FOR RECOMMENDATION **PUBLIC** **OPEN SESSION**

TO: UTM Campus Affairs Committee

SPONSORS: Luke Barber, Acting Chief Administrative Officer,
CONTACT INFO: cao.utm@utoronto.ca

PRESENTER: Mark Overton, Assistant Principal, Student Services & Dean of Student Affairs
mark.overton@utoronto.ca

DATE: February 1, 2024 for February 8, 2024

AGENDA ITEM: 2

ITEM IDENTIFICATION:

Capital Project (Level 3): Report of the Project Planning Committee for University of Toronto Mississauga Residence (Phase IX) – Project Scope and Sources of Funding

JURISDICTIONAL INFORMATION:

Pursuant to section 5.6.2 of the UTM Campus Affairs Committee's (UTM CAC) *Terms of Reference*, "the Committee considers reports of project planning committees for UTM capital projects and recommends to the UTM Council approval in principle of projects (i.e. site, space plan, overall cost and sources of funds) with a capital cost as specified in the *Policy on Capital Planning and Capital Projects*. The Business Board is responsible for approving any financing for individual projects and authorizing their execution within the approved costs."

According to section 1 a and b of the *Policy on Capital Planning and Capital Projects*, the UTM bodies will recommend approval to the Academic Board. For Level 3 capital projects, the Executive Committee of the Governing Council will then consider the recommendation of the Academic Board for endorsement and forwarding to the Governing Council for approval.

GOVERNANCE PATH:

A. Project Planning Report, Total Project Cost, and Sources of Funding

1. **UTM Campus Affairs Committee [For Recommendation] (February 8, 2024)**
2. UTM Campus Council [For Recommendation] (March 4, 2024)
3. Academic Board [For Recommendation] (March 7, 2024)
4. Business Board [For Approval, Financing] (March 13, 2024)
5. Executive Committee [For Endorsement and Forwarding] (March 26, 2024)
6. Governing Council [For Approval] (April 4, 2024)

B. Execution of the Project:

1. Business Board [For Approval] (March 13, 2024)

PREVIOUS ACTION TAKEN:

None.

HIGHLIGHTS:

Previous Action Taken by Administration

At the November 30, 2018, meeting of the Capital Project and Space Allocation (CaPS) Executive Committee, the project was brought forward, and Terms of Reference approved. At the June 8, 2020, CaPS Executive Committee meeting, the project was brought forward, and Request for Consultant Fees was approved to retain Consultants for Schematic Design through to Construction Documentation. At the February 23, 2023, CaPS Executive Committee meeting, the project was brought forward, and Request for Additional Consultant Fees was approved to continue design services and initiate Construction Management Pre-Construction Services required to complete the Construction Documents through to the Tender Phase. At the November 24, 2023, CaPS Executive Committee meeting, the project was brought forward, and the request for Early Works was approved to initiate demolition and site preparation for construction.

Background

The University of Toronto Mississauga (UTM) is a 225-acre campus located within the Regional Municipality of Peel, an area of significant population and economic growth. An increase in campus residential need is a result of a significant increase in student enrolment over the past decade, paired with increased interest in on-campus accommodation among a growing international student cohort. UTM's student population grew by ~4,600 headcount or 42%, with international students accounting for 60% of the growth. While this period saw expansion of physical infrastructure, there has been no new residence construction since the completion of Oscar Peterson Hall (OPH), or Residence Phase VIII, in 2007.

Student Housing & Residence Life (SHRL) at UTM can currently house approximately 10% of UTM's total undergraduate students. While it will remain primarily commuter, the UTM campus' attractiveness to students from beyond traditional commuter boundaries continues to grow, and additional residence capacity is necessary to enroll many of these academically talented students. At the same time, UTM wishes to maintain a healthy mix of first year and upper-years students for the mentorship experiences that strengthen community and facilitate success.

In 2016 Student Housing & Residence Life (SHRL) at UTM completed a Student Housing Master Plan. The Focus 15 Plan details the long-term capital renewal plan for our residence facilities. Consultation for the master plan included SHRL Staff, University of Toronto Mississauga Student Union, residence students, and staff from various departments at UTM which included the Chief Administrative Officer and the Vice-President and Principal. It also details the expected demand for residence spaces long-term and outlines plans for residence expansion. Simultaneously, the University of Toronto Mississauga has been strategically planning for overall campus development through the UTM Campus Master Plan 2021. The Campus Southwest Precinct, as outlined in this master plan, includes lands fronting onto Residence Road between the northern and central access points to campus, with significant frontage along Mississauga Road. The existing precinct contains low-rise townhouse units, low and mid-rise campus housing buildings, and surface parking lots, including notable residences such as Schreiberwood Residence, Roy Ivor Hall, McLuhan Court Residence, Oscar Peterson Hall, and the P6 and P7 parking lots.

The Campus Southwest Precinct, with its potential for increased density and ongoing redevelopment initiatives, aligns seamlessly with our proposal for a new residence building. This strategic location, north of Oscar Peterson Hall, not only adheres to the Campus Master Plan's vision for increased density but also enhances the streetscape design and open spaces within the precinct. As part of our commitment to meeting the evolving needs of the university community, our proposed residence building contributes to the positive and inclusive living experience for both upper-year and graduate students. By aligning our residence facilities with the broader vision outlined in the Campus Master Plan, we ensure that our campus development integrates seamlessly with the University of Toronto Mississauga's overarching goals and aspirations.

The development of the residence building at UTM serves as an embodiment of the UTM's Strategic Framework, a visionary document crafted between late 2020 and early 2022. This framework underscores UTM's commitment to principled flexibility and clear priorities, emphasizing adaptability in the face of changing circumstances. The proposed residence aligns with the framework's core components, such as fostering student success, as it provides a supportive and enriching living and learning environment. Furthermore, the residence contributes to UTM's dedication to collaboration and belonging, promoting a sense of community among diverse teams and enhancing the campus's inclusive and equitable culture. By incorporating sustainability measures and efficient operations, the residence aligns with the framework's goals of environmental responsibility and resource management. This strategic integration of the new residence within the broader context of UTM's Strategic Framework ensures that the physical infrastructure not only meets the immediate needs of students but also aligns with the institution's enduring values and long-term aspirations.

SHRL has been able to meet the University of Toronto's commitment to a first-year residence guarantee. However, with increasing first-year enrollment there are limited residence spaces available for upper year students and fewer for graduate students.

Residence space at UTM plays a very important role in U of T's internationalization strategy with more than 50% of the residence population being international students. In addition, UTM has approved the enrollment of an additional 100 international students in the 2023-2024 academic year. Historically, UTM was able to offer a 4-year international housing guarantee. This offering is no longer practical given our first-year guarantee commitment.

With the proposed residence construction, UTM anticipates continuing its ability to offer a first-year guarantee for the medium-term. Research has shown that living in residence has a positive impact on grades, better retention to 2nd year, and higher persistence to graduation. Graduation rates for international students at UTM residences 14% higher than their international peers living off-campus.

Highlights

UTM is proposing a new 6-storey 400-resident building (6,538 nasm / 10,088 gsm), adjacent to Oscar Peterson Hall (OPH) to cluster first-year residence housing to make efficient use of the existing cafeteria, residence services desk and staff offices. The style will be traditional, designed around bringing first-year students together in communities. The building will help continue UTM's first-year guarantee and will provide better availability for upper-year students as well. The building is anticipated to have 50% double rooms and 50% single rooms. Student residence dons will occupy single rooms and work in a ratio of one don per 25 students. The space planning for the residence will support SHRL's increased emphasis on living-learning communities, interaction/engagement and supporting student learning outside the classroom.

The project space requires demolition of one row of townhouses consisting of 36 dormitories (Schreiberwood G) for a net gain of 364 beds. This demolition work is planned to begin during an early works phase scheduled for early 2024.

The new dormitories consist of 115 single bedrooms at 14.5 nasm per room, 135 double bedrooms at 12.9 nasm per room as well as 15 don bedrooms which are 14 nasms per room. All single dormitories as well as the don bedrooms will be fully accessible.

Residence floors will include lounge and study areas on every level for a total of 942 nasm. Amenity spaces on the ground/main floor will include residence support spaces that will be used by residents across UTM's Student Housing & Residence Life system: a 120-person multi-purpose event space for community gatherings, special events, and regular programming, plus a main lobby, a music room, vending and laundry facilities, a modest community kitchen and lounge, and storage for programming materials, recycling, and waste. The main level amenities total 767 nasm.

The residence building has been designed to achieve at a minimum LEED® Silver best practice shadowing with a

desire to meet the new building performance targets set out in this standard. The following sustainability features have been incorporated into the design of the residence building:

- High performance triple pane glazing with thermally broken frames.
- Optimized shading across the entire façade and building massing with long side facing south.
- High performance lighting design (space-by-space lighting power densities 20% lower than those prescribed by ASHRAE 90.1-2013 for all spaces, except bedrooms).
- Advanced occupancy-based lighting controls, daylight dimming, and demand control ventilation in common spaces.
- Decoupled systems to address ventilation and zone sensible loads more efficiently.
- Enthalpy recovery wheels with 85% overall effectiveness.
- On a per-bed basis, the proposed building has 50% lower energy and 70% lower greenhouse gas emissions compared to the archetype, representing a more efficient use of resources. The low energy use intensity is primarily a result of aggressive targets for lighting energy, heating energy, cooling energy and domestic hot water.

The project delivery method for the residence is Construction Management. Input from the Construction Manager is intended to mitigate some cost and schedule risks.

Currently, the City of Mississauga is reviewing the Site Plan Application.

Schedule

The targeted project schedule is as follows:

CaPS Exec Approval for Consultant Fees	June 8, 2020
RFP & Consultant Selection	July – December 2020
Consultant Award	December 2020
Design & Construction Documents	January – September 2021
Municipal Approval start	December 2022 (Pre-Site Plan Application Submission)
Construction Documents 50% Completion	January 2023
CaPS Exec Approval for additional consultant fees and CM fees	February 23, 2023
Full Governance Approval submission (Cycle 4)	January 26, 2024
Subcontractor and Supplier Tender	February 2024
Early Works / Site Preparation	February 2024
Construction Start	April 2024
Occupancy	August 2026

FINANCIAL IMPLICATIONS:

Discussion of overall costs and sources of funds can be found in the *in-camera* (Item 11) document for this project.

RECOMMENDATION:

Be It Recommended:

THAT the project scope of the University of Toronto Mississauga (UTM) Residence (Phase IX), as identified in the Report of the Project Planning Committee for the UTM Residence (Phase IX), dated January 26, 2024, be approved in principle; and,

THAT the project totaling 6,538 net assignable square metres (nasm) and 10,088 gross square metres (gsm), be approved in principle, to be funded by UTM Residence Construction Reserve, UTM Operating Reserve, and Financing.

DOCUMENTATION PROVIDED:

- Report of the Project Planning Committee for the University of Toronto Mississauga Residence (Phase IX) (January 26, 2024)

Report of the Project Planning Committee for **University of Toronto Mississauga Residence (Phase IX)**

January 26, 2024

Office of University Planning - University Planning, Design and Construction
UTM Facilities Management & Planning

I.Executive Summary

Student Housing and Residence Life (SHRL) at UTM, has seen an increase in residence demand over the past number of years. While overall demand has slightly fallen due to the COVID-19 pandemic, SHRL saw its highest application numbers to date with 2,444 applications for 1,179 available residence spaces during the 2021-2022 academic year. SHRL is anticipating demand to continue to increase due to the low availability of off-campus housing, UTM enrollment to increase, and a higher percentage of on campus housing inventory that is fully renovated.

The bulk of this growth is from out-of-province and international students that seek on-campus student housing and related supports to help in transitioning to the local community. The University has a first-year residence guarantee that supports students in their transition to university studies by placing them near their academic activities, library resources, support services and engaging programs.

Residence Phase IX (RPHIX) will focus on a first-year residence student population in order to maintain its commitment to UofT's first-year residence guarantee for newly admitted high school students. UTM is anticipated to fall short of meeting UofT's guarantee of on-campus housing for first-year students as of Fall 2024. The 2021-2022 academic year was the first year that students remained on the waitlist into January, at which time SHRL was forced to cancel those outstanding applications. Students indicated they still needed housing as the inventory for off campus housing in Mississauga is limited.

The new 400 bed residence (6,538 nasm, or 10,088 gsm) will consist of 95% first-year students, with a modest number of additional spaces allocated to upper-year students employed by Student Housing & Residence Life in a supervisory, mentoring, and community development capacity, primarily as student dons.

The proposed program consists of 400 beds with a mix of 50% double rooms and 50% single rooms. Student dons will occupy single rooms and work in a ratio of one don per 25 students. In addition, there is one live-in Residence Life professional who oversees the dons and residence programming and will respond to emergencies as they arise. The ground floor includes residence support spaces that will be used by residents across UTM's Student Housing & Residence Life system, including a 120-person multi-purpose event space for community gatherings, special events, and regular programming. It will also include common laundry facilities. The building does not include dining or administrative service spaces as occupants will access these facilities in the adjacent Oscar Peterson Hall.

In 2020, the University retained Brook McIlroy (BMI) to prepare an updated Campus Master Plan, a long-term (10-15 year) vision for the UTM campus. The Master Plan, which was completed in 2021, is a critical resource to help guide capital projects and phasing decisions. The proposed massing studies and location of site included in this report are consistent with the Master Plan.

The proposed site is adjacent to Oscar Peterson Hall (OPH), occupying the existing P6 Parking Lot to the northwest as well as one row of existing townhouses (Shreiberwood Residences Townhouse Complex G), both of which will be demolished for the anticipated project. The main entrance of RPHIX will be off Residence Road. The entry doors are located under the covered passageway which allows for more than one "front door", providing access to a 120 person event space and enables wider-community oriented programs of the building in addition to more academic areas. There is also an existing pedestrian network around the project that relies heavily on a path that connects Parking Lot #6/OPH with the Campus Core. This pedestrian path gives the proposed residence the potential to act as a gateway to the residential sector of the campus.

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II. Project Background

a) Membership

Deborah Brown, Chief Administrative Officer, Office of the Vice President & Principal, UTM
Mark Overton, Dean of Student Affairs & Assistant Principal, Student Services (Co-Chair)
Chad Nuttall, Assistant Dean of Students and International Initiatives, UTM
Brian Cunha, Director, Student Housing & Residence Life, UTM*
Vicky Jezierski, Executive Director, Hospitality & Ancillary Services, UTM
Christine Burke, Assistant Vice-President, University Planning, UPDC
David Sasaki, Managing Director, University Planning, UPDC*
Jordan Breccia, Planner, University Planning, UPDC
Ed Bush, Project Management Consultant, UPDC*
Luke Barber, Executive Director, Digital & Physical Infrastructure, UTM FMP & I&ITS
Ahmed Azhari – Managing Director, Operations, Sustainability, and Asset Management, UTM FMP
Muhanad Sidek, Managing Director, Planning, Design and Construction, UTM FMP*
Jason Kwok, Director, Construction and PMO, UTM FMP*
Monika Farrell, Assistant Director, Planning and Design, UTM FMP
Bernard Hau, Senior Facilities Planner, UTM FMP*
Maria Codispoti, Manager, Project Administration and Technical Services, UTM FMP*

Previous Contributing Members:

Saher Fazilat, Chief Administrative Officer (Co-Chair), Office of the Vice President & Principal, UTM
Tammy Cook, Executive Director, Facilities Management & Planning (FMP), UTM
Susan Senese, Interim Chief Administrative Officer, Office of the Vice President & Principal, UTM
Lorretta Neebar, Registrar, Director of Enrollment Management, UTM
Saba AlSaady, Planning Specialist, UTM FMP
Ashwin Rodrigues, Senior Project Manager, UTM FMP*
Simisolacluwa Ogunsina, Undergraduate Student, UTM
Adam Snyder, Undergraduate Student, UTM
Sarah Hinves, Senior Planner, University Planning, UPDC
Sean O'Molloy, Senior Project Manager, UPDC
Maroun Abou Chacra, Senior Project Manager, UPDC*

* Denotes that the member was added since the initial TOR Approval in 2019 by the CaPS Executive Committee

b) Terms of Reference

1. Make recommendations for a detailed space program and functional layout for the new residence building.
2. Demonstrate that the proposed space program will be consistent with the Council of Ontario Universities' and the University's own space standards and guidelines.

3. Demonstrate that the proposed space program will be consistent with accepted standards in campus housing.
4. Determine the secondary effects of the project, including site elements, space reallocations, and the impact on the delivery of programs, activities, and services during construction.
5. Address campus-wide planning directives as set out in the UTM Campus Master Plan, open space plan, urban design criteria and site conditions.
6. Identify all equipment, furnishing necessary to the project and their related costs.
7. Identify all data, networking, AV and communications requirements and their related costs.
8. Identify all security, occupational health and safety and accessibility requirements and related costs.
9. Project approval will be conditional upon cost of project and financing model. Consider alternative financing structuring options, demonstrating through a cost/benefit analysis the trade-offs of various financial models.
10. Demonstrate a formal comparison of project needs, costs per bed, and projected balance of first and upper year student occupancy.
11. Identify specific sustainability goals, including energy efficiency goals for this project. Recommendations for goals should also be cost effective and incorporate proven best practices.
12. Determine a total project cost estimate [TPC] including costs of implementation in phases if required, identified secondary effects, and any requirements for improvements to services and infrastructure upgrades to the site.
13. Identify all sources of funding for capital and operating costs.
14. Complete Project Planning Report by November 2023.

c) Occupant Profile

UTM's new residence will focus on a first-year residence student population in order to maintain its commitment to UofT's first-year residence guarantee for newly admitted high school students. The new 400 bed residence will house 95% first-year students, with a modest number of additional spaces allocated to upper-year students employed by Student Housing & Residence Life in a supervisory, mentoring, and community development capacity, primarily as student dons. The building will be traditional in style with a mix of 50% double rooms and 50% single rooms. Student dons will occupy single rooms and work in a ratio of one don per 25 students. There will be one live-in Residence Life professional who oversees the dons and residence programming, and will respond to emergencies as they arise.

The ground floor will include residence support spaces that will be used by residents across UTM's Student Housing & Residence Life system, including a 120-person multi-purpose event space for community gatherings, special events, and regular programming. It will also include common laundry facilities. The building does not include dining or administrative service spaces as occupants will access these facilities in the adjacent Oscar Peterson Hall.

The residence will be designed around bringing first-year students together in 25-person communities. The space planning will support SHRL's increased emphasis on living-learning communities, interaction/engagement and supporting student learning outside the classroom.

d) Background Information

The University of Toronto Mississauga (UTM) is a 225-acre campus located within the Regional Municipality of Peel, an area of significant population and economic growth. An increase in campus residential need is a result of a significant increase in student enrolment over the past decade, paired with increased interest in on-campus accommodation among a growing international student cohort. UTM's student population grew by ~4,600 headcount or 42%, with international students accounting for 60% of the growth. While this period saw expansion of physical infrastructure, there has been no new residence construction since the completion of Oscar Peterson Hall (OPH), or Residence Phase VIII, in 2007.

Student Housing & Residence Life (SHRL) at UTM can currently house approximately 10% of UTM's total undergraduate students. While it will remain primarily a commuter campus, the UTM campus' attractiveness to students from beyond traditional commuter boundaries continues to grow, and additional residence capacity is necessary to enrol many of these academically talented students. At the same time, UTM wishes to maintain a healthy mix of first-year and upper-year students for the mentorship experiences that strengthen community and facilitate success.

In 2016 Student Housing & Residence Life (SHRL) at UTM completed a Student Housing Master Plan. The Focus 15 Plan details the long-term capital renewal plan for our residence facilities. It also details the expected demand for residence spaces long-term and outlines plans for residence expansion. SHRL has been able to meet the University of Toronto's commitment to a first-year residence guarantee. However, with increasing first-year enrollment there are limited residence spaces available for upper year students and fewer for graduate students. Studies suggest that upper year students can still benefit from living in residence. The research also shows that they can have positive impacts on the residence community, including peer support, mentorship and modelling positive behaviours.

At the November 30, 2018 meeting of the Capital Project and Space Allocation (CaPS) Executive Committee, the project was brought forward and the Terms of Reference approved.

Student Housing and Residence Life (SHRL) at UTM has seen an increase in residence demand over the past number of years. While the demand fell during the years of 2019-2020 and 2020-2021 due to the COVID-19 pandemic, SHRL is anticipating demand to continue to increase due to the low availability of off campus housing, the increase of UTM student enrollment, and a higher percentage of on campus housing inventory that is fully renovated.

At the June 8, 2020, Capital Project and Space Allocation (CaPS) Executive Committee meeting, the project was brought forward, and Request for Consultant Fees was approved to retain Consultants for Schematic Design through to Construction Documentation.

In January 2021, Montgomery Sisam Architects, Christensen & co. along with sub-consultants were retained to prepare Schematic Design through to Construction Documentation.

At the February 23, 2023, Capital Project and Space Allocation (CaPS) Executive Committee meeting, the project was brought forward, and Request for Additional Consultant Fees was approved to continue design services and initiate Construction Management Pre-Construction Services required to complete the Construction Documents through to the Tender Phase.

At the November 24, 2023, Capital Project and Space Allocation (CaPS) Executive Committee meeting, the project was brought forward, and Request for Early Works Services was approved to maintain a

prompt schedule and allow sufficient time to prepare a robust Project Execution Plan, inclusive of a detailed project schedule and construction cost estimate.

Residence space at UTM plays a very important role in UofT's internationalisation strategy, with more than 50% of the residence population being international fee-paying students. Historically, UTM was able to offer a 4-year international housing guarantee. This offering is no longer practical given our first-year guarantee commitment.

UTM is anticipated to fall short of meeting UofT's guarantee of on-campus housing for first-year students as of Fall 2023. Given residence's importance as a positive recruitment factor, particularly for those from out of province or out of country, an inability to meet the guarantee with actual on-campus housing is likely to have significant detrimental recruitment impacts, particularly on prospective new international students. The alternatives of meeting the guarantee through off-campus hotel-based housing and/or buying out students holding a guarantee (to incentivize renting off-campus or remaining in family homes), when used in similar situations elsewhere at UofT, have had negative consequences in enrolment, retention, and engagement.

With the proposed new residence construction, UTM anticipates the continued ability to offer a first-year guarantee for the medium-term. Research has shown that living in residence has a positive impact on grades, better retention to 2nd year, and higher persistence to graduation. Graduation rates for international students at UTM residences are 14% higher than their international peers living off-campus.

III. Project Description

a) Vision Statement

An extensive list of core principles for the building has been developed to help guide this project. These principles have been developed to focus the project on design elements that will best develop student communities. These principles have informed the space program to ensure appropriate spaces for engagement, learning outside the classroom and living in a community.

The principles focus the project on the single function of this building as a student residence. The design should:

- serve first-year students and facilitate the associated supports and services they need
- ensure appropriate community spaces
- leverage the context of the site
- ensure residents feel safe and secure
- incorporate universal design principles to ensure an inclusive environment where students with disabilities have full access to the building amenities and services.

Central to life in the building is the floor lounge. These common rooms and kitchens will be centrally located, on each floor, to encourage interaction and community development.

b) Statement of Academic Plan

"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."

UofT Policy on Student Housing, Preamble, 2006

There is a significant demand for undergraduate housing at UTM. A recent analysis indicated sufficient demand to build up to 900 beds. The bulk of this demand growth is from out-of-province and international students that seek on-campus student housing and related supports to help in transitioning to the local community. The University also has a first-year residence guarantee that supports students in their transition to university studies by placing them in close proximity to their academic activities, library resources, support services and engaging programs.

UTM currently houses first-year students in all building types – traditional dormitory, apartment or suite style and townhouses. Student Housing & Residence Life aims to house as many first-year students as possible in residence halls, which provide a more appropriate first-time residence experience.

The construction of this residence will increase the number of residence spaces at UTM by 364 beds. The new building will house 400 beds while 36 existing beds will be demolished from the Shreiberwood Townhouses.

c) Space Requirements, Program and Functional Plan

Space Requirements

Precedent studies were conducted and buildings such as Roy Ivor Hall, Erindale Hall, Oscar Peterson Hall and a recent residence completion at the University of Waterloo were analyzed to determine the best ratio of dormitories to dons, as well as the number of supporting spaces per dormitory. Based on the existing UofT residences across the 3 campuses, the analysis found that on average, residence spaces such as dormitories make up 66.31% of a residence building while service spaces take up 6.32%. Common spaces were low at only 0.20% and non assignable spaces taking up another 25.57% on average. The new Waterloo University precedent contained more favorable ratios of common spaces to living spaces as the building provides many opportunities for students to meet, socialize and create communities. Residence spaces at Waterloo make up 46.87% of the building while common areas are increased to 15.82%. The remaining service spaces and non assignable spaces make up 2.51% and 23.72% respectively.

Space Program

COU

The typology of the spaces and their size for this project was calculated by the number of users and precedent studies of residences across the university campuses. The Council of Ontario Universities (COU) guidelines were not incorporated as dormitories fall under living spaces and do not reside in any

academic subheadings. The remainder of the support space nasm was calculated based on precedent studies.

Space

The total project area is 6,538 nasm, or 10,088 gsm with a gross-up factor of 1.54.

Private Dorms & Shared Amenities include; Bedrooms, Accessible Bedrooms, Study Rooms (Quiet & Informal) and Standard and Accessible Washrooms assigned for building users (students use) only. These rooms are located away from common spaces and occupy the upper levels of the building.

Room Description	**Nasm per Room**	**# of Rooms**	**Total Area** (nasm)	**Bed Count**
Dormitory Bedrooms				
17.1 Single Bedroom (Accessible)	14.5	115	1,668	115
17.1 Don bedroom Single (Accessible)	14	15	210	15
17.1 Double Bedrooms	12.9	135	1,747.2	270
SUBTOTAL – Dormitory		**266**	**3,971**	**400**
Dormitory Washrooms				
17.2 Standard Bath / Washrooms	6.8	85	576	
17.2 Accessible Bath / Washrooms	11.4	15	171	
SUBTOTAL – Dorm Washrm		**100**	**747**	
Don's Amenities				
17.1 Living / Meeting Room - Don	7.4	15	111	
SUBTOTAL – Don Amenity		**15**	**111**	

Common spaces to be used by the residents and student guests will consist of the Main Lobby, an Event Space, two Conference Rooms, a Music Room, and a Laundry Room assigned for building occupants only.

Building Support Spaces, such as Storage and Garbage Rooms, will be located on the first level and will require direct access to the exterior.

Room Description (continued)	**Nasm per Room**	**# of Rooms**	**Total Area** (nasm)	**Bed Count**
Common Facilities / Communications				
17.2 Common Room	117.6	5	588	
14.2 Study Room - Quiet	18.1	10	181	
14.2 Study Room - Informal	27.2	5	136	
12.1 Communications Closet	7.4	5	37	
SUBTOTAL – Common Space		**25**	**942**	
Main Level Amenities				

7.1	Vending Machine Area	4	1	4	
11.1	Conference Room	22.5	2	45	
11.2	Student/Event Space	223	1	223	
11.2	Event Space Storage	15	1	15	
12.1	Communications Room	27	1	27	
12.1	Security Closet	15	1	15	
12.2	Storage	84	1	84	
17.1	Staff Apartment	56	1	56	
17.2	Main Lobby - Common Lounge	164	1	164	
17.2	Music Room	42	1	42	
17.2	Laundry Room	46	1	46	
17.2	Garbage Room	46	1	46	
	SUBTOTAL – Main Level		**13**	**767**	
Total Building (NASM)				6,538	
Total Building GSM			1.54	10,088*	

* The GSM does not include the penthouse.

The building is slab on grade and does not contain any below grade spaces. However, due to the sloped topography of the site, a portion of the ground floor which houses the Electrical, Mechanical, and Water Entry Rooms is sunken below the exterior grade.

Non-assignable Space

Included in the project are non-assignable elements that are not specifically described in the Space Program. Non-assignable spaces include: corridors, stairs, elevators, mechanical spaces, etc. These areas are listed in Non-Assignable Space section of this document and included in the gross-up factor of 1.54.

Functional Plan

The building is composed of a ground floor level that houses common spaces, five (5) upper levels of private quarters, and a penthouse for mechanical and electrical utilities. It is preferable to have the high-voltage electrical room placed on the first level for easy connection to the main campus infrastructure.

Placing all the private suites in the levels above provides privacy and security to the residents. The Don's suites, common rooms, study rooms, and kitchens are oriented on each level to maximize interaction and reinforce community. Considerations for quiet spaces provide students the ability to study outside their dormitories.

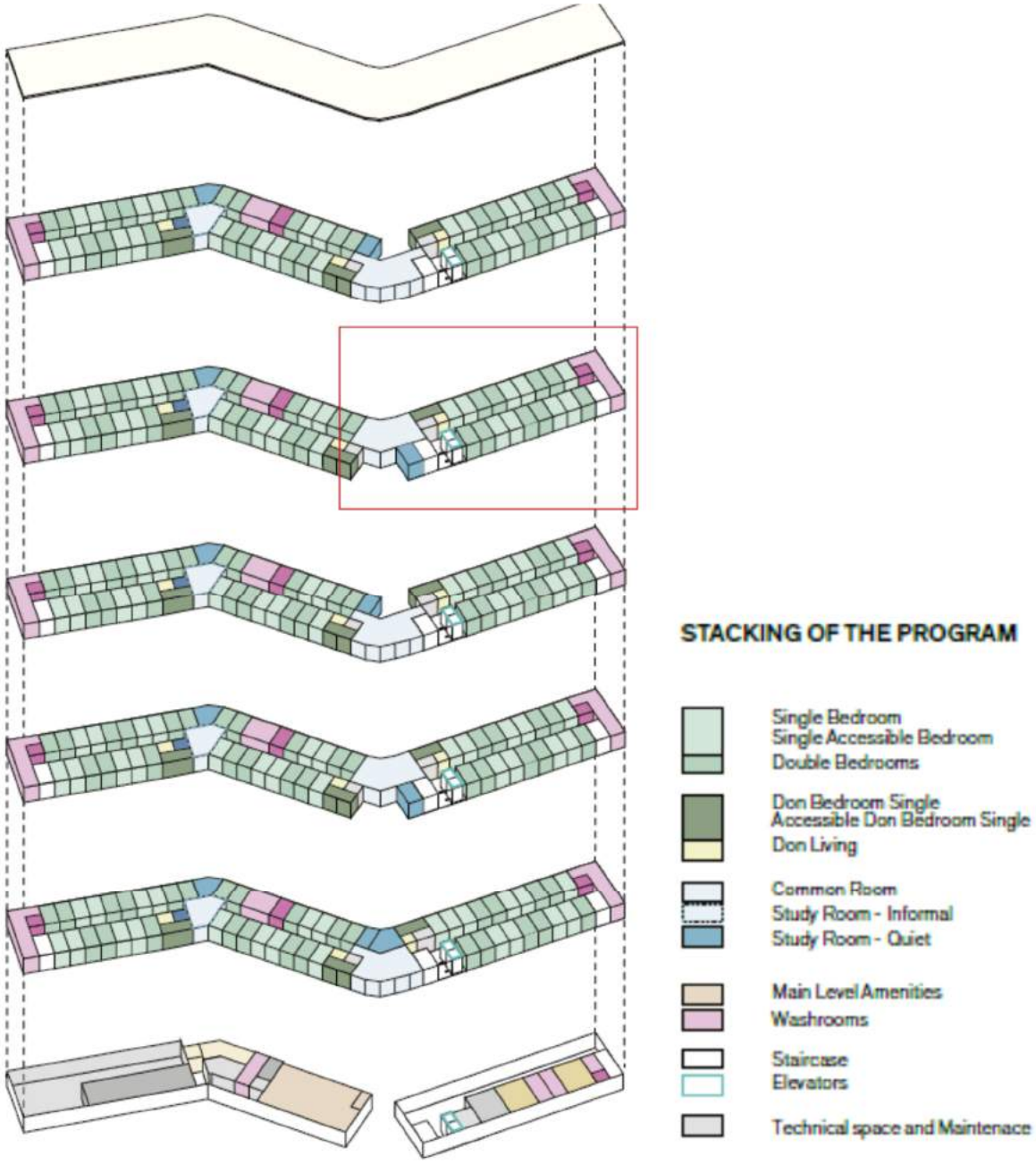


Figure 1.3 Building Stacking Opportunities (Christensen & Co/ Montgomery Sisam)

Washroom facilities are located at the two ends, as well as the middle, of the building and provide stacking opportunities as shown in the stacking diagrams.

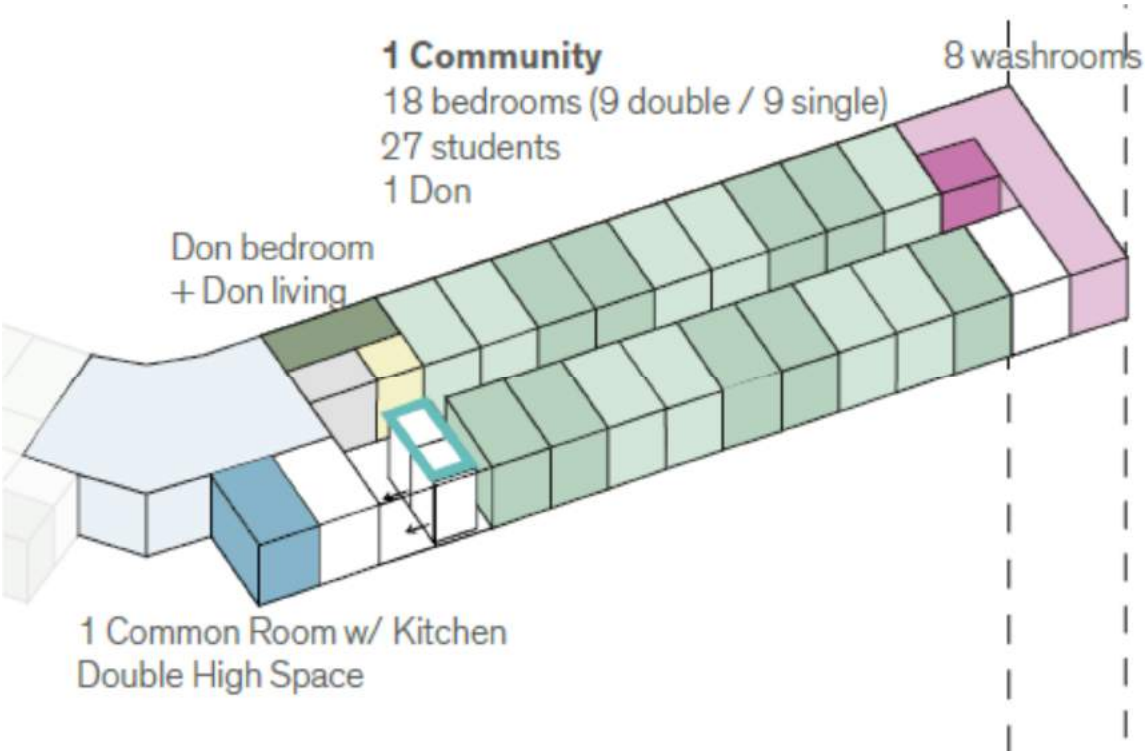


Figure 1.3 Cluster of Common Rooms, Bedrooms and Washrooms on a Typical Floorplate (Christensen & Co/ Montgomery Sisam)

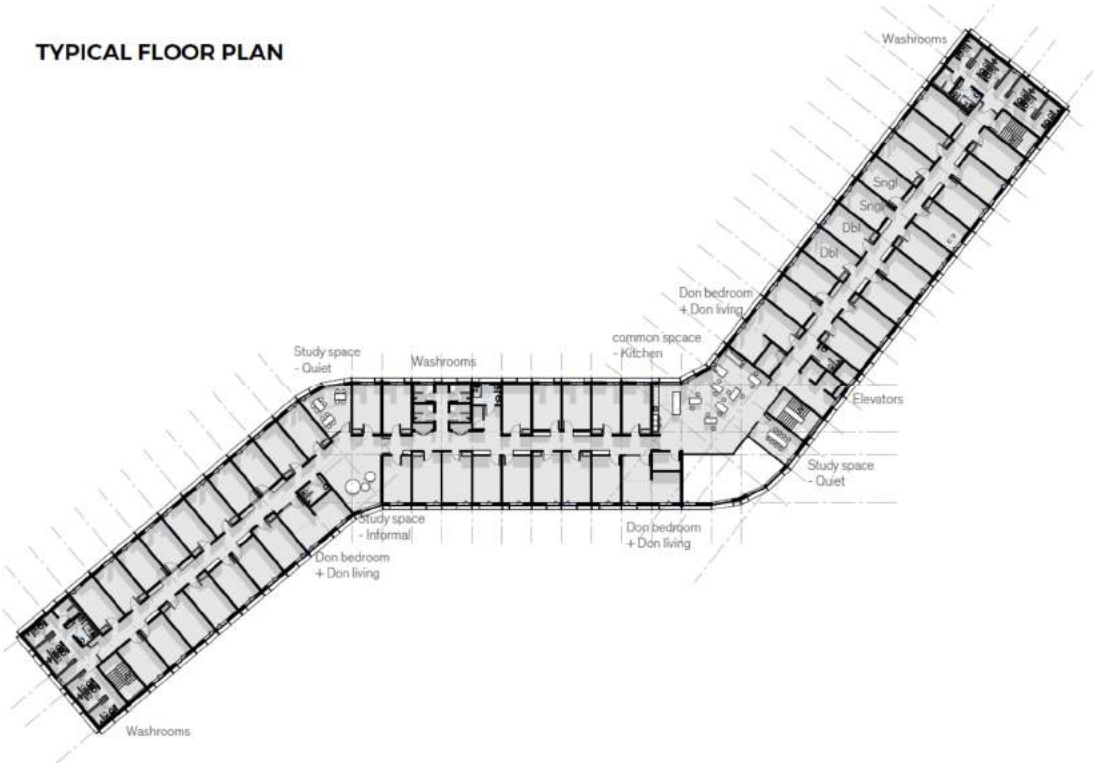


Figure 1.4 Typical Residence Floor Layout (Christensen & Co/ Montgomery Sisam)

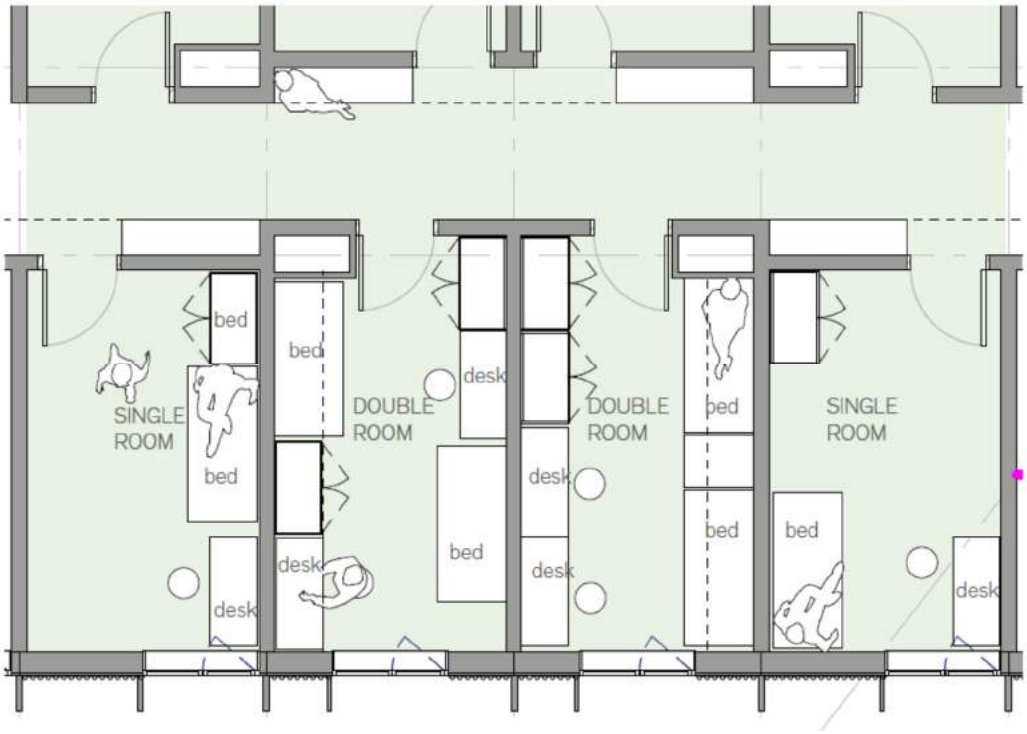


Figure 1.5 Suite Typologies; Single, Double and Accessible Suite Layouts (Christensen & Co/ Montgomery Sisam)

d) Building Considerations

Standards of construction

UTM's recently constructed buildings (the Maanjiwe nendamowinan Building, Deerfield Hall, the Innovation Complex, the Instructional Centre, the Terrence Donnelly Health Sciences Complex, and the Hazel McCallion Academic Learning Centre) and those that are currently in design and construction (the F2 Building and the New Science Building), have evolved from basic, functional forms that are evident in earlier structures, such as the existing William G. Davis Building and the former North Building. These recent buildings consistently demonstrate design excellence and can be considered as not only architectural benchmarks, but also as representative of the general standards of construction quality and level of finish for the New Student Residence building.

Durability and functionality of interior spaces are critical. The Claudette Millar Hall at the University of Waterloo (opened in 2017) served as an example for spatial planning and for construction. Composed of hollow core slab and steel beam structure, the building was built on time and budget. The partitions throughout the building consist mainly of Concrete Masonry Units for durability and acoustics. Note: many student residences built in the Ontario post-secondary system use concrete block construction to reduce sound transmission and add durability. It is the intent of Residence Phase IX (RPHIX) to use a cast-in-place reinforced concrete structural system with concrete block construction as much as possible. Similarly, exposed ceiling slabs are preferred in areas where minimal services are run in the ceiling

spaces. For planning and costing purposes, it was assumed that the New Student Residence will be of a quality similar to that found in the design and finishes of the Claudette Millar Hall.

Key Building Components and Systems

UTM has developed detailed specifications and standards for architectural design, mechanical and electrical design, and building automation systems. As well, UTM's Information and Instructional Technology Services division and Campus Safety maintain standards and specifications for their systems.

These specifications and standards are reviewed and updated on a regular basis. All of UTM's design standards and specifications, and policies and procedures are available through UTM's Facilities Management and Planning and will be made available to all invested parties as required.

Mechanical / Electrical and Data

The project has been designed to connect to the Central Utilities Plant (CUP-1) on opening day for all heating and cooling systems as shown in *Figure 2.0 Central Utilities Plant Connection.* This system allows the project to meet UTM's sustainability design requirements, UTM's design standards, and the requirements of all associated municipal, regional, provincial and federal regulatory agencies.

Upon completion of the F2 Building, the project will connect to CUP-2 which is the expansion of the system along Outer Circle Road.

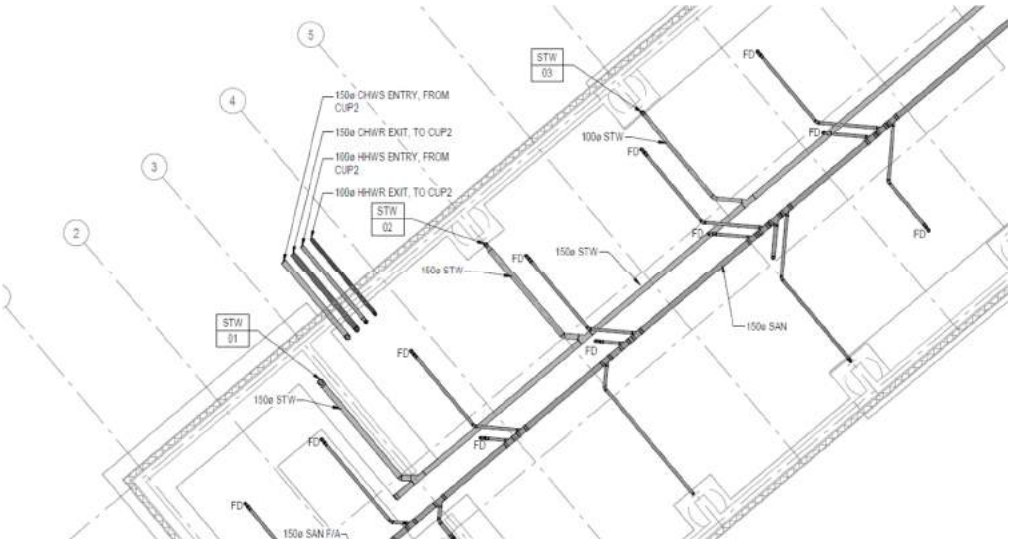


Figure 2.0 Central Utilities Plant Connection

UTM's Facilities Management & Planning has established and regularly updates specifications and standards for architectural design, mechanical and electrical design, and building automation systems. As well, UTM's Information and Instructional Technology Services division and Campus Safety maintain standards and specifications for their systems.

All of UTM's design standards and specifications, and policies and procedures are available through UTM's Facilities Management and Planning.

Tenants require excellent Wi-Fi coverage based on the latest I&ITS Wi-Fi and structured cabling standards, and Wi-Fi design criteria. This will include a predictive survey based on CAD drawings as part of the project, presuming a fully occupied furniture plan for residence rooms, and common areas, both indoor and outdoor (laundry, lounges, patios, picnic benches, etc.)

This wireless experience will require a true home Internet experience, with Wi-Fi that is capable of supporting consumer IoT devices such as gaming consoles and personal assistants.

Wired Internet connectivity in the common lounge areas to support communal entertainment activities such as gaming or viewing of Smart TV and similar devices.

The building must meet new fiber masterplan specifications – fiber ingress AND egress as "pass through", as well as all design criteria for inter-building fiber specified in the UTM structured cabling standards. Given the centrality of this building at that end of campus, we will require 2x48 strands of fiber via geographically distinct paths.

This building will become the new fiber distribution point for the southwest portion of campus and would therefore require connectivity to nearby consolidation points (yet to be installed), and a demarcation room for fiber distribution, in addition to typical in-building comms rooms. This room must be separate and apart from the communications room on that floor of the building (presumably the ground floor or basement, wherever fiber comes into the building). The specifications of this room would be similar to our communications room standard of a four-rack configuration. The new residence building must also have fiber access back to Oscar Peterson Hall.

For further information see: Section e) Site Considerations and Section g) Campus Infrastructure Considerations.

Sustainability design and energy conservation

The University of Toronto is committed to reducing its scope 1 and 2 greenhouse gas (GHG) emissions by at least 37% below its 1990 level of 116,959 tonnes eCO_2 by 2030, targeting a better than net-zero climate positive) institution by 2050. To accomplish this, the University has retired the previous Energy Performance and Modelling Standard (April 1, 2019) and introduced this now-governing Tri-Campus Energy Modelling & Utility Performance Standard (refer to links listed at the end of this section). This new standard provides project-specific energy and water efficiency targets, used to calculate energy and GHG project budgets, and necessary to achieve the 2030 goal, while also introducing a streamlined modelling and documentation submission approach.

This standard is meant to inspire innovative designs based on energy and GHG targets that are used to calculate energy and GHG performance budgets according to when the building is going to be constructed and building programming. The targets become more stringent over time as cost-effective technologies and delivery methods improve in conjunction with regulatory compliance changes.

The tool used to define the targets and budgets is called the "Charter" and completed by U of T staff

before design procurement commences. The energy and GHG performance targets for new construction are defined for the year that occupancy is scheduled in the project planning reports. The energy modelling procedures defined in the Tri-Campus Energy Modelling and Utilities Performance Standard will be used to calculate the energy and GHG performance for the designs and compared to the Charter targets throughout the design stages.

These Standards and resulting models are not post-occupancy energy or GHG predictions. They are to be used to establish and track the compliance of energy and GHG indices during the design process and as a comparative tool for building baseline and performance evaluation. Post-occupancy evaluation will be completed (12 – 14 months post-occupancy) by the U of T facilities staff and compared to the final performance model results.

All applicable Codes, Guidelines or Standards referenced in the standard are to be applicable to the current regulations within the project timeframe defined in the Charter. Estimates of the impact of any foreseeable future standards, codes and guidelines may be required and shall be presented to the U of T Implementation Team for consideration. In all cases, higher performance targets shall be the preferred targets.

Utility Performance Requirements for Capital Projects

Energy

New construction projects and Major Renovation Projects must meet the project-specific energy performance targets established in the Charter. The requirements will be calculated using the Charter's archetype targets and project information, including: planned building space use, year of occupancy, presence of a connection to the U of T district steam or low temperature heating, and district chilled water energy systems. For buildings with mixed uses, the targets are area-weighted using the Charter to determine a set of performance targets that are representative of the building programming.

The renovation of existing buildings plays a critical part in U of T's plan to achieve its established 2030 GHG emissions reduction target. UofT's Standard also identifies utility performance requirements and targets for renovation projects of varying scopes and complexities through a prescriptive pathway for minor renovations and performance pathway for major renovation projects.

For Feasibility Studies, the Charter will be developed within the scope of the feasibility study to inform design feasibility decision making. The developed Charter(s) will be calibrated to the predictive timeline(s) of construction included in the project costing and feasibility report.

The Project Consultant Team must complete and submit to UofT all the deliverables listed in the *Project Charter Submissions Checklist* including energy simulation files and report, key performance indicators (e.g. % EUI reduction, TEUI, TEDI, GHGI) with associated documentation at each stage of the design process to demonstrate ongoing compliance with these performance targets. At the completion of the commissioning, the energy model simulation must be updated to reflect the as-constructed building characteristics. This will form the basis of the project's baseline performance.

The targets will be revisited and adjusted regularly to ensure U of T remains in a leadership position. The progression of targets depends on numerous factors, many of which are outside U of T's direct control (e.g., the rate at which new technologies come to market). However, projects should anticipate the adjustments to the targets for 2022-2026 and 2026-2030 for all key performance indicators included in the standard to account for increased capabilities of designers, technologies and industry practices to meet net zero targets by 2030 in many jurisdictions, including the City of Toronto.

Beyond energy, additional performance levels may include:

- 50% reduction in indoor water use over the LEED™ version 4 baseline;
- 60% reduction in outdoor water use over the LEED™ version 4 baseline; and
- Complete whole-building air tightness testing following the US Army Corps of Engineers Air Leakage Test Protocol for Building Envelopes and submit air leakage testing report~~.~~ (Refer to links listed at the end of this section).

The above targets are combined with project-specific information to establish unique energy and water efficiency targets for every building based on floor area and different space use types. The project-specific goals are established as part of the Project Planning Report (PPR) using the separately enclosed Charter. The Charter outlines key project information, performance targets, and serves as a reference point throughout the project to ensure the performance goals are clearly understood by all involved parties and ultimately achieved.

To further ensure projects are developing in accordance with these performance requirements, documentation must be completed by the Project Consultant Team and/or the U of T Implementation Committee at each project stage. For each documentation item, the expectations and responsible parties are outlined in the Standard.

In addition to the energy performance, utilities performance and water efficiency targets mandated by the University through this standard, other regulatory authorities and certification processes will be included within the planning, design and implementation of all projects. The intent of these additional regulatory processes is to ensure that the high-performance building required by the energy and water performance targets of this standard is part of a holistic approach to sustainable building practices.

The following Certifications and regulations will be mandatory for all New Construction and Renovation projects: LEED™ Silver minimum (non-certified). The minimum requirements for these certifications and regulations are not to supersede the energy, utilities and water efficiency performance targets of this standard. The consultant is required to provide a memo demonstrating LEED™ Silver minimum (non-certified) shadowing.

On-site renewable energy requirements included in the Charter will be determined on a project-to-project basis in consultation between the Project Planning Committee and the Facilities and Services Sustainability Office. Considerations of the affordances of the capital project (i.e.. roof area, exposure) and campus wide energy planning and utilities master plans may impact the decision for inclusion of photovoltaics, wind turbines, and other on-site renewables. The following is the definition of on-site renewable energy generation included in the Tri-Campus Energy Modelling and Utilities Performance Standard:

Site Renewable Energy Generation:

Energy generated on site from renewable sources, such as solar photovoltaics (PV), wind, or solar thermal. Where a site is not able to send energy off-site (e.g. connected to the electricity grid), only energy that can be consumed (or stored and then ultimately consumed) on site shall be counted as Site Renewable Energy Generation. Site Renewable Energy Generation can be used to reduce Site Energy Use before calculating TEUI and GHGI. The U of T is not considering the purchase of renewable energy or other carbon offset packages.

In the case that excess on-site renewable energy generation (or heat recovery) beyond the building's demand can be exported to surrounding buildings or district energy systems, that exported energy will be counted as a credit to the TEUI and GHGI metrics.

Geo-exchange and other heat exchange strategies and technologies may be considered as on-site renewable if used in conjunction with other on-site renewable energy generating initiatives of the above listed items. **Consultation with the Facilities and Services Sustainability Office on the proposed on-site renewable strategy will be required.**

Other Considerations

New construction will increasingly include multiple uses and occupancies resulting in "mixed use buildings". As indicated, the energy performance targets and resulting budgets will be based on the area weighted aggregate as calculated by the Charter. Care is required when assigning the use areas when completing the Charter. **Coordination between University Planning, the end users and Facilities and Services Sustainability Office is to determine the appropriate assignment of Charter Archetypes to the space program.**

District Energy Systems (DES) includes heating and cooling energy supplied from our central or nodal plants. For networks supplied from low temperature heating sources (heat pumps, heat reclaim energy) the non-district system targets and factors will be used. **The Facilities and Services Sustainability Office (F&S SO) is to inform the PPC and University Planning of the project's connection (or not) to a DES.** The intent of the charter is to determine energy use at time of occupancy. Coordination with the F&S SO is required to ensure that the capital project will meet future energy and carbon planning targets.

The Project Planning Committee is to review the City of Toronto Green Standard and City of Mississauga By-Laws for Electric Vehicle parking requirements for appropriateness and alignment with our vision, use, campus Master Plans, and utilities as well as project capital and operating budgets for the project.

The decision to pursue full certification or higher levels of LEED™ and TGS or additional standards such as WELL™ Building Standard will be at the **discretion of the Project Planning Committee in consultation with University of Toronto Facilities and Services. The decision to include the above is to be included in the Project Planning Report for inclusion in the Capital Project's scope of work and preliminary costing.**

Photovoltaic-ready initiatives are to be considered where possible to allow for the future installation of photovoltaics where current project scope may not allow for the full installation of a photovoltaic array. Considerations of structural loading and provision of electrical conduit and servicing may be included in the capital project scope.

Project Planning, Implementation and Consultant teams are encouraged to address the embodied energy, embodied carbon and other emissions associated with building materials. Reporting of the embodied emissions of the building's structural and envelope materials using life-cycle assessment (LCA) software in compliance with the Canadian Green Building Council's recommended methodology is to be **reviewed in consultation with University of Toronto Facilities and Services on a project to project basis.** The decision to include the above is to be included in the Project Planning Report for inclusion in the Capital Project's scope of work.

The University of Toronto Facilities and Services is to be contacted to provide historical utilities data to the consultant team for the purposes of life cycle costing and energy modelling.

Please refer to the City of Toronto Green Roof Bylaw No. 583-2009, Chapter 492 for specific green roof requirements.

The University of Toronto Sustainability Standards

The University of Toronto Environmental Standard [University of Toronto Design Standards: Part One / Environment / Environment (draft revision)] was developed in 2011 and revised in 2018. A new and expanded University of Toronto Sustainable Building Design Standard is currently under development and targeted for release in the winter of 2023/2024. The new sustainability standard uses several external standards as a baseline from which to take a leadership position in holistic sustainable building design. The Project Planning Committee and consultants are encourage to **consult with the University of Toronto Facilities and Services Sustainability Office** to ensure that longer term project planning is anticipatory and inclusive of the new sustainable building design standard requirements, Tri-Campus Energy Modelling and Utility Performance Standard requirements, and Toronto Green Standard requirements.

The new sustainable design standard will supersede the requirement for LEED™ Silver minimum (non-certified) described above.

Sustainable strategies to be considered during the design phase to achieve the Charter targets may include:

- Envelope
    - High performance envelope and glazing
    - Improved air tightness. For renovations with limited envelope scope, qualitative envelope assessment and targeted sealing and/or aerosolized envelope sealant technology to be considered.
    - Low window to wall ratio at building facades with Low-E triple glazed insulated glazing units

- Water
    - Rainwater harvesting systems for flushing toilets and urinals, and for landscape watering systems
    - Water-efficient fixtures and combined water fountains/bottle-filling stations

- Heat Recovery
    - Exhaust air heat recovery actively using heat pumps (preference for ventilation rates – e.g. lab buildings) or passively
    - Heat recovery chiller for simultaneous heating and cooling loads

- Heat recovery ventilation
- Wastewater heat recovery

- Energy efficiency
  - DLC-rated LED lighting with central lighting controls and advanced control strategies including daylight harvesting, occupancy sensing, scheduling, zoning, high-end trim.
  - Energy Star appliances, office equipment, electronics, and commercial food service equipment
  - Building automation systems integrated into the University's EMRS
  - Demand control ventilation based on CO_2 or contaminant sensors in lab spaces
  - Occupancy sensors controlling HVAC and lighting
  - Zoned HVAC control where possible
  - Ultra-low flow, energy efficient fume cabinets in laboratories (with variable volume air flow and automated sashes)
  - Thermal or battery storage for resiliency and peak shaving

- Renewable energy
  - Geothermal
  - Solar thermal, Photovoltaic including Building Integrated Photovoltaics
  - Wind
  - RNG

- Roofs and landscaping
  - Green roofs (to improve rainwater absorption, mitigate local heat island effect, decrease the building's solar heat gain, and to increase the available habitat and help offset the impact of habitat loss associated with the new building)
  - Roofs suited to the incorporation of solar thermal water and/or photovoltaic arrays and 'Solar Ready' provisions for future installation if not included in project scope.
  - Low maintenance native plantings

- Materials
  - Durable, local materials with renewable and/or recycled content
  - Low-embodied carbon building materials
  - Provision of recycling depots for source-separation of waste throughout the building to meet the needs of the University's recycling and waste reduction programs and vehicular access to these sites
  - life cycle analysis (LCA) and embodied carbon reporting

Other Standards and Certifications to consider

- Passive House
- WELL™ Building Standard Certification / Shadowing
- Toronto Green Standard tiers above minimum requirement
- LEED™ Certification and/or shadowing above minimum requirement
- CAGBC's Zero Carbon Building™ Standard / Shadowing

Other considerations

- Transportation (i.e. support of active and lower carbon commuting (e.g. cycling)
- Location (i.e. Landscaping, Biodiversity, Light Pollution, Trees, Heat Island)
- Indoor Environment (i.e. Air, Lighting, Acoustics)
- Equity, Diversity & Inclusion (i.e. safe spaces, inclusive design)

- Health & Well-Being

UofT Climate Positive Campus

https://climatepositive.utoronto.ca/

UofT Tri-Campus Energy Modelling & Utility Performance Standard:

https://www.fs.utoronto.ca/wp-content/uploads/2022/06/Tri-Campus-Energy-Modelling-Utility Performance-Standard-July-2020.pdf

UofT Overall Design Standards:

https://www.fs.utoronto.ca/projects/design-standards-and-project-forms/

Toronto Green Standard Version 4:

https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/toronto-green-standard-version-4/

Discussion on Final Performance Targets

The project has now reached 100% CD and the consultants provided the Energy Analysis Report which outlines how the targets were exceeded or not met and provided an overall assessment. The complete report can be found in the appendix, however, an explanation of how the targets arrived at their final numbers can be seen below:

The energy model demonstrates that the building is performing very well overall, although it is only meeting the Charter on only the GHGI and C-TEDI metrics. The TEUI performance is marginally high, but on the H-TEDI metric the proposed building exceeds the Charter by about 17%. Below is a summary of why the building performance is high and additional details on areas where it falls short of the Charter targets.

Summary of High-Performance Features

The low energy use intensity is primarily a result of aggressive targets for lighting energy, heating energy, cooling energy, and domestic hot water. The following building features contribute to the project's current modelled energy performance:

1. High performance triple pane glazing with thermally broken frames
2. Optimized shading across the entire façade and building massing with long side facing south
3. High performance walls with an assembly performance of R-14 effective
4. High performance lighting design (space-by-space lighting power densities 20% lower than those prescribed by ASHRAE 90.1-2013 for all spaces except bedrooms)
5. Advanced occupancy-based lighting controls, daylight dimming, and demand control ventilation in common spaces
6. Decoupled systems to address ventilation and zone sensible loads more efficiently
7. Enthalpy recovery wheels with 85% overall effectiveness
5.Increase in Heating TEDI from 100% DD

While most performance metrics have stayed approximately the same since 100% DD, TEDI has increased. This is due to a few reasons:

- *Detailed envelope thermal bridging was performed. These calculations showed a decrease in wall R value from R-18 to R-14.*
- *Average glazing U value increased from 0.23 to 0.265 using the performance of the specified aluminum frame triple glazed windows.*
- *Laundry was previously anticipated to make use of condensing dryers. The decision to use non-condensing dryers added a makeup air requirement and associated heating load. More details about this impact are available in section 5.3 of the corresponding report.*
- *Air infiltration was increased to account for leakage through the roof assembly instead of only façade. However, an improved air tightness target was added, and the impacts ended up cancelling out.*

The TEDI is fundamentally still performing well for a building of a student residence typology, with a particularly high density of occupants, and with a shallow floorplate with only exterior occupied/living zones. See section 5.4 of the corresponding report for more information.

Accessibility

The University is committed to equitable access to all building facilities by the whole campus community. New buildings and renovations will incorporate equity, diversity and inclusion as well as the principles of universal design that will allow users with diverse abilities to access and use facilities with dignity.

Projects will meet the design requirements of the University of Toronto Facilities Accessibility Design Standards (FADS) and barrier-free design requirements of various codes and standards, such as the Ontario Human Rights Code (OHRC), Ontario Building Code (OBC), Accessibility for Ontarians with Disabilities Act (AODA), O.Reg. 191/11 Integrated Accessibility Standard Regulation (IASR) under the AODA and CSA B651 “Accessible design for the built environment”.

An achievement in accessibility, the final design of this residence provides barrier free access to all the dormitories and don bedrooms in the building, as well as to all common rooms including study rooms, conference room, event spaces, lobbies, music room, and laundry room. Out of the 100 bathrooms/washrooms in the building, 15 are fully accessible. The accessible washrooms are distributed evenly throughout each of the bathroom clusters.

The entrance of the building is designed to be fully accessible and the signage system follows the latest UTM Exterior Signage and Interior Signage Standards to assist individuals with disabilities with wayfinding and in identifying spaces (e.g. Braille, high contrast, raised tactile). The Director of the Accessibility Resource Centre along with the Universal Design Consultant provided consultation at the appropriate points throughout the design process.

Accessible parking will be provided close to the residence in addition to accessible drop off space along Residence road. Further information has been provided in the Vehicular Access and Vehicular Parking sections of this report.

The exterior, and some interior (i.e. service counters, fixed queuing guides, and waiting areas), public space, comply with Part IV.1, Design of Public Spaces Standards (Accessibility Standards for the Built Environment, Integrated Accessibility Standards of the Integrated Accessibility Standards, O.Reg. 191/11, http://aoda.hrandequity.utoronto.ca/buildings/**)**. Maintenance, environmental mitigation, or environmental restoration has been excluded from this requirement.

Public space projects affecting exterior paths of travel, recreational trails, outdoor play spaces, or accessible on-street parking have included consultation with the public and persons with disabilities pursuant to standards mentioned above.

For additional information contact the University of Toronto's AODA Office.

https://people.utoronto.ca/inclusion/accessibility/

https://teaching.utoronto.ca/resources/universal-design-for-learning/

https://people.utoronto.ca/inclusion/edi-at-u-of-t/

Facility Accessibility Design Standard (June 2023)

Personal safety and security

UTM subscribes to the belief that all members of the UTM community and all visitors to the campus should be able to readily enter the campus, its builidngs, and facilities without any hindrances or encumbrances. While the New Student Residence building is designed to allow its students, staff and visitors' safe and convenient access, it must at the same time be sensitive to the needs of those whose activities require security after hours. Limited areas of this building are operational throughout the week for 24 hours a day, and the residence levels above the main floor will consist of closed elevator lobbies that provide secured card readers for 24-hour resident access.

A detailed security plan of each floor, zone, and room has been developed in collaboration with the user group and UTM Campus Safety, and factored into the design of the building to ensure that accessibility, security and functional objectives are all met simultaneously. Specific security requirements have been identified in the Room Data Sheets.

Building Access Systems

The new residence building will use an electronic card access system. It will be an offline system. Currently, most of UTM's older buildings have exterior doors that are manually unlocked (either standard locksets or panic bars) by Campus Safety. As well, interior facilities that are accessed by students, faculty and staff on a regular basis, such as classrooms, study rooms, lounges, etc., are also unlocked and locked in the same manner as the building's exterior doors. UTM has transitioned to a new hard key system that provides greater control of security to academic and administrative units over their own space. The new Medeco system has been included in recently completed renovations and new buildings, including Deerfield Hall, Innovation Complex, and the Maanjiwe nendamowinan Building, and will be included as part of this project.

Non-public spaces, such as mechanical and electrical areas, custodial rooms and telecommunication closets, will require standard lock sets in addition to electronic card access devices. For TR rooms, card readers with dual-factor authentication must be utilized for added security: hard keys will conform to UTM's approved door hardware (Medeco) specifications and standards. For the New Residence Building (RPHIX); The two main entrance doors (front and back doors), will receive online & offline access control systems, while all other doors (e.g. bedrooms, study rooms, mechanical and electrical rooms and shafts, and communications and security closets, etc) will receive offline access control system only.

CCTV and Related Systems

UTM currently has closed circuit security cameras (CCTV) in critical areas of the campus, buildings and rooms. Wherever there are concerns of personal safety, cameras are strategically located to provide suitable coverage; these cameras are connected to Campus Safety's monitors and recording servers (via the campus' internet) in the William G. Davis Building. As well, Campus Safety may request that some cameras be located outside the building to provide coverage of building entrances/exits and surrounding landscaped areas.

The number of cameras that will be needed in this project will depend on the building's design and layout. Most of the cameras that have been supplied are fixed and are specified and located to provide the best coverage possible; where required pan-tilt-zoom (PTZ) cameras have been installed to optimize coverage.

UTM currently has emergency call stations located throughout the campus grounds and in some building locations; these stations are located in either high-risk areas or convenient locations (for example, readily visible in pedestrian travel routes or building entrances). The most recent building project has included the requirement for the camera closest to a call station to be able to pan, tilt and zoom onto the call station when the emergency function is activated.

Barrier-free washroom emergency call strips must be connected to the building electronic access control system and dial out to UTM Campus Safety via BELL Centrex line for redundancy.

As with all recently completed buildings on campus, public address (PA) systems for emergency communication and notification have been included in the budget. The PA system will cover the main hallways and any high occupancy locations; in the past, PA systems have been locally operated by Campus Safety or emergency personnel, but for this project, the system should also have the capability to be operated remotely from the Campus Safety office.

Environmental Health and Safety

The University of Toronto's Environmental Health and Safety office, including an Environmental Protection Services team, provides a broad range of health and safety services to the University community and whose responsibility it is to ensure environmentally responsible, safe and healthy work, research and study environments on campus. Please refer to their website for information, https://ehs.utoronto.ca/.

As per EHS requirements, emergency eyewash stations will be provided in all caretaking closets and mechanical areas, including the rooftop mechanical penthouse, where chemical dispensing may occur.

Additionally, EHS will be purchasing and installing an Automated External Defibrillator (AED) at the ground floor elevator lobby, a highly visible and publicly accessible space.

Key considerations for healthy environments included: student space design, use of materials, air quality, access to natural light, and overall space and furniture design.

Pre-engineering reports and feasibility studies on existing conditions and constraints were conducted to assess the following:

- Safety design for receiving areas
- Ergonomic design of mechanical rooms
- Code and environmental requirements
- Environmental health and safety (supply ventilation, specialized equipment and venting requirements, chemical hazard quantity – if any)
- Noise and vibration (insulation or amelioration of sound sources from the building such as air handling equipment in the mechanical penthouse)
- Hazardous materials disposal

Servicing (including Garbage, Recycling and Deliveries)

The RPHIX proposal includes waste management for building wastes (waste and recycling bins) and short- and medium-term storage space.

The Garbage Room is designed to have exterior doors to allow bins to easily roll to and from the designated waste collection area.

The storage area will also need an exterior door for easy loading/unloading.

Acoustics

The acoustical quality of the built environment is important in several areas of the building', and requires additional attention in several areas of the building's design:

- Between dormitory rooms;
- Between common spaces (such as public corridors, common rooms, and open study areas) and private spaces (dormitory rooms);
- Between floors;
- Between the Music Room and adjacent spaces;
- And between the Mechanical Penthouse and dormitory rooms located directly underneath

In any large common areas, such as the suggested central circulation lobby, study and conference rooms, and common and/or study open spaces, it is critical that noises created in these spaces are not unduly transmitted into adjacent bedroom areas. The areas previously mentioned may require both passive and active sound treatments to ensure that any noise or sound generation within the room is kept to an acceptable level.

Appropriate STC ratings for all wall, floor, and ceiling assemblies were applied as per the recommendations of an appointed acoustic consultant. The acoustic consultant worked closely with the architect in assessing the locations of building components, such as elevator shafts, mechanical rooms, the event space, the music room, conference rooms, the laundry room, etc and to provide advice on managing the sound and vibrations of these different spaces in order to optimize the acoustic design. Involvement of

the acoustic consultant began in the design phase of the project and will extend to the construction and commissioning stage to verify the required STC ratings.

(SLR Consulting Ltd) was retained as a sub by Montgomery Sisam. They were involved during early design. Concrete block wall construction (floor to under slab) has been selected to achieve good acoustical properties of bedroom and adjacent spaces.

Signage, donor recognition

This project will need to provide all necessary signage, wayfinding and donor recognition associated with the building. Interior signage includes not only those signs mandated by the Ontario Building Code but also departmental identifications, room names and numbers, room schedules (as required) and interior wayfinding. Exterior signage includes municipal building address, updating existing campus wide vehicular and pedestrian signage, adding pedestrian signage on the site fire route identification signage, and other site-specific signage (e.g. accessible parking spaces across from the project site, loading dock instructions, etc.). Additionally, the new building will utilize digital signage by the main floor elevator lobby for the cycling of campus information, events, student services, etc.

UTM has specifications and standards for both interior, exterior and digital signage that the design team will be required to implement on this project.

Non-Assignable Space

The proposed non-assignable spaces can be found in the tables below.

Ground Floor	
Name	**Area m2**
Universal WR	10
WR	2
WR	2
Janitor Room	4
Electrical Closet	5
Vestibule	11
Security	15
Communications Room	27
Electrical	54
Water Entry Room	57
Mechanical Room	177
BF WR	8
House Keeping	4
WR Corridor	8
WR	3
WR	3
WR	3
Kitchen Event Space	18
Vestibule	15
Corridor	60
WR Corridor	7

Second Floor	
Name	**Area m2**
WR Corridor	18
WR Corridor	17
WR Corridor	5
Electrical Closet	4
Electrical Closet	4
Janitor Room	2
Corridor	60
Corridor	53
Corridor	79
Stair C	13
Stair B	27
Stair A	12
Total	**294.00**

Third Floor	
Name	**Area m2**
WR Corridor	18
WR Corridor	17
WR Corridor	5
Electrical Closet	4
Electrical Closet	4
Janitor Room	2
Corridor	60
Corridor	53
Corridor	79
Stair C	13
Stair B	27
Stair A	13
Total	**295**

IT Closet	3
Elevator 1	6
Elevator 2	6
Stair C	29
Stair B	19
Stair A	16
Stair A	2
Total	**574.00**

Fourth Floor	
Name	**Area m2**
WR Corridor	18
WR Corridor	17
WR Corridor	5
Electrical Closet	4
Electrical Closet	4
Janitor Room	2
Corridor	60
Corridor	53
Corridor	79
Stair C	13
Stair B	27
Stair A	13
Total	**295**

Fifth Floor	
Name	**Area m2**
WR Corridor	18
WR Corridor	17
WR Corridor	5
Electrical Closet	4
Electrical Closet	4
Janitor Room	2
Corridor	60
Corridor	54
Corridor	79
Stair C	13
Stair B	28
Stair A	12
Total	**296**

Sixth Floor	
Name	**Area m2**
WR Corridor	18
WR Corridor	17
WR Corridor	5
Electrical Closet	4
Electrical Closet	4
Janitor Room	2
Corridor	60
Corridor	53
Corridor	79
Stair C	13
Stair B	27
Stair A	12
Total	**294**

Penthouse	
Name	**Area m2**
Vestibule	4
Penthouse West	471
Elevator Machine Room	6
Vestibule	7
Penthouse East	202
Vestibule Room	27
Stair B	11
Stair A	12
Total	**740**
Building Total	**2788.00**

All of the building's assignable and non-assignable areas are accommodated within the recommended building gross up factor of 1.54 times the net assignable area (nasm) outlined in the space program.

Each of the rooms identified in the space program has been described in detail in the Room Data Sheets. However, most of the non-assignable areas typically are not described with Room Data Sheets, and instead rely on best design and engineering practices, and UTM's design standards and specifications. In addition to the list above, the following non-assignable areas include:

Ground Floor:

1. Building entry facility (BEF) for domestic water & gas. Heating and Cooling handled as a standalone system (Not connected to the central system); as well, this mechanical room will accommodate the equipment associated the system above, fire suppression system, compressors & booster pumps (if required), and flow/consumption meters.

2. Building entry facility (BEF) for line voltage & emergency/back up electrical power; this main electrical room will accommodate the main electrical panel, consumption meter & emergency power switchgear.

3. Building entry facility (BEF) for telecommunications to accommodate voice and data lines.

Each Assignable Floor:

1. Elevators – number and location will depend on the design developed. Typical passenger elevators installed elsewhere at UTM are electric gearless traction elevators with one large enough to accommodate systems furniture, furniture, equipment, etc. The larger elevator must serve all floor levels including the mechanical penthouse.

2. Stairs – number and location will depend on the design developed and O.B.C; one set of stairs will need to extend to the mechanical penthouse.

3. Electrical rooms are to be provided as per efficient building distribution.

4. Security closet(s) per efficient building distribution.

5. Telecommunications closet(s) with boards (for voice) and racks (for data, security & AV systems) in each are to be suitably located for proper coverage on each floor. These rooms will be stacked on top of each other. Wireless access points (WAPs) will be provided throughout the building to ensure the coverage specified in I&ITS' standards. Note: the dimensional size of the building may require more than one stack of communications rooms.

6. Each floor to have caretaking closet that will allow for efficient storage of small amount of supplies plus floor designated cleaning equipment. Additional space might be required on the lower level to accommodate building wide storage and larger ride-on equipment. These closets should be near washrooms.

7. Washrooms are integral part of the residence design and have their own designated Room Data Sheets. As with custodial closets, washrooms are stacked on top of each other.

Mechanical Penthouse:

1. Primary function of this area is to accommodate the building's air handling equipment but will likely accommodate other mechanical equipment, such as, a workstation for the Building Automation System (BAS).

2. Elevator machine rooms may need to be provided as separate rooms within the penthouse for related equipment and/or controls.

Other considerations for building design that are not typically or may not be shown in Room Data Sheets or UTM design standards:

1. All custodial, campus services & waste management equipment, safety & security systems (including emergency phones, CCTV cameras & intrusion alarms, public address, card access, and Medeco hard key hardware), audio-visual equipment & infrastructure (instructional & digital wayfinding/information), IT systems equipment & infrastructure, and building, room & wayfinding signage will be included in the main construction contract.

2. All building entrances and roof areas will be supplied with outside hose bibs (non-freeze wall hydrants) & GFI electrical outlets; additional hydrants & GFI outlets will be needed to be provided along grade level building elevation & roof areas (especially green roofs). All main entrances will also have power-operated doors.

3. Each stair landing will need to be supplied with standard, wall electrical outlets for housekeeping & maintenance purposes; also, standards outlets will need to be provided along all corridors & public areas.

4. Standard water fountain/bottle filling stations will need to be provided on all floors of the building; no less than two stations on each of the lower three floors, and at least one station on each of the upper three floors.

e) Site Considerations

Site context

Located at 3387 Residence Road, the New Student Residence building lies within the Campus Southwest (CSW) precinct, fronting onto Residence Road between the northern and central access points to the UTM campus. The precinct currently contains low-rise townhouse units, low and mid-rise campus housing buildings, and surface parking lots. A mature tree buffer exists along Mississauga Road, and the precinct increases in topography towards the north end of Outer Circle Road.

The New Student Residence building is bounded by the existing Oscar Peterson Hall, a six-storey traditional style dormitory, to the southeast, Schreiberwood Townhouse Complexes E and F to the northwest and southwest, respectively, and a vegetated area to the northeast.

Several factors shape the building's siting, massing and layout, including the following:

- efficiency of stacking and massing
- scale and setback relative to other buildings including adjacent neighborhood
- preservation of trees and natural open space including wetland area
- critical adjacencies to, and separation from, other buildings and program areas
- desire for natural light and views to the outside

- appropriate ceiling heights and volumes
- clustering of space according to hours of operation and desire to create social hub
- need for security
- direct access to outside at the ground level
- proximity of service entrance to existing OPH loading area
- maintenance of through-connections on the site for pedestrians, cyclists, and UTM service vehicles
- minimized disruption of below-grade infrastructure
- preservation of adjacent lands for future development including potential realignment of Residence Road.

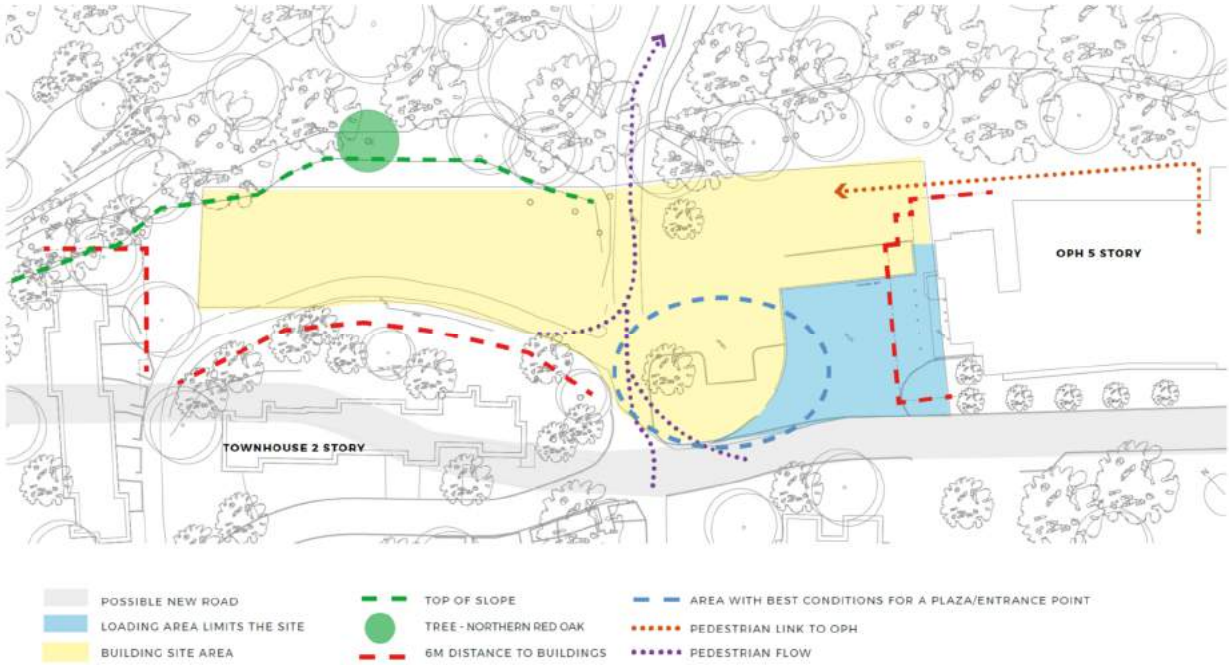


Figure 2.1 Context Plan (Christensen & Co/ Montgomery Sisam)

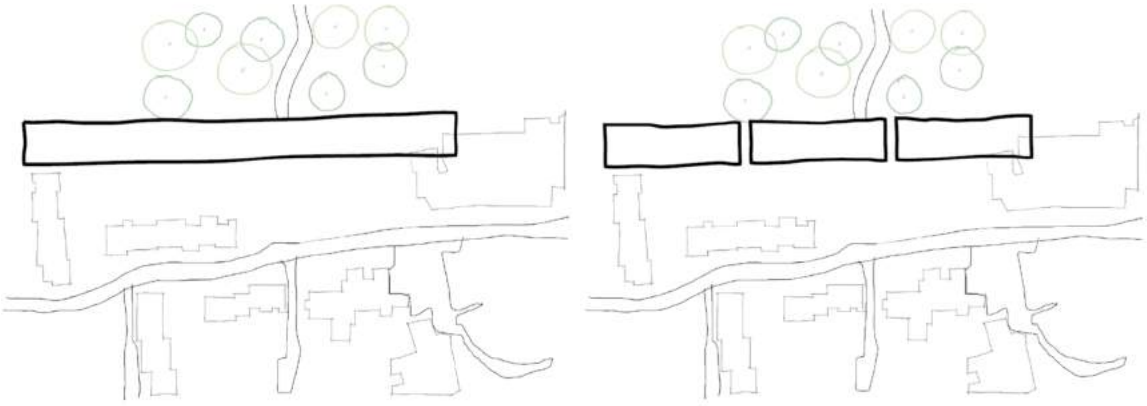


Figure 2.2 Massing Evolution (Christensen & Co/ Montgomery Sisam)

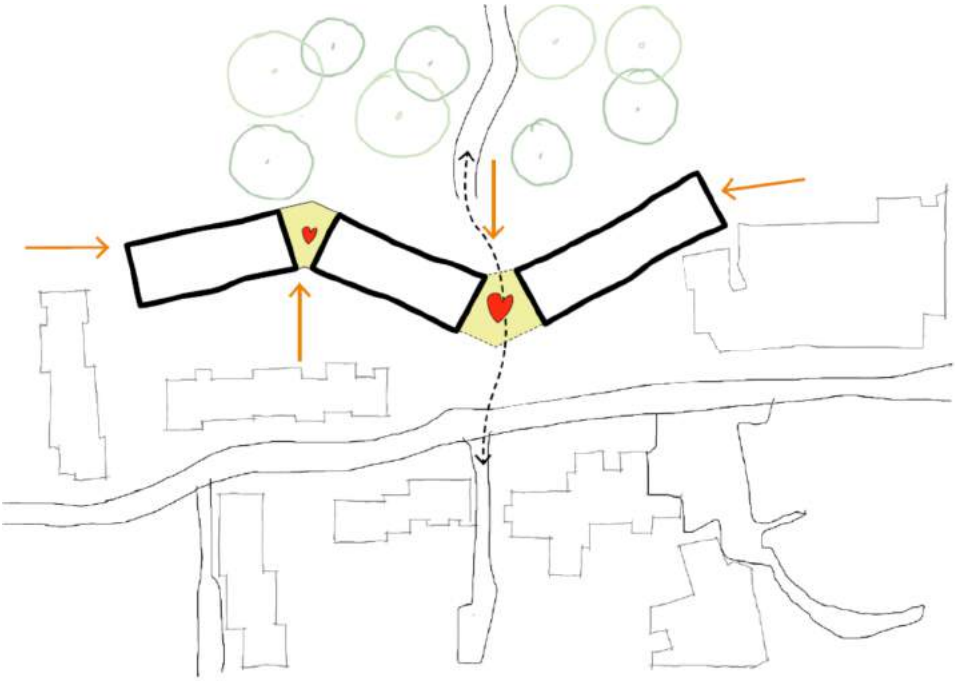


Figure 2.3 Site Opportunities (Christensen & Co/ Montgomery Sisam)

Figure 2.4 Site Concept Plan (Christensen & Co/ Montgomery Sisam)

The proposed landscape ensures accessibility and safety, and natural features are respected and enhanced. The existing pathway through the ravine will be maintained as a main source of connection for pedestrians and service vehicles to and from the Campus Core, while the primary vehicular access will remain on Residence Road. A lay-by near the main entrance has been incorporated as part of the project to provide a pick-up and drop-off area for students, as well as a space for short-term use by service vehicles. Residence Road will continue to remain a fire route throughout and post-construction.

The new building site includes the existing Parking Lot P6 adjacent to Oscar Peterson Hall (OPH) as well as one row of Shreiberwood residences (townhouse complex G). The relocation of parking spaces will be determined at a future date, outside of the scope of this project. Two of the existing accessible spaces will be relocated south of Residence Road in front of Roy Ivor Hall. Any new spaces required by the new building will be relocated to a future campus parking location. The new building will use the existing loading and garbage area adjacent to OPH for required services, and should not impede on the existing area.

The existing Schreiberwood Residence building that will be demolished consists of a two-storey wood-stud townhouse with exterior brick cladding. As noted in the Hazardous Waste Disposal section of this report, these existing structures contain asbestos as per the reports found in the appendix.

Figure 2.5 North Section; Grade evolution (Christensen & Co/ Montgomery Sisam)

The proposed building is situated along the edge of the ravine, creating a new gateway into the Campus Southwest precinct, where most of the housing resides at the UTM campus. The existing pathways, especially through the ravine, will be maintained in order to provide a seamless transition into this area of the campus. Pathways around the proposed site which provide access to the existing residences will also remain until future development in line with the 2021 UTM Campus Master Plan is implemented.

Master Plan

In 2020, the University retained Brook McIlroy (BMI) to prepare an updated master plan, a long-term (10-15 year) vision for the campus. The Master Plan addresses current needs and accommodates anticipated future needs, including academic, university housing and other ancillary uses. The new UTM MP has validated campus planning principles; identified strategic development sites; developed design guidelines to ensure flexibility for the University to adapt to evolving needs and parameters, while ensuring an overarching vision and cohesive campus over time. The new Master Plan is a resource to help guide capital projects and phasing decisions.

The proposed massing studies included in this report are consistent with the studies of this site by BMI as illustrated in *Figure 2.6 Master Plan analysis with New Residence with road realignment.*

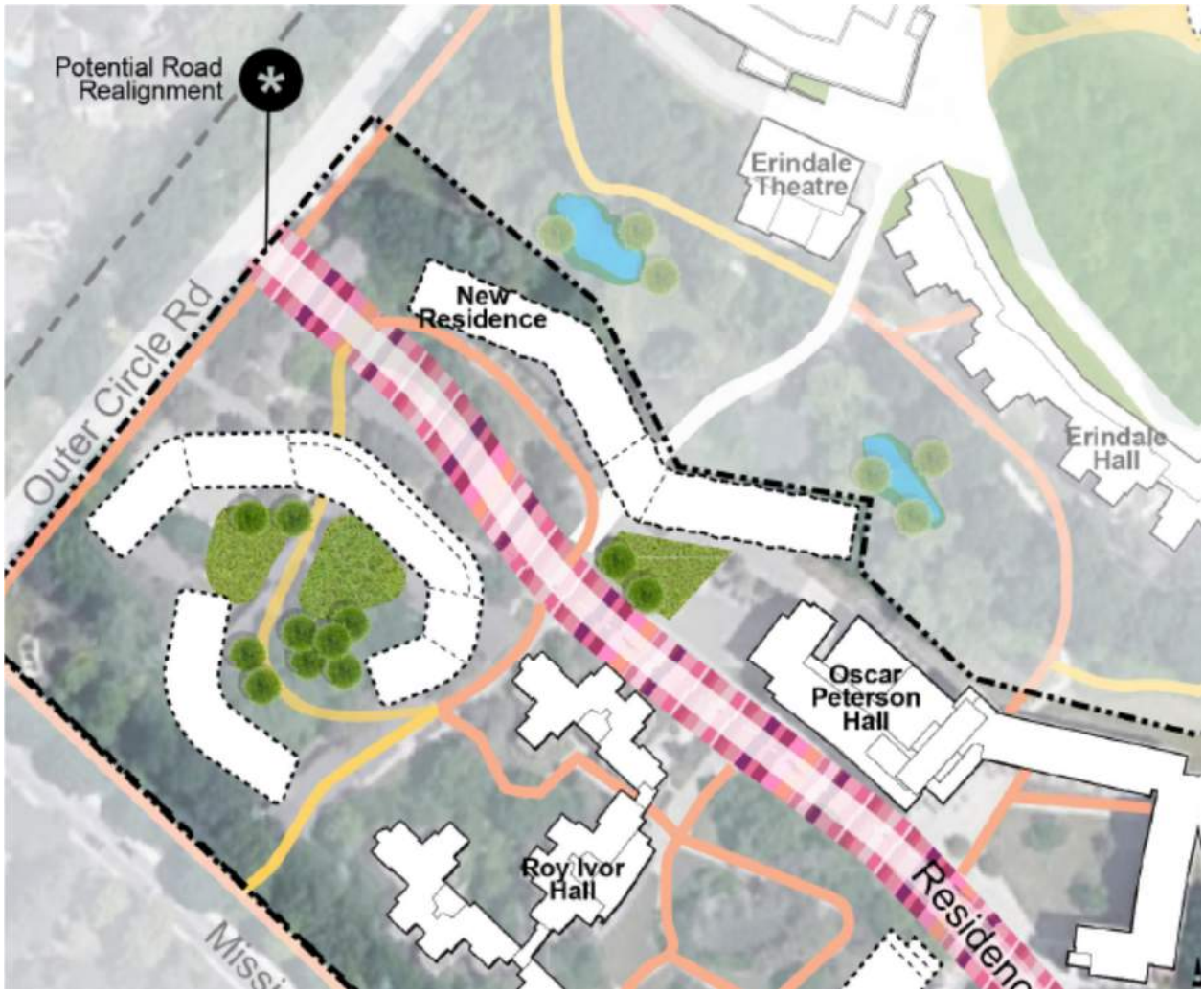


Figure 2.6 Master Plan analysis with New Residence with road realignment

This recent Master plan has included an approach to development for current low-rise student residence building sites along Mississauga Road. The updated Master Plan brings forward an overall framework that sets the stage for UTM to continue to grow and evolve in a way that positively contributes to the character of the area.

As detailed in the new Master Plan, proposed development on campus must continue to consider scale within the surrounding context; accentuate the natural setting of the campus; invite broader thinking about

the campus as an integral part of the environment and the city; improve the cohesiveness of buildings and open spaces within the campus setting; expand pedestrian links within and at the periphery of campus; carefully consider vehicular routes and transit locations; provide amenities for and support a variety of formal and informal outdoor activities and public art initiatives that enliven the campus experience; improve accessibility around the campus through consistent signage and wayfinding elements; removal of physical barriers, and improved safety. Definition of future open space, development parcels, road realignment and the introduction of ancillary uses on campus including a future transit hub will be pivotal in the evolution of the campus.

Zoning Regulations

The Mississauga City Council passed the Mississauga Zoning By-Law 0255-2007 on June 20, 2007 which regulates the use of land, buildings and structures, and implements the Mississauga Official Plan (2011). The By-law has designated three zones within the UTM property including: Institutional (I-5), Greenbelt – Natural Hazard (G1), and Parkway Belt – Passive Recreation Use or Conservation Use (PB1). Note: The By-law does not include height-restrictions on the campus.

This project's boundaries are included in the I-5 zoning, a classification that permits most uses related to the operation of a university.

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 toward adjacent residential areas, and also in the context of Mississauga Road Scenic Route policies.

The project has submitted a Site Plan Application with the City of Mississauga and is currently under review. Currently, no zoning variances have been identified for this project.

Environmental Considerations, Natural Heritage Features

Environmental stewardship continues to be a high priority, given the campus' naturalized context and the institution's emphasis on environmental sciences, sustainability, biodiversity, and climate in programs such as geography, chemical and physical sciences, and management.

One of the main regulating bodies affecting development on campus is the Credit Valley Conservation Authority (CVC). The CVC and Peel Region regulation and legislation boundaries surround the developed campus on all sides; each having specific implications on future growth not just within the boundaries, but in some cases, include setback requirements as well. According to Dougan & Associates, subconsultants for the campus 2021 Master Plan, alterations within 120m of the wetland area adjacent to the proposed site are subject to a permit issued by the CVC. Permits are obtained on the basis of consistency with CVC regulation and overall ecological/hydrological benefit.

Dougan & Associates classified the wetland area as:

> *…a Meadow Marsh community, dominated by Reed Canary Grass which is a common, native grass species that often forms monocultures in open marshy areas. [They] did not note any rare plants or wildlife while in this area, although it is a bit early in the spring to complete a detailed botanical inventory. [They] also completed a frog survey at this*

location and did not hear any individuals calling, although we did observe several American Toads nearby on Outer Circle Road…

The wetland itself did not appear to be of very high quality and is supported by drainage infrastructure… However, it should be noted that from an eco-hydrology perspective, maintaining drainage & water balance through this area will be important if the wetland is impacted as there were more diverse, high functioning forest communities to the southeast which seemed to have adapted to the wetter conditions.

While environmental regulations pose unique challenges, at UTM those limitations are viewed as opportunities to plan more intelligently, creatively, and in a sensitive manner to preclude interventions that would be detrimental to the ecosystems of interest. Carefully considered development can also seek to make connections with the surrounding natural areas, thus ensuring the natural assets are appreciated and accessible to the campus community.

The proposed development site for the proposed residence building is zoned by the City of Mississauga as Institutional (I-5) and is located outside of the Environmentally Significant Areas (ESA) and outside the boundaries of the Area of Natural and Scientific Interest (ANSI).

However, the site is adjacent to and encroaching on the ecological no-build zone, the proposed design needs to be environmentally sensitive.

Figure 2.7 Map showing regulation of environmental features and Dot indicating Proposed Site

A tree inventory was conducted and an arborist report has been prepared to address the current condition of all trees with a diameter at breast height (DBH) measuring equal to and greater than 10cm located within the area of work and up to 6m of the adjacent lands. A tree preservation plan identifying trees to be removed and preserved/protected was included in the report, as well as general recommendations for compensation, fertilization, irrigation, monitoring, pruning, root zone aeration, transplant, tree preservation, and tree removal.

The tree inventory included 71 trees, comprising both urban landscape and naturally occurring individuals. Six trees were assessed as hazardous, of which four have been recommended for immediate removal, and two have been recommended for immediate pruning, due to their hazardous condition in relation to the existing conditions. No Species at Risk trees were encountered in the inventoried area. A total of 27 trees measuring equal to or greater than 15 cm are recommended for removal, of which 23 are located in or near the proposed limit of disturbance. In accordance with municipal requirements, 46 compensation trees are required to offset the tree loss. Furthermore, an additional 394 trees are required for the replacement of trees disturbed, which will be planted in areas located at the northern extent of the UTM Campus property in an area situated in low-lying cultural woodland ecosites divided by tributaries and drainage features of the Credit River.

All of the trees recommended for preservation are to be protected during the undertaking of the proposed development, while one of the inventoried trees is recommended for transplant.

A topographical survey was undertaken during Fall 2019 and updated in the spring of 2023.

Building Site Specific Heritage & Archeological Assessments

The site is located within the University of Toronto Mississauga in which in its entirety is designated a cultural landscape as per the City of Mississauga's Cultural Landscape Inventory. The inventory states "this site is recognized as a unique cultural landscape within the City of Mississauga and one which is expected to demonstrate leadership balancing development requirements with the protection and enhancement of the natural environment."

A final Heritage Impact Statement was prepared on August 18, 2023, which concluded that the existing Schreiberwood Townhouse Complex G is not worthy of heritage designation in accordance with the heritage designation criteria per Regulation 9/06, Ontario Heritage Act. The New Student Residence will be an attractive addition to the UTM Campus, meets the intent of the Mississauga Road Scenic Route Cultural Landscape and the UTM Cultural Landscape, and will have no detrimental effect on the heritage character of the campus.

Landscape and Open Space Requirements

The natural environment is intrinsic to the UTM campus identity. Conservation of important existing open space networks and a vision for future open space opportunities continues to be pivotal in shaping proposed future development and campus evolution. This proposed residence considers scale within the surrounding context (natural, institutional, and the adjacent suburban residential neighbourhood) and invites broader thinking about the campus as an integral part of the environment and the city.

The proposed plaza including the outdoor seating, new vegetation, and new lighting design fulfill UTM's goals and set a benchmark for future development on the university campus.

Soil Condition

A Geotechnical Investigation and Engineering Design Report was prepared by Terraprobe Inc, following a geotechnical investigation conducted in September 2021. The report encompasses the results of the investigation done for the proposed development to determine the prevailing subsurface soil and ground water conditions, and provides geotechnical engineering design recommendations for the foundations, earth pressure and seismic design parameters, slab on grade and pavements:

- The relative weak overburden soil is not suitable to support the foundations, and the foundations must be extended to be founded on the partially weathered shale bedrock or sound, unweathered shale bedrock if a high bearing pressure is required. Given the bedrock is about 4.6 m to 8.2 m depth below the existing grade, the new building is supported by caisson foundations bearing in the bedrock
- The underside of footing/grade beam/pile cap elevations must be designed to provide a minimum of 1.2 m of soil cover or equivalent insulation to the foundation subgrade for frost protection considerations in unheated areas
- The earth fill materials may remain to support the slab-on-grade provided they are approved by the geotechnical engineer at the time of construction

Terraprobe Inc. also prepared a Hydrogeological Assessment following ground water level monitoring conducted in October to November of 2021, with the following findings:

- Underlying shallow fill deposits or weathered soil, native soil deposits consist of sandy silt to silty sand and silt and glacial till (clayey silt till) overlying bedrock (Georgian Bay Formation – weathered shale with intermittent limestone) to borehold termination depths of investigation at elevation 120.3 ± m above sea level (masl)
- The water table for design purposes should be considered at elevation 128.4 ± masl (this is the highest shallow groundwater level observed)
- A slab-on-grade building is proposed for the development with a Finished Floor Elevation (FFE) of 125.8 ± masl. The base of the grade beam for caisson foundation is considered 1.7m below the FFE (126.8 masl) including 500 mm of granular base. The proposed grade beam does not require a drained subgrade, thus, a discharge plan for long-term foundation drainage is not required for the post-development structure
- Short-term dewatering requirements for construction must include a dewatering system designed to take into account removal of rainfall from the excavation. Anticipated precipitation should be collected from the excavation trench that will be developed for construction of the proposed grade beams for caisson foundations

Noise and Vibration Restrictions

Construction activities are a major sources of dust, dirt, noise and vibration. Although UTM's campus community has demonstrated significant tolerance to these inconveniences during normal hours of campus operations, the Construction Manager and its trades must still provide sufficient notifications in advance for any activities that may be potentially disruptive or bothersome to the campus and surrounding communities. Disruptions and annoyances are especially important to avoid during examination periods and after hours.

Campus-wide and user-specific notifications will need to be sent out in a timely fashion, and UTM requires a moving two-week look ahead construction schedule with noise/vibration/dust ratings.

Fibre Connectivity

This construction will have significant input on fiber connectivity for existing buildings in the area.

- The townhouse block proposed for demolition is “upstream” of the adjacent block, and connectivity will be disrupted if that block is removed.

- The shallow trenching and unknown location of fiber in and around Schreiberwood poses a risk of construction, staging, or even site deliveries and access vehicles crushing existing fiber, and taking out service to parts or all of Schreiberwood.

- Existing fiber transition point (around southwest corner of lot 6 but not exactly) that feeds all of Schreiberwood may or may not be within the demolition or staging area, demolishing or accidentally disrupting this would disrupt service to all of Schreiberwood.

See Appendix B (Data) - Local Fiber Considerations for more information.

This location is a critical component of our fiber masterplan to complete southwest section of campus loop:

- Fibre would need to be brought in from DH through Theatre access road into the new residence building to a larger demarc room, which will serve as router/distribution point for all residence (and other structures in this part of campus, should that arise). The path would need to pass-through to south side of building and out to new consolidation point via conduiting.

- On the other side of the loop, consolidation points linked by conduit (one south of Schreiberwood, one north of Leacock, running back to the flagpole via existing conduit) would need to be installed, then connected.
- Exact location of current conduiting should be available, please consult as-builts from Meeting Place project.

- This may be the most reliable way to provide fiber connectivity in advance – do this work prior, install the consolidation points including one south of the new residence building that is outside of the staging/construction area, and not likely to be damaged. The building could be commissioned from this side, then the project would only need to provide pass-through, and a path back to Deerfield (this could also be done in advance!)

See Appendix A (Data) - Campus Fibre Map for more information.

f) Site Access

Pedestrian and vehicular routes, parking, and service areas are essential to the function of the campus, and must be carefully designed to minimize negative impacts on the campus experience. The following guidelines provide direction on how to support these essential functions while maintaining a high-quality public realm:

<u>Main Entry and Pedestrian Routes</u>

The proposed main entrance to the Residence Building will be off Residence Road. The entrance is located under the open passage space which provides access to the student event space along the north set of doors, while the south set of doors provide access to the main lobby.

The existing pedestrian network in the area of the project relies heavily on the paved pedestrian path that connects Parking Lot #6/OPH with Deerfield Hall/Erindale Theatre/Erindale Hall. It is essential that this path, potentially reconfigured as part of the project, is reopened once the project is completed.

Figure 3.0, Site Access and Main Entry. (Christensen & Co/ Montgomery Sisam)

Vehicular Access

Fire access and frequent deliveries have been considered and are integrated into the urban plaza space off the existing Residence Road. The project also utilizes and maintains the existing loading area.

The new Master Plan of the campus considers the realignment of Residence Road to improve intercampus vehicular movement. While this realignment will not be part of this project, it has been considered and designed for the future alignment.

Servicing and Fire Access

The RPHIX does not require a loading dock, but an easy access to a Storage/Garbage Room with exterior door (overhead door), similar to Erindale Hall Building, for the purpose of moving-in/out and through UTM Campus items. The storage room requires exterior loading unloading doors.

OPH front desk will have to be expanded (renovated) to accommodate other deliveries for the RPHIX such as mail. This expansion is not part of the RPHIX project.

Fire access for the New Residence Building has been considered carefully in the design process, especially given that the site is densely used by other residential buildings, and facilities (Parking Lot # 6 & OPH Loading Dock)

Hazardous Waste Disposal

In 2016, the University engaged Golder Associates to examine and provide an Asbestos Inventory Report for the Schreiberwood Residences. Subsequent annual re-assessments were done in 2017, 2018, 2019, 2022, and most recently in 2023. These reports, which are included in the appendix, all indicate the presence of asbestos in all the Schreiberwood Townhouse complexes.

An Environmental Consultant is currently being retained to conduct intrusive sampling as well as to provide a Designated Substances Survey Report (DSSR) and Hazardous Building Materials Removal Specifications, in order to support the collection, disposal, and removal of hazardous waste safely, efficiently, and in compliance with the University's environmental health and safety guidelines.

g) Campus Infrastructure Considerations

Utilities (district energy system, gas, electrical service, emergency power, water)

UTM's campus is effectively serviced by a central utilities system with most of its services centered in the Central Utilities Plant (CUP) and distributed to the campus' central building by a service tunnel. The campus' infrastructure and building systems are continually being upgraded. At the present time, CUP1 will initially serve the RPHIX Bldg until CUP2 (F2 Bldg.) is ready to serve the RPHIX Building.

District Energy System (Heating and Cooling)

There is sufficient floor space within the Central Utilities Plant to accommodate the proposed new boilers and chillers. The 1000 Tons of Cooling is planned to be added at CUP1 and will come online at the end of 2025. There is sufficient heating capacity to temporarily feed the NRB until the final connection to the new CUP2.

UTM has completed the replacement of the original cooling tower with a new state-of-the-art modular installation, and to upgrade the internal circulation within the CUP to meet the existing needs of the UTM campus. As well, the Maanjiwe nendamowinan Building installed a new 1000-ton (two stage) chiller to meet the DES needs of that building. This new chiller has been placed beside the two existing 1000-ton chiller. Even with these additions and upgrades, there is likely insufficient capacity to meet the incremental needs of the RPHIX Building (and any other growth in that sector).

Gas Service

There will be no natural gas distribution to the new residence building. However, the Construction Manager is considering propane set up for temporary heating while the building is under construction.
Electrical Service

The electrical service will be derived by modifications to the current loop serving the residence on opening day. Once the F2 Building is completed, electrical service will be provided from the CUP2.

Emergency and Back-up Power

Currently, UTM has two central diesel-powered generators in the CUP1 with a total output of 1.5 MW. By December 2025, UTM will be adding an additional 750KW generator to the current 1.5MW. RPHIX will get emergency power from CUP2 which has generators once ready. On day 1 there will be no emergency power to this building.

The New Science Building currently under construction is equipped with a new generator that is installed in a location adjacent to the Science Building. The New Residence Building will not use a new generator. Refer to the Electrical Section for more information.

Domestic Water

A 150-mm-diameter watermain originating on Outer Circle Road enters the site from the west at the intersection with Residence Road. The watermain becomes a 200-mm-diameter watermain at the entrance to Parking Lot P6 and proceeds east, aligned just south of Residence Road. From these watermains, both domestic demand and fire protection is provided to all the existing residence buildings in the vicinity of the site with, the exception of Oscar Peterson Hall, which is serviced from a second 200-mm-diameter watermain off a tee, which follows the existing pedestrian path north to Erindale Studio Theatre. The new residence building will be serviced via a realigned 200-mm-diameter watermain running through the building's walkway opening. The proposed water service will generally follow the alignment of the northeast side of the building along the wooded area before connecting at the northwest face of the building. The water service for Oscar Peterson Hall will be diverted around the proposed residence building before reconnecting at each respective meter location. A Servicing and Stormwater Management Report prepared by WalterFedy in April 2022 confirms that the existing water networks within the UTM campus can provide adequate domestic and fire protection to the building.

Sanitary Lines:

An existing 300-mm-diameter sanitary sewer is located beneath Residence Road, servicing all the surrounding buildings in addition to the residences within the Schreiberwood complex. The sewer drains towards the southeast connecting with the remainder of the campus' sanitary sewer network along Outer Circle Road, and eventually leaves the University's land on the east side of the campus. The existing sanity service for Schreiberwood Townhouse Complex G will be removed back to the 300-mm-diameter mainline sanitary sewer in Residence Road. The proposed sanitary service will run beneath the existing asphalt roadway and outlet to the existing sanitary mainline within Residence Road.

Stormwater Pond

The campus has been identified as having a high-water table, estimated between 1-3 metres below the surface at any given point. The UTM campus is serviced by a stormwater pond (adjacent to the P4 Parking Lot area). Constructed in 2008, the Stormwater Pond's capacity was designed to accommodate the expected campus growth through to the full build out as was published in the Master Plan (circa 2000). The proposed development project conforms with the Master Drainage Plan developed for the University of Toronto Mississauga. This plan was approved by the City of Mississauga and the Credit Valley Conservation Authority. The UTM Pond, constructed in accordance with the Master Drainage Plan, was designed to accommodate a full build out of the UTM campus to an overall imperviousness of 40% for the 54.2 ha catchment draining to the facility. Various building expansions and planned redevelopment was accounted for when determining the ultimate overall imperviousness in the Master Drainage Plan for this facility.

The proposed new student residence is comprised of approximately 0.38 ha of impervious area, resulting in an increase of 825 sqm of impervious area. It is noted that the scope of work also includes changes to the existing servicing infrastructure in the vicinity of the proposed building. However, these works are not anticipated to increase the area of imperviousness. A Servicing and Stormwater Management Report prepared by WalterFedy in April 2022 has concluded that the existing stormwater management facilities and infrastructure are adequately sized to accommodate this development.

Vehicular Parking

Though founded as a suburban, automobile-oriented campus, the University of Toronto Mississauga has evolved to become a more urban and accessible campus. With the integration of public transit, the growing popularity of ride-sharing, and autonomous vehicle technology on the horizon, a major shift in travel patterns is occurring and will continue to grow at UTM. This shift will support the continued decrease in parking demand. However, over the long term, the campus will continue to rely on a large supply of parking, which will increasingly be provided in parking structures (above or below-grade) rather than surface parking lots.

A portion of the proposed development lies on top of the existing P6 Surface Parking Lot, which will be demolished in full to accommodate the new student residence building. This impacts 21 parking spaces, including two barrier-free spots. The two accessible parking spots will be relocated on Residence Road within the vicinity of Roy Ivor and Oscar Peterson Halls. No other parking is planned for this development. Since the entire UTM Campus is treated as one deed of property and parking is calculated for the entire campus, the proposed development will reduce the total number of surplus parking spots by 19. Visitor, short-term, and other accessible parking will need to be accessed in other lots located

throughout the campus. The project will, however, incorporate a layby area for drop-off, food delivery (such as DoorDash and Uber), as well as student move in/out. This is also in response to current challenges faced by OPH to manage food and package delivery to the residence complex.

Bicycle parking

The City of Mississauga has developed a Transportation Demand Management (TDM) Strategy and Implementation Plan that emphasizes the importance of TDM for an urbanizing city. It recommends actions for decreasing vehicle use by increasing the attractiveness of sustainable modes of transportation such as cycling. The city amended its Zoning Bylaw 0225-2007 on January 31, 2023, requiring residential developments with more than 20 dwelling units as well as non-residential uses with more than 1,000 sqm to provide both indoor bicycle parking spaces in an enclosed area with controlled access (Class A) and outdoor bicycle parking spaces in a publicly accessible location (Class B).

Although the City has not requested the project to provide any Class A bicycle parking spaces, the proposed development includes 8 Class B bicycle parking spaces located in proximity to the building's main entrance and in a highly visible area, which benefits from the building's security features.

h) Secondary Effects

- Demolition of existing structures

The Student Housing & Residence Life is carefully managing the operation of existing buildings. The Schreiberwood residences are the oldest requiring the most improvements and renovations. Demolition of Complex G as well as the P6 Parking Lot are required in order to make room for the new proposed student residence, and follows long-term planning and asset management strategies. 36 existing beds will be removed as a result of demolishing Complex G, while reducing the impact on financial flow of Residence Operation.

- Staging requirements

The project will need to account for staging and changes in the Food Services area to accommodate addition of storage spaces allowing to provide food for additional 400 students.

- Impact on other buildings or projects in the sector (noise, access etc.)

  The area of this project is adjacent to UTM residence complexes and relatively close the private non-UTM residences. It will be imperative to control noise and light pollution and comply with various city regulations.

- Parking loss

UTM has carefully analyzed its parking inventory. Parking in P6 if affected will not be replaced as part of this project understanding site restrictions. Note: a large underground parking garage is planned in the new F2 building that is currently in design.

The project must maintain 2 existing Barrier-Free parking spots in the area.

- Impact on Infrastructure Underground Services

During construction, trucks and heavy vehicle movements will affect the Infrastructure Underground Services due to these services are buried close to road surface. The rerouting of the service road will also require services to be investigated and relocated.

- Fire Route

The fire route that serves the Schreiberwood complex needs to be maintained as per Mississauga Fire Department Standards, during and after construction.

i) Schedule

Please refer to the open cover letter for further schedule details.

IV. Resource Implications

a) Total Project Cost Estimate

The total estimated cost for the project includes but not limited to estimates or allowances for:

- construction costs (assuming a lump sum type of tender to qualified general contractors in the month of (date)
- contingencies
- taxes
- hazardous waste removal

    decommission of hazardous substances

    disposal costs for hazardous materials

    release of area (hazardous materials) for unrestricted re-use

- site service relocates (specify)
- infrastructure upgrades in the sector (specify)
- secondary effects
- demolition
- landscaping
- permits and insurance
- Professional fees, architect, engineer, misc consultants (ie. LEED etc.), project management.
- computer and telephone terminations

- furniture and equipment
- miscellaneous costs [signage, security, other]
- commissioning
- donor recognition
- escalation
- Financing costs during design & construction

b) Operating Costs

Please refer to the in-camera cover letter for further details on operating cost estimates.

c) Funding Sources

Please refer to the cover letters for further details on funding sources.

I. Appendices

1) Housing Master Plan (on request)
2) Room Specification Sheets (on request)
3) Equipment/Furnishings schedules (on request)
4) Total Project Cost Estimate dated January 19, 2024
5) Background reports/studies
   a) 2019 Schrieberwood Asbestos Report
   b) 2017 Schrieberwood Asbestos Report
   c) Existing Site Data Fibre Map
   d) Local Fibre Considerations
6) University of Toronto Policy Statement of Energy Efficiency PPR New Project Charter
   a) Charter
   b) 100% CD Energy Report
   c) Energy Target Comparison

Appendices

Appendix 1
Housing Master Plan

(on request)

Appendix 2
Room Specification Sheets

(on request)

Appendix 3
Equipment/Furnishings Schedules

(on request)

Appendix 4
Total Project Cost Estimate

(dated January 19, 2024)

University Planning, Design & Construction

PROJECT MANAGER: **Ed Bush**

PROJECT NUMBER: **P300-20-009**

CAMPUS: **UTM**

TOTAL PROJECT COST (TPC)
For Overall Project

PROJECT NAME: **NEW RESIDENCE at UTM**

PROJECT DURATION: **27 Months**

Number	Item	Remarks	Base Cost	HST (3.41%)	Cost	Notes
CONSTRUCTION						
835730	Construction: Main Contract	See notes	93,713,780	3,195,640	96,909,420	A
835752	Construction: Other Contract	N/A	-	-	-	
835754	Secondary Effects	See notes	200,000	6,820	206,820	B
835757	Construction Contingency	See notes - calculated at 10% of Main Contract	9,371,378	319,564	9,690,942	C
835762	Hazardous Waste Removal	Included in Main Contract	-	-	-	
835765	Demolition Services	Included in Main Contract	-	-	-	
835768	Site Preparation	See notes	311,185	10,611	321,796	D
				Total Construction	***$107,128,978***	
LANDSCAPING						
835755	Landscaping Services	Included in Main Contract	-	-	-	
				Total Landscaping	***$0***	
PERMITS, INSURANCE						
835400	Licences / Permits	Building permit and any CVCA fees - SPA $125,000 - HST excluded	425,000	-	425,000	
836700	Insurance	Calculated at 1% of Main Contract	937,138	31,956	969,094	
				Total Permits, Insurance	***$1,394,094***	
PROFESSIONAL FEES						
835200	Consulting	See notes	4,777,940	162,928	4,940,868	E
835201	Consultants: Disbursements	See notes	363,943	12,410	376,353	F
835204	Construction Management Fees	Included in Main Contract	-	-	-	
835206	Other Consultants	See notes	714,338	24,359	738,697	G
835210	Legal Services	Legal fees between 10K and 1% of construction cost	100,000	3,410	103,410	
835720	D&E Subconsultant Fees	N/A	-	-	-	
835721	External Project Management Fees	Included In Project Management - Fees (GL 895725)	-	-	-	
895720	Design Fees: In House	N/A	-	-	-	
895721	Design: Disbursements	N/A	-	-	-	
835723	Project Disbursements	Allowance	25,000	853	25,853	
895725	Project Management: Fees	2.5% of hard costs - HST excluded	$2,703,534	-	2,703,534	
				Total Professional Fees	***$8,888,714***	
SERVICES TO SITE						
835700	Site Services and Infrastructure	Allowance	150,000	5,115	155,115	
				Total Site Services	***$155,115***	
COMPUTER WIRING AND TELEPHONES						
821110	Equipment: Computing: Purchase	IT backbone, routers, switches, WAP's.Cabling in Main Contract	500,000	17,050	517,050	
835010	Telephone Line Service		150,000	5,115	155,115	
				Total Computer Wiring & Telephones	***$672,165***	
MOVING AND STAGING						
837100	Moving	Allowance	50,000	1,705	51,705	
837101	Staging	Allowance	50,000	1,705	51,705	
				Total Moving and Staging	***$103,410***	
FURNISHINGS AND EQUIPMENT						
820010	Furniture: Purchase	Loose furniture for dorm rooms, common rooms, kitchenettes	3,000,000	102,300	3,102,300	
821010	Equipment: Purchase	N/A	-	-	-	
821510	Equipment: Audio / Visual: Purchase	Supply and programming of AV equipment. Cabling in main contract	350,000	11,935	361,935	
821610	Equipment: Research: Purchase	N/A	-	-	-	
				Total Furnishings and Equipment	***$3,464,235***	
OTHERS						
820011	Interior Signage	Door signage only in Main Contract	50,000	1,705	51,705	
821325	Security and Access Systems	Terminations, equipment and programming - cabling in Main Contract	160,000	5,456	165,456	
835070	Courier		5,000	171	5,171	
835756	Exterior Signage		75,000	2,558	77,558	
835764	Client Construction Expenses	N/A	-	-	-	
835766	Ceremonies	Groundbreaking and opening functions	10,000	341	10,341	
835900	Advertising / Marketing	N/A	-	-	-	
836430	Donor Recognition	N/A	-	-	-	
890670	Facilities & Services Internal	Trades Incl. Fire-Utilities-Consultant, shut downs	150,000	5,115	155,115	
				Total Others	***$465,345***	
				SUB TOTAL:	**$122,272,057**	
PROJECT CONTINGENCY						
835758	Project Contingency	Carried at 2.5%	3,056,801	-	3,056,801	
				Total Project Contingency	***$3,056,801***	
FINANCE COSTS						
835300	Interest Charges		461,125	-	461,125	
835305	Capital Projects Financing Charges		-	-	-	
					$461,125	

Reviewed by _____ Executive Director, Capital Projects Group, UPDC

TOTAL PROJECT COST: **$125,789,983**

Client Signature:

Date: 2024.01.19 16:55:50 -05'00'

Recommended by:

Approved by:

Dave Lehto

Digitally signed by Dave Lehto
Date: 2024.01.19 16:22:55 -05'00'

$2,703,534	**Project Management Fees**	**Date:**	**Date:**

University Planning, Design and Construction

PROJECT MANAGER: Ed Bush
PROJECT NUMBER: P300-20-009 **CAMPUS:** UTM
TOTAL PROJECT COST (TPC) NOTES **PROJECT NAME: NEW RESIDENCE at UTM** **PROJECT DURATION:** 27 Months

Note	GL	Item	Remarks		Base Cost	HST 3.41%	Cost
A	835730	**Construction: Main Contract**					
		Division 2-16 (Including allowance for target bid reductions)	Multiplex Budget January 15, 2024		$77,327,312	$2,636,861	$79,964,173
		General Conditions (RFP Definition)	CM Proposal - August 30, 2023		$1,742,084	$59,405	$1,801,489
		General Conditions - Additional	Multiplex Budget January 15, 2024		$3,564,771	$121,559	$3,686,330
		Payroll / Staffing Costs	CM Proposal - August 30, 2023		$3,620,543	$123,461	$3,744,004
		CM Fee	CM Proposal - August 30, 2023		$1,976,500	$67,399	$2,043,899
		Performance / Labour and Material Payment Bond	Multiplex Budget January 15, 2024		$565,355	$19,279	$584,634
		Sub-Contractor Default Insurance	Multiplex Budget January 15, 2024		$948,148	$32,332	$980,480
				Sub-Total	$89,744,713	$3,060,295	$92,805,008
		Phase 1 - Pre-Construction Services	CM Proposal - August 30, 2023		$649,067	$22,133	$671,200
		Early Works - General Expenses	Included		$0	$0	$0
		Early Works - Payroll / Staffing Costs	Included		$0	$0	$0
		Underslab Drainage	Not part of IFT drawings and specifications		$150,000	$5,115	$155,115
		Monitoring Well Decommissioning	Not part of IFT drawings and specifications		$20,000	$682	$20,682
		Design Allowance	Included in 10% Contingency		$0	$0	$0
		HV Feeder Relocation (1500kVA Xfmr to Roy Ivor)	Allowance		$100,000	$3,410	$103,410
		HV Terminations	Allowance		$50,000	$1,705	$51,705
		Escalation	Sub-trade escalation included where applicable		$0	$0	$0
		Consumption - Water, Gas, Electricity	Excluded		$0	$0	$0
		Value Engineering Opportunities	Excluded		$0	$0	$0
		Permananent Connections to Future CUP2	Allowance		$3,000,000	$102,300	$3,102,300
		Main Contract Total:			**$93,713,780**	**$3,195,640**	**$96,909,420**
B	835754	**Secondary Effects**					
		Relocation of Compactor / Modifications - Oscar Peterson Hall	Allowance		$50,000	$1,705	$51,705
		New Accessible Parking Spaces	Allowance		$150,000	$5,115	$155,115
		Ecological Ofsetting Plan	Excluded - Described in Environmental Impact Study (EIS)		$0	$0	$0
		Secondary Effects Total			**$200,000**	**$6,820**	**$206,820**
C	835757	**Construction Contingency**					
		Construction Contingency - Post Contract	Estimated @ 10% of main contract		$9,371,378	$319,564	$9,690,942
		Construction Contingency Total			**$9,371,378**	**$319,564**	**$9,690,942**
D	835768	**Site Preparation**					
		New 1000kVA Transformer and Related Work	Alectra - UofT PO#30		$311,185	$10,611	$321,796
		Site Preparation Total			**$311,185**	**$10,611**	**$321,796**
E	835200	**Consulting**					
		Schematic Design Phase			$797,723	$27,202	$824,926
		Design Development Phase			$531,815	$18,135	$549,950
		Construction Document Phase			$1,329,539	$45,337	$1,374,876
		Bidding and Negotiating Phase	Part of Phase 2		$27,397	$934	$28,331
		Construction Phase	Part of Phase 2		$1,273,940	$43,441	$1,317,381
		Warranty Phase	Part of Phase 2		$68,491	$2,336	$70,827
				Sub-Total	$4,028,905	$137,386	$4,166,291
		Change Order 1	Cost Consulting Alternative Mechanical Systems		$3,500	$119	$3,619
		Change Order 2	Additional Fees for VE and Cost Analysis		$10,000	$341	$10,341
		Change Order 3	Feasibility Study for CUP1 Temporary Services		$15,000	$512	$15,512
		Change Order 4	Additional Fees Services for CUP2 Connection		$121,660	$4,149	$125,809
		Change Order 5	Wetland Landscape Redesign / Water Balance		$19,975	$681	$20,656
		Change Order 5	Penthouse Enclosure Design		$45,900	$1,565	$47,465
		Change Order 6	Authorization of Phase 2 - Included Above		$0	$0	$0
		Change Order X	Additional Cost Consulting - IFT Set & Reconciliation		$33,000	$1,125	$34,125
		Change Order X	Additional Services - CM Delivery Scope		$250,000	$8,525	$258,525
		Allowance for Additional Services			$250,000	$8,525	$258,525
		Consulting Total			**$4,777,940**	**$162,928**	**$4,940,868**
F	835201	**Consultant - Disbursements**					
		Disbursements	Upset Amount for Disbursements - Per Contract		$363,943	$12,410	$376,353
		Consultant - Disbursements Total			**$363,943**	**$12,410**	**$376,353**
G	835206	**Other Consultants**					
		Arborist - Sumac Environmental Consulting Ltd	Arborist Report per proposal January 26, 2022		$1,600	$55	$1,655
		EIS - Sumac Environmental Consulting Ltd.	EIS per proposal December 7, 2021		$8,510	$290	$8,800
		EIS - Sumac Environmental Consulting Ltd	POC-01 Additional Services - MECP / EIS		$2,860	$98	$2,958
		EIS - Sumac Environmental Consulting Ltd	Additional Services - EIS Update (Allowance)		$1,500	$51	$1,551
		Geotechnical & Environmental Consulting Services - Terraprobe	Geotechnical and Hydro-Geological Report		$36,300	$1,238	$37,538
		Geotechnical & Environmental Consulting Services - Terraprobe	POC-01 Additional Services		$600	$20	$620
		Geotechnical & Environmental Consulting Services - Terraprobe	POC-02 Additional Services - Dewatering Induced Settlement		$2,010	$69	$2,079
		Geotechnical & Environmental Consulting Services - Terraprobe	Additional Service Allowance		$15,000	$512	$15,512
		Cost Consulting - A.W. Hooker Associates Ltd	Cost Consulting per proposal August 27, 2021		$23,250	$793	$24,043
		Cost Consulting - A.W. Hooker Associates Ltd	POC-01 Additional Services		$32,000	$1,091	$33,091
		Cost Consulting - A.W. Hooker Associates Ltd	POC-01 Additional Services		$5,342	$182	$5,524
		Subsurface Utilities Engineering (SUE) - Multiview	Design Locates and Mobilization		$5,266	$180	$5,446
		Subsurface Utilities Engineering (SUE) - Multiview	Additional Service Allowance		$0	$0	$0
		Commissioning Consulting Services - WSP	Commissining Services per proposal October 20, 2022		$220,100	$7,505	$227,605
		Audio Visual Consultant			$10,000	$341	$10,341
		Signage Consultant			$25,000	$853	$25,853
		Testing & Inspection - 3rd Party			$150,000	$5,115	$155,115
		Surveyor			$25,000	$853	$25,853
		Allowance for Additional Services			$150,000	$5,115	$155,115
		Other Consultants Total:			**$714,338**	**$24,359**	**$738,697**

UNIVERSITY OF TORONTO

UNIVERSITY PLANNING, DESIGN & CONSTRUCTION
PROJECT MANAGEMENT

SUMMARY PROJECT BUDGET CHANGE – GC Stream

Project Name:	NEW RESIDENCE at UTM		
Project Number:	P300-20-009	**Date:**	19 January 2024
Original Budget:	$11,996,252	**Amount of Increase:**	$113,793,731
Revised Budget:	$125,789,983	**% Increase =**	
Additional Funding Source:		**Revised Occupancy Date:**	

REASON FOR REQUEST (see appendices for details of request):

☐ Client request ☐ Fire/other authority requirement ☐ Unforeseen site condition
☐ Coordination conflict ☐ Advance to next phase of design ☒ Full Project Approval

APPENDICES ATTACHED

Appendix A:	Scope Changes	Appendix D:	Revised TPC
Appendix B:	Variances	Appendix E:	Previous Approved Documents
Appendix C:	Original TPC		

Recommended by Project Manager

Name:	Ed Bushj	Title:	Project Manager
Signature:		Date:	19 January 2024

Approved:

Name:	Nagib Wassef	Title:	Executive Director, CPG
Signature:		Date:	19 January 2024

Department/Faculty Approval (Chair, Director or Dean):

Name:	Luke Barber	Title:	UTM CAO (Acting)
Signature:		Date:	19 January 2024
P.I. Name (Optional):		Title	
P.I. Signature (Optional):		Date:	

Complete below if Increase or Decrease is LESS THAN 10%

Approved:

Name:	Christine Burke	Title:	AVP, University Planning
Signature:		Date:	

Approved:

Name:	David Lehto	Title:	Chief, UPDC
Signature:		Date:	

Approved:

Name:	Scott Mabury	Title:	Vice-President, Operations and Real Estate Partnerships
Signature:		Date:	

UNIVERSITY OF TORONTO

UNIVERSITY PLANNING, DESIGN & CONSTRUCTION
PROJECT MANAGEMENT

REQUEST FOR APPROVAL OF PROJECT BUDGET CHANGE – GC Stream

APPENDIX A – DESCRIPTION OF CHANGES

Project Name:	NEW RESIDENCE at UTM		
Project Number:	P300-20-009	Date of Request:	19 January 2024

State: Date approved, amount and approving body; Current stage of project; Why increase/decrease is required and how related to the approved project scope.

At the November 30, 2018 meeting of the Capital Project and Space Allocation (CaPS) Executive Committee, the project was brought forward and Terms of Reference approved.

At the June 8, 2020, Capital Project and Space Allocation (CaPS) Executive Committee meeting, the project was brought forward, and a Request for Consultant Fees to the order of $4,857,237 was approved to retain Consultants for Schematic Design through to Construction Documentation.

At the February 23, 2023, Capital Project and Space Allocation (CaPS) Executive Committee meeting, the project was brought forward, and a Request for Additional Consultant Fees to the order of $3,851,190 (for a cumulative project total of $8,708,427) was approved to continue design services and initiate Construction Management Pre-Construction Services required to complete the Construction Documents through to the Tender Phase.

At the November 24, 2023, Capital Project and Space Allocation (CaPS) Executive Committee meeting, the project was brought forward, and the request for Early Works to the order of $3,287,825 (for a cumulative project total of $11,996,252) was approved to initiate demolition and site preparation for construction.

This request, as detailed in the attached documents, represents the increase for the anticipated costs related to the full costs of construction, completion of the design, contract administration, provisions of furnishings and equipment, contingencies and financing costs for the balance of the project.

UNIVERSITY OF TORONTO

UNIVERSITY PLANNING, DESIGN & CONSTRUCTION
PROJECT MANAGEMENT

REQUEST FOR APPROVAL OF PROJECT BUDGET CHANGE – GC Stream

APPENDIX B – VARIANCES

TPC Variance

Project Name:	NEW RESIDENCE at UTM		
Project Number:	P300-20-009	Date of Request:	19-Jan-24

General Ledger of Accounts	Original TPC	Revised TPC	Variance
835730: Construction: Main Contract	$ 3,287,825	$ 96,909,420	$ 93,621,595.00
835754: Secondary Effects	$ -	$ 206,820	$ 206,820.00
835757: Construction: Contingency	$ -	$ 9,690,942	$ 9,690,942.00
835768: Site Preparation	$ -	$ 321,796	$ 321,796.00
835400: Licences / Permits	$ 550,000	$ 425,000	$ (125,000.00)
836700: Insurance	$ -	$ 969,094	$ 969,094.00
835200: Consulting	$ 4,683,341	$ 4,940,868	$ 257,527.00
835201: Consultants - Disbursements	$ 428,058	$ 376,353	$ (51,705.00)
835204: Construction Management Fees	$ 1,654,560	$ -	$ (1,654,560.00)
835206: Other Consultants	$ 465,345	$ 738,697	$ 273,352.00
835210: Legal Services	$ -	$ 103,410	$ 103,410.00
835723: Project Disbursements	$ 5,171	$ 25,853	$ 20,682.00
895725: Project Management Fees	$ 659,034	$ 2,703,534	$ 2,044,500.00
835700: Site Services and Infrastructure	$ -	$ 155,115	$ 155,115.00
821110: Equipment: Computing Purchase	$ -	$ 517,050	$ 517,050.00
835010: Telephone Line Service	$ -	$ 155,115	$ 155,115.00
837100: Moving	$ -	$ 51,705	$ 51,705.00
837101: Staging	$ -	$ 51,705	$ 51,705.00
820010: Furniture: Purchase	$ -	$ 3,102,300	$ 3,102,300.00
821510: Equipment: Audio/Visual: Purchase	$ -	$ 361,935	$ 361,935.00
820011: Interior Signage	$ -	$ 51,705	$ 51,705.00
821325: Security and Access Systems	$ -	$ 165,456	$ 165,456.00
835070: Courier	$ 517	$ 5,171	$ 4,654.00
835756: Exterior Signage	$ -	$ 77,558	$ 77,558.00
835766: Ceremonies	$ -	$ 10,341	$ 10,341.00
890670: Facilities & Services Internal	$ 50,000	$ 155,115	$ 105,115.00
835758: Project Contingency	$ 212,401	$ 3,056,801	$ 2,844,400.00
835300: Interest Charges	$ -	$ 461,125	$ 461,125.00
Total	**$ 11,996,252**	**$ 125,789,984**	**$ 113,793,732**

Funding Source Variance

Source	Original Budget	Revised Budget	Variance
	$ 11,996,252	**$ 125,789,984**	**$ 113,793,732**

Appendix C - TPC Increase 2 (Original TPC)

University Planning
Design & Construction

NEW RESIDENCE at UTM
P300-20-009

PROJECT MANAGER: Ed Bush
CAMPUS: UTM

TOTAL PROJECT COST (TPC)

TPC VERSION: Early Works - TPC Increase #2

PROJECT DURATION: 30 Months

Number	Item	Remarks	Base Cost	HST (3.41%)	Cost	Notes
CONSTRUCTION						
835730	Construction: Main Contract	Early works scope	3,179,407	108,418	3,287,825	
835752	Construction: Other Contract	N/A	-	-	-	
835754	Secondary Effects	N/A	-	-	-	
835757	Construction Contingency	Carried at 10% of main contract - excluded from early works	-	-	-	
835762	Hazardous Waste Removal	Part of early works scope - part of townhouse demolition	-	-	-	
835765	Demolition Services	Part of early works scope	-	-	-	
835768	Site Preparation	Part of early works scope	-	-	-	
					$3,287,825	
LANDSCAPING						
835755	Landscaping Services	Included in main contract	-	-	-	
				Total Landscaping	***$0***	
PERMITS, INSURANCE						
835400	Licences / Permits	Development application - SPA, Tree Removals, Demolition and Building Permit	550,000		550,000	
836700	Insurance	Calculated at 1% of Main Contract		-	-	
				Total Permits, Insurance	***$550,000***	
PROFESSIONAL FEES						
835200	Consulting	Value adjusted to reflect revised contract amount.	4,528,905	154,436	4,683,341	
835201	Consultants: Disbursements	Value adjusted to reflect revised contract amount.	413,943	14,115	428,058	
835204	Construction Management Fees	Estimated amount for Pre-Construction Phase.	1,600,000	54,560	1,654,560	
835206	Other Consultants	Costing, Survey, Locates, Geotech, Arborist, Inspect/Test, and additional consultants including commissioning.	450,000	15,345	465,345	
835210	Legal Services	Legal fees between 10K and 1% of construction cost		-	-	
835720	D&E Subconsultant Fees	N/A	-	-	-	
835721	External Project Management Fees	N/A	-	-	-	
895720	Design Fees: In House	N/A	-	-	-	
895721	Design: Disbursements	N/A	-	-	-	
835723	Project Disbursements	Project Disbursements	5,000	171	5,171	
895725	Project Management: Fees	30% of the 2.25% of the anticipated final TPC at $105M.	$659,034		659,034	
				Total Professional Fees	***$7,895,509***	
SERVICES TO SITE						
835700	Site Services and Infrastructure			-	-	
				Total Site Services	***$0***	
COMPUTER WIRING AND TELEPHONES						
821110	Equipment: Computing: Purchase	IT backbone, routers, switches, WAP's, switchgear. Cabling in main contract		-	-	
835010	Telephone Line Service			-	-	
				Total Computer Wiring & Telephones	***$0***	
MOVING AND STAGING						
837100	Moving			-	-	
837101	Staging			-	-	
				Total Moving and Staging	***$0***	
FURNISHINGS AND EQUIPMENT						
820010	Furniture: Purchase	Loose furniture for dorm rooms, common rooms, kitchenettes		-	-	
821010	Equipment: Purchase	N/A	-	-	-	
821510	Equipment: Audio / Visual: Purchase	Supply and programming of AV equipment. Cabling in main contract		-	-	
821610	Equipment: Research: Purchase	N/A	-	-	-	
				Total Furnishings and Equipment	***$0***	
OTHERS						
820011	Interior Signage: Purchase / Design	Door signage only in main contract		-	-	
821325	Security and Access Systems	Terminations, equipment and programming. Cabling in main contract		-	-	
835070	Courier		500	17	517	
835756	Exterior Signage: Purchase / Design			-	-	
835764	Client Construction Expenses	N/A	-	-	-	
835766	Ceremonies	Groundbreaking and opening functions		-	-	
835900	Advertising / Marketing	N/A	-	-	-	
836430	Donor Recognition	N/A	-	-	-	
890670	Facilities & Services Internal	Trades Incl: Fire-Utilities-Consultant, shut downs	50,000		50,000	
				Total Others	***$50,517***	
				SUB TOTAL:	**$11,783,851**	
PROJECT CONTINGENCY						
835758	Project Contingency	Carried at 2.5%	212,401		212,401	
				Total Project Contingency	***$212,401***	
FINANCE COSTS						
835300	Interest Charges	N/A	-	-	-	
835305	Capital Projects Financing Charges	N/A	-	-	-	
					$0	
Reviewed by ___		Executive Director, Capital Projects Group, UPDC		**TOTAL PROJECT COST:**	**$11,996,252**	
Client Signature:		**Recommended by: Ed Bush** ED BUSH Digitally signed by ED BUSH Date: 2023.11.18 09:20:30 -05'00'		**Approved by:**		
$659,034	**Project Management Fees**	**Date: November 16, 2023**		**Date: 11/20/2023**		

Appendix D - Full TPC (Revised TPC)

University Planning, Design & Construction

PROJECT MANAGER: **Ed Bush**

PROJECT NUMBER: **P300-20-009**

CAMPUS: **UTM**

TOTAL PROJECT COST (TPC)
For Overall Project

PROJECT NAME: **NEW RESIDENCE at UTM**

PROJECT DURATION: **27 Months**

Number	Item	Remarks	Base Cost	HST (3.41%)	Cost	Notes
CONSTRUCTION						
835730	Construction: Main Contract	See notes	93,713,780	3,195,640	96,909,420	A
835752	Construction: Other Contract	N/A	-	-	-	
835754	Secondary Effects	See notes	200,000	6,820	206,820	B
835757	Construction Contingency	See notes - calculated at 10% of Main Contract	9,371,378	319,564	9,690,942	C
835762	Hazardous Waste Removal	Included in Main Contract	-	-	-	
835765	Demolition Services	Included in Main Contract	-	-	-	
835768	Site Preparation	See notes	311,185	10,611	321,796	D
				Total Construction	***$107,128,978***	
LANDSCAPING						
835755	Landscaping Services	Included in Main Contract	-	-	-	
				Total Landscaping	***$0***	
PERMITS, INSURANCE						
835400	Licences / Permits	Building permit and any CVCA fees - SPA $125,000 - HST excluded	425,000	-	425,000	
836700	Insurance	Calculated at 1% of Main Contract	937,138	31,956	969,094	
				Total Permits, Insurance	***$1,394,094***	
PROFESSIONAL FEES						
835200	Consulting	See notes	4,777,940	162,928	4,940,868	E
835201	Consultants: Disbursements	See notes	363,943	12,410	376,353	F
835204	Construction Management Fees	Included in Main Contract	-	-	-	
835206	Other Consultants	See notes	714,338	24,359	738,697	G
835210	Legal Services	Legal fees between 10K and 1% of construction cost	100,000	3,410	103,410	
835720	D&E Subconsultant Fees	N/A	-	-	-	
835721	External Project Management Fees	Included In Project Management - Fees (GL 895725)	-	-	-	
895720	Design Fees: In House	N/A	-	-	-	
895721	Design: Disbursements	N/A	-	-	-	
835723	Project Disbursements	Allowance	25,000	853	25,853	
895725	Project Management: Fees	2.5% of hard costs - HST excluded	$2,703,534	-	2,703,534	
				Total Professional Fees	***$8,888,714***	
SERVICES TO SITE						
835700	Site Services and Infrastructure	Allowance	150,000	5,115	155,115	
				Total Site Services	***$155,115***	
COMPUTER WIRING AND TELEPHONES						
821110	Equipment: Computing: Purchase	IT backbone, routers, switches, WAP's.Cabling in Main Contract	500,000	17,050	517,050	
835010	Telephone Line Service		150,000	5,115	155,115	
				Total Computer Wiring & Telephones	***$672,165***	
MOVING AND STAGING						
837100	Moving	Allowance	50,000	1,705	51,705	
837101	Staging	Allowance	50,000	1,705	51,705	
				Total Moving and Staging	***$103,410***	
FURNISHINGS AND EQUIPMENT						
820010	Furniture: Purchase	Loose furniture for dorm rooms, common rooms, kitchenettes	3,000,000	102,300	3,102,300	
821010	Equipment: Purchase	N/A	-	-	-	
821510	Equipment: Audio / Visual: Purchase	Supply and programming of AV equipment. Cabling in main contract	350,000	11,935	361,935	
821610	Equipment: Research: Purchase	N/A	-	-	-	
				Total Furnishings and Equipment	***$3,464,235***	
OTHERS						
820011	Interior Signage	Door signage only in Main Contract	50,000	1,705	51,705	
821325	Security and Access Systems	Terminations, equipment and programming - cabling in Main Contract	160,000	5,456	165,456	
835070	Courier		5,000	171	5,171	
835756	Exterior Signage		75,000	2,558	77,558	
835764	Client Construction Expenses	N/A	-	-	-	
835766	Ceremonies	Groundbreaking and opening functions	10,000	341	10,341	
835900	Advertising / Marketing	N/A	-	-	-	
836430	Donor Recognition	N/A	-	-	-	
890670	Facilities & Services Internal	Trades Incl. Fire-Utilities-Consultant, shut downs	150,000	5,115	155,115	
				Total Others	***$465,345***	
				SUB TOTAL:	**$122,272,057**	
PROJECT CONTINGENCY						
835758	Project Contingency	Carried at 2.5%	3,056,801	-	3,056,801	
				Total Project Contingency	***$3,056,801***	
FINANCE COSTS						
835300	Interest Charges		461,125	-	461,125	
835305	Capital Projects Financing Charges		-	-	-	
					$461,125	

Reviewed by _____ Executive Director, Capital Projects Group, UPDC

TOTAL PROJECT COST: **$125,789,983**

Client Signature:	**Recommended by:**	**Approved by:**
$2,703,534 **Project Management Fees**	**Date:**	**Date:**

University Planning, Design and Construction

PROJECT NUMBER: P300-20-009

PROJECT MANAGER: Ed Bush

CAMPUS: UTM

TOTAL PROJECT COST (TPC) NOTES

PROJECT NAME: NEW RESIDENCE at UTM

PROJECT DURATION: 27 Months

Note	GL	Item	Remarks	Base Cost	HST 3.41%	Cost
A	835730	**Construction: Main Contract**				
		Division 2-16 (Including allowance for target bid reductions)	Multiplex Budget January 15, 2024	$77,327,312	$2,636,861	$79,964,173
		General Conditions (RFP Definition)	CM Proposal - August 30, 2023	$1,742,084	$59,405	$1,801,489
		General Conditions - Additional	Multiplex Budget January 15, 2024	$3,564,771	$121,559	$3,686,330
		Payroll / Staffing Costs	CM Proposal - August 30, 2023	$3,620,543	$123,461	$3,744,004
		CM Fee	CM Proposal - August 30, 2023	$1,976,500	$67,399	$2,043,899
		Performance / Labour and Material Payment Bond	Multiplex Budget January 15, 2024	$565,355	$19,279	$584,634
		Sub-Contractor Default Insurance	Multiplex Budget January 15, 2024	$948,148	$32,332	$980,480
			Sub-Total	$89,744,713	$3,060,295	$92,805,008
		Phase 1 - Pre-Construction Services	CM Proposal - August 30, 2023	$649,067	$22,133	$671,200
		Early Works - General Expenses	Included	$0	$0	$0
		Early Works - Payroll / Staffing Costs	Included	$0	$0	$0
		Underslab Drainage	Not part of IFT drawings and specifications	$150,000	$5,115	$155,115
		Monitoring Well Decommissioning	Not part of IFT drawings and specifications	$20,000	$682	$20,682
		Design Allowance	Included in 10% Contingency	$0	$0	$0
		HV Feeder Relocation (1500kVA Xfmr to Roy Ivor)	Allowance	$100,000	$3,410	$103,410
		HV Terminations	Allowance	$50,000	$1,705	$51,705
		Escalation	Sub-trade escalation included where applicable	$0	$0	$0
		Consumption - Water, Gas, Electricity	Excluded	$0	$0	$0
		Value Engineering Opportunities	Excluded	$0	$0	$0
		Permananent Connections to Future CUP2	Allowance	$3,000,000	$102,300	$3,102,300
		Main Contract Total:		**$93,713,780**	**$3,195,640**	**$96,909,420**
B	835754	**Secondary Effects**				
		Relocation of Compactor / Modifications - Oscar Peterson Hall	Allowance	$50,000	$1,705	$51,705
		New Accessible Parking Spaces	Allowance	$150,000	$5,115	$155,115
		Ecological Ofsetting Plan	Excluded - Described in Environmental Impact Study (EIS)	$0	$0	$0
		Secondary Effects Total		**$200,000**	**$6,820**	**$206,820**
C	835757	**Construction Contingency**				
		Construction Contingency - Post Contract	Estimated @ 10% of main contract	$9,371,378	$319,564	$9,690,942
		Construction Contingency Total		**$9,371,378**	**$319,564**	**$9,690,942**
D	835768	**Site Preparation**				
		New 1000kVA Transformer and Related Work	Alectra - UofT PO#30	$311,185	$10,611	$321,796
		Site Preparation Total		**$311,185**	**$10,611**	**$321,796**
E	835200	**Consulting**				
		Schematic Design Phase		$797,723	$27,202	$824,926
		Design Development Phase		$531,815	$18,135	$549,950
		Construction Document Phase		$1,329,539	$45,337	$1,374,876
		Bidding and Negotiating Phase	Part of Phase 2	$27,397	$934	$28,331
		Construction Phase	Part of Phase 2	$1,273,940	$43,441	$1,317,381
		Warranty Phase	Part of Phase 2	$68,491	$2,336	$70,827
			Sub-Total	$4,028,905	$137,386	$4,166,291
		Change Order 1	Cost Consulting Alternative Mechanical Systems	$3,500	$119	$3,619
		Change Order 2	Additional Fees for VE and Cost Analysis	$10,000	$341	$10,341
		Change Order 3	Feasibility Study for CUP1 Temporary Services	$15,000	$512	$15,512
		Change Order 4	Additional Fees Services for CUP2 Connection	$121,660	$4,149	$125,809
		Change Order 5	Wetland Landscape Redesign / Water Balance	$19,975	$681	$20,656
		Change Order 5	Penthouse Enclosure Design	$45,900	$1,565	$47,465
		Change Order 6	Authorization of Phase 2 - Included Above	$0	$0	$0
		Change Order X	Additional Cost Consulting - IFT Set & Reconciliation	$33,000	$1,125	$34,125
		Change Order X	Additional Services - CM Delivery Scope	$250,000	$8,525	$258,525
		Allowance for Additional Services		$250,000	$8,525	$258,525
		Consulting Total		**$4,777,940**	**$162,928**	**$4,940,868**
F	835201	**Consultant - Disbursements**				
		Disbursements	Upset Amount for Disbursements - Per Contract	$363,943	$12,410	$376,353
		Consultant - Disbursements Total		**$363,943**	**$12,410**	**$376,353**
G	835206	**Other Consultants**				
		Arborist - Sumac Environmental Consulting Ltd	Arborist Report per proposal January 26, 2022	$1,600	$55	$1,655
		EIS - Sumac Environmental Consulting Ltd.	EIS per proposal December 7, 2021	$8,510	$290	$8,800
		EIS - Sumac Environmental Consulting Ltd	POC-01 Additional Services - MECP / EIS	$2,860	$98	$2,958
		EIS - Sumac Environmental Consulting Ltd	Additional Services - EIS Update (Allowance)	$1,500	$51	$1,551
		Geotechnical & Environmental Consulting Services - Terraprobe	Geotechnical and Hydro-Geological Report	$36,300	$1,238	$37,538
		Geotechnical & Environmental Consulting Services - Terraprobe	POC-01 Additional Services	$600	$20	$620
		Geotechnical & Environmental Consulting Services - Terraprobe	POC-02 Additional Services - Dewatering Induced Settlement	$2,010	$69	$2,079
		Geotechnical & Environmental Consulting Services - Terraprobe	Additional Service Allowance	$15,000	$512	$15,512
		Cost Consulting - A.W. Hooker Associates Ltd	Cost Consulting per proposal August 27, 2021	$23,250	$793	$24,043
		Cost Consulting - A.W. Hooker Associates Ltd	POC-01 Additional Services	$32,000	$1,091	$33,091
		Cost Consulting - A.W. Hooker Associates Ltd	POC-01 Additional Services	$5,342	$182	$5,524
		Subsurface Utilities Engineering (SUE) - Multiview	Design Locates and Mobilization	$5,266	$180	$5,446
		Subsurface Utilities Engineering (SUE) - Multiview	Additional Service Allowance	$0	$0	$0
		Commissioning Consulting Services - WSP	Commissining Services per proposal October 20, 2022	$220,100	$7,505	$227,605
		Audio Visual Consultant		$10,000	$341	$10,341
		Signage Consultant		$25,000	$853	$25,853
		Testing & Inspection - 3rd Party		$150,000	$5,115	$155,115
		Surveyor		$25,000	$853	$25,853
		Allowance for Additional Services		$150,000	$5,115	$155,115
		Other Consultants Total:		**$714,338**	**$24,359**	**$738,697**

University Planning
Design & Construction

TOTAL PROJECT COST (TPC)

NEW RESIDENCE at UTM
P300-20-009
TPC VERSION: Consultants & Construction Manager
TPC Increase #1

PROJECT MANAGER: Maroun Abou-Chacra
CAMPUS: UTM
PROJECT DURATION: 30 Months

Appendix E (page 1) - TPC Increase 1

Number	Item	Remarks	Base Cost	HST (3.41%)	Cost	Notes
CONSTRUCTION						
835730	**Construction: Main Contract**			-	-	
835752	Construction: Other Contract	N/A	-	-	-	
835754	Secondary Effects	N/A	-	-	-	
835757	Construction Contingency	Carried at 10% of main contract	-	-	-	
835762	Hazardous Waste Removal	Contaminated soils removal and designated substances in townhouses		-	-	
835765	Demolition Services	Included in main contract		-	-	
835768	Site Preparation	Included in main contract	-	-	-	
					$0	
LANDSCAPING						
835755	Landscaping Services	Included in main contract	-	-	-	
				Total Landscaping	***$0***	
PERMITS, INSURANCE						
835400	Licences / Permits	Development Application: SPA (SPC & ZBA), Tree Applications & Building Permit Application,	550,000		550,000	1
836700	Insurance	Calculated at 1% of Main Contract	-	-	-	
				Total Permits, Insurance	***$550,000***	
PROFESSIONAL FEES						
835200	Consulting	Value Adjusted to Reflect Revised Contract Amount.	4,528,905	154,436	4,683,341	2
835201	Consultants: Disbursements	Value Adjusted to Reflect Revised Contract Amount.	413,943	14,115	428,058	3
835204	Construction Management Fees	Estimated Amount for Pre-Construction Phase	1,600,000	54,560	1,654,560	4
835206	Other Consultants	Costing, Survey, Locates, Geotech, Arborist, Inspect/Test, and additional consultants including commissioning.	450,000	15,345	465,345	5
835210	Legal Services	Legal fees between 10K and 1% of construction cost		-	-	
835720	D&E Subconsultant Fees	N/A	-	-	-	
835721	External Project Management Fees	N/A	-	-	-	
895720	Design Fees: In House	N/A	-	-	-	
895721	Design: Disbursements	N/A	-	-	-	
835723	Project Disbursements	Project Disbursements	5,000	171	5,171	
895725	Project Management: Fees	30% of the 2.25% of the Anticipated Total TPC of $105M.	$659,034		659,034	6
				Total Professional Fees	***$7,895,509***	
SERVICES TO SITE						
835700	Site Services and Infrastructure			-	-	
				Total Site Services	***$0***	
COMPUTER WIRING AND TELEPHONES						
821110	Equipment: Computing: Purchase	IT backbone, routers, switches, WAP's, switchgear. Cabling in main contract		-	-	
835010	Telephone Line Service			-	-	
				Total Computer Wiring & Telephones	***$0***	
MOVING AND STAGING						
837100	Moving			-	-	
837101	Staging			-	-	
				Total Moving and Staging	***$0***	
FURNISHINGS AND EQUIPMENT						
820010	Furniture: Purchase	Loose furniture for dorm rooms, common rooms, kitchenettes		-	-	
821010	Equipment: Purchase	N/A	-	-	-	
821510	Equipment: Audio / Visual: Purchase	Supply and programming of AV equipment. Cabling in main contract		-	-	
821610	Equipment: Research: Purchase	N/A	-	-	-	
				Total Furnishings and Equipment	***$0***	
OTHERS						
820011	Interior Signage: Purchase / Design	Door signage only in main contract		-	-	
821325	Security and Access Systems	Terminations, equipment and programming. Cabling in main contract		-	-	
835070	Courier		500	17	517	
835756	Exterior Signage: Purchase / Design			-	-	
835764	Client Construction Expenses	N/A	-	-	-	
835766	Ceremonies	Groundbreaking and opening functions		-	-	
835900	Advertising / Marketing	N/A	-	-	-	
836430	Donor Recognition	N/A	-	-	-	
890670	Facilities & Services Internal	Trades Incl: Fire-Utilities-Consultant, shut downs	50,000		50,000	
				Total Others	***$50,517***	
				SUB TOTAL:	**$8,496,026**	
PROJECT CONTINGENCY						
835758	Project Contingency	Carried at 2.5%	212,401		212,401	7
				Total Project Contingency	***$212,401***	
FINANCE COSTS						
835300	Interest Charges	N/A	-	-	-	
835305	Capital Projects Financing Charges	N/A	-	-	-	
					$0	

Reviewed by _____ Executive Director, Capital Projects Group, UPDC

TOTAL PROJECT COST: **$8,708,427**

Client Signature:
Luke Barber, ED D&PI, UTM
2023-02-14

Recommended by: Maroun Abou-Chacra PM

Approved by:

$659,034 | **Project Management Fees** | **Date: February 01, 2023** | **Date:**

Appendix E - (Page 2) - Initial TPC

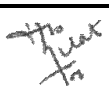
University Planning, Design & Construction

PROJECT NUMBER: **P300-20-009**
PROJECT NAME: **New Residence at UTM**

PROJECT MANAGER:
CAMPUS:
PROJECT DURATION:

TOTAL PROJECT COST (TPC)
Approval #1- Consulting Fees to 100% Construction Documents

Number	Item	Remarks	Base Cost	HST (3.41%)	Cost
CONSTRUCTION					
835730	Construction: Main Contract	N/A		-	-
835752	Construction: Other Contract	N/A	-	-	-
835754	Secondary Effects	N/A	-	-	-
835757	Construction Contingency	N/A	-	-	-
835762	Hazardous Waste Removal	N/A		-	-
835765	Demolition Services	N/A		-	-
835768	Site Preparation	N/A	-	-	-
					$0
LANDSCAPING					
835755	Landscaping Services	N/A	-	-	-
				Total Landscaping	***$0***
PERMITS, INSURANCE					
835400	Licences / Permits	Building permit ($250K), SPA ($125K) & CVCA ($50K)	425,000		425,000
836700	Insurance	Calculated at 1% of Main Contract	-	-	-
				Total Permits, Insurance	***$425,000***
PROFESSIONAL FEES					
835200	Consulting	Calculated at 10% of Main Contract value ($45,475,000.00) to end CD + 15% contingency for services not yet defined (promo materials, additional design services,etc.)	3,660,737	124,831	3,785,568
835201	Consultants: Disbursements	Calculated at 5% of above	183,037	6,242	189,278
835204	Construction Management Fees	N/A	-	-	-
835206	Other Consultants	Costing, Survey, Locates, Geotech, Arborist, Inspect/Testing (included at half of expected amount for entire project)	250,000	8,525	258,525
835210	Legal Services	N/A	-	-	-
835720	D&E Subconsultant Fees	N/A	-	-	-
835721	External Project Management Fees	N/A	-	-	-
895720	Design Fees: In House	N/A	-	-	-
895721	Design: Disbursements	N/A	-	-	-
835723	Project Disbursements		5,000	171	5,171
895725	Project Management: Fees	3.25%			-
				Total Professional Fees	***$4,238,542***
SERVICES TO SITE					
835700	Site Services and Infrastructure	N/A	-	-	-
				Total Site Services	***$0***
COMPUTER WIRING AND TELEPHONES					
821110	Equipment: Computing: Purchase	N/A		-	-
835010	Telephone Line Service	N/A	-	-	-
				Total Computer Wiring & Telephones	***$0***
MOVING AND STAGING					
837100	Moving	N/A	-	-	-
837101	Staging	N/A	-	-	-
				Total Moving and Staging	***$0***
FURNISHINGS AND EQUIPMENT					
820010	Furniture: Purchase	N/A		-	-
821010	Equipment: Purchase	N/A	-	-	-
821510	Equipment: Audio / Visual: Purchase	N/A		-	-
821610	Equipment: Research: Purchase	N/A	-	-	-
				Total Furnishings and Equipment	***$0***
OTHERS					
820011	Interior Signage: Purchase / Design	N/A		-	-
821325	Security and Access Systems	N/A		-	-
835070	Courier		500	17	517
835756	Exterior Signage: Purchase / Design	N/A		-	-
835764	Client Construction Expenses	N/A	-	-	-
835766	Ceremonies	N/A		-	-
835900	Advertising / Marketing	N/A	-	-	-
836430	Donor Recognition	N/A	-	-	-
890670	Facilities & Services Internal	Trades Incl. Fire-Utilities-Consultant, shut downs	50,000	1,705	51,705
				Total Others	***$52,222***
				SUB TOTAL:	**$4,715,764**
PROJECT CONTINGENCY					
835758	Project Contingency	Carried at 3.0%	141,473		141,473
				Total Project Contingency	***$141,473***
FINANCE COSTS					
835300	Interest Charges	N/A	-	-	-
835305	Capital Projects Financing Charges	N/A	-	-	-
					$0
Reviewed by _____		Executive Director, Capital Projects Group, UPDC		**TOTAL PROJECT COST:**	**$4,857,237**

Client Signature: 	**Recommended by:** 	**Approved by:**
Saher Fazilat, CAO, University of Toronto Mississauga	**Laragh Halldorson,** Manager, Project Development, UPDC	**Costas Catsaros,** Director, Project Development, UPDC
$0 **Project Management Fees**	**Date: May 29, 2020**	**Date: May 29, 2020**

Appendix 5
Background Reports/Studies

Appendix 5a
2019 Schreiberwood Asbestos Report

REPORT

2019 Asbestos-Containing Building Materials Condition Re-Assessment

Building 323 (1) - Schreiberwood Residence

Submitted to:

University of Toronto
Mississauga Campus
3359 Mississauga Road
Mississauga, Ontario
L5L1C6

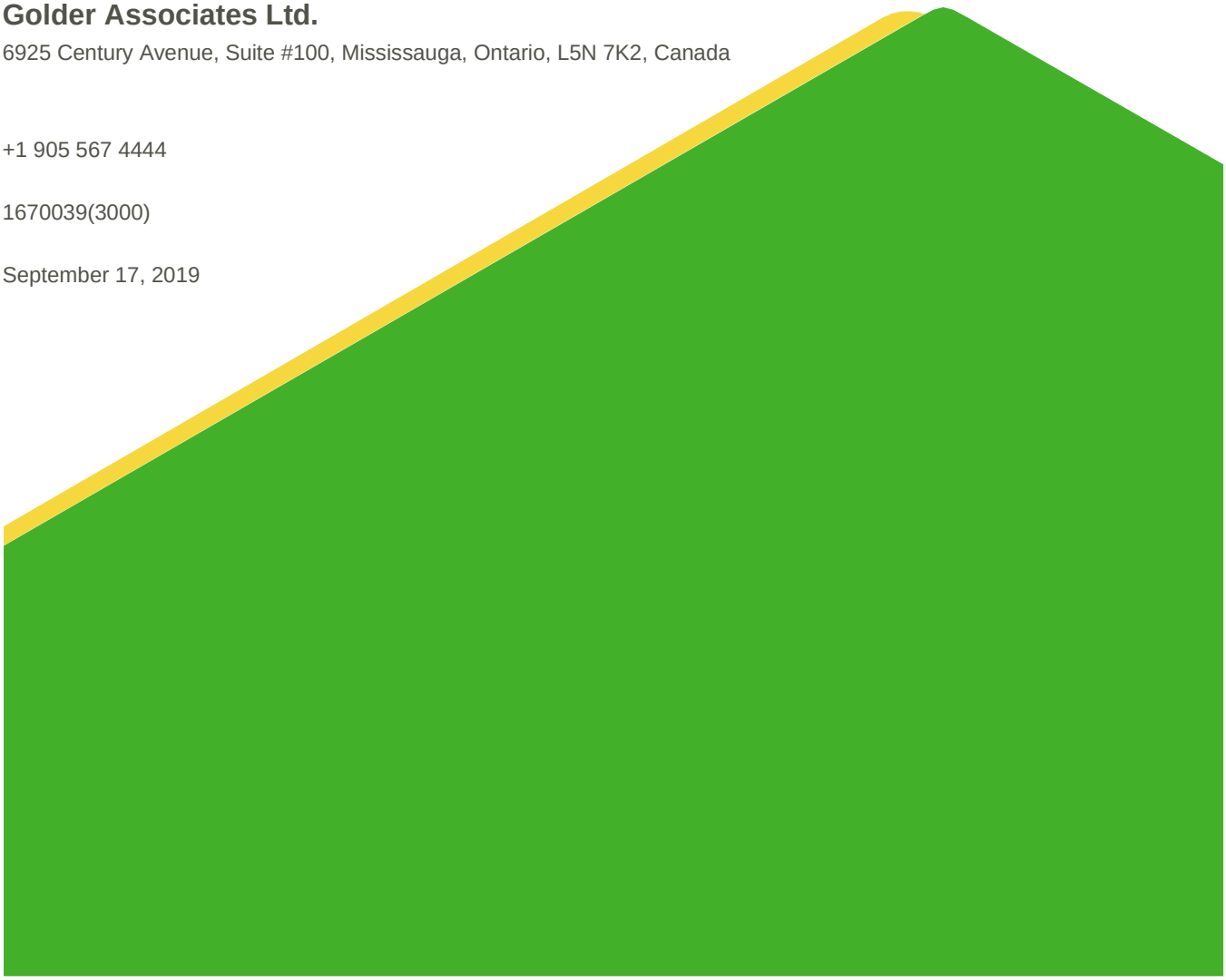
Submitted by:

Golder Associates Ltd.
6925 Century Avenue, Suite #100, Mississauga, Ontario, L5N 7K2, Canada

+1 905 567 4444

1670039(3000)

September 17, 2019



Distribution List

1 e-copy: University of Toronto

1 e-copy: Golder Associates Ltd.

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APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by University of Toronto, Mississauga Campus to conduct an asbestos-containing materials (ACM) condition re-assessment for multiple buildings located at 3359 Mississauga Road, Mississauga, Ontario (the Site). The inspection was conducted July 22nd, 2019, by Mr. Chris Beavers, Occupational Hygiene Technologist of Golder's EHS Management and Compliance Group

The following report summarizes the scope of work, methodology and findings of the ACM re-assessment for the Building 323 (1) – Schreiberwood Residence

2.0 PURPOSE & SCOPE

The objective of the assessment was to inspect the condition and verify the quantities of previously identified visible and accessible ACM, as detailed within the following historical reports,

- "Asbestos-Containing Building Materials Assessment and Inventory", prepared by Golder, dated June 11, 2017 (2016 Asbestos Report);
- "Asbestos-Containing Building Materials Condition Re-Assessment", prepared by Golder, dated March 17, 2018 (2017 Asbestos Report); and,
- "Asbestos-Containing Building Materials Condition Re-Assessment", prepared by Golder, dated November 30, 2018 (2018 Asbestos Report).

The 2019 inspection was performed to meet legislative requirements for the ongoing management of the ACM at the Site. It was comprised of a visual non-intrusive assessment of the materials identified within the 2016 Asbestos Report. The scope of work included a review of the historical reports, a Site visit, and preparation of a report detailing the findings, and recommendations for the Site where warranted.

3.0 METHOD

The risk of exposure to asbestos fibres from asbestos-containing building materials is based on a number of factors including, accessibility, condition and friability of the material in question. These are primary factors that are typically used to establish the rationale for abatement options such as removal, encasement, or encapsulation, and for ongoing management. For the purpose of this condition assessment, these criteria were used to assess the condition of known materials and to provide subsequent recommendations. A brief overview of these factors is provided.

Friability: Friability is the ease at which a material will crumble under hand pressure. Materials that are tightly bound are considered non-friable. Friability is directly proportional to the exposure potential; as friability increases so does the exposure potential. The following scale (low to high) was used to assess the friability.

- **Low**: requires mechanical abrasion to release fibres;
- **Medium**: requires fair contact to release fibres; and,
- **High**: readily releases fibres with minimal contact.

Condition: The condition of the ACM indicates how easily fibres can be released into the air. The assessment of materials considers the quality of installation, deterioration, vandalism and/or damage. The following scale was used to assess the condition of ACM:

- **Good**: no damage, deterioration or insulation exposed;
- **Fair**: minor penetrating damage and/or unjacketing insulation (exposed but no signs of deterioration); and,
- **Poor**: material is exposed and significant areas dislodged.

Accessibility: If the ACM can be reached, it is subject to accidental or intentional contact and damage. ACM in high traffic areas or those close to heating, ventilation, lighting and plumbing systems which require maintenance are examples of high accessibility. The following scale was used to assess the accessibility of the material.

- **High**: areas within reach from ground level of all Site users;
- **Medium**: frequently entered maintenance areas within the reach of maintenance workers without ladders but from fixed ladders, catwalks or frequently entered pipe chases; and,
- **Low**: above 6 feet and visible from floor or ladder; or require removal of hatch or ceiling tile, includes rarely entered crawlspaces.

4.0 REGULATIONS AND GUIDELINES

The Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations (O. Reg. 278/05) prescribes specific procedures for the identification of ACM, protocols for their ongoing management and procedures for repair, clean-up and removal. Section 8(3) of O. Reg. 278/05 prescribes that if ACM are suspected to be present or ought reasonably to be suspected, locations of the materials must be documented. It further prescribes the need to inspect and record observations of the ACM at reasonable intervals to determine its present condition and any required remedial action. Sections 8(5) define the necessity to update the record at a minimum of at least once in a 12 month period or when the Owner becomes aware of new relevant information.

5.0 FINDINGS AND RECOMMENDATIONS

According to the historical reports, the following materials were present and confirmed or presumed to be asbestos containing:

- Approximately 48,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 15-22;
- Approximately 1,960 linear feet of non-friable grey caulking, present around the exterior windows throughout the residence;
- Approximately 750 linear feet of non-friable window glazing, present around the exterior windows throughout the residence;
- Approximately 1,400 linear feet of non-friable light brown caulking, present around the siding, throughout the residence;
- Non-friable black sink acoustic dampener, present on the underside of sink in units 19 and 45;
- Approximately 48,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 23-27;

- Approximately 20 fittings of friable pipe fitting insulation present in the basement laundry rooms throughout the residence;
- Approximately 48,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 45-53;
- Approximately 60,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 5-14;
- Approximately 24,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 1-4;
- Approximately 42,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 28-34;
- Approximately 5,500 square feet of friable texture coat, present on the ceiling in units 45-53; and,
- Approximately 48,000 square feet of non-friable drywall joint compound, present throughout the walls and ceiling of units 35-42.

Please refer to the 2016 Asbestos Report for detailed information regarding the extent of the ACM at the Site and associated sample results.

Based on the Site investigation, in conjunction with a review of the 2018 Asbestos Report, previously identified ACM were observed to be in good condition with the exception of the following materials:

- Approximately 1 ft^2 of asbestos containing texture coat present on the first floor of unit 50. The ceiling should be repaired following Type 2 asbestos work procedures, as prescribed in O. Reg 278/05.

No further sampling was required during the investigation. The asbestos spreadsheet of findings has been updated to reflect the condition of the ACM at the Site and can be found in Appendix A. The site figures can be found in Appendix B.

Due to the minimal intrusive nature of the original investigation, a project specific pre-construction/pre-demolition survey is recommended prior to any interior and/or exterior renovation/demolition work to identify concealed materials not otherwise noted within this report.

6.0 LIMITATIONS

This report was prepared for the exclusive use of University of Toronto Mississauga Campus and is based on data and information collected during a Site visit conducted by Golder on July 22nd, 2019. This report is based solely on Site conditions encountered at the time of the Site visit, supplemented by historical information and data obtained by Golder as described in this report.

The quantities of ACM as reported, are estimates only and may not accurately reflect the exact quantities at the Site. Contractors retained to complete or quote on the abatement activities should independently confirm the reported quantities.

Please note that the 2016 Asbestos Report has not be physically updated or reissued; instead this document is intended to be read in conjunction with the 2016 Asbestos Report. Any subsequent ACM Inspections and or

changes to the building with respect to the asbestos-containing materials need to be incorporated into the Asbestos Management Plan for the Site.

The findings, observations and conclusions expressed by Golder in this report are not, and should not be considered, an opinion concerning compliance of any past or present owner or operator of the Site with any federal, provincial or local laws or regulations.

The conclusions and recommendations contained in this report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with currently accepted environmental assessment standards and practices applicable to this location.

The data and findings presented in this report are valid as of the date of the Inspection but additional materials that are not currently known to contain asbestos may arise in the future. The passage of time, manifestation of latent conditions or occurrence of future events or changes to currently accepted environmental assessment standards and practice may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.

In evaluating the Site conditions, Golder has relied in good faith on information provided by others. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons involved.

Golder will not be responsible for any real or perceived decrease in a property value, its saleability or ability to gain financing through the reporting of information in this report.

Additional asbestos containing building materials not identified in this report may become evident during demolition or renovation activities. Should additional information become available, Golder requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

7.0 CLOSURE

If you have any questions or require any further information, please feel free to contact the undersigned at (905) 567-4444. Thank you for the opportunity to be of service. We look forward to working with you again.

Signature Page

Golder Associates Ltd.

Christopher Beavers, B.Sc.
EHS Consultant

Robert Stoyanoff, MBA CChem CIH.
Senior Industrial Hygienist

CB/RS:kc

APPENDIX A

Spreadsheet of Findings - Asbestos

ASBESTOS-CONTAINING MATERIALS

Schreiberwood Residence

University of Toronto Mississauga, Mississauga, Ontario

Unit	Room	Level	Material	Description	Est. Qty*	Units	Condition	Friable	Accessibility	Sample #		% and Type	Photographs	Comments
								Yes/No		Building	Sample			
15-22	Throughout	Throughout	Drywall Joint Compound	Walls and ceiling	48,000	Sq.Ft.	Good	Yes	High	323 (1)	1A-H	2% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.
Throughout	Exterior	Ground Floor	Caulking	Grey window caulking around windows	1960	Ln.Ft.	Good	No	High	323 (1)	2A-C	0.7% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O. Reg. 278/05.
Throughout	Exterior	Ground Floor	Window Glazing	Window glazing from steel frame windows	750	Ln.Ft.	Good	No	High	323 (1)	3A-C	2% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O. Reg. 278/05.
Throughout	Exterior	Throughout	Caulking	Brown caulking on brown window frames	105	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required
Throughout	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	400	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
15-22	Living Room and Entrance Hallway	Ground Floor	Texture Coat	Ceiling	1400	Sq.Ft.	Good	Yes	High	323 (1)	6A-G	None detected		No action required

Accessibility:
High: Accessible to All
Mod: Accessible to Maintenance Staff Only
Low: Enclosed in Building Materials

ASBESTOS-CONTAINING MATERIALS

Schreiberwood Residence

University of Toronto Mississauga, Mississauga, Ontario

Unit	Room	Level	Material	Description	Est. Qty*	Units	Condition	Friable	Accessibility	Sample #		% and Type	Photographs	Comments
								Yes/No		Building	Sample			
Throughout	Exterior	Throughout	Caulking	Light brown flashing caulking present on the siding	1,400	Ln.Ft.	Good	No	High	323 (1)	7A-C	2% Chrysotile		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O. Reg. 278/05.
19, 42	Kitchen	Ground Floor	Sink Acoustic	Black sink acoustic	8	Sq.Ft.	Good	No	High	323 (1)	8A-C	3% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O. Reg. 278/05.
23-27	Throughout	Throughout	Drywall Joint Compound	Walls and ceiling	30,000	Sq.Ft.	Good	Yes	High	323 (1)	9A-G	2% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.
B Block, C Block, E Block, F Block	Storage Room, Laundry Room	Basement	Pipe Fitting Insulation	Associated with 2 inch line	20 Fittings	Each	Good	Yes	High	323 (1)	10A-C	45% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 2 asbestos work procedures as prescribed under O. Reg. 278/05.
Laundry Room	Laundry Room	Basement	Drywall Joint Compound	Ceiling in the stairwell	800	Sq.Ft.	Good	Yes	High	323 (1)	11A-C	None detected		No action required
43-53	Throughout	Throughout	Drywall Joint Compound	Walls and ceiling	66,000	Sq.Ft.	Good	Yes	High	323 (1)	12A-I	4% Chrysotile asbestos		Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.

Accessibility:
High: Accessible to All
Mod: Accessible to Maintenance Staff Only
Low: Enclosed in Building Materials

ASBESTOS-CONTAINING MATERIALS

Schreiberwood Residence

University of Toronto Mississauga, Mississauga, Ontario

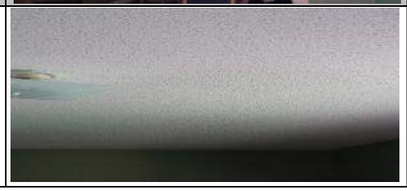
Unit	Room	Level	Material	Description	Est. Qty*	Units	Condition	Friable	Accessibility	Sample #		% and Type	Photographs	Comments
								Yes/No		Building	Sample			
23-27	Throughout	Throughout	Texture Coat	Ceiling	400	Sq.Ft.	Good	Yes	High	323 (1)	13A-C	None detected		No action required
5-14	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**60,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**14A-G**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.**
5-14	Living Room	Ground Floor	Texture Coat	Ceiling	4,000	Sq.Ft.	Good	Yes	High	323 (1)	15A-G	None detected		No action required
1-4	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**24,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**16A-E**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.**
1-4	Living Room	Ground Floor	Texture Coat	Ceiling	1600	Sq.Ft.	Good	Yes	High	323 (1)	17A-C	None detected		No action required
28-34	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**42,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**18A-G**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.**

Accessibility:
High: Accessible to All
Mod: Accessible to Maintenance Staff Only
Low: Enclosed in Building Materials

ASBESTOS-CONTAINING MATERIALS

Schreiberwood Residence

University of Toronto Mississauga, Mississauga, Ontario

Unit	Room	Level	Material	Description	Est. Qty*	Units	Condition	Friable	Accessibility	Sample #		% and Type	Photographs	Comments
								Yes/No		Building	Sample			
28-34	Living Room	Ground Floor	Texture Coat	Ceiling	3,000	Sq.Ft.	Good	Yes	High	323 (1)	19A-G	None detected		No action required
43-53	**Living Room**	**Ground Floor**	**Texture Coat**	**Ceiling**	**5500 (1ft2 damaged in Unit 50)**	**Sq. Ft.**	**Poor**	**Yes**	**High**	**323 (1)**	**20A-G**	**2% Chrysotile asbestos**		**Repair damaged ACM following Type 2 asbestos work procedures. If scheduled for impact through renovation or demolition, remove following Type 3 asbestos work procedures as prescribed under O. Reg. 278/05.**
35-42	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**48000**	**Sq. Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**21A-G**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O. Reg. 278/05.**
35-42	Living Room	Ground Floor	Texture Coat	Ceiling	5,000	Sq. Ft.	Good	Yes	High	323 (1)	22A-G	None detected		No action required

Accessibility:
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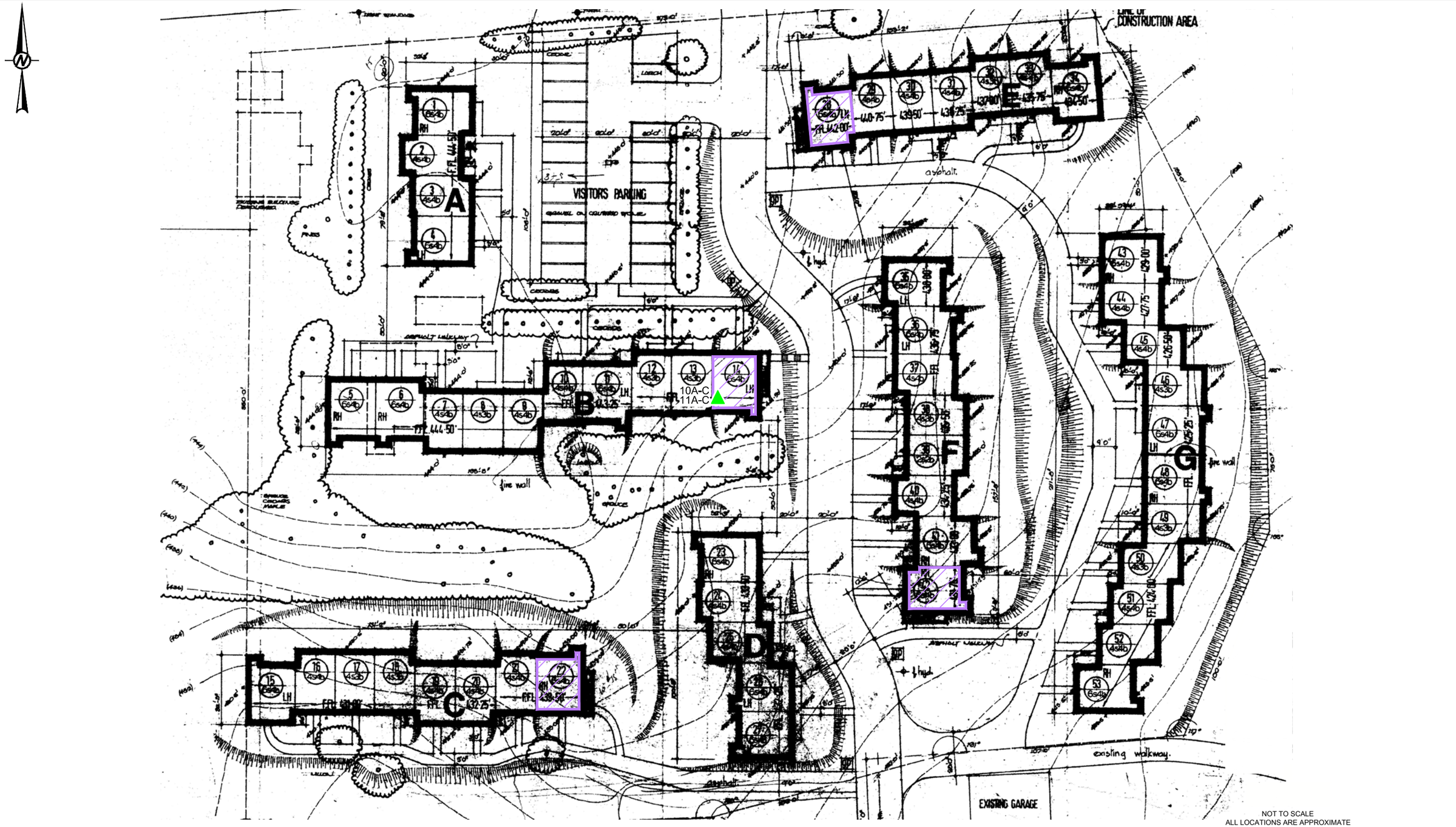
Mod: Accessible to Maintenance Staff Only
Low: Enclosed in Building Materials

APPENDIX B

Figures



NOT TO SCALE
ALL LOCATIONS ARE APPROXIMATE

LEGEND

- ASBESTOS SAMPLE LOCATION
- ASBESTOS CONTAINING PARGING CEMENT FITTINGS IN BASEMENT LAUNDRY ROOMS

REFERENCE

1. BASE PLAN PROVIDED BY UNIVERSAL SECTIONS LIMITED, ENTITLED "SITE DEVELOPMENT PLAN", DRAWING NO. A-101.

CLIENT
UNIVERSITY OF TORONTO MISSISSUAGA

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-03-17
DESIGNED	
PREPARED	MK
REVIEWED	
APPROVED	

PROJECT
ASBESTOS CONTAIINING MATERIALS SURVEY
SCHREIBERWOOD RESIDENCE
UNIVERSITY OF TORONTO MISSISSUAGA, 3359 MISSISSUAGA ROAD, MISSISSUAGA

TITLE
SAMPLE LOCATION PLAN - BASEMENT

PROJECT NO.	CONTROL	REV.	FIGURE
1654158		----	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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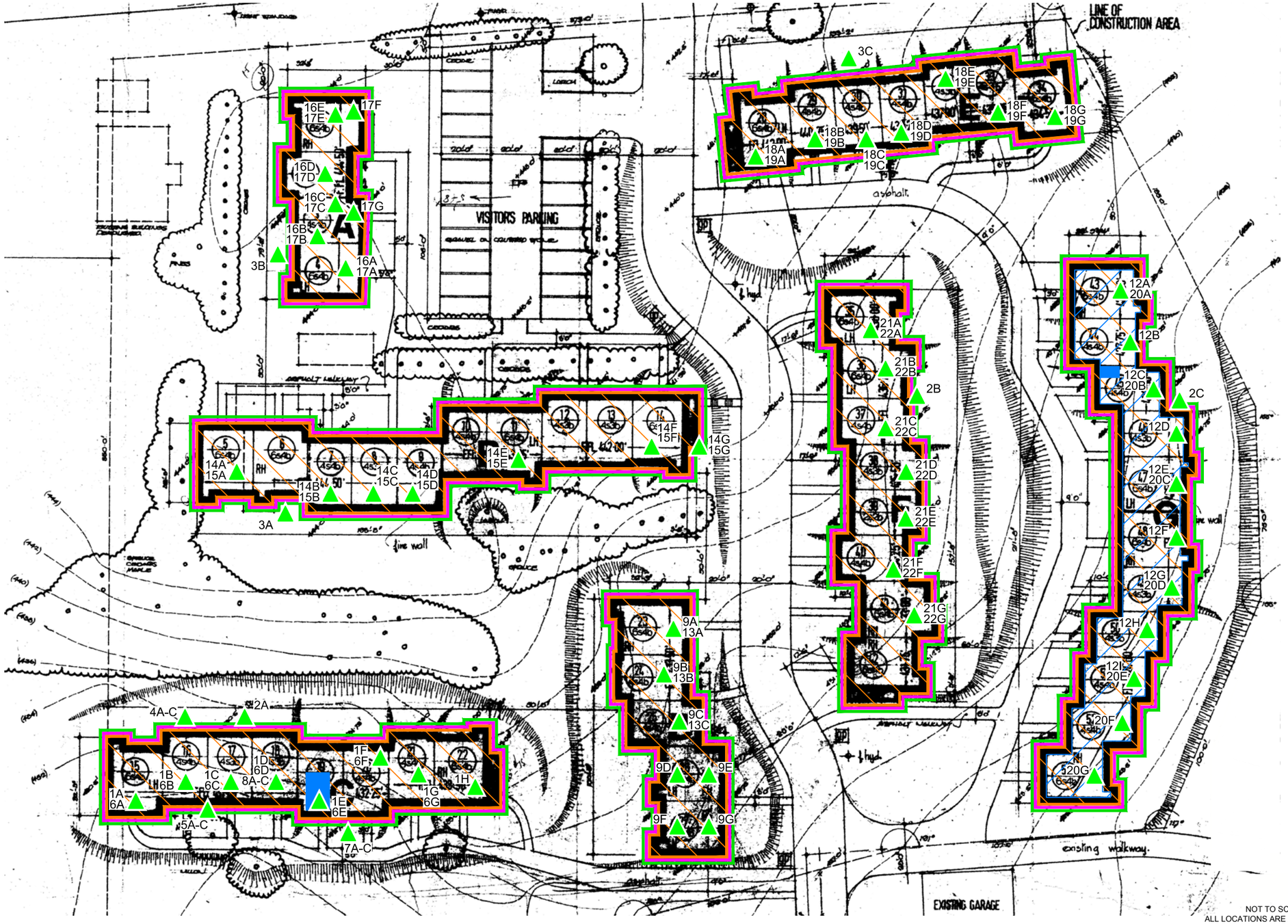

NOT TO SCALE
ALL LOCATIONS ARE APPROXIMATE

LEGEND

- ASBESTOS SAMPLE LOCATION
- ASBESTOS CONTAINING WINDOW CAULKING AND GLAZING
- ASBESTOS CONTAINING FLASHING CAULKING
- ASBESTOS CONTAINING BLACK SINK ACOUSTIC MATERIAL
- ASBESTOS CONTAINING TEXTURE COAT
- ASBESTOS CONTAINING DRYWALL JOINT COMPOUND

REFERENCE

1. BASE PLAN PROVIDED BY UNIVERSAL SECTIONS LIMITED, ENTITLED "SITE DEVELOPMENT PLAN", DRAWING NO. A-101.

CLIENT
UNIVERSITY OF TORONTO MISSISSUAGA

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-03-17
DESIGNED	
PREPARED	MK
REVIEWED	
APPROVED	

PROJECT
ASBESTOS CONTAINING MATERIALS SURVEY
SCHREIBERWOOD RESIDENCE
UNIVERSITY OF TORONTO MISSISSUAGA, 3359 MISSISSUAGA ROAD, MISSISSUAGA

TITLE
SAMPLE LOCATION PLAN - GROUND FLOOR

PROJECT NO.	CONTROL	REV.	FIGURE
1654158		----	2

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golder.com

Appendix 5b
2017 Schreiberwood Asbestos Report

March 17, 2017

BUILDING 323- SCHREIBERWOOD RESIDENCE

Asbestos-Containing Building Materials Assessment and Inventory

Submitted to:
University of Toronto
Mississauga Campus
3359 Mississauga Road
Mississauga, Ontario
L5L 1C6

REPORT

Report Number: 1654158-1000 (R01)

Distribution:

3 Hard Copies - UTM
1 PDF Copy - UTM
1 File Copy - Golder

Golder Associates

Table of Contents

PART A – REPORT OVERVIEW

1.0 INTRODUCTION

University of Toronto, Mississauga (UTM) retained Golder Associates Ltd. (Golder) to perform a non-intrusive asbestos survey for multiple buildings located at 3359 Mississauga Road, Mississauga, Ontario (the Site) for management purposes. The purpose of the survey is to meet the requirements prescribed under Ontario Regulation 278/05 – *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations* (O. Reg. 278/05), as amended.

The survey and sampling program included the collection of representative samples of suspected asbestos-containing materials (ACM). Wall cavities and ceiling spaces were accessed through existing access panels, drop ceilings, etc., where possible, and reviewed in order to identify ACM concealed in interstitial spaces. The roof was also included in the survey, however to maintain building integrity and protect against moisture intrusion, no exterior samples were collected where a risk of breaching the building envelope existed.

2.0 SURVEY METHOD

The Scope of Work for this project involved a non-intrusive survey of the Sites for ACM, as prescribed under O. Reg. 278/05. In addition to the visual identification of asbestos, representative samples of suspected ACM were collected.

All work was conducted in accordance with the prescribed requirements of O. Reg. 278/05, and the general requirements of the Ontario Occupational Health and Safety Act.

All ACM identified during the survey were assessed on the following criteria: accessibility, condition, and friability. Based on these risk factors recommendations were made as to the appropriate method for the management or removal of these materials. An overview is provided below.

2.1 Accessibility of Material

Each confirmed and suspect ACM identified as part of this assessment was assessed based on its accessibility. The following outlines the criteria used to assess the condition of a material:

Accessibility Rank	Descriptions
High	**Accessible to All**: Includes materials that are easily accessible to a typical building user. These materials are typically in plain view in washrooms, corridors or stairwells and are reachable (less than eight feet above ground) but could include materials inside frequently accessed storage cupboards or closets.
Moderate	**Limited Access**: Materials in areas routinely accessed or frequented by maintenance personnel. This includes materials in public areas that require use of a ladder to access the material. Only includes ACM materials that are exposed to view without the removal or opening of other building components such as ceiling tiles, or service access doors or hatches.
Low	**Restricted or No Access**: Materials which are not accessible to the general public and which would require effort for maintenance personnel to reach. These include materials enclosed or otherwise present behind solid surfaces, behind or above access hatches, and in crawl spaces or attics or other infrequently accessed service areas.

2.2 Condition of Material

Each confirmed and suspect ACM identified as part of this assessment was assessed based on its condition. The following outlines the criteria used to assess the condition of a material:

Condition Rank	Descriptions
Good	■ **Mechanical Insulation:** Minor damage to jacketed insulation including tears, cuts or deterioration or undamaged insulation not covered, Insulation is exposed with no surface deterioration. May be minor pieces of insulation missing but may be repaired. ■ **Spray of Trowel-applied Material:** surface shows no damage/deterioration and no delamination. Includes texture finishes or fireproofing that are not encapsulated/painted, and no delamination or damage. Also includes encapsulated fireproofing or sealed texture finishes. ■ **Non-friable Material:** intact with minor cracks or breaks with no loose, friable material and no friable debris present.
Fair	■ **Mechanical Insulation:** Minor damage to jacketed insulation including tears, cuts or deterioration or undamaged insulation not covered, Insulation is exposed with no surface deterioration. May be minor pieces of insulation missing but may be repaired. ■ **Spray of Trowel-applied Material:** materials not thoroughly sealed but with no evidence of deterioration or delamination. Generally fireproofing materials should be classified as either Good or Poor. ■ **Non-friable Material:** shows signs of physical deterioration or significant breakage but remains non-friable. No loose, friable debris present.
Poor	■ **Mechanical Insulation:** material in condition such that asbestos fibres may be readily released and become airborne with disturbance. ACM exposed and significant damage occurred. ■ **Spray of Trowel-applied Material:** shows signs of physical damage, delamination or deterioration. ■ **Non-friable Material:** material severely damaged or deteriorated to a state where material is friable. Loose debris may or may not be present.

2.3 Friability of Material

The assessment of friability was taken into account when determining the condition and recommendations. The friability of a material is determined by whether the material can be crushed or pulverized by hand pressure. Typically, thermal insulating asbestos products such as spray-applied fireproofing, pipe wraps and boiler breaching insulation are considered friable. Manufactured products such as floorings, caulks, and asbestos-cement panels and pipes are considered non-friable.

3.0 SAMPLING AND ANALYSIS METHOD

Samples of suspected "homogeneous" asbestos-containing building materials (i.e. materials that are uniform in content, colour, texture, and construction date) were collected and submitted for analysis. Sampling involved minor to moderate damage to materials in order to obtain a representative sample. Where sampling could not be conducted in areas of existing damaged building materials, Golder provided repair to the sampled surface. Non-structural items such as furniture, chairs, curtains, miscellaneous items, etc., were not included in the sampling program. Suspect materials that could not be accessed for sampling (such as those suspected to be present behind solid surfaces) were also not included in this assessment.

O. Reg. 278/05 prescribes a minimum number of samples required per "homogeneous material" to verify the presence or absence of asbestos. Following the requirements of O. Reg. 278/05, a minimum of three samples per homogeneous material was collected and submitted for analysis. Golder forwarded the samples of suspect ACM, under chain of custody procedures, to a laboratory accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) and American Industrial Hygiene Association (AIHA), for analysis of asbestos. As required in Section 3(1)1 of O. Reg. 278/05, all analysis performed was done in accordance with U.S. Environmental Protection Agency Test Method EPA/600/R-93/116: *Method for the Determination of Asbestos in Bulk Building Materials*.

During analysis, once a positive sample was identified (0.5% or greater asbestos content by dry weight), no additional analysis was conducted for other samples of the same homogeneous material, and the entire area of the material from which the sample was taken was deemed to be an ACM. This is referred to as a "stop positive" analytical result.

4.0 GENERAL RECOMMENDATIONS

O. Reg. 278/05 prescribes specific procedures with regards to maintenance, renovations, or demolition work where ACM are or may be disturbed. This requirement is best managed through the implementation of an asbestos management plan in any building where the owner of a building *knows or ought reasonably to know* that ACM has been used in a building for any purpose related to the building, [*O. Reg. 278/05* s. 8(2)].

Under this regulation, responsibilities of the Building Owner include:

- Preparation and maintenance of a record of locations, condition and friability of ACMs in the building, [s. 8(3)(a)] (i.e. this report);
- Notification of the building tenants (Occupier) of the locations of such materials that relate to areas occupied by the tenant, [s. 8(3)(b)];
- Notification of workers who may work in close proximity to the material or who have the potential to disturb this material(s), [s. 8(3)(c)(d)];
- Establishment of a training program for those employees who may work in close proximity to and/or disturb asbestos-containing materials, [s. 8(3)(e)];
- Periodic inspections of ACM to assess its condition [s. 8(3)(f)] and updating of the record at least once in each 12 month period, [s. 8(5)(a)(b)]; and,

- Implementation of remedial actions for material that has deteriorated, following the precautions and procedures prescribed in the regulation.

Based on this, the asbestos-containing materials as identified in this report can be managed in place provided the University of Toronto Asbestos Management Program is followed. The purpose of the program is to meet requirements as prescribed above.

With respect to any damaged ACM identified, or identified ACM that may be affected by future maintenance, renovation, or demolition activities, refer to the specific recommendations assigned to each identified ACM in *Appendix B – Asbestos-Containing Materials Inventory.*

Please note, the quantities of ACM as reported are estimates only and may not accurately reflect the exact quantities at the Site. Contractors retained to complete asbestos abatement activities should independently confirm the reported quantities.

Inaccessible, buried, or concealed ACM may be discovered in concealed locations (i.e. Transite™ asbestos cement pipes/products, caulking, gaskets, etc.) during renovation or demolition activities. Based on this, contractors retained to conduct the proposed renovation/construction activities should be notified of this limitation and written procedures be established in the event that concealed ACM are identified. The overall objective is to minimize exposure during any proposed demolition operations. If suspected ACM not identified in this report are encountered during any future renovations, the work should stop immediately and tested to confirm asbestos content. Alternatively, suspect ACM may be presumed to be asbestos-containing and removed as prescribed under O. Reg. 278/05.

The purpose of this survey was to identify accessible ACM present at the Site for management purposes. Due to the limitations of the scope of work, this document does not relieve project managers from fulfilling the requirements set forth in the *Designated Substances Regulation* O. Reg. 490/09. Should renovation or demolition work be planned in the future, it is a requirement of O. Reg. 490/09 to conduct or arrange for a designated substance survey in advance of tendering work of this nature.

5.0 LIMITATIONS

This report was prepared for the exclusive use of the University of Toronto, Mississauga. This report is based on data and information collected during the Site visits conducted by Golder and is based solely on Site conditions encountered at the time of the survey, supplemented by historical information and data obtained by Golder as described in this report.

The conclusions and recommendations contained in this report are based upon professional opinions with regard to the subject matter. These opinions are in accordance with applicable and currently accepted occupational health and safety or environmental assessment standards and practices applicable to these locations and are subject to the following limitations:

- The data and findings presented in this report are valid as of the date of the investigation. The passage of time, manifestation of latent conditions or occurrence of future events may warrant further exploration at the properties, analysis of the data, and re-evaluation of the findings, observations, and conclusions expressed in this report.

- The findings, observations and conclusions expressed by Golder in this report are not, and should not be considered, an opinion concerning compliance of any past or present owner or operator of the Site with any federal, provincial or local laws or regulations.

- Additional asbestos-containing building materials not identified in this report may become evident during future renovation activities. Should additional information become available, Golder requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

- We will not be responsible for any real or perceived decrease in a property value, its saleability or ability to gain financing through the reporting of information in this report.

- Our report presents professional opinions and findings of a scientific and technical nature. While attempts were made to relate the data and findings to applicable environmental and occupational health and safety laws and regulations, the report shall not be construed to offer legal opinion or representations as to the requirements of, nor compliance with, environmental and occupational health and safety laws, rules, regulations or policies of federal, provincial, or local governmental agencies. Any use of this assessment report constitutes acceptance of the limits of our liability. Our liability extends only to UTM and not to other parties who may obtain this assessment report. Issues raised by the report should be reviewed by appropriate legal counsel.

- The data reported and the findings and recommendations expressed in this report are limited by the Scope of Work. The Scope of Work is based on the request of the client, availability of access to the property and time constraints.

- In evaluating the Site conditions, we have relied in good faith on information provided by others. We accept no responsibility for any deficiency, mis-statements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of the persons involved.

- The quantities of identified materials noted herein are estimated quantities for reporting purposes, and this report is limited in that regard. In the event that asbestos-containing materials are scheduled to be removed in the future, it is solely the responsibility of the “contractor” to confirm the exact quantities of materials to be removed, prior to their removal.

- This report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by UTM, communications between Golder and UTM, and to any other reports prepared by Golder for UTM relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. We cannot be responsible for use of portions of the report without reference to the entire report.

- Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of UTM in the management of ACM. The extent and detail of investigations, including the number of locations investigated, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for management purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how concealed conditions may affect their

work, including but not limited to proposed construction techniques, schedule, safety, and equipment capabilities.

- Special risks occur whenever engineering or related disciplines are applied to identify Site conditions and/or a comprehensive investigation, sampling and testing program may fail to detect all or certain Site conditions. The conditions that Golder interprets to exist between and beyond investigation and sampling points may differ from those that actually exist.

PART B – INVENTORY REPORT

6.0 SITE DESCRIPTION

The Site consists of seven townhouse style complexes, each consisting of two storeys. Basement units are present below each block of units, which contain laundry facilities. The Site was reportedly constructed in 1972, and occupies an area of approximately 2,900 square metres. The Site was occupied at the time of investigation.

The following is a brief description of the building systems observed:

Structural: the Site was observed to be constructed with cement block and concrete foundation, brick façade, and wood framing, with a wooden roof deck.

Walls: interior walls consisted of concrete block, drywall, ceramic tile, and concrete.

Flooring: included concrete slab, vinyl floor tiles, carpet, and ceramic tiles.

Ceilings: mainly consisted of drywall.

Mechanical: the Site was heated and cooled via forced air units located in a utility room within each unit. Where observed, both the mechanical ductwork and piping systems were noted to be uninsulated or insulated in fibreglass.

Roof: the roofing systems consisted of wood struts with wood sheathing beneath tar paper vapour barrier and asphalt shingles.

7.0 SITE INSPECTION

The field activities for the Golder survey were conducted on August 17th and 31st, 2016, by Mr. Chris Beavers and Ms. Victoria Atencio of Golder's EHS Management & Compliance Group. During the assessment, all interior areas and ground level on the exterior of the Site were accessed and surveyed.

8.0 ASBESTOS RESULTS SUMMARY

During the assessment, Golder collected 111 samples of suspect ACM, representing 22 homogenous materials. A Site plan detailing sample locations is provided in Appendix A. Based on laboratory analysis, asbestos was confirmed in the following samples:

- Non-friable drywall joint compound, present throughout the walls and ceiling of units 15-22 (Golder Sample 323(1) 1A-H) was found to contain 2% chrysotile asbestos. Approximately 48,000 ft^2 of the material was confirmed to be present in good condition;
- Non-friable grey caulking, present around the exterior windows throughout the residence, (Golder Sample 323(1) 2A-C) was found to contain up to 0.7% chrysotile asbestos. Approximately 1960 ft. of the material was confirmed to be present and noted to be in good condition;
- Non-friable window glazing, present around the exterior windows throughout the residence, (Golder Sample 323(1) 3A-C) was found to contain 2% chrysotile asbestos. Approximately 750 ft. of the material was confirmed to be present and noted to be in good condition;

- Non-friable light brown caulking, present around the siding, throughout the residence, (Golder Sample 323(1) 7A-C) was found to contain 2% chrysotile asbestos. Approximately 1400 ft. of the material was confirmed to be present and noted to be in good condition;
- Non-friable black sink acoustic dampener, present on the underside of sink in units 19 and 45 (Golder Sample 323(1) 8A-C) was found to contain 3% chrysotile asbestos. The sinks were noted to be in good condition;
- Non-friable drywall joint compound, present throughout the walls and ceiling of units 23-27 (Golder Sample 323(1) 9A-G) was found to contain 2% chrysotile asbestos. Approximately 48,000 ft^2 of the material was confirmed to be present in good condition;
- Friable pipe fitting insulation present in the basement laundry rooms throughout the residence (Golder Sample 323(1) 10A-C) was found to contain 45% chrysotile asbestos. Approximately 20 fittings of the material was confirmed to be present in good condition;
- Non-friable drywall joint compound, present throughout the walls and ceiling of units 45-53 (Golder Sample 323(1) 12A-I) was found to contain 4% chrysotile asbestos. Approximately 48,000 ft^2 of the material was confirmed to be present in good condition;
- Non-friable drywall joint compound, present throughout the walls and ceiling of units 5-14 (Golder Sample 323(1) 14A-G) was found to contain 3% chrysotile asbestos. Approximately 60,000 ft^2 of the material was confirmed to be present in good condition;
- Non-friable drywall joint compound, present throughout the walls and ceiling of units 1-4 (Golder Sample 323(1) 16A-E) was found to contain 3% chrysotile asbestos. Approximately 24,000 ft^2 of the material was confirmed to be present in good condition;
- Non-friable drywall joint compound, present throughout the walls and ceiling of units 28-34 (Golder Sample 323(1) 18A-G) was found to contain 3% chrysotile asbestos. Approximately 42,000 ft^2 of the material was confirmed to be present in good condition;
- Friable texture coat, present on the ceiling in units 45-53 (Golder Sample 323(1) 20A-G) was found to contain 2% chrysotile asbestos. Approximately 5,500 ft^2 of the material was confirmed to be present in good condition; and,
- Non-friable drywall joint compound, present throughout the walls and ceiling of units 35-42 (Golder Sample 323(1) 21A-G) was found to contain 3% chrysotile asbestos. Approximately 48,000 ft^2 of the material was confirmed to be present in good condition.

The following materials were sampled and confirmed to be **non-asbestos containing**:

- Brown caulking on the window and door frames, throughout the residence (Golder Samples 323(1) 4A-C);
- Dark brown caulking around the front door frames, throughout the residence (Golder Samples 323(1) 5A-C);
- Texture coat present on the ceilings of units 15-22 (Golder Sample 323(1) 6A-G);

- Drywall joint compound from the basement laundry rooms, throughout the residence (Golder Sample 323(1) 11A-C);
- Texture coat present on the ceilings of units 23-27 (Golder Sample 323(1) 13A-C);
- Texture coat present on the ceilings of units 5-14 (Golder Sample 323(1) 15A-G);
- Texture coat present on the ceiling of units 1-4 (Golder Sample 323(1) 17A-G);
- Texture coat present on the ceiling of units 28-34 (Golder Sample 323(1) 19A-G); and,
- Texture coat present on the ceiling of units 35-42 (Golder Sample 323(1) 22A-G);

A summary of the asbestos samples collected including location, condition, friability, asbestos content, and recommendations are provided in Appendix B. The Laboratory Certificate of Analysis for asbestos results is provided in Appendix C.

9.0 RECOMMENDATIONS

Through Site investigation and laboratory analytical testing, asbestos was confirmed to be present in select applications of drywall joint compound, two caulking, sink acoustic dampener, one window glazing application, ceiling texture coat and pipe fitting insulation. All observed materials were noted to be in good condition. As a precautionary measure, based on the era of construction, asbestos should be presumed in certain materials that could not be investigated/sampled at the time of the work program. These presumed ACM include, but are not limited to pipe gaskets and buried Transite™ asbestos-cement water drainage.

The confirmed and presumed asbestos-containing materials can be managed in place, in accordance with the requirements of O. Reg. 278/05 and the University of Toronto Mississauga Asbestos Management Plan.

Due to the non-intrusive nature of the original investigation, prior to starting any scheduled renovation/demolition work on the interior and/or exterior of the Site building, a more intrusive Project Specific Pre-Construction / Pre-Demolition Survey may also be required to adequately investigate, identify and report on concealed materials. Should additional materials be found to contain asbestos, it is recommended that these materials be managed in accordance with O. Reg. 278/05.

Due to the non-destructive nature of the investigation, building materials such as roofing compounds, tars, felts and inaccessible materials were not sampled. Prior to any proposed maintenance/demolition activities, these renovation/demolition areas should be assessed and sampled to determine the presence or absence of ACM.

Inaccessible building materials hidden or obscured within pipe chases, bulk heads, wall cavities, chimneys, above solid ceilings, and other non-accessible locations were not accessed or sampled during this survey. It is recommended that, prior to renovation/demolition activities in areas of inaccessibility, these areas should be assessed and sampled as required for confirmation purposes to determine the presence of ACM.

Report Signature Page

GOLDER ASSOCIATES LTD.

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CB/JH/RS:kc

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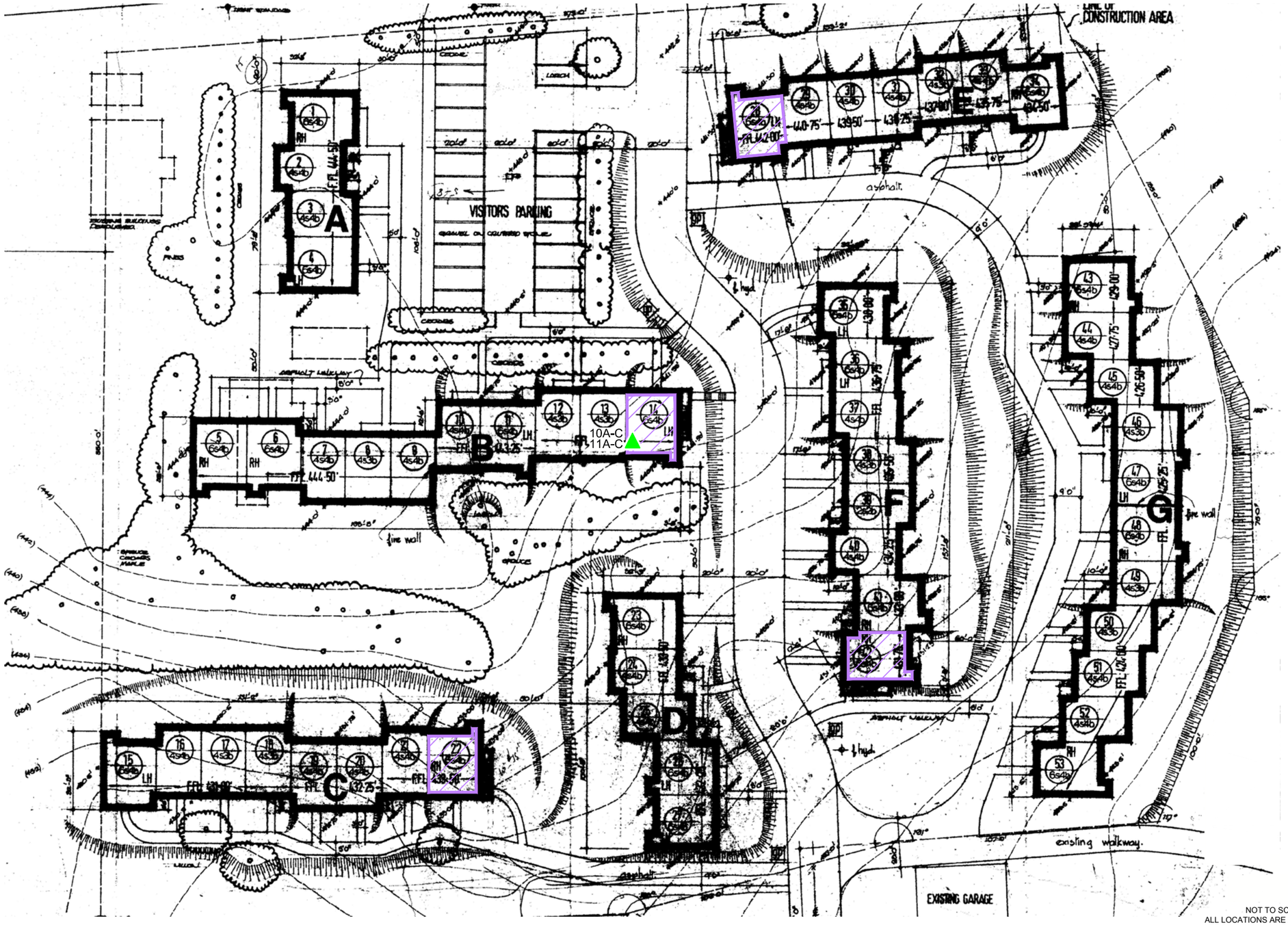
APPENDIX A

Sample Location and Confirmed ACM Location Plans



NOT TO SCALE
ALL LOCATIONS ARE APPROXIMATE

LEGEND

- ASBESTOS SAMPLE LOCATION
- ASBESTOS CONTAINING PARGING CEMENT FITTINGS IN BASEMENT LAUNDRY ROOMS

REFERENCE

1. BASE PLAN PROVIDED BY UNIVERSAL SECTIONS LIMITED, ENTITLED "SITE DEVELOPMENT PLAN", DRAWING NO. A-101.

CLIENT
UNIVERSITY OF TORONTO MISSISSUAGA

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-03-17
DESIGNED	
PREPARED	MK
REVIEWED	CB
APPROVED	RS

PROJECT
ASBESTOS CONTAIINING MATERIALS SURVEY
SCHREIBERWOOD RESIDENCE
UNIVERSITY OF TORONTO MISSISSUAGA, 3359 MISSISSUAGA ROAD, MISSISSUAGA

TITLE
SAMPLE LOCATION PLAN - BASEMENT

PROJECT NO.	CONTROL	REV.	FIGURE
1654158		----	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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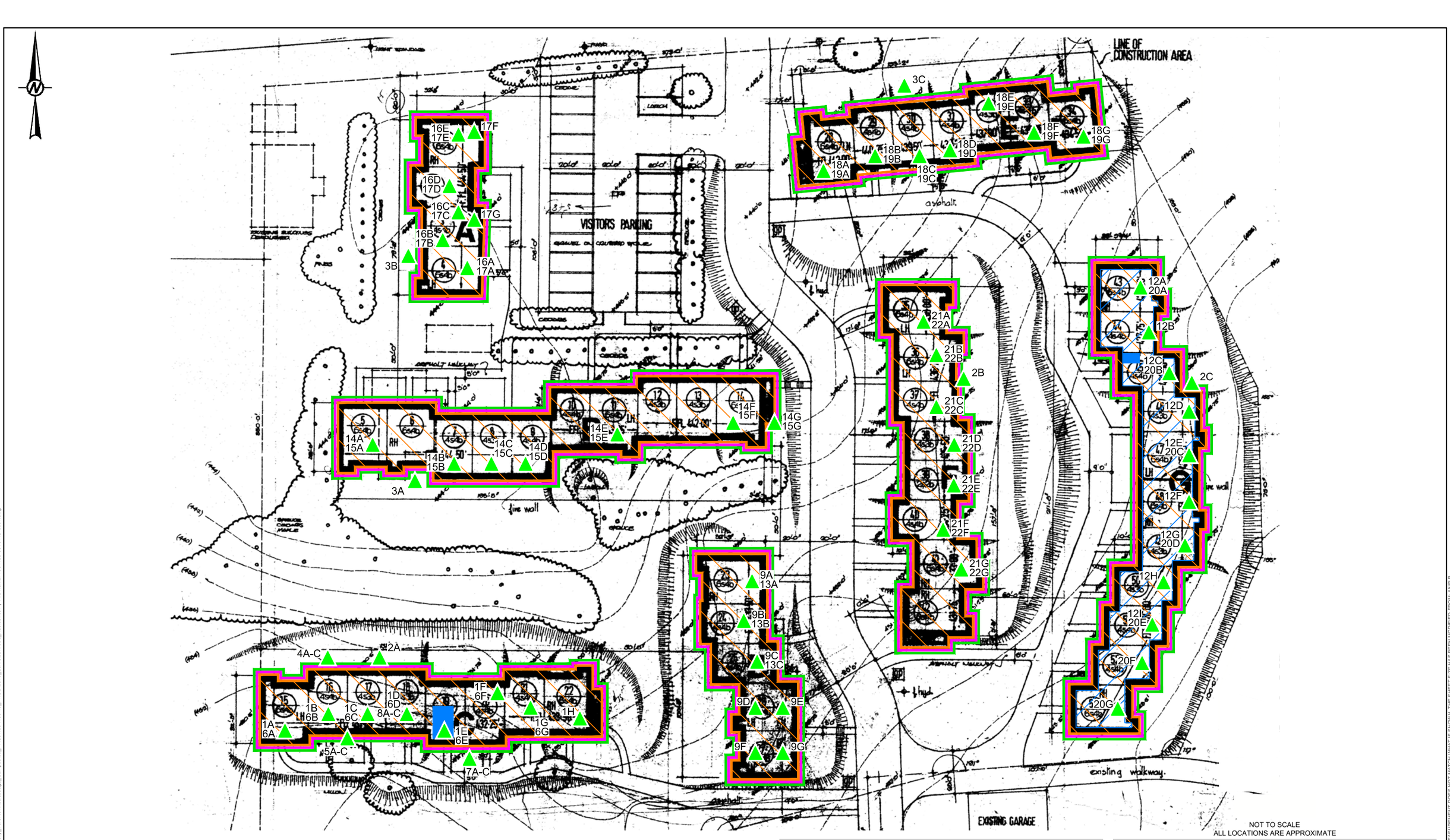

NOT TO SCALE
ALL LOCATIONS ARE APPROXIMATE

LEGEND

- ASBESTOS SAMPLE LOCATION
- ASBESTOS CONTAINING WINDOW CAULKING AND GLAZING
- ASBESTOS CONTAINING FLASHING CAULKING
- ASBESTOS CONTAINING BLACK SINK ACOUSTIC MATERIAL
- ASBESTOS CONTAINING TEXTURE COAT
- ASBESTOS CONTAINING DRYWALL JOINT COMPOUND

REFERENCE

1. BASE PLAN PROVIDED BY UNIVERSAL SECTIONS LIMITED, ENTITLED "SITE DEVELOPMENT PLAN", DRAWING NO. A-101.

CLIENT
UNIVERSITY OF TORONTO MISSISSUAGA

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-03-17
DESIGNED	
PREPARED	MK
REVIEWED	CB
APPROVED	RS

PROJECT
ASBESTOS CONTAINING MATERIALS SURVEY
SCHREIBERWOOD RESIDENCE
UNIVERSITY OF TORONTO MISSISSUAGA, 3359 MISSISSUAGA ROAD, MISSISSUAGA

TITLE
SAMPLE LOCATION PLAN - GROUND FLOOR

PROJECT NO.	CONTROL	REV.	FIGURE
1654158		----	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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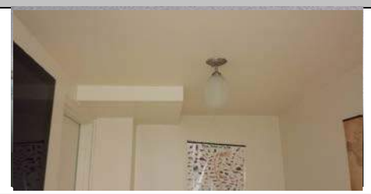
APPENDIX B

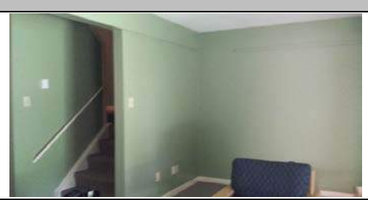
Asbestos-Containing Materials Inventory

Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
Units 1-4														
1-4	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**24,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**16A-E**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**
1-4	Living Room	Ground Floor	Texture Coat	Ceiling	1600	Sq.Ft.	Good	Yes	High	323 (1)	17A-C	None detected		No action required
1-4	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**200**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
1-4	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**80**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
1-4	Exterior	Throughout	Caulking	Brown caulking on brown window frames	80	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required
1-4	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	80	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required

Accessibility:
High: Accessible to Workers
Mod: Accessible Only With a Ladder
Low: Enclosed in Building Materials

Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
1-4	**Exterior**	**Throughout**	**Caulking**	**Light brown flashing caulking present on the siding**	**140**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**7A-C**	**2% Chrysotile**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
Units 5-14														
5-14	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**60,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**14A-G**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**
5-14	Living Room	Ground Floor	Texture Coat	Ceiling	4,000	Sq.Ft.	Good	Yes	High	323 (1)	15A-G	None detected		No action required
5-14	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**280**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
5-14	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**100**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
5-14	Exterior	Throughout	Caulking	Brown caulking on brown window frames	100	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required

Accessibility:
High: Accessible to Workers
Mod: Accessible Only With a Ladder
Low: Enclosed in Building Materials

Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
5-14	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	100	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
5-14	**Exterior**	**Throughout**	**Caulking**	**Light brown flashing caulking present on the siding**	**200**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**7A-C**	**2% Chrysotile**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
5-14	**Storage Room, Laundry Room**	**Basement**	**Pipe Fitting Insulation**	**Associated with 2inch line**	**3 Fittings**	**Each**	**Good**	**Yes**	**High**	**323 (1)**	**10A-C**	**45% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 2 asbestos work procedures as prescribed under O.Reg. 278/05.**
5-14	Laundry Room	Basment	Drywall Joint Compound	Ceiling in the stairwell	800	Sq.Ft.	Good	Yes	High	323 (1)	11A-C	None detected	Photograph Unavailable	No action required
Units 15-22														
15-22	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**48,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**1A-H**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**
15-22	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**280**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**

Accessibility:
High: Accessible to Workers
Mod: Accessible Only With a Ladder
Low: Enclosed in Building Materials

Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
15-22	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**100**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
15-22	Exterior	Throughout	Caulking	Brown caulking on brown window frames	100	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required
15-22	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	100	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
15-22	Living Room and Entrance Hallway	Ground Floor	Texture Coat	Ceiling	1400	Sq.Ft.	Good	Yes	High	323 (1)	6A-G	None detected		No action required
19	**Kitchen**	**Ground Floor**	**Sink Acoustic**	**Black sink acoustic**	**4**	**Sq.Ft.**	**Good**	**No**	**High**	**323 (1)**	**8A-C**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
15-22	**Storage Room, Laundry Room**	**Basement**	**Pipe Fitting Insulation**	**Associated with 2inch line**	**3 Fittings**	**Each**	**Good**	**Yes**	**High**	**323 (1)**	**10A-C**	**45% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 2 asbestos work procedures as prescribed under O.Reg. 278/05.**

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Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
15-22	Laundry Room	Basment	Drywall Joint Compound	Ceiling in the stairwell	800	Sq.Ft.	Good	Yes	High	323 (1)	11A-C	None detected	Photograph Unavailable	No action required
Units 23-27														
23-27	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**30,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**9A-G**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**
23-27	Throughout	Throughout	Texture Coat	Ceiling	400	Sq.Ft.	Good	Yes	High	323 (1)	13A-C	None detected		No action required
23-27	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**280**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
23-27	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**100**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
23-27	Exterior	Throughout	Caulking	Brown caulking on brown window frames	100	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required

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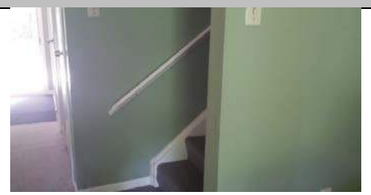
Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
23-27	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	100	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
23-27	**Exterior**	**Throughout**	**Caulking**	**Light brown flashing caulking present on the siding**	**200**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**7A-C**	**2% Chrysotile**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
Units 38-34														
28-34	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**42,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**18A-G**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**
28-34	Living Room	Ground Floor	Texture Coat	Ceiling	3,000	Sq.Ft.	Good	Yes	High	323 (1)	19A-G	None detected		No action required
28-34	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**280**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
28-34	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**100**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**

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Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
28-34	Exterior	Throughout	Caulking	Brown caulking on brown window frames	100	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required
28-34	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	100	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
28-34	**Exterior**	**Throughout**	**Caulking**	**Light brown flashing caulking present on the siding**	**200**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**7A-C**	**2% Chrysotile**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
28-34	**Storage Room, Laundry Room**	**Basement**	**Pipe Fitting Insulation**	**Associated with 2inch line**	**3**	**Each**	**Good**	**Yes**	**High**	**323 (1)**	**10A-C**	**45% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 2 asbestos work procedures as prescribed under O.Reg. 278/05.**
28-34	Laundry Room	Basment	Drywall Joint Compound	Ceiling in the stairwell	800	Sq.Ft.	Good	Yes	High	323 (1)	11A-C	None detected	Photograph Unavailable	No action required
Units 35-42														
35-42	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**48000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**21A-G**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**

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Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
35-42	Living Room	Ground Floor	Texture Coat	Ceiling	5,000	Sq.Ft.	Good	Yes	High	323 (1)	22A-G	None detected		No action required
35-42	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**280**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
35-42	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**100**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
35-42	Exterior	Throughout	Caulking	Brown caulking on brown window frames	100	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required
35-42	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	100	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
35-42	**Exterior**	**Throughout**	**Caulking**	**Light brown flashing caulking present on the siding**	**200**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**7A-C**	**2% Chrysotile**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**

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Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
35-42	**Storage Room, Laundry Room**	**Basement**	**Pipe Fitting Insulation**	**Associated with 2inch line**	**3**	**Each**	**Good**	**Yes**	**High**	**323 (1)**	**10A-C**	**45% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 2 asbestos work procedures as prescribed under O.Reg. 278/05.**
35-42	Laundry Room	Basment	Drywall Joint Compound	Ceiling in the stairwell	800	Sq.Ft.	Good	Yes	High	323 (1)	11A-C	None detected	Photograph Unavailable	No action required
43-53 Units														
43-53	**Throughout**	**Throughout**	**Drywall Joint Compound**	**Walls and ceiling**	**66,000**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**12A-I**	**4% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 or Type 2 asbestos work procedures, dependent upon method and quantity impacted, as prescribed under O.Reg. 278/05.**
43-53	**Living Room**	**Ground Floor**	**Texture Coat**	**Ceiling**	**5,500**	**Sq.Ft.**	**Good**	**Yes**	**High**	**323 (1)**	**20A-G**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 3 asbestos work procedures as prescribed under O.Reg. 278/05.**
43-53	**Exterior**	**Ground Floor**	**Caulking**	**Grey window caulking around windows**	**280**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**2A-C**	**0.7% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
43-53	**Exterior**	**Ground Floor**	**Window Glazing**	**Window Glazing from steel frame windows**	**100**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**3A-C**	**2% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**

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Unit	Room	Level	Material	Description	Est. Qty	Units	Condition	Friable	Access	Sample #		Asbestos Content	Photographs	Comments
										Building	Sample			
43-53	Exterior	Throughout	Caulking	Brown caulking on brown window frames	100	Ln.Ft.	Good	No	High	323 (1)	4A-C	None detected		No action required
43-53	Exterior	Throughout	Caulking	Dark brown caulking around front door and front windows	100	Ln.Ft.	Good	No	High	323 (1)	5A-C	None detected		No action required
43-53	**Exterior**	**Throughout**	**Caulking**	**Light brown flashing caulking present on the siding**	**200**	**Ln.Ft.**	**Good**	**No**	**High**	**323 (1)**	**7A-C**	**2% Chrysotile**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**
45	**Kitchen**	**Ground Floor**	**Sink Acoustic**	**Black sink acoustic**	**4**	**Sq.Ft.**	**Good**	**No**	**High**	**323 (1)**	**8A-C**	**3% Chrysotile asbestos**		**Manage in place. If scheduled for impact through renovation or demolition, remove following Type 1 asbestos work procedures as prescribed under O.Reg. 278/05.**

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APPENDIX C

Laboratory Certificate of Analysis

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 551609915
Customer ID: 55GLDE34
Customer PO: 1654158-323-S
Project ID:

Attn: Jeff Hunt
Golder Associates, Ltd.
210 SHELDON DRIVE
CAMBRIDGE, ON N1T 1A8

Phone: (122) 6 3-8693
Fax:
Collected:
Received: 9/14/2016
Analyzed: 10/12/2016

Proj: 1654158 -323 -S / SCHREIBERWOOD

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: 323-S-1A **Lab Sample ID:** **551609915-0001**
Sample Description: Walls & Ceilings/115

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Beige	0%	98%	**2% Chrysotile**	

Client Sample ID: 323-S-1B **Lab Sample ID:** **551609915-0002**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-1C **Lab Sample ID:** **551609915-0003**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-1D **Lab Sample ID:** **551609915-0004**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-1E **Lab Sample ID:** **551609915-0005**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-1F **Lab Sample ID:** **551609915-0006**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-1G **Lab Sample ID:** **551609915-0007**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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EMSL Canada Order 551609915
Customer ID: 55GLDE34
Customer PO: 1654158-323-S
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: 323-S-1H **Lab Sample ID:** **551609915-0008**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323-S-2A **Lab Sample ID:** **551609915-0009**
Sample Description: Grey Window Caulking around Windows/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Gray	0%	100%	**<1% Chrysotile**	Gravimetric reduction required for point count
400 PLM PtCt Grav. Red.	10/12/2016	Gray	0.0%	100%	**<0.25% Chrysotile**	

Client Sample ID: 323-S-2B **Lab Sample ID:** **551609915-0010**
Sample Description: Grey Window Caulking around Windows/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Gray	0%	100%	**<1% Chrysotile**	Gravimetric reduction required for point count
400 PLM PtCt Grav. Red.	10/12/2016	Gray	0.0%	99.7%	**0.3% Chrysotile**	

Client Sample ID: 323-S-2C **Lab Sample ID:** **551609915-0011**
Sample Description: Grey Window Caulking around Windows/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Gray	0%	100%	**<1% Chrysotile**	Gravimetric reduction required for point count
400 PLM PtCt Grav. Red.	10/12/2016	Gray	0.0%	99.3%	**0.7% Chrysotile**	

Client Sample ID: 323.S-3A **Lab Sample ID:** **551609915-0012**
Sample Description: Window Glazing from Steel Frame Windows/Window Glazing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Gray	0%	98%	**2% Chrysotile**	

Client Sample ID: 323.S-3B **Lab Sample ID:** **551609915-0013**
Sample Description: Window Glazing from Steel Frame Windows/Window Glazing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323.S-3C **Lab Sample ID:** **551609915-0014**
Sample Description: Window Glazing from Steel Frame Windows/Window Glazing

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

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EMSL Canada Order 551609915
Customer ID: 55GLDE34
Customer PO: 1654158-323-S
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: 323-S-4A **Lab Sample ID:** **551609915-0015**

Sample Description: Brown Caulking on Brown Window Frames/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Brown	0%	100%	None Detected	

Client Sample ID: 323-S-4B **Lab Sample ID:** **551609915-0016**

Sample Description: Brown Caulking on Brown Window Frames/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Brown	0%	100%	None Detected	

Client Sample ID: 323-S-4C **Lab Sample ID:** **551609915-0017**

Sample Description: Brown Caulking on Brown Window Frames/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Brown	0%	100%	None Detected	

Client Sample ID: 323-S-5A **Lab Sample ID:** **551609915-0018**

Sample Description: Dark Brown Caulking around Front Door & Front Windows/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Gray	0%	100%	**<1% Chrysotile**	Gravimetric reduction required for point count
400 PLM PtCt Grav. Red.	10/12/2016	Gray	0.0%	99.7%	**0.3% Chrysotile**	

Client Sample ID: 323-S-5B **Lab Sample ID:** **551609915-0019**

Sample Description: Dark Brown Caulking around Front Door & Front Windows/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Brown/Gray	0%	100%	**<1% Chrysotile**	Gravimetric reduction required for point count
400 PLM PtCt Grav. Red.	10/12/2016	Brown/Gray	0.0%	100%	**<0.25% Chrysotile**	

Client Sample ID: 323-S-5C **Lab Sample ID:** **551609915-0020**

Sample Description: Dark Brown Caulking around Front Door & Front Windows/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Brown/Gray	0%	100%	**<1% Chrysotile**	Gravimetric reduction required for point count
400 PLM PtCt Grav. Red.	10/12/2016	Brown/Gray	0.0%	100%	**<0.25% Chrysotile**	

Client Sample ID: 323-S-6A **Lab Sample ID:** **551609915-0021**

Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

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EMSL Canada Order 551609915
Customer ID: 55GLDE34
Customer PO: 1654158-323-S
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: 323-S-6B **Lab Sample ID:** **551609915-0022**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-6C **Lab Sample ID:** **551609915-0023**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-6D **Lab Sample ID:** **551609915-0024**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-6E **Lab Sample ID:** **551609915-0025**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-6F **Lab Sample ID:** **551609915-0026**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-6G **Lab Sample ID:** **551609915-0027**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-7A **Lab Sample ID:** **551609915-0028**
Sample Description: Light Brown Flashing Caulking Present on the Siding/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Brown	0%	98%	**2% Chrysotile**	

Client Sample ID: 323-S-7B **Lab Sample ID:** **551609915-0029**
Sample Description: Light Brown Flashing Caulking Present on the Siding/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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Customer PO: 1654158-323-S
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: 323-S-7C **Lab Sample ID:** **551609915-0030**
Sample Description: Light Brown Flashing Caulking Present on the Siding/Caulking

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-8A **Lab Sample ID:** **551609915-0031**
Sample Description: Black Sink Acoustic/Sink Acoustic

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Black	0%	97%	**3% Chrysotile**	

Client Sample ID: 323-S-8B **Lab Sample ID:** **551609915-0032**
Sample Description: Black Sink Acoustic/Sink Acoustic

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-8C **Lab Sample ID:** **551609915-0033**
Sample Description: Black Sink Acoustic/Sink Acoustic

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-9A **Lab Sample ID:** **551609915-0034**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	98%	**2% Chrysotile**	

Client Sample ID: 323-S-9B **Lab Sample ID:** **551609915-0035**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-9C **Lab Sample ID:** **551609915-0036**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-9D **Lab Sample ID:** **551609915-0037**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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Client Sample ID: 323-S-9E **Lab Sample ID:** **551609915-0038**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-9F **Lab Sample ID:** **551609915-0039**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-9G **Lab Sample ID:** **551609915-0040**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-10A **Lab Sample ID:** **551609915-0041**
Sample Description: Associated with 2inch Line/Pipe Fitting Insulation

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Gray	0%	55%	**45% Chrysotile**	

Client Sample ID: 323-S-10B **Lab Sample ID:** **551609915-0042**
Sample Description: Associated with 2inch Line/Pipe Fitting Insulation

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-10C **Lab Sample ID:** **551609915-0043**
Sample Description: Associated with 2inch Line/Pipe Fitting Insulation

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-11A **Lab Sample ID:** **551609915-0044**
Sample Description: Ceiling in the Stairwell/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-11B **Lab Sample ID:** **551609915-0045**
Sample Description: Ceiling in the Stairwell/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

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Client Sample ID: 323-S-11C **Lab Sample ID:** **551609915-0046**
Sample Description: Ceiling in the Stairwell/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-12A **Lab Sample ID:** **551609915-0047**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Beige	0%	96%	**4% Chrysotile**	

Client Sample ID: 323-S-12B **Lab Sample ID:** **551609915-0048**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-12C **Lab Sample ID:** **551609915-0049**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-12D **Lab Sample ID:** **551609915-0050**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-12E **Lab Sample ID:** **551609915-0051**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-12F **Lab Sample ID:** **551609915-0052**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Beige	0%	97%	**3% Chrysotile**	

Client Sample ID: 323-S-12G **Lab Sample ID:** **551609915-0053**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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Client Sample ID: 323-S-12H **Lab Sample ID:** **551609915-0054**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323-S-12I **Lab Sample ID:** **551609915-0055**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323-S-13A **Lab Sample ID:** **551609915-0056**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-13B **Lab Sample ID:** **551609915-0057**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-13C **Lab Sample ID:** **551609915-0058**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-14A **Lab Sample ID:** **551609915-0059**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Beige	0%	97%	**3% Chrysotile**	

Client Sample ID: 323-S-14B **Lab Sample ID:** **551609915-0060**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323-S-14C **Lab Sample ID:** **551609915-0061**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

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Client Sample ID: 323-S-14D **Lab Sample ID:** **551609915-0062**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-14E **Lab Sample ID:** **551609915-0063**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-14F **Lab Sample ID:** **551609915-0064**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-14G **Lab Sample ID:** **551609915-0065**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-15A **Lab Sample ID:** **551609915-0066**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-15B **Lab Sample ID:** **551609915-0067**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-15C **Lab Sample ID:** **551609915-0068**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-15D **Lab Sample ID:** **551609915-0069**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

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Client Sample ID: 323-S-15E **Lab Sample ID:** **551609915-0070**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-15F **Lab Sample ID:** **551609915-0071**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-15G **Lab Sample ID:** **551609915-0072**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-16A **Lab Sample ID:** **551609915-0073**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Tan	0%	97%	**3% Chrysotile**	

Client Sample ID: 323-S-16B **Lab Sample ID:** **551609915-0074**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-16C **Lab Sample ID:** **551609915-0075**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-16D **Lab Sample ID:** **551609915-0076**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-16E **Lab Sample ID:** **551609915-0077**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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Client Sample ID: 323-S17A **Lab Sample ID:** **551609915-0078**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S17B **Lab Sample ID:** **551609915-0079**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S17C **Lab Sample ID:** **551609915-0080**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-18A **Lab Sample ID:** **551609915-0081**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Tan	0%	98%	**2% Chrysotile**	

Client Sample ID: 323-S-18B **Lab Sample ID:** **551609915-0082**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-18C **Lab Sample ID:** **551609915-0083**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-18D **Lab Sample ID:** **551609915-0084**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-18E **Lab Sample ID:** **551609915-0085**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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Client Sample ID: 323-S-18F **Lab Sample ID:** **551609915-0086**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323-S-18G **Lab Sample ID:** **551609915-0087**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016			Positive Stop (Not Analyzed)		

Client Sample ID: 323-S-19A **Lab Sample ID:** **551609915-0088**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-19B **Lab Sample ID:** **551609915-0089**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-19C **Lab Sample ID:** **551609915-0090**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-19D **Lab Sample ID:** **551609915-0091**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-19E **Lab Sample ID:** **551609915-0092**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-19F **Lab Sample ID:** **551609915-0093**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

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Client Sample ID: 323-S-19G **Lab Sample ID:** **551609915-0094**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-20A **Lab Sample ID:** **551609915-0095**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-20B **Lab Sample ID:** **551609915-0096**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-20C **Lab Sample ID:** **551609915-0097**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-20D **Lab Sample ID:** **551609915-0098**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Tan/White	0%	98%	**2% Chrysotile**	

Client Sample ID: 323-S-20E **Lab Sample ID:** **551609915-0099**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-20F **Lab Sample ID:** **551609915-0100**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-20G **Lab Sample ID:** **551609915-0101**
Sample Description: Ceiling/Texture Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

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Client Sample ID: 323-S-21A **Lab Sample ID:** **551609915-0102**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-21B **Lab Sample ID:** **551609915-0103**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	Beige	0%	98%	**2% Chrysotile**	

Client Sample ID: 323-S-21C **Lab Sample ID:** **551609915-0104**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-21D **Lab Sample ID:** **551609915-0105**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-21E **Lab Sample ID:** **551609915-0106**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-21F **Lab Sample ID:** **551609915-0107**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-21G **Lab Sample ID:** **551609915-0108**
Sample Description: Walls & Ceilings/Drywall Joint Compound

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016				Positive Stop (Not Analyzed)	

Client Sample ID: 323-S-22A **Lab Sample ID:** **551609915-0109**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 551609915
Customer ID: 55GLDE34
Customer PO: 1654158-323-S
Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: 323-S-22B **Lab Sample ID:** **551609915-0110**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-22C **Lab Sample ID:** **551609915-0111**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-22D **Lab Sample ID:** **551609915-0112**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-22E **Lab Sample ID:** **551609915-0113**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-22F **Lab Sample ID:** **551609915-0114**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

Client Sample ID: 323-S-22G **Lab Sample ID:** **551609915-0115**
Sample Description: Ceiling/Textured Coat

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Asbestos Non-Fibrous	Asbestos	Comment
PLM	9/28/2016	White	0%	100%	None Detected	

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Project ID:

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Analyst(s):

Natalie D'Amico	PLM (45)
Romeo Samson	PLM (18) 400 PLM PtCt Grav. Red (2)
Ronald Ng	400 PLM PtCt Grav. Red (4)

Reviewed and approved by:

Matthew Davis
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 10/12/201613:56:24 Replaces initial report from: 09/28/201614:39:20 Reason Code: Client-Additional Analysis

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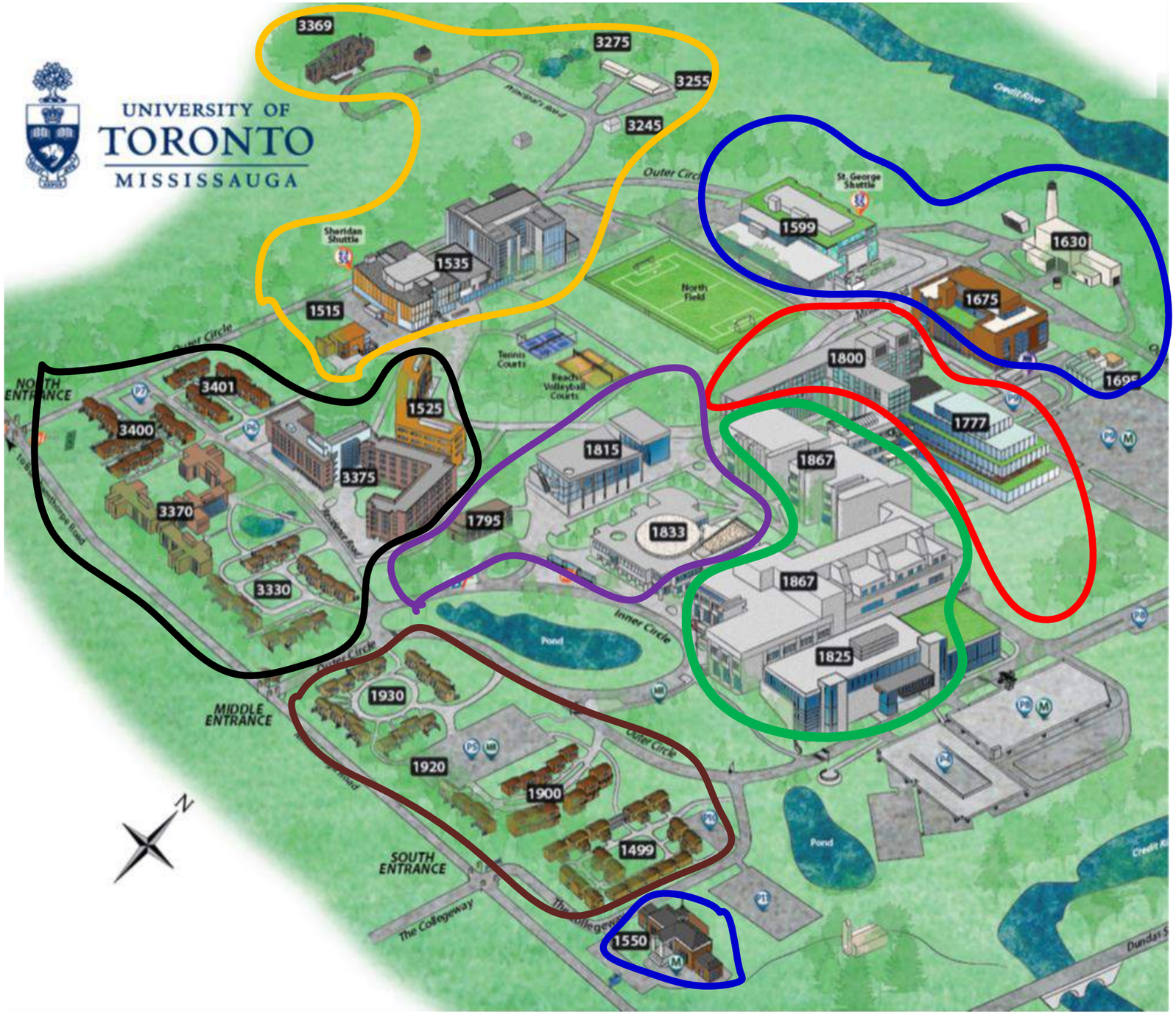
Appendix 5c
Existing Site Data Fibre Map



DRAWING - UTM001

Building Address*

Outer Circle

- 1630 Central Utilities Plant
- 1535 Deerfield Hall
- 1920 Early Learning Child Care Centre
- 1525 Erindale Hall
- 1515 Erindale Studio Theatre
- 1675 Hazel McCallion Academic Learning Centre & Library
- 1599 Instructional Centre
- 1900 Leacock Lane Residence
- 1535 North Building
- 1930 Putnam Place Residence
- 1825 Recreation, Athletics & Wellness Centre
- 1695 Research Greenhouse
- 1777 Terrence Donnelly Health Sciences Complex

Inner Circle

- 1795 Academic Annex
- 1833 Innovation Complex
- 1833 Kaneff Centre, Blackwood Gallery
- 1815 Student Centre
- 1867 William G. Davis Building

Middle Road

- 1800 Communication, Culture & Technology Building

The Collegeway

- 1550 Alumni House & Parking Office
- 1499 MaGrath Valley Residence

Residence Road

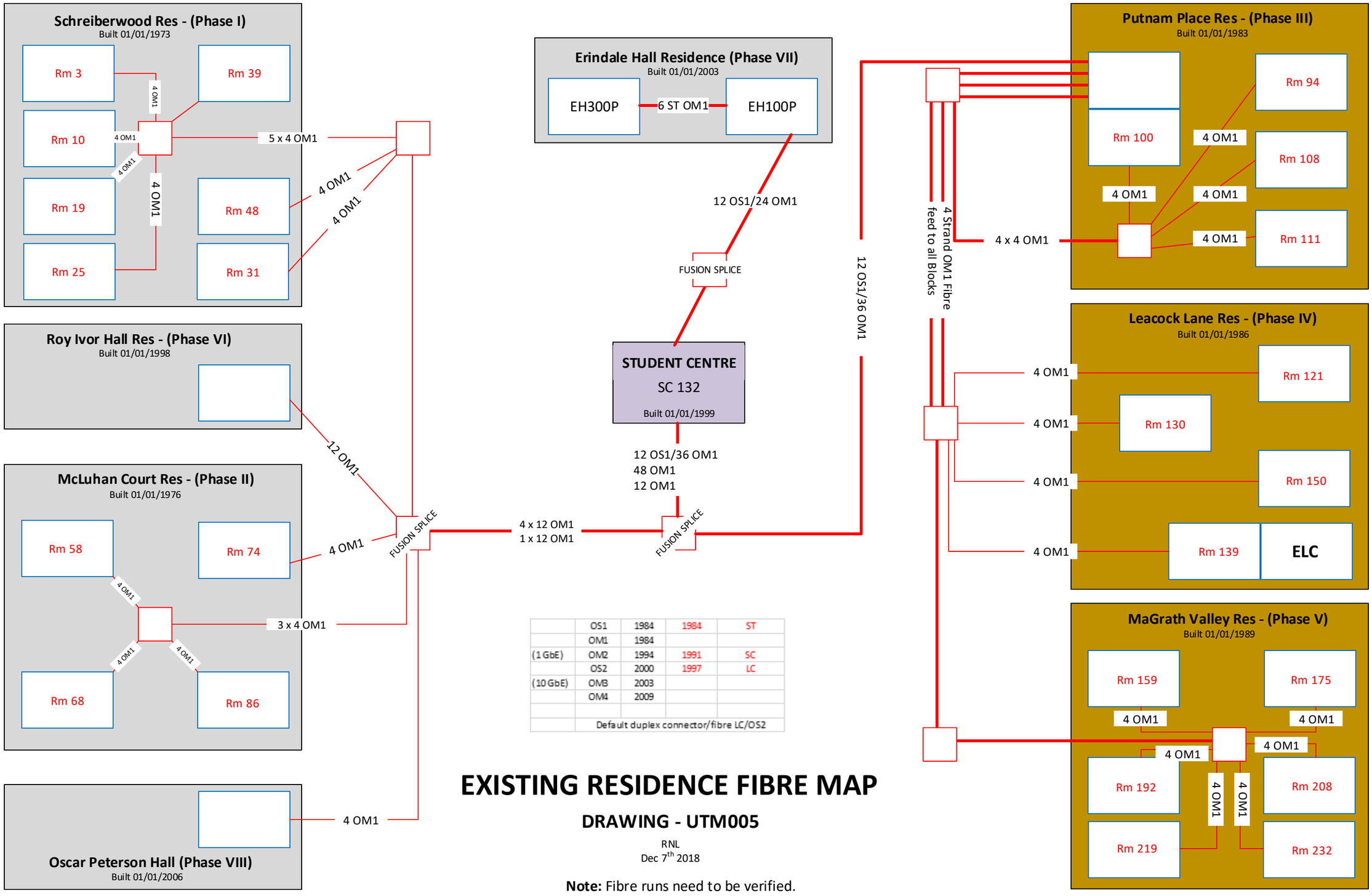
- 3330 McLuhan Court Residence
- 3375 Oscar Peterson Hall & Colman Commons Dining Hall
- 3370 Roy Ivor Hall
- 3400 Schreiberwood Residence
- 3401 Schreiberwood Residence

Principal's Road

- 3245 Forensic Anthropology Field School
- 3255 Grounds Building
- 3369 Lislehurst
- 3275 Paleomagnetism Lab

PROPOSED ROUTER MAP
DRAWING - UTM001

RNL
Nov. 29 2018



	OS1	1984	1984	ST
	OM1	1984		
(1 GbE)	OM2	1994	1991	SC
	OS2	2000	1997	LC
(10 GbE)	OM3	2003		
	OM4	2009		
	Default duplex connector/fibre LC/OS2			

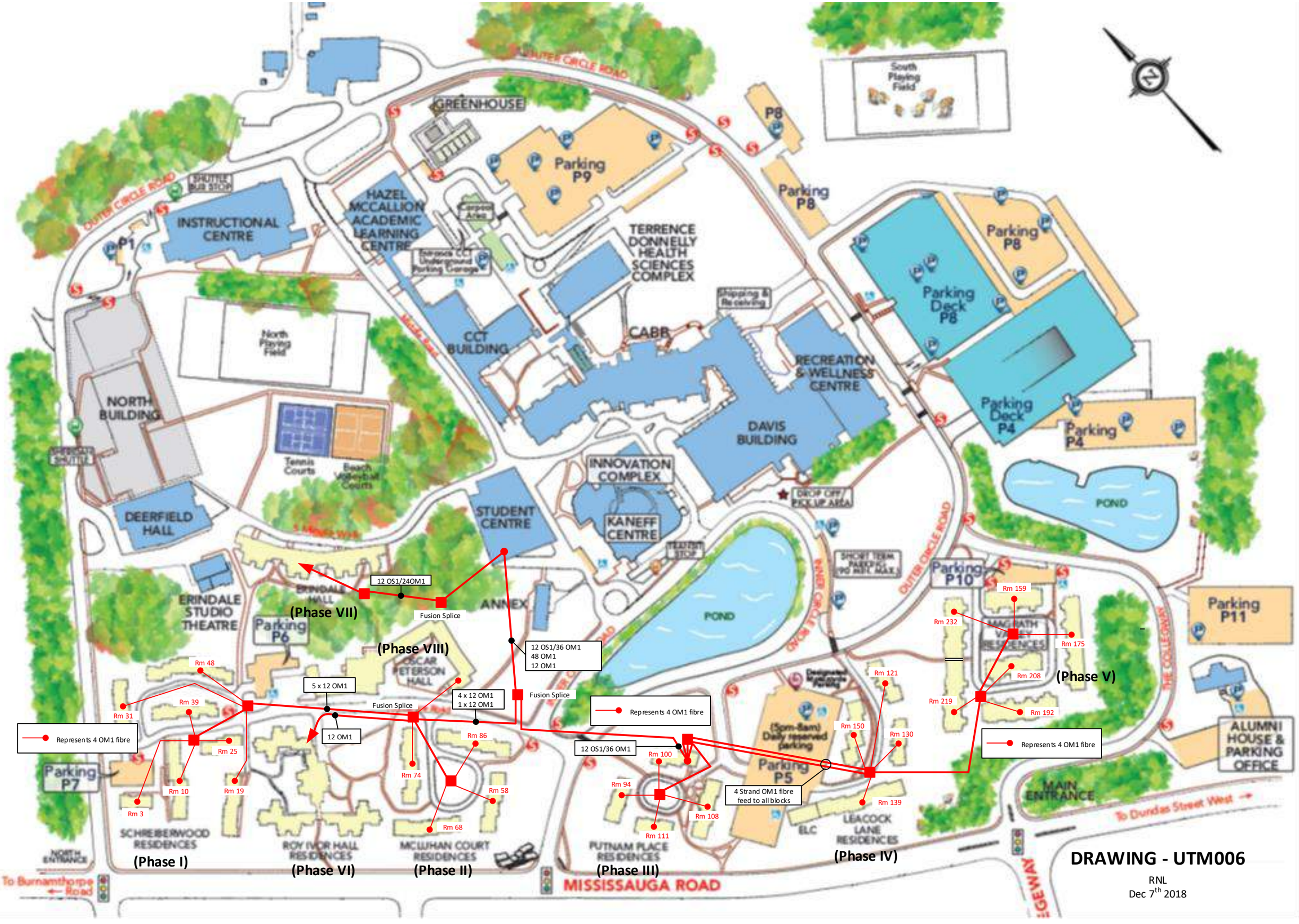
EXISTING RESIDENCE FIBRE MAP

DRAWING - UTM005

RNL

Dec 7th 2018

Note: Fibre runs need to be verified.
Taken from old site map


OUTER CIRCLE ROAD
GREENHOUSE
South Playing Field
P8
Parking P9
Parking P8
SHUTTLE BUS STOP
INSTRUCTIONAL CENTRE
P1
HAZEL MCCALLION ACADEMIC LEARNING CENTRE
Carpool Area
Entrance CCT Underground Parking Garage
TERRENCE DONNELLY HEALTH SCIENCES COMPLEX
Parking Deck P8
Parking P8
North Playing Field
CCT BUILDING
Shipping & Receiving
CABR
RECREATION & WELLNESS CENTRE
NORTH BUILDING
Tennis Courts
Beach Volleyball Courts
DAVIS BUILDING
Parking Deck P4
Parking P4
INNOVATION COMPLEX
DEERFIELD HALL
STUDENT CENTRE
KANEFF CENTRE
DROP OFF/ PICK UP AREA
POND
SHORT TERM PARKING (NO MORE THAN 3 HRS)
Parking P10
Parking P11
ERINDALE STUDIO THEATRE
ERINDALE HALL
ANNEX
Parking P6
OSCAR PETERSON HALL
INNER CIRCLE ROAD
THE COLLEGEWAY
ALUMNI HOUSE & PARKING OFFICE
(5pm-8am) Daily reserved parking
Parking P5
ELC
LEACOCK LANE RESIDENCES
MAGRATH VALLEY RESIDENCES
MAIN ENTRANCE
To Dundas Street West
Parking P7
SCHREIBERWOOD RESIDENCES
ROY IVOR HALL RESIDENCES
MCLUHAN COURT RESIDENCES
PUTNAM PLACE RESIDENCES
NORTH ENTRANCE
To Burnamthorpe Road
MISSISSAUGA ROAD
(Phase I)
(Phase VI)
(Phase II)
(Phase III)
(Phase IV)
(Phase V)
(Phase VII)
(Phase VIII)
12 OS1/24OM1
Fusion Splice
12 OS1/36 OM1
48 OM1
12 OS1/36 OM1
Fusion Splice
5 x 12 OM1
12 OM1
Fusion Splice
4 x 12 OM1
1 x 12 OM1
Represents 4 OM1 fibre
12 OS1/36 OM1
4 Strand OM1 fibre feed to all blocks
Represents 4 OM1 fibre
Represents 4 OM1 fibre
Rm 48
Rm 31
Rm 39
Rm 25
Rm 10
Rm 19
Rm 3
Rm 74
Rm 86
Rm 58
Rm 68
Rm 94
Rm 100
Rm 108
Rm 111
Rm 121
Rm 150
Rm 130
Rm 139
Rm 232
Rm 159
Rm 175
Rm 208
Rm 219
Rm 192
DRAWING - UTM006
RNL
Dec 7th 2018

Appendix 5d
Local Fibre Considerations

SYMBOL	DESCRIPTION
	FLAT DUCT 7 WAY 20/16
	FLAT DUCT 5 WAY 20/16
	FLAT DUCT 3 WAY 20/16
	FLAT DUCT 2 WAY 20/16
	1x 4" PVC W/ 2X3-CEL MAXCELL EDGE
	2x4" PVC W/ 2X3-CEL MAXCELL EDGE
	EXISTING CONDUIT CONNECTION
	EXISTING CONDUIT TO BE RE USE
	MAINTENACE HOLE
	OUTDOOR FIBRE PEDESTAL
	WALL MOUNT FTTH ENCLOSURE
	HD WALL MOUNT FTTH ENCLOSURE


Davis Rm 2115
PROPOSED RESIDENCE
NEW ROUTER LOCATION
Blown Fibre link
CONSOLIDATION
POINT

Appendix 6
University of Toronto Policy Statement of Energy Efficiency PPR
New Project Charter

Appendix 6a
Charter

New Construction Project Charter

Input Cells

PPR Form

Project Characteristics

Project Name	UTM New Student Residence (2019)
Proposed Occupancy Date	2022-2026

Programming Breakdown

Categorize the project's programmed areas as net assignable floor area ("NASM") into the appropriate use-types, following the descriptions provided below. Apply multipliers as appropriate to reach the total anticipated gross floor area ("GSM") of the project. When all space uses have been assigned, the total NASM and GSM should align with the PPR.

Space Use Types	NASM (m2)	Multiplier	GSM (m2)	Notes
Residence Space - including living quarters, amenity and common spaces, laundry rooms, etc.	5,622.9	1.7	9,558.9	Residential Space; Common Rooms; Vending Machine
Retail Space - including sales area, kitchen, dining/seating area, servery, etc.	0.0	2.0	0.0	
Athletic Space - including exercise rooms, gymnasiums, change rooms, lockers, multi-purpose rooms, etc.	0.0	2.0	0.0	
Wet Laboratory Space - laboratory and lab support/storage spaces that have high ventilation exhaust requirements and high equipment power density.	0.0	2.0	0.0	
Dry Laboratory Space - laboratory and lab support/storage spaces that have high equipment power density but no ventilation exhaust requirements.	0.0	2.0	0.0	
Office Space - including staff, faculty & grad offices, and associated areas	192.0	1.7	326.4	Office and support areas: Server & Communications
Academic Space - including classroom and lecture, meeting rooms, multipurpose academic spaces, etc.	555.0	1.7	943.5	Academic and support areas; Student Space; Study Space
All Other Areas - any space not attributed above	0.0	2.0	0.0	
Total (m2)	6,369.9		10,828.8	

Connected to District Energy?	No

Performance Targets

Total Energy Use Intensity	74.7	ekWh/m2/yr
Greenhouse Gas Intensity	4.9	kg CO2e/m2/yr
Heating Thermal Energy Demand Intensity	30.6	kWh/m2/yr
Cooling Thermal Energy Demand Intensity	20.3	kWh/m2/yr
Indoor Water Use Reduction	50%	
Outdoor Water Use Reduction	60%	
On-Site Renewable Requirements	if any	

Charter Agreement

Name	Role	Initials	Date

Appendix 6b
100% CD Energy Report

Introba

FORMERLY

INTEGRAL

Ross&Baruzzini

University of Toronto Mississauga

New Residence Building

100% CD Energy Analysis Report

June 7, 2023

introba.com

Issue	Description	Date	Prepared By	Signed Off
1	Issued for 100% CD	2023-06-07	EC, RD, LM	EC

PROJECT NUMBER

2020.210344.000

PROJECT OFFICE

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PROJECT CONTACT

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DISCLAIMER

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V1.1

LIMITING CONDITIONS

This report has been prepared for Montgomery Sisam Architects to provide estimated energy performance of the proposed building design for Construction Documentation stage. The analysis and the results present the estimated, annual energy use for the proposed building design. The proposed design calculations are applicable only for determining compliance with the targets set by the University of Toronto. Energy performance results are not predictions of actual energy use or costs of the proposed design after construction. Actual experience will differ from these calculations due to the variations such as occupancy, building operation and maintenance, weather, process loads estimations, and precision of the calculation tool.

Table of Contents

1 Project Overview

A new residence hall is being built at the University of Toronto Mississauga campus. The building with a gross floor area of about 11,300 m2 includes single and double occupancy dorm rooms, study rooms and common areas, conference rooms, a music room, and an event space.

The intent of this modelling exercise is to present the results from the energy model along with the input assumptions for the model to evaluate compliance with the University's project charter.

Energy modelling was used throughout design to study the thermal heating and cooling energy demand of the building, and the impact of various design parameters such as wall and roof insulation, window-to-wall ratios, and glazing specifications. In addition to this, the energy model was used to study different HVAC system parameters and their impact on the total energy use intensity (TEUI) and greenhouse gas intensity (GHGI) of the building.

1.1 Project Charter

The energy performance thresholds set by the university for this building typology and configuration are as follows:

- Total Energy Use Intensity (TEUI): 80.5 kWh/m^2/yr
- Greenhouse Gas emissions Intensity (GHGI): 4.9 kgCO_{2e}/m^2/yr
- Heating Thermal Energy Demand Intensity (H-TEDI): 30.6 kWh/m^2/yr
- Cooling Thermal Energy Demand Intensity (C-TEDI): 20.3 kWh/m^2/yr

2 Building Form

For reference purposes, a 3D rendering of the building in the eQuest 3.65 software is shown in the figure below. The grey portions depict exterior walls, the blue portions depict exterior glazing.

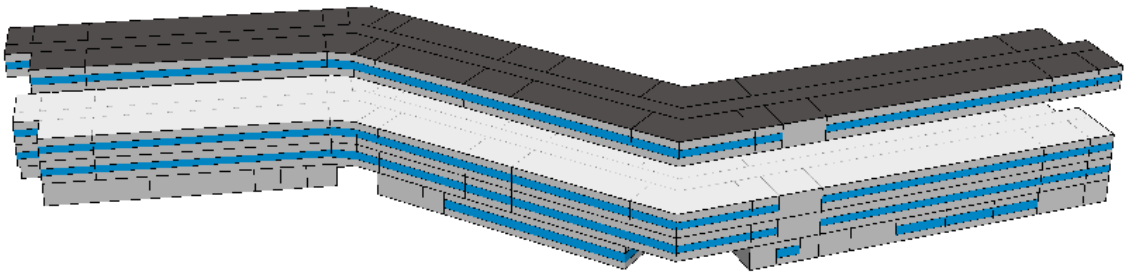


Figure-2.1: 3D Rendering of Energy Model

3 Energy Model Inputs

The inputs of the energy model are drawn from the 75% mechanical, electrical, and architectural drawing sets. The detailed list of these inputs is presented in the appendix.

4 Energy Modeling Results

Figure 1 below shows an energy end-use breakdown for the building. Energy in this case has been calculated for the proposed design using as-designed envelope parameters, lighting values, and HVAC systems. The primary energy use metrics for this design case are as follows:

- TEUI: 80.6 kWh/m^2/yr
- GHGI: 3.2 kgCO_2e/m^2/yr
- H-TEDI: 35.8 kWh/m^2/yr
- C-TEDI: 18.5 kWh/m^2/yr

These results are based on 100% occupancy from January to April and September to December, with 67% occupancy during the summer (double rooms to be used as single rooms). Energy use is very sensitive to the building's usage patterns, the design team is encouraged to review the energy model input assumptions outlined in Appendix A.

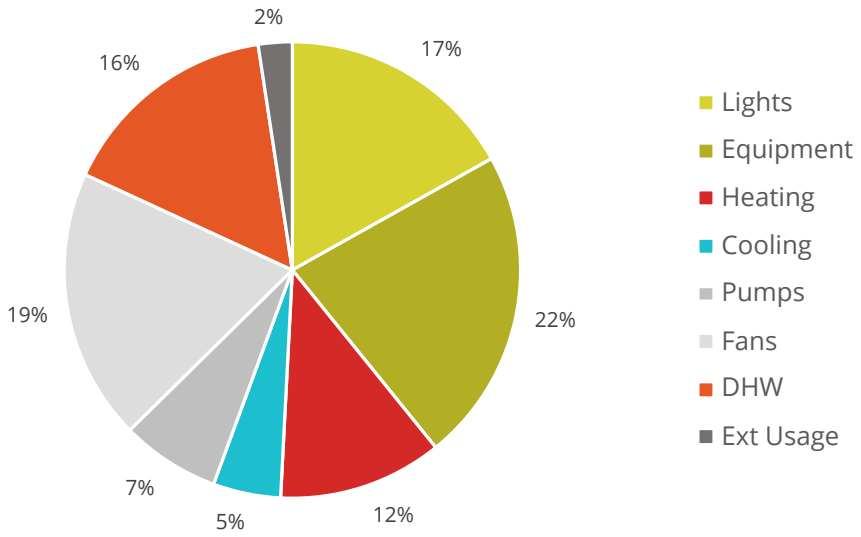


Figure-4.1: Annual building TEUI by end use

Figure-5.1 depicts the primary drivers of energy use in the building. Of the total EUI of 81 kWh/m^2/yr, about 36% is attributable to HVAC energy (heating, cooling, fan energy), 16% is attributable to service (DHW) water heating energy, 22% to equipment energy, and 17% to lighting energy.

5 Discussion

The energy model demonstrates that the building is performing very well overall, although it is meeting the project charter on only the GHGI and C-TEDI metrics. The TEUI performance is marginally high, but on the H-TEDI metric the proposed building exceeds the charter by about 17%. Below is a summary of why the building performance is high and additional details on areas where it falls short of the charter targets.

5.1 Summary of High-Performance Features

The low energy use intensity is primarily a result of aggressive targets for lighting energy, heating energy, cooling energy, and domestic hot water. The following building features contribute to the project's current modelled energy performance:

1. High performance triple pane glazing with thermally broken frames
2. Optimized shading across the entire façade and building massing with long side facing south
3. High performance walls with an assembly performance of R-14 effective
4. High performance lighting design (space-by-space lighting power densities 20% lower than those prescribed by ASHRAE 90.1-2013 for all spaces except bedrooms)
5. Advanced occupancy-based lighting controls, daylight dimming, and demand control ventilation in common spaces
6. Decoupled systems to address ventilation and zone sensible loads more efficiently
7. Enthalpy recovery wheels with 85% overall effectiveness

5.2 Increase in Heating TEDI from 100% DD

While most performance metrics have stayed approximately the same since 100% DD, TEDI has increased. This is due to a few reasons:

- Detailed envelope thermal bridging was performed. These calculations showed a decrease in wall R value from R-18 to R-14.
- Average glazing U value increased from 0.23 to 0.265 using the performance of the specified aluminum frame triple glazed windows.
- Laundry was previously anticipated to make use of condensing dryers. The decision to use non-condensing dryers added a makeup air requirement and associated heating load. More details about this impact are available in section 5.3.
- Air infiltration was increased to account for leakage through the roof assembly instead of only façade. However, an improved air tightness target was added, and the impacts ended up cancelling out.

The TEDI is fundamentally still performing well for a building of a student residence typology, with a particularly high density of occupants, and with a shallow floorplate with only exterior occupied/living zones. See section 5.4 for more information.

5.3 Laundry

Since laundry loads (electrical load, service hot water, and subsequent makeup air conditioning) have no bearing on building envelope design, the heating required for makeup air could be considered as a process load. If laundry were to be treated as such and excluded from the proposed design calculation, the primary energy use metrics are as follows:

- TEUI: 75.2 kWh/m^2/yr
- GHGI: 3.0 kgCO_2e/m^2/yr
- H-TEDI: 34.5 kWh/m^2/yr
- C-TEDI: 18.4 kWh/m^2/yr

Excluding laundry does not fundamentally alter the performance of the building in terms of compliance with the charter metrics for H-TEDI.

5.4 Adjusted Metrics

The proposed design currently achieves the CEDI and GHGI targets set by the project charter while narrowly missing the TEDI and TEUI targets. However, the project archetype (on which the charter targets are based) and proposed building differ in that the archetype has a GFA of 10,890 m^2 with 174 residence beds (63 m^2/bed) and the proposed building has a GFA of 11,300 m^2 with 400 residence beds (28 m^2/bed). On a per-bed basis, the proposed building performs extremely well, as summarized in the table below.

Metric	Project Charter Archetype	Proposed Building at 100% CD	Percentage Change
Total Energy Use Intensity *(TEUI)* (kWh/m^2/yr)	74.7 (adjusted to 80.5 at 100% DD)	80.6	**+7.9%**
Total Energy Use per person (kWh/bed/yr)	4,675	2,277	**-51.3%**
Greenhouse Gas Intensity *(GHGI)* (kg CO_2e/m^2/yr)	4.9	3.2	**-34.7%**
Greenhouse Gas per person (kg CO_2e/bed/year)	307	90.4	**-70.6%**
Heating Thermal Energy Demand Intensity *(H-TEDI)* (kWh/m^2/yr)	30.6	35.8	**+17.0%**
Heating Thermal Energy Demand per person (kWh/bed/yr)	1,915	1,011	**-47.2%**
Cooling Thermal Energy Demand Intensity *(C-TEDI)* (kWh/m^2/yr)	20.3	18.5	**-8.9%**
Cooling Thermal Energy Demand per person (kWh/bed/yr)	1,271	523	**-58.9%**

When adjusting for the function of the building (i.e., providing healthy living spaces for students), the proposed building performs far better than the archetype in all metrics evaluated, with high level takeaways being 50% lower energy use and 70% lower emissions per bed for the proposed building. Embodied carbon has not been evaluated here, but the drastic reduction in floor area per occupant

would result in significant greenhouse gas emissions savings there as well.

6 Conclusion

The proposed UTM New Residence building has a total energy use intensity of 80.6 kWh/m^2/yr, a greenhouse gas intensity of 3.1 kgCO_2e/m^2/yr, a heating thermal energy demand intensity of 35.8 kWh/m^2/yr, and a cooling thermal demand intensity of 18.5 kWh/m^2/yr. While the TEUI and H-TEDI do not meet the thresholds set by the University of Toronto Project Charter, the building has a much higher occupant density and therefore increased ventilation requirements compared to the archetype on which the standards were based. On a per-bed basis, the proposed building has 50% lower energy and 70% lower greenhouse gas emissions compared to the archetype, representing a more efficient use of resources.

Appendix A – Energy Model Inputs

The table below provides a summary of the building characteristics for the proposed design that are used as key input parameters for the energy model.

GENERAL PARAMETERS

Location	Mississauga, ON; Canada
Building Type	Residential Dorm | Common Rooms | Community Spaces
Conditioned Area	11,300 m^2
Modelling Software	eQuest v3.65 | DOE 2.3

ENVELOPE PARAMETERS

	Proposed Design
Exterior Walls	Assembly U: 0.071 Btu/h- ft^2-°F [R-14][1]
Roof Construction	Assembly U:0.025 Btu/h- ft^2-°F [R-40]
Windows	Assembly U:0.20-0.28 Btu/h- ft^2-°F; [2] | SHGC: 0.275
Window to Wall Ratio	South-facing: 31%; Southwest-facing: 36%; North-facing: 35%; Northeast-facing: 26%
Slab-on-grade	Vertical exterior R-10 insulation at the perimeter going 4 ft deep
Infiltration Rates	1.0 L/s-m^2 at 75Pa i.e. 0.034 cfm/ ft^2-above grade envelope area at ambient condition

[1] R-30 nominal insulation reduced to R-14 effective after accounting for thermal bridges per NECB 2017. Value provided by envelope consultant.
[2] Triple pane glazing performance as per email conversation with MSA dated April 4, 2022.

SPACE LOAD PARAMETERS

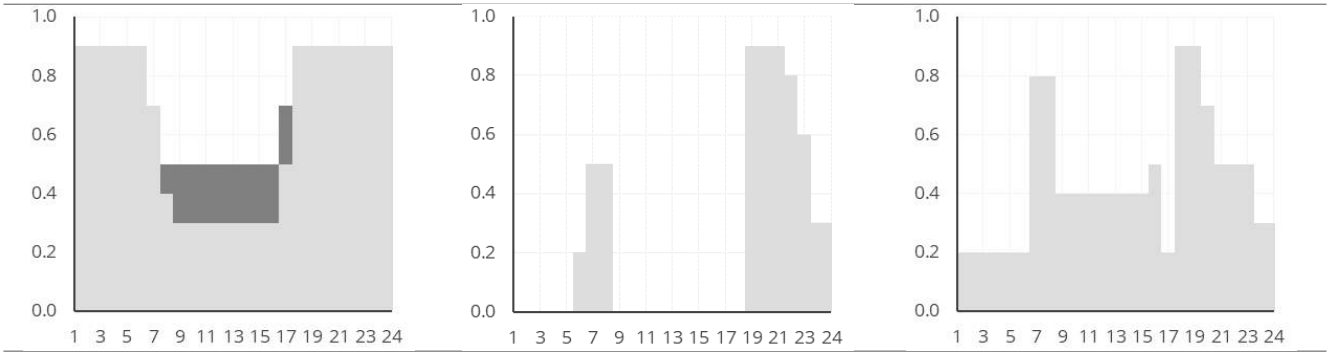
Space Type	Baseline Lighting	Proposed Lighting	Equipment	Occupants[2]	Outside Air
Bedroom	0.36 W/ft^2	0.36 W/ft^2	0.5 W/ ft^2	150 ft^2/pp	18-25 cfm/room
Study Room [1]	1.23 W/ft^2	0.98 W/ft^2	0.5 W/ ft^2	150 ft^2/pp	7.1 cfm/pp + 0.086 cfm/ft^2
Commons [1]	0.92 W/ft^2	0.74 W/ft^2	0.5 W/ft^2	75 ft^2/pp	7.1 cfm/pp + 0.086 cfm/ft^2
Conference Room [1]	1.23 W/ft^2	0.98 W/ft^2	0.5 W/ft^2	25 ft^2/pp	7.1 cfm/pp + 0.086 cfm/ft^2
Event Space [1]	1.23 W/ft^2	0.98 W/ft^2	0.5 W/ft^2	45 ft^2/pp	14.3 cfm/pp + 0.086 cfm/ft^2
Circulation [1]	0.69 W/ft^2	0.55 W/ft^2	-	500 ft^2/pp	0.086 cfm/ft^2
Restrooms	1.21 W/ft^2	0.97 W/ft^2	-	-	0.286 cfm/ft^2
Laundry [1]	0.60 W/ft^2	0.48 W/ft^2	5.0 W/ft^2	215 ft^2/pp	6.3 cfm/pp + 0.150 cfm/ft^2
Music [1]	1.23 W/ft^2	0.99 W/ft^2	0.5 W/ft^2	150 ft^2/pp	6.3 cfm/pp + 0.086 cfm/ft^2
Kitchen [1]	0.92 W/ft^2	0.74 W/ft^2	1.5 W/ft^2	75 ft^2/pp	10.7 cfm/pp + 0.257 cfm/ft^2 | 0.43 cfm/ft^2 KX
Elec/Mech [1]	0.42 W/ft^2	0.42 W/ft^2	-	-	-
Storage [1]	0.63 W/ft^2	0.50 W/ft^2	0.1 W/ft^2	500 ft^2/pp	0.171 cfm/ft^2
IT [1]	0.42 W/ft^2	0.42 W/ft^2	3.0 W/ft^2	-	-

[1] Ventilation rates based on ASHRAE 62.1-2013 and a ventilation effectiveness of 70% per mechanical design
[2] Occupancy assumed to drop to 65% during the summer (double occupancy rooms used as single rooms)

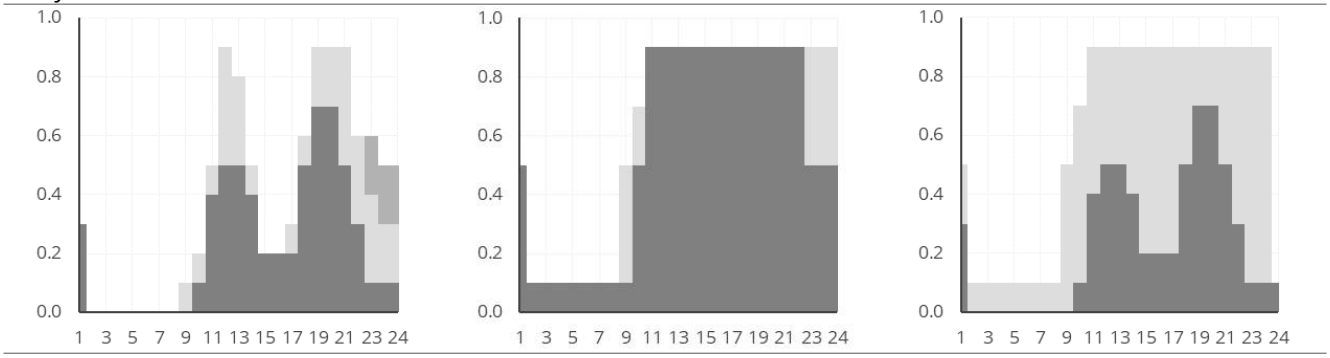
OPERATING SCHEDULES [1]

Occupancy	Lighting	Equipment

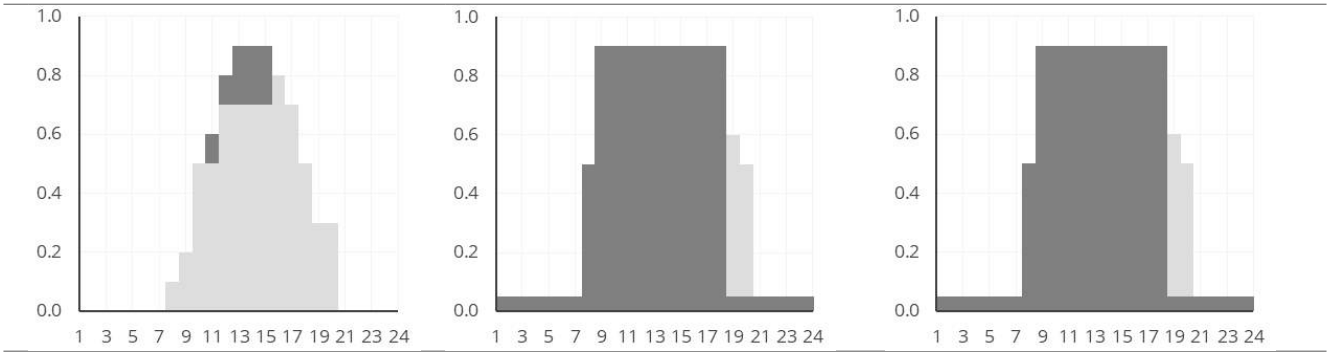
Residences



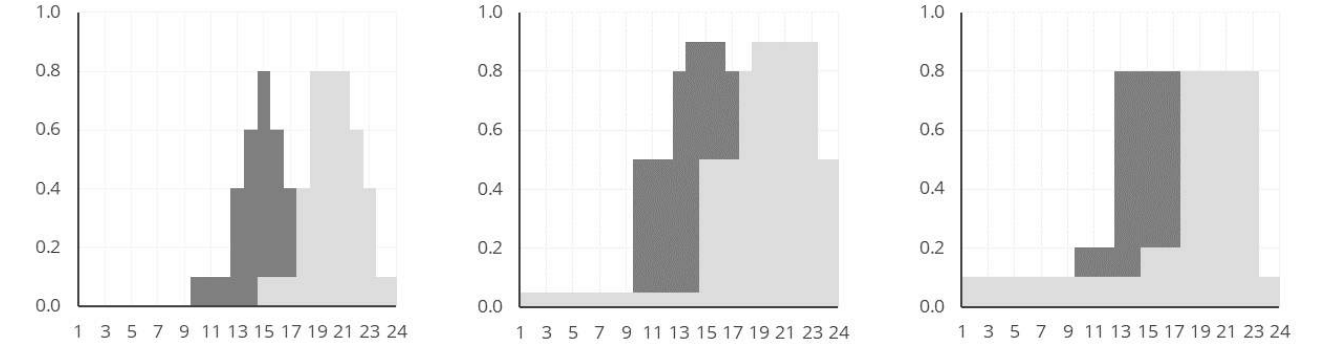
Study Rooms / Common Rooms



Conference Rooms



Event Spaces



[1] Occupancy assumed to drop to 65% during the summer - May to August (double occupancy rooms used as single rooms)

HVAC SYSTEM

Zone Conditions	Retail/Amenity: Cooling 75°F/23.9°C (Setback 81°F/27.2°C), Heating 70°F/21.1°C (Setback 64°F/17.8°C) Residences: Cooling 75°F/23.9°C, Heating 70°F/21.1°C Corridors: Cooling 81°F/27.2°C, Heating 64°F/17.8°C
System Type	Decentralized ERVs with CHW and HW coils providing ventilation air to all spaces; Zone four-pipe fan coil units with EC motors for space conditioning; Makeup Air Unit for laundry with electric preheat, CHW and HW coils
Supply Air Temperature	DOA AHUs: 65°F/18.3°C DBT reset up to 70°F/21.1°C | 37-64°F/2.8-17.8°C WBT; Humidifier integrated into ERVs Laundry MAU: 75°F/23.9°C Cooling, 65°F/18.3°C Heating
Fan System	Air handling units: VAV, 2.5" TSP Supply, 2.0" TSP Return FCUs: EC motors, 0.5" TSP Laundry MAU: 0.33 W/cfm (30% min flow, Off when unused)
Outside Airflow	ERV 1-8: 19,200 cfm; ERV 9-14: 5,070 cfm; DOAS-1: 2.600 cfm
Outside Air Controls	Economizer: 100% OA economizing up to DOAS capacity based on differential DBT; Energy recovery: Enthalpy wheels, 81% sensible effectiveness, 66% latent effectiveness; Demand controlled ventilation: Zone CO_2 sensors in all common areas
Cooling Source	Chilled water from central utility plant connected to geo-exchange wells; COP: 4.8 (annual average); 42°F/5.6°C Supply | 56°F/13.3°C Return; Reset based on load
Heating Source	Hot water from central utility plant connected to geo-exchange wells; COP: 4.0 (annual average); 120°F/48.9°C Supply | 100°F/37.8°C Return; Reset based on load
Pumps	Hot water pumps (building-level) - 22 W/gpm, Variable speed; Chilled water pumps (building-level) - 22 W/gpm, Variable speed
DHW Source	Hot water from central utility plant connected to geo-exchange wells up to 123°F/50.6°C + Electric boiler top-up to 140°F/60.0°C; COP: 4.0 (annual average) COP | 1.0 Electric boiler top-up
DHW Demand	**Number of residents**: 400 **Annual days of operation**: 365 [1]

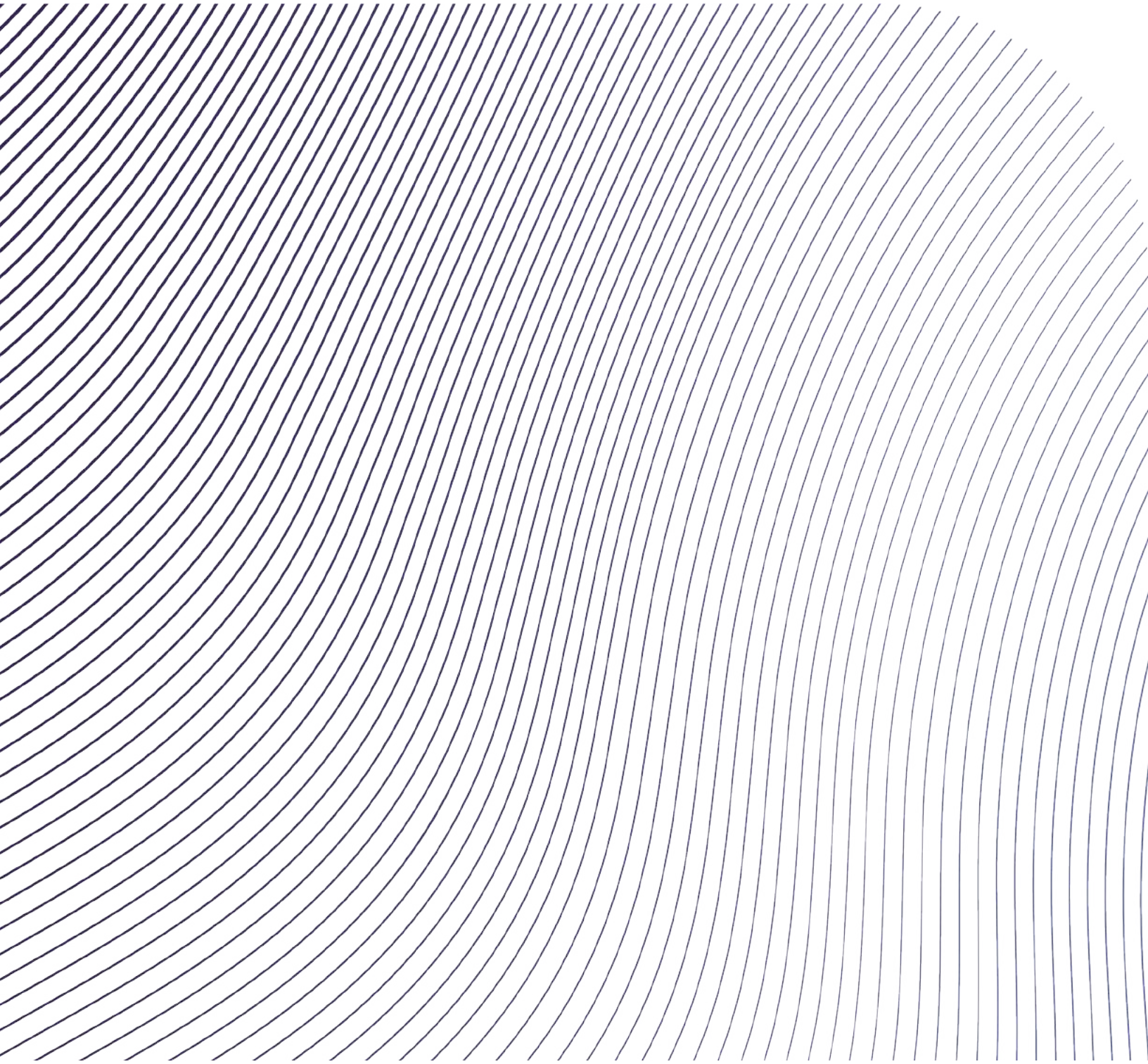
Fixture type	Duration (sec)	Flow rate (lpm)	Uses/day	Total Usage (L/yr)
Residential lavatory faucet	60	1.9	5	1,154,000
Residential showerhead	480	6.6	1	6,410,000

Fixture type	Litres per load (L)	Frequency of laundry	Total Usage (L/yr)
Central laundry	53	Biweekly	572,000

EVALUATION METRICS

GHG Emissions Factor	Electricity: 40 gCO_2/kWh

Introba



Appendix 6c
Energy Target Comparison

Project Charter

Overview

Introduction

The Project Charter has been developed to aid in the calculation of the project-specific performance targets and provide a central repository for the assumptions and design characteristics that drive the utility performance of buildings. It must be used in conjunction with the University of Toronto Tri-Campus Energy Modelling & Utility Performance Standard. The Project Charter serves as a reference point throughout the design process to ensure the performance goals are clearly understood by all involved parties and ultimately achieved.

Navigation

This workbook contains two versions of the Project Charter: for Renovation ("Reno") projects and for New Construction ("NC") projects, as categorized by U of T. For both of these versions, the Project Charter is comprised of three components: the PPR Form; the Design Form; and the Project Submissions Checklist. These components must be completed in accordance with the Standard, as summarized below:

Renovation Projects

Component	Worksheet	Instruction
PPR Form	"Reno-PPR"	Completed by U of T at PPR stage.
Design Form	"Reno-Design"	Completed by Project Consultant Team at Project Initiation.
Project Submissions Checklist	"Reno-Submissions Checklist"	Completed by Project Consultant Team at each project stage.

New Construction Projects

Component	Worksheet	Instruction
PPR Form	"NC-PPR"	Completed by U of T at PPR stage.
Design Form	"NC-Design"	Completed by Project Consultant Team at Project Initiation.
Prroject Submissions Checklist	"NC-Submissions Checklist"	Completed by Project Consultant Team at each project stage.

Instructions For Use

The Project Charter is completed by providing the required inputs as indicated by the visual cues defined below.

Visual Cues	Instruction
Input Cell	Cells that require input by U of T are identified in blue.
Input Cell	Cells that require input by Project Consultant Teams are identified in green.
Sample Drop Down	Some input cells have drop down menus.
Calculated Cell	Calculated values are displayed in white cells with borders.
Greyed Out Cell	Cells that are not applicable to the current project are greyed out.

Possible Error Types	Example
Missing a required input	** No Target Year

This type of error is resolved by finding and completing the input that was missed.

Calculation error	** Too Much Wet Lab

This error indicates the area inputs used to generate performance targets fall outside the expected bounds. It should be resolved in communication with U of T Facilities & Services.

Renovation Project Charter

Input Cells

PPR Form

Project Characteristics

Project Name

Proposed Occupancy Date Choose Target Year

Programming Breakdown

In the table below, categorize the project's programmed areas as net assignable floor area ("NASM") into the appropriate use-types, following the descriptions provided. Apply multipliers as appropriate to reach the total anticipated gross floor area ("GSM") of the project. When all space uses have been assigned, the total NASM and GSM should align with the PPR.

Space Use Types	NASM (m2)	Multiplier	GSM (m2)	Notes
Residence Space - including living quarters, amenity and common spaces, laundry rooms, etc.	0.0	2.0	0.0	
Retail Space - including sales area, kitchen, dining/seating area, servery, etc.	0.0	2.0	0.0	
Athletic Space - including exercise rooms, gymnasiums, change rooms, lockers, multi-purpose rooms, etc.	0.0	2.0	0.0	
Wet Laboratory Space - laboratory and lab support/storage spaces that have high ventilation exhaust requirements and high equipment power density.	0.0	2.0	0.0	
Dry Laboratory Space - laboratory and lab support/storage spaces that have high equipment power density but no ventilation exhaust requirements.	0.0	2.0	0.0	
Office Space - including staff, faculty & grad offices, and associated areas	8,700.0	1.84	16,008.0	
Academic Space - including classroom and lecture, meeting rooms, multipurpose academic spaces, etc.	0.0	2.0	0.0	
All Other Areas - any space not attributed above	0.0	2.0	0.0	
Total (m2)	8,700.0		16,008.0	

Baseline Energy Performance

Calculate the building's baseline energy performance by inputing the total annual energy use by fuel type. Use the most recent and complete full year of utility data available, making sure that usage from all fuel types is recorded during the same 12-month period. For fuel types that are not applicable, input 0.

Fuel Type	Annual Usage			Notes
Electricity	2,359,579.2	ekWh		
Natural Gas	0.0	ekWh		
District Heating	3,105,552.0	ekWh		
District Cooling	0.0	ekWh		
Other Fuel	0.0	ekWh		
Total Baseline Energy Usage	5,465,131.2	ekWh	341.4	Existing TEUI, ekWh/GSM

Performance Targets

The scope of the renovation project (major or minor) is assigned by Facilities & Services, and is based on the question: will the project meaningfully impact the energy use of the building?

Scope of Renovation Major Renovation

Performance Targets for Minor Renovation

Meet the mandatory and prescriptive provisions of SB-10 Division 3 Chapter 2 "Additional Requirements to 2013 ANSI/ASHRAE/IES 90.1 for all improvements.

Refer to Reno-Design tab for additional prescriptive requirements.

Performance Targets for Major Renovation

Renovation Category	Interior	HVAC	Envelope
Select all that apply	Yes	Yes	Yes

% Energy Use Reduction	** No Target Year	
Target Energy Usage	** No Target Year	ekWh
Indoor Water Use Reduction	50%	
Outdoor Water Use Reduction	60%	
On-Site Renewable Requirements	5%	

Charter Agreement

Name	Role	Initials	Date

Renovation Project Charter

Design Form

Input Cells

Project Name

Proposed Occupancy Date

Renovation Scope

Baseline Energy Usage ekWh

Performance Targets

Prescriptive Requirements - Minor Renovations

Requirement	Applicable?	Notes
Meet the mandatory and prescriptive provisions of SB-10 Division 3 Chapter 2 "Additional Requirements to 2013 ANSI/ASHRAE/IES 90.1 for all improvements.	Yes	
Provide a separate control zone for each solar exposure and interior space. Provide controls capable of sensing space conditions and modulating the HVAC system in response to space demand for all private offices and other enclosed spaces (e.g. conference rooms, classrooms).		
Reduce the connected interior lighting power density by at least 25% below that allowed by SB-10 Division 3 Chapter 2 as calculated using the space-by-space method.		
Install daylight-responsive controls in all regularly occupied daylit spaces within 4.5 m (15 ft) of windows and under skylights for at least 25% of the connected lighting load. Daylight controls must switch or dim electric lights in response to daylight illumination in the space.		
Install occupancy sensors for at least 75% of the connected lighting load.		
Install Energy Star appliances, office equipment, electronics, and commercial food service equipment for 100% of equipment and appliances.		
Comply with the requirements of SB-10 Division 3 Chapter 2 for the performance of all exterior building envelope components impacted by the renovation project.		
Comply with the requirements of SB-10 Division 3 Chapter 2 for the performance of all HVAC components impacted by the renovation project.		
Reduce indoor water use by 50% below the LEED version 4 baseline consumption.		
Reduce outdoor water use by 50% below the LEED version 4 baseline consumption.		

Performance Targets - Major Renovations

	Interior Systems	HVAC Systems	Envelope	Renovation GSM
Applicable Renovation Categories	Yes	Yes	Yes	16,008.0
Target % Energy Use Reduction	** No Target Year		341.4	**Existing TEUI, ekWh/GSM**
Target Energy Use	** No Target Year	ekWh	#VALUE!	**New TEUI, ekwh/GSM**
Indoor Water Use Reduction	50%			
Outdoor Water Use Reduction	60%			
On-Site Renewable Requirements	5%		#VALUE!	**Estimated solar, kWh/yr**
Proposed Calculation Methodology				

Charter Agreement

The project characteristics and performance targets recorded in this Project Charter are confirmed by the undersigned. Any changes to the project scope will require review and revision of this Charter.

U of T Implementation Committee	Name	Initials
Project Manager		
Facilities & Services		

Design Consultants Team	Name	Firm	Initials
Architect			
Energy Consultant			
Mechanical Engineer			
Electrical Engineer			
Landscape Consultant			

Date of Agreement	

Renovation Project Charter

Project Submissions Checklist

To be completed at each design stage.

Input Cells

Project Name

		PPR	Project Initializaton	SD	DD	CD	Occupancy
Date							
Documentation Submitted (Y/N)							
Project Charter							
Utilities Performance Report							
Water Efficiency Worksheets							
Summary of Changes							
Equipment Cut Sheets							
Performance	***Unit***						
Target % Energy Use Reduction	*%*	** No Target Year	** No Target Year				
Target Energy Usage	*ekWh*	** No Target Year	** No Target Year				
Indoor water reduction (%)	*%*	50%	50%				
Outdoor water reduction (%)	*%*	60%	60%				
Renewable Energy	*%*	0.1	5%				

New Construction Project Charter

Input Cells

PPR Form

Project Characteristics

Project Name	UTM New Student Residence (2019)
Proposed Occupancy Date	2022-2026

Programming Breakdown

Categorize the project's programmed areas as net assignable floor area ("NASM") into the appropriate use-types, following the descriptions provided below. Apply multipliers as appropriate to reach the total anticipated gross floor area ("GSM") of the project. When all space uses have been assigned, the total NASM and GSM should align with the PPR.

10.76

Space Use Types	NASM (m2)	Multiplier	GSM (m2)	Notes
Residence Space - including living quarters, amenity and common spaces, laundry rooms, etc.	5,622.9	1.7	9,558.9	Residential Space; Common Rooms; Vending Machine
Retail Space - including sales area, kitchen, dining/seating area, servery, etc.	0.0	2.0	0.0	
Athletic Space - including exercise rooms, gymnasiums, change rooms, lockers, multi-purpose rooms, etc.	0.0	2.0	0.0	
Wet Laboratory Space - laboratory and lab support/storage spaces that have high ventilation exhaust requirements and high equipment power density.	0.0	2.0	0.0	
Dry Laboratory Space - laboratory and lab support/storage spaces that have high equipment power density but no ventilation exhaust requirements.	0.0	2.0	0.0	
Office Space - including staff, faculty & grad offices, and associated areas	192.0	1.7	326.4	Office and support areas: Server & Communications
Academic Space - including classroom and lecture, meeting rooms, multipurpose academic spaces, etc.	555.0	1.7	943.5	Academic and support areas; Student Space; Study Space
All Other Areas - any space not attributed above	0.0	1.0	0.0	
Total (m2)	6,369.9		10,828.8	
Connected to District Steam System?	No		Assuming will be suppled by GSHP low temp heat	

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Performance Targets			Performance Budgets	
Total Energy Use Intensity	74.7	ekWh/m2/yr	808,913.6	ekWh/year
Greenhouse Gas Intensity	4.9	kg CO2e/m2/yr	53.1	tonnes CO2e/year
Heating Thermal Energy Demand Intensity	30.6	kWh/m2/yr	331,362.2	ekWh/year. See Stds for definition
Cooling Thermal Energy Demand Intensity	20.3	kWh/m2/yr	219,825.2	ekWh/yer. See Stds for definition
Indoor Water Use Reduction	50%			
Outdoor Water Use Reduction	60%			
On-Site Renewable Requirements	if any		#VALUE!	Estimated PV to contribute

Charter Agreement

Name	Role	Initials	Date

New Construction Project Charter

Design Form

Input Cells

Project Name	UTM New Student Residence (2019)	
Proposed Occupancy Date	2022-2026	

Performance Targets

Connected to District Energy?	No	
Total Energy Use Intensity	74.7	ekWh/m2/yr
Greenhouse Gas Intensity	4.9	kg CO2e/m2/yr
Heating Thermal Energy Demand Intensity	30.6	kWh/m2/yr
Cooling Thermal Energy Demand Intensity	20.3	kWh/m2/yr
Indoor Water Use Reduction	50%	
Outdoor Water Use Reduction	60%	
On-Site Renewable Requirements	if any	

Project Characteristics

Weekly Operating Schedule	**Monday - Friday**	**Saturday**	**Sunday**	**Notes**
Hours per Day	12	10	10	
Annual Scheduled Closures	32			
Total Annual Hours of Operation		hours		

Interior Design Conditions	Heating (°C)	Cooling (°C)	Relative Humidity	

Lab Characteristics (if applicable)

Lab Ventilation Requirement	6	Air Changes per Day	
Anticipated Lab Equipment	10	W/m2	

Energy Model Details

Energy Modelling Software			
Weather File	Choose File		
Target Air Leakage Rate		L/s-m2 of above-grade wall and window areas at 5 Pa	

Charter Agreement

The project characteristics and performance targets recorded in this Project Charter are confirmed by the undersigned. Any changes to the project scope will require review and revision of this Charter.

U of T Implementation Committee	Name	Initials
Project Manager		
Facilities & Services		

Design Consultants Team	Name	Firm	Initials
Architect			
Energy Consultant			
Mechanical Engineer			
Electrical Engineer			
Landscape Consultant			

Date of Agreement	

New Construction Project Charter

Input Cells

Project Submissions Checklist

To be completed at each design stage.

Project Name UTM New Student Residence (2019)

		PPR	Project Initializaton	SD	DD	CD	Occupancy
Date							
Documentation Submitted (Y/N)							
Project Charter							
Energy Simulation Files					Attached		
Energy Performance Report							
Water Efficiency Worksheets					Attached	Attached	
Summary of Changes							
Equipment Cut Sheets							
Air Leakage Test Report							
Performance	***Unit***						
TEUI	*ekWh/m2*	74.7	74.7	90.6	80.5	80.6	
GHGI	*kg CO2e/m2*	4.9	4.9	3.9	3.5	3.2	
TEDI-heating	*kWh/m2*	30.6	30.6	26.5	28.5	35.8	
TEDI-cooling	*kWh/m2*	20.3	20.3	26.9	20.3	18.5	
Indoor water reduction	*%*	50%	50%	TBC	45%		
Outdoor water reduction	*%*	60%	60%				
Renewable Energy	*%*	if any	if any	TBC	TBC		

Optional Project Specific Factors

TO BE USED BY PPR TEAM FOR UNIQUE PROJECT SPECIFIC DESIGNS. MUST BE APPROVED. Examples are for density greater than COU factors

Metric	Unit	Adjustment Factor
Energy Use Intensity - DES	kWh/m2	1
Energy Use Intensity - Non-DES	kWh/m2	1
GHG Intensity - DES	kg CO2e/m2	1
GHG Intensity - Non-DES	kg CO2e/m2	1
TEDI-Heating	kWh/m2	1
TEDI-Cooling	kWh/m2	1
Retrofit - Interior		1
Retrofit - HVAC		1
Retrofit - Envelope		1

2020-2022 Targets — Baseline Targets — 2020-2022 Targets

Metric	Unit	Admin/Academic (Academic)	Admin/Academic (Office)	Wet Lab	Dry Lab	Retail	Residence	Athletic
Energy Use Intensity - DES	kWh/m2	105	105	510	230	130	105	112
Energy Use Intensity - Non-DES	kWh/m2	80	80	430	210	105	80	85
GHG Intensity - DES	kg CO2e/m2	15	15	50	16	16	15	16
GHG Intensity - Non-DES	kg CO2e/m2	6	6	30	11	11	6	6
TEDI-Heating	kWh/m2	40	40	100	20	25	30	40
TEDI-Cooling	kWh/m2	25	25	100	110	25	20	35
Retrofit - Interior		6%	6%	2%	5%	11%	12%	9%
Retrofit - HVAC		30%	30%	36%	26%	26%	17%	27%
Retrofit - Envelope		20%	20%	3%	5%	2%	17%	16%

DES-Connected			EUI		GHGI		TEDI-heating		TEDI-cooling	
Space Use	**Real m2**	**Archetype m2**	**Target**	**Energy (kWh)**	**Target**	**Emissions (kg CO2e)**	**Target**	**Demand (kWh)**	**Target**	**Demand (kWh)**
Wet Lab	0.0	0.0	510	0.0	50	0.0	100	0.0	100	0.0
Dry Lab	0.0	0.0	230	0.0	16	0.0	20	0.0	110	0.0
Residence	9,558.9	9,558.9	105	1,003,687.7	15	143,384.0	30	286,767.9	20	191,178.6
Retail	0.0	0.0	130	0.0	16	0.0	25	0.0	25	0.0
Athletic	0.0	0.0	112	0.0	16	0.0	40	0.0	35	0.0
Office	326.4	326.4	105	34,272.0	15	4,896.0	40	13,056.0	25	8,160.0
Academic+Other&LabMultiplier	326.4	below								
Total	10,211.7	9,885.3		1,037,959.7		148,280.0		299,823.9		199,338.6
Adjusted Academic+Other		326.4	105	34,272.0	15	4,896.0	40	13,056.0	25	8,160.0
Weighted Targets			EUI (ekWh/m2)	105.0	GHGI (kg CO2e/m2)	15.0	TEDI (kWh/m2)	30.6	TEDI (kWh/m2)	20.3

Non-DES Connected			EUI		GHGI		TEDI		TEDI	
Space Use	**Real m2**	**Archetype m2**	**Target**	**Energy (kWh)**	**Target**	**Emissions (kg CO2e)**	**Target**	**Demand (kWh)**	**Target**	**Demand (kWh)**
Wet Lab	0.0	0.0	430	0.0	30	0.0	100	0.0	100	0.0
Dry Lab	0.0	0.0	210	0.0	11	0.0	20	0.0	110	0.0
Residence	9,558.9	9,558.9	80	764,714.4	6	57,353.6	30	286,767.9	20	191,178.6
Retail	0.0	0.0	105	0.0	11	0.0	25	0.0	25	0.0
Athletic	0.0	0.0	85	0.0	6	0.0	40	0.0	35	0.0
Office	326.4	326.4	80	26,112.0	6	1,958.4	40	13,056.0	25	8,160.0
Academic+Other&LabMultiplier	326.4	below								
Total	10,211.7	9,885.3		790,826.4		59,312.0		299,823.9		199,338.6
Adjusted Academic+Other		326.4	80	26,112.0	6	1,958.4	40	13,056.0	25	8,160.0
Weighted Targets			EUI (ekWh/m2)	80.0	GHGI (kg CO2e/m2)	6.0	TEDI (kWh/m2)	30.6	TEDI (kWh/m2)	20.3

Renovations - 2020-2022

Existing Targets				Interior Renovation		HVAC Renovation		Envelope Renovation	
Space Use	**Real m2**	**Archetype m2**	**Energy ekWh**	**Target**	**Energy (ekWh)**	**Target**	**Energy (ekWh)**	**Target**	**Energy (ekWh)**
Wet Lab	0.0	0.0	0.0	2%	0.0	36%	0.0	3%	0.0
Dry Lab	0.0	0.0	0.0	5%	0.0	26%	0.0	5%	0.0
Residence	0.0	0.0	0.0	12%	0.0	17%	0.0	17%	0.0
Retail	0.0	0.0	0.0	11%	0.0	26%	0.0	2%	0.0
Athletic	0.0	0.0	0.0	9%	0.0	27%	0.0	16%	0.0
Office	16,008.0	16,008.0	5,465,131.2	6%	5,137,223.3	30%	3,825,591.8	20%	4,372,105.0
Academic+Other&LabMultiplier	0.0	below							
Total	16,008.0	16,008.0	5,465,131.2		5,137,223.3		3,825,591.8		4,372,105.0
Adjusted Academic+Other		0.0	0.0	6%	0.0	30%	0.0	20%	0.0
Weighted Targets		Baseline Usage:	5,465,131.2	Energy (ekWh)	327,907.9	Energy (ekWh)	1,639,539.4	Energy (ekWh)	1,093,026.2
				% Reduction	6.0%	% Reduction	30.0%	% Reduction	20.0%

2022-2026 Targets — 10% Reduction vs 2020/22 — 2022-2026 Targets

Metric	Unit	Admin/Academic (Academic)	Admin/Academic (Office)	Wet Lab	Dry Lab	Retail	Residence	Athletic
Energy Use Intensity - DES	kWh/m2	95	95	459	207	117	95	101
Energy Use Intensity - Non-DES	kWh/m2	72	72	387	189	95	72	77
GHG Intensity - DES	kg CO2e/m2	14	14	45	14	14	14	14
GHG Intensity - Non-DES	kg CO2e/m2	5	5	27	10	10	5	5
TEDI-Heating	kWh/m2	37	37	95	20	24	28	38
TEDI-Cooling	kWh/m2	23	23	95	104	24	19	33
Retrofit - Interior		6%	6%	2%	5%	11%	12%	9%
Retrofit - HVAC		30%	30%	36%	26%	26%	17%	27%
Retrofit - Envelope		20%	20%	3%	5%	2%	17%	16%

DES-Connected			EUI		GHGI		TEDI-heating		TEDI-cooling	
Space Use	**Real m2**	**Archetype m2**	**Target**	**Energy (kWh)**	**Target**	**Emissions (kg CO2e)**	**Target**	**Demand (kWh)**	**Target**	**Demand (kWh)**
Wet Lab	0.0	0.0	459	0.0	45	0.0	95	0.0	95	0.0
Dry Lab	0.0	0.0	207	0.0	14	0.0	20	0.0	104	0.0
Residence	9,558.9	9,558.9	95	908,098.4	14	133,825.0	28	267,650.0	19	181,619.7
Retail	0.0	0.0	117	0.0	14	0.0	24	0.0	24	0.0
Athletic	0.0	0.0	101	0.0	14	0.0	38	0.0	33	0.0
Office	326.4	326.4	95	31,008.0	14	4,569.6	37	12,076.8	23	7,507.2
Academic+Other&LabMultiplier	326.4	below								
Total	10,211.7	9,885.3		939,106.4		138,394.6		279,726.8		189,126.9
Adjusted Academic+Other		326.4	95	31,008.0	14	4,569.6	37	12,076.8	23	7,507.2
Weighted Targets			EUI (ekWh/m2)	95.0	GHGI (kg CO2e/m2)	14.0	TEDI (kWh/m2)	28.6	TEDI (kWh/m2)	19.3

Non-DES Connected			EUI		GHGI		TEDI		TEDI	
Space Use	**Real m2**	**Archetype m2**	**Target**	**Energy (kWh)**	**Target**	**Emissions (kg CO2e)**	**Target**	**Demand (kWh)**	**Target**	**Demand (kWh)**
Wet Lab	0.0	0.0	387	0.0	27	0.0	95	0.0	95	0.0
Dry Lab	0.0	0.0	189	0.0	10	0.0	20	0.0	104	0.0
Residence	9,558.9	9,558.9	72	688,243.0	5	47,794.7	28	267,650.0	19	181,619.7
Retail	0.0	0.0	95	0.0	10	0.0	24	0.0	24	0.0
Athletic	0.0	0.0	77	0.0	5	0.0	38	0.0	33	0.0
Office	326.4	326.4	72	23,500.8	5	1,632.0	37	12,076.8	23	7,507.2
Academic+Other&LabMultiplier	326.4	below								
Total	10,211.7	9,885.3		711,743.8		49,426.7		279,726.8		189,126.9
Adjusted Academic+Other		326.4	72	23,500.8	5	1,632.0	37	12,076.8	23	7,507.2
Weighted Targets			EUI (ekWh/m2)	72.0	GHGI (kg CO2e/m2)	5.0	TEDI (kWh/m2)	28.6	TEDI (kWh/m2)	19.3

Renovations - 2022-2026

Existing Targets				Interior Renovation		HVAC Renovation		Envelope Renovation	
Space Use	**Real m2**	**Archetype m2**	**Energy ekWh**	**Target**	**Energy (ekWh)**	**Target**	**Energy (ekWh)**	**Target**	**Energy (ekWh)**
Wet Lab	0.0	0.0	0.0	2%	0.0	36%	0.0	3%	0.0
Dry Lab	0.0	0.0	0.0	5%	0.0	26%	0.0	5%	0.0
Residence	0.0	0.0	0.0	12%	0.0	17%	0.0	17%	0.0

Retail	0.0	0.0	0.0	11%	0.0	26%	0.0	2%	0.0
Athletic	0.0	0.0	0.0	9%	0.0	27%	0.0	16%	0.0
Office	16,008.0	16,008.0	5,465,131.2	6%	5,137,223.3	30%	3,825,591.8	20%	4,372,105.0
Academic+Other&LabMultiplier	0.0	below							
Total	16,008.0	16,008.0	5,465,131.2		5,137,223.3		3,825,591.8		4,372,105.0
Adjusted Academic+Other		0.0	0.0	6%	0.0	30%	0.0	20%	0.0
Weighted Targets		Baseline Usage:	5,465,131.2	Energy (ekWh)	327,907.9	Energy (ekWh)	1,639,539.4	Energy (ekWh)	1,093,026.2
				% Reduction	6.0%	% Reduction	30.0%	% Reduction	20.0%

2026-2030 Targets — 20% Reduction below 2022/26, rounded — 2026-2030 Targets

Metric	Unit	Admin/Academic (Academic)	Admin/Academic (Office)	Wet Lab	Dry Lab	Retail	Residence	Athletic
Energy Use Intensity - DES	kWh/m2	76	76	367	166	94	76	81
Energy Use Intensity - Non-DES	kWh/m2	58	58	310	151	76	58	62
GHG Intensity - DES	kg CO2e/m2	11	11	36	11	11	11	11
GHG Intensity - Non-DES	kg CO2e/m2	4	4	22	8	8	4	4
TEDI-Heating	kWh/m2	30	30	76	16	19	22	30
TEDI-Cooling	kWh/m2	18.4	18	76	83	19	15	26
Retrofit - Interior		8%	8%	3%	6%	14%	15%	11%
Retrofit - HVAC		38%	38%	45%	33%	33%	21%	34%
Retrofit - Envelope		25%	25%	4%	6%	3%	21%	20%

DES-Connected			EUI		GHGI		TEDI-heating		TEDI-cooling	
Space Use	**Real m2**	**Archetype m2**	**Target**	**Energy (kWh)**	**Target**	**Emissions (kg CO2e)**	**Target**	**Demand (kWh)**	**Target**	**Demand (kWh)**
Wet Lab	0.0	0.0	367	0.0	36	0.0	76	0.0	76	0.0
Dry Lab	0.0	0.0	166	0.0	11	0.0	16	0.0	83.2	0.0
Residence	9,558.9	9,558.9	76	726,478.7	11	105,148.2	22.4	214,120.0	15.2	145,295.7
Retail	0.0	0.0	94	0.0	11	0.0	19.2	0.0	19.2	0.0
Athletic	0.0	0.0	81	0.0	11	0.0	30.4	0.0	26.4	0.0
Office	326.4	326.4	76	24,806.4	11	3,590.4	29.6	9,661.4	18.4	6,005.8
Academic+Other&LabMultiplier	326.4	below								
Total	10,211.7	9,885.3		751,285.1		108,738.6		223,781.5		151,301.5
Adjusted Academic+Other		326.4	76	24,806.4	11	3,590.4	29.6	9,661.4	18.4	6,005.8
Weighted Targets			EUI (ekWh/m2)	76.0	GHGI (kg CO2e/m2)	11.0	TEDI (kWh/m2)	22.9	TEDI (kWh/m2)	15.4

Non-DES Connected			EUI		GHGI		TEDI		TEDI	
Space Use	**Real m2**	**Archetype m2**	**Target**	**Energy (kWh)**	**Target**	**Emissions (kg CO2e)**	**Target**	**Demand (kWh)**	**Target**	**Demand (kWh)**
Wet Lab	0.0	0.0	310	0.0	22	0.0	76	0.0	76	0.0
Dry Lab	0.0	0.0	151	0.0	8	0.0	16	0.0	83.2	0.0
Residence	9,558.9	9,558.9	58	554,417.9	4	38,235.7	22.4	214,120.0	15.2	145,295.7
Retail	0.0	0.0	76	0.0	8	0.0	19.2	0.0	19.2	0.0
Athletic	0.0	0.0	62	0.0	4	0.0	30.4	0.0	26.4	0.0
Office	326.4	326.4	58	18,931.2	4	1,305.6	29.6	9,661.4	18.4	6,005.8
Academic+Other&LabMultiplier	326.4	below								
Total	10,211.7	9,885.3		573,349.1		39,541.3		223,781.5		151,301.5
Adjusted Academic+Other		326.4	58	18,931.2	4	1,305.6	29.6	9,661.4	18.4	6,005.8
Weighted Targets			EUI (ekWh/m2)	58.0	GHGI (kg CO2e/m2)	4.0	TEDI (kWh/m2)	22.9	TEDI (kWh/m2)	15.4

Renovations - 2026-2030

Existing Targets				Interior Renovation		HVAC Renovation		Envelope Renovation	
Space Use	**Real m2**	**Archetype m2**	**Energy ekWh**	**Target**	**Energy (ekWh)**	**Target**	**Energy (ekWh)**	**Target**	**Energy (ekWh)**
Wet Lab	0.0	0.0	0.0	3%	0.0	45%	0.0	4%	0.0
Dry Lab	0.0	0.0	0.0	6%	0.0	33%	0.0	6%	0.0
Residence	0.0	0.0	0.0	15%	0.0	21%	0.0	21%	0.0
Retail	0.0	0.0	0.0	14%	0.0	33%	0.0	3%	0.0
Athletic	0.0	0.0	0.0	11%	0.0	34%	0.0	20%	0.0
Office	16,008.0	16,008.0	5,465,131.2	8%	5,027,920.7	38%	3,388,381.3	25%	4,098,848.4
Academic+Other&LabMultiplier	0.0	below							
Total	16,008.0	16,008.0	5,465,131.2		5,027,920.7		3,388,381.3		4,098,848.4
Adjusted Academic+Other		0.0	0.0	8%	0.0	38%	0.0	25%	0.0
Weighted Targets			5,465,131.2	Energy (ekWh)	437,210.5	Energy (ekWh)	2,076,749.9	Energy (ekWh)	1,366,282.8
				% Reduction	8.0%	% Reduction	38.0%	% Reduction	25.0%

Additional Info and Inputs for Charter

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		Admin/Academic	Wet Lab	Dry Lab	Retail	Residential	Athletic
Archetype Space Breakdown	Offices	21.27%	9.82%	18.80%		2.36%	2.92%
	Classroom & Lecture	20.61%		9.82%		2.89%	
	Meetings & Multipurpose	4.49%	15.59%	9.39%	14.62%	10.40%	19.27%
	Kitchen				15.97%		
	Wet Lab		32.74%				
	Wet Lab Support		13.59%				
	Dry Lab			29.23%			
	Retail				9.38%		
	Dining Areas	4.16%			33.00%		
	Residence					40.08%	
	Exercise / Fitness Area						43.57%
	Corridor /Stairs /Storage /Washrooms	42.40%	23.94%	26.49%	27.03%	40.88%	34.24%
	Mechanical	7.06%	4.33%	6.27%		3.40%	
	Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Choose Type	**Choose Yes/No**	**Choose Reno Scope**
Residence	Yes	Minor Renovation
Retail	No	Major Renovation
Athletic		
Lab	**Choose File**	
Admin/Academic	CWEC_v_2016 Toronto City_6158355	
Other	CWEC_v_2016 Toronto Intl Airport_6158731	
Choose Target Year		
2020-2022	**Choose Target Year**	
2022-2026	2020-2026	
2026-2030	2026-2030	
Sample Drop Down		
Yes		
No		