appropriate signage types and locations.

Rationale

Signage and other wayfinding elements are one of the simplest ways to create cohesion and a unified campus character. On the grand scale, gateway signage provides a sense of arrival and establishes the identity of the campus. At a smaller scale, signage provides directional links between key locations, as well as locational cues upon arrival.

Throughout the campus consultation, students, faculty and staff all expressed frustration with a lack of clear wayfinding on campus, including directional signage and building identification signage.

Priority Directions

1. Update the University’s existing signage and wayfinding strategy to identify the best locations for various types of signage (wayfinding signage, building signage, etc.), as well as the style/design of individual elements to ensure consistency across campus (and at the University’s off-campus sites).

2. Updates should consider opportunities to consolidate signage, and to reduce the amount of required signage, in order to minimize clutter.

Building signage is to be limited to the building name, rather than also include the department and/or faculty. This secondary information can be provided in a less prominent format.

3. Stronger entrance signage for the Mills Memorial Library, as well as clearer signage for loading facilities.

4. Welcome signage, campus maps and directional signage at all entrances identified in Section 3.1. This signage should allow students, faculty, staff and visitors to quickly and easily find their destination.

5. Explore opportunities for integrating digital wayfinding/mapping across campus.

6. Re-establish ‘information stations’ on campus, similar to the previous parking booth. These should be located in highly visible areas (near arrival points). The ‘information stations’ could have digital wayfinding/mapping, or subject to viability, could be operated by students who could provide basic information to campus visitors.
Above: Precedent showing simple, uncluttered campus signage.
Left: Precedent showing electronic campus signage.
3.9 Public Art

Public art beautifies the campus, and enhances the day-to-day experience of many users. Led by the McMaster Museum of Art, a comprehensive Public Art Strategy will identify key locations and recommended commissions, while exploring partnership opportunities with local artists.

Rationale
When carefully integrated throughout a campus, public art enhances the day-to-day experience of students, faculty, and staff, and broadens their knowledge of McMaster University, the surrounding area, and Hamilton’s rich history. Campus art also provides the opportunity to promote local artists and draw visitors from the surrounding community.

Priority Directions
1. Undertake a detailed Public Art Strategy to integrate public art at strategic locations throughout campus. This could be led by the McMaster Museum of Art to connect with, and increase awareness of, its extensive collection.

2. Formalize and increase awareness of the Artists Garden associated with the McMaster Museum of Art (located near the southwest corner of the MUSC Quad). This could include formal signage (local and wayfinding), unique collaborations, etc.

3. Explore opportunities for non-traditional forms of public art, including embedded art (e.g. in pathways, furniture, etc.), interpretive pieces, and sculpted or patterned landscapes.
Left: Existing Artist Garden at McMaster.

Right: Precedent showing how public art can be subtly integrated into campus furniture, pathways, etc.
Section Four
Campus Character Areas

4.1 The Mobility Hub

To support LRT on Main Street, a new mobility hub at the southwest edge of campus will integrate all modes of transportation. New buildings will provide an iconic ‘welcome centre’ on campus, as well as space for academic, retail, recreation, and social space. New plazas and open spaces will create a comfortable and welcoming environment that accommodates active and passive recreation.

As part of Metrolinx’s regional transportation plan, The Big Move, $1 billion is being invested in LRT along Main Street, from McMaster University to the East End. This LRT line will have a transformative impact on both Main Street, and McMaster University. With the re-routing of vehicular traffic to entrances at Cootes Drive and Sterling Street, and the consolidation of bus access at the mobility hub, there is an opportunity to reinforce a strong presence on Main Street through the establishment of an integrated development at the southwest quadrant of the campus.
Precedent images demonstrating the type of high-quality, visual landmark buildings that should be provided within the mobility hub, particularly at the corner of Main Street and Cootes Avenue.
NOTE:
A detailed demonstration plan for the mobility hub was prepared as part of this process (please refer to Appendix i). As the LRT alignment and bus circulation requirements are finalized, it is anticipated that the final design may change. Where the design changes from Appendix i, it should still achieve the Priority Directions outlined in this section.
Priority Directions

1. An anchor transit hub building that consolidates access and circulation for all transit services, including HSR, LRT, and GO Transit. This building should have a mix of uses, including academic uses, lounge space, a cafe, recreation facilities, etc.

2. A ‘welcome centre’ on Main Street as the first access point for users entering campus from the LRT and/or the University Avenue/Main Street entrance. This should be a landmark building, with a strong entry plaza, and could provide study/lounge space, a starting point for campus tours, and a western location for the Compass Information Centre (currently at MUSC).

3. Academic buildings on the south side of College Crescent to frame the street and provide additional classroom, research, and office space.

4. Structured parking should be provided in new buildings to offset parking lost to redevelopment, and to provide additional capacity. Where feasible, underground parking is recommended. If it is determined that this is not feasible, above-grade parking may be considered within the first two-storeys, though it should be ‘wrapped’ with active uses, and should not be visible from the public realm.

5. A new connection to Cootes Drive from College Crescent to accommodate transit access and to provide access to structured parking facilities to offset parking lost to redevelopment.

6. Improvements to the ITB/IAHS Quad to create an attractive, welcoming plaza and internal connection between University Avenue and the mobility hub pending the development of the site for a future McMaster University/Mohawk College building.

7. Upgrades to Brockhouse Way to provide a continuous, pedestrian-focused connection between Main Street and College Crescent.

See Also
- 3.1 Campus Entrances
- 3.2 Vehicle-Free Core Campus
- 3.3 Infill and Intensification
- 3.4 Parking Strategy
- 3.5 Cycling
- 3.6 Open Spaces and Landscaping
- 3.7 Campus Edges

Opposite: Development plan for the Mobility Hub.
4.2 University Avenue/Main Street Frontage

The frontage on Main Street, and University Avenue, will be upgraded and enhanced to reflect its role as the primary campus entrance. Large, well-landscaped plazas will frame both sides of this gateway, while upgrades to University Avenue will provide a direct visual and physical link to The Mall. New infill (T13) buildings, and the intensification of existing sites (CRL), will frame and animate University Avenue.

With the majority of vehicle traffic entering campus from College Crescent/Cootes Drive and Sterling Street (see Section 3.1), there is an opportunity to re-envision University Avenue and the Main Street frontage as the primary gateway to the campus.
Left: Precedent demonstrating what a new plaza could look like on the west side of University Avenue, at Main Street, in association with the redevelopment of T13 and CRL.
Right: Current gateway plaza at University Avenue and Main Street.
**Priority Directions**

1. Redevelop T13 and the Communications Research Lab to provide a new building that frames University Avenue and provides a strong at-grade relationship on all sides.

2. A new entrance plaza in association with the redevelopment of T13. This, combined with the existing entry park on the east side, will frame both sides of the University Avenue entrance with public space.

3. A narrow addition on the western edge of the hospital to soften this edge, and provide a stronger pedestrian-oriented presence on University Avenue. As a narrow addition, this site could accommodate a unique study/lounge space with limited retail, and opportunities for spill-out and active uses.

4. University Avenue redesigned as a beautiful, tree-lined north-south campus allée that provides a direct visual and physical connection to The Mall.

5. A double row of street trees along the entire Main Street frontage.

6. With the recent announcement that Hamilton Health Sciences will be ceasing operations at McMaster University Medical Centre as part of a 20-year plan, the future use of this building/site should be considered in the future planning of the campus.

**See Also**

- 3.1 Campus Entrances
- 3.2 Vehicle-free Core Campus
- 3.3 Infill and Intensification
- 3.7 Campus Edges
- 3.8 Signage and Wayfinding
- 3.9 Public Art
4.3 Core Campus

The Core Campus will prioritize pedestrians, including students, faculty, and staff, through the conversion of College Crescent, University Avenue, and Scholars Road to vehicle-free streets. This focus on campus users will be extended through upgrades and enhancements to the MUSC Quad and the re-imagining of the Arts Quad as a flexible, covered atrium space.

The Core Campus is the most densely populated area and generally refers to the buildings and open spaces located along College Crescent, University Avenue, and Scholars Road. At the heart of the Core Campus, The Mall provides a defining open space and a favourite destination for many campus users. Other key spaces include the MUSC Quad, a busy and significant space for gathering, socializing, working, and campus events, and the Arts Quad, a key space that provides a link between MUSC and the various Arts buildings. As the focal point of the campus, significant effort should be made to ensure buildings and open space are attractive and well-connected.
Left: Precedent showing what The Mall could look like with upgraded pathways and seating at the edge.
Right Top: Precedent showing what a flexible, internal atrium space at the Arts Quad might look like.
Right Bottom: Precedent showing how unique furniture, with warm materials, can enliven campus spaces, such as the MUSC Quad.
Priority Directions

1. College Crescent, University Avenue, and Scholars Road reconfigured as Pedestrian Priority Streets (see rendering on Page 20), including high-quality paving, street trees, seating areas, and sharrows with limited vehicular traffic.

2. Formalized pathways through The Mall to strengthen the physical appearance of this space as the heart of the campus. New pathways should respond to existing ‘desire’ paths, and should include opportunities for seating.

3. Undertake an inventory of existing trees within The Mall, identifying their existing health and a long-term replacement strategy.

4. Infill the existing GO Transit Terminal with a new academic building that provides a strong frontage along Cootes Drive.

5. Expand the ground floor of MUSC consistent with the findings of the MUSC Feasibility Study (2014) to improve functionality and pedestrian flow.

6. Improvements to the MUSC Quad to support its use as a flexible, outdoors gathering space.

Opportunities include:

- A new palette of high-quality materials that reinforce the MUSC Quad as a primary open space on campus.

- Work with the Campus Store, Mills Memorial Library (and others as necessary) to re-imagine the northwest corner, including the Campus Store entrance and the nearby landscaped circle. An integrated design could help draw attention to the Campus Store entrance, while providing unique opportunities for landscaping, public art, seating, etc. Much of the existing bicycle parking could be relocated to the opposite side of the MUSC Quad stairs (adjacent to the accessible ramp), and to the east side of the quad as part of a new transit loop and drop-off area (see Section 4.4).

- The refurbishment of the large concrete bench at the south end of the Quad. A wooden surface would create a warmer appearance, and encourage use throughout the year.

- Replacement of the existing benches with moveable (but tethered) chairs and tables. This provides flexible seating options, but can be removed if additional space is required for an event.

7. A 2-storey closed atrium space within the existing Arts Quad to create a unique, flexible space that can be used year-round. This space should accommodate a mix of uses, including study and collaboration space, small scale retail, lounge space, etc.

8. A new Biology Greenhouse located at the southwest corner of the Life Sciences Building.

9. The site of the existing Biology Greenhouse should be converted into a new academic or research building.

See Also

• 3.1 Campus Entrances
• 3.2 Vehicle-Free Core Campus
• 3.3 Infill and Intensification
• 3.5 Cycling
• 3.6 Open Spaces and Landscaping
• 3.7 Campus Edges
4.4 Sterling Street Entrance

Sterling Street will be reinforced as a key campus entry, and an arrival point for many campus users. A re-configuration of the existing circulation network will rationalize access to parking, while providing safe and convenient pedestrian circulation.

Sterling Street is the main entrance for a number of users approaching campus from the east. This role will be even greater with the re-direction of traffic from University Avenue (see Section 3.1). Currently, the entrance is difficult to navigate due to irregular access roads (to nearby parking), which often results in challenging conditions for pedestrians. Where Sterling Street enters campus, it is significantly constrained to accommodate a central traffic median. This leaves little room for pedestrian boulevards or cycling and makes the entry experience less than welcoming.

As a key Secondary Entrance (see Section 3.1), opportunities to improve conditions at this entrance should be prioritized.

Priority Directions

1. Eliminate bus traffic on Sterling Avenue. All buses will enter the campus at the mobility hub.

2. Remove the median on Sterling Street and realign travel lanes to accommodate cycling facilities and wider boulevards, and minimize pedestrian/vehicle conflicts.

3. Remove the eastern portion of Stearn Drive that runs parallel to Forsyth Avenue on McMaster property. This road is redundant and its removal will help to regularize circulation in this area of campus.

4. Improvements to the east end of the MUSC Quad to establish a welcoming arrival area, including seating, landscaping, signage, etc. A highly-visible student-run information kiosk is recommended here to provide immediate information upon arrival to campus.

5. A new building on the north side of Sterling Street (opposite the new L.R. Wilson Hall) to frame the street and create a well-defined entrance. Underground parking should be provided to offset the existing spaces lost to redevelopment.

See Also

- 3.1 Campus Entrances
- 3.2 Vehicle-Free Core Campus
- 3.3 Infill and Intensification
- 3.4 Parking Strategy
- 3.5 Cycling
- 3.7 Campus Edges
- 3.8 Signage and Wayfinding
4.5 The Oval

The Oval will be protected in its existing form, with efforts made to increase awareness and use of this unique campus open space through signage and additional programming. Additional trees and landscaping on the east edge will provide a visual and auditory buffer to the adjacent neighborhood.

The Oval is a large, informal lawn on the east side of Forsyth Avenue. It is well-used by local school programs during the summer, but is generally underutilized by the campus community as many people are either unaware of it, or associate it with the adjacent residential neighbourhood. Opportunities to increase use and awareness of The Oval should be explored, but should carefully consider impacts on the adjacent neighbourhood.

Priority Directions

1. Plant additional trees along the eastern edge of The Oval to provide a visual and auditory buffer between University recreational use and the adjacent residential neighbourhood.
4.6 North Campus

The North Campus will remain an athletic hub situated adjacent to the beautiful Royal Botanical Gardens property. Enhancements, as outlined in the Athletics and Recreation Master Plan, will strengthen this role. The new Living and Learning Centre, the Fitzhenry Studios and Atrium, and other new infill opportunities, combined with upgrades to Stearn Drive, will help to integrate this area with the remainder of the campus. Traditionally McMaster University was characterized by a Core Campus south of Stearn Drive, while the North Campus was recognized as an area for athletics. The new Living and Learning Centre, as well as the Fitzhenry Studios and Atrium addition at Togo Salmon Hall, demonstrate a new focus on providing greater integration between the North Campus and the Core Campus. The master plan furthers this integration, while enhancing the role of the North Campus as an athletic and recreational hub as outlined in the Athletics and Recreation Master Plan (Perkins + Will, 2016).

The North Campus focus will also explore opportunities to promote synergies between the McMaster Campus, and the Royal Botanical Gardens in a manner that protects and enhances use of this sensitive natural area.
Left: Precedent showing consolidated campus signage.

Right: Precedent showing how an outdoor classroom might be integrated at the Royal Botanical Gardens gateway with minimal disruption to the natural environment.
Priority Directions

1. New infill buildings along Stearn Drive to frame and animate the street.

2. New infill and additions as recommended in the Athletics and Recreation Master Plan (Perkins + Will, 2016), including upgrades to existing facilities, a new field house, and a new residence building.

3. Enhancements to Stearn Drive to reflect its important role as a spine through the North Campus. Opportunities include special paving, street trees and landscaping, seating, and cycling facilities.

4. Provide dedicated cycling routes on Stearn Drive to provide continuous connectivity throughout campus, and to provide direct connections to natural trails through Cootes Paradise.

5. Provide a strong entryway to the Royal Botanical Garden site including outdoor classroom space. This was favoured in initial discussions with the Royal Botanical Gardens, and the classroom has been recently constructed. Trail head signage should be provided, consistent with those that currently exist near Hedden Hall and Woodstock Hall, and should include information and education related to the use of the property. Access from unsigned locations should be prohibited through signage and an increased security presence.

6. Provide a direct connection from the outdoor classroom and trail head to the pathway on the east side of the David Braley Athletic Centre. This will minimize pedestrian/vehicle conflicts, and further enhance pedestrian priority on campus.

7. Eliminate ‘corners’ through continuous landscaping and continuous paths on the McMaster University property. This will discourage users from veering into the Royal Botanical Garden’s property while enjoying the North Campus.

See Also

- 3.1 Campus Entrances
- 3.3 Infill and Intensification
- 3.4 Parking Strategy
- 3.5 Cycling
4.7 West Campus

The West Campus can be a pillar of sustainability at McMaster, and within Hamilton, demonstrating how large scale redevelopment can be accommodated with minimal disruption to adjacent natural features. As a self-sustaining campus, the West Campus will provide the academic facilities, and supporting services, to retain users throughout the day.

The West Campus, located west of Cootes Drive, is generally underutilized. It is the location for the Applied Dynamics Laboratory, the Campus Services Building, and currently the McMaster Children’s Centre, as well as three baseball diamonds that are well used by the community. Otherwise, the West Campus is predominantly used for surface parking that serves the main campus.

Bounded by Ancaster Creek, and highlighted by large tree stands and varied topography, the West Campus provides the opportunity for a large, self-sustaining campus that provides a full range of institutional facilities, open spaces, and amenities that reflect its beautiful natural setting.

The West Campus can be a pillar of sustainability, and a shining example of large-scale campus development.
Precedents showing how new buildings in the West Campus will be high-quality and will frame outdoor spaces, including quads and plazas. They should be designed with a mix of uses to accommodate users throughout the day.
Priority Directions

1. New infill buildings at Cootes Drive and Westaway Road designed and massed to frame the entrance to the West Campus.

2. A beautiful, tree-lined north-south allée that anchors the West Campus and provides an attractive link between buildings.

3. New infill buildings that address the allée, with active uses at grade (e.g. social space, cafes, retail) and a full mix of uses above, potentially including classrooms, laboratories, study and collaboration space, residences, and offices. Buildings in this location should be designed to address the slope where the allée meets Westaway Road.

4. Protect and enhance the Ancaster Creek Floodplain. New buildings are located outside of the flood plain, and Low Impact Development (LID) strategies should be applied throughout the West Campus to mitigate future impacts.

5. Opportunities to accommodate a stand-alone parking garage within one of the identified infill sites, or to provide parking within the first two storeys of new buildings, should be explored to offset the parking lost to development (see Section 3.4).

6. Where above-grade parking is provided, it should be wrapped by active uses (e.g. offices, campus amenity spaces, etc.) and should not be visible from the public realm. Vehicular access to these sites should be from the rear or side of the building and should also be screened from view.

7. A grand, centrally-located quad to act as the heart of the West Campus. This will provide a beautiful outdoor space for recreation, informal teaching, collaboration and socializing. The Quad can also provide opportunities for noisier campus events (e.g. concerts, festivals, orientation activities) away from more sensitive uses (i.e. the library).

8. Protect and enhance MacMarsh as a natural research area, and a place for teaching and learning.

9. Preserve the existing parking in Lot M to serve both the West Campus and the main campus. Provide more frequent and convenient shuttle service, including accessible buses, and a comfortable, weather-protected waiting area that provides information about shuttle times, campus news, etc. The shuttle could continue to drop off at or near current location (i.e. GO area) once this area redevelops to maintain a more centrally-located drop-off point.

10. Building on the momentum of the recent Lot M Habitat Restoration project, permeable paving, bioswales, and other Low Impact Development strategies should be used throughout Lot M to minimize run-off and reduce the impacts of this large surface parking area.

11. Preserve the three baseball diamonds, in an alternative configuration, to provide recreational space for the campus community and the broader City. These should be located to minimize the destruction of the adjacent natural areas, including alteration of the existing slope (where possible).

12. Re-align the existing helipad and identify an appropriate flight path based on the location of potential new buildings.

See Also
- 3.3 Infill and Intensification
- 3.4 Parking Strategy
- 3.5 Cycling
- 3.6 Open Spaces and Landscaping
4.8 Off Campus Sites

McMaster’s off-campus sites play a significant role in the growth of the University. These sites range from a vacant downtown lot to large natural areas, and provide the University with a variety of unique development opportunities.

Outside of the main campus, the University has a number of off-campus holdings that will be a focus for new and unique development, including:

- King and Bay Street, Downtown Hamilton
- Ron Joyce Centre, Burlington
- MacForest

**King and Bay Street, Downtown Hamilton**

When the University acquired the land to build the David Braley Health Science Centre at Main Street and Bay Street, this included the parking lot at the north end of this site (at Bay Street and King Street). Considerations for development of the site should include:

1. A mixed-use building, including retail uses at grade to create an active frontage on both King Street and Main Street.

2. Office uses above, up to 12-storeys, to reflect the adjacent context. This height should be concentrated at the corner, stepping down to the lower buildings to the east.

3. A lower building podium to reinforce a human-scale at the streetscape, and to clearly distinguish between the upper and lower building elements.

4. Opportunities to provide a small plaza at the rear of the site to provide attractive outdoor space for those who work in the building, and nearby.

5. Parking should be accommodated underground with access provided at the rear of the site, via the existing laneway. This parking should serve both the David Braley Health Science Centre, as well as the new mixed-use building, and it is anticipated that two floors of underground parking will be required.

6. Servicing and loading should be accommodated at the rear of the site, via the existing laneway.
Off-Campus Site: King and Bay Street
Ron Joyce Centre, Burlington

The Ron Joyce Centre is located at 4350 South Service Road, in Burlington (just off the Queen Elizabeth Way). This is a 4-storey academic building that hosts the DeGroote School of Business, including a variety of classrooms, meeting spaces, and lecture facilities. The site is large, and with the potential to consolidate with the property to the west, presents opportunities for a new development.

Considerations should include:

1. Transformation of the fourth floor (underway) from a shelled space into a floor for research focused interdisciplinary work (Digital Management and Health Management at the School of Business).
2. Explore the potential for a comprehensive development with the vacant land to the west.
3. A new academic building, similar in size to the DeGroote School of Business, that provides a mix of classroom, meeting, and lecture space as determined by the University’s needs.
4. Maintain the existing scale established by the DeGroote School of Business, up to 5-storeys. This is permitted under the existing zoning (BC1) which has no maximum height requirement.
5. Parking located at the side and rear yard.
6. A clear, safe walkway provided between the DeGroote School of Business and any new development to facilitate synergies between the buildings and their programs.

7. Opportunities for permeable paving, bioswales, and other LID elements should be implemented to minimize the impacts of surface parking.

8. Opportunities for above-grade structured parking should be explored.

9. Additional planting along South Service Road to buffer noise from the Queen Elizabeth Way.

**MacForest**

MacForest is a 115 acre forest area located at the intersection of Wilson Street East and Lower Lions Club Road. It is located within the Greenbelt Area in the Growth Plan for the Greater Golden Horseshoe (Schedule 2: Places to Grow Concept), and is designated an Escarpment Natural Area and Escarpment Protection Area in the Niagara Escarpment Plan (Map 2). In the City’s Official Plan, this area is recognized as a Local Natural Area Environmentally Significant Area (Schedule B-6).

Currently the site is being used for teaching in Science and Fine Arts. Subject to the appropriate approvals, this site has been identified as a desirable location for a small building to facilitate on-site educational opportunities.
Section Five
Implementation

5.1 Phasing Strategy/Capital Planning

The recommendations of this master plan update provide a long-term vision for the campus, and are subject to the University’s needs and prioritization as outlined in the Facility Services Five Year Capital Plan (A Future Outlook). In addition, the implementation of these recommendations are pending the approval of funding. Some of the recommendations are already underway, while others have been identified for immediate funding. Other recommendations have no specific timing and it is anticipated that they may not be implemented for several decades (or possibly not at all), and will be subject to additional study, consultation and coordination with partners, and University needs/funding availability.

In addition, the University should budget for and undertake landscaping in open spaces in keeping with the objectives and priorities outlined in Section 3.6 (particularly Priority Directions 1 and 2).

The following sections prioritize the key recommendations of the master plan to align with the capital plan, and ensure funding is applied in a clear and organized manner. It does not represent all on-campus projects, but only those that relate to the master plan.

Ongoing Project and Initiatives
- Design and construction of the Gerald Hatch Centre for Engineering Experiential Learning (30,000 square feet)
- Completion of the Living and Learning Centre (Academic/Residence/Admin/Children Centre)

Major Projects (Planned Projects and Initiatives)
The following projects are integral to the campus master plan, but are mostly unfunded. They address the most critical space needs at McMaster University, based on the Campus Capacity Study, and include administrative offices, graduate student offices, assembly facilities, service space, classrooms, research space, recreation space, and quiet study space.

High Priority Projects (Externally Funded)
- Development of the mobility hub buildings and open spaces in tandem with construction of the LRT and realignment of HSR circulation along Main Street, Sterling Drive and through campus

Projects to be Considered/Approved for Central Bank Funding and/or Fundraising in the Near Future
- Design and construction of addition to DeGroote School of Business (80,000 square feet)
Projects to be Considered when External Funding is Available

- Design and construction of new Academic Building (200,000 gross square feet) to replace T13, along with new plaza and landscaping along Main Street
- Mills, Thode and Innis Library renovations and expansions

Medium-Priority Projects
Medium-priority directions focus on campus beautification, improvements to campus circulation and transit access, and development of some off-campus sites. They should be addressed as funding becomes available.
Recommended medium-priority directions include:

- Establish Secondary Entrance at Cootes Drive and College Crescent, as well as the adjacent welcoming facility/information kiosk
- Enclosure of the Arts Quad
- Design and construction of addition to Campus Services Building (10,000 square feet)
- Convert the north section of College Crescent (parallel to Cootes Drive) to a pedestrian-only street
- Upgrades to paving, seating and landscaping in the Mall
- Improvements to MUSC Quad
- Introduce interim cycling facilities throughout campus
- Tree planting along the eastern edge of the Oval and along Forsyth Avenue
- Tree planting along Main Street (double row of trees)
- Establish new right-out access at Forsyth Avenue
- Upgrade pedestrian streets along University Avenue, Scholar’s Road and College Crescent, including formal cycling facilities throughout campus
- Addition to the west edge of the hospital to activate University Avenue
• Redevelopment of the site to the south of the David Braley Athletic Centre

• Establishment of MacMarsh and upgrades to the adjacent parking lot (Lot M) to minimize stormwater run-off

• Re-location of the Biology Greenhouse to the south side of the Life Sciences Building

Low-Priority Projects
Low-priority directions focus on the development of infill buildings throughout campus, and will be undertaken as space needs warrant and as funding becomes available.

Recommended low-priority directions include:

• Development of remaining infill sites throughout the main campus, including those outlined in the Athletics and Recreation Master Plan (Perkins + Will, 2016)

• Improvements to the western campus edge, along Cootes Avenue, in association with the redevelopment of the existing GO station area

• Development of the West Campus, including
  - New buildings;
  - The West Campus Quad in concert with new buildings to provide outdoor space for students, faculty and staff;
  - New streets and parking areas; and,
  - Open spaces, including relocation of the baseball diamonds
5.2 Master Plan Communication Plan

The University’s website should be the central destination for information related to the master plan update and implementation progress. The website should contain summarized information about the key recommendations and priority directions, for quick reference, as well as any information on implementation projects, as they arise.

The University should ensure that Campus Builders (i.e. developers and consultants) that will be directly involved in implementation of the priority directions, projects or coordination with partners are fully briefed on the entire contents of the master plan and update. Key groups may benefit from targeted information sessions.

Partners, including Hamilton Health Sciences and the Royal Botanical Gardens, who are engaged to work on campus should also be provided with the detailed master plan update document.

5.3 Partnership Opportunities

A number of partners will be involved in achieving the objectives and priority directions of the master plan update. Key issues to be coordinated with partners are outlined below.

Hamilton Health Sciences and Emergency Services
- Improved access to the hospital and Main Street parking garage with redirection of non-hospital traffic away from the Main Street entrance
- Relocated helicopter pad and modified flight paths in the West Campus
- Removal of College Crescent between the mobility hub and Scholars Road.

City of Hamilton
- New Secondary Entrance at College Crescent and Cootes Drive and reduction in use of Main Street entrance by non-hospital traffic
- Providing right-out access to Forsyth Avenue from Main Street.
- Removal of Sterling Street median and reconfiguration of bus circulation

- Amendments to Zoning By-Law 6593 to allow heights beyond the existing 2-storey maximum to implement infill opportunities in the West Campus
- Streetscape upgrades along Main Street, Cootes Drive and Forsyth Avenue
- Connecting on-campus cycling routes to those at the edges of campus, including appropriate crossings
- Future redevelopment of the site to the north of the David Braley Health Science Centre and any facilities planned for MacForest

Hamilton Street Railway, City of Hamilton and Metrolinx
- Reconfiguration of bus circulation with a new terminal at the mobility hub and a dedicated transit turn-around at the Sterling Street entrance
- Relocation of GO Transit services to the mobility hub
- Design and implementation of the LRT, including stop locations and design
Niagara Escarpment Commission, Royal Botanical Gardens and Hamilton Conservation Authority
Though the West Campus is beyond the jurisdiction of the NEC and the HCA, consultation prior to redevelopment should be undertaken given the proximity of this site to the Ancaster Creek floodplain and the Niagara Escarpment. Potential facility or trail development in MacForest should also be undertaken in consultation with the NEC and the HCA.

The Royal Botanical Gardens should be consulted on any new signage or connections to the trails on its property. Potential partnership opportunities may be explored to utilize the Royal Botanical Gardens property for low-impact academic programming.

SoBi Hamilton
• Additional stations located at the mobility hub and the West Campus

Neighbourhood Partners / Resident Associations
• Consult prior to the development of new infill sites on the north side of Sterling Street opposite L.R. Wilson Hall and east side of Stearn Drive opposite the Oval
• Tree planting along the eastern edge of the Oval

City of Burlington
• Potential redevelopment of the site adjacent to the Ron Joyce Centre
5.4 Future Studies and Projects

The following additional studies will be required to move forward with the priority directions and recommendations contained within the master plan update.

Campus Capacity Study
In 2011, a Campus Capacity Study was completed to understand current physical capacity and uses, plan for potential future space needs and optimize space utilization. This study requires updating, with a particular focus on student lounge, social and study spaces.

This master plan update identifies locations for future infill and intensification sites, but the capacity, specific uses and allocation of space within these sites, as well as phasing of site development, should be guided by the updated Capacity Study.

Signage and Wayfinding Strategy
Improvements to signage and wayfinding have emerged as a major priority in the master plan update. An updated Signage and Wayfinding Strategy will enhance the campus experience for students, faculty and staff, as well as visitors, tour groups, conference attendees and delivery vehicles.

A simple, recognizable wayfinding and signage system will reduce confusion and enhance safety on roadways and at campus entrances. Reducing signage clutter will also contribute to beautifying the campus and creating a visual brand for the University.

Considerations should include:
- Digital/interactive versions of physical wayfinding tools - physical maps at key locations on campus as well as a wayfinding application
- Wayfinding to identify accessible entrances and routes

Public Art Strategy
The University should develop an overall Public Art Strategy to guide the selection and siting of public art throughout campus, both indoor and outdoor. An important opportunity exists to partner with, and draw on, the expertise and resources of the McMaster Museum of Art.

This Strategy should ensure that art is selected and sited appropriately for its location, that it will be adequately cared for, and that it reflects the University’s image. It can also provide the opportunity to showcase student and local Hamilton artistic talent.

Parking Needs Assessment
A high level Parking Strategy is provided in Section 3.4. In light of the increasing size of the McMaster University community, and changing commuting patterns, parking needs should be regularly reassessed as new buildings are planned/constructed. Parking assessments should consider existing parking facilities (at the time of completion) current modal-split (including cycling, LRT, and bus), and planned development projects.

It should also consider:
- Short-term vs. long-term parking needs
- Pick-up/drop-off and loading areas
- Accessible parking provision
- Bicycle parking locations/needs (see Section 3.5, Priority Direction 6)
- Feasibility of underground parking vs at-grade (within the building) for infill sites
- Demand based parking rates
College Crescent (Window Road) Removal Study
Section 3.7 recommends the removal of the portion of College Crescent that runs parallel to Cootes Drive. Prior to removal of this road, the University should undertake a detailed study to confirm frequency of use, and the impacts of removal in the context of the new Cootes Drive access.

Detailed Design for Campus Spaces
As major campus spaces are constructed, or reach the need for updating or redesign, detailed design should be undertaken on a site-by-site basis. Key spaces/elements that should undergo a more detailed design process, guided by the objectives and priorities contained in the master plan update, include:

- MUSC Quad
- The Mall
- Arts Quad Atrium
- Campus Store Entrance
- Pedestrian Priority Streets
- Cycling Routes

5.5 Plan Review Process
This master plan update reflects the University’s current needs and priorities and captures changes within the City and on campus since the previous update in 2008. However, since it is a long-term plan, it is important that the recommendations continue to respond to evolving realities and changing priorities.

It is recommended that the master plan continue to be updated every 5 to 10 years to capture both minor refinements and more significant changes to University needs and priorities, and changes within the City of Hamilton.
Section
Appendix

i. Potential Mobility Hub Plan
ii. McMaster Transportation Assessment
iii. Nineteen Considerations for Future Planning
iv. Consultation/Stakeholder Findings
i. Potential Mobility Hub Plan

The following plan was developed over the course of the study and represents one way in which the mobility hub can be developed to achieve the principles and objectives of this plan.

Key elements of the plan include:

1. An anchor transit hub building on Lot I.
2. A ‘welcome centre’ on Main Street.
3. A unique, above-grade park that mitigates the impacts of the transit circulation.
4. An academic building on the south side of College Crescent.
5. Structured parking provided in each of these buildings to offset parking lost to redevelopment.
6. A new connection to Cootes Drive from College Crescent.
7. An enlarged and improved ITB/IAHS Quad.
8. Upgrades to Brockhouse Way to provide a continuous, pedestrian-focused connection between Main Street and College Crescent.
iii. Considerations for Future Planning

Since completion of the 2008 campus master plan update, Facility Services has been receiving feedback on the physical design and development of the campus. This includes input from students, faculty, staff, and alumni, and has resulted in a series of considerations for future planning. This feedback is reflected throughout the plan, and a detailed overview of the considerations (including their references in the document) can be found below.

Specific Spaces

Light Rail Transit (LRT) on Main Street
As part of Metrolinx’s regional transportation plan, The Big Move, $1 billion is being invested in LRT along Main Street, from McMaster University to the Queenston Traffic Circle. This LRT line will have a transformative impact on both Main Street, and McMaster University, promoting an interface that extends the University’s frontage outwards, and inviting members of the community to explore the campus.

This LRT line, and the associated mobility hub, significantly impact the master plan update.

Primary References:
• 1.2 Campus Context
• 2.1 Campus Vision Statement
• 2.3 Master Plan Overview
• 3.2 Vehicle-free Core Campus

MUSC Expansion
The MUSC Feasibility Study looked at opportunities to expand the ground floor of MUSC to improve functionality and pedestrian flow.

Primary Reference:
• 4.3 Core Campus (Priority Direction # 5)

Campus Store Entrance Re-Theming
Given the recent death of a tree at the northwest corner of the MUSC Quad and Campus Store entrance, an opportunity was identified to potentially re-theme this area. In the master plan update, this is considered as part of a larger update to the MUSC Quad.

Primary Reference:
• 4.3 Core Campus (Primary Direction # 6)

Arts Quad Enclosure
Given that it is framed by buildings on all four sides, the Arts Quad is an opportunity for creative infill, and the development of a flexible, multi-use atrium space. This vision has been adopted as part of the master plan update.

Primary Reference:
• 4.3 Core Campus (Priority Direction # 7)
• 5.1 Phasing Strategy (Short-Term)
• 5.4 Future Studies and Projects (Detailed Design for Campus Spaces)

Off-Campus Holdings
McMaster University has a significant amount of off-campus holdings. While the plan focuses on the Main Street campus, efforts have been made to address three off-campus sites with significant development potential, including: King and Bay Street (Downtown Hamilton), the Ron Joyce Centre (Burlington), and MacForest. Off-campus consultation was also undertaken as part of this study.

Primary References:
• 1.4 Consultation Overview (Off-Campus Sessions)
• 4.8 Off Campus Sites
• 5.3 Partnership Opportunities (City of Hamilton, City of Burlington)
The Oval
The master plan update considers opportunities to increase use and awareness of The Oval while limiting impacts on the adjacent neighbourhood.

**Primary References:**
- 4.5 The Oval
- 5.1 Phasing Strategy (Short-Term)

Library Master Space Plan Report
In July, 2015, a Master Space Plan was completed for the University’s libraries. As an internal master plan, this document has little impact on the campus-wide master plan with the exception of a small addition proposed for the Innis Library.

**Primary Reference:**
- 3.3 Infill and Intensification (Infill Site AA)

MacMarsh
Due to its location adjacent to the Ancaster Creek flood plain, a large area in the West Campus has been identified as an opportunity for in-situ education and studies related to biodiversity. This area, known as MacMarsh, has been integrated into the master plan update.

**Primary References:**
- 2.3 Master Plan Overview
- 4.7 West Campus (Priority Direction # 6)
- 5.1 Phasing Strategy (Medium-Term)

MacForest
MacForest is a 115 acre forest area located near the intersection of Wilson Street East and Lower Lions Club Road. Subject to the appropriate approvals, this site has been identified as a desirable location for a small academic building.

**Primary References:**
- 4.8 Off Campus Sites
- 5.3 Partnership Opportunities (City of Hamilton, NEC, HCA)

New Greenhouse Location
The Faculty of Science has been exploring new locations for a Biology Greenhouse on the campus. This was considered in the master plan update and a location selected based on discussions with relevant stakeholders.

**Primary References:**
- 4.3 Core Campus (Priority Direction # 8)
- 5.1 Phasing Strategy (Medium-Term)

General Planning
Pedestrian Safety
Addressing pedestrian safety is an ongoing and evolving consideration at McMaster Campus, and is addressed throughout the Master plan update.

**Primary References:**
- 2.2 Design Principles (Principle 3; Principle 7)
- 3.1 Campus Entrances
- 3.2 Vehicle-free Core Campus
- 3.5 Cycling
- 4.4 Sterling Street Entrance
- 5.4 Future Studies and Projects (Signage and Wayfinding Strategy)

Building Intensification
Many of the infill sites identified in the master plan are challenging for development, given their location, policy context, and/or access. As McMaster requires new space, the option to develop these locations should be balanced against opportunities for the intensification of existing lower-density (i.e. 2-storey) buildings that could be expanded upon and/or may be nearing the end of their life cycle, and that better achieve the development objectives.

**Primary References:**
- 2.1 Campus Vision Statement
- 2.2 Design Principles (Principle 1)
- 2.3 Master Plan Overview
3.3 Infill and Intensification

3.4 Parking Strategy (Priority Direction # 1)

4.1 The Mobility Hub (Priority Directions # 1, 2 and 4)

4.2 University Avenue/Main Street Frontage (Priority Directions # 1 and 3)

4.3 Core Campus (Priority Directions # 4 and 7)

4.4 Sterling Street Entrance (Priority Direction # 5)

4.6 North Campus (Priority Direction # 1)

4.7 West Campus (Priority Directions # 1, 2 and 3)

5.1 Phasing Strategy (All Phases)

5.3 Partnership Opportunities

Lounge/Student Study Space
A proposal was submitted for FWI funding, co-sponsored by the MSU, Alumni Advancement and Athletics and Recreation, that involved conducting an assessment of student-focused space on campus. There was support for the project. This was considered further throughout this plan, and a number of opportunities have been identified to accommodate study/lounge space, while a more detailed study is recommended as part of the Campus Capacity Study Update.

Primary References:
- 2.2 Design Principles (Principle 11)
- 3.3 Infill and Intensification (Priority Direction # 8)
- 4.1 The Mobility Hub (Priority Direction # 2)
- 4.2 University Avenue/Main Street Frontage (Priority Direction # 3)
- 5.4 Future Projects (Campus Capacity Study)

Community Partnerships
McMaster University is well-used by members of the Hamilton community, particularly those attending sporting events, summer camp groups, and local residents who walk/run through the site. The University is committed to maintaining its role as a community partner, including:

- Encouraging public events and partnerships
- Open houses for key campus events
- A welcoming ‘front door’ and Secondary Entrances
- Clear wayfinding and signage throughout campus
- A ‘welcome centre’ and information signage

Primary References:
- 2.1 Campus Vision Statement
- 2.2 Design Principles (Principle 6)
- 3.1 Campus Entrances (Priority Directions # 3 and 4)
- 3.8 Signage and Wayfinding (Priority Direction # 4, 5 and 6)
- 4.1 The Mobility Hub (Priority Direction # 2)
- 4.2 University Avenue/Main Street Frontage (Priority Direction # 2)
- 5.1 Phasing Strategy (Short-Term and Medium-Term)
- 5.3 Partnership Opportunities (Neighbourhood Partners/Residents Associations)

Landscape Beautification
In addition to formal open spaces, gardens, and landmark landscape features, there is interest in general campus-wide beautification.

Primary Reference:
- 2.1 Campus Vision
- 3.6 Open Space and Landscaping (Priority Direction # 1)
- 3.7 Campus Edges (Priority Direction # 5)
- 5.1 Phasing Strategy (Short-Term)
Naming/Theming of Open Spaces
The University needs a documented process to govern the naming/theming of spaces and features, including installation of statues, gardens (memorial or otherwise). The master plan recommends a formal process be established, and provides an outline of the items that should be considered.

Primary References:
- 3.6 Open Spaces and Landscaping (Priority Direction # 2)
- 5.4 Future Studies (Detailed Design for Campus Spaces)

Planning/Zoning Implications
One of the most practical elements of the 2008 master plan was the planning/zoning section, which outlined the impact of the Niagara Escarpment Commission, Hamilton Conservation Authority, and the City of Hamilton on campus development. The master plan update provides similar guidance, including a reference table outlining the zoning implications of the proposed development.

Primary References:
- 3.3 Infill and Intensification (Rationale; Planning and Zoning Implications)
- 5.3 Partnership Opportunities (Niagara Escarpment Commission, Royal Botanical Gardens and Hamilton Conservation Authority)

9m Smoking Policy
Facility Services has received requests to limit smoking within 9m of all building entrances.

Primary Reference:
- 3.6 Open Space and Landscaping (Priority Direction # 10)
Consultation/Stakeholder Findings

The campus master plan update was founded on ongoing engagement and collaboration with the campus community, including students, faculty, and staff.

Key findings of this engagement included:

Visioning Stations (November 3 and December 3, 2015)

Buildings and Development
1. Protect the historic character of the campus
2. Frame the campus edges with new buildings
3. The West Campus is currently underutilized
4. The North Campus is currently disconnected from the rest of campus

Access and Circulation
5. Strengthen the University’s commitment to a pedestrian-focused campus
6. Improve cycling facilities and safety
7. Increase connections to adjacent trails
8. Provide more efficient and convenient parking

Open Space
9. Provide a variety of open spaces
10. Provide flexible open spaces
11. Enhance ‘The Mall’
12. Upgrade existing Quads
13. The Oval is currently underutilized
14. Provide better connections to adjacent natural features

Wayfinding
15. Improve wayfinding (directional and informational)
16. Reinforce campus entrances

Sustainability
17. Sustainability should be a key focus of the plan

Accessibility
18. Accessibility should be a key focus of the plan

Design Charettes (January 14th, 2016)
1. Enhance campus experience for research partners, recruitment, tours, and events
2. Provide alternative large, flexible gathering space (i.e. permanent pavilion)
3. Prioritize approach to short-term parking/drop-offs
4. Locate parking under all new buildings
5. Enhance and integrate wayfinding (i.e. technology)
6. Re-establish information kiosks across campus
7. Provide a mix of uses in Mobility Hub (e.g. classrooms, recreation, fitness, student lounge)
8. Create a stronger presence on Main Street
9. Maintain and enhance recreational focus in the North Campus
10. Establish West Campus as self-sufficient campus (i.e. Research Hub)
11. Establish cycling and ‘no cycling’ routes; strategic locations for bike parking and SOBI

12. Explore locations for an arena and/or outdoor skating rink

13. Provide a range of furniture in key public spaces (e.g. flexible seating, tables, outdoor fitness)

**Stakeholder Interviews**

**Office of Sustainability**
- Parking is a key issue (3500 spots for 8000 cars according to TDM study)
- There are lots of cyclists and facilities now, but could be improved (e.g. new parking areas and facilities, regular events, etc.)
- Would be helpful if University paid for faculty transit passes
- McMaster is a certified Bronze Smart Commute Workplace (Provincial program by Metrolinx)
- McMaster has 60% waste diversion
- McMaster has a District Energy System, but not on West Campus
- Gamification is recommended to get people involved in campus sustainability
- Signage should include a feedback loop about usage

**McMaster Museum of Art**
- Museum is a top University gallery and can borrow from AGO
- 52% of users are from campus
- Insufficient parking for visitors (visitor garage at York U as precedent); metered (i.e. 1 hour) parking nearby would be preferred (i.e. 10 spaces)
- Better signage on campus would be helpful
- The Museum does not deal with art on campus, but would be interested as they are the experts (i.e. Art Committee or Public Art Strategy)
- Would like to see additional campus art tied throughout and relating to museum
- Art helps create great spaces which leads to donors
- Small space near MUSC Quad reserved for ‘Artists Gardens’
McMaster Biology Greenhouse

- There are significant synergies between the Biology Greenhouse and RBG
- The area identified to the south is preferred
- A competition is underway to design this facility
- Current size is ~92m²; desire is for ~200m² (100 for Greenhouse, 60 for Research, and 40 for Teaching)
- Rectangle is best shape for convenient access
- Associated atrium would front The Mall and could be café (students and hospital), transit stop, etc.
- Cost = $3 million (1 for Greenhouse, 2 for Atrium) – need funding from Advancement
- The sun at the existing location is great and would be happy to maintain location with new facilities
- Full time staff is not required, particularly with teaching space on site
- Undergraduates are primary visitors; Users depend on timing (i.e. more off-campus users for significant events) and there is a strong local community
- Opportunities to improve Indigenous experience on campus (i.e. teaching Indigenous Peoples to grow blueberries)
- Parking is an issue for visitors
- Improved signage would be helpful
- MacForest is a Smithsonian Forest (every plant is tracked)
- Potential for a building here is in Province’s hands
- Faculty are active at the MacMarsh; Restoration here (i.e. parking lot edge) reflects parkland not natural preservation

McMaster Library

- The library is okay with not enclosing the MUSC/Library Quad as the Arts Quad is currently underutilized and could use the boost (students don’t want to lose outdoor spaces)
- Cycling/skateboarding through the Quad should be addressed (i.e. require dismount) and enforced
- Quad is rarely full
- It would be better used if it were more attractive and a focal point for events; More seating, and more comfortable (i.e. warmer) design, would be preferred
- Tables and chairs for eating would be nice (flexible and movable during events)
- Grates in Quad currently get clogged up with cigarette butts
• Major work is required on the entrance as identified in the Library Master Plan
• Connectivity to MUSC is difficult at the ground level due to heat/energy loss with too many access/egress requirements
• Entrances are not accessible (i.e. MUSC doors get locked during high winds because they do not close properly)
• Signage for the library is poor; No connection from parking lots and unclear from south side; Signage at loading dock should identify library (not MUSC)

**McMaster Campus Store**

• A new Campus Store would be useful at Mobility Hub depending on services offered (and nearby competition, agreements and traffic)
• The Campus Store has the ability to sell food and snacks
• Have a small location in the Sports Centre, but it is not self-sustaining
• eCommerce is a key focus of business model and could use more pick-up locations
• Attracted external shoppers when parking was easy but this is no longer a reality
• Need the entrance to be more visible within the MUSC/Library Quad including outdoor displays and tie-ins with events

**Security Services**

• Parking and speed on Stearn Drive is an issue, particularly with people getting ‘stuck’ on campus following a game
• Security at Living and Learning Centre is under discussion (i.e. base vs. premium)
• Parking is an issue throughout campus; the re-naturalization of the Lot M edge removed 100 parking spots
• There is a desire to update the trenches in Lot M with bioswales
• There is a City pumping station at the end of Westaway Road that requires access
• The campus runs on a District Energy System and the infill site near the President’s house needs to be mindful of underground infrastructure
• There is a desire to have security services re-located to the North Campus where they will be more central
• A new focus for Campus Security will be to be more visible on campus
• There is a formula for determining the Visitor Parking vs. Transponder Parking (visitor spots make more money, which is factored into this formula)
Health Sciences

- Bus access to the Health Sciences would be nice, but in the past this has damaged the structure of the garage through collisions
- Would like to see the area to the north (between the building wings) beautified
- Health Sciences leases the land from McMaster for $1
- The helicopter pad is being upgraded this summer
- Ambulances from helicopter pad are very rare (emergencies go to City Hospital); When needed, they come to Cootes/Main not College Crescent
- Health Sciences will look into whether an addition could be supported on the parking garage
- Consider opportunities to soften west edge of hospital with improvements to University Avenue

Royal Botanical Gardens (RBG)

- Water management is a key concern of the RBG; there is currently a broken drain pipe that is eroding the ravine
- It was questioned whether the University drains into this or if it is a direct connection from Main Street
- Impervious surfaces on campus is the preferred way to reduce surface run-off
- RBG and McMaster are currently preparing a Memorandum of Understanding related to use between the two facilities
- Signage and access are the two most important issues when dealing with University users utilizing the RBG property
- RBG is able to create its own by-laws and the is currently a by-law that governs usage (i.e. running on the trails is technically illegal)
- The RBG struggles with the scale of the campus; there are so many users directly adjacent to their property that it’s difficult to control usage
- There are provincially endangered species located directly on the RBG/McMaster boundary line
- Landscape design is the best way to control use, including the inclusion of very clearly defined paths (on McMaster land) and avoiding ‘corners’ where users are likely to veer off path
- The nodes between McMaster and RBG should be upgraded and improved with trail head signage, wayfinding, informational signage, etc. There is trail head signage at two of the entrances now, but there should be one at the primary entrance as well (north of Lot H)
- There are some instances where McMaster has built stuff (unintentionally) on RBG property and this should be settled in the future
- The trail that runs behind the residences is a pilot project (2-years) to determine the implications of designated trail access
- Access should generally be limited to the current three locations and where access is not appropriate (for natural heritage reasons) signage is encouraged (both by-law and educational)
- The biggest problem for RBG is students drinking and partying (who end up trampling plants)
• There are a number of programs that want to use the RBG land (i.e. Anthropology, Fine Arts, Biology); if done correctly, the primary entrance at Lot H could be a good opportunity to accommodate these uses

• Both McMaster and RBG use the RBG lands to run summer camp programs; often, McMaster uses it without registering or providing RBG with fees; a formal system should be established to ensure proper use of the area (similar to rbg.ca/uniportal site)

• There is a large public parking area owned by RBG near the Aviary; McMaster staff will park here and walk to work to save money over on-campus parking

• There are approximately a dozen sites within RBG that have archaeological significance

• Through VP Baker, PACNL has circulated a campus-wide survey to faculty and staff about how they use the RBG property; this will help to determine appropriate measures going forward

• Campus security help within the RBG property is welcome

• The area just north of Lot H is a tail-gate party area during football games which often results in bottles, furniture and garbage on RBG property

• The lighting from the stadium can be hazardous to wildlife species living in the RBG properties

• There is an area in the north of the RBG property that is being designated an ‘Urban Star Park’

• There are sound concerns on RBG property, including Faculty Hollow speakers during orientation week

• On occasion, helicopters fly very low over the RBG property which may result in bird collisions

• The University’s district energy facility is sometimes dangerous for wildlife who get through the fence but can not get back out

• Spencer Creek and Ancaster Creek are wildlife corridors from the RBG property; fencing has been installed to direct animals under the bridge at Cootes Drive

• Mississauga’s of the New Credit may have an interest in the land and we should follow up with them; there may be an opportunity for signage to celebrate migratory trails, etc.

City of Burlington (Transportation)

• The alignment for the LRT line will be announced on May 2nd

• The plan is for it to stop in the middle of the road

• About 12 to 15 bus bays will be required within a mobility hub to accommodate all modes of transit

• It was questioned how many people currently use Forsyth Avenue as a ‘cut-through’ and how many people use the Main Street intersection

• HSR would prefer a direct route out of the mobility hub, possibly between Main Street and College Crescent (at Cootes Drive); this would depend on discussions with the City’s Transportation Department; HSR could live with using College Crescent if needed

• Main Street will change in capacity with the LRT including two lanes in each direction with a cycle track on the north side

• The City will also be closing a lot of pedestrian intersections in order to facilitate quicker movement for vehicles once Main Street is re-configured for the LRT
• The channelized right-turn at Cootes Drive will be removed, consistent with the Master Plan to date
• The goal in the end is a plan for the campus, Main Street, etc. that works for McMaster, HSR, GO Transit, etc.
• The City has determined conceptual long-term routes for transit, but these won’t be finalized for many years
• A connection to College Crescent, as proposed in the plan, already exists but has been closed in the past
• Any transportation changes to the campus will need to consider the implications on Westdale and local schools
• There were questions about trip distribution and the increase with the changes to the campus and LRT on Main Street; MMM Group has been providing high-level analysis of this
• The bridge over Cootes Drive is nearing the end of its lifespan and could be enhanced to create a better conditions for those crossing Cootes Drive; it was suggested that this could become an at-grade entrance as traffic is slowed through changes to the campus
• The ownership of the bridge was unsure but McMaster has invested a large amount of money into it over the years