FOR CONFIRMATION **PUBLIC** **CLOSED SESSION**

TO: Executive Committee

SPONSOR: Ron Saporta, Acting Vice President, Operations
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PRESENTER:
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DATE: June 8, 2023, for June 15, 2023

AGENDA ITEM: 3 (a)

ITEM IDENTIFICATION:

Capital Project: *Report of the Project Planning Committee for the University of Toronto Temerty Faculty of Medicine Division of Teaching Laboratories Ramsay Wright Staging Project* – **Project Scope and Sources of Funding**

JURISDICTIONAL INFORMATION:

Pursuant to section 4.2.3. of the Planning and Budget Committee's terms of Reference, "…the Committee considers reports of project planning committees and recommends to the Academic Board approval in principle of projects (i.e. space plan, site, overall cost and sources of funds) with a capital cost as specified in the *Policy on Capital Planning and Capital Projects*."

Pursuant to section 5.1 of the Academic Board's Terms of Reference, the Board considers reports of project planning committees (i.e. space plan, site, overall cost and sources of funds) with a capital cost as specified in the *Policy on Capital Planning and Capital Projects*.

The Policy on Capital Planning and Capital Projects provides that capital projects with costs between $10 million and $50 million (Approval Level 2) on the St. George campus, will first be considered by the Planning & Budget Committee, which shall recommend approval to Academic Board. Such projects will be confirmed by the Executive Committee of the Governing Council on the recommendation of the Academic Board. [Section 3(b)(ii)(1)(a)] The Policy further states that "any financing will be approved by the Business Board". [Section 3(c)]

GOVERNANCE PATH:

A. **Project Planning Report, Total Project Cost, and Sources of Funding**
   1. Planning & Budget [for recommendation] (May 03, 2023)

2. Business Board [for approval, financing] (June 20, 2023)
3. Academic Board [for approval] (May 25, 2023)
4. **Executive Committee [for confirmation] (June 15, 2023)**

B. **Execution of the Project:**
1. Business Board [for approval] (June 20, 2023)

PREVIOUS ACTION TAKEN:

At the June 30, 2021, Capital Project and Space Allocation (CaPS Executive) Committee meeting, the Terms of Reference (TOR) for this project were approved.

On August 20, 2021, CaPS Executive Committee approved consultant fees to engage consultants for design services to the end of the 1-Year Warranty Period after construction for the University of Toronto Temerty Faculty of Medicine Division of Teaching Laboratories (DTL) Ramsay Wright Staging Project. HDR, Inc., were selected proponents in February 2022.

HIGHLIGHTS:

Project Background

The Temerty Faculty of Medicine (TFoM) Division of Teaching Laboratories (DTL) Ramsay Wright (RW) Staging Project will serve to support several departments on the Downtown St. George Campus and is a secondary effect of The Temerty Building project that is currently being planned and designed. DTL is currently located in the existing west wing of Medical Sciences Building (MSB), the site of The Temerty Building project. As such, the Division of Teaching Laboratories will relocate to the Ramsay Wright building. It has not been confirmed how long DTL will remain in Ramsay Wright, and a decision will be made once The Temerty Building project is completed as to whether the labs will be relocated back to MSB in the future (~ 2028).

In addition to providing a new operational home for DTL, this Project will accomplish several strategic planning objectives for the departments of Ecology and Evolutionary Biology (EEB) and Cell and Systems Biology (CSB). These strategic objectives include upgrades to both dedicated and shared research lab and research lab support facilities, expansion of undergraduate teaching lab capacity, and the creation of quality student study space to support specialised undergraduate and professional masters programming.

While addressing diverse and unique planning needs, the TFoM DTL RW Staging Project supports several departments on the Downtown St. George Campus that are committed to the delivery of undergraduate life science instruction. With 51% of the total effected renovation area dedicated to creating Classroom Facilities, Undergraduate Teaching Labs and Teaching Lab Support Spaces, this will provide an opportunity to develop a large volume of quality instructional environments to support a consistent experience of educational excellence at the University of Toronto. The newly renovated Ramsay Wright Laboratories building will be a hub for the next generation of undergraduate life sciences and medicine students. It will be an inclusive place to convene and collaborate for students and faculty alike. With industry best practices in teaching and lab

trends, as well as design and construction processes, the project will create quality accessible and equitable space on the Downtown St. George Campus.

Project Highlights

To assist with planning and design, this project has been divided into three main "Phases"; note that only Phase 2 and Phase 3 work are included in this project Total Project Cost (TPC). Phase 1 enabling works will proceed separately, and a number of the Phase 1 smaller projects are already underway. The costs related to the Phase 1 scope are captured by their own TPC's. Phases of work include:

- **Phase 1 – Pre-work/Other Enabling Projects** in Lash Miller, Earth Sciences Centre, and other areas under review. (854 nasm; 854 gsm)
- **Phase 2 – TFoM DTL RW Project** (1,897 nasm; 2,225 gsm) Design work for this phase started in March of 2022. Construction is scheduled to begin in summer 2023 for a tentative duration of 15.5 months.
- **Phase 3 – TFoM DTL RW Project** (470 nasm; 470 gsm) This phase will follow the completion of Phase 2, with construction tentatively scheduled to begin in September 2024 for a duration of 7 months.

In total, the project includes 2,367 nasm (2,695 gsm) [Phase 2 + Phase 3] of affected project area:

- **Division of Teaching Laboratories** (Temerty Faculty of Medicine) (1,172 nasm total)
  The DTL Project Scope includes areas provided to accommodate the DTL activities within Ramsay Wright. These include a series of CL1 & CL2 undergraduate teaching labs (745 nasm), interlab and other lab support spaces as well as an administrative area.
- **Ecology and Evolutionary Biology** (Faculty of Arts & Science) (463 nasm total)
  As part of this work a contiguous research lab and lab support facility will be created for the department. Additionally, a set of Undergraduate Teaching labs will be created, one of which will support the expansion of EEB's large BIO120 course.
- **Cell and Systems Biology** (Faculty of Arts & Science) (733 nasm total)
  A range of CSB's RW departmental spaces will be relocated and or upgraded as part of this project, including classrooms, administrative office suites, and office support areas. New and expanded research and research laboratory support spaces will be created, and CSB will also benefit from the creation of a shared A&S undergraduate teaching lab.

Viewed from another perspective, the Phase 2 + Phase 3 work totalling 2,367 nasm is allocated as follows:

- <u>DTL Project Scope (Levels: Ground/L4)</u>
  (Phase 2: 1,172 nasm)
  See program description provided in previous section.

- <u>DTL Project – A&S Secondary Effects (Levels: Ground/L1/L4/L5)</u>
  (1,313 total nasm = Phase 1: 854 nasm, Phase 2: 327 nasm, and Phase 3: 132 nasm)
  The DTL Project – A&S Secondary Effects refers to the A&S relocations that are required to facilitate the creation of a contiguous program area for the DTL on the fourth floor of Ramsay Wright. These enabling projects will be delivered in multiple phases including the pre-work (Phase 1) and the main

scope of this Capital Project (Phases 2 and 3). Included in this scope is a concentration of Category 2.1 Scheduled Class Labs (33%), and Category 3.1 Research Laboratory Space (24%). Overall this scope includes 519 nasm of research lab space, 429 nasm of undergraduate labs, and 366 nasm of academic departmental office area.

- A&S Other Projects – (Levels: Ground/L4/L5/L7)
  (736 nasm = Phase 2: 399 nasm and Phase 3: 337 nasm)
  The A&S Other Projects scope includes other building upgrades and planning priorities that were previously in development for Ramsay Wright. Similarly, this work includes a concentration of Category 3.1 Research Laboratory Space (20%), and Category 3.2 Research Laboratory Support Space (33%). Also included in this scope is the revitalization of the EEB/CSBGlasshouse (131 m2) located on the roof of Ramsay Wright. Overall, this scope of work includes 140 nasm of classroom facilities, 395 nasm of research lab space, 191 nasm of academic departmental office areas, and 11 nasm of common use and student activity.

- Non-Assignable Area (Phase 2: 328 sqm) This area contributes to the overall project gsm and includes improvements to unassignable areas such as corridors and washrooms.

A phased schedule has been established for this project, to minimise the impact to building occupants while expediting the work to meet the needs of the Division of Teaching Laboratories, Ecology and Evolutionary Biology, and Cell and Systems Biology. Of note is the relationship of this project to the "The Temerty Building" project, as the decant of the existing DTL facility from the west wing is a critical path milestone for that project.

Project Schedule

The proposed schedule for the project is as follows:

Terms of Reference to CaPS Executive	June 29, 2021
CaPS Executive Approval for Consulting Fees	August 20, 2021
Consultant RFSQ Issued	September 15, 2021
Consultant RFP Issued	November 16, 2021
Consultant Selection and Letter of Award	January 2022
Schematic Design	January 2022 - Apr 2022
Design Development 100%	June 2022 - Jan 2023
CM Preconstruction Services	Feb 2023 - Aug 2023
CaPS Executive Approval for Full Project Cost	Cycle 6 March. 2023 – June 2023
Sequential Tendering	June 2023
Construction Documents 100%	April 2023 - August 2023
Construction – Phase 1	Spring 2023 - Spring 2024
Construction – Phase 2	July 2023 - August 2024
Construction – Phase 3	September 2024 - April 2025
Occupancy	September 2025
Final Commissioning	September 2025

This schedule assumes all municipal approvals may be achieved within the timelines.

FINANCIAL IMPLICATIONS:

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

RECOMMENDATIONS:

Be It Confirmed by the Executive Committee:

> THAT the project scope of the Ramsay Wright Laboratories Building renovation as identified in the *Report of the Project Planning Committee for University of Toronto Temerty Faculty of Medicine Division of Teaching Laboratories Ramsay Wright Staging Project*, dated March 28, 2023, be approved in principle; and,
>
> THAT the project totaling 2,367 net assignable square meters (nasm) (2,695 gross square meters (gsm)), of renovated space be approved in principle, to be funded by the Faculty of Medicine Division of Teaching Laboratories and the Faculty of Arts and Science operating reserves, divisional contributions to the Future Major Capital Projects Reserve Fund, and Division of Teaching Laboratories financing.

DOCUMENTATION PROVIDED:

- *Report of the Project Planning Committee for University of Toronto Temerty Faculty of Medicine Division of Teaching Laboratories Ramsay Wright Staging Project*, dated March 28, 2023.

Report of the Project Planning Committee for

University of Toronto
Temerty Faculty of Medicine
Division of Teaching Laboratories
Ramsay Wright Staging Project

March 28, 2023

I. Executive Summary

The Temerty Faculty of Medicine (TFoM) Division of Teaching Laboratories (DTL) Ramsay Wright (RW) Staging Project will serve to support several departments on the Downtown St George Campus and is a secondary effect of the larger JLTB West Wing project that is currently being planned. DTL is currently located in the existing west wing of MSB, the site of the new West Wing project. As such, the Division of Teaching Laboratories will relocate to the Ramsay Wright building for approximately 7-10 years. A decision will be made once the West Wing Project is completed as to whether the labs will be relocated back to MSB in the future (~ 2028).

In addition to providing a new operational home for DTL, this project will accomplish several strategic planning objectives for the departments of Ecology and Evolutionary Biology (EEB) and Cell and Systems Biology (CSB).

While addressing diverse and unique planning needs, the TFoM DTL RW Staging Project supports several departments on the Downtown St George Campus that are committed to the delivery of undergraduate life science instruction. With 51% of the total affected renovation area dedicated to creating Classroom Facilities, Undergraduate Teaching Labs, and Teaching Lab Support Spaces, this will provide an opportunity to develop a large volume of quality instructional environments to support an enduring experience of educational excellence at the University of Toronto. The newly renovated Ramsay Wright Laboratories building will be a hub for the next generation of undergraduate life sciences and medicine students. It will be an inclusive place to convene and collaborate for students and faculty alike. With industry best practices in teaching and lab trends, as well as design and construction processes, the project will create quality accessible and equitable space on the Downtown St. George Campus.

In total, the project includes 3,549.04 nasm of affected project area, with scope of work derived from:

- DTL Project Scope (1,172.21 nasm)
  The DTL Project Scope are the areas provided to accommodate the DTL activities within Ramsay Wright. These include a series of CL1 & CL2 undergraduate teaching labs, interlab, and other lab support spaces as well as an administrative area.

- TFoM DTL RW Staging Project – FAS Secondary Effects (1,312.95 nasm)
  The DTL Project – FAS Secondary Effects refers to the FAS relocations that are required in order to facilitate the creation of a contiguous program area for the DTL on the fourth floor of Ramsay Wright. These enabling projects will be delivered in multiple phases including the pre-work (Phase 1) and the main capital project detailed in the enclosed (Phases 2 and 3). Included in this scope is a concentration of Category 2.1 Scheduled Class Labs (33%), and Category 3.1 Research Laboratory Space (24%)

- TFoM DTL RW Staging Project – FAS Other Projects (735.99 nasm)
  The FAS Other Projects scope includes other building upgrades and planning priorities that were previously in development for Ramsay Similarly, this work includes a concentration of

Category 3.1 Research Laboratory Space (20%), and Category 3.2 Research Laboratory Support Space (33%)

Of the above noted area 3,077.68 nasm is confirmed renovation scope. An additional 471.36 nasm is area that is tracked against the project, as space that has been reallocated to support the DTL move without replacement space identified. This area is assumed to include reallocation/relocations and some potential construction scope. This work, if required, will proceed as a separate project. With some of the known renovation scope of work addressed through pre-work enabling projects (Phase 1 work), the TFoM DTL RW Staging Project itself includes a total of 2,695.27 nasm (Phase 2 and Phase 3). This area breaks down by allocation as follows:

- DTL Project Renovation Area (1,172.21 nasm)
- EEB Project Renovation Area (462.73 nasm)
- CSB Project Renovation Area (732.82 nasm)
- Non-assignable Renovation Area (327.89 sqm)

A phased schedule has been established for this project, to minimise the impact to building occupants while expediting the work required to meet the needs of the Division of Teaching Laboratories, Ecology and Evolutionary Biology, and Cell and Systems Biology. Of note is the relationship of this project to the JLTB MSB redevelopment, as the decant of the existing DTL facility from the west wing is a critical path milestone for that project.

There are three main phases to the overall master project schedule as outlined below. While Phase 1 is captured and described in this Project Planning Report (PPR), the intent is to proceed with the Phase 1 early works in advance of the Phase 2 and Phase 3 work. Phase 1 scope will be captured by Total Project Cost (TPC) estimates outside of the TPC that accompanies this project. Phase 2 and Phase 3 scope of work are captured in the TPC that accompanies this PPR. Phases of work include:

- Phase 1 – Pre-work/Other Enabling Projects in Lash Miller and Earth Sciences Centre, other potential work to be confirmed and managed as part of a separate project. (853.77 nasm)
  Construction is scheduled to begin in the Spring 2023 for a tentative duration of 12 months.
- Phase 2 – TFoM DTL RW Staging Project (2,225.41 nasm)
  Design work for this phase began in March of 2022. Construction is scheduled to begin in the summer 2023 for a tentative duration of 9 months.
- Phase 3 – TFoM DTL RW Staging Project (469.86 nasm)
  This phase will follow the completion of Phase 2, with construction tentatively scheduled to begin in August 2024 for a duration of seven months.

II. Project Background

a) Membership

Vince Tropepe, Committee Co-Chair, Professor, Vice-Dean Research, Faculty of Arts & Science
Justin Nodwell, Committee Co-Chair, Vice Dean Research and Innovation, Temerty Faculty of Medicine.
Sara Sharifpoor*, Director, Office of the Vice Dean, Research & Health Science Education, TFoM
Marla Sokolowski*, Chair, Department of Ecology and Evolutionary Biology, Faculty of Arts & Science
Stephen Wright, Chair, Department of Ecology and Evolutionary Biology, Faculty of Arts & Science
John Peever*, Acting Chair, Department of Cell & Systems Biology, Faculty of Arts & Science
Nicholas Provart, Chair, Department of Cell & Systems Biology, Faculty of Arts & Science
Ahlia Khan-Trottier, Director, Division of Teaching Labs, Temerty Faculty of Medicine
Andreea Obersterescu, Graduate Student, Division of Teaching Labs, Temerty Faculty of Medicine
Simoun Icho, Graduate Student, Dept. of Biochemistry, TFoM
Andreea Obersterescu, Graduate Student, Dept of Physiology, TFoM
Brittany Dugan, Graduate Student, Department of Cell & Systems Biology, A&S
Angela Gong, Undergraduate Student, Department of Ecology and Evolutionary Biology, A&S
Marc Drouin, Director, Environmental Health & Safety
Costas Catsaros, Director, Project Development, UPDC
Laragh Halldorson, Manager, Project Development, UPDC
David Sasaki, Managing Director, University Planning, University of Toronto
Ivan Munoz, Planner, University Planning, University of Toronto
Heather Taylor, Executive Director, Major Projects and Facilities Management, TFoM
Nadja Baljozovic, Senior Facilities Planner, Facilities Management & Space Planning, TFoM
Lucy Chung, Director, Office of Infrastructure Planning, Faculty of Arts & Science
Kate Slotek, Senior Space Planner, Office of Infrastructure Planning, Faculty of Arts & Science
Ash Barrey, Facilities Designer, Office of Infrastructure Planning, Faculty of Arts & Science

The following original members have been superseded or are no longer required for the revised space program: Jeremy Knight, Director, Office of the Vice Dean, Research and Innovation, TFoM; Jelena Porovic, Senior Facilities Planner, Facilities Management & Space Planning, TFoM; Gordon Robins, Director of Utilities and Building Operations, Facilities and Services; Kim McLean, Chief Administrative Officer, Faculty of Arts & Science, F&S

* Denotes that the member was added since the initial CaPS Exec Approval in 2021

b) Terms of Reference

The Project Planning Committee will:

1. Make recommendations for a detailed space program, functional layouts, and project scope for the Ramsay Wright Laboratories Building to accommodate a) the Division of Teaching Laboratories (DTL), b) Cell & Systems Biology (CSB), and c) Ecology & Evolutionary Biology (EEB).
2. Develop a plan that permits the maximum flexibility of space for future allocation as program needs are adjusted during the planning process.
3. Identify the space program as relates to the Faculties and Departments' existing and approved academic plans; taking into account the impact of approved and proposed program enhancements that are reflected in the faculty, student, and staff complement.
4. Articulate the role of the expansion in this location as a key institutional strategic initiative.
5. Identify guidelines and opportunities where the Ramsay Wright Laboratories building can be exemplary in space for the University of Toronto Undergraduate community. This may include, but is not limited, to:
    a) Identifying functions and spaces that can benefit from shared use, in addition to teaching spaces.
    b) Planning for spaces that are flexible and dynamic to short- and long-term needs, as well as working individually and collectively (multi-functional) wherever possible.
    c) Identify inefficiencies in current spaces / work arrangements to avoid and identify efficiencies to replicate at Ramsay Wright.
    d) Identify any specific technical or programming needs for teaching laboratories.
6. Demonstrate that the proposed space program is consistent with the Council of Ontario Universities (COU) space standards and University of Toronto space standards and best practices.
7. Identify all secondary effects of the project, including staging of existing site occupants, and the impact on the delivery of academic programs during construction.
8. Identify a phased approach to the implementation of a comprehensive plan, including any staging that may be required.
9. Review the capacity of existing conditions, services, and infrastructure in project related areas at Ramsay Wright, and determine the extent of upgrades or new systems as required.
10. Identify all equipment and moveable furnishings necessary to the project and their related costs.
11. Identify all data, networking, and communication requirements and their related costs.
12. Identify all security, occupational health and safety, and accessibility requirements and their related costs.
13. Determine a total project cost estimate (TPC) for the capital project, including costs associated with secondary effects and phasing, identifying all resource costs and a projected increase to the annual operating cost.
14. Identify all sources of funding for the capital project and operating costs once the project is complete.
15. Identify specific sustainability goals, including energy efficiency goals, energy targets for this project that support the day-to-day operational targets, as well as the long-term sustainability vision for the campus.

16. Determine whether there are other projects in the vicinity that may impact this project or that may be impacted by this project.
17. Address any campus-wide planning directives that may influence this project.
18. Identify a signage strategy, including interior signage and wayfinding, to identify the location of new activities in the building.
19. Interim Project Planning Report by August 6th, 2021.

c) Background Information

The Medical Sciences Building west wing redevelopment, which will create a new state-of-the-art building for education and research at the University of Toronto, is scheduled to begin construction in 2025. As one of the occupants of the west wing, the Division of Teaching Laboratories (DTL) will be displaced from its current residence and will therefore require a new location to support its teaching activities on campus.

In the fall of 2020, a series of existing teaching labs on the Downtown St George Campus were identified as potential staging locations for the Division of Teaching Labs, including:

- Ramsay Wright Laboratories Building
  Department of Ecology and Evolutionary Biology Scheduled Class Labs
  Faculty of Arts & Sciences Computer Teaching Labs
  Department of Cell & Systems Biology Scheduled Class Labs
  Human Biology Scheduled Class Labs
- Lash Miller Chemical Laboratories Building
  Department of Chemistry Scheduled Class Labs
- Earth Sciences Centre
  Department of Earth Sciences Scheduled Class Labs

As part of this review the needs of students, faculty, and staff within each of the affected departments were reviewed and assessed for potentially beneficial opportunities for co-location.

Several key project opportunities were identified, including:

1. Opportunity to leverage ongoing Ramsay Wright Laboratories Building infrastructure upgrades.

   Originally built in 1965, the Ramsay Wright Laboratories Building has recently undergone a series of renovations to its research and teaching laboratory facilities. These major upgrade projects include the 2014 RW Teaching Lab Upgrades Project and the 2017 SIF Projects. This work has focused on creating purpose-built modern lab facilities to support the delivery of life sciences instruction on the downtown St. George Campus and included major investments to the Biological Sciences Facility, Vivarium, and Aquatics Labs. The creation of new facilities for the Division of Teaching Laboratories within Ramsay Wright aligns with ongoing efforts to upgrade the building.

2. Opportunity for a contiguous DTL Suite on the 4th Floor of Ramsay Wright.

   The fourth floor of Ramsay Wright currently houses a concentration of CSB & EEB Category 3.0 (26%/71% respectfully) and Category 4.0 spaces (74% / 29%). After comprehensive consultation with both departments, a set of relocations and reallocations were agreed upon to facilitate the creation of a contiguous area on the fourth floor of Ramsay Wright to support the needs of the DTL (~1,170 nasm).

   Note there are ongoing discussions to determine the most suitable location for some of the replacement spaces being moved out of the fourth floor of Ramsay Wright. These include Category 3 Research Laboratory Space and Category 4 Academic Dept. Offices and Related Space, which are proposed to be relocated to Earth Sciences Centre, pending confirmation of feasibility and discussion with stakeholder groups. This additional area is captured within the Phase 1 nasm count.

3. Locations for new computer labs (secondary effects)

   While the existing computer labs within Ramsay Wright have a high level of utilisation and support course delivery for several programs, these are not required to stay within the building. While reviewing teaching labs across campus as part of the DTL needs assessment, it was noted that the existing Chemistry computer lab in Lash Miller currently has a lower relative level of utilisation, making it ideal for a shared computing facility conversion. As part of the pre-work, the RW labs will be relocated to Lash Miller Chemical Laboratories Building, and so will continue to support the sector needs while creating opportunities for the project within Ramsay Wright. (246.49 nasm)

   Refer to Appendix 1 – FAS Teaching Lab Tour and Appendix 2d – Computer Lab Typical Schedule and Appendix 2e – Chem Typical Schedule for additional information on the teaching lab visits.

d) Existing Space

Medical Sciences Building (MSB)

The Medical Sciences Building first opened in 1969. The portion of the building commonly known as the "west wing", on King's College Circle, will be rebuilt in the coming years as a modern, architecturally inviting edifice designed to meet the needs of a new era. This new development, the James and Louise Temerty Building, will have multiple purposes, providing space for education of all levels and research of all kinds.

Division of Teaching Labs

The Division of Teaching Laboratories (DTL) currently operates out of the west wing (WW) in the Medical Sciences Building (MSB) on the second and third floors. Its primary function is to administer laboratory space, technical support, and expertise to the academic faculty providing basic science undergraduate laboratory courses. DTL delivers around 17 different courses to ~800 undergraduate students primarily from the Faculty of Arts & Science (FAS). DTL strives to expose learners to a wide variety of experimental techniques, from the most basic and classic laboratory skills to modern advanced technologies. DTL also delivers graduate courses and practicals and provides space and resources for Meds skills training.

One of the most advantageous aspects of DTL's operational methodology is the use of a wide range of equipment to conduct their undergraduate courses. Many classes share this specialized equipment and are assisted by a core group of highly qualified technicians. The shared equipment and the extremely valuable, knowledgeable core staff are why DTL works extremely well as a contiguous group. This is an essential quality of the existing space characteristics, as the DTL must remain a contiguous working unit to preserve their quality of teaching and facilitate the highly beneficial sharing of resources that exists in their day-to-day teaching and prep activities.

The following table displays the current distribution of DTL space by space category. The Division of Teaching Laboratories currently occupies 3,467 nasm of space in the Medical Sciences Building.

Medical Sciences Building		
Division of Teaching Laboratories		
Subcategory Code	Subcategory Description	NASM
1.3	Active Learning Classroom	177
2.1	Scheduled Class Lab	1,923
2.2	Unscheduled Class Lab	87
2.3	Undergraduate Lab Support Space	1,028
4.4	Departmental Support Staff Office	162
11.2	Informal Study Space	78
14.1	Student Office and Support Space	12
TOTAL		3,467

DTL Existing MSB Space Program Summary:

The existing 23 DTL class labs & lab support space total 3,038 nasm. The active labs and support space total another 440 nasm.

Additional key characteristics of the existing DTL space includes:

- CL2 containment level (five labs and one interlab)
- Four cold rooms (47 nasm)
- Dedicated glass washing/autoclave (138 nasm)
- Media preparation space (220 nasm)
- Two flat floored active collaboration rooms

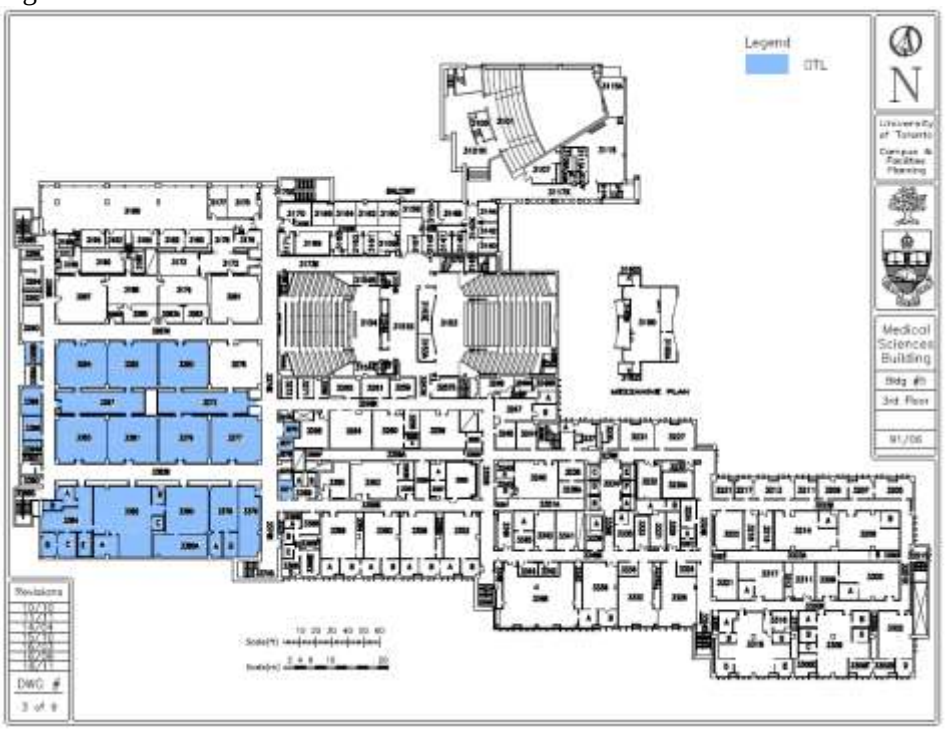
The distribution of this existing space includes:

- Level 2 MSB:
  - (16x) wet labs, including interconnected interlab support spaces
  - (2x) Active Collaboration Rooms (i.e., Active Learning Classrooms)
  - Lab support spaces (cold rooms, storages, and repair room (rm 2269)
  - Administrative areas and staff offices

- Level 3 MSB:
  - (7x) wet labs, including interconnected interlab support spaces
  - Dedicated Chemical Media Prep and Glass Washing facilities
  - Staff offices
  - Lab support spaces (cold rooms and storages)

Fig 1: Location of DTL in MSB – Level 2:

Fig 2: Location of DTL in MSB – Level 3:



Refer to Appendix 7 – Detailed DTL Space Program for additional details relating to the DTL space in MSB.

The following table describes the typical (pre-COVD-19) utilisation of the teaching labs in MSB.

Medical Sciences Building

Division of Teaching Laboratories: Typical Activities

	FALL						WINTER					
ACTIVITY	WEEKLY HRS (23 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	UTILISATION COU CAT 2.0 (18HRS)*	UTILISATION COU CAT 1.0 (35HRS)**	WEEKLY HRS (23 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	UTILISATION COU CAT 2.0 (18HRS)*	UTILISATION COU CAT 1.0 (35HRS)**
PREP/DROP-IN	387	17	37%	30%			523	23	51%	40%		
LAB INSTRUCTION	156	7	15%	12%	38%	19%	179	8	17%	14%	43%	22%
TOTAL ACTIVE HOURS	543	24	52%	41%			702	31	68%	54%		
LABORATORIES												
ACR	32	16	36%	28%			31	16	34%	27%		
CLASSROOMS (2 ACR)												

*Where COU Guidelines indicate a benchmark of 18HRS a week for Teaching Labs; (40%) of a 45HR week, (32%) of a 57HR week.

**Where COU Guidelines indicate a benchmark of 35HRS a week for Classroom Facilities; (78%) of a 45HR week, (61%) of a 57HR week.

Refer to Appendix 2a DTL Typical Schedule for additional schedule information that describes DTL's current pattern of activity in MSB.

Ramsay Wright Laboratories Building (RW)

Originally built in 1965, the Ramsay Wright Building recently underwent an extensive renovation to upgrade its research and teaching laboratory facilities. One of the goals of the 2014 Ramsay Wright Teaching Laboratory Upgrades Project was to create purpose-built modern lab facilities to support the specific needs of the building occupants. At the time, the Department of Ecology and Evolutionary Biology (EEB) and the Department of Cell & Systems Biology (CSB) were delivering a sizable portion of their teaching in Ramsay Wright, in facilities that were original to the building, lacked proper equipment, furnishings, and infrastructure. These technical limitations also displaced some of EEB and CSB's core courses to other shared lab facilities in the Earth Sciences Centre. The limited lab and support space available for use in Earth Sciences presented both scheduling and operational challenges; EEB and CSB alternated use of the labs by term and were required to continually relocate equipment between buildings.

The RW Upgrades Project created nine new dedicated EEB teaching labs, associated lab support space, offices, and student study spaces, and renovated an additional twelve existing labs in the building. With new upgraded facilities, this project provided the opportunity for the University to consolidate most of its life sciences teaching on the Downtown Campus into the Ramsay Wright Building. Currently, the undergraduate teaching lab activity in the building primarily supports the Department of Ecology and Evolutionary Biology (EEB), the Department of Cell & Systems Biology (CSB), and the Human Biology Program (HMB).

Ecology & Evolutionary Biology

The Department of EEB was established in 2006 and is one of the largest of its kind in North America. EEB is one of the top research schools in the world in ecology and evolution, ranked #6 out of nearly 100 leading universities. Presently, the Department is housed within two buildings, the Ramsay Wright Laboratories Building and the Earth Sciences Centre (ESC). While teaching and research facilities are present in both locations, most of the undergraduate teaching takes place within Ramsay Wright while the research facilities are more concentrated within the ESC.

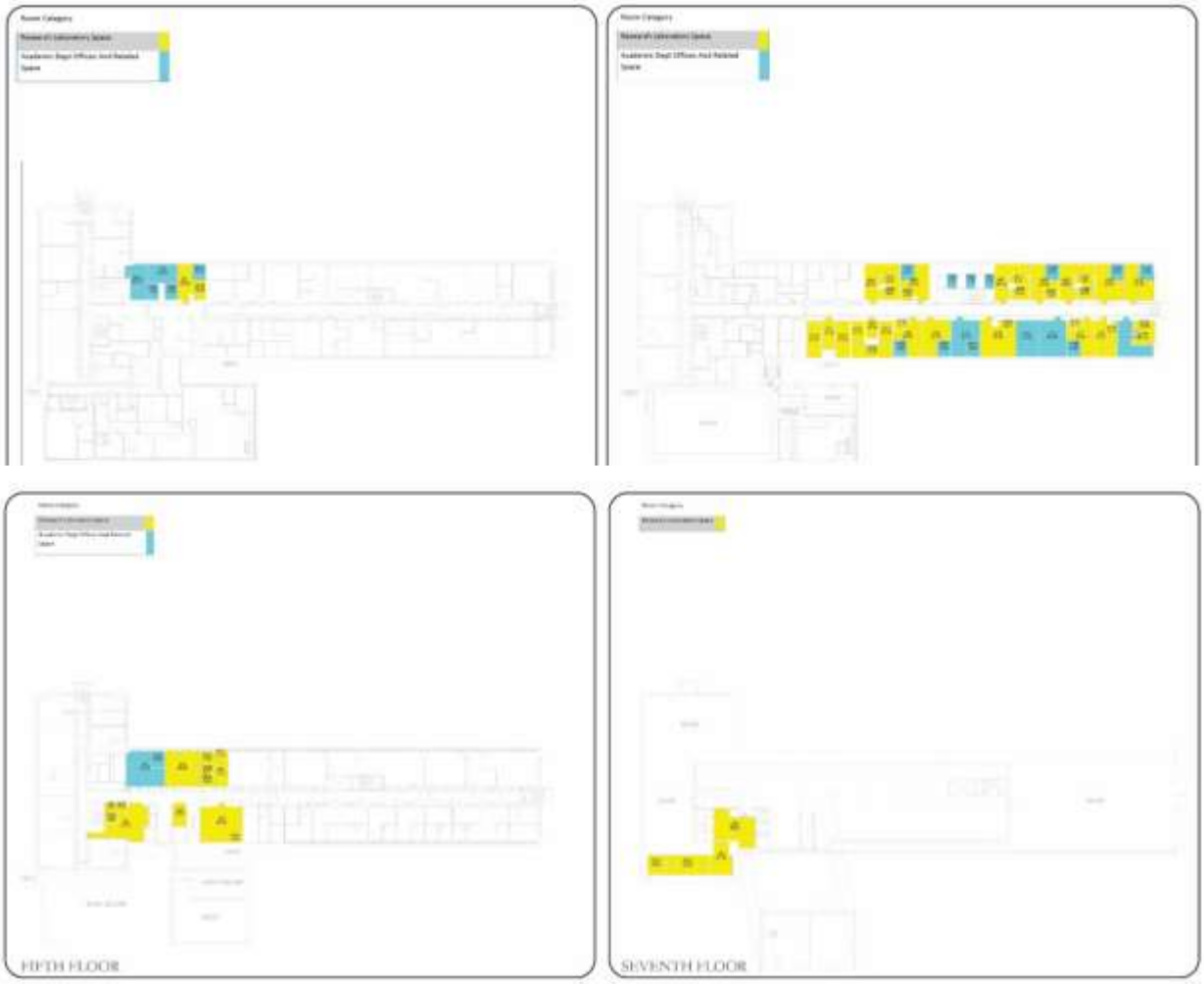
The department has four undergraduate program streams: Ecology & Evolutionary Biology, Biodiversity & Conservation Biology, and Environmental Biology. Within these programs there is a diverse offering of over 50 courses delivered through a range of formats and sizes, including small practical lab courses, discussion-based seminars, off-campus field courses, independent research projects, and larger lecture-based classes. In the Ramsay Wright building there are typically 10 lab courses delivered in the Fall, and 6 in the Spring. In 2019/2020 this involved overall enrolments of 2,130 and 1,270 respectively. The EEB graduate program offers 6-9 graduate courses and 7 joint graduate/undergraduate courses a year. This teaching takes places in both RW and ESC.

The following table displays the 2023 distribution of EEB space by space category. Ecology & Evolutionary Biology currently occupies 3,586.39 nasm of space in the Ramsay Wright Laboratories Building.

Ramsay Wright Laboratories		
Ecology & Evolutionary Biology		
Subcategory Code	Subcategory Description	NASM
11.2	Informal Study Space	160.06
2.1	Scheduled Class Lab	1,091.37
2.3	Undergraduate Lab Support Space	540.65
3.1	Research Lab Space	621.88
3.2	Research Lab Support Space	656.85
4.1	Academic Offices	140.74
4.2	Research Office/Project Space	34.7
4.3	Graduate Student Office	159.36
4.4	Departmental Support Staff Office	120.11
4.5	Office Support Space	60.67
TOTAL		3,586.39

EEB Existing RW Space Program Summary:

Fig 3: Location of existing EEB spaces in RW ground, first, second, third, fifth, and seventh floors:



Ecology and Evolutionary Biology has 10 rooms for Scheduled Undergraduate Teaching Labs, for a total of 1,091 nasm in Ramsay Wright. These labs are currently in use full-time M-F, 9am-930pm in the Fall with activities that include lab sessions and lengthy preparation and clean-up time. While the Spring calendar is not as consistent, six of the teaching labs maintain this all-day pattern of usage while four accommodate limited course and prep activity during this time.

The following table describes the typical (2019/2020) utilisation of the EEB teaching labs in RW.

Ramsay Wright Laboratories

Ecology and Evolutionary Biology: Typical Teaching Lab Activities

	FALL						WINTER					
ACTIVITY	WEEKLY HRS (10 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	UTILISATION COU CAT 2.0 (18HRS)*	UTILISATION COU CAT 1.0 (35HRS)**	WEEKLY HRS (10 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	UTILISATION COU CAT 2.0 (18HRS)*	UTILISATION COU CAT 1.0 (35HRS)**
PREP/DROP-IN	457	46	102%	80%			339.5	34	75%	60%		
LAB INSTRUCTION	168	17	37%	29%	93%	48%	106	11	24%	19%	59%	30%
TOTAL ACTIVE HOURS	625	63	139%	110%			445.5	45	99%	78%		

*Where COU Guidelines indicate a benchmark of 18HRS a week for Teaching Labs; (40%) of a 45HR week, (32%) of a 57HR week.

**Where COU Guidelines indicate a benchmark of 35HRS a week for Classroom Facilities; (78%) of a 45HR week, (61%) of a 57HR week.

Based on the review of this typical activity, the 10 EEB Teaching Labs in Ramsay Wright show a high level of utilisation, with an average of 63 active lab hours in the Fall and 45 active lab hours in the Spring. This includes the time that is required to set up and take down the lab materials, and experiments are often set up and maintained through the week. This is needed to support larger courses that are delivered in multiple course practicals. BIO120 *Adaptation and Biodiversity*, for example, has 10 sections totalling ~1,500 students, and is taught bi-weekly T-F across eight of EEB's teaching labs. Because of the sustained use of the labs through the week, there is little capacity to accommodate additional activities within the EEB Teaching Labs.

Refer to Appendix 2b_EEB Typical Schedule for additional schedule information that describes EEB's current pattern of activity in RW.

Cell & Systems Biology

The Department of CSB was established in 2006 to advance research and teaching in molecular life sciences and systems biology. Presently, the Department is housed within two buildings, the Ramsay Wright Laboratories Building and the Earth Sciences Centre (ESC). While there are teaching and research facilities in both locations, most of the undergraduate teaching and research facilities are located within the Ramsay Wright building, with a smaller compliment in the ESC.

CSB has two core programs: Animal Physiology and Cell & Molecular Biology, as well as Multi-Departmental programs including Biology, Bioinformatics & Computational Biology, and Genome Biology. The department typically offers 45 courses that engage students in fields of study such as high-throughput genomics, chemical biology, imaging, computational, and physiological approaches. The purpose-built teaching laboratories at Ramsay Wright have enabled a focus on laboratory skills development in many of these courses, however program delivery also includes lecture, discussion-based seminar, and independent research modules. Within Ramsay Wright CSB delivers 6 lab courses in the Fall and Winter Terms. In 2019/2020 the overall undergraduate enrolment counts were 1,410 and 1,760 students respectively.

The following table displays the distribution of CSB space by space category. Cell & Systems Biology currently occupies 6,774.13 nasm of space in the Ramsay Wright Laboratories Building.

Ramsay Wright Laboratories Cell & Systems Biology		
Subcategory Code	Subcategory Description	NASM
1.2	Non-Tiered Classroom	82.76
1.4	Classroom Service	62.45
11.2	Informal Study Space	160.06
14.1	Student Office and Support Space	20.08
2.1	Scheduled Class Lab	810.27
2.3	Undergraduate Lab Support Space	349.43
3.1	Research Lab Space	2622.28
3.2	Research Lab Support Space	1267.1
4.1	Academic Offices	408.35
4.2	Research Office/Project Space	25.89
4.3	Graduate Student Office	285.48
4.4	Departmental Support Staff Office	247.99
4.5	Office Support Space	431.99
TOTAL		6,774.13

CSB Existing RW Space Program Summary:

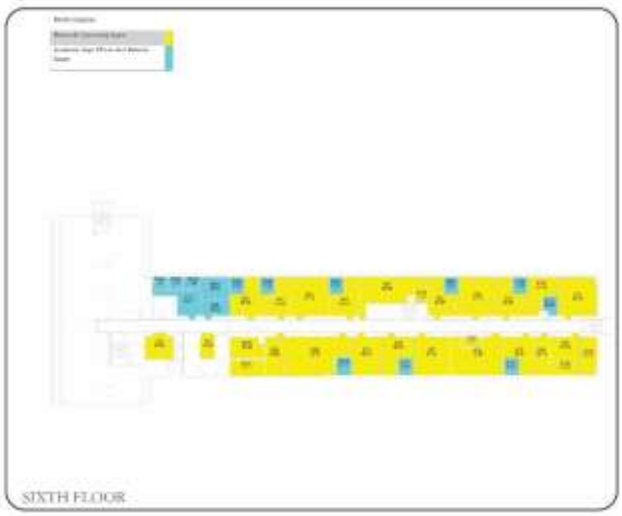
Fig 4: Location of existing CSB spaces in RW ground, first, second, third, fourth, fifth, and sixth:


SECOND FLOOR


THIRD FLOOR


FOURTH FLOOR


FIFTH FLOOR



Cell & Systems Biology has 9 Scheduled Class Labs, for a total of 810.27 nasm in Ramsay Wright. CSB also schedules courses in 2 additional FAS Teaching Labs in RW. The CSB labs are currently in use most of the time in Fall and Spring, however the lab schedules are not uniform. The typical (2019/2020) usage ranges from 17 hours a week to a maximum weekly use of 54 hours.

The following tables describe the typical utilisation of the CSB teaching labs in RW.

Ramsay Wright Laboratories

Cell & System Biology: Typical Teaching Lab Activities

	FALL						WINTER					
ACTIVITY	WEEKLY HRS (9 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	COU CAT 2.0 (18HRS)*	COU CAT 1.0 (35HRS)**	WEEKLY HRS (9 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	COU CAT 2.0 (18HRS)*	COU CAT 1.0 (35HRS)**
PREP/DROP-IN	204	23	50%	40%			339.5	38	84%	66%		
LAB INSTRUCTION	177	20	44%	35%	109%	56%	163	18	40%	32%	101%	52%
TOTAL ACTIVE HOURS	381	42	94%	74%			387	43	96%	75%		

*Where COU Guidelines indicate a benchmark of 18HRS a week for Teaching Labs; (40%) of a 45HR week, (32%) of a 57HR week.

**Where COU Guidelines indicate a benchmark of 35HRS a week for Classroom Facilities; (78%) of a 45HR week, (61%) of a 57HR week.

The CSB Teaching Labs have an above average level of utilisation, with an average of 42 active lab hours in the Fall and 43 active lab hours in the Spring. The activities in the CSB labs are similar to EEB in that they rely on extensive prep and clean-up time to support lab instruction. CSB labs typically require 2-3 hours of set-up time before labs, and 1-2 hours clean-up time after each lab. The prep time may involve bringing in small and large pieces of equipment for shared or individual use and setting up bench top experiments. CSB also has very large first and second year classes that rely on multiple labs to deliver multiples sections. For example, BIO130 *Molecular and Cell Biology* has 18 bi-weekly sections totalling ~1,500 students and is taught M-R across seven of CSB's teaching labs. Because of the sustained use of

the majority of the labs through the week, there is little capacity to accommodate additional activities within the CSB Teaching Labs.

Refer to Appendix 2c CSB Typical Schedule for additional schedule information that describes CSB's current pattern of activity in RW, and Appendix 1 FAS Teaching Lab Tour.

e) Occupant profile

This project will provide newly upgraded space for the Division of Teaching Laboratories, Ecology and Evolutionary Biology, and Cell & Systems Biology.

Division of Teaching Laboratories (DTL)

The University of Toronto's Temerty Faculty of Medicine (TFoM) is Canada's preeminent center for medical education and research. At the center of the faculty's education and research platforms is the Medical Sciences Building (MSB), built in 1969 and now at its half-century mark. The 2020 MSB Master Programming exercise concluded that MSB's outdated research, teaching environments, and building systems cannot compete with today's new academic medical science education and research centers. Given the physical and operational constraints presented by the existing facilities, planning and design for a new building has commenced. The Medical Science's Building western most block ("B"), is the chosen site for the new James and Louise Temerty Building. As one of many departments that currently resides within Block B, the Division of Teaching Labs (DTL) will need to be relocated, either temporarily or permanently, so that it can continue to deliver its undergraduate programming.

There are 14 full time appointed staff in DTL without counting the director who is currently Associate Dean, Undergraduate Education and Associate Professor of Biochemistry. The move to RW is planned to accommodate all existing FTE. As space is limited, and a preference lies in allocating as much available space to class labs and its supporting spaces as possible, office space has been re-evaluated during design process and some offices will be shared while director will keep her office in another building thus allowing an office space for the lab manager.

The working assumption has been no FTE growth anticipated, and if this changes in the future, then hybrid work will be further explored.

DTL	
Occupant Category	Anticipated FTE
Faculty	0
Graduate Students	0
Administration & Support Staff*	14
TOTAL FTE	14

* Non-Academic Staff – Private Office = 3
Non-Academic Staff – Open Office = 11

The Temerty Faculty of Medicine Division of Teaching Laboratories Staging Project will also impact current building occupants within Ramsay Wright, through a series of relocations, reallocations, and upgrades to existing facilities. These include faculty, staff, and students within the departments of Ecology and Evolutionary Biology and Cell and Systems Biology.

Ecology and Evolutionary Biology (EEB)

EEB faculty have achieved an international reputation for excellence in both research and teaching, with a focus on diverse sub-disciplines within ecology and evolutionary biology. The department is currently housed within the Ramsay Wright Laboratories Building and Earth Sciences Centres. The department has approved searches for three FTE (Faculty – Tenured Stream) in the coming years; this will include one in 2023 and two in 2024.

The following tables summarise the EEB Occupant Profile, both on Campus and as it relates to project specific scope:

EEB - CAMPUS WIDE (DOWNTOWN ST GEORGE CAMPUS UNLESS NOTED OTHERWISE)			
Occupant Category	FTE	Non-FTE (Headcount)	Notes
4.1 Academic			
Faculty - Tenure Stream	24	25	
Faculty - Tenure Stream (approved searches)			1 (2023), 2 (2024)
Faculty - Tenure Stream (UTM/UTSC)		24	
Faculty - Teaching Stream	2	2	
Faculty - CLTA	1	1	
Emeritus/Emerita		9	
Sessional lecturers		5	
4.1 Academic Total	27	66	
4.2 Research Appointment			
Postdoctoral Fellows (Postdocs)	14	14	
Research Associates			
4.1 Research Appointments Total	14	14	
4.4 - Dept. Admin. & Support Staff			
Administrative	22	23	
4.4 - Dept. Admin. & Support Staff Total	22	23	
Enrolment Summary			
Graduate Students		152	

EEB - PROJECT SPECIFIC			
Occupant Category	FTE	Non-FTE (Headcount)	Notes
4.1 Academic			
Faculty - Tenure Stream	14	18	
Faculty - Tenure Stream (approved searches)			
Faculty - Tenure Stream (UTM/UTSC)			
Faculty - Teaching Stream			
Faculty - CLTA			
Emeritus/Emerita			
Sessional lecturers			
4.1 Academic Total			
4.2 Research Appointment			
Postdoctoral Fellows (Postdocs)	14	14	
Research Associates			
4.1 Research Appointments Total			
4.4 - Dept. Admin. & Support Staff			
Administrative			
4.4 - Dept. Admin. & Support Staff Total			
Enrolment Summary			
Graduate Students		24	

Department of Cell & Systems Biology (CSB)

Much like EEB, CSB also has a concentration of its space on campus within the Ramsay Wright Laboratories Building and the Earth Sciences Centre. The department currently has two approved Faculty – Tenured Stream searches.

The following tables summarise the CSB Occupant Profile, both on Campus and as it relates to project specific scope:

CSB - CAMPUS WIDE (DOWNTOWN ST GEORGE CAMPUS UNLESS NOTED OTHERWISE)			
Occupant Category	FTE	Non-FTE (Headcount)	Notes
4.1 Academic			
Faculty - Tenure Stream	27	29	
Faculty - Tenure Stream (approved searches)	2	2	
Faculty - Tenure Stream (UTM/UTSC)		40	
Faculty - Teaching Stream	2	2	
Faculty - CLTA	4	6	
Emeritus/Emerita		13	
Sessional lecturers		5	
4.1 Academic Total	35	97	
4.2 Research Appointment			
Postdoctoral Fellows (Postdocs)	13	13	
Research Associates	5	5	
4.1 Research Appointments Total	18	18	
4.4 - Dept. Admin. & Support Staff			
Administrative	45	45	
4.4 - Dept. Admin. & Support Staff Total	45	45	
Enrolment Summary			
Graduate Students		233	

CSB - PROJECT SPECIFIC			
Occupant Category	FTE*	Non-FTE* (Headcount)	Notes
4.1 Academic			
Faculty - Tenure Stream	18	19	Bioinformatics Suite FTE (3)
Faculty - Tenure Stream (approved searches)	2	2	
Faculty - Tenure Stream (UTM/UTSC)		40	
Faculty - Teaching Stream	2	2	
Faculty - CLTA	4	6	
Emeritus/Emerita		13	
Sessional lecturers		5	
4.1 Academic Total	26	87	
4.2 Research Appointment			
Postdoctoral Fellows (Postdocs)	13	13	
Research Associates	5	5	
4.1 Research Appointments Total	18	18	
4.4 - Dept. Admin. & Support Staff			
Administrative	45	45	
4.4 - Dept. Admin. & Support Staff Total			
Enrolment Summary			
Graduate Students		24	
Undergraduate Students		99	

**Note building wide FTE inputs are provided to inform the Category 4.5 and shared Category 3.2 needs*

III. Project Description

a) Vision Statement

While this project consolidates a series of distinct planning objectives, including the DTL staging needs, secondary effects, and other discrete FAS projects, the proposal maintains an ongoing dedication to upgrading the existing facilities within the Ramsay Wright Laboratories building. Originally built in 1965, Ramsay Wright has recently undergone a series of renovations to some of its research and teaching laboratory facilities. These major upgrade projects include the 2014 RW Teaching Lab Upgrades Project and the 2017 SIF Projects. One of the goals of the Ramsay Wright Teaching Laboratory Upgrades Project was to create purpose-built modern lab facilities to support the delivery of life sciences instruction on the downtown St. George Campus.

Similarly, the TFoM DTL RW Staging Project includes a concentration of project area dedicated to the creation of new or upgraded teaching facilities within Ramsay Wright. With 51% of the total affected renovation area dedicated to creating Classroom Facilities and Undergraduate Teaching Labs and Teaching Lab Support Spaces, this will provide an opportunity to create high quality instructional space to support a consistent experience of educational excellence at the University of Toronto.

b) Statement of Academic Plan

<u>Division of Teaching Laboratories (DTL):</u>

The Division of Teaching Labs (DTL) primary purpose is to support the delivery of undergraduate lab courses offered by the basic medical science (BMS) departments within the Faculty of Medicine (Biochemistry, Immunology, Molecular Genetics, Pharmacology & Toxicology, and Physiology). Graduate-level lab courses and practicals for these departments are also supported. Currently, there are 17 undergraduate lab courses with over 800 Arts & Science students within diverse life science programs enrolled each year. It is DTL's responsibility to provide laboratory infrastructure, equipment, supplies, reagents, and technical expertise to ensure the smooth delivery of these courses. DTL technicians work behind the scenes to prepare reagents, setup and clean up each class, and maintain equipment and facilities, ensuring safety standards and regulations are always followed. We assist Course Coordinators and teaching assistants during the labs and with development of new experiments and courses.

DTL strives to provide an enriching laboratory experience for life science students by being a world-class teaching facility which evolves through continuous improvement and engagement with our faculty, students, and staff. In serving the Temerty Faculty of Medicine, DTL aims to: provide sustainable, effective, and responsive service to the BMS departments; ensure a positive, productive, and safe learning and work environment; and enhance the local and global reputation of the Faculty through outreach and educational programming.

To the last point, enhancing TFoM's reputation, DTL offers its own high school summer program (MedYSP) as well as supports several outreach initiatives by providing space and resources. The MedYSP provides a unique opportunity for high school students to get a glimpse of what it is like to be an undergraduate student at the University with hands-on labs, lectures, and demonstrations. Students from all over the world attend the program and DTL provides scholarship opportunities through partnerships with local school boards to make the program accessible to those who could not otherwise afford to attend. MedYSP has become a very impactful program, promoting the reputation of the faculty within the local communities and internationally. For many years, DTL has supported the activities of various youth organizations and outreach groups, including Jr. DEEP, Science Rendez-Vous, Summer Mentorship Program, iGEM, the Saturday Program, and TAIE International Institute. Should space allow, DTL will continue to do so in the years to come.

In contrast to other lab facilities at the University, since DTL serves the diverse needs of many departments, DTL functions best through extensive sharing of resources and staff expertise. Sharing increases efficiency while reducing costs and storage needs.

For detailed information about DTL's minimum desired program requirements, refer to Appendix 11 DTL Statement of Academic Plan Program Requirements. It is important to note that DTL spaces allocated in this PPR are smaller than desired, the most important being a requirement for 12 labs (Appendix 6). Seven labs are detailed in this PPR.

Department of EEB:

The Department of Ecology and Evolutionary Biology at the University of Toronto is at the forefront of teaching and research into the factors governing biodiversity, from genomes to ecosystems. The integration of both basic and applied perspectives into EEB's research and teaching mean that EEB's research and teaching activities will continue to have a major impact on both the fundamental understanding of the natural world, as well as on policy and practice for minimizing and managing human impacts on biodiversity.

Department of CSB:

The Department of Cell & Systems Biology (CSB) was established in July of 2006 to advance research and teaching in some of the most dynamic and vital areas of biological research. This bold new initiative prompted the development of ambitious graduate and undergraduate programs and facilitated the pursuit of innovative research in the molecular life sciences and systems biology.

CSB research investigates the behaviour of cells – the fundamental units of life – in terms of molecular processes within and between cells. Both hypothesis-driven and discovery-based strategies are integrated to gain a mechanistic understanding of complex and highly dynamic cellular systems and how they govern the development, physiology, interaction, and evolution of organisms.

CSB embraces new methodologies and state-of-the art technologies. Its researchers use a wide range of innovative tools to study the fundamental biological mechanisms that govern interactions at all levels of complexity, ranging from molecules to communities. CSB has expertise in high-throughput genomics, chemical biology, imaging, computational, and physiological approaches.

c) Space Program, Requirements and Functional Plan

Space Requirements - DTL

DTL functions via extensive sharing of equipment, supplies, reagents, and technical expertise, which allows them to minimize course delivery costs and maximize efficiency of operations. DTL operates best when these resources are easily accessible within one contiguous location as this reduces preparation and clean-up time. For example, time required to transport equipment, supplies, and reagents from their storage/prep location to the lab room is minimized when the support spaces and teaching areas are in proximity. Many DTL courses use large/stationary equipment which cannot be moved from one location to another; maintaining such equipment in a centralized area minimizes the need to purchase additional equipment and the associated space required. Also, having interstitial and prep spaces in close proximity to labs rather than storage within labs allows for uninterrupted classes.

Likewise, staff can more easily coordinate their work and assist each other to set up and clean up labs if they are working within the same area, which takes 3 hours each. As staff are assigned to multiple courses, contiguity is key to allowing the appropriate scheduling of shifts to provide the necessary expertise and real-time support while courses are running. High amount of chemicals that are stored and used to prepare reagents daily best serves the department if located in a single place in order to provide for various classes. The same applies for glass washing. Efficiency in both staff work and education delivery is thus achieved.

TFoM instructors highly value the opportunity to interact closely with their students that the teaching lab environment provides. Delivering courses within a contiguous block allows course coordinators to move easily from room to room to provide this direct support for their students, thus enhancing the learning experience for their students. DTL's ability to adapt and cater to ever-changing program and course needs rests on their contiguity and sharing of resources.

Perkins Eastman was engaged to perform an MSB Master Programming Study which reviewed DTL's Class Laboratory needs. Within the draft Master Programming document Perkins Eastman's projected Class Laboratory needs for DTL for 2019 were 1,475 NASM and 1,620 NASM for 2039 (incl. an estimated 10% contingency for future growth). The COU calculations reveal space needs that are considerably below DTLs existing footprint. Based on industry best practices, Perkins Eastman proposed 2,212 nasm as appropriate space for DTL. This proposal is over and above their COU calculations. Perkins Eastman based their COU calculation on busiest week and not on weekly student contact hours as calculated by U of T UPDC. More information can be found in Appendix 6 DTL COU Space Analysis.

At RW, DTL is proposed to occupy a contiguous space on the fourth floor along a double loaded public corridor. All teaching labs will be located adjacent to one another or across the corridor from one another, pairing CL2 and CL1 labs. There is a total of 8 labs (7 teaching and 1 student drop-in lab). The labs are interconnected as much as possible to allow for seamless class delivery as well as provide second exists for safety. Lab support spaces such as interlabs, a drop-in lab, a tissue culture room, will be incorporated as adjoining spaced to class labs. Lab support spaces, chemical prep, cold rooms, and glass washing will be also located near class labs. Only Media Prep cannot be accommodated on the floor footprint and has been located on the ground level as close to elevators as possible for efficient transportation of materials. Storages and touchdown stations will be integrated as much as possible wherever possible within labs, and interlabs. Level 4 spaces are to house departmental admin office suite.

Active Learning Classroom has been deleted from the functional program to accommodate better sized lab support spaces. An Active Learning Classroom was originally costed as part of Option 2, Appendix 9b DTL Option 2 Functional space program for Option 2 is provided in Appendix 7 Detailed DTL Space Program. It is expected that Proponent take into consideration both options in their proposal. During schematic design, Option 2 has been abandoned due to space limitations.

To strategically use available allocated space various out-of-the box ideas are being considered as well as DTL's own operations. In terms of space use, high density storage is being used for chemical prep area. Structural assessment and feasibility of the floor during schematic design confirmed its possibility. Other modes of storage that were explored included fire rated millwork cabinets within the public corridor for equipment, but it wasn't feasible due to corridor width requirements for number of students circulating. To provide appropriate space for TA's and instructors during classes, hoteling touch down workstations were being considered as flip-down desks in the public corridors outside class labs. Schematic design was able to provide workstations within some lab support spaces as well as admin open office area. It was most appropriate to have a concise administrative suite, as proposed in this PPR, which was achieved. However, DTL will still consider off-site locations for some offices that may not be crucial for running the department on daily basis. Additional storage areas and potential for collocated offices with other RW departments were explored but did not bear fruit due to vast differences in organization. However, options are still being investigated. Outdated equipment replacement with multi-purpose functions will be achieved outside of this Project scope.

The following table describes the proposed utilisation of the new DTL teaching labs in RW.

Ramsay Wright Building

Division of Teaching Laboratories: Proposed Activities

	FALL						WINTER					
ACTIVITY	WEEKLY HRS (8 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	UTILISATION COU CAT 2.0 (18HRS)*	UTILISATION COU CAT 1.0 (35HRS)**	WEEKLY HRS (8 Labs)	AVG.	UTILISATION ACTUAL (45HR WK)	UTILISATION ACTUAL (57HR WK)	UTILISATION COU CAT 2.0 (18HRS)*	UTILISATION COU CAT 1.0 (35HRS)**
PREP/DROP-IN	238	30	66%	52%			297	37	83%	65%		
LAB INSTRUCTION	139	17	39%	30%	97%	50%	109	14	30%	24%	76%	39%
TOTAL ACTIVE HOURS	377	47	105%	83%			406	51	113%	89%		
ACR (1 Classroom)	32	32	71%	56%			31	31	69%	54%	172%	89%

*Where COU Guidelines indicate a benchmark of 18HRS a week for Teaching Labs; (40%) of a 45HR week, (32%) of a 57HR week.

**Where COU Guidelines indicate a benchmark of 35HRS a week for Classroom Facilities; (78%) of a 45HR week, (61%) of a 57HR week.

Refer to Appendix 4 DTL Proposed Schedule for additional information with respect to DTL's proposed new schedule of activity in Ramsay Wright, and Appendix 5a and 5b DTL Equipment List and Specs for a detailed list of new and existing equipment and specifications.

The proposed new schedule will have a very high level of utilisation. Through subsequent meetings with sub-committee user groups, it was determined that due to scheduling requirements of teaching labs and interlabs for the majority of day during regular working hours, it may be necessary in rare occasions to allocate class time to an unscheduled / drop-in lab. The sharing of one CL2 and one CL1 interlab during class time and prep time already poses challenges due to space infringements and technicians requiring doing their work while students use the interlab. Since interlabs will be always in use during the day, DTL will develop appropriate operations for lab set-up and prep.

It should be noted that DTL uses animals (mice, rats, frogs and sometimes rabbits) which will be housed, fed, and managed in the Biological Sciences Facilities (BSF) in RW. An internal agreement between DTL, DCM (Division of Comparative Medicine who also supplies animals and services to DTL) and BSF is being developed and it will not influence the project. Animals will be brought up to the labs for their respective courses for use and sometimes return to BSF, depending on the course requirements. The use of animals has been thoroughly considered in the design of the DTL class lab spaces (ethics, training, and handling).

Space Program

In total, the project includes 3,549.04 nasm of affected project area, with 3,077 nasm of confirmed renovation area.

- Pre-Work/Other (RW, LM, ESC) enabling projects: 853.77 nasm
    a. DTL Project – FAS Secondary Effects renovation scope (382.41 nasm)
    b. DTL Project – FAS Secondary Effects relocations (43.46 nasm)
    c. DTL Project – FAS Secondary Effects TBD (427.9nasm)
- TFoM DTL RW Staging project renovation scope includes: 2,695.67 nasm
    a. DTL Project Scope (1,172.21 nasm)
    b. DTL Project – FAS Secondary Effects (459.18 nasm)
    c. FAS Other Projects (735.99 nasm)

1. DTL Program Elements

DTL Project Scope at RW:1,172.21 nasm

The following table is a summary of existing vs. proposed areas per COU space subcategory, per department:

		MSB Existing Area	COU Calculated	RW Proposed Area
COU Subcategory Code	Subcategory Description	NASM		
1.3	Active Learning Classroom	177		
Category 1	***Total***	***177***	***120***	***0***
2.1	Scheduled Class Lab	1,923		670
2.2	Unscheduled Class Lab	87		24
2.3	Undergraduate Lab Support Space	1,028		353
*Category 2**	***Total***	***3,038***	***1,108***	***1,047***
4.4	Departmental Support Staff Office	162	99	81
4.5	Office Support Space	0	25	44
Category 4	***Total***	***162***	***124***	***125***
11.2	Informal Study Space	78	0	0
14.1	Student Office and Support Space	12	0	0
	TOTAL	**3,467**	**1,414**	**1,172**

*For Category 2.0, it should be noted that COU formulas to generate nasm for DTL are not a perfect benchmark as DTL is not a typical lab setting. The COU calculations will provide generic lab classroom benchmarks but may not be able to give DTL specific nasm with regards to lab support spaces that they require. Therefore, what is proposed in appendix 6 (PE proposal) is higher than COU requirements for Category 2.0.

Refer to Appendix 7 for detailed DTL space program and area comparisons.

2. EEB Program Elements

EEB Renovation Scope at RW: 462.73 nasm

		RW Existing Area (Project Scope Only)	**COU Calculated***	**RW Proposed Area**
COU Subcategory Code	Subcategory Description	NASM		
2.1	Scheduled Class Lab		156.26	133.13
2.3	Undergraduate Lab Support Space	45.12		
Category 2	**Total**	***45.12***	***156.26****	***133.13***
3.1	Research Lab Space	549.79		178.13
3.2	Research Lab Support Space	364.16		146.06
Category 3	***Total***	***913.95***	*376.48***	***324.19***
4.1	Academic Offices	99.89		
4.2	Research Office/Project Space	34.7		
4.3	Graduate Student Office	96.28		
Category 4	***Total***	***230.87***	***n/a***	
14.1	Common Use and Student Activity	5.41		5.41
Category 14	***Total***	***5.41***	***n/a***	***5.41***
	TOTAL	**1,195.35***	**532.74**	**462.73**

* The EEB space program for this project is composed of discrete standalone projects, with additional Ramsay Wright inventory to remain as is. The COU calculations have been pro-rated to relate the current project areas to the overall space inventory profile.

**As described elsewhere in the PPR, the creation of the DTL Suite on the fourth floor of Ramsay Wright involves the relocation of EEB program space. This will include the relocation of Category 3 spaces elsewhere in the building and to other locations on campus.

3. CSB Program Elements

CSB Project Scope at RW: 732.84 nasm

		RW Existing Area (Project Scope Only)	**COU Calculated***	**RW Proposed Area**
COU Subcategory Code	Subcategory Description	NASM		
1.2	Non-Tiered Classroom	82.76	54.4	69.81
1.3	Active Learning		72	69.75
Category 1	***Total***	**82.76**	126.4	**139.56**
2.1	Scheduled Class Lab			49.37
2.3	Undergraduate Lab Support Space	12.14		
Category 2	***Total***	**12.14**	n/a	**49.37**
3.1	Research Lab Space	412.47		103.78
3.2	Research Lab Support Space	122.82		111.6
Category 3	***Total***	**535.29**	251.41*	**215.38**
4.1	Academic Offices	48.37	88	77.66
4.3	Graduate Student Office	11.52		
4.4	Departmental Support Staff Office	68.09	55	74.98
4.5	Office Support Space	147.48	122.29	170.36**
Category 4	***Total***	**275.46**	*265.29*	**323.13**
14.1	Student Office and Support Space			5.41
Category 14	***Total***		***n/a***	**5.41**
	TOTAL	**905.65**	**643.10**	**732.82**

* The CSB space program for this project is composed of discrete standalone projects, with much existing Ramsay Wright inventory to remain as is. The COU calculations have been pro-rated to relate the current project areas to the overall space inventory profile.

** Office Support Space provided includes lounge space that is open to undergrad students in the BCB program.

Fig 5: Project Scope of Work

Division of Teaching Labs Ramsay Wright Planning - TFoM RW Staging Project

Project Scope of Work

1. DTL PROJECT (only)

DTL Teaching Labs, Lab Support, & Administrative Suite

PHASE 2	Construction May 2023 - May/August 2024								
Existing COU Subcategory Code	Existing Subcategory Description	Proposed COU Subcategory Code	Proposed Subcategory Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (NASM)
3.1/3.2/4.1/16.2	Research Lab Space + Research Lab Support Space + Academic Office + Other Non-Assignable	2.3	Undergraduate Laboratory Support Space	RW	4	404, 404A-C, 405, 405B-C	407, 416	DTL Chemical Prep & Tissue Culture	99.15
3.1	Research Lab	2.3	Undergraduate Laboratory Support Space	RW	4	406	407A	DTL Cold Room (Staff - Chem)	13.51
4.3/16.2	Graduate Student Office + Other Non-Assignable	2.3	Undergraduate Laboratory Support Space	RW	4	406K, 406A-C	405	DTL Cold Room (Student)	20.54
2.3/3.2/4.4	Undergraduate Lab Support + Research Laboratory Support Space +	2.3	Undergraduate Laboratory Support Space	RW	Ground	32, 32A-C	31	DTL Media Prep	62.62
2.3/3.2/4.4	Undergraduate Lab Support + Research Laboratory Support Space +	2.3	Undergraduate Laboratory Support Space	RW	Ground	32, 32A-C	31A	DTL Cold Room (Staff - Media)	8.24
3.1/3.2/16.2	Research Lab Space + Research Lab Support Space + Other Non-Assignable	2.3	Undergraduate Laboratory Support Space	RW	4	407A-C, 408	421	DTL Glasswashing	66.4
3.1/3.2/4.1	Research Lab Space + Research Lab Support Space + Academic Office	2.1	Scheduled Class Lab	RW	4	408A-C, 409, 409A-C	404	DTL CL1 Teaching Lab	95.65
3.1/4.1	Research Lab Space + Academic Office	2.1	Scheduled Class Lab	RW	4	410, 410A, 411, 411A	408	DTL CL1 Teaching Lab	93.16
2.3/3.2/4.4	Undergraduate Lab Support + Research Laboratory Support Space +	2.3	Undergraduate Laboratory Support Space	RW	Ground	32, 32A-C	31A	DTL Storage	8.5
3.2/4.2/16.2	Research Lab Support Space + Research Office/Project Space + Other Non-Assignable	2.1	Scheduled Class Lab	RW	4	412, 412A-C, 413A-B	415	DTL CL2 Teaching Lab	95.83
3.1/3.2/4.1	Research Lab + Research Lab Support Space + Academic Office	2.1	Scheduled Class Lab	RW	4	414, 414A-B	414	DTL CL2 Interlab	48.88
3.1/3.2/4.1/4.3	Research Lab + Research Lab Support Space + Academic Office + Graduate Student Office	2.1	Scheduled Class Lab	RW	4	415, 415A, 416, 416A-B	412	DTL CL2 Teaching Lab	94.82
3.1	Research Lab	2.3	Undergraduate Laboratory Support Space	RW	4	416	417	DTL Unscheduled/Drop-in Lab	23.8
3.1/4.1/4.3	Research Lab Space + Academic Office + Graduate Office	2.1	Scheduled Class Lab	RW	4	417, 417A, 418, 418A	411	DTL CL1 Teaching Lab	97.81
3.1/3.2/4.1	Research Lab Space + Research Lab Support + Academic Office	2.1	Scheduled Class Lab	RW	4	419, 419A-B, 420B	418	DTL CL1 Teaching Lab	95.99
3.2/16.2	Research Lab Support Space + Other Non-Assignable	2.1	Scheduled Class Lab	RW	4	420, 420A/C	409	DTL CL1 Interlab	25.48
3.2/16.2	Research Lab Support Space + Other Non-Assignable	2.1	Scheduled Class Lab	RW	4	421, 421A-C	420	DTL CL1 Teaching Lab	96.99
4.4/4.5	Departmental Support Staff Office/Office Support Space	4.4/4.5	Departmental Support Staff Office/Office Support Space	RW	4	424, 424A-G	424, 424A, 424C-H	DTL Office	124.84
								TOTAL NASM:	1172.21

Notes Change of Use

2. DTL PROJECT - FAS SECONDARY EFFECTS

Teaching Lab, Research Labs, Research Lab Support, Academic Office

PHASE 2	Construction May 2023 - May/August 2024								
Existing COU Subcategory Code	Existing Subcategory Description	Proposed COU Subcategory Code	Proposed Subcategory Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (NASM)
3.1	Research Laboratory Space	3.1	Research Laboratory Space	RW	Ground	07,07A, 07B	8	EEB Environmental Rooms	89.46
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	3.1	Research Lab	RW	Ground	32, 32D, 32E	32B	EEB Aquatics Lab (Dead Room)	45.86
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	3.2	Research Lab Support Space	RW	Ground	32D, 32E	32C	EEB Aquatics Lab Fumehood Room 2	11.33
2.1/11.1	Scheduled Class Lab + Structured Formal Study Space (Computer Labs)	2.1	Scheduled Class Lab (Or Research Labs)	RW	1	107, 107A, 109, & 109A	107, 108, 109	Teaching Labs & Lab Support	182.1
PHASE 3	Construction August 2024/February 2025								
3.1/4.1	Research Laboratory Space + Academic Office	4.4	Departmental Support Staff Offices	RW	4	402, 402B & 403, 403A	402, 402A-E, 403	CSB Admin Office Space	87.39
3.1/3.2	Research Lab Space + Research Lab Support Space	4.1	Academic Office	RW	5	531, 531B-C	536, 536A-E	CSB Sessionals Office	45.04
								TOTAL NASM:	459.18

Notes Change of Use

2. DTL PROJECT - FAS SECONDARY EFFECTS

FAS Computer Labs, Teaching Lab, Research Labs, Research Lab Support, Academic Office, Graduate Offices, Office Support

PHASE 1a	Construction Spring/Summer/Fall 2023								
Existing COU Subcategory Code	Existing Category Description	Proposed COU Subcategory Code	New Category Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (NASM)
2.1	Scheduled Class Lab (Computer Lab)	2.1	Scheduled Class Lab	LM	1	LM 121	LM 121a/121b	A&S Computer Lab	246.49
3.2	Research Laboratory Support Space	3.2	Research Laboratory Support Space	ESC	B01	B109/B102/ B107	B109/B102/ B107	Environmental Chambers/Cold Room	135.92
PHASE 1b	Relocation May 2022 - May 2023 (No Construction Scope)								
3.1/3.2/4.1	Research Lab + Research Lab Support Space + Academic Office	3.1/3.2/4.1	Research Lab + Research Lab Support Space + Academic Office	RW	3	301, 301A-C	301, 301A-C	Research Lab, Environmental Room, Faculty Office	43.46
PHASE 1c	TBD								
TBD	TBD	3.1	Research Lab	TBD	TBD	TBD	TBD	(4) Research Labs	162.6
TBD	TBD	3.2	Research Lab Support Space	TBD	TBD	TBD	TBD	(4) Environmental Rooms	41.4
TBD	TBD	4.1	Academic Office	TBD	TBD	TBD	TBD	Faculty Offices (4)	48
TBD	TBD	4.1	Academic Office	ESC	TBD	TBD	TBD	(1) Sessional Office (RW412)	34.7
TBD	TBD	4.3	Graduate Student Office	ESC	TBD	TBD	TBD	Graduate Student/Post-doc Offices (410, 413,	104.87
TBD	TBD	4.5	Office Support	ESC	TBD	TBD	TBD	(1) Meeting Room (RW417)	36.33
PHASE 2	Construction May 2023 - May/August 2024								
Existing COU Subcategory Code	Existing Subcategory Description	Proposed COU Subcategory Code	Proposed Subcategory Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (NASM)
3.1	Research Laboratory Space	3.1	Research Laboratory Space	RW	Ground	07,07A, 07B	8	EEB Environmental Rooms	89.46
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	3.1	Research Lab	RW	Ground	32, 32D, 32E	32B	EEB Aquatics Lab (Dead Room)	43.86
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	3.2	Research Lab Support Space	RW	Ground	32D, 32E	32C	EEB Aquatics Lab Fumehood Room 2	11.33
2.1/11.1	Scheduled Class Lab + Structured Formal Study Space (Computer Labs)	2.1	Scheduled Class Lab (Or Research Labs)	RW	1	107, 107A, 109, & 109A	107, 108, 109	Teaching Labs & Lab Support	182.1
PHASE 3	Construction August 2024/February 2025								
3.1/4.1	Research Laboratory Space + Academic Office	4.4/4.5	Departmental Support Staff Offices / Office Support	RW	4	402, 402B & 403, 403A	402, 402A-E, 403	CSB Admin Office Space	87.39
3.1/3.2	Research Lab Space + Resarch Lab Support Space	4.1	Academic Office	RW	5	531, 531B-C	536, 536A-E	CSB Sessionals Office	45.04
								TOTAL NASM:	1312.95

Notes Change of Use

Non-Assignable Space

PHASE 2	Construction May 2023 - May/August 2024								
Existing COU Subcategory Code	Existing Category Description	Proposed COU Subcategory Code	New Category Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (SM)
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	16.2	Other Non-Assignable Area	RW	Ground	32	32K	CORRIDOR	48.40
		16.2	Other Non-Assignable Area	RW	Ground	32D	32V	CORRIDOR	10.16
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	Ground	08A	08A	Public Toilet-Men	20.06
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	Ground	09A	09A	Public Toilet-Women	20.32
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	4	411K	411K	Corridor	188.76
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	4	436/436A	436	Public Toilet-Universal Washroom	8.65
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	4	437/437A	437	Public Toilet-Women	14.50
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	4	437	437V	Corridor	2.99
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	4	438/438A	438A	Public Toilet-Men	11.70
16.2	Other Non-Assignable Area	16.2	Other Non-Assignable Area	RW	4	438/438A	438V	Corridor	2.35
								TOTAL NASM:	327.89

Notes Change of Use

DTL Proposed Space Program (RW) Highlights:

The space program for the new DTL facility was developed by UofT users, stakeholders, EHS, facilities and planning staff. Findings from external consultants (Master Planning, Prime Consultant and their team of engineers and specialists) as well as the recommendations of the Project Planning Committee inform this report. All labs will be designed to CL2 standards so that they can be easily adapted for future use as courses require. This was also a recommendation by EHS who is implementing the same principle for all new labs.

Scheduled Class Laboratory CL1 Space Program considerations (24 student capacity):

- Provided interconnected class labs with a glass door (preferably sliding) as there are instances where multiple rooms are used simultaneously.
- In this project, the rooms are smaller than ideally required. Only one out of proposed five CL1 teaching labs will have an interconnected interlab. This poses a challenge to class prep and is currently being mitigated by maximizing storages within teaching labs themselves for equipment. Chemical and media materials will be brought in on carts.
- Beside one fume hood per room, miscellaneous benchtop and mobile equipment, majority of equipment will have to be stored in labs as there is limited storage area and interlabs (can be disruptive to classes). It is the intention to replace existing outdated equipment with new multi-functional equipment where possible, thus reducing footprint required for storage. Coordination of classes and equipment storage will be developed.
- Perimeter benches are used for shared equipment, to set out supplies and glassware and to collect used/dirty glassware. Some animal work is done here as well (see DCM information within this

document). Compact and creative ways are being explored to utilize all space required (high density storage, flip top TA's demo tables). This also applies to CL2 class labs.
- Use of flammable and combustible chemicals. This also applies to CL2 class labs.

Scheduled Class Laboratory CL2 Space Program considerations (24 student capacity):

- Rooms are interconnected with an interlab in between. The interlab will be used by both students during class and techs (biosafety cabinets) to prepare for next class, most likely at the same time. To mitigate interference, dedicated workbenches are provided.
- In the project, rooms are appropriately sizes and follow a standardized lab grid, same as CL1 labs. They differ from existing rooms as they here accommodate 6 BSCs each which require clearances.
- Two fume hoods are accommodated in the interlab.

Unscheduled Class Laboratory (CL2) Space Program considerations:

- Room is immediately adjacent to CL2 lab, and it is directly connected by a door to at one CL1 class lab. It is also directly connected to a newly programmed Tissue Culture Room for CL2 work.
- In the project, room is much smaller than the ideal program and it may be booked in rare occasions when classes require it.
- A combination of student lab benches and large floor mounted equipment is required for students to perform off-hours work and check on their refrigerated samples. It also provides common storage space for additional lab equipment like an interlab.

Lab Support – Interlab (CL1 and CL2) Space Program considerations:

- These are smaller lab support spaces interconnected with class labs. RW space allows for two interlabs, one between two CL1 labs and one between two CL2 labs.
- CL2 interlab to have a student dedicated refrigerator to replace a small cold room. Two fume hoods are located in the CL2 interlab and it will help prep-time for techs and allow student use of fume hoods. Touch down workstations for TA's / instructors is provided as well as plenty of floor space for fridges and equipment.
- CL1 interlab allows for many floor mounted equipment and bench upper and lower storage for smaller equipment.

Lab Support – Chemical Prep Area CL2 Space Program considerations:

- Adjacent to and between CL1 labs along the departmental corridor. Direct connection to dedicated cold room.
- It contains high density storage as there is no additional storage room assigned within RW. Large floor area is provided for fridges and deep freezers as an alcove at lab entrance, and floor space for flammable cabinets.
- Sterilized tissue culture dedicated corner area within room with a dedicated BSC, fume hood and at least six work benches and shared equipment benches was originally considered inside, but schematic designed was able to provide a separate CL2 Tissue Culture room across the corridor.

- Storage of flammable and combustible chemicals. Refer to Appendix 8 DTL Flammable Combustible Chemicals List for list and quantities. Chemicals are prepped and taken into all class labs for various uses by classes.

Lab Support – Glass Washing CL1 Space Program considerations:

- To include glassware wash and storage serving only DTL. 2 glass washing machines, autoclave / sterilization area, 2 specialty sinks. Special plumbing and electrical requirements.
- In the proposal, room is much smaller than the ideal program. There is very limited space for required storage within space. If the intention becomes later on to share this room with other RW departments, workspace and storage are most likely required to be increased.
- Additional notes: large storage area for glassware is in a separate area of the same suite.

Lab Support – Media Prep CL1 Space Program considerations:

- In the project, room is smaller than the ideal program. There is limited space for required storage within space, no direct connection to glass washing. A dedicated cold room is provided.
- Media prep dedicated storage in one area of room with two autoclaves, dedicated dispensing benches.

Lab Support – Cold Room Space Program considerations:

- There are two types of cold rooms: student cold room with SS benches and sinks and staff cold rooms with shelving only for storage. Staff cold rooms are split in two: chemical prep and media cold room for sterile compounds. Student cold room for storage of lab samples will be supplemented with refrigerator(s) in CL2 drop-in lab.
- In the project, rooms are properly sized as required.
- All cold rooms will be prefabricated, site installed, and all mechanical and electrical requirement as per equipment / unit specification / requirements.

Lab Support – Storage Space Program considerations:

- Small storage room is provided on the ground floor:
    - Full height open metal shelving.

  Some floor space to store equipment and carts with equipment on them.in the absence of a dedicated storage location, a part of ground floor public corridor near Media Prep will be used to store some of the above in fire rated clockable cabinets.

Active Learning Classroom – Central Storage Space Program considerations:

- Note the active learning classroom for 40 students was removed from the program.

Student Storage Space Program considerations:

- No student storage room. Double tier student lockers are provided in corridors along CL-1 and CL-2. Number of lockers to accommodate student numbers in front of each class lab is appropriate.
- Lockable, non-assignable lockers / cabinets with student supplied locks. Small items can be stored in under bench pedestals (only in CL1).

General Office Space Program considerations:

- Space allows for all minimally required offices and workstations.
- Adequate (eight) touch down open office workstations are provided, and some workstations are also provided in dedicated lab support spaces for tech (I.e. glass washing, media prep)
- A conference room for 6 people in office suite as well as a kitchenette.
- Limited general office storage. Filing cabinet in open workstation area.
- Workstation / office for a specialty DTL trade is also provided.

2. EEB/CSB Shared Program Elements

1. Category 2.1 Scheduled Class Labs and Category 2.3 Undergraduate Lab Support Space (182.1 nasm)

The Ramsay Wright Teaching Laboratory Upgrades Project consolidated much of EEB and CSB's undergraduate teaching within the building, and the existing teaching labs indicate a high level of regular usage. To meet growing demand for life science instruction at the undergraduate level, this project will create two new Arts & Science teaching labs for:

- EEB Teaching Lab
  This lab is being planned to support the expansion of BIO120 course delivery.
- A&S Teaching Lab (Shared)
  This lab is being designed to meet the building standards and to meet typical instructional needs for building occupants.
- Support Space for Teaching Lab prep staff (Shared)

In addition to creating two new teaching labs, the planned glass house upgrades will also help to support expanded instruction. These glasshouse upgrades will allow staff to grow tomatoes, impatiens, coleus, and other plants that are used to support undergraduate instruction.

The new teaching lab(s) in RW will be modeled after the existing undergraduate teaching labs and will require the following:

- (24) seat capacity
- Student seating at peninsular lab benching with access to:
  a. Power
  b. Sightlines to instruction & lab demonstrations
  c. Clear workspace at table for equipment use and experimentation

- (1) 4’ fume hood for shared use
- Teaching front of room with:
    a. Display (either projector/projection screen)
    b. Ample writing surfaces (blackboard/whiteboards)
- Eye wash station, hand wash sink, deluge shower, and drain and other safety equipment as outlined by EHS.

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A6.1 for additional information relating to the EEB/CSB Teaching Labs.

2. Category 3.2 Research Laboratory Support Space: EEB/CSB Growth Facilities (131.28nasm)

The Departments of Ecology and Evolutionary Biology and Cell & Systems Biology rely on a centrally managed network of Growth Facilities to support research activities and undergraduate education. These facilities provide growth space for research organisms in environments controlled for temperature, light, and occasionally humidity. These include walk-in growth chambers, reach-in growth chambers, and glass house facilities that are located within Ramsay Wright and Earth Sciences Centre. This project proposes to upgrade the Ramsay Wright glasshouse to better support the delivery of undergraduate education in the building.

The Ramsay Wright (RW) Facility is original to the building and is dedicated to supporting undergraduate instruction. Unfortunately, it has received minimal enhancements over the years, and requires additional upgrades to make it more useable for the biology departments. EEB and CSB undergraduate courses require glasshouses for propagation and housing of undergraduate teaching materials. However, the RW facility is not currently suitable for germinating, transplanting, and growing material. Although most of the undergraduate teaching labs were moved to Ramsay Wright in 2017, some teaching labs have remained in ESC due to the inadequate growth space in the RW glasshouse. These glass house upgrades would enable this teaching laboratory activity to be consolidated in RW if desired, would potentially free up much needed research lab space in the Earth Sciences Centre, and would increase the functional capacity of the ESC Glass House, which is currently more than 90% occupied.

Upgrades to the existing glasshouse facility includes:

a) Temperature control required for a typical range of 20-25°, with an operating range of 10-35°C.
b) Ideal humidity levels 40-80 RH. Note tightly controlled humidity conditions in the glasshouse are not expected.
c) LED Lighting Upgrade.
d) Centralised control system that manages glass house systems, with remote monitoring capability. The greenhouse automation system should have the ability to remotely monitor and control the greenhouse processes.
e) Integrated controls to manage:
    - LED lighting
    - Temperature Control

- Venting system
- Misting
- Controls to be Priva, Argus, or approved alternate.

f) General envelope upgrades (maintenance scope only such as caulking, seals, etc.)

Refer to Appendix 13_RW Glasshouse PPR and Appendix 14_ME Feasibility Study for additional information relating to the RW Glasshouse Upgrades.

3. Category 14.1 Student Office and Support Space: CSB/EEB Undergraduate Student Union (10.81 nasm)

A new undergraduate union office will be created on the fourth floor, to replace the existing office (RW 16). The existing Student Union Office area is being repurposed for the expanded Imaging Facility on the ground floor. This student office is a shared space between EEB and CSB, and will include:

- o Loose meeting tables & chairs
- o Power conveniently located near tables
- o Writing surface (whiteboard/chalkboard)
- o Storage lockers

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A5.4 for additional information relating to the CSB UG Student Union Office.

3. EEB Program Elements

1. Category 3.1 Research Lab and Category 3.2 Research Laboratory Support Space.

a. EEB Aquatics Labs (111.33nasm)

The Shared Aquatics Facility will provide shared, dedicated labs for use by PIs and students, including those with animals in the existing Biology Sciences Facility (BSF). This will allow researchers to bring specimens into the shared labs to perform measurements, experiments, or prepare them for experiments and then, in some studies using the Live Lab, return them to the BSF. The Shared Aquatics Lab will include:

- A Live Aquatics Lab for the use of six or seven faculty members (two graduate/undergraduate students and/or postdocs each). Note the in-room capacity will be limited to ~4 stations to enable ample work surfaces. Experiments are typically limited to day use.
- A Dead Aquatics Lab for the use of up to ten faculty members (two graduate/undergraduate students and/or postdocs each). Samples being processed will be parts of experiments that will typically run long term for the year or academic term.
- Dedicated Fume Hood rooms are required to support the separate activities in both the Live and Dead Aquatics Labs.

b. EEB Environmental Rooms (89.46nasm)

The Environmental Room Suite will provide a dedicated research lab support area with (6) medium and small environmental rooms, for invertebrates and non-mammalian, non-avian vertebrates with:

- Insulated rooms with individual temperature control
- Overhead lights on timers
- Researchers will provide shelving for aquaria and cages

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A5.2 & A5.3 for additional information relating to the EEB Aquatics Labs & Environmental Rooms.

4. CSB Program Elements

1. Category 1.0 Classroom Facilities: CSB Departmental Classrooms (139.56 nasm)

The CSB Category 1.0 Classroom Facilities are at 110% of the COU benchmark. Both the Cat 1.2 Seminar and Cat 1.3 Active Learning Classroom are being designed to allow for functional flexibility, which requires a higher space factor. With station areas of 2.3 nasm/person and 2.9 nasm/person respectively, these classrooms will be able to support reconfigurability, for lecture, discussion, or group format collaboration.

The new Category 1.0 facilities include:

a. Seminar Classroom (69.81 nasm)

A new seminar room will be created on the fifth floor, to replace the existing seminar rooms in the basement (15 and 15a). These rooms typically support 2nd, 3rd, and 4th year undergraduate courses. Priority booking is provided to CSB courses, however other course delivery is often supported when time is available in the classroom. The newly created classroom will be:

- (30) seat capacity
- Presentation technology at the teaching front of room with:
    - Monitor Displays
    - Central teaching station control podium
    - Ample writing surfaces (whiteboard)
    - Lecture capture capacity
- Audio & speaker system
- Loose furnishings to support flexible layouts and reconfigurability
- Option for Thread Power System by Steelcase (or similar) to provide flexible access to power to dispersed seating layout.

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A8.1 for additional information relating to the CSB Classroom.

b. CSB Active Learning Classroom (69.75 nasm)

An active learning pilot will be launched as part of this project, to support existing instruction delivered in the building and to test new modes of pedagogy. This new classroom will have:

- (24) seat capacity
- Sophisticated AV technology system including:
    - Central teaching station control podium control
    - Monitor displays at both the central teaching front of room and dispersed around the room at a 1/1 relationship with the student tables.
    - Power inputs at each table and wireless technology to allow for content sharing
- Ample writing surfaces (whiteboard)
- Lecture capture capacity
- Audio & speaker system

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A9.3 for additional information relating to the CSB Active Learning Classroom.

2. Category 3.1 Research Laboratory Space and 4.1 Academic Offices: CSB Professional Masters in Biological Data Science Faculty Offices, Research Lab Space (136.4 nasm)

The new Professional Masters in Biological Data Science program will help build critical capacity in the growing field of bioinformatics and biological data science. To build the program three new tenure-stream Faculty members will be hired, including a Program Director. Each Principal Investigator will require research laboratory space and co-located faculty offices. In the interest of facilitating collaboration amongst the researchers, a shared facility has been designed, which includes:

- (3) Faculty offices, including (1) Program Director's office.
    - Power and data at workstation
    - Executive style L-shaped workstation c/w storage and task chair
    - Loose visitor chairs
    - Writing surface (whiteboard/chalkboard)
- A shared open work area to support (3) research lab groups. This space will accommodate 3-4 graduate students/post-doctoral fellows each.
    - Power and data at each workstation
    - Fixed computer workstations c/w wall shelving, under desk storage, and task chairs
    - Writing surface (whiteboard/chalkboard)
- A mix of formal and information meeting spaces, including two enclosed meeting rooms and a collaborative group table in the open work zone.

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A9.2 for additional information relating to the CSB PM BDS Faculty Offices & Research Lab Spaces.

3. Category 3.2 Research Laboratory Support Space: CSB Microscopy/Imaging Facility (103.72 nasm)

The expansion of the existing Imaging Facility will provide (4) new shared microscopy research lab rooms and (1) new CL2 cell culture prep room. The expanded facility will include:

- (2) Spinning Disk Confocal Microscope Rooms c/w peripheral devices, (1) with laser ablation.
- (1) Multi-Photon A1R Microscope c/w peripheral devices and Class 4 laser.
- (1) Leica TCS SP8 Resonant Confocal Room.
  - Compressed air (1 outlet per room)
  - Data ports for computer monitoring system (2 per room)
  - Individual overhead lighting control (dimmable)
  - Power - wall outlets each on separate circuits (3 to 4 in each room)
  - Localized temperature control, 18-22°C +/-1 degree per minute
  - HEPA filtered supply air
  - Ample wall shelving
- (1) Shared Prep Room
  - (1) 6’ Biosafety Cabinet
  - Ample benching & wall storage cabinets
  - (1) utility sink
  - Eye wash station, hand wash sink, deluge shower, and drain.
  - Power (for BSC and incubator)
- (3) Existing Microscope Room Upgrades
  - Individual overhead lighting control (dimmable)
  - Localized temperature control, 18-22°C +/-1 degree per minute
  - Flood mitigation and leak protection measures, including floor drains and ceiling protection.

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A5.1 for additional information relating to the CSB Microscopy Expansion.

4. Category 4.1 Academic Offices: CSB Sessional Offices (45.04 nasm)

New sessional offices will be created on the fifth floor to replace the existing fourth floor sessional office suite, RW 406. This existing set of shared offices is being repurposed to provide new program for the contiguous DTL suite. While the departmental compliment of Sessionals will vary by term, the five offices will be for shared use, assigned by term when timing allows. The new sessional suite requires:

- Power and data at each workstation
- L-shaped workstation c/w storage
- Loose visitor & task chairs
- Writing surface (whiteboard/chalkboard)

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A9.4 for additional information relating to the CSB Sessional Office Suite.

5. Category 4.4 Departmental Support Staff Offices and 4.1 Office Support: CSB Office & Admin Support (87.39 nasm)

The Category 4.4 Departmental Support Staff Office area is above COU benchmark at 136%. While the individual offices are a moderate size, averaging 8.9 nasm, this administrative suite includes large waiting room for students. This provides a comfortable, semi-private location for students to view tests, exams, and other private documents with a direct sightline from the adjacent offices.

This new office area will be created on the fourth floor, to replace the existing administrative office suite, RW 424, that is being repurposed to provide office space for the DTL. The new Admin suite will include:

- (5) Admin Offices
  - Power and data at each workstation
  - L-shaped workstation c/w storage and filing cabinet
  - Loose visitor & task chairs
- Waiting Room
- Loosing visitor furnishings
- Coat Closet
- Meeting Room
  - Presentation technology at front of the room c/w audio & speaker system.
  - Monitor Display w/ wireless casting
  - Power, data, and a/v inputs at meeting table.
  - Document camera
  - Fixed table and loose executive style chairs

Refer to Appendix 10 DTL Index Room Data Sheets and Appendix 9a DTL Drawing Set Drawing A9.1 for additional information relating to the CSB Administrative Office Suite.

6. Category 4.5 Office Support Space (170.36)

a. CSB Professional Masters in Biological Data Science Student Study + UG BCB Student Lounge (90.82 nasm)

The overall Category 4.5 Office Support Space being renovated as part of this project are above COU benchmark at 139%. This is largely derived from the creation of the new dedicated Student Study and Lounge area that will support two student populations at the undergraduate and graduate levels.

The new Student Study & Lounge will provide a shared flexible study environment for students enrolled in the undergraduate specialist program in Bioinformatics and Computational Biology (BCB) and new professional masters in Biological Data Science (PMBDS). The combination of meeting, office, and lounge space will provide many opportunities for project work, community building, and interaction between programs. The new student study lounge will have:

- (1) Meeting room
  a. Presentation technology at front of the room c/w audio & speaker system.
  b. Monitor Display
  c. Power, data, and a/v inputs at meeting table.

d. Fixed table and loose chairs

- (1) Lounge/Study space to accommodate 40 students
    a. Presentation technology at front of the room c/w audio & speaker system.
    b. Ceiling mounted projector and projection screen w/ digital control panel.
    c. Power at each table.
    d. Thread Power System by Steelcase (or similar) to provide flexible access to power to dispersed seating layout.
    e. Loose furnishings to support flexible layouts and reconfigurability

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A7.1 for additional information relating to the CSB PM BDS & UG BCB Student Study & Lounge.

b. CSB Kitchenette, Lounge, and Meeting Room Suite (67.26 nasm)

The existing CSB Kitchenette/Lounge is currently used as a space to gather, make food, eat, and relax. Currently, the kitchenette is separated from the lounge and there is a desire to provide a more open concept, modernized environment to promote interaction and community building. The combined kitchenette & lounge will include:

- New kitchen cupboards, countertops, and backsplash.
- New sink & faucet
- Equipment to include full size refrigerator, dishwasher, microwave, and coffee machine.
- Fixed lunch tables and stackable chairs
- Thread Power System by Steelcase (or similar) to provide flexible access to power to dispersed seating layout.
- Loose furnishings (tables, chairs, and lounge) to support flexible layouts and reconfigurability
- New meeting space with AV technology and capacity for sound/light isolation.

Refer to Appendix 10_DTL Index Room Data Sheets and Appendix 9a_DTL Drawing Set Drawing A7.2 for additional information relating to the CSB Kitchenette/Lounge.

d) Building Considerations

Standards of construction

Design and construction must be carried out in accordance with all applicable environmental, health and safety legislation and University of Toronto policies and standards. The design standards can be found here:
https://www.fs.utoronto.ca/projects/design-standards-and-project-forms/

For planning and costing purposes, it was assumed that spaces within the proposed RW spaces will have a similar level of finish as the renovated 2014 RW Teaching Lab Upgrades Project located on the 1st and 2nd floors, and 2017 SIF Projects which upgraded a series of research labs on the 3rd, 5th, and 6th floors as well as a Vivarium, Aquatics Labs, and Biological Sciences Facility on the ground level.

Elevators

Two passenger elevators (422B & 422C) and one freight elevator (422A) located near the proposed fit-out space have recently been replaced and upgraded. These elevators will be available to faculty, students and staff who need to access the proposed spaces.

No changes to existing elevators are anticipated as a part of this project.

Sustainability design and energy conservation

The Project Charter for this project has been developed through consultation with the Office of Sustainability. This project has been identified as a major renovation and has been required to achieve performance targets or budgets as outlined in the attached project Charter. Appendix 17 – Project Charter.

General Overview of the University's Commitment to GHG Emissions and Energy Efficiency

The University of Toronto is committed to reducing its greenhouse gas (GHG) emissions by at least 37% below its 1990 level of 116,959 tonnes eCO2 by 2030, targeting a net-zero GHG 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 Performances 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 absolute energy and GHG targets that are used to calculate energy and GHG performance budgets. The targets become more stringent over time as cost-effective technologies and delivery methods improve in conjunction with compliance paths with authority approvals.

The tool used to define the targets and budgets is called the "Charter" and completed by U of T staff before the call for design tenders is issued. The energy and GHG performance targets for new construction are defined for the year that occupancy is scheduled in the project planning reports. The approved energy modelling procedures 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 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.

Energy

The renovation of existing buildings plays a critical part in U of T's plan to achieve the established 2030 GHG emission 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.

The Project Consultant Team completed and submitted as part of the DD package to UofT an energy modelling report, with key performance indicators (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 modelling report must be updated to reflect the as-constructed building characteristics. This will form the basis of the project's baseline performance. Refer to Appendix 21 – 100% DD Energy Modelling Report.

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 the key performance indicators included in the standard to account for increased capabilities of designers, technologies, and the industry practices to meet net zero targets by 2030 in many jurisdictions, including the City of Toronto.

Beyond energy, additional performance levels 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 U of T Utilities & Building Operations Commissioning Process for Overall Building Commissioning (refer to links listed at the end of this section), and the US Army Corps of Engineers Air Leakage Test Protocol for Building Envelopes and submit air leakage testing report.

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 Project Charter. The Project 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 process 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 practice. The following Certifications and regulations will be mandatory for all New Construction and Renovation projects: LEED™ Silver minimum (non-certified); Minimum required Toronto Green Standard Tier; WELL™ Building Standard (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 decision to pursue full certification or a higher level of LEED™, TGS and WELL™ certification will be at the discretion of the Project Planning Committee in consultation with University of Toronto Facilities and Services.

Project Planning, Implementation and Consultant teams are to address the embodied energy, embodied carbon and other GHG emissions associated with building materials. Building and Renovation projects will be required to report 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. (CAGBC Zero Carbon Building Standard, May 2017: Pg. 7) The University of Toronto Facilities and Services will provide utility costs to the consultant team for the purposes of life cycle costing.

UofT Tri-Campus Energy Modelling & Utility Performance Standard:
https://www.fs.utoronto.ca/projects/design-standards-and-project-forms/UofT Overall Building
Commissioning Standard:
https://www.fs.utoronto.ca/projects/design-standards-and-project-forms/
UofT Building Commissioning Responsibility Matrix:
https://www.fs.utoronto.ca/wp-content/uploads/2021/06/BuildingCommissioningProcess_2021.pdf

Accessibility

The University is committed to equitable access to all the building's facilities by the whole campus community.

To address the broad diversity of people who will use the facilities, the signage system will be designed to assist individuals with disabilities in identifying spaces (e.g., Braille, high contrast) and wayfinding.

Attention will be given to the layout of the space and the materials used and the Manager of the AccessAbility Resource Centre will be consulted throughout the design process.

An amendment to the Ontario Building Code (2012) related to Accessibility was filed on December 27, 2013 (Ontario Regulation 368/13). Effective for applications submitted after January 1, 2015, the requirements are more stringent and impact the following areas relevant to this project: barrier-free path of travel, visual fire safety devices, washrooms, and seating in assembly spaces.

New or redeveloped exterior, and some interior (i.e. service counters, fixed queuing guides, and waiting areas), public space, must 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/). This would include approaches to new buildings. Maintenance, environmental mitigation, or environmental restoration excluded from this requirement.

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

For additional information contact the University of Toronto's AODA Office.
http://aoda.hrandequity.utoronto.ca/

Equity Diversion and Inclusion

Following the U of T's statement on Equity, Diversity and Excellence, EDI principles will be considered during the development of the design.

Personal safety and security

The building design must allow its students, faculty, staff, and visitors' access as required and as allowed, safely and easily. At the same time, the design must be sensitive to the needs of those whose activities require security after hours. Limited areas of this building could be operational throughout the week for 24 hours a day.

Entry and Exit Access Control and intrusion detection systems will be provided to all rooms with access card / fob entry.

Security features include fire alarm / heat / smoke detectors. Security systems will connect to Campus Police F&S Network.

Panic button solution will be investigated for the expanded Microscopy/Imaging Facility.

A Code Review was undertaken for the majority of Phase 2 project area. Refer to Appendix 12 - Code Next Report RW Laboratories and Glasshouse for Code Review Report, however the key considerations are below:

- Fire Separations: New laboratory suites are required to be separated from the remainder of the building by fire separations having a fire-resistance rating of at least 1 hour.
- Classifications of Liquids: Safe storage, handling, and use of flammable and combustible liquids in the basement, typically not permitted, will require the presentation of a Slope Grade Consideration for Basement Laboratories, and includes the following:
    - Demonstration that accesses to the laboratory can be achieved directly from the exterior via the sloped grade and the exterior stair /doorways,
    - Increasing the fire-resistance rating of the laboratory (from 1 hour to 2 hour), and
    - Provision of a smoke exhaust system and / or flammable vapour detection systems in the laboratory.
- Laboratories:
    - Maximum quantity limits for the use of classified liquids in the lab suite, as well as maximum container and cabinet storage sizes
    - General & power ventilation requirements relating to the lab activities and equipment.

A detailed security plan will need to be developed for each room, zone, or floor, 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.

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.

UofT has specifications and standards for both interior, exterior, and digital signage that the design team will be required to implement on this project. Exterior donor recognition signage will be subject to the University of Toronto Design Review Committee review.

Non-assignable space

Included in the renovation project are non-assignable elements that are not specifically described in the Space Program but are a part of the consultant's responsibility for design and/or consideration. Non-assignable spaces include corridors, lockers, washrooms, mechanical and electrical rooms/closets/shafts, etc. Each of the rooms identified in the space program has been described in detail in room data sheets. However, most of the non-assignable areas were not described with rooms data sheets, and instead rely on best design and engineering practices, and U of T's design standards and specifications.

Specific requirements include:

- Select corridors and circulation space adjacent to and within the proposed laboratories / support areas / offices. Refer to the plans for exact scope of work.
- Mechanical and electrical rooms and closets serving the proposed spaces and Level 1 of LM, Level B of SS, and Levels B, 1, 4, 5 and 7 of RW: existing mechanical penthouses and on the roofs.
- Data and communication closet needs to be considered, as required.
- Washroom upgrades on the basement and fourth levels will be included in the project, as the wc facilities adjacent to the major program areas are original to the building. Given the increase to occupancy (on the fourth floor), and the extent of upgrades throughout, a general upgrade would be beneficial at this time.

  In addition, the provision of public washrooms must meet or exceed minimum code requirements, to be confirmed by the Proponent.

  Universal washrooms must comply with current AODA standards. (Prime Consultant to check at Schematic Design stage)

Washroom non-assignable table below:

Floor Code	***Room Code***	***Subcategory***	***Subcategory Description***	***Room Name***	***Shared Area***
B01	08	16.2	Other Non-Assignable Area	Corridor	1.63
B01	08A	16.2	Other Non-Assignable Area	Public Toilet-Men	17.72
B01	09	16.2	Other Non-Assignable Area	Corridor	1.63
B01	09A	16.2	Other Non-Assignable Area	Public Toilet-Women	15.09
4	436	16.2	Other Non-Assignable Area	Corridor	1.70
4	436A	16.2	Other Non-Assignable Area	Public Toilet-Women	6.37
4	436A	16.2	Other Non-Assignable Area	Public Toilet-Women	6.37
4	437A	16.2	Other Non-Assignable Area	Public Toilet-Women	8.92
4	438	16.2	Other Non-Assignable Area	Corridor	2.10
4	438A	16.2	Other Non-Assignable Area	Public Toilet-Men	12.08
				TOTAL NASM	75.86

Mechanical/ Electrical

In the past few years, the existing M&E infrastructure has gone through significant modifications as a part of major renovations on several floors.

The upgrades identified as part of this PPR are on floors that were not part of these previous renovations. Still, the design of M&E services (new, modification and integration to the existing), new for the scope of this PPR, needs to look holistically at the existing infrastructure, ensuring integrity of the systems during the phases of construction and supporting University "A Climate Positive Campus "strategic goal.

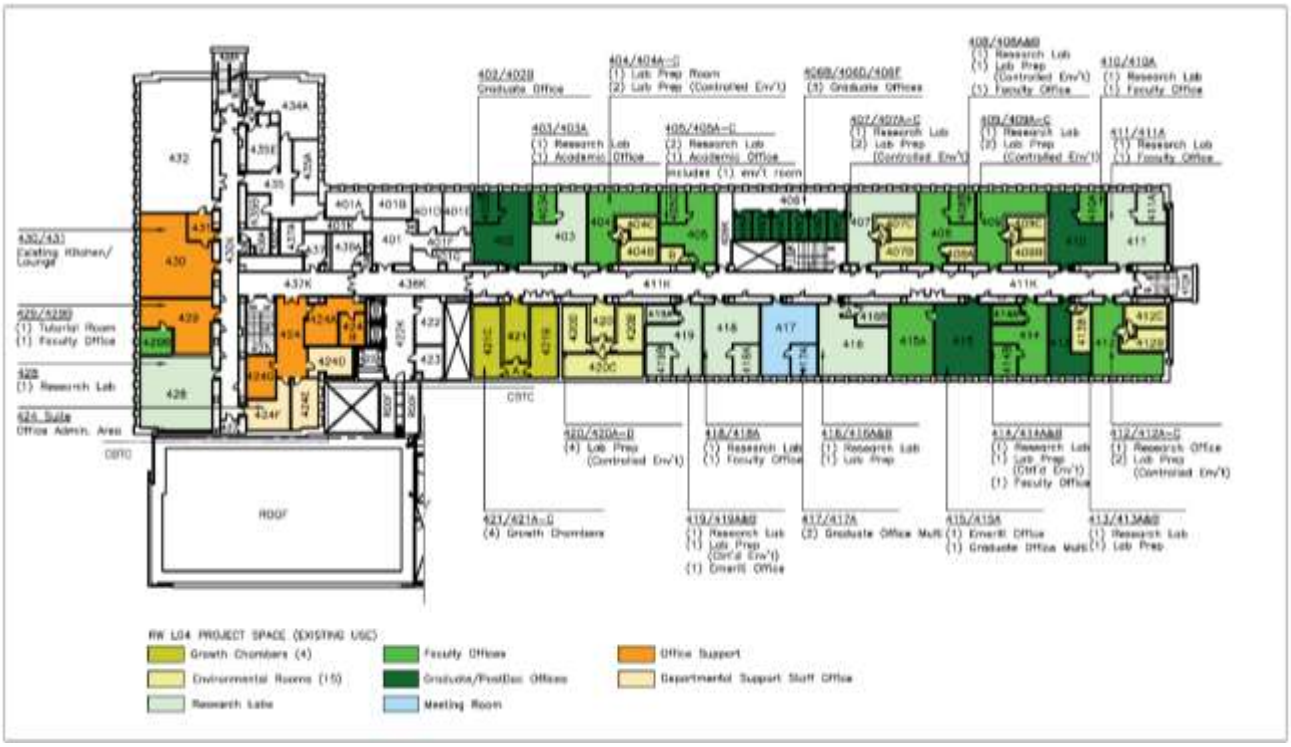
Some areas of the work were part of the initial M&E feasibility review process. The following areas were not:

- Ground Floor (Phase 2)
    - Microscopy/Imaging Facility Expansion

- 4th Floor Scope of Work
    - DTL Suite (Phase 2)
      Including CL1 & CL2 teaching labs, interlabs, and all other lab support spaces as well as an administrative area.
    - CSB Upgrades (Phase 2)
        - CSB Professional Masters in Biological Data Science Student Study + UG BCB Student Lounge
        - CSB Kitchenette/Lounge (Upgrade to existing, no change of use)
    - CSB Upgrades (Phase 3)
        - Admin Office Relocation (Phase 3)

This scope of work includes change of use from Category 3.0 Research Lab and Category 4.0 Academic Dept Offices and Related Space. Please see the figure below for the current use in the area of work:

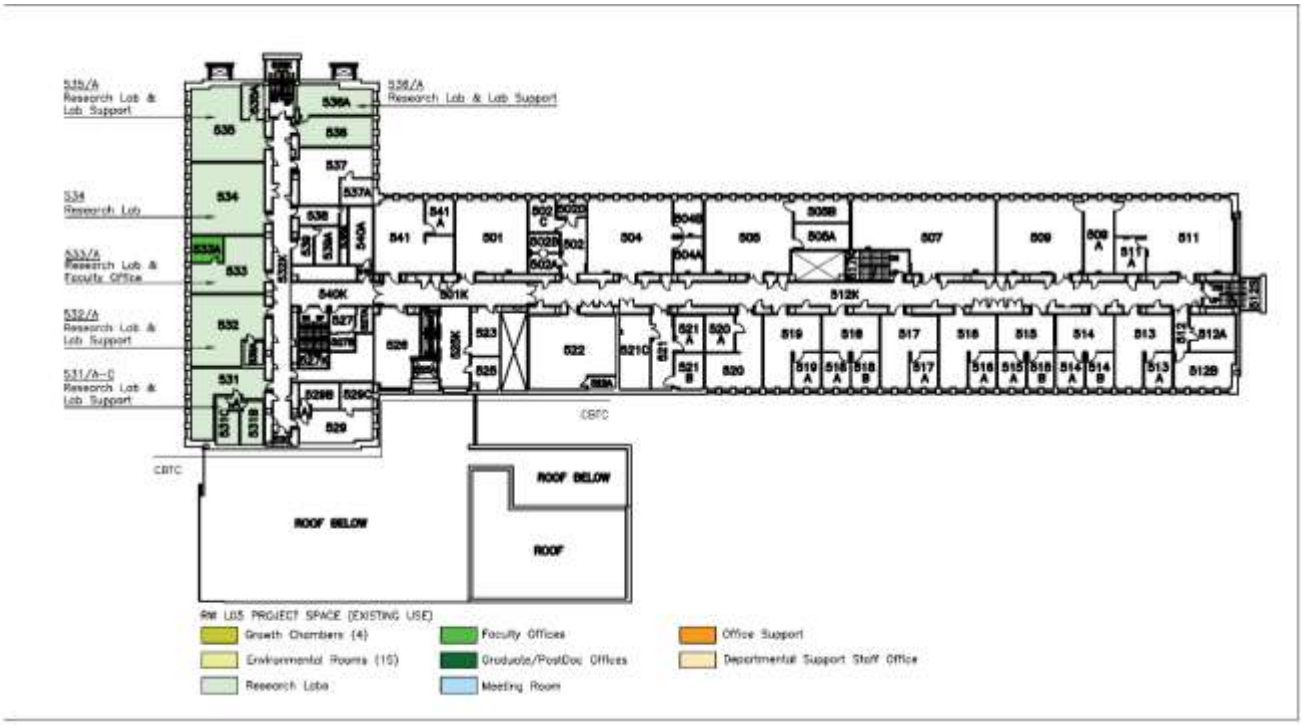
Fig 6: 4th Floor Current Usage



- 5th Floor Scope of Work
  - CSB Upgrades (Phase 2)
    - (1) Seminar Classroom
  - CSB Upgrades (Phase 3)
    - Shared sessional office
    - (1) Active learning Classroom
    - CSB Professional Masters in Biological Data Science Faculty Offices, Research Lab Space for Grads/PDs (no change of use).

This scope of work includes change of use from Category 3.0 Research Lab and Category 4.0 Academic Dept Offices and Related Space. Please see the figure below for the current use in the area of work:

Fig 7: 5th Floor Current Usage



Detailed calculations have been performed to assess the suitability of the existing services for the renovation, from the perspective of capacity and current applicable codes, and inform design of new infrastructure.

Condition Assessment of Existing Equipment

Based on the review of the existing drawings and site visit review, the following condition assessment of

existing equipment and system for the Ramsay wright building is observed. The condition assessment is limited to the Ground level, 1st floor, 4th floor, 5th floor and Penthouse portion of the building which is considered as part of the project renovation scope. The existing centralized system such as Chilled water, Heating Hot water, Domestic hot water, Compressed Air and Natural gas is also assessed as those systems are critical for the operational functionality.

- Existing HVAC systems:

Ground level:

Ground level project scope is supplied with necessary Heating, cooling, and ventilation by the AHU-05.

AHU-05: New mixed air AHU, installed in 2019, located on the penthouse level, provides ventilation and air conditioning to general labs and support spaces on the ground floor. Return air is provided by a

dedicated return fan (RAF-05as per ventilation zoning drawings). The AHU contains a VFD modulating supply fan, cooling coil, heating coil, steam humidifier and mixing box.

Level-01:

Level-01 project scope is supplied with an existing AHU-11.

AHU-11: An existing AHU-11 originally installed in 1961 serves the entire 1st floor space on the North part of the building. It has exceeded its anticipated lifespan and will require replacement in the foreseeable future.

However, since existing AHU -11 Also serves majority of 1st level space that is not covered in the scope of work. The design team decided that existing AHU 11 remains to serve area outside of the scope of this project and a new make-up air unit with heat recovery on the roof to serve area of renovation that covers room 107 & 109

Level-04 and Level 05:

Level-04 East project scope is supplied with an existing AHU-4.

AHU-4: An existing AHU-04 originally installed in 1961serves the 3rd floor, 4th floor, and 6th floor east side of the building. It has exceeded its anticipated lifespan and will require replacement in the foreseeable future. However, since the replacement of the existing AHU-04 also serves spaces that is not covered in the scope of work the design team in partnership with the client decided that existing AHU 04 remains to serve area outside of the scope of this project and a new make-up air unit with heat recovery on the 6th floor Mechanical room is to be added to serve area of renovation that covers 4th floor East building.

Level-04 and Level-05 West project scope is supplied with the existing AHU -07 and AHU -08.

AHU-07: Original mixed air AHU, installed in the 1961, located within the mechanical room on level 6, provides ventilation and air conditioning via induction units on levels 3-5 along the east perimeter of the building. Return air system (RF-159, as per ventilation zoning drawings) is central to AHU-7 and AHU-8. The AHU contains a constant volume supply fan, cooling coil, pre-heating coil, humidifier, mist liminator and mixing box.

AHU-08: New mixed air AHU, replaced in 2015, located within the mechanical room on level 6, provides ventilation and air conditioning via induction units on levels 3-5 along the east perimeter of the building.

Return air system (RF-159, as per ventilation zoning drawings) is central to AHU-7 and AHU-8. The AHU contains a VFD modulating supply fan, cooling coil, pre-heating coil, and space for a future humidifier

Glasshouse:

Currently, Glasshouse does not have any cooling system. Heating is supplied with the radiator panels which are due for replacement. The overhead panels are mix of automated and manual operation to provide the natural ventilation when condition permits.

- Existing Chilled water systems:

There is extra capacity in the existing chillers which will be used for the renovation portion of the building.

- Existing Steam System:

The existing steam system consist of district steam provided to the building at 160 lbs to support process loads (i.e., autoclaves, cage wash, etc.), humidification and domestic hot water (back-up). A steam boiler plant is also provided with two boilers at 2,511 MBH to provide back-up duty for the district steam system

- Existing Heating Systems:

The central heating plant for the building is provided by high temperature hot water (HTHW) delivered to the building at the ground level on the southeast corner of the building from the central utility plant CUP).

The HTHW is converted to low temperature hot water in the ground level mechanical room via two (2) shell & tube heat exchangers.

- Domestic Hot water System:

The existing domestic hot water system consist of HTHW heat exchangers that is backed up by steam heat exchangers for production of domestic hot water. The heat exchangers are located in the ground level mechanical room.

An early and accurate assessment of clients' needs, and risk levels through a collaborative approach between lab users, designers, health & safety representatives, and M&E engineers/consultants took place during the design development phase and the following ventilation strategy were discussed and approved as a result.

Major Criteria that were discussed are as below:

1. Temperature and relative humidity

2. Air pressure differentials between rooms (Pressurization)

3. Number of air-changes for each room

4. Air velocity and airflow pattern

5. Filtration (type, position)

To find out more about Ramsay Wright existing conditions, and DTL to RW Staging Project Mechanical design approach - Refer to Appendix 24 – 100% DD Mechanical Design Development Narrative

Electrical:

- Condition Assessment of Existing Equipment

A report has been prepared to detail the electrical layouts whilst, coordinating with architectural and mechanical designs.

- Existing Electrical Equipment Condition

Existing distribution board, power/ lighting panels will be removed. Feeders wiring, conduits will be removed back to the source. Potentially some of wiring and conduits will be reused, this will be assessed at the later design stage.

- Normal Power distribution

The existing building has incoming electrical feeds from the adjacent building (CENTRAL STATION and SIDNEY SMITH SUBSTATION), that is metered independently prior to feeding the three step-down Transformers (each 4160V:600V Delta: Wye). The main switchboard is in Electrical Room G-98 and provides three separate bus duct runs up the building at 208V. The runs have been identified as East – Bus Duct A, Central – Bus Duct B and West Bus Duct C. The main brakers (Air circuit breakers) have been maintained throughout the years and are in good working condition and are understood to still under the projected lifetime usage. Bus Duct risers A, B and C have been visually surveyed on site and will be the primary focus to shut down power to the fourth floor for the new Staging Project.

- Emergency Power distribution

Ramsay Wright is backed up via two (2) emergency generators. A 450kW Generator located south side of the building within a dedicated enclosed room near the loading dock. As well as another 450kW enclosed generator similarly located at the south side of the building on top of the loading dock area complete with a steel frame and exhaust up to the roof of the building. For the purposes of this report Generator (Gen-Set) #1 will be attributed to represent life safety systems and Generator (Gen-Set) #2 will be attributed to represent non-Life-safety Systems. After review of the current conditions on site it is recommended to retain the existing Generator #1, as the unit is still in good working condition.

Still within operating life expectancy as well as maintained as per CSA282. Automatic Transfer Switch feeding the life safety systems, designated as ATS#1, is located adjacent to the main life safety distribution panels. The unit itself has been maintained by Smith and Long through the past years and is in good operating condition. However, the panels in question are original to the building are extremely dated. It is highly recommended to replace the 600V integrated transformer and the 208V panels

respectively. A new 600V panel corresponding transformer and new 208V panel is recommended for life safety systems.

- Electrical Closets/Risers Distribution

The equipment in the typical West, Central and East electrical closets located within the fourth floor will be upgraded to house the power distribution equipment to accommodate for the new electrical services.

The Electrical design strategy for power distribution, lighting, lighting controls, fire alarm, Security, and telecommunications systems for the University of Toronto – Ramsay Wright Building Staging Project.

- Additional info regarding Electrical Project Scope can be found below.

DP-L:

Panels connected to DO-L are recommended to be replaced.

4th floor DP-A,DP-B, and DP-C:

Panels to be replaced due to obsolescence and to accommodate the available short circuit current from the bus ducts. Panels to be re-worked to ensure future work inside the panel will not necessitate a shutdown of the entire bus duct riser (as this is the current configuration). Feeders from these distribution panels to be replaced with new Branch Circuit Panels
Branch circuit panels shall be added, or existing ones replaced to suit additional power requirements relating to the proposed area of work and equipment requirements.

5th floor branch circuit panels:

To be re-used provided they are not in excess of 25 years of age.

Branch circuit panels:

Panels with an incident energy rating above 1.2 cal/cm2 shall be located in locked electrical spaces.

New electrical spaces shall be designated/created as required maintain the safety of university personnel.

- Emergency Power

Existing life safety branch circuit panel and wiring may be re-used for life safety applications in the areas of renovation.

Non-Life safety loads shall be accommodated by a new non-life safety panel serving the 4th floor. This panel shall be fed from the basement non-life safety distribution panel.

Non-Life safety loads shall be accommodated by the existing non-life safety panel serving the 5th floor.

- Lighting

New 120V LED lighting throughout, accompanied with new local lighting controls and new metered lighting panel, per UofT standards.

Laboratories, Glass Washing, & Chemical/Media Prep. Electrical upgrades required for the laboratory and lab support areas include:

- New metered power panels provided for the new lab areas
- New power connections/receptacles, GFI/watertight covers where required.
- Emergency power for lab equipment as required.
- A new metered mechanical power panel.

During design confirm all assumptions and design system that best suites this project and is in line with the latest, currently applicable codes including UofT design standards, Energy "Project Charter" and "A Climate Positive Campus" strategy.

New fire alarm devices:

New devices shall be provided throughout the renovated spaces as per ULC and installed as per university standards. New devices shall be connected to the existing fire alarm panel.

New loops shall be provided as per ULC along with additional Fire Alarm connections for emergency shut off valves/fans/door operators, etc.

Existing fire alarm connections will be removed and replaced by the new fire alarm connections back to sub panel located at the first floor. This panel is connected to the main fire alarm panel in the Mechanical room. All existing fire alarm devices on initiating and notification circuits, as well as control modules, will be removed and replaced by the new devices. All the wiring and conduits to be replaced or removed as needed to facilitate the rearrangement and new reconfiguration of spaces. Depending on the number of new devices needed and capacity of the existing circuit and panel, existing connections will be likely reused for new devices and relocated existing devices. This will be further reviewed in the next design stage.

All installations for new and existing devices will meet OBC and ULC 524 requirements.

Provide audible signals throughout the building to meet the minimum sound pressure levels required by the OBC. Provide visual warning devices as per the most recent revision of the building code and to accessible bedrooms and washrooms. Smoke detectors shall be provided for early detection requirements as per OBC. New work areas are designed to be complete with both audible and visual alarming devices for new layouts where enclosure have been added and relocated.

Position duct smoke detectors within HVAC ducts and provide shutdown modules as per OBCe

Fume Hoods:

Fume hoods are an integral part of the building air handling system. The efficiency of operation is essential in maintaining good air quality in laboratories. It is, therefore, imperative that all new fume hood provided in the project to be designed and function appropriately.

The new strobic fan serving the fume hoods located in the 1st and on the 4th floor laboratory spaces will be furnished with the emergency power.

Fume hoods selected for the renovation portion of the building is equipped with automatic sash operation with user detection and has features such as

1. Auto close
2. Auto open
3. Tiptronic Open/Close
4. Manual operation
5. Keypad operation and
6. BMS interface

Rooms with fume hoods will be controlled to the U of T design standards.

Refer to the UofT EHS Design Standard for Fume Hoods & Fume Hood Exhausts.
https://ehs.utoronto.ca/wp-content/uploads/2018/12/Fume-Hoods-03-Design-Standard_November-2018.pdf

Data & IT Infrastructure:

The project will include upgrades to network cabling in renovation areas to meet University of Toronto design standards. If a new network room is required, the location is to be determined with the UofT Information Technology Services.

To find out more about Ramsay Wright existing Electrical conditions, and DTL to RW Staging Project - Refer to Appendix 25 – 100% DD Electrical Basis of Design Report

Environmental Health and Safety & Laboratory Standards

EHS planning will be aimed at recognizing, assessing, controlling, and evaluating hazards as they relate to the building, work areas, and environment. It involves the identification, evaluation, and control of hazards in the workplace in order to prevent illness and injuries of staff, faculty, students, and visitors. Types of hazards can include biological, chemical, physical (including safety hazards from equipment) and ergonomic.

Wet laboratories are labs where chemicals, drugs, or other material or biological matter are handled in liquid solutions or volatile phases, requiring direct ventilation, and specialized piped utilities (water, various gases, etc.). Containment level 1 (standard chemical ‘wet lab’ and biological agents) and Containment level 2 teaching and research labs in this project will include the minimum physical containment and operational practice requirements for handling infectious material or toxins safely in laboratory and animal work environments.

EHS is guided by UofT's Biosafety policies and procedures manual, Laboratory Safety Program and Design Standard, the Ontario Occupational Health & Safety Act, associated regulations, relevant standards, Public Health Agency of Canada (PHAC), Canadian Food Inspection Agency (CFIA), Canadian Nuclear Safety Commission (CNSC), and Environment Canada.

All fume hoods provided in the project must follow the UofT EHS Design Standard for Fume Hoods & Fume Hood Exhausts. This standard was developed in accordance with the Canadian Standards Association (CSA) Standard Z316.5-15 Fume Hoods and Associated Exhaust Systems.

The DTL will be designed to meet all operational and physical safety and security requirements identified in the current Canadian Biosafety Guidelines and Standards issued by the Public Health Agency of Canada and U of T EHS standards and guidelines.

As required, any critical containment HVAC systems will be designed to maintain the containment zones under negative differential air pressure so that air flows into the containment zone from areas of lower containment to areas of higher containment, establishing a physical containment barrier or air against airborne or aerosolized hazardous chemicals.

Ergonomics:

Ergonomic design of lab benching, and offices will be taken into consideration.

Laboratory Biosafety Equipment:

There are A2 Biosafety Cabinets – BSCs are proposed as primary containment for work with any hazardous and /or flammable materials. These are the main equipment elements to ensure optimum environmental health and safety standards within the labs.
All fume hoods provided in the project must follow the UofT EHS Design Standard for Fume Hoods & Fume Hood Exhausts. This standard was developed in accordance with the Canadian Standards Association (CSA) Standard Z316.5-15 Fume Hoods and Associated Exhaust Systems.

- Lighting
- Environmental emissions (MOE submission considerations)
- Safety (supply ventilation, chemical hazard quantity, specialized equipment, and venting requirements)
- Special safety hazards (biological, radiological, highly toxic chemicals)
- Special considerations for venting or sewage traps for hazardous chemicals
- Safety design for receiving areas and loading docks

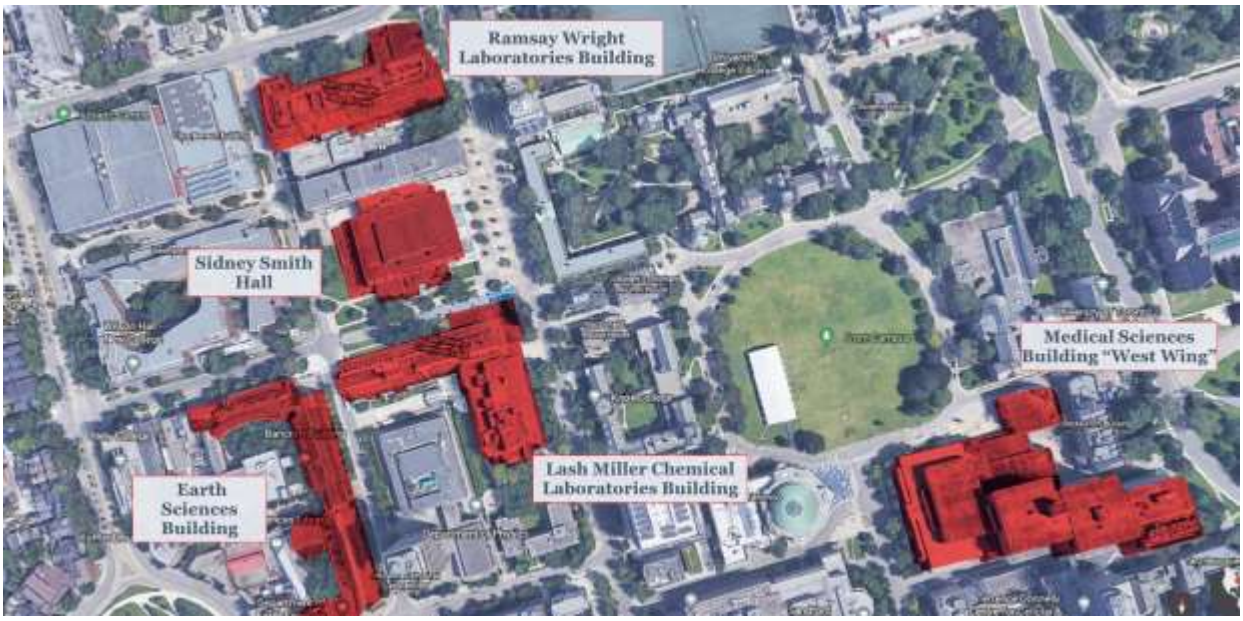
Projects that include renovations of existing buildings will also be required to address a number of additional issues.

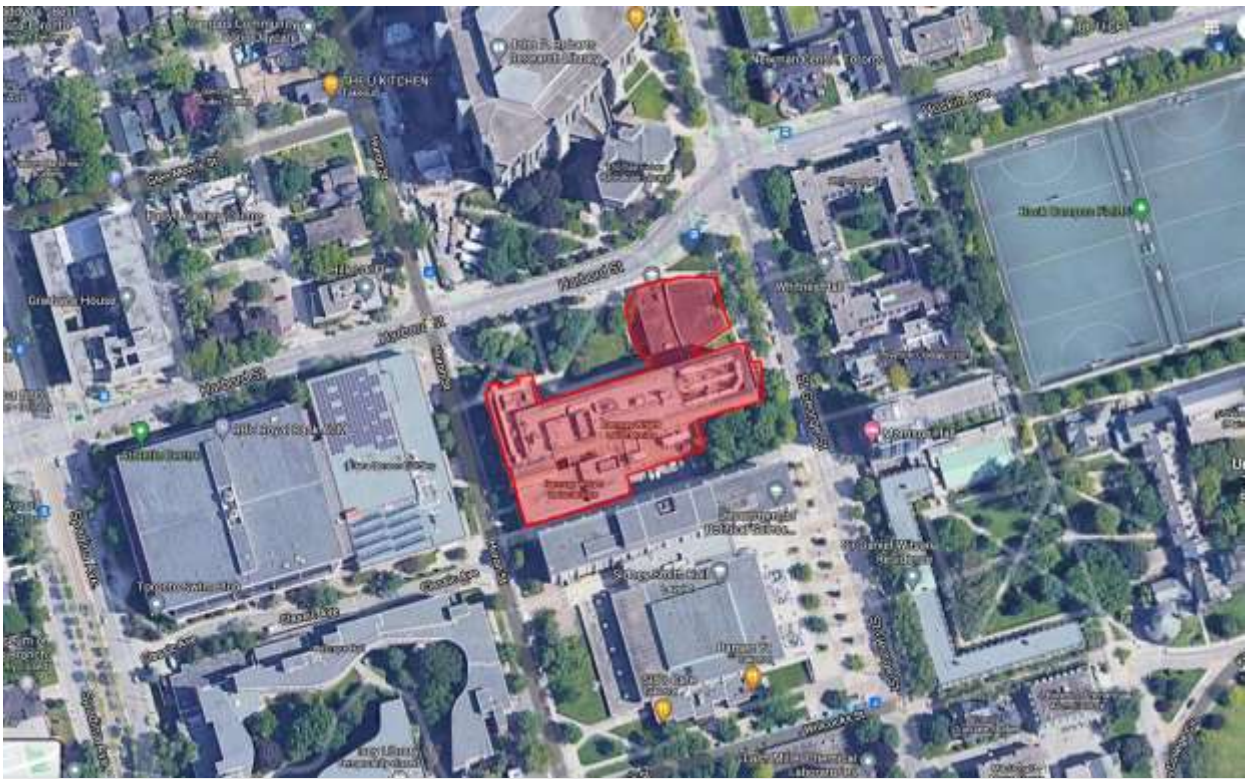
When a site/site options have been identified, pre-engineering reports and feasibility studies on existing facility condition and constraints may be required to assess the following:

- Building Systems improvement requirements: t - A Mechanical & Electrical Feasibility Study was undertaken for portions of the project areas. Refer to the ME Feasibility Study, as well as the key considerations detailed in the Mechanical, Electrical, Data Section of this report.
- Addressing Deferred Maintenance items– During feasibility study identify if there is synergy to preform work associated with deferred maintenance items that may not be absolutely essential for this renovation but from sustainable and smart stewardship perspective consultant would recommend to be performed at this time. Cleary breakdown the scope and cost.
- Code and environmental requirements – A Building Code Study was undertaken for portions of the project areas. Refer to the Code Review and key considerations detailed in the Personal safety & security section of this report.
- Hazardous materials disposal - Asbestos-containing sprayed fireproofing is present within the renovation areas, as well as other asbestos-containing material. Refer to the Hazardous Waste Disposal section in this report.
- Decommission of Laboratories – Laboratory decommissioning and decontamination, mercury assessment, etc. may be required. Coordination with UofT EHS is required prior to any construction work.
- Supply ventilation controls
- Hazardous emissions to environment
- Use incompatibility
- pre-approval from CNSC for radioisotope work, if any
- preapproval from Public Health Agency of Canada for biological work, if any
- laboratory change of use detail
- Identification of areas of demolition
- Project boundaries
- Phasing plans
- Impact on existing occupants
- Coordination with other renovation projects in building
- Feasibility of LEED certification

e) Site Considerations

Site context





The Ramsay Wright building sits on the block bound by Harbord Street to the north, St. George Street to the east, and Huron Street to the west. To the south it is in close proximity to the Sidney Smith building. Between Sid Smith and Ramsay Wright is a shared lane used for servicing both buildings which is accessed from St. George Street. To the north of the primary Ramsay Wright building is a connected one storey lecture pavilion along with generous green space fronting Harbord Street.

Master Plan

In the 2011 St. George Campus Master Plan, the Ramsay Wright Laboratories building is located adjacent to development "Site D". There currently is no timeline for these future improvements, which includes adding additional density to the north of the existing building.

Zoning regulations

At this point in time, there are no anticipated zoning issues for this project.

Environmental issues, regional conservation, Ministry of the Environment

Site will be required to be compliant to acoustic, and air emissions standards as currently provided to the MOECC.

Landscape and open space requirements

There is no landscape scope as a part of this project.

Site access

Pedestrian access to Ramsay Wright is provided through numerous entrances, the main entrance to the laboratories is located from St. George Street and the other from Harbord Street.

The loading dock is located in a laneway behind Ramsay Wright Laboratories Building, 25 Harbord Street, and is only accessible from the St. George Street entrance. Loading dock access is to be pre-arranged when receiving larger shipments. There are two loading bays with overhead doors on grade.

There is a freight elevator accessed on the ground floor of Ramsay Wright.

Heritage status

The Ramsey Wright Building does not have heritage status. No impacts due to heritage considerations are anticipated for this project, given the interior nature of this work.

Soil conditions

Due to the nature of this project (interior renovation to existing space) there is no anticipated need to study soil conditions.

Site servicing; existing and proposed

Service (garbage, recycling) and loading access is currently at an Alley in between RW and SS and has an entrance from St George St, and this arrangement is expected to be maintained during and after the completion of the project. Hazardous waste disposal Asbestos-containing sprayed fireproofing is present within the renovation areas. Other asbestos-containing materials within the project area may include vinyl floor tiles, insulation on mechanical systems, acoustic transit panels, transit fume hood panels, and drywall joint compounds.

A high-level summary based on a more detailed survey will be available to the planning team. Prior to planning any renovation or demolition project a pre-construction survey must be carried out.

Laboratory decommissioning and decontamination, mercury assessment, etc. may be required prior to work. Contact UofT EHS for coordination and assessment.

Fire Prevention and Suppression Systems

The renovation portion of the building will be installed with a fully automatic wet type of sprinkler system. Fire protection systems will comply with NFPA Standards for the specific hazard classification.

The main fire protection service currently enters the building in the dust collector room on Level 1. The incoming fire service may require a separate room enclosure that is separated from the dust collector room. Majority of the existing sprinkler system is to remain, and sections of the sprinkler system will be modified as required to accommodate revised room layouts. New branch piping and sprinkler heads will be provided as required to suit new wall and room configurations.

The building consists of the following sprinkler zones with zone control valves located on the respective floors.

- Ground level Wet Sprinkler Zone.
- Level 1 Wet Sprinkler Zone.
- Level 2 Wet Sprinkler Zone.
- Level 3 Wet Sprinkler Zone.
- Level 4 Wet Sprinkler Zone. (New- Zone valve assembly required)
- Level 5 Wet Sprinkler Zone.
- Level 6 Wet Sprinkler Zone.
- Penthouse Wet Sprinkler Zone.

Each new sprinkler zone will be provided with supervised valves connected to the building fire alarm system.

Sprinkler piping will be black steel with grooved Victaulic mechanical couplings

To find out more about Ramsay Wright existing conditions, and DTL to RW Staging Project Mechanical design approach - Refer to Appendix 24 – 100% DD Mechanical Design Development Narrative and Refer to enclosed Code review for recommendation.

Flood Mitigation Strategy

Due to the risk of floods within aging buildings, water infiltration mitigation includes drip pans under floor drains and traps along with a suspended membrane above the hard ceiling of the Ramsay Wright basement.

The building envelope should be investigated in project areas that have experienced past flooding incidents, in particular RW 010, where flood waters came through exterior doorways. The Microscopy Suite in the basement has historically experienced damaging water infiltration from both local and remote sources. This has included penetration through basement stairwells and ceiling leaks. As this suite houses highly specialised Microscopy equipment, including Electron Microscopes, water damage is of critical concern. While it is assumed that recent envelope remediation work around RW010 and ongoing roof work is addressing these problems, if issues persist then some related upgrades in the Microscopy Suite will be required. These may include additional floor drains, ceiling drip pans to protect sensitive equipment, and/or local moisture detection sensors.

Designated Substances

The University of Toronto has investigated and identified designated substances and other site-specific hazardous materials present within the project area as per appropriate regulations and the Ontario Occupational Health and Safety Act. The scope of work for removal of asbestos-containing materials has been prepared and issued by the University of Toronto Hazardous Materials Group and will be used as part of the Demolition and Abatement Construction Manager's tender package. Refer to Appendix 23 - Designated Substances Abatement/Procedures

f) Campus Infrastructure Considerations

Utilities Masterplan

Utilities infrastructure on the St. George Campus has recently undergone a master planning exercise to align the future of these systems with the long-term goals of the University and its commitment to curbing climate change. The long-term goal is to put U of T on a path to a net zero campus by 2050. The 2030 goal is to realize a 37% reduction in absolute carbon loads, tri-campus, to below 1990 levels.

Due to the interior nature of this work, this project will tie into existing building energy sources (see the Mechanical section of the report).

Sewer and storm water management

Sewer and storm water management is expected to be maintained during and after the completion of the project.

Bicycle parking

There are no anticipated changes to bicycle parking.

Vehicle parking

There are no anticipated changes to vehicle parking.

g) Phasing

The project will be delivered in three phases, which have been organized according to scope complexity and schedule requirements:

- Phase 1: Pre-Work/Other (Ramsay Wright, Lash Miller, and Earth Sciences Centre) *

  Phase 1a Lash Miller & Earth Sciences (382.41 nasm)

  This phase includes a series of smaller renovations that will enable programming to move out of the key Ramsay Wright areas of work. This includes the Lash Miller 121 Computer Lab Project and the Earth Sciences Centre Growth Chamber Upgrades Project

  The LM 121 Computer Lab project will relocate two Faculty of Arts & Science computer labs from Ramsay Wright to an existing computer lab space in Lash Miller. Construction is scheduled to begin in Spring 2023 and will be completed for the Fall 2023 term. The ESC Growth Chamber Project will complete a series of chamber installations and infrastucture upgrades in the building. Four new chambers will be installed, to relocate activity being displaced through the TFoM DTL RW Staging Project. These four new chambers in the basement of ESC will support research activities of many ESC occupants including EEB, CSB, and Faculty of Architecture, Landscape & Design. While final chamber selection is under review, equipment with specialised environmental conditions to support entomology are proposed. The chambers may be retrofit for future flexibility; however these chambers will not be general purpose to accommodate all research requirements broadly. Construction for this project is scheduled for late Fall 2023 – Spring 2024.

Phase 1b Ramsay Wright Relocation (45.46 nasm)

Phases 1b will include minor relocation of an office and research lab within Ramsay Wright in order to facilitate the concentrated DTL suite on the fourth floor. This move, and additional clean-out pre-works, is scheduled to be completed in Spring 2023.

Phase 1c To Be Confirmed (428 nasm)

While critical program has been addressed as part of this project, there remain Categories 3 & 4 space needs for EEB that must be resolved over the coming years. These relate to inventory reallocations completed as part of this project that resulted in nasm losses for the department. EEB has requested replacement space in the Earth Sciences Centre and have communicated in particular a concern regarding insufficient research lab and graduate student office spaces. The analysis of departmental needs and opportunities for space provision is in development, and resolution is a priority for the Faculty. Discussions are ongoing between the Vice-Dean, Research & Infrastructure, the department of Ecology & Evolutionary Biology, and the Office of Infrastructure Planning
*Note this phase is not included in the TFoM DTL RW Staging Project

- Phase 2: Ramsay Wright (2,225.41 nasm)
  Construction Spring 2023 – Summer 2024

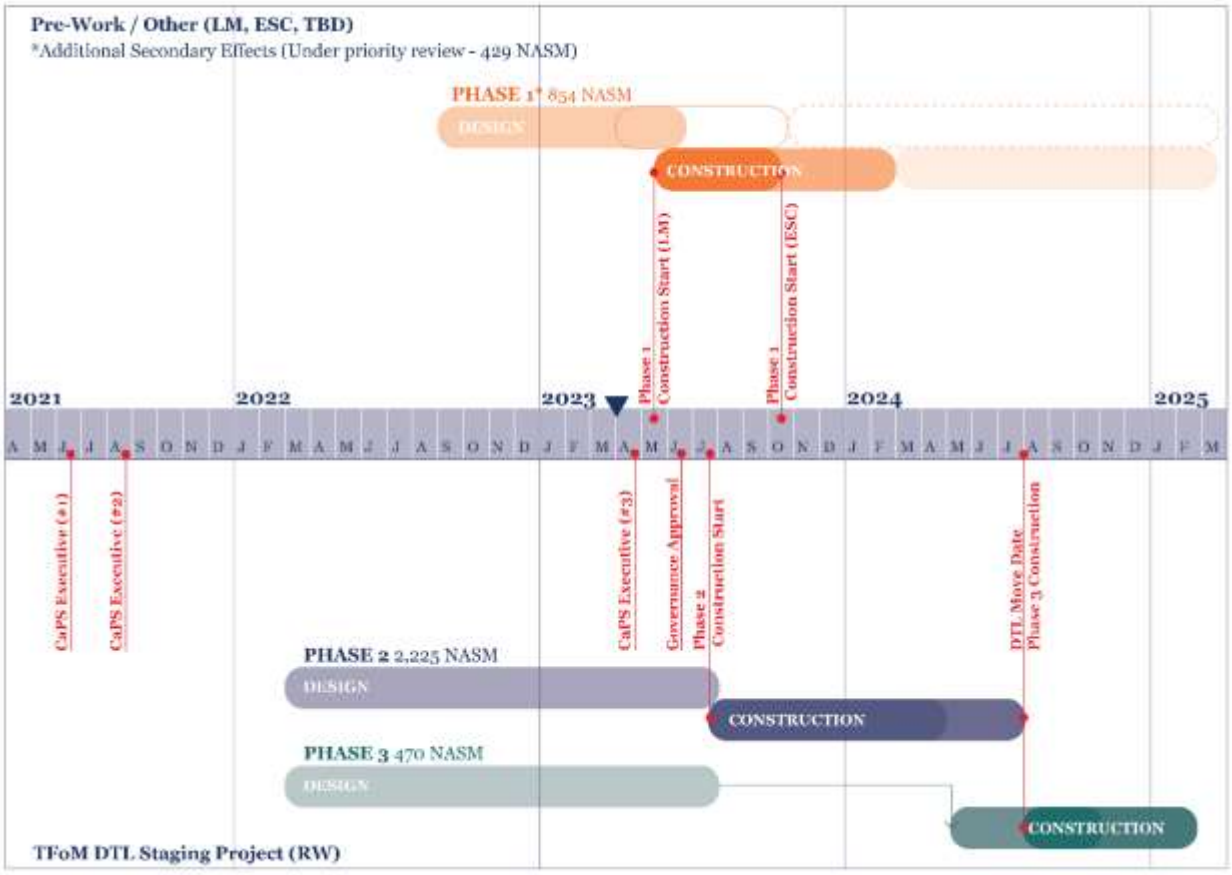
  Phase 2 of the project represents much of the renovation scope at 2,225.41 nasm. This includes the DTL Project Scope, the remaining DTL Project – FAS Secondary Effects, as well as a portion of the FAS Other Projects within Ramsay Wright. This scope of work is scheduled to be completed in advance of the 2024/2025 academic year, as this will ensure the DTL, EEB, and CSB will have an uninterrupted academic year, with teaching labs, lab support space, and classrooms ready in time for Fall 2024. The renovation areas include the ground floor, 1st, and 4th floors, as well as a small amount of work on the 5th floor.

- Phase 3: Ramsay Wright (469.86 nasm)
  Construction Summer 2024 – Winter 2025

  Phase Three, the final phase of the project, involves the renovation of 469.86 nasm of building area within Ramsay Wright. This phase includes the remaining area of work on the fourth, fifth, and seventh floors and that falls within the FAS Other Projects scope of work.

See figure below for a phasing diagram.

Fig 8: Phasing Schedule Diagram



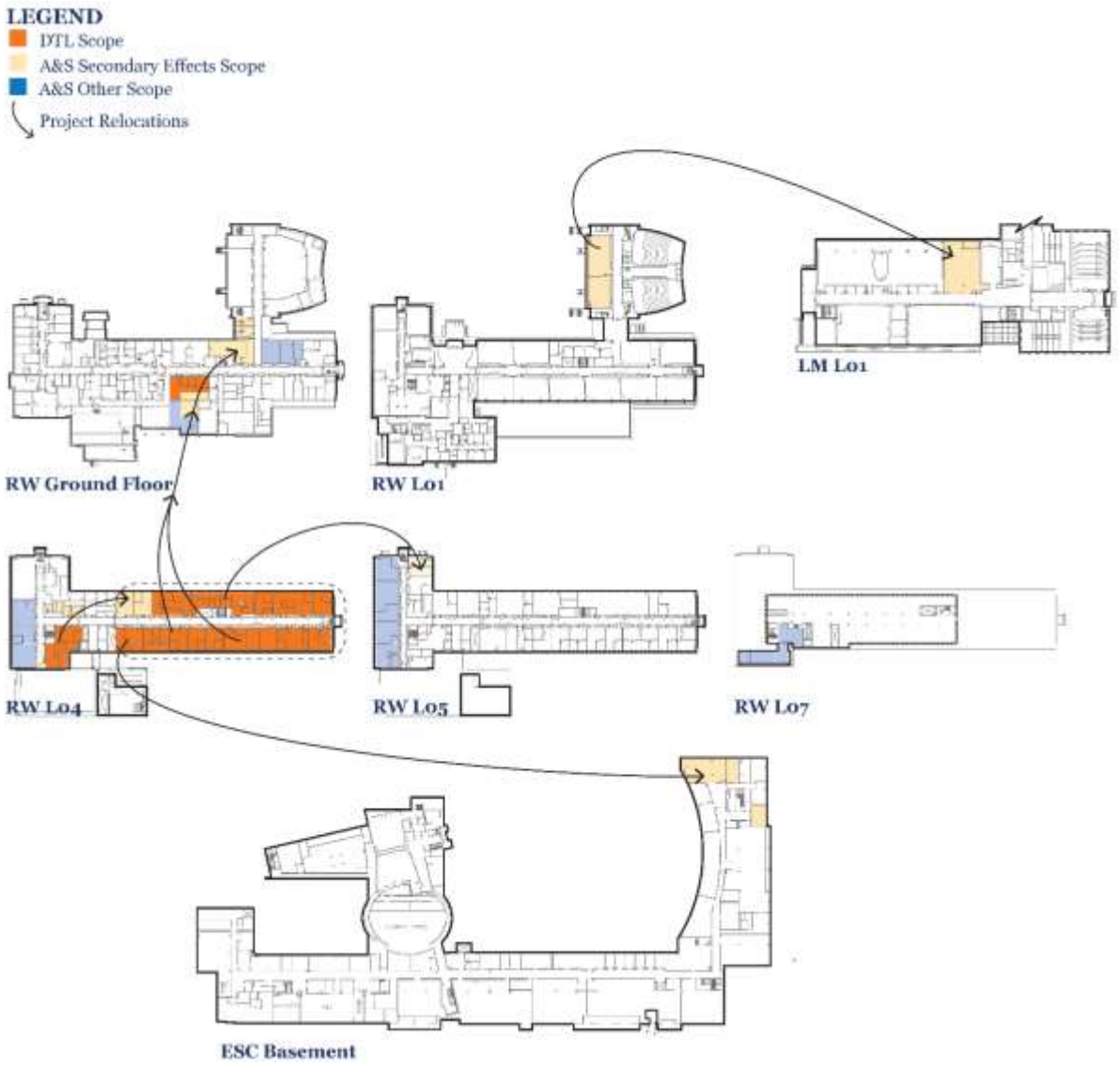
h) Secondary Effects

- Enabling Projects

  As described above, this project includes a series of relocations, with departmental program relocated between buildings to create opportunities for the DTL within Ramsay Wright. These enabling projects are included within Phases 1a, 1b, 1c, and Phase 2 and total 1,312.95 nasm.

See figure below for Project Area of Work

Fig 9: Project Area of Work Floor Plans, including Enabling Projects (diagram requires update)



The following table details the full list of enabling projects required:

Fig 10: Project Area of Work FAS Secondary Effects Chart, including Enabling Projects

2. DTL PROJECT - FAS SECONDARY EFFECTS

FAS Computer Labs, Teaching Lab, Research Labs, Research Lab Support, Academic Office, Graduate Offices, Office Support

PHASE 1a	Construction Spring/Summer/Fall 2023								
Existing COU Subcategory Code	Existing Category Description	Proposed COU Subcategory Code	New Category Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (NASM)
2.1	Scheduled Class Lab (Computer Lab)	2.1	Scheduled Class Lab	UM	1	UM 121	UM 121a/121b	A&S Computer Lab	246.49
3.2	Research Laboratory Support Space	3.2	Research Laboratory Support Space	ESC	B01	B109/B102/ B107	B109/B102/ B107	Environmental Chambers/Cold Room	135.92
PHASE 1b	Relocation May 2022 - May 2023 (No Construction Scope)								
3.1/3.2/4.1	Research Lab + Research Lab Support Space + Academic Office	3.1/3.2/4.1	Research Lab + Research Lab Support Space + Academic Office	RW	3	301, 301A-C	301, 301A-C	Research Lab, Environmental Room, Faculty Office	43.46
PHASE 1c	TBD								
TBD	TBD	3.1	Research Lab	TBD	TBD	TBD	TBD	(4) Research Labs	162.6
TBD	TBD	3.2	Research Lab Support Space	TBD	TBD	TBD	TBD	(4) Environmental Rooms	41.4
TBD	TBD	4.1	Academic Office	TBD	TBD	TBD	TBD	Faculty Offices (4)	48
TBD	TBD	4.1	Academic Office	ESC	TBD	TBD	TBD	(1) Sessional Office (RW412)	34.7
TBD	TBD	4.3	Graduate Student Office	ESC	TBD	TBD	TBD	Graduate Student/Post-doc Offices (410, 413,	104.87
TBD	TBD	4.5	Office Support	ESC	TBD	TBD	TBD	(1) Meeting Room (RW417)	36.33
PHASE 2	Construction May 2023 - May/August 2024								
Existing COU Subcategory Code	Existing Subcategory Description	Proposed COU Subcategory Code	Proposed Subcategory Description	Building Abbreviation	Floor	Room Code (Existing)	Room Code (Proposed)	Room Name	Proposed Size (NASM)
3.1	Research Laboratory Space	3.1	Research Laboratory Space	RW	Ground	07,07A, 07B	B	EEB Environmental Rooms	89.46
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	3.1	Research Lab	RW	Ground	32, 32D, 32E	32B	EEB Aquatics Lab (Dead Room)	43.86
2.3/3.2	Undergraduate Lab Support Space + Research Lab Support Space (Metal & Wood Shop)	3.2	Research Lab Support Space	RW	Ground	32D, 32E	32C	EEB Aquatics Lab Fumehood Room 2	11.33
2.1/11.1	Scheduled Class Lab + Structured Formal Study Space (Computer Labs)	2.1	Scheduled Class Lab (Or Research Labs)	RW	1	107, 107A, 109, & 109A	107, 108, 109	Teaching Labs & Lab Support	182.1
PHASE 3	Construction August 2024/February 2025								
3.1/4.1	Research Laboratory Space + Academic Office	4.4	Departmental Support Staff Offices	RW	4	402, 402B & 409, 409A	402, 402A-E, 409	CSB Admin Office Space	87.39
3.4/3.2	Research Lab Space + Research Lab Support Space	4.1	Academic Office	RW	5	581, 581B-C	536, 536A-E	CSB Sessionals Office	45.04
								TOTAL NASM:	1312.95

Denotes Change of Use

As noted above, the Phase 1 project scope will be managed separately from the main capital project, the Temerty Faculty of Medicine Division of Teaching Laboratories Ramsay Wright Staging Project.

- Phase 1A Space Requirements

The Phase 1 work will include the relocation of the FAS computer labs from Ramsay Wright 107/109 to Lash Miller. The existing FAS computer labs have a moderate level of scheduled usage. The 2021/2022 fall lab instruction hours were 12 and 20 hours respectively, while the scheduled winter hours are 19 and 19 hours, respectively. When not in use for scheduled instruction, these labs are available to students as a drop-in resource. While these labs are well used by multiple departments, they are not required to remain within the building. Relocating these to Sidney Smith and Lash Miller buildings will allow the labs to continue to serve as a sector resource, while providing opportunities to the TFoM DTL RW Staging Project. Additionally, the computer lab within Lash Miller will be combined with an existing computing facility with a historically low level of utilisation providing greater efficiency within an upgraded computing lab.

- The scope of work for these labs will require:
    - The creation of two computer labs that can be scheduled separately or together for expanded capacity.
    - Operable partition to allow for flexible usage.
    - Computer lab capacity for 25 & 40 students.
    - Power, data, and desktop computer terminals (1 per seat).
    - Teaching front of room with central teaching station control podium, projection capability, and ample writing surfaces.

The Earth Sciences Growth Chamber Project will install four new growth chambers in ESC to support research activities, and will include the following:

- Two new chambers installed in ESC B109
    - Two existing functional chambers are to remain in the room
    - Existing benching to be modified to accommodate control panel and growth chamber access.
- One new chamber installed in ESC B107
    - Full or partial removal of shared B109/B107 partition to allow for chamber co-location and direct access between the research support spaces.
- One new chamber installed in ESC B102
    - New double door entry is required into B102 to allow for transport of material on carts
    - ESC B102 is an existing field storage room and will continue to function as storage space in the area that remains.

The ESC Growth Chambers Project will also be completed as part of Phase 1 work and will relocate four new growth chambers to support research within that building.

- Phase 1B & Phase 1C Space Requirements
  At this time, the requirements for Phase 1B and 1C scope will be limited to reuse of existing spaces. Additional study is required to identify additional opportunities and needs.

- Site related
  - Hoarding will be required to delineate between construction area and to maintain access to active research facilities.
  - Vibration isolation mats and other sound & vibration mitigation measures must be considered to protect areas with ongoing research & testing.
  - Vapour barriers to be put in place to seal and protect rooms with equipment from dust within the construction areas. At least 2-weeks advance notice to be provided for electrical and ventilation shutdowns.
  - There may be other derived effects project areas that have not been detailed in this report. These additional programming needs will be discussed during the upcoming subcommittee meetings and addressed and detailed in the final PPR.

i) Schedule

Feasibility study	April-June 2021
TOR approved by CaPS Exec	June 29, 2021
Request for consultant fees approved by CaPS Exec	August 20, 2021
Consensus Meeting to establish RFSQ Shortlist	November 2021
Architect Selection Step 2: Request for Proposals	November-December 2021
Successful Proponent selected	January 2022
Schematic Design	March to July 2022
Phase 1 Construction (Enabling Works)	Spring 2023 to Spring 2024
Design Development	August 2022 to February 2023
Full Governance Approval (target Cycle 6)	April to June 2023
Construction Documents	April to August 2023
Construction Tendering Phase	July to August 2023
Construction – Phase 2 (Ramsay Wright)	July 2023 to August 2024
Construction – Phase 3 (Ramsay Wright)	August 2024 to February 2025
MSB West Wing to be decanted	November 2024

IV. Resource Implications

a) Total Project Cost Estimate

Refer to Appendix for the Total Project Cost Estimate.

b) Operating Costs

Operating costs for the Ramsay Wright Laboratories Building #072 are assigned per nasms.

An operating cost of $413/nasm was determined for the 2022 fiscal year occupancy. Projected cost/nasm will be applied uniformly across the entire building and operating expenses will be funded by the Faculty of Arts & Science and The Temerty Faculty of Medicine.

The unit rate per nasms will be determined at the completion of the project, a total amount of 1,172 nasms allocated to DTL Project Area will be funded by The Temerty Faculty of Medicine.

c) Funding Sources

The project will be funded between The Temerty Faculty of Medicine and the Faculty of Arts & Science.

V. APPENDICES:

Appendix 1 – FAS Teaching Lab Tour

Appendix 2a – DTL Typical Schedule

Appendix 2b – EEB Teaching Lab Typical Schedule

Appendix 2c – CSB Teaching Lab Typical Schedule

Appendix 2d – Computer Lab Typical Schedule

Appendix 2e– CHEM Teaching Lab Typical Schedule

Appendix 3 – Proposed Plan Diagram Updated

Appendix 4 – DTL Proposed Teaching Lab Schedule

Appendix 5a – DTL Equipment List Updated

Appendix 5b – DTL Equipment Specifications Updated

Appendix 5c – EEB & CSB Equipment List Updated

Appendix 6 – DTL COU Space Analysis

Appendix 7 – Detailed DTL Space Program

Appendix 8 – DTL Flammable Combustible Chemicals List

Appendix 9a – DTL Drawing Set (Planning Stage Test Fits)

Appendix 9b – Reserved

Appendix 10 – DTL Index Room Data Sheets (Planning Stage)

Appendix 10a - Reserved

Appendix 10b – Reserved

Appendix 10c – DTL Phase 2 DTL Room Data Sheets (Planning Stage)

Appendix 10d – DTL Phase 2 FAS Secondary Effects Room Data Sheets (Planning Stage)

Appendix 10e – DTL Phase 2 FAS Other Room Data Sheets (Planning Stage)

Appendix 10f – DTL Phase 3 FAS Secondary Effects Room Data Sheets (Planning Stage)

Appendix 10g – DTL Phase 3 FAS Other Room Data Sheets (Planning Stage)

Appendix 11 – DTL Statement of Academic Plan – Program Requirements

Appendix 12 – RW Code Report

Appendix 13 – PPR RW Glasshouse Upgrade

Appendix 14 – ME Feasibility Study

Appendix 15 – Reserved

Appendix 16 – RW Equipment Matrix

Appendix 17 – Project Charter

Appendix 18 – RW Mechanical Master Record Drawings

Appendix 19 – RW Structural Drawings

Appendix 20 – Reserved

Appendix 21 – 100% DD Energy Modelling Report

Appendix 22 – HDR 100% Design Development Drawing Set

Appendix 23 - Designated Substances Abatement/Procedures

Appendix 24 – 100% DD Mechanical Design Development Narrative

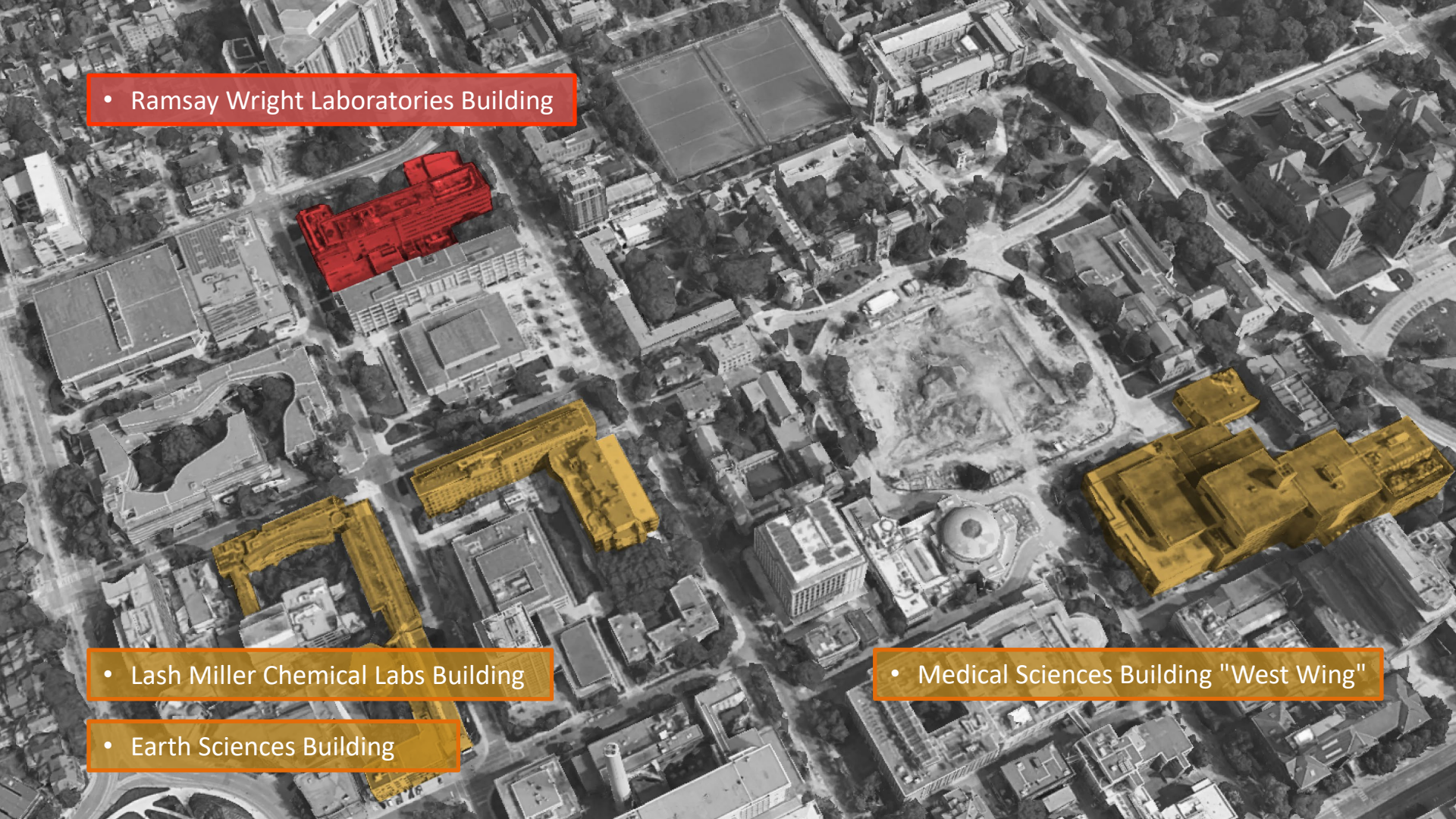
Appendix 25 – 100% DD Electrical Basis of Design Report

Appendix 26 – RW Glasshouse Condition Assessment

DTL to Ramsay Wright Staging Project

25 Harbord Street

Cycle 6 / 2022-2023


• Ramsay Wright Laboratories Building
• Lash Miller Chemical Labs Building
• Earth Sciences Building
• Medical Sciences Building "West Wing"

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