FINAL ASSESSMENT REPORT

Institutional Quality Assurance Program (IQAP) Review

Civil Engineering, M.Eng, M.A.Sc., Ph.D.

Date of Review: April 23rd and 24th, 2024

In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response and assessments of the undergraduate and graduate programs offered by Civil Engineering. This report identifies the significant strengths of the program, together with opportunities for program improvement and enhancement, and it sets out and prioritizes the recommendations that have been selected for implementation.

The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources entailed by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations and who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.

Executive Summary of the Review

In accordance with the Institutional Quality Assurance Process (IQAP), the Civil Engineering program submitted a self-study in March 2024 to the Vice-Provost and Dean of Graduate Studies to initiate the cyclical program review of its program. The approved self-study presented program descriptions, learning outcomes, and analyses of data provided by the Office of Institutional Research and Analysis. Appendices to the self-study contained the CVs for each full-time member in the department.

Two arm's length external reviewers and one internal reviewer were endorsed by the Dean, Faculty of Engineering, and selected by the Vice-Provost and Dean of Graduate Studies. The review team reviewed the self-study documentation and then conducted a site visit to McMaster University on April 23rd and 24th, 2024. The review included interviews with the Deputy Provost, Vice-Provost and Dean of Graduate Studies, Associate Dean, Grad Studies and Research, Chair of the program and meetings with groups of current students, full-time faculty and support staff.

The Chair of the program and the Dean of the Faculty of Engineering submitted responses to the Reviewers' Report (September 2024). Specific recommendations were discussed, and clarifications and corrections were presented. Follow-up actions and timelines were included.

Summary of Previous Review's Recommendations

Recommendation	Response to Recommendation

ADL space and equipment needs to be modernized, and equity issues related to washroom and change room access for women-identifying students needs to be improved.	The Department, Vice-President Research, and Deanery have invested significantly in improving the Applied Dynamics Lab, with more $2.6 million in new equipment procured in the last ten years. In order to make the Applied Dynamics Laboratory more inclusive, ADL 202 was renovated in 2017 to provide a women's change-room. This room can only be accessed by key card and includes lockers that are available to woman-identified users of the ADL. The possibility of providing showers for woman-identified users of the ADL was also investigated, but the tight space restrictions of the ADL do not allow for additional showers. In 2019 we provided a single-person accessible non-gendered washroom, which is in addition to the woman-identified washroom. With support from the University and Faculty of Engineering, an elevator was installed in Fall 2021 so that the building is now accessible on all four floors. The cost of the elevator exceeded $1.6 million.
Concerns with the transportation theme lacking critical mass	We have put a high emphasis on creating critical mass in our "Smarter Mobility" theme, to enable mobility in all its forms in a safe, clean, efficient, accessible, and inclusive way. The "Smarter Mobility" theme of the Department has grown considerably since the last IQAP review and is now supported by 1 Assistant Professor, 2 Associate Professors, and 1 Full Professor. The Department has also built stronger ties with the McMaster Institute for Transportation and Logistics (MITL) with the appointment of Dr. Razavi as the Director of the institute from 2017-2023, and now the appointment of Dr. Moataz Mohamed as of July 2023. MITL conducts evidence-based interdisciplinary, cross-sectoral and collaborative research projects and is supported by the public and private sectors. All four previously mentioned faculty members are affiliated with MITL and actively involved in its projects, proposals, and events in Transportation and Logistics. Combined, the above changes now make our transportation group among the most competitive nationwide.

Concerns with the water and environmental curriculum	With three recent hires in the water and environmental stream (Drs. Sonia Hassini, Zoe Li, and Robin Zhao), the graduate curriculum in this area has been growing considerably with the addition of new graduate courses to better reflect the expertise and research directions of the recent hires. Four new courses have been added in the areas of Environmental Systems Engineering, Computational Methods for FLow in Porous Media, Social Hydrology and Applied Probability Models in Water Resources Engineering.
Concerns with the Geotechnical Theme requiring renewal	Two new faculty members in the area of geotechnical and environmental engineering were hired in recent years. Dr. Robin Zhao is an Assistant Professor who came to our department from MIT in September 2018. His expertise is in the area of multiphase transport in porous media, which bridges the areas of geotechnical and water resources. In addition, Dr. Tingting Xu who comes from Georgia Tech (Ph.D.) and John Hopkins (PDF) is expected to join our Department in Fall 2024. Dr. Xu brings experience in topology optimization, microporomechanics and upscaling models, numerical modelling of fracture propagation and constitutive models in relation to plasticity, viscoplasticity and fabric-based model. The addition of these two faculty members enables the department to move forward and grow within this area. Furthermore, research active faculty members (Peijun Guo - Full Professor) and Stanislaw Pietruszczak (Professor Emeritus) provide additional necessary critical mass for the doctoral program in the area of geotechnical engineering.
Lack of Professional Development opportunities for graduate students	Graduate students are now provided with ample professional development opportunities through the School of Graduate Studies, MacPherson Institute, and the Engineering Co-op and Career Services office. The School of Graduate Studies offers professional development opportunities related to writing literature reviews, dissertation bootcamps, writing research abstracts, as well as the 'drawing conclusions' program which teaches graduate students how to overcome biases that can limit observations and impact their research. The MacPherson Institute offers Teaching and Learning Certificates of Completion in the areas of theory and inquiry, and in practice and application, as well as intensive workshops aimed at improving instructional skills, courses design and assessment development. Engineering Co-op and Career Services supports student learning and skill development outside the classroom through co-curricular programming in the form of facilitated, hands-on community experiences. They support this process via workshops and one-on-one career planning. All graduate students in the Faculty of Engineering are required to attend career planning workshops hosted by Engineering Co-op and Career Services in

	the Faculty of Engineering and submit a CARP-Career Planning Report, which should identify the long-term career plan, short-term career goals and skills required to achieve those goals. The reports are reviewed by the Graduate Affairs Committee.
Concerns with the M.A.Sc. program being limited to 20 months of funding	The department has recognized this issue regarding thesis expectations and time to completion. We converted the M.A.Sc. to a 24-month program beginning in the Fall 2020.
Distinction between M.A.Sc. and M.Eng. programs is unclear	Our current M.Eng. program requires students to complete six graduate half courses (or equivalent) and then conduct a project under the supervision of a faculty member. These students will need to complete and submit a project report, which will be reviewed and approved by a committee. This committee is comprised of the student's supervisor and another faculty member. The course requirements ensure that M.Eng. graduates are well trained to acquire expertise covering key learning areas. The expectations in terms of originality and scope of research and their time devoted to research are significantly reduced compared to M.A.Sc. students to ensure that they can graduate on time (within 24 months). These M.Eng. students do not receive any funding support from the department. Conversely, M.A.Sc, students are required to take fewer graduate courses, with most of their time dedicated to research towards developing a research thesis that far exceeds in terms of scope and originality the expectations for the M.Eng. project. Those M.A.Sc. students also received funding and gain additional experience as teaching assistants for our undergraduate courses. The Department is in the early stages of exploring the possibility of converting the existing M.Eng. program to a course-based option. Discussions amongst the Department, and with the Faculty of Engineering, are expected to continue in the coming months.
Graduate office space challenges	Since the last IQAP visit all graduate spaces in JHE have been renovated, resulting in brighter, modernized spaces for our students to utilize. Details of these renovations may be found in section 7.1.9 of the IQAP report. These spaces are being revisited again and will be converted to a hoteling style with ergonomically friendly sit/stand desks, new chairs, and a small kitchenette.

	We also have planned for ADL graduate student space renovation that will modernize the space with windows and allow for bright office areas. We expect construction to begin in Fall 2024.
Technical support for graduate programs	The current department resources are still limited; however, we strive to maximize the utilization of our resources. With the current fiscal climate in higher education, we are not in a position to hire additional technicians. We have nonetheless created peer-support teams to address the limited availability of the technicians who operate our specialized test equipment. Junior graduate students work with the senior students to learn the test procedure, how to operate the test equipment, and to assist each other with their experiments. Finally, our faculty members have made themselves as available as possible to support our students in the labs, building on our experimental research expertise and the department's focus on experiential learning.

Summary of Program Current Program Review

Strengths

- The Department is in "a growth mode with hiring of a large cohort of new and early career faculty." The reviewers noted that they "were very impressed with the energy and enthusiasm of newer faculty as well as some exceptional successes in funding and development of state-of the-art facilities, especially the Applied Dynamics and Environmental labs, along with the highly committed staff." (p. 7)
- The reviewers noted that there is a strong desire amongst the Department to increase domestic students, and to increase research support funds. (p. 7)
- The Department's research areas are well-aligned with McMaster's strategic plan which focuses on planetary health, which the reviewers felt that the Department would be "uniquely poised to address" (p. 7)
- It was noted that the graduate students and their faculty supervisors "expressed a high degree of satisfaction, emphasizing regular meeting and mentoring, encouragement to attend conferences, engagement with industry partners, engagement in research activities" (p. 7)
- The reviewers noted that they were "impressed by the high degree of freedom observed in hands-on laboratory work with the highly engaged, supportive, and enthusiastic lab technicians. This is a superlative example of the department's commitment to experiential learning and ownership of staff towards student learning and success." (p.7)

Opportunities for Improvement and Enhancement, including appropriateness of resources

- Focus on growth of the graduate programs. The reviewers noted that the M.Eng. program has the highest potential for growth, but that this would require additional administrative and faculty support. (p. 8)
- Graduate student spaces should be improved. (p. 8)
- Encouragement to set key performance indicators as aspirational goals to help increase research activities and productivity. (p. 8)
- Enhance engagement with alumni to improve advancement opportunities. (p. 8)
- Encourage graduate students to take additional courses to improve their skills, and empower faculty to assign additional courses outside of the Department. (p. 8)
- Encourage senior faculty to provide recruitment mentorship to early career colleagues. (p. 8)
- Promote newly developed research themes as a research tool. (p. 8)
- Review the outcome and impact of the recent changes to the Ph.D. comprehensive examination process, particularly with the reduced graduate course requirements. (p. 8)
- The Geotechnical theme is at risk as it is below critical mass. The reviewers noted that this area will require additional hires as well as improved and enlarged lab space. (p. 8)
- Recommendation to consider retreats to focus on strategic planning, particularly in the areas of the M.Eng. program, geotechnical theme, domestic student recruitment, and increasing funding. (p. 8)
- Increase interaction with industry via consortia, MITACS or other alliances.
- Promote full engagement with the leadership team and continue to follow a consultative style. (p. 8)

Recommendation #1: There is room for growth across the three graduate degree programs.
Department's Response and Actions to be Taken: We agree that there is room for growth within our three graduate programs and our faculty members have made an active effort to increase enrollment. In particular, we have had a strong focus on growth within our Ph.D. program. Between 2019 and 2023 we accepted an average of 6.5 Ph.D. students each September. This number has increased substantially with 20 Ph.D. students expected to begin their studies in September 2024. Including this, our enrolment in research-based graduate programs (M.A.Sc. and Ph.D.) has increased by 52% from 2019 to 2024. We aim to increase recruitment efforts at the Masters level with the implementation of our Accelerated M.A.Sc. option and improved recruitment event strategies. We also plan to review our M.Eng. program with consideration for opportunities for growth (see Recommendation #2).
Dean's Response: We agree with this strategy for increasing enrollment and will support the department's ongoing efforts to enhance recruitment at both the Masters and Ph.D. levels. The faculty will continue to work with the department to tailor recruitment efforts, and we will make the necessary connections in the School of Graduate Studies, where international recruitment efforts for MEng programs are expanding.

Recommendation #2: M. Eng is the smallest program thus with highest potential for growth, but this will require additional administrative and faculty support (e.g., Associate director M. Eng program).
Department's Response and Actions to be Taken: We agree with the reviewers that the M.Eng. program currently has the smallest cohort within our graduate offerings, indicating potential for growth. Presently, the M.Eng. program mandates each student to undertake a research project under faculty supervision, which constrains the number of admissions. The Department may consider transitioning the M.Eng. program to a purely course-based format. However, this adjustment could impact the quality and rigor of our graduate course offerings, given that M.Eng. students often have different academic backgrounds and interests compared to our M.A.Sc. and Ph.D. students. Additionally, expanding the M.Eng. program would necessitate increased administrative and faculty support, as noted by the reviewers. We will continue to solicit feedback from faculty and staff regarding the Department's strategy for the M.Eng. program in the forthcoming year.

Dean's Response: We look forward to the department having discussions on how they would like to change the M.Eng. program. The faculty will consider the supports needed for any change and assist in aligning resources.

Recommendation #3:

To enable overall growth in graduate enrollment, improved space for graduate students will be essential. This concern was raised in multiple settings.

Department's Response and Actions to be Taken:

The Department agrees that improved space is necessary to improve the graduate student experience and is currently finalizing a plan that will involve renovating all existing graduate student space in JHE and in the ADL to better suit a hoteling model of space utilization. As noted in the report, the ADL renovations also include the installation of a windowed curtain wall to allow for natural light in a currently windowless space, and to replace HVAC systems servicing the graduate student offices. We expect that these renovations will greatly improve the student experience. We also continue to advocate for additional student space to accommodate our significantly increased enrollment.

Dean's Response: We fully support the department's renovation plans to improve graduate student spaces and are confident the changes will make an impact on the graduate experience. Additionally, we will be conducting space audits to assess current utilization, ensuring that the department's growing needs are prioritized in future space allocations.

Recommendation #4:

There is room for growth in research activities and productivity in the department in general. The department is encouraged to set key performance indicators (e.g., funding, graduate student enrollments, scholarly activity) as aspirational goals.

Department's Response and Actions to be Taken:

Our young Department, with 11 faculty hired since our previous IQAP review in 2017, is indeed continuing to ramp up our research activities and productivity. The typical teaching load of faculty was reduced beginning in 2023-2024 in an effort to increase the bandwidth available for growth in research, but the effects of this change are not yet clear.

Since the IQAP reviewer visit in Spring 2024, we have appointed an inaugural Associate Chair, Research: Dr. Wael El-Dakhakhni. He will be leading our efforts in response to this recommendation, including consulting within and beyond our Department to identify our collective research goals, and working to build connections to help us achieve those goals.

To inform this process, the Department Chair will request the data suggested by the reviewers in Section 7.1.3 from the Faculty and from Canadian Heads & Chairs.

Dean's Response: The Faculty supports the appointment of the Associate Chair, Research, and looks forward to seeing the key performance indicators and strategic goals that emerge from this initiative. We will provide support for them in this area via our Associate Dean Research, Innovation and Partnerships.

Recommendation #5:

The department is encouraged to enhance engagement with alumni in pursuit of advancement opportunities.

Department's Response and Actions to be Taken:

As a first step, the Department Chair will meet with Joel Cote (Director of Development, Faculty of Engineering) to discuss how the Department can partner with the Faculty in pursuit of advancement opportunities.

Dean's Response: We support the department to strengthen its engagement with alumni in partnership with the Faculty's development team.

Recommendation #6:

For areas of civil engineering that may not be well addressed at the undergraduate level, graduate students may be encouraged to take additional courses at the advisement of the supervising faculty members. To that end Supervisors should be empowered to assign additional courses, especially outside of the unit, without impediments.

Department's Response and Actions to be Taken:

We agree that supervisors should be empowered to assign additional courses as needed. We also note that the Ministry of Colleges and Universities requires that at least 50% of courses used towards completing degree requirements must be completed within the Department granting the degree. As such, the School of Graduate Studies rightfully reviews requests to complete courses outside of the Faculty and rejects requests that would breach Ministry requirements. At the Department level, we

must continue to require that students complete at least 50% of their minimum course requirements within the Department, but we will also continue to empower our faculty members to assign additional courses outside of the Department or Faculty, provided the minimum requirement is met.

Dean's Response: We agree with this strategy. The Faculty supports empowering supervisors to assign external courses where appropriate, while ensuring adherence to Ministry requirements, to enhance students' learning opportunities.

Recommendation #7:

Senior faculty members could provide recruitment mentoring to early career faculty and help with networking to enhance recruitment.

Department's Response and Actions to be Taken:

Referring also to Recommendation #4, our new Associate Chair, Research, will be consulting with early career faculty members about how the Department can support the launch of their careers, including how to strengthen the quality and quantity of graduate student recruitment.

Dean's Response: We endorse the department's approach to providing mentoring and recruitment support to early career faculty and look forward to further discussions on this matter. Support via workshops organized by the Associate Dean Graduate Studies is also planned for new faculty members across all departments.

Recommendation #8:

The department should continue to promote newly developed research themes (i.e. the four areas of specialization) as a recruitment tool.

Department's Response and Actions to be Taken:

We will continue to promote our research themes as part of our recruitment strategy. During our recruitment events these themes are discussed and we provide direct links between faculty research and the themes in order to assist prospective students in identifying where their interests may fit, and with which supervisors. We have also created a new accelerated M.A.Sc. option will enable us to introduce these themes at the undergraduate level through our 400-600 courses which are offered at both the undergraduate and graduate level. Students who choose to apply for the accelerated option will enroll in a 400-level course but will complete the 600-level coursework, granting them an opportunity to better connect their undergraduate studies with future research opportunities.

Dean’s Response: This is a reasonable approach, the Faculty strongly supports the continued promotion of the department’s research themes as a recruitment tool and encourages their integration into both graduate and undergraduate programming.

Recommendation #9:

The department should keep a close eye on the outcome and impact of the recent change to the comprehensive exam, particularly with the reduced graduate course requirements for Ph.D.s, to gauge the desired positive impact on students while at the same time insuring that foundational knowledge-based learning outcomes are not negatively impacted.

Department’s Response and Actions to be Taken:

The Department has streamlined the comprehensive examination process and reduced the number of required courses for Ph.D. students who commenced their studies after September 2023. Specifically, the comprehensive exam format has been modified to exclude the assessment of a Ph.D. candidate’s knowledge of undergraduate material in their major field of study, focusing exclusively on the candidate’s research proposal. Additionally, the course requirement for graduation has been decreased from four half courses to two half courses. These measures aim to provide Ph.D. students with additional time to dedicate to their research endeavors. We will develop a survey to be distributed to all Ph.D. supervisors at the end of each academic year, soliciting their evaluations of student research productivity and fundamental knowledge acquisition as a result of implementing these changes.

Dean’s Response: We support the department's changes to the comprehensive exam and course requirements for Ph.D. students and look forward to the survey results that assess the impact of these adjustments.

Recommendation #10:

The Geotechnical program is currently at high risk of fading. It is below critical mass and likely will need additional hires and improved and enlarged lab space to nurture and rebuild this program.

Department’s Response and Actions to be Taken:

We agree that our geotechnical program is critical. We expect an additional faculty member, Dr. Tingting Xu, to join our geotechnical group as soon as her visa application is approved. Beyond Dr. Xu’s hiring, the geotechnical area will be a priority for requests for future hires after the current faculty hiring freeze is lifted. After our faculty complement in this area is confirmed, we will then work with them to identify specific lab space needs and potential opportunities to meet those needs.

Dean's Response: The Faculty acknowledges the critical importance of the geotechnical program and will note its priority for future hiring and lab space enhancements to rebuild the program.

Recommendation #11:

We recommend retreats and/or town halls to focus on strategic planning, to prioritize areas of growth such as the M.Eng., geotechnical program, increase of domestic students, and ways to increase funding levels and other areas that will allow a greater proportion of grad students.

Department's Response and Actions to be Taken:

These are all good suggestions for Department discussions. The Chair will initiate some of these discussions within our monthly Department Meetings and will also integrate them into the planning of our next Annual Department Retreat. This is to complement the more immediate discussions among the Department leadership team (see Recommendation #13).

Dean's Response: The Faculty endorses strategic planning initiatives, such as retreats and town halls, and will collaborate with the department to prioritize growth areas and funding strategies.

Recommendation #12:

We would encourage increased interaction with industry via consortia, MITACS and other alliances. The MITACS program is seriously underutilized. The Faculty and Department are encouraged to take advantage of this program, not only for funding but also for experiential learning.

Department's Response and Actions to be Taken:

We appreciate the reviewers' recommendation to further leverage MITACS. However, since the IQAP visit, MITACS has announced significant funding reductions in Ontario for at least the 2024-2025 academic year, potentially extending beyond this period due to changes in the federal funding landscape. In response, the Department will continue to monitor updates to the MITACS program and actively seek alternative sources of funding and experiential learning opportunities, including the NSERC Collaborative Research and Training Experience (CREATE) program.

Dean's Response: We encourage the department to continue exploring opportunities through MITACS and other industry partnerships. Through the Office of Associate Dean Research, Innovation and Partnerships, we will assist in this pursuit and identifying alternative funding sources where necessary. Students may also benefit from the expanding graduate cooperative education program in the Faculty.

Recommendation #13:

We recommend that the department continues to promote full engagement with the leadership team (i.e., Associate Chairs), and continues to follow a consultative style with upper administration.

Department's Response and Actions to be Taken:

The new Department Chair is initiating a monthly leadership team meeting with the Associate Chairs and Academic Department Manager to promote communication among this group, and will continue to promote full engagement with all faculty and staff in the department by initiating discussions at Department Meetings and with key individuals. In addition, the new Chair and Associate Chairs are already having meetings with the Deans and Associate Deans to discuss their portfolios, and will continue to consult about any critical issues affecting the Department.

Dean's Response: The Faculty fully endorses the department's consultative approach with leadership and will continue to engage with the department's leadership team to address key issues collaboratively.

Implementation Plan

Recommendation	Action(s) to be Taken	Responsibility for Leading Action	Timeline for Completing Action
1. There is room for growth across the three graduate degree programs.	Continue to focus recruitment efforts on improving the quality and number of applications, and to increase recruitment efforts at the Masters level with the implementation of our Accelerated M.A.Sc. option and improved recruitment event strategies.	Associate Chair, Graduate, in consultation with Associate Chair, Research	12 months
2. M.Eng. is the smallest program thus with highest potential for growth, but this will require additional administrative and faculty support (e.g., Associate director M. Eng program).	Solicit feedback from faculty and staff regarding the Department's strategy for the M.Eng. program.	Associate Chair, Graduate	12 months
3. To enable overall growth in graduate enrollment, improved space for graduate students will be essential. This concern was raised in multiple settings.	The Department is transitioning to a hoteling model for graduate student office space. However, additional office space will still be needed to enable further growth in graduate enrollment in the coming year(s).	Department Chair and Academic Department Manager, in consultation with Associate Chair, Graduate and Faculty of Engineering Director of Finance and Administration	12 months
4. There is room for growth in research activities and productivity in the department in general. The department is encouraged to set key performance indicators (e.g., funding, graduate	Develop and implement a consultation plan to identify our collective research goals and steps needed to achieve those goals.	Associate Chair, Research, in consultation with Department Chair	Consultation and plan development: 12 months

student enrollments, scholarly activity) as aspirational goals.			Implementation: to be determined based on needs
5. The department is encouraged to enhance engagement with alumni in pursuit of advancement opportunities.	Meet with Director of Development, Faculty of Engineering	Department Chair	6 months
6. For areas of civil engineering that may not be well addressed at the undergraduate level, graduate students may be encouraged to take additional courses at the advisement of the supervising faculty members. To that end Supervisors should be empowered to assign additional courses, especially outside of the unit, without impediments.	We will continue to empower our faculty members to assign additional courses outside of the Department or Faculty, provided the Ministerial minimum requirement of completing 50% of degree requirements within the Department is met.	Associate Chair, Graduate	This has already been initiated and is ongoing.
7. Senior faculty members could provide recruitment mentoring to early career faculty and help with networking to enhance recruitment.	Consult with early career faculty members about how the Department can support the launch of their careers, including how to strengthen the quality and quantity of graduate student recruitment.	Associate Chair, Research	Consultation and plan development: 12 months Implementation: to be determined based on needs
8. The department should continue to promote newly developed research themes (i.e. the four areas of specialization) as a recruitment tool.	During our recruitment events these themes will continue to be discussed and we will provide direct links between faculty research and the themes in order to assist prospective students in identifying where their interests may fit, and with which supervisors. We have also created a new accelerated M.A.Sc. option will enable us to introduce these themes at the undergraduate level through our 400-600 courses.	Associate Chair, Graduate	This has already been initiated and is ongoing.

9. The department should keep a close eye on the outcome and impact of the recent change to the comprehensive exam, particularly with the reduced graduate course requirements for Ph.D.s, to gauge the desired positive impact on students while at the same time insuring that foundational knowledge-based learning outcomes are not negatively impacted.	The Department will develop a survey to be distributed to all Ph.D. supervisors at the end of each academic year, soliciting their evaluations of student research productivity and fundamental knowledge acquisition as a result of implementing these changes.	Associate Chair, Graduate, in consultation with Department Chair and Department Graduate Administrative Assistant	12 months
10. The Geotechnical program is currently at high risk of fading. It is below critical mass and likely will need additional hires and improved and enlarged lab space to nurture and rebuild this program.	1. Support onboarding of new faculty member in geotechnics. 2. Advocate for new hires and/or lab space for geotechnical engineering, based on discussions with current and incoming faculty.	Department Chair	1. Immediately after visa approval 2. Within 12 months after new faculty member joins.
11. We recommend retreats and/or town halls to focus on strategic planning, to prioritize areas of growth such as the M.Eng., geotechnical program, increase of domestic students, and ways to increase funding levels and other areas that will allow a greater proportion of grad students.	Initiate discussions on these and other topics at Department Meetings and Retreats	Department Chair	Discussion over next 12 months, with potential action to follow.
12. We would encourage increased interaction with industry via consortia, MITACS and other alliances. The MITACS program is seriously underutilized. The Faculty and Department are encouraged to take advantage of this program, not only for funding but also for experiential learning.	The Department will continue to monitor updates to the MITACS program and actively seek alternative sources of funding and experiential learning opportunities, including the NSERC Collaborative Research and Training Experience (CREATE) program.	Associate Chair, Research	12 months

13. We recommend that the department continues to promote full engagement with the leadership team (i.e., Associate Chairs), and continues to follow a consultative style with upper administration.	Initiate discussions within Department and with upper administration.	Department Chair	This has already been initiated and will be ongoing.

Quality Assurance Committee Recommendation:

McMaster's Quality Assurance Committee (QAC) reviewed the above documentation at the October 17, 2024, meeting. The committee recommends that the **Civil Engineering** graduate programs should follow the regular course of action with an 18-month progress report and subsequent full external cyclical review to be conducted no later than eight years after the start of the last review.