Multidisciplinary Urban Capstone Project 2019/2020

The 2019/2020 academic year was the pilot year of the School of Cities’ Multidisciplinary Urban Capstone Project (MUCP). The MUCP is a unique program that provides fourth-year students from across the university an opportunity to work on an urban problem, sourced from municipalities, NGOs and community groups, and where the outcome yields significant value. This kind of interdisciplinary collaboration is rare to see in a university.

In our first year we had over 15 urban problems proposed by organizations, from which we chose four. A team composed of students from the Daniels Faculty of Architecture, Rotman School of Management and the Faculty of Arts and Science Department of Geography and Planning, was assigned to each project. The projects ranged from an engagement plan and model innovations of TinyTownTO at the City of Toronto, to developing a revitalization strategy for outdoor environments of schools for the TDSB/TCDSB, as well as analyzing district energy and prioritizing projects for the Municipality of Clarington’s climate action plan, and designing an innovation district proposal for the City of Brampton.

As we near the end of the term, it is clear that this pilot year has been a success. The multidisciplinary teams have worked well together and with their problem sponsors. They have produced excellent design solutions. Building on this success, we will be expanding the MUCP in 2020-21 to include students from the Faculty of Applied Science and Engineering, the Faculty of
Information, Urban Studies at Innis College, and the Department of Sociology (UTSC and UTSG).

Finally, I want to thank the clients for dedicating their time to provide students with a challenging and rewarding learning experience: City of Brampton Planning and Development Services Department, the Municipality of Clarington Office of the Chief Administrative Office, City of Toronto City Planning Department, and the Toronto District School Board. Their expertise and enthusiasm was critical to the success of this program.

I am especially proud of students’ achievements in this short period of time, and all the hard work they put in for the past academic year. I wish the students all the best in their future endeavors.

Sincerely,

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Located by the front entrance of Toronto City Hall, #TinyTownTo is a scale model of the City of Toronto that was first unveiled in 1989 as a planning tool for the City Planning Division. The model adopted contemporary technology in its construction, using advanced materials, 3D digital modelling and 2D printing, and hand-made structures representing the individual styles of their creators.

While scale models continue to be useful tools in the professions of architecture, urban planning, and city development, this model has not kept up with Toronto’s rapid growth, and no longer physically represents what the city is. This has adversely affected its ability to foster meaningful engagement and interaction with its stakeholders, which includes diverse citizens, thousands of tourists, and City Hall employees and programs. The goal of this project is to create an engagement plan that fosters civic education and involvement, and stimulates the process of model revitalization. This needs to be achieved within a reasonable timeline and budget, and while assuring that developed solutions can be easily used and accessed by the model’s stakeholders.
A key barrier to engagement that was identified through primary research with the model’s users is the physicality of the model itself; it is out-of-date, visually unappealing, ambiguous, and inconsistently maintained and updated. This has rendered the model as more of a one-off attraction than a meaningful tool for engagement. The solution of 3D printing would easily be able to resolve the physical issues of the model. City massing data is publicly available on the City’s database, and this information can be used to design and print model components. This also allows for costs and timelines to be easily anticipated by the City Planning department when they go about model updates.

We believe that creating a program where students would take on the required labour for these model updates would lay the groundwork for meaningful community engagement. With students at the University of Toronto and Humber College already working on projects related to the model, there is potential not only to complete the essential updates that are presently needed, but also for future ideas that can leverage new technologies, sources of funding, and partnership opportunities to adapt the model to future technologies (such as AR). By partnering with relevant faculties at University of Toronto and other institutions, we hope to empower students to work creatively through the medium of Tiny Town TO, and think critically about the role they play in the city’s future.
Revitalizing Outdoor Environments

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Over the 2019-2020 academic year, a student group comprised of members from the Daniels Faculty of Architecture and the Rotman School of Management have been working in collaboration with the City of Toronto, the Toronto District School Board (TDSB), and the Toronto Catholic District School Board (TCDSB) to develop a revitalization strategy for outdoor environments of schools in Toronto.

With guidance from members of the School of Cities the student team was tasked with answering the question: How can Outdoor Environments be arranged for mixed-use in a way that is safe, sustainable, cost-efficient, and applicable to both school boards? To answer this question the group has provided a booklet to highlight their research, design alternative development, guidelines, and case studies that they have conducted over the course of the academic year. The guidelines seek to aid with the redevelopment and revitalization of outdoor environments in a way that benefit all stakeholder groups. The two stakeholder groups that have been considered by the student team are the student-focused stakeholder group which represents teachers, students, parents, and custodians; and the community-focused stakeholder group that represents the school boards, the city, and the local community.
In addition to the guidelines provided, the student group has conducted four revitalization case studies that cover a diverse range of schools around the City of Toronto. The schools that were selected for the case studies are Chalkfarm Public School (TDSB), Yorkwoods Public School (TDSB), St. John Catholic Elementary School (TCDSB), and St. Barbara Catholic Elementary School (TCDSB). Together, the guidelines and case studies showcase ways in which concerns towards safety, sustainability, maintenance, community involvement, and the integration of third-party partnerships can be resolved.

Finally, it is important to note that the guidebook does not aim to resolve the complex nature of outdoor revitalization with great detail as there are many obstacles that pertain to the organization of school boards and the city. Instead, the guidebook provides insight into possibilities that could be engaged with in further detail if these organizations wish to pursue the suggestions offered by the student group. The intent of the guidebook is to point stakeholders and clients in the right direction so that they can offer excellent and well-valued mixed-use spaces that are utilized by schools and communities.
In accordance to the Paris Agreement, municipalities across Canada are taking the needed actions to mitigate and adapt their cities to the potential impacts of climate change. To maintain a temperature increase of only 1.5 degrees above the pre-industrial levels, cities need to limit their greenhouse gas (GHG) emissions. Currently, the energy required to heat and cool homes within Clarington, makes up for half of Clarington’s total energy use and significantly contributes to GHG emissions. Since the establishment of the Durham York Energy Centre (DYEC), nearly 140,000 tonnes of garbage are being redirected from the landfill to the incinerator. Garbage is then burned at temperatures greater than 1000 degrees Celsius, producing thermal energy, otherwise known as steam. The steam is then used to produce electricity, where that energy is sold to the Provincial grid to power homes and businesses. In addition to the production of electricity, thermal energy can be used to run a district heating and cooling system.

Otherwise known as low-carbon thermal energy networks, district energy systems produce and supply energy to multiple buildings within a single network. The Clarington Energy Park, which is located adjacent to the DYEC facility, will produce hot and cold water using the thermal energy from the incineration plant. The water will then be transported to buildings within the city through a network of closed-loop underground systems known as a thermal grid. This will allow buildings to use thermal energy for space heating, domestic hot water heating, and air conditioning, instead of boilers, furnaces, chillers, or air conditioners. All buildings that are connected to the thermal grid, including commercial buildings, condominiums, hotels, recreation centres, universities, and government buildings will be able to access the distributed energy. Central plants are able to transport heat through the thermal grid for up to 30 kilometres; however, with the incorporation of several distribution centres, networks can grow up to hundreds of kilometres long. The establishment of a District Heating and Cooling System within the Municipality of Clarington will dramatically reduce their GHG emissions.

Both the residential and commercial area can benefit from the implementation of district cooling and heating systems. Firstly, district cooling and heating systems reduce the greenhouse emissions that are released. These systems have greater energy efficiency and efficient delivery where less energy is needed and distributed due to the centralization and thus, reducing the cost of energy. Secondly, it lowers the operation and maintenance costs since each building does not need to maintain and operate their own system. Lastly, it improves the safety of the buildings by eliminating noise from the machinery that each building would be operating if there was no system in place and provides a better environment suitable for both living and working.
In tandem with the analysis of Clarington’s district energy, the research team has been conducting interviews with experts across Canada to learn about best practices for climate action implementation. One of the major insights was that it is important to prioritize projects based on impact and scalability. The implementation of a District Heating and Cooling System hits both of these points as it will address one of the main sources of emissions in the municipality, and there is potential for large expansions over several years.
Innovation district proposal for Brampton

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The current built form of the Bram West Lands includes large areas of land occupied by warehouses and industrial buildings. These large-scale facilities are mostly self-contained with spaces for its occupants, leading to an absence of a local socio-economic community surrounding these businesses. Despite a comprehensive public transportation system, transport needs are usually fulfilled by personal automobiles. Adding to this pedestrian-unfriendly mix are large trucks coming in and out of large warehouse facilities such as Amazon’s. Such an environment does not align with the values set out in the Brampton 2040 Vision document and the secondary plans for the Bram West Lands. Ultimately, it is necessary to reassess the space and cater to the city’s growing population.

After reviewing and weighing the costs and benefits of three different alternatives (the single use space, multi-use space and innovation district), the team decided upon continuing with the innovation district. Through site analysis and research on precedents, the innovation district proved to be a way for the space to grow and change overtime. Typically, innovation districts are made up of multiple buildings with different uses. Unlike that of multi-use spaces, the innovation district allows for collaboration between large and medium sized firms and startups, which creates an ecosystem for innovation. Additionally, the innovation district provides an opportunity to act as the center for community and employment within the Bram West Lands. As a result, the chosen solution enables the Bram West Lands to be a space of growth, collaboration and diversity.

We chose to use the land at Steeles and Mississauga Road for the location of the innovation district. The district was designed keeping the surrounding community in mind. Townhouses will be on the outside areas of the innovation district facing community space, acting as a visual barrier between the surrounding houses and the innovation district, and creating living spaces to bridge the two parties. There will also be a community centre and multiple green spaces that can be used by the employees working on-site and the surrounding community. The district itself will include one main multi-use area located in the south-west and multiple other single-use spaces. The main multi-use space will act as the core and front-facing part of the whole area, including restaurants, a convention centre and multiple types of businesses ranging from large companies to start-ups. The single-use spaces range in sizes and will consist of a multitude of different sized businesses. The goal is for the larger of these spaces to be used as a headquarters space for a large multinational corporation. Finally, there will also be multiple buildings that will be areas for local businesses (restaurants, dry cleaners, etc.)
Above: Site of the innovation district, image courtesy of Afsah, Petros, Patrick, and Shan.