Opportunities & Challenges

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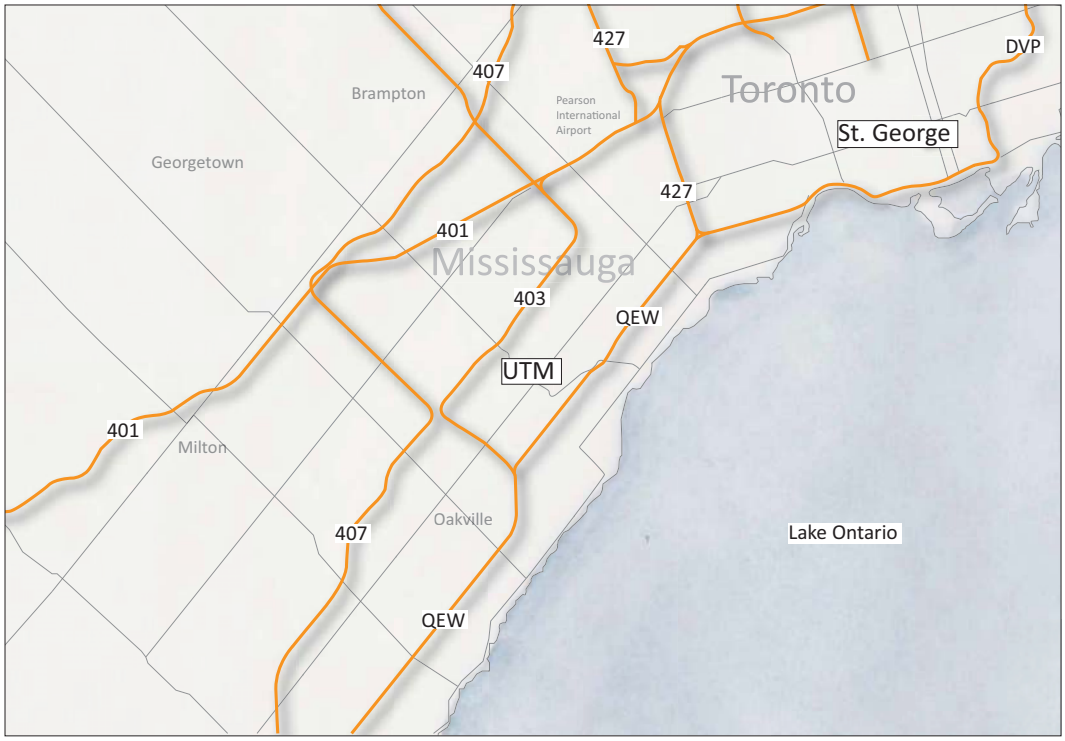
Background

Each University of Toronto campus has distinct pedestrian, vehicular and transit circulation systems. Differences in geographical location, municipal jurisdiction and student population contribute to defining campus circulation. UTM, like UTSC, is a suburban 'destination' campus. The implication includes an ongoing balance between the need for parking and on-campus amenities, improved connections to campus via transit and cycling routes, as well as thoughtful planning with respect to the interface between pedestrian and automobile.



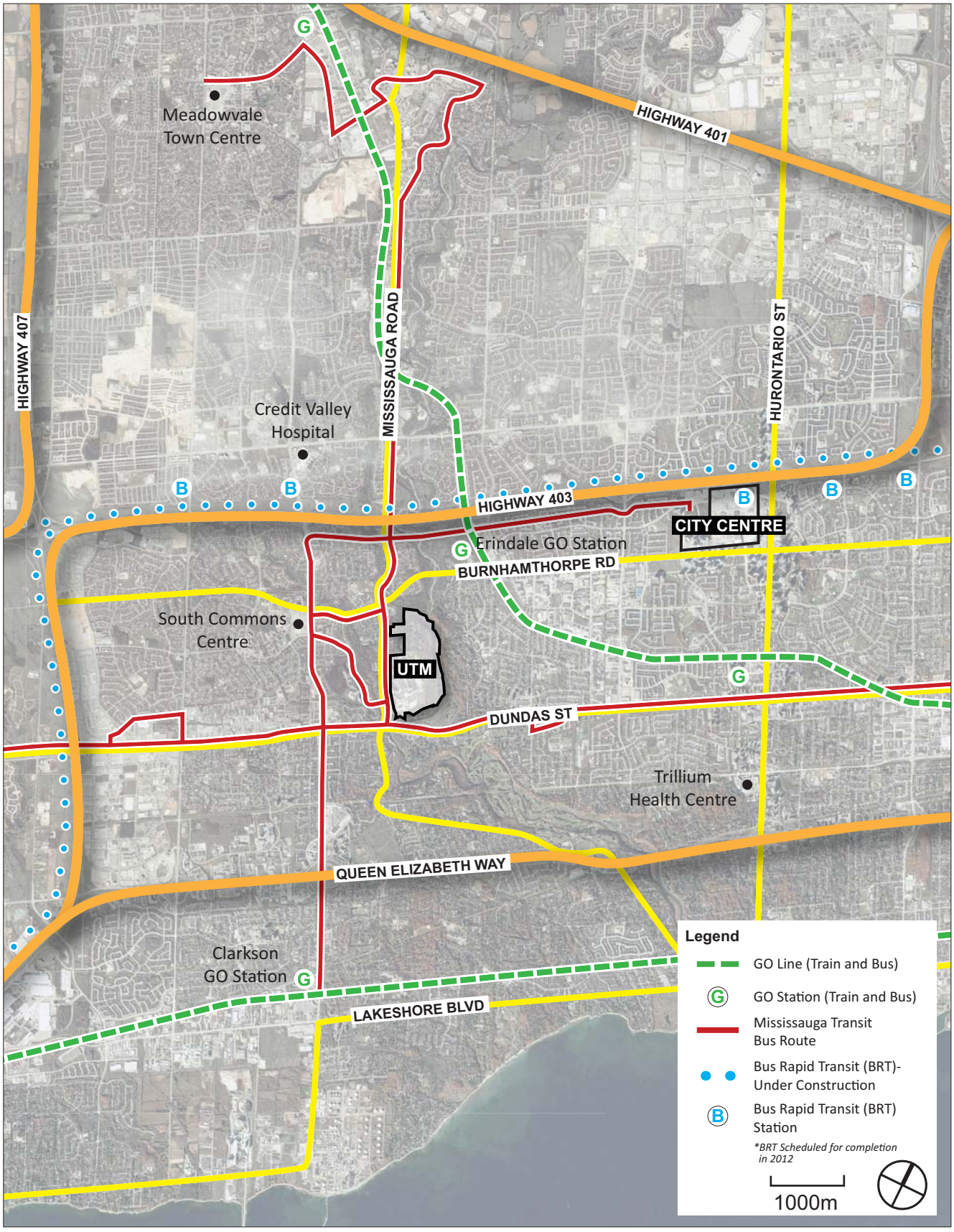
Regional Map: UTM Campus.

The map above identifies major routes connecting the UTM campus to the greater regional transportation network. The campus can be accessed from a broad regional highway network. From the south, the Queen Elizabeth Way (QEW) connects to Mississauga Road and Erin Mills Parkway, heading north towards the campus. Highway 403 connects to Erin Mills Parkway, leading south towards the campus. Wider highway connections include Highway 407, Highway 410, Highway 401, and Highway 427.

The City of Mississauga is the only city in the Greater Toronto Area (GTA) served by seven major highways, and the regional GO Transit and municipal Mississauga transit systems.

The Campus Planning Principle of CAMPUS ENVIRONMENT, which states that "the University community's environment must provide shelter and active travel between buildings; be safe, secure, and accessible …", is fundamental to the discussion on Circulation.

Circulation



UTM is accessed from Mississauga Road, between Dundas Street to the south and Burnhamthorpe Road to the north.

Existing Campus

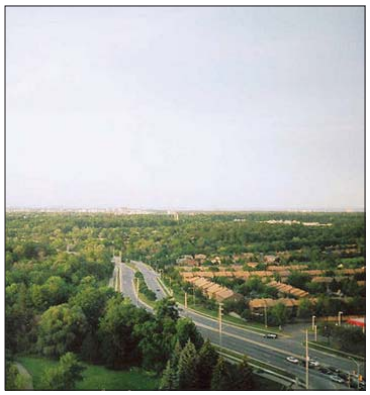
Vehicular

UTM is located on Mississauga Road, a major collector and scenic route between two arterial roads: Dundas Street to the south and Burnhamthorpe Road to the north.

On campus, academic buildings, including future development sites, are largely contained within Outer Circle Road (the ring road). This main road through campus connects to Mississauga Road at the North Entrance, and via The Collegeway at the relatively new South Entrance. Vehicular routes are used for pick-up and drop-off, to access small parking lots, for transit, and as service routes. Academic buildings located adjacent to the ring road typically have their own loading areas and most parking is accessed directly from the ring road, eliminating the need for an extensive vehicular system through campus.

Highway 401 in Mississauga near Pearson International Airport

An internal road, Inner Circle Road, connects to Mississauga Road at the campus' Main Entrance and loops around the campus pond to serve transit and drop-off to the Davis Building, Kaneff Building and Student Centre. It also connects to townhouse residence parking, Outer Circle Road, and Residence Road. Though Middle Road is identified on the campus map, it does not serve vehicular traffic; Middle Road is a paved pedestrian path, which also serves as an Emergency Vehicle Access route.



View looking north-east along Burnhamthorpe Road (towards UTM campus) from Erin Mills Parkway

Public Transit

Four Mississauga Transit routes serve the campus, with connections to two GO Train stations; the Mississauga City Centre Transit Terminal, Oakville Transit, and Toronto's system, the TTC, at Islington station. In addition, a dedicated shuttle bus connects UTM to the St. George campus every 20 minutes. A second shuttle bus route connects UTM to the Oakville campus of Sheridan College as required by the academic calendar. The main transit stop is located along Inner Circle Road in front of the Kaneff Building.

A dedicated bus transit corridor, the Bus Rapid Transit (BRT) project planned to run east-west across Mississauga along the 403, is scheduled to operate by 2012. The BRT will be an efficient way to connect within Mississauga and to other systems in the GTA. Existing transit routes will link to Erin Mills and City Centre, two of the twelve proposed stations.

Circulation

Clockwise from top left:

Drop-off/Pick-up in front of HMALC, and gates at the end of Middle Road

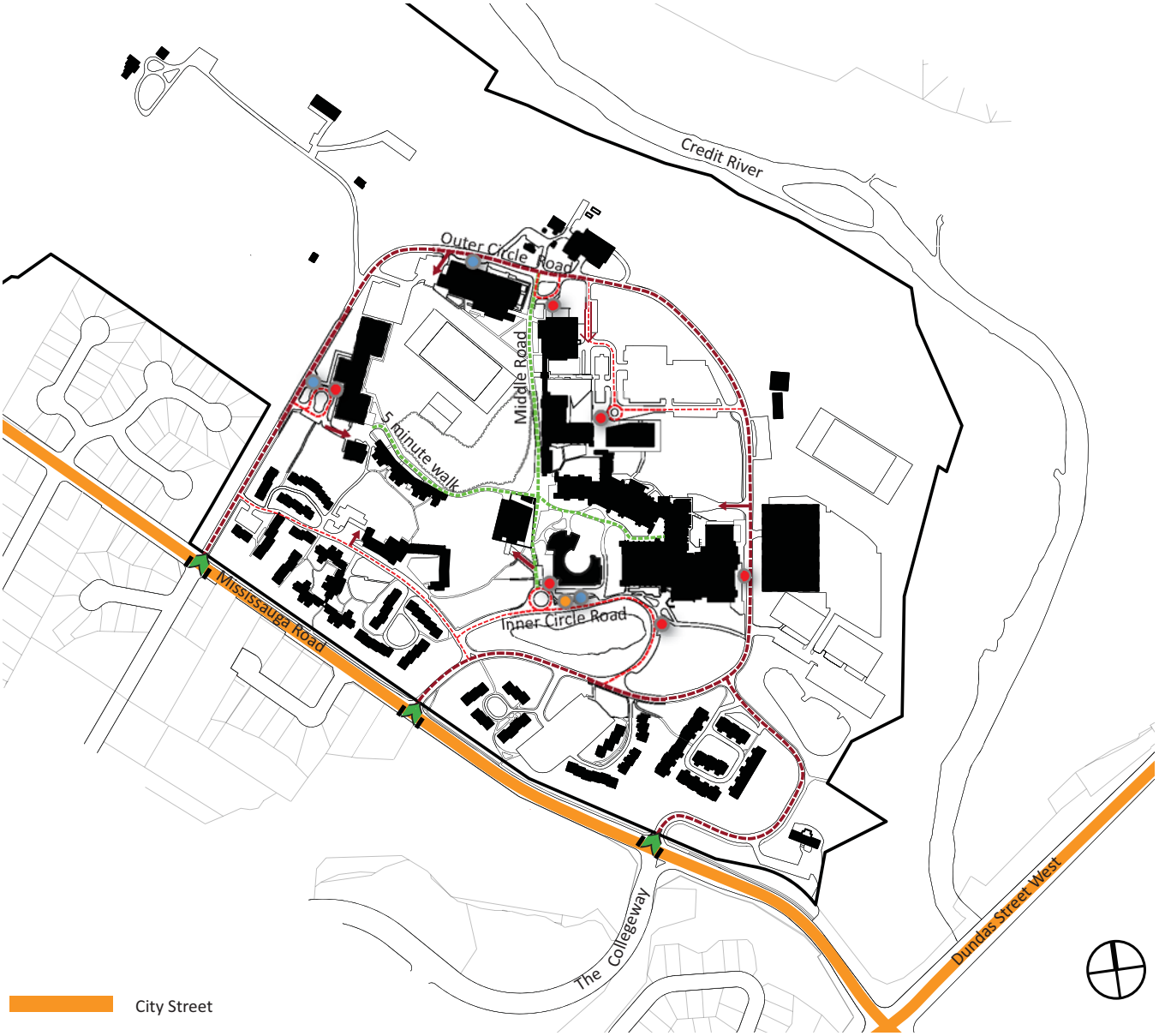
Transit Stop, Inner Circle Road

Drop-off in front of the South Building, Inner Circle Road

UTM Shuttle Bus (between St. George and UTM campuses)

Outer Circle Road and sidewalk in front of the RAWC, looking north

HMALC loading dock



City Street

Primary Road

Fire/Service/Pedestrian Route

Pick Up/Drop Off Route

Service Entry Point

Service and Parking Entry Point

Pick Up/ Drop Off

Mississauga Transit Stop

UTM Shuttle Stop

Campus Entry

Vehicular Circulation Map.

View of Davis Building from Collegeway/Outer Circle Road intersection.

Circulation

Bicycle Routes

The campus links indirectly to City of Mississauga's bike path system, which stretches 500 kilometres. The system includes unpaved multi-use trails, Culham and Sawmill, and Oakridge Trail, a paved and marked bike lane running along Mississauga Road from Dundas Street West to just south of the QEW.

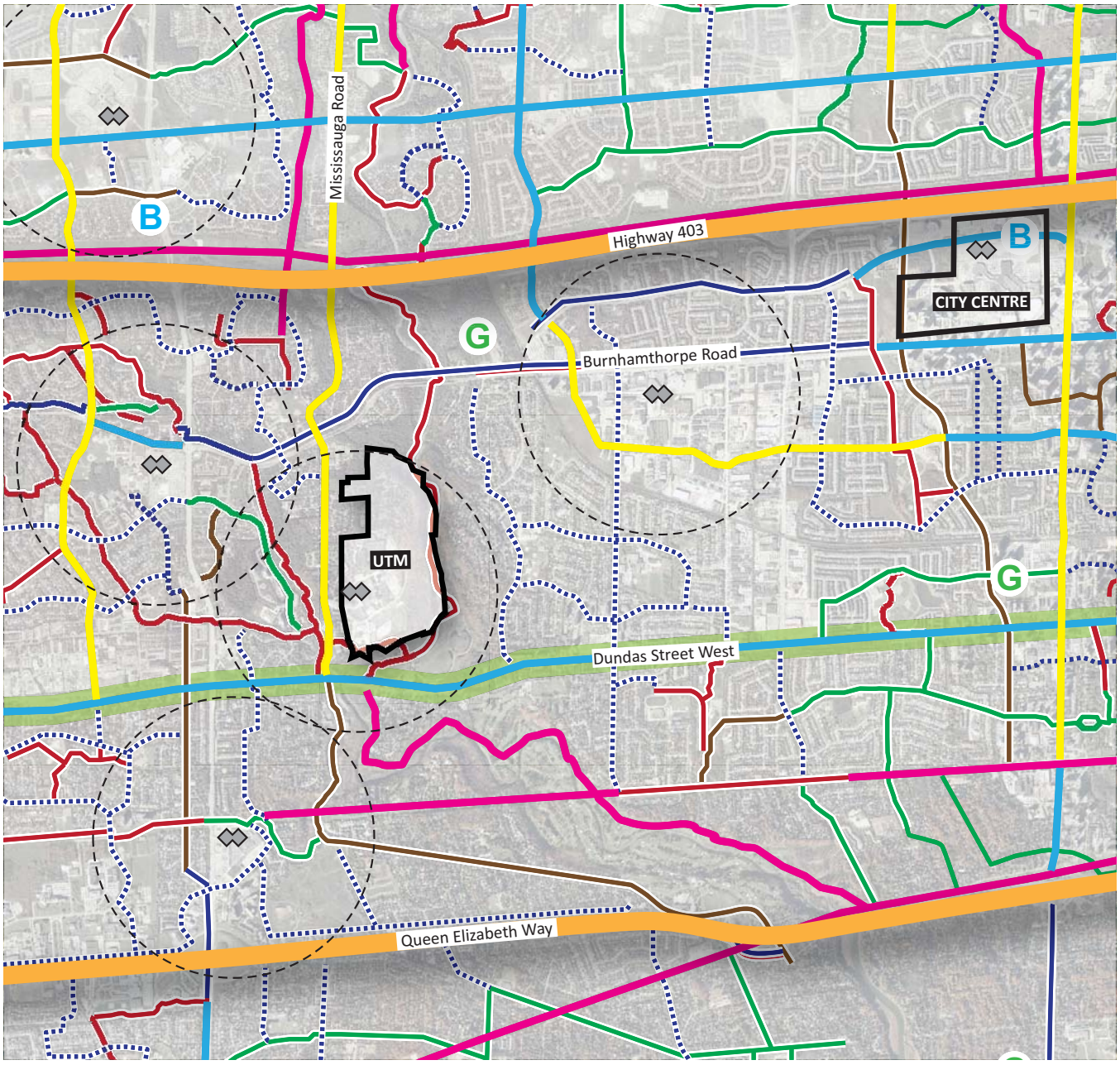
On campus, a dedicated bike/pedestrian road adjacent to the Collegeway entrance connects to Mississauga Road. The map opposite identifies the City's proposed extension of the route north, which would directly connect to campus entrance points from both north and south.

Improved connection to the trail system is also under consideration at this time. Culham Trail runs along the Credit River through Erindale Park east of campus. The current connection between the trail and the campus, close to the stormwater pond and parking Lot 4, is steep, unpaved and poorly marked. The City's *Credit River Parks Strategy* draft master plan identifies potential for trail improvements, including formalizing this connection, as part of proposed improvements to Erindale Park.

Pedestrian Circulation

A network of pedestrian paths and an inter-building weather-protected pedestrian system connect the campus within the ring road. Two primary pedestrian links intersect at the centre of campus: the Five-minute Walk connecting the Davis Building and North Building; and Middle Road, a pedestrian and fire route between the Central Plant and Inner Circle Road. Recently constructed buildings, the CCT and the HMLAC (library), have enhanced this system with the addition of the Link, an interior main thoroughfare running parallel to Middle Road.

The new Instructional Centre provides a prominent interior connection and exterior path linking the North Building to the HMALC.



Proposed Mississauga Cycling Route Network, City of Mississauga 2010.

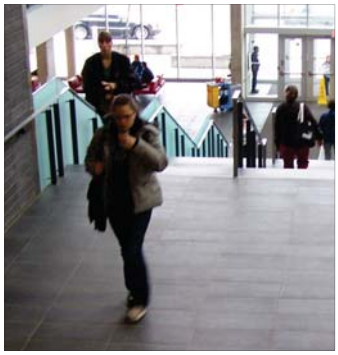
- Proposed Secondary Routes
- Proposed Primary Off-Road Routes
- Proposed Primary Boulevard Routes
- Proposed Primary On-Road Routes
- Special Study Area
- Ex. On-Road Bike Lanes Route
- Ex. Boulevard Trails
- Ex. Off-Road Multi-use Trails
- Existing On-Road Share Use Lanes
- G — GO Station
- B — BRT Station
- Mississauga Transit Terminal
- 1 km radius from transit station

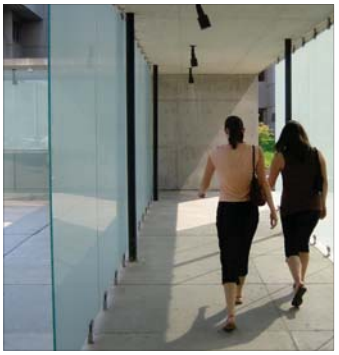
Circulation

5- and 10-minute walking radius on campus.

The academic schedule allows for a 10-minute change between classes, so maintaining easy walking distances and improving the experience and ease with which staff and students are able to traverse the campus on foot are both extremely important. In planning for pedestrian circulation through campus, ¼ mile / 400m is generally accepted as a distance that one can comfortably walk in a 5-minute period, and ½ mile / 800 metres in 10 minutes. These standards define 'walkable catchments' within the University campus area. The majority of academic buildings, as well as residences and entry points to the trail system, are within a 5-minute distance from the Davis Building, a campus hub which includes the Meeting Place. From the same point, access to the Credit River Valley and locations for field research – the Paleomagnetism Lab, forensic research, and the weather station – are within the 10-minute catchment.

Nolli plan showing all means of pedestrian passage: streets, laneways, pathways and interior 'streets' indicate the fine-grain at which the pedestrian experiences the UTM campus ('Nolli' plan is an architectural term, after Giambattista Nolli's map depicting circulation through Rome in the 1700's).





From left to right:

1. *Covered pedestrian pathway in the Health Sciences Complex looking out onto a landscaped courtyard and HMALC (beyond)*
2. *Corridor and main stair between the RAWC entrance and the Davis Building Meeting Place*
3. *Covered walkway between the Davis Building and CCT*

Current Practice and Recent Projects

Vehicular

The 2000 Master Plan called for the development of a coordinated parking, servicing and traffic plan. That plan has continued to inform the development of individual projects and initiatives in the areas of parking and traffic. Recently, a safety audit was conducted of vehicle traffic patterns and specific locations were identified where improvements are needed. One location, the entrance/exit to the CCT garage, has already been modified to improve flow, increase safety and improve sight-lines for both pedestrians and vehicles. Detailed improvements to other locations are under consideration.

Public Transit

The University continues to be in discussions with Mississauga Transit to improve service and connections to the campus. It now benefits from a new express route to campus on Dundas Street (Route 101), which connects the campus to Toronto's subway system at Islington station. As UTM is within the Region of Peel, its service is governed at the regional level by the Metrolinx Regional Transportation Plan. This plan considers GO Transit, Oakville Transit, Brampton Transit and Toronto Transit Commission connections and services.

New transportation policies and incentives at UTM have resulted in increased transit use on the campus. Over 9,000 students picked up their U-Passes in 2010 and almost half of UTM's students use public transit regularly for travel to and from the campus.

Inner Circle Road is the main transit drop-off loop on campus, and currently the only stop for Mississauga Transit buses. Shuttles stop at this location and at the North Building. A shuttle lay-by is under construction as part of the new Instructional Centre project. The new lay-by will be used for all UTM-St. George shuttle buses, while the existing North Building lay-by will be used only for the UTM-Sheridan shuttle. This will improve the efficiency of bus traffic and remove shuttle buses from Inner Circle Road. The Instructional Centre also includes lay-by areas for drop-off and pick-up by private vehicles and should provide some relief for the Inner Circle Road in that regard.

Transit Hub

Mississauga Transit buses stop along Inner Circle Road, in front of the Kaneff Building which is also one of three UTM shuttle stops. Inner Circle Road also serves as a vehicle pick up/drop off loop.

Bicycle Routes

Cycling is encouraged on and to campus through a series of initiatives. On campus, a dedicated bike/pedestrian road adjacent to the Collegeway entrance connects to Mississauga Road. The Bike Share free rental and repair program was established in 2004; students can sign out bicycles free of charge to use for up to 24 hours.

New street furniture and paving along Middle Road

Pedestrian Circulation

To address key concerns related to pedestrian circulation, installation of a new walkway and LED lighting along the Outer Circle Road was completed this year. It extends from the RAWC to the north campus entrance. In addition, light installation and remedial work is being done along the pathway through the wood lot between the North Building and the CCT.

Opportunities to improve safety and ease of access across the ring road include additional crosswalks, placed relative to trail entry points, and parking. Improvements began in 2010.

Pedestrian link connecting the Instructional Centre and HMALC (in distance)

Impact on the Master Plan

Opportunities and Challenges

In general, UTM is well served by circulation networks, both vehicular and pedestrian. Care must be taken that each new University project is considered with a view to enhancing the extent and quality of those networks

Vehicular Circulation

The UTM's road network is contained on campus, with an absence of through traffic, and is not subject to the same extent of municipal regulations as the St. George campus. There is an opportunity for UTM to develop its own guidelines to create coherent and comprehensive streetscape and pedestrian networks on campus. Reference documents could include the City of Toronto *Streetscape Manual* and the initiatives being undertaken as part of the *Toronto Walking Strategy*.

View looking west towards the service loading bay of the Davis Building

Implications to site servicing and access will be an important consideration with all new development proposals. The greatest challenge continues to be serving the CCT and the laboratory portion of the Davis Building at the centre of campus. Expansion linked to the Davis Building and adjacent to the loading area, Site 1, presents an opportunity to rationalize and expand shipping and receiving, and improve the internal connection to laboratories and the CCT. A similar opportunity applies to Site 2 (HMALC) and 7 (North) expansions.

Public Transit

Preliminary proposals for the Davis Building Master Plan include redevelopment of the Inner Circle Road transit stop, in conjunction with improvements to the Davis Building's exterior and main entrance (Sites 5 and 6 discussed further in Sites & Sectors). This project could re-establish a front door to the campus, help to create a safe and appealing pedestrian environment, and define transit stops separate from vehicular circulation and drop-off.

Bicycle Routes

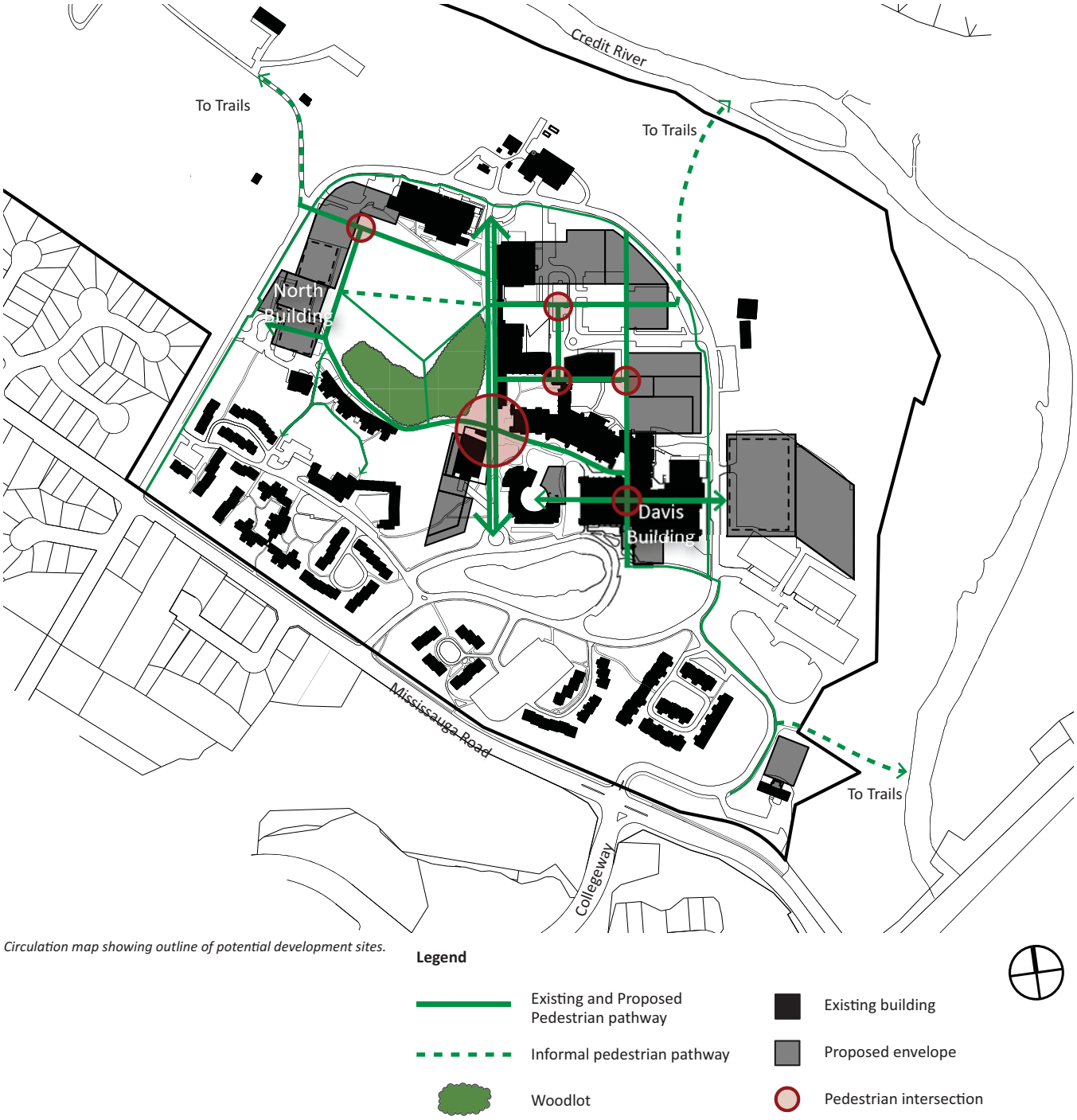
There is further opportunity to improve cycling lanes, signage, and parking/storage on campus. In addition, the City of Mississauga proposes an eventual extension of the dedicated cycling lanes northwards along Mississauga Road; and an improved connection between UTM and the Culham Trail is identified under the Credit River Parks Strategy draft master plan.

Pedestrian Circulation

The 2000 Master Plan called for a more systematic approach to street furniture and even specified a vocabulary of walls, planters, and benches. However, a decade later little progress has been made in that regard, primarily because of limited funds. Efforts are underway to improve that situation and include: a new standard for street/exterior lighting that is being used on the new walkway along the Outer Ring Road; improved and consistent exterior signage for buildings and outside way finding; adoption of a standard for street furniture that will build on that being used in the landscaping of the new Instructional Centre; and broader landscaping approach to create a pedestrian mall or courtyard, complete with built-in seating, between the Instructional Centre and the HMALC. It is hoped that the new continuity between elements, improved signage, and more outdoor seating will encourage a more vibrant public realm.

Priorities through 2030

1. Coordinate open spaces and pedestrian routes, such as the future Campus Green and the Link.
2. Continue to develop a hierarchy of pedestrian circulation (both interior and exterior), well defined through material, lighting, signage and coordinated with capital development.
3. Provide safe and clearly marked crossing points for pedestrians, particularly across Outer Circle Road.
4. Clearly connect the inner campus pedestrian circulation network with the outlying nature trail system.
5. Provide clear and safe connections to the greater City of Mississauga cycling route network.
6. Expand and improve vehicular pick-up and drop-off at key points of entry to the inner campus.
7. Improve UTM's transit service hub. Separate transit and other vehicular traffic, and provide safe and sheltered waiting areas for transit users.
8. Improve and rationalize existing service/loading areas as development sites are implemented.



Circulation map showing outline of potential development sites.

In addition, the campus lacks clear pedestrian connection to the nature trails and Credit River Valley north and east of the campus. Providing clear and amenable links between inner- and outer-campus networks would vastly improve continuity of the overall pedestrian circulation network.

As circulation intersects with so many different aspects of the University's physical structure, it must also be considered when addressing other areas of the master plan including other sections: Open Space, Accessibility, Personal Safety and Security, and Parking.

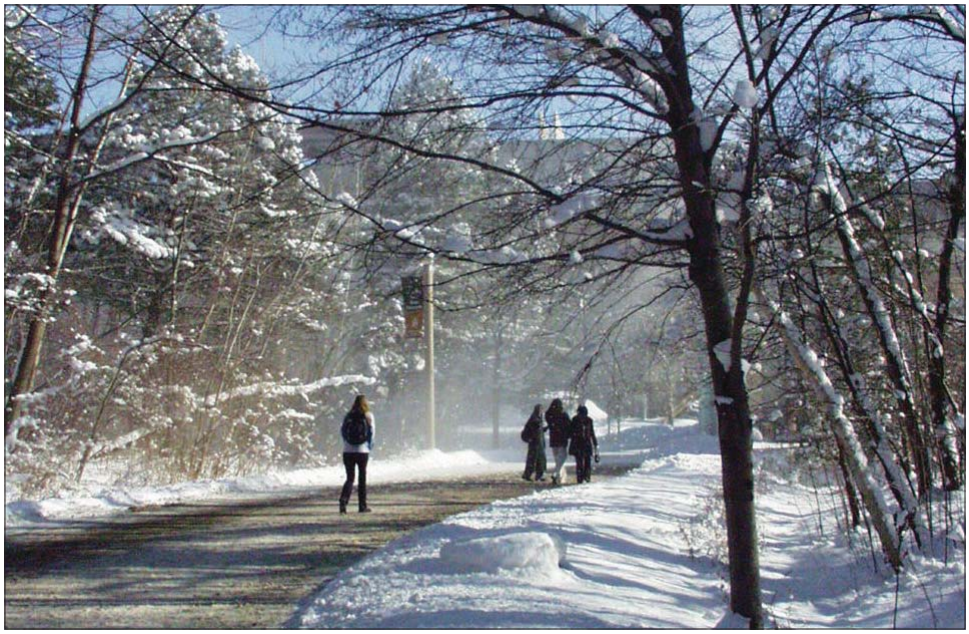
Regulations and Guidelines

University of Toronto Policy on Capital Planning and Capital Projects (2001)
The *University of Toronto Policy on Capital Planning and Capital Projects* includes principles that address circulation on campus including those that encourage continuous pedestrian routes throughout the campus, and the provision for safe and convenient access to all University facilities. The Policy further identifies landscape improvements, including those to streetscapes through the use of distinctive paving, lighting, signage and outdoor furnishings.

Mississauga Cycling Master Plan (2010)
The *Mississauga Cycling Master Plan* will be used to inform cycling plans within the campus with a view to providing appropriate connections to the city-wide network of bicycle pathways. The Cycling Master Plan contains comprehensive guidelines relating to Cycling Route Design, Design Standards, Signage and Way Finding, Bicycle Parking and Amenities, and more. It outlines a strategy to develop over 900 kilometres of on- and off-road cycling routes in the city over the next 20 years. The plan focuses on fostering cycling as a way of life in the city, building an integrated network of cycling routes and aims to adopt a safety first approach to cycling.

Background

Located within the Credit River Valley, the UTM campus identity is defined by the natural environment. In fact, the campus in its entirety is heritage designated as a cultural landscape. Minimal intrusion on open space and wooded areas, through consolidated and compact built form, was formative in the original campus plan, again in the 2000 Master Plan, and remains a primary factor in proposed development moving forward.



The Five-minute Walk in winter.

Existing Open Space

Woodlots, green space, two ponds, and surface parking lots make up the broad fabric of open space at UTM. The individual open spaces on campus are part of a larger, campus-wide framework of spaces linked together by pedestrian routes, and rendered coherent though the consideration of views and gateways, landscaping and planting, lighting and seating, and other design elements.

Many of the current open spaces consist of connections between buildings and playing fields. Recent construction projects, guided by the 2000 Master Plan, have been successful in providing well-planned open spaces, particularly in the form of courtyards and green roofs. The courtyards formed between the CCT building, completed in 2003, and Davis Building and the open space between the HMALC library and CCT embody the qualities of open space envisioned for the campus.

A key challenge identified by the UTM community is the lack of programmed open space within these courtyards, other green spaces, and most importantly a central green common space. In addition to informal gathering, student study and recreation, outdoor space could be activated by functions such as community events, alumni gatherings, convocation (now held at St. George), movies, reception, fairs, orientation, conferences etc. The success of these spaces also requires definition and appropriate programming of surrounding buildings.

Front Lawn

A secondary effect of site excavation for current construction projects resulted in the creation of a small hill where there was once a significant depression in the campus' front lawn. The intention was to provide a more usable space for informal gathering and recreation however the lawn is under-utilized, perhaps due to its location, being surrounded on three sides by roads, and lack of shelter.

Woodlot on campus; Ecological/No-Build zone

Athletic fields

The largest expanses of campus open space are occupied by athletic fields. These two soccer/football field areas are currently designated for permitted athletics uses only. The North Field (above), adjacent to the new Instructional Centre and the North Building, was recently resurfaced and fenced, and is situated on top of the Instructional Centre's geothermal borehole array.

Courtyard between CCT and Davis Building

Guiding Strategies

The University intends to continue the traditional campus patterns of development and ensure that the most important aspects of the built and landscaped environment will be preserved, protected and enhanced. The following text outlines the key principles and studies on which that intent will be realized:

i) Relevant Agreed Planning Principles:
The principles identified under CAMPUS ENVIRONMENT define the vision and aspiration of spaces between buildings; and recognize the University's unique sense of place as far more than the sum of its parts.

The University community's environment must:

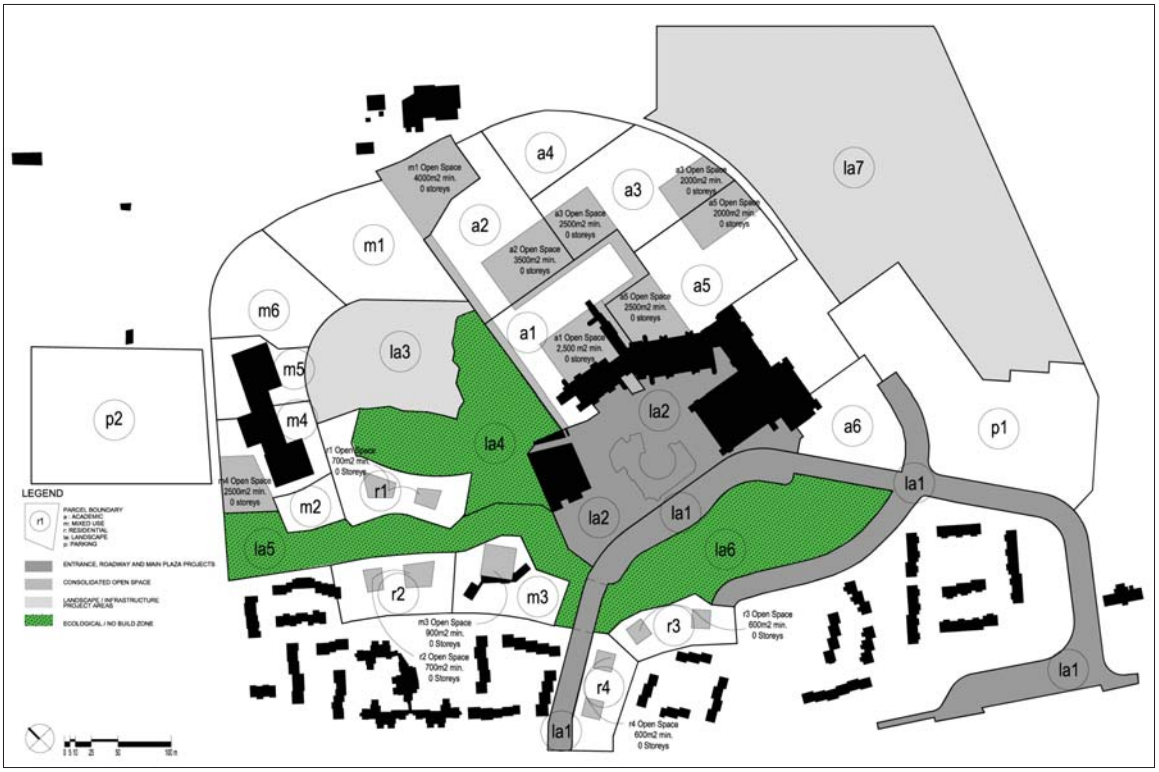
- *support intellectual aspirations of its community;*
- *build on a fundamental framework of social and environmental amenity;*
- *be vibrant and encourage activity;*
- *relate buildings to landscapes and create a logical sequence of movement;*
- *provide shelter and active travel between buildings;*
- *be safe, secure, and accessible;*
- *respect and engage with the unique ecological context; and*
- *maintain and enhance a central unified open space, as a unifying element on Campus.*

ii) integration with other considerations:

As Open Space intersects with so many different aspects of the University's physical structure, it must also be considered when addressing other areas of the master plan including other sections within Opportunities & Challenges: Circulation, Parking, Environment, Heritage, Personal Safety and Security, and Accessibility.

iii) UTM 2000 Master Plan

The UTM Master Plan of 2000 sought to address several key issues including community, environment, and consolidation of built form. The Master Plan included a parcel plan dividing the campus into parcels by use: academic, mixed-use, residential, landscape and parking, and designated open spaces to be retained over the long term. Courtyards within academic parcels and the 'UTM Quad' were introduced in the 2000 Plan as means to better integrate the campus experience with the exterior environment. It also established Ecological/No-Build Zones, which this Plan carries forward.



UTM 2000 Master Plan Parcel Plan with Landscaped Spaces; No Build Zones are highlighted in green.

Impact on the Master Plan

Opportunities and Challenges

Preservation of existing green space and definition of future green space was pivotal in shaping proposed future development. Future buildings need to be seen in conjunction with open spaces as urban pieces tying together academic programs. Each new project presents an opportunity to move the campus' open spaces and connective network in a planned and desired direction. At minimum, 1% of the construction budget for each new building goes to landscaping while another 2% is allotted to developing and improving campus-wide areas.

The courtyard scale has by now been successfully established by the 2000 Master Plan and should be encouraged in future developments. The CCT building sets the tone for future planning on campus by creating a major link through the campus, as well as enclosing courtyards on either side. A similar intimacy in scale is desired between the Instructional Centre and the HMALC.

The green space shown below is comparable in size to Front Campus on the St. George campus. Its size offers significant potential as a multi-purpose gathering space, especially given its central location on campus and future development of the North campus sector.

The North Field - currently designated for permitted athletic uses only - represents an opportunity to provide the UTM campus with a central green space usable by all members of the University community.

Site Plan showing the existing UTM North Field overlaid with the St. George Front Campus for size comparison.

Open space map showing outline of potential development sites.

Legend

- Existing building
- Proposed envelope
1. North Athletic Field *(exist.)*; Campus Green *(proposed)*
2. Parking Lot 9 *(existing)*; Academic Quad *(proposed)*
3. Transparency/view to open space
4. Ecological/No-Build zones
5. Pond *(existing)*
6. Green roof *(existing)*
7. Connections to trail system
8. South Athletic Field
9. Old Field development site

Public Art on Campus

The City of Mississauga has identified public art as a priority of the *Mississauaga Culture Master Plan* (2009) and has drafted the *Framework for a Public Art Program* (2010). The Framework has listed the Blackwood Gallery as a potential resource, and there could be an opportunity to partner with the City of Mississauga's Civic Public Art Program to create a program and policy for public art at UTM in concert with the campus master plan.

As an example of public art initiatives elsewhere at the University of Toronto, UTSC has shown an ongoing commitment to contemporary art, with a major piece of original art being planned for the atrium of their new Instructional Centre. In April 2010, UTSC posted an International Call to Artists for Expressions of Interest in developing a $175,000 public art installation.

Priorities through 2030

1. Seek to achieve a consistent campus-wide language of materials and landscape when implementing individual capital projects.
2. Activate current green space, particularly courtyards, through increased programming, furnishing, and shelter from the elements.
3. Maintain naturalized environments as no-build zones.
4. Seek opportunities for creation of roof-top open space.
5. Participate with City initiatives related to open space, particularly the potential for outdoor art.
6. Create a multi-use campus green in the current location of the North Field.
7. Consider the potential for green space, an Academic Quad, in the development of Sites 1 and 2.

Regulations and Guidelines

Mississauga Campus Master Plan (2000)
This master plan, prepared by multi-disciplinary consultant team led by Sterling Finlayson Architects, is both wide in scope and fine in detail. It identifies landscape goals, including planting and paving strategies, street furniture, and ecological presentation; and introduces the notion of 'open space hierarchy', consisting of a major green quadrant and series of courtyards.

Official Plan
The City of Mississauga's 2010 Official Plan identifies the UTM campus as the "University of Toronto at Mississauga Special Purpose Area". The Plan addresses the campus' relation to the surrounding residential land use context, calling out the desire for development to be located and designed with sensitivity to adjacent residential areas, and with regard for the Mississauga Road Scenic Route policies.

Zoning
The vast majority of the campus falls under the municipal zoning designation of Institutional (I5). As such, there are no municipal restrictions or clauses that mandate the provision or maintenance of open space within the I5 zone. While there may be no official acts governing open space on campus, each proposed new development is reviewed by the City in reference to UTM's Master Plan (2000) to ensure that a continuity of approach is followed.

The only area of the campus lands that falls outside of the Institutional zone is the buffer zone along the Credit River. This area is zoned as Greenbelt (G1) with no construction permitted with the exception of trails and activity related to passive recreational uses.

Under the City of Mississauga's Official Plan, Open Space is considered as part of a network of Public Open Space and Private Open Space. There are no areas officially designated as Public Open Space on the UTM property however the Greenbelt area along the Credit River forms part of the Natural Areas System.

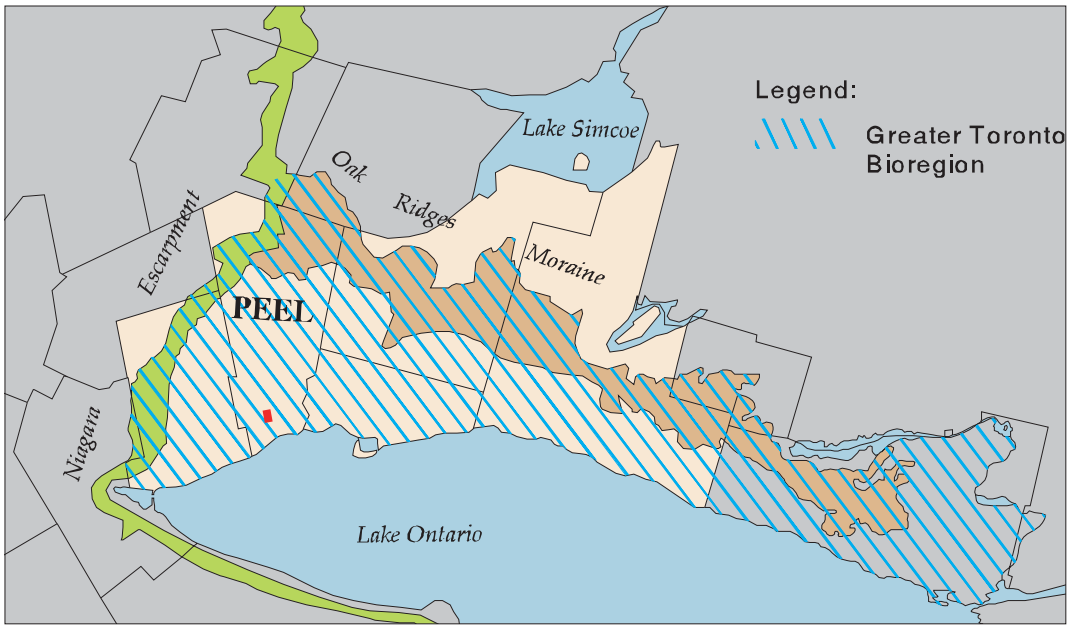
Background

The University of Toronto Mississauga sits within the Greater Toronto Bioregion, bounded by the Oak Ridges Moraine, the Niagara Escarpment and Lake Ontario. Specifically located within the Credit River watershed boundary, the campus sits on the western bank of a bend in the Credit River, in proximity to Mullet Creek. The campus property includes several ecologically sensitive and protected areas.

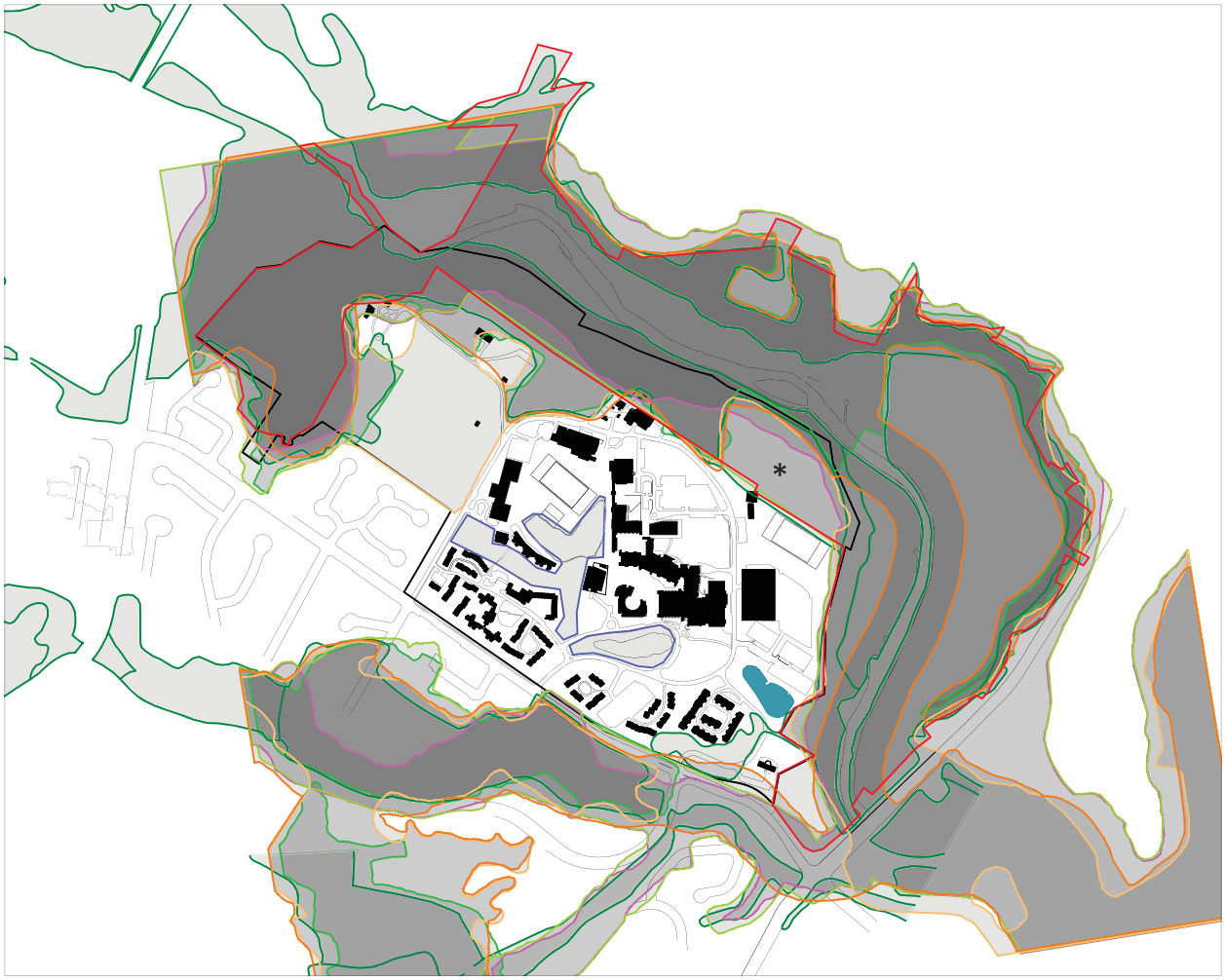
Deer can often be seen passing through campus

Historically, the assemblage of lands consists mainly of the Reginald Watkins estate (including the Principal's residence Lislehurst). Areas of what is now the campus at one time included woodlots, undisturbed ravine lands, cleared fields for agriculture, orchards and a series of excavated gravel pits at the southern end.

Regulation, conservation, stewardship and enhancement of the natural environment and the underlying ecosystems on-campus are a topic of great interest and concern to the UTM community, as are related topics of Sustainability and Open Space, discussed elsewhere in this document under their own chapters.



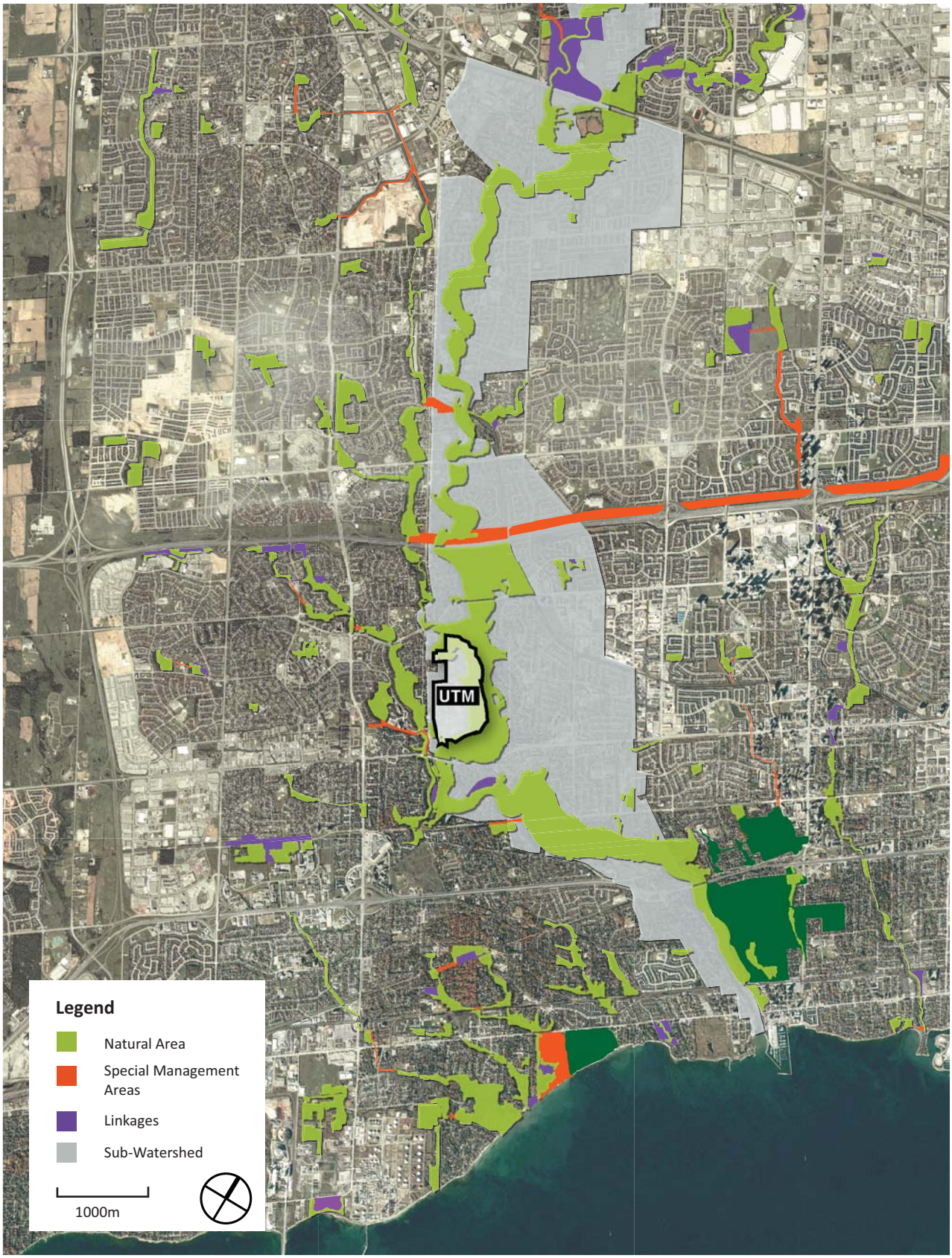
Regional plan locating the UTM campus (in red) within the Greater Toronto Bioregion. Source: Regional Municipality of Peel Official Plan



Regulation of environmental features.

- Watercourse
- Slope Hazard
- Environmentally Significant Areas (ESA)
- Areas of Natural and Scientific Interest (ANSI)
- Significant Natural Site
- Peel Greenlands
- Regulated Feature
- Greenbelt Zoning (G1)
- Ecological/No Build Zone
- * Old Field

The map above clearly emphasizes the relationship between the environment and the campus identity. The primary regulating body affecting development on campus is the Credit Valley Conservation Authority (CVCA). CVCA and Peel Region regulation and legislation boundaries surround the developed campus on all sides; each will have specific implications on future growth not just within the boundaries, but in some cases, will include setback requirements as well.



Regional Mississauga plan showing Credit River watershed and natural systems contiguous to the UTM campus.

One of the several forested areas found within the borders of the UTM campus

Current Practice and Recent Projects

The University of Toronto has taken steps to increase the role of grounds and maintenance and to coordinate environmental planning across all three campuses. In particular, the establishment of the Sustainability Board has brought together representatives from each campus in order to better coordinate, plan and execute energy and resource conservation efforts. Mississauga has its own Environmental Affairs office and an Environmental Inventories Coordinator that undertake ecosystem regeneration and resource conservation projects on the campus.

Currently, efforts are underway to increase the campus environment's habitat, biodiversity and watershed integration; all measures that would help increase the campus' functioning as an ecological asset in the greater urban environment. These initiatives include green roof retrofits, allowing for natural rainwater infiltration and irrigation, the creation and protection of native and adaptive forest and grassland ecosystems, pesticide-free policies and stewardship.

Landscape improvements are included on all three campuses as part of a comprehensive planning process that is integral to the planning and budgets for each new building project.

Environmental Affairs Office

The Environmental Affairs Office (EAO) at the University of Toronto Mississauga was formed in May of 2004 and was the first of its kind at the University. The office is charged with promoting sustainability on campus through education, partnership and management. To that end, the EAO works to connect academic research with natural elements on campus. The campus Old Field site, nature trail and stormwater pond are all popular sites for student research. This emphasis on environmental stewardship is quite appropriate, given the campus' context overlooking the Credit River Valley, and as such was a fundamental part of the 2000 Master Plan . In this updated plan, large areas of the campus are designated "Protected, Naturalized Research Space", where protection against development is to be accorded a high priority.

Naturalization planting project with student engagement

Naturalization

With the support of students, grounds staff, the City of Mississauga and the CVCA, UTM has partnered with Evergreen, a not-for-profit organization, to establish a major naturalization initiative. Since 2004, hundreds of volunteers have planted trees and shrubs annually. Twenty-one locations have been designated as protected, re-naturalized areas on campus. In 2010 the campus held five tree planting events. Over 200 volunteers planted 236 native trees and shrubs and cast seed for 1000 native wildflowers in three of these areas on campus.

Ongoing plans include broader community outreach, further partnership with Evergreen for landscape planning, and a Threatened Amphibian Recovery project. UTM's Old Field Recovery project was a recent success in ecological and public outreach terms. Two controlled burns, in 2008 and 2010, to assist in the regeneration of native grassland species, were widely publicized events; six events have been carried out post-burn with University and Region of Peel school groups.

Species at Risk

Studies on the flora and fauna of the campus have revealed a number of threatened or endangered species on campus. Protecting these specimens from harm remains a priority.

Grounds Monitoring

Grounds monitoring plays an increasingly important role in campus sustainability. The Grounds Monitoring Subcommittee deals with existing and future uses of the grounds of UTM, covering such issues as pesticide use, species selection, monitoring projects and most recently, naturalization issues. The Committee's membership includes faculty, staff, including the Environmental Project Coordinator, Grounds Supervisor, staff from the Campus Housing and Athletics and Recreation and students. This subcommittee reports to the Resource Planning & Priorities Committee, which in turn reports to Erindale College Council.

Stormwater Management Pond

Stormwater Management Pond

A stormwater management pond, designed to collect and retain all surface water runoff from the campus, was completed in 2008. The site features a naturalized perimeter, provides some water for irrigation and will be used as an educational tool for hydrologic studies by geography field students. These initiatives will both beautify the campus and help protect the ecological integrity of the adjacent Credit River by mitigating the effects of uncontrolled and untreated water runoff from the campus.


Native flower species in Davis Building front garden; (right) green roof on top of the Recreation, Athletic and Wellness Centre.

Green Roofs

In the interest of increasing habitat and biodiversity on the campus, improving rain water absorption, mitigating the local heat island effect, decreasing a building's solar heat gain, and providing a symbolic embodiment of the University's growing commitment to environmental improvements, the UTM campus features green roofs on its most recent buildings:

- The CCT building features an intensive type of green roof over its parking garage.
- The HMALC building has a rooftop patio/roof garden featuring an array of lower-maintenance species.
- The RAWC facility features an extensive type of green roof with a variety of drought-resistant species.
- The new Health Sciences Complex was designed to incorporate a series of roof terraces, irrigated by a grey-water system.

These roofs contribute to the campus' available habitat and help to offset the impact of habitat loss associated with new building development.

Impact on the Master Plan

Opportunities and Challenges

While environmental regulations pose unique challenges to planning strategies on each campus, at UTM those limitations are viewed as opportunities to plan more intelligently and creatively. Smart planning can contribute to more articulated, compact and integrated building and open space networks. For instance, a large regulated swath of land on the Mississauga campus is designated as an Area of Natural and Scientific Interest (ANSI). That designation is carefully constructed so as to permit sensitive development while precluding interventions that would be detrimental to the ecosystems of interest. Planning for such areas presents an opportunity for the University to demonstrate research and policy leadership and to implement low-impact development strategies.

Planning strategies can also seek to make connections from within the campus to the protected natural areas at its perimeter, thus ensuring the assets are appreciated and accessible to the campus community. In the interest of increasing the interactive and educational possibilities afforded by the adjacent natural environment on campus, the master plan advocates promoting a 'living lab' approach. This means restoring and strengthening certain key features of the woodlots and wetlands and, where practical, engaging these environments through sensitive access through the forests and marshes and providing safe connections across Outer Circle Road leading toward trail entry points.

With these issues in mind, this master plan focuses on development primarily within Outer Circle Road. While the most obvious areas of ecological sensitivity lie on the outside of this ring road and along the Credit River, there are smaller-scale areas of interest within the campus proper, including: the central woodlot (to the west of the CCT); the Wilson Pond (south of the Davis Building); and the woodlands and wetlands (south of the Five-minute Walk). These inner campus areas have been identified as Ecological/No-build zones in the 2000 UTM Campus Master Plan, and development proposed as part of this master plan maintains respect for these boundaries. In addition, the landscape component of new projects should include use of native species, and integrate green roofs where feasible, and as required by LEED® Silver certification.

Priorities through 2030

1. Use native species for planting in all feasible locations.
2. Add green roofs to existing and new structures on campus to begin to restore habitat lost through development
3. Introduce permeable surfaces, where possible, to enable rainwater infiltration and reduce loads on storm/sewer systems.
4. Balance the need to connect to ecological environments (Credit River Valley ecosystem) for research with the impact of built form.

Regulations and Guidelines

University of Toronto

The University of Toronto's Environmental Protection Policy was originally drafted in 1994 and was updated in 2010. The policy includes principles that mandate the protection and enhancement of the local and global environment including the following requirements of the University to:

- meet and, where reasonably possible, exceed compliance with applicable federal, provincial and local environmental regulations and other requirements to which the University subscribes;
- operate so as to minimize negative impacts on the environment;
- adopt practices that reflect the conservation and wise use of natural resources; and
- respect biodiversity.

External Legislation

Parts of the campus fall within an area designated as Core Greenlands by the Region of Peel and the campus itself is within the jurisdiction of the Credit Valley Conservation Authority. There are therefore numerous regulations affecting alterations and development at UTM.

The Credit River Valley borders the campus to the north.

Background

Infrastructure, for the purpose of this discussion, refers to the campus-wide systems that provide the University's buildings and facilities with:

- power,
- heat and cooling,
- piped services such as water and gas, and
- a means to discharge waste.

The Central Utilities Plant (CUP) constructed in 1971

Since the 1970's, environmental legislation and the rise in the cost of resources have acted as catalysts for the *University of Toronto Infrastructure Plan*, the goal of which is to minimize environmental impact incurred through campus expansion and the upgrading of existing buildings and landscapes. Further, the Campus Planning Principle Sustainability which states "the University of Toronto Mississauga seeks to take a leadership role in line with the University's overall mission…" must be considered with respect to all campus infrastructure planning going forward.

The original master plan called for a campus that would be served by a Central Utilities Plant (CUP). The CUP, constructed in 1971, was designed to supply heat, cooling, water and electricity to all academic buildings on campus and to serve a student population of 25,000. The first building to connect to the CUP was the South Building, a central mega-structure, which officially opened in 1973 and recently renamed the Davis Building. Early drawings indicate the planned expansion of this building along an underground service spine. However, the campus has taken on a much different form than originally conceived. While the utility tunnel between the CUP and the Davis Building operates to this day, the majority of the more recent buildings on campus are individually equipped.

Five new buildings have been constructed on campus since 2000. This growth represents 62,000 gross square metres of institutional space and a 59% increase in the physical resources of the campus. Despite UTM's capacity for supplying district energy, rather than tap into the central system, gas-fired boilers and chillers were installed in each building. In response to this rapid expansion, a consultant was hired in 2004 to take stock of service infrastructure across campus. In addition to heating and cooling, the report itemizes infrastructure upgrades, and associated costs related to electricity, sewer and storm water, and gas lines. These findings have helped prioritize, and continue to inform, infrastructure improvements.

Concerns related to multiple maintenance agreements and associated costs have prompted UTM to re-visit the idea of greater centralization, such as investigating opportunities to connect existing buildings to central utilities, including a below-grade extension of utilities along the Five-minute Walk. If this concept were implemented, individual HVAC chillers and boilers already in place would serve as back-up.

Current Practice and Recent Projects

A new stormwater pond was sized for a capacity 35% beyond 2007/08 development

The *University of Toronto Infrastructure Plan* seeks a balance between redundant or backup systems and resource efficiency. As technologies and systems continue to evolve, becoming more integrated and efficient, individual technologies, such as heat recovery, are often synchronized to complement one another. The Plan identifies the goal to minimize environmental impact of continued campus expansion and upgrades to existing buildings and landscapes. Today, the University's building and infrastructure design principles are a cornerstone of UTM's *Grow Smart, Grow Green*, a comprehensive, multi-faceted initiative that provides a framework to reduce environmental impact on campus.

Stormwater

A stormwater management pond, completed in 2008 was designed to accommodate full build-out of the 2000 UTM Master Plan, or enough capacity for a 35% increase in development footprint beyond 2007/08. The pond collects, retains and treats surface water runoff from the campus prior to its release into the Credit River. A growing number of green roofs on campus buildings also help to mitigate runoff.

The Health Sciences Complex is the first building to connect to the service tunnel, since the Davis Building; the service tunnel was constructed between the CUP and the Davis Building as part of the original campus construction. (top)

Davis Building Phase One

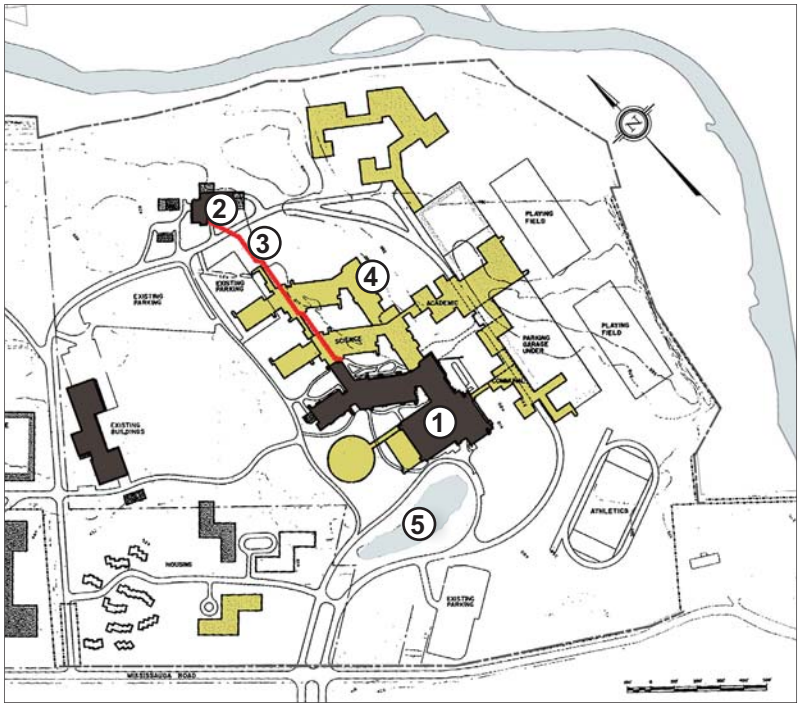
Renovation of the Davis Building third floor from library to office space took advantage of infrastructure already in place. The required upgrades to the area's HVAC systems were undertaken with additional capacity in mind in order to support the planned next phases of renovations.

Ground Source Heat Pump

The site selected for the construction of the new Instructional Centre presented a unique opportunity. The adjacent green space (playing field) provided sufficient area for a field of underground wells to be installed. The wells will enable the new building to have the bulk of its heating/cooling requirements met through ground heat exchange, with the CUP only providing heating/cooling at peak times and as back-up to the geothermal system.

Service Tunnel connections

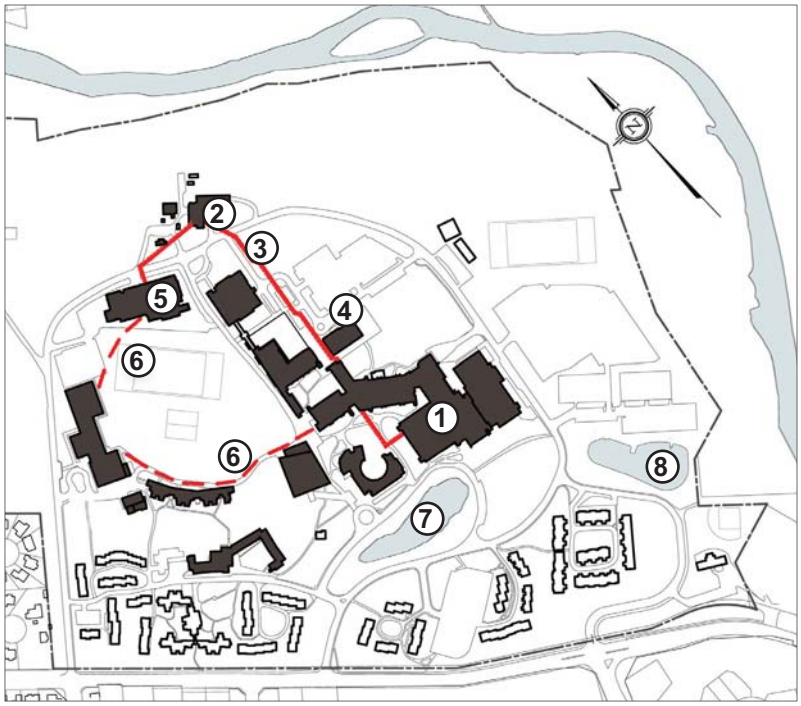
The Health Sciences Complex was designed and located to connect to the existing service tunnel and is the first facility since the Davis Building to be served by the CUP. The Instructional Centre construction project includes a new service tunnel, not only to provide back-up energy, but also in anticipation of the north campus expansion. In doing so, both projects begin to set up the infrastructure for future development.



The 1972 A.D. Margison plan builds on the 'megastructure' and ring road approach of previous Master Plans by Raymond Moriyama and John Andrews.

1972 Master Plan

1 South Building
2 Central Utilities Plant (CUP)
3 Service Tunnel
4 Proposed 'megastructure' Expansion *(unbuilt)*
5 Stormwater Pond



The campus grew rapidly between 2000-2011. The plan shows potential for new and existing buildings to connect to the CUP.

2011 Campus Plan

1 Davis Building *(formerly South Building)*
2 Central Utilities Plant (CUP)
3 Service Tunnel
4 Health Sciences Complex *(2011 occupancy)*
5 Instructional Centre (*2011 occupancy)*
6 Proposed Extension of Underground Utilities
7 Original Stormwater Pond
8 New Stormwater Pond

Impact on the Master Plan

Opportunities and Challenges

Infrastructure planning must consider campus expansion (enrolment growth), upgrades to existing systems, as well as specialized requirements for an increasing number of highly sophisticated research laboratories. The plan must continue to minimize environmental impact, while anticipating campus expansion and upgrades to existing buildings and landscapes.

UTM can serve projected development either through expansion of existing infrastructure or with capacity already built in. The central heating system could be upgraded to meet an increased load, and the new chiller system, installed in 2006, has excess capacity built in. There is provision for a future electrical feed from Mississauga Road to double the current load and the sanitary system can accommodate expansion.

A UTM energy plan, which anticipates a future requirement by the Green Energy Act, is under development at the time of this writing. The plan identifies current projects and practice, as well as limitations and opportunities related to future campus development in the short term.

Priorities through 2030

1. Continue to update UTM's energy inventory annually.
2. Connect to the Central Utility Plant rather than install stand alone systems for future projects.
3. Maintain and update the plan for addressing deferred maintenance utilizing the Facility Condition Assessment Program.

As infrastructure ties in with so many different aspects of the University's physical structure, it must also be considered when addressing other areas of the master plan such as: Sustainability, Environment, Personal Safety and Security, and Open Space.

Regulations and Guidelines

Facility Condition Assessment Program (FCAP)

The Facility Condition Assessment Program (FCAP) provides greater understanding of the issue of Deferred Maintenance both within institutions themselves and within the Provincial Government by quantifying and benchmarking the deferred maintenance liability across all Ontario universities. At the institutional level FCAP provides a rigorous process of site inspections, creating credible data; an ability to identify and prioritize deferred maintenance items; an ability to track, create funding scenarios; and the ability to make a case for funding and ultimately manage this issue.

Green Energy Act

In anticipation of a Green Energy Act requirement, an infrastructure plan specifically addressing energy is currently under development for each campus.

Background

Sustainable development is widely known as that which "meets the needs of the present without compromising the ability of future generations to meet their own needs". This definition was first used in *Our Common Future*, a 1987 report by the United Nations World Commission on Environment and Development. In the two decades since, much has occurred in both research and promotion of, and commitment to, sustainability. This timeline is marked with global commitments to reverse climate change, such as the Earth Summit in 1992 and adoption of the Kyoto Protocol in 1997, as well as establishment of policies, principals and organizations specific to the built environment: the Hannover Principals developed for Expo 2000; and the US Green Building Council (USGBC) in 1993, with the Canadian Green Building Council (CaGBC) established in 2002.

For UTM, this Master Plan further identifies SUSTAINABILITY as an overarching Planning Principle and defines it in the context of University development:

Beyond reduced environmental impact, the University of Toronto Mississauga seeks to:

- *take a leadership role in line with the University's overall mission;*
- *further opportunities to link with research and teaching;*
- *promote its environmental achievements on campus and to the outside community;*
- *meet the University's stringent Design Standards related to environmental measures, and continue to strive beyond minimum requirements.*
- *incorporate technological advancements in building and landscape design, and seek partnerships where appropriate;*
- *encourage bicycle commuting and transit-oriented modes of travel; and*
- *enhance, connect and respond to the Campus' ecological context.*

The University of Toronto has long been a strong proponent of sustainable development. As early as the 1970s during the oil crisis, the University engaged environmental engineers to review and make recommendations on the best practices in the use of energy. Three decades later, the legacy of those early practices is evident on campus. Further, the University made gains in this area with the establishment of the Sustainability Board and its subcommittees, reviewing energy, capital projects, and funding models for sustainable initiatives. The University has constructed an increasingly impressive list of building and landscape projects that follow strict sustainable principles.

The University of Toronto is committed to being a sustainability leader in the city, as well as the country, through its progressive operations standards as well as its cutting edge research and education in the field. It strives to increase energy and water efficiency, in addition to creating and maintaining healthy interior environments. With recent public opinion polls ranking the environment as one of the most critical issues among voters in Ontario, the University must continue to embrace this marked trend in values particularly as it continues to compete for the most gifted faculty and students.

Current Practice

In 2009, President Naylor committed the University to increased sustainability by signing, along with 19 other signatories from across the province, the *Ontario Universities Commitment to a Greener World*. Among other things, these institutions made a commit to work together to:

- build new facilities in accordance with principles of sustainability and energy efficiency;
- renovate existing facilities to improve energy efficiency;
- seek to preserve green space on their campuses wherever possible; and
- develop institutional environmental sustainability plans with measurable objectives.

More than 70% of the campuses have implemented LEED® (Leadership in Energy and Environmental Design) certification for new buildings.

Design Standards

The current standard, *Part 1, Section 5 of the University of Toronto Design Standards*, includes specific Environmental Design requirements including the minimization of energy and water use; eco-friendly material choice; the control of effluents and emissions; coordination with the outdoor environment; recycling and waste management; and monitoring of environmental performance. This standard, along with an environmental design check list, has been used for all capital projects over the last decade as a means of ensuring that the design team considers all aspects of environmental sustainability during the design phase of the project. An updated version of the standard is to be implemented in 2011 and proposes CaGBC's Leadership in Energy and Environmental Design (LEED®) 2009 Silver certification as a target, calling out minimum compliance for each credit.

In addition to this particular section, other sections such as *Part 1, Section 6* describe the University's approach to landscape and include sustainable practices.

Tri-Campus Sustainability Board

The Tri-Campus Sustainability Board was formed with membership from the three University campuses to provide resources for the sustainability offices, a platform for their cooperation, and a basis for their accountability. The Board:

- helps the individual campuses find opportunities to coordinate their agendas and priorities with the other campuses on University-wide initiatives;
- oversees the University of Toronto's tri-campus collaboration regarding environmental sustainability; and
- works to ensure that the high quality of life experienced within the University of Toronto community is provided in a financially viable and ecologically appropriate way.

Environmental Affairs Office

Each year the Environmental Affairs Office oversees 30 work study students and 28 students, which will increase to 54 students in Fall 2011, in the ENV232: Environmental Sustainability Practicum course. These

students work to make campus based sustainability improvements collectively. UTM's banner for growth – *Grow Smart, Grow Green* – balances campus development with environmental sensitivity and responsibility. As a microcosm for the pressures of urban growth, UTM is determined to prove that rapid expansion and development can be accomplished in an environmentally sensitive and responsible manner.

Green Team site and the UTM Environmental Affairs Office acts as the central hub for environmental activity on campus.

Energy & Resource Planning Committee

In 2007, a recommendation was made for a comprehensive energy plan for all three campuses to address the long range requirements of the University. An Energy Planning Committee established by the Sustainability Board met several times in 2007 and 2008 to develop an energy plan for the University that will work in parallel with and intersect a proposed Policy on Capital Projects and Sustainability. By fall 2008, it was determined that three individual plans would be more effective. The campuses continue to work on these separately. Goals of the UTM energy plan, now called the Climate Action Plan and in progress at this writing, are identified under the following areas:

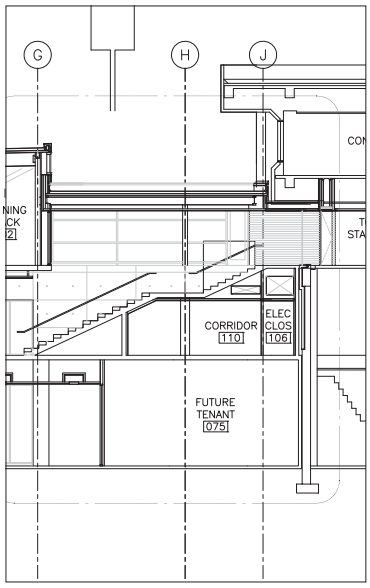
- an energy and greenhouse gas inventory;
- energy consumption and potential savings from retrofit and new buildings;
- building/occupant relationships;
- energy supply;
- alternative methods to finance energy reduction initiatives; and
- University policies and guidelines.

Oak tree in front of the Hazel McCallion Learning Centre

Recent Projects

Some of the most intriguing of new U of T buildings include environmentally sustainable measures to help reduce operating costs and improve indoor environmental quality for occupants. The new Instructional Centre follows the lead of recent projects at UTM: the Hazel McCallion Library (HMALC) achieved LEED® Silver in 2007; green roofs were installed on three new buildings at UTM constructed within the last five years; the Health Sciences Complex, scheduled for completion in 2011, was designed to achieve LEED® Silver, as was the Davis Building 3rd floor renovation, completed in January, 2010.

HMALC accessible roof garden



Section showing RAWC connection to Davis Building

Recreation, Athletics and Wellness Centre (RAWC)

The building design employs principles of sustainable design in many different facets, employing both a low-tech approach in its siting, orientation and maximization of micro-climates around the building, as well as a higher tech approach in its components and systems design. This included technologies such as heat recovery on the pool exhaust and Variable-Air-Volume (VAV) systems, more efficient supply fans and condensing boilers, as well as low flow plumbing fixtures and demand control ventilation throughout.

Great care was taken in the envelope design and the interface to the existing Davis Building which resulted in an energy efficient design that exceeds the national energy model by 53%. Green roof technology and a significant amount of buried surface area greatly assisted in achieving these efficiencies, while minimizing the environmental impact of the building on the landscape.

Hazel McCallion Learning Centre (HMALC)

The HMALC was designed by architects Shore Tilbe Irwin & Partners with Enermodal Engineering as a consultant. The library was initially designed using US-GBC LEED® as the equivalent Canadian requirements were not yet established at the outset of the project.

HMALC

The library design provides natural light and view throughout the building, creating a desirable study environment. Natural light sensors are just one of many energy-saving features incorporated into the project.

The building received 35 LEED® credits to qualify for Silver certification, and was one of only four buildings in Mississauga to meet certification at that time.

The HMALC scored high marks thanks in part to its high-efficiency outdoor air sensible heat/cool recovery system and lighting design that incorporates sensors to monitor occupancy. The building project also used a significant amount of recycled and regional supplies, and reduces water use with low-flow urinals and sinks. The library also operates a green housekeeping program that improves the building's air quality. Plans to use waste heat from the Central Utility Plant will lead to even lower energy consumption.

Solar array, Davis Building

W.G. Davis Building Photovoltaic solar array

The photovoltaic (PV) solar array, installed in 2005 includes 35 modules, each rated at 155 watts. Electricity from the solar system combines with incoming power from Enersource Corporation and is then fed to the University's electrical loads. The actual power creation is updated in graph form and provided on the UTM website with updates every 15 minutes. In addition, visitors and members of the UTM community can view real-time performance of the array via an active display installation in the Davis Building Meeting Place.

PV systems have many attributes including no CO2 emissions, low maintenance and renewable source of electricity. A much larger array, 22 kW, has been fully integrated into the exterior design of the Instructional Centre, forming the awnings on the southwest façade of the building.

Phase I renovation, Davis Building

W.G. Davis Building Phase I Renovation

The Davis Building third floor renovation, of the former library into office space, is the first project at UTM to strive toward LEED® CI (Commercial Interiors) certification.

The project includes installation of recycled and rapidly renewable materials, such as bamboo and wood from managed forests, as well as low-consumption plumbing fixtures. A sensor-activated lighting system switches off lights automatically when certain areas are not occupied. In addition, skylights and clerestory glazing bring daylight into the deep floor plate.

Solar array incorporated into the exterior of the Instructional Centre

Instructional Centre

The design for the Instructional Centre brings a range of classroom and lecture hall spaces to the north end of the campus and provides student study spaces, student lounges and food services. The project employs a high level of sustainability and is targeting a LEED® Gold standing with the following initiatives:

- A ground source heat pump system will provide the bulk of the building's heating and cooling requirements.
- PV panels are incorporated into the exterior facade of the building.
- The overall design of the building provides substantial natural lighting through extensive glazing adjacent to the building's large, open interior spaces.

Impact on the Master Plan

Opportunities and Challenges

Although the University's Design Standards and companion check-list promote environmental strategies, the current standards are not requirements but rather suggested areas of inclusion. By mandating a certain quantifiable level of compliance the University could be assured a consistently high level of performance from all projects.

The design of the Health Sciences Complex includes a rainwater collection system and utilizes the Central Utilities Plant to supply water, steam, propane and electricity.

Without a firm policy in place, UTM has taken the initiative to strive toward LEED® Silver on its most recent projects. UTM is well-posed, as municipal guidelines and recommendations become enforced policy. City Council adopted the *City of Mississauga Green Development Strategy* in 2010, and now requires LEED® Silver for new construction.

Sustainability will continue to drive the planning and design on the UTM campus.

Priorities through 2030

1. Implement the Climate Action Plan for the UTM Campus.
2. Continue to update, and respond to, UTM's energy and green house gas emissions inventories annually.
3. Continue to strive beyond LEED® Silver on capital projects.

Regulations and Guidelines

Numerous regulations and guidelines have been developed over the last decade in an effort to improve the quality of our environment. The University is governed by both University policy and standards required by municipal and provincial bodies.

University of Toronto Environmental Protection Policy

The University established the *University Environmental Protection Policy* in 1994, making the first steps towards a holistic approach to sustainability across the University. The intent of the Policy and its fundamental principles and objectives, updated in 2010, remain strong.

The policy, in part, states, "The University of Toronto is committed to being a positive and creative force in the protection and enhancement of the local and global environment, through its teaching, research and administrative operations…".

University of Toronto Design Standards

The University Design Standards apply to all capital projects and include requirements to:

- minimize energy use and water use;
- ensure eco-friendly material choice;
- control effluents and emissions;
- regulate recycling and waste management;
- measure and monitor environmental performance.

This standard, along with an environmental design check list, has been used for all capital projects over the last decade, as a means of ensuring that the design team considers all aspects of environmental sustainability during the design phase of the project. An updated version of the standard is to be implemented in 2011 and proposes CaGBC's Leadership in Energy and Environmental Design (LEED®) 2009 Silver certification as a target, calling out minimum compliance for each credit.

The Mississauga Green Development Strategy

Mississauga City Council adopted the Green Development Strategy in July 2010. It was developed in response to the City of Mississauga Strategic Plan's 40-year net-zero, carbon neutral target.

A task force has been designated to review a process for implementation of LEED® Silver certification for new buildings as a requirement for Site Plan and Rezoning Applications. In addition, the Strategy includes specific recommendations under:

1. On-site Stormwater Retention Technologies
2. Soft Landscape Material
3. Pedestrian and Cycling

Background

The Oxford Dictionary defines 'access' as:

1. *the means or opportunity to approach or enter a place;*
2. *the right or opportunity to use or benefit from something.*

With its focus on the physical nature of the UTM campus, this plan considers accessibility to encompass a broad definition. Accessibility is discussed in this chapter as both the inclusion of students with disabilities into all aspects of university life (mission of Accessibility Services), but also the right of all individuals to use or benefit from the greater University as a whole.

ACCESSIBILITY is one of seven headings under the UTM Campus Planning Principles:

> *The University's buildings and landscape must accommodate a diverse population in an open and inclusive campus. The campus environment should adhere to the principles of universal design.*

UTM is a relatively new campus and as such largely accessible. Improvements to areas can be made such as to the ramp at the main entrance to the Davis Building, the front door to campus. The design of the ramp could be better integrated into the architecture.

The University has a long history of consistently integrating legislation such as Ontario's *Human Rights Code* within its policies and mandates. With the passing of the *Ontarians with Disabilities Act* (ODA) in 2001, the University began to formalize a process for developing accessibility guidelines on campus.

The ODA requires the provincial government, all municipalities in Ontario, universities and other public institutions each to establish an Accessibility Plan; this plan must be updated annually and made available to the public. The ODA's purpose is to improve opportunities for people with disabilities through identification, removal and prevention of barriers to participation in the life of the province. Barriers can be physical, sensory, a learning disability, a mental health disorder, or even a chemical sensitivity. An open and inclusive environment requires year-round ease of access, relying on a barrier-free physical infrastructure, and clear, well-located signage.

The ramp at the Davis Building main entrance could have been improved on through better integration into the landscape.

Barriers under stairways adress a safety concern for the visually impaired.

Push buttons are installed in new buildings, as well as in existing buildings with an emphasis on student residences in 2008 and 2009.

Accessibility

The ODA Accessibility Planning Committee was established at the University in 2002, producing the first Accessibility Plan in 2003-2004 which has been updated annually. University of Toronto Accessibility Plans respond to ODA requirements, and identify ongoing and past initiatives on campus under four broad categories: Built Environment, Best Practice/Pedagogy, Student Life, and Mental Health. While an accessible campus relies on advancements in all of these areas, the AODA* *Built Environment Standard*, which will apply to new construction and extensive renovation projects, is most relevant to the Master Plan.

The University of Toronto was the first post-secondary institution in Ontario to create the position of an AODA Officer. The Officer assists departments and divisions in meeting obligations under the legislation and is proactive in implementing best practice on all three campuses. The Officer also directly assists individuals who have difficulty accessing on-campus services due to a disability.

Current Practice

Over the last several years, an increased awareness of disability issues has had an impact on physical planning and building on all three University campuses. The University of Toronto Accessibility Plan of 2007-08 established significant commitment to campus-wide barrier free access. For example:

Municipal Guidelines: Incorporation or adoption of Municipal Guidelines
Local municipal guidelines (the City of Mississauga *Accessibility Design Handbook*) are currently being reviewed against the University of Toronto Design Standards and Accessibility Checklist, and continue to serve as a benchmark to improve and enhance outcomes. The ODA's mandate is to make Accessibility Plans public, and to share information and best practices without duplicating effort.

Universal Design consultant on all Capital Projects:
A Universal Design consultant is required for all capital projects. Retaining a specialized consultant ensures that accessibility is incorporated from the outset of a project and that accessible, barrier-free expertise will inform decisions throughout the design process.

Pathways

Several cross-campus initiatives are ongoing, including improving accessibility of pathways across campus; now jointly accessible as entrances between buildings and to the Five-minute Walk pathway have completed a renovation project related to ramps and automatic door openers.

** The Accessibility of Ontarians with Disabilities Act (AODA) received Royal Assent in June, 2005. However, the planning requirements of the ODA, 2001, are still applicable until they have been replaced by standards in the new act.*

Recent Projects

The University's Barrier Free Design checklist was reviewed and completed for all current or recent capital projects at UTM: Instructional Centre 2011; Health Sciences Complex 2011; Phase 8 Residence and Dining Hall 2007; Communication, Culture and Information Technology Building (CCT) 2004; and Hazel McCallion Academic Learning Centre (HMALC) and the Wellness Centre (RAWC) completed in 2006.

The Recreation, Athletics and Wellness Centre (RAWC) barrier-free features include: common gateways rather than turnstiles for universal access; extensive signage throughout, which includes braille script in washroom and change room facilities; emergency messaging annunciation lights and signals; wheelchair access in team room shower facilities.

Several cross-campus initiatives are ongoing: furniture upgrades and new layouts in classrooms, office areas, and common space create a more comfortable, welcoming, and physically accessible environment. In addition, several buildings are now jointly accessible through a completed renovation project related to ramps and automatic door openers at building entrances, and pathway improvements between buildings and of the Five-minute Walk. Construction of a new pathway, which will provide for pedestrian accessibility along the campus' Outer Circle Road was completed in 2011; it extends from the RAWC to the North Campus entrance.

Ramps

Ramps are integrated into the CCT Link design, and used universally.

Accessibility

Impact on the Master Plan

Opportunities and Challenges

Each development site and future open space project presents an opportunity to overcome existing barriers in the built environment. Projects such as the RAWC, HMALC, Health Sciences Complex and the Instructional Centre are exemplary in their application of accessibility measures and serve as excellent examples for future development at UTM.

Compliance with the University of Toronto Barrier Free Accessibility Design Standards is required for all new construction and renovation projects at all campuses of the University. Design teams are required to submit the checklist to the University at 75% completion of the Design Development. For renovation projects, particularly of older buildings, there may be recommendations that are very difficult or impossible to implement, and in these instances each is individually considered. The University maintains a policy of accommodation and will provide fully accessible space elsewhere on campus should accommodation in existing facilities not be possible.

The proposed AODA *Built Environment Standard* was issued in July 2010. Once legislated, it will apply to new projects, retrofits, common space and circulation areas, and change in use. AODA must be met in conjunction with the *Ontario Building Code*. Section by section the more stringent of the two requirements will prevail.

As part of U of T's commitment to providing physical accessibility on its campuses, the University strives to provide an environment that is universally welcoming and inclusive.

Priorities through 2030

1. Review and update University of Toronto accessibility standards to align or improve upon municipal and provincial standards and guidelines.
2. Maintain inventory of accessibility in the physical environment.
3. Seek to improve accessibility within existing buildings and landscapes through carefully establishing priorities for the allocation of funds.

Regulations and Guidelines

University of Toronto Design Standards

Accessibility is covered by many jurisdictions both within the University and outside. Within the University, the *University of Toronto Design Standards Part 1.2 Barrier Free Accessibility* is to be applied in the design of all capital projects, by both the University's internal design group and external consultants. The design team is required to read and comply with the full Design Standards as they apply to the project. A completed copy of the applicable check lists must be submitted by the design team to the University's project manager when the Design Development Phase is 75% complete, unless instructed otherwise.

Ontario Building Code

The *Ontario Building Code* (OBC) 2006, *Section 3.8 Barrier-free Design* contains legislated minimum requirements for the design and construction of all projects. The latest version of the OBC must be followed in all construction projects.

Ontarians with Disabilities Act

The *Ontarians with Disabilities Act* (ODA) was passed in December 2001 to "improve access and opportunities for people with disabilities" identifying, removing and preventing barriers to participation in life within the province of Ontario. The ODA requires municipalities, universities and other public institutions to establish an accessibility plan annually.

City of Mississauga Accessibility Design Handbook and
City of London 2007 Facility Accessibility Design Standards

Both guidelines were developed in 2007 for implementation of 'best practices' on municipal capital projects in response to ODA requirements and are continually updated to reflect changes in legislation; in some cases the guidelines exceed OBC requirements. These documents serve as reference under U of T's Accessibility Planning Committee review.

Accessibility of Ontarians with Disabilities Act

The Accessibility of Ontarians with Disabilities Act (AODA) received Royal Assent in June 2005. A final version of the proposed *Accessible Built Environment Standard* was issued in July 2010. Once the standard is adopted as legislation, institutions will have a transition period within which to comply.

Background

Municipalities have two methods at their disposal to recognize and protect heritage properties, landscapes and districts. 'Listed' refers to properties for which City Council has adopted a recommendation that they be included in the City's Inventory. Such recommendations are based on criteria that relate to architecture, history, and neighbourhood context. Inclusion of a property on the Inventory is a clear statement that the City would like to see the heritage attributes of that property preserved.

Designated applies to properties that have been individually designated under *Part IV* of the *Ontario Heritage Act*, or are located within a Heritage Conservation District designated under Part V. Designated properties are also included on the municipal Inventory and are identified by a by-law number.

Heritage designations apply to structures, buildings, group of buildings, districts, landscape or archaeological sites that have been formally recognized for their heritage value. Heritage value has been defined by Parks Canada as "the aesthetic, historic, scientific, cultural, social or spiritual importance or significance for past, present or future generations", which is "embodied in its character-defining materials, forms, location, spatial configurations, uses and cultural associations and meanings".

The Campus Planning Principle, HERITAGE PRESERVATION, describes the University's approach to heritage structures and landscapes on its campus: "The University of Toronto seeks to protect and maintain its heritage properties and landscapes." Listed and designated properties should not be considered in isolation, but as character-defining elements within the overall campus context. Development should respect and engage with the contextual value of these heritage elements.

There are two buildings designated, and four listed at UTM. In addition, the Mississauga campus in its entirety is designated a cultural landscape, one of sixty in Mississauga, and defined as "a setting which has enhanced a community's vibrancy, aesthetic quality, distinctiveness, sense of history or sense of place.

Lislehurst (top) and Alumni House are designated heritage buildings.

The Student Centre constructed in 1999 is a listed heritage building.

Current Practice and Projects

The University retains a heritage consultant for all projects involving its listed and designated buildings. Consultants work within the overall project team to ensure heritage concerns are well-integrated from the onset of a project. Site plan applications, official plan amendments and zoning by-law applications usually must include a Heritage Impact Statement to assess the effects of new development on heritage properties.

Until recently heritage listings and designations have focused on nineteenth and early-twentieth century properties. However, recent attention has been paid to the heritage value of modern buildings, thus further listings and designations to the University's modern building inventory are possible. At the Mississauga campus for example, the Student Centre, constructed in 1999, as well as the 1968 wing of the Davis Building and the Central Utilities Plant are listed on the City Inventory.

Impact on the Master Plan

Opportunities and Challenges

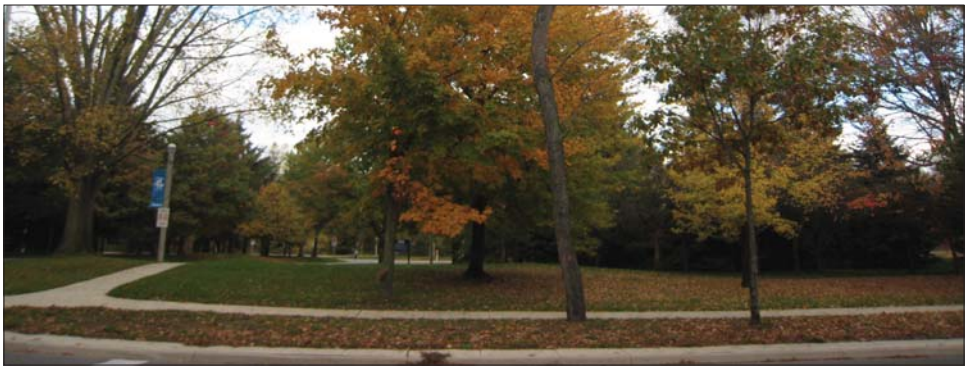
The University of Toronto Mississauga seeks to protect and maintain its heritage properties and landscapes. Listed and designated properties cannot be considered in isolation, but as elements within the overall precinct.

New development will continue to respect the contextual value of these heritage elements. Demolition of designated buildings must receive approval from City Council. Under the *Ontario Heritage Act*, municipalities now have the authority to take action against unmaintained heritage properties.

Most expansion proposed in this Master Plan will not be constrained by heritage issues, as the only designated heritage properties on campus, Lislehurst and Alumni House, are both outside Outer Circle Road. A potential addition or development adjacent to, Alumni House, would require approval from Mississauga City Council, as required by the *Ontario Heritage Act*.

Cultural Landscape

The Mississauga campus in its entirety is designated a cultural landscape, one of sixty in Mississauga.



Most influential to planning of the campus is its unique designation as a Cultural Landscape. The City of Mississauga affirms the campus' unique sense of place and significance in the region:

> *The campus grounds have struck a good balance between preserving and enhancing natural areas and developing manicured grounds for campus activities. The campus has an interesting portfolio of buildings ranging from modern to newer international styled structures. As the campus matures, this range of styles will expand and form an impressive collection of architecturally significant buildings. If the campus plan continues to acknowledge an environmentally friendly, sustainable balance between natural and developed landscape areas, the campus will be unique among Ontario universities in terms of its visual quality and character.*

The proposed master plan continues to respect heritage context through sensitive scaling, setback and siting of proposed envelopes.

Regulations and Guidelines

Ontario Heritage Act

The *Ontario Heritage Act* was introduced in 1975 by the provincial government as a means of identifying and protecting individual properties and districts with cultural heritage value. Designation under this Act is intended to protect the property or district from demolition or alterations not in keeping with its heritage value.

The majority of designations occur through municipal by-law, although the Province has the ability to designate through the Ministry of Culture. Designation includes a defined list of what constitutes the property or district's heritage value.

In 2005, the Ontario Government implemented changes to the *Ontario Heritage Act* legislation meant to strengthen its effectiveness. Key changes include, among others, demolition controls, standard criteria for the listing and designation of properties across municipalities. and enhanced protection for heritage conservation districts.

City of Mississauga

Heritage Impact Statements are prepared by qualified heritage consultants and serve to evaluate how well the proposal conserves the listed or designated property. Heritage Impact Statements may be required for development applications that include heritage properties.

Heritage Easement Agreements (HEA) are used to ensure a building's preservation, and are set out between the property owner and the City and registered on title. The HEA identifies elements of a building which are to be retained in perpetuity and may also set out permitted alterations and development.

The City of Mississauga heritage grant currently provides funds of up to 50% of the estimated cost of eligible heritage conservation work, to a maximum of $5000. Properties must be designated in order to qualify for the program.

Background

> *Student Housing is an important part of the University of Toronto student experience. The University's purpose in relation to student housing is to encourage the development of high-quality communities on and off-campus that support the academic and educational aims of the University community. To this end, student housing shall be administered in a manner that promotes safe, secure and stimulating environments that are conducive to students' academic success and personal growth, and foster a sense of community, civic responsibility, and an appreciation of the diversity of the University community.*
>
> Preamble, University of Toronto Policy on Student Housing, June 29, 2006

Each of the Campus Planning Principles will apply to the topic of housing on the UTM campus. Particularly applicable are: LAND USE, which indicates "the use of physical resources of all kinds should aim to promote the University's academic goals and serve the overall mission…"; ACCESSIBILITY in that "the University buildings, landscape and grounds must accommodate a diverse population in an open and inclusive campus…"; and HERITAGE as the residential sector of campus runs along Mississauga Road, identified by the City of Mississauga as a Scenic Route.

The University of Toronto is committed to the principle that the academic environment and the student experience are improved when students live on or near campus as members of the University community. Although the elements of student housing vary, some combination of residence for both undergraduate and graduate students, family housing, and off-campus housing, are well-established features of the University landscape and an integral part of university life. The University is committed to planning for the assurance of these opportunities as an essential part of its academic offering.

Oscar Peterson Hall

Oscar Peterson Hall, UTM's largest and newest residence, was completed in 2007 and accommodates 423 students.

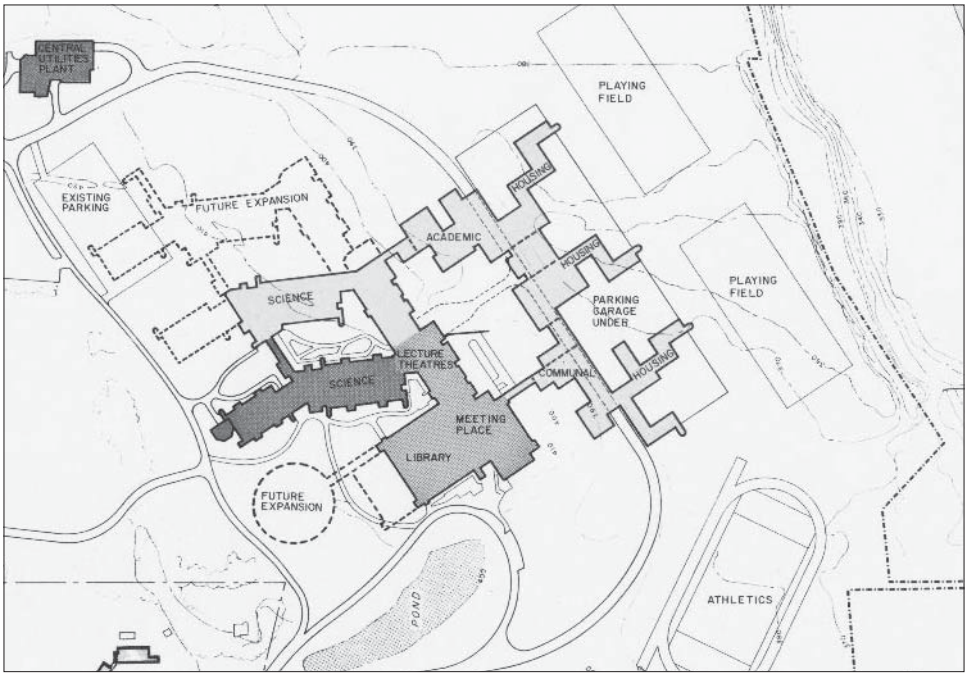
Housing

Erindale College Master Plan 1972
A.D. Margison and Associates Ltd.

This site plan (parital) shows housing straddling the ring road and above parking (current lot 8).

Due to financial constraints at the time, only the South Building and Central Utilities Plant were constructed as shown.

If desirable, proposed building Site 8 offers potential to reconsider the merits of this proposal.



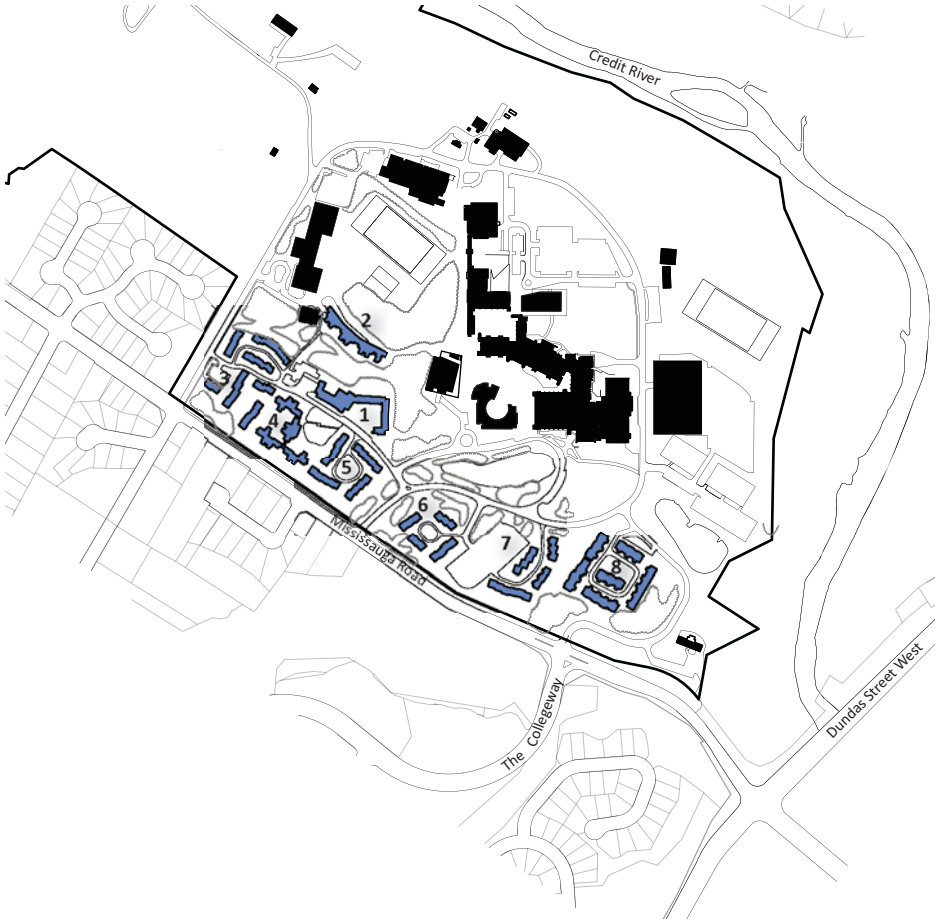
The original planned form of student housing at UTM was significantly different from the first residence communities, townhouses, built in the 1970s and 1980s. Early plans called for high-density residences integrated into the larger building complex (the South Building). The 1966 John Andrew's plan proposed a 'part time' residence community balancing the benefit of on-campus community with the reality of the commuter nature of campus. It called for "significant amounts of bunk and carrel space" where the large number of commuting students could rent accommodation for one or two days if they wished to stay late to study or socialize. This idea was carried forward in subsequent plans in the late '60s and early '70s but funding cuts prevented its implementation. The growth and diversification of the campus and its academic offerings over the subsequent years combined with other social and economic influences saw the construction of more traditional student residences at UTM.

In 2002 the University was faced with increasing demand from the double cohort, resulting from a province-wide elimination of the fifth year of high school (OAC), and exacerbated by rising participation rates. At that time, housing demand far exceeded supply, a trend that would have continued if not addressed. U of T responded with a capital plan that included the construction of new residences for each of its three campuses, with the objective of ensuring residence space for first-year undergraduate students. Erindale Hall, a 197 student residence, was completed in 2003 and named in honour of the campus' transition from Erindale College to the University of Toronto Mississauga (UTM). Oscar Peterson Hall, completed four years later, accommodates 423 students.

Existing Campus

A significant portion of the student body lives in Mississauga, with 87% of the student population living off-campus. That said, students choose UTM not only from the Greater Toronto Area (GTA), but from all parts of Canada and abroad. The University's ability to offer on-campus housing is an important factor in attracting international students, including international exchange students. On-campus housing is also part of its commitment to accommodate students with disabilities and of its objective to help as many students as possible find accommodation either on campus or within reasonable commuting distance. As efforts to recruit and retain the very best minds continue, the provision of student housing will figure prominently in the kind of experience the university is able to offer.

Residence communities, housed in moderately-scaled buildings, are nestled in a well-treed swath of land between Mississauga Road and the academic zone of the campus. Both scale and occupancy are appropriate to the nature of the residential and natural scenic setting. The compact nature of the developed campus enables those residences to be conveniently located a short walk from academic, social and athletic facilities, and other campus amenities.



1. Oscar Peterson Hall
2. Erindale Hall
3. Schreiberwood
4. Roy Ivor Hall
5. McLuhan Court
6. Putnam Place
7. Leacock Lane
8. MaGrath Valley

Residence buildings create a campus frontage along Mississauga Road. The 1,500 students residing on the UTM campus are distributed between apartment, townhouse and dormitory units.

Housing

Roy Ivor Hall (above); Erindale Hall (right)

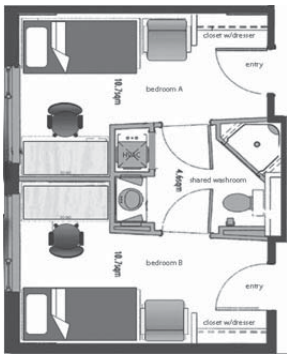
Both residence buildings, constructed in 1999 and 2003, successfully respond to the surrounding landscape and embody a clear sensitivity to human scale through form and materiality.

Townhouses

Five townhouse communities serve students and their families. They were constructed as the most efficient and inexpensive means to provide housing in the '70s and '80s. Though constructed as a temporary measure, they continue to be in good repair.

Dormitory style residences are all paired single rooms with shared common and dining facilities while apartment and townhouse style residences feature grouped single rooms with living and kitchen facilities shared between two and four rooms. First-year undergraduate, upper year undergraduate, graduate students and students with families are generally housed in separate residence communities.

While the intent of the construction of individual residence facilities varied, the overall diversity of the housing inventory allows the University to be nimble in its response to student demand, and also aligns operational priorities with the strategic and academic plans of the division.



Oscar Peterson Hall

Oscar Peterson Hall is a traditional dormitory-style residence. RezONE, a year-round orientation program, places students into smaller communities of 25-50 peers.

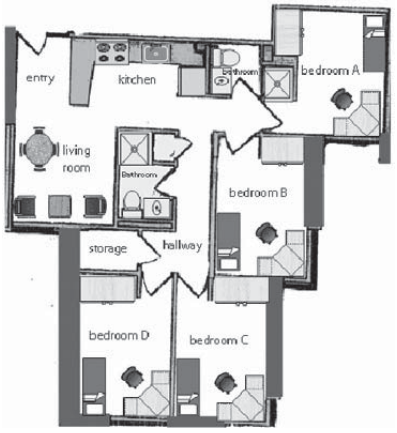
Oscar Peterson Hall

Oscar Peterson Hall is a traditional dormitory-style residence. Though UTM does not have a college system, within this residence, social and academic community is reinforced with rezONE, a year-round first-year experience program, which places students into smaller living-learning communities of 25-50 peers in accordance with their academic program. These communities are led and facilitated by upper-year academic mentors and residence life dons.

Family Housing

Housing for students and their families is available in two- to four-bedroom townhouse style units in the MaGrath Valley and Schreiberwood residences located adjacent to Mississauga Road. Five townhouse communities were constructed as the most efficient and inexpensive means to provide housing in the '70s and '80s, in large part the result of the province funding withdrawal for major capital expansion projects for colleges and universities in 1972. The townhouses were constructed, as a temporary solution, as residences that could be occupied by the larger community once dormitory style housing true to the original plan was constructed.

That being said, they continue to be in good repair. Furthermore, UTM maintains an annual maintenance budget to ensure that the quality of the townhouses is comparable to the available housing options in the off-campus market.



Roy Ivor Hall

Typical dormitory style residence includes individual or shared bedrooms with shared amenity space including grouped washrooms, common rooms and study spaces.

Faculty/Temporary Housing

UTM provides short-term housing for new or visiting faculty, parents and other guests of the university. The two fully furnished two-bedroom townhouse units are situated on campus and may be requested by students and university departments or programs on a daily, weekly, or monthly basis.

Summer and Conference Accommodations

UTM provides housing for students over the summer months in housing units that are available and appropriate to the various and diverse academic programs and priorities on campus. Availability of housing inventory over the summer months is also determined by the major maintenance needs, major upgrades and improvements. The remaining under-utilized housing inventory over the summer months is available for conference operations.

Off Campus Housing/Temporary/Emergency Housing

The University provides several resources to help students find suitable off-campus housing including an online rental listing, links to the *Mississauga Good Neighbours' Guide* and information on housing safety and the Landlord & Tenant Board. Students requiring legal assistance or information pertaining to housing have access to Downtown Legal Services, which is operated by the Faculty of Law on the St. George Campus, and provides free legal assistance to UTM students. Student Housing and Residence Life, in collaboration with other administrative offices of the University, is also sometimes able to assist students facing a housing crisis due to eviction, financial circumstances, violence/abuse or other problems on a case-by-case basis.

The City of Mississauga has enacted the *Residential Rental Accommodation Licensing By-law* to ensure that minimum health and safety standards are met in off-campus student housing. Currently the by-law applies to 'lodging houses', which are defined as any rental property containing four or more units. The by-law prohibits basement units, limits the total number of units in a house, establishes minimum space requirements, and requires that the building be inspected annually and that the landlord display the license verifying that standards have been met. The City is also undertaking an affordable housing initiative to assess and potentially improve the availability and affordability of off-campus housing options.

Impact on the Master Plan

Opportunities and Challenges

The residence system at UTM currently operates at 95% occupancy, housing 13% of the student population. Significant undergraduate enrolment expansion, and modest graduate student enrolment expansion, is anticipated, which would generate an increased demand for student housing. UTM's expressed desire for safe, secure, active environments, and increased campus amenity can only be strengthened by an increase in on-campus residents. However, a potential increase in the demand for student housing could disturb the current mix of first-year and returning undergraduate students, which allow for effective mentorship and a well-balanced campus community. The determination of 'balance' continues to be reviewed and monitored by the University's Student Housing Advisory Committee, as well as regular reviews as to the viability of the Provostial First-year Residence Guarantee.

Though the residential sector of campus is identified under Sites & Sectors, precise building envelopes are not, as there is little room for expansion apart from on existing parking or current town house lots. Currently it is not financially or operationally feasible to remove existing housing inventory to meet increasing demand. There is, however, ample capacity for housing as part of a mixed-use proposal on sites identified elsewhere on campus. In the longer term, if new development with the residential sector were to occur, the existing setback required by zoning must be maintained, and the scale of construction of new residences must preserve the visual quality of Mississauga Road as a heritage Cultural Landscape.

Priorities through 2030

1. Maintain quality housing options on the UTM campus to accommodate the range of the student population as enrolment increases.
2. Review and plan for change to residential infrastructure to align with priorities and requirements under provincial accessibility legislation (Accessibility for Ontarians with Disabilities Act).

Regulations and Guidelines

University of Toronto Policy on Student Housing

The *University of Toronto Policy on Student Housing* (June 2006) governs student housing accommodations for the University. The policy addresses elements related to student housing including recruitment and retention, student life, common standards and accessibility. It requires a Student Housing Advisory Committee be struck each year to monitor housing practices and policy issues and to develop standards common to the three University of Toronto campuses.

Implementation guidelines for the administration of University student housing are set by the Vice-President and Provost, in cooperation with the heads of the federated institutions. These guidelines direct the Student Housing Advisory Committee in matters regarding the implementation of student housing policy.

Background

The Campus Planning Principle CAMPUS ENVIRONMENT requires that "The University community's environment be safe, secure, and accessible…"

Although perceived and real safety issues vary from campus to campus, where possible, standards for the design of facilities and landscape and security systems have been developed to ensure a consistent approach and level of overall safe practices across all of them. Individual programs and initiatives are also implemented on a campus by campus basis to address the particular nature of each. As with all standards, guidelines and programs, documents and mandates require review and updating at regular intervals to assure their application remains consistent with best practices.

Current Projects and Practice

Campus Police

All U of T Campus Police are trained in, and advocate for, Crime Prevention through Environmental Design (CPTED). CPTED is a pro-active crime prevention strategy utilized by planners, architects, police services, security professionals and everyday users of space. CPTED works on the basis that proper design and effective use of the built environment can lead to a reduction in the incidence and fear of crime and improve the quality of life. There are four underlying CPTED concepts:

1. Natural Surveillance
2. Natural Access Control
3. Territorial Reinforcement
4. Maintenance

Campus police are engaged in the design process of new buildings and the overall planning of campus precincts.

Environmental Health and Safety

The University of Toronto, as an employer, is responsible under the Ontario Occupational Health and Safety Act for establishing and maintaining joint health and safety committees in the workplace. These committees, consisting of representatives of workers and management, serve to provide consultation and meaningful input from employees in matters relating to health and safety in the University of Toronto context.

The mission of the EH&S Department is to ensure that an environmentally responsible, safe and healthy work, research and study environment exists at the University of Toronto. This is accomplished by being proactive in identifying risks and emerging issues and by developing and implementing innovative, practical and sustainable processes to manage them, including training and awareness, teaching, provision of expert advice, emergency response and assurance.

Personal Safety and Security

Crossing

Recent road improvements begin to address safety concerns at Outer Circle Road. The image on the left shows new surfacing at the new entry to the Health Science Complex and parking Lot 9. Both colour and change in material alert motorists of the pedestrian crossing.

A similar approach could be taken at other locations, particularly key points of travel across the ring road. The slope and curve of the road (right) invites higher traffic speeds, near one of the trail entry points.

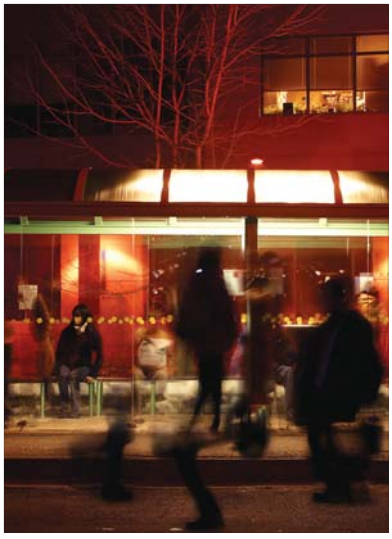
The Link

The CCT Link provides a sheltered, highly visible, and well-lit connection through the centre of campus.

Waiting

The HMALC entry provides a safe place to wait, 24 hours a day, and visibility to the passenger pick-up loop outside;

The campus' main transit hub (right) is well-lit but would benefit from an interior waiting area, or at minimum, increased activity in, and views from, adjacent buildings. A future student plaza proposed in the Davis Building offers potential to address this concern.



Impact on the Master Plan

Opportunities and Challenges

Standards of safety and security are applied to new construction and renovation as they occur, particularly as related to Crime Prevention through Environmental Design, Asbestos Abatement, and Environmental Health and Safety.

UTM is largely a commuter campus, operating 24 hours a day. Standards of safety and security are applied to new construction and renovation as they occur. Involvement of Campus Police early in the planning and design stages of new construction projects and major renovations is regularly undertaken so as to incorporate knowledge of CPTED and to identify appropriate and design-sensitive security measures. In addition, all renovations to existing buildings are subject to review of asbestos material and abatement if found in an area to be disturbed.

Although existing landscaped areas on campus are not, for practical reasons, held to the same standards as a rule, campus-wide safety and security continues to be addressed through a carefully considered plan, which includes placement of security posts, lighting standards and strict landscape standards related to sightlines and elimination of spaces of entrapment. Well-lit, sheltered, visible and populated waiting areas, parking lots, and cross-campus connections are critical to this plan. Positive examples on campus include: the Recreation, Athletics and Wellness Centre's through connection between the Davis Building and parking Lot 8, as well as transparency and openness throughout the building, and the CCT Link, which provides a sheltered, highly visible, and well-lit pedestrian connection through the centre of campus. The Instructional Centre continues the Link concept by providing a prominent interior pedestrian route to the North Building, and separates 24-hour study lounges and computer areas from the rest of the building as part of the strategy to optimize security.

Proposed development sites identified under Sites & Sectors are positioned to continue the network of interior linkages and active circulation space along proposed courtyards. Further, the compact campus plan will result in relatively short distances between buildings, and a more concentrated campus population (eyes on the street).

UTM's main safety challenge lies in more remote naturalized areas of the campus, including the City's trail system, which connects to campus at three key locations. For these remote areas, the University must rely on signage and careful management of the areas immediately adjacent to the trails, where hazards presented by decaying trees are regularly assessed and dealt with. In addition, the City of Mississauga has identified the importance of prioritizing and allocate funding to trail improvements and maintenance, including lighting, wayfinding, and accessibility.

As safety intersects with so many different aspects of the University's physical structure, it must also be considered when addressing other areas of the Master Plan including other sections: Circulation, Open Space, Accessibility, and Parking.

Regulations and Guidelines

University of Toronto

The University's Design Standards for new construction and building renovation include requirements for maintaining safe, secure buildings and open spaces. Areas of particular concern covered in the Safety and Security section of this document include:

- Lighting and Visibility,
- Sightlines,
- Entrapment and Movement Predictors,
- Isolation,
- Access Control,
- Communication, and
- Activity Generators/Activity Mix.

Areas of particular concern within the Landscape Design Standard include:

- Principles of the Open Space Master Plan 1999 (St. George);
- Location of below grade utilities verified prior to excavation;
- Provision of lighting for safety & security of passageways, building entrances, courtyards, etc.; and
- Ensuring building walls and fences do not obstruct visibility or create unsafe, secluded spaces.

Facilities and Services also maintain Security System Standards, last updated in October 2005. The document describes aspirations of access control going forward for the University including:

- limited key access for groups no larger than 15-20 and
- access control basic standard b/c can be locked & unlocked remotely, programmed, etc.

All renovations to existing buildings are subject to review of asbestos material and abatement where found to be located in an area to be disturbed. Health and Safety Policies and Procedures can be found on the University website for Environmental Health and Safety.

Under the authority of the *Asbestos Control Policy* (2003), the University's Asbestos Control Program establishes proper precautions, practices and procedures to prevent the exposure of individuals to airborne asbestos fibres. The Program meets the requirements defined under the regulation respecting *Asbestos on Construction Projects and in Buildings and Repair Operations* (Regulation 838), made under the Ontario *Occupational Health and Safety Act*.

Background

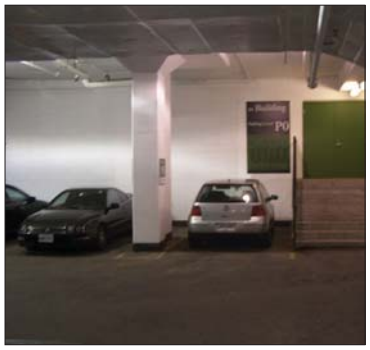
UTM is a commuter campus with approximately 87% of the campus population living off-campus. Given this fact and the campus' suburban context, automobile access and parking continues to be a key component of campus planning.

When the 1972 Master Plan was developed, the South and North Buildings were the only academic buildings on campus and were served by two existing surface lots (2 and 5); the plan's proposals included building a new parking garage below student housing on what is now parking Lot 8. The garage would accommodate 2,500 parking spaces to support a projected a student population of 5,000, a ratio of 43 spots for 100 headcount. The current parking ratio of 15 spots per 100 indicates the shift in transportation planning that has occurred in the intervening period and the success of alternative strategies, particularly since 2003 when the per-person parking supply was double what it is now.

With the double cohort entering first-year undergraduate studies, the University began offering incentives for reducing automobile use. Improvements to Mississauga Transit routes to and through campus, as well as the introduction of the U-Pass in 2007 has significantly increased ridership. Currently 90% of the student population has picked up their pre-paid U-Pass, up from 77% in its first-year. Recently U-Pass coverage has been extended, on a trial basis, to cover part-time students and the two summer sessions. In addition, priority parking is given to carpooling and ride-share commuters as well as for hybrid and low-emitting vehicles. These vehicles are also recieve 'Eco-Park' permit rebates.

Today there are approximately 2,400 parking spaces on campus.

Campus Planning Principles including CAMPUS ENVIRONMENT, LAND USE and ACCESSIBILITY each help to frame the topic of parking, both vehicular and bicycle, for the UTM campus.

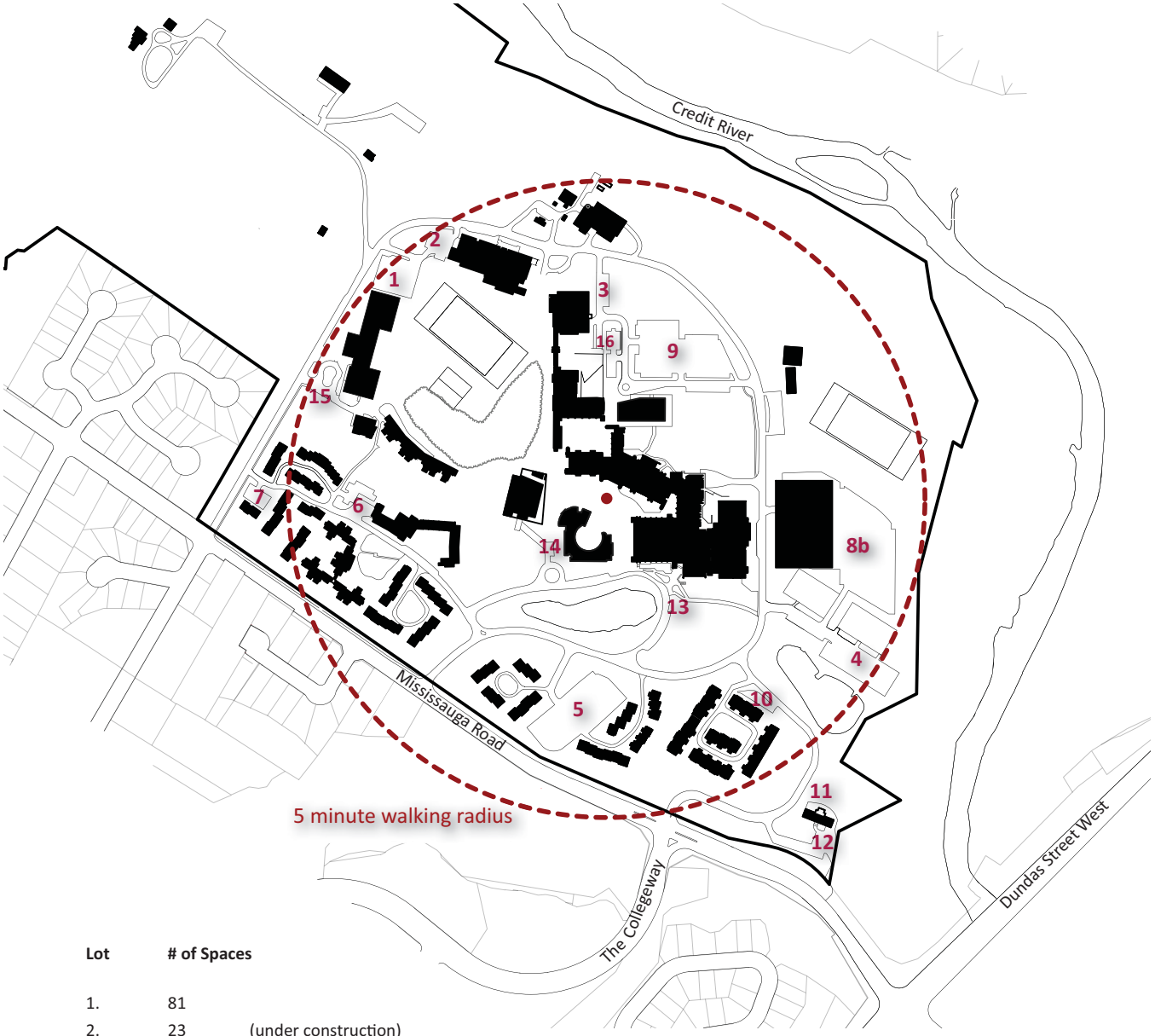


The CCT garage

UTM's only below-grade parking garage, conceals parking and preserves green space, and operates at optimum levels. However, due to the exceptionally high construction cost an alternate approach, construction of parking decks on existing paved areas, will be taken in future.

View north toward Lot 9; some spaces, lost as a result of the Health Sciences Complex construction, have been replaced in the construction of a new parking deck.

Parking



Distribution of on-campus parking.

Lot	# of Spaces	
1.	81	
2.	23	(under construction)
3.	16	
4.	312	
5.	197	
6.	21	
7.	17	
8.	821	(includes new deck)
9.	256	
10.	9	
11.	54	
12.	31	(short term)
13.	19	(short term)
14.	6	(short term)
15.	11	(short term)
16.	366	(CCT garage)

Lot Type	Spaces
Unreserved	1164
Carpool	50
Residence	41
Accessible	33
Reserved	32
Drop-off	2
New Deck	290
Lot 2	23
	2350 Total

Current Practice and Recent Projects

The UTM Campus provides vehicular parking spaces via surface and structured lots.

CCT Garage

In an effort to conceal parking, UTM's first and only underground structure was completed as part of the CCT project in 2003. While utilization of that premium space has reached optimal levels, the exceptionally high construction costs of underground parking mean that any future plans for parking expansion will have to be met by other approaches.

Parking Deck

As an economical and expedient means of doubling parking availability for a given footprint, an above-ground single storey parking deck was constructed on Parking Lot 8 across from the RAWC. It provides approximately 290 new spots, to replace surface parking losses generated by two projects under construction: the Health Sciences Complex and the Instructional Centre. The deck's cost was approximately half that of a below-grade structure, and was completed in October, 2010 with the first level available in time for the start of the Fall Semester.

Sustainability

Recent construction projects on campus have pursued LEED® certification through the Canada Green Building Council (CaGBC), including credits available under Sustainable Sites Credit 4 - *Alternative Transportation*. Points can be obtained through provision of preferred parking for carpooling and low-emitting vehicles, and the provision of alternative fueling stations such as plug-in for electric cars. The *Alternative Transportation* credit also rewards access to public transportation, and bicycle commuting.

Parking Lot 8, prior to parking deck construction, was completed in 2010.

Impact on the Master Plan

Opportunities and Challenges

A parking structure at Tufts University integrates parking with academic and ancillary uses. Architectural details such as brick, 'window' openings, and cornices are in keeping with other academic buildings on campus.

Parking is intrinsically linked to future development on campus. As existing surface parking lots serve as primary development sites, the need for parking will grow with increased campus population, albeit at a more moderate rate than that required several years ago.

The 2000 Master Plan called for a coordinated parking, servicing and traffic plan and stated that "without a strategy for underground and structured parking the higher aspirations of the plan would ultimately not succeed." This plan recommends continued construction of parking decks. A parking deck is a relatively low cost way to satisfy the desire for increased parking density without sacrificing highly-valued green space. The current strategy is to continue constructing parking decks on existing surface Lot 8 as needed. Based on projected enrolment, the new deck is expected to meet parking demand to 2013/14 and beyond.

Without careful design and concealment, above grade parking can appear unsightly. Wrapping parking decks with academic space, and/or green space are possible strategies for improving the appearance of above-grade parking structures. More economically, above ground parking structures can be made less intrusive by keeping them to a single level and locating them where sloping site conditions make it possible to partially embed the structure, as was done with the recent parking deck built over part of Lot 8.

UTM will continue its multi-faceted approach to parking and transportation: limiting supply (not over-building); emphasize alternatives such as carpooling and ride-sharing support; and working with Mississauga Transit to focus on further improvements to public transit access to campus.

Priorities through 2030

1. Review the parking by-law to determine an appropriate parking capacity for the UTM campus.
2. Encourage carpooling, the use of public transit, and increase bicycle infrastructure to decrease the campus parking demand.
3. Preserve existing green space by constructing parking decks on existing lots, and in connection with proposed site development.
4. Minimize the visual impact of parking structures and surface lots.

As Parking intersects with so many different aspects of the University's physical structure, it must also be considered when addressing other areas of the master plan including other sections: Circulation, Open Space, Sustainability, and Personal Safety and Security.

Regulations and Guidelines

The City of Mississauga reviews parking to ensure that UTM's demand can be accommodated within campus boundaries, and that accessibility and emergency services standards are met. However, the campus is viewed as a single entity; individual projects are not required to comply with a fixed ratio of parking spaces to built area. This affords the University longer-range assessment of parking need, continued reduction of demand through encouraging alternate modes of transportation, and carefully considered location of parking as the campus expands.