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То:	University Planning Committee
From:	Jeremiah Hurley, Dean, Faculty of Social Sciences
Date:	January 31, 2022
Re:	Creation of an Indigenous Studies Department

Below please find a proposal for the creation of an Indigenous Studies Department in the Faculty of Social Sciences. The Faculty of Social Sciences currently hosts the Indigenous Studies Program, which offers BA and Hon BA degrees in Indigenous Studies. The Indigenous Studies Program is staffed by Indigenous faculty who hold full-time appointments in home departments in the Faculty of Social Sciences and Humanities, with teaching obligation to the Indigenous Studies Program. The proposal was prepared and submitted to me by members of the Indigenous Studies Program, as represented by the Acting Director, Dr. Adrianne Xavier. As the proposal describes well, the creation of an Indigenous Studies Department, which would be home to the Indigenous Studies Program and a planned new graduate program, is the culmination of decades of work building Indigenous Studies at McMaster. The department is a critical element of McMaster's response to the Truth and Reconciliation Commission and represents an effort both the create a more visible Indigenous presence on campus and to provide greater scope for Indigenous self-determination within the McMaster community. Further, this is one component of the recently launched University-wide Indigenous Strategic plan and responds to a specific recommendation from a recent IQAP assessment of the Indigenous Studies Program.

The proposal was developed through considerable consultation with relevant parties and enjoys the strong support of the Provost and the President. The Dean of Humanities has been consulted as it has developed, and the proposal was presented for comment to the Faculty of Social Sciences Dean's Advisory Committee and the Joint Indigenous Administration Consultation Group, both of which enthusiastically endorse the proposal. Finally, it was formally approved by the Faculty of Social Sciences Faculty Council.

I, along with Adrianne Xavier, Acting Director of the Indigenous Studies Program, look forward to discussing this exciting initiative with you.

Proposal for the Creation of an The Indigenous Studies Department January 2022 Submitted to Jeremiah Hurley, Dean, Faculty of Social Sciences

The format for this proposal is in accordance with the format for the Process of Approval for New Programs or Major Changes to Existing Programs of the <u>New and Revised Undergraduate</u> <u>Programs</u> Policy Approved by the McMaster University Senate December 2020, adapted for the creation of a new department rather than an educational program. The headings listed in the above policy are used below (adapted to reflect a creation of a department instead of a new program).

1. Consultations: Broad consultation among faculty members in the development of a draft proposal.

This proposal is the result of faculty discussions and work done by a working group comprised of junior, mid- and senior career level Indigenous faculty, including a mix of new and long-standing McMaster faculty affiliated with the Indigenous Studies Program (ISP). Our ISP Administrator was also a member of this working group. Consultation was also taken up by the Indigenous Education Council (IEC) and was integral to the 2019-2021 Indigenous Education Strategy. At each stage, there was support from faculty, staff, students, and administration with the goal to create a Department of Indigenous Studies (that, as part of its activities, would be the departmental home for the ISP).

2. A meeting involving those proposing the change

There have been meetings with the ISP Faculty, the associated Deans, the IEC and conversation has been initiated with the new Director of the McMaster Indigenous Research Institute (MIRI). Input has also been offered by FSS Dean's Advisory Committee (comprising Chairs and Directors in the Faculty of Social Sciences) and the Joint Indigenous Administrative Consultation Group. Historical documents were referenced to inform current discussions.

3. Consultation with the affected parties

As noted above, stakeholders and interested parties have been consulted.

4. Approval and/or consultation by the following bodies (proposed dates):

Completed: FSS Dean's Advisory Committee: January 20, 2022 Joint Indigenous-Administrative Consultation Group (JIACG): January 20, 2022 Faculty Council of Faculty of Social Sciences: January 27, 2022

Proposed:

UPC: February 9, 2022 Senate: March 9, 2022 Board of Governors April 28, 2022

Appendix A: Rationale for structural change. Attached.

Appendix A

Rationale for structural change

From: Adrianne Lickers Xavier, Acting Director, Indigenous Studies Program (ISP), on behalf of the ISP

To: Jeremiah Hurley, Dean, Faculty of Social Sciences

Date: January 31, 2022

Re: Proposal: Creation of Indigenous Studies Department

This memo provides the background and context for the creation of an Indigenous Studies Department in the Faculty of Social Sciences, which is a natural next step in the growth of the Indigenous Studies Program (ISP) and related activities at McMaster. This Department would be home to the ISP and a planned new graduate program in Indigenous Studies. The following pages describe the origin and expansion of the ISP since it began. This is a proposal on behalf of the ISP. As the Acting Director, let me share the story of this program and its successes and accomplishments. The history is evident and our transition to a department is now more timely than ever.

Evolution of Indigenous Studies at McMaster

Indigenous Studies is a multidisciplinary field of study, drawing on diverse Indigenous thought, theories and methodologies both locally and globally. The field draws upon Indigenous cultures, traditions, languages and philosophy to consider Indigenous knowledge in critical and transformational ways. Indigenous Studies deploys Indigenous-centred thinking and analysis to contextualize the historical, social, political and cultural aspects of Indigenous societies in Canada and globally. This is true of the 'discipline' of Indigenous Studies across Canada.

McMaster's first experience in this area began with the first Drumbeat conference, held at McMaster University in 1989. The event was organized by Indigenous students. The three-day event, co-hosted by the Six Nations Confederacy, marked the beginning of new possibilities for Six Nations and McMaster to increase the presence of Haudenosaunee people on campus. At the time, Dr. Dawn Martin-Hill, then an undergraduate student, requested support to develop courses and to address the needs of Indigenous students at McMaster. Then-President Dr. Peter George, Dr. Harvey Feit, (Professor Emeritus of Anthropology) and Chief Harvey Longboat of the Six Nations Confederacy responded to the call. This resulted in the development of the President's Committee on Native Students. Shortly after, the McMaster First Nations Students Association (MFNSA) was established, with founding President, Marriotte McGregor. In 1992, McMaster University's Indigenous Studies Program was established offering a 3-yr BA degree. That BA program transitioned to a four-year Honours degree program in Fall 2015. Since its inception, the Indigenous Studies Program (ISP) has integrated community-based expertise as an elemental function of its structure. Throughout this development of Indigenous Studies at McMaster, McMaster University has heeded Chief Harvey Longboat's call to support "the Confederacy and raise visibility in both the community and the university which will help all of us"; this has been the ISP's guiding compass for the past two decades.

In supporting Chief Longboat's vision the Indigenous Studies Program has initiated the

development and accreditation of numerous courses focused on supporting and teaching language, culture, and history with an emphasis on Haudenosaunee people. The program is a focal point for McMaster's enhanced commitment to, and support of, Indigenous students. During this time, Indigenous Studies has grown as a discipline, garnering interest from Indigenous and non-Indigenous students alike. Our program continues to maintain strong community relationships to Six Nations as a commitment to honour our inception as a program. We have since diversified our program in terms of course offerings, enrolment, and faculty complement over the last decade. Our curriculum continues to expand with our faculty's successful research programs and expertise, along with Indigenous knowledge experts in our local communities. Our existing areas of strength include: health and well-being, literary and cultural studies, Indigenous ontologies and epistemologies; history; gender studies; policy and governance; Indigenous histories; Indigenous languages; material knowledge production, Indigenous theory and methodologies, Indigenous ways of knowing, and traditional ecological knowledge.

The Indigenous Studies Program is entering its 30th year at McMaster, making us one of the longest-standing Indigenous Studies programs in Canada. During this time McMaster's Indigenous Studies Program has grown in substantial ways. Beginning with zero faculty in 1992, when Indigenous graduate students were the first ever instructors, we have grown to seven cross-appointed full-time faculty. Our four most recent tenure track faculty were hired in the last year. Three started July of 2021 and the current Acting Director will be taking up a tenure track appointment in July 2022.

Growth & Innovation

The core vision of Indigenous Studies is to support the formation of Indigenous Studies as a standalone discipline staffed by scholars that study and engage with Indigenous knowledge systems and societies from within, in ways that promote the resurgence of these systems including their philosophies, epistemologies, identities, political governance, land-based practices, cultures, and languages. It continues to be critical for programs to engage with and expand upon this approach to Indigenous Studies while prioritizing locally focused content and partnerships and continuing to work in collaboration with local Indigenous communities and organizations in mutually beneficial relationships.

We transitioned from a three-year general Bachelors degree program to a four year honours degree-granting program in 2015. Since that time, the Program has experienced substantial growth in our level one introductory courses and our level II courses that are mandatory for either a Minor, Honours or double Honours pathways (see Table 1 below). For our Fall introductory course, INDIGST 1A03, between 2015/16 and 2020/21 enrolment increased from 93 to 243 students (162%). For its winter term counterpart, INDIGST 1AA3, between 2015/16 and 2020/21 enrolment increased from 105 to 193 students (84%). The growth has continued into the Winter 2022 offering with 261 students enrolled. Enrolment in our Level II courses required for entry into the ISP has also increased. For 2M03, between 2016/17 and 2020/21 enrolment in 2MM3 increased from 6 to 25 (310%). Enrolments in Levels II through IV elective courses continue to increase as more students enrol in the introductory level courses and required Level II courses. The total increase in enrolment in ISP courses from 2015/16 to 2021/22 was 85%.

In addition to growing interest among McMaster students, enrolment continues to grow through

recent program innovations such as our ONCAT 2+2 Pathway: Indigenous Studies Programs Partnership to Ladder to Wilfrid Laurier University and McMaster University's Indigenous Studies Bachelor Degree Programs. The Indigenous Studies Program has partnered with the Indigenous Studies Program at Wilfrid Laurier University, and the General Arts & Science programs at Mohawk College and Lambton College, to develop a 2+2 pathway from the college to university. This project is funded by the Ontario Council on Articulation and Transfer (ONCAT). The overall goal of this pathway project is to develop an innovative, collaborative path that allows Lambton and Mohawk (in partnership with Six Nations Polytechnic) graduates to complete Certificate and Diploma level programs with a focus on Indigenous Studies that will ladder to an Honours Indigenous Studies degree (or a Combined Honours in Indigenous Studies and Another Subject BA) at McMaster University (or Social and Environmental Justice and Indigenous Studies degree programs at Wilfrid Laurier University). Opportunities to engage additional partner institutions, including Conestoga College, are being explored.

This partnership will engage both local Indigenous peoples and non-Indigenous peoples as it creates pathways through curriculum development and prospective student participation. It will enhance student mobility, expand transfer opportunities, and create a seamless pathway that reduces mobility barriers for Indigenous students in the Sarnia-Lambton and Hamilton areas. Our institutional MOUs with Mohawk and Lambton grant full credit for two years of college study to achieve a laddered entry into year three of the Indigenous Studies Program at McMaster. This innovative academic program will see a structured pathway for more accessible learning opportunities for Indigenous Studies students as well as an increase in enrolment into our Program. This pathway comes into effect for college-level learners in Fall 2022.

The recent 2019 IQAP review of ISP highlighted two factors with respect the complement of ISP faculty at McMaster. First, growing program and course enrolments call for an expanded faculty complement: "The full-time faculty complement warrants enhancement in order to ensure that students doing an honours thesis receive proper support". The recent growth in the complement of ISP-affiliated faculty at least partially addresses this first concern. Second, the review highlighted a tension, especially with respect to tenure and promotion, created by a structure in which Indigenous faculty must be appointed in a traditional Social Science or Humanities disciplinary departments. The IQAP reviewers noted: "There is a need to build greater recognition on the part of the ISP faculty members' home departments the breadth and types of activities that constitute Indigenous scholarship, more specifically that it is not limited to academic publications", and "Tenure and promotion criteria need to be made more flexible in order that the kinds of vital research in which ISP faculty engage are recognized". Even when such Indigenous scholarship is recognized, however, Indigenous Studies faculty are still expected to publish in more traditional disciplinary outlets associated with their tenure homes, which can divert from their work developing Indigenous Studies as a distinct discipline. This can produce challenging conditions for Indigenous faculty. The creation of an Indigenous Studies Department would respond directly to these two crucial considerations for Indigenous Studies scholars by expanding the faculty teaching-commitments to the ISP and enabling Indigenous Studies faculty to shape the metrics by which research activities are measured for tenure and promotion, CPM, etc. The long-standing evolution and growth of the Indigenous Studies Program (ISP) at McMaster, dating back over 30 years, indicates the ongoing presence, dedication, and growing need for departmental status. There are multiple points of support for this from: the ISP faculty over the years, the committed and ongoing relationship of the Haudenosaunee confederacy and Six Nations community (MOU's), the 2019 IQAP review; and the Indigenous Education Council's Indigenous Education Strategy (2021).

Current Context

In addition to this McMaster-specific history, events in the external environment also support creation of an Indigenous Studies department. Recommendation 62(ii) of the 2015 TRC Calls to Action calls on [Government] to "Provide the necessary funding to post-secondary institutions to educate teachers on how to integrate Indigenous knowledge and teaching methods into the classrooms." The lack of such funding notwithstanding, McMaster has the opportunity to provide Indigenous scholars a safe and supported space to use Indigenous knowledge and teaching methods in our classrooms. 2021 has seen the announcement of thousands of unmarked burials at Residential Schools and there is a growing awareness of the need on a national and global scale to provide Truthful education around Indigenous Issues. McMaster has been at the forefront of institutions providing space and support for Indigenous Education. The 2021 Indigenous Education Council's (IEC) Strategic directions recommended the transition of ISP to Department status. This priority in the IEC Strategy is a key sign of the desire for self-determination in relation to the ongoing reconciliation efforts at McMaster.

Department status will afford many opportunities within the university to advance Indigenous education and research. As previously noted, current faculty hold appointments in various departments and Indigenous scholars do not have their own tenure and promotion process. Department status would allow for a more specific and relevant process for Indigenous Studies scholars. Incorporating Indigenous ways of knowing and pedagogy will enhance the ability to expand our current program and build a thriving graduate program, another priority articulated in the 2021 Indigenous Strategy. Department status will enable ISP to enhance existing relationships and be equal partners across departments and Faculties. These linkages will give support and strength to Indigenous education and research for both faculty and students. The support and collaboration of departments and programs such as the Indigenous Health Learning Lodge, Midwifery program and others create opportunities to strengthen Indigenous learning across the university. The ability to cross-list classes and work with other programs and departments allow us to increase our social and pedagogical experiences. Department status will also allow an ISD to signify it network of collaborators through, as appropriate, associate appointments. This will in turn assist to grow the relationship with Indigenous community. McMaster's investment in an Indigenous Studies department will enhance ISP and help keep McMaster at the forefront of Indigenous education locally and as a discipline on the national stage. This is the time to ensure that we at McMaster work together to build Indigenous leadership in Canada.

We know from the past and current students that Indigenous learners desire curricula that is relevant to their experience and that they can ground themselves in while transitioning into a post-secondary environment. As well, students are aware that having community knowledge around contemporary issues, tradition, politics and governance, health, gender, and other Indigenous issues will translate into a skill set that will make them well suited for careers in areas such as: Education, Law, Politics, Governance, Social Services, Advocacy, graduate work, and research. Supporting the Indigenous Studies Department is also supporting Indigenous students as there is a greater network of allies on campus (through awareness), and because the curriculum is relevant to their needs, desires, and goals for educations. The department adds the opportunity for activities, relationships and experiences both within the department itself as well as with other departments across the university; meaning more opportunity for students.

Resources

Space: The ISP current is not adequate given the current growth of both students and faculty and that fact that we share space with Indigenous Student Services. No faculty currently have a full-time office in the ISP space; all faculty have an office in their 'home' department. An Indigenous Studies Department will create further demands for space. Faculty desire an office within such a department, we plan to create a graduate program, and undergraduate enrolment continues to increase. We are currently in discussions with the Dean of the Faculty of Social Sciences regarding options to ensure adequate space for a department.

Staffing: We currently have one staff member, the program administrative coordinator. Operating a department will require at least one department administrator and at least one program assistant. We are currently in discussions with the Dean of the Faculty of Social Sciences and the Provost regarding these staffing needs.

Financial: Creation of a department will create new financial requirements. The Dean of the Faculty of Social Sciences, the Dean of Humanities, and the Provost in discussion regarding strategies to ensure the long-run financial sustainability of the department and to share costs appropriate across units.

	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Course Enrolment							
Level 1	241	356	463	354	400	457	420
Level 2	74	116	139	168	162	162	205
Level 3	99	111	134	136	151	147	128
Level 4	9	12	33	37	28	37	32
Total Course Enrolment	423	595	769	695	741	803	785
Program Enrolment (FTE)		17.30	19.66	23.51	27.53	28.00	

Table 1: ISP Student Enrolments, 2015-16 to 2021-22



UNIVERSITY SECRETARIAT Gilmour Hall, Room 210 Board of Governors Senate

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REPORT TO THE UNIVERSITY PLANNING COMMITTEE from the **UNDERGRADUATE COUNCIL**

a. Establishment of Certificate and Diploma Programs

At its January 25, 2022 meeting, the Undergraduate Council received, for approval, the Committee of Continuing Education's plan to establish the Full-Stack Development Program. Details of the program are contained within the circulated report.

- Full-Stack Development Diploma. a.
- Certificate of Professional Learning in User Experience and User Interface b. (UX/UI) Design.
- Certificate of Professional Learning in Front-End Development. c.
- d. **Certificate of Professional Learning in Back-End Development.**

It is now recommended,

that the University Planning Committee approve the establishment of the Full-Stack Development Diploma, as set out in the attached.

It is now recommended,

that the University Planning Committee approve the establishment of the Certificate of Professional Learning in User Experience and User Interface (UX/UI) Design, the Certificate of Professional Learning in Front-End Development, and the Certificate of Professional Learning in Back-End Development, as set out in the attached.

b. Establishment of New Programs

i. **Combined Honours Program, Arts & Science and Sustainable Chemistry**

At the same meeting, the Undergraduate Council reviewed and approved a proposal to establish the Combined Honours Program, Arts & Science and Sustainable *Chemistry* program. Details of the proposed programs are contained in the circulated report.

It is now recommended,

that the University Planning Committee approve the establishment of the Combined Honours Program, Arts & Science and Sustainable Chemistry for inclusion in the 2022-2023 Undergraduate Calendar, as recommended by the Undergraduate Council, as set out in the attached.

ii. Honours Bachelor of Science in Biology – Physiology Core, Molecular Biology and Genetics Core, and the Honours Bachelor of Science in Integrated Science with a Concentration in Sustainable Chemistry Program.

At the same meeting, the Undergraduate Council reviewed and approved a proposal to establish the *Honours Bachelor of Science in Biology – Physiology Core, Honours Bachelor of Science in Molecular Biology and Genetics Core, and the Honours Bachelor of Science in Integrated Science with a Concentration in Sustainable Chemistry* program. Details of the proposed programs are contained in the circulated report.

It is now recommended,

that the University Planning Committee approve the establishment of the Honours Bachelor of Science in Biology – Physiology Core, the Honours Bachelor of Science in Molecular Biology and Genetics Core, and the Honours Bachelor of Science in Integrated Science with a Concentration in Sustainable Chemistry programs for inclusion in the 2022-2023 Undergraduate Calendar, as recommended by the Undergraduate Council, as set out in the attached.

c. Move of Programs between Faculties

 Move of the Honours Biochemistry, Honours Biochemistry- Biomedical Research Specialization, Honours Biochemistry-Biomedical Research Specialization Co-op programs from the Faculty of Science to the Faculty of Health Sciences. At the same meeting, the Undergraduate Council reviewed and approved a proposal to move the Honours Biochemistry, Honours Biochemistry- Biomedical Research Specialization, Honours Biochemistry-Biomedical Research Specialization Co-op programs from the Faculty of Science to the Faculty of Health Sciences. Details of the proposed programs are contained in the circulated report. It is now recommended,

that University Planning Committee approve the move of the *Honours Biochemistry, Honours Biochemistry- Biomedical Research Specialization, Honours Biochemistry-Biomedical Research Specialization Co-op* programs from the Faculty of Science to the Faculty of Health Sciences, and the change in degree designation for the programs from *Honours B.Sc. to Honours B.H.Sc.*, for inclusion in the 2022-2023 Undergraduate Calendar, as recommended by the Undergraduate Council, as set out in the attached.

University Planning Committee: FOR APPROVAL February 9, 2022

2



Continuing Education Academic Program Submission – For Approval

Department & Program Information (complete all fields):				
Program Name:	Full-Stack Development			
Academic Credential:	Diploma			
Name of Representative:	Nathan Cheney, Program Manager			
Effective Date:	2022-02-01			
Date of Submission:	2022-01-11			
Academic Merit (complete	all fields; write "not applicable" as needed):			
Program Overview:	The proposed <i>Full-Stack Development</i> program is designed to prepare students with skills and knowledge to become full-stack developers for websites and online content. This program will provide training across three disciplines in the web design and development: UX/UI Design, Front-End Development and Back-End Development. Students will leave the program with a strong knowledge of the web development language JavaScript, HTML, design best practices and working as part of a development team. This program will highlight the core competencies and skillsets that every full-stack development professional needs in today's workforce.			
Learning Objectives:	 Upon completion of this program, the students will demonstrate the skills in competencies in the following areas: UX/UI Design: Use the design thinking process to better support clients and users Follow the design process to problem solve and develop new products/designs. Work in major design programs like Adobe Creative Suite. Work as part of a design team. Develop mockups/storyboards for design problems Demonstrate a basic understanding of HTML/CSS to work with developers throughout the design process. 			

	7. Apply accessibility and WCAG guidelines for design.
	Front-End Development:
	1 Use HTML to develop the front-end of websites
	2 Develop proficiency in JavaScript coding
	3 Apply JavaScript frameworks
	4 Work as part of a development team
	4. Work as part of a development team.
	5. Use source control software when developing websites.
	nart of the design process
	7 Explain what an API is and how it is incornorated into
	website design.
	Back-End Development:
	1. Demonstrate how a server interacts with a database.
	2. Develop expertise in JavaScript coding.
	3. Demonstrate how to use API software.
	4. Critically analyze the future of full-stack
	development through the lens of AWS and Shopify.
	5. Demonstrate how to run queries from a back-end
	database.
	6. Identify the role and tasks of a back-end developer as
	part of the website development process.
	7. Understand what an API is and how it is
	incorporated into website design.
	8. Apply web development principles to build functioning back-end code.
	The following additional objectives will be threaded within each course:
	 Demonstration of awareness of ethical practices and
	professional standards applicable to a field of
	employment and/or academic study.
	• Exemplification of the knowledge, skills, attitudes
	and behaviours required to work and collaborate
	with people from different cultural backgrounds and
	to develop effective personal management skills.
Meeting Learning	All course learning outcomes in the program will be mapped to
Objectives:	the overall program objectives. The delivery format and
	teaching methods are structured to have a maximum effect on
	achieving the learning objectives.

Program Admission	In compliance with the Certificates and Diploma, admission			
Requirements and Pre-	policy from Undergraduate Council, students who wish to			
requisites	enter the program should meet the following requirements			
	based on their education and work experience:			
	1. Be a mature student as defined in the Undergraduate			
	Calendar of McMaster University; or be deemed an			
	exceptional case by the Centre for Continuing			
	Education			
	2. English Language Proficiency requirements: Completion			
	of TOEFL exam with a minimum acceptable IBT score of			
	86 overall with a minimum score of 20 on each of the			
	four components (Reading, Writing, Speaking,			
	Listening), valid for 2 years			
	3. Students are recommended to have some background			
	in web design and development but it is not required.			
Program Completion	Students who complete all nine courses (27 units) will be			
Requirements:	granted a Diploma in Full-Stack Development.			
Program Delivery Format:	Courses will be delivered online. The online delivery formats			
	will include instructor lectures and/or presentations, group			
	discussions, and individual and/or small group practical			
	application activities. Each course will contain 39 hours of			
	content delivered over 12 weeks.			
Student Evaluations	Student evaluation will be based on application activities,			
(Grading Process):	individual of group projects, tests/quizzes, class participation,			
	or a combination thereof. Where appropriate, evaluations will			
	be structured to evaluate participants level of competency in			
Course Evoluation	achieving overall learning objectives.			
Course Evaluation:	For each course, students will complete an evaluation to assess			
	instruction			
Course Instruction:	Instruction.			
course instruction.	instructors for courses will be selected from a poor of qualified			
	and Undergraduate Council Guidelines for Cartificates and			
	Diplomas soloction will be based on academic background			
	and/or experience within the field Instructors must have a			
	Master's Degree (or equivalent) and significant professional			
	experience and teaching within the field			
Program Advanced	Three transfer credits (3 units) will be accented into this			
Standing	program with no more than one transfer credit in each			
	content area (UX/UI Design Front-End Development Back-End			
	Development). Students will need to have obtained a minimum			
	grade of C+ in each course transferred. The courses must have			

 last 5 years.
heen taken at a recognized post-secondary institution in the

Statement of Financial Viability:

I have reviewed the business case and financial projections which include enrolment projections and costs. Sources of revenue for this program include tuition and supplementary fees (MAPS). Expenses are typical and include significant upfront development and marketing costs, as well as typical ongoing delivery costs (such as payment of facilitators, honoraria for other guest facilitators, materials, advertising and administration).

Lorraine Carter, Director, McMaster Continuing Education

Statement of Administrative Responsibilities:

Statement of Faculty Alignment:

The staffing and systems infrastructure to support the following functions already exists within Continuing Education. Costs will be fully covered by tuition, except the first year of the program, when the startup will be subsidized by Continuing Education. Continuing Education program responsibilities:

- budget development and monetary responsibilities
- program and course development
- course registrations/administration
- supervision of instructors to ensure all required policies and practices are adhered to and course are taught according to program requirements and standards
- Marketing and Promotions

The Faculty of Humanities will act as an academic liaison and is charged with the responsibility of ongoing academic review and assessment of the curriculum. The Faculty's letter of support is included at the end of this document.

Listing of Courses:			
Course Name	Required/Elective	Unit Value	Term
Design Thinking	Required	3 units	Fall 2022

Course Description:

This course will enable students to use design thinking methodology to assess problems and challenges, discover and use relevant data, develop design solutions, and construct prototypes for validation. Students will also learn how design thinking is a valuable mindset and model in today's global and mobile world and why it is quickly becoming an industry-accepted toolset.

UX/UI Applications	Required	3 units	Winter 2023
Course Description			

Course Description:

This application-based course enables students to work with design programs and applications to develop prototypes and mockups for different design challenges. With a focus on modern design tools, students will explore when to use specific programs and how programs can help solve design problems. They will also practice using the tools on real design problems. An introduction to HTML/CSS will prepare students to work within a development team.

The Design Team	Required	3 units	Winter 2023		
Course Description:		•			
This creative, critical thinking	and problem-solving cour	se challenges stude	ents to solve		
industry-related case studies	as part of a design team. I	JX/UI designers cor	nsistently need to		
work as part of a larger team	during the design process	, product integratio	on, usability and		
functionality. Students will r	navigate interpersonal cha	llenges through tea	m building and		
leadership activities while for	cussing on solving design is	sues and problems	for the client and		
user.	0 0 0	·			
Website Development	Required	3 units	Fall 2022		
Course Description:					
This course teaches the princ	iples of designing a websit	e to ensure the info	ormation is		
displayed in a relevant and us	ser-friendly format. Focus	is placed on the ro	le of the front-		
end developer in the design p	process and on skill develo	pment with the to	ols of web		
development, such as HTML	5, Cascading Style Sheets (CSS) and JavaScript	. Students will		
begin coding simple websites	, learn the technical langu	age and develop th	eir skills related		
to front-end website develop	ment.				
HTML and CSS	Required	3 units	Winter 2023		
Course Description:		•			
In this course, there is an in-c	lepth focus on required kn	owledge and skills	in HTML and CSS		
so that students will feel com	fortable in their website d	levelopment work.	Students will		
learn and apply industry-reco	gnized techniques to mak	e a visually appeali	ng, functional,		
and interactive website.		,	C, ,		
Javascript and Frameworks	Required	3 units	Winter 2023 or		
			Spring 2023		
Course Description:					
The use of JavaScript and associated frameworks is the basis of this course so that students					
become proficient in the programming language. Students will develop a mobile-first					
design, add interactivity to a website, and make their websites functional for future use by					
adding key features to their p	bages, including e-commer	ce applications.	,		
Back-End Development	Required	3 units	Fall 2022		
Course Description:			I		
In this course, students will le	earn about the purpose of	back-end developn	nent and how		
servers, databases and the code that makes them drive web applications. Students will be					
given opportunities to apply their knowledge through case study scenarios which will					
enable development of their knowledge of the complex structure of a website. Students will					
also examine current development systems like Amazon Web Services and e-commerce					
sites to better understand ho	w their systems align with	the future of webs	ite development.		
Interactivity and	Required	3 units	Winter 2023		
Databases					
		1			
Course Description		•			

In this course, students will learn about the structure of database systems within a website and how their code will impact the interactivity with that database system. Students will learn how to set up and configure a database, how information is queried from the database, how systems work with the front-end of a website, the difference in database capability and the structured query language (SQL).

Advanced Javascript	Required	3 units	Spring 2023
through Node.JS			
Course Description			

Course Description:

Students will deepen their understanding of the JavaScript system and apply their knowledge through developing the back-end of a website using Node.JS. During this course, students will learn to develop their application programming interfaces (APIs), Lambda, and apply their knowledge by developing foundational code that will allow users to take action on any website.



Dr. David Harris Smith Associate Professor in Communication Studies & Media Arts McMaster University 1280 Main Street West, Hamilton, ON, L8S 4L8 905-525-9140, ext. 23248 | Mobile (416) 274-2102

December 17, 2021

RE: Evaluation of the Full-Stack Development Program Proposals for McMaster Continuing Education including Certificates of Professional Learning and Diploma

TO: Dr. Sean Corner, Associate Dean, Faculty of Humanities

At your request, I have reviewed the academic submission documents for the Certificates of Professional Learning in User Experience/User Interface Design, Front-End Development and Back-End Development to be offered through McMaster Continuing Education. I have examined the structure of each submission and the proposed course descriptions. My finding is that each course meets the standards necessary to be an academic course with 3.0 units of advanced credit value.

Based on my examination of the content as well as the teaching and testing methods proposed for each course, my assessment is that the intellectual rigour of the courses is comparable to that found in undergraduate degree courses. The academic submission documents also indicate that the courses will be taught by qualified individuals (possessing a Master's degree or equivalency), as defined by the Undergraduate Council's Certificate and Diploma requirements. The students taking the courses will meet the minimum requirements set out in the Senate's Certificates and Diplomas Policy (2020) for Undergraduate Council.

I also support the option that, if a student successfully completes the three Certificates of Professional Learning, the student is eligible for a Diploma in Full-Stack Development.

Sincerely,

Sand Jakk

Dr. David Harris Smith Associate Professor in the Department of Communication Studies & Multimedia Faculty of Humanities

Cc: Lorraine Carter, Director, McMaster Continuing Education Dan Piedra, Assistant Director Nathan Cheney, Program Manager





Department & Program Information (complete all fields):				
Program Name:	User Experience and User Interface (UX/UI) Design			
Academic Credential:	Certificate of Professional Learning			
Name of Representative:	Nathan Cheney, Program Manager			
Effective Date:	2022-02-01			
Date of Submission:	2022-01-11			
Academic Merit (complete	all fields; write "not applicable" as needed):			
Program Overview:	The proposed User Experience/User Interface Design Program (UX/UI) is designed to prepare students with skills and knowledge to become designers of online content as identified by industry professionals and employers. This program will provide specialized training in design, highlighting the core competencies and skill sets that design professionals need in the digital workforce. The curriculum will cover the following competency areas and software training: design thinking and the iterative process (empathize, define, ideate, prototype and test); Adobe Creative Suite and other industry-recognized tools and technologies; developing mockups, frames and wireframes; an introduction to HTML/CSS and working as part of a design team on experiential projects.			
Learning Objectives:	 Use the design thinking process to better support clients and users Follow the design process to problem solve and develop new products/designs. Work in major design programs like Adobe Creative Suite. Work as part of a design team. Develop mockups/storyboards for design problems Demonstrate a basic understanding of HTML/CSS to work with developers throughout the design process. Apply accessibility and WCAG guidelines for design. The following additional objectives will be threaded within each course: 			

	Demonstration of an awareness of ethical practices and
	professional standards applicable to a field of employment
	and/or academic study
	 Examplification of the knowledge skills attitudes and
	Exemplification of the knowledge, skills, attitudes, and hebridgers required to work and colleborate with people
	benaviours required to work and collaborate with people
	from different cultural backgrounds and to develop
	effective personal management skills
Meeting Learning	All course learning outcomes in the program will be mapped to
Objectives:	the overall program objectives. The delivery format and
	teaching methods are structured to have a maximum effect on
	achieving the learning objectives.
Program Admission	In compliance with the Certificates and Diploma admission
Requirements and Pre-	policy from Undergraduate Council, students who wish to
requisites	enter the program should meet the following requirements
	Dased on their education and work experience:
	1. Be a mature student as defined in the ondergraduate
	exceptional case by McMaster Continuing Education
	2. English Language Proficiency requirements: Completion
	of TOEFL exam with a minimum acceptable score of IBT:
	86 overall with a minimum score of 20 on each of the
	four components (Reading, Writing, Speaking,
	Listening), valid for 2 years
	3. Some experience in web design and development is
	recommended but not required.
Program Completion	Students who complete all three UX/UI Design courses (9 units)
Requirements:	will be granted a Certificate of Professional Learning in UX/UI
	Design.
Program Delivery Format:	Courses will be delivered online. The online delivery formats
	will include instructor lectures and/or presentations, group
	discussions, and individual and/or small group practical
	application activities. Each course will have 39 hours of content
Student Evaluations	Cellvered over 12 weeks.
(Grading Process):	individual or group projects, tosts/guizzos, class participation
	or a combination thereof Where appropriate evaluations will
	he structured to evaluate participants' level of competency in
	achieving the overall learning objectives.
Course Evaluation:	For each course, students will complete an evaluation to assess
	content, delivery, materials, method of evaluation and
	instruction.
Course Instruction:	Instructors for courses will be selected from a pool of qualified

			1		
	external professionals. In c	compliance with Ma	:Master's Senate		
	and Undergraduate Counc	il Guidelines for Cer	tificates and		
Diplomas, selection will be based on academic background					
and/or experience within the field. Instructors must have a					
Master's Degree (or equivalent) and significant professional					
	experience and teaching within the field.				
Program Advanced	ogram Advanced One transfer credit (3 units) will be accepted into this program.				
Standing:	anding: Students will need to have obtained a minimum grade of C+ in				
each course transferred. The courses must have been taken at					
a recognized post-secondary institution in the last 5 years.					
Statement of Financial Viabi	lity:				
I have reviewed the business	case and financial projecti	ons which include e	enrolment		
projections and costs. Source	es of revenue for this progr	am include tuition	and		
supplementary fees (MAPS).	Expenses are typical and i	nclude significant u	pfront		
development and marketing	costs, as well as typical ong	going delivery costs	s (such as		
payment of facilitators, honc	oraria for other guest facilita	ators, materials, ad	vertising and		
administration).					
Lorraine Carter, Director, Mc	Master Continuing Education	on			
Statement of Administrative	e Responsibilities:				
Statement of Faculty Alignme	ent:				
The staffing and systems infrastructure to support the following functions already exists					
within Continuing Education. Costs will be fully covered by tuition, except the first year of					
the program, when the startup will be subsidized by Continuing Education.					
Continuing Education program responsibilities:					
 budget development and monetary responsibilities 					
 program and course development 					
 course registrations/administration 					
• supervision of instructors to ensure all required policies and practices are adhered to					
and courses are taught according to program requirements and standards					
 marketing and promotions 					
The Faculty of Humanities will act as an academic liaison and is charged with the					
responsibility of ongoing academic review and assessment of the curriculum. The Faculty's					
letter of support is included a	at the end of this documen	t.	,		
Listing of Courses:					
Course Name	Required/Elective	Unit Value	Term		
Design Thinking	Required	3 units	Fall 2022		
Course Description:	• • •	-			
This course will enable stude	nts to use design thinking r	methodology to ass	sess problems and		
challenges, discover and use relevant data, develop design solutions, and construct					
prototypes for validation. Stu	prototypes for validation. Students will also learn how design thinking is a valuable mindset				
and model in today's global and mobile world and why it is quickly becoming an industry-					
and model in today's global a	and mobile world and why	it is quickly becomi	ng an industry-		
and model in today's global a accepted toolset.	and mobile world and why	it is quickly becomi	ng an industry-		

UX/UI Applications	Required	3 units	Winter 2023		
Course Description:	Course Description:				
This application-based course enables students to work with design programs and					
applications to develop prototypes and mockups for different design challenges. With a					
focus on modern design tools, students will explore when to use specific programs and how					
programs can help solve design problems. They will also practice using the tools on real					
design problems. An introduction to HTML/CSS will prepare students to work within a					
development team.					
The Design Team	Required	3 units	Winter 2023		
Course Description:					
This creative, critical thinking and problem-solving course challenges students to solve					
industry-related case studies as part of a design team. UX/UI designers consistently need to					
work as part of a larger team during the design process, product integration, usability and					
functionality. Students will navigate interpersonal challenges through team building and					
leadership activities while for	cussing on solving design is	ssues and problems	for the client and		
user.					





Department & Program Inf	ormation (complete all fields):		
Program Name:	Front-End Development		
Academic Credential:	Certificate of Professional Learning		
Name of Representative:	Nathan Cheney, Program Manager		
Effective Date:	2022-02-01		
Date of Submission:	2022-01-11		
Academic Merit (complete	all fields; write "not applicable" as needed):		
Program Overview:	The proposed <i>Front-End Development</i> program is designed to prepare students with skills and knowledge to become front- end developers of online content as identified by industry professionals and employers. This program will provide specialized training in HTML and JavaScript, highlighting the core competencies and skillsets that front-end developers need in today's workforce. The curriculum will cover the following competency areas and software training: HTML, CSS, JavaScript and frameworks, source control (GIT) and an understanding of web services.		
Learning Objectives:	 Use HTML to develop the front-end of websites. Develop proficiency in JavaScript coding. Apply JavaScript frameworks. Work as part of a development team. Use source control software when developing websites. Identify the role and tasks of a front-end developer as part of the design process. Explain what an API is and how it is incorporated into website design. The following additional objectives will be threaded within each course: Demonstration of awareness of ethical practices and professional standards applicable to a field of employment and/or academic study. Exemplification of the knowledge, skills, attitudes, and behaviours required to work and collaborate with people 		

	from different cultural backgrounds and to develop			
	effective personal management skills.			
Meeting Learning	All course learning outcomes in the program will be mapped to			
Objectives:	the overall program objectives. The delivery format and			
	teaching methods are structured to have a maximum effect on			
	achieving the learning objectives.			
Program Admission	In compliance with the Certificates and Diploma admission			
Requirements and Pre-	policy from Undergraduate Council, students who wish to			
requisites	enter the program should meet the following requirements			
	based on their education and work experience:			
	1. Be a mature student as defined in the Undergraduate			
	Calendar of McMaster University; or be deemed an			
	exceptional case by the Centre for Continuing			
	Education			
	2. English Language Proficiency requirements: Completion			
	of TOEFL exam with a minimum acceptable IBT score of			
	86 overall with a minimum score of 20 on each of the			
	four components (Reading, Writing, Speaking,			
	Listening), valid for 2 years			
	Some experience in HTML and JavaScript is			
	recommended but not required.			
	Completion of the UX/UI Design program is			
	recommended, but not required.			
Program Completion	Students who complete all three Front-End Development			
Requirements:	courses (9 units) will be granted a Certificate of Professional			
	Learning in Front-End Development.			
Program Delivery Format:	Courses will be delivered online. The online delivery formats			
	will include instructor lectures and/or presentations, group			
	discussions, and individual and/or small group practical			
	application activities. Each course will contain 39 hours of			
	content delivered over 12 weeks.			
Student Evaluations	Student evaluation will be based on application activities,			
(Grading Process):	individual or group projects, tests/quizzes, class participation,			
	or a combination thereof. Where appropriate, evaluations will			
	be structured to evaluate participants' level of competency in			
	achieving the overall learning objectives.			
Course Evaluation:	For each course, students will complete an evaluation to assess			
	content, delivery, materials, method of evaluation and			
	instruction.			
Course Instruction:	Instructors for courses will be selected from a pool of qualified			
	external professionals. In compliance with McMaster's Senate			
	and Undergraduate Council Guidelines for Certificates and			

	Diplomas, selection will be	e based on academi	ic background		
	and/or experience within	the field. Instructor	s must have a		
	Master's Degree (or equiv	alent) and significa	nt professional		
	experience and teaching within the field.				
Program Advanced	lvanced One transfer credit (3 units) will be accepted into this program.				
Standing:	Students will need to have	obtained a minim	um grade of C+ in		
	each course transferred. T	he courses must ha	ave been taken at		
	a recognized post-seconda	ary institution in the	e last 5 years.		
Statement of Financial Viabi	ility:				
I have reviewed the business	case and financial projecti	ions which include	enrolment		
projections and costs. Source	es of revenue for this progr	am include tuition	and		
supplementary fees (MAPS).	Expenses are typical and i	nclude significant u	pfront		
development and marketing	costs, as well as typical on	going delivery cost	s (such as		
payment of facilitators, honc	praria for other guest facilit	ators, materials, ad	vertising and		
administration).	C	, ,	U		
Lorraine Carter. Director. Mc	Master Continuina Educati	ion			
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Statement of Administrative	e Responsibilities:				
Statement of Faculty Alignme	ent:				
The staffing and systems infrastructure to support the following functions already exists					
within Continuing Education. Costs will be fully covered by tuition. except the first year of					
the program, when the startup will be subsidized by Continuing Education.					
Continuing Education progra	m responsibilities:				
budget development	and monetary responsibili	tioc			
budget development	and monetary responsibilit	ties -			
 program and course of 					
 course registrations/a 	administration				
supervision of instructors to ensure all required policies and practices are adhered to					
and courses are taught according to program requirements and standards					
 Marketing and Promo 	otions				
The Faculty of Humanities with the second seco	ill act as an academic liaiso	on and is charged w	ith the		
responsibility of ongoing aca	demic review and assessm	ent of the curriculu	Im. The Faculty's		
letter of support is included a	at the end of this documen	nt.			
Listing of Courses:					
Course Name	Required/Elective	Unit Value	Term		
Website Development	Required	3 units	Fall 2022		
Course Description:					
This course teaches the princ	ciples of designing a websit	te to ensure the inf	ormation is		
displayed in a relevant and u	ser-friendly format. Focus	is placed on the ro	le of the front-		
end developer in the design	process and on skill develo	opment with the to	ols of web		
development, such as HTML	5, Cascading Style Sheets (CSS) and JavaScript	t. Students will		
begin coding simple websites, learn the technical language and develop their skills related					
to front-end website development.					
HTML and CSS	Required	3 units	Winter 2023		
		•			

Course Description:

In this course, there is an in-depth focus on required knowledge and skills in HTML and CSS so that students will feel comfortable in their website development work. Students will learn and apply industry-recognized techniques to make a visually appealing, functional, and interactive website.

	5 01	Javascript and Frameworks
Spring 2023		

Course Description:

The use of JavaScript and associated frameworks is the basis of this course so that students become proficient in the programming language. Students will develop a mobile-first design, add interactivity to a website, and make their websites functional for future use by adding key features to their pages, including e-commerce applications.





Department & Program Information (complete all fields):			
Program Name:	Back-End Development		
Academic Credential:	Certificate of Professional Learning		
Name of Representative:	Nathan Cheney, Program Manager		
Effective Date:	2022-02-01		
Date of Submission:	2022-01-11		
Academic Merit (complete	all fields; write "not applicable" as needed):		
Program Overview:	The proposed <i>Back-End Development</i> program is designed to prepare students with skills and knowledge to become back-end developers and full-stack developers for websites and online content. This program will provide more specialized training in the web development language JavaScript and an understanding of web databases and their relationship to websites, servers and API technology. This course will highlight the core competencies and skillsets that every back-end and full-stack development professional needs in today's workforce.		
Learning Objectives:	 Demonstrate how a server interacts with a database. Develop expertise in JavaScript coding. Demonstrate how to use API software. Critically analyze the future of full-stack development through the lens of AWS and Shopify. Demonstrate how to run queries from a back-end database. Identify the role and tasks of a back-end developer as part of the website development process. Understand what an API is and how it is incorporated into website design. Apply web development principles to build functioning back-end code. The following additional objectives will be threaded within each course: Demonstration of awareness of ethical practices and professional standards applicable to a field of employment and/or academic study. 		

	• Exemplification of the knowledge, skills, attitudes and behaviours required to work and collaborate with people from different cultural backgrounds and to develop effective personal management skills.
Meeting Learning Objectives:	All course learning outcomes in the program will be mapped to the overall program objectives. The delivery format and teaching methods are structured to have a maximum effect on achieving the learning objectives.
Program Admission Requirements and Pre- requisites	 In compliance with the Certificates and Diploma, admission policy from Undergraduate Council, students who wish to enter the program should meet the following requirements based on their education and work experience: Be a mature student as defined in the Undergraduate Calendar of McMaster University; or be deemed an exceptional case by the Centre for Continuing Education English Language Proficiency requirements: Completion of TOEFL exam with a minimum acceptable IBT score of 86 overall with a minimum score of 20 on each of the four components (Reading, Writing, Speaking, Listening), valid for 2 years Completion of the Front-End Development Certificate of Professional Learning or equivalent is required. Students are recommended to have completed the UX/UI Design Certificate of Professional Learning before the start of the program, but it is not required.
Program Completion Requirements:	Students who complete all three Back-End Development courses (9 units) will be granted a Certificate of Professional Learning in Back-End Development.
Program Delivery Format:	Courses will be delivered online. The online delivery formats will include instructor lectures and/or presentations, group discussions, and individual and/or small group practical application activities. Each course will contain 39 hours of content delivered over 12 weeks.
Student Evaluations (Grading Process):	Student evaluation will be based on application activities, individual or group projects, tests/quizzes, class participation, or a combination thereof. Where appropriate, evaluations will be structured to evaluate participants' level of competency in achieving overall learning objectives.
Course Evaluation:	For each course, students will complete an evaluation to assess content, delivery, materials, method of evaluation and instruction.
Course Instruction:	Instructors for courses will be selected from a pool of qualified

	external professionals. In c	compliance with Mo	cMaster's Senate	
	and Undergraduate Counc	il Guidelines for Cei	rtificates and	
	Diplomas, selection will be	based on academi	c background	
and/or experience within the field. Instructors must have a				
Master's Degree (or equivalent) and significant professional				
experience and teaching within the field.				
Program Advanced	One transfer credit (3 units	s) will be accepted	into this program.	
Standing:	Students will need to have	obtained a minimu	um grade of C+ in	
	each course transferred. The courses must have been taken at			
	a recognized post-seconda	rv institution in the	e last 5 vears.	
Statement of Financial Viabi	litv:	,		
L have reviewed the business	case and financial projecti	ons which include (enrolment	
projections and costs. Source	s of revenue for this progr	am include tuition	and	
supplementary fees (MAPS)	Expenses are typical and i	nclude significant u	infront	
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administration)		ators, materials, au		
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within Continuing Education. Costs will be fully covered by tuition, excent the first year of				
the presence when the stort	costs will be subsidized by Co	by tuition, except i	ne first year of	
Continuing Education program responsibilities:				
Continuing Education program responsibilities:				
 budget development 	and monetary responsibilit	ties		
program and course development				
 course registrations/administration 				
 supervision of instructors to ensure all required policies and practices are adhered to 				
and course are taught according to program requirements and standards				
Marketing and Promotions				
The Faculty of Humanities will act as an academic liaison and is charged with the				
responsibility of ongoing academic review and assessment of the curriculum. The Faculty's				
letter of support is included a	it the end of this documen	t.		
Listing of Courses:				
Course Name	Required/Elective	Unit Value	Term	
Back-End Development	Required	3 units	Fall 2022	
Course Description:				
In this course, students will le	earn about the purpose of	back-end developn	nent and how	
servers, databases and the co	ode that makes them drive	web applications.	Students will be	
given opportunities to apply their knowledge through case study scenarios which will				
enable development of their knowledge of the complex structure of a website. Students will				
•	- •			

also examine current development systems like Amazon Web Services and e-commerce				
sites to better understand how their systems align with the future of website development.				
Interactivity and	Required	3 units	Winter 2023	
Databases				
Course Description:				
In this course, students will learn about the structure of database systems within a website				
and how their code will impact the interactivity with that database system. Students will				
learn how to set up and configure a database, how information is queried from the				
database, how systems work with the front-end of a website, the difference in database				
capability and the structured query language (SQL).				
Advanced Javascript	Required	3 units	Spring 2023	
through Node.JS				
Course Description:				
Students will deepen their understanding of the JavaScript system and apply their				
knowledge through developing the back-end of a website using Node.JS. During this course,				
students will learn to develop their application programming interfaces (APIs), Lambda, and				
apply their knowledge by developing foundational code that will allow users to take action				
on any website.				



REPORT TO SENATE

ARTS & SCIENCE PROGRAM SUMMARY OF MAJOR CURRICULUM CHANGES FOR 2022-2023

This report highlights substantive changes being proposed. For a complete review of all changes, please refer to the November 2021 Arts & Science Program Report to Undergraduate Council for changes to the 2022-2023 Undergraduate Calendar, found at https://artsci.mcmaster.ca/app/uploads/2021/11/2022-23-Arts-Science-Undergraduate-Curriculum-Report-FINAL-17-Nov.-2021.pdf.

NEW PROGRAMS:

COMBINED HONOURS PROGRAM, ARTS & SCIENCE AND SUSTAINABLE CHEMISTRY

Rationale: This new combined honours option, developed jointly with the Department of Chemistry and Chemical Biology (Faculty of Science), has been added to the list of Arts & Science combined honours programs. It aligns with the Dept. of Chemistry and Chemical Biology's introduction of a combined honours program in Sustainable Chemistry.

Honours Arts & Science and Sustainable Chemistry

ADMISSION

Completion of Arts & Science I with a grade point average of at least 6.0 and an average of at least 6.0 in CHEM 1A03, 1AA3.

NOTES:

1. See additional notes in the Undergraduate Calendar, Faculty of Science, Department of Chemistry and Chemical Biology.

Nine units from the following list are required: ARTSSCI 3A06, 3B03, 3BB3, 3RL3/3S03. Students who choose to take ARTSSCI 3RL3 or 3S03 may only use one of those courses towards satisfying 3 units of the requirement. Students are encouraged, however, to take additional units from this list as an elective.
 Six units of Upper-Level Inquiry beyond Level I are required. Additional units of Upper-Level Inquiry may be included as an elective with the permission of the Director. Upper-Level Inquiry courses are: ARTSSCI 3CL3, 3CU3, 3EH3, 3GJ3, 3TR3, 4CD3, 4CF3, 4CI3, 4CP3, 4CT3, 4DS3, 4EP3, 4HS3, 4ST3, 4VC3.

Students are recommended to take CHEM 2SC3 in Level II when possible.
 Students considering postgraduate studies in Chemistry should note that 18 units of Level IV Chemistry or

related subjects are required for consideration for admission at McMaster and most graduate schools in Canada. Such students are recommended to take CHEM 4G12 for their thesis.

6. Students who select CHEM 4G12 will take six units of Electives; students who select ARTSSCI 4A06, 4C06, or CHEM 4RP6 will take twelve units of Electives.

COURSE LIST 1

CHEM 2A03, 2II3, 2LB3, 2OD3, 2OG3, 2P03, 3AA3, 3EP3 A/B S, 3I03, 3II3, 3LA3, 3OA3, 3PA3, 3PC3, 3RC3, 3RP3, 4AA3, 4D03, 4IA3, 4IB3, 4IC3, 4II3, 4OA3, 4OB3, 4PB3, 4Q03, 4RP6 A/B S, 4W03; CHEMBIO 3BM3, 3OA3, 3OB3, 3P03, 4A03, 4OA3, 4OB3, 4Q03

COURSE LIST 2

BIOLOGY 3EI3, 3ET3; EARTHSC 2GG3, 3CC3, 4CC3; ENVIRSC 2B03, 2C03, 2Q03, 2WW3, 3O03, 4EA3, 4N03; ENVSOCTY 2EI3, 3EC3, 3EE3, 3ER3, 4HH3; HTHSCI 4MS3; LIFESCI 2X03; POLSCI 3GC3; SUSTAIN 2S03, 3S03

REQUIREMENTS

120 units total (Levels I-IV), of which 48 units may be Level I

24 units ARTSSCI 1A03, 1AA3, 1B03, 1BB3, 1C06, 1D06
6 units CHEM 1A03, 1AA3
18 units ARTSSCI 2A06, 2D06, 2E03, 2R03
9 units from ARTSSCI 3A06, 3B03, 3BB3, one of 3RL3/3S03 (see Note 2)
6 units Upper-Level Inquiry (see Note 3)
3 units CHEM 2SC3 (see Note 4)
3 units CHEM 2Q03
12 units from CHEM 2A03, 2II3, 2LB3, 2OD3, 2OG3, 2P03
3 units from CHEM 3SC3, CHEM 4SC3
6-12 units: one of ARTSSCI 4A06, 4C06, CHEM 4RP6, or 4G12 (see Note 5 and Note 6)
9 units from Course List 1
3 units from Course List 2
6 units from Course List 1 or Course List 2
6-12 units Electives (see Note 5 and Note 6)

PROGRAM CLOSURES:

N/A

MAJOR REVISIONS:

N/A



SCIENCE

Undergraduate Curriculum Report to Undergraduate Council, for the 2022-2023 Undergraduate Calendar

Approved by the General Faculty of the Faculty of Science on November 19, 2021

November 19, 2021

FACULTY OF SCIENCE REPORT TO SENATE

SUMMARY OF MAJOR CURRICULUM CHANGES FOR 2022-2023

Following, is the summary of substantive curriculum changes being proposed by the Faculty of Science. For a complete review of all changes, refer to the November 19, 2021, Report of the Academic Planning and Policy Committee for changes to the 2022-2023 Undergraduate Calendar, found at:

https://macdrive.mcmaster.ca/f/f8c97562ba16468bb250/

1.0 NEW PROGRAMS

1.1 Honours Biology - Physiology Core (B.Sc.)

Admission Note

One of PHYSICS 1A03 or 1C03 is required for admission. Completion of PHYSICS 1AA3 or 1CC3 is also recommended.

Admission

Enrolment in this program is limited and possession of the published minimum requirements does not guarantee admission. Selection is based on academic achievement but requires, as a minimum, completion of any Level I program with a Grade Point Average of at least 5.0 including:

6 units

from the following courses, where an average of at least 6.0 (between the courses) is required

- BIOLOGY 1A03 Cellular and Molecular Biology
- BIOLOGY 1M03 Biodiversity, Evolution and Humanity

6 units

- CHEM 1A03 Introductory Chemistry I
- CHEM 1AA3 Introductory Chemistry II

3 units

from

- MATH 1A03 Calculus for Science I
- MATH 1LS3 Calculus for the Life Sciences I

3 units

from

- PHYSICS 1A03 Introductory Physics
- PHYSICS 1C03 Physics for the Chemical and Physical Sciences

6 units

from

• the Science I Course List

Program Notes

- 1. The Honours Biology Physiology Core program allows students to choose Biology courses that reflect their own Physiology-related interest. Students are encouraged to discuss their course selections with a Biology academic program advisor.
- 2. It is recommended that students take both PSYCH 1X03 and 1XX3 if they are interested in upper level Psychology courses.
- 3. Completion of BIOLOGY 2A03 is required by the end of Level II.
- 4. Completion of STATS 2B03 is required by the end of Level III.

Physiology Course List

- BIOCHEM 2EE3 Metabolism and Physiological Chemistry
- BIOCHEM 4M03 Cellular and Integrated Metabolism
- BIOCHEM 4N03 Molecular Membrane Biology
- BIOLOGY 2L03 Experimental Design in Biology
- BIOLOGY 3AA3 Fundamental Concepts of Pharmacology
- BIOLOGY 3B03 Plant Physiology
- BIOLOGY 3EP3 A/B S Applied Biology Placement
- BIOLOGY 3IR3 A/B S Independent Research Project
- BIOLOGY 3MM3 Invertebrate Form and Function
- BIOLOGY 3S03 An Introduction to Bioinformatics
- BIOLOGY 3XL3 Comparative Vertebrate Anatomy & Physiology
- BIOLOGY 3ZZ3 Topics in Physiology
- BIOLOGY 4C12 A/B S Senior Thesis
- BIOLOGY 4F06 A/B S Senior Project
- BIOLOGY 4T03 Molecular and Cellular Neuroscience
- BIOLOGY 4X03 Environmental Physiology
- BIOPHYS 2A03 Biophysics of the Cell and Living Organisms
- KINESIOL 2C03 Neuromuscular Exercise Physiology
- KINESIOL 2CC3 Cardiorespiratory and Metabolic Exercise Physiology
- KINESIOL 4C03 Integrative Physiology of Human Performance
- LIFESCI 3AA3 Human Pathophysiology
- MOLBIOL 3M03 Fundamental Concepts of Development
- NEUROSCI 3J03 Visual Neuroscience
- NEUROSCI 3SN3 Neural Circuits
- PSYCH 2E03 Sensory Processes
- PSYCH 3A03 Audition
- PSYCH 3FA3 Neuroscience of Learning and Memory

Experiential Learning Course List

- BIOLOGY 2L03 Experimental Design in Biology
- BIOLOGY 3B03 Plant Physiology
- BIOLOGY 3EI3- Ecological Indicators
- BIOLOGY 3EP3 Applied Biology Placement
- BIOLOGY 3FF3- Evolution
- BIOLOGY 3IR3 Independent Research Project
- BIOLOGY 3R03- Field Biology I
- BIOLOGY 3U03 Animal Physiology Homeostasis
- BIOLOGY 4A03- Advanced Topics in Ecology
- BIOLOGY 4C12 A/B S -Senior Thesis
- BIOLOGY 4F06- A/B S Senior Project
- BIOLOGY 4103- Senior Project
- BIOLOGY 4J03- Field Biology II
- BIOLOGY 4PP3- Environmental Microbiology and Biotechnology
- MOLBIOL 3A03 Current Topics in Molecular Biology and Genetics
- MOLBIOL 3D03 Experimental Approaches in Cell Biology
- MOLBIOL 3I03 Independent Research Project
- MOLBIOL 3V03 Techniques in Molecular Genetics
- MOLBIOL 3Y03 Plant Responses to the environment
- MOLBIOL 4BB3- Plant Metabolism and Molecular Biology
- MOLBIOL 4G12 A/B S- Senior Thesis

Requirements

120 units total (Levels I to IV), of which no more than 48 units may be Level I
Level I: 30 Units 30 units (See *Admission* above.) Levels II-IV: 90 Units 12 units

- BIOLOGY 2A03 Integrative Physiology of Animals
- BIOLOGY 2B03 Cell Biology
- BIOLOGY 2C03 Genetics
- BIOLOGY 2F03 Fundamental and Applied Ecology (See Program Note 3 above.)

6 units

- CHEM 2OA3 Organic Chemistry I
- CHEM 20B3 Organic Chemistry II

3 units

• STATS 2B03 - Statistical Methods for Science (See *Program Note 4* above.)

(See Plogi

3 units

BIOCHEM 3G03 - Proteins and Nucleic Acids

9 units

- BIOLOGY 3P03 Cell Physiology
- BIOLOGY 3U03 Animal Physiology Homeostasis
- BIOLOGY 3UU3 Animal Physiology Regulatory Systems

3 units

from

• the Experiential Learning Course List

3 units

from

• Level IV Biology or Molecular Biology courses

24 units

from

• the Physiology Course List

27 units

• Electives

Justification 1.1: Introduction of a new core program version of the Honours Biology – Physiology Research Specialization program. This new program option in Physiology will provide flexibility for students who still want to focus their studies in Physiology but have no interest in pursuing applied research or lab intensive experiences. This model is functionally equivalent to the Honours Biology Research Specialization and Honours Biology Core programs.

This new Honours Physiology program will initially be capped at 50 seats to ensure it is manageable given our current course offerings and their associated enrolment caps. Students in this program will be required to complete a minimum three units of experiential learning from a new experiential course list which will be added to all Biology core programs.

1.2 Honours Molecular Biology and Genetics Core (B.Sc.)

Admission Note

One of PHYSICS 1A03 or 1C03 is required for admission. Completion of PHYSICS 1AA3 or 1CC3 by the end of Level II is also recommended.

Admission

Enrolment in this program is limited and possession of the published minimum requirements does not guarantee admission. Selection is based on academic achievement but requires, as a minimum, completion of any Level I program with a Grade Point Average of at least 5.0 including:

6 units

from the following courses, where an average of at least 6.0 (between the courses) is required • BIOLOGY 1A03 - Cellular and Molecular Biology

BIOLOGY 1M03 - Biodiversity, Evolution and Humanity

6 units

- CHEM 1A03 Introductory Chemistry I
- CHEM 1AA3 Introductory Chemistry II

3 units

- from
 - MATH 1A03 Calculus For Science I
 - MATH 1LS3 Calculus for the Life Sciences I

3 units

- from
 - PHYSICS 1A03 Introductory Physics
 - PHYSICS 1C03 Physics for the Chemical and Physical Sciences (See Admission Note above.)
- 6 units

from

• the Science I Course List (See Admission Note above.)

Program Notes

- The Honours Molecular Biology and Genetics Core program allows students to choose Biology courses that reflect their own Molecular Biology-related interest. Students are encouraged to discuss their course selections with a Biology academic program advisor.
- 2. BIOLOGY 2B03, 2EE3 and MOLBIOL 2C03 must be completed in Level II.
- 3. Six units of BIOLOGY 2A03, 2D03, 2F03, 3FF3 are required. However, completion of at least nine units is recommended.
- 4. Completion of STATS 2B03 is required for admission to the Honours Molecular Biology and Genetics Research Specialization (Co-op) program and therefore, students intending to apply for the Co-op option must complete STATS 2B03 in Level II.
- Students interested in microbiology and biotechnology and especially those considering postgraduate studies in this area should take the following courses: BIOLOGY 4PP3, MOLBIOL 4P03.

Molecular Biology and Genetics Course List I

- MOLBIOL 3A03 Current Topics in Molecular Biology and Genetics
- MOLBIOL 3D03 Experimental Approaches in Cell Biology
- MOLBIOL 3I03 A/B S Independent Research Project
- MOLBIOL 3M03 Fundamental Concepts of Development
- MOLBIOL 3Y03 Plant Responses to the Environment
- MOLBIOL 4BB3 Plant Metabolism and Molecular Biology
- MOLBIOL 4DD3 Molecular Evolution
- MOLBIOL 4ED3 Evolutionary Developmental Biology
- MOLBIOL 4H03 Molecular Biology of Cancer
- MOLBIOL 4K03 Research Advances in Biology of Aging
- MOLBIOL 4P03 Medical Microbiology
- MOLBIOL 4RR3 Human Genetics

Molecular Biology and Genetics Course List II

5

- BIOCHEM 2B03 Nucleic Acid Structure and Function
- BIOCHEM 2BB3 Protein Structure and Enzyme Function
- BIOCHEM 2EE3 Metabolism and Physiological Chemistry
- BIOCHEM 3G03 Proteins and Nucleic Acids
- BIOCHEM 4E03 Gene Regulation in Stem Cells and Development
- BIOLOGY 2A03 Integrative Physiology of Animals
- BIOLOGY 2D03 Plant Biodiversity and Biotechnology
- BIOLOGY 2F03 Fundamental and Applied Ecology
- BIOLOGY 2L03 Experimental Design in Biology
- BIOLOGY 3FF3 Evolution
- BIOLOGY 3PG3 Population Genetics
- BIOLOGY 4EE3 Human Diversity and Human Nature
- BIOLOGY 4PP3 Environmental Microbiology and Biotechnology
- BIOPHYS 2A03 Biophysics of the Cell and Living Organisms
- BIOPHYS 3G03 Modelling Life
- CHEMBIO 2A03 Introduction to Bio-Analytical Chemistry
- CHEMBIO 2P03 Physical Chemistry Tools for Chemical Biology
- CHEMENG 3BK3 Bio-Reaction Engineering
- CHEMENG 3BM3 Bioseparations Engineering
- HTHSCI 3I03 Introductory Immunology
- HTHSCI 3K03 Introductory Virology
- HTHSCI 4II3 Advanced Concepts in Immunology

Experiential Course List

- BIOLOGY 2L03 Experimental Design in Biology
- BIOLOGY 3B03 Plant Physiology
- BIOLOGY 3EI3- Ecological Indicators
- BIOLOGY 3EP3 Applied Biology Placement
- BIOLOGY 3FF3- Evolution
- BIOLOGY 3IR3 Independent Research Project
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- MOLBIOL 3Y03 Plant Responses to the environment
- MOLBIOL 4BB3 Plant Metabolism and Molecular Biology
- MOLBIOL 4G12 A/B S Senior Thesis

Requirements 120 units total (Levels I to IV), of which no more than 48 units may be Level I Level I: 30 Units 30 units (See Admission above.) Levels II-IV: 90 Units 6 units

- CHEM 2OA3 Organic Chemistry I
- CHEM 20B3 Organic Chemistry II

3 units

- STATS 2B03 Statistical Methods for Science
 - (See Program Note 4 above.)

6 units from

- BIOLOGY 2A03 Integrative Physiology of Animals
- BIOLOGY 2D03 Plant Biodiversity and Biotechnology
- BIOLOGY 2F03 Fundamental and Applied Ecology
- BIOLOGY 3FF3 Evolution
 - (See Program Note 3 above.)

21 units

- BIOLOGY 2B03 Cell Biology
- BIOLOGY 2EE3 Introduction to Microbiology and Biotechnology
- BIOLOGY 3S03 An Introduction to Bioinformatics
- MOLBIOL 2C03 Genetics
- MOLBIOL 3B03 Advanced Cell Biology
- MOLBIOL 3II3 Molecular Genetics of Eukaryotes
- MOLBIOL 3003 Microbial Genetics
- (See Program Note 2 above.)

3 units

from

• the Experiential Course List

9 units

from

 the Molecular Biology and Genetics Course List I, which must include at least three units of Level IV

12 units from

• the Molecular Biology and Genetics Course List I or II

30 units

• Electives (See Program Note 3 above.)

Justification 1.2: Introduction of a new core program version of the Honours Molecular Biology and Genetics Research Specialization program. This new program option in Molecular Biology and Genetics will provide flexibility for students who still want to focus their studies in Molecular Biology and Genetics but have no interest in pursuing applied research or lab intensive experiences. This model is functionally equivalent to the Honours Biology Research Specialization and Honours Biology Core programs.

2.0 PROGRAM CLOSURES

Honours B.Sc. in Biochemistry, Honours B.Sc. in Biochemistry – Biomedical Research Specializatino, Honours B.Sc. in Biochemistry – Biomedical Research Specializatino Co-op

Memo from Dr. Maureen MacDonald, Dean of Science, and Dr. Susan Denburg, Executive Vice-Dean and Associate Vice-President, Academic, Faculty of Health Sciences will be sent as soon as possible.





Burke Science Building, Room 102 1280 Main Street West Hamilton, Ontario, Canada L8S 4K1 🗞 905.525.9140 x22616

- 🛱 905.546.9995
- ☑ deansci@mcmaster.ca
- \oplus science.mcmaster.ca

February 3, 2022

TO: Dr. Kimberley Dej, Acting Vice-Provost (Faculty), Chair, Undergraduate				
FROM:	Dr. Maureen MacDonald, Dean, Faculty of Science			
	Dr. Susan Denburg, Executive Vice-Dean and Associate Vice-President			
	Academic, Faculty of Health Sciences			
SUBJECT:	Program Closures of Honours Biochemistry, Honours Biochemistry –			
	Biomedical Research Specialization, Honours Biochemistry – Biomedical			
	Research Specialization Co-op (B.Sc.)			

The Faculties of Science and Health Sciences are jointly requesting that the Honours Biochemistry, Honours Biochemistry – Biomedical Research Specialization, and, Honours Biochemistry – Biomedical Research Specialization Co-op programs be moved from the Faculty of Science to the Faculty of Health Sciences and that the degree designation be changed to an Honours B.H.Sc. To facilitate this move the Department of Biochemistry and Biomedical Sciences will close the Honours Biochemistry (B.Sc.), Honours Biochemistry – Biomedical Research Specialization (B.Sc.), and, Honours Biochemistry – Biomedical Research Specialization Co-op (B.Sc.) programs, effective, September 2022.

Incoming Level 1 students (Fall 2022), interested in applying to the program in Level 2 (entry Fall 2023), will be directed to the Faculty of Health Sciences section of the 2022-23 Calendar for admission and program requirements.

Students currently enrolled in a Level 1 program, or Levels 2, 3 and 4 (co-op only) of the Biochemistry programs will be given the option of remaining in the Faculty of Science and completing the Hons. B.Sc. degree or transferring to Health Sciences to pursue the Hons. B.H.Sc degree.

Students in their final year, who have met all program requirements, will graduate with the Hons. B.Sc. degree at the Faculty of Science 2022 Spring (or Fall) Convocation.

The Faculty of Science agrees that Science Career and Co-operative Education (SCCE) will administer the co-op component of the program.

This agreement is contingent on the signing of an MOA that establishes the relevant recoveries that would be transferred to the Faculty of Science.

m. mar Anal

Maureen MacDonald, PhD

Susa Denling

Susan Denburg, PhD

cc. Office of the Associate Dean (Academic), Faculty of Science Rob Whyte, Vice Dean, Education, Faculty of Health Sciences

BRIGHTER WORLD



SCIENCE

Undergraduate Curriculum Addendum to Undergraduate Council, for the 2022-2023 Undergraduate Calendar

January 3, 2022

FACULTY OF SCIENCE REPORT TO SENATE

SUMMARY OF MAJOR CURRICULUM CHANGES FOR 2022-2023

Following, is the summary of substantive curriculum changes being proposed by the Faculty of Science. For a complete review of all changes, refer to the November 19, 2021, Report of the Academic Planning and Policy Committee for changes to the 2022-2023 Undergraduate Calendar, found at:

https://macdrive.mcmaster.ca/f/f8c97562ba16468bb250/

1.0 NEW PROGRAMS

2.0 PROGRAM CLOSURES

N/A

3.0 MAJOR REVISIONS:

3.1 Honours Biochemistry – Biomedical Research Specialization Co-op (B.Sc.) Entry at Level III last available September 2022.

Effective September 2022, all Honours Biochemistry programs will be administered by the Faculty of Health Sciences. Students interested in applying to this program should see the Honours Biochemistry (B.H.Sc.) in the Faculty of Health Sciences section of the Calendar.

Students who enrolled prior to September 2022 are given the choice to remain in Honours Biochemistry – Biomedical Research Specialization Co-op (B.Sc.) or transfer into Honours Biochemistry – Biomedical Research Specialization Co-op (B.H.Sc.). Such students will graduate at a Faculty of Science convocation.

Admission

Enrolment in this program is limited and possession of the published minimum requirements does not guarantee admission. Selection is based on academic achievement and an interview but requires, as a minimum, submission of the on-line application by the stated deadline and completion of Level II Honours Biochemistry with a Grade Point Average of at least 5.0 and completion of the following courses:

- 12 units
 - BIOCHEM 2B03 Nucleic Acid Structure and Function
 - BIOCHEM 2BB3 Protein Structure and Enzyme Function
 - BIOCHEM 2L06 A/B Inquiry in Biochemical Techniques

3 units

• BIOLOGY 2C03 - Genetics

3 units

from

• the Biochemistry Course List (See Program Note 6 below.)

6 units

- CHEM 20A3 Organic Chemistry I
- CHEM 2OB3 Organic Chemistry II

N/A



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1 EXECUTIVE SUMMARY

This 2022/2023 Capital Plan forms part of an annual process for capital planning at McMaster University.

The Council of Ontario Universities recently published the 2019-20 Inventory of Physical Facilities of Ontario Universities report, a triennial report that helps Ontario universities analyze changing trends in space needs and to use existing space more efficiently. Since the last reporting cycle (2016-17), McMaster has managed to close the gap of its classroom space deficit with the construction of the Peter George Centre for Living and Learning, which has added over 3,400 square meters of physical classroom space to our inventory. This new building, along with other smaller additions over the last three years has brought our classroom space on campus to 103% when compared to the standard space required based on student FTE set out by the COU.

There are still a number of types of spaces where McMaster falls below the average COU standard. Most notably, these spaces include: Recreation and Athletics at 64.6%, Class Labs at 61.7%, Library Study Space at 58.7%, and Student & Central Services at 58.5%. The Student Activity & Fitness Expansion (SAFE) and the McLean Centre for Collaborative Discovery are two significant capital projects that will help to address some of these deficiencies over the next cycle.

McMaster is continually seeking out new opportunities for growth and expansion, both on campus and off-site. It will continue to be important to increase efficiencies in our utilization of space on campus, either through optimization of existing space or through densification of certain areas on-site.

Over its rich history, McMaster has accumulated a wealth of physical assets. The challenge today is to manage this inventory of aging buildings and infrastructure as best suits anticipated needs. To this effect, McMaster University continues to review the deferred maintenance funding for the academic portfolio and has allocated \$15.76 million (including funds from the Ministry of Colleges and Universities) in 2022/2023. This investment will maintain control of the top priority deferred maintenance items in the short term.

The transition to remote teaching and learning effectuated by the pandemic is anticipated to have an impact on the University's approach to capital improvement planning in the future. Recommendations from the Virtual Learning Task Force established by the Provost during the Fall 2020 semester include holding an ongoing discussion forum that will help advise the development of a Teaching and Learning Strategy and Digital Strategy. The University needs to ensure technological and physical infrastructure supports the needs set out in these strategic plans. The full report from the Task Force can be found at:

https://www.mcmaster.ca/vpacademic/documents/Taskforce/Fall_VLT_Final_Recomme ndations_Report.pdf

McMaster University, Facility Services, Capital Plan 2022/2023

In addition, McMaster needs to further embrace sustainable construction and energy management practices. Accessibility needs to be increased for compliance with today's standards, including new installations of barrier-free ramps, washrooms, fire alarm strobe lights, water fountains, etc. The University does have a Campus Accessibility Action Plan (CAAP), which is used to prioritize accessibility issues on campus, and funds are allocated annually to address these. The full plan can be found at: https://facilities.mcmaster.ca/app/uploads/2020/09/Campus-Accessibility-Plan-2018-2013-V5-20Apr2018.pdf.

Numerous documents and reports have been produced to inform McMaster's efforts. Primary among them are McMaster President David Farrar's Institutional Priorities and Strategic Framework 2021-2024, found at:

https://president.mcmaster.ca/app/uploads/2021/05/Institutional-Priorities-and-Strategic-Framework_FINAL_5May21.pdf.

The Strategic Mandate Agreements have been prominent in outlining priorities and principles which help shape the University's development. Also, McMaster has joined the world's health-promoting universities and colleges in signing the Okanagan Charter, dedicated to advancing human and societal health and well-being.

The Capital Plan is updated annually in order to ensure that the Plan continues to reflect the priorities of the institution.

McMaster University, Facility Services, Capital Plan 2022/2023

2 INTRODUCTION

2.1 Scope of the Capital Plan

McMaster University's 2022/2023 Capital Plan is a planning document that is intended to guide the growth of physical assets at McMaster University and includes planning through fiscal year 2025/2026. The Capital Plan encompasses all buildings under the purview of McMaster University, both on and off the main campus.

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

2.2 What is a Capital Plan?

The Capital Plan represents McMaster University's existing approved priority projects and a number of additional projects for capital investment. It will set forth a framework to guide the growth of physical assets such as buildings, land and infrastructure. The IT Strategy 2019-21, which sets the strategy for information systems, is a separate document which helps inform the Capital Plan.

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

Table 1 illustrates the relationship of the Capital Plan within the hierarchy of key capital plans and other documents prepared for the University.

McMaster University, Facility Services, Capital Plan 2022/2023

Table 1 – Key Plans & Reports

Level of Planning/Reporting	Key Capital Plans and Reports at McMaster	Audience	Review
Strategic: University's	McMaster Capital Plan	Public	Annual
overall philosophy and	Campus Master Plan	Public	Every 5 -10
approach to managing			years
capital; highest level of	Asset Management Plan	Public	Annual
planning; fundamental	Energy Management Plan	Public	Annual
decisions and actions	Campus Accessibility Action	Public	Annual
directed to achieving	Plan		
institutional goals	Campus Capacity Study	Public	2011
Portfolio Governance:	McMaster Capital Plan	Public	Annual
Updates/funding status	Capital Funding and	Planning and	Monthly
of capital projects for	Expenditure Report	Resource Committee	
Board; delineate			
McMaster's			
management, oversight			
and monitor capital			
projects approved/under			
construction			
Project Management:	Key Technical/Management I	Documents (Asset Report	ts)
Identify strategic and	Asset Management Plan	Public	Annual
specific capital	Project Management	Public	Every 5
requirements along with	Methodology Manual		years
plans and strategies			
intended to resolve the			
most urgent and highest			
priority needs			

McMaster University, Facility Services, Capital Plan 2022/2023

3 BACKGROUND AND CURRENT STATE OF CAPITAL INFRASTRUCTURE

3.1 The First 30 Years in Hamilton

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

3.2 Buildings Procured 1960 - 2021

For detailed information about the development of McMaster facilities during this period, refer to "McMaster University, Facility Services, Planning and Infrastructure Development History: 1960 – 2019" posted at https://facilities.mcmaster.ca/app/uploads/2019/05/2019-04-16-History.pdf.

In the past 60 years McMaster has not only acquired infrastructure through new build construction and renovation/addition projects but has also procured the use of various existing off-campus buildings. The opening of the David Braley Health Sciences Centre in 2015 has been an anchor to future development opportunities in the City core, including the planned Graduate Student Residence ("10 Bay"). Off-campus buildings owned by the University include:

- McMaster's family practice teaching unit, established in the early 1970's at Henderson Hospital, was relocated in the early 1990's to the south mountain as the Stonechurch Family Health Centre
- McMaster Innovation Park (procured for use in 2004)
- 100 Main St West (David Braley Health Science Centre opened in 2015)
- 88 Forsyth Avenue (purchased in 2015).
- 47 Whitton Road (acquired in May 2015 and used for research purposes)
- 182 Sterling Street (purchased in 2015)
- 96 Forsyth Avenue North (purchased in 2017)
- Existing houses bound by Forsyth Avenue South, Traymore Avenue, Dalewood Avenue and Main Street West (purchased in 2017)
- 106 Forsyth Avenue North (purchased in 2018)
- 132 Mayfair Crescent (purchased in 2019)
- 8 Mayfair Crescent (purchased in 2019)
- 30 South Street West, Dundas "Osler House" (purchased in 2020)
- 22 Bay Street (purchased in 2020)

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

McMaster University, Facility Services, Capital Plan 2022/2023

- The Waterloo Regional Campus was established by McMaster at the University of Waterloo in 2007 and focuses on Health and Medical Sciences.
- In 2012, McMaster opened the Niagara Regional Campus in St. Catharine's at Brock University's Cairns Family Health and Bioscience Research Complex.
- In 2010, McMaster built the Ron Joyce Centre in Burlington.
- The Welland McMaster Family Health Team has been in operation since 2011.

3.2.1 Summary

Since 1960, McMaster has added a total of 42 buildings on campus to its existing infrastructure through new construction. These buildings total 4,952,836 gross square feet of added infrastructure, during the past 60 years. McMaster has also invested in several renovation/addition projects to existing infrastructure since 1960. During this time, McMaster has completed major renovations/additions, totaling 1,029,656 square feet, on 21 campus buildings.

Renovations and additions were often completed in order to update technological, electrical and utility infrastructure as well as add usable space. These construction projects have been supplemented with infrastructure growth off campus, particularly in the last decade, through the procurement of buildings and property.

Facility Services has undertaken significant growth in projects over the last 5 years with the capital spend on new building expansion and renovation; this is depicted in the chart below compared to capital asset additions per our audited financial statements.

Note that the 2017 and 2018 fiscal years show a higher capital spend. This increase corresponds to the construction period for the Peter George Centre for Living and Learning and the ABB Tower addition projects. We expect to see another increase as the McLean Centre for Collaborative Discovery enters its intensive construction period over the course of the next two years.



Chart 1 – Capital Spending

McMaster University, Facility Services, Capital Plan 2022/2023





Chart 2 – 70 Years of Growth in Space and Undergraduate Enrollment

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

In the 2020/2021 academic year, McMaster University was home to a total enrolment of 36,450 students (undergraduate and graduate, full-time and part-time). The University employs more than 13,750 staff and 950 full-time instructional faculty¹. Concerning the critical space categories, space is dispersed as indicated in Table 2, current as of August 1, 2020 and reported to the Council of Ontario Universities (COU) Committee on Space Standards and Reporting to inform the triennial "Inventory of Physical Facilities of Ontario Universities" report. An updated report has just been released and is being reviewed.

Since the last reporting cycle (2016-17), McMaster has managed to close the gap of its classroom space deficit with the construction of the Peter George Centre for Living and Learning, which has added over 3,400 square meters of physical classroom space to our inventory. This new building, along with other smaller additions over the last three years has brought our classroom space on campus to 103% when compared to the standard space required based on student FTE set out by the COU.

¹ McMaster University Fact Book 2020 2021

McMaster University, Facility Services, Capital Plan 2022/2023

There are still a number of types of spaces where McMaster falls below the average COU standard. Most notably, these spaces include: Recreation and Athletics at 64.6%, Class Labs at 61.7%, Library Study Space at 58.7%, and Student & Central Services at 58.5%. The Student Activity & Fitness Expansion (SAFE) and the McLean Centre for Collaborative Discovery are two significant capital projects that will help to address some of these deficiencies over the next cycle.

Category	Area (net assignable	Area (net assignable
	square feet (NASF))	square metres (NASM))
1 Classrooms	377,791	35,098
2 Class Labs	204,045	18,956
3 Research Labs	578,594	53,753
4 Office Academics	722,055	67,081
5.1 Library Collections	91,414	8,493
5.2 Library Office Space	35,690	3,316
5.3 Library Support	10,526	977
5.4 Library Study	96,416	8,957
6 Athletics	190,929	17,738
9 Maintenance Shop	37,002	3,438
10 Office Administration	200,195	18,595
11 Non-Library Study Space	100,253	9,314
7,8,12,13,14,15 Central Services	287,912	26,748
Total	2,932,784	272,464

Table 2: 2020 Space by Category

McMaster has 57 buildings on the main campus, including 13 residences, a nuclear reactor, a stadium complex and a hospital. McMaster owns or otherwise operates out of several more buildings throughout Hamilton and the province, such as the Ron Joyce Centre in Burlington and the David Braley Health Sciences Centre in downtown Hamilton. The main campus itself sits on 377 acres of land with approximately 686,367 gross square meters of building area. *Appendix D* includes a list of McMaster properties.

McMaster University, Facility Services, Capital Plan 2022/2023

Chart 3 and Chart 4 show the breakdown of McMaster's building age and areas (buildings and areas as listed in *Appendix C*).



Chart 5 shows building age (as a percentage of total building area) at Canadian campuses compared to that at McMaster during the 2013-14 and 2018-19 cycles.



Chart 5 – Building Age: Canadian Campuses compared with McMaster

Note: Chart 5 data comes from the Canadian Association of Business Officers, showing comparative data from 2013 and 2018. More recent data will be included as it becomes available through CAUBO.

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The Deferred Maintenance backlog was identified in 2012 as a high-risk item. Facility Services developed an Asset Management Plan which is updated on an annual basis.

Currently the University funds deferred maintenance from the operating budget. The asset management base was increased by \$2 million in each of 2013/14, 2014/2015, 2015/16 and 2016/17; i.e., until the allocation reached an annual base increase of \$8 million per year. This allocation continued for years 2017/18 and 2018/19. In 2019/2020 McMaster increased its allocation for the MUMC site to \$1.3 million per year. In 2020/21, an additional \$1.0 million was approved on a continued basis, dedicated initially to the tunnels, buried utilities and other failing infrastructure upgrades.

The total budget for deferred maintenance for 2022/23 is \$15.76 million, which includes the \$10.7 million base allocation, along with \$5.06 million from the Ministry of Colleges and Universities for deferred maintenance needs. Facility Services also receives a Campus Accessibility Action Plan (CAAP) fund of \$337,000 for accessibility upgrade projects and an Emergency Funding of \$869,000 every year, which makes the total funding received \$16.99 million.

Discussions are occurring with provincial Universities through OAPPA and CSAO related to the funding distribution methodology from the Ministry of Colleges and Universities. The current formula is based on the Council of Ontario Universities projected net assignable square meters. A new formula based on %CRV (Current Replacement Value) Base + %FCI (Facility Condition Index) may be adopted for distribution of FRP funds among colleges and universities. We anticipate this change would be a positive for the McMaster proportion of funds, but this has yet to be confirmed.

The 2022/23 approved project list for deferred maintenance items is attached as *Appendix E*.

3.4 Computerized Maintenance Management System

PeopleSoft's Maintenance and Asset Management modules are used to maintain McMaster University's facilities and grounds. These modules integrate with McMaster's Finance landscape (Asset Management, Project Costing, Expenses, Procurement and Payables and General Ledger). Proper maintenance of an organization's asset infrastructure is key to ensuring safety, complying with regulations and achieving the financial and operational targets that are established by the leadership team. This software enables the organization to create work orders, schedule resources and track costs associated with asset maintenance and repair. In addition, McMaster employees can create an online self-service request to report or request maintenance, repairs, renovations, cleaning, moves and other service activities. When required, a work order is generated from the service request and associated costs can be billed back to the requestor. Business process mapping of the work order process is underway to ensure the most efficient process is in place.

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3.5 Land Assets, Physical Growth Opportunities

The McMaster University Campus Master Plan was originally prepared in 2002 and updated in 2008 and again in 2017. The 2017 process included the sourcing of campus user input by way of on-campus visioning stations, online polling and meetings with stakeholders in a working committee that included students, staff and faculty. Facilities Services will be undertaking the development of a new plan in 2022, with consultant selection in the winter of 2021. Development of the updated plan will follow a similar process to previous updates: identification of issues and opportunities, stakeholder engagement at all levels within the University and consolidation of the findings to develop the updated plan.

This new plan will have a focus on post-pandemic space needs and incorporation of President David Farrar's strategic vision for the University. The transition to remote teaching and learning effectuated by the pandemic is anticipated to have an impact on the University's approach to capital improvement planning in the future. Post-pandemic space needs are anticipated to include integration of new future-focused technologies and changes to physical infrastructure requirements to accommodate new blended learning models currently being developed.

The Campus Master Plan provides an overall physical framework for campus growth and renewal. The Plan outlines a vision for the campus and recommends that this be updated every five to ten years. Specifically, it establishes a framework for future development that extends the structure of the campus' historic core to its periphery while respecting the surrounding built and open space context. Although it does not advocate for growth, it identifies area for potential new development, with supporting open space amenities and infrastructure initiatives. The capacity identified in the 2017 plan which was available for new development was estimated to be 3,000,000 gross square feet (close to 279,000 square meters) of floor area on the main campus. As outlined in the Campus Master Plan, physical capacity on McMaster's main campus has been largely determined by its physical structure, which contains a well-established hierarchy of streets and natural features. This clear structure has provided a strong setting and logic for development and infrastructure investments to continue to evolve in an integrated manner.

The Campus Master Plan is intended to be flexible, to accommodate the changing needs of various departments and Faculties and to enhance learning by providing the physical environment in which to gain knowledge, live and work.

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

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The identified development sites in the current Master Plan are primarily within the Core Campus, North Campus and West Campus:

- Within the Core Campus, there are several opportunities to introduce new buildings and/or building additions: north of Bates Residence beside the President's Residence, Forsyth Avenue frontages and a significant gateway/landmark development site at the location of existing building to be removed, T-13. Parking Lot 'l' at Cootes Drive and Main Street is being planned for development of a transit hub with the LRT development. The University continues to work with the City on the Light Rail Transit hub, planned for this south-west corner of campus.
- Even with years of substantial building activity in the North Campus (the David Braley Athletic Centre, Stadium and Les Prince Hall), there remains development potential in the area. The Peter George Centre for Living and Learning opened in 2019 at the location of previously demolished buildings T28, T29 and T18. The October 2016 McMaster Athletics and Recreation Complex Facility Assessment and Master Plan Study identified a number of potential additions that are either under consideration for future development or otherwise are already underway, (i.e. the Student Activity and Fitness Expansion "SAFE" project).
- West Campus has substantial potential to accommodate new buildings, subject to more detailed investigations. There is current interest in developing parts of the West Campus as a potential living laboratory. The development of a strategy for this area of campus, and connecting it to the Campus Master Plan, will be a focus of the master planning process.

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Figure 1 below highlights areas on campus where potential development can occur.



Figure 1 – Potential Development Sites

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

McMaster has recently acquired seven existing houses in the Westdale neighbourhood; 88 Forsyth Avenue North has been transformed into the new Home of the Bertrand Russell Archives and Research Centre. The Faculty of Engineering is using 47 Whitton Road as a "Smart House", i.e., as a space to monitor elderly health in a typical home; 182 Sterling Street is now being used by Student Affairs for recipients of the Wilson Leadership Scholar Award; other homes on Forsyth and Mayfair (106 and 96 Forsyth and 8 and 132 Mayfair) are managed by Housing and Conference Services.

Towards the end of 2020, McMaster purchased 30 South Street West in Dundas (Osler House) for use by the Faculty of Health Sciences.

McMaster owns land and a grouping of houses bound by Main Street West, Traymore Avenue, Dalewood Avenue and Forsyth Avenue South. This is a prime development location, immediately adjacent to the main campus.

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The University has received Board approval to build an undergraduate student residence at this location as part of a P3 partnership. It is anticipated that this building will be open in 2024.

McMaster also received Board approval to build a Graduate student residence ("10 Bay") on the south-west corner of King Street West and Bay Street South in downtown Hamilton; this is also part of a P3 partnership. Construction has begun on the 30-storey development on this site which will be the home for 630 graduate students in late 2023. These projects form part of a developing real estate strategy for the University. The University has also acquired 22 Bay Street, in partnership with Knightstone Capital, for potential future development.

3.6 Accessibility

3.6.1 McMaster University Accessibility Plan 2012-2025

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

3.6.2 Campus Accessibility Action Plan (CAAP)

The Campus Accessibility Action Plan (CAAP) Phase 2 (2018-2023) is a multi-year plan to address the identified accessibility issues on campus buildings. The Plan is posted at: https://facilities.mcmaster.ca/app/uploads/2018/10/Campus-Accessibility-Plan-2018-2013-V5-20Apr2018.pdf.

Funding for the plan is provided by an operating allocation through Deferred Maintenance.

3.7 Sustainable Infrastructure

The 2021/22 Energy Management Plan identifies and recommends energy-saving projects and projects aligned with the University's Net Zero Carbon strategy. More information about Sustainability, including LEED and Energy Management, is included in the Energy Management Plan posted on the Facility Services website and Section 5.3, Energy Management Projects and Sustainability.

3.7.1 LEED®

McMaster currently has seventeen LEED[®] certified, or anticipated to be certified, projects.

New buildings and major additions at McMaster are to be constructed according to McMaster's Sustainable Building Policy, which in turn references the LEED[®] Rating System. The LEED[®] Rating system has recently undergone some revisions, which will need to be reflected in an updated Sustainable Building Policy anticipated in late 2022.

Building	Construction / Renovation	Gross Area (square feet)	Attained/ Anticipated LEED® Certification
New Construction	Date		Level
Les Prince Hall	2006	106.016	LEED® Certified
David Braley Athletic Centre	2007	140,479	LEED® Certified
Engineering Technology Building	2009	125,600	LEED® Gold
Ron Joyce Centre (Burlington)	2010	105,745	LEED® Gold
CANMET Materials Technology			
Laboratory (MIP)	2010	145,000	LEED [®] Platinum
Halton McMaster Family Health			
Centre (Burlington)	2014	10,647	LEED® Gold
David Braley Health Sciences			
Centre (downtown Hamilton)	2014	192,081	LEED® Gold
L. R. Wilson Hall	2015	177,927	LEED® Gold
Peter George Centre for Living			
and Learning (PGCLL)	2019	335,167	LEED [®] Silver
McLean Centre for Collaborative			
Discovery (MCCD)	2024	190,647	LEED® Silver*
LSB Greenhouse Addition	2023	13,000	LEED® Silver*
Total New Construction		1,542,309	

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Renovation/Addition			
C.E. Burke Science Building	2005	196,401	LEED® Silver
Nuclear Research Building	2011	23,605	LEED® Gold
Ivor Wynne Centre	2012	20,010	LEED® Silver
McMaster Automotive Resource			
Centre (MARC)	2013	85,000	LEED® Silver*
Gerald Hatch Centre for			
Engineering Experiential Learning	2017	28,007	LEED® Silver*
ABB Chemistry Wing Renovation	2018	44,939	LEED® Silver*
ABB Tower Addition	2018	63,173	LEED® Silver*
Student Activity and Fitness			
Expansion (SAFE)	2022	104,033	LEED® Silver*
Total Renovation/Addition	565,168		
TOTAL New Construction +			
Renovation/Addition (gross squar	2,107,477		

* denotes anticipated certification level

3.8 Environmental Compliance

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

The approved Phase 1 of the plan authorized spending of \$400,000 per year for 5 years (2014/15 to 2018/19) from the deferred maintenance funds to achieve compliance for all buildings on campus except the E.T. Clarke building. While this was ongoing, in 2017, as part of the co-gen project Environmental Compliance Approval (ECA) process, the MOE asked McMaster to apply for a campus wide ECA. This changed the mitigation requirements and a re-audit of all campus buildings was undertaken again in 2017. A campus wide ECA application was made in June 2017 and McMaster received a conditional ECA in November of 2017. The ECA requires McMaster to replace the non-compliant cooling towers at the E. T. Clarke building and achieve compliance before 2028.

Phase 2 of the ECAP is for 2019/20 – 2027/28. Facility Services engaged mechanical, structural and environmental consultants to prepare a feasibility report for replacing the cooling towers. The consultant report estimates \$15.19 million in 5 phases for replacing the ten existing cooling towers, roof replacement, additional structural reinforcements and the acoustical sound barrier. This will be funded from the deferred maintenance funds of years 2020/21 to 2027/28 (8 years). Updated costing for this work is ongoing.

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4 RESEARCH PRIORITIES GUIDING FUTURE CAPITAL DEVELOPMENT

4.1 Overview

McMaster University continues to submit applications to the Canada Foundation for Innovation's (CFI) competitions and to the Province of Ontario seeking funding for new construction and renovation projects to support McMaster's innovative and transformative research and technology development activities.

During the last year McMaster has been awarded more than \$5M from the CFI John Evans Leaders Fund (JELF) and the Ontario Research Fund-Small Infrastructure Fund programs to provide McMaster researchers with the infrastructure they require to achieve advances in a variety of strategic research areas. Three of the eleven awarded projects include renovations which are expected to be completed in 2022 or 2023. The creation of a Virtual Care and Remote Automated Monitoring research facility in the Juravinski Cancer centre, a Mobility Assessment Lab at McMaster Innovation Park, and an Aging Swallow Research Lab at the Institute for Applied Health Science will contribute to our understanding of how to best provide remote postoperative and cancer care, how to keep older adults healthy and mobile in their community for as long as possible, and when and why swallowing impairments present in adults with dementia.

McMaster was also awarded more than \$58M from the 2020 CFI Innovation Fund and the Ontario Research Fund-Large Infrastructure Fund in support of the Canadian Centre for Electron Microscopy (CCEM), the Canadian Longitudinal Study on Aging (CLSA), the Centre for Emerging Device Technologies (CEDT), and the McMaster Nuclear Reactor (MNR). The five awarded projects include renovations that are expected to be completed in 2022. Expansion of the CCEM in the Arthur N. Bourns Building to include dedicated space to house and use environmental imaging, 3D imaging and testing technologies will enable the dynamic characterization of the structure and composition of materials as they evolve over time. Expansion of the CLSA operational hub at McMaster Innovation Park to accommodate IT infrastructure, additional space for data collection and additional space for software development will allow the CLSA to continue supporting the development of new interventions, programs and policies for Canada's aging population. Upgrades to the CEDT space in the Tandem Accelerator Building, the Engineering Technology Building and John Hodgins Engineering Building to accommodate new nanotechnology tools and instruments will allow for the development innovative manufacturing protocols and their efficient translation to industry. The addition of three neutron beamlines at the MNR will enable innovative materials research in areas such as clean energy technology, understanding and combating disease, and information technology.

4.2 Projections of Growth in Research

Recent trends (five years of McMaster's financial statements as reported to the Canadian Association of University Business Officers (CAUBO)) indicate a sponsored research income of approximately \$205 - \$220 million per year, not including intake for affiliated hospitals.

During the 2020/21 Fiscal, Research funding increased by \$38.4 million (19.6%) to \$234.9 million compared to \$196.4 million in $2018/19^2$

² Annual Financial Report 2020-2021

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5 PLANNING AND GROWTH ASSUMPTIONS

5.1 Enrolment Growth

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

International student enrolment has been steadily increasing. In 2006, 1,714 international students made up 7.8% of the McMaster student population. In 2020, 5,740 international students made up 15.7% of the McMaster student population. This trend of growth will continue in the short-term.

5.2 Efficient Space Management

In order to actively and responsibly plan for future growth, McMaster is presently reviewing its current space management practices. The McMaster University Space Management Policy was last approved in 1987 and will be reviewed in 2022, taking into consideration data on space usage (Campus Capacity Study from 2011). Space processes such as maintenance of the space inventory database, control of scheduling, maintenance of facilities, new project approval, evaluation of space requests, etc., will be reviewed through this policy revision.

In early 2019, the Board of Governor's approved a \$2 million annual allocation for 5 years to renovate classrooms on campus. Classrooms have been prioritized based on data from a survey completed in 2018 of faculty and students along with health, safety and legislative requirements. Funding will be used to replace seating, upgrade lighting, flooring, electrical, accessibility and audio visual in classrooms identified. To date, classrooms in Togo Salmon Hall, Burke Sciences, John Hodgins Engineering, Chester New Hall and McMaster University Medical Centre have been renovated. The group is working with the Teaching and Learning group to ensure renovations are aligned with the teaching strategy for the campus.

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5.3 Student Residences

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

McMaster's objective is to guarantee all first-year entrants a space in residence if they so desire. Currently, admission is given using an incoming average percent cut-off. This cut-off percentage changes from year to year based on factors including number of applicants, existing capacity and department cut-off percentages.

Since 2012, configurations to campus residences – such as changing bunk and loft rooms to double rooms – have impacted total capacity. McMaster has thirteen different residence buildings on campus, with a variety of room types and lifestyle themes for a total capacity across all buildings of 4,298 students living on campus. To accommodate public health restrictions in the 2021/22 year there were approximately 3,500 students living on campus. Given enrolment growth as noted above, more capacity is needed. To this end, new residence buildings (approved by Board) are being planned which includes the following:

- A new Main Street Undergraduate student residence bordering Main Street West, Traymore Avenue, Forsyth Avenue and Dalewood Avenue and is now moving through the site plan approval process with the City of Hamilton. This new residence will include 1,366 beds and is part of a P3 partnership. It is expected to open in 2024.
- A new 30-storey Graduate Student Residence also working in partnership with a P3 developer and an integrated McMaster parking garage, will be located on the south-west corner of King Street West and Bay Street South in downtown Hamilton. This new residence, 10 Bay, will be home to 630 graduate students and will be open for staggered occupancy in the fall of 2023.

Research shows that students who stay in residence develop stronger relationships and support networks, leading to a more positive overall student experience. McMaster is one of only two universities in Ontario that cannot guarantee residence to all first-year students, for lack of space.

5.4 Planning for Return to Campus

Facility Services continues to work with the Return to McMaster Working committees and the Office of the Provost and Vice-Provost (Academic) to ensure instructional spaces are ready to support a mix of in-person and enhanced blended learning as continuing and evolving provincial COVID-19 Public Health restrictions allow.

Space Planning has also created a detailed guide for teams returning to in-person work to be able to assess and set up office spaces considering both physical distancing and hybrid work. The guide can be found here: <u>https://facilities.mcmaster.ca/services/space-planning/</u>.

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6 PROJECTS AND INITIATIVES TO SUPPORT THE CAPITAL PLAN

6.1 Addressing Research, Program and Enrolment Growth

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

As noted in part in the Campus Capacity Study, the most critical space needs at McMaster in 2016 were for administrative offices, graduate student offices, assembly facilities, service space, classrooms, labs, research space, recreation space and quiet study space. The new Peter George Centre for Living and Learning (PGCLL) has addressed some of the need for new large classrooms. A new addition has recently been completed on the A. N. Bourns Science Building (ABB) as part of a Strategic Innovation Fund (SIF) project. Another project, the Student Activity & Fitness Expansion (SAFE) is underway to increase athletics and recreation space. The East addition, which includes the High-Performance Area and Turf Gym opened in 2021 while the West addition, which includes the MSU Hub, multi-faith prayer space, studios and the Pulse expansion is expected to be completed by Fall 2022.

6.1.1 Ongoing Projects and Initiatives

The following summarizes the ongoing major capital projects at McMaster. These are also summarized in *Appendix A*.

- o Athletics and Recreation Student Activity & Fitness Expansion (SAFE)
 - In March 2017 students voted in a referendum to have a significant expansion and improvement of campus activity and athletic recreation space, including adding nearly 100,000 square feet of fitness studios, study areas, multi-faith prayer space and meeting facilities. The plan calls for the expansion of the Pulse fitness area, providing all students with Pulse memberships, a small grocery store and rooms for events and meetings. The expanded facilities will contribute to a revitalization of the north end of campus, which is also the site of the Peter George Living and Learning Centre. The project is anticipated to be completed in Fall 2022.
- o The McLean Centre for Collaborative Discovery (DSB Expansion)
 - This \$128.56 million project when complete, will create a new 10-storey building on McMaster campus, measuring approximately 190,647 sf that will support and enhance learning experiences for graduate and undergraduate students and create a space for collaborative learning for the Faculty of Business.

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The fourth floor will be assigned to several components of the One Stop Shop original project, including the Registrar's Office, Student Services, Aid and Awards, Systems and Records, Scheduling and Exams and Communications. The fifth floor will be assigned to the Faculty of Health Sciences and will house collaborative programs with DSB and FHS, including the Health Leadership Academy, Masters in eHealth, and the Biomedical Discovery and Commercialization program. This project is expected to be completed in 2024.

- o Classroom Reconfiguration Plan
 - At the March 7, 2019 meeting of the Board of Governors, the Board approved a \$2 million allocation per year, from the McMaster Strategic Reserve, beginning in 2018/19 for a five-year period, or up to a total commitment of \$10 million, for classroom renovations. The Classroom Renovation Committee is chaired by the Assistant Vice-President and Chief Facilities Officer and recommends extensive classroom renovations for each summer based on feedback from the academy.
- o Research Capital Commercialization Project (at McMaster Innovation Park)
 - McMaster is investing \$70 million into the renovation of the warehouse at 200 Longwood at MIP. This space will be sublet by McMaster to research intensive companies in the next phase of commercialization of research. This space will allow for a continued commitment to research by the University.
- o Advanced Manufacturing Centre (at McMaster Innovation Park)
 - The McMaster Manufacturing Research Institute (MMRI) is being relocated from their current location in the John Hodgins Engineering building, over to newly renovated space at the McMaster Innovation Park (MIP) warehouse. This project will build a space for the MMRI of 15,000 SF on the ground floor of the warehouse, with an estimated cost of \$9.06 million, which includes the construction of a concrete slab to accommodate a second level.
- CFI Projects (University Contributions)
 - Includes 20% contribution (for construction & renovation aspects of projects) from the Strategic Capital Reserve to match all successful submissions to CFI.
- o McMaster Main Street Residence (P3)
 - The University, in partnership with Knightstone Capital, is in the process of finalizing the site plan approval process for c an undergraduate student residence on Main Street West.

The building will be situated on Main Street between Forsyth, Traymore and Dalewood. The building will accommodate 1,366 students and is expected to open in 2024.

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- o Graduate Student Residence Partnership and Parking Structure (P3) 10 Bay
 - In partnership with Knightstone Capital, a new Graduate Residence will support student recruitment and retention and will also further enhance the student experience at McMaster. A total of 630 new graduate student beds and 265 parking spaces will be housed in a 30-storey building located in downtown Hamilton. This project's integrated parking structure has been designed to meet the needs of the building and provide public parking in the downtown core. Construction of the building is underway, and is anticipated to be ready for staged occupancy in late 2023.
- Greenhouse and Phase One LSB Renovation
 - This \$24.435 million project involves demolishing the existing Greenhouse and building new 13,000 sf greenhouse on the west side of LSB, adjacent to University Ave. Phase 1 also includes interior renovations and renewal of LSB level 1 and is expected to be completed in 2023.
- o Lot K Parking Structure
 - This \$17 million project envisioned a parking structure on the current Lot K
 parking footprint. The University currently leases land at Ward Ave and this
 lease is set to expire in Fiscal 2024 with no option to renew. This project is
 currently on hold pending the updated Campus Master Plan.
- Peak Shavers and Electric Boilers
 - This project anticipates the purchase of Peak Shavers that are electrical generators that are fuelled by natural gas. The peak shavers' electrical output is synchronized with the electrical grid. The peak shaver generators would only be operated at times when the IESO is experiencing the potential of a coincidental peak demand. With the operation of the peak shavers, this would reduce McMaster's typical 9-11MW electrical demand down to approximately 6 MW, resulting in a reduction of GA costs by 30%. This savings stream will provide payback to central bank to purchase and install 2 electric boilers. This project is part of the Net Zero Carbon strategy for the University and will reduce carbon on campus by 22% by 2024.
- Psychology Atrium Addition
 - The Faculty of Science is intending to build an atrium off the front of the Psychology building. The atrium is intended to be approximately 6,400 sf double-height space. The area will be used for gatherings as well as for a memorial garden. The full scope is being finalized with the Faculty.
- MRI Installation at IAHS
 - Includes the acquisition and installation of a 3T MRI unit at the IAHS as well as approval for base operating funding for the expansion of Clinical operations in partnership with Mohawk College, Hamilton Health Sciences & St. Joseph's Healthcare Hamilton.

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- Parking & Security
 - Renovation and relocation of Security and Parking offices from E.T. Clarke into the basement of Commons Building. Includes offices, interview rooms, vault, monitoring & dispatch centre, locker rooms, and secure rooms.

Ongoing projects with annual allocations or loans:

- Energy Management Projects and Sustainability
 - Projects included with listing of other projects in Appendix A. The Energy Management Plan is updated annually. See the most recent report, posted on the Facility Services website, for more details: <u>https://facilities.mcmaster.ca/app/uploads/2020/09/McMaster-EMP-Report-2020-.v11-1.pdf</u>
- o Existing Building Infrastructure Asset Management and Renewal
 - See the Asset Management Plan, posted on the Facility Services website, for details: <u>https://facilities.mcmaster.ca/app/uploads/2020/09/Asset-Management-Plan-Update-on-Implementation-2019-2020.pdf</u>
- o Deferred Maintenance Facility Renewal Program (FRP) Projects
 - Facility Renewal Program (FRP) under the deferred maintenance budget, (Ministry funding portion). For a list of approved projects for the 2021/22 fiscal, see the Capital Plan Update 2021/2022, posted on the Facility Services website, for more details: <u>https://facilities.mcmaster.ca/app/uploads/2021/03/010121_UPC_Capital-Plan-V12.pdf</u>
- o Environmental Compliance
 - The Cogeneration project completed at the E.T. Clarke Centre required an Environmental Compliance Approval (ECA) and the Ministry of the Environment asked McMaster to submit a campus wide ECA application. Some of the major noncompliance noise sources such as cooling towers will be mitigated as part of a multi-year plan. McMaster is implementing a 9-year phased plan given that most of the non-compliant sources are at the end of their service life and are identified for replacement as part of the deferred maintenance/Asset Management Plan.
- Campus Accessibility Action Plan (CAAP)
 - The approved Campus Accessibility Action Plan (CAAP) now invests \$337,000 annually for accessibility-related improvements to McMaster buildings. The CAAP Phase 1 ran from 2012-2013 through to 2016-2017. Phase 2 of CAAP (2018-2023) is underway. See the report, posted on the Facility Services website, for details: https://facilities.mcmaster.ca/app/uploads/2020/09/Campus-Accessibility-Plan-

https://facilities.mcmaster.ca/app/uploads/2020/09/Campus-Accessibility-Plan-2018-2013-V5-20Apr2018.pdf

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Projects that have reached Substantial Completion:

- o CCEM/CALM Renovation
 - The Departments of Engineering, Science, and Health Sciences, along with the Canadian Centre of Electron Microscopy are renovating existing space within the basement of the Arthur Bourns Building (ABB) which will create two new distinct labs, CCEM and CALM. The CCEM lab space will be designed for a new ultrahigh resolution transmission electron microscope complete with adjoining control room and equipment service room. The CALM lab space will be a new Optical Microscopy BSL2 facility with an adjoining anti-chamber office. The estimated project total is \$3.86 million.
- o Global Hub International Affairs & Student Services
 - Includes relocation of the Office of International Affairs to the first floor of Gilmour Hall, relocation of Recruitment and Admissions to the north-east side of the Arts Quad, within Togo Salmon Hall .This work will be completed in early 2022.
- o ABB 5th Floor Fit-Out
 - This \$2.8M project includes offices, a boardroom and meeting space for the School of Interdisciplinary Science as well as offices, grad space and a dry lab for the School of Engineering.
- o NF-91 Substation Upgrade
 - Incoming power to campus is delivered via two 115kV service lines to a university-owner substation (NF91). From here, two transformers (T1 & T2) step down the voltage to deliver 13.8kV electricity to the electrical switchgear in E.T. Clarke for distribution to the 50+ buildings on campus, including the hospital. As the substation was built in the early 1960s, the transformers and much of the associated equipment are nearing the end of their lifecycle. This \$12M project will replace the aging transformers in a phased approach so as to maintain power supply to campus at all times, and limit periods when only one electrical feed is in service. Other work will include the replacement of all end-of-life equipment and associated circuits, as well as the safe decommissioning, dismantling and disposal of obsolete equipment.

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6.1.2 Planned Major Projects and Initiatives (see Appendix B)

Appendix B provides a summary of potential future capital projects for the University in several categories of prioritization. These projects are at various stages of planning/development and available funding. Appendix B includes a description of each project, along with anticipated cash flows and timelines. All projects will flow through appropriate governance as the projects evolve.

6.2 Design Principles and Standards

All projects will be executed in accordance with appropriate campus planning principles, design standards, code compliance and functional requirements; and all major projects are to adhere to McMaster policy on sustainable buildings.

The overall planning policies for the McMaster Campus follow from the twelve principles as detailed in Section 2.2 of the McMaster University Campus Master Plan. The Campus Master Plan Update can be found here: <u>https://facilities.mcmaster.ca/app/uploads/2018/10/Campus-Master-Plan-2017-</u> Update1.pdf

The policies are intended to guide the University's growth and renewal over time and are supplemented by area-specific policies for the campus found elsewhere in the Campus Master Plan. In all cases, the policies are intended to reflect the intent of the University's Environmental Policies, including its Sustainable Building Policy, the City of Hamilton's Official Plan and Zoning By-law, the principles of Hamilton's Vision 2020 document and the planning and environmental policies of the Hamilton Conservation Authority and Royal Botanical Gardens.

Also, the space standards from the McMaster Space Management Policy (1987) need to be reviewed and revised, to more appropriate and up-to-date minimum standards, based on current minimum space standards outlined by the Council of Ontario Universities and the analysis of McMaster's current spatial data to reflect how space is actually being used on campus.

McMaster University, Facility Services, Capital Plan 2022/2023
7 CONCLUSIONS AND RECOMMENDATIONS

McMaster has recently successfully completed a great deal of new construction, addition and renovation projects. Areas for development on campus still exist, and these locations need to be the focus of future growth. McMaster's many ongoing addition and renovation projects and plans for new residence buildings and new teaching facilities, will help support existing needs and new growth over the next few years.

A comprehensive review of the 2019-20 Inventory of Physical Facilities of Ontario Universities report will also help the university determine what types of spaces will need to grow in the next upcoming years.

Facility Services has recently completed a strategic planning process which aligns the direction of the department and the goals of the President. Development of goals in Sustainability, along with executing the Net Zero Carbon Strategy are a primary focus of the department. As we move into 2022, a focus on the Campus Master Plan will allow us to think about how we use our campus in a post-pandemic world, and ensure we are prepared for the coming years with our facilities and alignment with the academic direction of the University.

McMaster University, Facility Services, Capital Plan 2022/2023

Active Projects at August 2021 (greater than \$2M)*	Project Budget
Athletics and Dec. Dules and Chudent Cross Europeien (CAEE)	
Athletics and Rec - Pulse and Student Space Expansion (SAFE)	\$ 64,000,000
McLean Center for Collaborative Discovery (DSB Expansion)	\$ 128,560,000
Classroom Reconfiguration Plan	\$ 10,000,000
Research Capital Commercialization Project (@ MIP)	\$ 70,000,000
Advanced Manufacturing Centre (@ MIP)	\$ 9,060,000
CFI (University contribution)	\$ 1,345,024
McMaster Main Street Residence (P3)	\$ 12,900,000
Graduate Student Residence & Parking Garage Partnership (P3)	\$ 30,900,000
Greenhouse and Phase One LSB Renovation	\$ 21,935,333
Lot K Parking Structure – On Hold	\$ 17,000,000
Peak Shavers and Electric Boilers	\$ 31,600,000
Psychology Atrium Addition	\$ 5,000,000
MRI Installation at IAHS	\$ 4,000,000
Parking and Security	\$ 2,300,000
*Energy Management Projects and Sustainability	\$ 27,830,778
*Existing Building Infrastructure Asset Management and Renewal	\$ 11,569,000
*Deferred Maintenance FRP Projects (Ministry Funding)	\$ 5,060,900
*Environmental Compliance	Incl. in DM
*Campus Accessibility Action Plan (CAAP)	\$ 337,000
**CCEM/CALM Renovation	\$ 3,860,000
**Global Hub - International Affairs - One-Stop Shop (Student Affairs) Reno	\$ 2,753,100
**ABB 5 th Floor Fit-out	\$ 2,815,000
**NF-91 Substation Upgrade	\$ 12,000,000

Appendix A: 2021/22 Governance Approved Capital Projects

* Note: the green highlighted lines represent long-term, ongoing projects with annual allocations or loans. The amount denotes the 20/21 allocated.

** The yellow highlighted lines represent projects that are substantially complete.

McMaster University, Facility Services, Capital Plan 2022/2023

Appendix B: 2022/23 Subject to Approval Capital Projects

High	Priority:	Estimated Project Budget
1	NEXUS Pandemic Centre	\$ 409,000,000
2	Central Animal Facility (CAF) Renovation	\$ 36,000,000
3	Bates Retrofit	\$ 44,000,000
4	Light Rail Transit – Transit Hub (Phase 1)	\$ 20,000,000
5	McMaster Bridge to Impact – Eng Tower	\$ 103,000,000
6	Life Sciences Building Deep Renovation (Phases 2-4)	\$ 59,500,000
7	Net Zero Capital Infrastructure (Phases 3-5)	\$ 115,000,000
8	Athletics & Recreation – Aquatic Centre/Pool Replacement	\$ 12,000,000
9	Sterling Street Entrance – Redesign and Pedestrian Route from Traymore Residence	\$ 4,500,000
10	Arts Quad Renovation	\$ 63,000,000
Med	lium Priority:	
11	Thode Library – Major Renovation and High-Density Shelving	\$ 8,000,000
12	Watershed Trust – Redevelopment of West Campus	\$ 2,000,000
Low	Priority:	
13	Transit Hub - Academic and Commercial Building (Phase 2)	\$ 34,900,000
14	Transit Hub - Academic Classroom (Phase 3)	\$ 56,250,000
15	Athletics and Recreation (Phase 3 Expansion)	\$ 37,900,000
16	MAC Forest (Ancaster) – Proposed Teaching and Research Building	\$ 4,000,000
17	IAHS Expansion with Mohawk	\$ 20,000,000

McMaster University, Facility Services, Capital Plan 2022/2023

Detail Table:

1. NEXUS Pandemic Research Centre

Champions: Dr. David Farrar, President, Dr. Paul O'Byrne, Dean and Vice-President, FHS and Dr. Karen Mossman, Vice-President, Research

Description: To be constructed at 606 Aberdeen Avenue (Glass Warehouse building at MIP). This research centre, intended to be similar to The Francis Crick Institute in Paris, France, would house some of McMaster's growing research programs in Health Sciences and other collaborative areas with a focus on pandemic planning.

Total estimated cost: \$409M

Cash outflow timing: 2023 - 2027

Sources of funding: TBD. \$90M earmarked from McMaster Capital Reserves.

2. Central Animal Facility (CAF) Renovation

Champion: Dr. Karen Mossman, Vice-President, Research and Dr. Paul O'Byrne, Dean and Vice-President (Health Sciences)

Description: The Central Animal Facility (CAF), located in the MUMC building, is in need of a complete renovation in order to meet accreditation requirements by the Canadian Council on Animal Care. The facility has undergone minor renovations in the past several years, including an overhaul of the ventilation system, but a more extensive complete renovation is now an urgent need. An external consultant has been engaged and the current estimate is a \$36M investment in order to meet the current requirements. It is anticipated that the new NEXUS Pandemic Research Centre will house a significant animal facility, which will in large part replace the CAF in MUMC.

Total estimated cost: \$36M

Cash outflow timing: 2023 - 2025

Sources of Funding: Potentially funded through a central bank loan (approx. 40 years) with requisite operating fund allocation to service the loan.

3. Ancillary Project: Bates Residence – Retrofit

Champion: Saher Fazilat, Vice-President Operations and Finance

Description: This multi-year, multi-phase project calls for major upgrades to nearly all building systems at Bates Residence and includes interior finish replacements and suite re-arrangements.

Total estimated cost: \$44M

Cash outflow timing: 2024 – 2028

Sources of funding: Housing & Conference Services (H&CS) had been saving toward this project over several years and transferring savings (equity) into the capital project account for this project. The savings was returned to H&CS in 2021 to assist in their COVID accumulated deficit. H&CS to develop funding strategy with Financial Affairs.

McMaster University, Facility Services, Capital Plan 2022/2023

4. Light Rail Transit – Phase 1 Transit Hub

Champion: Saher Fazilat, Vice-President Operations and Finance

Description: The City of Hamilton is proceeding with a Light Rail Transit running 17 kilometres from Eastgate Square to McMaster University. The University will work with Metrolinx to develop a multi-story parking structure integrated with a transit hub for the LRT development. This project was approved in 2017/2019. The business case will be re-developed and re-submitted for approvals.

Total Estimated Cost: \$20M

Cash Outflow Timing: 2023-2025

Sources of Funding: Land lease for Lot I with Metrolinx. Parking loan to be repaid from land lease.

5. McMaster's Bridge to Impact – Engineering Tower

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic) and Dr. Heather Sheardown, Acting Dean, Faculty of Engineering

Description: The Faculty of Engineering is reimagining the curriculum, beginning with Level 1, and working through all levels to increase integration, experiential learning, PBL, innovation, etc. Space to support this transition is needed.

Total Estimated Cost: \$103M

Cash Outflow Timing: 2023 - 2026

Sources of Funding: \$30M has been secured in Faculty reserves. Remaining balance from fundraising and loan.

6. Life Science Building Deep Renovation

Champion: Dr. Maureen MacDonald, Dean, Faculty of Science

Description: Revitalization of the buildings envelope, systems and infrastructure. The proposed deep retrofit will solve existing building envelope deficiencies of barrier leaks, thermal bridging, and roof leaks. Student study space and an identifiable entrance is lacking within the current configuration. With a growing enrolment for the programs, additional space is needed to increase capacity and must be located within close proximity to required services. Overall this project would offer a platform for future development and growth of life sciences research and education. It would also bring an aging building in line with current industry standards for both research and operations.

Total estimated cost: \$59.5M

Cash outflow timing: 20252 - 2028

Sources of funding: Funding to be confirmed. Deferred maintenance funding set aside for a portion of the total renovation.

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7. Net Zero Capital Infrastructure (Phases 3-5)

Champion: Saher Fazilat, Vice-President Operations and Finance

Description: The plan proposed within the report reduces these emissions by 75% by 2030, and by 90% by 2050. Other strategies are contemplated to eliminate the remaining 10% to become completely net zero. The net-zero report estimates energy conservation measures, ground source heat pump conversion (all blocks for a total of 5 blocks), waste water heat recovery and reactor heat recovery. An acceleration of this 2050 strategy is being developed.

Total estimated cost: \$115M

Cash outflow timing: 2023 - 2035

Sources of funding: TBD. Government funding and/or donor needed.

8. Athletics & Recreation – Aquatic Centre/Pool Replacement

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic)

Description: This phase includes the demolition and re-construction of the pool. Options for partnering around major events in Hamilton (eg. Commonweath Games) are ongoing which may provide opportunity for a more extensive renovation.

Total estimated cost: \$12M

Cash outflow timing: 2023 - 2024

Sources of funding: TBD

9. Sterling Street Entrance Redesign and Pedestrian Route from Traymore Residence

Champion: Saher Fazilat, Vice-President Operations and Finance

Description: A redevelopment of the entrance to campus at Sterling Street is being considered in conjunction with work on Forsyth to accommodate the new student residence at Main/Traymore. The entrance to campus will be modified to allow for easier pedestrian and vehicular access to campus, including consideration of access to the Wilson Building and bus routes on campus. Pedestrian access from the new student residence will encompass new, expanded sidewalks, redevelopment of the road to slow vehicles and a pedestrian walkway over the entrance to the hospital underground parking lot at King Street.

Total Estimated cost: \$4.5M

Cash outflow timing: 2023-2024

Source of funding: TBD

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10. Arts Quad Renovations

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic)

Description: L. R. Wilson Hall (phase 1), allowed for the migration of teaching and learning spaces from the Arts Quad to this new building. Phase 2 – Arts Quad Renovation is to allocate \$63 million toward critically needed design and construction renovation improvements in the teaching and learning spaces within the existing Arts Quad.

Total estimated cost: \$63M

Cash outflow timing: 2027 - 2029

Sources of funding: to be determined. Government funding and/or donor needed.

11. Thode Library – Major renovation and high-density shelving

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic)

Description: This is a multi-phase project to thoroughly renovate and expand library space on campus.

Total estimated cost: \$8M

Cash outflow timing: 2023-2026

Sources of funding: TBD

12. Watershed Trust – Redevelopment of West Campus

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic)

Description: Potential redevelopment of components of west campus, in conjunction with the campus Master Plan. May include the development of a living laboratory and optimizing green space near Coldwater Creek.

Total estimated cost: \$2M

Cash outflow timing: 2024

Sources of funding: TBD

13. Transit Hub - Academic and Commercial Building (Phase 2)

Champion: Saher Fazilat, Vice-President Operations and Finance

Description: The Transit Hub (Phase 2) may incorporate a mixed-use McMaster building with programs appropriate to the accommodation of transit users (students, faculty, and staff). A mixed-use building incorporating classrooms for population flow throughout the day along with mixed support and commercial services for users (health clinics, vision, foot care, hair, nails, food, etc., etc.). Non-academic services would be either run by ancillary services using a full-cost recovery model or involve commercial leases using a cost plus model.

Total estimated cost: \$34.9M

Cash outflow timing: TBD

Sources of funding: To be determined, likely a series of loans for ancillary units or recoveries from commercial leases involve upfront central bank investment. Academic space would need to be funded by the UF/McMaster Capital Reserve.

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14. Transit Hub - Academic Classroom (Phase 3)

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic)

Description: The Transit Hub may incorporate a mixed-use McMaster building with classroom spaces to accommodate growth.

Total estimated cost: \$56.25M

Cash outflow timing: TBD

Sources of funding: TBD

15. Athletics and Recreation – Expansion

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic)

Description: This phase includes a proposed new Field House (covered playing field) and a high-performance centre (totalling 111,000 sf and a cost of \$25.8M) and covered parking (totalling 71,700 sf costing \$12.1M). Additional information is available upon request to Financial Affairs within the Athletics and Recreation Business Case (November 3, 2017)

Total estimated cost: \$37.9M

Cash outflow timing: 2026-2030

Sources of funding: TBD

16. MAC Forest (Ancaster) - Proposed Teaching and Research Building

Champion: Dr. Karen Mossman, Vice-President (Research)

Description: This is a planned 5,000SF building, which includes extensive mandatory site assessments and permitting. The property is owned by McMaster, on Lower Lions Club Road.

Total estimated cost: \$4M

Cash outflow timing: TBD

Sources of funding: to be determined.

17. IAHS Expansion with Mohawk

Champion: Dr. Susan Tighe, Provost and Vice-President (Academic) and Saher Fazilat, Vice-President Operations and Finance

Description: This building is a partnership with Mohawk College. In the Mohawk capital plan and in the University master plan, there is a wing to be constructed on IAHS to support future growth. If built in similar shape/size to the current arm of the building, it would be 60,000 sf of space. Use TBD.

Total estimated cost: \$20M

Cash outflow timing: TBD

Sources of funding: to be determined.

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Appendix C: Schedule of Facilities

Bldg. Code	Building Name	Building Section	Construction / Renovation / Acquisition Date	Current Total Building Gross Area (Square Feet)	Current Total Building Gross Area (Square Metres)
1	University Hall	Addition	1929	48,652.83	4,520.00
2	Hamilton Hall	Addition	1991	51 865 81	1 818 /0
	Refectory		1929	51,005.01	4,010.49
4	Relectory	Addition	1929	23,365.44	2,170.72
5	Edwards Hall	Addition	1929	25 025 44	2 324 94
6	Wallingford Hall		1929	23,461,70	2,179.66
7	Alumni House (Formerly President's Residence)		1929	6,523.90	606.09
8	Alumni Memorial Building		1949		
Ŭ		Addition	2003	14,062.10	1,306.41
9	Nuclear Research Building		1950		
	5	Addition	1957		
		Addition	2001	66,814.39	6,207.26
		Addition	2011		
		Addition	2017		
10	Mills Memorial Library/Alvin A.		1950		
	Lee Building	Addition	1962	000 004 05	22.469.00
		Addition	1968	238,624.05	22,168.90
		Addition	1990		
11	Burke Science Building		1953		
		Addition	1958		
		Addition	1961	196,401.35	18,246.28
		Addition	1963		
		Addition	1969		
12	E. T. Clarke Centre		1954		
		Addition	1958		
		Addition	1965	53 465 93	4 967 15
		Addition	1968	00,100100	1,001110
		Addition	1996		
		Addition	2002		
15	Nuclear Reactor		1957	24,332.68	2,260.58
		A 1 11/1	1958		
		Addition	2017		
16	Jonn Hodgins Engineering	Addition	1989	278,377.00	25,862.06
	Building	Addition	2001		
		Addition	2016		
17	Divinity College	Addition	2017	20 1 40 20	2 544 00
1/			1959	30,140.20	3,344.08
10			1959	58,092.50	5,452.71
19			1909	09,909.40	0,002.23
20		10	1909	50,127.80	0,313.13
22	General Sciences Building	١٥	1962	J9,J0J.ZU	5,535.40

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23	Chester New Hall		1964	87,870.01	8,163.39
			1964		
24	Ivor Wynne Centre	Addition	1972	246,954	22,942.77
		Addition	2011		
			1968		
05	Arthur N. Dourso Duilding	Addition	2003	252 649 00	20 702 07
25	Annur N. Bourns Building	Addition	2006	352,646.00	32,762.07
		Addition	2019		
26	Matthews Hall		1964	61,808.30	5,742.18
27	McKay Hall		1964	66,824.30	6,208.18
20	Commono Building		1965	EC 119 00	E 044 07
20		Addition	1968	56,446.90	5,244.27
			1965		
29	Togo Salmon Hall	Addition	2000	146,039.68	13,567.53
		Addition	2015		
30	Biology Greenhouse		1967	8,377.60	778.30
31	Campus Services Building		1968	51,935.60	4,824.98
	· · · · · · · · · · · · · · · · · · ·		1966		
32	Tandem Accelerator Building	Addition	2002	36,493.00	3,390.31
	5	Addition	2011		
33	Applied Dynamics Laboratory		1967	21,480.00	1,995.56
04	Developer v Devildire e		1970	400.004.5	0 5 4 0 0
34	Psychology Building	Addition	2013	102,691.5	9,540.3
35	Woodstock Hall		1968	64,341.30	5,977.50
36	Brandon Hall		1968	118,354.70	10,995.51
37	Health Sciences Centre ¹		1970	4 070 004 74	440.007.50
		Addition	2005	1,273,021.74	118,267.59
38	Kenneth Taylor Hall		1971	126,990.70	11,797.82
39	Life Sciences Building		1970	106,851.52	9,926.83
10			1971	101.055.40	45 044 05
40	Bates Residence	Addition	1972	164,055.40	15,241.25
42	H. G. Thode Library		1976	87,793.70	8,156.30
40	Communications Research	1	1983	00.000	0.004.00
43	Laboratory	Addition	1989	28,862	2,681.36
44	Health Sciences Parking Garage		1986	N/A	N/A
45	Hedden Hall		1989	104,279.10	9,687.85
46			1990		
	DeGroote School of Business	Addition	1999	74,422.44	6,914.07
		Addition	2001		
48	Institute for Applied Health Sciences*		2000	177,444.25	16,485.11
		1	1955		
				1	25.60 11.495.00
49	Information Technology Building	Addition	1959	123,725.60	11,495.00
49	Information Technology Building	Addition Addition	1959 2001	123,725.60	11,495.00
49	Information Technology Building Mary E. Keyes Residence	Addition Addition	1959 2001 2002	123,725.60	11,495.00
49	Information Technology Building Mary E. Keyes Residence McMaster University Student	Addition Addition	1959 2001 2002 2002	123,725.60	11,495.00

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	· · · · ·		Grand Total:	7 387 987 95	686 366 54
200	(Waterloo)	10	2010	59,816.34	5,557.12
134	Integrated Health Building	76	2019	3,000.00	404.01
T33	Children's Centre)		2013	7,805.02	725.11
132	Temporary Portables (Offices)		2013	0,031.30	500.55
T32	Centre		2013	6.031.56	560 35
T31	Stone Church Family Health Care		N/A	15,726.01	1,460.00
TB26	Temporary Building, Multi-use (Formerly Scourge Building)		1989	2,112.00	196.21
T13	Preliminary Laboratory		1967	23,066.60	2,142.96
TBD	30 South Street West, Dundas		2020	TBD	TBD
97	8 Mayfair Crescent		2019	3,315.28	308.00
96	132 Mayfair Crescent		2019	4,543.02	422.06
95	106 Forsyth Avenue North		2018	3,087.09	286.80
94	96 Forsyth Avenue North		2017	3,611.29	335.50
92	Cairns Research Complex- (Brock University)		2012	10,176	967.53
91	Canadian Martyrs – Leased Space		2016	8,049.47	747.82
90	Halton McMaster Family Health Centre/JBH		2013	31,107.70	2,890.00
89	Peter George Centre for Living and Learning (PGCLL)		2019	335,165.00	31,137.85
87	182 Sterling Street		2015	3,937.00	345.39
86	47 Whitton Road		2015	3,587.00	358.33
85	One James North – Leased Space ¹		2015	54,195.96	5,034.97
83	David Braley Health Sciences Centre		2015	232,843.00	21,631.82
82	88 Forsyth Avenue North		2015	4,754.00	429.92
74	L.R Wilson Hall		2016	178,605.13	16,592.96
73	St. Paul's Anglican Church (Hamilton) – Leased Space		2013	5,808	539.5
59	MIP – Atrium Building		2009	104,992.98	16,722.55
50	MIP - MARC	Addition	2013	105,000.00	9,754.82
57	Ron Joyce Centre (Burnington)		2010	103,391.07	9,624.00
50	Engineering Technology Building		2009	138,682	12,884.00
55	Ron V. Joyce Stadium		2008	56,941.95	5,290.08
54	David Braley Athletic Centre		2007	139,451.41	12,955.46
53	Les Prince Hall		2006	106,016.20	9,849.23
		Addition	2017		
52	Michael G. Degroote Centre for	Addition	2005	304,365.61	28,276.49
			2004		

* values for IHAS (Bldg#48) show McMaster space in shared building

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Appendix D: Schedule of Properties

Of McMaster's on-campus buildings, the following have unique ownership arrangements:

- o Divinity College owned by College of Divinity
- Health Sciences Centre owned by McMaster and leased to Hamilton Health Sciences (HHS then leases approximately 38% of the building back to the Faculty of Health Sciences).
- o Institute for Applied Health Sciences owned jointly by McMaster and Mohawk.
- McMaster University Student Centre operated by McMaster Students Union under the direction of a management committee.
- David Braley Athletic Centre owned by McMaster and operated by Athletics and Recreation; construction paid for from external sources, operating expenses paid for by McMaster and the students.

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

- o 4350 South Service Road, Burlington Ron Joyce Centre (east side)
- o 4350 South Service Road, Burlington Farmland (west side)
- 200 Longwood Rd South, Hamilton McMaster Automotive Resource Centre (MARC) Warehouse (MIP)
- 175 Longwood Rd South, Hamilton The Atrium Building at McMaster Innovation Park (MIP), aka The Atrium@MIP (Various Suites)
- 155 Chatham Street, Hamilton (MIP) (undeveloped)
- o 270 Longwood Road South, Hamilton BEAM (Fraunhofer)
- o 565 Sanatorium Road, Hamilton Chedoke Hospital (leased space)
- o 25 Charlton Avenue East, Hamilton, Suites: 300, 303, and 702 Family Medicine
- o 30 Birge Street, Hamilton David Braley Research Institute (leased space)
- o 237 Barton Street East, Hamilton Hamilton General Hospital (leased space)
- o 699 Concession Street, Hamilton Juravinski Cancer Centre (leased space)
- 100 West 5th Street, Hamilton Juravinski Centre for Integrated Healthcare (leased space)
- o 711 Concession Street, Hamilton Juravinski Hospital (leased space)
- o 1475 Upper Ottawa St, Hamilton Stonechurch Family Health Centre
- 2757 King Street East, Hamilton St. Joseph's Community Health Services (leased space)
- o 50 Charlton Avenue East, Hamilton St. Joseph's Healthcare (leased space)

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- 1140 King Street West, Hamilton St. Paul's Anglican Church in Westdale (leased space)
- 10B Victoria Street, Kitchener McMaster Michael G. DeGroote School of Medicine in the Integrated Health Building, Waterloo Regional Campus, Education Services, Faculty of Health Sciences
- o 304 Victoria Avenue, Hamilton Victoria Medical Center (leased space)
- o 25 Main Street West (leased space)
- o 88 Forsyth Avenue North, Hamilton
- 100 Main Street West, Hamilton David Braley Health Sciences Centre (south side)
- o 100 Main Street West, Hamilton Parking (north side)
- One James North, Hamilton (previously known as The Downtown Centre, i.e., DTC) (leased space at Lloyd D. Jackson Square):
 - The Centre for Continuing Education (CCE),
 - Finance,
 - University Advancement (UA),
 - Institutional Research and Analysis (IRA)
- o 47 Whitton Road, Hamilton
- o 182 Sterling Street, Hamilton
- Existing houses bound by Forsyth Avenue South, Traymore Avenue, Dalewood Avenue, and Main Street West
- 1221 Lakeshore Road, Burlington Halton McMaster Family Health Centre at Joseph Brant Hospital
- o 1355 Main Street West, Hamilton Canadian Martyrs (licensed space)
- Brock University, Level 200 @ 500 Glenridge Ave., St. Catharines (leased space, Education Services)
- o 96 Forsyth Avenue North, Hamilton
- o 106 Forsyth Avenue North, Hamilton
- o 110 King Street West, Hamilton (leased space)
- o 199 James Street North, Unit 2, Hamilton (leased space, Sociology
- o 1205 Rymal Road East, Hamilton (leased space, Faculty of Health Sciences)
- o 142 Queenston Street, St. Catharines (leased space)
- o 16-24 Ontario Street, St. Catharines (leased space, Medical Clinic)
- 180 James Street South, Hamilton (leased space)
- o 249 Caroline St S, Unit A, Hamilton (leased space, School of Nursing)
- 293 Wellington Street North, Hamilton (leased space, Family Medicine Surgery), Suites: 110, 111

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- 3155 Harvester Rd., Burlington (leased space, Family Medicine), Suites: 207, 208, 209
- o 495 Woodward Avenue, Hamilton (leased space)
- o 1960 Main Street West, Ancaster (leased space)
- o 555 Prince Charles Drive North, Suite 201, Welland (leased space)
- o 700 Bay Street, Suite 2303, Toronto (leased space)
- 701 Main St. West, Suite 101, Hamilton Family Medicine Maternity Centre (leased space)
- o 162 Ward Avenue, Hamilton Parking lot (leased lot)
- Lot 56, of Hamilton Plan 1475 (MIP)
- o 245 James Street North, Hamilton (leased space)
- o 200 Victoria Street, Toronto, unit 1506 (leased space)
- Property on the north side of Lower Lions Club Road, east of Louise Drive, Ancaster – (undeveloped 115 acres)
- o 120 Forsyth Avenue North, Hamilton (The Oval at Mayfair Crescent: 5.5 acres)
- Grant Boulevard at Barrie Street, Hamilton (undeveloped)
- 1190 Main Street West, Hamilton (between Forsyth Avenue South and Dalewood Avenue) (undeveloped)
- o 1480 Sandhill Drive, Ancaster (leased space) Suites: 9A
- 777 Bay Street, Toronto Capital Hill Group (leased space)
- 459 Hume Street, Collingwood Collingwood General and Marine Hospital (leased space)
- Osler Drive, south side, east of University Plaza (undeveloped)
- o Osler Drive, north side, east of University Plaza (undeveloped)
- o 132 Mayfair Crescent, Hamilton
- o 8 Mayfair Crescent, Hamilton
- o 30 South Street West, Dundas (Osler House)
- o 22 Bay Street, Hamilton

Appendix E: 2022/23 Proposed Project List for Deferred Maintenance Items

Bldg.#	Building Name	Scope	Estimate (\$)
Structur	e		
34	Psychology	Structural assessment of north porch and exterior cladding	
55	Ron Joyce Stadium	Repair of structural issues in the stadium and parking garage	
		Sub-Total	\$620,000

Exterior Enclosure					
23	Chester New Hall	Remediate water leak and repair ceiling damage in breezeway			
24	Ivor Wynne Centre	Remediate water leak in transformer room			
8	Alumni Memorial Hall	Replace exterior doors to west patio entrance and add ventilation to electrical room			
15	Nuclear Reactor	Remediate water infiltration through roof below cooling tower			
43	Communications Research Laboratory	Replace roofing			
		Sub-Total	\$900,000		

Conveya	Conveyance and Interior Finishes					
16	John Hodgins Engineering	Common washrooms and corridor upgrades, (multi-year project)				
24	Ivor Wynne Stadium	Renovate 4 team change rooms				
46	DeGroote School of Business	Elevator modernization				
		Sub-Total	\$875,900			

Mechan	ical		
39	Life Sciences Building	DM contribution to the Greenhouse addition and Phase 1 renovations	
28	Commons Building	Replace supply fan and controls	
32	Ivor Wynne Centre	Replace piping in the basement mechanical room (B101/A), central air handling unit, distribution equipment, switches, panel boards, return fan and exhaust fans	
11	Burke Science Building	Re-insulate exterior plenum	
12	E.T. Clarke	Replace chiller	
12	E.T. Clarke	Replace air compressor	
52	Michael DeGroote Centre for Learning and Discovery (MDCL)	Replace eye wash stations	
		Sub-Total	\$6,390,000

Electric	al			
15	Nuclear Reactor	Electrical distribution renewal		
			Sub-Total	\$75,000
Fire Saf	ety			
32	Tandem Accelerator	Fire alarm upgrades		
	•			\$ 000 000

Tanuelli Accelerator	The alarm upgrades	
	Sub-Total	\$300,000

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	1		
Bldg.#	Building Name	Scope	Estimate (\$)
Environmental Compliance Action Plan (ECAP)			
12	E.T. Clarke	Cooling tower replacement Phase 1	
		Sub-Total	\$3,300,000
Infrastructure			
Campus	Tunnels	Repairs to tunnels and replacement of	
Campus	Turineis	buried cables and utilities (multi-year project)	
		Sub-Total	\$1,000,000
McMaster University Medical Centre (MUMC)			
37	МЛМС	Facility contribution to pay for the	\$200.000
07		outstanding central bank loan	0 4 400 000
37	мимс	Infrastructure projects at MUMC	\$1,100,000
		Sub-Total	\$1,300,000
Enabling Accordibility Fund Grant Application (university contribution)*			
	Compus Services Building	Accessibility upgrades	
31	Campus Services Building	Accessibility upgrades	¢1 000 000
		Sub-Total	\$1,000,000
Emorgoney Funde**			
Various		Contingency fund	
various		Sub-Total	000 0382
			ψ003,000
Campus Accessibility Action Plan (CAAP) Fund**			
Various		For accessibility projects on campus	
10.1000	1	Sub-Total	\$337,000
<u> </u>			<i>4001,000</i>
		Total	\$15,760.900
		Total	<i>,</i>

* If grant is not approved, these funds will be re-allocated to the deferred maintenance contribution for the LSB Greenhouse and Phase 1 renovations.

** The Emergency and CAAP funds do not make up part of the 2022/23 Deferred Maintenance Budget and are therefore not included in the total above. When added, the total funding received is \$16,966,000.

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