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

TO: Planning and Budget Committee

SPONSOR: Scott Mabury, Vice-President, University Operations
CONTACT: 416-978-2031, scott.mabury@utoronto.ca

PRESENTER: Christine Burke, Director, Campus and Facilities Planning
CONTACT: 416-978-4333, christine.e.burke@utoronto.ca

DATE: April 28, 2015 for May 13, 2015

AGENDA ITEM: 4

ITEM IDENTIFICATION:

Report of the Project Planning Committee for the Faculty of Medicine Biomedical Laboratories in the MaRS Centre Phase 2 Tower – Project Scope and Sources of Funding

JURISDICTIONAL INFORMATION:

Pursuant to section 4.2.3. of the 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)."

Under the Policy on Capital Planning and Capital Projects, "…proposals for capital projects exceeding $10 million must be considered by the appropriate Boards and Committees of Governing Council on the joint recommendation of the Vice-President and Provost and the Vice-President, University Operations. Normally, they will require approval of the Governing Council. Execution of such projects is approved by the Business Board. If the project will require financing as part of the funding, the project proposal must be considered by the Business Board."

GOVERNANCE PATH:

A. Project Planning Report: Site and Space Plan

1. **Planning and Budget [for recommendation] (May 13, 2015)**
2. Academic Board [for recommendation] (June 1, 2015)
3. Business Board [(financing) for recommendation] (June 18, 2015)
4. Executive Committee [for endorsement and forwarding] (June 15, 2015)
4. Governing Council [for approval] (June 25, 2015)

B. Execution of the Project: Total Project Cost and Sources of Funding

1. Business Board [for approval] (June 18, 2015)

PREVIOUS ACTION TAKEN:

No previous action taken.

HIGHLIGHTS:

The proposed project is to fit out the 15th and 16th floors at the MaRS Centre Phase 2 tower on University Avenue at College Street (661 University Avenue) to accommodate a component of the research infrastructure renewal needs of the Faculty of Medicine (FoM) as identified in the Faculty 2014 Master Plan.

Renewal of the Basic Sciences Sector is a key strategic priority for the FoM and must be addressed in a timely manner. The solution requires acquisition of over 42,000 square metres of new space to replace all of the Medical Sciences basic science labs. While continuing to work on identifying an overall solution, an opportunity to occupy 4 floors (MED4) in MaRS 2 is available that amounts to about 1/3 of the Faculty basic science space needs. Two floors are accounted for by new funded initiatives, one from philanthropy and one from health care based industry, both of which enhance and align with the core academic foci. Some or all of this assigned space is potentially available for FoM researchers in 5 or 10 years based on our current commitments. The two remaining floors are intended to be occupied by the FoM to provide the required infrastructure renewal for research faculty on the St. George campus.

This report identifies a total space program of 4,440 net assignable square meters (nasm) consistent with the space planning principles of the Faculty of Medicine, the University of Toronto and the Council of Ontario Universities (COU) standards.

The Project Planning Report is substantially based on the work of the TBEL Project Planning Committee. The Faculty of Medicine and the Faculty of Engineering have been working closely together on the Translational Biology and Engineering Laboratories (TBEL) renovation of the 14th Floor of MaRS2, approved at Governing Council on October 30, 2015. Plans for the 15-16th Floors for FoM will essentially replicate the flexible layout offered at TBEL. In light of this, a Project Planning Committee was not formally established for this project. In developing the project planning report for the Translational Biology and Engineering Laboratories at the MaRS Phase 2 Tower, extensive consultation was undertaken to ensure that the project's objectives, functional program and detailed room specifications would accurately reflect the needs of the users and serve as clear guide for the project's implementation.

An Offer to Lease (25 years plus renewal rights) between MaRS Phase 2 Inc. and The Governing Council of the University of Toronto is under negotiation at this time for the additional adjoining floors to the currently acquired 14th floor; namely the 13th, 15th and 16th Floors. The intent is to proceed with the FoM Labs project in the very near term so that the labs are fully functional by early to mid- 2016.

FINANCIAL AND PLANNING IMPLICATIONS:

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

RECOMMENDATION:

Be It Recommended to the Academic Board:

1. THAT the Report of the Project Planning Committee for the Faculty of Medicine Biomedical Laboratories in the Mars Centre Phase 2 Tower, dated May 6th, 2015, be approved in principle; and,

2. THAT the total project scope of approximately 4,440 net assignable square metres (nasm) (7,382 gross square metres (gsm)) to be funded by a MaRS2 Tenant Allowance, Faculty of Medicine Graduate Expansion Capital Funds, Provost Central Funds and Capital Campaign Funds, be approved in principle.

DOCUMENTATION PROVIDED:

- Project Planning Report for the Faculty of Medicine Biomedical Laboratories in the MaRS Centre Phase 2 Tower, dated May 6, 2015.

PROJECT PLANNING REPORT

FACULTY OF MEDICINE
BIOMEDICAL LABORATORIES IN THE
MaRS CENTRE PHASE 2 TOWER

Facilities Management and Space Planning, Faculty of Medicine

and

Campus and Facilities Planning
University of Toronto

May 6th, 2015

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY 1
II. PROJECT BACKGROUND 2
a. Planning Team 2
b. Terms of Reference 3
c. Background Information 3
d. Space Requirements 4
III. PROJECT DESCRIPTION 6
a. Vision Statement 6
b. Space Program and Functional Plan 8
c. Building Considerations 9
d. Building Construction 10
e. Key Building Components 12
g. Environmental Health and Safety 12
h. Secondary Effects 12
IV. RESOURCE IMPLICATIONS 13
a. Total Project Cost Estimate 13
b. Operating Costs 14
c. Funding Sources 14
V. RECOMMENDATIONS 15
VI. APPENDICES 16

A. Floor Plans
B. Draft Offer to Lease (Schedules - available upon request to limited distribution)
C. Total Project Cost Estimate (available upon request to limited distribution)
D. Links to U of T Standards and Policies, and Faculty of Medicine

I. EXECUTIVE SUMMARY

The proposed project is to fit out the 15th and 16th floors at the MaRS Centre Phase 2 tower on University Avenue at College Street (661 University Avenue) to accommodate a component of the research infrastructure renewal needs of the Faculty of Medicine (FoM) as identified in the Faculty 2014 Master Plan.

Renewal of the Basic Sciences Sector is a key strategic priority for the FoM and must be addressed in a timely manner. The solution requires acquisition of over 42,000 square metres of new space to replace all of the Medical Sciences basic science labs. While continuing to work on identifying an overall solution, an opportunity to occupy 4 floors (MED4) in MaRS 2 is available that amounts to about 1/3 of the Faculty basic science space needs. Two floors are accounted for by new funded initiatives, one from philanthropy and one from industry, both of which enhance and align with the core academic foci. Some or all of this assigned space is potentially available for FoM researchers in 5 or 10 years based on our current commitments. The two remaining floors are intended to be occupied by the FoM to provide the required infrastructure renewal for research faculty on the St. George campus.

This report identifies a total space program of 4,440 net assignable square meters (nasm) consistent with the space planning principles of the Faculty of Medicine, the University of Toronto and the Council of Ontario Universities (COU) standards. It is based on the previously approved Translational Biology Engineering Laboratories (TBEL) report that laid out a space program for research laboratories in the same building on the 14th floor. The labs as configured for TBEL are highly flexible and suitable for duplication on the Faculty of Medicine floors.

The total project cost estimate includes consulting fees, construction and relocation costs for the fit-out of the 2 floors at the MaRS Centre Phase 2 tower.

An Offer to Lease (25 years plus renewal rights) between MaRS Phase 2 Inc. and The Governing Council of the University of Toronto is under negotiation at this time for the additional adjoining floors to the currently acquired 14th floor; namely the 13th, 15th and 16th Floors. The intent is to proceed with the FoM Labs project in the very near term so that the labs are fully functional by early to mid- 2016.

RECOMMENDATIONS:

Be it Recommended to the Academic Board:

1. THAT the Report of the Project Planning Committee for the Faculty of Medicine Biomedical Laboratories in the Mars Centre Phase 2 Tower, dated May 6th, 2015, be approved in principle; and,

2. THAT the total project scope of approximately 4,440 net assignable square metres (nasm) (7,382 gross square metres (gsm)) to be funded by a MaRS2 Tenant Allowance, FoM Graduate Expansion Capital Funds, Provost Central Funds and Capital Campaign Funds, be approved in principle.

II. PROJECT BACKGROUND

a. Planning Team

The Project Planning Report is substantially based on the work of the TBEL Project Planning Committee. The Faculty of Medicine and the Faculty of Engineering have been working closely together on the Translational Biology and Engineering Laboratories (TBEL) renovation of the 14th Floor of MaRS2, approved at Governing Council on October 30, 2015. Plans for the 15-16th Floors for FoM will essentially replicate the flexible layout offered at TBEL. In light of this, a Project Planning Committee was not formally established for this project

In developing the project planning report for the Translational Biology and Engineering Laboratories at the MaRS Phase 2 Tower, extensive consultation was undertaken to ensure that the project's objectives, functional program and detailed room specifications would accurately reflect the needs of the users and serve as clear guide for the project's implementation.

The original 18 member project planning committee consisted of key representatives from the Faculty of Medicine, the Faculty of Applied Science & Engineering, the Faculty of Dentistry, the Institute of Biomaterials & Biomedical Engineering, Campus & Facilities Planning, Project Development, and Facilities & Services. Included in this membership were the Principal Investigators whose activities would be accommodated in the new TBEL facility, as well as post-graduate student representation.

Throughout the 9 month project planning process (December, 2013 to August, 2014), regular committee meetings were held, as were targeted consultations with specific researchers to gain a deeper understanding of their research's space and functional needs. Following the project's approval through governance, a request for proposals led to engaging the architects Perkins and Will to carry the project through detailed design and construction. With additional input from the project implementation committee, TBEL's functional and space needs were translated into a detailed design optimized for the 14th Floor of the MaRS Phase 2 Tower.

This report, the Faculty of Medicine Biomedical Laboratories in the Mars Centre Phase 2 Tower, was prepared by Campus and Facilities Planning, Faculty of Medicine: Vice Dean of Research and International Relations and Facilities Management and FoM Facilities Management & Space Planning.

Faculty of Medicine

Trevor Young	Dean
Alison Buchan	Vice Dean, Research and International Relations
Tim Neff	CAO
Heather Taylor	Director, Facilities Management & Space Planning

University Planning, Design and Construction

Scott Mabury	Vice President, University Operations
Malcolm Lawrie	Assistant Vice President, University Planning, Design and Construction
Christine Burke	Director, Campus and Facilities Planning
George Phelps	Director, Project Development
Alan Webb	Planner, Campus and Facilities Planning

b. Terms of Reference

The following items are addressed in this report:

1. Space program, COU standards and flexibility of space to permit future allocation as programmatic needs changes, were all reported on for the TBEL project and remain the same for this project. TBEL is under construction and the required space program has been met.
2. Determine the secondary effects of the project and the resource implications of relocating activities as required.
3. Determine a total project cost (TPC) estimate for the project, including costs of implementation in phases if required, and costs associated with secondary effects.

   Identify all sources of funding for the capital project and anticipated operating costs once the project is complete.

c. Background Information

Renewal of the Basic Sciences Sector is a key strategic priority for the FoM and must be addressed in a timely manner. The solution requires acquisition of over 42,000 square metres of new space to replace all of the Medical Sciences basic science labs. While continuing to work on identifying an overall solution, an opportunity to occupy 4 floors (MED4) in MaRS 2 is available that amounts to about 1/3 of the Faculty basic science space needs. Two floors are accounted for by new funded initiatives, one from philanthropy and one from industry, both of which enhance and align with our core academic foci. Some or all of this assigned space is potentially available for FoM researchers in 5 or 10 years based on our current commitments. The two remaining floors are intended to be occupied by the FoM to provide the required infrastructure renewal for research faculty on the St. George campus.

Quality of Current Research Space:

Although in Medical Sciences Building (MSB), there are ongoing upgrades to laboratories, implementation has been a slow process due to lack of swing space and the requirement to decommission a laboratory fully prior to renovations. A rough estimate of completed renovations of laboratories in MSB is in the 35 to 40% range to meet current standards for laboratory safety and biohazard compliance. New legislation, the Canadian Biosafety Standards and Guidelines requiring greater infrastructure compliance for CL2 labs coupled with new requirements by Public Health Agency of Canada (PHAC) to obtain compliance letters for ordering biohazardous material is hampering the ability of faculty to perform research in a timely manner. Previously, compliance letters would be issued by the University Environmental Health and Safety (EHS) office within days of the request by the PI, and orders by PIs fulfilled within a further 24 hours. However, EHS now must indicate non-compliance with particular infrastructure standards on the new PHAC form. Decommissioning a laboratory and then making the necessary repairs is a process that can take months and seriously interrupt ongoing and funded research.

Addressing the chronic insufficiency of the building infrastructure for health sciences research will enable a surge in exciting innovative science. Since the opening of the Donnelly Centre in 2005 members of the Centre have become established as internationally renowned leading scientists, two of whom are leading Canadian Centres of Excellence for Commercialization of Research. The Centre has enabled the recruitment of scientists from top academic institutions (Harvard, Stanford) and from

the private sector (Genetech) and the Centre houses students drawn from across the globe. There is the opportunity to expand and consolidate the Faculty's lead in health sciences research and make a difference in our communities locally and globally.

A review and analysis of the Faculty's space suitable for research was completed in 2012 and is available in the document Faculty of Medicine, 2014 Facilities Master Plan.

Quantity of Current Research Space:
In addition to the quality of research space, the Faculty also faces a shortage of wet research laboratories. The Faculty 2014 Master Plan reviewed the COU for the Basic Science departments and found that the quantity of space was significantly below COU and University standards. The average of all the basic science departments is 69% of COU indicating crowded facilities – visually evident in the labs. This crowding is exacerbated by the isolated nature of the labs in MSB that create inefficiencies in space and inappropriate uses – i.e. multiple freezers in small rooms with inadequate cooling and ventilation.

The Medical Sciences building is home to 107 Principle Investigators (PIs)_and their research teams. Creating new space for 20 PIs will help to reduce the quantity and quality issue faced by the Faculty.

d. Space Requirements

Occupant Profile

At this time, planning is for 20 Principal Investigators (PI) for the new MaRS2 space. Each PI will have a full appointment to the Faculty of Medicine.

For planning purposes, each research team will be comprised of one PI, with up to 12 research staff and/or graduate students.

Type	**Proposed Total** (FTE)	**Proposed Per Floor** (FTE)
Principal Investigator	20	10
Technical Coordinator	2	1
Administrator	2	1
Researchers/ Graduate Students	240	120

Using the occupant profile above, a nominal space program was developed guided by the Council of Ontario Universities (COU) Building Block guidelines modified according to University of Toronto planning practice. The total space generated using the guidelines is 6,842 nasm. The space program was developed at 4,440 nasm, to be contained within a usable floor plate of 5,776 square metres, or 2,888 square metres on 2 floors.

Space, generated and proposed, as noted is one of two categories: Wet Research Laboratory, CL2; or Dry Research Laboratory (office and project space):

	Room Type	**Generated Space** (nasm)	**Proposed Space** (nasm)
Dry Lab	Standard Office	264	264
	Carrel Rooms and Lockers	960	810
	Office Support Space	382	316
Wet Lab	Open Laboratories, Special Purpose and Service Rooms	6,270	3,050
	TOTAL	**7,876**	**4,440**

Note that although the proposed laboratory space appears to fall well below the space generated, the COU input measure for Wet Lab, CL2 space considers extensive service space such as animal facilities, etc. which are not required in this programme. The critical measure of the space required is the bench allocation per researcher. This has been determined as a minimum of five linear feet (1.5m) or one bench per researcher, for a total of 1,200 linear feet (366m), which can be contained within the proposed 2,000 nasm of open laboratory allocation.

III. PROJECT DESCRIPTION

a. Vision Statement

The vision for the future of health sciences research in the Faculty of Medicine is based on a fundamental re-think of the design and composition of research groupings required to enable integrative, discovery and innovative Health Sciences Research.

The Concept: the Future of Discovery and Translational Health Research

Key Elements:

1) Interfaces: Designing open collaborative spaces to foster interaction between disciplinary and professional research groups of faculty, staff and students to address global challenges.

2) Dynamic Learning: Creating an environment that stimulates, emboldens and excites our students and faculty and opens new horizons for their exploration in the bio-health-sciences.

3) Partnerships for Innovation: Facilitating partnerships with not-for-profit and private sector organizations with the intent to speed delivery and uptake of discovery and innovation.

The future of bio-medical research and advanced education in the Faculty of Medicine (FoM) on the St. George campus is at risk. The status quo is not an option - it is impossible to continue to accommodate high-level research and education in the ageing building infrastructure. In essence the U of T and FoM have to invest in the future of health research on the St. George campus or it will cease to be competitive.

The current MaRS opportunity means that we can move forward with the planning to relocate 20 faculty members to occupy the two unassigned floors. The MaRS 2 space is ideal for FoM Discovery scientists because of key adjacencies within MaRS including: infection and immunology (Public Health Ontario), Stuctural Genomics Consortium, among others) and regenerative medicine (Rogers TBEL, Ontario Centre for Regenerative Medicine). We recommend that the FoM act now to identify the specific researchers that will relocate to the new laboratories.

In May 2015 a small working group will be convened drawn from the MSB leadership and individual researchers to engage in crafting a solution for all 107 researchers in the MSB and the 17 in the Fitzgerald Building. In parallel, the Faculty will host two retreats for all faculty in the MSB and Fitzgerald Building to inform and engage them in the process. A key deliverable from the working group will be to identify the 20 – 22 scientists to move into the MaRS2 space in 2016.The goal is to identify those individuals by September 2015.

The working group and retreats will be informed by the Vision developed over the last 3 years through a series of Ideas Salons involving internal and external stakeholders (including IBM, GE and Health Innovations companies), a Design Thinking group internal to the U of T, and ongoing discussions with Basic Science Department Heads. The occupancy of two floors of the MaRS2 tower by 20 – 22 researchers and their teams, will in turn free space in the MSB for new collaborative programs and/or relocation of faculty from sub-standard space in the Fitzgerald Building.

Example of a Potential Integrative Theme:

The Centre for Collaborative Drug Research, and the Departments of Biochemistry, Laboratory Medicine and Pathobiology, Molecular Genetics, Physiology and Pharmacology & Toxicology will create a *Collaborative Drug Research HUB*. This HUB will interface with two local Centres of Excellence for Commercialization and Research (CECR) MaRS innovation and CCAB and the projected international health care based company development on an adjacent floor.

By bringing together the structural biologists who solve protein structures and identify potential "druggable" targets, biologists with appropriate high through put screens and animal models, the Faculty will create a seamless and efficient pipeline to provide the data packs the Pharmaceutical and BioTechnology Industries require to inform decisions about patentability and commercial viability. This will be achieved in the pre-competitive space such that all data will be freely available and published on the web and in appropriate peer-reviewed journals. Once a successful candidate is identified the commercialization would be handled by MaRS Innovation in partnership with the appropriate industry partner(s).

The majority of drugs are small organic molecules that interact with protein targets to bring about a therapeutic biological response. Improving the safety, efficacy and specificity of existing drugs and discovering new, more targeted therapies will depend on modeling and understanding the complexity of these interactions. This is crucial for illnesses that do not respond to existing therapies, where existing drugs have detrimental side effects such as neurodegenerative diseases/mood disorders or, in the case of many antibacterials or anticancer agents, where resistance is a critical limiting factor.

Summary

The paradigmatic change in biomedical and health science research will be a competitive game-changer for the FoM on the St. George campus and will drive a new age of discovery and innovation. For its implementation, it is essential to integrate research areas, new concepts and methods, as well as adopt new technologies derived from physical, mathematical, computational and engineering sciences.

b. SPACE PROGRAM AND FUNCTIONAL PLAN

Space Program

The tables below provide a space program with a total area of 4,440 nasm (7,350 gsm) for the FoM on 2 floors of the MaRS2 Tower. The proposed program anticipates 20 Principal Investigators (PI's) and a complement of researchers, graduate students and staff. The facilities will be dry laboratory and wet laboratory CL2 space.

Total Nominal Space Program		**Proposed Rooms**	**Per unit** (nasm)	**Proposed Space** (nasm)
Dry Lab	Standard Office (PI)	20	12	240
	Standard Office (Tech. Coordinator)	6	12	72
	Carrel Rooms	4	192	768
	Lounge / Kitchenette	2	40	80
	Lockers (240)		0.17	42
	Receiving / Storage	2	30	60
	Conference Room	2	40	80
	Meeting Rooms	4	12	48
Wet Lab CL2	Open Laboratory	2	1,000	2,000
	Special Purpose - Tissue Culture	12	30	360
	Special Purpose - Analytical Rooms	18	30	540
	Service Rooms	10	15	150
	TOTAL	82		4,440

Functional Plan

The research space program is essentially two types of space, namely the *wet laboratory CL2 space* and the *dry laboratory space.* Both floors are intended to be substantially identical with variations only where specific conditions dictate.

Wet Laboratory, CL2: 2 floors, each 1,525 nasm
The wet laboratory, CL2 space will comprise on each floor, a large open concept laboratory supported by fifteen special purpose rooms adjacent to the open laboratory and five service rooms. The open concept laboratory will be contained within one defined area.

11 fume-hoods (four within the Open Laboratory and seven in the Special Purpose rooms) are included in the project. The positioning of the fume-hoods within the Open Laboratory will be similar to the TBEL project and will minimize the length of ducting required for the exhausts.

Other requirements of note include:

- Within the Open Laboratory it is recommended that an internal passageway or corridor could conveniently be used to house the freezers and or fridges thereby using the corridor space to access these facilities. A minimum of 3 ULT freezers per PI is to be provided, depending on space availability. As the TBEL floor layout was based on the provision of 9 freezers and 6 fridges (one floor), this proposed change in equipment will increase cooling loads, requirements for emergency power and will require layout test fits to accommodate the number of freezers identified above.
- Emergency power is required.
- Chemical Storage is required to be provided in the Open Laboratory within chemical storage cabinets.
- The location of all safety deluge showers and eyewash stations in the Open Laboratory need to be carefully optimized. Safety showers to include curtains and drains.

Dry Laboratory: 2 floors, each 695 nasm

The dry laboratory areas comprise all support services and include the offices, carrel space for researchers to write up results etc., meeting rooms, conference room, a lounge / kitchenette, lockers and space to handle deliveries and storage of such items. These support facilities are best located with window exposure in the narrower confines along the building periphery, allowing these areas to benefit from natural light with interior glazing into the corridors and beyond.

Non-assignable Space: 2 floors, each 620 sm allowance

The rentable floor area is ~39,442 sf [3,664 sm] on the 15th floor
The rentable floor area is ~40,017 sf [3,717 sm] on the 16th floor
The difference in these two measurements accounts for all existing core elements: structure, washrooms, elevators, stairs and vertical ducting shafts, etc. The useable area is defined by MaRS to be 2,840 sm per floor, and this will accommodate the required space program plus non-assignable space.

c. Building Considerations

The MaRS Centre Phase 2 tower is located at 661 University Avenue, at College Street within a short walk from the St. George campus and the Faculty of Medicine in particular. It is a new 20 storey research laboratory building with a street level concourse, 2 levels of underground parking and a loading dock that provides receiving and shipping services for Toronto Medical Discovery Tower (TMDT) and MaRS.

Construction of the MaRS Phase 2 Tower was completed in 2013. Current occupants include the Ontario Institute for Cancer Research and Public Health Ontario.

The large floor plate shaped as 2 overlapping rectangles with an offset service core includes 4 passenger elevators and 3 service elevators. The building is a reinforced concrete structure, designed for live loads of 80 psf. The existing clear height (floor to underside of structure) is 13'-2" (4 m), with a 9'-0" (2.74 m) height to ceiling anticipated, rising to 11'-0" (3.4 m) at the perimeter. Greater than 9'-0" is desired where possible and as such, above ceiling coordination drawings should be

included in the consulting fees. Note that a ceiling is required in laboratory space to comply with CL2 classification.

The building exterior utilizes a curtain wall enclosure to allow as much natural light into the building as possible from all compass points. The building was designed as a dedicated research laboratory building.

d. Building Construction

The space is required to be functional and durable and robust with a consistency throughout that can be efficiently maintained. Good quality space that is both attractive and welcoming, the space must feel comfortable, airy, and light. Glazing can and should be used in corridors for light transmission and to achieve an open look, but where required, interior glazed walls should be half-height, above desk or counter level, to hide cables and boxes as well as the backside of computer screens from corridor viewing. With the exception of Microscopy Rooms, natural light is desired in the Special Purpose Rooms and may be achieved with glazing in doors and/or sidelights. All of these requirements are identical to those of TBEL:

Acoustics:

- full-height, acoustic GWB partitions to underside of structure for office and meeting rooms

Networking:

- wireless throughout the facility.
- researchers need to operate on the University of Toronto grid [operate as if they were located on the St. George Campus]. All labs and researchers sites to be networked. There is an existing communications room / closet on the floor.

Emergency Power:

Emergency power is required, specifically for ULT freezers, incubators and selected bio-safety cabinets within all special purpose rooms and within the open laboratory. Emergency power will be located on the roof, and will supply power to the 4 floors (MED4) in MaRS 2.

Interior Glazing:

- half-height glazed walls between open labs and corridors or adjacent dry research spaces
- half-height glazed walls between dry research areas and corridors or adjacent open lab spaces
- sidelights and/or clerestory glass between perimeter offices and other areas.
- glazing in doors and/or sidelights desired for special purpose rooms (except Microscopy)

Finishes:

- high quality, durable finish throughout
- local materials where possible
- durable, attractive hard surface material required in high traffic public spaces
- solid epoxy laboratory bench surfaces
- durable seamless floors in lab and work spaces.

Compressed Air and Vacuum

Laboratories will also require 100 psig compressed air and vacuum in laboratories. It is proposed to house both such facilities within the Supplemental Mechanical Plant and to pipe these services to a number of locations within the Open Laboratory and selected Ante-Rooms.

Natural Gas
Natural Gas is required to be piped into the Open Laboratory and to be provided at each of seven fume-hood locations plus two additional sites within the Open Laboratory

Security, Automation:
Security on the floor needs to conform to the specific building standard. A card reader system that will provide secure access to the open concept laboratory facility with provision for individual researcher access to be granted to selected ante-rooms is anticipated.

Research files are to be stored in secured cabinets within the open concept laboratory and/or special purpose rooms as required.

Display with negative pressure alarm.

Plumbing:

Compressed air, vacuum, natural gas, hot and cold water, RO water with polishing facilities at lab bench sites are to be provided at locations within the Open Laboratory. An RO water facility is to be located in a Service Room, but, depending on the location of the supplemental mechanical plant it might be preferable to locate the RO water facility in this supplemental plant.

Safety showers w/ eyewash stations and drains are required in the Open Lab space(s); eyewash stations may be required in Tissue Culture rooms as well as handwash sinks and lab sinks in each room. Floor drains are not to be provided in special purpose rooms.

Other Lab requirements:

Lab Bench Modules: The Open Laboratory provides for lab bench space and it is a requirement in the design layout to demonstrate the linear footage of bench space that can be achieved with the layout.

Benches: Laboratory Benches are to be movable, but will generally be fixed in position with the ability to move. There will be no sinks installed on the laboratory benches; however, sinks will be required in the Open Laboratory space, either at the end of the island benching or at the perimeter walls. Selected special purpose rooms and / or service rooms will also require sinks. Note: benches will be identical in colour to the benches selected for TBEL for maximum flexibility.

Fume-hoods: It is also required to include11 fume hoods, four within the Open Laboratory and five in the Special Purpose Rooms.

Freezers: It will be necessary to position freezers within the Open Concept Laboratory as well as in a separate freezer corridor or room. Freezer temperature requirements are -150, -80 and -20 degrees Centigrade. A total of 60 freezers should be planned for, depending on space availability.

Glass washing and Autoclave: A separate room is to be provided for glasswashing and autoclave equipment. Gas cylinders: The gases to be used in the facility include: oxygen, nitrogen, propane, carbon dioxide, air, helium and argon. These will be delivered to the site and suitably stored and secured within the Service room until required to be used in either the Open Laboratory and or Special Purpose rooms. All cylinders will be required to be secured when stored and or in use consistent with environmental health and safety guidelines.

Safety Showers: These are required to be distributed throughout the Open Laboratory at regular intervals, accompanied by floor drains. Eyewash stations to be located at sinks.

Stairwell Access: Controlled stairwell access is required at all exit stairs between floors to provide easy access floor to floor for collaboration, including the TBEL floor.

e. Key Building Components

Refer to Appendix B: Schedule "D"

f. Sustainable Design and Energy Conservation (LEED)

The MaRS2 structure conforms to LEED Silver and LEED Silver Certification is a requirement of the lease agreement.

Refer to Appendix B: Tenant Manual

g. Environmental Health and Safety

The laboratory, special purpose rooms and support space design and specifications must comply with all applicable governing body safety regulations, including the University of Toronto's Office of Environmental Health and Safety Lab Protocols and Resources, and Laboratory Hazardous Waste Management and Disposal Guidelines.

All CL2 spaces must satisfy Public Health Agency of Canada's requirements for Containment Level 2 Compliance in accordance with Canadian Biosafety Standards and Guidelines.

TMDT is registered through MaRS with the Ontario Ministry of Environment and has a Certificate of Compliance detailing use of chemicals and base building mechanical systems. Chemical hazards are managed through utilization of variable flow fume hoods and UHN's 'Shut the Sash' program ensures fume hoods are closed when not in use. Chemical storage for hazardous solvents and acids are provided with fume hoods, however additional storage if required is to be provided by research teams. Biological containment is achieved through use of recirculating Biological Safety Class II Cabinets. Loading dock staff receives annual training on the hazards of materials typically received and used in a research laboratory building. Spill kits are maintained and available in the loading dock area.

h. Secondary Effects

Principal Investigators from the Faculty of Medicine are to be identified and vacated space will be reviewed as part of a revision to the Master Plan that takes into account the newly acquired MaRS 2 space. FoM will work with Campus and Facilities Planning in the FoM Master Plan update.

i. Schedule

The following is the proposed project schedule:

CaPS Executive Approval	May 8, 2015
Governing Council Approval	June 25, 2015
Architect/consultant retention	post-CaPS Executive Approval – 2 weeks
Project Design and Documentation	2 months
Tender issue	1 month, August 2015
Contract award	September 2015
Construction	9 months
Occupancy	May 2016; Lease start April 1, 2016, or if earlier, upon occupation

IV. RESOURCE IMPLICATIONS

a. Total Project Cost Estimate

A preliminary construction cost estimate was prepared by Project Development, UPDC and was based on the tendered and awarded TBEL project.

The total estimated cost for the project includes estimates or allowances for:

- Construction
- Contingencies
- Taxes
- Permits and insurance
- Professional fees: architect, engineer, misc. consultants, project management.
- IT and Telecom requirements
- Moving and staging
- Acquiring new lab benching and misc. furnishings
- Miscellaneous costs [security, other]
- Commissioning

The project delivery method will be traditional (Design-Bid-Build), requiring a stipulated lump sum contract.

b. Operating Costs

The total Operating Costs comprise two components, namely i) a Base Rent and ii) an Occupancy Cost. The latter includes the costs dictated by the landlord, specifically conveyed in the terms of the lease agreement, on a cost per rentable square foot for services pertaining to management, cleaning, insurance, maintenance of elevators, washrooms etc. + the cost per rentable square foot of the utilities, specifically the hydro that is required to be independently metered.

Other pertinent Occupancy Costs are realty taxes (from which the University is exempt) and the variable costs pertaining to and anticipated for glass washing, use of vivarium, hazardous waste disposal, and emergency power.

Below, the Base Rent, and the Occupancy Costs for TBEL re-tabulated and compared with Occupancy Costs for on-campus facilities such as the CCBR:

		MaRS2 39,729 rsf[1] (per floor)	**MaRS2 2,220 nasm** (per floor)	**CCBR**
	Cost /rentable sf	Annual cost	Cost /nasm /yr	Cost /nasm /yr
Base Rent (years 1 - 10)[2]	$22.50	$893,903	$403	NIL
Occupancy Costs (Estimated)				
Landlord:	$10.00	$397,290		
Utilities (Hydro):	$12.00	$476,748		
Subtotal	$22.00	$874,038	$394	$392
Total per floor (Base rent plus occupancy costs)	**$44.50**	**$1,767,941**	**$797**	**$392**

[1]rsf - average rentable square feet per floor

[2]Increasing to $30.00 years 11 - 20, $35.00 years 21 - 25

A 25 year lease (plus renewal rights) is currently under negotiation between The Governing Council of the University of Toronto and MaRS Phase 2 Inc. The cost estimate is based on a total of 79,458 rentable square feet, which for the FoM Lab space is equivalent to ~4,440 nasm. The annual cost to operate the FoM Lab space is therefore $3,535,882 and this includes the annual estimated utility cost of $953,496.

c. Funding Sources

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

V. RECOMMENDATIONS

Be it Recommended to the Academic Board:

1. THAT the Report of the Project Planning Committee for the Faculty of Medicine Biomedical Laboratories in the Mars Centre Phase 2 Tower, dated May 6th, 2015, be approved in principle; and,

3. THAT the total project scope of approximately 4,440 net assignable square metres (nasm) (7,382 gross square metres (gsm)) to be funded by a MaRS2 Tenant Allowance, Faculty of Medicine Graduate Expansion Capital Funds, Provost Central Funds and Capital Campaign Funds, be approved in principle.

VI. APPENDICES

A. Floor Plans

B. Draft Offer to Lease (Schedules – available upon request to limited distribution)

C. Total Project Cost Estimate (available upon request to limited distribution)

D. Links to U of T Standards and Policies, and Faculty of Medicine

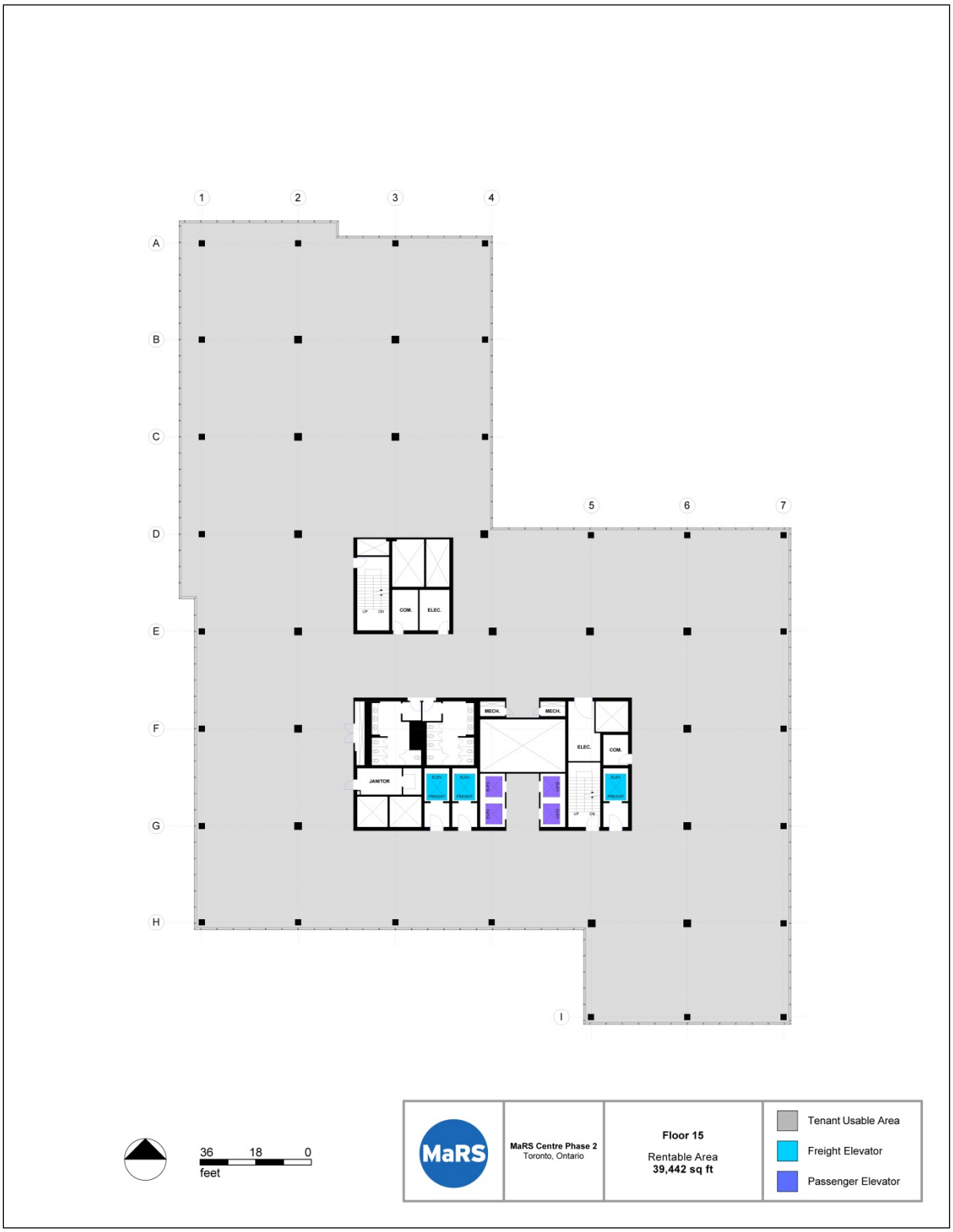
Appendix A. Floor Plans

The floor plate below provides 2,840 nasm for the 2,220 nasm space program and an allowance for non-assignable space: M/E Plant, corridors, and communications room. The plan is based on a 9.6m x 9.6m (31'6" x 31'6") structural bay. The layout below is for the TBEL 14th Floor Plan. The FoM Biomedical Laboratories 15th and 16th Floors have only minor floorplate variations to the 14th Floor. As such, there will be minor variations to the TBEL layout required in the design of the 15th and 16th Floors. These layouts will move forward once consultants are retained.

MaRS 2 14th Floor Plan – TBEL


WET LAB 40 NORTH ENTRANCE
HUMAN STEM CELLS ANTE ROOM (01)
HUMAN STEM CELLS ANTE ROOM (02)
OFFICE
NORTHWEST STUDY CARRELS (02)
CELL LINES ANTE ROOM (03)
WET LABS
MICROSCOPY ANTE ROOM (11)
ANALYTICAL I ANTE ROOM (12)
ANALYTICAL II ANTE ROOM (B)
OFFICE (TECH)
COPY AISLE
WET LAB 40 SOUTH ENTRANCE
LOUNGE
KITCHENETTE
EXIST. STAIR B
MEETING A
EXIST. COMM.
EXIST. ELEC.
CORRIDOR
CONFERENCE ROOM
IT SERVER ROOM
ELECTRICAL
COLD ROOM II (12A)
RADIO LABEL HANDLING ANTE ROOM (11)
SURFACE COATING ELECTRO SPINNING (10)
CHEMICAL DISTILLATION ANTE ROOM (09)
ANALYTICAL I ANTE ROOM (07)
FREEZER / FRIDGES
WET LAB 60 NORTH ENTRANCE
OFFICE (ADMIN)
EXIST. VEST.
EXIST. SERVICE SPACE/GAIN
EXIST. ELEV.
VESTIBULE
COLD ROOM I (12)
ANIMAL PRIMARY CELLS TISSUES ANTE ROOM (04)
ELEV. LOBBY
EXIST. STAIR A
ANALYTICAL ROOM 4
SOUTHWEST STUDY CARRELS (01)
WET LAB 60 CENTRAL ENTRANCE
MECHANICAL ROOM
R.O. WATER (15)
AUTOCLAVE-GLASSWASH
FLY WORK ROOM (16)
GLASSWARE
MICROSCOPY I / DARKROOM (13)
MICROSCOPY II / DARKROOM (14)
WET LAB 60 SOUTH ENTRANCE
GLASSWARE STORAGE (14)
MICROSCOPY III / DARKROOM (15)

MaRS 2 15th Floor Plan



Appendix B. DRAFT Offer to Lease between: MaRS Phase 2 Inc. and Governing Council of the University of Toronto (Schedules only)

SCHEDULE "D"
LANDLORD'S WORK

ARCHITECTURAL

GENERAL BUILDING

- Total building area of 780,000 rentable square feet.
- 20 storey lab/office building, generally designed as 60% lab space and 40% office space.
- Connected to the adjacent MaRS Heritage Building and towers through an aligning atria and concourse Food Court.
- Direct connection to TTC's Queen's Park Subway Station and Toronto General Hospital.
- level underground car parking garage with dedicated bicycle parking and showers.
- Thermally broken high performance unitized aluminum and double-glazed curtain wall with laminated glass accent fins.
- 62' high glazed skylight atrium featuring an illuminated glass ceiling, metal mesh and terracotta walls and stone flooring.
- One of Toronto's most prominent addresses for research and development located within the middle of the Discovery District.
- Building designed to achieve LEED® Silver Certification.

TYPICAL FLOOR

- Area: 38,500 sf to 41,500 sf per floor (rentable)
- Ceiling Heights: Designed for 9' high susp. ceiling (by tenant)
- Planning Module: Average 31'6" x 31'6" bay size
- Window Size: Floor to ceiling glass with 5' x 11 ' high vision glass.
- Core to Window Depth: Generally 51' to 56' with some lower dimensions within the north-south direction

STRUCTURE

- Floor Loading:
    - 80 lbs. per sq. foot (live load).
    - 15 lbs. per sq. foot ceiling and mechanical load allowance.
    - 20 lbs. per sq. foot partition load allowance.

- Poured in place reinforced concrete superstructure. Concrete floors level to have a tolerance of plus or minus 8mm/3metres ready for tenant flooring.

- Shallow floor framing system (typical 12" slab plus 10” drop panels) maximizing available ceiling zone for services distribution.

- Lateral loads resisted entirely by the reinforced concrete core.

MECHANICAL

COOLING

- Enwave Deep Lake Water Cooling System provides environmentally conscious cooling to the building.

- Each floor is provided with valve and capped connections to chilled water risers at two core locations.

- Tenants to utilize the chilled water provided for their own on-floor HVAC system (fan coils, chilled beams, etc.). Tenant supplied HVAC system shall be sized to satisfy space occupancy, lighting allowance, equipment allowance and envelop heat gains.

- Base building lighting and equipment allowance (per floor) for chilled water cooling:

    - Office (40% of typical floor) = 1.2 W/sf + 2 W/sf = 3.2 W/sf
    - Lab (60% of typical floor) = 2 W/sf + 8 W/sf = 10 W/sf

- Roof space and riser sleeves exist for tenants to install their own supplemental air-cooled chilled water systems.

HEATING

- Enwave District Steam provides environmentally conscious heating to the building.

- Each floor is provided with perimeter hot water baseboard heating convectors, each structural grid (approximately 30 feet) is a temperature control zone.

- Hydronic heating is provided by the base building as follows: Valved and capped heating water pipe connections are provided at the building core on each floor for the tenant’s re-heat requirements. The base building ventilation air temperature will be reset down to a minimum of 57F when air-side economizer operation is available. Each floor is provided with a 2” valved and capped piping provisions with an allocation for 43 usgpm/floor. Supply heating water temperature is 140F and return is 120F. Allowable tenant hydronic pressure drop on the system is 40 ft.wg.

PROCESS STEAM

- Each floor is provided with a valved and capped connection to high pressure (+100 psig) steam and high pressure condensate.

AIR HANDLING

- Each floor is provided with connections to central, outdoor air ventilation supply risers at two core locations. Outdoor air is filtered and pre-conditioned for distribution to the tenant’s HVAC system. Ventilation air will vary in temperature throughout the year. Ventilation air will vary

between 57F in the winter to 70F in the summer. The Building Automation System (BAS) will determine the optimal ventilation air temperature to minimize the building's energy consumption as a whole. Outdoor air ventilation system is variable air volume and will require tenant supplied volume control devices.

Outdoor air systems operate on emergency power in the event of a power failure.

- Base building outdoor air ventilation allowance (per floor):
    - Office (40% of typical floor) = 0.2 cfm/sf
    - Lab (60% of typical floor) = 10 ACH based on 9 foot ceiling
    - Net (Typical floor) = 31,000 cfm of tempered outdoor air
- Each floor is provided with connections to central, general laboratory exhaust risers at three core locations. Laboratory exhaust risers are standard galvanized construction. All downstream laboratory exhaust ductwork is supplied and installed by the tenant. General laboratory exhaust systems operate on emergency power in the event of a power failure.
- Base building general laboratory exhaust allowance (per floor):
    - Lab (60% of typical floor) =10 ACH based on 9 foot ceiling
    - Net (Typical floor) = 29,700 cfm of exhaust
- Central outdoor air ventilation system and general laboratory exhaust system form part of the Ontario Building Code prescribed "Smoke Control" and "Venting to Aid Fire Fighting" systems. As such, smoke dampers connected to the building fire alarm system are located at each floor connection. Any modifications to the systems must be tested and coordinated with the building fire safety systems.
- Roof space and riser sleeves (350 mm) exist for Landlord to offer tenant installation of two (2) special exhaust systems (duct and fan) per typical floor.

PLUMBING AND DRAINAGE

- Each floor is provided with a valved and capped connection at one location at the core for domestic water service. Downstream domestic water distribution and domestic heating water system for on-floor use (except base building washrooms) shall be supplied and installed by the tenant. Base building domestic water allowance (per floor):
    - One 38 mm (1-1/2 inch) connection
- Each floor is provided with a valved and capped connection at two locations at the core for laboratory water service. Laboratory water service is City water and will require tenant provided backflow prevention devices. Any downstream purification systems would be supplied and installed by the tenant. Downstream domestic water distribution and domestic heating water system for on-floor use shall be supplied and installed by the tenant. Base building laboratory water allowance (per floor):
    - Two at 32 mm (1-1/4 inch) connection
- Each floor is provided with a valved and capped connection at one location at the core for natural gas. Base building natural gas allowance (per floor) at 7" - 14" of water column:
    - One 38 mm (1-1/2 inch) connection

- Each floor is provided with a capped connection to sanitary drain and vent at one location at the core.

- Each floor is provided with capped connections to the laboratory drainage and vent risers located at 8 locations on the floor (at columns). The laboratory drainage material is polypropylene. The laboratory drainage risers connect to a central acid neutralization system (consisting of solids interceptors and acid neutralization tanks) prior to discharge to City drains.

- Each floor is provided with capped connections to a radio-isotopic drainage and vent riser located at one location on the floor. The radio-isotopic drainage material is borosilicate glass. The radio-isotopic riser connects to the main building sanitary at the location of exit from the building.

- Tenant is allowed to install purified water systems, specialty lab gases, lab compressed air, or lab vacuum as required within the mechanical chases.

BUILDING METERING AND AUTOMATION

- All base building systems including perimeter heating are controlled through the base building BAS system.
-
- Tenant shall provide on-floor control system and provide BACNET interface at Tier 1 level to interface with base building control system.

- Tenant shall provide meters to building specifications to connect to the base building system for measuring electricity, chilled water, steam, domestic water, and natural gas consumption.

FIRE PROTECTION

- Provide a wet sprinkler system and standpipe system to be designed and installed in accordance with the OBC and NFC and the NFPA requirements for tenant occupancy.

- Provide on-floor sprinkler system to the tenant based on open ceiling. Tenant shall modify to suit layouts. Sprinkler coverage shall meet base building Ontario Building Code requirements.

ELEVATORS AND ESCALATORS

- 3 Low Rise Passenger Elevators: Serving Floors – Ground, 2 to 6 with a rated speed of 350 fpm and design carrying capacity of 3,500 lb or 26 persons.

- 4 Mid-Rise Passenger Elevators; Serving Floors – Ground, 6 to 13 with a rated speed of 500 fpm and designed carrying capacity of 3,500 lb or 26 persons.

- 4 High Rise Passenger Elevators; Serving Floors – Ground, 13 to 20 with a rated speed of 800 fpm and designed carrying capacity of 3,500 lb or 26 persons

- 2 Parking Passenger Shuttles: Serving Floors - P2, P1 and Ground, with a rated speed of 125 fpm and designed carrying capacity of 3,500 lb or 26 persons.

- 1 TTC Barrier Free Passenger Access Shuttle: Serving Floors P1 and Ground with a rated speed of 125 fpm and designed carrying capacity of 2,500 lb or 19 persons.

- 2 Dedicated Service Elevators: Serving Floors - Ground, 2 to 20 with a rated speed of 350 fpm and a designed capacity of 4,500 lbs or 33 persons. These cars are designed to

accommodate power truck concentrated loading. Cab interior size 5'4” wide x 8’7” deep. Although duplex in configuration these two (2) service elevators are contained within their own separate hoistways and related elevator lobbies. Each car operates in a simplex mode of operation with its own dedicated hall call push button riser.

- 1 Dedicated Service Elevator: Serving floors - P2, P1, Ground, Mezzanine, 2 to 20 and 21 (Penthouse) with a rated speed of 450 fpm and a designed capacity of 4,500 lbs or 33 persons. This car is designed to accommodate power truck concentrated loading. Cab interior size 5'4" wide x 8'7" deep. This car is designated as the fire-fighters' car.

- 2 Escalators: Serving floors - P1 (TTC connection) to Ground. Escalators are double lane type, 48" wide balustrade or hip width, 100 fpm operating speed, Heavy Duty Type with solid balustrade construction.

- All passenger elevators equipped to accommodate card reader access provisions, CCTV camera monitoring, and centralized remote control.

- All service elevators equipped with card reader access provisions, CCTV camera monitoring, and centralized remote control.

- All elevators equipped with an automatic emergency recall feature to react to building fire alarm conditions, emergency power operation and two-way duplex emergency voice communication. All elevators and escalators designed in accordance with the latest adopted edition of ASME A17.1/CSA B-44 and all other applicable code requirements including TSSA.

ELECTRICAL

LIGHTING

- Provisions for Tenant supplied 347 volt lighting system.

- Centrally controlled low voltage lighting control system with one relay panel in the north electrical room of each floor (system can be expanded to accommodate additional tenant supplied panels).

POWER

- Base building lighting and equipment allowance (per floor):
  - Office (40% of typical floor) = 1.2 (lighting) W/sf + 2 (equipment) W/sf = 3.2 W/sf

- For a lab/office use mix:
  - Lab (60% of typical floor) = 1.2 (lighting) W/sf + 8 (equipment) W/sf= 9.2 W/sf
  - Office (40% of typical floor)= 1.2 (lighting) W/sf + 2 (equipment) W/sf = 3.2 W/sf

EMERGENCY POWER GENERATING SYSTEM

- One 2,000 kW Diesel Generator, located in the penthouse, supports all of the life safety loads and critical base building loads.

- One 2,000 kW diesel generator, located in the penthouse, is available for the Landlord to offer power to Tenants at designated rates.

- Provisions exist within the penthouse for the addition of an additional diesel generator to offer power to Tenants at designated rates.

ELECTRONIC TENANT METERING SYSTEM

- In each electrical room, connection points to the base building metering system have been provided for the monitoring of tenant loads.
- Tenant is to provide all transducers and electronic metering devices for connection to the base building system.

FIRE ALARM

- Two Stage Addressable fire alarm system which is expandable for tenant connection points or for dedicated tenant panels.

- Speakers in the typical floor space are provided at a rate of 1 speaker per structural bay. The base building master fire alarm system will be capable of handling additional speakers as required.

So long as the building is not approved by the City of Toronto for occupancy and the landlord is the Constructor, the Landlord will provide a fire watch on the Tenant's floor as required at no cost to the Tenant until sprinkler system is approved by the City of Toronto.

LEED Requirements
Tenant Manual

Office Premises

In order to preserve the Landlord's LEED certification of the base building, the tenant must comply with the credit requirements listed below. To ensure LEED requirements specified within this manual are properly integrated into tenant fit-up, the Landlord's consultant will review and approve tenant drawings at tenant cost.

Carbon Dioxide Monitoring

The Tenant must install a permanent carbon dioxide monitoring system that provides feedback on space ventilation performance to ensure that ventilation systems maintain design minimum ventilation requirements and in a form that affords operational adjustments. The Tenant must configure all monitoring equipment to generate an alarm if underventilation is detected, via either a building automation system alarm to the building operator or via an alarm that alerts building occupants.

For Mechanically Vented Spaces: Monitor carbon dioxide concentrations within all densely occupied spaces (those with a design occupant density great than or to 25 people per 93 m_2 (1,000 SF). CO2 Monitoring locations shall be between 0.9 m (3 ft) and 1.8 m (6 ft) above the floor. For each mechanical ventilation system serving non-densely occupied spaces, provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor airflow rate with an accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2004.

Daylight & Views – Views for 90% of Spaces

The Tenant shall achieve a direct line of sight to the outdoor environment via vision glazing between 0.76m and 2.3m above finish floor for building occupants in 90% of all regularly occupied areas. Areas directly connected to perimeter windows must have a glazing-to-floor area ratio of at least 0.07. Determine the area with direct line of sight by totalling the regularly occupied square footage that meet the following criteria:

- In plan view, the area is within sight lines drawn from perimeter vision glazing.
- In section view, a direct sight line can be drawn from the area to perimeter vision glazing at a recommended height of 1.1 m, representing the average seated height, or at an otherwise appropriate height as determined by the design team.

Line of sight may be drawn through interior glazing. For private offices, the entire square footage of the office can be counted if 75% or more of the area has direct line of sight to perimeter vision glazing. In all other cases, if the view area of any applicable room exceeds 90%, the entire square footage of the room can be counted.

Lighting Controls

In all perimeter non-lab areas (offices, meeting rooms, support areas, etc.) provide continuous dimming daylight sensors to control the lighting fixtures within an area 15' from the windows. In all perimeter lab areas provide occupancy sensors. In all core areas (defined as more than 15' from the windows), provide occupancy sensors.

Office Ventilation Controls

For non-lab systems, for each compartment unit or for each fan coil provide a constant volume box and associated controls capable of limiting the outdoor air rate to the minimum required by ASHRAE 62.1-2004 as calculated by the ventilation rate procedure. For each VAV terminal box (in the case of

compartment units) or for each fan coil unit, provide a CO2 sensor and associated controls to implement demand control ventilation.

Office HVAC Systems

For non-lab compartment unit systems, provide NEMA premium efficiency fan motors and limit the compartment unit static pressure to 3". For non-lab fan coil systems provide ECM ("brushless") motors.

Lighting Density Allowance

The building and its systems have been designed to perform efficiently and to reduce environmental and economic impact associated with excessive energy use. The Tenant must provide lighting with a maximum lighting power density of 1.2 W/sf in lab and office spaces.

Lab Premises

In order to preserve the Landlord's targeted LEED certification of the base building, the tenant must comply with the credit requirements listed below. To ensure LEED requirements specified within this manual are properly integrated into tenant fit-up, the Landlord's consultant will review and approve tenant drawings at tenant cost.

Carbon Dioxide Monitoring

The Tenant must install a permanent carbon dioxide monitoring system that provides feedback on space ventilation performance to ensure that ventilation systems maintain design minimum ventilation requirements and in a form that affords operational adjustments. The Tenant must configure all monitoring equipment to generate an alarm if underventilation is detected, via either a building automation system alarm to the building operator or via an alarm that alerts building occupants.

For Mechanically Vented Spaces: Monitor carbon dioxide concentrations within all densely occupied spaces (those with a design occupant density great than or to 25 people per 93 m_2 (1,000 SF). CO2 Monitoring locations shall be between 0.9 m (3 ft) and 1.8 m (6 ft) above the floor. For each mechanical ventilation system serving non-densely occupied spaces, provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor airflow rate with an accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2004.

Daylight & Views – Views for 90% of Spaces

The Tenant shall achieve a direct line of sight to the outdoor environment via vision glazing between 0.76m and 2.3m above finish floor for building occupants in 90% of all regularly occupied areas. Areas directly connected to perimeter windows must have a glazing-to-floor area ratio of at least 0.07. Determine the area with direct line of sight by totalling the regularly occupied square footage that meet the following criteria:

- In plan view, the area is within sight lines drawn from perimeter vision glazing.
- In section view, a direct sight line can be drawn from the area to perimeter vision glazing at a recommended height of 1.1 m, representing the average seated height, or at an otherwise appropriate height as determined by the design team.

Line of sight may be drawn through interior glazing. For private offices, the entire square footage of the office can be counted if 75% or more of the area has direct line of sight to perimeter vision glazing. In all other cases, if the view area of any applicable room exceeds 90%, the entire square footage of the room can be counted.

Lighting Controls

In all perimeter non-lab areas (offices, meeting rooms, support areas, etc.) provide continuous dimming daylight sensors to control the lighting fixtures within an area 15' from the windows. In all perimeter lab areas provide occupancy sensors. In all core areas (defined as more than 15' from the windows), provide occupancy sensors.

Fume Hood Controls – Lab Tenant Only

Provide fume hoods capable of varying the exhaust rate. The base building ventilation and exhaust systems are variable airflow systems. Tenant ventilation and exhaust airflow must be controlled to minimize ventilation use. Tenant pressure independent variable airflow control devices are required to:

a) regulate ventilation air to office occupancies to meet ASHRAE 62.1. (CO_2 controlled demand based ventilation).
b) regulate ventilation air to laboratories to maintain minimum air change rates.
c) regulate ventilation air to laboratories to maintain fume hood face velocity.
d) regulate ventilation air to laboratories to maintain space temperature control.
e) Fume hoods are to be provided with variable air flow control based upon sash position.
f) Ventilation rates are required to be controlled to different criteria depending upon occupied and unoccupied modes of operation.
g) Measurement and verification communication capability with the BAS is required as outlined within the TLIM.
Air distribution static pressures and ventilation air flow rates are required to be communicated to the BAS for all zones.
h) Tenant controls systems are required to be integrated with the BAS. The use of BACnet IP or Ethernet protocol is required. BACnet MS-TP systems will be considered as long as all points are mapped to the BAS. The tenant is responsible for the cost of using the base building controls vendor for all controls integration.

Heating and Cooling utility costs will be paid for by the tenant. It is in the best interest of the tenant to minimize the use of ventilation air. The tenant is encouraged to implement additional strategies such as fume hood occupancy sensors or other technologies to minimize energy use.

Office Ventilation Controls

For non-lab systems, for each compartment unit or for each fan coil provide a constant volume box and associated controls capable of limiting the outdoor air rate to the minimum required by ASHRAE 62.1-2004 as calculated by the ventilation rate procedure. For each VAV terminal box (in the case of compartment units) or for each fan coil unit, provide a CO_2 sensor and associated controls to implement demand control ventilation.

Office HVAC Systems

For non-lab compartment unit systems, provide NEMA premium efficiency fan motors and limit the compartment unit static pressure to 3". For non-lab fan coil systems provide ECM ("brushless") motors.

Lighting Density Allowance

The building and its systems have been designed to perform efficiently and to reduce environmental and economic impact associated with excessive energy use. The Tenant must provide lighting with a maximum lighting power density of 1.2 W/sf in lab and office spaces.

Appendix C. Total Project Cost Estimate

(available upon request to limited distribution)

Appendix D. Links

U of T Standards and Policies
www.fs.utoronto.ca/standards_and_policies/design.htm

U of T Environmental Health and Safety
www.ehs.utoronto.ca

Faculty of Medicine
http://www.medicine.utoronto.ca/

U of T Medicine
Strategic Academic Plan 2011-16, Research Strategic Plan 2012-17, Strategic Implementation
http://www.medicine.utoronto.ca/about-faculty-medicine/strategic-priorities

Faculty of Medicine Facilities Master Plan 2012
Available upon request

Faculty of Medicine Master Plan 2014
Available upon request